



# LM Guide®

**THK** General Catalog

# LM Guide

THK General Catalog

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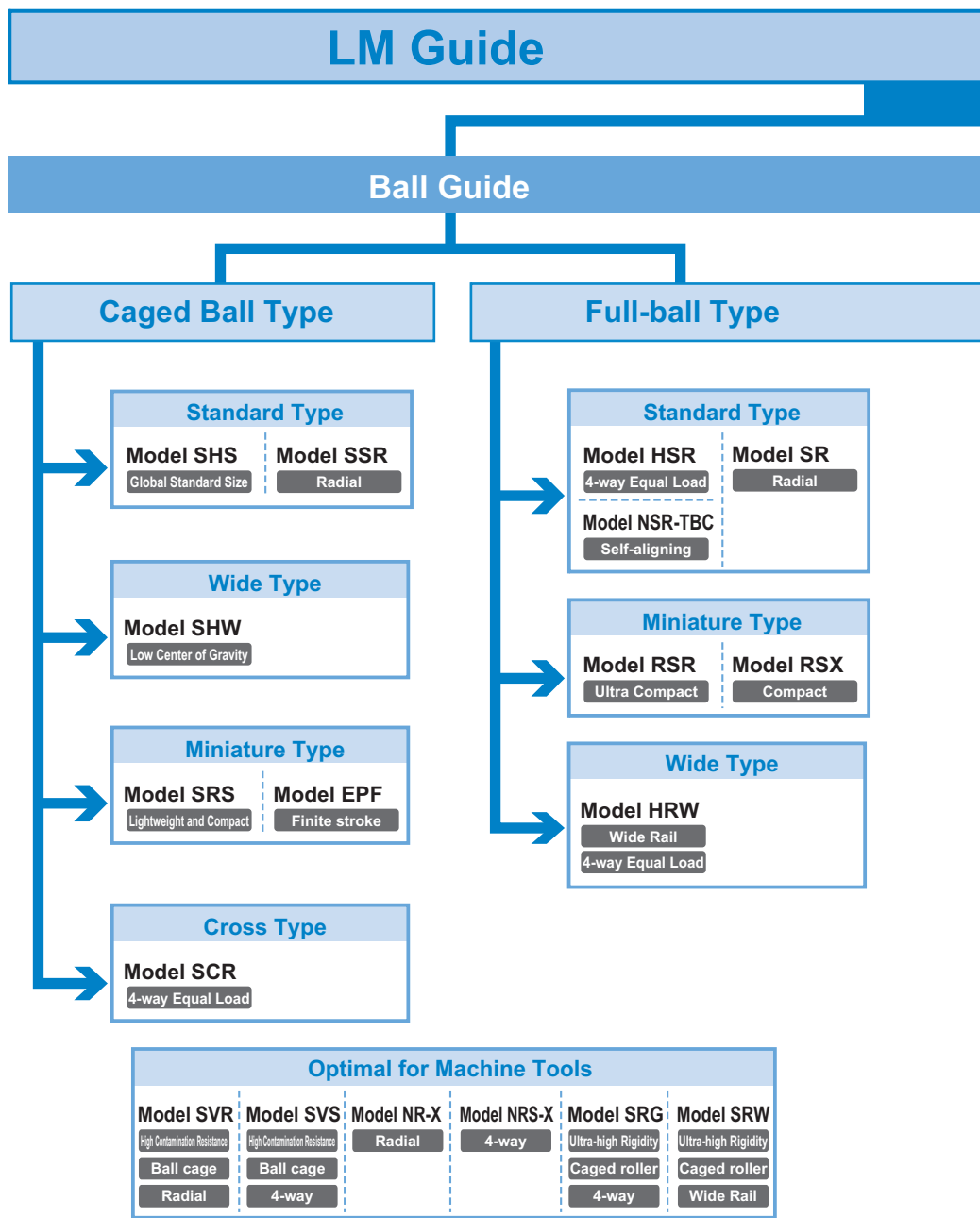
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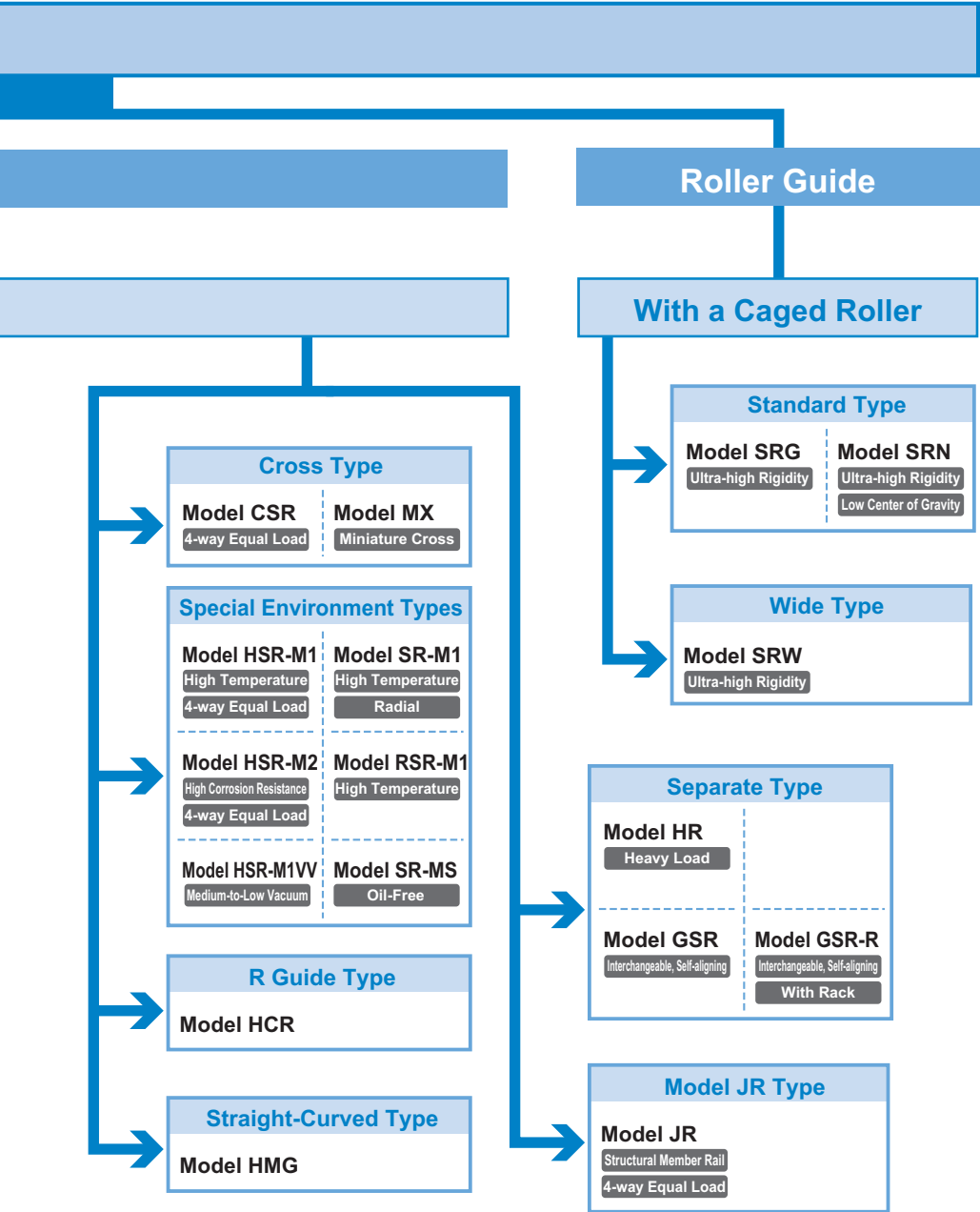
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| <b>Dedicated bellows</b> .....                      | B1-112 |
| <b>Dedicated LM Cover</b> .....                     | B1-112 |
| <b>Dedicated Cap for LM Rail Mounting Holes</b> ..  | B1-113 |
| <b>Plate Cover SV Steel Tape SP</b> .....           | B1-115 |
| <b>QZ Lubricator</b> .....                          | B1-118 |
| <b>Lubrication Adapter</b> .....                    | B1-121 |
| <b>Removing/mounting Jig</b> .....                  | B1-122 |
| <b>End Piece EP</b> .....                           | B1-123 |

|                             |        |
|-----------------------------|--------|
| <b>Model No.</b> .....      | B1-124 |
| • Model Number Coding ..... | B1-124 |
| • Notes on Ordering .....   | B1-128 |

|                                                                        |        |
|------------------------------------------------------------------------|--------|
| <b>Precautions on Use</b> .....                                        | B1-130 |
| <b>Precautions on Using the LM Guide</b> .....                         | B1-130 |
| <b>Precautions on Handling the LM Guide for Special Environment</b> .. | B1-132 |
| • LM Guide for Medium-to-Low Vacuum ....                               | B1-132 |
| • Oil-Free LM Guide .....                                              | B1-132 |
| <b>Precautions on Using Options for the LM Guide</b> ..                | B1-133 |
| • QZ Lubricator for the LM Guide .....                                 | B1-133 |
| • Laminated Contact Scraper LaCS, Side Scraper for LM Guides ..        | B1-133 |
| • Light Contact Seal LiCS for LM Guides ..                             | B1-134 |
| • High Chemical Resistance Fluorine Seal FS for the LM Guide ..        | B1-134 |
| • Cap GC .....                                                         | B1-134 |

# Classification Table of the LM Guides

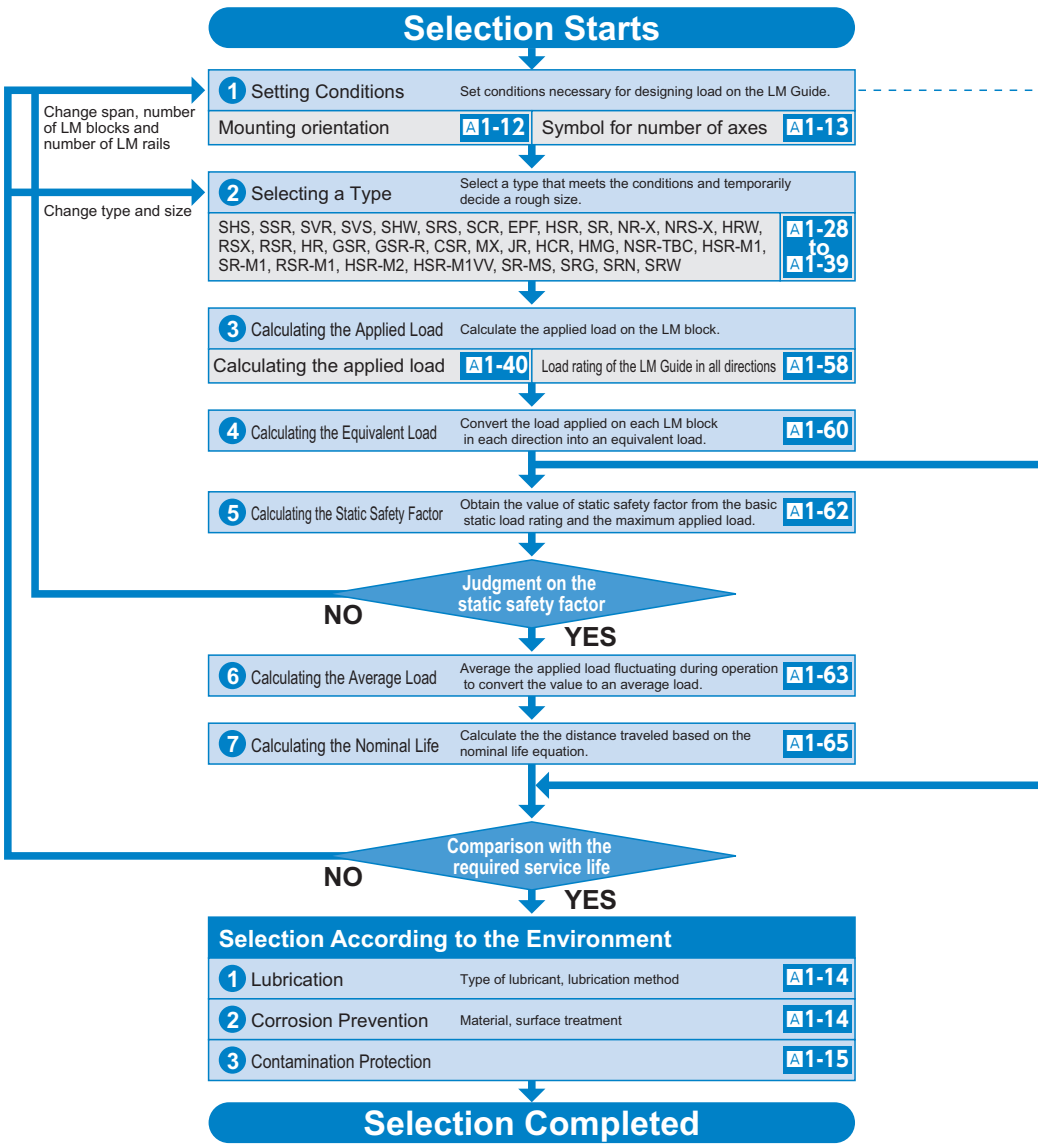




# Flowchart for Selecting an LM Guide

[Steps for Selecting an LM Guide]

The following flowchart can be used as reference for selecting an LM Guide.



- Space in the guide section
- Dimensions (span, number of LM blocks, number of LM rails, thrust)
- Installation direction (horizontal, vertical, slant mount, wall mount, suspended)
- Magnitude, direction and position of the working load
- Operating frequency (duty cycle)
- Speed (acceleration)
- Stroke length
- Required service life
- Precision of motion
- Environment
- In a special environment (vacuum, clean room, high temperature, environment exposed to contaminated environment, etc.), it is necessary to take into account material, surface treatment, lubrication and contamination protection.

| Prediction the Rigidity                    |        |
|--------------------------------------------|--------|
| ① Selecting a Radial Clearance (Preload)   | A1-69  |
| ② Service Life with a Preload Considered   | A1-70  |
| ③ Rigidity                                 | A1-70  |
| ④ Radial Clearance Standard for Each Model | A1-71  |
| ⑤ Designing the Guide System               | A1-454 |

| Determining the Accuracy                         |        |
|--------------------------------------------------|--------|
| ① Accuracy Standards                             | A1-74  |
| ② Guidelines for Accuracy Grades by Machine Type | A1-75  |
| ③ Accuracy Standard for Each Model               | A1-76~ |

# Setting Conditions

## Conditions of the LM Guide

### [Mounting Orientation]

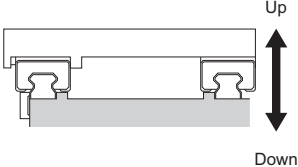
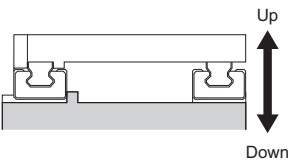
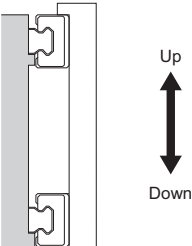
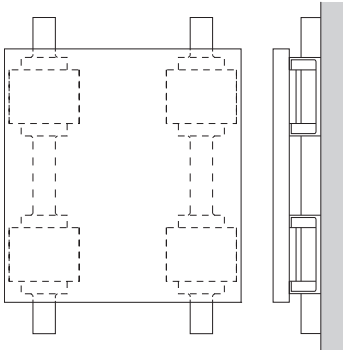
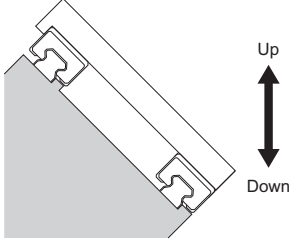
The LM Guide can be mounted in the following 5 orientations.

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

Be sure to let THK know the mounting orientation and the exact position in each LM block where the grease nipple or the piping joint should be attached.

For the lubrication, see **A24-2**.

### [Mounting Orientation]

| Horizontal (symbol: H)                                                             | Inverted (symbol: R)                                                              | Wall mount (symbol: K)                                                              |
|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|    |  |    |
| Vertical (symbol: V)                                                               |                                                                                   | Slant mount (symbol: T)                                                             |
|  |                                                                                   |  |

[Symbol for Number of Axes]

If two or more units of the LM Guide are parallelly used in combination on the same plane, specify the number of the LM rails (symbol for number of axes) used in combination in advance.  
(For accuracy standards and radial clearance standards, see **A1-76** and **A1-71**, respectively.)

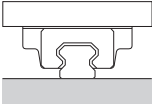
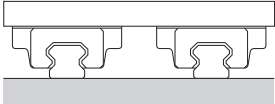
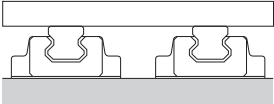
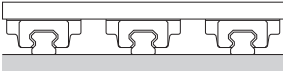
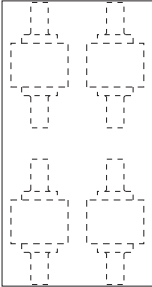
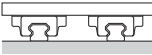
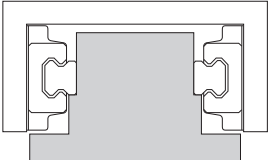
Model number coding

**SHS25C2SSCO+1000LP - II**

Model number (details are given on the corresponding page of the model)

Symbol for number of axes  
("II" indicates 2 axes. No symbol for a single axis)

[Symbol for Number of Axes]

| Symbol for number of axes: none                                                                                                                                                                         | Symbol for number of axes: II                                                                                                                                                                                                                                                              | Symbol for number of axes: II                                                                                                                                                                          |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Required number of axes: 1</p>                                                                                      | <p>Required number of axes: 2</p>  <p>Note:<br/>When placing an order, specify the number in multiple of 2 axes.</p>                                                                                      | <p>Required number of axes: 2</p>  <p>Note:<br/>When placing an order, specify the number in multiple of 2 axes.</p> |
| Symbol for number of axes: III                                                                                                                                                                          | Symbol for number of axes: IV                                                                                                                                                                                                                                                              | Other                                                                                                                                                                                                  |
| <p>Required number of axes: 3</p>  <p>Note:<br/>When placing an order, specify the number in multiple of 3 axes.</p> | <p>Required number of axes: 4</p>   <p>Note:<br/>When placing an order, specify the number in multiple of 4 axes.</p> | <p>Required number of axes: 2</p>  <p>Using 2 axes opposed to each other</p>                                       |

## [Service environment]

### ● Lubrication

When using an LM system, it is necessary to provide effective lubrication. Without lubrication, the rolling elements or the raceway may be worn faster and the service life may be shortened.

A lubricant has effects such as the following.

- (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 to prevent rust formation.

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

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

Be sure to let THK know the mounting orientation and the exact position in each LM block where the grease nipple or the piping joint should be attached. For the mounting orientations of LM Guides, see **A1-12**. For the lubrication, see **A24-2**.

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 service conditions.

### ● Corrosion Prevention

#### ■Determining a Material

Any LM system requires a material that meets the environments. For use in environments where corrosion resistance is required, some LM system models can use martensite stainless steel.

(Martensitic stainless steel can be used for LM Guide models SHS, SSR, SHW, SRS, HSR, SR, HRW, RSX, RSR and HR.)

The HSR series includes HSR-M2, a highly corrosion resistant LM Guide using austenite stainless steel, which has high anti-corrosive effect. For details, see **A1-386**.

#### ■Surface Treatment

The surfaces of the rails and shafts of LM systems can be treated for anti-corrosive or aesthetic purposes.

THK offers THK-AP treatment, which is the optimum surface treatment for LM systems.

There are roughly three types of THK-AP treatment: AP-HC, AP-C and AP-CF. (See **B0-20**.)

### ● Contamination Protection

When foreign material enters an LM system, it will cause abnormal wear or shorten the service life, and it is necessary to prevent foreign material from entering the system. When entrance of foreign material is predicted, it is important to select an effective sealing device or dust-control device that meets the environment conditions.

THK offers contamination protection accessories for LM Guides by model number, such as end seals made of special synthetic rubber with high wear resistance, and side seals and inner seals for further increasing dust-prevention effect.

In addition, for locations with adverse environment, Laminated Contact Scraper LaCS and dedicated bellows are available by model number. Also, THK offers dedicated caps for LM rail mounting holes, designed to prevent cutting chips from entering the LM rail mounting holes.

When it is required to provide contamination protection for a Ball Screw in an environment exposed to cutting chips and moisture, we recommend using a telescopic cover that protects the whole system or a large bellows.

For the options, see **A1-482**.

# Clean Room

In a clean environment generation of dust from the LM system has to be reduced and anti-rust 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-CA and AFF Grease**

Use environmentally clean grease that produces little dust.

■ **Measure to Reduce Dust Generation Resulting from Metallic Abrasion Dust**

**Caged Ball LM Guide**

Use 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 martensite stainless steel, which has corrosion resistant effect.

**Highly Corrosion Resistant LM Guide**

It uses austenite stainless steel, which has a high corrosion resistant effect, in its LM rail.

■ **Measure Through Surface Treatment**

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

The LM system is surface treated to increase corrosion resistance.

## Caged Ball LM Guide

 SHS SSR SVR/SVS  
SHW SRS SCR EPF

## Caged Roller LM Guide

 SRG SRN SRW

## Stainless Steel LM Guide

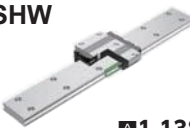
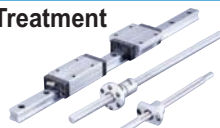
 SHS SSR SHW SRS HSR  
SR HRW HR RSX RSR

## LM Guides for Special Environment

 High Corrosion Resistance HSR-M2  
Oil-Free SR-MS

## Surface Treatment

## Grease

|                                                                                                                                                |                                                                                                                                            |                                                                                                                                         |                                                                                                                                |                                                                                                                                |
|------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| <div>SHS</div> <div></div> <div>A1-92</div>                   | <div>SSR</div> <div></div> <div>A1-104</div>              | <div>SVR/SVS</div> <div></div> <div>A1-118</div>       | <div>SHW</div> <div></div> <div>A1-138</div> |                                                                                                                                |
| <div>SRS</div> <div></div> <div>A1-148</div>                  | <div>SCR</div> <div></div> <div>A1-164</div>              | <div>EPF</div> <div></div> <div>A1-172</div>           |                                                                                                                                |                                                                                                                                |
| <div>SRG</div> <div></div> <div>A1-412</div>                  | <div>SRN</div> <div></div> <div>A1-432</div>              | <div>SRW</div> <div></div> <div>A1-446</div>          |                                                                                                                                |                                                                                                                                |
| <div>SHS</div> <div></div> <div>A1-92</div>                   | <div>SSR</div> <div></div> <div>A1-104</div>              | <div>SHW</div> <div></div> <div>A1-138</div>           | <div>SRS</div> <div></div> <div>A1-148</div>  | <div>HSR</div> <div></div> <div>A1-180</div> |
| <div>SR</div> <div></div> <div>A1-210</div>                   | <div>HRW</div> <div></div> <div>A1-242</div>              | <div>HR</div> <div></div> <div>A1-272</div>            | <div>RSX</div> <div></div> <div>A1-252</div>  | <div>RSR</div> <div></div> <div>A1-262</div> |
| <div>HSR-M2</div> <div></div> <div>A1-386</div>              | <div>SR-MS</div> <div></div> <div>A1-400</div>           |                                                                                                                                         |                                                                                                                                |                                                                                                                                |
| <div>THK AP-HC Treatment</div> <div></div> <div>B0-20</div> |                                                                                                                                            |                                                                                                                                         |                                                                                                                                |                                                                                                                                |
| <div>THK AFE-CA Grease</div> <div></div> <div>A24-13</div>  | <div>THK AFF Grease</div> <div></div> <div>A24-15</div> | <div>L100 Grease</div> <div></div> <div>A24-25</div> |                                                                                                                                |                                                                                                                                |

## Vacuum

In a vacuum environment, measures are required to prevent gas from being emitted from a resin and the scattering of grease. Anti-rust 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

The endplate (ball circulation path normally made of resin) of the LM block is made of stainless steel 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 lubricity. Therefore, use a vacuum grease that uses fluorine based oil, whose vapor pressure is low, as the base oil.

### ■ Corrosion Prevention

#### Stainless Steel LM Guide

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

#### High Temperature LM Guide

If high temperature is predicted 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 austenite stainless steel, which has a high anti-corrosion effect, in the LM rail.

## Oil-Free

In environments susceptible to liquid lubricants, a lubrication method other than grease or oil is required.

### ■ Dry Lubricant

#### Dry Lubrication S-Compound Film

Dry Lubrication S-Compound Film is a fully dry lubricant developed for use under atmospheric to high-vacuum environments. It has superior characteristics in load carrying capacity, wear resistance and sealability to other lubrication systems.

## High Temperature LM Guide



HSR-M1 SR-M1  
RSR-M1

## LM Guides for Special Environment



For Medium-to-Low Vacuum HSR-M1VV  
Oil-Free SR-MS

## Highly Corrosion Resistant LM Guide

## Stainless Steel LM Guide



HSR SR HRW HR  
RSX RSR

## Vacuum Grease

## Oil-Free LM Guide

HSR-M1



A1-350

SR-M1



A1-366

RSR-M1



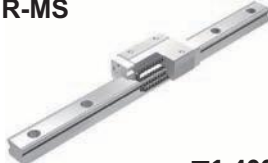
A1-376

HSR-M1VV



A1-392

SR-MS



A1-400

HSR-M2



A1-386

HSR



A1-180

SR



A1-210

HRW



A1-242

HR



A1-272

RSX



A1-252

RSR



A1-262

SR-MS



A1-400

# 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 martensite stainless steel, which has an anti-corrosion effect.

### **Highly Corrosion Resistant LM Guide**

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

## ■ Measure Through Surface Treatment

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

The LM system is surface treated to increase corrosion resistance.

## Stainless Steel LM Guide



SHS SSR SHW SRS HSR  
SR HRW HR RSX RSR

## Highly Corrosion Resistant LM Guide

## Surface Treatment

|                                                                                                                                                |                                                                                                                               |                                                                                                                               |                                                                                                                                |
|------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| <div>SHS</div> <div></div> <div>A1-92</div>                   | <div>SSR</div> <div></div> <div>A1-104</div> | <div>SHW</div> <div></div> <div>A1-138</div> | <div>SRS</div> <div></div> <div>A1-148</div> |
| <div>HSR</div> <div></div> <div>A1-180</div>                  | <div>SR</div> <div></div> <div>A1-210</div>  | <div>HRW</div> <div></div> <div>A1-242</div> | <div>HR</div> <div></div> <div>A1-272</div>  |
| <div>RSX</div> <div></div> <div>A1-252</div>                  | <div>RSR</div> <div></div> <div>A1-262</div> |                                                                                                                               |                                                                                                                                |
| <div>HSR-M2</div> <div></div> <div>A1-386</div>               |                                                                                                                               |                                                                                                                               |                                                                                                                                |
| <div>THK AP-HC Treatment</div> <div></div> <div>B0-20</div>  |                                                                                                                               |                                                                                                                               |                                                                                                                                |
| <div>THK AP-C Treatment</div> <div></div> <div>B0-20</div>  |                                                                                                                               |                                                                                                                               |                                                                                                                                |
| <div>THK AP-CF Treatment</div> <div></div> <div>B0-20</div> |                                                                                                                               |                                                                                                                               |                                                                                                                                |

# 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.

### THK AFA Grease, AFJ Grease

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

## ■ Measure to Improve Lubrication

### QZ Lubricator

Continuous oil lubrication ensures that 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 Guide

Supported models

SHS SSR SVR/SVS  
SHW SRS SCR EPF

## Caged Roller LM Guide

Supported models

SRG SRN SRW

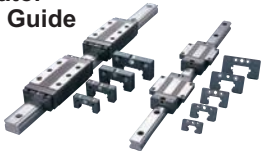
## QZ Lubricator

## Grease

|                                                                                                                  |                                                                                                                  |                                                                                                                      |                                                                                                                   |
|------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>SHS</b><br><br><b>A1-92</b>  | <b>SSR</b><br><br><b>A1-104</b> | <b>SVR/SVS</b><br><br><b>A1-118</b> | <b>SHW</b><br><br><b>A1-138</b> |
| <b>SRS</b><br><br><b>A1-148</b> | <b>SCR</b><br><br><b>A1-164</b> | <b>EPF</b><br><br><b>A1-172</b>     |                                                                                                                   |

|                                                                                                                  |                                                                                                                  |                                                                                                                  |
|------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| <b>SRG</b><br><br><b>A1-412</b> | <b>SRN</b><br><br><b>A1-432</b> | <b>SRW</b><br><br><b>A1-446</b> |
|------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|

**QZ Lubricator  
for the LM Guide**



**A1-509**

|                                                                                                                              |                                                                                                                               |
|------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| <b>THK AFA Grease</b><br><br><b>A24-7</b> | <b>THK AFJ Grease</b><br><br><b>A24-21</b> |
|------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|

## High Temperature

In a high temperature environment, dimensional alterations caused by heat is problematic. Use a High Temperature LM Guide, which is heat resistant and has minimal dimensional alterations after being heated. Also, use a high temperature grease.

### ■ Heat Resistance

#### High Temperature LM Guide

A special heat treatment to maintain dimensional stability minimizes dimensional variations due to heating and cooling.

### ■ Grease

#### High Temperature Grease

Use a high temperature grease with which the rolling resistance of the LM system is consistent even at high temperature.

## Low Temperature

In a low temperature environment, use an LM system with a minimal amount of resin components and a grease that minimize fluctuations in rolling resistance, 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 is consistent even at low temperature.

## Micro Motion

Micro strokes cause the oil film to break, resulting in poor lubrication and 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.

## High Temperature LM Guide

Supported models

HSR-M1 SR-M1 RSR-M1  
HSR-M1VV

## High Temperature Grease

## Stainless Steel LM Guide

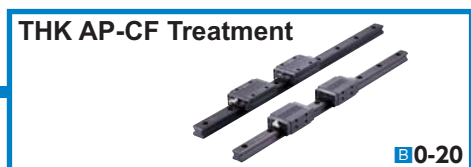
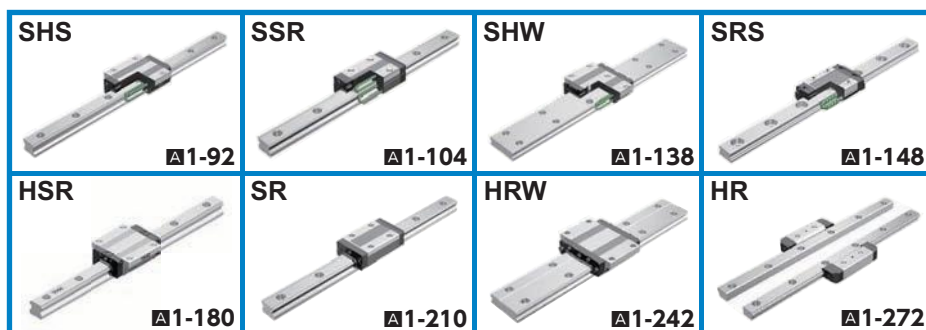
Supported models

SHS SSR SHW SRS HSR  
SR HRW HR RSX RSR

## Surface Treatment

## Low Temperature Grease

## Grease



# 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 small foreign matter or a water-soluble coolant that a telescopic cover or a bellows cannot remove, it is necessary to attach a contamination protection 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 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 contamination protection effect against small 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.

## ■ Metal Cap Dedicated for LM Rail Mounting Holes GC Cap

GC cap is a metallic cap that plugs the LM rail mounting hole (article compliant with the RoHS Directives). It prevents the entrance of foreign material and coolant from the LM rail top face (mounting hole) under harsh environments, and significantly increases the dust control performance of the LM Guide if used with a dust control seal.

## ■ Protector

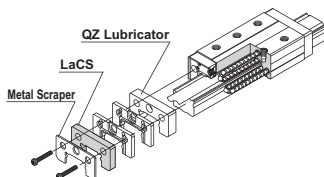
The protector minimizes the entrance of foreign material even in harsh environments where foreign material such as fine particles and liquids are present.

## LM Guide

+Metal scraper

+Contact scraper LaCS

+Cap GC, etc.



A1-477

Supported models

**Caged Ball LM Guide**

SHS SSR SVR/SVS SHW SRS

**Full Ball LM Guide**

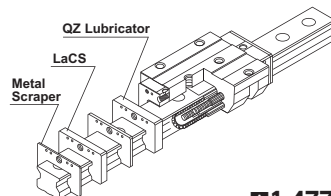
HSR NR/NRS-X

## Caged Roller LM Guide

+Metal scraper

+Contact scraper LaCS

+Cap GC, etc.



A1-477

Supported models

**SRG**

Caged Ball LM Guide

|                                                                                                                          |                                                                                                                                                      |                                                                                                                           |
|--------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| <p><b>SHS</b></p>  <p><b>A1-92</b></p>  | <p><b>SSR</b></p>  <p><b>A1-104</b></p>                             | <p><b>SHW</b></p>  <p><b>A1-138</b></p> |
| <p><b>SRS</b></p>  <p><b>A1-148</b></p> | <p><b>SVR/SVS</b></p>  <p>Featuring the protector <b>A1-118</b></p> |                                                                                                                           |

Full ball LM Guide

|                                                                                                                           |                                                                                                                                |
|---------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| <p><b>HSR</b></p>  <p><b>A1-180</b></p> | <p><b>NR/NRS-X</b></p>  <p><b>A1-222</b></p> |
|---------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|

Caged Roller LM Guide

**SRG**

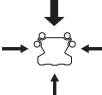
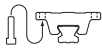
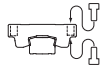
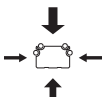
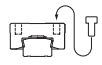
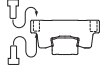
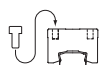


Featuring the protector **A1-412**

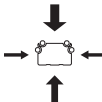
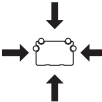
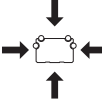
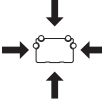
# Selecting a Type

## Types of LM Guides

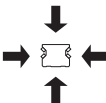
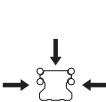
THK offers a wide array of types and dimensions with LM Guides as standard so that you can select the optimal product for any application. With the unit structure of each model, you can easily obtain high running accuracy with no clearance simply by mounting the product on a plane surface with bolts. We have a proven track record and know-how in extensive applications with LM Guides.

| Classification |                                                                                  | Type                                                                                |         | Specification Table | Load capacity diagram                                                               | Basic load rating (kN)    |                          |
|----------------|----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------|---------------------|-------------------------------------------------------------------------------------|---------------------------|--------------------------|
|                |                                                                                  |                                                                                     |         |                     |                                                                                     | Basic dynamic load rating | Basic static load rating |
| Radial type    | Caged Ball LM Guide                                                              |    | SSR-XW  | ▶A1-108             |    | 14.7 to 64.6              | 16.5 to 71.6             |
|                |                                                                                  |                                                                                     | SSR-XV  | ▶A1-110             |                                                                                     | 9.1 to 48.3               | 9.7 to 46.7              |
|                |                                                                                  |    | SSR-XTB | ▶A1-112             |                                                                                     | 14.7 to 64.6              | 16.5 to 71.6             |
|                |                                                                                  |                                                                                     | SSR-XSB | ▶A1-114             |                                                                                     | 9.1 to 48.3               | 9.7 to 46.7              |
|                | Full-Complement Ball LM Guides                                                   |    | SR-W    | ▶A1-216             |                                                                                     | 13.8 to 411               | 20.5 to 537              |
|                |                                                                                  |                                                                                     | SR-M1W  | ▶A1-370             |                                                                                     | 13.8 to 60.4              | 20.5 to 81.8             |
|                |                                                                                  |                                                                                     | SR-V    | ▶A1-216             |                                                                                     | 9.1 to 40.9               | 11.7 to 46.7             |
|                |                                                                                  |                                                                                     | SR-M1V  | ▶A1-370             |                                                                                     | 9.1 to 40.9               | 11.7 to 46.7             |
|                |                                                                                  |    | SR-TB   | ▶A1-218             |                                                                                     | 13.8 to 136               | 20.5 to 179              |
|                |                                                                                  |                                                                                     | SR-M1TB | ▶A1-372             |                                                                                     | 13.8 to 60.4              | 20.5 to 81.8             |
|                |                                                                                  |                                                                                     | SR-SB   | ▶A1-218             |                                                                                     | 9.1 to 40.9               | 11.7 to 46.7             |
|                |                                                                                  |                                                                                     | SR-M1SB | ▶A1-372             |                                                                                     | 9.1 to 40.9               | 11.7 to 46.7             |
|                | Oil-Free LM Guides for Special Environments                                      |  | SR-MSV  | ▶A1-404             |                                                                                     | —                         | —                        |
|                |                                                                                  |                                                                                     | SR-MSW  | ▶A1-404             |                                                                                     | —                         | —                        |
|                | Caged Ball LM Guides for Machine Tools high-rigidity model for ultra-heavy loads |  | SVR-C   | ▶A1-128             |  | 48 to 260                 | 68 to 328                |
|                |                                                                                  |                                                                                     | SVR-LC  | ▶A1-128             |                                                                                     | 57 to 340                 | 86 to 481                |
|                |                                                                                  |  | SVR-R   | ▶A1-124             |                                                                                     | 48 to 260                 | 68 to 328                |
|                |                                                                                  |                                                                                     | SVR-LR  | ▶A1-124             |                                                                                     | 57 to 340                 | 86 to 481                |
|                |                                                                                  |  | SVR-CH  | ▶A1-134             |                                                                                     | 90 to 177                 | 115 to 238               |
|                |                                                                                  |                                                                                     | SVR-LCH | ▶A1-134             |                                                                                     | 108 to 214                | 159 to 312               |
|                |                                                                                  |  | SVR-RH  | ▶A1-132             |                                                                                     | 90 to 177                 | 115 to 238               |
|                |                                                                                  |                                                                                     | SVR-LRH | ▶A1-132             |                                                                                     | 108 to 214                | 159 to 312               |

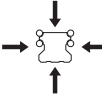
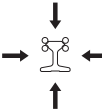
|  | External dimensions (mm) |            | Features                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Major application                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|--|--------------------------|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | Height                   | Width      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|  | 24 to 48                 | 34 to 70   | <ul style="list-style-type: none"> <li>Long service life, long-term maintenance-free operation</li> <li>Low dust generation, low noise, acceptable running sound</li> <li>Superbly high speed</li> <li>Smooth motion in all mounting orientations</li> <li>Thin, compact design, large radial load capacity</li> <li>Superb in planar running accuracy</li> <li>Superb capability of absorbing mounting error</li> <li>Stainless steel type also available as standard</li> </ul>                                                                                                                                                               | <ul style="list-style-type: none"> <li>Surface grinder table</li> <li>Tool grinder table</li> <li>Electric discharge machine</li> <li>Printed circuit board drilling machine</li> <li>Chip mounter</li> <li>High-speed transfer equipment</li> </ul>                                                                                                                                                                                                                                                                                                                   |
|  | 24 to 48                 | 34 to 70   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|  | 24 to 48                 | 52 to 100  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|  | 24 to 48                 | 52 to 100  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|  | 24 to 135                | 34 to 250  | <ul style="list-style-type: none"> <li>Thin, compact design, large radial load capacity</li> <li>Superb in planar running accuracy</li> <li>Superb capability of absorbing mounting error</li> <li>Stainless steel type also available as standard</li> <li>Type M1, achieving max service temperature of 150°C, also available</li> </ul>                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"> <li>Traveling unit of robots</li> <li>Machining center</li> <li>NC lathe</li> <li>Five axis milling machine</li> <li>Conveyance system</li> <li>Mold guide of pressing machines</li> <li>Inspection equipment</li> <li>Testing machine</li> <li>Food-related machine</li> <li>Medical equipment</li> <li>3D measuring instrument</li> <li>Packaging machine</li> <li>Injection molding machine</li> <li>Woodworking machine</li> <li>Ultra precision table</li> <li>Semiconductor/liquid crystal manufacturing equipment</li> </ul> |
|  | 24 to 48                 | 34 to 70   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|  | 24 to 48                 | 34 to 70   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|  | 24 to 48                 | 34 to 70   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|  | 24 to 68                 | 52 to 140  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|  | 24 to 48                 | 52 to 100  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|  | 24 to 48                 | 52 to 100  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|  | 24 to 48                 | 52 to 100  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|  | 24 to 28                 | 34 to 42   | <ul style="list-style-type: none"> <li>Minimum generation of outgases (water, organic matter)</li> <li>Small amount of particles generated</li> <li>Can be used at high temperature (up to 150°C)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>Photolithography machine</li> <li>Organic EL display manufacturing machine</li> <li>Ion implantation equipment</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                       |
|  | 24 to 28                 | 34 to 42   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|  | 31 to 75                 | 72 to 170  | <ul style="list-style-type: none"> <li>Long service life, long-term maintenance-free operation</li> <li>Low dust generation, low noise, acceptable running sound</li> <li>Superbly high speed</li> <li>Smooth motion in all mounting orientations</li> <li>Ultra-heavy load capacity optimal for machine tools</li> <li>Thin, compact design, large radial load capacity</li> <li>High vibration resistance and impact resistance due to improved damping characteristics</li> <li>Superb in planar running accuracy</li> </ul>                                                                                                                 | <ul style="list-style-type: none"> <li>Machining center</li> <li>NC lathe</li> <li>Grinding machine</li> <li>Five axis milling machine</li> <li>Jig borer</li> <li>Drilling machine</li> <li>NC milling machine</li> </ul>                                                                                                                                                                                                                                                                                                                                             |
|  | 31 to 75                 | 72 to 170  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|  | 31 to 75                 | 50 to 126  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|  | 31 to 75                 | 50 to 126  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|  | 48 to 70                 | 100 to 140 | <ul style="list-style-type: none"> <li>Long service life, long-term maintenance-free operation</li> <li>Low dust generation, low noise, acceptable running sound</li> <li>Superbly high speed</li> <li>Smooth motion in all mounting orientations</li> <li>Ultra-heavy load capacity optimal for machine tools</li> <li>Large radial load capacity</li> <li>High vibration resistance and impact resistance due to improved damping characteristics</li> <li>Superb in planar running accuracy</li> <li>Has dimensions almost the same as that of the full-ball type LM Guide model HSR, which is practically a global standard size</li> </ul> | <ul style="list-style-type: none"> <li>Horizontal milling machine</li> <li>Mold processing machine</li> <li>Graphite working machine</li> <li>Electric discharge machine</li> <li>Wire-cut electric discharge machine</li> </ul>                                                                                                                                                                                                                                                                                                                                       |
|  | 48 to 70                 | 100 to 140 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|  | 55 to 80                 | 70 to 100  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|  | 55 to 80                 | 70 to 100  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

| Classification        |                                                                                            | Type                                                                                |         | Specification Table      | Load capacity diagram                                                               | Basic load rating (kN)    |                          |
|-----------------------|--------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------|--------------------------|-------------------------------------------------------------------------------------|---------------------------|--------------------------|
|                       |                                                                                            |                                                                                     |         |                          |                                                                                     | Basic dynamic load rating | Basic static load rating |
| Radial type           | Full-Complement Ball LM Guides for Machine Tools high-rigidity model for ultra-heavy loads |    | NR-RX   | ▶ <a href="#">■1-228</a> |    | 37.1 to 208.7             | 68.1 to 351.7            |
|                       |                                                                                            |                                                                                     | NR-LRX  | ▶ <a href="#">■1-228</a> |                                                                                     | 45.4 to 268.9             | 90.8 to 505.5            |
|                       |                                                                                            |    | NR-CX   | ▶ <a href="#">■1-232</a> |                                                                                     | 37.1 to 208.7             | 68.1 to 351.7            |
|                       |                                                                                            |                                                                                     | NR-LCX  | ▶ <a href="#">■1-232</a> |                                                                                     | 45.4 to 268.9             | 90.8 to 505.5            |
|                       |                                                                                            |    | NR-R    | ▶ <a href="#">■1-228</a> |                                                                                     | 271 to 479                | 610 to 1040              |
|                       |                                                                                            |                                                                                     | NR-LR   | ▶ <a href="#">■1-228</a> |                                                                                     | 355 to 599                | 800 to 1300              |
|                       |                                                                                            |    | NR-A    | ▶ <a href="#">■1-236</a> |                                                                                     | 271 to 479                | 610 to 1040              |
|                       |                                                                                            |                                                                                     | NR-LA   | ▶ <a href="#">■1-236</a> |                                                                                     | 355 to 599                | 800 to 1300              |
|                       |                                                                                            |    | NR-B    | ▶ <a href="#">■1-238</a> |                                                                                     | 271 to 479                | 610 to 1040              |
|                       |                                                                                            |                                                                                     | NR-LB   | ▶ <a href="#">■1-238</a> |                                                                                     | 355 to 599                | 800 to 1300              |
| 4-way type            | LM Guides for Machine Tools high-rigidity model for ultra-heavy loads                      |    | SVS-R   | ▶ <a href="#">■1-126</a> |   | 37 to 199                 | 52 to 251                |
|                       |                                                                                            |                                                                                     | SVS-LR  | ▶ <a href="#">■1-126</a> |                                                                                     | 44 to 261                 | 66 to 368                |
|                       |                                                                                            |    | SVS-C   | ▶ <a href="#">■1-130</a> |                                                                                     | 37 to 199                 | 52 to 251                |
|                       |                                                                                            |                                                                                     | SVS-LC  | ▶ <a href="#">■1-130</a> |                                                                                     | 44 to 261                 | 66 to 368                |
|                       |                                                                                            |    | SVS-RH  | ▶ <a href="#">■1-132</a> |                                                                                     | 69 to 136                 | 88 to 182                |
|                       |                                                                                            |                                                                                     | SVS-LRH | ▶ <a href="#">■1-132</a> |                                                                                     | 83 to 164                 | 122 to 239               |
|                       |                                                                                            |   | SVS-CH  | ▶ <a href="#">■1-134</a> |                                                                                     | 69 to 136                 | 88 to 182                |
|                       |                                                                                            |                                                                                     | SVS-LCH | ▶ <a href="#">■1-134</a> |                                                                                     | 83 to 164                 | 122 to 239               |
|                       | Full-Complement Ball LM Guides for Machine Tools high-rigidity model for ultra-heavy loads |  | NRS-CX  | ▶ <a href="#">■1-234</a> |  | 28.4 to 159.8             | 52.2 to 269.4            |
|                       |                                                                                            |                                                                                     | NRS-LCX | ▶ <a href="#">■1-234</a> |                                                                                     | 34.7 to 206               | 69.6 to 387.2            |
|                       |                                                                                            |  | NRS-RX  | ▶ <a href="#">■1-230</a> |                                                                                     | 28.4 to 159.8             | 52.2 to 269.4            |
|                       |                                                                                            |                                                                                     | NRS-LRX | ▶ <a href="#">■1-230</a> |                                                                                     | 34.7 to 206               | 69.6 to 387.2            |
| 4-way equal load type | Full-Complement Ball LM Guides for Machine Tools high-rigidity model for ultra-heavy loads |  | NRS-A   | ▶ <a href="#">■1-236</a> |  | 212 to 376                | 431 to 737               |
|                       |                                                                                            |                                                                                     | NRS-LA  | ▶ <a href="#">■1-236</a> |                                                                                     | 278 to 470                | 566 to 920               |
|                       |                                                                                            |  | NRS-B   | ▶ <a href="#">■1-238</a> |                                                                                     | 212 to 376                | 431 to 737               |
|                       |                                                                                            |                                                                                     | NRS-LB  | ▶ <a href="#">■1-238</a> |                                                                                     | 278 to 470                | 566 to 920               |
|                       |                                                                                            |  | NRS-R   | ▶ <a href="#">■1-230</a> |                                                                                     | 212 to 376                | 431 to 737               |
|                       |                                                                                            |                                                                                     | NRS-LR  | ▶ <a href="#">■1-230</a> |                                                                                     | 278 to 470                | 566 to 920               |

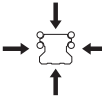
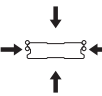
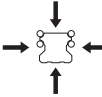
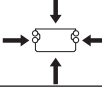
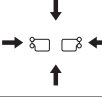
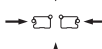
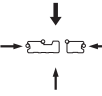
| External dimensions (mm) |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Features                                                                                                                                                                                                                                                                                                                                                                                                                      | Major application |
|--------------------------|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| Height                   | Width      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| 31 to 75                 | 50 to 126  | <ul style="list-style-type: none"><li>• Low dust generation, low noise, acceptable running sound</li><li>• Superbly high speed</li><li>• Smooth motion in all mounting orientations</li><li>• Ultra-heavy load capacity optimal for machine tools</li><li>• Thin, compact design, large radial load capacity</li><li>• High vibration resistance and impact resistance due to improved damping characteristics</li><li>• Superb in planar running accuracy</li></ul>                                                                                                                                                                | <ul style="list-style-type: none"><li>• Machining center</li><li>• NC lathe</li><li>• Grinding machine</li><li>• Five axis milling machine</li><li>• Jig borer</li><li>• Drilling machine</li><li>• NC milling machine</li><li>• Horizontal milling machine</li><li>• Mold processing machine</li><li>• Graphite working machine</li><li>• Electric discharge machine</li><li>• Wire-cut electric discharge machine</li></ul> |                   |
| 31 to 75                 | 50 to 126  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| 31 to 75                 | 72 to 170  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| 31 to 75                 | 72 to 170  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| 83 to 105                | 145 to 200 | <ul style="list-style-type: none"><li>• Ultra-heavy load capacity optimal for machine tools</li><li>• High vibration resistance and impact resistance due to improved damping characteristics</li><li>• Thin, compact design, large radial load capacity</li><li>• Superb in planar running accuracy</li></ul>                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| 83 to 105                | 145 to 200 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| 83 to 105                | 195 to 260 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| 83 to 105                | 195 to 260 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| 83 to 105                | 195 to 260 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| 83 to 105                | 195 to 260 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| 31 to 75                 | 50 to 126  | <ul style="list-style-type: none"><li>• Long service life, long-term maintenance-free operation</li><li>• Low dust generation, low noise, acceptable running sound</li><li>• Superbly high speed</li><li>• Smooth motion in all mounting orientations</li><li>• Ultra-heavy load capacity optimal for machine tools</li><li>• Low profile, compact 4-way type</li><li>• High vibration resistance and impact resistance due to improved damping characteristics</li></ul>                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| 31 to 75                 | 50 to 126  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| 31 to 75                 | 72 to 170  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| 31 to 75                 | 72 to 170  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| 55 to 80                 | 70 to 100  | <ul style="list-style-type: none"><li>• Long service life, long-term maintenance-free operation</li><li>• Low dust generation, low noise, acceptable running sound</li><li>• Superbly high speed</li><li>• Smooth motion in all mounting orientations</li><li>• Ultra-heavy load capacity optimal for machine tools</li></ul> <ul style="list-style-type: none"><li>• 4-way type</li><li>• High vibration resistance and impact resistance due to improved damping characteristics</li><li>• Has dimensions almost the same as that of the full-ball type LM Guide model HSR, which is practically a global standard size</li></ul> |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| 55 to 80                 | 70 to 100  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| 48 to 70                 | 100 to 140 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| 48 to 70                 | 100 to 140 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| 31 to 75                 | 72 to 170  | <ul style="list-style-type: none"><li>• Low dust generation, low noise, acceptable running sound</li><li>• Superbly high speed</li><li>• Smooth motion in all mounting orientations</li><li>• Ultra-heavy load capacity optimal for machine tools</li><li>• Low profile, compact 4-way type</li><li>• High vibration resistance and impact resistance due to improved damping characteristics</li></ul>                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| 31 to 75                 | 72 to 170  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| 31 to 75                 | 50 to 126  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| 31 to 75                 | 50 to 126  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| 83 to 105                | 195 to 260 | <ul style="list-style-type: none"><li>• Ultra-heavy load capacity optimal for machine tools</li><li>• High vibration resistance and impact resistance due to improved damping characteristics</li><li>• Low-Profile compact design, 4-way equal load</li></ul>                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| 83 to 105                | 195 to 260 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| 83 to 105                | 195 to 260 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| 83 to 105                | 195 to 260 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| 83 to 105                | 145 to 200 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| 83 to 105                | 145 to 200 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |

| Classification        |                                                                     | Type                                                                               |            | Specification Table      | Load capacity diagram                                                              | Basic load rating (kN)    |                          |
|-----------------------|---------------------------------------------------------------------|------------------------------------------------------------------------------------|------------|--------------------------|------------------------------------------------------------------------------------|---------------------------|--------------------------|
|                       |                                                                     |                                                                                    |            |                          |                                                                                    | Basic dynamic load rating | Basic static load rating |
| 4-way equal load type | Caged Roller LM Guide - super ultra-heavy-load, high rigidity types |   | SRG-A, C   | ▶ <a href="#">A1-418</a> |   | 11.3 to 131               | 25.8 to 266              |
|                       |                                                                     |                                                                                    | SRG-LA, LC | ▶ <a href="#">A1-418</a> |                                                                                    | 26.7 to 278               | 63.8 to 599              |
|                       |                                                                     |   | SRG-R, V   | ▶ <a href="#">A1-424</a> |                                                                                    | 11.3 to 131               | 25.8 to 266              |
|                       |                                                                     |                                                                                    | SRG-LR, LV | ▶ <a href="#">A1-424</a> |                                                                                    | 26.7 to 601               | 63.8 to 1170             |
|                       |                                                                     |   | SRN-C      | ▶ <a href="#">A1-438</a> |                                                                                    | 59.1 to 219               | 119 to 441               |
|                       |                                                                     |                                                                                    | SRN-LC     | ▶ <a href="#">A1-438</a> |                                                                                    | 76 to 278                 | 165 to 599               |
|                       |                                                                     |                                                                                    | SRN-SLC    | ▶ <a href="#">A1-438</a> |                                                                                    | 87.9 to 352               | 199 to 811               |
|                       |                                                                     |   | SRN-R      | ▶ <a href="#">A1-440</a> |                                                                                    | 59.1 to 219               | 119 to 441               |
|                       |                                                                     |                                                                                    | SRN-LR     | ▶ <a href="#">A1-440</a> |                                                                                    | 76 to 278                 | 165 to 599               |
|                       |                                                                     |                                                                                    | SRN-SLR    | ▶ <a href="#">A1-440</a> |                                                                                    | 87.9 to 352               | 199 to 811               |
|                       |                                                                     |   | SRW-LR     | ▶ <a href="#">A1-450</a> |                                                                                    | 115 to 601                | 256 to 1170              |
|                       | Caged Ball LM Guide - heavy-load, high rigidity types               |   | SHS-C      | ▶ <a href="#">A1-96</a>  |  | 14.2 to 205               | 24.2 to 320              |
|                       |                                                                     |                                                                                    | SHS-LC     | ▶ <a href="#">A1-96</a>  |                                                                                    | 17.2 to 253               | 31.9 to 408              |
|                       |                                                                     |  | SHS-V      | ▶ <a href="#">A1-98</a>  |                                                                                    | 14.2 to 205               | 24.2 to 320              |
|                       |                                                                     |                                                                                    | SHS-LV     | ▶ <a href="#">A1-98</a>  |                                                                                    | 17.2 to 253               | 31.9 to 408              |
|                       |                                                                     |                                                                                    | SHS-R      | ▶ <a href="#">A1-100</a> |                                                                                    | 14.2 to 128               | 24.2 to 197              |
|                       |                                                                     |                                                                                    | SHS-LR     | ▶ <a href="#">A1-100</a> |                                                                                    | 36.8 to 161               | 64.7 to 259              |
|                       |                                                                     |                                                                                    |            |                          |                                                                                    |                           |                          |

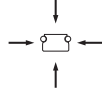
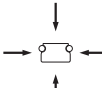
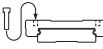
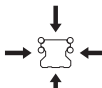
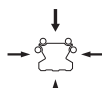
|  | External dimensions (mm) |            | Features                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Major application                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |
|--|--------------------------|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
|  | Height                   | Width      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |
|  | 24 to 70                 | 47 to 140  | <ul style="list-style-type: none"><li>● Long service life, long-term maintenance-free operation</li><li>● Low noise, acceptable running sound</li><li>● Superbly high speed</li><li>● Smooth motion due to prevention of rollers from skewing</li><li>● Ultra-heavy load capacity optimal for machine tools</li></ul>                                                                                                                                                                              | <ul style="list-style-type: none"><li>● Machining center</li><li>● NC lathe</li><li>● Grinding machine</li><li>● Five axis milling machine</li><li>● Jig borer</li><li>● Drilling machine</li><li>● NC milling machine</li><li>● Horizontal milling machine</li><li>● Mold processing machine</li><li>● Graphite working machine</li><li>● Electric discharge machine</li><li>● Wire-cut electric discharge machine</li></ul>                                                                                                                                                                                                                                                                                                                                                |  |
|  | 30 to 120                | 63 to 250  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |
|  | 24 to 80                 | 34 to 100  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |
|  | 30 to 90                 | 44 to 126  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |
|  | 44 to 75                 | 100 to 170 | <ul style="list-style-type: none"><li>● Long service life, long-term maintenance-free operation</li><li>● Low noise, acceptable running sound</li><li>● Superbly high speed</li><li>● Smooth motion due to prevention of rollers from skewing</li><li>● Ultra-heavy load capacity optimal for machine tools</li><li>● Low center of gravity, ultra-high rigidity</li></ul>                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |
|  | 44 to 75                 | 100 to 170 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |
|  | 44 to 75                 | 100 to 170 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |
|  | 44 to 75                 | 70 to 126  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |
|  | 44 to 75                 | 70 to 126  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |
|  | 44 to 75                 | 70 to 126  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |
|  | 44 to 75                 | 70 to 126  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |
|  | 70 to 150                | 135 to 300 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |
|  | 24 to 90                 | 47 to 170  | <ul style="list-style-type: none"><li>● Long service life, long-term maintenance-free operation</li><li>● Low dust generation, low noise, acceptable running sound</li><li>● Superbly high speed</li><li>● Smooth motion in all mounting orientations</li><li>● Heavy load, high rigidity</li><li>● Has dimensions almost the same as that of the full-ball type LM Guide model HSR, which is practically a global standard size</li><li>● Superb capability of absorbing mounting error</li></ul> | <ul style="list-style-type: none"><li>● Machining center</li><li>● NC lathe</li><li>● XYZ axes of heavy cutting machine tools</li><li>● Grinding head feeding axis of grinding machines</li><li>● Components requiring a heavy moment and high accuracy</li><li>● NC milling machine</li><li>● Horizontal milling machine</li><li>● Gantry five axis milling machine</li><li>● Z axis of electric discharge machines</li><li>● Wire-cut electric discharge machine</li><li>● Car elevator</li><li>● Food-related machine</li><li>● Testing machine</li><li>● Vehicle doors</li><li>● Printed circuit board drilling machine</li><li>● ATC</li><li>● Construction equipment</li><li>● Shield machine</li><li>● Semiconductor/liquid crystal manufacturing equipment</li></ul> |  |
|  | 24 to 90                 | 47 to 170  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |
|  | 24 to 90                 | 34 to 126  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |
|  | 24 to 90                 | 34 to 126  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |
|  | 28 to 80                 | 34 to 100  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |
|  | 28 to 80                 | 34 to 100  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |

| Classification        |                                                                 | Type                                                                                |            | Specification Table      | Load capacity diagram                                                               | Basic load rating (kN)    |                          |
|-----------------------|-----------------------------------------------------------------|-------------------------------------------------------------------------------------|------------|--------------------------|-------------------------------------------------------------------------------------|---------------------------|--------------------------|
|                       |                                                                 |                                                                                     |            |                          |                                                                                     | Basic dynamic load rating | Basic static load rating |
| 4-way equal load type | Full-Complement Ball LM Guide - heavy-load, high rigidity types |    | HSR-C/XC   | ▶ <a href="#">■1-186</a> |    | 10.9 to 195               | 15.7 to 228              |
|                       |                                                                 |                                                                                     | HSR-LC/XLC | ▶ <a href="#">■1-186</a> |                                                                                     | 14.2 to 249               | 22.9 to 323              |
|                       |                                                                 |    | HSR-A      | ▶ <a href="#">■1-192</a> |                                                                                     | 10.9 to 304               | 15.7 to 355              |
|                       |                                                                 |                                                                                     | HSR-M1A    | ▶ <a href="#">■1-356</a> |                                                                                     | 10.9 to 53.9              | 15.7 to 70.2             |
|                       |                                                                 |                                                                                     | HSR-LA     | ▶ <a href="#">■1-192</a> |                                                                                     | 23.9 to 367               | 35.8 to 464              |
|                       |                                                                 |                                                                                     | HSR-M1LA   | ▶ <a href="#">■1-356</a> |                                                                                     | 23.9 to 65                | 35.8 to 91.7             |
|                       |                                                                 |                                                                                     | HSR-CA/XCA | ▶ <a href="#">■1-198</a> |                                                                                     | 19.8 to 304               | 27.4 to 355              |
|                       |                                                                 |                                                                                     | HSR-HA/XHA | ▶ <a href="#">■1-198</a> |                                                                                     | 23.9 to 518               | 35.8 to 728              |
|                       |                                                                 |                                                                                     | HSR-B      | ▶ <a href="#">■1-194</a> |                                                                                     | 10.9 to 304               | 15.7 to 355              |
|                       |                                                                 |    | HSR-M1B    | ▶ <a href="#">■1-358</a> |                                                                                     | 10.9 to 53.9              | 15.7 to 70.2             |
|                       |                                                                 |                                                                                     | HSR-LB     | ▶ <a href="#">■1-194</a> |                                                                                     | 23.9 to 367               | 35.8 to 464              |
|                       |                                                                 |                                                                                     | HSR-M1LB   | ▶ <a href="#">■1-358</a> |                                                                                     | 23.9 to 65                | 35.8 to 91.7             |
|                       |                                                                 |                                                                                     | HSR-CB/XCB | ▶ <a href="#">■1-200</a> |                                                                                     | 19.8 to 304               | 27.4 to 355              |
|                       |                                                                 |                                                                                     | HSR-HB/XHB | ▶ <a href="#">■1-200</a> |                                                                                     | 23.9 to 518               | 35.8 to 728              |
|                       |                                                                 |   | HSR-R/XR   | ▶ <a href="#">■1-190</a> |                                                                                     | 1.08 to 304               | 2.16 to 355              |
|                       |                                                                 |                                                                                     | HSR-M1R    | ▶ <a href="#">■1-360</a> |                                                                                     | 10.9 to 53.9              | 15.7 to 70.2             |
|                       |                                                                 |                                                                                     | HSR-LR/XLR | ▶ <a href="#">■1-190</a> |                                                                                     | 23.9 to 367               | 35.8 to 464              |
|                       |                                                                 |                                                                                     | HSR-M1LR   | ▶ <a href="#">■1-360</a> |                                                                                     | 23.9 to 65                | 35.8 to 91.7             |
|                       |                                                                 |                                                                                     | HSR-HR     | ▶ <a href="#">■1-202</a> |                                                                                     | 441 to 518                | 540 to 728               |
|                       | LM Guide for Medium-to-Low Vacuum                               |                                                                                     | HSR-M1VV   | ▶ <a href="#">■1-396</a> |                                                                                     | 10.9                      | 15.7                     |
|                       | Full-ball LM Guide - side mount types                           |  | HSR-YR/XYR | ▶ <a href="#">■1-196</a> |                                                                                     | 10.9 to 195               | 15.7 to 228              |
|                       |                                                                 |                                                                                     | HSR-M1YR   | ▶ <a href="#">■1-362</a> |                                                                                     | 10.9 to 53.9              | 15.7 to 70.2             |
|                       | Full-Complement LM Guides - special LM rail types               |  | JR-A       | ▶ <a href="#">■1-324</a> |  | 27.6 to 121               | 36.4 to 146              |
|                       |                                                                 |  | JR-B       | ▶ <a href="#">■1-324</a> |                                                                                     | 27.6 to 121               | 36.4 to 146              |
|                       |                                                                 |  | JR-R       | ▶ <a href="#">■1-324</a> |                                                                                     | 27.6 to 121               | 36.4 to 146              |

| External dimensions (mm) |               | Features                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Major application                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------------|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Height                   | Width         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 24 to 90                 | 47 to 170     | <ul style="list-style-type: none"> <li>Heavy load, high rigidity</li> <li>Practically a global standard size</li> <li>Superb capability of absorbing mounting error</li> <li>Stainless steel type also available as standard</li> <li>Type M1, achieving max service temperature of 150°C, also available</li> <li>Type M2, with high corrosion resistance, also available (Basic dynamic load rating: 2.33 to 5.57 kN) (Basic static load rating: 2.03 to 5.16 kN)</li> </ul> | <ul style="list-style-type: none"> <li>Machining center</li> <li>NC lathe</li> <li>XYZ axes of heavy cutting machine tools</li> <li>Grinding head feeding axis of grinding machines</li> <li>Components requiring a heavy moment and high accuracy</li> <li>NC milling machine</li> <li>Horizontal milling machine</li> <li>Gantry five axis milling machine</li> <li>Z axis of electric discharge machines</li> <li>Wire-cut electric discharge machine</li> <li>Car elevator</li> <li>Food-related machine</li> <li>Testing machine</li> <li>Vehicle doors</li> <li>Printed circuit board drilling machine</li> <li>ATC</li> <li>Construction equipment</li> <li>Shield machine</li> <li>Semiconductor/liquid crystal manufacturing equipment</li> </ul> |
| 24 to 90                 | 47 to 170     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 24 to 110                | 47 to 215     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 24 to 48                 | 47 to 100     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 30 to 110                | 63 to 215     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 30 to 48                 | 63 to 100     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 30 to 110                | 63 to 215     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 30 to 145                | 63 to 350     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 24 to 110                | 47 to 215     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 24 to 48                 | 47 to 100     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 30 to 110                | 63 to 215     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 30 to 48                 | 63 to 100     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 30 to 110                | 63 to 215     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 30 to 145                | 63 to 350     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 11 to 110                | 16 to 156     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 28 to 55                 | 34 to 70      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 30 to 110                | 44 to 156     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 30 to 55                 | 44 to 70      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 120 to 145               | 250 to 266    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 28                       | 34            | <ul style="list-style-type: none"> <li>Can be used in various environments at atmospheric pressure to vacuum (<math>10^{-3}</math> [Pa])</li> <li>Allows baking temperature of 200°C* at a maximum</li> <li>* If the baking temperature exceeds 100°C, multiply the basic load rating with the temperature coefficient.</li> </ul>                                                                                                                                             | <ul style="list-style-type: none"> <li>Medical equipment</li> <li>Semiconductor/liquid crystal manufacturing equipment</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 28 to 90                 | 33.5 to 124.5 | <ul style="list-style-type: none"> <li>Easy mounting and reduced mounting height when using 2 units opposed to each other since the side faces of the LM block have mounting holes</li> <li>Heavy load, high rigidity</li> <li>Superb capability of absorbing mounting error</li> <li>Stainless steel type also available as standard</li> <li>Type M1, achieving max service temperature of 150°C, also available</li> </ul>                                                  | <ul style="list-style-type: none"> <li>Cross rails of gantry machine tools</li> <li>Z axis of woodworking machines</li> <li>Z axis of measuring instruments</li> <li>Components opposed to each other</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 28 to 55                 | 33.5 to 69.5  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 61 to 114                | 70 to 140     | <ul style="list-style-type: none"> <li>Since the central part of the LM rail is thinly structured, the LM Guide is capable of absorbing an error and achieving smooth motion if the parallelism between the two axes is poor</li> <li>Since the LM rail has a highly rigid sectional shape, it can be used as a structural member</li> </ul>                                                                                                                                   | <ul style="list-style-type: none"> <li>Automated warehouse</li> <li>Garage</li> <li>Gantry robot</li> <li>FMS traveling rail</li> <li>Lift</li> <li>Conveyance system</li> <li>Welding machine</li> <li>Lifter</li> <li>Crane</li> <li>Forklift</li> <li>Coating machine</li> <li>Shield machine</li> <li>Stage setting</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 61 to 114                | 70 to 140     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 65 to 124                | 48 to 100     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

| Classification          |                                                                   | Type                                                                                |             | Specification Table | Load capacity diagram                                                               | Basic load rating (kN)    |                                                                    |
|-------------------------|-------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------|---------------------|-------------------------------------------------------------------------------------|---------------------------|--------------------------------------------------------------------|
|                         |                                                                   |                                                                                     |             |                     |                                                                                     | Basic dynamic load rating | Basic static load rating                                           |
| 4-way equal load type   | Caged Ball Cross LM Guide                                         |    | SCR         | ▶ <b>A1-168</b>     |    | 36.8 to 253               | 64.7 to 408                                                        |
|                         | Full-Complement LM Guide orthogonal type                          |                                                                                     | CSR         | ▶ <b>A1-310</b>     |                                                                                     | 10.9 to 100               | 15.7 to 135                                                        |
|                         | Caged Ball LM Guide - wide, low center of gravity types           |    | SHW-CA      | ▶ <b>A1-142</b>     |    | 4.31 to 70.2              | 5.66 to 91.4                                                       |
|                         |                                                                   |    | SHW-CR, HR  | ▶ <b>A1-144</b>     |                                                                                     | 4.31 to 70.2              | 5.66 to 91.4                                                       |
|                         | Full-Complement Ball LM Guide - wide, low center of gravity types |    | HRW-CA      | ▶ <b>A1-246</b>     |                                                                                     | 5.53 to 80.3              | 9.1 to 109                                                         |
|                         |                                                                   |    | HRW-CR, LRM | ▶ <b>A1-248</b>     |                                                                                     | 3.29 to 62.4              | 7.16 to 86.3                                                       |
|                         | Full-ball Straight - Curved Guide                                 |    | HMG         | ▶ <b>A1-340</b>     |    | 2.56 to 66.2              | Straight section<br>4.23 to 66.7<br>Curved section<br>0.44 to 36.2 |
|                         | Caged Ball LM Guides Finite stroke                                |   | EPF         | ▶ <b>A1-176</b>     |   | 0.90 to 3.71              | 1.60 to 5.88                                                       |
|                         | Full-Complement Ball LM Guide - separate types                    |  | HR, HR-T    | ▶ <b>A1-278</b>     |  | 2.82 to 226               | 3.48 to 232                                                        |
|                         |                                                                   |  | GSR-T       | ▶ <b>A1-290</b>     |  | 8.42 to 37                | 9.77 to 39.1                                                       |
|                         |                                                                   |                                                                                     | GSR-V       | ▶ <b>A1-290</b>     |  | 6.51 to 15.5              | 6.77 to 15.2                                                       |
| Interchangeable designs | Full-Complement Ball LM Guides - LM rail-rack intergrated type    |  | GSR-R       | ▶ <b>A1-298</b>     |  | 15.5 to 37                | 15.2 to 39.1                                                       |

| External dimensions (mm) |                | Features                                                                                                                                                                                                                                                                                                                                                                                                      | Major application                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Height                   | Width          |                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 70 to 180                | 88 to 226      | <ul style="list-style-type: none"> <li>A compact XY structure is allowed due to an XY orthogonal, single-piece LM block</li> <li>Since a saddle-less structure is allowed, the machine can be lightweighted and compactly designed</li> <li>Long service life, long-term maintenance-free operation</li> <li>Low dust generation, low noise, acceptable running sound</li> <li>Superbly high speed</li> </ul> | <ul style="list-style-type: none"> <li>Low center of gravity, precision XY table</li> <li>NC lathe</li> <li>Optical measuring instrument</li> <li>Automatic lathe</li> <li>Inspection equipment</li> <li>Cartesian coordinate robot</li> <li>Bonding machine</li> <li>Wire-cut electric discharge machine</li> <li>Hollow table</li> <li>Printed circuit board assembler</li> <li>Machine tool table</li> <li>Electric discharge machine</li> <li>XY axes of horizontal machining center</li> </ul> |
| 47 to 118                | 38.8 to 129.8  | <ul style="list-style-type: none"> <li>A compact XY structure is allowed due to an XY orthogonal, single-piece LM block</li> <li>Since a saddle-less structure is allowed, the machine can be lightweighted and compactly designed</li> </ul>                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 12 to 50                 | 40 to 162      | <ul style="list-style-type: none"> <li>Long service life, long-term maintenance-free operation</li> <li>Low dust generation, low noise, acceptable running sound</li> <li>Superbly high speed</li> <li>Smooth motion in all mounting orientations</li> <li>Wide, low center of gravity, space saving structure</li> <li>Stainless steel type also available as standard</li> </ul>                            | <ul style="list-style-type: none"> <li>Z axis of IC printed circuit board drilling machine</li> <li>Z axis of small electric discharge machine</li> <li>Loader</li> <li>Machining center</li> <li>NC lathe</li> <li>Robot</li> <li>Wire-cut electric discharge machine</li> <li>APC</li> <li>Semiconductor/liquid crystal manufacturing equipment</li> <li>Measuring instrument</li> <li>Wafer transfer equipment</li> <li>Construction equipment</li> <li>Railroad vehicle</li> </ul>              |
| 12 to 50                 | 30 to 130      |                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 17 to 60                 | 60 to 200      | <ul style="list-style-type: none"> <li>4-way equal load, thin and highly rigid</li> <li>Wide, low center of gravity, space saving structure</li> <li>Stainless steel type also available as standard</li> </ul>                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 12 to 50                 | 30 to 130      |                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 24 to 90                 | 47 to 170      | <ul style="list-style-type: none"> <li>Freedom of design</li> <li>Cost reduction through simplified structure</li> </ul>                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"> <li>Large swivel base</li> <li>Pendulum vehicle for railroad</li> <li>Pantagraph</li> <li>Control unit</li> <li>Optical measuring machine</li> <li>Tool grinder</li> <li>X-Ray machine</li> <li>CT scanner</li> <li>Medical equipment</li> <li>Stage setting</li> <li>Car elevator</li> <li>Amusement machine</li> <li>Turntable</li> <li>Tool changer</li> </ul>                                                                                                |
| 8 to 16                  | 17 to 32       | <ul style="list-style-type: none"> <li>Caged ball effect using a cage</li> <li>Smooth movement with minimal rolling variation</li> <li>4-groove construction in a compact body</li> </ul>                                                                                                                                                                                                                     | <ul style="list-style-type: none"> <li>Semiconductor manufacturing equipment</li> <li>Medical equipment</li> <li>Inspection equipment</li> <li>Industrial machinery</li> </ul>                                                                                                                                                                                                                                                                                                                      |
| 8.5 to 60                | 18 to 125      | <ul style="list-style-type: none"> <li>Low-Profile high rigidity, space saving structure</li> <li>Interchangeable with Cross-Roller Guide</li> <li>Preload can be adjusted</li> <li>Stainless steel type also available as standard</li> </ul>                                                                                                                                                                | <ul style="list-style-type: none"> <li>XYZ axes of electric discharge machine</li> <li>Precision table</li> <li>XZ axes of NC lathe</li> <li>Assembly robot</li> <li>Conveyance system</li> <li>Machining center</li> <li>Wire-cut electric discharge machine</li> <li>Tool changer</li> <li>Woodworking machine</li> </ul>                                                                                                                                                                         |
| 20 to 38                 | 32 to 68       | <ul style="list-style-type: none"> <li>LM block and LM rail are both interchangeable</li> <li>Preload can be adjusted</li> <li>Capable of absorbing vertical level error and horizontal tolerance for parallelism</li> </ul>                                                                                                                                                                                  | <ul style="list-style-type: none"> <li>Industrial robot</li> <li>Various conveyance systems</li> <li>Automated warehouse</li> <li>Palette changer</li> <li>ATC</li> <li>Door closing device</li> <li>Guide using an aluminum mold base</li> <li>Welding machine</li> <li>Coating machine</li> <li>Car washing machine</li> </ul>                                                                                                                                                                    |
| 20 to 30                 | 32 to 50       |                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 30 to 38                 | 59.91 to 80.18 | <ul style="list-style-type: none"> <li>LM rail-rack integrated design eliminates assembly and adjustment work</li> <li>LM rail-rack integrated design enables a space-saving structure to be achieved</li> <li>Capable of supporting long strokes</li> </ul>                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

| Classification      |                                                 | Type                                                                                |           | Specification Table | Load capacity diagram                                                               | Basic load rating (kN)    |                          |  |
|---------------------|-------------------------------------------------|-------------------------------------------------------------------------------------|-----------|---------------------|-------------------------------------------------------------------------------------|---------------------------|--------------------------|--|
|                     |                                                 |                                                                                     |           |                     |                                                                                     | Basic dynamic load rating | Basic static load rating |  |
| Miniature types     | Caged Ball LM Guides                            |    | SRS-S     | ▶ <b>A1-154</b>     |    | 1.09 to 4.5               | 0.964 to 3.39            |  |
|                     |                                                 |                                                                                     | SRS-M     |                     |                                                                                     | 0.439 to 16.5             | 0.468 to 20.2            |  |
|                     |                                                 |                                                                                     | SRS-N     |                     |                                                                                     | 0.515 to 9.71             | 0.586 to 8.55            |  |
|                     |                                                 |    | SRS-WS    | ▶ <b>A1-158</b>     |                                                                                     | 1.38 to 6.64              | 1.35 to 5.94             |  |
|                     |                                                 |                                                                                     | SRS-WM    |                     |                                                                                     | 0.584 to 9.12             | 0.703 to 8.55            |  |
|                     |                                                 |                                                                                     | SRS-WN    |                     |                                                                                     | 0.746 to 12.4             | 0.996 to 12.1            |  |
|                     | Full-Complement Ball LM Guides                  |    | RSX-M     | ▶ <b>A1-256</b>     |    | 1.16 to 5.59              | 1.54 to 6.78             |  |
|                     |                                                 |                                                                                     | RSX-WM    | ▶ <b>A1-258</b>     |                                                                                     | 1.63 to 7.43              | 2.51 to 10.18            |  |
|                     |                                                 |                                                                                     | RSR-M     | ▶ <b>A1-268</b>     |                                                                                     | 0.18 to 8.82              | 0.27 to 12.7             |  |
|                     |                                                 |                                                                                     | RSR-M1V   | ▶ <b>A1-380</b>     |                                                                                     | 1.47 to 8.82              | 2.25 to 12.7             |  |
|                     |                                                 |                                                                                     | RSR-N     | ▶ <b>A1-268</b>     |                                                                                     | 0.3 to 14.2               | 0.44 to 20.6             |  |
|                     |                                                 |                                                                                     | RSR-M1N   | ▶ <b>A1-380</b>     |                                                                                     | 2.6 to 14.2               | 3.96 to 20.6             |  |
|                     | Full-Complement Ball LM Guide - wide types      |    | RSR-WM/WV | ▶ <b>A1-268</b>     |                                                                                     | 0.25 to 6.66              | 0.47 to 9.8              |  |
|                     |                                                 |                                                                                     | RSR-M1WV  | ▶ <b>A1-382</b>     |                                                                                     | 2.45 to 6.66              | 3.92 to 9.8              |  |
|                     |                                                 |                                                                                     | RSR-WN    | ▶ <b>A1-268</b>     |                                                                                     | 0.39 to 9.91              | 0.75 to 14.9             |  |
|                     |                                                 |                                                                                     | RSR-M1WN  | ▶ <b>A1-382</b>     |                                                                                     | 3.52 to 9.91              | 5.37 to 14.9             |  |
|                     | Full Complement Ball LM Guide - orthogonal type |  | MX        | ▶ <b>A1-316</b>     |                                                                                     | 0.59 to 2.04              | 1.1 to 3.21              |  |
| Circular arc types  | Full-Complement Ball LM Guides                  |  | HCR       | ▶ <b>A1-332</b>     |  | 4.7 to 141                | 8.53 to 215              |  |
| Self-aligning types | Full-Complement Ball LM Guides                  |  | NSR-TBC   | ▶ <b>A1-346</b>     |  | 9.41 to 90.8              | 18.6 to 152              |  |

|  | External dimensions (mm) |              | Features                                                                                                                                                                                                                                                                                                                                                    | Major application                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                               |
|--|--------------------------|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | Height                   | Width        |                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                               |
|  | 8 to 16                  | 17 to 32     | <ul style="list-style-type: none"><li>• Long service life, long-term maintenance-free operation</li><li>• Low dust generation, low noise, acceptable running sound</li><li>• Superbly high speed</li><li>• Smooth motion in all mounting orientations</li><li>• Stainless steel type also available as standard</li><li>• Lightweight and compact</li></ul> | <ul style="list-style-type: none"><li>• IC/LSI manufacturing machine</li><li>• Hard disc drive</li><li>• Slide unit of OA equipment</li><li>• Wafer transfer equipment</li><li>• Printed circuit board assembly table</li></ul>                                                                                                                                                                                                                                       | <ul style="list-style-type: none"><li>• Medical equipment</li><li>• Electronic components of electron microscope</li><li>• Optical stage</li><li>• Stepper</li><li>• Plotting machine</li><li>• Feed mechanism of IC bonding machine</li><li>• Inspection equipment</li></ul> |
|  | 6 to 25                  | 17 to 48     |                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                               |
|  | 6 to 16                  | 12 to 32     |                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                               |
|  | 9 to 16                  | 25 to 60     |                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                               |
|  | 6.5 to 16                | 17 to 60     |                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                               |
|  | 8 to 16                  | 17 to 32     | <ul style="list-style-type: none"><li>• Lightweight and compact</li><li>• Smooth motion in all mounting orientations</li><li>• Stainless steel type also available as standard</li></ul>                                                                                                                                                                    | <ul style="list-style-type: none"><li>• IC/LSI manufacturing machine</li><li>• Hard disc drive</li><li>• Slide unit of OA equipment</li><li>• Wafer transfer equipment</li><li>• Printed circuit board assembly table</li><li>• Medical equipment</li><li>• Electronic components of electron microscope</li><li>• Optical stage</li><li>• Stepper</li><li>• Plotting machine</li><li>• Feed mechanism of IC bonding machine</li><li>• Inspection equipment</li></ul> |                                                                                                                                                                                                                                                                               |
|  | 9 to 16                  | 25 to 60     |                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                               |
|  | 4 to 25                  | 8 to 46      | <ul style="list-style-type: none"><li>• Ultra-compact</li><li>• Stainless steel type also available as standard</li><li>• Long type with increased load capacity also offered as standard</li><li>• Type M1, achieving max service temperature of 150℃, also available</li></ul>                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                               |
|  | 10 to 25                 | 20 to 46     |                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                               |
|  | 4 to 25                  | 8 to 46      |                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                               |
|  | 10 to 25                 | 20 to 46     | <ul style="list-style-type: none"><li>• Stainless steel type also available as standard</li><li>• Long type with increased load capacity also offered as standard</li><li>• Type M1, achieving max service temperature of 150℃, also available</li></ul>                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                               |
|  | 4.5 to 16                | 12 to 60     |                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                               |
|  | 12 to 16                 | 30 to 60     |                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                               |
|  | 4.5 to 16                | 12 to 60     |                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                               |
|  | 12 to 16                 | 30 to 60     |                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                               |
|  | 10 to 14.5               | 15.2 to 30.2 | <ul style="list-style-type: none"><li>• A compact XY structure is allowed due to an XY orthogonal, single-piece LM block</li><li>• Stainless steel type also available as standard</li></ul>                                                                                                                                                                | <ul style="list-style-type: none"><li>• IC/LSI manufacturing machine</li><li>• Inspection equipment</li><li>• Slide unit of OA equipment</li><li>• Wafer transfer equipment</li></ul>                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"><li>• Feed mechanism of IC bonding machine</li><li>• Printed circuit board assembly table</li><li>• Medical equipment</li><li>• Electronic components of electron microscope</li><li>• Optical stage</li></ul>                              |
|  | 18 to 90                 | 39 to 170    | <ul style="list-style-type: none"><li>• Circular motion guide in a 4-way equal load design</li><li>• Highly accurate circular motion without play</li><li>• Allows an efficient design with the LM block placed in the loading point</li><li>• Large circular motion easily achieved</li></ul>                                                              | <ul style="list-style-type: none"><li>• Large swivel base</li><li>• Pendulum vehicle for railroad</li><li>• Pantagraph</li><li>• Control unit</li><li>• Optical measuring machine</li><li>• Tool grinder</li></ul>                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"><li>• X-Ray machine</li><li>• CT scanner</li><li>• Medical equipment</li><li>• Stage setting</li><li>• Car elevator</li><li>• Amusement machine</li><li>• Turntable</li><li>• Tool changer</li></ul>                                        |
|  | 40 to 105                | 70 to 175    | <ul style="list-style-type: none"><li>• Can be used in rough mount due to self-aligning on the flat surface of the case</li><li>• Preload can be adjusted</li><li>• Can be mounted on a black steel sheet</li></ul>                                                                                                                                         | <ul style="list-style-type: none"><li>• XY axes of ordinary industrial machinery</li><li>• Various conveyance systems</li><li>• Automated warehouse</li><li>• Palette changer</li><li>• Automatic coating machine</li><li>• Various welding machines</li></ul>                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                               |

# Calculating the Applied Load

The LM Guide is capable of receiving loads and moments in all directions that are generated due to the mounting orientation, alignment, gravity center position of a traveling object, thrust position and cutting resistance.

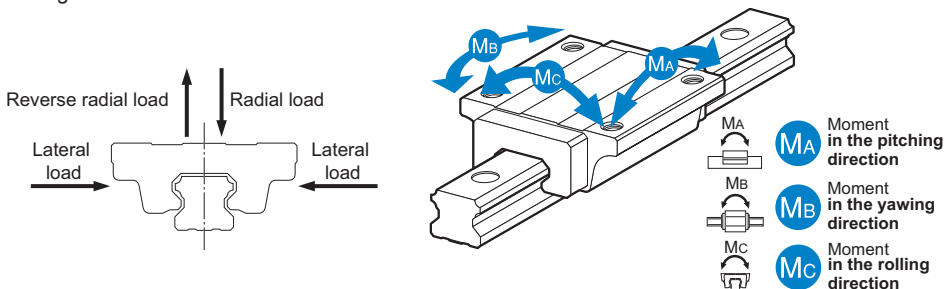


Fig.1 Directions of the Loads Applied on the LM Guide

## Calculating an Applied Load

### [Single-Axis Use]

#### ● Moment Equivalence

When the installation space for the LM Guide is limited, you may have to use only one LM block, or double LM blocks closely contacting with each other. In such a setting, the load distribution is not uniform and, as a result, an excessive load is applied in localized areas (i.e., both ends) as shown in Fig.2. Continued use under such conditions may result in ☐aking in those areas, consequently shortening the service life. In such a case, calculate the actual load by multiplying the moment value by any one of the equivalent-moment factors specified in Table1 to Table6.

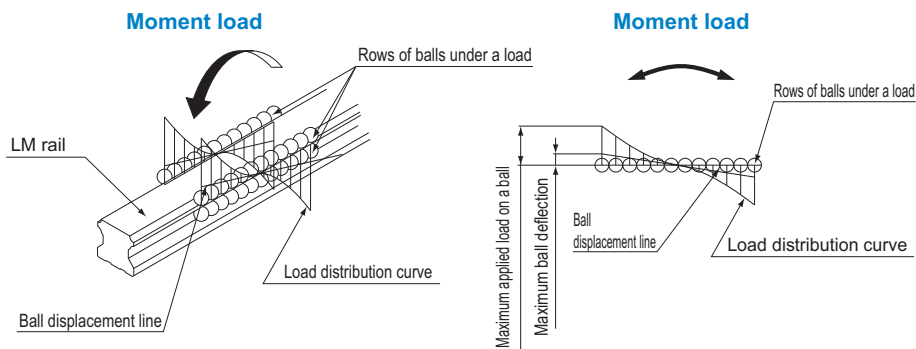


Fig.2 Ball Load when a Moment is Applied

An equivalent-load equation applicable when a moment acts on an LM Guide is shown below.

$$P = K \cdot M$$

P : Equivalent load per LM Guide (N)

K : Equivalent moment factor

M : Applied moment (N·mm)

### ● Equivalent Factor

Since the rated load is equivalent to the permissible moment, the equivalent factor to be multiplied when equalizing the  $M_A$ ,  $M_B$  and  $M_C$  moments to the applied load per block is obtained by dividing the rated loads in the corresponding directions.

With those models other than 4-way equal load types, however, the load ratings in the 4 directions differ from each other. Therefore, the equivalent factor values for the  $M_A$  and  $M_C$  moments also differ depending on whether the direction is radial or reverse radial.

### ■ Equivalent Factors for the $M_A$ Moment

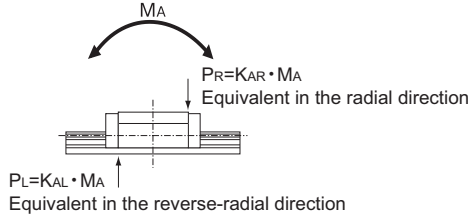


Fig.3 Equivalent Factors for the  $M_A$  Moment

Equivalent factors for the  $M_A$  Moment

|                                                   |                               |
|---------------------------------------------------|-------------------------------|
| Equivalent factor in the radial direction         | $K_{AR} = \frac{C_0}{M_A}$    |
| Equivalent factor in the reverse radial direction | $K_{AL} = \frac{C_{0L}}{M_A}$ |

$$\frac{C_0}{K_{AR} \cdot M_A} = \frac{C_{0L}}{K_{AL} \cdot M_A} = 1$$

### ■ Equivalent Factors for the $M_B$ Moment

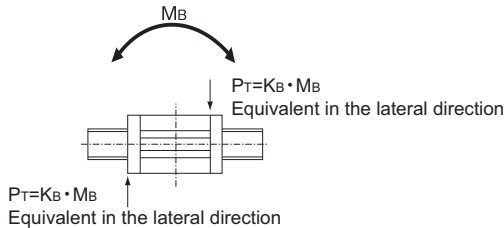


Fig.4 Equivalent Factors for the  $M_B$  Moment

Equivalent factors for the  $M_B$  Moment

|                                             |                            |
|---------------------------------------------|----------------------------|
| Equivalent factor in the lateral directions | $K_B = \frac{C_{0T}}{M_B}$ |
|---------------------------------------------|----------------------------|

$$\frac{C_{0T}}{K_B \cdot M_B} = 1$$

### ■Equivalent Factors for the $M_c$ Moment

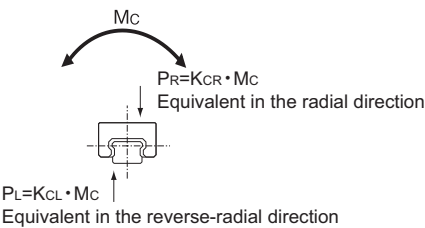


Fig.5 Equivalent Factors for the  $M_c$  Moment

Equivalent factors for the  $M_c$  Moment

|                                                      |                               |
|------------------------------------------------------|-------------------------------|
| Equivalent factor<br>in the radial direction         | $K_{CR} = \frac{C_0}{M_c}$    |
| Equivalent factor in the<br>reverse radial direction | $K_{CL} = \frac{C_{0L}}{M_c}$ |

$$\frac{C_0}{K_{CR} \cdot M_c} = \frac{C_{0L}}{K_{CL} \cdot M_c} = 1$$

|          |                                                       |     |
|----------|-------------------------------------------------------|-----|
| $C_0$    | : Basic static load rating (radial direction)         | (N) |
| $C_{0L}$ | : Basic static load rating (reverse radial direction) | (N) |
| $C_{0T}$ | : Basic static load rating (lateral direction)        | (N) |
| $P_R$    | : Calculated load (radial direction)                  | (N) |
| $P_L$    | : Calculated load (reverse radial direction)          | (N) |
| $P_T$    | : Calculated load (lateral direction)                 | (N) |

Table1 Equivalent Factors (Models SHS, SSR, SVR, SVS, SHW and SRS)

| Model No. |           | Equivalent factor     |                       |                       |                       |                       |                       |                       |                       |
|-----------|-----------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|           |           | K <sub>AR1</sub>      | K <sub>AL1</sub>      | K <sub>AR2</sub>      | K <sub>AL2</sub>      | K <sub>B1</sub>       | K <sub>B2</sub>       | K <sub>CR</sub>       | K <sub>CL</sub>       |
| SHS       | 15        | $1.38 \times 10^{-1}$ |                       | $2.69 \times 10^{-2}$ |                       | $1.38 \times 10^{-1}$ | $2.69 \times 10^{-2}$ | $1.50 \times 10^{-1}$ |                       |
|           | 15L       | $1.07 \times 10^{-1}$ |                       | $2.22 \times 10^{-2}$ |                       | $1.07 \times 10^{-1}$ | $2.22 \times 10^{-2}$ | $1.50 \times 10^{-1}$ |                       |
|           | 20        | $1.15 \times 10^{-1}$ |                       | $2.18 \times 10^{-2}$ |                       | $1.15 \times 10^{-1}$ | $2.18 \times 10^{-2}$ | $1.06 \times 10^{-1}$ |                       |
|           | 20L       | $8.85 \times 10^{-2}$ |                       | $1.79 \times 10^{-2}$ |                       | $8.85 \times 10^{-2}$ | $1.79 \times 10^{-2}$ | $1.06 \times 10^{-1}$ |                       |
|           | 25        | $9.25 \times 10^{-2}$ |                       | $1.90 \times 10^{-2}$ |                       | $9.25 \times 10^{-2}$ | $1.90 \times 10^{-2}$ | $9.29 \times 10^{-2}$ |                       |
|           | 25L       | $7.62 \times 10^{-2}$ |                       | $1.62 \times 10^{-2}$ |                       | $7.62 \times 10^{-2}$ | $1.62 \times 10^{-2}$ | $9.29 \times 10^{-2}$ |                       |
|           | 30        | $8.47 \times 10^{-2}$ |                       | $1.63 \times 10^{-2}$ |                       | $8.47 \times 10^{-2}$ | $1.63 \times 10^{-2}$ | $7.69 \times 10^{-2}$ |                       |
|           | 30L       | $6.52 \times 10^{-2}$ |                       | $1.34 \times 10^{-2}$ |                       | $6.52 \times 10^{-2}$ | $1.34 \times 10^{-2}$ | $7.69 \times 10^{-2}$ |                       |
|           | 35        | $6.95 \times 10^{-2}$ |                       | $1.43 \times 10^{-2}$ |                       | $6.95 \times 10^{-2}$ | $1.43 \times 10^{-2}$ | $6.29 \times 10^{-2}$ |                       |
|           | 35L       | $5.43 \times 10^{-2}$ |                       | $1.16 \times 10^{-2}$ |                       | $5.43 \times 10^{-2}$ | $1.16 \times 10^{-2}$ | $6.29 \times 10^{-2}$ |                       |
|           | 45        | $6.13 \times 10^{-2}$ |                       | $1.24 \times 10^{-2}$ |                       | $6.13 \times 10^{-2}$ | $1.24 \times 10^{-2}$ | $4.69 \times 10^{-2}$ |                       |
|           | 45L       | $4.79 \times 10^{-2}$ |                       | $1.02 \times 10^{-2}$ |                       | $4.79 \times 10^{-2}$ | $1.02 \times 10^{-2}$ | $4.69 \times 10^{-2}$ |                       |
|           | 55        | $4.97 \times 10^{-2}$ |                       | $1.02 \times 10^{-2}$ |                       | $4.97 \times 10^{-2}$ | $1.02 \times 10^{-2}$ | $4.02 \times 10^{-2}$ |                       |
|           | 55L       | $3.88 \times 10^{-2}$ |                       | $8.30 \times 10^{-3}$ |                       | $3.88 \times 10^{-2}$ | $8.30 \times 10^{-3}$ | $4.02 \times 10^{-2}$ |                       |
|           | 65        | $3.87 \times 10^{-2}$ |                       | $7.91 \times 10^{-3}$ |                       | $3.87 \times 10^{-2}$ | $7.91 \times 10^{-3}$ | $3.40 \times 10^{-2}$ |                       |
|           | 65L       | $3.06 \times 10^{-2}$ |                       | $6.51 \times 10^{-3}$ |                       | $3.06 \times 10^{-2}$ | $6.51 \times 10^{-3}$ | $3.40 \times 10^{-2}$ |                       |
| SSR       | 15XW(XTB) | $2.08 \times 10^{-1}$ | $1.04 \times 10^{-1}$ | $3.75 \times 10^{-2}$ | $1.87 \times 10^{-2}$ | $1.46 \times 10^{-1}$ | $2.59 \times 10^{-2}$ | $1.71 \times 10^{-1}$ | $8.57 \times 10^{-2}$ |
|           | 15XV(XSB) | $3.19 \times 10^{-1}$ | $1.60 \times 10^{-1}$ | $5.03 \times 10^{-2}$ | $2.51 \times 10^{-2}$ | $2.20 \times 10^{-1}$ | $3.41 \times 10^{-2}$ | $1.71 \times 10^{-1}$ | $8.57 \times 10^{-2}$ |
|           | 20XW(XTB) | $1.69 \times 10^{-1}$ | $8.46 \times 10^{-2}$ | $3.23 \times 10^{-2}$ | $1.62 \times 10^{-2}$ | $1.19 \times 10^{-1}$ | $2.25 \times 10^{-2}$ | $1.29 \times 10^{-1}$ | $6.44 \times 10^{-2}$ |
|           | 20XV(XSB) | $2.75 \times 10^{-1}$ | $1.37 \times 10^{-1}$ | $4.28 \times 10^{-2}$ | $2.14 \times 10^{-2}$ | $1.89 \times 10^{-1}$ | $2.89 \times 10^{-2}$ | $1.29 \times 10^{-1}$ | $6.44 \times 10^{-2}$ |
|           | 25XW(XTB) | $1.41 \times 10^{-1}$ | $7.05 \times 10^{-2}$ | $2.56 \times 10^{-2}$ | $1.28 \times 10^{-2}$ | $9.86 \times 10^{-2}$ | $1.77 \times 10^{-2}$ | $1.10 \times 10^{-1}$ | $5.51 \times 10^{-2}$ |
|           | 25XV(XSB) | $2.15 \times 10^{-1}$ | $1.08 \times 10^{-1}$ | $3.40 \times 10^{-2}$ | $1.70 \times 10^{-2}$ | $1.48 \times 10^{-1}$ | $2.31 \times 10^{-2}$ | $1.10 \times 10^{-1}$ | $5.51 \times 10^{-2}$ |
|           | 30XW(XTB) | $1.18 \times 10^{-1}$ | $5.91 \times 10^{-2}$ | $2.19 \times 10^{-2}$ | $1.10 \times 10^{-2}$ | $8.26 \times 10^{-2}$ | $1.52 \times 10^{-2}$ | $9.22 \times 10^{-2}$ | $4.61 \times 10^{-2}$ |
|           | 30XV(XSB) | $1.85 \times 10^{-1}$ | $9.24 \times 10^{-2}$ | $4.69 \times 10^{-2}$ | $2.34 \times 10^{-2}$ | $1.27 \times 10^{-1}$ | $3.19 \times 10^{-2}$ | $9.16 \times 10^{-2}$ | $4.58 \times 10^{-2}$ |
|           | 35XW(XTB) | $1.01 \times 10^{-1}$ | $5.03 \times 10^{-2}$ | $1.92 \times 10^{-2}$ | $9.60 \times 10^{-3}$ | $7.04 \times 10^{-2}$ | $1.33 \times 10^{-2}$ | $7.64 \times 10^{-2}$ | $3.82 \times 10^{-2}$ |
| SVR       | 35XV(XSB) | $1.58 \times 10^{-1}$ | $7.91 \times 10^{-2}$ | $4.04 \times 10^{-2}$ | $2.02 \times 10^{-2}$ | $1.09 \times 10^{-1}$ | $2.75 \times 10^{-2}$ | $7.59 \times 10^{-2}$ | $3.80 \times 10^{-2}$ |
|           | 25        | $1.13 \times 10^{-1}$ | $7.28 \times 10^{-2}$ | $2.25 \times 10^{-2}$ | $1.45 \times 10^{-2}$ | $7.14 \times 10^{-2}$ | $1.43 \times 10^{-2}$ | $9.59 \times 10^{-2}$ | $6.17 \times 10^{-2}$ |
|           | 25L       | $9.14 \times 10^{-2}$ | $5.88 \times 10^{-2}$ | $1.85 \times 10^{-2}$ | $1.19 \times 10^{-2}$ | $5.80 \times 10^{-2}$ | $1.17 \times 10^{-2}$ | $9.59 \times 10^{-2}$ | $6.17 \times 10^{-2}$ |
|           | 30        | $1.01 \times 10^{-1}$ | $6.50 \times 10^{-2}$ | $1.89 \times 10^{-2}$ | $1.21 \times 10^{-2}$ | $6.36 \times 10^{-2}$ | $1.19 \times 10^{-2}$ | $8.45 \times 10^{-2}$ | $5.43 \times 10^{-2}$ |
|           | 30L       | $7.56 \times 10^{-2}$ | $4.86 \times 10^{-2}$ | $1.57 \times 10^{-2}$ | $1.01 \times 10^{-2}$ | $4.79 \times 10^{-2}$ | $1.00 \times 10^{-2}$ | $8.45 \times 10^{-2}$ | $5.43 \times 10^{-2}$ |
|           | 35        | $9.19 \times 10^{-2}$ | $5.91 \times 10^{-2}$ | $1.68 \times 10^{-2}$ | $1.08 \times 10^{-2}$ | $5.77 \times 10^{-2}$ | $1.06 \times 10^{-2}$ | $7.08 \times 10^{-2}$ | $4.55 \times 10^{-2}$ |
|           | 35L       | $6.80 \times 10^{-2}$ | $4.37 \times 10^{-2}$ | $1.39 \times 10^{-2}$ | $8.97 \times 10^{-3}$ | $4.31 \times 10^{-2}$ | $8.86 \times 10^{-3}$ | $7.08 \times 10^{-2}$ | $4.55 \times 10^{-2}$ |
|           | 45        | $6.73 \times 10^{-2}$ | $4.33 \times 10^{-2}$ | $1.35 \times 10^{-2}$ | $8.71 \times 10^{-3}$ | $4.25 \times 10^{-2}$ | $8.59 \times 10^{-3}$ | $5.32 \times 10^{-2}$ | $3.42 \times 10^{-2}$ |
|           | 45L       | $5.40 \times 10^{-2}$ | $3.47 \times 10^{-2}$ | $1.10 \times 10^{-2}$ | $7.09 \times 10^{-3}$ | $3.41 \times 10^{-2}$ | $6.97 \times 10^{-3}$ | $5.30 \times 10^{-2}$ | $3.41 \times 10^{-2}$ |
|           | 55        | $5.89 \times 10^{-2}$ | $3.79 \times 10^{-2}$ | $1.14 \times 10^{-2}$ | $7.35 \times 10^{-3}$ | $3.72 \times 10^{-2}$ | $7.24 \times 10^{-3}$ | $4.63 \times 10^{-2}$ | $2.98 \times 10^{-2}$ |
|           | 55L       | $4.55 \times 10^{-2}$ | $2.92 \times 10^{-2}$ | $9.45 \times 10^{-3}$ | $6.08 \times 10^{-3}$ | $2.89 \times 10^{-2}$ | $6.02 \times 10^{-3}$ | $4.63 \times 10^{-2}$ | $2.98 \times 10^{-2}$ |
|           | 65        | $4.85 \times 10^{-2}$ | $3.12 \times 10^{-2}$ | $1.01 \times 10^{-2}$ | $6.48 \times 10^{-3}$ | $3.06 \times 10^{-2}$ | $6.40 \times 10^{-3}$ | $3.91 \times 10^{-2}$ | $2.51 \times 10^{-2}$ |
|           | 65L       | $3.58 \times 10^{-2}$ | $2.30 \times 10^{-2}$ | $7.73 \times 10^{-3}$ | $4.97 \times 10^{-3}$ | $2.28 \times 10^{-2}$ | $4.93 \times 10^{-3}$ | $3.91 \times 10^{-2}$ | $2.51 \times 10^{-2}$ |

| Model No. |      | Equivalent factor     |                       |                       |                       |                       |                       |                       |                       |
|-----------|------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|           |      | $K_{AR1}$             | $K_{AL1}$             | $K_{AR2}$             | $K_{AL2}$             | $K_{B1}$              | $K_{B2}$              | $K_{CR}$              | $K_{CL}$              |
| SVS       | 25   | $1.09 \times 10^{-1}$ | $9.14 \times 10^{-2}$ | $2.17 \times 10^{-2}$ | $1.82 \times 10^{-2}$ | $1.00 \times 10^{-1}$ | $2.00 \times 10^{-2}$ | $9.95 \times 10^{-2}$ | $8.35 \times 10^{-2}$ |
|           | 25L  | $8.82 \times 10^{-2}$ | $7.40 \times 10^{-2}$ | $1.78 \times 10^{-2}$ | $1.50 \times 10^{-2}$ | $8.13 \times 10^{-2}$ | $1.64 \times 10^{-2}$ | $9.95 \times 10^{-2}$ | $8.35 \times 10^{-2}$ |
|           | 30   | $9.71 \times 10^{-2}$ | $8.15 \times 10^{-2}$ | $1.82 \times 10^{-2}$ | $1.52 \times 10^{-2}$ | $8.95 \times 10^{-2}$ | $1.67 \times 10^{-2}$ | $8.78 \times 10^{-2}$ | $7.37 \times 10^{-2}$ |
|           | 30L  | $7.29 \times 10^{-2}$ | $6.11 \times 10^{-2}$ | $1.51 \times 10^{-2}$ | $1.27 \times 10^{-2}$ | $6.72 \times 10^{-2}$ | $1.39 \times 10^{-2}$ | $8.78 \times 10^{-2}$ | $7.37 \times 10^{-2}$ |
|           | 35   | $8.84 \times 10^{-2}$ | $7.42 \times 10^{-2}$ | $1.61 \times 10^{-2}$ | $1.35 \times 10^{-2}$ | $8.14 \times 10^{-2}$ | $1.48 \times 10^{-2}$ | $7.36 \times 10^{-2}$ | $6.17 \times 10^{-2}$ |
|           | 35L  | $6.56 \times 10^{-2}$ | $5.50 \times 10^{-2}$ | $1.34 \times 10^{-2}$ | $1.13 \times 10^{-2}$ | $6.04 \times 10^{-2}$ | $1.24 \times 10^{-2}$ | $7.36 \times 10^{-2}$ | $6.17 \times 10^{-2}$ |
|           | 45   | $6.48 \times 10^{-2}$ | $5.44 \times 10^{-2}$ | $1.30 \times 10^{-2}$ | $1.09 \times 10^{-2}$ | $5.98 \times 10^{-2}$ | $1.20 \times 10^{-2}$ | $5.45 \times 10^{-2}$ | $4.57 \times 10^{-2}$ |
|           | 45L  | $5.22 \times 10^{-2}$ | $4.38 \times 10^{-2}$ | $1.07 \times 10^{-2}$ | $8.94 \times 10^{-3}$ | $4.81 \times 10^{-2}$ | $9.81 \times 10^{-3}$ | $5.44 \times 10^{-2}$ | $4.56 \times 10^{-2}$ |
|           | 55   | $5.67 \times 10^{-2}$ | $4.76 \times 10^{-2}$ | $1.10 \times 10^{-2}$ | $9.24 \times 10^{-3}$ | $5.23 \times 10^{-2}$ | $1.01 \times 10^{-2}$ | $4.78 \times 10^{-2}$ | $4.01 \times 10^{-2}$ |
|           | 55L  | $4.39 \times 10^{-2}$ | $3.68 \times 10^{-2}$ | $9.12 \times 10^{-3}$ | $7.65 \times 10^{-3}$ | $4.05 \times 10^{-2}$ | $8.40 \times 10^{-3}$ | $4.78 \times 10^{-2}$ | $4.01 \times 10^{-2}$ |
|           | 65   | $4.67 \times 10^{-2}$ | $3.92 \times 10^{-2}$ | $9.72 \times 10^{-3}$ | $8.15 \times 10^{-3}$ | $4.30 \times 10^{-2}$ | $8.95 \times 10^{-3}$ | $4.04 \times 10^{-2}$ | $3.39 \times 10^{-2}$ |
|           | 65L  | $3.46 \times 10^{-2}$ | $2.90 \times 10^{-2}$ | $7.46 \times 10^{-3}$ | $6.26 \times 10^{-3}$ | $3.19 \times 10^{-2}$ | $6.88 \times 10^{-3}$ | $4.04 \times 10^{-2}$ | $3.39 \times 10^{-2}$ |
| SHW       | 12   | $2.48 \times 10^{-1}$ |                       | $4.69 \times 10^{-2}$ |                       | $2.48 \times 10^{-1}$ | $4.69 \times 10^{-2}$ | $1.40 \times 10^{-1}$ |                       |
|           | 12HR | $1.70 \times 10^{-1}$ |                       | $3.52 \times 10^{-2}$ |                       | $1.70 \times 10^{-1}$ | $3.52 \times 10^{-2}$ | $1.40 \times 10^{-1}$ |                       |
|           | 14   | $1.92 \times 10^{-1}$ |                       | $3.80 \times 10^{-2}$ |                       | $1.92 \times 10^{-1}$ | $3.80 \times 10^{-2}$ | $9.93 \times 10^{-2}$ |                       |
|           | 17   | $1.72 \times 10^{-1}$ |                       | $3.41 \times 10^{-2}$ |                       | $1.72 \times 10^{-1}$ | $3.41 \times 10^{-2}$ | $6.21 \times 10^{-2}$ |                       |
|           | 21   | $1.59 \times 10^{-1}$ |                       | $2.95 \times 10^{-2}$ |                       | $1.59 \times 10^{-1}$ | $2.95 \times 10^{-2}$ | $5.57 \times 10^{-2}$ |                       |
|           | 27   | $1.21 \times 10^{-1}$ |                       | $2.39 \times 10^{-2}$ |                       | $1.21 \times 10^{-1}$ | $2.39 \times 10^{-2}$ | $4.99 \times 10^{-2}$ |                       |
|           | 35   | $8.15 \times 10^{-2}$ |                       | $1.64 \times 10^{-2}$ |                       | $8.15 \times 10^{-2}$ | $1.64 \times 10^{-2}$ | $3.02 \times 10^{-2}$ |                       |
| SRS       | 50   | $6.22 \times 10^{-2}$ |                       | $1.24 \times 10^{-2}$ |                       | $6.22 \times 10^{-2}$ | $1.24 \times 10^{-2}$ | $2.30 \times 10^{-2}$ |                       |
|           | 5M   | $6.33 \times 10^{-1}$ |                       | $9.20 \times 10^{-2}$ |                       | $6.45 \times 10^{-1}$ | $9.30 \times 10^{-2}$ | $3.85 \times 10^{-1}$ |                       |
|           | 5GM  | $6.71 \times 10^{-1}$ |                       | $9.15 \times 10^{-2}$ |                       | $6.66 \times 10^{-1}$ | $9.08 \times 10^{-2}$ | $3.85 \times 10^{-1}$ |                       |
|           | 5N   | $5.23 \times 10^{-1}$ |                       | $7.87 \times 10^{-2}$ |                       | $5.32 \times 10^{-1}$ | $7.99 \times 10^{-2}$ | $3.86 \times 10^{-1}$ |                       |
|           | 5GN  | $5.25 \times 10^{-1}$ |                       | $7.97 \times 10^{-2}$ |                       | $5.33 \times 10^{-1}$ | $8.12 \times 10^{-2}$ | $3.84 \times 10^{-1}$ |                       |
|           | 5WM  | $4.48 \times 10^{-1}$ |                       | $7.30 \times 10^{-2}$ |                       | $4.56 \times 10^{-1}$ | $7.40 \times 10^{-2}$ | $1.96 \times 10^{-1}$ |                       |
|           | 5WGM | $4.58 \times 10^{-1}$ |                       | $7.39 \times 10^{-2}$ |                       | $4.54 \times 10^{-1}$ | $7.34 \times 10^{-2}$ | $1.96 \times 10^{-1}$ |                       |
|           | 5WN  | $3.31 \times 10^{-1}$ |                       | $5.93 \times 10^{-2}$ |                       | $3.36 \times 10^{-1}$ | $6.02 \times 10^{-2}$ | $1.96 \times 10^{-1}$ |                       |
|           | 5WGN | $3.31 \times 10^{-1}$ |                       | $5.97 \times 10^{-2}$ |                       | $3.35 \times 10^{-1}$ | $6.05 \times 10^{-2}$ | $1.96 \times 10^{-1}$ |                       |
|           | 7S   | $6.03 \times 10^{-1}$ |                       | $7.65 \times 10^{-2}$ |                       | $6.27 \times 10^{-1}$ | $7.91 \times 10^{-2}$ | $2.58 \times 10^{-1}$ |                       |
|           | 7GS  | $5.92 \times 10^{-1}$ |                       | $7.89 \times 10^{-2}$ |                       | $6.14 \times 10^{-1}$ | $8.17 \times 10^{-2}$ | $2.58 \times 10^{-1}$ |                       |
|           | 7M   | $4.19 \times 10^{-1}$ |                       | $6.76 \times 10^{-2}$ |                       | $4.18 \times 10^{-1}$ | $6.94 \times 10^{-2}$ | $2.58 \times 10^{-1}$ |                       |
|           | 7GM  | $4.27 \times 10^{-1}$ |                       | $6.04 \times 10^{-2}$ |                       | $4.43 \times 10^{-1}$ | $6.23 \times 10^{-2}$ | $2.34 \times 10^{-1}$ |                       |
|           | 7N   | $2.97 \times 10^{-1}$ |                       | $5.35 \times 10^{-2}$ |                       | $3.07 \times 10^{-1}$ | $5.50 \times 10^{-2}$ | $2.58 \times 10^{-1}$ |                       |
|           | 7GN  | $3.11 \times 10^{-1}$ |                       | $5.35 \times 10^{-2}$ |                       | $3.20 \times 10^{-1}$ | $5.51 \times 10^{-2}$ | $2.58 \times 10^{-1}$ |                       |
|           | 7WS  | $4.67 \times 10^{-1}$ |                       | $6.89 \times 10^{-2}$ |                       | $4.84 \times 10^{-1}$ | $7.08 \times 10^{-2}$ | $1.36 \times 10^{-1}$ |                       |
|           | 7WGS | $5.23 \times 10^{-1}$ |                       | $6.75 \times 10^{-2}$ |                       | $5.43 \times 10^{-1}$ | $6.95 \times 10^{-2}$ | $1.36 \times 10^{-1}$ |                       |
|           | 7WM  | $3.01 \times 10^{-1}$ |                       | $5.32 \times 10^{-2}$ |                       | $3.00 \times 10^{-1}$ | $5.46 \times 10^{-2}$ | $1.36 \times 10^{-1}$ |                       |
|           | 7WGM | $2.83 \times 10^{-1}$ |                       | $4.87 \times 10^{-2}$ |                       | $2.93 \times 10^{-1}$ | $5.02 \times 10^{-2}$ | $1.24 \times 10^{-1}$ |                       |
|           | 7WN  | $2.19 \times 10^{-1}$ |                       | $4.16 \times 10^{-2}$ |                       | $2.24 \times 10^{-1}$ | $4.28 \times 10^{-2}$ | $1.36 \times 10^{-1}$ |                       |
|           | 7WGN | $2.20 \times 10^{-1}$ |                       | $4.17 \times 10^{-2}$ |                       | $2.27 \times 10^{-1}$ | $4.31 \times 10^{-2}$ | $1.36 \times 10^{-1}$ |                       |

$K_{AR1}$  : Equivalent factor in the  $M_r$  radial direction when one LM block is used  
 $K_{AL1}$  : Equivalent factor in the  $M_r$  reverse radial direction when one LM block is used  
 $K_{AR2}$  : Equivalent factor in the  $M_a$  radial direction when two LM blocks are used in close contact with each other  
 $K_{AL2}$  : Equivalent factor in the  $M_a$  reverse radial direction when two LM blocks are used in close contact with each other

$K_{B1}$  :  $M_s$  Equivalent factor when one LM block is used  
 $K_{B2}$  :  $M_s$  Equivalent factor when two LM blocks are used in close contact with each other  
 $K_{CR}$  : Equivalent factor in the  $M_c$  radial direction  
 $K_{CL}$  : Equivalent factor in the  $M_c$  reverse radial direction

Table2 Equivalent Factors (Models SRS, SCR, EPF and HSR)

| Model No. |       | Equivalent factor     |                  |                       |                  |                       |                       | K <sub>CR</sub> | K <sub>CL</sub>       |
|-----------|-------|-----------------------|------------------|-----------------------|------------------|-----------------------|-----------------------|-----------------|-----------------------|
|           |       | K <sub>AR1</sub>      | K <sub>AL1</sub> | K <sub>AR2</sub>      | K <sub>AL2</sub> | K <sub>B1</sub>       | K <sub>B2</sub>       |                 |                       |
| SRS       | 9XS   | $4.86 \times 10^{-1}$ |                  | $6.89 \times 10^{-2}$ |                  | $5.04 \times 10^{-1}$ | $7.11 \times 10^{-2}$ |                 | $2.17 \times 10^{-1}$ |
|           | 9XGS  | $5.37 \times 10^{-1}$ |                  | $6.77 \times 10^{-2}$ |                  | $5.57 \times 10^{-1}$ | $7.00 \times 10^{-2}$ |                 | $2.17 \times 10^{-1}$ |
|           | 9XM   | $2.95 \times 10^{-1}$ |                  | $5.27 \times 10^{-2}$ |                  | $3.06 \times 10^{-1}$ | $5.43 \times 10^{-2}$ |                 | $2.17 \times 10^{-1}$ |
|           | 9XGM  | $3.10 \times 10^{-1}$ |                  | $5.28 \times 10^{-2}$ |                  | $3.19 \times 10^{-1}$ | $5.44 \times 10^{-2}$ |                 | $2.17 \times 10^{-1}$ |
|           | 9XN   | $2.13 \times 10^{-1}$ |                  | $4.12 \times 10^{-2}$ |                  | $2.19 \times 10^{-1}$ | $4.23 \times 10^{-2}$ |                 | $2.17 \times 10^{-1}$ |
|           | 9XGN  | $2.18 \times 10^{-1}$ |                  | $4.14 \times 10^{-2}$ |                  | $2.24 \times 10^{-1}$ | $4.27 \times 10^{-2}$ |                 | $2.17 \times 10^{-1}$ |
|           | 9WS   | $4.10 \times 10^{-1}$ |                  | $5.73 \times 10^{-2}$ |                  | $4.25 \times 10^{-1}$ | $5.63 \times 10^{-2}$ |                 | $1.06 \times 10^{-1}$ |
|           | 9WGS  | $4.16 \times 10^{-1}$ |                  | $5.80 \times 10^{-2}$ |                  | $4.30 \times 10^{-1}$ | $5.98 \times 10^{-2}$ |                 | $1.06 \times 10^{-1}$ |
|           | 9WM   | $2.37 \times 10^{-1}$ |                  | $4.25 \times 10^{-2}$ |                  | $2.44 \times 10^{-1}$ | $4.37 \times 10^{-2}$ |                 | $1.06 \times 10^{-1}$ |
|           | 9WGM  | $2.41 \times 10^{-1}$ |                  | $4.80 \times 10^{-2}$ |                  | $2.41 \times 10^{-1}$ | $4.13 \times 10^{-2}$ |                 | $1.06 \times 10^{-1}$ |
|           | 9WN   | $1.74 \times 10^{-1}$ |                  | $3.35 \times 10^{-2}$ |                  | $1.78 \times 10^{-1}$ | $3.44 \times 10^{-2}$ |                 | $1.06 \times 10^{-1}$ |
|           | 9WGN  | $1.75 \times 10^{-1}$ |                  | $3.38 \times 10^{-2}$ |                  | $1.73 \times 10^{-1}$ | $3.32 \times 10^{-2}$ |                 | $1.06 \times 10^{-1}$ |
|           | 12S   | $4.55 \times 10^{-1}$ |                  | $5.60 \times 10^{-2}$ |                  | $4.55 \times 10^{-1}$ | $5.60 \times 10^{-2}$ |                 | $1.52 \times 10^{-1}$ |
|           | 12GS  | $5.04 \times 10^{-1}$ |                  | $5.51 \times 10^{-2}$ |                  | $5.04 \times 10^{-1}$ | $5.51 \times 10^{-2}$ |                 | $1.52 \times 10^{-1}$ |
|           | 12M   | $2.94 \times 10^{-1}$ |                  | $4.50 \times 10^{-2}$ |                  | $2.94 \times 10^{-1}$ | $4.50 \times 10^{-2}$ |                 | $1.53 \times 10^{-1}$ |
|           | 12GM  | $2.93 \times 10^{-1}$ |                  | $4.49 \times 10^{-2}$ |                  | $2.93 \times 10^{-1}$ | $4.49 \times 10^{-2}$ |                 | $1.53 \times 10^{-1}$ |
|           | 12N   | $1.86 \times 10^{-1}$ |                  | $3.51 \times 10^{-2}$ |                  | $1.86 \times 10^{-1}$ | $3.51 \times 10^{-2}$ |                 | $1.53 \times 10^{-1}$ |
|           | 12GN  | $1.96 \times 10^{-1}$ |                  | $3.50 \times 10^{-2}$ |                  | $1.96 \times 10^{-1}$ | $3.50 \times 10^{-2}$ |                 | $1.53 \times 10^{-1}$ |
|           | 12WS  | $3.22 \times 10^{-1}$ |                  | $5.00 \times 10^{-2}$ |                  | $3.22 \times 10^{-1}$ | $5.00 \times 10^{-2}$ |                 | $7.97 \times 10^{-2}$ |
|           | 12WGS | $3.32 \times 10^{-1}$ |                  | $5.07 \times 10^{-2}$ |                  | $3.32 \times 10^{-1}$ | $5.07 \times 10^{-2}$ |                 | $7.97 \times 10^{-2}$ |
|           | 12WM  | $2.00 \times 10^{-1}$ |                  | $3.69 \times 10^{-2}$ |                  | $2.00 \times 10^{-1}$ | $3.69 \times 10^{-2}$ |                 | $7.97 \times 10^{-2}$ |
|           | 12WGM | $2.07 \times 10^{-1}$ |                  | $3.64 \times 10^{-2}$ |                  | $2.07 \times 10^{-1}$ | $3.64 \times 10^{-2}$ |                 | $7.96 \times 10^{-2}$ |
|           | 12WN  | $1.44 \times 10^{-1}$ |                  | $2.83 \times 10^{-2}$ |                  | $1.44 \times 10^{-1}$ | $2.83 \times 10^{-2}$ |                 | $7.97 \times 10^{-2}$ |
|           | 12WGN | $1.46 \times 10^{-1}$ |                  | $2.85 \times 10^{-2}$ |                  | $1.46 \times 10^{-1}$ | $2.85 \times 10^{-2}$ |                 | $7.95 \times 10^{-2}$ |
|           | 15S   | $3.56 \times 10^{-1}$ |                  | $4.38 \times 10^{-2}$ |                  | $3.56 \times 10^{-1}$ | $4.38 \times 10^{-2}$ |                 | $1.41 \times 10^{-1}$ |
|           | 15GS  | $3.37 \times 10^{-1}$ |                  | $4.57 \times 10^{-2}$ |                  | $3.37 \times 10^{-1}$ | $4.57 \times 10^{-2}$ |                 | $1.41 \times 10^{-1}$ |
|           | 15M   | $2.17 \times 10^{-1}$ |                  | $3.69 \times 10^{-2}$ |                  | $2.17 \times 10^{-1}$ | $3.69 \times 10^{-2}$ |                 | $1.41 \times 10^{-1}$ |
|           | 15GM  | $2.31 \times 10^{-1}$ |                  | $3.61 \times 10^{-2}$ |                  | $2.31 \times 10^{-1}$ | $3.61 \times 10^{-2}$ |                 | $1.41 \times 10^{-1}$ |
|           | 15N   | $1.43 \times 10^{-1}$ |                  | $2.73 \times 10^{-2}$ |                  | $1.43 \times 10^{-1}$ | $2.73 \times 10^{-2}$ |                 | $1.41 \times 10^{-1}$ |
|           | 15GN  | $1.45 \times 10^{-1}$ |                  | $2.75 \times 10^{-2}$ |                  | $1.45 \times 10^{-1}$ | $2.75 \times 10^{-2}$ |                 | $1.41 \times 10^{-1}$ |
|           | 15WS  | $2.34 \times 10^{-1}$ |                  | $3.76 \times 10^{-2}$ |                  | $2.34 \times 10^{-1}$ | $3.76 \times 10^{-2}$ |                 | $4.83 \times 10^{-2}$ |
|           | 15WGS | $2.34 \times 10^{-1}$ |                  | $3.81 \times 10^{-2}$ |                  | $2.34 \times 10^{-1}$ | $3.81 \times 10^{-2}$ |                 | $4.84 \times 10^{-2}$ |
|           | 15WM  | $1.67 \times 10^{-1}$ |                  | $2.94 \times 10^{-2}$ |                  | $1.67 \times 10^{-1}$ | $2.94 \times 10^{-2}$ |                 | $4.83 \times 10^{-2}$ |
|           | 15WGM | $1.63 \times 10^{-1}$ |                  | $2.93 \times 10^{-2}$ |                  | $1.63 \times 10^{-1}$ | $2.93 \times 10^{-2}$ |                 | $4.83 \times 10^{-2}$ |
|           | 15WN  | $1.13 \times 10^{-1}$ |                  | $2.27 \times 10^{-2}$ |                  | $1.13 \times 10^{-1}$ | $2.27 \times 10^{-2}$ |                 | $4.83 \times 10^{-2}$ |
|           | 15WGN | $1.15 \times 10^{-1}$ |                  | $2.28 \times 10^{-2}$ |                  | $1.15 \times 10^{-1}$ | $2.28 \times 10^{-2}$ |                 | $4.83 \times 10^{-2}$ |
|           | 20M   | $1.80 \times 10^{-1}$ |                  | $3.30 \times 10^{-2}$ |                  | $1.86 \times 10^{-1}$ | $3.41 \times 10^{-2}$ |                 | $9.34 \times 10^{-2}$ |
|           | 20GM  | $2.10 \times 10^{-1}$ |                  | $3.88 \times 10^{-2}$ |                  | $2.10 \times 10^{-1}$ | $3.87 \times 10^{-2}$ |                 | $1.03 \times 10^{-1}$ |
|           | 25M   | $1.14 \times 10^{-1}$ |                  | $2.17 \times 10^{-2}$ |                  | $1.14 \times 10^{-1}$ | $2.17 \times 10^{-2}$ |                 | $8.13 \times 10^{-2}$ |
|           | 25GM  | $1.23 \times 10^{-1}$ |                  | $2.32 \times 10^{-2}$ |                  | $1.23 \times 10^{-1}$ | $2.32 \times 10^{-2}$ |                 | $8.75 \times 10^{-2}$ |

| Model No. |       | Equivalent factor     |                  |                       |                  |                                             |                       |                       |                 |
|-----------|-------|-----------------------|------------------|-----------------------|------------------|---------------------------------------------|-----------------------|-----------------------|-----------------|
|           |       | K <sub>AR1</sub>      | K <sub>AL1</sub> | K <sub>AR2</sub>      | K <sub>AL2</sub> | K <sub>B1</sub> K <sub>B2</sub>             |                       | K <sub>CR</sub>       | K <sub>CL</sub> |
| SCR       | 15S   | $1.38 \times 10^{-1}$ |                  | $2.69 \times 10^{-2}$ |                  | $1.38 \times 10^{-1}$                       |                       | —                     |                 |
|           | 20S   | $1.15 \times 10^{-1}$ |                  | $2.18 \times 10^{-2}$ |                  | $1.15 \times 10^{-1}$                       |                       | —                     |                 |
|           | 20    | $8.85 \times 10^{-2}$ |                  | $1.79 \times 10^{-2}$ |                  | $8.85 \times 10^{-2}$                       |                       | —                     |                 |
|           | 25    | $9.25 \times 10^{-2}$ |                  | $1.90 \times 10^{-2}$ |                  | $9.25 \times 10^{-2}$ $1.90 \times 10^{-2}$ |                       | —                     |                 |
|           | 30    | $8.47 \times 10^{-2}$ |                  | $1.63 \times 10^{-2}$ |                  | $8.47 \times 10^{-2}$ $1.63 \times 10^{-2}$ |                       | —                     |                 |
|           | 35    | $6.95 \times 10^{-2}$ |                  | $1.43 \times 10^{-2}$ |                  | $6.95 \times 10^{-2}$ $1.43 \times 10^{-2}$ |                       | —                     |                 |
|           | 45    | $6.13 \times 10^{-2}$ |                  | $1.24 \times 10^{-2}$ |                  | $6.13 \times 10^{-2}$ $1.24 \times 10^{-2}$ |                       | —                     |                 |
|           | 65    | $3.87 \times 10^{-2}$ |                  | $7.91 \times 10^{-3}$ |                  | $3.87 \times 10^{-2}$ $7.91 \times 10^{-3}$ |                       | —                     |                 |
| EPF       | 7M    | $3.55 \times 10^{-1}$ |                  | —                     |                  | $3.55 \times 10^{-1}$                       |                       | $2.86 \times 10^{-1}$ |                 |
|           | 9M    | $3.10 \times 10^{-1}$ |                  | —                     |                  | $3.10 \times 10^{-1}$                       |                       | $2.22 \times 10^{-1}$ |                 |
|           | 12M   | $2.68 \times 10^{-1}$ |                  | —                     |                  | $2.68 \times 10^{-1}$                       |                       | $1.67 \times 10^{-1}$ |                 |
|           | 15M   | $2.00 \times 10^{-1}$ |                  | —                     |                  | $2.00 \times 10^{-1}$                       |                       | $1.34 \times 10^{-1}$ |                 |
| HSR       | 8     | $4.39 \times 10^{-1}$ |                  | $6.75 \times 10^{-2}$ |                  | $4.39 \times 10^{-1}$                       | $6.75 \times 10^{-2}$ | $2.97 \times 10^{-1}$ |                 |
|           | 10    | $3.09 \times 10^{-1}$ |                  | $5.33 \times 10^{-2}$ |                  | $3.09 \times 10^{-1}$                       | $5.33 \times 10^{-2}$ | $2.35 \times 10^{-1}$ |                 |
|           | 12    | $2.08 \times 10^{-1}$ |                  | $3.74 \times 10^{-2}$ |                  | $2.08 \times 10^{-1}$                       | $3.74 \times 10^{-2}$ | $1.91 \times 10^{-1}$ |                 |
|           | 15    | $1.66 \times 10^{-1}$ |                  | $2.98 \times 10^{-2}$ |                  | $1.66 \times 10^{-1}$                       | $2.98 \times 10^{-2}$ | $1.57 \times 10^{-1}$ |                 |
|           | 15L   | $1.18 \times 10^{-1}$ |                  | $2.33 \times 10^{-2}$ |                  | $1.18 \times 10^{-1}$                       | $2.33 \times 10^{-2}$ | $1.57 \times 10^{-1}$ |                 |
|           | 20    | $1.26 \times 10^{-1}$ |                  | $2.28 \times 10^{-2}$ |                  | $1.26 \times 10^{-1}$                       | $2.28 \times 10^{-2}$ | $1.17 \times 10^{-1}$ |                 |
|           | 20L   | $9.88 \times 10^{-2}$ |                  | $1.92 \times 10^{-2}$ |                  | $9.88 \times 10^{-2}$                       | $1.92 \times 10^{-2}$ | $1.17 \times 10^{-1}$ |                 |
|           | 25    | $1.12 \times 10^{-1}$ |                  | $2.02 \times 10^{-2}$ |                  | $1.12 \times 10^{-1}$                       | $2.02 \times 10^{-2}$ | $9.96 \times 10^{-2}$ |                 |
|           | 25L   | $8.23 \times 10^{-2}$ |                  | $1.70 \times 10^{-2}$ |                  | $8.23 \times 10^{-2}$                       | $1.70 \times 10^{-2}$ | $9.96 \times 10^{-2}$ |                 |
|           | 30    | $8.97 \times 10^{-2}$ |                  | $1.73 \times 10^{-2}$ |                  | $8.97 \times 10^{-2}$                       | $1.73 \times 10^{-2}$ | $8.24 \times 10^{-2}$ |                 |
|           | 30L   | $7.05 \times 10^{-2}$ |                  | $1.44 \times 10^{-2}$ |                  | $7.05 \times 10^{-2}$                       | $1.44 \times 10^{-2}$ | $8.24 \times 10^{-2}$ |                 |
|           | 35    | $7.85 \times 10^{-2}$ |                  | $1.56 \times 10^{-2}$ |                  | $7.85 \times 10^{-2}$                       | $1.56 \times 10^{-2}$ | $6.69 \times 10^{-2}$ |                 |
|           | 35L   | $6.17 \times 10^{-2}$ |                  | $1.29 \times 10^{-2}$ |                  | $6.17 \times 10^{-2}$                       | $1.29 \times 10^{-2}$ | $6.69 \times 10^{-2}$ |                 |
|           | 45    | $6.73 \times 10^{-2}$ |                  | $1.21 \times 10^{-2}$ |                  | $6.73 \times 10^{-2}$                       | $1.21 \times 10^{-2}$ | $5.20 \times 10^{-2}$ |                 |
|           | 45L   | $5.22 \times 10^{-2}$ |                  | $1.01 \times 10^{-2}$ |                  | $5.22 \times 10^{-2}$                       | $1.01 \times 10^{-2}$ | $5.20 \times 10^{-2}$ |                 |
|           | 55    | $5.61 \times 10^{-2}$ |                  | $1.03 \times 10^{-2}$ |                  | $5.61 \times 10^{-2}$                       | $1.03 \times 10^{-2}$ | $4.26 \times 10^{-2}$ |                 |
|           | 55L   | $4.35 \times 10^{-2}$ |                  | $8.56 \times 10^{-3}$ |                  | $4.35 \times 10^{-2}$                       | $8.56 \times 10^{-3}$ | $4.26 \times 10^{-2}$ |                 |
|           | 65    | $4.49 \times 10^{-2}$ |                  | $9.13 \times 10^{-3}$ |                  | $4.49 \times 10^{-2}$                       | $9.13 \times 10^{-3}$ | $3.68 \times 10^{-2}$ |                 |
|           | 65L   | $3.29 \times 10^{-2}$ |                  | $7.08 \times 10^{-3}$ |                  | $3.29 \times 10^{-2}$                       | $7.08 \times 10^{-3}$ | $3.68 \times 10^{-2}$ |                 |
|           | 85    | $3.49 \times 10^{-2}$ |                  | $6.94 \times 10^{-3}$ |                  | $3.49 \times 10^{-2}$                       | $6.94 \times 10^{-3}$ | $2.78 \times 10^{-2}$ |                 |
|           | 85L   | $2.74 \times 10^{-2}$ |                  | $5.72 \times 10^{-3}$ |                  | $2.74 \times 10^{-2}$                       | $5.72 \times 10^{-3}$ | $2.78 \times 10^{-2}$ |                 |
|           | 100   | $2.61 \times 10^{-2}$ |                  | $5.16 \times 10^{-3}$ |                  | $2.61 \times 10^{-2}$                       | $5.16 \times 10^{-3}$ | $2.24 \times 10^{-2}$ |                 |
|           | 120   | $2.37 \times 10^{-2}$ |                  | $4.72 \times 10^{-3}$ |                  | $2.37 \times 10^{-2}$                       | $4.72 \times 10^{-3}$ | $1.96 \times 10^{-2}$ |                 |
|           | 150   | $2.17 \times 10^{-2}$ |                  | $4.35 \times 10^{-3}$ |                  | $2.17 \times 10^{-2}$                       | $4.35 \times 10^{-3}$ | $1.61 \times 10^{-2}$ |                 |
|           | 15M2A | $1.65 \times 10^{-1}$ |                  | $2.89 \times 10^{-2}$ |                  | $1.65 \times 10^{-1}$                       | $2.89 \times 10^{-2}$ | $1.86 \times 10^{-1}$ |                 |
|           | 20M2A | $1.23 \times 10^{-1}$ |                  | $2.23 \times 10^{-2}$ |                  | $1.23 \times 10^{-1}$                       | $2.23 \times 10^{-2}$ | $1.34 \times 10^{-1}$ |                 |
|           | 25M2A | $1.10 \times 10^{-1}$ |                  | $1.98 \times 10^{-2}$ |                  | $1.10 \times 10^{-1}$                       | $1.98 \times 10^{-2}$ | $1.14 \times 10^{-1}$ |                 |

K<sub>AR1</sub> : Equivalent factor in the M<sub>A</sub> radial direction when one LM block is used

K<sub>AL1</sub> : Equivalent factor in the M<sub>A</sub> reverse radial direction when one LM block is used

K<sub>AR2</sub> : Equivalent factor in the M<sub>A</sub> radial direction when two LM blocks are used in close contact with each other

K<sub>AL2</sub> : Equivalent factor in the M<sub>A</sub> reverse radial direction when two LM blocks are used in close contact with each other

K<sub>B1</sub> : M<sub>B</sub> Equivalent factor when one LM block is used

K<sub>B2</sub> : M<sub>B</sub> Equivalent factor when two LM blocks are used in close contact with each other

K<sub>CR</sub> : Equivalent factor in the M<sub>C</sub> radial direction

K<sub>CL</sub> : Equivalent factor in the M<sub>C</sub> reverse radial direction

Table3 Equivalent Factors (Models SR, NR-X and NR)

| Model No. |          | Equivalent factor     |                       |                       |                       |                       |                       |                       |                       |
|-----------|----------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|           |          | $K_{AR1}$             | $K_{AL1}$             | $K_{AR2}$             | $K_{AL2}$             | $K_{B1}$              | $K_{B2}$              | $K_{CR}$              | $K_{CL}$              |
| SR        | 15W (TB) | $2.08 \times 10^{-1}$ | $1.04 \times 10^{-1}$ | $3.72 \times 10^{-2}$ | $1.86 \times 10^{-2}$ | $1.46 \times 10^{-1}$ | $2.57 \times 10^{-2}$ | $1.69 \times 10^{-1}$ | $8.43 \times 10^{-2}$ |
|           | 15V (SB) | $3.40 \times 10^{-1}$ | $1.70 \times 10^{-1}$ | $5.00 \times 10^{-2}$ | $2.50 \times 10^{-2}$ | $2.34 \times 10^{-1}$ | $3.37 \times 10^{-2}$ | $1.69 \times 10^{-1}$ | $8.43 \times 10^{-2}$ |
|           | 20W (TB) | $1.71 \times 10^{-1}$ | $8.56 \times 10^{-2}$ | $3.23 \times 10^{-2}$ | $1.61 \times 10^{-2}$ | $1.20 \times 10^{-1}$ | $2.24 \times 10^{-2}$ | $1.28 \times 10^{-1}$ | $6.40 \times 10^{-2}$ |
|           | 20V (SB) | $2.69 \times 10^{-1}$ | $1.34 \times 10^{-1}$ | $4.34 \times 10^{-2}$ | $2.17 \times 10^{-2}$ | $1.86 \times 10^{-1}$ | $2.95 \times 10^{-2}$ | $1.28 \times 10^{-1}$ | $6.39 \times 10^{-2}$ |
|           | 25W (TB) | $1.37 \times 10^{-1}$ | $6.85 \times 10^{-2}$ | $2.57 \times 10^{-2}$ | $1.29 \times 10^{-2}$ | $9.61 \times 10^{-2}$ | $1.78 \times 10^{-2}$ | $1.09 \times 10^{-1}$ | $5.47 \times 10^{-2}$ |
|           | 25V (SB) | $2.15 \times 10^{-1}$ | $1.08 \times 10^{-1}$ | $3.47 \times 10^{-2}$ | $1.73 \times 10^{-2}$ | $1.49 \times 10^{-1}$ | $2.36 \times 10^{-2}$ | $1.10 \times 10^{-1}$ | $5.48 \times 10^{-2}$ |
|           | 30W (TB) | $1.14 \times 10^{-1}$ | $5.71 \times 10^{-2}$ | $2.21 \times 10^{-2}$ | $1.10 \times 10^{-2}$ | $8.01 \times 10^{-2}$ | $1.54 \times 10^{-2}$ | $9.16 \times 10^{-2}$ | $4.58 \times 10^{-2}$ |
|           | 30V (SB) | $1.98 \times 10^{-1}$ | $9.92 \times 10^{-2}$ | $2.98 \times 10^{-2}$ | $1.49 \times 10^{-2}$ | $1.37 \times 10^{-1}$ | $2.01 \times 10^{-2}$ | $9.16 \times 10^{-2}$ | $4.58 \times 10^{-2}$ |
|           | 35W (TB) | $1.04 \times 10^{-1}$ | $5.21 \times 10^{-2}$ | $1.91 \times 10^{-2}$ | $9.57 \times 10^{-3}$ | $7.30 \times 10^{-2}$ | $1.32 \times 10^{-2}$ | $7.59 \times 10^{-2}$ | $3.80 \times 10^{-2}$ |
|           | 35V (SB) | $1.70 \times 10^{-1}$ | $8.50 \times 10^{-2}$ | $2.61 \times 10^{-2}$ | $1.31 \times 10^{-2}$ | $1.17 \times 10^{-1}$ | $1.77 \times 10^{-2}$ | $7.59 \times 10^{-2}$ | $3.80 \times 10^{-2}$ |
|           | 45W (TB) | $9.11 \times 10^{-2}$ | $4.56 \times 10^{-2}$ | $1.69 \times 10^{-2}$ | $8.44 \times 10^{-3}$ | $6.38 \times 10^{-2}$ | $1.17 \times 10^{-2}$ | $5.67 \times 10^{-2}$ | $2.83 \times 10^{-2}$ |
|           | 55W (TB) | $6.85 \times 10^{-2}$ | $3.42 \times 10^{-2}$ | $1.37 \times 10^{-2}$ | $6.86 \times 10^{-3}$ | $4.80 \times 10^{-2}$ | $9.57 \times 10^{-3}$ | $5.38 \times 10^{-2}$ | $2.69 \times 10^{-2}$ |
|           | 15MSV    | $4.00 \times 10^{-1}$ | $2.48 \times 10^{-1}$ | $5.89 \times 10^{-2}$ | $3.65 \times 10^{-2}$ | $3.51 \times 10^{-1}$ | $4.98 \times 10^{-2}$ | $2.76 \times 10^{-1}$ | $1.71 \times 10^{-1}$ |
|           | 15MSW    | $2.43 \times 10^{-1}$ | $1.50 \times 10^{-1}$ | $4.38 \times 10^{-2}$ | $2.72 \times 10^{-2}$ | $2.17 \times 10^{-1}$ | $3.84 \times 10^{-2}$ | $2.74 \times 10^{-1}$ | $1.70 \times 10^{-1}$ |
|           | 20MSV    | $3.19 \times 10^{-1}$ | $1.97 \times 10^{-1}$ | $5.09 \times 10^{-2}$ | $3.16 \times 10^{-2}$ | $2.77 \times 10^{-1}$ | $4.36 \times 10^{-2}$ | $2.10 \times 10^{-1}$ | $1.30 \times 10^{-1}$ |
|           | 20MSW    | $1.99 \times 10^{-1}$ | $1.24 \times 10^{-1}$ | $3.77 \times 10^{-2}$ | $2.34 \times 10^{-2}$ | $1.78 \times 10^{-1}$ | $3.33 \times 10^{-2}$ | $2.09 \times 10^{-1}$ | $1.30 \times 10^{-1}$ |
| NR-X      | 25       | $1.19 \times 10^{-1}$ | $7.64 \times 10^{-2}$ | $2.24 \times 10^{-2}$ | $1.43 \times 10^{-2}$ | $7.47 \times 10^{-2}$ | $1.41 \times 10^{-2}$ | $9.69 \times 10^{-2}$ | $6.20 \times 10^{-2}$ |
|           | 25L      | $9.18 \times 10^{-2}$ | $5.87 \times 10^{-2}$ | $1.85 \times 10^{-2}$ | $1.18 \times 10^{-2}$ | $5.78 \times 10^{-2}$ | $1.17 \times 10^{-2}$ | $9.69 \times 10^{-2}$ | $6.21 \times 10^{-2}$ |
|           | 30       | $9.95 \times 10^{-2}$ | $6.37 \times 10^{-2}$ | $1.90 \times 10^{-2}$ | $1.21 \times 10^{-2}$ | $6.23 \times 10^{-2}$ | $1.19 \times 10^{-2}$ | $8.55 \times 10^{-2}$ | $5.47 \times 10^{-2}$ |
|           | 30L      | $7.65 \times 10^{-2}$ | $4.89 \times 10^{-2}$ | $1.57 \times 10^{-2}$ | $1.00 \times 10^{-2}$ | $4.82 \times 10^{-2}$ | $9.91 \times 10^{-3}$ | $8.55 \times 10^{-2}$ | $5.47 \times 10^{-2}$ |
|           | 35       | $9.08 \times 10^{-2}$ | $5.81 \times 10^{-2}$ | $1.69 \times 10^{-2}$ | $1.08 \times 10^{-2}$ | $5.67 \times 10^{-2}$ | $1.06 \times 10^{-2}$ | $7.17 \times 10^{-2}$ | $4.59 \times 10^{-2}$ |
|           | 35L      | $6.88 \times 10^{-2}$ | $4.40 \times 10^{-2}$ | $1.40 \times 10^{-2}$ | $8.96 \times 10^{-3}$ | $4.32 \times 10^{-2}$ | $8.81 \times 10^{-3}$ | $7.17 \times 10^{-2}$ | $4.59 \times 10^{-2}$ |
|           | 45       | $7.02 \times 10^{-2}$ | $4.50 \times 10^{-2}$ | $1.35 \times 10^{-2}$ | $8.64 \times 10^{-3}$ | $4.37 \times 10^{-2}$ | $8.39 \times 10^{-3}$ | $5.31 \times 10^{-2}$ | $3.40 \times 10^{-2}$ |
|           | 45L      | $5.25 \times 10^{-2}$ | $3.36 \times 10^{-2}$ | $1.11 \times 10^{-2}$ | $7.11 \times 10^{-3}$ | $3.31 \times 10^{-2}$ | $7.05 \times 10^{-3}$ | $5.32 \times 10^{-2}$ | $3.41 \times 10^{-2}$ |
|           | 55       | $5.92 \times 10^{-2}$ | $3.79 \times 10^{-2}$ | $1.15 \times 10^{-2}$ | $7.36 \times 10^{-3}$ | $3.72 \times 10^{-2}$ | $7.21 \times 10^{-3}$ | $4.66 \times 10^{-2}$ | $2.98 \times 10^{-2}$ |
|           | 55L      | $4.66 \times 10^{-2}$ | $2.98 \times 10^{-2}$ | $9.43 \times 10^{-3}$ | $6.02 \times 10^{-3}$ | $2.92 \times 10^{-2}$ | $5.93 \times 10^{-3}$ | $4.65 \times 10^{-2}$ | $2.98 \times 10^{-2}$ |
|           | 65       | $5.12 \times 10^{-2}$ | $3.28 \times 10^{-2}$ | $1.00 \times 10^{-2}$ | $6.40 \times 10^{-3}$ | $3.21 \times 10^{-2}$ | $6.31 \times 10^{-3}$ | $3.93 \times 10^{-2}$ | $2.52 \times 10^{-2}$ |
|           | 65L      | $3.66 \times 10^{-2}$ | $2.34 \times 10^{-2}$ | $7.73 \times 10^{-3}$ | $4.93 \times 10^{-3}$ | $2.31 \times 10^{-2}$ | $4.89 \times 10^{-3}$ | $3.93 \times 10^{-2}$ | $2.52 \times 10^{-2}$ |
| NR        | 75       | $4.21 \times 10^{-2}$ | $2.99 \times 10^{-2}$ | $8.31 \times 10^{-3}$ | $5.90 \times 10^{-3}$ | $3.08 \times 10^{-2}$ | $6.13 \times 10^{-3}$ | $3.16 \times 10^{-2}$ | $2.24 \times 10^{-2}$ |
|           | 75L      | $3.14 \times 10^{-2}$ | $2.23 \times 10^{-2}$ | $6.74 \times 10^{-3}$ | $4.78 \times 10^{-3}$ | $2.33 \times 10^{-2}$ | $5.04 \times 10^{-3}$ | $3.16 \times 10^{-2}$ | $2.24 \times 10^{-2}$ |
|           | 85       | $3.70 \times 10^{-2}$ | $2.62 \times 10^{-2}$ | $7.31 \times 10^{-3}$ | $5.19 \times 10^{-3}$ | $2.71 \times 10^{-2}$ | $5.40 \times 10^{-3}$ | $2.80 \times 10^{-2}$ | $1.99 \times 10^{-2}$ |
|           | 85L      | $2.80 \times 10^{-2}$ | $1.99 \times 10^{-2}$ | $6.07 \times 10^{-3}$ | $4.31 \times 10^{-3}$ | $2.08 \times 10^{-2}$ | $4.55 \times 10^{-3}$ | $2.80 \times 10^{-2}$ | $1.99 \times 10^{-2}$ |
|           | 100      | $3.05 \times 10^{-2}$ | $2.17 \times 10^{-2}$ | $6.20 \times 10^{-3}$ | $4.41 \times 10^{-3}$ | $2.26 \times 10^{-2}$ | $4.63 \times 10^{-3}$ | $2.38 \times 10^{-2}$ | $1.69 \times 10^{-2}$ |
|           | 100L     | $2.74 \times 10^{-2}$ | $1.95 \times 10^{-2}$ | $5.46 \times 10^{-3}$ | $3.87 \times 10^{-3}$ | $2.00 \times 10^{-2}$ | $4.00 \times 10^{-3}$ | $2.38 \times 10^{-2}$ | $1.69 \times 10^{-2}$ |

$K_{AR1}$  : Equivalent factor in the  $M_A$  radial direction when one LM block is used

$K_{AL1}$  : Equivalent factor in the  $M_A$  reverse radial direction when one LM block is used

$K_{AR2}$  : Equivalent factor in the  $M_A$  radial direction when two LM blocks are used in close contact with each other

$K_{AL2}$  : Equivalent factor in the  $M_A$  reverse radial direction when two LM blocks are used in close contact with each other

$K_{B1}$  :  $M_B$  Equivalent factor when one LM block is used

$K_{B2}$  :  $M_B$  Equivalent factor when two LM blocks are used in close contact with each other

$K_{CR}$  : Equivalent factor in the  $M_C$  radial direction

$K_{CL}$  : Equivalent factor in the  $M_C$  reverse radial direction

Table4 Equivalent Factors (Models NRS-X, NRS, HRW, and RSX)

| Model No. |      | Equivalent factor     |                       |                       |                       |                       |                       |                       |                       |
|-----------|------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|           |      | $K_{AR1}$             | $K_{AL1}$             | $K_{AR2}$             | $K_{AL2}$             | $K_{B1}$              | $K_{B2}$              | $K_{CR}$              | $K_{CL}$              |
| NRS-X     | 25   | $1.15 \times 10^{-3}$ | $9.66 \times 10^{-2}$ | $2.16 \times 10^{-2}$ | $1.81 \times 10^{-2}$ | $1.06 \times 10^{-1}$ | $1.98 \times 10^{-2}$ | $9.51 \times 10^{-2}$ | $7.99 \times 10^{-2}$ |
|           | 25L  | $8.85 \times 10^{-2}$ | $7.44 \times 10^{-2}$ | $1.79 \times 10^{-2}$ | $1.50 \times 10^{-2}$ | $8.14 \times 10^{-2}$ | $1.64 \times 10^{-2}$ | $9.51 \times 10^{-2}$ | $7.99 \times 10^{-2}$ |
|           | 30   | $9.58 \times 10^{-2}$ | $8.05 \times 10^{-2}$ | $1.83 \times 10^{-2}$ | $1.53 \times 10^{-2}$ | $8.81 \times 10^{-2}$ | $1.68 \times 10^{-2}$ | $8.40 \times 10^{-2}$ | $7.05 \times 10^{-2}$ |
|           | 30L  | $7.38 \times 10^{-2}$ | $6.20 \times 10^{-2}$ | $1.51 \times 10^{-2}$ | $1.27 \times 10^{-2}$ | $6.79 \times 10^{-2}$ | $1.39 \times 10^{-2}$ | $8.40 \times 10^{-2}$ | $7.05 \times 10^{-2}$ |
|           | 35   | $8.73 \times 10^{-2}$ | $7.33 \times 10^{-2}$ | $1.62 \times 10^{-2}$ | $1.36 \times 10^{-2}$ | $8.03 \times 10^{-2}$ | $1.49 \times 10^{-2}$ | $7.04 \times 10^{-2}$ | $5.91 \times 10^{-2}$ |
|           | 35L  | $6.63 \times 10^{-2}$ | $5.57 \times 10^{-2}$ | $1.35 \times 10^{-2}$ | $1.13 \times 10^{-2}$ | $6.10 \times 10^{-2}$ | $1.24 \times 10^{-2}$ | $7.04 \times 10^{-2}$ | $5.91 \times 10^{-2}$ |
|           | 45   | $6.78 \times 10^{-2}$ | $5.69 \times 10^{-2}$ | $1.30 \times 10^{-2}$ | $1.09 \times 10^{-2}$ | $6.23 \times 10^{-2}$ | $1.19 \times 10^{-2}$ | $5.22 \times 10^{-2}$ | $4.39 \times 10^{-2}$ |
|           | 45L  | $5.07 \times 10^{-2}$ | $4.26 \times 10^{-2}$ | $1.07 \times 10^{-2}$ | $8.99 \times 10^{-3}$ | $4.66 \times 10^{-2}$ | $9.86 \times 10^{-3}$ | $5.22 \times 10^{-2}$ | $4.39 \times 10^{-2}$ |
|           | 55   | $5.71 \times 10^{-2}$ | $4.79 \times 10^{-2}$ | $1.10 \times 10^{-2}$ | $9.24 \times 10^{-3}$ | $5.25 \times 10^{-2}$ | $1.01 \times 10^{-2}$ | $4.58 \times 10^{-2}$ | $3.84 \times 10^{-2}$ |
|           | 55L  | $4.50 \times 10^{-2}$ | $3.78 \times 10^{-2}$ | $9.14 \times 10^{-3}$ | $7.65 \times 10^{-3}$ | $4.14 \times 10^{-2}$ | $8.39 \times 10^{-3}$ | $4.57 \times 10^{-2}$ | $3.84 \times 10^{-2}$ |
|           | 65   | $4.93 \times 10^{-2}$ | $4.14 \times 10^{-2}$ | $9.70 \times 10^{-3}$ | $8.15 \times 10^{-3}$ | $4.53 \times 10^{-2}$ | $8.88 \times 10^{-3}$ | $3.86 \times 10^{-2}$ | $3.25 \times 10^{-2}$ |
|           | 65L  | $3.54 \times 10^{-2}$ | $2.97 \times 10^{-2}$ | $7.47 \times 10^{-3}$ | $6.30 \times 10^{-3}$ | $3.25 \times 10^{-2}$ | $6.86 \times 10^{-3}$ | $3.86 \times 10^{-2}$ | $3.25 \times 10^{-2}$ |
| NRS       | 75   | $4.05 \times 10^{-2}$ |                       | $8.01 \times 10^{-3}$ |                       | $4.05 \times 10^{-2}$ | $8.01 \times 10^{-3}$ |                       | $3.20 \times 10^{-2}$ |
|           | 75L  | $3.03 \times 10^{-2}$ |                       | $6.50 \times 10^{-3}$ |                       | $3.03 \times 10^{-2}$ | $6.50 \times 10^{-3}$ |                       | $3.20 \times 10^{-2}$ |
|           | 85   | $3.56 \times 10^{-2}$ |                       | $7.05 \times 10^{-3}$ |                       | $3.56 \times 10^{-2}$ | $7.05 \times 10^{-3}$ |                       | $2.83 \times 10^{-2}$ |
|           | 85L  | $2.70 \times 10^{-2}$ |                       | $5.87 \times 10^{-3}$ |                       | $2.70 \times 10^{-2}$ | $5.87 \times 10^{-3}$ |                       | $2.83 \times 10^{-2}$ |
|           | 100  | $2.93 \times 10^{-2}$ |                       | $5.97 \times 10^{-3}$ |                       | $2.93 \times 10^{-2}$ | $5.97 \times 10^{-3}$ |                       | $2.41 \times 10^{-2}$ |
|           | 100L | $2.65 \times 10^{-2}$ |                       | $5.27 \times 10^{-3}$ |                       | $2.65 \times 10^{-2}$ | $5.27 \times 10^{-3}$ |                       | $2.41 \times 10^{-2}$ |
| HRW       | 12   | $2.72 \times 10^{-1}$ | $1.93 \times 10^{-1}$ | $5.16 \times 10^{-2}$ | $3.65 \times 10^{-2}$ | $5.47 \times 10^{-1}$ | $1.04 \times 10^{-1}$ | $1.40 \times 10^{-1}$ | $9.92 \times 10^{-2}$ |
|           | 14   | $2.28 \times 10^{-1}$ | $1.61 \times 10^{-1}$ | $4.16 \times 10^{-2}$ | $2.94 \times 10^{-2}$ | $4.54 \times 10^{-1}$ | $8.28 \times 10^{-2}$ | $1.01 \times 10^{-1}$ | $7.18 \times 10^{-2}$ |
|           | 17   | $1.96 \times 10^{-1}$ |                       | $3.34 \times 10^{-2}$ |                       | $1.96 \times 10^{-1}$ | $3.34 \times 10^{-2}$ |                       | $6.30 \times 10^{-2}$ |
|           | 21   | $1.65 \times 10^{-1}$ |                       | $2.90 \times 10^{-2}$ |                       | $1.65 \times 10^{-1}$ | $2.90 \times 10^{-2}$ |                       | $5.89 \times 10^{-2}$ |
|           | 27   | $1.30 \times 10^{-1}$ |                       | $2.34 \times 10^{-2}$ |                       | $1.30 \times 10^{-1}$ | $2.34 \times 10^{-2}$ |                       | $5.11 \times 10^{-2}$ |
|           | 35   | $8.69 \times 10^{-2}$ |                       | $1.60 \times 10^{-2}$ |                       | $8.69 \times 10^{-2}$ | $1.60 \times 10^{-2}$ |                       | $3.06 \times 10^{-2}$ |
|           | 50   | $6.52 \times 10^{-2}$ |                       | $1.22 \times 10^{-2}$ |                       | $6.52 \times 10^{-2}$ | $1.22 \times 10^{-2}$ |                       | $2.35 \times 10^{-2}$ |
|           | 60   | $5.80 \times 10^{-2}$ |                       | $1.08 \times 10^{-2}$ |                       | $5.80 \times 10^{-2}$ | $1.08 \times 10^{-2}$ |                       | $1.77 \times 10^{-2}$ |
| RSX       | 7    | $4.72 \times 10^{-1}$ |                       | $6.68 \times 10^{-2}$ |                       | $4.87 \times 10^{-1}$ | $6.88 \times 10^{-2}$ |                       | $2.59 \times 10^{-1}$ |
|           | 9    | $3.10 \times 10^{-1}$ |                       | $5.28 \times 10^{-2}$ |                       | $3.19 \times 10^{-1}$ | $5.44 \times 10^{-2}$ |                       | $2.17 \times 10^{-1}$ |
|           | 12   | $2.96 \times 10^{-1}$ |                       | $4.55 \times 10^{-2}$ |                       | $2.96 \times 10^{-1}$ | $4.55 \times 10^{-2}$ |                       | $1.52 \times 10^{-1}$ |
|           | 15   | $2.34 \times 10^{-1}$ |                       | $3.65 \times 10^{-2}$ |                       | $2.34 \times 10^{-1}$ | $3.65 \times 10^{-2}$ |                       | $1.41 \times 10^{-1}$ |
|           | 7W   | $3.10 \times 10^{-1}$ |                       | $5.34 \times 10^{-2}$ |                       | $3.20 \times 10^{-1}$ | $5.50 \times 10^{-2}$ |                       | $1.36 \times 10^{-1}$ |
|           | 9W   | $2.31 \times 10^{-1}$ |                       | $4.31 \times 10^{-2}$ |                       | $2.38 \times 10^{-1}$ | $4.43 \times 10^{-2}$ |                       | $1.06 \times 10^{-1}$ |
|           | 12W  | $2.10 \times 10^{-1}$ |                       | $3.69 \times 10^{-2}$ |                       | $2.10 \times 10^{-1}$ | $3.69 \times 10^{-2}$ |                       | $7.97 \times 10^{-2}$ |
|           | 15W  | $1.66 \times 10^{-1}$ |                       | $2.97 \times 10^{-2}$ |                       | $1.66 \times 10^{-1}$ | $2.97 \times 10^{-2}$ |                       | $4.82 \times 10^{-2}$ |

$K_{AR1}$  : Equivalent factor in the  $M_a$  radial direction when one LM block is used

$K_{AL1}$  : Equivalent factor in the  $M_a$  reverse radial direction when one LM block is used

$K_{AR2}$  : Equivalent factor in the  $M_a$  radial direction when two LM blocks are used in close contact with each other

$K_{AL2}$  : Equivalent factor in the  $M_a$  reverse radial direction when two LM blocks are used in close contact with each other

$K_{B1}$  :  $M_b$  Equivalent factor when one LM block is used

$K_{B2}$  :  $M_b$  Equivalent factor when two LM blocks are used in close contact with each other

$K_{CR}$  : Equivalent factor in the  $M_c$  radial direction

$K_{CL}$  : Equivalent factor in the  $M_c$  reverse radial direction

Table5 Equivalent Factors (Models RSR and HR)

| Model No. |        | Equivalent factor     |                       |                       |                       |                       |                       |                       |                       |
|-----------|--------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|           |        | $K_{AR1}$             | $K_{AL1}$             | $K_{AR2}$             | $K_{AL2}$             | $K_{B1}$              | $K_{B2}$              | $K_{CR}$              | $K_{CL}$              |
| RSR       | 2N     | $6.81 \times 10^{-1}$ |                       | $1.28 \times 10^{-1}$ |                       | $6.81 \times 10^{-1}$ | $1.28 \times 10^{-1}$ | $8.69 \times 10^{-1}$ |                       |
|           | 2WN    | $5.10 \times 10^{-1}$ |                       | $9.32 \times 10^{-2}$ |                       | $5.10 \times 10^{-1}$ | $9.32 \times 10^{-2}$ | $4.54 \times 10^{-1}$ |                       |
|           | 3M     | $9.20 \times 10^{-1}$ |                       | $1.27 \times 10^{-1}$ |                       | $9.20 \times 10^{-1}$ | $1.27 \times 10^{-1}$ | $6.06 \times 10^{-1}$ |                       |
|           | 3N     | $6.06 \times 10^{-1}$ |                       | $1.01 \times 10^{-1}$ |                       | $6.06 \times 10^{-1}$ | $1.01 \times 10^{-1}$ | $6.06 \times 10^{-1}$ |                       |
|           | 3W     | $7.03 \times 10^{-1}$ |                       | $1.06 \times 10^{-1}$ |                       | $7.03 \times 10^{-1}$ | $1.06 \times 10^{-1}$ | $3.17 \times 10^{-1}$ |                       |
|           | 3WN    | $4.76 \times 10^{-1}$ |                       | $8.27 \times 10^{-2}$ |                       | $4.76 \times 10^{-1}$ | $8.27 \times 10^{-2}$ | $3.17 \times 10^{-1}$ |                       |
|           | 9M1K   | $3.06 \times 10^{-1}$ |                       | $5.19 \times 10^{-2}$ |                       | $3.06 \times 10^{-1}$ | $5.19 \times 10^{-2}$ | $2.15 \times 10^{-1}$ |                       |
|           | 9M1N   | $2.15 \times 10^{-1}$ |                       | $4.08 \times 10^{-2}$ |                       | $2.15 \times 10^{-1}$ | $4.08 \times 10^{-2}$ | $2.15 \times 10^{-1}$ |                       |
|           | 12M1V  | $3.52 \times 10^{-1}$ | $2.46 \times 10^{-1}$ | $5.37 \times 10^{-2}$ | $3.76 \times 10^{-2}$ | $2.81 \times 10^{-1}$ | $4.21 \times 10^{-2}$ | $2.09 \times 10^{-1}$ | $1.46 \times 10^{-1}$ |
|           | 12M1N  | $2.30 \times 10^{-1}$ | $1.61 \times 10^{-1}$ | $4.08 \times 10^{-2}$ | $2.85 \times 10^{-2}$ | $1.85 \times 10^{-1}$ | $3.25 \times 10^{-2}$ | $2.09 \times 10^{-1}$ | $1.46 \times 10^{-1}$ |
|           | 14WV   | $2.10 \times 10^{-1}$ | $1.47 \times 10^{-1}$ | $3.89 \times 10^{-2}$ | $2.73 \times 10^{-2}$ | $1.69 \times 10^{-1}$ | $3.10 \times 10^{-2}$ | $8.22 \times 10^{-2}$ | $5.75 \times 10^{-2}$ |
|           | 15M1V  | $2.77 \times 10^{-1}$ | $1.94 \times 10^{-1}$ | $4.38 \times 10^{-2}$ | $3.07 \times 10^{-2}$ | $2.21 \times 10^{-1}$ | $3.45 \times 10^{-2}$ | $1.69 \times 10^{-1}$ | $1.18 \times 10^{-1}$ |
|           | 15M1N  | $1.70 \times 10^{-1}$ | $1.19 \times 10^{-1}$ | $3.24 \times 10^{-2}$ | $2.27 \times 10^{-2}$ | $1.37 \times 10^{-1}$ | $2.59 \times 10^{-2}$ | $1.69 \times 10^{-1}$ | $1.18 \times 10^{-1}$ |
|           | 15M1WV | $1.95 \times 10^{-1}$ | $1.36 \times 10^{-1}$ | $3.52 \times 10^{-2}$ | $2.46 \times 10^{-2}$ | $1.56 \times 10^{-1}$ | $2.80 \times 10^{-2}$ | $5.83 \times 10^{-2}$ | $4.08 \times 10^{-2}$ |
|           | 15M1WN | $1.34 \times 10^{-1}$ | $9.41 \times 10^{-2}$ | $2.68 \times 10^{-2}$ | $1.88 \times 10^{-2}$ | $1.09 \times 10^{-1}$ | $2.16 \times 10^{-2}$ | $5.82 \times 10^{-2}$ | $4.08 \times 10^{-2}$ |
|           | 20M1V  | $1.68 \times 10^{-1}$ | $1.18 \times 10^{-1}$ | $2.92 \times 10^{-2}$ | $2.04 \times 10^{-2}$ | $1.35 \times 10^{-1}$ | $2.32 \times 10^{-2}$ | $1.30 \times 10^{-1}$ | $9.13 \times 10^{-2}$ |
|           | 20M1N  | $1.20 \times 10^{-1}$ | $8.39 \times 10^{-2}$ | $2.30 \times 10^{-2}$ | $1.61 \times 10^{-2}$ | $9.68 \times 10^{-2}$ | $1.84 \times 10^{-2}$ | $1.30 \times 10^{-1}$ | $9.13 \times 10^{-2}$ |
| HR        | 918    | $2.65 \times 10^{-1}$ |                       | $3.58 \times 10^{-2}$ |                       | $2.65 \times 10^{-1}$ | $3.58 \times 10^{-2}$ | —                     | —                     |
|           | 1123   | $2.08 \times 10^{-1}$ |                       | $3.17 \times 10^{-2}$ |                       | $2.08 \times 10^{-1}$ | $3.17 \times 10^{-2}$ | —                     | —                     |
|           | 1530   | $1.56 \times 10^{-1}$ |                       | $2.39 \times 10^{-2}$ |                       | $1.56 \times 10^{-1}$ | $2.39 \times 10^{-2}$ | —                     | —                     |
|           | 2042   | $1.11 \times 10^{-1}$ |                       | $1.80 \times 10^{-2}$ |                       | $1.11 \times 10^{-1}$ | $1.80 \times 10^{-2}$ | —                     | —                     |
|           | 2042T  | $8.64 \times 10^{-2}$ |                       | $1.53 \times 10^{-2}$ |                       | $8.64 \times 10^{-2}$ | $1.53 \times 10^{-2}$ | —                     | —                     |
|           | 2555   | $7.79 \times 10^{-2}$ |                       | $1.38 \times 10^{-2}$ |                       | $7.79 \times 10^{-2}$ | $1.38 \times 10^{-2}$ | —                     | —                     |
|           | 2555T  | $6.13 \times 10^{-2}$ |                       | $1.17 \times 10^{-2}$ |                       | $6.13 \times 10^{-2}$ | $1.17 \times 10^{-2}$ | —                     | —                     |
|           | 3065   | $6.92 \times 10^{-2}$ |                       | $1.15 \times 10^{-2}$ |                       | $6.92 \times 10^{-2}$ | $1.15 \times 10^{-2}$ | —                     | —                     |
|           | 3065T  | $5.45 \times 10^{-2}$ |                       | $9.92 \times 10^{-3}$ |                       | $5.45 \times 10^{-2}$ | $9.92 \times 10^{-3}$ | —                     | —                     |
|           | 3575   | $6.23 \times 10^{-2}$ |                       | $1.08 \times 10^{-2}$ |                       | $6.23 \times 10^{-2}$ | $1.08 \times 10^{-2}$ | —                     | —                     |
|           | 3575T  | $4.90 \times 10^{-2}$ |                       | $9.42 \times 10^{-3}$ |                       | $4.90 \times 10^{-2}$ | $9.42 \times 10^{-3}$ | —                     | —                     |
|           | 4085   | $5.19 \times 10^{-2}$ |                       | $9.53 \times 10^{-3}$ |                       | $5.19 \times 10^{-2}$ | $9.53 \times 10^{-3}$ | —                     | —                     |
|           | 4085T  | $4.09 \times 10^{-2}$ |                       | $7.97 \times 10^{-3}$ |                       | $4.09 \times 10^{-2}$ | $7.97 \times 10^{-3}$ | —                     | —                     |
|           | 50105  | $4.15 \times 10^{-2}$ |                       | $7.40 \times 10^{-3}$ |                       | $4.15 \times 10^{-2}$ | $7.40 \times 10^{-3}$ | —                     | —                     |
|           | 50105T | $3.27 \times 10^{-2}$ |                       | $6.26 \times 10^{-3}$ |                       | $3.27 \times 10^{-2}$ | $6.26 \times 10^{-3}$ | —                     | —                     |
|           | 60125  | $2.88 \times 10^{-2}$ |                       | $5.18 \times 10^{-3}$ |                       | $2.88 \times 10^{-2}$ | $5.18 \times 10^{-3}$ | —                     | —                     |

 $K_{AR1}$  : Equivalent factor in the  $M_a$  radial direction when one LM block is used $K_{AL1}$  : Equivalent factor in the  $M_a$  reverse radial direction when one LM block is used $K_{AR2}$  : Equivalent factor in the  $M_a$  radial direction when two

LM blocks are used in close contact with each other

 $K_{AL2}$  : Equivalent factor in the  $M_a$  reverse radial direction when two LM blocks are used in close contact with each other $K_{B1}$  :  $M_b$  Equivalent factor when one LM block is used $K_{B2}$  :  $M_b$  Equivalent factor when two LM blocks are used in close contact with each other $K_{CR}$  : Equivalent factor in the  $M_c$  radial direction $K_{CL}$  : Equivalent factor in the  $M_c$  reverse radial direction

Table6 Equivalent Factors (Models GSR, CSR, MX, JR, NSR, SRG, SRN, and SRW)

| Model No. |       | Equivalent factor     |                       |                       |                       |                       |                       |                       |          |
|-----------|-------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|----------|
|           |       | $K_{AR1}$             | $K_{AL1}$             | $K_{AR2}$             | $K_{AL2}$             | $K_{B1}$              | $K_{B2}$              | $K_{CR}$              | $K_{CL}$ |
| GSR       | 15T   | $1.61 \times 10^{-1}$ | $1.44 \times 10^{-1}$ | $2.88 \times 10^{-2}$ | $2.59 \times 10^{-2}$ | $1.68 \times 10^{-1}$ | $3.01 \times 10^{-2}$ | —                     | —        |
|           | 15V   | $2.21 \times 10^{-1}$ | $1.99 \times 10^{-1}$ | $3.54 \times 10^{-2}$ | $3.18 \times 10^{-2}$ | $2.30 \times 10^{-1}$ | $3.68 \times 10^{-2}$ | —                     | —        |
|           | 20T   | $1.28 \times 10^{-1}$ | $1.16 \times 10^{-1}$ | $2.34 \times 10^{-2}$ | $2.10 \times 10^{-2}$ | $1.34 \times 10^{-1}$ | $2.44 \times 10^{-2}$ | —                     | —        |
|           | 20V   | $1.77 \times 10^{-1}$ | $1.59 \times 10^{-1}$ | $2.87 \times 10^{-2}$ | $2.58 \times 10^{-2}$ | $1.84 \times 10^{-1}$ | $2.99 \times 10^{-2}$ | —                     | —        |
|           | 25T   | $1.07 \times 10^{-1}$ | $9.63 \times 10^{-2}$ | $1.97 \times 10^{-2}$ | $1.77 \times 10^{-2}$ | $1.12 \times 10^{-1}$ | $2.06 \times 10^{-2}$ | —                     | —        |
|           | 25V   | $1.47 \times 10^{-1}$ | $1.33 \times 10^{-1}$ | $2.42 \times 10^{-2}$ | $2.18 \times 10^{-2}$ | $1.53 \times 10^{-1}$ | $2.52 \times 10^{-2}$ | —                     | —        |
|           | 30T   | $9.17 \times 10^{-2}$ | $8.26 \times 10^{-2}$ | $1.68 \times 10^{-2}$ | $1.51 \times 10^{-2}$ | $9.59 \times 10^{-2}$ | $1.76 \times 10^{-2}$ | —                     | —        |
|           | 35T   | $8.03 \times 10^{-2}$ | $7.22 \times 10^{-2}$ | $1.48 \times 10^{-2}$ | $1.33 \times 10^{-2}$ | $8.39 \times 10^{-2}$ | $1.55 \times 10^{-2}$ | —                     | —        |
| CSR       | 15    | $1.66 \times 10^{-1}$ | —                     | —                     | —                     | $1.66 \times 10^{-1}$ | —                     | —                     | —        |
|           | 20S   | $1.26 \times 10^{-1}$ | —                     | —                     | —                     | $1.26 \times 10^{-1}$ | —                     | —                     | —        |
|           | 20    | $9.88 \times 10^{-2}$ | —                     | —                     | —                     | $9.88 \times 10^{-2}$ | —                     | —                     | —        |
|           | 25S   | $1.12 \times 10^{-1}$ | —                     | —                     | —                     | $1.12 \times 10^{-1}$ | —                     | —                     | —        |
|           | 25    | $8.23 \times 10^{-2}$ | —                     | —                     | —                     | $8.23 \times 10^{-2}$ | —                     | —                     | —        |
|           | 30S   | $8.97 \times 10^{-2}$ | —                     | —                     | —                     | $8.97 \times 10^{-2}$ | —                     | —                     | —        |
|           | 30    | $7.05 \times 10^{-2}$ | —                     | —                     | —                     | $7.05 \times 10^{-2}$ | —                     | —                     | —        |
|           | 35    | $6.17 \times 10^{-2}$ | —                     | —                     | —                     | $6.17 \times 10^{-2}$ | —                     | —                     | —        |
| MX        | 45    | $5.22 \times 10^{-2}$ | —                     | —                     | —                     | $5.22 \times 10^{-2}$ | —                     | —                     | —        |
|           | 5     | $4.27 \times 10^{-1}$ | —                     | $7.01 \times 10^{-2}$ | —                     | $4.27 \times 10^{-1}$ | $7.01 \times 10^{-2}$ | —                     | —        |
|           | 7W    | $2.18 \times 10^{-1}$ | —                     | $4.13 \times 10^{-2}$ | —                     | $2.18 \times 10^{-1}$ | $4.13 \times 10^{-2}$ | —                     | —        |
| JR        | 25    | $1.12 \times 10^{-1}$ | —                     | $2.02 \times 10^{-2}$ | —                     | $1.12 \times 10^{-1}$ | $2.02 \times 10^{-2}$ | $9.96 \times 10^{-2}$ | —        |
|           | 35    | $7.85 \times 10^{-2}$ | —                     | $1.56 \times 10^{-2}$ | —                     | $7.85 \times 10^{-2}$ | $1.56 \times 10^{-2}$ | $6.69 \times 10^{-2}$ | —        |
|           | 45    | $6.73 \times 10^{-2}$ | —                     | $1.21 \times 10^{-2}$ | —                     | $6.73 \times 10^{-2}$ | $1.21 \times 10^{-2}$ | $5.20 \times 10^{-2}$ | —        |
|           | 55    | $5.61 \times 10^{-2}$ | —                     | $1.03 \times 10^{-2}$ | —                     | $5.61 \times 10^{-2}$ | $1.03 \times 10^{-2}$ | $4.26 \times 10^{-2}$ | —        |
| NSR       | 20TBC | $2.29 \times 10^{-1}$ | —                     | $2.68 \times 10^{-2}$ | —                     | $2.29 \times 10^{-1}$ | $2.68 \times 10^{-2}$ | —                     | —        |
|           | 25TBC | $2.01 \times 10^{-1}$ | —                     | $2.27 \times 10^{-2}$ | —                     | $2.01 \times 10^{-1}$ | $2.27 \times 10^{-2}$ | —                     | —        |
|           | 30TBC | $1.85 \times 10^{-1}$ | —                     | $1.93 \times 10^{-2}$ | —                     | $1.85 \times 10^{-1}$ | $1.93 \times 10^{-2}$ | —                     | —        |
|           | 40TBC | $1.39 \times 10^{-1}$ | —                     | $1.60 \times 10^{-2}$ | —                     | $1.39 \times 10^{-1}$ | $1.60 \times 10^{-2}$ | —                     | —        |
|           | 50TBC | $1.24 \times 10^{-1}$ | —                     | $1.42 \times 10^{-2}$ | —                     | $1.24 \times 10^{-1}$ | $1.42 \times 10^{-2}$ | —                     | —        |
|           | 70TBC | $9.99 \times 10^{-2}$ | —                     | $1.15 \times 10^{-2}$ | —                     | $9.99 \times 10^{-2}$ | $1.15 \times 10^{-2}$ | —                     | —        |

| Model No. |       | Equivalent factor     |           |                       |           |                       |                       |                       |          |
|-----------|-------|-----------------------|-----------|-----------------------|-----------|-----------------------|-----------------------|-----------------------|----------|
|           |       | $K_{AR1}$             | $K_{AL1}$ | $K_{AR2}$             | $K_{AL2}$ | $K_{B1}$              | $K_{B2}$              | $K_{CR}$              | $K_{CL}$ |
| SRG       | 15    | $1.23 \times 10^{-1}$ |           | $2.07 \times 10^{-2}$ |           | $1.23 \times 10^{-1}$ | $2.07 \times 10^{-2}$ | $1.04 \times 10^{-1}$ |          |
|           | 20    | $9.60 \times 10^{-2}$ |           | $1.71 \times 10^{-2}$ |           | $9.60 \times 10^{-2}$ | $1.71 \times 10^{-2}$ | $8.00 \times 10^{-2}$ |          |
|           | 20L   | $7.21 \times 10^{-2}$ |           | $1.42 \times 10^{-2}$ |           | $7.21 \times 10^{-2}$ | $1.42 \times 10^{-2}$ | $8.00 \times 10^{-2}$ |          |
|           | 25    | $8.96 \times 10^{-2}$ |           | $1.55 \times 10^{-2}$ |           | $8.96 \times 10^{-2}$ | $1.55 \times 10^{-2}$ | $7.23 \times 10^{-2}$ |          |
|           | 25L   | $6.99 \times 10^{-2}$ |           | $1.31 \times 10^{-2}$ |           | $6.99 \times 10^{-2}$ | $1.31 \times 10^{-2}$ | $7.23 \times 10^{-2}$ |          |
|           | 30    | $8.06 \times 10^{-2}$ |           | $1.33 \times 10^{-2}$ |           | $8.06 \times 10^{-2}$ | $1.33 \times 10^{-2}$ | $5.61 \times 10^{-2}$ |          |
|           | 30L   | $6.12 \times 10^{-2}$ |           | $1.11 \times 10^{-2}$ |           | $6.12 \times 10^{-2}$ | $1.11 \times 10^{-2}$ | $5.61 \times 10^{-2}$ |          |
|           | 35    | $7.14 \times 10^{-2}$ |           | $1.18 \times 10^{-2}$ |           | $7.14 \times 10^{-2}$ | $1.18 \times 10^{-2}$ | $4.98 \times 10^{-2}$ |          |
|           | 35L   | $5.26 \times 10^{-2}$ |           | $9.67 \times 10^{-3}$ |           | $5.26 \times 10^{-2}$ | $9.67 \times 10^{-3}$ | $4.98 \times 10^{-2}$ |          |
|           | 35SL  | $4.40 \times 10^{-2}$ |           | $8.34 \times 10^{-3}$ |           | $4.40 \times 10^{-2}$ | $8.34 \times 10^{-3}$ | $4.98 \times 10^{-2}$ |          |
|           | 45    | $5.49 \times 10^{-2}$ |           | $9.58 \times 10^{-3}$ |           | $5.49 \times 10^{-2}$ | $9.58 \times 10^{-3}$ | $3.85 \times 10^{-2}$ |          |
|           | 45L   | $4.18 \times 10^{-2}$ |           | $7.93 \times 10^{-3}$ |           | $4.18 \times 10^{-2}$ | $7.93 \times 10^{-3}$ | $3.85 \times 10^{-2}$ |          |
|           | 45SL  | $3.28 \times 10^{-2}$ |           | $6.56 \times 10^{-3}$ |           | $3.28 \times 10^{-2}$ | $6.56 \times 10^{-3}$ | $3.85 \times 10^{-2}$ |          |
|           | 55    | $4.56 \times 10^{-2}$ |           | $8.04 \times 10^{-3}$ |           | $4.56 \times 10^{-2}$ | $8.04 \times 10^{-3}$ | $3.25 \times 10^{-2}$ |          |
|           | 55L   | $3.37 \times 10^{-2}$ |           | $6.42 \times 10^{-3}$ |           | $3.37 \times 10^{-2}$ | $6.42 \times 10^{-3}$ | $3.25 \times 10^{-2}$ |          |
|           | 55SL  | $2.56 \times 10^{-2}$ |           | $5.22 \times 10^{-3}$ |           | $2.56 \times 10^{-2}$ | $5.22 \times 10^{-3}$ | $3.25 \times 10^{-2}$ |          |
|           | 65    | $3.54 \times 10^{-2}$ |           | $6.06 \times 10^{-3}$ |           | $3.54 \times 10^{-2}$ | $6.06 \times 10^{-3}$ | $2.70 \times 10^{-2}$ |          |
|           | 65L   | $2.63 \times 10^{-2}$ |           | $4.97 \times 10^{-3}$ |           | $2.63 \times 10^{-2}$ | $4.97 \times 10^{-3}$ | $2.70 \times 10^{-2}$ |          |
|           | 65SL  | $1.97 \times 10^{-2}$ |           | $4.01 \times 10^{-3}$ |           | $1.97 \times 10^{-2}$ | $4.01 \times 10^{-3}$ | $2.70 \times 10^{-2}$ |          |
|           | 85LC  | $2.19 \times 10^{-2}$ |           | $4.15 \times 10^{-3}$ |           | $2.19 \times 10^{-2}$ | $4.15 \times 10^{-3}$ | $1.91 \times 10^{-2}$ |          |
|           | 100LC | $1.95 \times 10^{-2}$ |           | $3.67 \times 10^{-3}$ |           | $1.95 \times 10^{-2}$ | $3.67 \times 10^{-3}$ | $1.62 \times 10^{-2}$ |          |
| SRN       | 35    | $7.14 \times 10^{-2}$ |           | $1.18 \times 10^{-2}$ |           | $7.14 \times 10^{-2}$ | $1.18 \times 10^{-2}$ | $4.98 \times 10^{-2}$ |          |
|           | 35L   | $5.26 \times 10^{-2}$ |           | $9.67 \times 10^{-3}$ |           | $5.26 \times 10^{-2}$ | $9.67 \times 10^{-3}$ | $4.98 \times 10^{-2}$ |          |
|           | 35SL  | $4.40 \times 10^{-2}$ |           | $8.34 \times 10^{-3}$ |           | $4.40 \times 10^{-2}$ | $8.34 \times 10^{-3}$ | $4.98 \times 10^{-2}$ |          |
|           | 45    | $5.49 \times 10^{-2}$ |           | $9.58 \times 10^{-3}$ |           | $5.49 \times 10^{-2}$ | $9.58 \times 10^{-3}$ | $3.85 \times 10^{-2}$ |          |
|           | 45L   | $4.18 \times 10^{-2}$ |           | $7.93 \times 10^{-3}$ |           | $4.18 \times 10^{-2}$ | $7.93 \times 10^{-3}$ | $3.85 \times 10^{-2}$ |          |
|           | 45SL  | $3.28 \times 10^{-2}$ |           | $6.56 \times 10^{-3}$ |           | $3.28 \times 10^{-2}$ | $6.56 \times 10^{-3}$ | $3.85 \times 10^{-2}$ |          |
|           | 55    | $4.56 \times 10^{-2}$ |           | $8.04 \times 10^{-3}$ |           | $4.56 \times 10^{-2}$ | $8.04 \times 10^{-3}$ | $3.25 \times 10^{-2}$ |          |
|           | 55L   | $3.37 \times 10^{-2}$ |           | $6.42 \times 10^{-3}$ |           | $3.37 \times 10^{-2}$ | $6.42 \times 10^{-3}$ | $3.25 \times 10^{-2}$ |          |
|           | 55SL  | $2.56 \times 10^{-2}$ |           | $5.22 \times 10^{-3}$ |           | $2.56 \times 10^{-2}$ | $5.22 \times 10^{-3}$ | $3.25 \times 10^{-2}$ |          |
|           | 65    | $3.54 \times 10^{-2}$ |           | $6.06 \times 10^{-3}$ |           | $3.54 \times 10^{-2}$ | $6.06 \times 10^{-3}$ | $2.70 \times 10^{-2}$ |          |
|           | 65L   | $2.63 \times 10^{-2}$ |           | $4.97 \times 10^{-3}$ |           | $2.63 \times 10^{-2}$ | $4.97 \times 10^{-3}$ | $2.70 \times 10^{-2}$ |          |
|           | 65SL  | $1.97 \times 10^{-2}$ |           | $4.01 \times 10^{-3}$ |           | $1.97 \times 10^{-2}$ | $4.01 \times 10^{-3}$ | $2.70 \times 10^{-2}$ |          |
| SRW       | 70    | $4.18 \times 10^{-2}$ |           | $7.93 \times 10^{-3}$ |           | $4.18 \times 10^{-2}$ | $7.93 \times 10^{-3}$ | $2.52 \times 10^{-2}$ |          |
|           | 85    | $3.37 \times 10^{-2}$ |           | $6.42 \times 10^{-3}$ |           | $3.37 \times 10^{-2}$ | $6.42 \times 10^{-3}$ | $2.09 \times 10^{-2}$ |          |
|           | 100   | $2.63 \times 10^{-2}$ |           | $4.97 \times 10^{-3}$ |           | $2.63 \times 10^{-2}$ | $4.97 \times 10^{-3}$ | $1.77 \times 10^{-2}$ |          |
|           | 130   | $2.19 \times 10^{-2}$ |           | $4.15 \times 10^{-3}$ |           | $2.19 \times 10^{-2}$ | $4.15 \times 10^{-3}$ | $1.33 \times 10^{-2}$ |          |
|           | 150   | $1.95 \times 10^{-2}$ |           | $3.67 \times 10^{-3}$ |           | $1.95 \times 10^{-2}$ | $3.67 \times 10^{-3}$ | $1.15 \times 10^{-2}$ |          |

 $K_{AR1}$  : Equivalent factor in the  $M_A$  radial direction when one LM block is used $K_{AL1}$  : Equivalent factor in the  $M_A$  reverse radial direction when one LM block is used $K_{AR2}$  : Equivalent factor in the  $M_A$  radial direction when two LM blocks are used in close contact with each other $K_{AL2}$  : Equivalent factor in the  $M_A$  reverse radial direction when two LM blocks are used in close contact with each other $K_{B1}$  :  $M_B$  Equivalent factor when one LM block is used $K_{B2}$  :  $M_B$  Equivalent factor when two LM blocks are used in close contact with each other $K_{CR}$  : Equivalent factor in the  $M_C$  radial direction $K_{CL}$  : Equivalent factor in the  $M_C$  reverse radial direction

**[Double-axis Use]**

● **Setting Conditions**

Set the conditions needed to calculate the LM system's applied load and service life in hours. The conditions consist of the following items.

- (1) Mass:  $m$  (kg)
- (2) Direction of the working load
- (3) Position of the working point (e.g., center of gravity):  $\ell_2, \ell_3, h_1$ (mm)
- (4) Thrust position:  $\ell_4, h_2$ (mm)
- (5) LM system arrangement:  $\ell_0, \ell_1$ (mm)  
(No. of units and axes)
- (6) Velocity diagram  
Speed:  $V$  (mm/s)  
Time constant:  $t_n$  (s)  
Acceleration:  $\alpha_n$ (mm/s<sup>2</sup>)

$$(\alpha_n = \frac{V}{t_n})$$

- (7) Duty cycle  
Number of reciprocations per minute:  $N_1$ (min<sup>-1</sup>)
- (8) Stroke length:  $\ell_s$ (mm)
- (9) Average speed:  $V_m$ (m/s)
- (10) Required service life in hours:  $L_h$ (h)

Gravitational acceleration  $g=9.8$  (m/s<sup>2</sup>)

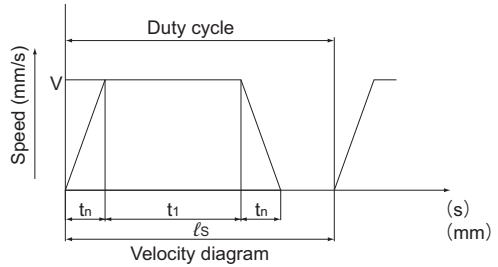
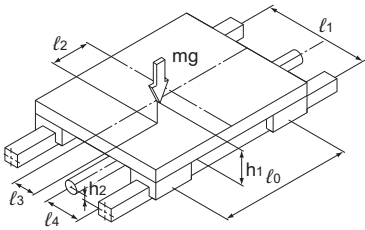


Fig.6 Condition

### ● Applied Load Equation

The load applied to the LM Guide varies with the external force, such as the position of the gravity center of an object, thrust position, inertia generated from acceleration/deceleration during start or stop, and cutting force.

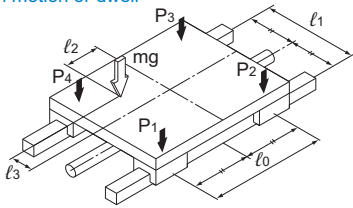
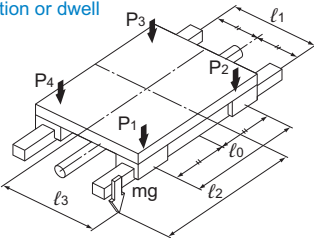
In selecting an LM Guide, it is necessary to obtain the value of the applied load while taking into account these conditions.

Calculate the load applied to the LM Guide in each of the examples 1 to 10 shown below.

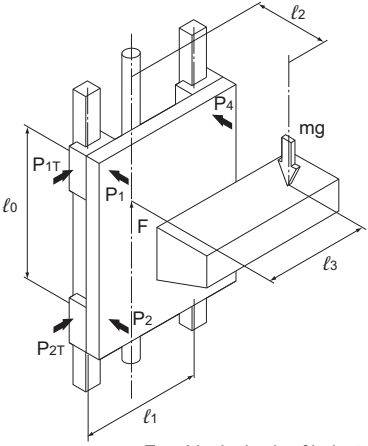
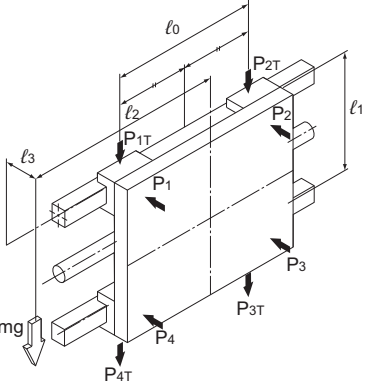
|            |                                                  |                     |
|------------|--------------------------------------------------|---------------------|
| m          | : Mass                                           | (kg)                |
| $\ell_n$   | : Distance                                       | (mm)                |
| $F_n$      | : External force                                 | (N)                 |
| $P_n$      | : Applied load (radial/reverse radial direction) | (N)                 |
| $P_{nT}$   | : Applied load (lateral directions)              | (N)                 |
| g          | : Gravitational acceleration                     | (m/s <sup>2</sup> ) |
|            | (g = 9.8m/s <sup>2</sup> )                       |                     |
| V          | : Speed                                          | (m/s)               |
| $t_n$      | : Time constant                                  | (s)                 |
| $\alpha_n$ | : Acceleration                                   | (m/s <sup>2</sup> ) |

$$(\alpha_n = \frac{V}{t_n})$$

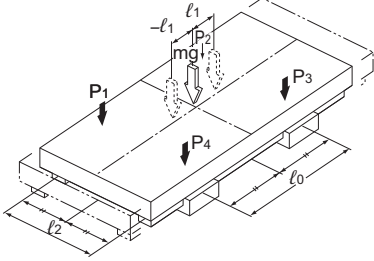
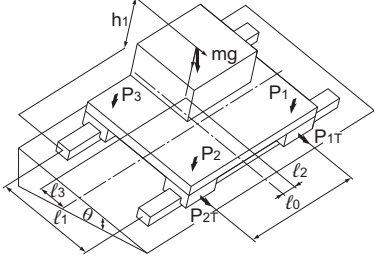
### [Example]

|   | Condition                                                                                                                                                                        | Applied Load Equation                                                                                                                                                                                                                                                                                                                                                                                                       |
|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | <p>Horizontal mount<br/>(with the block traveling)<br/>Uniform motion or dwell</p>             | $P_1 = \frac{mg}{4} + \frac{mg \cdot \ell_2}{2 \cdot \ell_0} - \frac{mg \cdot \ell_3}{2 \cdot \ell_1}$ $P_2 = \frac{mg}{4} - \frac{mg \cdot \ell_2}{2 \cdot \ell_0} - \frac{mg \cdot \ell_3}{2 \cdot \ell_1}$ $P_3 = \frac{mg}{4} - \frac{mg \cdot \ell_2}{2 \cdot \ell_0} + \frac{mg \cdot \ell_3}{2 \cdot \ell_1}$ $P_4 = \frac{mg}{4} + \frac{mg \cdot \ell_2}{2 \cdot \ell_0} + \frac{mg \cdot \ell_3}{2 \cdot \ell_1}$ |
| 2 | <p>Horizontal mount, overhung<br/>(with the block traveling)<br/>Uniform motion or dwell</p>  | $P_1 = \frac{mg}{4} + \frac{mg \cdot \ell_2}{2 \cdot \ell_0} + \frac{mg \cdot \ell_3}{2 \cdot \ell_1}$ $P_2 = \frac{mg}{4} - \frac{mg \cdot \ell_2}{2 \cdot \ell_0} + \frac{mg \cdot \ell_3}{2 \cdot \ell_1}$ $P_3 = \frac{mg}{4} - \frac{mg \cdot \ell_2}{2 \cdot \ell_0} - \frac{mg \cdot \ell_3}{2 \cdot \ell_1}$ $P_4 = \frac{mg}{4} + \frac{mg \cdot \ell_2}{2 \cdot \ell_0} - \frac{mg \cdot \ell_3}{2 \cdot \ell_1}$ |

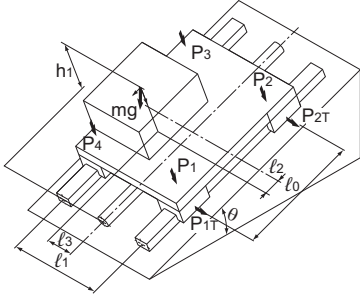
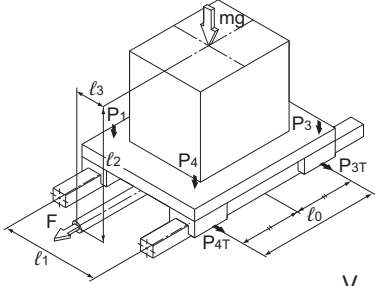
Note) Load is positive in the direction of the arrow.

|   | Condition                                                                                                                                                                                                                   | Applied Load Equation                                                                                                                                                                                                                   |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3 | <b>Vertical mount</b><br><b>Uniform motion or dwell</b>  <p>E.g.: Vertical axis of industrial robot, automatic coating machine, lifter</p> | $P_1 = P_4 = - \frac{mg \cdot l_2}{2 \cdot l_0}$ $P_2 = P_3 = \frac{mg \cdot l_2}{2 \cdot l_0}$ $P_{1T} = P_{4T} = \frac{mg \cdot l_3}{2 \cdot l_0}$ $P_{2T} = P_{3T} = - \frac{mg \cdot l_3}{2 \cdot l_0}$                             |
| 4 | <b>Wall mount</b><br><b>Uniform motion or dwell</b>  <p>E.g.: Travel axis of cross-rail loader</p>                                        | $P_1 = P_2 = - \frac{mg \cdot l_3}{2 \cdot l_1}$ $P_3 = P_4 = \frac{mg \cdot l_3}{2 \cdot l_1}$ $P_{1T} = P_{4T} = \frac{mg}{4} + \frac{mg \cdot l_2}{2 \cdot l_0}$ $P_{2T} = P_{3T} = \frac{mg}{4} - \frac{mg \cdot l_2}{2 \cdot l_0}$ |

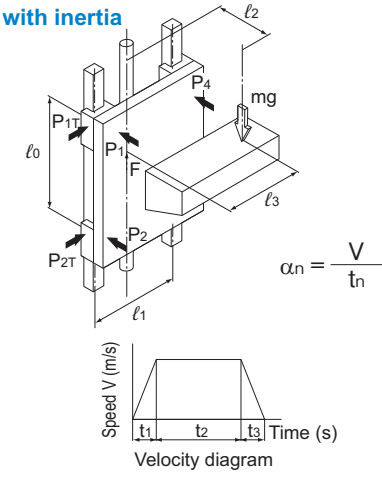
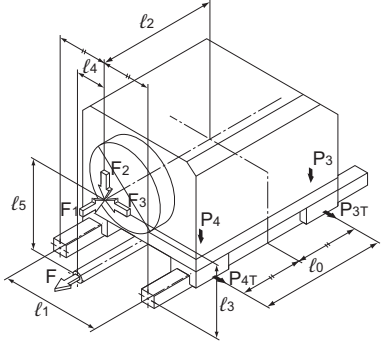
Note) Load is positive in the direction of the arrow.

|   | Condition                                                                                                                                                                                | Applied Load Equation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5 | <p><b>With the LM rails movable</b><br/><b>Horizontal mount</b></p>  <p>E.g.: XY table sliding fork</p> | $P_1 \text{ to } P_4 (\max) = \frac{mg}{4} + \frac{mg \cdot l_1}{2 \cdot l_0}$ $P_1 \text{ to } P_4 (\min) = \frac{mg}{4} - \frac{mg \cdot l_1}{2 \cdot l_0}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 6 | <p><b>Laterally tilt mount</b></p>  <p>E.g.: NC lathe Carriage</p>                                     | $P_1 = + \frac{mg \cdot \cos \theta}{4} + \frac{mg \cdot \cos \theta \cdot l_2}{2 \cdot l_0}$ $- \frac{mg \cdot \cos \theta \cdot l_3}{2 \cdot l_1} + \frac{mg \cdot \sin \theta \cdot h_1}{2 \cdot l_1}$ $P_{1T} = \frac{mg \cdot \sin \theta}{4} + \frac{mg \cdot \sin \theta \cdot l_2}{2 \cdot l_0}$ $P_2 = + \frac{mg \cdot \cos \theta}{4} - \frac{mg \cdot \cos \theta \cdot l_2}{2 \cdot l_0}$ $- \frac{mg \cdot \cos \theta \cdot l_3}{2 \cdot l_1} + \frac{mg \cdot \sin \theta \cdot h_1}{2 \cdot l_1}$ $P_{2T} = \frac{mg \cdot \sin \theta}{4} - \frac{mg \cdot \sin \theta \cdot l_2}{2 \cdot l_0}$ $P_3 = + \frac{mg \cdot \cos \theta}{4} - \frac{mg \cdot \cos \theta \cdot l_2}{2 \cdot l_0}$ $+ \frac{mg \cdot \cos \theta \cdot l_3}{2 \cdot l_1} - \frac{mg \cdot \sin \theta \cdot h_1}{2 \cdot l_1}$ $P_{3T} = \frac{mg \cdot \sin \theta}{4} - \frac{mg \cdot \sin \theta \cdot l_2}{2 \cdot l_0}$ $P_4 = + \frac{mg \cdot \cos \theta}{4} + \frac{mg \cdot \cos \theta \cdot l_2}{2 \cdot l_0}$ $+ \frac{mg \cdot \cos \theta \cdot l_3}{2 \cdot l_1} - \frac{mg \cdot \sin \theta \cdot h_1}{2 \cdot l_1}$ $P_{4T} = \frac{mg \cdot \sin \theta}{4} + \frac{mg \cdot \sin \theta \cdot l_2}{2 \cdot l_0}$ |

Note) Load is positive in the direction of the arrow.

|   | Condition                                                                                                                                                     | Applied Load Equation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7 | <p><b>Longitudinally tilt mount</b></p>  <p>E.g.: NC lathe<br/>Tool rest</p> | $P_1 = + \frac{mg \cdot \cos \theta}{4} + \frac{mg \cdot \cos \theta \cdot \ell_2}{2 \cdot \ell_0}$ $- \frac{mg \cdot \cos \theta \cdot \ell_3}{2 \cdot \ell_1} + \frac{mg \cdot \sin \theta \cdot h_1}{2 \cdot \ell_0}$ $P_{1T} = + \frac{mg \cdot \sin \theta \cdot \ell_3}{2 \cdot \ell_0}$ $P_2 = + \frac{mg \cdot \cos \theta}{4} - \frac{mg \cdot \cos \theta \cdot \ell_2}{2 \cdot \ell_0}$ $- \frac{mg \cdot \cos \theta \cdot \ell_3}{2 \cdot \ell_1} - \frac{mg \cdot \sin \theta \cdot h_1}{2 \cdot \ell_0}$ $P_{2T} = - \frac{mg \cdot \sin \theta \cdot \ell_3}{2 \cdot \ell_0}$ $P_3 = + \frac{mg \cdot \cos \theta}{4} - \frac{mg \cdot \cos \theta \cdot \ell_2}{2 \cdot \ell_0}$ $+ \frac{mg \cdot \cos \theta \cdot \ell_3}{2 \cdot \ell_1} - \frac{mg \cdot \sin \theta \cdot h_1}{2 \cdot \ell_0}$ $P_{3T} = - \frac{mg \cdot \sin \theta \cdot \ell_3}{2 \cdot \ell_0}$ $P_4 = + \frac{mg \cdot \cos \theta}{4} + \frac{mg \cdot \cos \theta \cdot \ell_2}{2 \cdot \ell_0}$ $+ \frac{mg \cdot \cos \theta \cdot \ell_3}{2 \cdot \ell_1} + \frac{mg \cdot \sin \theta \cdot h_1}{2 \cdot \ell_0}$ $P_{4T} = + \frac{mg \cdot \sin \theta \cdot \ell_3}{2 \cdot \ell_0}$ |
| 8 | <p><b>Horizontal mount with inertia</b></p>  <p>E.g.: Conveyance truck</p>  | <p>During acceleration</p> $P_1 = P_4 = \frac{mg}{4} - \frac{m \cdot \alpha_1 \cdot \ell_2}{2 \cdot \ell_0}$ $P_2 = P_3 = \frac{mg}{4} + \frac{m \cdot \alpha_1 \cdot \ell_2}{2 \cdot \ell_0}$ $P_{1T} = P_{4T} = - \frac{m \cdot \alpha_1 \cdot \ell_3}{2 \cdot \ell_0}$ $P_{2T} = P_{3T} = + \frac{m \cdot \alpha_1 \cdot \ell_3}{2 \cdot \ell_0}$ <p>During uniform motion</p> $P_1 \text{ to } P_4 = \frac{mg}{4}$ <p>During deceleration</p> $P_1 = P_4 = \frac{mg}{4} + \frac{m \cdot \alpha_3 \cdot \ell_2}{2 \cdot \ell_0}$ $P_2 = P_3 = \frac{mg}{4} - \frac{m \cdot \alpha_3 \cdot \ell_2}{2 \cdot \ell_0}$ $P_{1T} = P_{4T} = + \frac{m \cdot \alpha_3 \cdot \ell_3}{2 \cdot \ell_0}$ $P_{2T} = P_{3T} = - \frac{m \cdot \alpha_3 \cdot \ell_3}{2 \cdot \ell_0}$                                                                                                                                                                                                                                                                                                                                                                                                                 |

Note) Load is positive in the direction of the arrow.

|    | Condition                                                                                                                                                                                                                                                                                                                                                                                    | Applied Load Equation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 9  | <b>Vertical mount with inertia</b>  <p> <math>\alpha_n = \frac{V}{t_n}</math> </p> <p>                         Velocity diagram<br/>                         E.g.: Conveyance lift                     </p>                                                                                                 | <p>During acceleration</p> $P_1 = P_4 = -\frac{m(g + \alpha_1)l_2}{2 \cdot l_0}$ $P_2 = P_3 = \frac{m(g + \alpha_1)l_3}{2 \cdot l_0}$ $P_{1T} = P_{4T} = \frac{m(g + \alpha_1)l_3}{2 \cdot l_0}$ $P_{2T} = P_{3T} = -\frac{m(g + \alpha_1)l_3}{2 \cdot l_0}$ <p>During uniform motion</p> $P_1 = P_4 = -\frac{mg \cdot l_2}{2 \cdot l_0}$ $P_2 = P_3 = \frac{mg \cdot l_3}{2 \cdot l_0}$ $P_{1T} = P_{4T} = \frac{mg \cdot l_3}{2 \cdot l_0}$ $P_{2T} = P_{3T} = -\frac{mg \cdot l_3}{2 \cdot l_0}$ <p>During deceleration</p> $P_1 = P_4 = -\frac{m(g - \alpha_3)l_2}{2 \cdot l_0}$ $P_2 = P_3 = \frac{m(g - \alpha_3)l_3}{2 \cdot l_0}$ $P_{1T} = P_{4T} = \frac{m(g - \alpha_3)l_3}{2 \cdot l_0}$ $P_{2T} = P_{3T} = -\frac{m(g - \alpha_3)l_3}{2 \cdot l_0}$ |
| 10 | <b>Horizontal mount with external force</b>  <p>                         E.g.: Drill unit,<br/>                         Milling machine,<br/>                         Lathe,<br/>                         Machining center<br/>                         and other cutting machine                     </p> | <p>Under force <math>F_1</math></p> $P_1 = P_4 = -\frac{F_1 \cdot l_5}{2 \cdot l_0}$ $P_2 = P_3 = \frac{F_1 \cdot l_5}{2 \cdot l_0}$ $P_{1T} = P_{4T} = \frac{F_1 \cdot l_4}{2 \cdot l_0}$ $P_{2T} = P_{3T} = -\frac{F_1 \cdot l_4}{2 \cdot l_0}$ <p>Under force <math>F_2</math></p> $P_1 = P_4 = \frac{F_2}{4} + \frac{F_2 \cdot l_2}{2 \cdot l_0}$ $P_2 = P_3 = \frac{F_2}{4} - \frac{F_2 \cdot l_2}{2 \cdot l_0}$ <p>Under force <math>F_3</math></p> $P_1 = P_2 = \frac{F_3 \cdot l_3}{2 \cdot l_1}$ $P_3 = P_4 = -\frac{F_3 \cdot l_3}{2 \cdot l_1}$ $P_{1T} = P_{4T} = -\frac{F_3}{4} - \frac{F_3 \cdot l_2}{2 \cdot l_0}$ $P_{2T} = P_{3T} = -\frac{F_3}{4} + \frac{F_3 \cdot l_2}{2 \cdot l_0}$                                                         |

Note) Load is positive in the direction of the arrow.

# Calculating the Equivalent Load

## Rated Load of an LM Guide in Each Direction

The LM Guide is categorized into roughly two types: the 4-way equal load type, which has the same rated load in the radial, reverse radial and lateral directions, and the radial type, which has a large rated load in the radial direction. With the radial type LM Guide, the rated load in the radial direction is different from that in the reverse radial and lateral directions. The basic load rating in the radial direction is indicated in the specification table. The values in the reverse-radial and lateral directions are obtained from Table7 on **A1-59**.

### [Rated Loads in All Directions]

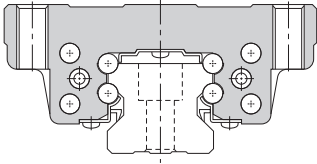
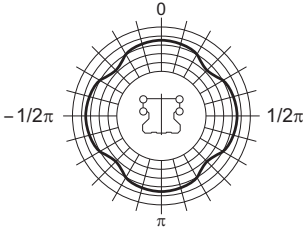
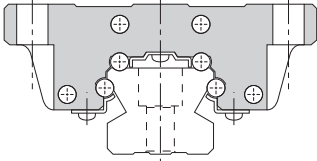
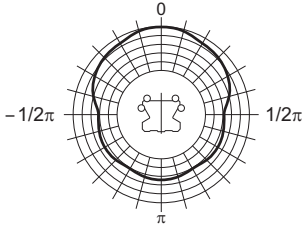
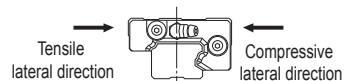
| Type                                                                                                                  | Load Distribution Curve                                                           |
|-----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| <p><b>4-way Equal Load Type</b></p>  |  |
| <p><b>Radial Type</b></p>            |  |

Table7 Rated Loads in All Directions

| Classification   | Model No. |                         | Reverse radial direction<br> |                                | Lateral directions<br> |                                      |
|------------------|-----------|-------------------------|---------------------------------------------------------------------------------------------------------------|--------------------------------|---------------------------------------------------------------------------------------------------------|--------------------------------------|
|                  | Type      | Size                    | Dynamic load rating<br>$C_L$                                                                                  | Static load rating<br>$C_{0L}$ | Dynamic load rating<br>$C_T$                                                                            | Static load rating<br>$C_{0T}$       |
| 4-way Equal Load | SHS       |                         | C                                                                                                             | $C_0$                          | C                                                                                                       | $C_0$                                |
|                  | SHW       |                         | C                                                                                                             | $C_0$                          | C                                                                                                       | $C_0$                                |
|                  | SRS       | 12,15,25                | C                                                                                                             | $C_0$                          | C                                                                                                       | $C_0$                                |
|                  | SCR       |                         | C                                                                                                             | $C_0$                          | C                                                                                                       | $C_0$                                |
|                  | EPF       |                         | C                                                                                                             | $C_0$                          | C                                                                                                       | $C_0$                                |
|                  | HSR       |                         | C                                                                                                             | $C_0$                          | C                                                                                                       | $C_0$                                |
|                  | NRS       | 75,85,100               | C                                                                                                             | $C_0$                          | C                                                                                                       | $C_0$                                |
|                  | HRW       | 17,21,27,35,50,60       | C                                                                                                             | $C_0$                          | C                                                                                                       | $C_0$                                |
|                  | RSR       | 2,3                     | C                                                                                                             | $C_0$                          | C                                                                                                       | $C_0$                                |
|                  | CSR       |                         | C                                                                                                             | $C_0$                          | C                                                                                                       | $C_0$                                |
|                  | MX        |                         | C                                                                                                             | $C_0$                          | C                                                                                                       | $C_0$                                |
|                  | JR        |                         | C                                                                                                             | $C_0$                          | C                                                                                                       | $C_0$                                |
|                  | HCR       |                         | C                                                                                                             | $C_0$                          | C                                                                                                       | $C_0$                                |
|                  | HMG       |                         | C                                                                                                             | $C_0$                          | C                                                                                                       | $C_0$                                |
|                  | HSR-M1    |                         | C                                                                                                             | $C_0$                          | C                                                                                                       | $C_0$                                |
|                  | RSR-M1    | 9                       | C                                                                                                             | $C_0$                          | C                                                                                                       | $C_0$                                |
|                  | HSR-M2    |                         | C                                                                                                             | $C_0$                          | C                                                                                                       | $C_0$                                |
|                  | HSR-M1VV  |                         | C                                                                                                             | $C_0$                          | C                                                                                                       | $C_0$                                |
|                  | SRG       |                         | C                                                                                                             | $C_0$                          | C                                                                                                       | $C_0$                                |
|                  | SRN       | 35,45,55,65             | C                                                                                                             | $C_0$                          | C                                                                                                       | $C_0$                                |
|                  | SRW       |                         | C                                                                                                             | $C_0$                          | C                                                                                                       | $C_0$                                |
| Radial           | SSR       |                         | 0.50C                                                                                                         | 0.50 $C_0$                     | 0.53C                                                                                                   | 0.43 $C_0$                           |
|                  | SVR       |                         | 0.64C                                                                                                         | 0.64 $C_0$                     | 0.47C                                                                                                   | 0.38 $C_0$                           |
|                  | SR        | 15,20,25,30,35,45,55,70 | 0.62C                                                                                                         | 0.50 $C_0$                     | 0.56C                                                                                                   | 0.43 $C_0$                           |
|                  | SR        | 85,100,120,150          | 0.78C                                                                                                         | 0.71 $C_0$                     | 0.48C                                                                                                   | 0.35 $C_0$                           |
|                  | NR-X      |                         | 0.64C                                                                                                         | 0.64 $C_0$                     | 0.47C                                                                                                   | 0.38 $C_0$                           |
|                  | NR        | 75,85,100               | 0.78C                                                                                                         | 0.71 $C_0$                     | 0.48C                                                                                                   | 0.45 $C_0$                           |
|                  | HRW       | 12,14                   | 0.78C                                                                                                         | 0.71 $C_0$                     | 0.48C                                                                                                   | 0.35 $C_0$                           |
|                  | NSR       |                         | 0.62C                                                                                                         | 0.50 $C_0$                     | 0.56C                                                                                                   | 0.43 $C_0$                           |
|                  | SR-M1     |                         | 0.62C                                                                                                         | 0.50 $C_0$                     | 0.56C                                                                                                   | 0.43 $C_0$                           |
| Other            | SR-MS     |                         | —                                                                                                             | 0.50 $F_0$                     | —                                                                                                       | 0.43 $F_0$                           |
|                  | SVS       |                         | 0.84C                                                                                                         | 0.84 $C_0$                     | 0.92C                                                                                                   | 0.85 $C_0$                           |
|                  | NRS-X     |                         | 0.84C                                                                                                         | 0.84 $C_0$                     | 0.92C                                                                                                   | 0.85 $C_0$                           |
|                  | SRS       | 5,7,9,20                | C                                                                                                             | $C_0$                          | 1.19C                                                                                                   | 1.19 $C_0$                           |
|                  | RSX       | 7,9                     | C                                                                                                             | $C_0$                          | 1.19C                                                                                                   | 1.19 $C_0$                           |
|                  | RSX       | 12,15                   | C                                                                                                             | $C_0$                          | C                                                                                                       | $C_0$                                |
|                  | RSR       | 14                      | 0.78C                                                                                                         | 0.70 $C_0$                     | 0.78C                                                                                                   | 0.71 $C_0$                           |
|                  | HR        |                         | C                                                                                                             | $C_0$                          | C                                                                                                       | $C_0$                                |
|                  | GSR       |                         | 0.93C                                                                                                         | 0.90 $C_0$                     | (T) 0.84C*<br>(C) 0.93C*                                                                                | (T) 0.78 $C_0$ *<br>(C) 0.90 $C_0$ * |
|                  | GSR-R     |                         | 0.93C                                                                                                         | 0.90 $C_0$                     | (T) 0.84C*<br>(C) 0.93C*                                                                                | (T) 0.78 $C_0$ *<br>(C) 0.90 $C_0$ * |
|                  | RSR-M1    | 12,15,20                | 0.78C                                                                                                         | 0.70 $C_0$                     | 0.78C                                                                                                   | 0.71 $C_0$                           |

\*(T): Tensile lateral direction; (C): Compressive lateral direction  
 Note) C and  $C_0$  in the table each represent the basic load rating indicated in the specification table of the respective model.  $F_0$  represents the permissible load.  
 For types with no size indication in the table, the same factor is applied to all sizes.  
 Models HR, GSR and GSR-R cannot be used in single-axis applications.



### [Equivalent Load $P_E$ ]

The LM Guide can bear loads and moments in all directions, including a radial load ( $P_R$ ), reverse radial load ( $P_L$ ) and lateral loads ( $P_T$ ), simultaneously.

When two or more loads (e.g., radial load and lateral load) are simultaneously applied to the LM Guide, the service life and the static safety factor are calculated using equivalent load values obtained by converting all the loads into radial load or reverse radial load.

### [Equivalent Load Equation]

When the LM block of the LM Guide receives loads simultaneously in the radial and lateral directions, or the reverse radial and lateral directions, the equivalent load is obtained from the equation below.

$$P_E = X \cdot P_{R(L)} + Y \cdot P_T$$

|        |                           |              |
|--------|---------------------------|--------------|
| $P_E$  | : Equivalent load         | (N)          |
|        | ·Radial direction         |              |
|        | ·Reverse radial direction |              |
| $P_L$  | : Reverse radial load     | (N)          |
| $P_T$  | : Lateral load            | (N)          |
| $X, Y$ | : Equivalent factor       | (see Table8) |

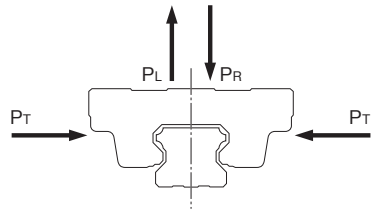


Fig.7 Equivalent of Load of the LM Guide

Table8 Equivalent factor in each direction

| Classification   | Model No. |                         | If radial and lateral loads are applied simultaneously |       | If reverse-radial and lateral loads are applied simultaneously |       |
|------------------|-----------|-------------------------|--------------------------------------------------------|-------|----------------------------------------------------------------|-------|
|                  |           |                         | Equivalent in radial direction                         |       | Equivalent in reverse radial direction                         |       |
|                  | Type      | Size                    | X                                                      | Y     | X                                                              | Y     |
| 4-way Equal Load | SHS       |                         | 1.000                                                  | 1.000 | 1.000                                                          | 1.000 |
|                  | SHW       |                         | 1.000                                                  | 1.000 | 1.000                                                          | 1.000 |
|                  | SRS       | 12,15,25                | 1.000                                                  | 1.000 | 1.000                                                          | 1.000 |
|                  | RSX       | 12,15                   | 1.000                                                  | 1.000 | 1.000                                                          | 1.000 |
|                  | SCR       |                         | 1.000                                                  | 1.000 | 1.000                                                          | 1.000 |
|                  | EPF       |                         | 1.000                                                  | 1.000 | 1.000                                                          | 1.000 |
|                  | HSR       |                         | 1.000                                                  | 1.000 | 1.000                                                          | 1.000 |
|                  | NRS       | 75,85,100               | 1.000                                                  | 1.000 | 1.000                                                          | 1.000 |
|                  | HRW       | 17,21,27,35,50,60       | 1.000                                                  | 1.000 | 1.000                                                          | 1.000 |
|                  | RSR       | 2,3                     | 1.000                                                  | 1.000 | 1.000                                                          | 1.000 |
|                  | CSR       |                         | 1.000                                                  | 1.000 | 1.000                                                          | 1.000 |
|                  | MX        |                         | 1.000                                                  | 1.000 | 1.000                                                          | 1.000 |
|                  | JR        |                         | 1.000                                                  | 1.000 | 1.000                                                          | 1.000 |
|                  | HCR       |                         | 1.000                                                  | 1.000 | 1.000                                                          | 1.000 |
|                  | HMG       |                         | 1.000                                                  | 1.000 | 1.000                                                          | 1.000 |
|                  | HSR-M1    |                         | 1.000                                                  | 1.000 | 1.000                                                          | 1.000 |
|                  | RSR-M1    | 9                       | 1.000                                                  | 1.000 | 1.000                                                          | 1.000 |
|                  | HSR-M2    |                         | 1.000                                                  | 1.000 | 1.000                                                          | 1.000 |
|                  | HSR-M1VV  |                         | 1.000                                                  | 1.000 | 1.000                                                          | 1.000 |
|                  | SRG       |                         | 1.000                                                  | 1.000 | 1.000                                                          | 1.000 |
| Radial           | SSR       |                         | —                                                      | —     | 1.000                                                          | 1.155 |
|                  | SVR       |                         | —                                                      | —     | 1.000                                                          | 1.678 |
|                  | SR        | 15,20,25,30,35,45,55,70 | —                                                      | —     | 1.000                                                          | 1.155 |
|                  | SR        | 85,100,120,150          | —                                                      | —     | 1.000                                                          | 2.000 |
|                  | NR-X      |                         | —                                                      | —     | 1.000                                                          | 1.678 |
|                  | NR        | 75,85,100               | —                                                      | —     | 1.000                                                          | 2.000 |
|                  | HRW       | 12,14                   | —                                                      | —     | 1.000                                                          | 2.000 |
|                  | NSR       |                         | —                                                      | —     | 1.000                                                          | 1.155 |
|                  | SR-M1     |                         | —                                                      | —     | 1.000                                                          | 1.155 |
| Other            | SR-MS     |                         | —                                                      | —     | 1.000                                                          | 1.155 |
|                  | SVS       |                         | 1.000                                                  | 0.935 | 1.000                                                          | 1.020 |
|                  | NRS-X     |                         | 1.000                                                  | 0.935 | 1.000                                                          | 1.020 |
|                  | SRS       | 5,7,9,20                | 1.000                                                  | 0.839 | 1.000                                                          | 0.839 |
|                  | RSX       | 7,9                     | 1.000                                                  | 0.839 | 1.000                                                          | 0.839 |
|                  | RSR       | 14                      | 1.000                                                  | 0.830 | 1.000                                                          | 0.990 |
|                  | HR        |                         | 1.000                                                  | 0.500 | 1.000                                                          | 0.500 |
|                  | GSR       |                         | 1.000                                                  | 1.280 | 1.000                                                          | 1.000 |
|                  | GSR-R     |                         | 1.000                                                  | 1.280 | 1.000                                                          | 1.280 |
| Other            | RSR-M1    | 12,15,20                | 1.000                                                  | 0.830 | 1.000                                                          | 0.990 |

Note) If the radial type LM Guide receives radial and lateral loads simultaneously, study the safety static factor and the rated load in the radial-load and lateral-load directions.

For types with no size indication in the table, the same factor is applied to all sizes.

Models HR, GSR and GSR-R cannot be used in single-axis applications.

# Calculating the Static Safety Factor

To calculate a load applied to the LM Guide, the average load required for calculating the service life and the maximum load needed for calculating the static safety factor must be obtained □rst. In a system subject to frequent starts and stops, placed under cutting forces or under a large moment caused by an overhang load, an excessively large load may apply to the LM Guide. When selecting a model number, make sure that the desired model is capable of receiving the required maximum load (whether stationary or in motion). Table9 shows reference values for the static safety factor.

Table9 Reference Values for the Static Safety Factor (f<sub>s</sub>)

| Machine using the LM Guide   | Load conditions             | Lower limit of f <sub>s</sub> |
|------------------------------|-----------------------------|-------------------------------|
| General industrial machinery | Without vibration or impact | 1.0 to 3.5                    |
|                              | With vibration or impact    | 2.0 to 5.0                    |
| Machine tool                 | Without vibration or impact | 1.0 to 4.0                    |
|                              | With vibration or impact    | 2.5 to 7.0                    |

|                                       |                                                             |
|---------------------------------------|-------------------------------------------------------------|
| When the radial load is large         | $\frac{f_H \cdot f_T \cdot f_C \cdot C_0}{P_R} \geq f_s$    |
| When the reverse radial load is large | $\frac{f_H \cdot f_T \cdot f_C \cdot C_{OL}}{P_L} \geq f_s$ |
| When the lateral loads are large      | $\frac{f_H \cdot f_T \cdot f_C \cdot C_{OT}}{P_T} \geq f_s$ |

- f<sub>s</sub> : Static safety factor  
C<sub>0</sub> : Basic static load rating (radial direction) (N)  
C<sub>OL</sub> : Basic static load rating (reverse-radial direction) (N)  
C<sub>OT</sub> : Basic static load rating (lateral direction) (N)  
P<sub>R</sub> : Calculated load (radial direction) (N)  
P<sub>L</sub> : Calculated load (reverse-radial direction) (N)  
P<sub>T</sub> : Calculated load (lateral direction) (N)  
f<sub>H</sub> : Hardness factor (see Fig.8 on **A1-67**)  
f<sub>T</sub> : Temperature factor (see Fig.9 on **A1-67**)  
f<sub>C</sub> : Contact factor (see Table10 on **A1-67**)

# Calculating the Average Load

In cases where the load applied to each LM block fluctuates under different conditions, such as an industrial robot holding a work with its arm as it advances and receding with its arm empty, and a machine tool handling various workpieces, it is necessary to calculate the service life of the LM Block while taking into account such fluctuating loading conditions.

The average load ( $P_m$ ) is the load under which the service life of the LM Guide is equivalent to that under varying loads applied to the LM blocks.

$$P_m = \sqrt[i]{\frac{1}{L} \cdot \sum_{n=1}^n (P_n^i \cdot L_n)}$$

$P_m$  : Average Load (N)

$P_n$  : Varying load (N)

$L$  : Total travel distance (mm)

$L_n$  : Distance traveled under load  $P_n$  (mm)

$i$  : Constant determined by rolling element

Note) The above equation or the equation (1) below applies when the rolling elements are balls.

(1) When the load fluctuates stepwise

LM Guide Using Balls ( $i=3$ )

$$P_m = \sqrt[3]{\frac{1}{L} (P_1^3 \cdot L_1 + P_2^3 \cdot L_2 \cdots + P_n^3 \cdot L_n)} \cdots \cdots (1)$$

$P_m$  : Average load (N)

$P_n$  : Varying load (N)

$L$  : Total travel distance (mm)

$L_n$  : Distance traveled under  $P_n$  (mm)

LM Guide Using Rollers ( $i = \frac{10}{3}$ )

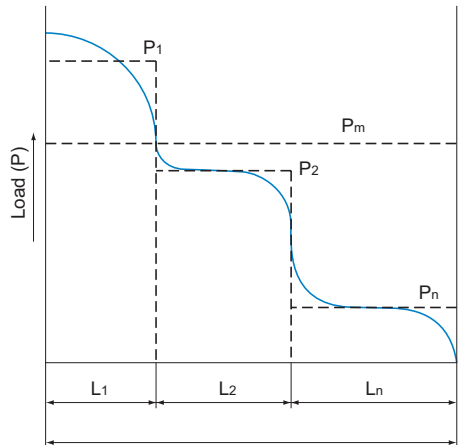
$$P_m = \sqrt[\frac{10}{3}]{\frac{1}{L} (P_1^{\frac{10}{3}} \cdot L_1 + P_2^{\frac{10}{3}} \cdot L_2 \cdots + P_n^{\frac{10}{3}} \cdot L_n)} \cdots \cdots (2)$$

$P_m$  : Average Load (N)

$P_n$  : Varying load (N)

$L$  : Total travel distance (mm)

$L_n$  : Distance traveled under  $P_n$  (mm)

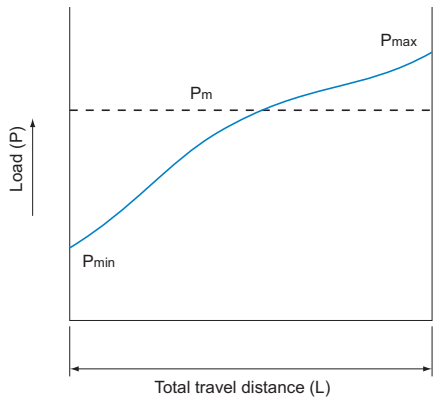


Total travel distance (L)

(2) When the load fluctuates monotonically

$$P_m \doteq \frac{1}{3} (P_{min} + 2 \cdot P_{max}) \dots\dots\dots (3)$$

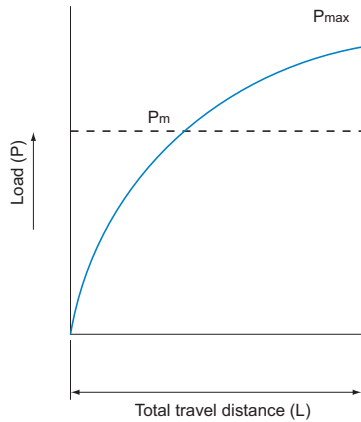
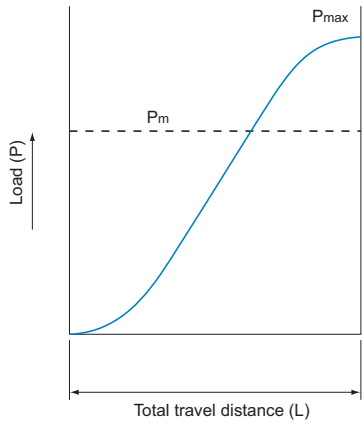
$P_{min}$  : Minimum load (N)  
 $P_{max}$  : Maximum load (N)



(3) When the load fluctuates sinusoidally

(a)  $P_m \doteq 0.65P_{max} \dots\dots\dots (4)$

(b)  $P_m \doteq 0.75P_{max} \dots\dots\dots (5)$



## Calculating the Nominal Life

The service life of an LM Guide is subject to variations even under the same operational conditions. Therefore, it is necessary to use the nominal life defined below as a reference value for obtaining the service life of the LM Guide. The nominal life means the total travel distance that 90% of a group of units of the same LM Guide model can achieve without flaking (scale-like pieces on the metal surface) after individually running under the same conditions.

### Calculating the Nominal Life

The nominal life ( $L_{10}$ ) of an LM Guide is obtained from the following formulas using the basic dynamic load rating ( $C$ ), which is based on a reference distance of 50 km for an LM Guide with balls and 100 km for an LM Guide with rollers, and the calculated load acting on the LM Guide ( $P_c$ ).

- LM Guide with balls (Using a basic dynamic load rating based on a nominal life of 50 km)

$$L_{10} = \left( \frac{C}{P_c} \right)^3 \times 50 \dots\dots\dots (1)$$

$L_{10}$  : Nominal life (km)  
 $C$  : Basic dynamic load rating (N)  
 $P_c$  : Calculated load (N)

- LM Guide with rollers (Using a basic dynamic load rating based on a nominal life of 100 km)

$$L_{10} = \left( \frac{C}{P_c} \right)^{\frac{10}{3}} \times 100 \dots\dots\dots (2)$$

\* These nominal life formulas may not apply if the length of the stroke is less than or equal to twice the length of the LM block.

When comparing the nominal life ( $L_{10}$ ), you must take into account whether the basic dynamic load rating was defined based on 50 km or 100 km. Convert the basic dynamic load rating based on ISO 14728-1 as necessary.

ISO-regulated basic dynamic load rating conversion formulas:

- LM Guide with balls

$$C_{100} = \frac{C_{50}}{1.26}$$

$C_{50}$  : Basic dynamic load rating based on a nominal life of 50 km

$C_{100}$  : Basic dynamic load rating based on a nominal life of 100 km

- LM Guide with rollers

$$C_{100} = \frac{C_{50}}{1.23}$$

# Calculating the Modified Nominal Life

During use, an LM Guide may be subjected to vibrations and shocks as well as fluctuating loads, which are difficult to detect. In addition, the surface hardness of the raceways, the operating temperature, and having LM blocks arranged directly behind one another will have a decisive impact on the service life. Taking these factors into account, the modified nominal life ( $L_{10m}$ ) can be calculated according to the following formulas (3) and (4).

•Modified factor  $\alpha$

$$\alpha = \frac{f_H \cdot f_T \cdot f_C}{f_W}$$

- $\alpha$  : Modified factor
- $f_H$  : Hardness factor (see Fig.8 on **A1-67**)
- $f_T$  : Temperature factor (see Fig.9 on **A1-67**)
- $f_C$  : Contact factor (see Table10 on **A1-67**)
- $f_W$  : Load factor (see Table11 on **A1-68**)

•Modified nominal life  $L_{10m}$

• LM Guide with balls

$$L_{10m} = \left( \alpha \times \frac{C}{P_C} \right)^3 \times 50 \dots\dots\dots (3)$$

- $L_{10m}$  : Modified nominal life (km)
- $C$  : Basic dynamic load rating (N)
- $P_C$  : Calculated load (N)

• LM Guide with rollers

$$L_{10m} = \left( \alpha \times \frac{C}{P_C} \right)^{\frac{10}{3}} \times 100 \dots\dots\dots (4)$$

Once the nominal life ( $L_{10}$ ) has been obtained, the service life time can be obtained using the following equation if the stroke length and the number of reciprocations are constant.

$$L_h = \frac{L_{10} \times 10^6}{2 \times \ell_s \times n_1 \times 60}$$

- $L_h$  : Service life time (h)
- $\ell_s$  : Stroke length (mm)
- $n_1$  : Number of reciprocations per minute ( $\text{min}^{-1}$ )

[f<sub>H</sub>: Hardness Factor]

To ensure the achievement of the optimum load capacity of the LM Guide, the raceway hardness must be between 58 and 64 HRC.

If the hardness is lower than this range, the basic dynamic load rating and the basic static load rating decrease. Therefore, it is necessary to multiply each rating by the respective hardness factor (f<sub>H</sub>).

Since the LM Guide has sufficient hardness, the f<sub>H</sub> value for the LM Guide is normally 1.0 unless otherwise specified.

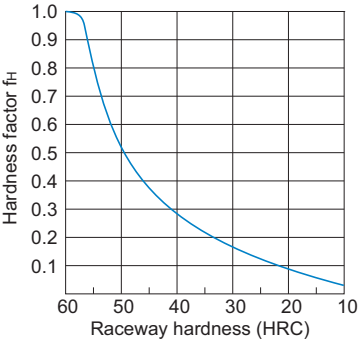


Fig.8 Hardness Factor (f<sub>H</sub>)

[f<sub>T</sub>:Temperature Factor]

If the temperature of the environment surrounding the operating LM Guide exceeds 100°C, take into account the adverse effect of the high temperature and multiply the basic load ratings by the temperature factor indicated in Fig.9.

In addition, the selected LM Guide must also be of a high temperature type.

Note) LM guides not designed to withstand high temperatures should be used at 80°C or less.Please contact THK if application requirements exceed 80°C.

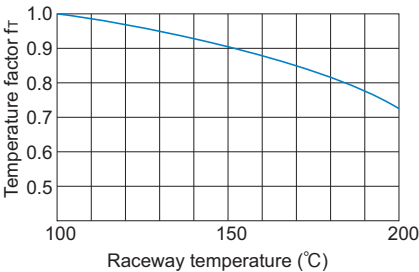


Fig.9 Temperature Factor (f<sub>T</sub>)

[f<sub>c</sub>: Contact Factor]

When multiple LM blocks are used in close contact with each other, it is difficult to achieve uniform load distribution due to moment loads and mounting-surface accuracy. When using multiple blocks in close contact with each other, multiply the basic load rating (C or C<sub>0</sub>) by the corresponding contact factor indicated in Table10.

Note) If uneven load distribution is expected in a large machine, take into account the respective contact factor indicated in Table10.

Table10 Contact Factor (f<sub>c</sub>)

| Number of blocks used in close contact | Contact factor f <sub>c</sub> |
|----------------------------------------|-------------------------------|
| 2                                      | 0.81                          |
| 3                                      | 0.72                          |
| 4                                      | 0.66                          |
| 5                                      | 0.61                          |
| 6 or more                              | 0.6                           |
| Normal use                             | 1                             |

[fw: 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 Table11, which contains empirically obtained data.

Table11 Load Factor (fw)

| Vibrations/<br>impact | Speed (V)                           | fw         |
|-----------------------|-------------------------------------|------------|
| Faint                 | Very low<br>$V \leq 0.25\text{m/s}$ | 1 to 1.2   |
| Weak                  | low<br>$0.25 < V \leq 1\text{m/s}$  | 1.2 to 1.5 |
| Medium                | Medium<br>$1 < V \leq 2\text{m/s}$  | 1.5 to 2   |
| Strong                | High<br>$V > 2\text{m/s}$           | 2 to 3.5   |

# Predicting the Rigidity

## Selecting a Radial Clearance (Preload)

Since the radial clearance of an LM Guide greatly affects the running accuracy, load carrying capacity and rigidity of the LM Guide, it is important to select an appropriate clearance according to the application. In general, selecting a negative clearance (i.e., a preload\* is applied) while taking into account possible vibrations and impact generated from reciprocating motion favorably affects the service life and the accuracy.

For specific radial clearances, contact THK. We will help you select the optimal clearance according to the conditions.

The clearances of all LM Guide models (except model HR, GSR and GSR-R, which are separate types) are adjusted as specified before shipment, and therefore they do not need further preload adjustment.

\*Preload is an internal load applied to the rolling elements (balls, rollers, etc.) of an LM block in advance in order to increase its rigidity.

Table12 Types of Radial Clearance

|                          | Normal Clearance                                                                                                                                                                                                                                                                                                                                                 | Clearance C1 (Light Preload)                                                                                                                                                                                                                                                                                                                                                                                                           | Clearance C0 (Medium Preload)                                                                                                                                                                                                                                                   |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Condition                | <ul style="list-style-type: none"> <li>The loading direction is fixed, impact and vibrations are minimal and 2 rails are installed in parallel.</li> <li>Very high precision is not required, and the sliding resistance must be as low as possible.</li> </ul>                                                                                                  | <ul style="list-style-type: none"> <li>An overhang load or moment load is applied.</li> <li>LM Guide is used in a single-rail configuration.</li> <li>Light load and high accuracy are required.</li> </ul>                                                                                                                                                                                                                            | <ul style="list-style-type: none"> <li>High rigidity is required and vibrations and impact are applied.</li> <li>Heavy-cutting machine tool</li> </ul>                                                                                                                          |
| Examples of applications | <ul style="list-style-type: none"> <li>Beam-welding machine</li> <li>Book-binding machine</li> <li>Automatic packaging machine</li> <li>XY axes of general industrial machinery</li> <li>Automatic sash-manufacturing machine</li> <li>Welding machine</li> <li>Flame cutting machine</li> <li>Tool changer</li> <li>Various kinds of material feeder</li> </ul> | <ul style="list-style-type: none"> <li>Grinding machine table feed axis</li> <li>Automatic coating machine</li> <li>Industrial robot</li> <li>various kinds of material high speed feeder</li> <li>NC drilling machine</li> <li>Vertical axis of general industrial machinery</li> <li>Printed circuit board drilling machine</li> <li>Electric discharge machine</li> <li>Measuring instrument</li> <li>Precision XY table</li> </ul> | <ul style="list-style-type: none"> <li>Machining center</li> <li>NC lathe</li> <li>Grinding stone feed axis of grinding machine</li> <li>Milling machine</li> <li>Vertical/horizontal boring machine</li> <li>Tool rest guide</li> <li>Vertical axis of machine tool</li> </ul> |

# Service Life with a Preload Considered

When using an LM Guide under a medium preload (clearance C0), it is necessary to calculate the service life while taking into account the magnitude of the preload.  
To identify the appropriate preload for any selected LM Guide model, contact THK.

## Rigidity

When a load is applied to an LM Guide, the bearings and LM block will elastically deform within the allowable load range. The ratio of displacement to applied load is referred to as "rigidity." The radial internal clearance (preload) for the LM Guide can be specified in order to reduce displacement. By using balls larger than the width of the race, they will naturally deform elastically as they roll, allowing the load to be maintained for longer while limiting displacement in the LM Guide. The effect of the preload can be up to 2.8 times greater than the size of the preload itself. If that level is exceeded, the preload is released and the effect of the preload is lost. When a preloaded LM Guide takes an external load, the displacement will be linear. The level of displacement will be approximately half that of an LM Guide with no preload. The preload, in addition to reducing displacement, helps prevent premature failure due to vibration and impact/shock.

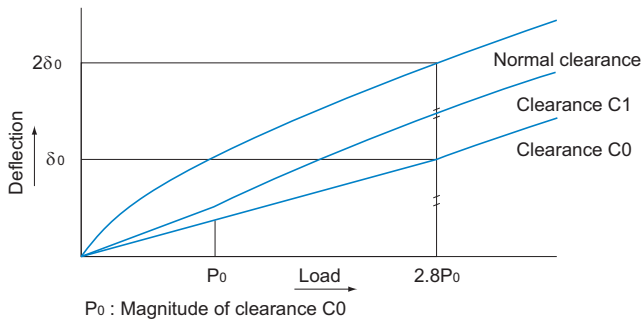
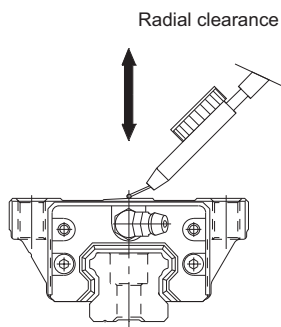


Fig.10 Rigidity Data

$$K=\frac{P}{\delta}$$

|          |                   |              |
|----------|-------------------|--------------|
| K        | : Rigidity value  | (N/ $\mu$ m) |
| $\delta$ | : Deflection      | ( $\mu$ m)   |
| P        | : Calculated load | (N)          |

## Radial Clearance Standard for Each Model



### [Radial clearances for models SHS and SCR]

Unit:  $\mu\text{m}$ 

| Indication symbol | Normal    | Light preload | Medium preload |
|-------------------|-----------|---------------|----------------|
| Model No.         | No Symbol | C1            | C0             |
| 15                | -5 to 0   | -12 to -5     | —              |
| 20                | -6 to 0   | -12 to -6     | -18 to -12     |
| 25                | -8 to 0   | -14 to -8     | -20 to -14     |
| 30                | -9 to 0   | -17 to -9     | -27 to -17     |
| 35                | -11 to 0  | -19 to -11    | -29 to -19     |
| 45                | -12 to 0  | -22 to -12    | -32 to -22     |
| 55                | -15 to 0  | -28 to -16    | -38 to -28     |
| 65                | -18 to 0  | -34 to -22    | -45 to -34     |

### [Radial clearance for model SSR]

Unit:  $\mu\text{m}$ 

| Indication symbol | Normal    | Light preload |
|-------------------|-----------|---------------|
| Model No.         | No Symbol | C1            |
| 15                | -4 to +2  | -10 to -4     |
| 20                | -5 to +2  | -12 to -5     |
| 25                | -6 to +3  | -15 to -6     |
| 30                | -7 to +4  | -18 to -7     |
| 35                | -8 to +4  | -20 to -8     |

### [Radial clearance for models SVR/SVS, NR/NRS-X and NR/NRS]

Unit:  $\mu\text{m}$ 

| Indication symbol | Normal    | Light preload | Medium preload |
|-------------------|-----------|---------------|----------------|
| Model No.         | No Symbol | C1            | C0             |
| 25                | -3 to +2  | -6 to -3      | -9 to -6       |
| 30                | -4 to +2  | -8 to -4      | -12 to -8      |
| 35                | -4 to +2  | -8 to -4      | -12 to -8      |
| 45                | -5 to +3  | -10 to -5     | -15 to -10     |
| 55                | -6 to +3  | -11 to -6     | -16 to -11     |
| 65                | -8 to +3  | -14 to -8     | -20 to -14     |
| 75                | -10 to +4 | -17 to -10    | -24 to -17     |
| 85                | -13 to +4 | -20 to -13    | -27 to -20     |
| 100               | -14 to +4 | -24 to -14    | -34 to -24     |

### [Radial clearance for model SHW]

Unit:  $\mu\text{m}$ 

| Indication symbol | Normal    | Light preload | Medium preload |
|-------------------|-----------|---------------|----------------|
| Model No.         | No Symbol | C1            | C0             |
| 12                | -1.5 to 0 | -4 to -1      | —              |
| 14                | -2 to 0   | -5 to -1      | —              |
| 17                | -3 to 0   | -7 to -3      | —              |
| 21                | -4 to +2  | -8 to -4      | —              |
| 27                | -5 to +2  | -11 to -5     | —              |
| 35                | -8 to +4  | -18 to -8     | -28 to -18     |
| 50                | -10 to +5 | -24 to -10    | -38 to -24     |

### [Radial clearances for models SRS and RSX]

Unit:  $\mu\text{m}$ 

| Indication symbol | Normal    | Light preload |
|-------------------|-----------|---------------|
| Model No.         | No Symbol | C1            |
| 5                 | 0 to +1.5 | -1 to 0       |
| 7                 | -2 to +2  | -3 to 0       |
| 9                 | -2 to +2  | -4 to 0       |
| 12                | -3 to +3  | -6 to 0       |
| 15                | -5 to +5  | -10 to 0      |
| 20                | -5 to +5  | -10 to 0      |
| 25                | -7 to +7  | -14 to 0      |

(Note) Model RSX includes types 7, 9, 12, and 15.

### [Radial clearance for models HSR, CSR, HSR-M1 and HSR-M1VV]

Unit:  $\mu\text{m}$

| Indication symbol | Normal    | Light preload | Medium preload |
|-------------------|-----------|---------------|----------------|
| Model No.         | No Symbol | C1            | C0             |
| 8                 | -1 to +1  | -4 to -1      | —              |
| 10                | -2 to +2  | -5 to -1      | —              |
| 12                | -3 to +3  | -6 to -2      | —              |
| 15                | -4 to +2  | -12 to -4     | —              |
| 20                | -5 to +2  | -14 to -5     | -23 to -14     |
| 25                | -6 to +3  | -16 to -6     | -26 to -16     |
| 30                | -7 to +4  | -19 to -7     | -31 to -19     |
| 35                | -8 to +4  | -22 to -8     | -35 to -22     |

Unit:  $\mu\text{m}$

| Indication symbol | Normal     | Light preload | Medium preload |
|-------------------|------------|---------------|----------------|
| Model No.         | No Symbol  | C1            | C0             |
| 45                | -10 to +5  | -25 to -10    | -40 to -25     |
| 55                | -12 to +5  | -29 to -12    | -46 to -29     |
| 65                | -14 to +7  | -32 to -14    | -50 to -32     |
| 85                | -16 to +8  | -36 to -16    | -56 to -36     |
| 100               | -19 to +9  | -42 to -19    | -65 to -42     |
| 120               | -21 to +10 | -47 to -21    | -73 to -47     |
| 150               | -23 to +11 | -51 to -23    | -79 to -51     |

### [Radial clearances for models SR and SR-M1]

Unit:  $\mu\text{m}$

| Indication symbol | Normal     | Light preload | Medium preload |
|-------------------|------------|---------------|----------------|
| Model No.         | No Symbol  | C1            | C0             |
| 15                | -4 to +2   | -10 to -4     | —              |
| 20                | -5 to +2   | -12 to -5     | -17 to -12     |
| 25                | -6 to +3   | -15 to -6     | -21 to -15     |
| 30                | -7 to +4   | -18 to -7     | -26 to -18     |
| 35                | -8 to +4   | -20 to -8     | -31 to -20     |
| 45                | -10 to +5  | -24 to -10    | -36 to -24     |
| 55                | -12 to +5  | -28 to -12    | -45 to -28     |
| 70                | -14 to +7  | -32 to -14    | -50 to -32     |
| 85                | -20 to +9  | -46 to -20    | -70 to -46     |
| 100               | -22 to +10 | -52 to -22    | -78 to -52     |
| 120               | -25 to +12 | -57 to -25    | -87 to -57     |
| 150               | -29 to +14 | -69 to -29    | -104 to -69    |

Unit:  $\mu\text{m}$

### [Radial clearance for model HRW]

| Indication symbol | Normal       | Light preload | Medium preload |
|-------------------|--------------|---------------|----------------|
| Model No.         | No Symbol    | C1            | C0             |
| 12                | -1.5 to +1.5 | -4 to -1      | —              |
| 14                | -2 to +2     | -5 to -1      | —              |
| 17                | -3 to +2     | -7 to -3      | —              |
| 21                | -4 to +2     | -8 to -4      | —              |
| 27                | -5 to +2     | -11 to -5     | —              |
| 35                | -8 to +4     | -18 to -8     | -28 to -18     |
| 50                | -10 to +5    | -24 to -10    | -38 to -24     |
| 60                | -12 to +5    | -27 to -12    | -42 to -27     |

### [Radial clearance for models RSR, RSR-W and RSR-M1]

Unit:  $\mu\text{m}$

| Indication symbol | Normal    | Light preload |
|-------------------|-----------|---------------|
| Model No.         | No Symbol | C1            |
| 2                 | 0 to +4   | —             |
| 3                 | 0 to +1   | -0.5 to 0     |
| 9                 | -2 to +2  | -4 to 0       |
| 12                | -3 to +3  | -6 to 0       |
| 14                | -5 to +5  | -10 to 0      |
| 15                | -5 to +5  | -10 to 0      |
| 20                | -7 to +7  | -14 to 0      |

Unit:  $\mu\text{m}$

### [Radial clearance for model MX]

| Indication symbol | Normal    | Light preload |
|-------------------|-----------|---------------|
| Model No.         | No Symbol | C1            |
| 5                 | 0 to +1.5 | -1 to 0       |
| 7                 | -2 to +2  | -3 to 0       |

### [Radial clearance for model JR]

Unit:  $\mu\text{m}$

| Indication symbol | Normal    |
|-------------------|-----------|
| Model No.         | No Symbol |
| 25                | 0 to +30  |
| 35                | 0 to +30  |
| 45                | 0 to +50  |
| 55                | 0 to +50  |

### [Radial clearances for models HCR and HMG]

Unit:  $\mu\text{m}$

| Indication symbol | Normal    | Light preload |
|-------------------|-----------|---------------|
| Model No.         | No Symbol | C1            |
| 12                | -3 to +3  | -6 to -2      |
| 15                | -4 to +2  | -12 to -4     |
| 25                | -6 to +3  | -16 to -6     |
| 35                | -8 to +4  | -22 to -8     |
| 45                | -10 to +5 | -25 to -10    |
| 65                | -14 to +7 | -32 to -14    |

### [Radial clearance for model NSR-TBC]

Unit:  $\mu\text{m}$

| Indication symbol | Normal     | Light preload | Medium preload |
|-------------------|------------|---------------|----------------|
| Model No.         | No Symbol  | C1            | C0             |
| 20                | -5 to +5   | -15 to -5     | -25 to -15     |
| 25                | -5 to +5   | -15 to -5     | -25 to -15     |
| 30                | -5 to +5   | -15 to -5     | -25 to -15     |
| 40                | -8 to +8   | -22 to -8     | -36 to -22     |
| 50                | -8 to +8   | -22 to -8     | -36 to -22     |
| 70                | -10 to +10 | -26 to -10    | -42 to -26     |

### [Radial clearance for model HSR-M2]

Unit:  $\mu\text{m}$

| Indication symbol | Normal    | Light preload |
|-------------------|-----------|---------------|
| Model No.         | No Symbol | C1            |
| 15                | -4 to +2  | -12 to -4     |
| 20                | -5 to +2  | -14 to -5     |
| 25                | -6 to +3  | -16 to -6     |

### [Radial clearances for models SRG and SRN]

Unit:  $\mu\text{m}$

| Indication symbol | Normal    | Light preload | Medium preload |
|-------------------|-----------|---------------|----------------|
| Model No.         | No Symbol | C1            | C0             |
| 15                | -0.5 to 0 | -1 to -0.5    | -2 to -1       |
| 20                | -0.8 to 0 | -2 to -0.8    | -3 to -2       |
| 25                | -2 to -1  | -3 to -2      | -4 to -3       |
| 30                | -2 to -1  | -3 to -2      | -4 to -3       |
| 35                | -2 to -1  | -3 to -2      | -5 to -3       |
| 45                | -2 to -1  | -3 to -2      | -5 to -3       |
| 55                | -2 to -1  | -4 to -2      | -6 to -4       |
| 65                | -3 to -1  | -5 to -3      | -8 to -5       |
| 85                | -3 to -1  | -7 to -3      | -12 to -7      |
| 100               | -3 to -1  | -8 to -3      | -13 to -8      |

### [Radial clearance for model SRW]

Unit:  $\mu\text{m}$

| Indication symbol | Normal    | Light preload | Medium preload |
|-------------------|-----------|---------------|----------------|
| Model No.         | No Symbol | C1            | C0             |
| 70                | -2 to -1  | -3 to -2      | -5 to -3       |
| 85                | -2 to -1  | -4 to -2      | -6 to -4       |
| 100               | -3 to -1  | -5 to -3      | -8 to -5       |
| 130               | -3 to -1  | -7 to -3      | -12 to -7      |
| 150               | -3 to -1  | -8 to -3      | -13 to -8      |

### [Radial clearance for model EPF]

Unit:  $\mu\text{m}$

| Indication symbol | Normal    |
|-------------------|-----------|
| Model No.         | No Symbol |
| 7M                | 0 or less |
| 9M                |           |
| 12M               |           |
| 15M               |           |

### [Radial Clearance for the Oil-Free LM Guide Model SR-MS]

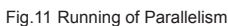
Unit:  $\mu\text{m}$

| Indication symbol | Clearance CS |
|-------------------|--------------|
| Model No.         |              |
| 15                | -2 to +1     |
| 20                | -2 to +1     |

## Accuracy Standards

For details, see “Accuracy Standard for Each Model” on **A1-76** to **A1-86**.

It refers to the tolerance for parallelism between the LM block and the LM rail reference surface when the LM block travels the whole length of the LM rail with the LM rail secured on the reference reference surface using bolts.



Indicates a difference between the minimum and maximum values of height (M) of each of the LM blocks used on the same plane in combination.

Indicates a difference between the minimum and maximum values of the width ( $W_2$ ) between each of the LM blocks, mounted on one LM rail in combination, and the LM rail.

Note 1) When two or more rails are used on the same plane in parallel, this applies only to the difference in width ( $W_2$ ) and dimensional tolerance of the master rail. Please specify if you wish for it to apply to the difference in width and dimensional tolerance of the subsidiary rail as well. Master LM rails will have a serial number ending with "KB" printed on them. However, this is not the case for standard grade products.



Note 3) If it is mounted on a less rigid base such as an aluminum base, the curve of the rail will affect the accuracy of the machine. Therefore, it is necessary to define the straightness of the rail in advance.

## Guidelines for Accuracy Grades by Machine Type

Table13 shows guidelines for selecting an accuracy grade of the LM Guide according to the machine type.

Table13 Guideline for Accuracy Grades by Machine Type

| Type of machine                       |                                        | Accuracy grades |   |   |    |    |
|---------------------------------------|----------------------------------------|-----------------|---|---|----|----|
|                                       |                                        | Normal          | H | P | SP | UP |
| Machine tool                          | Machining center                       |                 |   | ● | ●  |    |
|                                       | Lathe                                  |                 |   | ● | ●  |    |
|                                       | Milling machine                        |                 |   | ● | ●  |    |
|                                       | Boring machine                         |                 |   | ● | ●  |    |
|                                       | Jig borer                              |                 |   |   | ●  | ●  |
|                                       | Grinding machine                       |                 |   |   | ●  | ●  |
|                                       | Electric discharge machine             |                 |   | ● | ●  | ●  |
|                                       | Punching press                         |                 | ● | ● |    |    |
|                                       | Laser beam machine                     |                 | ● | ● | ●  |    |
|                                       | Woodworking machine                    | ●               | ● | ● |    |    |
|                                       | NC drilling machine                    |                 | ● | ● |    |    |
|                                       | Tapping center                         |                 | ● | ● |    |    |
|                                       | Palette changer                        | ●               |   |   |    |    |
|                                       | ATC                                    | ●               |   |   |    |    |
|                                       | Wire cutting machine                   |                 |   | ● | ●  |    |
|                                       | Dressing machine                       |                 |   |   | ●  | ●  |
| Industrial robot                      | Cartesian coordinate                   | ●               | ● | ● |    |    |
|                                       | Cylindrical coordinate                 | ●               | ● |   |    |    |
| Semiconductor manufacturing equipment | Wire bonding machine                   |                 |   | ● | ●  |    |
|                                       | Prober                                 |                 |   |   | ●  | ●  |
|                                       | Electronic component inserter          |                 | ● | ● |    |    |
|                                       | Printed circuit board drilling machine |                 | ● | ● | ●  |    |
| Other equipment                       | Injection molding machine              | ●               | ● |   |    |    |
|                                       | 3D measuring instrument                |                 |   |   | ●  | ●  |
|                                       | Office equipment                       | ●               | ● |   |    |    |
|                                       | Conveyance system                      | ●               | ● |   |    |    |
|                                       | XY table                               |                 | ● | ● | ●  |    |
|                                       | Coating machine                        | ●               | ● |   |    |    |
|                                       | Welding machine                        | ●               | ● |   |    |    |
|                                       | Medical equipment                      | ●               | ● |   |    |    |
|                                       | Digitizer                              |                 | ● | ● | ●  |    |
|                                       | Inspection equipment                   |                 |   | ● | ●  | ●  |

Normal : Normal grade  
H : High accuracy grade  
P : Precision grade

SP : Super precision grade  
UP : Ultra precision grade

# Accuracy Standard for Each Model

- Accuracies of models SHS, SSR, SVR/SVS, SHW, HSR, SR, NR/NRS-X, NR/NRS, HRW, NSR-TBC, HSR-M1, HSR-M1VV, SR-M1, HSR-M2, SRG and SRN are categorized into Normal grade (no symbol), High accuracy grade (H), Precision grade (P), Super precision grade (SP) and Ultra precision grade (UP) by model numbers, as indicated in Table15 on **A1-77**.

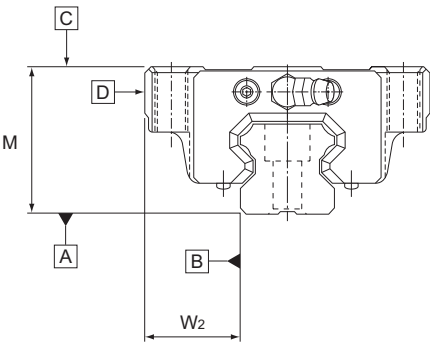


Fig.13

Table14 LM Rail Length and Running Parallelism by Accuracy Standard

Unit: μm

| LM rail length (mm) |         | Running Parallelism Values |                     |                 |                       |                       |
|---------------------|---------|----------------------------|---------------------|-----------------|-----------------------|-----------------------|
| Above               | Or less | Normal grade               | High-accuracy grade | Precision grade | Super precision grade | Ultra precision grade |
| —                   | 50      | 5                          | 3                   | 2               | 1.5                   | 1                     |
| 50                  | 80      | 5                          | 3                   | 2               | 1.5                   | 1                     |
| 80                  | 125     | 5                          | 3                   | 2               | 1.5                   | 1                     |
| 125                 | 200     | 5                          | 3.5                 | 2               | 1.5                   | 1                     |
| 200                 | 250     | 6                          | 4                   | 2.5             | 1.5                   | 1                     |
| 250                 | 315     | 7                          | 4.5                 | 3               | 1.5                   | 1                     |
| 315                 | 400     | 8                          | 5                   | 3.5             | 2                     | 1.5                   |
| 400                 | 500     | 9                          | 6                   | 4.5             | 2.5                   | 1.5                   |
| 500                 | 630     | 11                         | 7                   | 5               | 3                     | 2                     |
| 630                 | 800     | 12                         | 8.5                 | 6               | 3.5                   | 2                     |
| 800                 | 1000    | 13                         | 9                   | 6.5             | 4                     | 2.5                   |
| 1000                | 1250    | 15                         | 11                  | 7.5             | 4.5                   | 3                     |
| 1250                | 1600    | 16                         | 12                  | 8               | 5                     | 4                     |
| 1600                | 2000    | 18                         | 13                  | 8.5             | 5.5                   | 4.5                   |
| 2000                | 2500    | 20                         | 14                  | 9.5             | 6                     | 5                     |
| 2500                | 3090    | 21                         | 16                  | 11              | 6.5                   | 5.5                   |

Table15 Accuracy Standards for Models SHS, SSR, SVR/SVS, SHW, HSR, SR, NR/NRS-X, NR/NRS, HRW, NSR-TBC, HSR-M1, HSR-M1VV, SR-M1, HSR-M2, SRG, and SRN.

Unit: mm

| Model No.                                 | Accuracy standards                                 | Normal grade                     | High-accuracy grade | Precision grade | Super precision grade | Ultra precision grade |
|-------------------------------------------|----------------------------------------------------|----------------------------------|---------------------|-----------------|-----------------------|-----------------------|
|                                           | Item                                               | No Symbol                        | H                   | P               | SP                    | UP                    |
| 8<br>10<br>12<br>14                       | Dimensional tolerance in height M                  | ±0.07                            | ±0.03               | ±0.015          | ±0.007                | —                     |
|                                           | Difference in height M                             | 0.015                            | 0.007               | 0.005           | 0.003                 | —                     |
|                                           | Dimensional tolerance in width $W_2$               | ±0.04                            | ±0.02               | ±0.01           | ±0.007                | —                     |
|                                           | Difference in width $W_2$                          | 0.02                             | 0.01                | 0.006           | 0.004                 | —                     |
|                                           | Running parallelism of surface C against surface A | As shown in Table14 <b>A1-76</b> |                     |                 |                       |                       |
|                                           | Running parallelism of surface D against surface B | As shown in Table14 <b>A1-76</b> |                     |                 |                       |                       |
| 15<br>17<br>20<br>21                      | Dimensional tolerance in height M                  | ±0.07                            | ±0.03               | 0<br>-0.03      | 0<br>-0.015           | 0<br>-0.008           |
|                                           | Difference in height M                             | 0.02                             | 0.01                | 0.006           | 0.004                 | 0.003                 |
|                                           | Dimensional tolerance in width $W_2$               | ±0.06                            | ±0.03               | 0<br>-0.02      | 0<br>-0.015           | 0<br>-0.008           |
|                                           | Difference in width $W_2$                          | 0.02                             | 0.01                | 0.006           | 0.004                 | 0.003                 |
|                                           | Running parallelism of surface C against surface A | As shown in Table14 <b>A1-76</b> |                     |                 |                       |                       |
|                                           | Running parallelism of surface D against surface B | As shown in Table14 <b>A1-76</b> |                     |                 |                       |                       |
| 25<br>27<br>30<br>35                      | Dimensional tolerance in height M                  | ±0.08                            | ±0.04               | 0<br>-0.04      | 0<br>-0.02            | 0<br>-0.01            |
|                                           | Difference in height M                             | 0.02                             | 0.015               | 0.007           | 0.005                 | 0.003                 |
|                                           | Dimensional tolerance in width $W_2$               | ±0.07                            | ±0.03               | 0<br>-0.03      | 0<br>-0.015           | 0<br>-0.01            |
|                                           | Difference in width $W_2$                          | 0.025                            | 0.015               | 0.007           | 0.005                 | 0.003                 |
|                                           | Running parallelism of surface C against surface A | As shown in Table14 <b>A1-76</b> |                     |                 |                       |                       |
|                                           | Running parallelism of surface D against surface B | As shown in Table14 <b>A1-76</b> |                     |                 |                       |                       |
| 40<br>45<br>50<br>55<br>60                | Dimensional tolerance in height M                  | ±0.08                            | ±0.04               | 0<br>-0.05      | 0<br>-0.03            | 0<br>-0.015           |
|                                           | Difference in height M                             | 0.025                            | 0.015               | 0.007           | 0.005                 | 0.003                 |
|                                           | Dimensional tolerance in width $W_2$               | ±0.07                            | ±0.04               | 0<br>-0.04      | 0<br>-0.025           | 0<br>-0.015           |
|                                           | Difference in width $W_2$                          | 0.03                             | 0.015               | 0.007           | 0.005                 | 0.003                 |
|                                           | Running parallelism of surface C against surface A | As shown in Table14 <b>A1-76</b> |                     |                 |                       |                       |
|                                           | Running parallelism of surface D against surface B | As shown in Table14 <b>A1-76</b> |                     |                 |                       |                       |
| 65<br>70<br>75<br>85<br>100<br>120<br>150 | Dimensional tolerance in height M                  | ±0.08                            | ±0.04               | 0<br>-0.05      | 0<br>-0.04            | 0<br>-0.03            |
|                                           | Difference in height M                             | 0.03                             | 0.02                | 0.01            | 0.007                 | 0.005                 |
|                                           | Dimensional tolerance in width $W_2$               | ±0.08                            | ±0.04               | 0<br>-0.05      | 0<br>-0.04            | 0<br>-0.03            |
|                                           | Difference in width $W_2$                          | 0.03                             | 0.02                | 0.01            | 0.007                 | 0.005                 |
|                                           | Running parallelism of surface C against surface A | As shown in Table14 <b>A1-76</b> |                     |                 |                       |                       |
|                                           | Running parallelism of surface D against surface B | As shown in Table14 <b>A1-76</b> |                     |                 |                       |                       |

Note1) Models SRG35 to 65 are available in high accuracy grade and above. Other models are only available in precision grade or above. (Normal grade is not available.)

Note2) Model SRN is available in high accuracy grade or above. (Normal grade is not available.)

- Accuracies of model HMG are defined by model number as indicated in Table16.

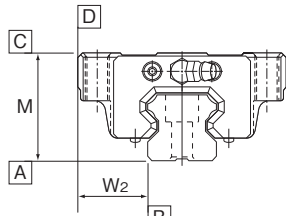


Fig.14

Table16 Model HMG Accuracy Standard

Unit: mm

| Model No. | Accuracy Standards Item                            | Normal grade No symbol |
|-----------|----------------------------------------------------|------------------------|
| 15        | Dimensional tolerance in height M                  | ±0.1                   |
|           | Difference in height M                             | 0.02                   |
|           | Dimensional tolerance in width W <sub>2</sub>      | ±0.1                   |
|           | Difference in width W <sub>2</sub>                 | 0.02                   |
|           | Running parallelism of surface C against surface A | as shown in Table17    |
|           | Running parallelism of surface D against surface B | as shown in Table17    |
| 25<br>35  | Dimensional tolerance in height M                  | ±0.1                   |
|           | Difference in height M                             | 0.02                   |
|           | Dimensional tolerance in width W <sub>2</sub>      | ±0.1                   |
|           | Difference in width W <sub>2</sub>                 | 0.03                   |
|           | Running parallelism of surface C against surface A | as shown in Table17    |
|           | Running parallelism of surface D against surface B | as shown in Table17    |
| 45<br>65  | Dimensional tolerance in height M                  | ±0.1                   |
|           | Difference in height M                             | 0.03                   |
|           | Dimensional tolerance in width W <sub>2</sub>      | ±0.1                   |
|           | Difference in width W <sub>2</sub>                 | 0.03                   |
|           | Running parallelism of surface C against surface A | as shown in Table17    |
|           | Running parallelism of surface D against surface B | as shown in Table17    |

Table17 LM Rail Length and Running Parallelism by Accuracy Standard

Unit: μm

| LM rail length (mm) |         | Running Parallelism Values |
|---------------------|---------|----------------------------|
| Above               | Or less | Normal grade               |
| —                   | 125     | 30                         |
| 125                 | 200     | 37                         |
| 200                 | 250     | 40                         |
| 250                 | 315     | 44                         |
| 315                 | 400     | 49                         |
| 400                 | 500     | 53                         |
| 500                 | 630     | 58                         |
| 630                 | 800     | 64                         |
| 800                 | 1000    | 70                         |
| 1000                | 1250    | 77                         |
| 1250                | 1600    | 84                         |
| 1600                | 2000    | 92                         |

- Accuracies of model HCR are categorized into normal and high accuracy grades by model number as indicated in Table18.

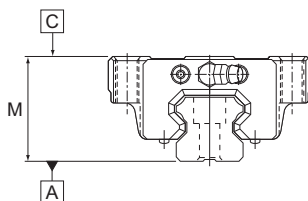


Fig.15

Table18 Accuracy Standard for Model HCR

Unit: mm

| Model No. | Accuracy standards                                 | Normal grade        | High-accuracy grade |
|-----------|----------------------------------------------------|---------------------|---------------------|
|           | Item                                               | No Symbol           | H                   |
| 12        | Dimensional tolerance in height M                  | $\pm 0.2$           | $\pm 0.2$           |
| 15        | Difference in height M                             | 0.05                | 0.03                |
| 25        | Running parallelism of surface C against surface A | as shown in Table19 |                     |
| 35        |                                                    |                     |                     |
| 45        | Dimensional tolerance in height M                  | $\pm 0.2$           | $\pm 0.2$           |
|           | Difference in height M                             | 0.06                | 0.04                |
|           | Running parallelism of surface C against surface A | as shown in Table19 |                     |

Table19 LM Rail Length and Running Parallelism by Accuracy Standard

Unit:  $\mu\text{m}$

| LM rail length (mm) |         | Running Parallelism Values |                     |
|---------------------|---------|----------------------------|---------------------|
| Above               | Or less | Normal grade               | High-accuracy grade |
| —                   | 125     | 30                         | 15                  |
| 125                 | 200     | 37                         | 18                  |
| 200                 | 250     | 40                         | 20                  |
| 250                 | 315     | 44                         | 22                  |
| 315                 | 400     | 49                         | 24                  |
| 400                 | 500     | 53                         | 26                  |
| 500                 | 630     | 58                         | 29                  |
| 630                 | 800     | 64                         | 32                  |
| 800                 | 1000    | 70                         | 35                  |
| 1000                | 1250    | 77                         | 38                  |
| 1250                | 1600    | 84                         | 42                  |
| 1600                | 2000    | 92                         | 46                  |

- Accuracies of model JR are defined by model number as indicated in Table20.

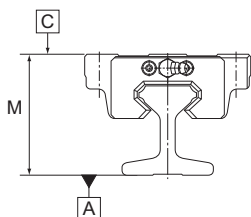


Fig.16

Table20 Accuracy Standard for Model JR

Unit: mm

| Model No. | Accuracy standards                                 | Normal grade        |
|-----------|----------------------------------------------------|---------------------|
|           | Item                                               | No Symbol           |
| 25        | Difference in height M                             | 0.05                |
| 35        | Running parallelism of surface C against surface A | as shown in Table21 |
| 45        | Difference in height M                             | 0.06                |
|           | Running parallelism of surface C against surface A | as shown in Table21 |

Table21 LM Rail Length and Running Parallelism by Accuracy Standard

Unit:  $\mu\text{m}$

| LM rail length (mm) |         | Running Parallelism Values |
|---------------------|---------|----------------------------|
| Above               | Or less | Normal grade               |
| —                   | 50      | 5                          |
| 50                  | 80      | 5                          |
| 80                  | 125     | 5                          |
| 125                 | 200     | 6                          |
| 200                 | 250     | 8                          |
| 250                 | 315     | 9                          |
| 315                 | 400     | 11                         |
| 400                 | 500     | 13                         |
| 500                 | 630     | 15                         |
| 630                 | 800     | 17                         |
| 800                 | 1000    | 19                         |
| 1000                | 1250    | 21                         |
| 1250                | 1600    | 23                         |
| 1600                | 2000    | 26                         |
| 2000                | 2500    | 28                         |
| 2500                | 3150    | 30                         |
| 3150                | 4000    | 33                         |

- Accuracies of models SCR and CSR are categorized into precision, super precision and ultra precision grades by model number as indicated in Table22.

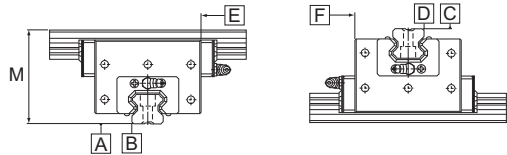


Fig.17

Table22 Accuracy Standard for Models SCR and CSR  
Unit: mm

| Model No. | Accuracy standards                                 | Precision grade     | Super precision grade | Ultra precision grade |
|-----------|----------------------------------------------------|---------------------|-----------------------|-----------------------|
|           | Item                                               | P                   | SP                    | UP                    |
| 15<br>20  | Difference in height M                             | 0.01                | 0.007                 | 0.005                 |
|           | Perpendicularity of surface D against surface B    | 0.005               | 0.004                 | 0.003                 |
|           | Running parallelism of surface E against surface B | as shown in Table23 |                       |                       |
| 25        | Running parallelism of surface F against surface D | as shown in Table23 |                       |                       |
|           | Difference in height M                             | 0.01                | 0.007                 | 0.005                 |
|           | Perpendicularity of surface D against surface B    | 0.008               | 0.006                 | 0.004                 |
| 30<br>35  | Running parallelism of surface E against surface B | as shown in Table23 |                       |                       |
|           | Running parallelism of surface F against surface D | as shown in Table23 |                       |                       |
|           | Difference in height M                             | 0.01                | 0.007                 | 0.005                 |
| 45        | Perpendicularity of surface D against surface B    | 0.01                | 0.007                 | 0.005                 |
|           | Running parallelism of surface E against surface B | as shown in Table23 |                       |                       |
|           | Running parallelism of surface F against surface D | as shown in Table23 |                       |                       |
| 65        | Difference in height M                             | 0.012               | 0.008                 | 0.006                 |
|           | Perpendicularity of surface D against surface B    | 0.012               | 0.008                 | 0.006                 |
|           | Running parallelism of surface E against surface B | as shown in Table23 |                       |                       |
| 65        | Running parallelism of surface F against surface D | as shown in Table23 |                       |                       |
|           | Difference in height M                             | 0.018               | 0.012                 | 0.009                 |
|           | Perpendicularity of surface D against surface B    | 0.018               | 0.012                 | 0.009                 |
| 65        | Running parallelism of surface E against surface B | as shown in Table23 |                       |                       |
|           | Running parallelism of surface F against surface D | as shown in Table23 |                       |                       |

Table23 LM Rail Length and Running Parallelism  
by Accuracy Standard

Unit: μm

| LM rail length (mm) |         | Running Parallelism Values |                       |                       |
|---------------------|---------|----------------------------|-----------------------|-----------------------|
| Above               | Or less | Precision grade            | Super precision grade | Ultra precision grade |
| —                   | 50      | 2                          | 1.5                   | 1                     |
| 50                  | 80      | 2                          | 1.5                   | 1                     |
| 80                  | 125     | 2                          | 1.5                   | 1                     |
| 125                 | 200     | 2                          | 1.5                   | 1                     |
| 200                 | 250     | 2.5                        | 1.5                   | 1                     |
| 250                 | 315     | 3                          | 1.5                   | 1                     |
| 315                 | 400     | 3.5                        | 2                     | 1.5                   |
| 400                 | 500     | 4.5                        | 2.5                   | 1.5                   |
| 500                 | 630     | 5                          | 3                     | 2                     |
| 630                 | 800     | 6                          | 3.5                   | 2                     |
| 800                 | 1000    | 6.5                        | 4                     | 2.5                   |
| 1000                | 1250    | 7.5                        | 4.5                   | 3                     |
| 1250                | 1600    | 8                          | 5                     | 4                     |
| 1600                | 2000    | 8.5                        | 5.5                   | 4.5                   |
| 2000                | 2500    | 9.5                        | 6                     | 5                     |
| 2500                | 3090    | 11                         | 6.5                   | 5.5                   |

- Accuracies of model HR are categorized into normal, high accuracy, precision, super precision and ultra precision grades as indicated in Table24.

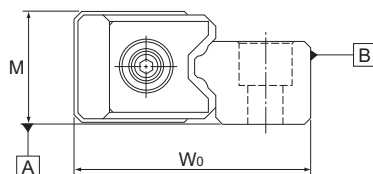


Fig.18

Table24 Accuracy Standard for Model HR

Unit: mm

| Accuracy standards                                  | Normal grade        | High-accuracy grade | Precision grade | Super precision grade | Ultra precision grade |
|-----------------------------------------------------|---------------------|---------------------|-----------------|-----------------------|-----------------------|
| Item                                                | No Symbol           | H                   | P               | SP                    | UP                    |
| Dimensional tolerance in height M                   | $\pm 0.1$           | $\pm 0.05$          | $\pm 0.025$     | $\pm 0.015$           | $\pm 0.01$            |
| Difference in height M <sup>Note 1)</sup>           | 0.03                | 0.02                | 0.01            | 0.005                 | 0.003                 |
| Dimensional tolerance for total width $W_0$         | $\pm 0.1$           |                     | $\pm 0.05$      |                       |                       |
| Difference in total width $W_0$ <sup>Note 2)</sup>  | 0.03                | 0.015               | 0.01            | 0.005                 | 0.003                 |
| Parallelism of the raceway against surfaces A and B | as shown in Table25 |                     |                 |                       |                       |

Note 1) Difference in height M applies to a set of LM Guides used on the same plane.

Note 2) Difference in total width  $W_0$  applies to LM blocks used in combination on one LM rail.

Note 3) In a set of LM Guides, dimensional tolerance and difference in total width  $W_0$  for precision and higher grades apply only to the master rail. The Master LM Guide will have a serial number ending with "KB" printed on it.

Table25 LM Rail Length and Running Parallelism by Accuracy Standard

Unit:  $\mu\text{m}$

| LM rail length (mm) |         | Running Parallelism Values |                     |                 |                       |                       |
|---------------------|---------|----------------------------|---------------------|-----------------|-----------------------|-----------------------|
| Above               | Or less | Normal grade               | High-accuracy grade | Precision grade | Super precision grade | Ultra precision grade |
| —                   | 50      | 5                          | 3                   | 2               | 1.5                   | 1                     |
| 50                  | 80      | 5                          | 3                   | 2               | 1.5                   | 1                     |
| 80                  | 125     | 5                          | 3                   | 2               | 1.5                   | 1                     |
| 125                 | 200     | 5                          | 3.5                 | 2               | 1.5                   | 1                     |
| 200                 | 250     | 6                          | 4                   | 2.5             | 1.5                   | 1                     |
| 250                 | 315     | 7                          | 4.5                 | 3               | 1.5                   | 1                     |
| 315                 | 400     | 8                          | 5                   | 3.5             | 2                     | 1.5                   |
| 400                 | 500     | 9                          | 6                   | 4.5             | 2.5                   | 1.5                   |
| 500                 | 630     | 11                         | 7                   | 5               | 3                     | 2                     |
| 630                 | 800     | 12                         | 8.5                 | 6               | 3.5                   | 2                     |
| 800                 | 1000    | 13                         | 9                   | 6.5             | 4                     | 2.5                   |
| 1000                | 1250    | 15                         | 11                  | 7.5             | 4.5                   | 3                     |
| 1250                | 1600    | 16                         | 12                  | 8               | 5                     | 4                     |
| 1600                | 2000    | 18                         | 13                  | 8.5             | 5.5                   | 4.5                   |
| 2000                | 2500    | 20                         | 14                  | 9.5             | 6                     | 5                     |
| 2500                | 3000    | 21                         | 16                  | 11              | 6.5                   | 5.5                   |

- Accuracies of model GSR are categorized into normal, high accuracy and precision grades by model number as indicated in Table26.

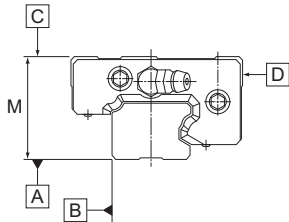


Fig.19

Table26 Accuracy Standard for Model GSR

Unit: mm

| Model No.      | Accuracy standards                                 | Normal grade        | High-accuracy grade | Precision grade |
|----------------|----------------------------------------------------|---------------------|---------------------|-----------------|
|                | Item                                               | No Symbol           | H                   | P               |
| 15<br>20       | Dimensional tolerance in height M                  | ±0.02               |                     |                 |
|                | Running parallelism of surface C against surface A | as shown in Table27 |                     |                 |
|                | Running parallelism of surface D against surface B | as shown in Table27 |                     |                 |
| 25<br>30<br>35 | Dimensional tolerance in height M                  | ±0.03               |                     |                 |
|                | Running parallelism of surface C against surface A | as shown in Table27 |                     |                 |
|                | Running parallelism of surface D against surface B | as shown in Table27 |                     |                 |

- Accuracies of model GSR-R are categorized into normal and high accuracy grades by model number as indicated in Table28.

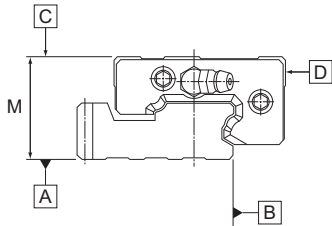


Fig.20

Table28 Accuracy Standard for GSR-R

Unit: mm

| Model No.      | Accuracy standards                                 | Normal grade        | High-accuracy grade |
|----------------|----------------------------------------------------|---------------------|---------------------|
|                | Item                                               | No Symbol           | H                   |
| 25<br>30<br>35 | Dimensional tolerance in height M                  | ±0.03               |                     |
|                | Running parallelism of surface C against surface A | as shown in Table29 |                     |
|                | Running parallelism of surface D against surface B | as shown in Table29 |                     |

Table27 LM Rail Length and Running Parallelism by Accuracy Standard

Unit: μm

| LM rail length (mm) |         | Running Parallelism Values |                     |                 |
|---------------------|---------|----------------------------|---------------------|-----------------|
| Above               | Or less | Normal grade               | High-accuracy grade | Precision grade |
| —                   | 50      | 5                          | 3                   | 2               |
| 50                  | 80      | 5                          | 3                   | 2               |
| 80                  | 125     | 5                          | 3                   | 2               |
| 125                 | 200     | 5                          | 3.5                 | 2               |
| 200                 | 250     | 6                          | 4                   | 2.5             |
| 250                 | 315     | 7                          | 4.5                 | 3               |
| 315                 | 400     | 8                          | 5                   | 3.5             |
| 400                 | 500     | 9                          | 6                   | 4.5             |
| 500                 | 630     | 11                         | 7                   | 5               |
| 630                 | 800     | 12                         | 8.5                 | 6               |
| 800                 | 1000    | 13                         | 9                   | 6.5             |
| 1000                | 1250    | 15                         | 11                  | 7.5             |
| 1250                | 1600    | 16                         | 12                  | 8               |
| 1600                | 2000    | 18                         | 13                  | 8.5             |
| 2000                | 2500    | 20                         | 14                  | 9.5             |
| 2500                | 3000    | 21                         | 16                  | 11              |

Table29 LM Rail Length and Running Parallelism by Accuracy Standard

Unit: μm

| LM rail length (mm) |         | Running Parallelism Values |                     |
|---------------------|---------|----------------------------|---------------------|
| Above               | Or less | Normal grade               | High-accuracy grade |
| —                   | 50      | 5                          | 3                   |
| 50                  | 80      | 5                          | 3                   |
| 80                  | 125     | 5                          | 3                   |
| 125                 | 200     | 5                          | 3.5                 |
| 200                 | 250     | 6                          | 4                   |
| 250                 | 315     | 7                          | 4.5                 |
| 315                 | 400     | 8                          | 5                   |
| 400                 | 500     | 9                          | 6                   |
| 500                 | 630     | 11                         | 7                   |
| 630                 | 800     | 12                         | 8.5                 |
| 800                 | 1000    | 13                         | 9                   |
| 1000                | 1250    | 15                         | 11                  |
| 1250                | 1600    | 16                         | 12                  |
| 1600                | 2000    | 18                         | 13                  |

- Accuracies of models SRS, RSX, RSR, RSR-M1, and RSR-W are categorized into normal, high accuracy, and precision grades by model number as indicated in Table30.

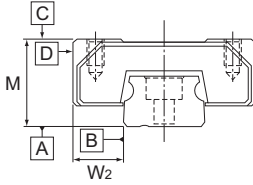


Fig.21

Table30 Accuracy Standards for Models SRS, RSX, RSR, RSR-M1, and RSR-W

Unit: mm

| Model No.                            | Accuracy standards                                 | Normal grade        | High-accuracy grade | Precision grade |
|--------------------------------------|----------------------------------------------------|---------------------|---------------------|-----------------|
|                                      | Item                                               | No Symbol           | H                   | P               |
| 3<br>5                               | Dimensional tolerance in height M                  | ±0.03               | —                   | ±0.015          |
|                                      | Difference in height M                             | 0.015               | —                   | 0.005           |
|                                      | Dimensional tolerance in width W <sub>2</sub>      | ±0.03               | —                   | ±0.015          |
|                                      | Difference in width W <sub>2</sub>                 | 0.015               | —                   | 0.005           |
|                                      | Running parallelism of surface C against surface A | as shown in Table31 |                     |                 |
|                                      | Running parallelism of surface D against surface B | as shown in Table31 |                     |                 |
| 7<br>9<br>12<br>14<br>15<br>20<br>25 | Dimensional tolerance in height M                  | ±0.04               | ±0.02               | ±0.01           |
|                                      | Difference in height M                             | 0.03                | 0.015               | 0.007           |
|                                      | Dimensional tolerance in width W <sub>2</sub>      | ±0.04               | ±0.025              | ±0.015          |
|                                      | Difference in width W <sub>2</sub>                 | 0.03                | 0.02                | 0.01            |
|                                      | Running parallelism of surface C against surface A | as shown in Table32 |                     |                 |
|                                      | Running parallelism of surface D against surface B | as shown in Table32 |                     |                 |

Table31 LM Rail Length and Running Parallelism for Models SRS5, RSR3 and RSR5 by Accuracy Standard

Unit: μm

| LM rail length (mm) |         | Running Parallelism Values |                 |
|---------------------|---------|----------------------------|-----------------|
| Above               | Or less | Normal grade               | Precision grade |
| —                   | 25      | 2.5                        | 1.5             |
| 25                  | 50      | 3.5                        | 2               |
| 50                  | 100     | 5.5                        | 3               |
| 100                 | 150     | 7                          | 4               |
| 150                 | 200     | 8.4                        | 5               |

Table32 LM Rail Length and Running Parallelism for Models SRS7 to SRS25, RSX, and RSR7 to RSR25 by Accuracy Standard  
Unit: μm

| LM rail length (mm) |         | Running Parallelism Values |                     |                 |
|---------------------|---------|----------------------------|---------------------|-----------------|
| Above               | Or less | Normal grade               | High-accuracy grade | Precision grade |
| —                   | 40      | 8                          | 4                   | 1               |
| 40                  | 70      | 10                         | 4                   | 1               |
| 70                  | 100     | 11                         | 4                   | 2               |
| 100                 | 130     | 12                         | 5                   | 2               |
| 130                 | 160     | 13                         | 6                   | 2               |
| 160                 | 190     | 14                         | 7                   | 2               |
| 190                 | 220     | 15                         | 7                   | 3               |
| 220                 | 250     | 16                         | 8                   | 3               |
| 250                 | 280     | 17                         | 8                   | 3               |
| 280                 | 310     | 17                         | 9                   | 3               |
| 310                 | 340     | 18                         | 9                   | 3               |
| 340                 | 370     | 18                         | 10                  | 3               |
| 370                 | 400     | 19                         | 10                  | 3               |
| 400                 | 430     | 20                         | 11                  | 4               |
| 430                 | 460     | 20                         | 12                  | 4               |
| 460                 | 520     | 21                         | 12                  | 4               |
| 520                 | 550     | 22                         | 12                  | 4               |
| 550                 | 640     | 22                         | 13                  | 4               |
| 640                 | 670     | 23                         | 13                  | 4               |
| 670                 | 700     | 23                         | 13                  | 5               |
| 700                 | 820     | 23                         | 14                  | 5               |
| 820                 | 850     | 24                         | 14                  | 5               |
| 850                 | 970     | 24                         | 15                  | 5               |
| 970                 | 1030    | 25                         | 16                  | 5               |
| 1030                | 1150    | 25                         | 16                  | 6               |
| 1150                | 1330    | 26                         | 17                  | 6               |
| 1330                | 1420    | 27                         | 18                  | 6               |
| 1420                | 1510    | 27                         | 18                  | 7               |
| 1510                | 1830    | 28                         | 19                  | 7               |
| 1830                | 2000    | 28                         | 19                  | 8               |

- Accuracies of model MX are categorized into normal and precision grades by model number as indicated in Table33.

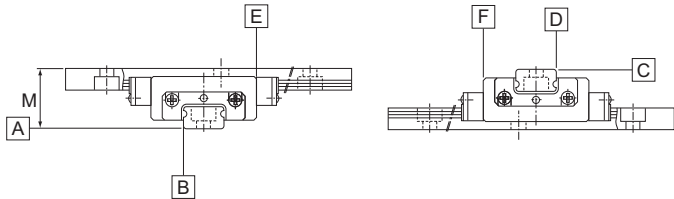


Fig.22

Table33 Accuracy Standard for Model MX  
Unit: mm

| Model No. | Accuracy standards                                 | Normal grade        | Precision grade |
|-----------|----------------------------------------------------|---------------------|-----------------|
|           | Item                                               | No Symbol           | P               |
| 5         | Difference in height M                             | 0.015               | 0.005           |
|           | Perpendicularity of surface D against surface B    | 0.003               | 0.002           |
|           | Running parallelism of surface E against surface B | as shown in Table34 |                 |
|           | Running parallelism of surface F against surface D | as shown in Table34 |                 |
| 7         | Difference in height M                             | 0.03                | 0.007           |
|           | Perpendicularity of surface D against surface B    | 0.01                | 0.005           |
|           | Running parallelism of surface E against surface B | as shown in Table35 |                 |
|           | Running parallelism of surface F against surface D | as shown in Table35 |                 |

Table35 LM Rail Length and Running Parallelism for Model MX7 by Accuracy Standard  
Unit: μm

| LM rail length (mm) |         | Running Parallelism Values |                 |
|---------------------|---------|----------------------------|-----------------|
| Above               | Or less | Normal grade               | Precision grade |
| —                   | 40      | 8                          | 1               |
| 40                  | 70      | 10                         | 1               |
| 70                  | 100     | 11                         | 2               |
| 100                 | 130     | 12                         | 2               |
| 130                 | 160     | 13                         | 2               |
| 160                 | 190     | 14                         | 2               |
| 190                 | 220     | 15                         | 3               |
| 220                 | 250     | 16                         | 3               |
| 250                 | 280     | 17                         | 3               |
| 280                 | 310     | 17                         | 3               |
| 310                 | 340     | 18                         | 3               |
| 340                 | 370     | 18                         | 3               |
| 370                 | 400     | 19                         | 3               |

Table34 LM Rail Length and Running Parallelism for Model MX5 by Accuracy Standard  
Unit: μm

| LM rail length (mm) |         | Running Parallelism Values |                 |
|---------------------|---------|----------------------------|-----------------|
| Above               | Or less | Normal grade               | Precision grade |
| —                   | 25      | 2.5                        | 1.5             |
| 25                  | 50      | 3.5                        | 2               |
| 50                  | 100     | 5.5                        | 3               |
| 100                 | 150     | 7                          | 4               |
| 150                 | 200     | 8.4                        | 5               |

- Accuracies of model SRW are categorized into precision, super precision and ultra precision grades by model number as indicated in Table36.

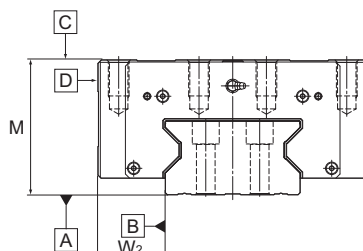


Fig.23

Table36 Accuracy Standard for Model SRW

Unit: mm

| Model No.  | Accuracy standards                                 | Precision grade     | Super precision grade | Ultra precision grade |
|------------|----------------------------------------------------|---------------------|-----------------------|-----------------------|
|            | Item                                               | P                   | SP                    | UP                    |
| 70<br>85   | Dimensional tolerance in height M                  | 0<br>-0.05          | 0<br>-0.03            | 0<br>-0.015           |
|            | Difference in height M                             | 0.007               | 0.005                 | 0.003                 |
|            | Dimensional tolerance in width W <sub>2</sub>      | 0<br>-0.04          | 0<br>-0.025           | 0<br>-0.015           |
|            | Difference in width W <sub>2</sub>                 | 0.007               | 0.005                 | 0.003                 |
|            | Running parallelism of surface C against surface A | as shown in Table37 |                       |                       |
|            | Running parallelism of surface D against surface B | as shown in Table37 |                       |                       |
| 100        | Dimensional tolerance in height M                  | 0<br>-0.05          | 0<br>-0.04            | 0<br>-0.03            |
|            | Difference in height M                             | 0.01                | 0.007                 | 0.005                 |
|            | Dimensional tolerance in width W <sub>2</sub>      | 0<br>-0.05          | 0<br>-0.04            | 0<br>-0.03            |
|            | Difference in width W <sub>2</sub>                 | 0.01                | 0.007                 | 0.005                 |
|            | Running parallelism of surface C against surface A | as shown in Table37 |                       |                       |
|            | Running parallelism of surface D against surface B | as shown in Table37 |                       |                       |
| 130<br>150 | Dimensional tolerance in height M                  | 0<br>-0.05          | 0<br>-0.04            | 0<br>-0.03            |
|            | Difference in height M                             | 0.01                | 0.007                 | 0.005                 |
|            | Dimensional tolerance in width W <sub>2</sub>      | 0<br>-0.05          | 0<br>-0.04            | 0<br>-0.03            |
|            | Difference in width W <sub>2</sub>                 | 0.01                | 0.007                 | 0.005                 |
|            | Running parallelism of surface C against surface A | as shown in Table37 |                       |                       |
|            | Running parallelism of surface D against surface B | as shown in Table37 |                       |                       |

Table37 LM Rail Length and Running Parallelism by Accuracy Standard

Unit: μm

| LM rail length (mm) |         | Running Parallelism Values |                       |                       |
|---------------------|---------|----------------------------|-----------------------|-----------------------|
| Above               | Or less | Precision grade            | Super precision grade | Ultra precision grade |
| —                   | 50      | 2                          | 1.5                   | 1                     |
| 50                  | 80      | 2                          | 1.5                   | 1                     |
| 80                  | 125     | 2                          | 1.5                   | 1                     |
| 125                 | 200     | 2                          | 1.5                   | 1                     |
| 200                 | 250     | 2.5                        | 1.5                   | 1                     |
| 250                 | 315     | 3                          | 1.5                   | 1                     |
| 315                 | 400     | 3.5                        | 2                     | 1.5                   |
| 400                 | 500     | 4.5                        | 2.5                   | 1.5                   |
| 500                 | 630     | 5                          | 3                     | 2                     |
| 630                 | 800     | 6                          | 3.5                   | 2                     |
| 800                 | 1000    | 6.5                        | 4                     | 2.5                   |
| 1000                | 1250    | 7.5                        | 4.5                   | 3                     |
| 1250                | 1600    | 8                          | 5                     | 4                     |
| 1600                | 2000    | 8.5                        | 5.5                   | 4.5                   |
| 2000                | 2500    | 9.5                        | 6                     | 5                     |
| 2500                | 3090    | 11                         | 6.5                   | 5.5                   |

- Accuracies of model EPF are categorized into normal, high accuracy and precision grades by model number as indicated in Table38.

Table38 Accuracy Standard for Model EPF

Unit: mm

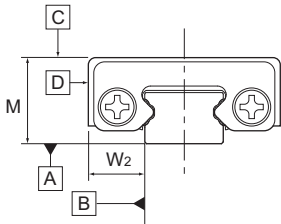


Fig.24

| Model No.              | Accuracy Standards                                                   | Normal grade | High-accuracy grade | Precision grade |
|------------------------|----------------------------------------------------------------------|--------------|---------------------|-----------------|
|                        |                                                                      | No Symbol    | H                   | P               |
| 7M<br>9M<br>12M<br>15M | Dimensional tolerance in height M                                    | ±0.04        | ±0.02               | ±0.01           |
|                        | Difference in height M                                               | 0.03         | 0.015               | 0.007           |
|                        | Dimensional tolerance in width W <sub>2</sub>                        | ±0.04        | ±0.025              | ±0.015          |
|                        | Running parallelism of surface C against surface A <sup>(Note)</sup> | 0.008        | 0.004               | 0.001           |
|                        | Running parallelism of surface D against surface B <sup>(Note)</sup> | 0.008        | 0.004               | 0.001           |

Note) If the stroke is more than 40 mm, contact THK.

- Accuracies of model SR-MS are categorized into precision, super precision and ultra precision grades by model number as indicated in Table39.

Table40 LM Rail Length and Running Parallelism by Accuracy Standard

Unit: μm

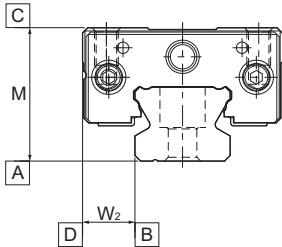


Fig.25

Table39 Accuracy Standard for Model SR-MS

Unit: mm

| Model No. | Accuracy Standards                                 | Precision grade     | Super precision grade | Ultra precision grade |
|-----------|----------------------------------------------------|---------------------|-----------------------|-----------------------|
|           | Item                                               | P                   | SP                    | UP                    |
| 15<br>20  | Dimensional tolerance in height M                  | 0<br>-0.03          | 0<br>-0.015           | 0<br>-0.008           |
|           | Difference in Height M                             | 0.006               | 0.004                 | 0.003                 |
|           | Dimensional tolerance in width W <sub>2</sub>      | 0<br>-0.02          | 0<br>-0.015           | 0<br>-0.008           |
|           | Difference in Width W <sub>2</sub>                 | 0.006               | 0.004                 | 0.003                 |
|           | Running parallelism of surface C against surface A | as shown in Table40 |                       |                       |
|           | Running parallelism of surface D against surface B | as shown in Table40 |                       |                       |

| LM rail length (mm) |         | Running Parallelism Values |                       |                       |
|---------------------|---------|----------------------------|-----------------------|-----------------------|
| Above               | Or less | Precision grade            | Super precision grade | Ultra precision grade |
|                     |         | P                          | SP                    | UP                    |
| —                   | 50      | 2                          | 1.5                   | 1                     |
| 50                  | 80      | 2                          | 1.5                   | 1                     |
| 80                  | 125     | 2                          | 1.5                   | 1                     |
| 125                 | 200     | 2                          | 1.5                   | 1                     |
| 200                 | 250     | 2.5                        | 1.5                   | 1                     |
| 250                 | 315     | 3                          | 1.5                   | 1                     |
| 315                 | 400     | 3.5                        | 2                     | 1.5                   |

LM Guide

## Features and Dimensions of Each Model

# Structure and Features of the Caged Ball LM Guide

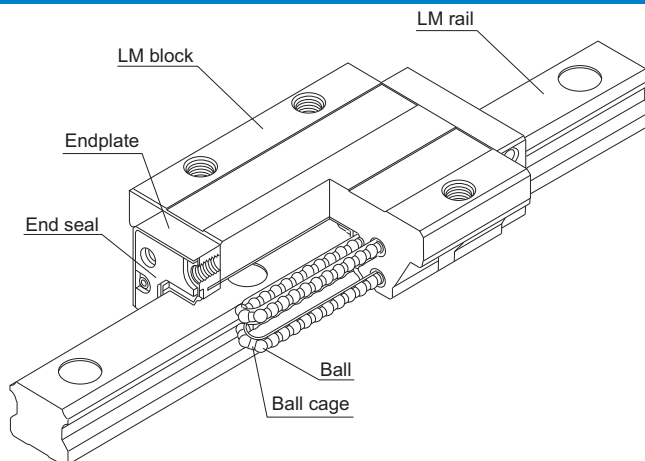


Fig.1 Structural Drawing of the Caged Ball LM Guide Model SHS

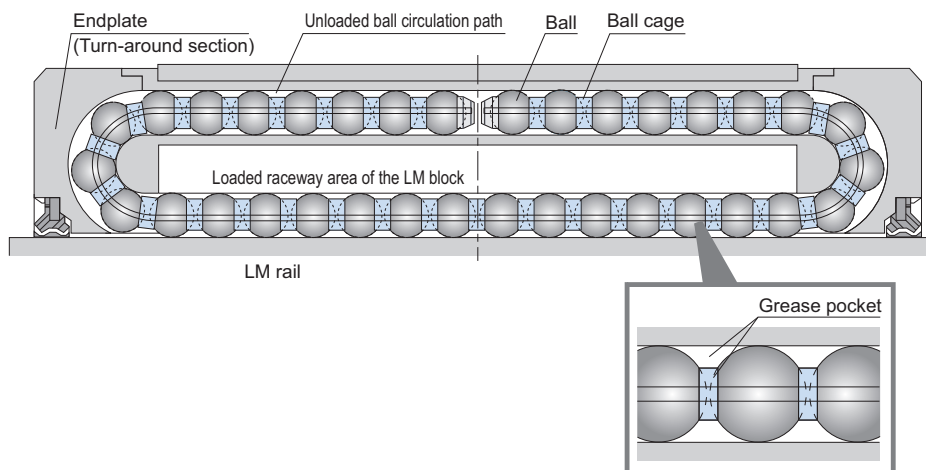


Fig.2 Circulation Structure inside the LM Block of the Caged Ball LM Guide

With the Caged Ball LM Guide, the use of a ball cage allows lines of evenly spaced balls to circulate, thus to eliminate friction between the balls.

In addition, grease held in a space between the ball circulation path and the ball cage (grease pocket) is applied on the contact surface between each ball and the ball cage as the ball rotates, forming an oil film on the ball surface. As a result, an oil film is not easily broken.

## Advantages of the Ball Cage Technology

- (1) The absence of friction between balls, together with increased grease retention, achieves long service life and long-term maintenance-free (lubrication-free) operation.
- (2) The absence of ball-to-ball collision achieves low noise and acceptable running sound.
- (3) The absence of friction between balls achieves low heat generation and high speed operation.
- (4) The circulation of lines of evenly spaced balls ensures smooth ball rotation.
- (5) The absence of friction between balls allows high grease retention and low dust generation.

### [Long Service Life and Long-term Maintenance-free Operation]

#### ● Data on Long Service Life and Long-term Maintenance-free Operation

Use of a ball cage eliminates friction between balls and increases grease retention, thus to achieve long service life and long-term maintenance-free operation.

[Condition]

Speed : 60m/min

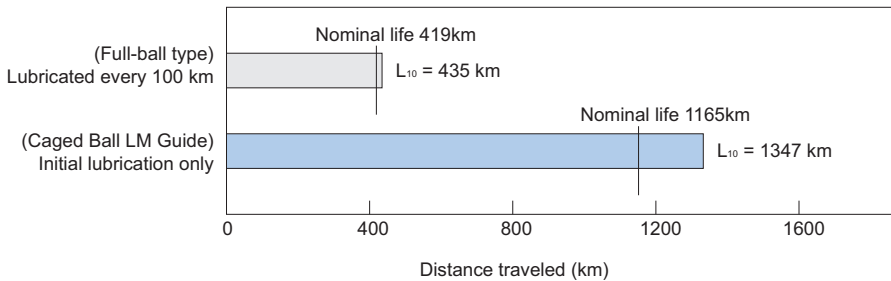
Stroke : 350mm

Acceleration:  $9.8\text{m/s}^2$

Orientation : horizontal

Load : Caged Ball LM Guide : 11.1kN

Full-ball type : 9.8kN

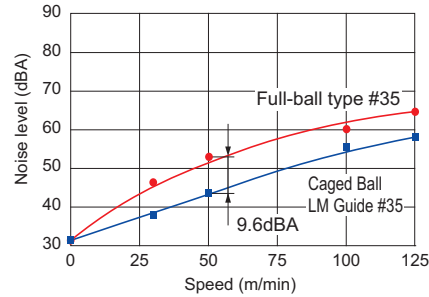


Caged Ball LM Guide and Full-Ball Type Durability Testing Data

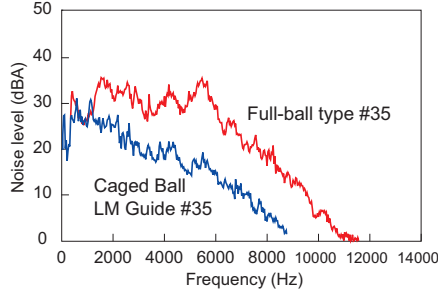
[Low Noise, Acceptable Running Sound]

● Noise Level Data

Since the ball circulation path inside the LM block is made of resin, metallic noise between balls and the LM block is eliminated. In addition, use of a ball cage eliminates metallic noise of ball-to-ball collision, allowing a low noise level to be maintained even at high speed.



Comparison of Noise Levels between  
Caged Ball LM Guide #35 and  
Full-Ball Type #35



Comparison of Noise Levels between  
Caged Ball LM Guide #35 and Full-Ball Type #35  
(at speed of 50 m/min)

[High Speed]

● High-speed Durability Test Data

Since use of a ball cage eliminates friction between balls, only a low level of heat is generated and superhigh speed is achieved.

[Condition]

Model No. : Caged Ball LM Guide Model SHS65LVSS

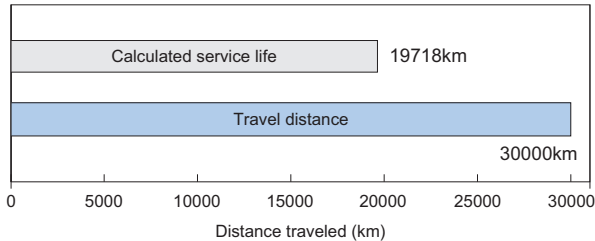
Speed : 200m/min

Stroke : 2500mm

Lubrication : initial lubrication only

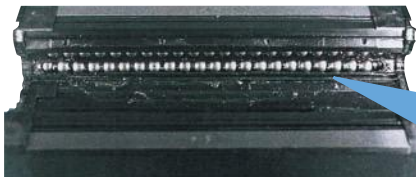
Applied load: 34.5kN

Acceleration: 1.5G



SHS65LVSS High-speed Durability Test Data

Grease remains, and no anomaly is observed in the balls and grease.

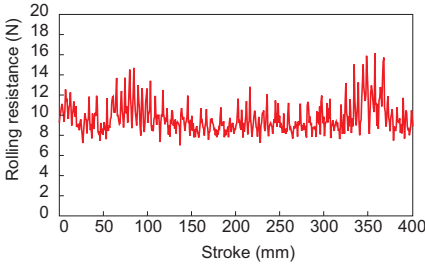


Detail view of the ball cage

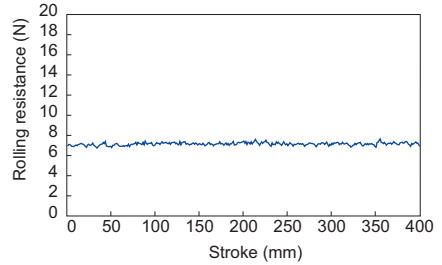
**[Smooth Motion]**

● **Rolling Resistance Data**

Use of a ball cage allows the balls to be uniformly aligned and prevents a line of balls from meandering as they enter the LM block. This enables smooth and stable motion to be achieved, minimizes fluctuations in rolling resistance, and ensures high accuracy, in any mounting orientation.



Rolling Resistance Fluctuation Data with Full-Ball Type #25  
 (Vertical-use feeding speed: 1 mm/s)

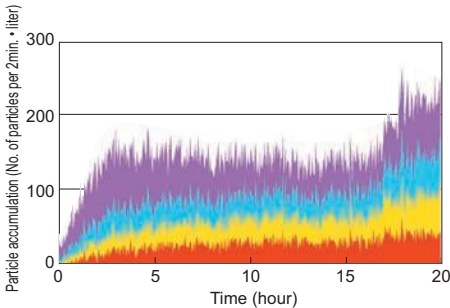
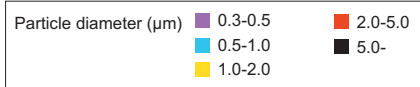


Rolling Resistance Fluctuation Data with Caged Ball LM Guide #25  
 (Vertical-use feeding speed: 1 mm/s)

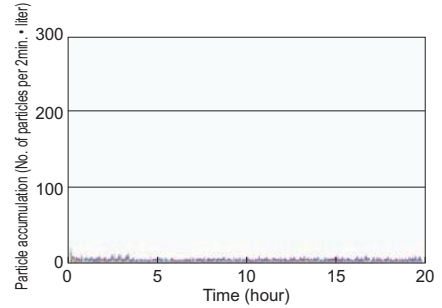
**[Low dust generation]**

● **Low Dust Generation Data**

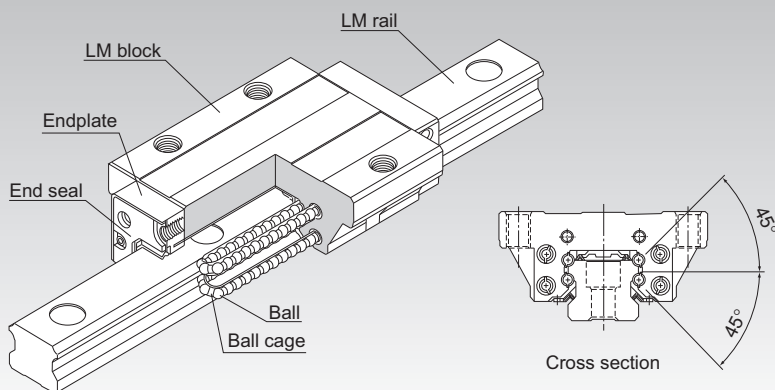
In addition to friction between balls, metallic contact has also been eliminated by using resin for the through holes. Furthermore, the Caged Ball LM Guide has a high level of grease retention and minimizes oil loss of grease, thus to achieve superbly low dust generation.



Full-Ball Type Dust Generation Data



Caged Ball LM Guide Model SSR20  
 Dust Generation Data



\*For the Ball Cage, see **A1-88**.

**Point of Selection** **A1-10**

**Point of Design** **A1-454**

**Options** **A1-477**

**Model No.** **A1-543**

**Precautions on Use** **A1-549**

**Accessories for Lubrication** **A24-1**

**Mounting Procedure and Maintenance** **B1-89**

Equivalent moment factor **A1-43**

Rated Loads in All Directions **A1-59**

Equivalent factor in each direction **A1-61**

Radial Clearance **A1-71**

Accuracy Standards **A1-77**

Shoulder Height of the Mounting Base and the Corner Radius **A1-464**

Permissible Error of the Mounting Surface **A1-470**

Dimensions of Each Model with an Option Attached **A1-491**

## Structure and Features

Balls roll in four rows of raceways precision-ground on an LM rail and an LM block, and ball cages and endplates incorporated in the LM block allow the balls to circulate.

Each row of balls is placed at a contact angle of  $45^\circ$  so that the rated loads applied to the LM block are uniform in the four directions (radial, reverse-radial, and lateral directions), enabling the LM Guide to be used in all orientations. In addition, the LM block can receive a well-balanced preload, increasing the rigidity in the four directions while maintaining a constant, low friction coefficient.

### [4-way Equal Load]

Each row of balls is placed at a contact angle of  $45^\circ$  so that the rated loads applied to the LM block are uniform in the four directions (radial, reverse radial and lateral directions), enabling the LM Guide to be used in all orientations and in extensive applications.

### [Self-adjustment Capability]

The self-adjustment capability through front-to-front configuration of THK's unique circular-arc grooves (DF set) enables a mounting error to be absorbed even under a preload, thus to achieve highly accurate, smooth straight motion.

### [Global Standard Size]

SHS is designed to have dimensions almost the same as that of Full Ball LM Guide model HSR, which THK as a pioneer of the linear motion system has developed and is practically a global standard size.

### [Stainless Steel Type also Available]

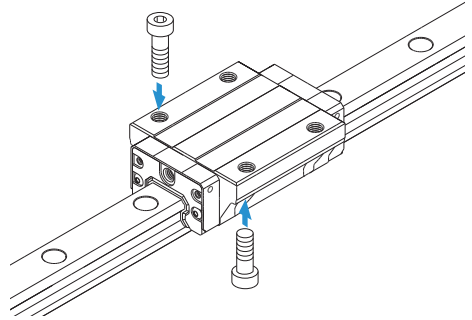
A special type whose LM block, LM rail, and balls are made of stainless steel is also available. Applicable only to models 15 through 25.

## Types and Features

### Model SHS-C

Specification Table⇒ **A1-96**

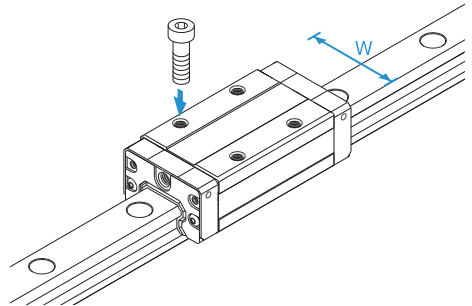
The range of the LM block has tapped holes.  
Can be mounted from the top or the bottom.  
Used in places where the table cannot have through holes for mounting bolts.



### Model SHS-V

Specification Table⇒ **A1-98**

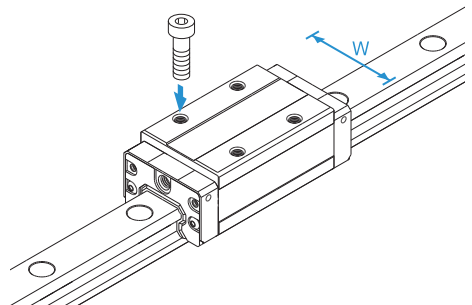
With this type, the LM block has a smaller width (W) and tapped holes.  
Used in places where the space for table width is limited.



### Model SHS-R

Specification Table⇒ **A1-100**

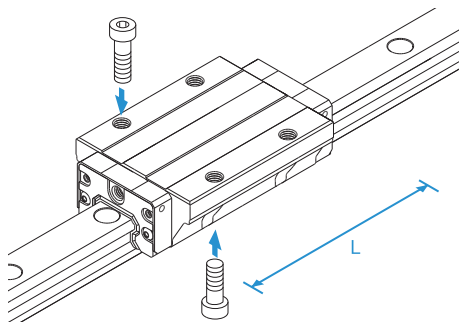
The LM block has a smaller width (W) and the mounting holes are tapped.  
It succeeds the height dimension of full-ball type LM Guide HSR-R.



## Model SHS-LC

Specification Table⇒ **A1-96**

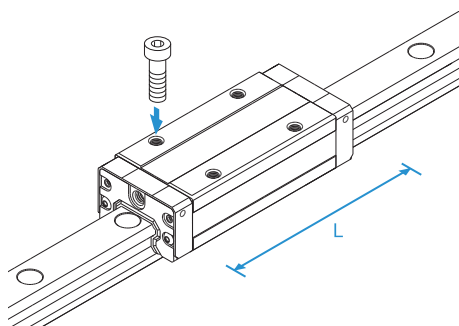
The LM block has the same cross-sectional shape as model SHS-C, but has a longer overall LM block length (L) and a greater rated load.



## Model SHS-LV

Specification Table⇒ **A1-98**

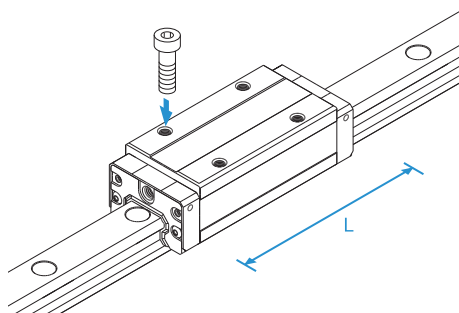
The LM block has the same cross-sectional shape as model SHS-V, but has a longer overall LM block length (L) and a greater rated load.



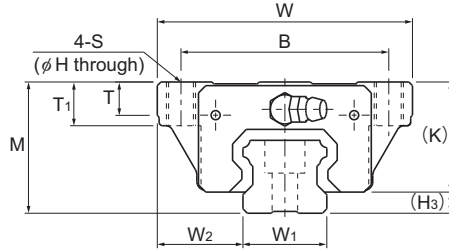
## Model SHS-LR

Specification Table⇒ **A1-100**

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



# Models SHS-C, SHS-CM, SHS-LC and SHS-LCM



| Model No.             | Outer dimensions |       |            | LM block dimensions |     |     |      |                |      |                |      |      |     |               | Pilot hole for side nipple |                |                |
|-----------------------|------------------|-------|------------|---------------------|-----|-----|------|----------------|------|----------------|------|------|-----|---------------|----------------------------|----------------|----------------|
|                       | Height           | Width | Length     |                     |     |     |      |                |      |                |      |      |     | Grease nipple |                            |                |                |
|                       | M                | W     | L          | B                   | C   | S   | H    | L <sub>1</sub> | T    | T <sub>1</sub> | K    | N    | E   |               | e <sub>0</sub>             | f <sub>0</sub> | D <sub>0</sub> |
| SHS 15C<br>SHS 15CM   | 24               | 47    | 64.4       | 38                  | 30  | M5  | 4.4  | 48             | 5.9  | 8              | 21   | 5.5  | 5.5 | PB1021B       | 4                          | 4              | 3              |
| SHS 15LC<br>SHS 15LCM | 24               | 47    | 79.4       | 38                  | 30  | M5  | 4.4  | 63             | 5.9  | 8              | 21   | 5.5  | 5.5 | PB1021B       | 4                          | 4              | 3              |
| SHS 20C<br>SHS 20CM   | 30               | 63    | 79         | 53                  | 40  | M6  | 5.4  | 59             | 7.2  | 10             | 25.4 | 6.5  | 12  | B-M6F         | 4.3                        | 5.3            | 3              |
| SHS 20LC<br>SHS 20LCM | 30               | 63    | 98         | 53                  | 40  | M6  | 5.4  | 78             | 7.2  | 10             | 25.4 | 6.5  | 12  | B-M6F         | 4.3                        | 5.3            | 3              |
| SHS 25C<br>SHS 25CM   | 36               | 70    | 92         | 57                  | 45  | M8  | 6.8  | 71             | 9.1  | 12             | 30.2 | 7.5  | 12  | B-M6F         | 4.5                        | 5.5            | 3              |
| SHS 25LC<br>SHS 25LCM | 36               | 70    | 109        | 57                  | 45  | M8  | 6.8  | 88             | 9.1  | 12             | 30.2 | 7.5  | 12  | B-M6F         | 4.5                        | 5.5            | 3              |
| SHS 30C<br>SHS 30LC   | 42               | 90    | 106<br>131 | 72                  | 52  | M10 | 8.5  | 80<br>105      | 11.5 | 15             | 35   | 8    | 12  | B-M6F         | 5.8                        | 6              | 5.2            |
| SHS 35C<br>SHS 35LC   | 48               | 100   | 122<br>152 | 82                  | 62  | M10 | 8.5  | 93<br>123      | 11.5 | 15             | 40.5 | 8    | 12  | B-M6F         | 6.5                        | 5.5            | 5.2            |
| SHS 45C<br>SHS 45LC   | 60               | 120   | 140<br>174 | 100                 | 80  | M12 | 10.5 | 106<br>140     | 14.1 | 18             | 51.1 | 10.5 | 16  | B-PT1/8       | 8                          | 8              | 5.2            |
| SHS 55C<br>SHS 55LC   | 70               | 140   | 171<br>213 | 116                 | 95  | M14 | 12.5 | 131<br>173     | 16   | 21             | 57.3 | 11   | 16  | B-PT1/8       | 10                         | 8              | 5.2            |
| SHS 65C<br>SHS 65LC   | 90               | 170   | 221<br>272 | 142                 | 110 | M16 | 14.5 | 175<br>226     | 18.8 | 24             | 71   | 19   | 16  | B-PT1/8       | 10                         | 12             | 5.2            |

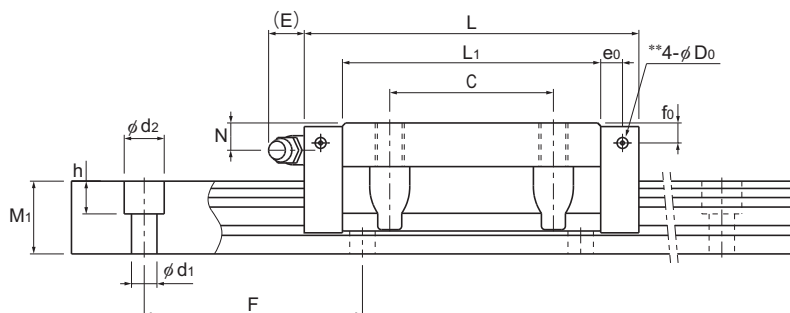
## Model number coding

|              |                  |                                        |                    |                                                |                              |                          |                        |                 |                            |                                |                                                     |            |
|--------------|------------------|----------------------------------------|--------------------|------------------------------------------------|------------------------------|--------------------------|------------------------|-----------------|----------------------------|--------------------------------|-----------------------------------------------------|------------|
| <b>SHS25</b> | <b>LC</b>        | <b>2</b>                               | <b>QZ</b>          | <b>KKHH</b>                                    | <b>C0</b>                    | <b>M</b>                 | <b>+1240L</b>          | <b>P</b>        | <b>Z</b>                   | <b>T</b>                       | <b>M</b>                                            | <b>-II</b> |
| Model number | Type of LM block | No. of LM blocks used on the same rail | With QZ Lubricator | Contamination protection accessory symbol (*1) | Radial clearance symbol (*2) | Stainless steel LM block | LM rail length (in mm) | With steel tape | Accuracy symbol (*3)       | Symbol for LM rail jointed use | Symbol for No. of rails used on the same plane (*4) |            |
|              |                  |                                        |                    | Normal (No symbol)                             | Light preload (C1)           |                          |                        |                 | Normal grade (No Symbol)   |                                |                                                     |            |
|              |                  |                                        |                    | High accuracy grade (H)                        | Medium preload (C0)          |                          |                        |                 | Precision grade (P)        |                                |                                                     |            |
|              |                  |                                        |                    |                                                |                              |                          |                        |                 | Super precision grade (SP) |                                |                                                     |            |
|              |                  |                                        |                    |                                                |                              |                          |                        |                 | Ultra precision grade (UP) |                                |                                                     |            |

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-71**. (\*3) See **A1-77**. (\*4) See **A1-13**.

Note) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.)

Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.



Unit: mm

|  | H <sub>3</sub> | LM rail dimensions                        |                |                          |            |                                   |                    | Basic load rating |                          | Static permissible moment kN·m*                                                   |                  |                                                                                   |                  |                                                                                   | Mass         |                       |                        |
|--|----------------|-------------------------------------------|----------------|--------------------------|------------|-----------------------------------|--------------------|-------------------|--------------------------|-----------------------------------------------------------------------------------|------------------|-----------------------------------------------------------------------------------|------------------|-----------------------------------------------------------------------------------|--------------|-----------------------|------------------------|
|  |                | Width<br><br>W <sub>1</sub><br>0<br>-0.05 | W <sub>2</sub> | Height<br>M <sub>1</sub> | Pitch<br>F | d <sub>1</sub> ×d <sub>2</sub> ×h | Length*<br><br>Max | C<br><br>kN       | C <sub>0</sub><br><br>kN |  |                  |  |                  |  |              | LM<br>block<br><br>kg | LM<br>rail<br><br>kg/m |
|  |                |                                           |                |                          |            |                                   |                    |                   |                          | 1<br>block                                                                        | Double<br>blocks | 1<br>block                                                                        | Double<br>blocks | 1<br>block                                                                        |              |                       |                        |
|  | 3              | 15                                        | 16             | 13                       | 60         | 4.5×7.5×5.3                       | 3000<br>(1240)     | 14.2              | 24.2                     | 0.175                                                                             | 0.898            | 0.175                                                                             | 0.898            | 0.16                                                                              | 0.23         | 1.3                   |                        |
|  | 3              | 15                                        | 16             | 13                       | 60         | 4.5×7.5×5.3                       | 3000<br>(1240)     | 17.2              | 31.9                     | 0.296                                                                             | 1.43             | 0.296                                                                             | 1.43             | 0.212                                                                             | 0.29         | 1.3                   |                        |
|  | 4.6            | 20                                        | 21.5           | 16.5                     | 60         | 6×9.5×8.5                         | 3000<br>(1480)     | 22.3              | 38.4                     | 0.334                                                                             | 1.75             | 0.334                                                                             | 1.75             | 0.361                                                                             | 0.46         | 2.3                   |                        |
|  | 4.6            | 20                                        | 21.5           | 16.5                     | 60         | 6×9.5×8.5                         | 3000<br>(1480)     | 28.1              | 50.3                     | 0.568                                                                             | 2.8              | 0.568                                                                             | 2.8              | 0.473                                                                             | 0.61         | 2.3                   |                        |
|  | 5.8            | 23                                        | 23.5           | 20                       | 60         | 7×11×9                            | 3000<br>(2020)     | 31.7              | 52.4                     | 0.566                                                                             | 2.75             | 0.566                                                                             | 2.75             | 0.563                                                                             | 0.72         | 3.2                   |                        |
|  | 5.8            | 23                                        | 23.5           | 20                       | 60         | 7×11×9                            | 3000<br>(2020)     | 36.8              | 64.7                     | 0.848                                                                             | 3.98             | 0.848                                                                             | 3.98             | 0.696                                                                             | 0.89         | 3.2                   |                        |
|  | 7              | 28                                        | 31             | 23                       | 80         | 9×14×12                           | 3000               | 44.8<br>54.2      | 66.6<br>88.8             | 0.786<br>1.36                                                                     | 4.08<br>6.6      | 0.786<br>1.36                                                                     | 4.08<br>6.6      | 0.865<br>1.15                                                                     | 1.34<br>1.66 | 4.5                   |                        |
|  | 7.5            | 34                                        | 33             | 26                       | 80         | 9×14×12                           | 3000               | 62.3<br>72.9      | 96.6<br>127              | 1.38<br>2.34                                                                      | 6.76<br>10.9     | 1.38<br>2.34                                                                      | 6.76<br>10.9     | 1.53<br>2.01                                                                      | 1.9<br>2.54  | 6.2                   |                        |
|  | 8.9            | 45                                        | 37.5           | 32                       | 105        | 14×20×17                          | 3090               | 82.8<br>100       | 126<br>166               | 2.05<br>3.46                                                                      | 10.1<br>16.3     | 2.05<br>3.46                                                                      | 10.1<br>16.3     | 2.68<br>3.53                                                                      | 3.24<br>4.19 | 10.4                  |                        |
|  | 12.7           | 53                                        | 43.5           | 38                       | 120        | 16×23×20                          | 3060               | 128<br>161        | 197<br>259               | 3.96<br>6.68                                                                      | 19.3<br>31.1     | 3.96<br>6.68                                                                      | 19.3<br>31.1     | 4.9<br>6.44                                                                       | 5.35<br>6.97 | 14.5                  |                        |
|  | 19             | 63                                        | 53.5           | 53                       | 150        | 18×26×22                          | 3000               | 205<br>253        | 320<br>408               | 8.26<br>13.3                                                                      | 40.4<br>62.6     | 8.26<br>13.3                                                                      | 40.4<br>62.6     | 9.4<br>11.9                                                                       | 10.7<br>13.7 | 23.7                  |                        |

Note) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-102**.)

Static permissible moment\* 1 block: the static permissible moment with one LM block

Double blocks: static permissible moment when two LM blocks are in close contact with each other

Total block length L

: The total block length L shown in the table is the length with the dust proof parts, code UU or SS.  
If other contamination protection accessories or lubricant equipment are installed, the total block length will increase.

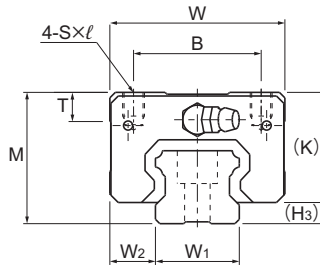
(See **A1-491** or **A1-512**)

\*\* A pilot hole for side nipples, when a grease nipple for a model equipped with LaCS or QZ Lubricator is needed.

Pilot holes for side nipples are not drilled through for models other than those stated above.

For grease nipple mount machining, contact THK.

# Models SHS-V, SHS-VM, SHS-LV and SHS-LVM



| Model No.             | Outer dimensions |       |            | LM block dimensions |           |        |                |      |      |      |     |               |                | Pilot hole for side nipple |                |  |
|-----------------------|------------------|-------|------------|---------------------|-----------|--------|----------------|------|------|------|-----|---------------|----------------|----------------------------|----------------|--|
|                       | Height           | Width | Length     |                     |           |        |                |      |      |      |     |               |                |                            |                |  |
|                       | M                | W     | L          | B                   | C         | S×ℓ    | L <sub>1</sub> | T    | K    | N    | E   | Grease nipple | e <sub>0</sub> | f <sub>0</sub>             | D <sub>0</sub> |  |
| SHS 15V<br>SHS 15VM   | 24               | 34    | 64.4       | 26                  | 26        | M4×4   | 48             | 5.9  | 21   | 5.5  | 5.5 | PB1021B       | 4              | 4                          | 3              |  |
| SHS 15LV<br>SHS 15LVM | 24               | 34    | 79.4       | 26                  | 34        | M4×4   | 63             | 5.9  | 21   | 5.5  | 5.5 | PB1021B       | 4              | 4                          | 3              |  |
| SHS 20V<br>SHS 20VM   | 30               | 44    | 79         | 32                  | 36        | M5×5   | 59             | 8    | 25.4 | 6.5  | 12  | B-M6F         | 4.3            | 5.3                        | 3              |  |
| SHS 20LV<br>SHS 20LVM | 30               | 44    | 98         | 32                  | 50        | M5×5   | 78             | 8    | 25.4 | 6.5  | 12  | B-M6F         | 4.3            | 5.3                        | 3              |  |
| SHS 25V<br>SHS 25VM   | 36               | 48    | 92         | 35                  | 35        | M6×6.5 | 71             | 8    | 30.2 | 7.5  | 12  | B-M6F         | 4.5            | 5.5                        | 3              |  |
| SHS 25LV<br>SHS 25LVM | 36               | 48    | 109        | 35                  | 50        | M6×6.5 | 88             | 8    | 30.2 | 7.5  | 12  | B-M6F         | 4.5            | 5.5                        | 3              |  |
| SHS 30V<br>SHS 30LV   | 42               | 60    | 106<br>131 | 40                  | 40<br>60  | M8×8   | 80<br>105      | 8    | 35   | 8    | 12  | B-M6F         | 5.8            | 6                          | 5.2            |  |
| SHS 35V<br>SHS 35LV   | 48               | 70    | 122<br>152 | 50                  | 50<br>72  | M8×10  | 93<br>123      | 14.7 | 40.5 | 8    | 12  | B-M6F         | 6.5            | 5.5                        | 5.2            |  |
| SHS 45V<br>SHS 45LV   | 60               | 86    | 140<br>174 | 60                  | 60<br>80  | M10×15 | 106<br>140     | 14.9 | 51.1 | 10.5 | 16  | B-PT1/8       | 8              | 8                          | 5.2            |  |
| SHS 55V<br>SHS 55LV   | 70               | 100   | 171<br>213 | 75                  | 75<br>95  | M12×15 | 131<br>173     | 19.4 | 57.3 | 11   | 16  | B-PT1/8       | 10             | 8                          | 5.2            |  |
| SHS 65V<br>SHS 65LV   | 90               | 126   | 221<br>272 | 76                  | 70<br>120 | M16×20 | 175<br>226     | 19.5 | 71   | 19   | 16  | B-PT1/8       | 10             | 12                         | 5.2            |  |

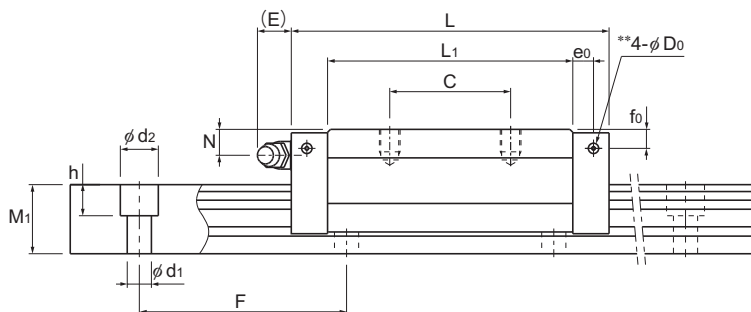
## Model number coding

|              |                  |                                        |                    |                                                |                              |                          |                            |                 |                         |                                |                                                     |            |
|--------------|------------------|----------------------------------------|--------------------|------------------------------------------------|------------------------------|--------------------------|----------------------------|-----------------|-------------------------|--------------------------------|-----------------------------------------------------|------------|
| <b>SHS25</b> | <b>V</b>         | <b>2</b>                               | <b>QZ</b>          | <b>KKHH</b>                                    | <b>C1</b>                    | <b>M</b>                 | <b>+1240L</b>              | <b>P</b>        | <b>Z</b>                | <b>T</b>                       | <b>M</b>                                            | <b>-II</b> |
| Model number | Type of LM block | No. of LM blocks used on the same rail | With QZ Lubricator | Contamination protection accessory symbol (*1) | Radial clearance symbol (*2) | Stainless steel LM block | LM rail length (in mm)     | With steel tape | Stainless steel LM rail | Symbol for LM rail jointed use | Symbol for No. of rails used on the same plane (*4) |            |
|              |                  |                                        |                    | Normal (No symbol)                             | Light preload (C1)           |                          | Accuracy symbol (*3)       |                 |                         |                                |                                                     |            |
|              |                  |                                        |                    | Medium preload (C0)                            |                              |                          | Normal grade (No Symbol)   |                 |                         |                                |                                                     |            |
|              |                  |                                        |                    |                                                |                              |                          | High accuracy grade (H)    |                 |                         |                                |                                                     |            |
|              |                  |                                        |                    |                                                |                              |                          | Precision grade (P)        |                 |                         |                                |                                                     |            |
|              |                  |                                        |                    |                                                |                              |                          | Super precision grade (SP) |                 |                         |                                |                                                     |            |
|              |                  |                                        |                    |                                                |                              |                          | Ultra precision grade (UP) |                 |                         |                                |                                                     |            |

(\*1) See contamination protection accessory on **■1-516**. (\*2) See **■1-71**. (\*3) See **■1-77**. (\*4) See **■1-13**.

Note) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.)

Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.



Unit: mm

|  | H <sub>3</sub> | LM rail dimensions           |                |                |     |                                     |                | Basic load rating |                | Static permissible moment kN·m* |               |                |               |                | Mass         |         |
|--|----------------|------------------------------|----------------|----------------|-----|-------------------------------------|----------------|-------------------|----------------|---------------------------------|---------------|----------------|---------------|----------------|--------------|---------|
|  |                | Width                        | Height         | Pitch          |     |                                     | Length*        | C                 | C <sub>0</sub> | M <sub>A</sub>                  |               | M <sub>B</sub> |               | M <sub>C</sub> | LM block     | LM rail |
|  |                | W <sub>1</sub><br>0<br>-0.05 | W <sub>2</sub> | M <sub>1</sub> | F   | d <sub>1</sub> × d <sub>2</sub> × h | Max            | kN                | kN             | 1 block                         | Double blocks | 1 block        | Double blocks | 1 block        | kg           | kg/m    |
|  | 3              | 15                           | 9.5            | 13             | 60  | 4.5 × 7.5 × 5.3                     | 3000<br>(1240) | 14.2              | 24.2           | 0.175                           | 0.898         | 0.175          | 0.898         | 0.16           | 0.19         | 1.3     |
|  | 3              | 15                           | 9.5            | 13             | 60  | 4.5 × 7.5 × 5.3                     | 3000<br>(1240) | 17.2              | 31.9           | 0.296                           | 1.43          | 0.296          | 1.43          | 0.212          | 0.22         | 1.3     |
|  | 4.6            | 20                           | 12             | 16.5           | 60  | 6 × 9.5 × 8.5                       | 3000<br>(1480) | 22.3              | 38.4           | 0.334                           | 1.75          | 0.334          | 1.75          | 0.361          | 0.35         | 2.3     |
|  | 4.6            | 20                           | 12             | 16.5           | 60  | 6 × 9.5 × 8.5                       | 3000<br>(1480) | 28.1              | 50.3           | 0.568                           | 2.8           | 0.568          | 2.8           | 0.473          | 0.46         | 2.3     |
|  | 5.8            | 23                           | 12.5           | 20             | 60  | 7 × 11 × 9                          | 3000<br>(2020) | 31.7              | 52.4           | 0.566                           | 2.75          | 0.566          | 2.75          | 0.563          | 0.54         | 3.2     |
|  | 5.8            | 23                           | 12.5           | 20             | 60  | 7 × 11 × 9                          | 3000<br>(2020) | 36.8              | 64.7           | 0.848                           | 3.98          | 0.848          | 3.98          | 0.696          | 0.67         | 3.2     |
|  | 7              | 28                           | 16             | 23             | 80  | 9 × 14 × 12                         | 3000           | 44.8<br>54.2      | 66.6<br>88.8   | 0.786<br>1.36                   | 4.08<br>6.6   | 0.786<br>1.36  | 4.08<br>6.6   | 0.865<br>1.15  | 0.94<br>1.16 | 4.5     |
|  | 7.5            | 34                           | 18             | 26             | 80  | 9 × 14 × 12                         | 3000           | 62.3<br>72.9      | 96.6<br>127    | 1.38<br>2.34                    | 6.76<br>10.9  | 1.38<br>2.34   | 6.76<br>10.9  | 1.53<br>2.01   | 1.4<br>1.84  | 6.2     |
|  | 8.9            | 45                           | 20.5           | 32             | 105 | 14 × 20 × 17                        | 3090           | 82.8<br>100       | 126<br>166     | 2.05<br>3.46                    | 10.1<br>16.3  | 2.05<br>3.46   | 10.1<br>16.3  | 2.68<br>3.53   | 2.54<br>3.19 | 10.4    |
|  | 12.7           | 53                           | 23.5           | 38             | 120 | 16 × 23 × 20                        | 3060           | 128<br>161        | 197<br>259     | 3.96<br>6.68                    | 19.3<br>31.1  | 3.96<br>6.68   | 19.3<br>31.1  | 4.9<br>6.44    | 4.05<br>5.23 | 14.5    |
|  | 19             | 63                           | 31.5           | 53             | 150 | 18 × 26 × 22                        | 3000           | 205<br>253        | 320<br>408     | 8.26<br>13.3                    | 40.4<br>62.6  | 8.26<br>13.3   | 40.4<br>62.6  | 9.4<br>11.9    | 8.41<br>10.7 | 23.7    |

Note) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-102**.)

Static permissible moment\* 1 block: the static permissible moment with one LM block

Double blocks: static permissible moment when two LM blocks are in close contact with each other

Total block length L : The total block length L shown in the table is the length with the dust proof parts, code UU or SS.

If other contamination protection accessories or lubricant equipment are installed, the total block length will increase.

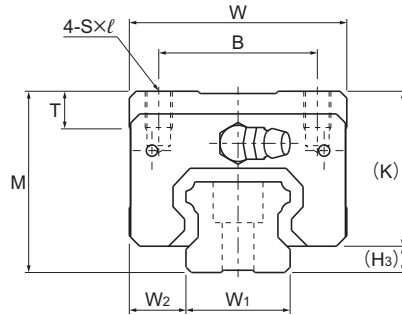
(See **A1-491** or **A1-512**)

\*\* A pilot hole for side nipples, when a grease nipple for a model equipped with LaCS or QZ Lubricator is needed.

Pilot holes for side nipples are not drilled through for models other than those stated above.

For grease nipple mount machining, contact THK.

# Models SHS-R, SHS-RM, SHS-LR and SHS-LRM



| Model No.             | Outer dimensions |       |            | LM block dimensions |          |        |                |      |      |      |               |                | Pilot hole for side nipple |                |     |
|-----------------------|------------------|-------|------------|---------------------|----------|--------|----------------|------|------|------|---------------|----------------|----------------------------|----------------|-----|
|                       | Height           | Width | Length     |                     |          |        |                |      |      |      | Grease nipple |                |                            |                |     |
|                       | M                | W     | L          | B                   | C        | S×ℓ    | L <sub>1</sub> | T    | K    | N    | E             | e <sub>o</sub> | f <sub>o</sub>             | D <sub>o</sub> |     |
| SHS 15R<br>SHS 15RM   | 28               | 34    | 64.4       | 26                  | 26       | M4×5   | 48             | 5.9  | 25   | 9.5  | 5.5           | PB1021B        | 4                          | 8              | 3   |
| SHS 25R<br>SHS 25RM   | 40               | 48    | 92         | 35                  | 35       | M6×8   | 71             | 8    | 34.2 | 11.5 | 12            | B-M6F          | 6                          | 9.5            | 3   |
| SHS 25LR<br>SHS 25LRM | 40               | 48    | 109        | 35                  | 50       | M6×8   | 88             | 8    | 34.2 | 11.5 | 12            | B-M6F          | 6                          | 9.5            | 3   |
| SHS 30R<br>SHS 30LR   | 45               | 60    | 106<br>131 | 40                  | 40<br>60 | M8×10  | 80<br>105      | 8    | 38   | 11   | 12            | B-M6F          | 5.8                        | 9              | 5.2 |
| SHS 35R<br>SHS 35LR   | 55               | 70    | 122<br>152 | 50                  | 50<br>72 | M8×12  | 93<br>123      | 14.7 | 47.5 | 15   | 12            | B-M6F          | 6.5                        | 12.5           | 5.2 |
| SHS 45R<br>SHS 45LR   | 70               | 86    | 140<br>174 | 60                  | 60<br>80 | M10×17 | 106<br>140     | 14.9 | 61.1 | 20.5 | 16            | B-PT1/8        | 8                          | 18             | 5.2 |
| SHS 55R<br>SHS 55LR   | 80               | 100   | 171<br>213 | 75                  | 75<br>95 | M12×18 | 131<br>173     | 19.4 | 67.3 | 21   | 16            | B-PT1/8        | 10                         | 18             | 5.2 |

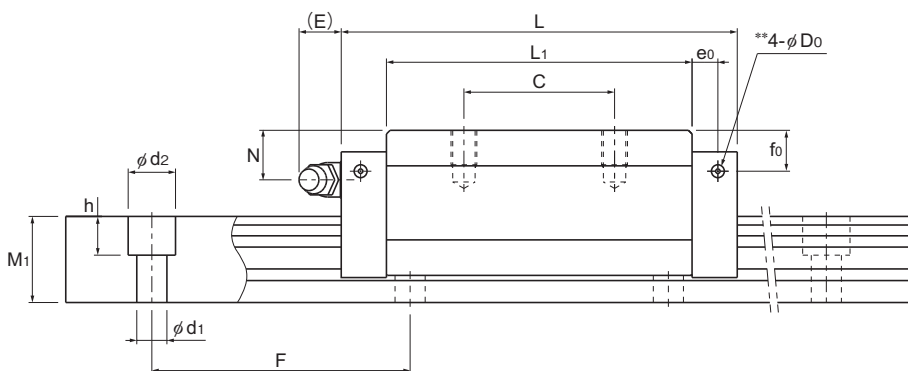
## Model number coding

|              |                                        |                    |                                                |                          |                            |                            |                         |                                |                                          |          |            |
|--------------|----------------------------------------|--------------------|------------------------------------------------|--------------------------|----------------------------|----------------------------|-------------------------|--------------------------------|------------------------------------------|----------|------------|
| <b>SHS25</b> | <b>LR</b>                              | <b>2</b>           | <b>QZ</b>                                      | <b>KKHH</b>              | <b>C0</b>                  | <b>M</b>                   | <b>+1240L</b>           | <b>P</b>                       | <b>T</b>                                 | <b>M</b> | <b>-II</b> |
| Model number | Type of LM block                       | With QZ Lubricator | Contamination protection accessory symbol (*1) | Stainless steel LM block | LM rail length (in mm)     | Accuracy symbol (*3)       | Stainless steel LM rail | Symbol for LM rail jointed use | No. of rails used on the same plane (*4) |          |            |
|              | No. of LM blocks used on the same rail |                    | Radial clearance symbol (*2)                   |                          | Normal grade (No Symbol)   | High accuracy grade (H)    |                         |                                |                                          |          |            |
|              |                                        |                    | Normal (No symbol)                             |                          | Precision grade (P)        | Super precision grade (SP) |                         |                                |                                          |          |            |
|              |                                        |                    | Light preload (C1)                             |                          | Ultra precision grade (UP) |                            |                         |                                |                                          |          |            |
|              |                                        |                    | Medium preload (C0)                            |                          |                            |                            |                         |                                |                                          |          |            |

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-71**. (\*3) See **A1-77**. (\*4) See **A1-13**.

Note) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.)

Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.



Unit: mm

|  | H <sub>3</sub> | LM rail dimensions           |                |                |     |                                     |                | Basic load rating |                | Static permissible moment kN·m* |               |                |               |                | Mass         |         |
|--|----------------|------------------------------|----------------|----------------|-----|-------------------------------------|----------------|-------------------|----------------|---------------------------------|---------------|----------------|---------------|----------------|--------------|---------|
|  |                | Width                        | Height         | Pitch          |     | Length*                             |                | C                 | C <sub>0</sub> | M <sub>A</sub>                  |               | M <sub>B</sub> |               | M <sub>C</sub> | LM block     | LM rail |
|  |                | W <sub>1</sub><br>0<br>-0.05 | W <sub>2</sub> | M <sub>1</sub> | F   | d <sub>1</sub> × d <sub>2</sub> × h | Max            | kN                | kN             | 1 block                         | Double blocks | 1 block        | Double blocks | 1 block        | kg           | kg/m    |
|  | 3              | 15                           | 9.5            | 13             | 60  | 4.5 × 7.5 × 5.3                     | 3000<br>(1240) | 14.2              | 24.2           | 0.175                           | 0.898         | 0.175          | 0.898         | 0.16           | 0.22         | 1.3     |
|  | 5.8            | 23                           | 12.5           | 20             | 60  | 7 × 11 × 9                          | 3000<br>(2020) | 31.7              | 52.4           | 0.566                           | 2.75          | 0.566          | 2.75          | 0.563          | 0.66         | 3.2     |
|  | 5.8            | 23                           | 12.5           | 20             | 60  | 7 × 11 × 9                          | 3000<br>(2020) | 36.8              | 64.7           | 0.848                           | 3.98          | 0.848          | 3.98          | 0.696          | 0.8          | 3.2     |
|  | 7              | 28                           | 16             | 23             | 80  | 9 × 14 × 12                         | 3000           | 44.8<br>54.2      | 66.6<br>88.8   | 0.786<br>1.36                   | 4.08<br>6.6   | 0.786<br>1.36  | 4.08<br>6.6   | 0.865<br>1.15  | 1.04<br>1.36 | 4.5     |
|  | 7.5            | 34                           | 18             | 26             | 80  | 9 × 14 × 12                         | 3000           | 62.3<br>72.9      | 96.6<br>127    | 1.38<br>2.34                    | 6.76<br>10.9  | 1.38<br>2.34   | 6.76<br>10.9  | 1.53<br>2.01   | 1.8<br>2.34  | 6.2     |
|  | 8.9            | 45                           | 20.5           | 32             | 105 | 14 × 20 × 17                        | 3090           | 82.8<br>100       | 126<br>166     | 2.05<br>3.46                    | 10.1<br>16.3  | 2.05<br>3.46   | 10.1<br>16.3  | 2.68<br>3.53   | 3.24<br>4.19 | 10.4    |
|  | 12.7           | 53                           | 23.5           | 38             | 120 | 16 × 23 × 20                        | 3060           | 128<br>161        | 197<br>259     | 3.96<br>6.68                    | 19.3<br>31.1  | 3.96<br>6.68   | 19.3<br>31.1  | 4.9<br>6.44    | 5.05<br>6.57 | 14.5    |

Note) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-102**)

Static permissible moment\* 1 block: the static permissible moment with one LM block

Double blocks: static permissible moment when two LM blocks are in close contact with each other

Total block length L

: The total block length L shown in the table is the length with the dust proof parts, code UU or SS. If other contamination protection accessories or lubricant equipment are installed, the total block length will increase.

(See **A1-491** or **A1-512**)

\*\* A pilot hole for side nipples, when a grease nipple for a model equipped with LaCS or QZ Lubricator is needed.

Pilot holes for side nipples are not drilled through for models other than those stated above.

For grease nipple mount machining, contact THK.

# Standard Length and Maximum Length of the LM Rail

Table1 shows the standard and maximum lengths of the SHS model rail. If a rail length longer than the listed max length is required, rails may be jointed to meet the overall length. Contact THK for details. For special rail lengths, it is recommended to use a value corresponding to the G,g dimension from the table. As the G,g dimension increases, this portion becomes less stable, and the accuracy performance is severely impacted.

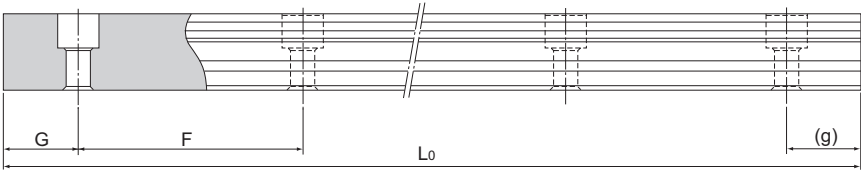


Table1 Standard Length and Maximum Length of the LM Rail for Model SHS

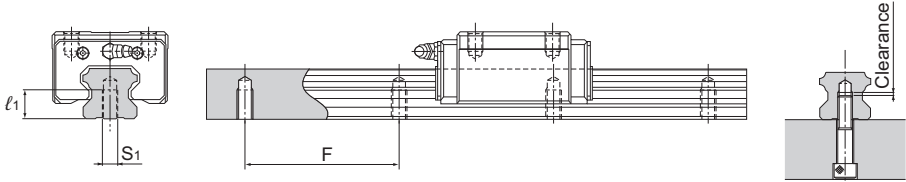
Unit: mm

| Model No.                                 | SHS 15         | SHS 20         | SHS 25         | SHS 30 | SHS 35 | SHS 45 | SHS 55 | SHS 65 |
|-------------------------------------------|----------------|----------------|----------------|--------|--------|--------|--------|--------|
| LM rail standard length (L <sub>0</sub> ) | 160            | 220            | 220            | 280    | 280    | 570    | 780    | 1270   |
|                                           | 220            | 280            | 280            | 360    | 360    | 675    | 900    | 1570   |
|                                           | 280            | 340            | 340            | 440    | 440    | 780    | 1020   | 2020   |
|                                           | 340            | 400            | 400            | 520    | 520    | 885    | 1140   | 2620   |
|                                           | 400            | 460            | 460            | 600    | 600    | 990    | 1260   |        |
|                                           | 460            | 520            | 520            | 680    | 680    | 1095   | 1380   |        |
|                                           | 520            | 580            | 580            | 760    | 760    | 1200   | 1500   |        |
|                                           | 580            | 640            | 640            | 840    | 840    | 1305   | 1620   |        |
|                                           | 640            | 700            | 700            | 920    | 920    | 1410   | 1740   |        |
|                                           | 700            | 760            | 760            | 1000   | 1000   | 1515   | 1860   |        |
|                                           | 760            | 820            | 820            | 1080   | 1080   | 1620   | 1980   |        |
|                                           | 820            | 940            | 940            | 1160   | 1160   | 1725   | 2100   |        |
|                                           | 940            | 1000           | 1000           | 1240   | 1240   | 1830   | 2220   |        |
|                                           | 1000           | 1060           | 1060           | 1320   | 1320   | 1935   | 2340   |        |
|                                           | 1060           | 1120           | 1120           | 1400   | 1400   | 2040   | 2460   |        |
|                                           | 1120           | 1180           | 1180           | 1480   | 1480   | 2145   | 2580   |        |
|                                           | 1180           | 1240           | 1240           | 1560   | 1560   | 2250   | 2700   |        |
|                                           | 1240           | 1360           | 1300           | 1640   | 1640   | 2355   | 2820   |        |
|                                           | 1360           | 1480           | 1360           | 1720   | 1720   | 2460   | 2940   |        |
|                                           | 1480           | 1600           | 1420           | 1800   | 1800   | 2565   | 3060   |        |
|                                           | 1600           | 1720           | 1480           | 1880   | 1880   | 2670   |        |        |
|                                           |                | 1840           | 1540           | 1960   | 1960   | 2775   |        |        |
|                                           |                | 1960           | 1600           | 2040   | 2040   | 2880   |        |        |
|                                           |                | 2080           | 1720           | 2200   | 2200   | 2985   |        |        |
|                                           |                | 2200           | 1840           | 2360   | 2360   | 3090   |        |        |
|                                           |                |                | 1960           | 2520   | 2520   |        |        |        |
|                                           |                |                | 2080           | 2680   | 2680   |        |        |        |
|                                           |                |                | 2200           | 2840   | 2840   |        |        |        |
|                                           |                |                | 2320           | 3000   | 3000   |        |        |        |
|                                           |                |                | 2440           |        |        |        |        |        |
| Standard pitch F                          | 60             | 60             | 60             | 80     | 80     | 105    | 120    | 150    |
| G,g                                       | 20             | 20             | 20             | 20     | 20     | 22.5   | 30     | 35     |
| Max length                                | 3000<br>(1240) | 3000<br>(1480) | 3000<br>(2020) | 3000   | 3000   | 3090   | 3060   | 3000   |

Note1) The maximum length varies with accuracy grades. Contact THK for details.  
Note2) If jointed rails are not allowed and a greater length than the maximum values above is required, contact THK.  
Note3) The figures in the parentheses indicate the maximum lengths of stainless steel models.

## Tapped-hole LM Rail Type of Model SHS

SHS model rails also include a type where the LM rail is tapped from the bottom. This type is useful when mounting from the bottom of the base and when increased contamination protection is desired.



- (1) Determine the bolt length so that a clearance of 2 to 5 mm is secured between the bolt end and the bottom of the tap (effective tap depth). (See figure above.)
- (2) For standard pitches of the taps, see Table1 on **A1-102**.

Table2 Dimensions of the LM Rail Tap

Unit: mm

| Model No. | $S_1$ | Effective tap depth $l_1$ |
|-----------|-------|---------------------------|
| SHS 15    | M5    | 8                         |
| SHS 20    | M6    | 10                        |
| SHS 25    | M6    | 12                        |
| SHS 30    | M8    | 15                        |
| SHS 35    | M8    | 17                        |
| SHS 45    | M12   | 20                        |
| SHS 55    | M14   | 24                        |
| SHS 65    | M20   | 30                        |

### Model number coding

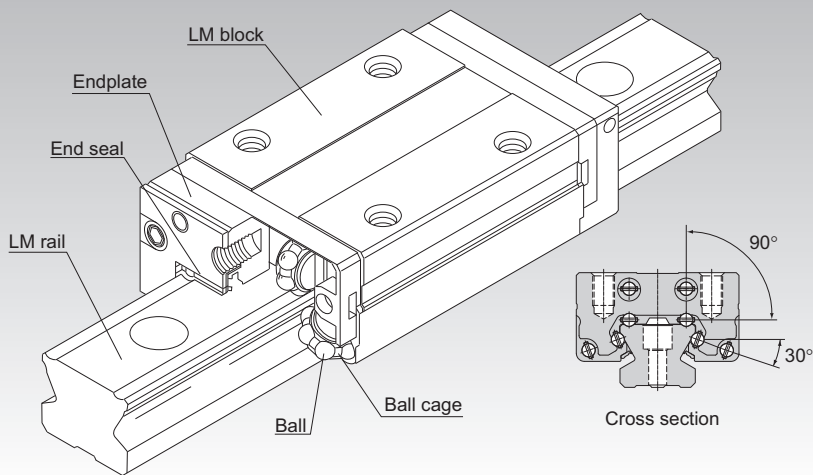
**SHS35 LC2UU +1000LH K**

Symbol for  
tapped-hole LM rail type

# SSR



## Caged Ball LM Guide Radial Type Model SSR



\*For the Ball Cage, see **A1-88**.

**Point of Selection** **A1-10**

**Point of Design** **A1-454**

**Options** **A1-477**

**Model No.** **A1-543**

**Precautions on Use** **A1-549**

**Accessories for Lubrication** **A24-1**

**Mounting Procedure and Maintenance** **B1-89**

Equivalent moment factor **A1-43**

Rated Loads in All Directions **A1-59**

Equivalent factor in each direction **A1-61**

Radial Clearance **A1-71**

Accuracy Standards **A1-77**

Shoulder Height of the Mounting Base and the Corner Radius **A1-467**

Permissible Error of the Mounting Surface **A1-470**

Dimensions of Each Model with an Option Attached **A1-491**

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## Structure and Features

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Balls roll in four rows of raceways precision-ground on an LM rail and an LM block, and ball cages and endplates incorporated in the LM block allow the balls to circulate.

Use of the ball cage eliminates friction between balls and increases grease retention, thus to achieve low noise, high speed and long-term maintenance-free operation.

### [Compact, Radial Type]

Since it is a compactly designed model that has a low sectional height and a ball contact structure in the radial direction, this model is optimal for horizontal guide units.

### [Superb Planar Running Accuracy]

Use of a ball contact structure that is highly resistant to loads in the radial direction minimizes radial displacement under radial loads and provides stable, highly accurate motion.

### [Self-adjustment Capability]

The self-adjustment capability through front-to-front configuration of THK's unique circular-arc grooves (DF set) enables a mounting error to be absorbed even under a preload, thus to achieve highly accurate, smooth straight motion.

### [Stainless Steel Type Also Available]

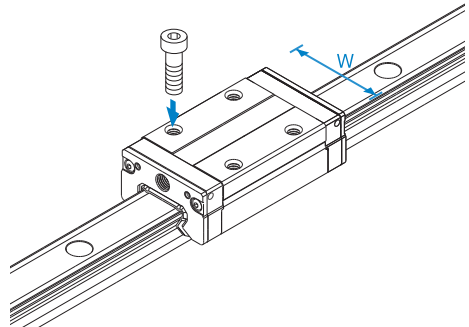
A special type whose LM block, LM rail, and balls are made of stainless steel is also available.

## Types and Features

### Model SSR-XW

With this type, the LM block has a smaller width (W) and tapped holes.

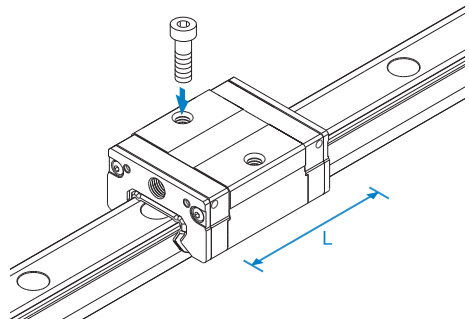
Specification Table⇒ **A1-107**



### Model SSR-XV

This type has the same cross-sectional shape as SSR-XW but has a shorter overall LM block length (L).

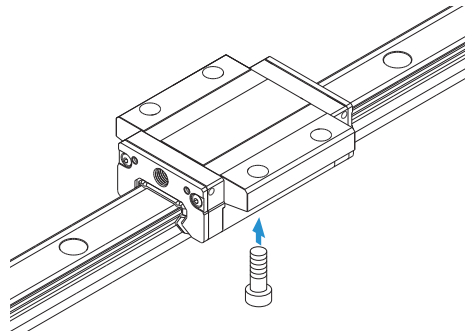
Specification Table⇒ **A1-110**



### Model SSR-XTB

Since the LM block can be mounted from the bottom, this type is optimal for applications where through holes for mounting bolts cannot be drilled on the table.

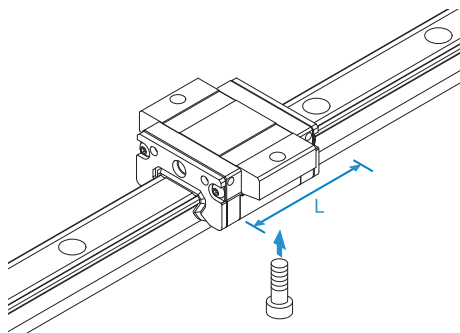
Specification Table⇒ **A1-112**



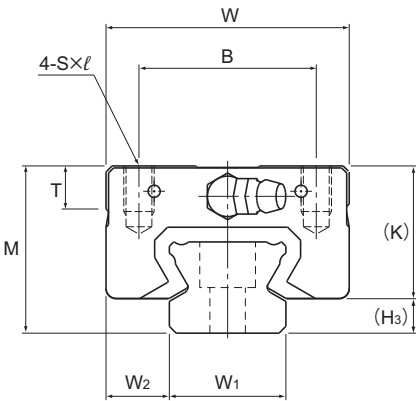
## Model SSR-XSB

This type has the same cross-sectional shape as SSR-XTB but has a shorter overall LM block length (L).

Specification Table⇒ **A1-114**



# Models SSR-XW and SSR-XWM



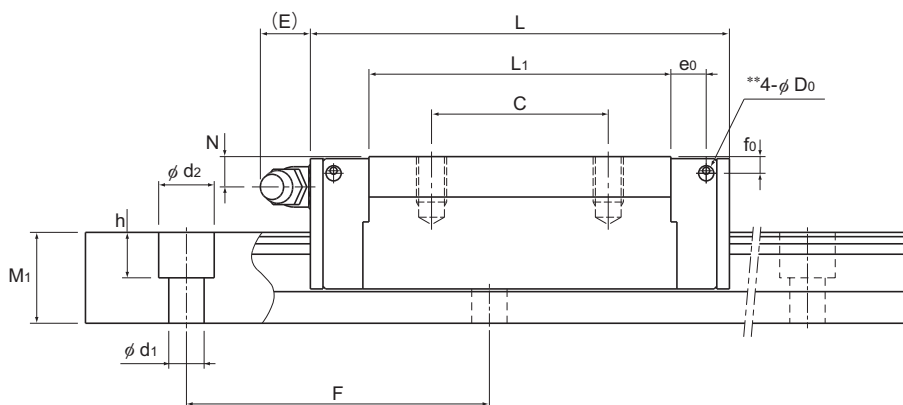
| Model No.             | Outer dimensions |       |        | LM block dimensions |    |       |                |      |      |     |     |                |                |                |               | H <sub>3</sub> |
|-----------------------|------------------|-------|--------|---------------------|----|-------|----------------|------|------|-----|-----|----------------|----------------|----------------|---------------|----------------|
|                       | Height           | Width | Length | B                   | C  | S×ℓ   | L <sub>1</sub> | T    | K    | N   | E   | f <sub>0</sub> | e <sub>0</sub> | D <sub>0</sub> | Grease nipple |                |
|                       | M                | W     | L      |                     |    |       |                |      |      |     |     |                |                |                |               |                |
| SSR 15XW<br>SSR 15XWM | 24               | 34    | 56.9   | 26                  | 26 | M4×7  | 39.9           | 6.5  | 19.5 | 4.5 | 5.5 | 2.7            | 4.5            | 3              | PB1021B       | 4.5            |
| SSR 20XW<br>SSR 20XWM | 28               | 42    | 66.5   | 32                  | 32 | M5×8  | 46.6           | 8.2  | 22   | 5.5 | 12  | 2.9            | 5.2            | 3              | B-M6F         | 6              |
| SSR 25XW<br>SSR 25XWM | 33               | 48    | 83     | 35                  | 35 | M6×9  | 59.8           | 8.4  | 26.2 | 6   | 12  | 3.3            | 6.8            | 3              | B-M6F         | 6.8            |
| SSR 30XW<br>SSR 30XWM | 42               | 60    | 97     | 40                  | 40 | M8×12 | 70.7           | 11.3 | 32.5 | 8   | 12  | 4.5            | 7.6            | 4              | B-M6F         | 9.5            |
| SSR 35XW              | 48               | 70    | 110.9  | 50                  | 50 | M8×12 | 80.5           | 13   | 36.5 | 8.5 | 12  | 4.7            | 8.8            | 4              | B-M6F         | 11.5           |

Note) The M in the model number symbol indicates that the LM block, LM rail and balls are made of stainless steel.  
The stainless steel provides excellent corrosion and environmental resistance.

## Model number coding

|               |                                        |                    |                                                |                          |                        |                           |                          |                                             |                                                       |                         |                                |                                                     |
|---------------|----------------------------------------|--------------------|------------------------------------------------|--------------------------|------------------------|---------------------------|--------------------------|---------------------------------------------|-------------------------------------------------------|-------------------------|--------------------------------|-----------------------------------------------------|
| <b>SSR25X</b> | <b>W</b>                               | <b>2</b>           | <b>QZ</b>                                      | <b>UU</b>                | <b>C1</b>              | <b>M</b>                  | <b>+1200L</b>            | <b>Y</b>                                    | <b>P</b>                                              | <b>T</b>                | <b>M</b>                       | <b>-II</b>                                          |
| Model number  | Type of LM block                       | With QZ lubricator | Contamination protection accessory symbol (*1) | Stainless steel LM block | LM rail length (in mm) | Applied to only 15 and 25 | Accuracy symbol (*3)     | High accuracy grade (H)/Precision grade (P) | Super precision grade (SP)/Ultra precision grade (UP) | Stainless steel LM rail | Symbol for LM rail jointed use | Symbol for No. of rails used on the same plane (*4) |
|               | No. of LM blocks used on the same rail |                    | Radial clearance symbol (*2)                   | Normal (No symbol)       | Light preload (C1)     |                           | Normal grade (No Symbol) |                                             |                                                       |                         |                                |                                                     |

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-71**. (\*3) See **A1-77**. (\*4) See **A1-13**.  
Note) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.)  
Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.



Unit: mm

| LM rail dimensions  |        |       |    |                             |                | Basic load rating |                | Static permissible moment $\text{kN}\cdot\text{m}^*$ |               |         |               |         | Mass     |         |
|---------------------|--------|-------|----|-----------------------------|----------------|-------------------|----------------|------------------------------------------------------|---------------|---------|---------------|---------|----------|---------|
| Width               | Height | Pitch |    | Length*                     |                | C                 | C <sub>0</sub> | $M_A$                                                |               | $M_B$   |               | $M_C$   | LM block | LM rail |
| $W_1$<br>$\pm 0.05$ | $W_2$  | $M_1$ | F  | $d_1 \times d_2 \times h$   | Max            | kN                | kN             | 1 block                                              | Double blocks | 1 block | Double blocks | 1 block | kg       | kg/m    |
| 15                  | 9.5    | 12.5  | 60 | $4.5 \times 7.5 \times 5.3$ | 3000<br>(1240) | 14.7              | 16.5           | 0.0792                                               | 0.44          | 0.0486  | 0.274         | 0.0962  | 0.15     | 1.2     |
| 20                  | 11     | 15.5  | 60 | $6 \times 9.5 \times 8.5$   | 3000<br>(1480) | 19.6              | 23.4           | 0.138                                                | 0.723         | 0.0847  | 0.448         | 0.18    | 0.25     | 2.1     |
| 23                  | 12.5   | 18    | 60 | $7 \times 11 \times 9$      | 3000<br>(2020) | 31.5              | 36.4           | 0.258                                                | 1.42          | 0.158   | 0.884         | 0.33    | 0.4      | 2.7     |
| 28                  | 16     | 23    | 80 | $7 \times 11 \times 9$      | 3000<br>(2520) | 46.5              | 52.7           | 0.446                                                | 2.4           | 0.274   | 1.49          | 0.571   | 0.8      | 4.3     |
| 34                  | 18     | 27.5  | 80 | $9 \times 14 \times 12$     | 3000           | 64.6              | 71.6           | 0.711                                                | 3.72          | 0.437   | 2.31          | 0.936   | 1.1      | 6.4     |

Note1) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-116**.)  
 Static permissible moment\* 1 block: the static permissible moment with one LM block

Double blocks: static permissible moment when two LM blocks are in close contact with each other  
 Total block length L : The total block length L shown in the table is the length with the dust proof parts, code UU or SS.  
 If other contamination protection accessories or lubricant equipment are installed, the total block length will increase.  
 (See **A1-491** or **A1-512**)

\*\* A pilot hole for side nipples, when a grease nipple for a model equipped with LaCS or QZ Lubricator is needed.  
 Pilot holes for side nipples are not drilled through for models other than those stated above.

For grease nipple mount machining, contact THK.

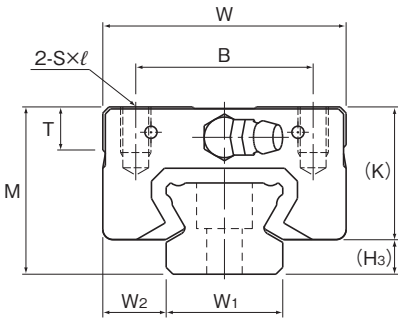
Note2) For models SSR15 and 25, two types of rails with different mounting hole dimensions are offered (see Table1).  
 When, replacing this model with model SR, pay attention to the mounting hole dimension of the LM rail.  
 Contact THK for details.

Note3) The basic load rating in the dimension table is for a load in the radial direction. Use Table7 on **A1-59** to calculate the load rating for loads in the reverse radial direction or lateral direction.

Table1 The dimension of the rail mounting hole

| Model No. | Standard rail     | Semi-Standard rail |
|-----------|-------------------|--------------------|
| SSR 15    | For M4 (Symbol Y) | For M3 (No symbol) |
| SSR 25    | For M6 (Symbol Y) | For M5 (No symbol) |

# Models SSR-XV and SSR-XVM



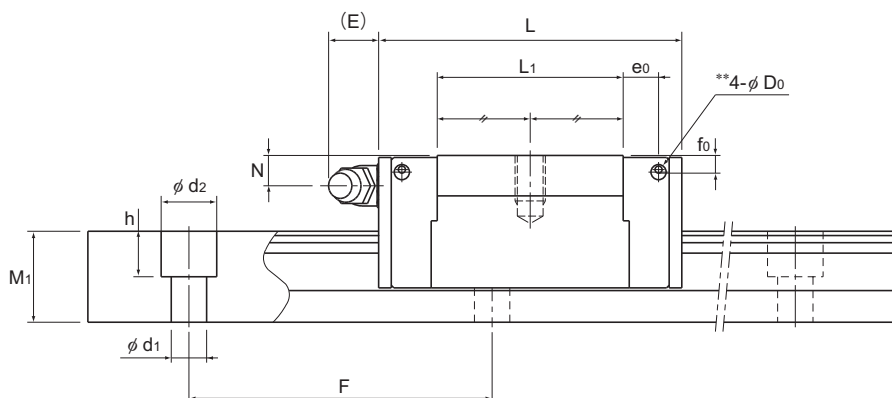
| Model No.             | Outer dimensions |       |        | LM block dimensions |       |                |      |      |     |     |                |                |                |         | Grease nipple | H <sub>3</sub> |
|-----------------------|------------------|-------|--------|---------------------|-------|----------------|------|------|-----|-----|----------------|----------------|----------------|---------|---------------|----------------|
|                       | Height           | Width | Length |                     |       |                |      |      |     |     |                |                |                |         |               |                |
|                       | M                | W     | L      | B                   | S×ℓ   | L <sub>1</sub> | T    | K    | N   | E   | f <sub>0</sub> | e <sub>0</sub> | D <sub>0</sub> |         |               |                |
| SSR 15XV<br>SSR 15XVM | 24               | 34    | 40.3   | 26                  | M4×7  | 23.3           | 6.5  | 19.5 | 4.5 | 5.5 | 2.7            | 4.5            | 3              | PB1021B | 4.5           |                |
| SSR 20XV<br>SSR 20XVM | 28               | 42    | 47.7   | 32                  | M5×8  | 27.8           | 8.2  | 22   | 5.5 | 12  | 2.9            | 5.2            | 3              | B-M6F   | 6             |                |
| SSR 25XV<br>SSR 25XVM | 33               | 48    | 60     | 35                  | M6×9  | 36.8           | 8.4  | 26.2 | 6   | 12  | 3.3            | 6.8            | 3              | B-M6F   | 6.8           |                |
| SSR 30XV<br>SSR 30XVM | 42               | 60    | 66.7   | 40                  | M8×12 | 40.4           | 11.5 | 32.5 | 8   | 12  | 4.5            | 7.6            | 4              | B-M6F   | 9.5           |                |
| SSR 35XV              | 48               | 70    | 77.5   | 50                  | M8×12 | 47.1           | 16.2 | 36.5 | 8.5 | 12  | 4.7            | 8.8            | 4              | B-M6F   | 11.5          |                |

Note) The M in the model number symbol indicates that the LM block, LM rail and balls are made of stainless steel.  
The stainless steel provides excellent corrosion and environmental resistance.

## Model number coding

|              |                                        |                    |                                                                          |                          |                        |                           |                                                                                                                                                          |                                |                         |                                                     |   |      |
|--------------|----------------------------------------|--------------------|--------------------------------------------------------------------------|--------------------------|------------------------|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|-------------------------|-----------------------------------------------------|---|------|
| SSR25X       | V                                      | 2                  | QZ                                                                       | UU                       | C1                     | M                         | +1200L                                                                                                                                                   | Y                              | P                       | T                                                   | M | -III |
| Model number | Type of LM block                       | With QZ lubricator | Contamination protection accessory symbol (*1)                           | Stainless steel LM block | LM rail length (in mm) | Applied to only 15 and 25 | Accuracy symbol (*3)<br>Normal grade (No Symbol)<br>High accuracy grade (H)/Precision grade (P)<br>Super precision grade (SP)/Ultra precision grade (UP) | Symbol for LM rail jointed use | Stainless steel LM rail | Symbol for No. of rails used on the same plane (*4) |   |      |
|              | No. of LM blocks used on the same rail |                    | Radial clearance symbol (*2)<br>Normal (No symbol)<br>Light preload (C1) |                          |                        |                           |                                                                                                                                                          |                                |                         |                                                     |   |      |

(\*1) See contamination protection accessory on A1-516. (\*2) See A1-71. (\*3) See A1-77. (\*4) See A1-13.  
Note) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 3 rails are used in parallel is 3 at a minimum.)  
Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.



Unit: mm

| LM rail dimensions      |                |                |    |                                   |                | Basic load rating |                | Static permissible moment kN·m* |               |                |               |                | Mass     |         |
|-------------------------|----------------|----------------|----|-----------------------------------|----------------|-------------------|----------------|---------------------------------|---------------|----------------|---------------|----------------|----------|---------|
| Width                   | Height         | Pitch          |    | Length*                           |                | C                 | C <sub>0</sub> | M <sub>A</sub>                  |               | M <sub>B</sub> |               | M <sub>C</sub> | LM block | LM rail |
| W <sub>1</sub><br>±0.05 | W <sub>2</sub> | M <sub>1</sub> | F  | d <sub>1</sub> ×d <sub>2</sub> ×h | Max            | kN                | kN             | 1 block                         | Double blocks | 1 block        | Double blocks | 1 block        | kg       | kg/m    |
| 15                      | 9.5            | 12.5           | 60 | 4.5×7.5×5.3                       | 3000<br>(1240) | 9.1               | 9.7            | 0.0303                          | 0.119         | 0.0189         | 0.122         | 0.0562         | 0.08     | 1.2     |
| 20                      | 11             | 15.5           | 60 | 6×9.5×8.5                         | 3000<br>(1480) | 13.4              | 14.4           | 0.0523                          | 0.336         | 0.0326         | 0.213         | 0.111          | 0.14     | 2.1     |
| 23                      | 12.5           | 18             | 60 | 7×11×9                            | 3000<br>(2020) | 21.7              | 22.5           | 0.104                           | 0.661         | 0.0652         | 0.419         | 0.204          | 0.23     | 2.7     |
| 28                      | 16             | 23             | 80 | 7×11×9                            | 3000<br>(2020) | 34.8              | 34.4           | 0.186                           | 1.12          | 0.116          | 0.711         | 0.376          | 0.43     | 4.3     |
| 34                      | 18             | 27.5           | 80 | 9×14×12                           | 3000           | 48.3              | 46.7           | 0.295                           | 1.77          | 0.184          | 1.12          | 0.615          | 0.6      | 6.4     |

Note1) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-116**.)  
 Static permissible moment\* 1 block: the static permissible moment with one LM block

Double blocks: static permissible moment when two LM blocks are in close contact with each other  
 : The total block length L shown in the table is the length with the dust proof parts, code UU or SS.  
 If other contamination protection accessories or lubricant equipment are installed, the total block length will increase.  
 (See **A1-491** or **A1-512**)

\*\* A pilot hole for side nipples, when a grease nipple for a model equipped with LaCS or QZ Lubricator is needed.

Pilot holes for side nipples are not drilled through for models other than those stated above.

For grease nipple mount machining, contact THK.

Note2) For models SSR15 and 25, two types of rails with different mounting hole dimensions are offered (see Table1).

When, replacing this model with model SR, pay attention to the mounting hole dimension of the LM rail.

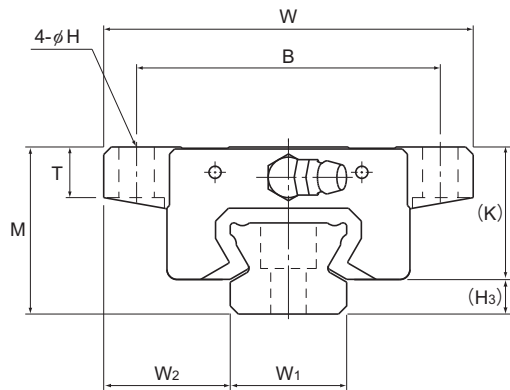
Contact THK for details.

Note3) The basic load rating in the dimension table is for a load in the radial direction. Use Table7 on **A1-59** to calculate the load rating for loads in the reverse radial direction or lateral direction.

Table1 The dimension of the rail mounting hole

| Model No. | Standard rail     | Semi-Standard rail |
|-----------|-------------------|--------------------|
| SSR 15    | For M4 (Symbol Y) | For M3 (No symbol) |
| SSR 25    | For M6 (Symbol Y) | For M5 (No symbol) |

# Model SSR-XTB

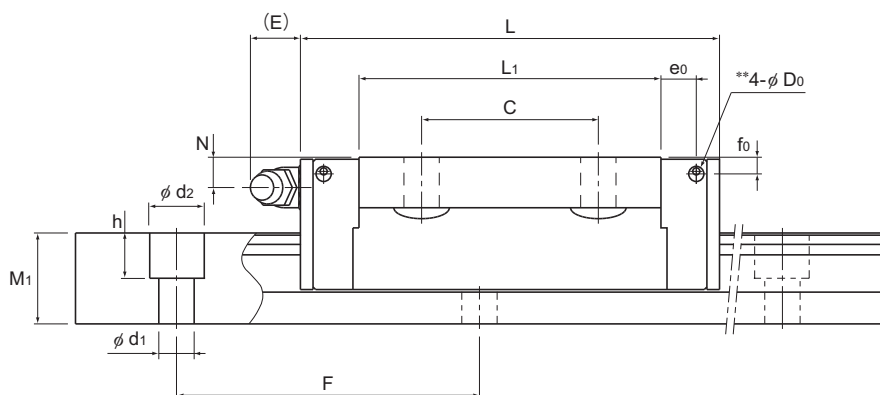


| Model No. | Outer dimensions |       |        | LM block dimensions |    |     |                |    |      |     |     |                |                |                |               | H <sub>3</sub> |
|-----------|------------------|-------|--------|---------------------|----|-----|----------------|----|------|-----|-----|----------------|----------------|----------------|---------------|----------------|
|           | Height           | Width | Length | B                   | C  | H   | L <sub>1</sub> | T  | K    | N   | E   | f <sub>0</sub> | e <sub>0</sub> | D <sub>0</sub> | Grease nipple |                |
|           | M                | W     | L      |                     |    |     |                |    |      |     |     |                |                |                |               |                |
| SSR 15XTB | 24               | 52    | 56.9   | 41                  | 26 | 4.5 | 39.9           | 7  | 19.5 | 4.5 | 5.5 | 2.7            | 4.5            | 3              | PB1021B       | 4.5            |
| SSR 20XTB | 28               | 59    | 66.5   | 49                  | 32 | 5.5 | 46.6           | 9  | 22   | 5.5 | 12  | 2.9            | 5.2            | 3              | B-M6F         | 6              |
| SSR 25XTB | 33               | 73    | 83     | 60                  | 35 | 7   | 59.8           | 10 | 26.2 | 6   | 12  | 3.3            | 6.8            | 3              | B-M6F         | 6.8            |
| SSR 30XTB | 42               | 90    | 97     | 72                  | 40 | 9   | 70.7           | 10 | 32.5 | 8   | 12  | 4.5            | 7.6            | 4              | B-M6F         | 9.5            |
| SSR 35XTB | 48               | 100   | 110.9  | 82                  | 50 | 9   | 80.5           | 13 | 36.5 | 8.5 | 12  | 4.7            | 8.8            | 4              | B-M6F         | 11.5           |

## Model number coding

| SSR15X       | TB               | 2                                      | QZ                 | UU                                             | C1                                                                                              | +820L                                                         | Y | P                                                                                                                                                              | T | -II                                                 |
|--------------|------------------|----------------------------------------|--------------------|------------------------------------------------|-------------------------------------------------------------------------------------------------|---------------------------------------------------------------|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-----------------------------------------------------|
| Model number | Type of LM block | No. of LM blocks used on the same rail | With QZ lubricator | Contamination protection accessory symbol (*1) | Radial clearance symbol (*2)<br>Normal (No symbol)<br>Light preload (C1)<br>Medium preload (C0) | LM rail length (in mm)<br><br>Applied to only 15 and 25 sizes |   | Symbol for LM rail jointed use                                                                                                                                 |   | Symbol for No. of rails used on the same plane (*4) |
|              |                  |                                        |                    |                                                |                                                                                                 |                                                               |   | Accuracy symbol (*3)<br>Normal grade (No Symbol)<br>High accuracy grade (H)<br>Precision grade (P)<br>Super precision grade (SP)<br>Ultra precision grade (UP) |   |                                                     |

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-71**. (\*3) See **A1-77**. (\*4) See **A1-13**.  
 Note) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.)  
 Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.



Unit: mm

| LM rail dimensions  |       |        |       |                             |                | Basic load rating |       | Static permissible moment $\text{kN}\cdot\text{m}^*$ |               |         |               |         | Mass     |         |
|---------------------|-------|--------|-------|-----------------------------|----------------|-------------------|-------|------------------------------------------------------|---------------|---------|---------------|---------|----------|---------|
| Width               |       | Height | Pitch |                             | Length*        | C                 | $C_0$ | $M_A$                                                |               | $M_B$   |               | $M_C$   | LM block | LM rail |
| $W_1$<br>$\pm 0.05$ | $W_2$ | $M_1$  | F     | $d_1 \times d_2 \times h$   | Max            | kN                | kN    | 1 block                                              | Double blocks | 1 block | Double blocks | 1 block | kg       | kg/m    |
| 15                  | 18.5  | 12.5   | 60    | $4.5 \times 7.5 \times 5.3$ | 3000<br>(1240) | 14.7              | 16.5  | 0.0792                                               | 0.44          | 0.0486  | 0.274         | 0.0962  | 0.19     | 1.2     |
| 20                  | 19.5  | 15.5   | 60    | $6 \times 9.5 \times 8.5$   | 3000<br>(1480) | 19.6              | 23.4  | 0.138                                                | 0.723         | 0.0847  | 0.448         | 0.18    | 0.31     | 2.1     |
| 23                  | 25    | 18     | 60    | $7 \times 11 \times 9$      | 3000<br>(2020) | 31.5              | 36.4  | 0.258                                                | 1.42          | 0.158   | 0.884         | 0.33    | 0.53     | 2.7     |
| 28                  | 31    | 23     | 80    | $7 \times 11 \times 9$      | 3000<br>(2020) | 46.5              | 52.7  | 0.446                                                | 2.4           | 0.274   | 1.49          | 0.571   | 0.87     | 4.3     |
| 34                  | 33    | 27.5   | 80    | $9 \times 14 \times 12$     | 3000           | 64.6              | 71.6  | 0.711                                                | 3.72          | 0.437   | 2.31          | 0.936   | 1.33     | 6.4     |

Note1) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-116**.)  
Static permissible moment\* 1 block: the static permissible moment with one LM block

Double blocks: static permissible moment when two LM blocks are in close contact with each other  
Total block length L : The total block length L shown in the table is the length with the dust proof parts, code UU or SS.  
If other contamination protection accessories or lubricant equipment are installed, the total block length will increase.  
(See **A1-491** or **A1-512**)

\*\* A pilot hole for side nipples, when a grease nipple for a model equipped with LaCS or QZ Lubricator is needed.  
Pilot holes for side nipples are not drilled through for models other than those stated above.

For grease nipple mount machining, contact THK.

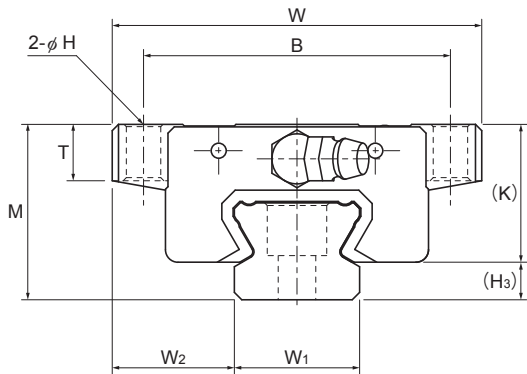
Note2) For models SSR15 and 25, two types of rails with different mounting hole dimensions are offered (see Table1).  
When replacing this model with model SR, pay attention to the mounting hole dimension of the LM rail.  
Contact THK for details.

Note3) The basic load rating in the dimension table is for a load in the radial direction. Use Table7 on **A1-59** to calculate the load rating for loads in the reverse radial direction or lateral direction.

Table1 The dimension of the rail mounting hole

| Model No. | Standard rail     | Semi-Standard rail |
|-----------|-------------------|--------------------|
| SSR 15    | For M4 (Symbol Y) | For M3 (No symbol) |
| SSR 25    | For M6 (Symbol Y) | For M5 (No symbol) |

# Model SSR-XSB

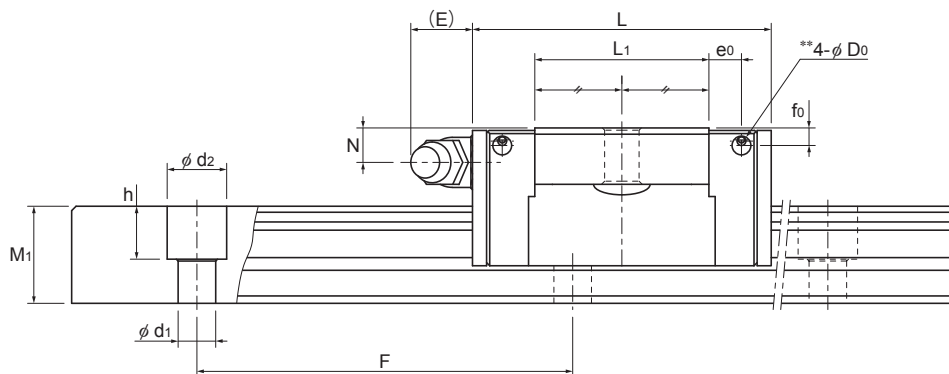


| Model No. | Outer dimensions |       |        | LM block dimensions |     |                |    |      |     |     |                |                |                |         | Grease nipple | H <sub>3</sub> |
|-----------|------------------|-------|--------|---------------------|-----|----------------|----|------|-----|-----|----------------|----------------|----------------|---------|---------------|----------------|
|           | Height           | Width | Length |                     |     |                |    |      |     |     |                |                |                |         |               |                |
|           | M                | W     | L      | B                   | H   | L <sub>1</sub> | T  | K    | N   | E   | f <sub>0</sub> | e <sub>0</sub> | D <sub>0</sub> |         |               |                |
| SSR 15XSB | 24               | 52    | 40.3   | 41                  | 4.5 | 23.3           | 7  | 19.5 | 4.5 | 5.5 | 2.7            | 4.5            | 3              | PB1021B | 4.5           |                |
| SSR 20XSB | 28               | 59    | 47.7   | 49                  | 5.5 | 27.8           | 9  | 22   | 5.5 | 12  | 2.8            | 5.2            | 3              | B-M6F   | 6             |                |
| SSR 25XSB | 33               | 73    | 60     | 60                  | 7   | 36.8           | 10 | 26.2 | 6   | 12  | 3.3            | 7              | 3              | B-M6F   | 6.8           |                |
| SSR 30XSB | 42               | 90    | 66.7   | 72                  | 9   | 40.4           | 10 | 32.5 | 8   | 12  | 4.5            | 7.6            | 4              | B-M6F   | 9.5           |                |
| SSR 35XSB | 48               | 100   | 77.5   | 82                  | 9   | 47.1           | 13 | 36.5 | 8.5 | 12  | 4.7            | 8.8            | 4              | B-M6F   | 11.5          |                |

## Model number coding

|               |                  |                                        |                    |                                                |                                                                                                 |                                                               |          |                                                                                                                                                                |          |                                                     |
|---------------|------------------|----------------------------------------|--------------------|------------------------------------------------|-------------------------------------------------------------------------------------------------|---------------------------------------------------------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------------------------------------------------|
| <b>SSR15X</b> | <b>SB</b>        | <b>2</b>                               | <b>QZ</b>          | <b>UU</b>                                      | <b>C1</b>                                                                                       | <b>+820L</b>                                                  | <b>Y</b> | <b>P</b>                                                                                                                                                       | <b>T</b> | <b>-II</b>                                          |
| Model number  | Type of LM block | No. of LM blocks used on the same rail | With QZ lubricator | Contamination protection accessory symbol (*1) | Radial clearance symbol (*2)<br>Normal (No symbol)<br>Light preload (C1)<br>Medium preload (C0) | LM rail length (in mm)<br><br>Applied to only 15 and 25 sizes |          | Symbol for LM rail jointed use                                                                                                                                 |          | Symbol for No. of rails used on the same plane (*4) |
|               |                  |                                        |                    |                                                |                                                                                                 |                                                               |          | Accuracy symbol (*3)<br>Normal grade (No Symbol)<br>High accuracy grade (H)<br>Precision grade (P)<br>Super precision grade (SP)<br>Ultra precision grade (UP) |          |                                                     |

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-71**. (\*3) See **A1-77**. (\*4) See **A1-13**.  
Note) This model number indicates that a single-rail unit constitutes one set (i.e., the required number of sets when 2 rails are used in parallel is 2 at a minimum).  
Those models equipped with a QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model with a QZ attached, contact THK.



Unit: mm

| LM rail dimensions |       |        |       |                           |                | Basic load rating |                | Static permissible moment kN·m * |          |         |          |         |  | Mass     |         |
|--------------------|-------|--------|-------|---------------------------|----------------|-------------------|----------------|----------------------------------|----------|---------|----------|---------|--|----------|---------|
| Width              |       | Height | Pitch |                           | Length*        | C                 | C <sub>0</sub> |                                  |          |         |          |         |  | LM block | LM rail |
| $W_1$<br>±0.05     | $W_2$ | $M_1$  | F     | $d_1 \times d_2 \times h$ | Max            | kN                | kN             | 1 block                          | 2 blocks | 1 block | 2 blocks | 1 block |  | kg       | kg/m    |
| 15                 | 18.5  | 12.5   | 60    | 4.5×7.5×5.3               | 3000<br>(1240) | 9.1               | 9.7            | 0.0303                           | 0.1192   | 0.0189  | 0.122    | 0.0562  |  | 0.11     | 1.2     |
| 20                 | 19.5  | 15.5   | 60    | 6×9.5×8.5                 | 3000<br>(1480) | 13.4              | 14.4           | 0.0523                           | 0.336    | 0.0326  | 0.213    | 0.111   |  | 0.18     | 2.1     |
| 23                 | 25    | 18     | 60    | 7×11×9                    | 3000<br>(2020) | 21.7              | 22.5           | 0.104                            | 0.661    | 0.0652  | 0.419    | 0.204   |  | 0.31     | 2.7     |
| 28                 | 31    | 23     | 80    | 7×11×9                    | 3000<br>(2520) | 34.8              | 34.4           | 0.186                            | 1.12     | 0.116   | 0.711    | 0.376   |  | 0.52     | 4.3     |
| 34                 | 33    | 27.5   | 80    | 9×14×12                   | 3000           | 48.3              | 46.7           | 0.295                            | 1.77     | 0.184   | 1.12     | 0.615   |  | 0.77     | 6.4     |

Note1) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-116**.)

Static permissible moment\* 1 block: The static permissible moment with one LM block

2 blocks: Static permissible moment when two LM blocks are in close contact with each other

Total block length L : The total block length L shown in the table is the length with the dust proof parts, code UU or SS. If other contamination protection accessories or lubricant equipment are installed, the total block length will increase.

(See **A1-491** or **A1-512**)

\*\* A pilot hole for side nipples, when a grease nipple for a model equipped with LaCS or QZ Lubricator is needed.

Pilot holes for side nipples are not drilled through for models other than those stated above.

For grease nipple mount machining, contact THK.

Note2) For models SSR15 and 25, two types of rails with different mounting hole dimensions are offered (see Table1).

When, replacing this model with model SR, pay attention to the mounting hole dimension of the LM rail.

Contact THK for details.

Note3) The basic load rating in the dimension table is for a load in the radial direction. Use Table7 on **A1-59** to calculate the load rating for loads in the reverse radial direction or lateral direction.

Table1 The dimension of the rail mounting hole

| Model No. | Standard rail     | Semi-standard rail |
|-----------|-------------------|--------------------|
| SSR 15    | For M4 (Symbol Y) | For M3 (No symbol) |
| SSR 25    | For M6 (Symbol Y) | For M5 (No symbol) |

# Standard Length and Maximum Length of the LM Rail

Table1 shows the standard lengths and the maximum lengths of model SSR variations. If the maximum length of the desired LM rail exceeds them, jointed rails will be used. Contact THK for details. For special rail lengths, it is recommended to use a value corresponding to the G,g dimension from the table. As the G,g dimension increases, this portion becomes less stable, and the accuracy performance is severely impacted.

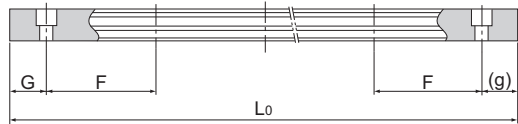


Table1 Standard Length and Maximum Length of the LM Rail

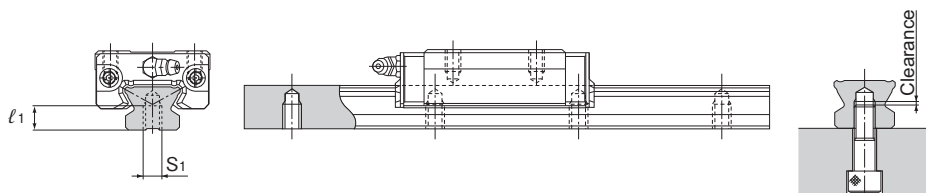
Unit: mm

| Model No.                         | SSR 15X     | SSR 20X     | SSR 25X     | SSR 30X     | SSR 35X |
|-----------------------------------|-------------|-------------|-------------|-------------|---------|
| LM rail standard length ( $L_0$ ) | 160         | 220         | 220         | 280         | 280     |
|                                   | 220         | 280         | 280         | 360         | 360     |
|                                   | 280         | 340         | 340         | 440         | 440     |
|                                   | 340         | 400         | 400         | 520         | 520     |
|                                   | 400         | 460         | 460         | 600         | 600     |
|                                   | 460         | 520         | 520         | 680         | 680     |
|                                   | 520         | 580         | 580         | 760         | 760     |
|                                   | 580         | 640         | 640         | 840         | 840     |
|                                   | 640         | 700         | 700         | 920         | 920     |
|                                   | 700         | 760         | 760         | 1000        | 1000    |
|                                   | 760         | 820         | 820         | 1080        | 1080    |
|                                   | 820         | 940         | 940         | 1160        | 1160    |
|                                   | 940         | 1000        | 1000        | 1240        | 1240    |
|                                   | 1000        | 1060        | 1060        | 1320        | 1320    |
|                                   | 1060        | 1120        | 1120        | 1400        | 1400    |
|                                   | 1120        | 1180        | 1240        | 1480        | 1480    |
|                                   | 1180        | 1240        | 1300        | 1640        | 1640    |
|                                   | 1240        | 1300        | 1360        | 1720        | 1720    |
|                                   | 1300        | 1360        | 1420        | 1800        | 1800    |
|                                   | 1360        | 1420        | 1480        | 1880        | 1880    |
|                                   | 1420        | 1480        | 1540        | 1960        | 1960    |
|                                   | 1480        | 1540        | 1600        | 2040        | 2040    |
|                                   | 1540        | 1600        | 1660        | 2120        | 2120    |
|                                   |             | 1660        | 1720        | 2200        | 2200    |
|                                   |             | 1720        | 1780        | 2280        | 2280    |
|                                   |             | 1780        | 1840        | 2360        | 2360    |
|                                   |             | 1840        | 1900        | 2440        | 2440    |
|                                   |             | 1900        | 1960        | 2520        | 2520    |
|                                   |             | 1960        | 2020        | 2600        | 2600    |
|                                   |             | 2020        | 2080        | 2680        | 2680    |
|                                   |             | 2080        | 2140        | 2760        | 2760    |
|                                   |             | 2140        | 2200        | 2840        | 2840    |
|                                   |             |             | 2260        | 2920        | 2920    |
|                                   |             |             | 2320        |             |         |
|                                   |             |             | 2380        |             |         |
|                                   |             |             | 2440        |             |         |
| Standard pitch F                  | 60          | 60          | 60          | 80          | 80      |
| G,g                               | 20          | 20          | 20          | 20          | 20      |
| Max length                        | 3000 (1240) | 3000 (1480) | 3000 (2020) | 3000 (2520) | 3000    |

Note1) The maximum length varies with accuracy grades. Contact THK for details.  
Note2) If jointed rails are not allowed and a greater length than the maximum values above is required, contact THK.  
Note3) The figures in the parentheses indicate the maximum lengths of stainless steel made models.

## Tapped-hole LM Rail Type of Model SSR

SSR model rails also include a type where the LM rail is tapped from the bottom. This type is useful when mounting from the bottom of the base and when increased contamination protection is desired.



- (1) A tapped-hole LM rail type is available only for high accuracy or lower grades.
- (2) Determine the bolt length so that a clearance of 2 to 5 mm is secured between the bolt end and the bottom of the tap (effective tap depth). (See figure above.)
- (3) For standard pitches of the taps, see Table1 on **A1-116**.

Table2 Dimensions of the LM Rail Tap Unit: mm

| Model No. | S <sub>1</sub> | Effective tap depth $l_1$ |
|-----------|----------------|---------------------------|
| SSR 15X   | M5             | 7                         |
| SSR 20X   | M6             | 9                         |
| SSR 25X   | M6             | 10                        |
| SSR 30X   | M8             | 14                        |
| SSR 35X   | M8             | 16                        |

### Model number coding

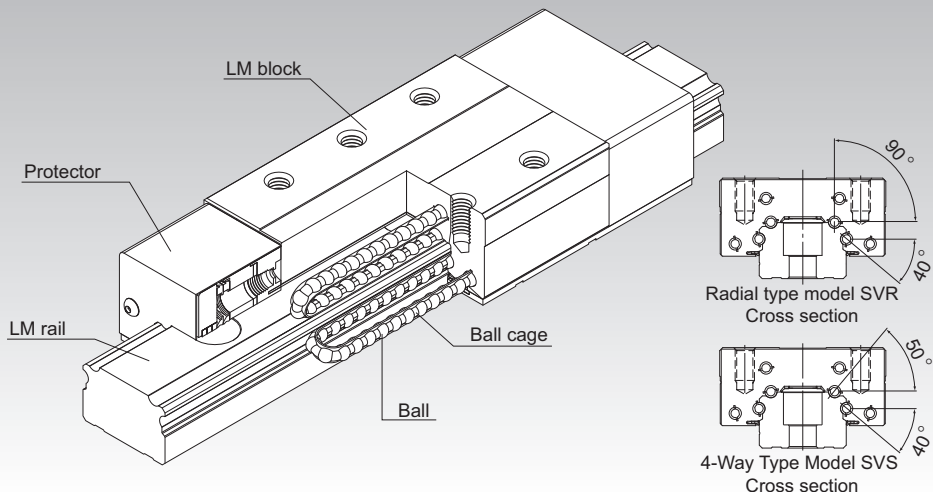
**SSR20X W2UU +1200LH K**

Symbol for  
tapped-hole LM rail t

# SVR/SVS



Caged Ball LM Guide Ultra-heavy Load Type for Machine Tools Model SVR/SVS



\*For the Ball Cage, see **A1-88**.

**Point of Selection** **A1-10**

**Point of Design** **A1-454**

**Options** **A1-477**

**Model No.** **A1-543**

**Precautions on Use** **A1-549**

**Accessories for Lubrication** **A24-1**

**Mounting Procedure and Maintenance** **B1-89**

Equivalent moment factor **A1-43**

Rated Loads in All Directions **A1-59**

Equivalent factor in each direction **A1-61**

Radial Clearance **A1-71**

Accuracy Standards **A1-77**

Shoulder Height of the Mounting Base and the Corner Radius **A1-464**

Permissible Error of the Mounting Surface **A1-470**

Dimensions of Each Model with an Option Attached **A1-491**

## Structure and Features

Models SVR/SVS have especially high rigidity and load carrying capacity among the Caged Ball LM Guide series. In addition, these models maintain the LM Guide performance and achieve high reliability through the strengthening of the dust proof performance with a broad range of options that take into account the service environments of machine tools, etc.

\*Since models SVR/SVS have very high rigidity, their structures are easily affected by the misalignment of the mounting surface and the installation error. If affected by these factors, their service life may be shortened or their motion may be disrupted. When considering using these models, contact THK.

### [Super Heavy Load, Increased Damping]

The raceway of models SVR/SVS adopts a circular-arc deep groove with a curvature approximate to the ball diameter. Since the ball contact area increases as the applied load increases, a large load carrying capacity is achieved and damping is also improved.

### [Increased Dust-proof Performance]

The foreign material removal function is improved with a newly developed protector to strengthen the dust-proof performance. In addition, use of a side scraper reduces the entrance of foreign material into the LM block, thus maintaining the LM Guide performance for a long period even in adverse environments.

### [High Rigidity]

Models SVR/SVS achieve the highest rigidity among the Caged Ball LM Guide series.

Both the radial type SVR and the 4-way equal load type SVS are available for the same size. Depending on the intended use, you can select either type.

### [Wide Array of Options]

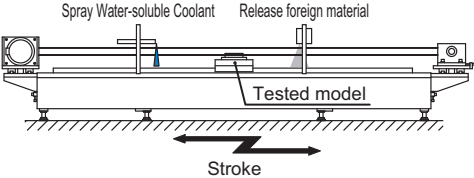
Various options are available, including end seal, inner seal, side seal, Laminated Contact Scraper LaCS, protector, side scraper and Cap GC, to respond to diversified service environments.

[Models SVR/SVS Contamination Protection Performance Evaluation]

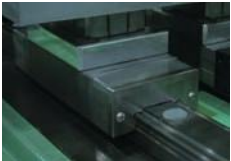
Models SVR/SVS maintain their performance under severe conditions with fine particles or liquid contamination.

Test conditions

| Item                     |                  | Description                                                                 |
|--------------------------|------------------|-----------------------------------------------------------------------------|
| Tested model             |                  | SVS45LR1TTHYYC1+2880LP×2set                                                 |
| Maximum speed            |                  | 200m/min                                                                    |
| Stroke                   |                  | 2500mm                                                                      |
| Grease used              |                  | THK AFB-LF Grease                                                           |
| Environmental conditions | Foreign material | Type: Metal powder (Atomized Powder)<br>(particle diameter: 125 μm or less) |
|                          |                  | Amount: 0.4 g/20 min                                                        |
|                          | Coolant          | Water-soluble coolant                                                       |
|                          |                  | Amount: 0.2 cc/10 s                                                         |

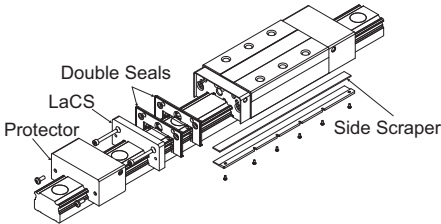


Test equipment



Tested model

Models SVR/SVS with option (TTHYY option)

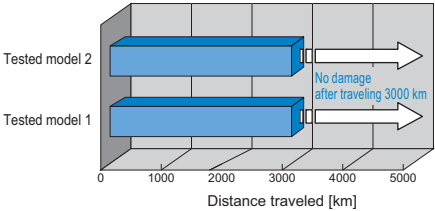


- TTHYY Option:
- Double Seals
  - Laminated Contact Scraper LaCS
  - Protector
  - Side Scraper

Test Result



After traveling 3000 km



Models SVR/SVS maintain their performance even after traveling 3000 km under severe conditions with exposure to coolant and contamination.

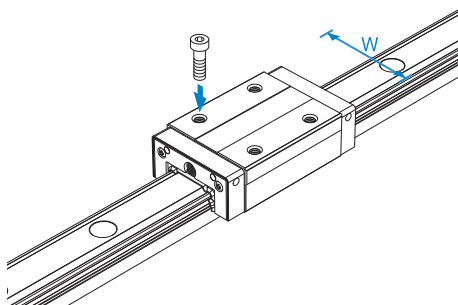
## Types and Features

### Models SVR-R/SVS-R

With this type, the LM block has a smaller width (W) and tapped holes.

Used in places where the space for table width is limited.

Specification Table⇒ [A1-124](#)/[A1-126](#)

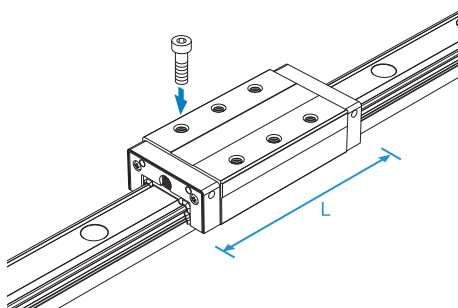


LM Guide

### Models SVR-LR/SVS-LR

The LM block has the same cross-sectional shape as models SVR/SVS-R, but has a longer overall LM block length (L) and a greater rated load.

Specification Table⇒ [A1-124](#)/[A1-126](#)

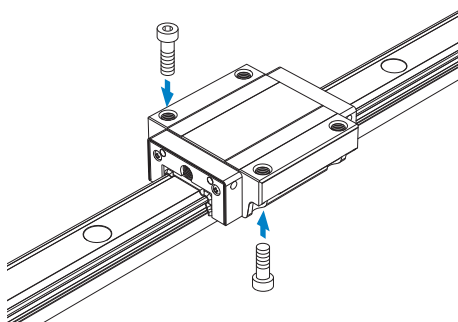


### Models SVR-C/SVS-C

The flange of the LM block has tapped holes. Can be mounted from the top or the bottom.

Can also be used in places where the table cannot have through holes for mounting bolts.

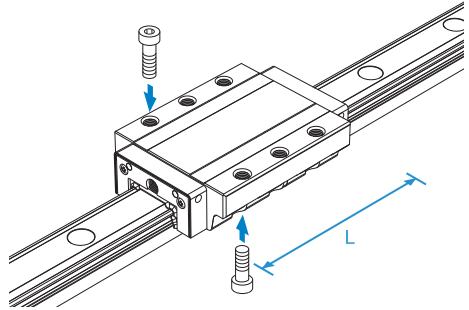
Specification Table⇒ [A1-128](#)/[A1-130](#)



## Models SVR-LC/SVS-LC

The LM block has the same cross-sectional shape as models SVR/SVS-C, but has a longer overall LM block length (L) and a greater rated load.

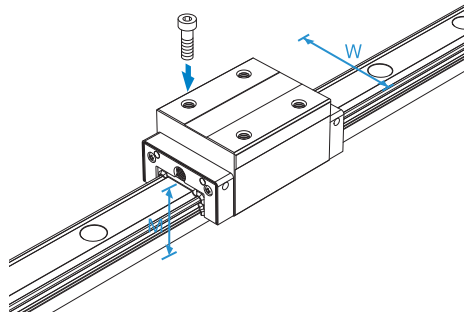
Specification Table⇒ **A1-128/A1-130**



## Models SVR-RH/SVS-RH

The dimensions are almost the same as that of LM Guide models SHS and HSR, and the LM block has tapped holes.

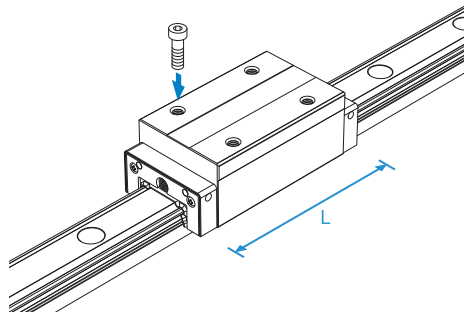
Specification Table⇒ **A1-132**



## Models SVR-LRH/SVS-LRH

The LM block has the same cross-sectional shape as models SVR/SVS-RH, but has a longer overall LM block length (L) and a greater rated load.

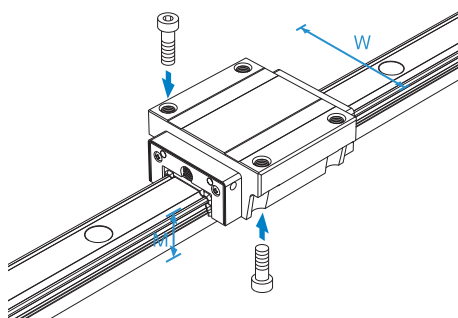
Specification Table⇒ **A1-132**



## Models SVR-CH/SVS-CH

The dimensions are similar to that of LM Guide models SHS and HSR, and the range of the LM block has tapped holes.

Specification Table⇒ **A1-134**

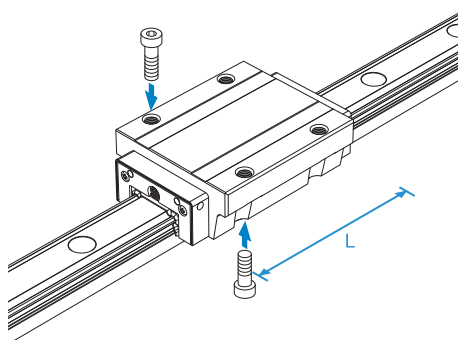


LM Guide

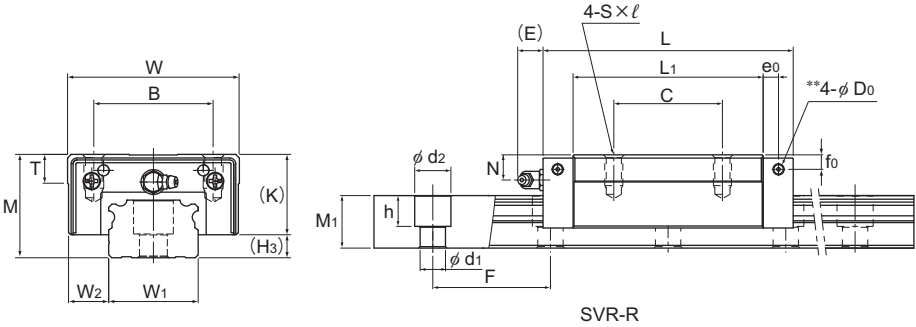
## Models SVR-LCH/SVS-LCH

The LM block has the same cross-sectional shape as models SVR/SVS-CH, but has a longer overall LM block length (L) and a greater rated load.

Specification Table⇒ **A1-134**



# Models SVR-R and SVR-LR

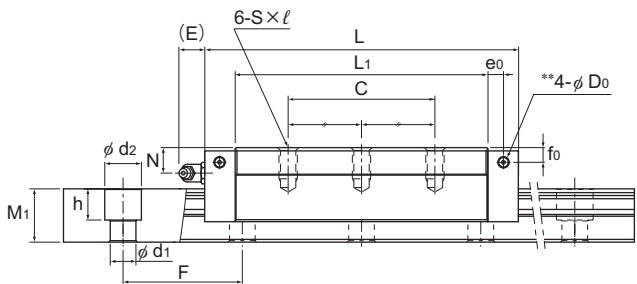


| Model No.           | Outer dimensions |       |                | LM block dimensions |           |        |                |      |      |      |                |    |                |                |               |      | H <sub>3</sub> |
|---------------------|------------------|-------|----------------|---------------------|-----------|--------|----------------|------|------|------|----------------|----|----------------|----------------|---------------|------|----------------|
|                     | Height           | Width | Length         | B                   | C         | S×ℓ    | L <sub>1</sub> | T    | K    | N    | f <sub>0</sub> | E  | e <sub>0</sub> | D <sub>0</sub> | Grease nipple |      |                |
|                     | M                | W     | L              |                     |           |        |                |      |      |      |                |    |                |                |               |      |                |
| SVR 25R<br>SVR 25LR | 31               | 50    | 82.8<br>102    | 32                  | 35<br>50  | M6×8   | 61.4<br>80.6   | 9.7  | 25.5 | 7.8  | 5.1            | 12 | 4.5            | 3.9            | B-M6F         | 5.5  |                |
| SVR 30R<br>SVR 30LR | 38               | 60    | 98<br>120.5    | 40                  | 40<br>60  | M8×10  | 72.1<br>94.6   | 9.7  | 31   | 10.3 | 7              | 12 | 6.5            | 3.9            | B-M6F         | 7    |                |
| SVR 35R<br>SVR 35LR | 44               | 70    | 109.5<br>135   | 50                  | 50<br>72  | M8×12  | 79<br>104.5    | 11.7 | 35   | 12.1 | 8              | 12 | 6              | 5.2            | B-M6F         | 9    |                |
| SVR 45R<br>SVR 45LR | 52               | 86    | 138.2<br>171   | 60                  | 60<br>80  | M10×17 | 105<br>137.8   | 14.7 | 40.4 | 13.9 | 8              | 16 | 8.5            | 5.2            | B-PT1/8       | 11.6 |                |
| SVR 55R<br>SVR 55LR | 63               | 100   | 163.3<br>200.5 | 65                  | 75<br>95  | M12×18 | 123.6<br>160.8 | 17.7 | 49   | 16.6 | 10             | 16 | 10             | 5.2            | B-PT1/8       | 14   |                |
| SVR 65R<br>SVR 65LR | 75               | 126   | 186<br>246     | 76                  | 70<br>110 | M16×20 | 143.6<br>203.6 | 21.6 | 60   | 19   | 15             | 16 | 8.7            | 8.2            | B-PT1/8       | 15   |                |

## Model number coding

|              |                  |                                        |                    |                                                |                        |                              |                                                  |                                                     |            |
|--------------|------------------|----------------------------------------|--------------------|------------------------------------------------|------------------------|------------------------------|--------------------------------------------------|-----------------------------------------------------|------------|
| <b>SVR45</b> | <b>LR</b>        | <b>2</b>                               | <b>QZ</b>          | <b>TTHH</b>                                    | <b>C0</b>              | <b>+1200L</b>                | <b>P</b>                                         | <b>T</b>                                            | <b>-II</b> |
| Model No.    | Type of LM block | No. of LM blocks used on the same rail | With QZ Lubricator | Contamination protection accessory symbol (*1) | LM rail length (in mm) | Radial clearance symbol (*2) | Symbol for LM rail jointed use                   | Symbol for No. of rails used on the same plane (*4) |            |
|              |                  |                                        |                    |                                                | Normal (No symbol)     | Normal (No symbol)           | Accuracy symbol (*3)                             |                                                     |            |
|              |                  |                                        |                    |                                                | Light preload (C1)     | Light preload (C1)           | Normal grade (No Symbol)/High accuracy grade (H) |                                                     |            |
|              |                  |                                        |                    |                                                | Medium preload (C0)    | Medium preload (C0)          | Precision grade (P)/Super precision grade (SP)   |                                                     |            |
|              |                  |                                        |                    |                                                |                        |                              | Ultra precision grade (UP)                       |                                                     |            |

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-71**. (\*3) See **A1-77**. (\*4) See **A1-13**.  
Note) This model number indicates that an LM block and an LM rail constitute one set (i.e., the required number of sets when 2 rails are used in parallel is 2).  
Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.



SVR-LR

Unit: mm

|    | LM rail dimensions                        |      |                              |                                      |      |                    | Basic load rating |                          | Static permissible moment<br>kN·m*                                                |                |                                                                                   |               |                                                                                   |      | Mass               |                     |
|----|-------------------------------------------|------|------------------------------|--------------------------------------|------|--------------------|-------------------|--------------------------|-----------------------------------------------------------------------------------|----------------|-----------------------------------------------------------------------------------|---------------|-----------------------------------------------------------------------------------|------|--------------------|---------------------|
|    | Width<br><br>W <sub>1</sub><br>0<br>-0.05 |      | Height<br><br>W <sub>2</sub> | Pitch<br><br>M <sub>1</sub><br><br>F |      | Length<br><br>Max* | C<br><br>kN       | C <sub>0</sub><br><br>kN |  |                |  |               |  |      | LM block<br><br>kg | LM rail<br><br>kg/m |
|    |                                           |      |                              |                                      |      |                    |                   |                          | 1 block                                                                           | Double blocks  | 1 block                                                                           | Double blocks | 1 block                                                                           |      |                    |                     |
|    |                                           |      |                              |                                      |      |                    |                   |                          |                                                                                   |                |                                                                                   |               |                                                                                   |      |                    |                     |
| 25 | 12.5                                      | 17   | 40                           | 6×9.5×8.5                            | 3000 | 48.2<br>57         | 68.1<br>86.3      | 0.602<br>0.944           | 3.02<br>4.67                                                                      | 0.365<br>0.57  | 1.83<br>2.81                                                                      | 0.71<br>0.9   | 0.4<br>0.5                                                                        | 2.9  |                    |                     |
| 28 | 16                                        | 21   | 80                           | 7×11×9                               | 3000 | 67.9<br>84         | 91.6<br>124       | 0.907<br>1.64            | 4.85<br>7.92                                                                      | 0.552<br>0.991 | 2.94<br>4.76                                                                      | 1.08<br>1.47  | 0.7<br>0.9                                                                        | 4.2  |                    |                     |
| 34 | 18                                        | 24.5 | 80                           | 9×14×12                              | 3000 | 89.6<br>112        | 116<br>160        | 1.26<br>2.35             | 6.91<br>11.5                                                                      | 0.769<br>1.42  | 4.2<br>6.91                                                                       | 1.64<br>2.26  | 1<br>1.3                                                                          | 6.0  |                    |                     |
| 45 | 20.5                                      | 29   | 105                          | 14×20×17                             | 3090 | 138<br>161         | 186<br>233        | 2.76<br>4.52             | 13.7<br>22.1                                                                      | 1.67<br>2.74   | 8.3<br>13.4                                                                       | 3.5<br>4.6    | 1.8<br>2.3                                                                        | 9.5  |                    |                     |
| 53 | 23.5                                      | 36.5 | 120                          | 16×23×20                             | 3060 | 177<br>214         | 235<br>309        | 3.99<br>6.8              | 20.6<br>32.7                                                                      | 2.42<br>4.1    | 12.4<br>19.7                                                                      | 5.07<br>6.67  | 3.3<br>4.3                                                                        | 14   |                    |                     |
| 63 | 31.5                                      | 43   | 150                          | 18×26×22                             | 3000 | 271<br>339         | 352<br>484        | 7.26<br>13.5             | 34.9<br>62.6                                                                      | 4.4<br>8.14    | 21.1<br>37.6                                                                      | 9<br>12.4     | 6.0<br>8.5                                                                        | 19.6 |                    |                     |

Note1) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-136**.)

Static permissible moment\* 1 block: the static permissible moment with one LM block

Double blocks: static permissible moment when two LM blocks are in close contact with each other

For oil lubrication, be certain to let THK know the mounting orientation and where the LM block piping joint should be attached.

(Mounting orientation: see **A1-12**, Lubricant: see **A24-2**)

Total block length L : The total block length L shown in the table is the length with the dust proof parts, code UU or SS. If other contamination protection accessories or lubricant equipment are installed, the total block length will increase. (See **A1-491** or **A1-512**)

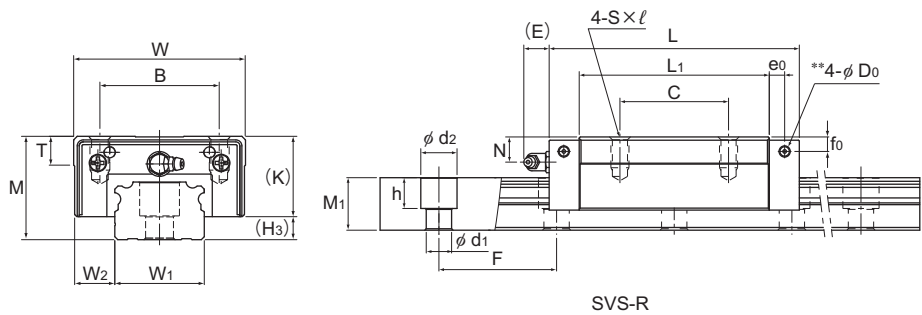
\*\* A pilot hole for side nipples, when a grease nipple for a model equipped with LaCS or QZ Lubricator is needed.

Pilot holes for side nipples are not drilled through for models other than those stated above.

For grease nipple mount machining, contact THK.

Note2) The basic load rating in the dimension table is for a load in the radial direction. Use Table7 on **A1-59** to calculate the load rating for loads in the reverse radial direction or lateral direction.

# Models SVS-R and SVS-LR



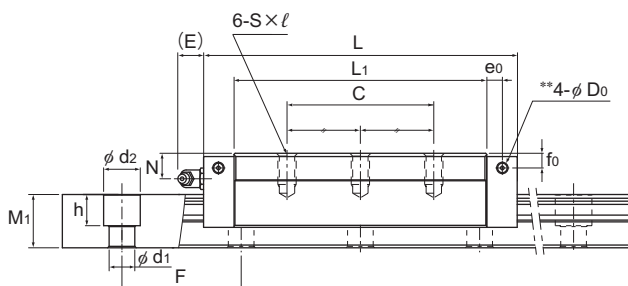
| Model No. | Outer dimensions |       |        | LM block dimensions |     |        |                |      |      |      |                |    |                |                |               |      | H <sub>3</sub> |
|-----------|------------------|-------|--------|---------------------|-----|--------|----------------|------|------|------|----------------|----|----------------|----------------|---------------|------|----------------|
|           | Height           | Width | Length | B                   | C   | S×ℓ    | L <sub>1</sub> | T    | K    | N    | f <sub>0</sub> | E  | e <sub>0</sub> | D <sub>0</sub> | Grease nipple |      |                |
|           | M                | W     | L      |                     |     |        |                |      |      |      |                |    |                |                |               |      |                |
| SVS 25R   | 31               | 50    | 82.8   | 32                  | 35  | M6×8   | 61.4           | 9.7  | 25.5 | 7.8  | 5.1            | 12 | 4.5            | 3.9            | B-M6F         | 5.5  |                |
| SVS 25LR  |                  |       | 102    |                     | 50  |        | 80.6           |      |      |      |                |    |                |                |               |      |                |
| SVS 30R   | 38               | 60    | 98     | 40                  | 40  | M8×10  | 72.1           | 9.7  | 31   | 10.3 | 7              | 12 | 6.5            | 3.9            | B-M6F         | 7    |                |
| SVS 30LR  |                  |       | 120.5  |                     | 60  |        | 94.6           |      |      |      |                |    |                |                |               |      |                |
| SVS 35R   | 44               | 70    | 109.5  | 50                  | 50  | M8×12  | 79             | 11.7 | 35   | 12.1 | 8              | 12 | 6              | 5.2            | B-M6F         | 9    |                |
| SVS 35LR  |                  |       | 135    |                     | 72  |        | 104.5          |      |      |      |                |    |                |                |               |      |                |
| SVS 45R   | 52               | 86    | 138.2  | 60                  | 60  | M10×17 | 105            | 14.7 | 40.4 | 13.9 | 8              | 16 | 8.5            | 5.2            | B-PT1/8       | 11.6 |                |
| SVS 45LR  |                  |       | 171    |                     | 80  |        | 137.8          |      |      |      |                |    |                |                |               |      |                |
| SVS 55R   | 63               | 100   | 163.3  | 65                  | 75  | M12×18 | 123.6          | 17.7 | 49   | 16.6 | 10             | 16 | 10             | 5.2            | B-PT1/8       | 14   |                |
| SVS 55LR  |                  |       | 200.5  |                     | 95  |        | 160.8          |      |      |      |                |    |                |                |               |      |                |
| SVS 65R   | 75               | 126   | 186    | 76                  | 70  | M16×20 | 143.6          | 21.6 | 60   | 19   | 15             | 16 | 8.7            | 8.2            | B-PT1/8       | 15   |                |
| SVS 65LR  |                  |       | 246    |                     | 110 |        | 203.6          |      |      |      |                |    |                |                |               |      |                |

## Model number coding

|              |                  |                                        |                    |                                                |                        |                              |                                |                                                     |            |
|--------------|------------------|----------------------------------------|--------------------|------------------------------------------------|------------------------|------------------------------|--------------------------------|-----------------------------------------------------|------------|
| <b>SVS45</b> | <b>LR</b>        | <b>2</b>                               | <b>QZ</b>          | <b>TTHH</b>                                    | <b>C0</b>              | <b>+1200L</b>                | <b>P</b>                       | <b>T</b>                                            | <b>-II</b> |
| Model No.    | Type of LM block | No. of LM blocks used on the same rail | With QZ Lubricator | Contamination protection accessory symbol (*1) | LM rail length (in mm) | Radial clearance symbol (*2) | Symbol for LM rail jointed use | Symbol for No. of rails used on the same plane (*4) |            |
|              |                  |                                        |                    |                                                | Normal (No symbol)     | Light preload (C1)           | Accuracy symbol (*3)           | Normal grade (No Symbol)/High accuracy grade (H)    |            |
|              |                  |                                        |                    |                                                | Medium preload (C0)    |                              | Ultra precision grade (UP)     | Precision grade (P)/Super precision grade (SP)      |            |

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-71**. (\*3) See **A1-77**. (\*4) See **A1-13**.

Note) This model number indicates that an LM block and an LM rail constitute one set (i.e., the required number of sets when 2 rails are used in parallel is 2). Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.



SVS-LR

Unit: mm

| LM rail dimensions           |                |                |       |                                     |        | Basic load rating |                | Static permissible moment<br>kN·m* |               |                |               |                | Mass       |         |
|------------------------------|----------------|----------------|-------|-------------------------------------|--------|-------------------|----------------|------------------------------------|---------------|----------------|---------------|----------------|------------|---------|
| Width                        |                | Height         | Pitch |                                     | Length | C                 | C <sub>0</sub> | M <sub>A</sub>                     |               | M <sub>B</sub> |               | M <sub>C</sub> | LM block   | LM rail |
| W <sub>1</sub><br>0<br>-0.05 | W <sub>2</sub> | M <sub>1</sub> | F     | d <sub>1</sub> × d <sub>2</sub> × h | Max*   | kN                | kN             | 1 block                            | Double blocks | 1 block        | Double blocks | 1 block        | kg         | kg/m    |
| 25                           | 12.5           | 17             | 40    | 6 × 9.5 × 8.5                       | 3000   | 37<br>43.7        | 52.2<br>66.1   | 0.479<br>0.75                      | 2.41<br>3.71  | 0.443<br>0.693 | 2.23<br>3.43  | 0.525<br>0.665 | 0.4<br>0.5 | 2.9     |
| 28                           | 16             | 21             | 80    | 7 × 11 × 9                          | 3000   | 52<br>64.4        | 70.1<br>95.2   | 0.722<br>1.31                      | 3.86<br>6.3   | 0.667<br>1.21  | 3.58<br>5.83  | 0.798<br>1.08  | 0.7<br>0.9 | 4.2     |
| 34                           | 18             | 24.5           | 80    | 9 × 14 × 12                         | 3000   | 68.6<br>86.1      | 88.6<br>123    | 1<br>1.88                          | 5.49<br>9.15  | 0.927<br>1.73  | 5.09<br>8.46  | 1.2<br>1.67    | 1<br>1.3   | 6.0     |
| 45                           | 20.5           | 29             | 105   | 14 × 20 × 17                        | 3090   | 105<br>123        | 142<br>178     | 2.19<br>3.58                       | 10.9<br>17.5  | 2.02<br>3.31   | 10.1<br>16.2  | 2.6<br>3.44    | 1.8<br>2.3 | 9.5     |
| 53                           | 23.5           | 36.5           | 120   | 16 × 23 × 20                        | 3060   | 136<br>164        | 180<br>237     | 3.17<br>5.4                        | 16.4<br>26    | 2.93<br>4.99   | 15.1<br>24    | 3.76<br>4.96   | 3.3<br>4.3 | 14      |
| 63                           | 31.5           | 43             | 150   | 18 × 26 × 22                        | 3000   | 208<br>260        | 269<br>370     | 5.76<br>10.7                       | 27.7<br>49.6  | 5.33<br>9.88   | 25.6<br>45.8  | 6.66<br>9.16   | 6.0<br>8.5 | 19.6    |

Note1) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-136**.)

Static permissible moment\* 1 block: the static permissible moment with one LM block

Double blocks: static permissible moment when two LM blocks are in close contact with each other

For oil lubrication, be certain to let THK know the mounting orientation and where the LM block piping joint should be attached.

(Mounting orientation: see **A1-12**, Lubricant: see **A24-2**)

Total block length L

: The total block length L shown in the table is the length with the dust proof parts, code UU or SS.

If other contamination protection accessories or lubricant equipment are installed, the total block length will increase.

(See **A1-491** or **A1-512**)

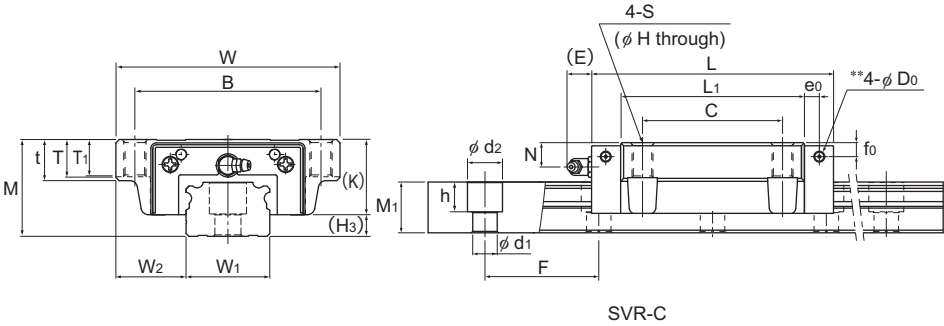
\*\* A pilot hole for side nipples, when a grease nipple for a model equipped with LaCS or QZ Lubricator is needed.

Pilot holes for side nipples are not drilled through for models other than those stated above.

For grease nipple mount machining, contact THK.

Note2) The basic load rating in the dimension table is for a load in the radial direction. Use Table7 on **A1-59** to calculate the load rating for loads in the reverse radial direction or lateral direction.

# Models SVR-C and SVR-LC



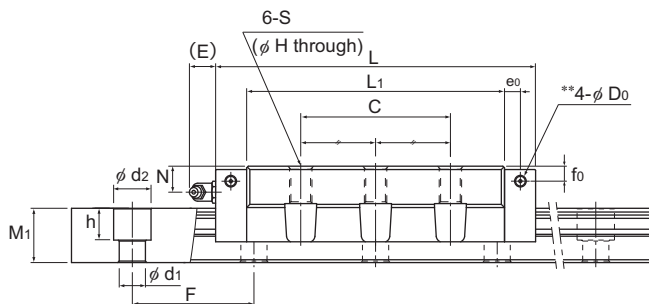
| Model No.           | Outer dimensions |       |                | LM block dimensions |     |     |      |                |      |      |                |      |      |                |    |                |                |               | H <sub>3</sub> |
|---------------------|------------------|-------|----------------|---------------------|-----|-----|------|----------------|------|------|----------------|------|------|----------------|----|----------------|----------------|---------------|----------------|
|                     | Height           | Width | Length         | B                   | C   | S   | H    | L <sub>1</sub> | t    | T    | T <sub>1</sub> | K    | N    | f <sub>0</sub> | E  | e <sub>0</sub> | D <sub>0</sub> | Grease nipple |                |
|                     | M                | W     | L              |                     |     |     |      |                |      |      |                |      |      |                |    |                |                |               |                |
| SVR 25C<br>SVR 25LC | 31               | 72    | 82.8<br>102    | 59                  | 45  | M8  | 6.8  | 61.4<br>80.6   | 16   | 14.8 | 12             | 25.5 | 7.8  | 5.1            | 12 | 4.5            | 3.9            | B-M6F         | 5.5            |
| SVR 30C<br>SVR 30LC | 38               | 90    | 98<br>120.5    | 72                  | 52  | M10 | 8.5  | 72.1<br>94.6   | 18.1 | 16.9 | 14             | 31   | 10.3 | 7              | 12 | 6.5            | 3.9            | B-M6F         | 7              |
| SVR 35C<br>SVR 35LC | 44               | 100   | 109.5<br>135   | 82                  | 62  | M10 | 8.5  | 79<br>104.5    | 20.1 | 18.9 | 16             | 35   | 12.1 | 8              | 12 | 6              | 5.2            | B-M6F         | 9              |
| SVR 45C<br>SVR 45LC | 52               | 120   | 138.2<br>171   | 100                 | 80  | M12 | 10.5 | 105<br>137.8   | 22.1 | 20.6 | 20             | 40.4 | 13.9 | 8              | 16 | 8.5            | 5.2            | B-PT1/8       | 11.6           |
| SVR 55C<br>SVR 55LC | 63               | 140   | 163.3<br>200.5 | 116                 | 95  | M14 | 12.5 | 123.6<br>160.8 | 24   | 22.5 | 22             | 49   | 16.6 | 10             | 16 | 10             | 5.2            | B-PT1/8       | 14             |
| SVR 65C<br>SVR 65LC | 75               | 170   | 186<br>246     | 142                 | 110 | M16 | 14.5 | 143.6<br>203.6 | 28   | 26   | 25             | 60   | 19   | 15             | 16 | 8.7            | 8.2            | B-PT1/8       | 15             |

## Model number coding

**SVR45 LC 2 QZ TTHH C0 +1200L P T - II**

|           |                                        |                    |                                                |                                                                                                                           |                                                                                                                                                                                            |                                                     |
|-----------|----------------------------------------|--------------------|------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|
| Model No. | Type of LM block                       | With QZ Lubricator | Contamination protection accessory symbol (*1) | LM rail length (in mm)<br>Radial clearance symbol (*2)<br>Normal (No symbol)<br>Light preload (C1)<br>Medium preload (C0) | Symbol for LM rail jointed use<br>Accuracy symbol (*3)<br>Normal grade (No Symbol)/High accuracy grade (H)<br>Precision grade (P)/Super precision grade (SP)<br>Ultra precision grade (UP) | Symbol for No. of rails used on the same plane (*4) |
|           | No. of LM blocks used on the same rail |                    |                                                |                                                                                                                           |                                                                                                                                                                                            |                                                     |

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-71**. (\*3) See **A1-77**. (\*4) See **A1-13**.  
Note) This model number indicates that an LM block and an LM rail constitute one set (i.e., the required number of sets when 2 rails are used in parallel is 2).  
Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.



SVR-LC

Unit: mm

|    | LM rail dimensions                        |                |                              |                |                                   |                    | Basic load rating |                          | Static permissible moment<br>kN•m*                                                |                  |                                                                                   |                  |                                                                                   |      | Mass                  |                        |
|----|-------------------------------------------|----------------|------------------------------|----------------|-----------------------------------|--------------------|-------------------|--------------------------|-----------------------------------------------------------------------------------|------------------|-----------------------------------------------------------------------------------|------------------|-----------------------------------------------------------------------------------|------|-----------------------|------------------------|
|    | Width<br><br>W <sub>1</sub><br>0<br>-0.05 | W <sub>2</sub> | Height<br><br>M <sub>1</sub> | Pitch<br><br>F | d <sub>1</sub> ×d <sub>2</sub> ×h | Length<br><br>Max* | C<br><br>kN       | C <sub>0</sub><br><br>kN |  |                  |  |                  |  |      | LM<br>block<br><br>kg | LM<br>rail<br><br>kg/m |
|    |                                           |                |                              |                |                                   |                    |                   |                          | 1<br>block                                                                        | Double<br>blocks | 1<br>block                                                                        | Double<br>blocks | 1<br>block                                                                        |      |                       |                        |
|    |                                           |                |                              |                |                                   |                    |                   |                          |                                                                                   |                  |                                                                                   |                  |                                                                                   |      |                       |                        |
| 25 | 23.5                                      | 17             | 40                           | 6×9.5×8.5      | 3000                              | 48.2<br>57         | 68.1<br>86.3      | 0.602<br>0.944           | 3.02<br>4.67                                                                      | 0.365<br>0.57    | 1.83<br>2.81                                                                      | 0.71<br>0.9      | 0.6<br>0.8                                                                        | 2.9  |                       |                        |
| 28 | 31                                        | 21             | 80                           | 7×11×9         | 3000                              | 67.9<br>84         | 91.6<br>124       | 0.907<br>1.64            | 4.85<br>7.92                                                                      | 0.552<br>0.991   | 2.94<br>4.76                                                                      | 1.08<br>1.47     | 1.1<br>1.5                                                                        | 4.2  |                       |                        |
| 34 | 33                                        | 24.5           | 80                           | 9×14×12        | 3000                              | 89.6<br>112        | 116<br>160        | 1.26<br>2.35             | 6.91<br>11.5                                                                      | 0.769<br>1.42    | 4.2<br>6.91                                                                       | 1.64<br>2.26     | 1.6<br>2                                                                          | 6.0  |                       |                        |
| 45 | 37.5                                      | 29             | 105                          | 14×20×17       | 3090                              | 138<br>161         | 186<br>233        | 2.76<br>4.52             | 13.7<br>22.1                                                                      | 1.67<br>2.74     | 8.3<br>13.4                                                                       | 3.5<br>4.6       | 2.7<br>3.6                                                                        | 9.5  |                       |                        |
| 53 | 43.5                                      | 36.5           | 120                          | 16×23×20       | 3060                              | 177<br>214         | 235<br>309        | 3.99<br>6.8              | 20.6<br>32.7                                                                      | 2.42<br>4.1      | 12.4<br>19.7                                                                      | 5.07<br>6.67     | 4.5<br>5.9                                                                        | 14   |                       |                        |
| 63 | 53.5                                      | 43             | 150                          | 18×26×22       | 3000                              | 271<br>339         | 352<br>484        | 7.26<br>13.5             | 34.9<br>62.6                                                                      | 4.4<br>8.14      | 21.1<br>37.6                                                                      | 9<br>12.4        | 7.8<br>11.0                                                                       | 19.6 |                       |                        |

Note1) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See [A1-136](#).)

Static permissible moment \* 1 block: the static permissible moment with one LM block

Double blocks: static permissible moment when two LM blocks are in close contact with each other

For oil lubrication, be certain to let THK know the mounting orientation and where the LM block piping joint should be attached.

(Mounting orientation: see [A1-12](#), Lubricant: see [A24-2](#))

Total block length L

: The total block length L shown in the table is the length with the dust proof parts, code UU or SS.

If other contamination protection accessories or lubricant equipment are installed, the total block length will increase.

(See [A1-491](#) or [A1-512](#))

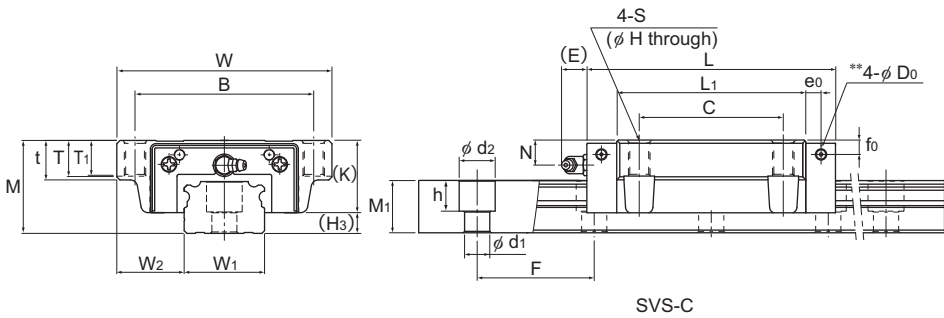
\*\* A pilot hole for side nipples, when a grease nipple for a model equipped with LaCS or QZ Lubricator is needed.

Pilot holes for side nipples are not drilled through for models other than those stated above.

For grease nipple mount machining, contact THK.

Note2) The basic load rating in the dimension table is for a load in the radial direction. Use Table7 on [A1-59](#) to calculate the load rating for loads in the reverse radial direction or lateral direction.

# Models SVS-C and SVS-LC

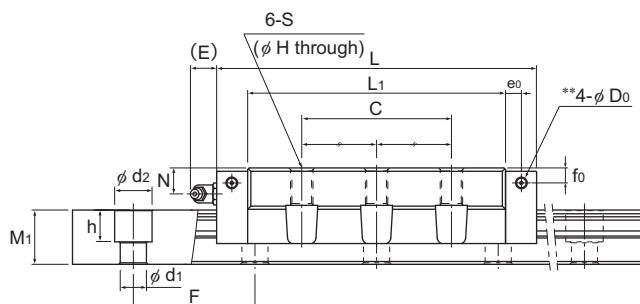


| Model No.           | Outer dimensions |       |                | LM block dimensions |     |     |      |                |      |      |                |      |      |                |    |                |                |               | H <sub>3</sub> |
|---------------------|------------------|-------|----------------|---------------------|-----|-----|------|----------------|------|------|----------------|------|------|----------------|----|----------------|----------------|---------------|----------------|
|                     | Height           | Width | Length         | B                   | C   | S   | H    | L <sub>1</sub> | t    | T    | T <sub>1</sub> | K    | N    | f <sub>0</sub> | E  | e <sub>0</sub> | D <sub>0</sub> | Grease nipple |                |
|                     | M                | W     | L              |                     |     |     |      |                |      |      |                |      |      |                |    |                |                |               |                |
| SVS 25C<br>SVS 25LC | 31               | 72    | 82.8<br>102    | 59                  | 45  | M8  | 6.8  | 61.4<br>80.6   | 16   | 14.8 | 12             | 25.5 | 7.8  | 5.1            | 12 | 4.5            | 3.9            | B-M6F         | 5.5            |
| SVS 30C<br>SVS 30LC | 38               | 90    | 98<br>120.5    | 72                  | 52  | M10 | 8.5  | 72.1<br>94.6   | 18.1 | 16.9 | 14             | 31   | 10.3 | 7              | 12 | 6.5            | 3.9            | B-M6F         | 7              |
| SVS 35C<br>SVS 35LC | 44               | 100   | 109.5<br>135   | 82                  | 62  | M10 | 8.5  | 79<br>104.5    | 20.1 | 18.9 | 16             | 35   | 12.1 | 8              | 12 | 6              | 5.2            | B-M6F         | 9              |
| SVS 45C<br>SVS 45LC | 52               | 120   | 138.2<br>171   | 100                 | 80  | M12 | 10.5 | 105<br>137.8   | 22.1 | 20.6 | 20             | 40.4 | 13.9 | 8              | 16 | 8.5            | 5.2            | B-PT1/8       | 11.6           |
| SVS 55C<br>SVS 55LC | 63               | 140   | 163.3<br>200.5 | 116                 | 95  | M14 | 12.5 | 123.6<br>160.8 | 24   | 22.5 | 22             | 49   | 16.6 | 10             | 16 | 10             | 5.2            | B-PT1/8       | 14             |
| SVS 65C<br>SVS 65LC | 75               | 170   | 186<br>246     | 142                 | 110 | M16 | 14.5 | 143.6<br>203.6 | 28   | 26   | 25             | 60   | 19   | 15             | 16 | 8.7            | 8.2            | B-PT1/8       | 15             |

## Model number coding

|              |                  |                                        |                    |                                                |                        |                              |                                                  |                                                     |            |
|--------------|------------------|----------------------------------------|--------------------|------------------------------------------------|------------------------|------------------------------|--------------------------------------------------|-----------------------------------------------------|------------|
| <b>SVS45</b> | <b>LC</b>        | <b>2</b>                               | <b>QZ</b>          | <b>TTHH</b>                                    | <b>C0</b>              | <b>+1200L</b>                | <b>P</b>                                         | <b>T</b>                                            | <b>-II</b> |
| Model No.    | Type of LM block | No. of LM blocks used on the same rail | With QZ Lubricator | Contamination protection accessory symbol (*1) | LM rail length (in mm) | Radial clearance symbol (*2) | Symbol for LM rail jointed use                   | Symbol for No. of rails used on the same plane (*4) |            |
|              |                  |                                        |                    |                                                | Normal (No symbol)     | Light preload (C1)           | Accuracy symbol (*3)                             |                                                     |            |
|              |                  |                                        |                    |                                                | Medium preload (C0)    |                              | Normal grade (No Symbol)/High accuracy grade (H) |                                                     |            |
|              |                  |                                        |                    |                                                |                        |                              | Precision grade (P)/Super precision grade (SP)   |                                                     |            |
|              |                  |                                        |                    |                                                |                        |                              | Ultra precision grade (UP)                       |                                                     |            |

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-71**. (\*3) See **A1-77**. (\*4) See **A1-13**.  
Note) This model number indicates that an LM block and an LM rail constitute one set (i.e., the required number of sets when 2 rails are used in parallel is 2).  
Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.



SVS-LC

Unit: mm

| LM rail dimensions           |                |                |       |                                   |        | Basic load rating |                | Static permissible moment<br>kN·m* |               |                |               |                | Mass        |         |
|------------------------------|----------------|----------------|-------|-----------------------------------|--------|-------------------|----------------|------------------------------------|---------------|----------------|---------------|----------------|-------------|---------|
| Width                        |                | Height         | Pitch |                                   | Length | C                 | C <sub>0</sub> | M <sub>A</sub>                     |               | M <sub>B</sub> |               | M <sub>C</sub> | LM block    | LM rail |
| W <sub>1</sub><br>0<br>-0.05 | W <sub>2</sub> | M <sub>1</sub> | F     | d <sub>1</sub> ×d <sub>2</sub> ×h | Max*   | kN                | kN             | 1 block                            | Double blocks | 1 block        | Double blocks | 1 block        | kg          | kg/m    |
| 25                           | 23.5           | 17             | 40    | 6×9.5×8.5                         | 3000   | 37<br>43.7        | 52.2<br>66.1   | 0.479<br>0.75                      | 2.41<br>3.71  | 0.443<br>0.693 | 2.23<br>3.43  | 0.525<br>0.665 | 0.6<br>0.8  | 2.9     |
| 28                           | 31             | 21             | 80    | 7×11×9                            | 3000   | 52<br>64.4        | 70.1<br>95.2   | 0.722<br>1.31                      | 3.86<br>6.3   | 0.667<br>1.21  | 3.58<br>5.83  | 0.798<br>1.08  | 1.1<br>1.5  | 4.2     |
| 34                           | 33             | 24.5           | 80    | 9×14×12                           | 3000   | 68.6<br>86.1      | 88.6<br>123    | 1<br>1.88                          | 5.49<br>9.15  | 0.927<br>1.73  | 5.09<br>8.46  | 1.2<br>1.67    | 1.6<br>2    | 6.0     |
| 45                           | 37.5           | 29             | 105   | 14×20×17                          | 3090   | 105<br>123        | 142<br>178     | 2.19<br>3.58                       | 10.9<br>17.5  | 2.02<br>3.31   | 10.1<br>16.2  | 2.6<br>3.44    | 2.7<br>3.6  | 9.5     |
| 53                           | 43.5           | 36.5           | 120   | 16×23×20                          | 3060   | 136<br>164        | 180<br>237     | 3.17<br>5.4                        | 16.4<br>26    | 2.93<br>4.99   | 15.1<br>24    | 3.76<br>4.96   | 4.5<br>5.9  | 14      |
| 63                           | 53.5           | 43             | 150   | 18×26×22                          | 3000   | 208<br>260        | 269<br>370     | 5.76<br>10.7                       | 27.7<br>49.6  | 5.33<br>9.88   | 25.6<br>45.8  | 6.66<br>9.16   | 7.8<br>11.0 | 19.6    |

Note1) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-136**.)

Static permissible moment\* 1 block: the static permissible moment with one LM block

Double blocks: static permissible moment when two LM blocks are in close contact with each other

For oil lubrication, be certain to let THK know the mounting orientation and where the LM block piping joint should be attached.

(Mounting orientation: see **A1-12**, Lubricant: see **A24-2**)

Total block length L

: The total block length L shown in the table is the length with the dust proof parts, code UU or SS.

If other contamination protection accessories or lubricant equipment are installed, the total block length will increase.

(See **A1-491** or **A1-512**)

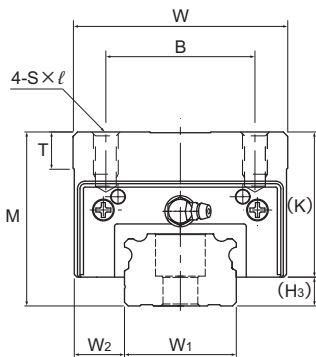
\*\* A pilot hole for side nipples, when a grease nipple for a model equipped with LaCS or QZ Lubricator is needed.

Pilot holes for side nipples are not drilled through for models other than those stated above.

For grease nipple mount machining, contact THK.

Note2) The basic load rating in the dimension table is for a load in the radial direction. Use Table7 on **A1-59** to calculate the load rating for loads in the reverse radial direction or lateral direction.

# Models SVR-RH, SVR-LRH, SVS-RH and SVS-LRH

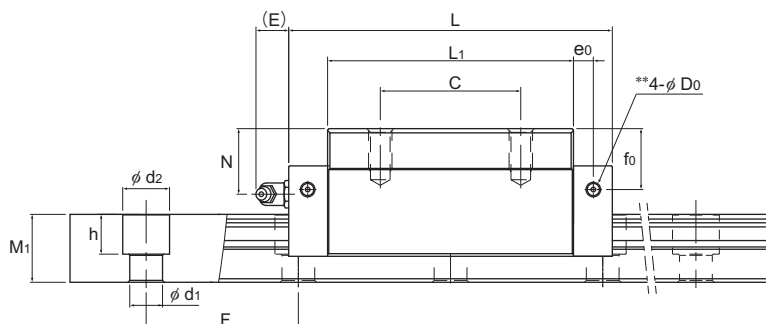


| Model No.              | Outer dimensions |       |        | LM block dimensions |    |        |                |      |      |      |                |    |                |                |               |      | H <sub>3</sub> |
|------------------------|------------------|-------|--------|---------------------|----|--------|----------------|------|------|------|----------------|----|----------------|----------------|---------------|------|----------------|
|                        | Height           | Width | Length | B                   | C  | S×ℓ    | L <sub>1</sub> | T    | K    | N    | f <sub>0</sub> | E  | e <sub>0</sub> | D <sub>0</sub> | Grease nipple |      |                |
|                        | M                | W     | L      |                     |    |        |                |      |      |      |                |    |                |                |               |      |                |
| SVR 35RH<br>SVS 35RH   | 55               | 70    | 109.5  | 50                  | 50 | M8×12  | 79             | 11.7 | 46   | 23.1 | 19             | 12 | 6              | 5.2            | B-M6F         | 9    |                |
| SVR 35LRH<br>SVS 35LRH | 55               | 70    | 135    | 50                  | 72 | M8×12  | 104.5          | 11.7 | 46   | 23.1 | 19             | 12 | 6              | 5.2            | B-M6F         | 9    |                |
| SVR 45RH<br>SVS 45RH   | 70               | 86    | 138.2  | 60                  | 60 | M10×17 | 105            | 14.7 | 58.4 | 31.9 | 26             | 16 | 8.5            | 5.2            | B-PT1/8       | 11.6 |                |
| SVR 45LRH<br>SVS 45LRH | 70               | 86    | 171    | 60                  | 80 | M10×17 | 137.8          | 14.7 | 58.4 | 31.9 | 26             | 16 | 8.5            | 5.2            | B-PT1/8       | 11.6 |                |
| SVR 55RH<br>SVS 55RH   | 80               | 100   | 163.3  | 75                  | 75 | M12×18 | 123.6          | 17.7 | 66   | 33.6 | 27             | 16 | 10             | 5.2            | B-PT1/8       | 14   |                |
| SVR 55LRH<br>SVS 55LRH | 80               | 100   | 200.5  | 75                  | 95 | M12×18 | 160.8          | 17.7 | 66   | 33.6 | 27             | 16 | 10             | 5.2            | B-PT1/8       | 14   |                |

## Model number coding

|              |                  |                                        |                    |                                                |                                                                                                                           |                                                                                                                                                          |                                |                                                     |            |
|--------------|------------------|----------------------------------------|--------------------|------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|-----------------------------------------------------|------------|
| <b>SVR35</b> | <b>RH</b>        | <b>2</b>                               | <b>QZ</b>          | <b>TTHH</b>                                    | <b>C0</b>                                                                                                                 | <b>+920L</b>                                                                                                                                             | <b>H</b>                       | <b>T</b>                                            | <b>-II</b> |
| Model No.    | Type of LM block | No. of LM blocks used on the same rail | With QZ Lubricator | Contamination protection accessory symbol (*1) | LM rail length (in mm)<br>Radial clearance symbol (*2)<br>Normal (No symbol)<br>Light preload (C1)<br>Medium preload (C0) | Accuracy symbol (*3)<br>Normal grade (No Symbol)/High accuracy grade (H)<br>Precision grade (P)/Super precision grade (SP)<br>Ultra precision grade (UP) | Symbol for LM rail jointed use | Symbol for No. of rails used on the same plane (*4) |            |

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-71**. (\*3) See **A1-77**. (\*4) See **A1-13**.  
Note) This model number indicates that an LM block and an LM rail constitute one set (i.e., the required number of sets when 2 rails are used in parallel is 2).  
Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.



Unit: mm

| LM rail dimensions           |                |                |       |    |                                   |                | Basic load rating |                | Static permissible moment<br>kN·m* |               |                |               |                |  | Mass           |                 |
|------------------------------|----------------|----------------|-------|----|-----------------------------------|----------------|-------------------|----------------|------------------------------------|---------------|----------------|---------------|----------------|--|----------------|-----------------|
| Width                        | W <sub>2</sub> | M <sub>1</sub> | Pitch | F  | d <sub>1</sub> ×d <sub>2</sub> ×h | Length<br>Max* | C                 | C <sub>0</sub> | M <sub>A</sub>                     |               | M <sub>B</sub> |               | M <sub>C</sub> |  | LM block<br>kg | LM rail<br>kg/m |
| W <sub>1</sub><br>0<br>-0.05 |                |                |       |    |                                   |                | kN                | kN             | 1 block                            | Double blocks | 1 block        | Double blocks | 1 block        |  |                |                 |
| 34                           | 18             | 24.5           | 80    | 9  | 14×12                             | 3000           | 89.6<br>68.6      | 116<br>88.6    | 1.26<br>1                          | 6.91<br>5.49  | 0.769<br>0.927 | 4.2<br>5.09   | 1.64<br>1.2    |  | 1.5            | 6.0             |
| 34                           | 18             | 24.5           | 80    | 9  | 14×12                             | 3000           | 112<br>86.1       | 160<br>123     | 2.35<br>1.88                       | 11.5<br>9.15  | 1.42<br>1.73   | 6.91<br>8.46  | 2.26<br>1.67   |  | 2              | 6.0             |
| 45                           | 20.5           | 29             | 105   | 14 | 20×17                             | 3090           | 138<br>105        | 186<br>142     | 2.76<br>2.19                       | 13.7<br>10.9  | 1.67<br>2.02   | 8.3<br>10.1   | 3.5<br>2.6     |  | 3.1            | 9.5             |
| 45                           | 20.5           | 29             | 105   | 14 | 20×17                             | 3090           | 161<br>123        | 233<br>178     | 4.52<br>3.58                       | 22.1<br>17.5  | 2.74<br>3.31   | 13.4<br>16.2  | 4.6<br>3.44    |  | 4.1            | 9.5             |
| 53                           | 23.5           | 36.5           | 120   | 16 | 23×20                             | 3060           | 177<br>136        | 235<br>180     | 3.99<br>3.17                       | 20.6<br>16.4  | 2.42<br>2.93   | 12.4<br>15.1  | 5.07<br>3.76   |  | 4.7            | 14              |
| 53                           | 23.5           | 36.5           | 120   | 16 | 23×20                             | 3060           | 214<br>164        | 309<br>237     | 6.8<br>5.4                         | 32.7<br>26    | 4.1<br>4.99    | 19.7<br>24    | 6.67<br>4.96   |  | 6.2            | 14              |

Note1) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-136**.)

Static permissible moment\* 1 block: the static permissible moment with one LM block

Double blocks: static permissible moment when two LM blocks are in close contact with each other  
For oil lubrication, be certain to let THK know the mounting orientation and where the LM block piping joint should be attached.

(Mounting orientation: see **A1-12**, Lubricant: see **A24-2**)

Total block length L : The total block length L shown in the table is the length with the dust proof parts, code UU or SS.  
If other contamination protection accessories or lubricant equipment are installed, the total block length will increase.

(See **A1-491** or **A1-512**)

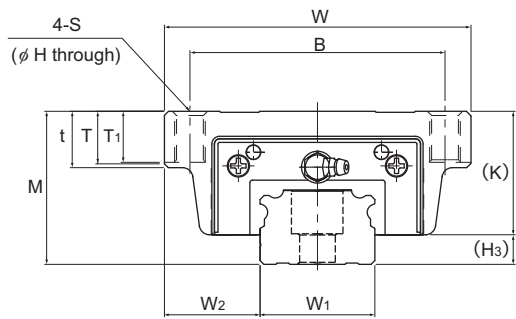
\*\* A pilot hole for side nipples, when a grease nipple for a model equipped with LaCS or QZ Lubricator is needed.

Pilot holes for side nipples are not drilled through for models other than those stated above.

For grease nipple mount machining, contact THK.

Note2) The basic load rating in the dimension table is for a load in the radial direction. Use Table7 on **A1-59** to calculate the load rating for loads in the reverse radial direction or lateral direction.

# Models SVR-CH, SVR-LCH, SVS-CH and SVS-LCH

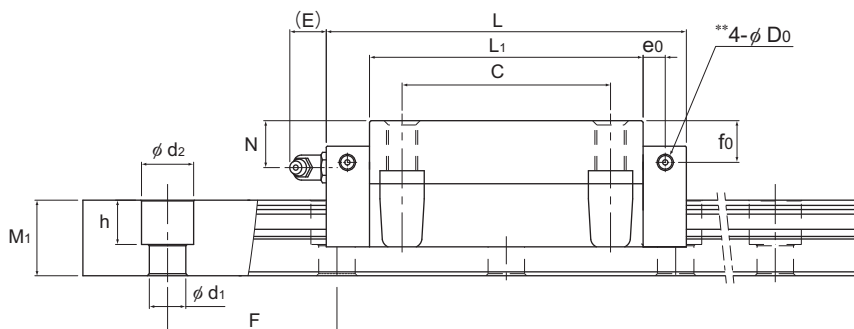


| Model No.              | Outer dimensions |       |        | LM block dimensions |    |     |      |                |    |      |                |      |      |                |    |                |                |               |      |  | H <sub>3</sub> |
|------------------------|------------------|-------|--------|---------------------|----|-----|------|----------------|----|------|----------------|------|------|----------------|----|----------------|----------------|---------------|------|--|----------------|
|                        | Height           | Width | Length | B                   | C  | S   | H    | L <sub>1</sub> | t  | T    | T <sub>1</sub> | K    | N    | f <sub>0</sub> | E  | e <sub>0</sub> | D <sub>0</sub> | Grease nipple |      |  |                |
|                        | M                | W     | L      |                     |    |     |      |                |    |      |                |      |      |                |    |                |                |               |      |  |                |
| SVR 35CH<br>SVS 35CH   | 48               | 100   | 109.5  | 82                  | 62 | M10 | 8.5  | 79             | 20 | 19   | 16             | 39   | 16.1 | 12             | 12 | 6              | 5.2            | B-M6F         | 9    |  |                |
| SVR 35LCH<br>SVS 35LCH | 48               | 100   | 135    | 82                  | 62 | M10 | 8.5  | 104.5          | 20 | 19   | 16             | 39   | 16.1 | 12             | 12 | 6              | 5.2            | B-M6F         | 9    |  |                |
| SVR 45CH<br>SVS 45CH   | 60               | 120   | 138.2  | 100                 | 80 | M12 | 10.5 | 105            | 22 | 20.5 | 20             | 48.4 | 21.9 | 16             | 16 | 8.5            | 5.2            | B-PT1/8       | 11.6 |  |                |
| SVR 45LCH<br>SVS 45LCH | 60               | 120   | 171    | 100                 | 80 | M12 | 10.5 | 137.8          | 22 | 20.5 | 20             | 48.4 | 21.9 | 16             | 16 | 8.5            | 5.2            | B-PT1/8       | 11.6 |  |                |
| SVR 55CH<br>SVS 55CH   | 70               | 140   | 163.3  | 116                 | 95 | M14 | 12.5 | 123.6          | 24 | 22.5 | 22             | 56   | 23.6 | 17             | 16 | 10             | 5.2            | B-PT1/8       | 14   |  |                |
| SVR 55LCH<br>SVS 55LCH | 70               | 140   | 200.5  | 116                 | 95 | M14 | 12.5 | 160.8          | 24 | 22.5 | 22             | 56   | 23.6 | 17             | 16 | 10             | 5.2            | B-PT1/8       | 14   |  |                |

## Model number coding

|              |                                        |                    |                                                |                                                                 |                                                                                                                                  |                                |                      |                                                     |            |
|--------------|----------------------------------------|--------------------|------------------------------------------------|-----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|--------------------------------|----------------------|-----------------------------------------------------|------------|
| <b>SVR45</b> | <b>LCH</b>                             | <b>2</b>           | <b>QZ</b>                                      | <b>TTHH</b>                                                     | <b>C0</b>                                                                                                                        | <b>+1200L</b>                  | <b>P</b>             | <b>T</b>                                            | <b>-II</b> |
| Model No.    | Type of LM block                       | With QZ Lubricator | Contamination protection accessory symbol (*1) | LM rail length (in mm)                                          | Radial clearance symbol (*2)                                                                                                     | Symbol for LM rail jointed use | Accuracy symbol (*3) | Symbol for No. of rails used on the same plane (*4) |            |
|              | No. of LM blocks used on the same rail |                    |                                                | Normal (No symbol)<br>Light preload (C1)<br>Medium preload (C0) | Normal grade (No Symbol)/High accuracy grade (H)<br>Precision grade (P)/Super precision grade (SP)<br>Ultra precision grade (UP) |                                |                      |                                                     |            |

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-71**. (\*3) See **A1-77**. (\*4) See **A1-13**.  
Note) This model number indicates that an LM block and an LM rail constitute one set (i.e., the required number of sets when 2 rails are used in parallel is 2).  
Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.



Unit: mm

|    | LM rail dimensions                        |                |                              |                |                                                             |              | Basic load rating        |                    | Static permissible moment<br>kN•m* |                    |               |                    |     |                    | Mass                |  |
|----|-------------------------------------------|----------------|------------------------------|----------------|-------------------------------------------------------------|--------------|--------------------------|--------------------|------------------------------------|--------------------|---------------|--------------------|-----|--------------------|---------------------|--|
|    | Width<br><br>W <sub>1</sub><br>0<br>-0.05 | W <sub>2</sub> | Height<br><br>M <sub>1</sub> | Pitch<br><br>F | Length<br><br>d <sub>1</sub> ×d <sub>2</sub> ×h<br><br>Max* | C<br><br>kN  | C <sub>0</sub><br><br>kN | M <sub>A</sub><br> |                                    | M <sub>B</sub><br> |               | M <sub>C</sub><br> |     | LM block<br><br>kg | LM rail<br><br>kg/m |  |
|    |                                           |                |                              |                |                                                             |              |                          | 1 block            | Double blocks                      | 1 block            | Double blocks | 1 block            |     |                    |                     |  |
|    |                                           |                |                              |                |                                                             |              |                          |                    |                                    |                    |               |                    |     |                    |                     |  |
| 34 | 33                                        | 24.5           | 80                           | 9×14×12        | 3000                                                        | 89.6<br>68.6 | 116<br>88.6              | 1.26<br>1          | 6.91<br>5.49                       | 0.769<br>0.927     | 4.2<br>5.09   | 1.64<br>1.2        | 1.7 | 6.0                |                     |  |
| 34 | 33                                        | 24.5           | 80                           | 9×14×12        | 3000                                                        | 112<br>86.1  | 160<br>123               | 2.35<br>1.88       | 11.5<br>9.15                       | 1.42<br>1.73       | 6.91<br>8.46  | 2.26<br>1.67       | 2.2 | 6.0                |                     |  |
| 45 | 37.5                                      | 29             | 105                          | 14×20×17       | 3090                                                        | 138<br>105   | 186<br>142               | 2.76<br>2.19       | 13.7<br>10.9                       | 1.67<br>2.02       | 8.3<br>10.1   | 3.5<br>2.6         | 3.3 | 9.5                |                     |  |
| 45 | 37.5                                      | 29             | 105                          | 14×20×17       | 3090                                                        | 161<br>123   | 233<br>178               | 4.52<br>3.58       | 22.1<br>17.5                       | 2.74<br>3.31       | 13.4<br>16.2  | 4.6<br>3.44        | 4.3 | 9.5                |                     |  |
| 53 | 43.5                                      | 36.5           | 120                          | 16×23×20       | 3060                                                        | 177<br>136   | 235<br>180               | 3.99<br>3.17       | 20.6<br>16.4                       | 2.42<br>2.93       | 12.4<br>15.1  | 5.07<br>3.76       | 5.1 | 14                 |                     |  |
| 53 | 43.5                                      | 36.5           | 120                          | 16×23×20       | 3060                                                        | 214<br>164   | 309<br>237               | 6.8<br>5.4         | 32.7<br>26                         | 4.1<br>4.99        | 19.7<br>24    | 6.67<br>4.96       | 6.6 | 14                 |                     |  |

Note1) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-136**.)

Static permissible moment\* 1 block: the static permissible moment with one LM block

Double blocks: static permissible moment when two LM blocks are in close contact with each other

For oil lubrication, be certain to let THK know the mounting orientation and where the LM block piping joint should be attached.

(Mounting orientation: see **A1-12**, Lubricant: see **A24-2**)

Total block length L : The total block length L shown in the table is the length with the dust proof parts, code UU or SS. If other contamination protection accessories or lubricant equipment are installed, the total block length will increase.

(See **A1-491** or **A1-512**)

\*\* A pilot hole for side nipples, when a grease nipple for a model equipped with LaCS or QZ Lubricator is needed.

Pilot holes for side nipples are not drilled through for models other than those stated above.

For grease nipple mount machining, contact THK.

Note2) The basic load rating in the dimension table is for a load in the radial direction. Use Table7 on **A1-59** to calculate the load rating for loads in the reverse radial direction or lateral direction.

# Standard Length and Maximum Length of the LM Rail

Table1 shows the standard lengths and the maximum lengths of model SVR/SVS variations. If the maximum length of the desired LM rail exceeds them, jointed rails will be used. Contact THK for details.

For special rail lengths, it is recommended to use a value corresponding to the G,g dimension from the table. As the G,g dimension increases, this portion becomes less stable, and the accuracy performance is severely impacted.

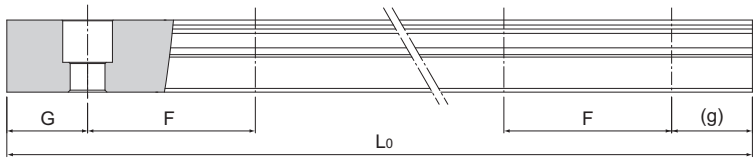


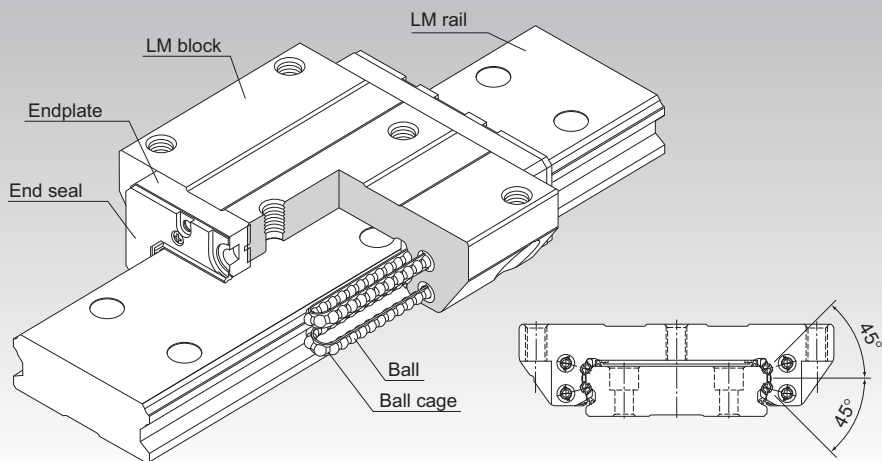
Table1 Standard Length and Maximum Length of the LM Rail for Models SVR/SVS Unit: mm

| Model No.                                 | SVR/SVS 25 | SVR/SVS 30 | SVR/SVS 35 | SVR/SVS 45 | SVR/SVS 55 | SVR/SVS 65 |
|-------------------------------------------|------------|------------|------------|------------|------------|------------|
| LM rail standard length (L <sub>0</sub> ) | 230        | 280        | 280        | 570        | 780        | 1270       |
|                                           | 270        | 360        | 360        | 675        | 900        | 1570       |
|                                           | 350        | 440        | 440        | 780        | 1020       | 2020       |
|                                           | 390        | 520        | 520        | 885        | 1140       | 2620       |
|                                           | 470        | 600        | 600        | 990        | 1260       |            |
|                                           | 510        | 680        | 680        | 1095       | 1380       |            |
|                                           | 590        | 760        | 760        | 1200       | 1500       |            |
|                                           | 630        | 840        | 840        | 1305       | 1620       |            |
|                                           | 710        | 920        | 920        | 1410       | 1740       |            |
|                                           | 750        | 1000       | 1000       | 1515       | 1860       |            |
|                                           | 830        | 1080       | 1080       | 1620       | 1980       |            |
|                                           | 950        | 1160       | 1160       | 1725       | 2100       |            |
|                                           | 990        | 1240       | 1240       | 1830       | 2220       |            |
|                                           | 1070       | 1320       | 1320       | 1935       | 2340       |            |
|                                           | 1110       | 1400       | 1400       | 2040       | 2460       |            |
|                                           | 1190       | 1480       | 1480       | 2145       | 2580       |            |
|                                           | 1230       | 1560       | 1560       | 2250       | 2700       |            |
|                                           | 1310       | 1640       | 1640       | 2355       | 2820       |            |
|                                           | 1350       | 1720       | 1720       | 2460       | 2940       |            |
|                                           | 1430       | 1800       | 1800       | 2565       | 3060       |            |
|                                           | 1470       | 1880       | 1880       | 2670       |            |            |
|                                           | 1550       | 1960       | 1960       | 2775       |            |            |
|                                           | 1590       | 2040       | 2040       | 2880       |            |            |
|                                           | 1710       | 2200       | 2200       | 2985       |            |            |
|                                           | 1830       | 2360       | 2360       | 3090       |            |            |
|                                           | 1950       | 2520       | 2520       |            |            |            |
|                                           | 2070       | 2680       | 2680       |            |            |            |
|                                           | 2190       | 2840       | 2840       |            |            |            |
|                                           | 2310       | 3000       | 3000       |            |            |            |
|                                           | 2430       |            |            |            |            |            |
|                                           | 2470       |            |            |            |            |            |
| Standard pitch F                          | 40         | 80         | 80         | 105        | 120        | 150        |
| G,g                                       | 15         | 20         | 20         | 22.5       | 30         | 35         |
| Max length                                | 3000       | 3000       | 3000       | 3090       | 3060       | 3000       |

Note1) The maximum length varies with accuracy grades. Contact THK for details.  
Note2) If jointed rails are not allowed and a greater length than the maximum values above is required, contact THK.



## Caged Ball LM Guide Wide Rail Model SHW



\*For the ball cage, see **A1-88**.

**Point of Selection** **A1-10**

**Point of Design** **A1-454**

**Options** **A1-477**

**Model No.** **A1-543**

**Precautions on Use** **A1-549**

**Accessories for Lubrication** **A24-1**

**Mounting Procedure and Maintenance** **B1-89**

Equivalent moment factor **A1-43**

Rated Loads in All Directions **A1-59**

Equivalent factor in each direction **A1-61**

Radial Clearance **A1-71**

Accuracy Standards **A1-77**

Shoulder Height of the Mounting Base and the Corner Radius **A1-467**

Permissible Error of the Mounting Surface **A1-471**

Dimensions of Each Model with an Option Attached **A1-491**

## Structure and Features

A wide and highly rigid LM Guide that uses ball cages to achieve low noise, long-term maintenance-free operation and high speed.

### [Wide, Low Center of Gravity]

Model SHW, which has a wide LM rail and a low center of gravity, is optimal for locations requiring space saving and large  $M_c$  moment rigidity.

### [4-way Equal Load]

Each row of balls is placed at a contact angle of  $45^\circ$  so that the rated loads applied to the LM block are uniform in the four directions (radial, reverse radial and lateral directions), enabling the LM Guide to be used in all orientations and in extensive applications.

### [Self-adjustment Capability]

The self-adjustment capability through front-to-front configuration of THK's unique circular-arc grooves (DF set) enables a mounting error to be absorbed even under a preload, thus to achieve highly accurate, smooth straight motion.

### [Low Dust Generation]

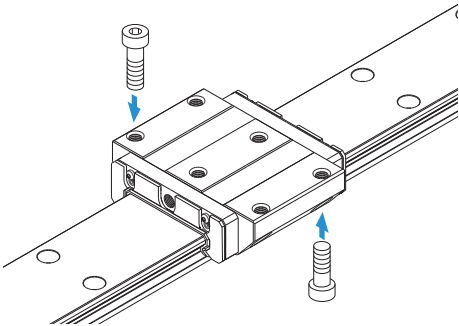
Use of ball cages eliminates friction between balls and retains lubricant, thus achieving low dust generation.

# Types and Features

## Model SHW-CA

The flange of the LM block has tapped holes.  
Can be mounted from the top or the bottom.

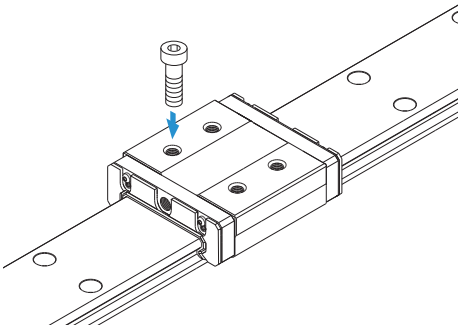
Specification Table⇒A1-142



## Model SHW-CR

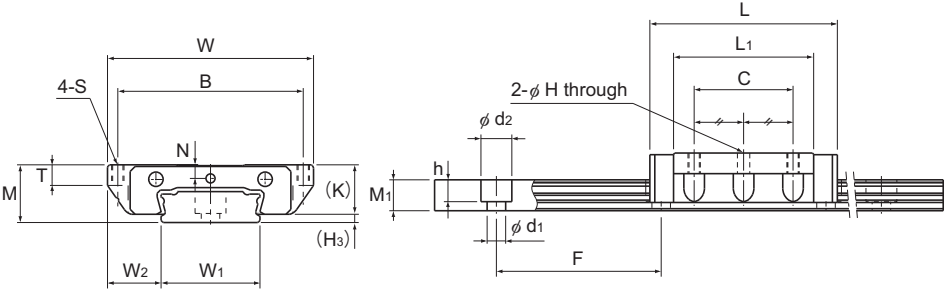
The LM block has tapped holes.

Specification Table⇒A1-144





# Model SHW-CA



Models SHW12CAM and SHW14CAM

| Model No. | Outer dimensions |       |        | LM block dimensions |    |     |     |                |    |      |     | H <sub>3</sub> |
|-----------|------------------|-------|--------|---------------------|----|-----|-----|----------------|----|------|-----|----------------|
|           | Height           | Width | Length | B                   | C  | S   | H   | L <sub>1</sub> | T  | K    | N   |                |
|           | M                | W     | L      |                     |    |     |     |                |    |      |     |                |
| SHW 12CAM | 12               | 40    | 37     | 35                  | 18 | M3  | 2.5 | 27             | 4  | 10   | 2.8 | 2              |
| SHW 14CAM | 14               | 50    | 45.5   | 45                  | 24 | M3  | 2.5 | 34             | 5  | 12   | 3.3 | 2              |
| SHW 17CAM | 17               | 60    | 51     | 53                  | 26 | M4  | 3.3 | 38             | 6  | 14.5 | 4   | 2.5            |
| SHW 21CA  | 21               | 68    | 59     | 60                  | 29 | M5  | 4.4 | 43.6           | 8  | 17.7 | 5   | 3.3            |
| SHW 27CA  | 27               | 80    | 72.8   | 70                  | 40 | M6  | 5.3 | 56.6           | 10 | 23.5 | 6   | 3.5            |
| SHW 35CA  | 35               | 120   | 107    | 107                 | 60 | M8  | 6.8 | 83             | 14 | 31   | 7.6 | 4              |
| SHW 50CA  | 50               | 162   | 141    | 144                 | 80 | M10 | 8.6 | 107            | 18 | 46   | 14  | 4              |

Note) The M in the model number symbol indicates that the LM block, LM rail and balls are made of stainless steel.  
The stainless steel provides excellent corrosion and environmental resistance.

## Model number coding

**SHW17 CA 2 QZ UU C1 M +580L P M - II**

Model number

Type of LM block

With QZ Lubricator

Contamination protection accessory symbol (\*1)

Stainless steel LM block

LM rail length (in mm)

Stainless steel LM rail

Symbol for No. of rails used on the same plane (\*4)

No. of LM blocks used on the same rail

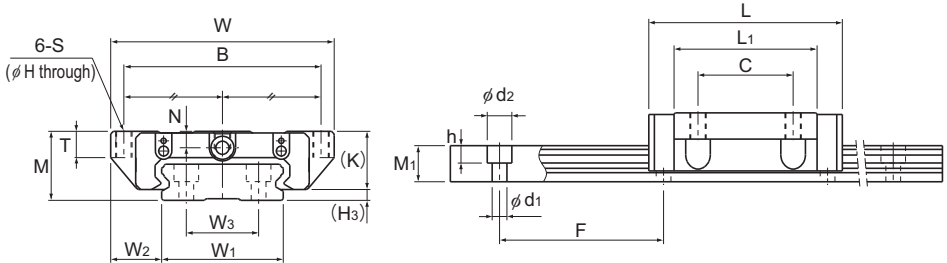
Radial clearance symbol (\*2)  
Normal (No symbol)  
Light preload (C1)  
Medium preload (C0)

Accuracy symbol (\*3)  
Normal grade (No Symbol)/High accuracy grade (H)  
Precision grade (P)/Super precision grade (SP)  
Ultra precision grade (UP)

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-71**. (\*3) See **A1-77**. (\*4) See **A1-13**.

Note) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.)

Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.



Models SHW17CAM and SHW21 to 50CA

Unit: mm

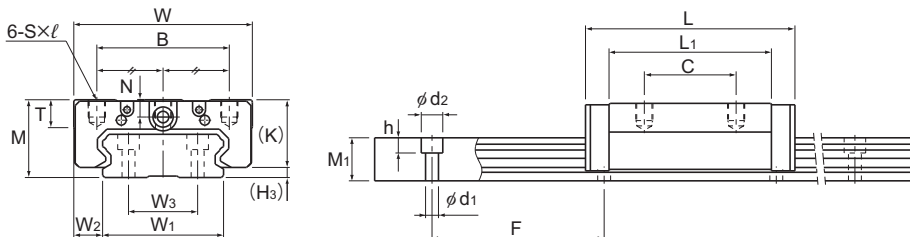
| LM rail dimensions           |                |                |                |       |                                   |         | Basic load rating |                | Static permissible moment<br>kN·m* |               |                |               |                | Mass     |         |
|------------------------------|----------------|----------------|----------------|-------|-----------------------------------|---------|-------------------|----------------|------------------------------------|---------------|----------------|---------------|----------------|----------|---------|
| Width                        |                |                | Height         | Pitch |                                   | Length* | C                 | C <sub>0</sub> | M <sub>A</sub>                     |               | M <sub>B</sub> |               | M <sub>C</sub> | LM block | LM rail |
| W <sub>1</sub><br>0<br>-0.05 | W <sub>2</sub> | W <sub>3</sub> | M <sub>1</sub> | F     | d <sub>1</sub> ×d <sub>2</sub> ×h | Max     | kN                | kN             | 1 block                            | Double blocks | 1 block        | Double blocks | 1 block        | kg       | kg/m    |
| 18                           | 11             | —              | 6.6            | 40    | 4.5×7.5×5.3                       | 1230    | 4.31              | 5.66           | 0.0228                             | 0.12          | 0.0228         | 0.12          | 0.0405         | 0.05     | 0.8     |
| 24                           | 13             | —              | 7.5            | 40    | 4.5×7.5×5.3                       | 1430    | 7.05              | 8.98           | 0.0466                             | 0.236         | 0.0466         | 0.236         | 0.0904         | 0.1      | 1.23    |
| 33                           | 13.5           | 18             | 8.6            | 40    | 4.5×7.5×5.3                       | 1800    | 7.65              | 10.18          | 0.0591                             | 0.298         | 0.0591         | 0.298         | 0.164          | 0.15     | 1.9     |
| 37                           | 15.5           | 22             | 11             | 50    | 4.5×7.5×5.3                       | 3000    | 8.24              | 12.8           | 0.0806                             | 0.434         | 0.0806         | 0.434         | 0.229          | 0.24     | 2.9     |
| 42                           | 19             | 24             | 15             | 60    | 4.5×7.5×5.3                       | 3000    | 16                | 22.7           | 0.187                              | 0.949         | 0.187          | 0.949         | 0.455          | 0.47     | 4.5     |
| 69                           | 25.5           | 40             | 19             | 80    | 7×11×9                            | 3000    | 35.5              | 49.2           | 0.603                              | 3             | 0.603          | 3             | 1.63           | 1.4      | 9.6     |
| 90                           | 36             | 60             | 24             | 80    | 9×14×12                           | 3000    | 70.2              | 91.4           | 1.46                               | 7.37          | 1.46           | 7.37          | 3.97           | 3.7      | 15      |

Note) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-146**.)

Static permissible moment\* 1 block: the static permissible moment with one LM block

Double blocks: static permissible moment when two LM blocks are in close contact with each other  
Total block length L : The total block length L shown in the table is the length with the dust proof parts, code UU or SS. If other contamination protection accessories or lubricant equipment are installed, the total block length will increase.  
(See **A1-491** or **A1-512**)

# Models SHW-CR and SHW-HR



Models SHW27 to 50CR

| Model No. | Outer dimensions |       |        | LM block dimensions |    |        |                |    |      |     | H <sub>3</sub> |
|-----------|------------------|-------|--------|---------------------|----|--------|----------------|----|------|-----|----------------|
|           | Height           | Width | Length |                     |    |        |                |    |      |     |                |
|           | M                | W     | L      | B                   | C  | S×ℓ    | L <sub>1</sub> | T  | K    | N   |                |
| SHW 12CRM | 12               | 30    | 37     | 21                  | 12 | M3×3.5 | 27             | 4  | 10   | 2.8 | 2              |
| SHW 12HRM | 12               | 30    | 50.4   | 21                  | 24 | M3×3.5 | 40.4           | 4  | 10   | 2.8 | 2              |
| SHW 14CRM | 14               | 40    | 45.5   | 28                  | 15 | M3×4   | 34             | 5  | 12   | 3.3 | 2              |
| SHW 17CRM | 17               | 50    | 51     | 29                  | 15 | M4×5   | 38             | 6  | 14.5 | 4   | 2.5            |
| SHW 21CR  | 21               | 54    | 59     | 31                  | 19 | M5×6   | 43.6           | 8  | 17.7 | 5   | 3.3            |
| SHW 27CR  | 27               | 62    | 72.8   | 46                  | 32 | M6×6   | 56.6           | 10 | 23.5 | 6   | 3.5            |
| SHW 35CR  | 35               | 100   | 107    | 76                  | 50 | M8×8   | 83             | 14 | 31   | 7.6 | 4              |
| SHW 50CR  | 50               | 130   | 141    | 100                 | 65 | M10×15 | 107            | 18 | 46   | 14  | 4              |

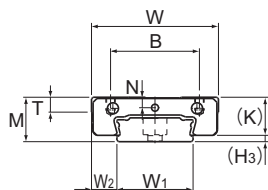
(Note) The M in the model number symbol indicates that the LM block, LM rail and balls are made of stainless steel.  
The stainless steel provides excellent corrosion and environmental resistance.

## Model number coding

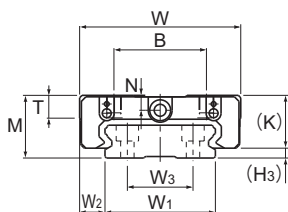
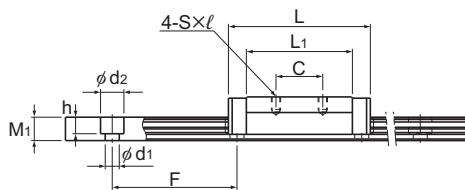
| SHW17        | CR                                     | 2                  | QZ                                             | KKHH                                                            | C1                       | M                      | +820L                              | P                                                                                                                                | M                                                   | -II |
|--------------|----------------------------------------|--------------------|------------------------------------------------|-----------------------------------------------------------------|--------------------------|------------------------|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|-----|
| Model number | Type of LM block                       | With QZ Lubricator | Contamination protection accessory symbol (*1) | Radial clearance symbol (*2)                                    | Stainless steel LM block | LM rail length (in mm) | LM rail is made of stainless steel | Accuracy symbol (*3)                                                                                                             | Symbol for No. of rails used on the same plane (*4) |     |
|              | No. of LM blocks used on the same rail |                    |                                                | Normal (No symbol)<br>Light preload (C1)<br>Medium preload (C0) |                          |                        |                                    | Normal grade (No Symbol)<br>High accuracy grade (H)/Precision grade (P)<br>Super precision grade (SP)/Ultra precision grade (UP) |                                                     |     |

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-71**. (\*3) See **A1-77**. (\*4) See **A1-13**.

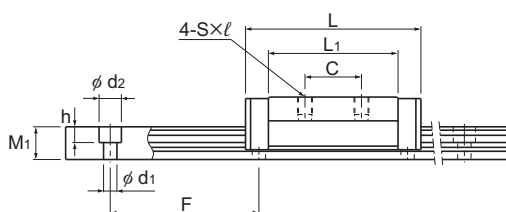
(Note) Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.



Models SHW12CRM, SHW12HRM and SHW14CRM



Models SHW17CRM and SHW21CRM



Unit: mm

|    | LM rail dimensions                        |                |                |                          |             |                                   |                    | Basic load rating |                          | Static permissible moment kN·m*                                                   |                  |                                                                                   |                  |                                                                                   | Mass |                       |                        |
|----|-------------------------------------------|----------------|----------------|--------------------------|-------------|-----------------------------------|--------------------|-------------------|--------------------------|-----------------------------------------------------------------------------------|------------------|-----------------------------------------------------------------------------------|------------------|-----------------------------------------------------------------------------------|------|-----------------------|------------------------|
|    | Width<br><br>W <sub>1</sub><br>0<br>-0.05 | W <sub>2</sub> | W <sub>3</sub> | Height<br>M <sub>1</sub> | Pitch<br>F  | d <sub>1</sub> ×d <sub>2</sub> ×h | Length*<br><br>Max | C<br><br>kN       | C <sub>0</sub><br><br>kN |  |                  |  |                  |  |      | LM<br>block<br><br>kg | LM<br>rail<br><br>kg/m |
|    |                                           |                |                |                          |             |                                   |                    |                   |                          | 1<br>block                                                                        | Double<br>blocks | 1<br>block                                                                        | Double<br>blocks | 1<br>block                                                                        |      |                       |                        |
|    |                                           |                |                |                          |             |                                   |                    |                   |                          |                                                                                   |                  |                                                                                   |                  |                                                                                   |      |                       |                        |
| 18 | 6                                         | —              | 6.6            | 40                       | 4.5×7.5×5.3 | 1230                              | 4.31               | 5.66              | 0.0228                   | 0.12                                                                              | 0.0228           | 0.12                                                                              | 0.0405           | 0.04                                                                              | 0.8  |                       |                        |
| 18 | 6                                         | —              | 6.6            | 40                       | 4.5×7.5×5.3 | 1230                              | 5.56               | 8.68              | 0.0511                   | 0.246                                                                             | 0.0511           | 0.246                                                                             | 0.0621           | 0.06                                                                              | 0.8  |                       |                        |
| 24 | 8                                         | —              | 7.5            | 40                       | 4.5×7.5×5.3 | 1430                              | 7.05               | 8.98              | 0.0466                   | 0.236                                                                             | 0.0466           | 0.236                                                                             | 0.0904           | 0.08                                                                              | 1.23 |                       |                        |
| 33 | 8.5                                       | 18             | 8.6            | 40                       | 4.5×7.5×5.3 | 1800                              | 7.65               | 10.18             | 0.0591                   | 0.298                                                                             | 0.0591           | 0.298                                                                             | 0.164            | 0.13                                                                              | 1.9  |                       |                        |
| 37 | 8.5                                       | 22             | 11             | 50                       | 4.5×7.5×5.3 | 3000                              | 8.24               | 12.8              | 0.0806                   | 0.434                                                                             | 0.0806           | 0.434                                                                             | 0.229            | 0.19                                                                              | 2.9  |                       |                        |
| 42 | 10                                        | 24             | 15             | 60                       | 4.5×7.5×5.3 | 3000                              | 16                 | 22.7              | 0.187                    | 0.949                                                                             | 0.187            | 0.949                                                                             | 0.455            | 0.36                                                                              | 4.5  |                       |                        |
| 69 | 15.5                                      | 40             | 19             | 80                       | 7×11×9      | 3000                              | 35.5               | 49.2              | 0.603                    | 3                                                                                 | 0.603            | 3                                                                                 | 1.63             | 1.2                                                                               | 9.6  |                       |                        |
| 90 | 20                                        | 60             | 24             | 80                       | 9×14×12     | 3000                              | 70.2               | 91.4              | 1.46                     | 7.37                                                                              | 1.46             | 7.37                                                                              | 3.97             | 3                                                                                 | 15   |                       |                        |

Note) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-146**.)

Static permissible moment\*

1 block: the static permissible moment with one LM block

Double blocks: static permissible moment when two LM blocks are in close contact with each other

Total block length L

: The total block length L shown in the table is the length with the dust proof parts, code UU or SS.

If other contamination protection accessories or lubricant equipment are installed, the

total block length will increase.

(See **A1-491** or **A1-512**)

# Standard Length and Maximum Length of the LM Rail

Table1 shows the standard lengths and the maximum lengths of model SHW variations. If the maximum length of the desired LM rail exceeds them, jointed rails will be used. Contact THK for details. For special rail lengths, it is recommended to use a value corresponding to the G,g dimension from the table. As the G,g dimension increases, this portion becomes less stable, and the accuracy performance is severely impacted.

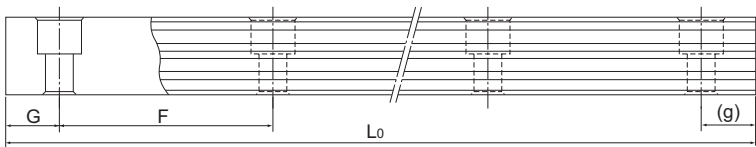


Table1 Standard Length and Maximum Length of the LM Rail for Model SHW Unit: mm

| Model No.                                 | SHW 12 | SHW 14 | SHW 17 | SHW 21 | SHW 27 | SHW 35 | SHW 50 |
|-------------------------------------------|--------|--------|--------|--------|--------|--------|--------|
| LM rail standard length (L <sub>0</sub> ) | 70     | 70     | 110    | 130    | 160    | 280    | 280    |
|                                           | 110    | 110    | 190    | 230    | 280    | 440    | 440    |
|                                           | 150    | 150    | 310    | 380    | 340    | 760    | 760    |
|                                           | 190    | 190    | 470    | 480    | 460    | 1000   | 1000   |
|                                           | 230    | 230    | 550    | 580    | 640    | 1240   | 1240   |
|                                           | 270    | 270    |        | 780    | 820    | 1560   | 1640   |
|                                           | 310    | 310    |        |        |        |        | 2040   |
|                                           | 390    | 390    |        |        |        |        |        |
|                                           | 470    | 470    |        |        |        |        |        |
|                                           |        | 550    |        |        |        |        |        |
|                                           |        | 670    |        |        |        |        |        |
| Standard pitch F                          | 40     | 40     | 40     | 50     | 60     | 80     | 80     |
| G,g                                       | 15     | 15     | 15     | 15     | 20     | 20     | 20     |
| Max length                                | 1230   | 1430   | 1800   | 3000   | 3000   | 3000   | 3000   |

Note1) The maximum length varies with accuracy grades. Contact THK for details.  
 Note2) If jointed rails are not allowed and a greater length than the maximum values above is required, contact THK.  
 Note3) Models SHW12, 14 and 17 are made of stainless steel.

# Greasing Hole

## [Grease Nipple and Greasing Hole for Model SHW]

Model SHW does not have a grease nipple as standard. Installation of a grease nipple and the drilling of a greasing hole is performed at THK. When ordering SHW, indicate that the desired model requires a grease nipple or greasing hole. (For greasing hole dimensions and supported grease nipple types and dimensions, see Table2).

When using SHW under harsh conditions, use QZ Lubricator\* (optional) or Laminated Contact Scraper LaCS\* (optional).

Note1) Grease nipple is not available for models SHW12 and SHW14. They can have a greasing hole.

Note2) Using a greasing hole other than for greasing may cause damage.

Note3) For QZ Lubricator\*, see [A1-509](#). For Laminated Contact Scraper LaCS\*, see [A1-484](#).

Note4) When desiring a grease nipple for a model attached with QZ Lubricator, contact THK.

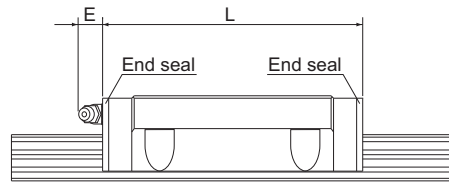


Fig.1 Dimensions of the Grease Nipple for Model SHW

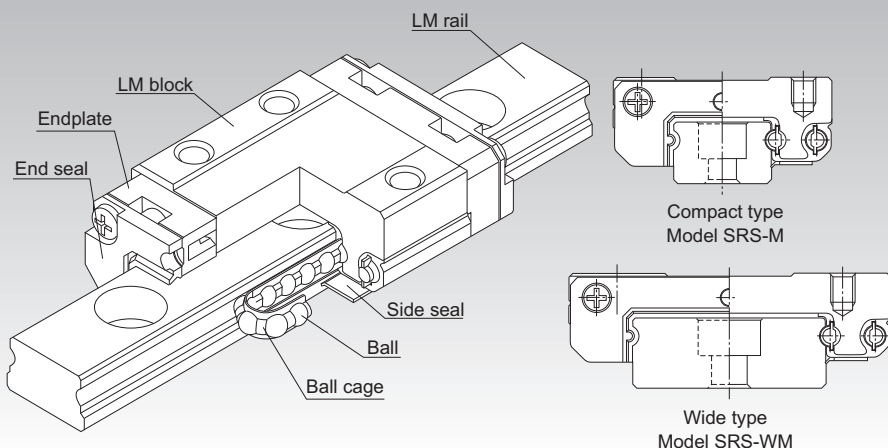
Note) For the L dimension, see the corresponding specification table.

Table2 Table of Grease Nipple and Greasing Hole Dimensions

Unit: mm

| Model No. | E  | Grease nipple or greasing hole |
|-----------|----|--------------------------------|
| SHW       | 12 | — $\phi$ 2.2 drilled hole      |
|           | 14 | — $\phi$ 2.2 drilled hole      |
|           | 17 | 5 PB107                        |
|           | 21 | 5.5 PB1021B                    |
|           | 27 | 12 B-M6F                       |
|           | 35 | 12 B-M6F                       |
|           | 50 | 16 B-PT1/8                     |

## Caged Ball LM Guide Miniature Type Model SRS



\*For the ball cage, see **A1-88**.

**Point of Selection** **A1-10**

**Point of Design** **A1-454**

**Options** **A1-477**

**Model No.** **A1-543**

**Precautions on Use** **A1-549**

**Accessories for Lubrication** **A24-1**

**Mounting Procedure and Maintenance** **B1-89**

**Equivalent moment factor** **A1-43**

**Rated Loads in All Directions** **A1-59**

**Equivalent factor in each direction** **A1-61**

**Radial Clearance** **A1-71**

**Accuracy Standards** **A1-83**

**Shoulder Height of the Mounting Base and the Corner Radius** **A1-469**

**Permissible Error of the Mounting Surface** **A1-471**

**Flatness of the Mounting Surface** **A1-472**

**Dimensions of Each Model with an Option Attached** **A1-491**

## Structure and Features

Caged Ball LM Guide model SRS has a structure where two raceways are incorporated into the compact body, enabling the model to receive loads in all directions, and to be used in locations where a moment is applied with a single rail. In addition, use of ball cages eliminates friction between balls, thus achieving high speed, low noise, acceptable running sound, long service life, and long-term maintenance-free operation.

### [Low Dust Generation]

Use of ball cages eliminates friction between balls and retains lubricant, thus achieving low dust generation. In addition, the LM block and LM rail use stainless steel, which is highly resistant to corrosion.

### [Compact]

Since SRS has a compact structure where the rail cross section is designed to be low and that contains only two rows of balls, it can be installed in space-saving locations.

### [Lightweight]

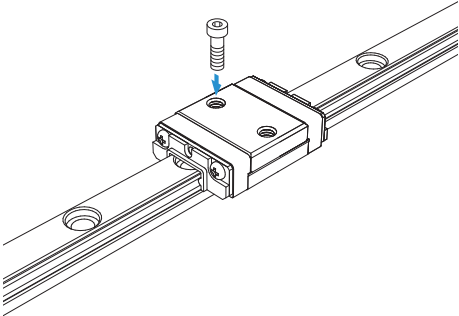
Since part of the LM block (e.g., around the ball relief hole) is made of resin and formed through insert molding, SRS is a lightweight, low inertia type of LM Guide.

# Types and Features

## Model SRS5M

SRS5 is the smallest caged ball LM guide.

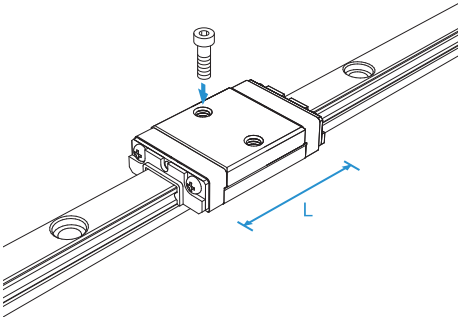
Specification Table⇒A1-154



## Model SRS-5N

Overall LM block length (L) is greater than for model SRS5M; load rating and permissible moment are higher as well.

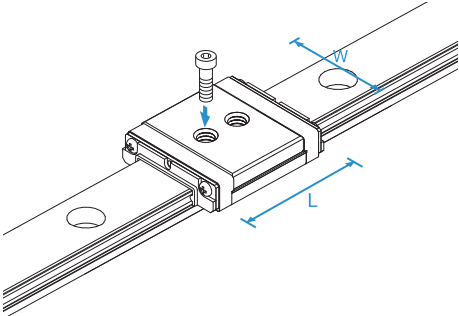
Specification Table⇒A1-154



## Model SRS5WM

This model has a larger overall LM block length (L), width (W), rated load and permissible moment than model SRS5M.

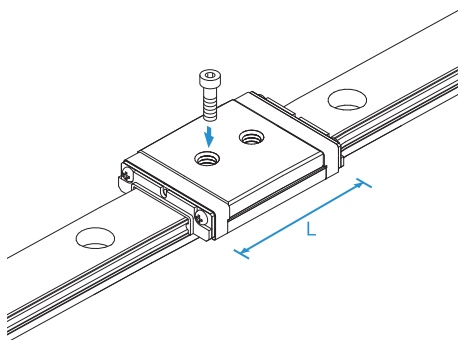
Specification Table⇒A1-158



## Model SRS-5WN

Specification Table⇒ **A1-158**

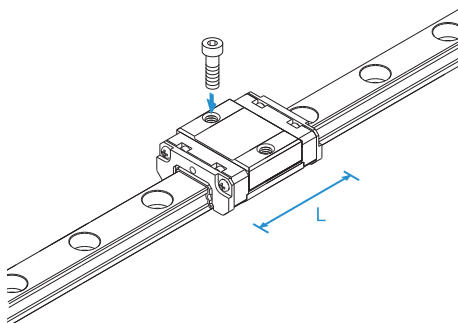
Overall LM block length (L) is greater than for model SRS5WM; load rating and permissible moment are higher as well.



## Model SRS-S

Specification Table⇒ **A1-154**

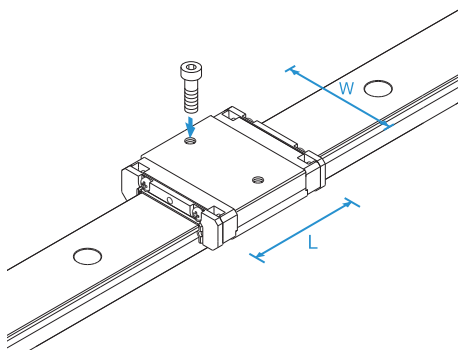
Overall LM block length (L) is less than that of model SRS-M.



## Model SRS-WS

Specification Table⇒ **A1-158**

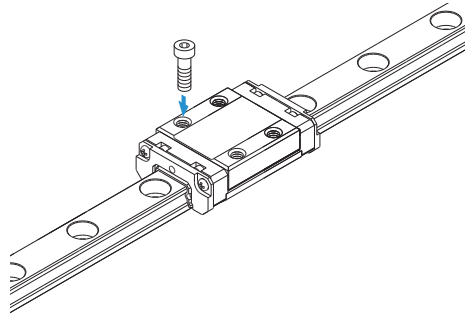
Has a longer overall LM block length (L), a greater width and a larger rated load and permissible moment than SRS-S.



## Model SRS-M

A standard type of SRS.

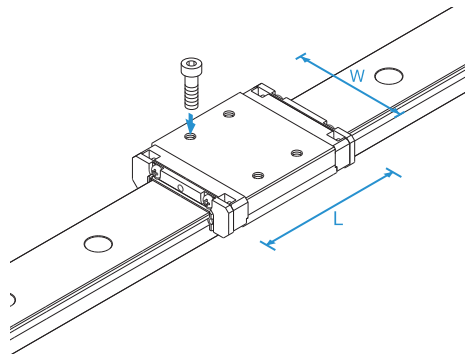
Specification Table⇒A1-154



## Model SRS-WM

Has a longer overall LM block length (L), a greater width and a larger rated load and permissible moment than SRS-M.

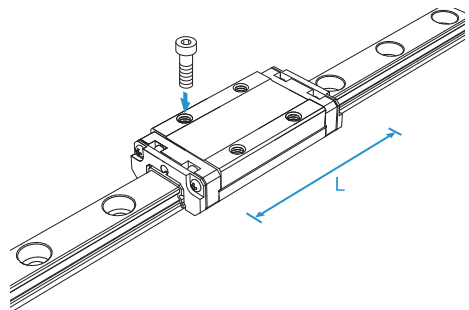
Specification Table⇒A1-158



## Model SRS-N

Compared with model SRS-M, it has a longer total LM block length (L) and a higher load rating and permissible moment.

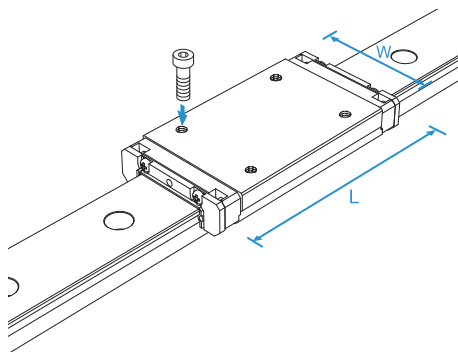
Specification Table⇒A1-154



## Model SRS-WN

Compared with Model SRS-WM, it has a longer total LM block length (L) and a higher load rating and permissible moment.

Specification Table⇒ **A1-158**



## SRS-G

Specification Table⇒ **A1-154 to A1-160**

The SRS-G, a model equipped with uncaged, full-complement bearings, is also available. Due to its cageless design, however, the SRS-G's dynamic load rating is lower than that of standard SRS models. For specific data, please refer to the dimension tables in this catalog.

## Flatness of the LM Rail and the LM Block Mounting Surface

Since the Model SRS has Gothic-arch grooves, any precision errors in the mounting surface may negatively affect its operability. Therefore, we recommend using SRS on mounting surfaces made with high precision.

Table1 Flatness of the LM Rail and the LM Block Mounting Surface

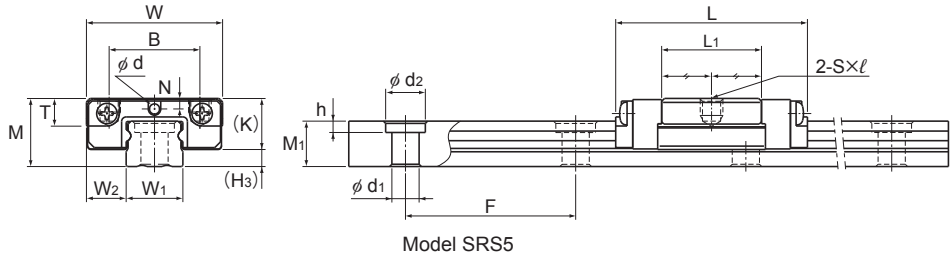
Unit: mm

| Model No. | Flatness error |
|-----------|----------------|
| SRS 5     | 0.015/200      |
| SRS 7     | 0.025/200      |
| SRS 9     | 0.035/200      |
| SRS 12    | 0.050/200      |
| SRS 15    | 0.060/200      |
| SRS 20    | 0.070/200      |
| SRS 25    | 0.070/200      |

Note 1) As many factors can affect the mounting precision, we recommend using values 70% or less than those shown.

Note 2) The above figures apply to normal clearances. When using two or more rails with C1 clearance, we recommend using values 50% or less than those shown.

# Models SRS-S, SRS-M and SRS-N



| Model No.           | Outer dimensions |       |        | LM block dimensions |    |        |                |     |     |      |               |                |
|---------------------|------------------|-------|--------|---------------------|----|--------|----------------|-----|-----|------|---------------|----------------|
|                     | Height           | Width | Length |                     |    |        |                |     |     |      | Greasing hole |                |
|                     | M                | W     | L      | B                   | C  | S×ℓ    | L <sub>1</sub> | T   | K   | N    | d             | H <sub>3</sub> |
| SRS 5M<br>SRS 5GM   | 6                | 12    | 16.9   | 8                   | —  | M2×1.5 | 8.8            | 1.7 | 4.5 | 0.93 | 0.8           | 1.5            |
| SRS 5N<br>SRS 5GN   | 6                | 12    | 20.1   | 8                   | —  | M2×1.5 | 12             | 1.7 | 4.5 | 0.93 | 0.8           | 1.5            |
| SRS 7S<br>SRS 7GS   | 8                | 17    | 19     | 12                  | —  | M2×2.3 | 9              | 3.3 | 6.7 | 1.6  | 1.2           | 1.3            |
| SRS 7M<br>SRS 7GM   | 8                | 17    | 23.4   | 12                  | 8  | M2×2.3 | 13.4           | 3.3 | 6.7 | 1.6  | 1.2           | 1.3            |
| SRS 7N<br>SRS 7GN   | 8                | 17    | 31     | 12                  | 13 | M2×2.3 | 21             | 3.3 | 6.7 | 1.6  | 1.2           | 1.3            |
| SRS 9XS<br>SRS 9XGS | 10               | 20    | 21.5   | 15                  | —  | M3×2.8 | 10.5           | 4.5 | 8.5 | 2.4  | 1.6           | 1.5            |
| SRS 9XM<br>SRS 9XGM | 10               | 20    | 30.8   | 15                  | 10 | M3×2.8 | 19.8           | 4.5 | 8.5 | 2.4  | 1.6           | 1.5            |
| SRS 9XN<br>SRS 9XGN | 10               | 20    | 40.8   | 15                  | 16 | M3×2.8 | 29.8           | 4.5 | 8.5 | 2.4  | 1.6           | 1.5            |
| SRS 12S<br>SRS 12GS | 13               | 27    | 25     | 20                  | —  | M3×3.2 | 11.2           | 5.7 | 11  | 3    | 2             | 2.1            |
| SRS 12M<br>SRS 12GM | 13               | 27    | 34.4   | 20                  | 15 | M3×3.2 | 20.6           | 5.7 | 11  | 3    | 2             | 2.1            |
| SRS 12N<br>SRS 12GN | 13               | 27    | 47.1   | 20                  | 20 | M3×3.2 | 33.3           | 5.7 | 11  | 3    | 2             | 2.1            |

Note) Since stainless steel is used in the LM block, LM rail and balls, these models are highly resistant to corrosion and environment.  
 The SRS-G is equipped with uncaged, full-complement bearings.  
 Using a greasing hole other than for greasing may cause damage.

## Model number coding

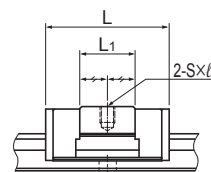
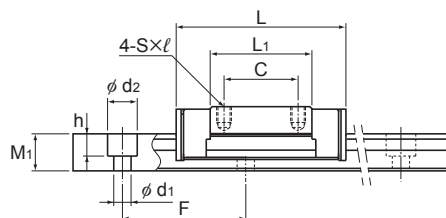
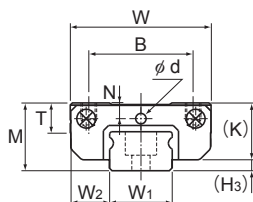
**2 SRS12M QZ UU C1 +220L P M -II**

Model No.    With QZ Lubricator    Contamination protection accessory symbol (\*2)    LM rail length (in mm)    Stainless steel LM rail    Symbol for No. of rails used on the same plane (\*5)

No. of LM blocks used on the same rail (\*1)    Radial clearance symbol (\*3)    Accuracy symbol (\*4)    Normal grade (No Symbol)/High accuracy grade (H)    Precision grade (P)

(\*1) No symbol for 1 LM block. (\*2) See contamination protection accessories on **A1-516**.  
 (\*3) See **A1-71**. (\*4) See **A1-83**. (\*5) See **A1-13**.

Note) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.)  
 Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.



Models SRS7M/N, 9XM/XN, 12M/N

Models SRS7S, 9XS, 12S  
Unit: mm

|  | LM rail dimensions               |                |                |       |                                   |         | Basic load rating |                | Static permissible moment N•m*                                                    |               |                                                                                   |               |                                                                                   |          | Mass    |  |
|--|----------------------------------|----------------|----------------|-------|-----------------------------------|---------|-------------------|----------------|-----------------------------------------------------------------------------------|---------------|-----------------------------------------------------------------------------------|---------------|-----------------------------------------------------------------------------------|----------|---------|--|
|  | Width                            |                | Height         | Pitch |                                   | Length* | C                 | C <sub>0</sub> |  |               |  |               |  | LM block | LM rail |  |
|  | W <sub>1</sub>                   | W <sub>2</sub> | M <sub>1</sub> | F     | d <sub>1</sub> ×d <sub>2</sub> ×h | Max     | kN                | kN             | 1 block                                                                           | Double blocks | 1 block                                                                           | Double blocks | 1 block                                                                           | kg       | kg/m    |  |
|  | 5 <sup>0</sup> <sub>-0.02</sub>  | 3.5            | 4              | 15    | 2.4×3.5×1                         | 220     | 0.439<br>0.366    | 0.468<br>0.527 | 0.74<br>0.79                                                                      | 5.11<br>5.76  | 0.86<br>0.94                                                                      | 5.99<br>6.91  | 1.21<br>1.37                                                                      | 0.002    | 0.13    |  |
|  | 5 <sup>0</sup> <sub>-0.02</sub>  | 3.5            | 4              | 15    | 2.4×3.5×1                         | 220     | 0.515<br>0.448    | 0.586<br>0.703 | 1.12<br>1.34                                                                      | 7.45<br>8.82  | 1.31<br>1.57                                                                      | 8.73<br>10.3  | 1.52<br>1.83                                                                      | 0.003    | 0.13    |  |
|  | 7 <sup>0</sup> <sub>-0.02</sub>  | 5              | 4.7            | 15    | 2.4×4.2×2.3                       | 480     | 1.09<br>0.946     | 0.964<br>1.16  | 1.60<br>1.96                                                                      | 12.6<br>14.7  | 1.83<br>2.25                                                                      | 14.5<br>16.9  | 3.73<br>4.49                                                                      | 0.005    | 0.25    |  |
|  | 7 <sup>0</sup> <sub>-0.02</sub>  | 5              | 4.7            | 15    | 2.4×4.2×2.3                       | 480     | 1.51<br>1.16      | 1.29<br>1.54   | 3.09<br>3.61                                                                      | 17.2<br>25.5  | 3.69<br>4.14                                                                      | 17.3<br>29.4  | 5.02<br>6.57                                                                      | 0.009    | 0.25    |  |
|  | 7 <sup>0</sup> <sub>-0.02</sub>  | 5              | 4.7            | 15    | 2.4×4.2×2.3                       | 480     | 2.01<br>1.63      | 2.31<br>2.51   | 7.77<br>8.08                                                                      | 43.2<br>46.9  | 8.96<br>9.32                                                                      | 50.0<br>54.2  | 8.96<br>9.72                                                                      | 0.012    | 0.25    |  |
|  | 9 <sup>0</sup> <sub>-0.02</sub>  | 5.5            | 5.5            | 20    | 3.5×6×3.3                         | 1240    | 1.78<br>1.37      | 1.53<br>1.53   | 3.15<br>2.85                                                                      | 22.2<br>22.6  | 3.61<br>3.27                                                                      | 25.6<br>26    | 7.04<br>7.04                                                                      | 0.009    | 0.36    |  |
|  | 9 <sup>0</sup> <sub>-0.02</sub>  | 5.5            | 5.5            | 20    | 3.5×6×3.3                         | 1240    | 2.69<br>2.22      | 2.75<br>3.06   | 9.31<br>9.87                                                                      | 52.2<br>57.9  | 10.7<br>11.4                                                                      | 60.3<br>66.9  | 12.7<br>14.1                                                                      | 0.016    | 0.36    |  |
|  | 9 <sup>0</sup> <sub>-0.02</sub>  | 5.5            | 5.5            | 20    | 3.5×6×3.3                         | 1240    | 3.48<br>2.94      | 3.98<br>4.59   | 18.7<br>21.1                                                                      | 96.5<br>111   | 21.6<br>24.4                                                                      | 112<br>128    | 18.3<br>21.1                                                                      | 0.024    | 0.36    |  |
|  | 12 <sup>0</sup> <sub>-0.02</sub> | 7.5            | 7.5            | 25    | 3.5×6×4.5                         | 2000    | 2.70<br>2.07      | 2.10<br>2.10   | 4.62<br>4.17                                                                      | 37.5<br>38.1  | 4.62<br>4.17                                                                      | 37.5<br>38.1  | 13.8<br>13.8                                                                      | 0.017    | 0.65    |  |
|  | 12 <sup>0</sup> <sub>-0.02</sub> | 7.5            | 7.5            | 25    | 3.5×6×4.5                         | 2000    | 4.00<br>3.36      | 3.53<br>3.55   | 12.0<br>12.1                                                                      | 78.5<br>79.0  | 12.0<br>12.1                                                                      | 78.5<br>79.0  | 23.1<br>23.2                                                                      | 0.027    | 0.65    |  |
|  | 12 <sup>0</sup> <sub>-0.02</sub> | 7.5            | 7.5            | 25    | 3.5×6×4.5                         | 2000    | 5.82<br>4.72      | 5.30<br>6.83   | 28.4<br>34.8                                                                      | 151<br>195    | 28.4<br>34.8                                                                      | 151<br>195    | 34.7<br>44.7                                                                      | 0.049    | 0.65    |  |

Note1) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-162**.)

Static permissible moment\* 1 block: the static permissible moment with one LM block

Double blocks: static permissible moment when two LM blocks are in close contact with each other

Total block length L : The total block length L shown in the table is the length with the dust proof parts, code UU or SS. If other contamination protection accessories or lubricant equipment are installed, the total block length will increase.

(See **A1-491** or **A1-512**)

For the SRS5M and SRS5N LM guide, the balls will fall out of the block if it is removed from the rail.

To secure the LM rail of model SRS5M, use cross-recessed head screws for precision equipment (No. 0 pan head screw, class 1) M2.

Note2) The basic load rating in the dimension table is for a load in the radial direction. Use Table7 on **A1-59** to calculate the load rating for loads in the reverse radial direction or lateral direction.

- Reference bolt tightening torque when mounting an LM block for model SRS 5 and 7 are shown in the table below.

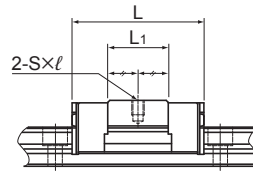
Reference tightening torque

| Model No. | Model No. of screw | Screw depth (mm) | Reference tightening torque(N·m)* |
|-----------|--------------------|------------------|-----------------------------------|
| SRS 5     | M2                 | 1.5              | 0.4                               |
| SRS 7     | M2                 | 2.3              | 0.4                               |

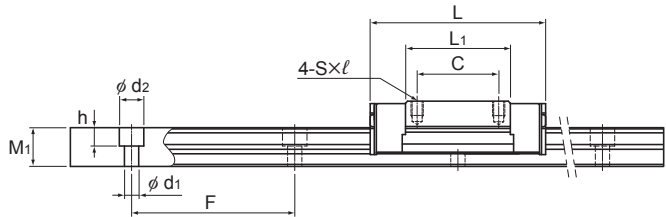
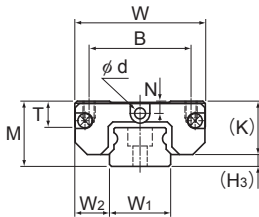
\*Tightening above the tightening torque affects accuracy.

Be sure to tighten at or below the defined tightening torque.

# Models SRS-S, SRS-M and SRS-N



Model SRS15S



Models SRS15M/N, 20M, 25M

| Model No.           | Outer dimensions |       |        | LM block dimensions |    |        |                |     |      |   |          |        |              | Greasing hole<br>d | Grease nipple | H <sub>3</sub> |
|---------------------|------------------|-------|--------|---------------------|----|--------|----------------|-----|------|---|----------|--------|--------------|--------------------|---------------|----------------|
|                     | Height           | Width | Length |                     |    |        |                |     |      |   |          |        |              |                    |               |                |
|                     | M                | W     | L      | B                   | C  | S×ℓ    | L <sub>1</sub> | T   | K    | N | E        |        |              |                    |               |                |
| SRS 15S<br>SRS 15GS | 16               | 32    | 32     | 25                  | —  | M3×3.5 | 14.7           | 6.5 | 13.3 | 3 | —<br>4   | 3<br>— | —<br>PB107   |                    |               | 2.7            |
| SRS 15M<br>SRS 15GM | 16               | 32    | 43     | 25                  | 20 | M3×3.5 | 25.7           | 6.5 | 13.3 | 3 | —<br>4   | 3<br>— | —<br>PB107   |                    |               | 2.7            |
| SRS 15N<br>SRS 15GN | 16               | 32    | 60.8   | 25                  | 25 | M3×3.5 | 43.5           | 6.5 | 13.3 | 3 | —<br>4   | 3<br>— | —<br>PB107   |                    |               | 2.7            |
| SRS 20M<br>SRS 20GM | 20               | 40    | 50     | 30                  | 25 | M4×6   | 34             | 9   | 16.6 | 4 | —<br>3.5 | 3<br>— | —<br>PB107   |                    |               | 3.4            |
| SRS 25M<br>SRS 25GM | 25               | 48    | 77     | 35                  | 35 | M6×7   | 56             | 11  | 20   | 5 | —<br>4   | 4<br>— | —<br>PB1021B |                    |               | 5              |

Note) Since stainless steel is used in the LM block, LM rail and balls, these models are highly resistant to corrosion and environment.  
 The SRS-G is equipped with uncaged, full-complement bearings.  
 For the SRS15S/M/N, 20M, and 25M, if a grease nipple is required, please specify upon ordering.  
 Using a greasing hole other than for greasing may cause damage.

## Model number coding

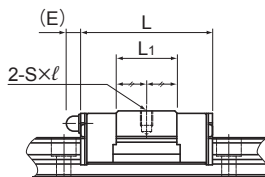
**2 SRS20M QZ UU C1 +220L P M - II**

Model No.      With QZ Lubricator      Contamination protection accessory symbol (\*2)      LM rail length (in mm)      Stainless steel LM rail      Symbol for No. of rails used on the same plane (\*5)

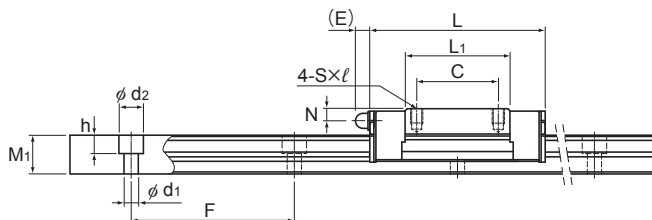
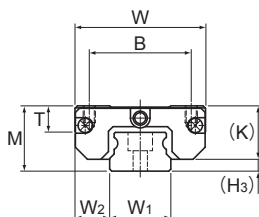
No. of LM blocks used on the same rail (\*1)      Radial clearance symbol (\*3)      Normal (No symbol)/Light preload (C1)      Accuracy symbol (\*4)      Normal grade (No Symbol)/High accuracy grade (H)      Precision grade (P)

(\*1) No symbol for 1 LM block. (\*2) See contamination protection accessories on **A1-516**.  
 (\*3) See **A1-71**. (\*4) See **A1-83**. (\*5) See **A1-13**.

Note) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.)  
 Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.



Model SRS15GS



Models SRS15GM/GN, 20GM, 25GM

Unit: mm

| LM rail dimensions               |                |                |       |                                     |         | Basic load rating |                | Static permissible moment N·m*                                                    |               |                                                                                   |               |                                                                                   | Mass     |         |
|----------------------------------|----------------|----------------|-------|-------------------------------------|---------|-------------------|----------------|-----------------------------------------------------------------------------------|---------------|-----------------------------------------------------------------------------------|---------------|-----------------------------------------------------------------------------------|----------|---------|
| Width                            |                | Height         | Pitch |                                     | Length* | C                 | C <sub>0</sub> |  |               |  |               |  | LM block | LM rail |
| W <sub>1</sub>                   | W <sub>2</sub> | M <sub>1</sub> | F     | d <sub>1</sub> × d <sub>2</sub> × h | Max     | kN                | kN             | 1 block                                                                           | Double blocks | 1 block                                                                           | Double blocks | 1 block                                                                           | kg       | kg/m    |
| 15 <sup>0</sup> <sub>-0.02</sub> | 8.5            | 9.5            | 40    | 3.5 × 6 × 4.5                       | 2000    | 4.50<br>4.01      | 3.39<br>4.24   | 9.54<br>12.6                                                                      | 77.5<br>92.7  | 9.54<br>12.6                                                                      | 77.5<br>92.7  | 24.1<br>30.1                                                                      | 0.033    | 0.96    |
| 15 <sup>0</sup> <sub>-0.02</sub> | 8.5            | 9.5            | 40    | 3.5 × 6 × 4.5                       | 2000    | 6.66<br>5.59      | 5.7<br>5.72    | 26.2<br>24.8                                                                      | 154<br>158    | 26.2<br>24.8                                                                      | 154<br>158    | 40.4<br>40.6                                                                      | 0.047    | 0.96    |
| 15 <sup>0</sup> <sub>-0.02</sub> | 8.5            | 9.5            | 40    | 3.5 × 6 × 4.5                       | 2000    | 9.71<br>8.27      | 8.55<br>11.9   | 59.7<br>82.3                                                                      | 312<br>433    | 59.7<br>82.3                                                                      | 312<br>433    | 60.7<br>84.5                                                                      | 0.095    | 0.96    |
| 20 <sup>0</sup> <sub>-0.03</sub> | 10             | 11             | 60    | 6 × 9.5 × 8                         | 1800    | 7.75<br>5.95      | 9.77<br>9.4    | 54.3<br>44.7                                                                      | 296<br>242    | 62.4<br>53.3                                                                      | 341<br>289    | 104<br>91.4                                                                       | 0.11     | 1.68    |
| 23 <sup>0</sup> <sub>-0.03</sub> | 12.5           | 15             | 60    | 7 × 11 × 9                          | 1800    | 16.5<br>13.3      | 20.2<br>22.3   | 177<br>181                                                                        | 932<br>962    | 177<br>181                                                                        | 932<br>962    | 248<br>255                                                                        | 0.24     | 2.6     |

Note1) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-162**.)

Static permissible moment\* 1 block: the static permissible moment with one LM block

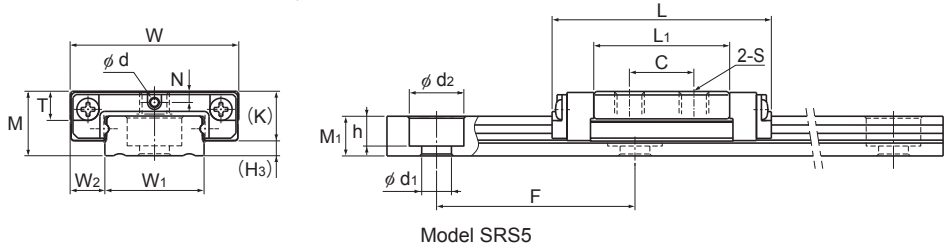
Double blocks: static permissible moment when two LM blocks are in close contact with each other

Total block length L : The total block length L shown in the table is the length with the dust proof parts, code UU or SS. If other contamination protection accessories or lubricant equipment are installed, the total block length will increase.

(See **A1-491** or **A1-512**)

Note2) The basic load rating in the dimension table is for a load in the radial direction. Use Table7 on **A1-59** to calculate the load rating for loads in the reverse radial direction or lateral direction.

# Models SRS-WS, SRS-WM and SRS-WN



| Model No. | Outer dimensions |       |        | LM block dimensions |     |            |                |     |     |     |               | H <sub>3</sub> |
|-----------|------------------|-------|--------|---------------------|-----|------------|----------------|-----|-----|-----|---------------|----------------|
|           | Height           | Width | Length |                     |     |            |                |     |     |     | Greasing hole |                |
|           | M                | W     | L      | B                   | C   | S×ℓ        | L <sub>1</sub> | T   | K   | N   | d             |                |
| SRS 5WM   | 6.5              | 17    | 22.1   | —                   | 6.5 | M3 through | 13.7           | 2.7 | 5   | 1.1 | 0.8           | 1.5            |
| SRS 5WGM  | 6.5              | 17    | 28.1   | —                   | 11  | M3 through | 19.7           | 2.7 | 5   | 1.1 | 0.8           | 1.5            |
| SRS 7WS   | 9                | 25    | 22.5   | 19                  | —   | M3×2.8     | 11.9           | 3.8 | 7.2 | 1.8 | 1.2           | 1.8            |
| SRS 7WGS  | 9                | 25    | 31     | 19                  | 10  | M3×2.8     | 20.4           | 3.8 | 7.2 | 1.8 | 1.2           | 1.8            |
| SRS 7WN   | 9                | 25    | 40.9   | 19                  | 17  | M3×2.8     | 30.3           | 3.8 | 7.2 | 1.8 | 1.2           | 1.8            |
| SRS 7WGN  | 9                | 25    | 40.9   | 19                  | 17  | M3×2.8     | 30.3           | 3.8 | 7.2 | 1.8 | 1.2           | 1.8            |
| SRS 9WS   | 12               | 30    | 26.5   | 21                  | —   | M3×2.8     | 14.5           | 4.9 | 9.1 | 2.3 | 1.6           | 2.9            |
| SRS 9WGS  | 12               | 30    | 39     | 21                  | 12  | M3×2.8     | 27             | 4.9 | 9.1 | 2.3 | 1.6           | 2.9            |
| SRS 9WM   | 12               | 30    | 39     | 21                  | 12  | M3×2.8     | 27             | 4.9 | 9.1 | 2.3 | 1.6           | 2.9            |
| SRS 9WGM  | 12               | 30    | 50.7   | 23                  | 24  | M3×2.8     | 38.7           | 4.9 | 9.1 | 2.3 | 1.6           | 2.9            |
| SRS 9WN   | 12               | 30    | 50.7   | 23                  | 24  | M3×2.8     | 38.7           | 4.9 | 9.1 | 2.3 | 1.6           | 2.9            |
| SRS 9WGN  | 12               | 30    | 50.7   | 23                  | 24  | M3×2.8     | 38.7           | 4.9 | 9.1 | 2.3 | 1.6           | 2.9            |
| SRS 12WS  | 14               | 40    | 30.5   | 28                  | —   | M3×3.5     | 16.9           | 5.7 | 11  | 3   | 2             | 3              |
| SRS 12WGS | 14               | 40    | 44.5   | 28                  | 15  | M3×3.5     | 30.9           | 5.7 | 11  | 3   | 2             | 3              |
| SRS 12WM  | 14               | 40    | 44.5   | 28                  | 15  | M3×3.5     | 30.9           | 5.7 | 11  | 3   | 2             | 3              |
| SRS 12WGM | 14               | 40    | 59.5   | 28                  | 28  | M3×3.5     | 45.9           | 5.7 | 11  | 3   | 2             | 3              |
| SRS 12WN  | 14               | 40    | 59.5   | 28                  | 28  | M3×3.5     | 45.9           | 5.7 | 11  | 3   | 2             | 3              |
| SRS 12WGN | 14               | 40    | 59.5   | 28                  | 28  | M3×3.5     | 45.9           | 5.7 | 11  | 3   | 2             | 3              |

Note) Since stainless steel is used in the LM block, LM rail and balls, these models are highly resistant to corrosion and environment.  
 The SRS-G is equipped with uncaged, full-complement bearings.  
 Using a greasing hole other than for greasing may cause damage.

## Model number coding

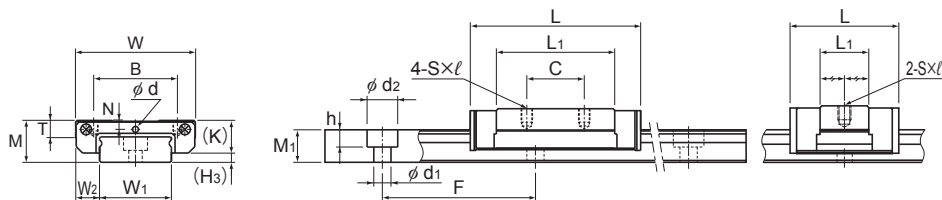
**2 SRS12WM QZ UU C1 +470L P M -II**

2: No. of LM blocks used on the same rail (\*1)  
 SRS12WM: Model No.  
 QZ: With QZ Lubricator  
 UU: Contamination protection accessory symbol (\*2)  
 C1: Radial clearance symbol (\*3)  
 +470L: LM rail length (in mm)  
 P: Accuracy symbol (\*4)  
 M: Stainless steel LM rail  
 -II: Symbol for No. of rails used on the same plane (\*5)

(\*1) No symbol for 1 LM block. (\*2) See contamination protection accessories on **A1-516**.

(\*3) See **A1-71**. (\*4) See **A1-83**. (\*5) See **A1-13**.

Note) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.)  
 Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.



Models SRS7WM/WN,9WM/WN,12WM/WN

Models SRS7 to 12WS  
Unit: mm

| LM rail dimensions               |                |                |                |       |                                     |         |  | Basic load rating |                | Static permissible moment N·m* |               |              |               |               |  | Mass     |         |
|----------------------------------|----------------|----------------|----------------|-------|-------------------------------------|---------|--|-------------------|----------------|--------------------------------|---------------|--------------|---------------|---------------|--|----------|---------|
| Width                            |                |                | Height         | Pitch |                                     | Length* |  | C                 | C <sub>0</sub> |                                |               |              |               |               |  | LM block | LM rail |
| W <sub>1</sub>                   | W <sub>2</sub> | W <sub>3</sub> | M <sub>1</sub> | F     | d <sub>1</sub> × d <sub>2</sub> × h | Max     |  | kN                | kN             | 1 block                        | Double blocks | 1 block      | Double blocks | 1 block       |  | kg       | kg/m    |
| 10 <sup>0</sup> <sub>-0.02</sub> | 3.5            | —              | 4              | 20    | 3×5.5×3                             | 220     |  | 0.584<br>0.498    | 0.703<br>0.82  | 1.57<br>1.79                   | 9.59<br>11.1  | 1.83<br>2.15 | 11.24<br>13.3 | 3.58<br>4.18  |  | 0.005    | 0.27    |
| 10 <sup>0</sup> <sub>-0.02</sub> | 3.5            | —              | 4              | 20    | 3×5.5×3                             | 220     |  | 0.746<br>0.64     | 0.996<br>1.17  | 3.01<br>3.54                   | 16.8<br>19.6  | 3.53<br>4.15 | 19.7<br>23    | 5.08<br>5.97  |  | 0.007    | 0.27    |
| 14 <sup>0</sup> <sub>-0.02</sub> | 5.5            | —              | 5.2            | 30    | 3.5×6×3.2                           | 480     |  | 1.38<br>1.06      | 1.35<br>1.35   | 2.89<br>2.58                   | 19.6<br>20.0  | 3.32<br>2.96 | 22.7<br>23.1  | 9.95<br>9.95  |  | 0.011    | 0.56    |
| 14 <sup>0</sup> <sub>-0.02</sub> | 5.5            | —              | 5.2            | 30    | 3.5×6×3.2                           | 480     |  | 2.01<br>1.63      | 1.94<br>2.51   | 6.47<br>8.87                   | 36.4<br>51.5  | 7.71<br>10.2 | 42.3<br>59.5  | 14.33<br>20.3 |  | 0.018    | 0.56    |
| 14 <sup>0</sup> <sub>-0.02</sub> | 5.5            | —              | 5.2            | 30    | 3.5×6×3.2                           | 480     |  | 2.56<br>2.12      | 3.28<br>3.66   | 15.0<br>16.6                   | 78.9<br>87.7  | 17.4<br>19.2 | 91.2<br>101   | 24.2<br>27    |  | 0.026    | 0.56    |
| 18 <sup>0</sup> <sub>-0.02</sub> | 6              | —              | 7.5            | 30    | 3.5×6×4.5                           | 1430    |  | 2.03<br>1.73      | 1.84<br>2.14   | 4.49<br>5.15                   | 32.1<br>36.9  | 5.15<br>5.92 | 38.9<br>42.6  | 17.4<br>20.2  |  | 0.018    | 1.01    |
| 18 <sup>0</sup> <sub>-0.02</sub> | 6              | —              | 7.5            | 30    | 3.5×6×4.5                           | 1430    |  | 3.29<br>2.67      | 3.34<br>3.35   | 14.0<br>13.9                   | 78.6<br>69.7  | 16.2<br>16.6 | 91.0<br>96.7  | 31.5<br>31.7  |  | 0.031    | 1.01    |
| 18 <sup>0</sup> <sub>-0.02</sub> | 6              | —              | 7.5            | 30    | 3.5×6×4.5                           | 1430    |  | 4.20<br>3.48      | 4.37<br>5.81   | 25.1<br>33.2                   | 130<br>172    | 29.1<br>40   | 151<br>208    | 41.3<br>54.9  |  | 0.049    | 1.01    |
| 24 <sup>0</sup> <sub>-0.02</sub> | 8              | —              | 8.5            | 40    | 4.5×8×4.5                           | 2000    |  | 3.58<br>3.05      | 3.15<br>3.68   | 9.77<br>11.1                   | 63<br>72.6    | 9.77<br>11.1 | 63<br>72.6    | 39.5<br>46.2  |  | 0.034    | 1.52    |
| 24 <sup>0</sup> <sub>-0.02</sub> | 8              | —              | 8.5            | 40    | 4.5×8×4.5                           | 2000    |  | 5.48<br>4.46      | 5.3<br>5.32    | 26.4<br>25.7                   | 143<br>146    | 26.4<br>25.7 | 143<br>146    | 66.5<br>66.8  |  | 0.055    | 1.52    |
| 24 <sup>0</sup> <sub>-0.02</sub> | 8              | —              | 8.5            | 40    | 4.5×8×4.5                           | 2000    |  | 7.13<br>5.93      | 7.07<br>9.46   | 49.2<br>64.7                   | 249<br>332    | 49.2<br>64.7 | 249<br>332    | 88.7<br>119   |  | 0.091    | 1.52    |

Note1) The maximum length under "Length \* " indicates the standard maximum length of an LM rail. (See **A1-162.**)

Static permissible moment\* 1 block: the static permissible moment with one LM block

Double blocks: static permissible moment when two LM blocks are in close contact with each other  
Total block length L : The total block length L shown in the table is the length with the dust proof parts, code UU or SS.  
If other contamination protection accessories or lubricant equipment are installed, the total block length will increase.  
(See **A1-491** or **A1-512**)

For the SRS5WM and SRS5WN, the balls will fall out of the block if it is removed from the rail.

Note2) The basic load rating in the dimension table is for a load in the radial direction. Use Table7 on **A1-59** to calculate the load rating for loads in the reverse radial direction or lateral direction.

- Reference bolt tightening torque when mounting an LM block for model SRS 5 and 7W are shown in the table below.

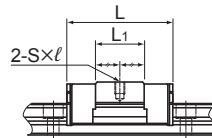
Reference tightening torque

| Model No. | Model No. of screw | Screw depth (mm) | Reference tightening torque(N·m)* |
|-----------|--------------------|------------------|-----------------------------------|
| SRS 5W    | M3                 | 2.3              | 0.4                               |
| SRS 7W    | M3                 | 2.8              | 0.4                               |

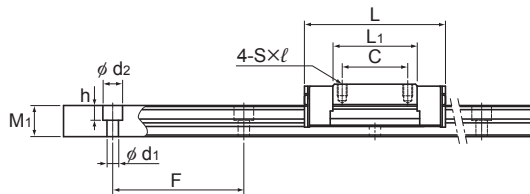
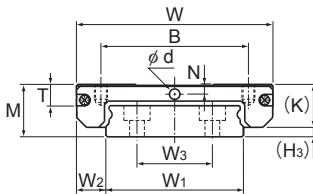
\*Tightening above the tightening torque affects accuracy.

Be sure to tighten at or below the defined tightening torque.

# Models SRS-WS, SRS-WM and SRS-WN



Model SRS15WS



Model SRS15WM/WN

| Model No.             | Outer dimensions |       |        | LM block dimensions |    |        |                |     |      |   |               |               |            | H <sub>3</sub> |
|-----------------------|------------------|-------|--------|---------------------|----|--------|----------------|-----|------|---|---------------|---------------|------------|----------------|
|                       | Height           | Width | Length |                     |    |        |                |     |      |   | Greasing hole | Grease nipple |            |                |
|                       | M                | W     | L      | B                   | C  | S×ℓ    | L <sub>1</sub> | T   | K    | N | E             | d             |            |                |
| SRS 15WS<br>SRS 15WGS | 16               | 60    | 41.5   | 45                  | —  | M4×4.5 | 24.9           | 6.5 | 13.3 | 3 | —<br>4        | 3<br>—        | —<br>PB107 | 2.7            |
| SRS 15WM<br>SRS 15WGM | 16               | 60    | 55.5   | 45                  | 20 | M4×4.5 | 38.9           | 6.5 | 13.3 | 3 | —<br>4        | 3<br>—        | —<br>PB107 | 2.7            |
| SRS 15WN<br>SRS 15WGN | 16               | 60    | 74.5   | 45                  | 35 | M4×4.5 | 57.9           | 6.5 | 13.3 | 3 | —<br>4        | 3<br>—        | —<br>PB107 | 2.7            |

Note) Since stainless steel is used in the LM block, LM rail and balls, these models are highly resistant to corrosion and environment.

The SRS-G is equipped with uncaged, full-complement bearings.

For the SRS15WS/WM/WN, if a grease nipple is required, please specify upon ordering.

Using a greasing hole other than for greasing may cause damage.

## Model number coding

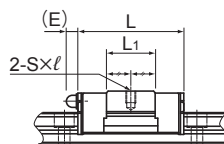
**2 SRS15WM QZ UU C1 +550L P M - II**

|                                             |                    |                                                |                        |                                       |                                                                      |                         |                                                     |      |
|---------------------------------------------|--------------------|------------------------------------------------|------------------------|---------------------------------------|----------------------------------------------------------------------|-------------------------|-----------------------------------------------------|------|
| 2                                           | SRS15WM            | QZ                                             | UU                     | C1                                    | +550L                                                                | P                       | M                                                   | - II |
| Model No.                                   | With QZ Lubricator | Contamination protection accessory symbol (*2) | LM rail length (in mm) | Radial clearance symbol (*3)          | Accuracy symbol (*4)                                                 | Stainless steel LM rail | Symbol for No. of rails used on the same plane (*5) |      |
| No. of LM blocks used on the same rail (*1) |                    |                                                |                        | Normal (No symbol)/Light preload (C1) | Normal grade (No Symbol)/High accuracy grade (H) Precision grade (P) |                         |                                                     |      |

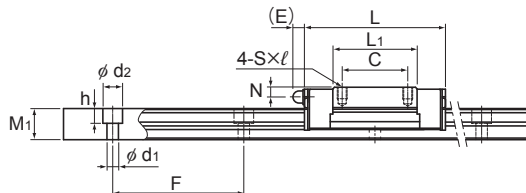
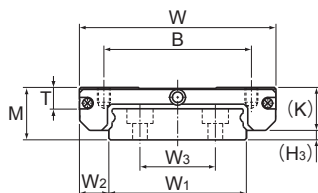
(\*1) No symbol for 1 LM block. (\*2) See contamination protection accessories on **A1-516**.

(\*3) See **A1-71**. (\*4) See **A1-83**. (\*5) See **A1-13**.

Note) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.) Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.



Model SRS15WGS



Model SRS15WGM/WGN

Unit: mm

|                                  | LM rail dimensions |                |                |        |                                   |      |              | Basic load rating |                | Static permissible moment N·m*                                                    |               |                                                                                   |               |                                                                                   |          | Mass    |  |
|----------------------------------|--------------------|----------------|----------------|--------|-----------------------------------|------|--------------|-------------------|----------------|-----------------------------------------------------------------------------------|---------------|-----------------------------------------------------------------------------------|---------------|-----------------------------------------------------------------------------------|----------|---------|--|
|                                  | Width              |                |                | Height | Pitch                             |      | Length*      | C                 | C <sub>0</sub> |  |               |  |               |  | LM block | LM rail |  |
|                                  |                    |                |                |        |                                   |      |              |                   |                | 1 block                                                                           | Double blocks | 1 block                                                                           | Double blocks | 1 block                                                                           |          |         |  |
|                                  |                    |                |                |        |                                   |      |              |                   |                |                                                                                   |               |                                                                                   |               |                                                                                   |          |         |  |
| W <sub>1</sub>                   | W <sub>2</sub>     | W <sub>3</sub> | M <sub>1</sub> | F      | d <sub>1</sub> ×d <sub>2</sub> ×h | Max  | kN           | kN                |                |                                                                                   |               |                                                                                   |               | kg                                                                                | kg/m     |         |  |
| 42 <sup>0</sup> <sub>-0.02</sub> | 9                  | 23             | 9.5            | 40     | 4.5×8×4.5                         | 2000 | 6.64<br>5.59 | 5.94<br>6.78      | 25.4<br>29     | 158<br>178                                                                        | 25.4<br>29    | 158<br>178                                                                        | 123<br>140    | 0.087                                                                             | 2.87     |         |  |
| 42 <sup>0</sup> <sub>-0.02</sub> | 9                  | 23             | 9.5            | 40     | 4.5×8×4.5                         | 2000 | 9.12<br>7.43 | 8.55<br>8.59      | 51.2<br>52.7   | 290<br>293                                                                        | 51.2<br>52.7  | 290<br>293                                                                        | 176<br>178    | 0.13                                                                              | 2.87     |         |  |
| 42 <sup>0</sup> <sub>-0.02</sub> | 9                  | 23             | 9.5            | 40     | 4.5×8×4.5                         | 2000 | 12.4<br>9.87 | 12.1<br>15.3      | 106<br>133     | 532<br>671                                                                        | 106<br>133    | 532<br>671                                                                        | 250<br>317    | 0.201                                                                             | 2.87     |         |  |

Note) The maximum length under "Length \* " indicates the standard maximum length of an LM rail. (See **A1-162**.)

Static permissible moment\* 1 block: the static permissible moment with one LM block

Double blocks: static permissible moment when two LM blocks are in close contact with each other

Total block length L

: The total block length L shown in the table is the length with the dust proof parts, code UU or SS. If other contamination protection accessories or lubricant equipment are installed, the total block length will increase.

(See **A1-491** or **A1-512**)

# Standard Length and Maximum Length of the LM Rail

Table2 shows the standard lengths and the maximum lengths of model SRS variations. If the maximum length of the desired LM rail exceeds them, jointed rails will be used. Contact THK for details. For special rail lengths, it is recommended to use a value corresponding to the G,g dimension from the table. As the G,g dimension increases, this portion becomes less stable, and the accuracy performance is severely impacted.

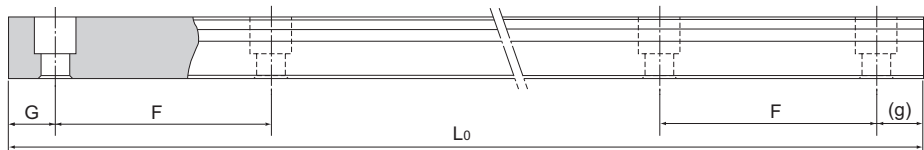


Table2 Standard Length and Maximum Length of the LM Rail for Model SRS Unit: mm

| Model No.                         | SRS 5 | SRS 5W | SRS 7 | SRS 7W | SRS 9 | SRS 9W | SRS 12 | SRS 12W | SRS 15 | SRS 15W | SRS 20 | SRS 25 |
|-----------------------------------|-------|--------|-------|--------|-------|--------|--------|---------|--------|---------|--------|--------|
| LM rail standard length ( $L_0$ ) | 40    | 50     | 40    | 50     | 55    | 50     | 70     | 70      | 70     | 110     | 220    | 220    |
|                                   | 55    | 70     | 55    | 80     | 75    | 80     | 95     | 110     | 110    | 150     | 280    | 280    |
|                                   | 70    | 90     | 70    | 110    | 95    | 110    | 120    | 150     | 150    | 190     | 340    | 340    |
|                                   | 100   | 110    | 85    | 140    | 115   | 140    | 145    | 190     | 190    | 230     | 460    | 460    |
|                                   | 130   | 130    | 100   | 170    | 135   | 170    | 170    | 230     | 230    | 270     | 640    | 640    |
|                                   | 160   | 150    | 115   | 200    | 155   | 200    | 195    | 270     | 270    | 310     | 880    | 880    |
|                                   |       | 170    | 130   | 260    | 175   | 260    | 220    | 310     | 310    | 430     | 1000   | 1000   |
|                                   |       |        |       | 290    | 195   | 290    | 245    | 390     | 350    | 550     |        |        |
|                                   |       |        |       |        | 275   | 320    | 270    | 470     | 390    | 670     |        |        |
|                                   |       |        |       |        | 375   |        | 320    | 550     | 430    | 790     |        |        |
|                                   |       |        |       |        |       |        | 370    |         | 470    |         |        |        |
|                                   |       |        |       |        |       |        | 470    |         | 550    |         |        |        |
|                                   |       |        |       |        |       |        | 570    |         | 670    |         |        |        |
|                                   |       |        |       |        |       |        |        |         | 870    |         |        |        |
| Standard pitch F                  | 15    | 20     | 15    | 30     | 20    | 30     | 25     | 40      | 40     | 40      | 60     | 60     |
| G,g                               | 5     | 5      | 5     | 10     | 7.5   | 10     | 10     | 15      | 15     | 15      | 20     | 20     |
| Max length                        | 220   | 220    | 480   | 480    | 1240  | 1430   | 2000   | 2000    | 2000   | 2000    | 1800   | 1800   |

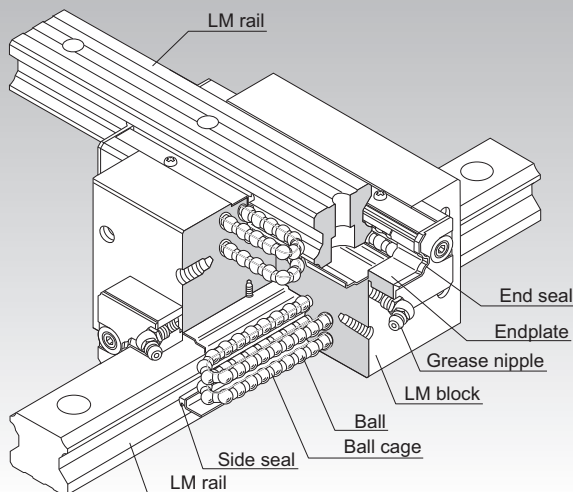
Note1) The maximum length varies with accuracy grades. Contact THK for details.  
 Note2) If jointed rails are not allowed and a greater length than the maximum values above is required, contact THK.



# SCR



## Caged Ball LM Guide Cross LM Guide Model SCR



\*For the ball cage, see **A1-88**.

**Point of Selection** **A1-10**

**Point of Design** **A1-454**

**Options** **A1-477**

**Model No.** **A1-543**

**Precautions on Use** **A1-549**

**Accessories for Lubrication** **A24-1**

**Mounting Procedure and Maintenance** **B1-89**

Equivalent moment factor **A1-43**

Rated Loads in All Directions **A1-59**

Equivalent factor in each direction **A1-61**

Radial Clearance **A1-71**

Accuracy Standards **A1-80**

Shoulder Height of the Mounting Base and the Corner Radius **A1-464**

Permissible Error of the Mounting Surface **A1-470**

Dimensions of Each Model with an Option Attached **A1-491**

## Structure and Features

Balls roll in four rows of raceways precision-ground on an LM rail and an LM block, and ball cages and endplates incorporated in the LM block allow the balls to circulate.

This model is an integral type of Caged Ball LM Guide that squares an internal structure similar to model SHS, which has a proven track record and is highly reliable, with another and uses two LM rails in combination. Since an orthogonal LM system can be achieved with model SCR alone, a conventionally required saddle is no longer necessary, the structure for X-Y motion can be simplified and the whole system can be downsized.

### [4-way Equal Load]

Each row of balls is placed at a contact angle of  $45^\circ$  so that the rated loads applied to the LM block are uniform in the four directions (radial, reverse radial and lateral directions), enabling the LM Guide to be used in all orientations and in extensive applications.

### [High Rigidity]

Since balls are arranged in four rows in a well-balanced manner, this model is stiff against a moment, and smooth straight motion is ensured even a preload is applied to increase the rigidity.

Since the rigidity of the LM block is higher than that of a combination of two LM blocks of the conventional type secured together back-to-back with bolts, this model is optimal for building an X-Y table that requires a high rigidity.

### [Compact]

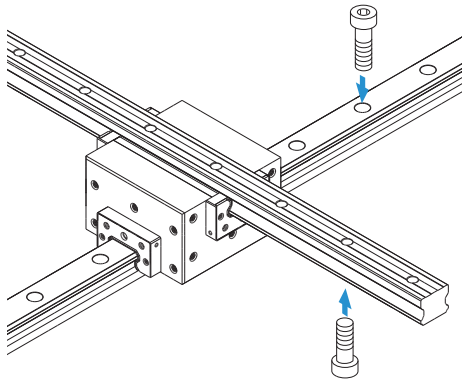
This model is an integral type of Caged Ball LM Guide that squares an internal structure similar to model SHS, which has a proven track record and is highly reliable, with another and uses two LM rails in combination. Since an orthogonal LM Guide can be achieved with model SCR alone, a conventionally required saddle is no longer necessary, the structure for X-Y motion can be simplified and the whole system can be downsized.

Types and Features

Model SCR

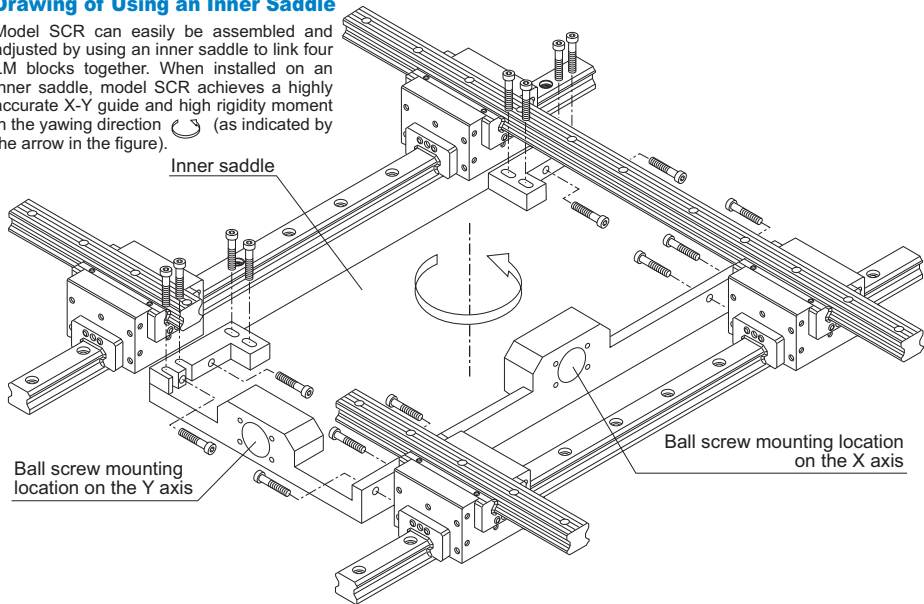
Specification Table⇒A1-168

This model is a standard type.



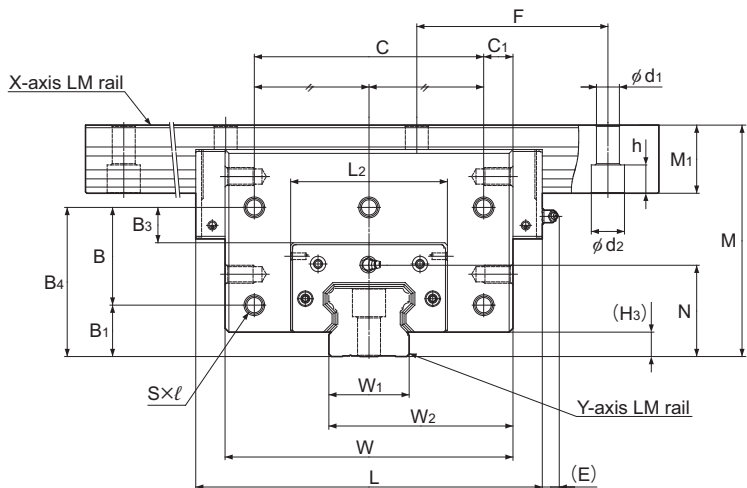
Drawing of Using an Inner Saddle

Model SCR can easily be assembled and adjusted by using an inner saddle to link four LM blocks together. When installed on an inner saddle, model SCR achieves a highly accurate X-Y guide and high rigidity moment in the yawing direction (as indicated by the arrow in the figure).





# Model SCR



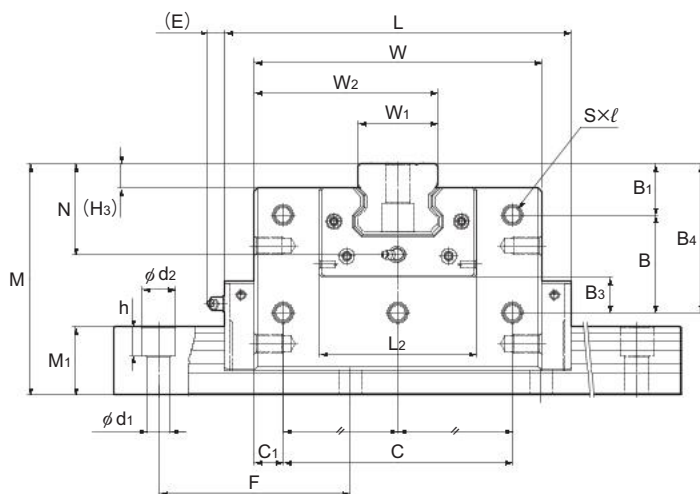
| Model No. | Outer dimensions |       |        | LM block dimensions |                |                |    |     |                |            |                |                |      |     |
|-----------|------------------|-------|--------|---------------------|----------------|----------------|----|-----|----------------|------------|----------------|----------------|------|-----|
|           | Height           | Width | Length |                     |                |                |    |     |                |            |                |                |      |     |
|           | M                | W     | L      | B <sub>1</sub>      | B <sub>3</sub> | B <sub>4</sub> | B  | C   | C <sub>1</sub> | S×ℓ        | L <sub>2</sub> | H <sub>3</sub> | N    | E   |
| SCR 15S   | 47               | 48    | 64.4   | —                   | 11.3           | 34.8           | —  | 20  | 14             | 2×2-M4×6   | 33.4           | 3              | 18.5 | 5.5 |
| SCR 20S   | 57               | 59    | 79     | —                   | 13             | 42.5           | —  | 30  | 14.5           | 2×2-M5×8   | 43             | 4.6            | 23.5 | 12  |
| SCR 20    | 57               | 78    | 98     | 13                  | 7.5            | 37             | 24 | 56  | 11             | 2×5-M5×8   | 43             | 4.6            | 23.5 | 12  |
| SCR 25    | 70               | 88    | 109    | 18                  | 9              | 44             | 26 | 64  | 12             | 2×5-M6×10  | 47.4           | 5.8            | 28.5 | 12  |
| SCR 30    | 82               | 105   | 131    | 21                  | 12             | 53             | 32 | 76  | 14.5           | 2×5-M6×10  | 58             | 7              | 34   | 12  |
| SCR 35    | 95               | 123   | 152    | 24                  | 14             | 61             | 37 | 90  | 16.5           | 2×5-M8×14  | 68             | 7.5            | 40   | 12  |
| SCR 45    | 118              | 140   | 174    | 30                  | 16.5           | 75             | 45 | 110 | 15             | 2×5-M10×15 | 84.6           | 8.9            | 49.5 | 16  |
| SCR 65    | 180              | 226   | 272    | 40                  | 27.5           | 116            | 76 | 180 | 23             | 2×5-M14×22 | 123            | 19             | 71   | 16  |

## Model number coding

|                        |              |                    |                                                                                              |                                      |                                      |                                                                                                         |
|------------------------|--------------|--------------------|----------------------------------------------------------------------------------------------|--------------------------------------|--------------------------------------|---------------------------------------------------------------------------------------------------------|
| 4                      | SCR25        | QZ                 | KKHH                                                                                         | C0                                   | +1200/1000L                          | P                                                                                                       |
| Total No. of LM blocks | Model number | With QZ Lubricator | Contamination protection accessory symbol (*1)                                               | LM rail length on the X axis (in mm) | LM rail length on the Y axis (in mm) | Accuracy symbol (*3)<br>Precision grade (P)<br>Super precision grade (SP)<br>Ultra precision grade (UP) |
|                        |              |                    | Radial clearance symbol (*2)<br>Normal (No symbol)/Light preload (C1)<br>Medium preload (C0) |                                      |                                      |                                                                                                         |

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-71**. (\*3) See **A1-80**.

Note) Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.



Unit: mm

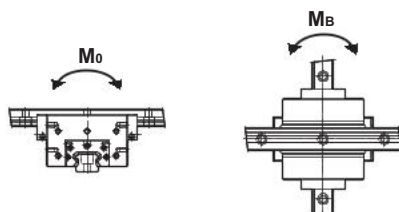
|  |               | LM rail dimensions           |                 |                |                      |                           | Basic load rating |             | Static permissible moment* |               | Mass           |                 |
|--|---------------|------------------------------|-----------------|----------------|----------------------|---------------------------|-------------------|-------------|----------------------------|---------------|----------------|-----------------|
|  | Grease nipple | Width<br>$W_1$<br>0<br>-0.05 | Height<br>$W_2$ | Pitch<br>$M_1$ | Mounting hole<br>$F$ | $d_1 \times d_2 \times h$ | C<br>kN           | $C_0$<br>kN | $M_0$<br>kN·m              | $M_B$<br>kN·m | LM block<br>kg | LM rail<br>kg/m |
|  | PB1021B       | 15                           | 31.5            | 13             | 60                   | 4.5×7.5×5.3               | 14.2              | 24.2        | 0.16                       | 0.175         | 0.54           | 1.3             |
|  | B-M6F         | 20                           | 39.5            | 16.5           | 60                   | 6×9.5×8.5                 | 22.3              | 38.4        | 0.334                      | 0.334         | 0.88           | 2.3             |
|  | B-M6F         | 20                           | 49              | 16.5           | 60                   | 6×9.5×8.5                 | 28.1              | 50.3        | 0.473                      | 0.568         | 1.7            | 2.3             |
|  | B-M6F         | 23                           | 55.5            | 20             | 60                   | 7×11×9                    | 36.8              | 64.7        | 0.696                      | 0.848         | 3.4            | 3.2             |
|  | B-M6F         | 28                           | 66.5            | 23             | 80                   | 9×14×12                   | 54.2              | 88.8        | 1.15                       | 1.36          | 4.6            | 4.5             |
|  | B-M6F         | 34                           | 78.5            | 26             | 80                   | 9×14×12                   | 72.9              | 127         | 2.01                       | 2.34          | 6.8            | 6.2             |
|  | B-PT1/8       | 45                           | 92.5            | 32             | 105                  | 14×20×17                  | 100               | 166         | 3.46                       | 3.46          | 10.8           | 10.4            |
|  | B-PT1/8       | 63                           | 144.5           | 53             | 150                  | 18×26×22                  | 253               | 408         | 11.9                       | 13.3          | 44.5           | 23.7            |

Note) Static permissible moment\*  
Total block length L

1 block: the static permissible moment with one LM block

: The total block length L shown in the table is the length with the dust proof parts, code UU or SS. If other contamination protection accessories or lubricant equipment are installed, the total block length will increase.

(See [A1-491](#) or [A1-512](#))



# Standard Length and Maximum Length of the LM Rail

Table1 shows the standard and maximum lengths of the SCR model rail. If a rail length longer than the listed max length is required, rails may be jointed to meet the overall length. Contact THK for details. For special rail lengths, it is recommended to use a value corresponding to the G,g dimension from the table. As the G,g dimension increases, this portion becomes less stable, and the accuracy performance is severely impacted.

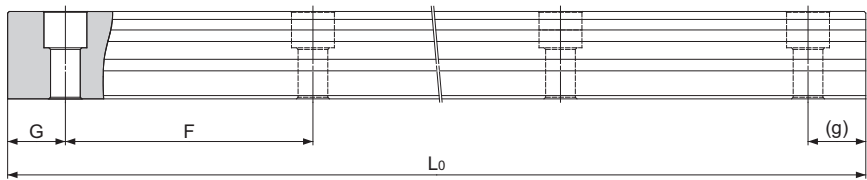


Table1 Standard Length and Maximum Length of the LM Rail for Model SCR Unit: mm

| Model No.                                       | SCR 15 | SCR 20 | SCR 25 | SCR 30 | SCR 35 | SCR 45 | SCR 65 |
|-------------------------------------------------|--------|--------|--------|--------|--------|--------|--------|
| LM rail<br>standard length<br>(L <sub>0</sub> ) | 160    | 220    | 220    | 280    | 280    | 570    | 1270   |
|                                                 | 220    | 280    | 280    | 360    | 360    | 675    | 1570   |
|                                                 | 280    | 340    | 340    | 440    | 440    | 780    | 2020   |
|                                                 | 340    | 400    | 400    | 520    | 520    | 885    | 2620   |
|                                                 | 400    | 460    | 460    | 600    | 600    | 990    |        |
|                                                 | 460    | 520    | 520    | 680    | 680    | 1095   |        |
|                                                 | 520    | 580    | 580    | 760    | 760    | 1200   |        |
|                                                 | 580    | 640    | 640    | 840    | 840    | 1305   |        |
|                                                 | 640    | 700    | 700    | 920    | 920    | 1410   |        |
|                                                 | 700    | 760    | 760    | 1000   | 1000   | 1515   |        |
|                                                 | 760    | 820    | 820    | 1080   | 1080   | 1620   |        |
|                                                 | 820    | 940    | 940    | 1160   | 1160   | 1725   |        |
|                                                 | 940    | 1000   | 1000   | 1240   | 1240   | 1830   |        |
|                                                 | 1000   | 1060   | 1060   | 1320   | 1320   | 1935   |        |
|                                                 | 1060   | 1120   | 1120   | 1400   | 1400   | 2040   |        |
|                                                 | 1120   | 1180   | 1180   | 1480   | 1480   | 2145   |        |
|                                                 | 1180   | 1240   | 1240   | 1560   | 1560   | 2250   |        |
|                                                 | 1240   | 1360   | 1300   | 1640   | 1640   | 2355   |        |
|                                                 | 1360   | 1480   | 1360   | 1720   | 1720   | 2460   |        |
|                                                 | 1480   | 1600   | 1420   | 1800   | 1800   | 2565   |        |
|                                                 | 1600   | 1720   | 1480   | 1880   | 1880   | 2670   |        |
|                                                 |        | 1840   | 1540   | 1960   | 1960   | 2775   |        |
|                                                 |        | 1960   | 1600   | 2040   | 2040   | 2880   |        |
|                                                 |        | 2080   | 1720   | 2200   | 2200   | 2985   |        |
|                                                 |        | 2200   | 1840   | 2360   | 2360   | 3090   |        |
|                                                 |        |        | 1960   | 2520   | 2520   |        |        |
|                                                 |        |        | 2080   | 2680   | 2680   |        |        |
|                                                 |        |        | 2200   | 2840   | 2840   |        |        |
|                                                 |        |        | 2320   | 3000   | 3000   |        |        |
|                                                 |        |        | 2440   |        |        |        |        |
| Standard pitch F                                | 60     | 60     | 60     | 80     | 80     | 105    | 150    |
| G,g                                             | 20     | 20     | 20     | 20     | 20     | 22.5   | 35     |
| Max length                                      | 3000   | 3000   | 3000   | 3000   | 3000   | 3090   | 3000   |

Tapped-hole LM Rail Type of Model SCR

The model SCR variations include a type with its LM rail bottom tapped. With the X-axis LM rail having tapped holes, this model can be secured with bolts from the top.

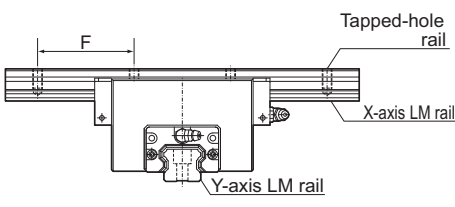


Table2 Dimensions of the LM Rail Tap Unit: mm

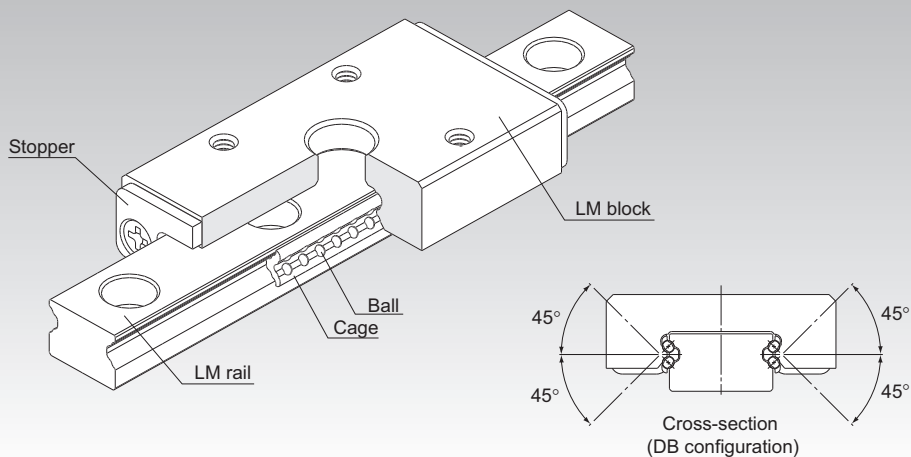
| Model No. | Tap diamete | Tap depth |
|-----------|-------------|-----------|
| 15        | M5          | 8         |
| 20        | M6          | 10        |
| 25        | M6          | 12        |
| 30        | M8          | 15        |
| 35        | M8          | 17        |
| 45        | M12         | 20        |
| 65        | M20         | 30        |

Model number coding

4 SCR35 KKHH C0 +1000/1000L P <sup>T</sup>K

Symbol for  
tapped-hole LM rail type

## Caged Ball LM Guide Finite stroke Model EPF



\*For the ball cage, see **A1-88**.

**Point of Selection** **A1-10**

**Point of Design** **A1-454**

**Options** **A1-477**

**Model No.** **A1-543**

**Precautions on Use** **A1-549**

**Accessories for Lubrication** **A24-1**

**Mounting Procedure and Maintenance** **B1-89**

Equivalent moment factor **A1-43**

Rated Loads in All Directions **A1-59**

Equivalent factor in each direction **A1-61**

Radial Clearance **A1-73**

Accuracy Standards **A1-86**

Shoulder Height of the Mounting Base and the Corner Radius **A1-465**

Accuracy of the Mounting Surface **A1-175**

Dimensions of Each Model with an Option Attached **A1-491**

## Structure and Features

Balls are held in cages with spherical ball holders and the balls roll in four rows of circular-arc grooves in raceways on precision-ground LM rails and LM blocks.

### [Smooth motion]

Because a finite stroke is used, balls do not circulate and movement is smooth even with pre-loading. Also, because variations in rolling resistance are small, this model is ideal for locations where smooth movement is required with a short stroke.

### [High Rigidity]

Because model EPF uses a DB construction featuring 4 rows of circular-arc grooves, it offers particularly high rigidity with respect to moment in the  $M_c$  direction. This makes it ideal for locations where  $M_c$  moment is applied with one rail.

### [Miniature Type]

Because the mounting method is compatible with the Miniature LM Guide Model RSR-N, the models are dimensionally interchangeable.

### [4-way Equal Load]

Each row of balls is configured at a contact angle of  $45^\circ$  so that the rated loads applied to the LM block are uniform in the all directions (radial, reverse radial and lateral directions), enabling the LM Guide to be used in all orientations and in extensive applications.

### [Ball cage technology application 1]

Because the cage is formed out of plastic resin, there is no metal contact between the cage and the balls, providing excellent noise characteristics, low dust emissions and long product life.

### [Ball cage technology application 2]

Forming the cage in a spherical shape out of plastic resin allows lubricant to be held in grease pockets, enabling long periods of maintenance-free operation.

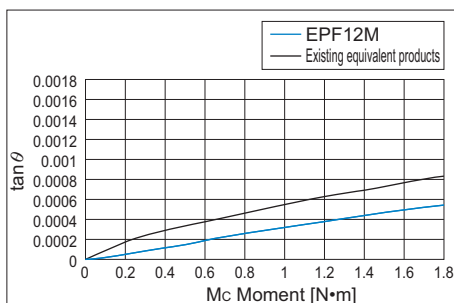
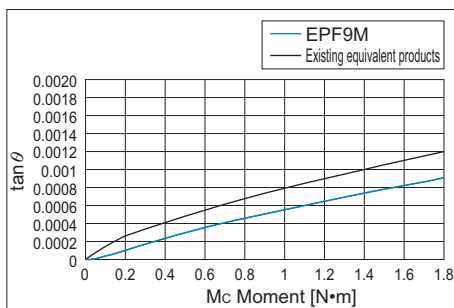


Fig.1 Comparison of  $M_c$  moment test data

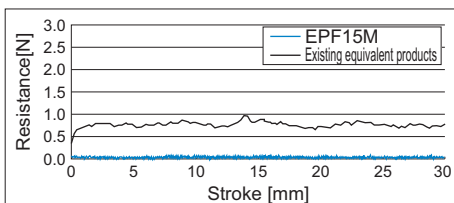
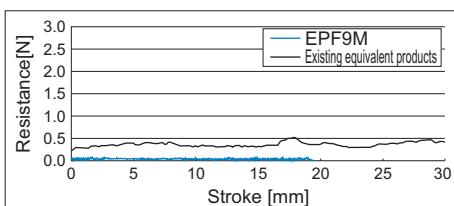
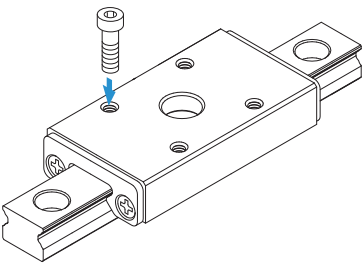


Fig.2 Comparison of rolling resistance test data



## Accuracy of the Mounting Surface

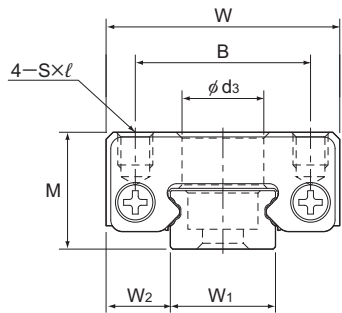
If there is not sufficient precision in the LM rail and LM block mounting surfaces, the product may not function to its full potential. Table 1 Machine to values no higher than those shown in... (Recommended value: 70% of Table 1)

Table 1 Flatness of the LM Rail and the LM Block Mounting Surface  
Unit: mm

| Model No.  | Flatness error |
|------------|----------------|
| EPF 7M, 9M | 0.015/200      |
| EPF 12M    | 0.025/200      |
| EPF 15M    | 0.035/200      |

Note) It is recommended that highly rigid materials such as iron or cast metal be used as the mounting material. If a material with poor rigidity, such as aluminum, is used, unforeseen loading may be applied to the product. In such situations, contact THK.

# Model EPF



| Model No. | Outer dimensions |       |        | LM block dimensions |    |       |                 |          | LM rail dimensions |       |       |
|-----------|------------------|-------|--------|---------------------|----|-------|-----------------|----------|--------------------|-------|-------|
|           | Height           | Width | Length |                     |    |       |                 |          |                    |       |       |
|           | M                | W     | $L_B$  | B                   | C  | $d_3$ | $S \times \ell$ | $L_{B1}$ | $W_1$              | $W_2$ | $M_1$ |
| EPF 7M    | 8                | 17    | 31.6   | 12                  | 13 | 5     | M2×2.3          | 29.6     | 7                  | 5     | 5     |
| EPF 9M    | 10               | 20    | 37.8   | 15                  | 16 | 7     | M3×2.8          | 35.8     | 9                  | 5.5   | 5     |
| EPF 12M   | 13               | 27    | 43.7   | 20                  | 20 | 7     | M3×3.2          | 41.7     | 12                 | 7.5   | 6.75  |
| EPF 15M   | 16               | 32    | 56.5   | 25                  | 25 | 7     | M3×3.5          | 54.5     | 15                 | 8.5   | 9     |

Note) The M in the model number symbol indicates that the LM block, LM rail and balls are made of stainless steel.  
 The stainless steel provides excellent corrosion and environmental resistance.

## Model number coding

EPF7M

Model No.

16

LM rail length  
(in mm)

+55L

Guaranteed stroke  
(in mm)

P

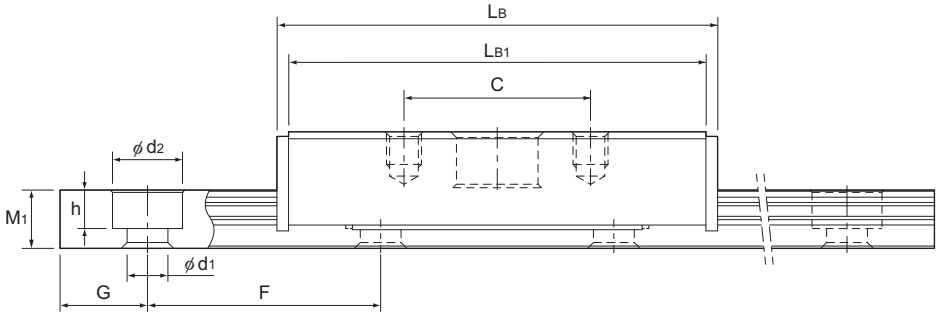
Accuracy symbol (\*1)

M

Rail material:  
Stainless steel (standard)

(\*1) See **A1-86**.

Note) This model number indicates that a single-rail unit constitutes one set.



Unit: mm

|  |     |    |                             | Guaranteed stroke | Basic load rating |             | Static permissible moment $N \cdot m^*$                                                    |                                                                                            |                                                                                            | Mass           |                 |
|--|-----|----|-----------------------------|-------------------|-------------------|-------------|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|----------------|-----------------|
|  | G   | F  | $d_1 \times d_2 \times h$   | $S_T$             | C<br>kN           | $C_0$<br>kN | $M_A$<br> | $M_B$<br> | $M_C$<br> | LM block<br>kg | LM rail<br>kg/m |
|  | 5   | 15 | $2.4 \times 4.2 \times 2.6$ | 16                | 0.90              | 1.60        | 5.08                                                                                       | 5.08                                                                                       | 5.26                                                                                       | 0.019          | 0.230           |
|  | 7.5 | 20 | $3.5 \times 6 \times 3.3$   | 21                | 1.00              | 1.87        | 6.81                                                                                       | 6.81                                                                                       | 7.89                                                                                       | 0.036          | 0.290           |
|  | 10  | 25 | $3.5 \times 6 \times 3.8$   | 27                | 2.26              | 3.71        | 15.5                                                                                       | 15.5                                                                                       | 20.8                                                                                       | 0.074          | 0.550           |
|  | 15  | 40 | $3.5 \times 6 \times 4$     | 34                | 3.71              | 5.88        | 33.0                                                                                       | 33.0                                                                                       | 41.3                                                                                       | 0.136          | 0.940           |

Note) Static permissible moment\*: Static permissible moment value with 1 LM block

Recommended Tightening Torques of Mounting Bolts

Unit:  $N \cdot m$

| Model No. | Nominal bolt | Rated tightening torque |         |          |
|-----------|--------------|-------------------------|---------|----------|
|           |              | Iron                    | Casting | Aluminum |
| EPF 7M    | M2           | 0.588                   | 0.392   | 0.294    |
| EPF 9M    | M3           | 1.96                    | 1.27    | 0.98     |
| EPF 12M   |              |                         |         |          |
| EPF 15M   |              |                         |         |          |

Table2 Maximum slip resistance

Unit: N

| Model No. | Maximum slip resistance |
|-----------|-------------------------|
| EPF 7M    | 20                      |
| EPF 9M    | 20                      |
| EPF 12M   | 30                      |
| EPF 15M   | 30                      |

Note) While the cage used to hold the balls is designed to operate extremely precisely, factors such as impacts or inertial moment or drive vibration from the machine can cause cage distortion.

If using the EPF LM guide in the following conditions, contact THK.

- Vertical Orientation
- Under a large moment load
- Butting the guide's external stopper with the table
- For applications involving high acceleration/deceleration

If cage distortion occurs, the cage must be forcibly restored to its original shape.  
Table 1 shows the required slip resistance in this event.  
Set the thrust so that it is no less than the maximum value shown in the table.

# Standard Length of the LM Rail

Table3 shows the standard LM rail lengths of model EPF.  
 For special rail lengths, it is recommended to use a value corresponding to the G,g dimension from the table. As the G,g dimension increases, this portion becomes less stable, and the accuracy performance is severely impacted.

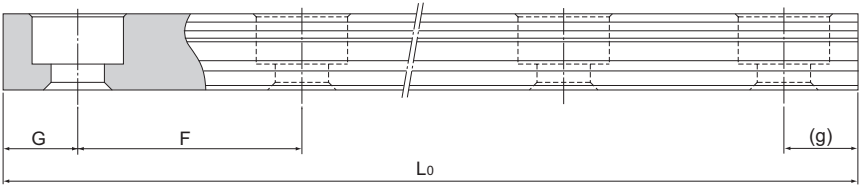


Table3 Standard Length of the LM Rail for Model EPF Unit: mm

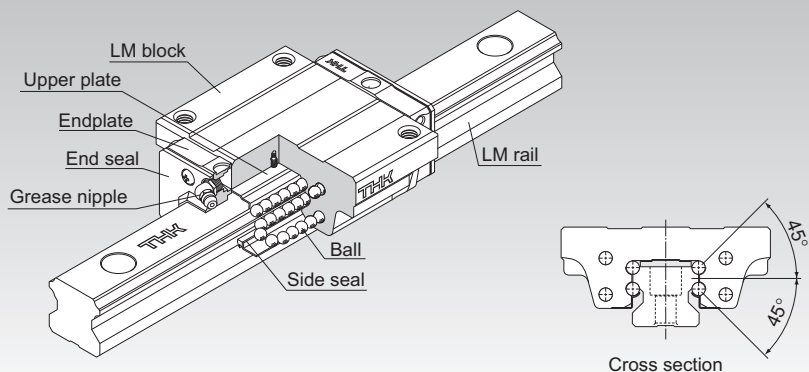
| Model No.                                 | EPF 7M | EPF 9M | EPF 12M | EPF 15M |
|-------------------------------------------|--------|--------|---------|---------|
| LM rail standard length (L <sub>0</sub> ) | 55     | 75     | 95      | 110     |
| Standard pitch F                          | 15     | 20     | 25      | 40      |
| G,g                                       | 5      | 7.5    | 10      | 15      |

Note) Lengths other than the standard LM rail length (L<sub>0</sub>) are also available. Contact THK for details.



# HSR

## LM Guide Global Standard Size Model HSR



**Point of Selection** **A1-10**

**Point of Design** **A1-454**

**Options** **A1-477**

**Model No.** **A1-543**

**Precautions on Use** **A1-549**

**Accessories for Lubrication** **A24-1**

**Mounting Procedure and Maintenance** **B1-89**

Equivalent moment factor **A1-43**

Rated Loads in All Directions **A1-59**

Equivalent factor in each direction **A1-61**

Radial Clearance **A1-72**

Accuracy Standards **A1-77**

Shoulder Height of the Mounting Base and the Corner Radius **A1-465**

Permissible Error of the Mounting Surface **A1-470**

Dimensions of Each Model with an Option Attached **A1-491**

## Structure and Features

Balls roll in four rows of raceways precision-ground on an LM rail and an LM block, and endplates incorporated in the LM block allow the balls to circulate.

Since retainer plates hold the balls, they do not fall off even if the LM rail is pulled out (except models HSR 8, 10 and 12).

Each row of balls is placed at a contact angle of 45° so that the rated loads applied to the LM block are uniform in the four directions (radial, reverse radial and lateral directions), enabling the LM Guide to be used in all orientations. In addition, the LM block can receive a well-balanced preload, increasing the rigidity in the four directions while maintaining a constant, low friction coefficient. With the low sectional height and the high rigidity design of the LM block, this model achieves highly accurate and stable straight motion.

### [4-way Equal Load]

Each row of balls is placed at a contact angle of 45° so that the rated loads applied to the LM block are uniform in the four directions (radial, reverse radial and lateral directions), enabling the LM Guide to be used in all orientations and in extensive applications.

### [High Rigidity Type]

Since balls are arranged in four rows in a well-balanced manner, a large preload can be applied and the rigidity in four directions can easily be increased.

### [Self-adjustment Capability]

The self-adjustment capability through front-to-front configuration of THK's unique circular-arc grooves (DF set) enables a mounting error to be absorbed even under a preload, thus to achieve highly accurate, smooth straight motion.

### [High Durability]

Even under a preload or excessive biased load, differential slip of balls does not occur. As a result, smooth motion, high wear resistance, and long-term maintenance of accuracy are achieved.

### [Stainless Steel Type also Available]

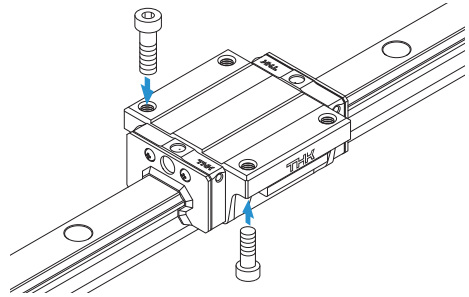
A special type which LM block, LM rail and balls are made of stainless steel is also available.

## Types

### Models HSR-C/XC

The flange of the LM block has tapped holes. Can be mounted from the top or the bottom. Used in places where the table cannot have through holes for mounting bolts.

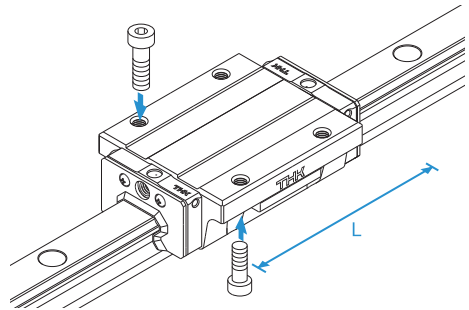
Specification Table⇒ **A1-186**



### Models HSR-LC/XLC

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

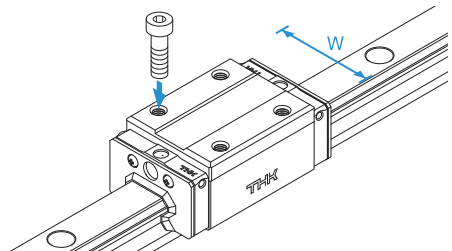
Specification Table⇒ **A1-186**



### Models HSR-R/XR

With this type, the LM block has a smaller width (W) and tapped holes. Used in places where the space for table width is limited.

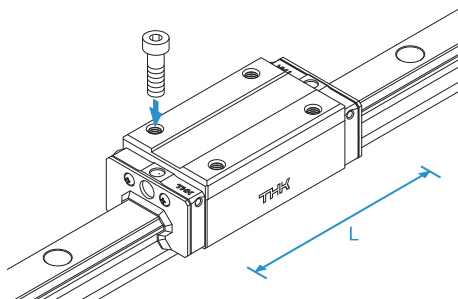
Specification Table⇒ **A1-188/A1-190**



## Models HSR-LR/XLR

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

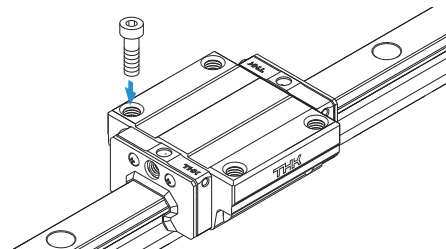
Specification Table⇒ **A1-190**



## Model HSR-A

The flange of its LM block has tapped holes.

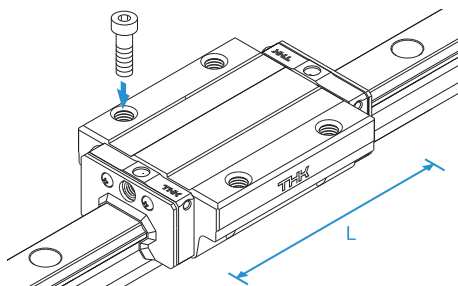
Specification Table⇒ **A1-192**



## Model HSR-LA

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

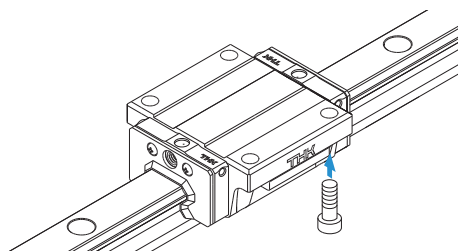
Specification Table⇒ **A1-192**



## Model HSR-B

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

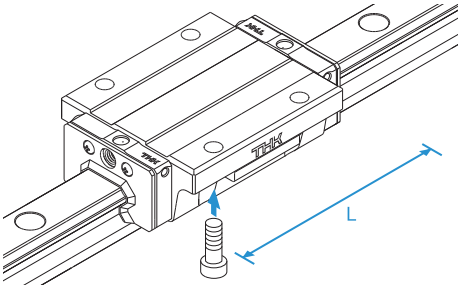
Specification Table⇒ **A1-194**



## Model HSR-LB

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

Specification Table⇒A1-194



## Models HSR-YR/XYR

When using two conventional LM Guide units facing each other, it would take a long time to machine the table, and it was difficult to achieve the desired accuracy and adjust the clearance. With the Model HSR-YR and Model HSR-XYR, the tapped holes on the side of the LM block simplify the structure, which drastically reduces labor time and increases accuracy.

Specification Table⇒A1-196

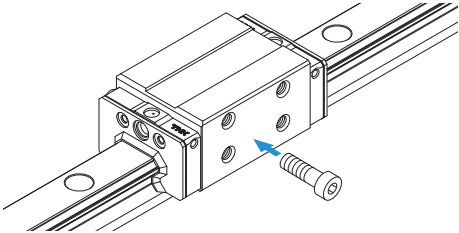


Fig.1 Conventional Structure

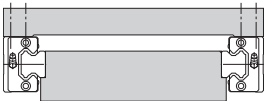
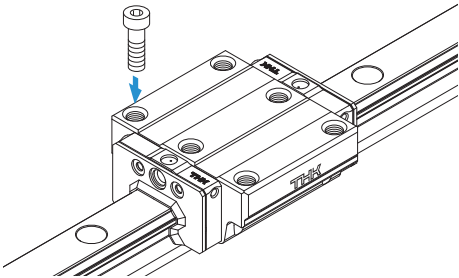


Fig.2 Mounting Structure for Model HSR-YR

## Models HSR-CA/XCA

Has six tapped holes on the LM block.

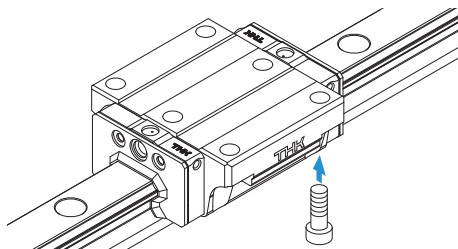
Specification Table⇒A1-198



## Models HSR-CB/XCB

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

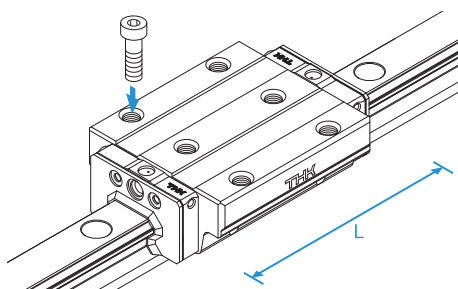
Specification Table⇒ **A1-200**



## Models HSR-HA/XHA

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

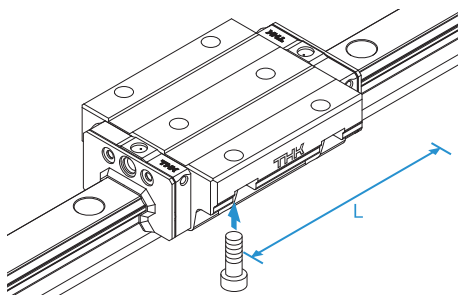
Specification Table⇒ **A1-198**



## Models HSR-HB/XHB

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

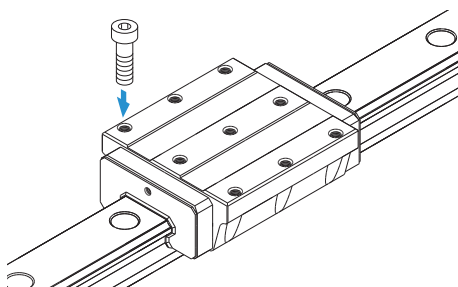
Specification Table⇒ **A1-200**



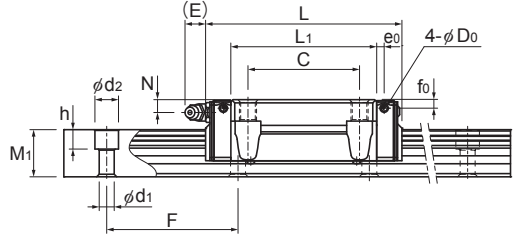
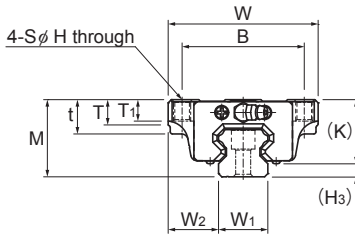
## Models HSR 100/120/150 HA/HB/HR

Large types of model HSR that can be used in large-scale machine tools and building structures.

Specification Table⇒ **A1-202**



# Models HSR-C, HSR-CM, HSR-LC, HSR-LCM, HSR-XC and HSR-XLC



Models HSR15 to 35C/LC/CM/LCM

| Model No.             | Outer dimensions |       |              | LM block dimensions |     |                    |      |                |    |      |                |      |     |     |               |                |                | Pilot hole for side nipple |                |  |  |
|-----------------------|------------------|-------|--------------|---------------------|-----|--------------------|------|----------------|----|------|----------------|------|-----|-----|---------------|----------------|----------------|----------------------------|----------------|--|--|
|                       | Height           | Width | Length       | B                   | C   | Mounting hole<br>S | H    | L <sub>1</sub> | t  | T    | T <sub>1</sub> | K    | N   | E   | Grease nipple | e <sub>0</sub> | f <sub>0</sub> | D <sub>0</sub>             | H <sub>3</sub> |  |  |
|                       | M                | W     | L            |                     |     |                    |      |                |    |      |                |      |     |     |               |                |                |                            |                |  |  |
| HSR 15C<br>HSR 15CM   | 24               | 47    | 56.6         | 38                  | 30  | M5                 | 4.5  | 38.8           | 11 | 7    | 7              | 19.3 | 4.3 | 5.5 | PB1021B       | 3.2            | 3.9            | 3                          | 4.7            |  |  |
| HSR 15LC<br>HSR 15LCM | 24               | 47    | 74.6         | 38                  | 30  | M5                 | 4.5  | 56.8           | 11 | 7    | 7              | 19.3 | 4.3 | 5.5 | PB1021B       | 3.2            | 3.9            | 3                          | 4.7            |  |  |
| HSR 20C<br>HSR 20CM   | 30               | 63    | 74           | 53                  | 40  | M6                 | 5.4  | 50.8           | 10 | 9.5  | 10             | 26   | 5   | 12  | B-M6F         | 3.1            | 3.4            | 3                          | 4              |  |  |
| HSR 20LC<br>HSR 20LCM | 30               | 63    | 90           | 53                  | 40  | M6                 | 5.4  | 66.8           | 10 | 9.5  | 10             | 26   | 5   | 12  | B-M6F         | 3.1            | 3.4            | 3                          | 4              |  |  |
| HSR 25C<br>HSR 25CM   | 36               | 70    | 83.1         | 57                  | 45  | M8                 | 6.8  | 59.5           | 16 | 11   | 10             | 30.5 | 6   | 12  | B-M6F         | 3.5            | 4              | 3                          | 5.5            |  |  |
| HSR 25LC<br>HSR 25LCM | 36               | 70    | 102.2        | 57                  | 45  | M8                 | 6.8  | 78.6           | 16 | 11   | 10             | 30.5 | 6   | 12  | B-M6F         | 3.5            | 4              | 3                          | 5.5            |  |  |
| HSR 30C<br>HSR 30CM   | 42               | 90    | 98           | 72                  | 52  | M10                | 8.5  | 70.4           | 18 | 9    | 10             | 35   | 7   | 12  | B-M6F         | 5.2            | 6.2            | 5.2                        | 7              |  |  |
| HSR 30LC<br>HSR 30LCM | 42               | 90    | 120.6        | 72                  | 52  | M10                | 8.5  | 93             | 18 | 9    | 10             | 35   | 7   | 12  | B-M6F         | 5.2            | 6.2            | 5.2                        | 7              |  |  |
| HSR 35C<br>HSR 35CM   | 48               | 100   | 109.4        | 82                  | 62  | M10                | 8.5  | 80.4           | 21 | 12   | 13             | 40.5 | 8   | 12  | B-M6F         | 5.5            | 5.6            | 5.2                        | 7.5            |  |  |
| HSR 35LC<br>HSR 35LCM | 48               | 100   | 134.8        | 82                  | 62  | M10                | 8.5  | 105.8          | 21 | 12   | 13             | 40.5 | 8   | 12  | B-M6F         | 5.5            | 5.6            | 5.2                        | 7.5            |  |  |
| HSR 45C<br>HSR 45LC   | 60               | 120   | 139<br>170.8 | 100                 | 80  | M12                | 10.5 | 98<br>129.8    | 25 | 13   | 15             | 50   | 10  | 16  | B-PT1/8       | 6.1            | 6.6            | 5.2                        | 10             |  |  |
| HSR 55C<br>HSR 55LC   | 70               | 140   | 163<br>201.1 | 116                 | 95  | M14                | 12.5 | 118<br>156.1   | 29 | 13.5 | 17             | 57   | 11  | 16  | B-PT1/8       | 5.6            | 7.7            | 5.2                        | 13             |  |  |
| HSR 65XC<br>HSR 65XLC | 90               | 170   | 190.5<br>250 | 142                 | 110 | M16                | 14.5 | 138.5<br>198   | 37 | 21.5 | 23             | 76   | 19  | 16  | B-PT1/8       | 6.8            | 14.6           | 5.2                        | 14             |  |  |

## Model number coding

**HSR25 C 2 QZ UU C0 M +1200L P T M -II**

Model number

Type of LM block

With QZ Lubricator

Contamination protection accessory symbol (\*1)

Stainless steel LM block

LM rail length (in mm)

Stainless steel LM rail jointed use  
Symbol for LM rail jointed use

Symbol for No. of rails used on the same plane (\*4)

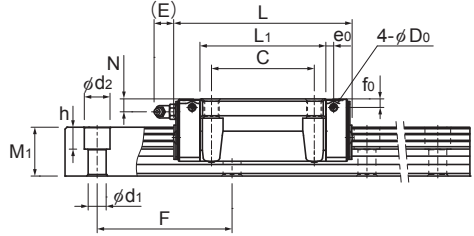
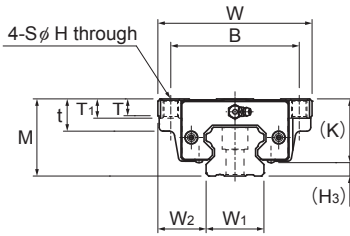
No. of LM blocks used on the same rail

Radial clearance symbol (\*2)  
Normal (No symbol)  
Light preload (C1)  
Medium preload (C0)

Accuracy symbol (\*3)  
Normal grade (No Symbol)/High accuracy grade (H)  
Precision grade (P)/Super precision grade (SP)  
Ultra precision grade (UP)

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-72**. (\*3) See **A1-77**. (\*4) See **A1-13**.

Note) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.) Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.



Models HSR45 to 65C/LC/XC/LC

Unit: mm

|  | LM rail dimensions                   |      |                              |                             |                |                                                             | Basic load rating |                          | Static permissible moment kN•m*                                                   |                  |                                                                                   |                  |                                                                                   |             | Mass                  |                        |
|--|--------------------------------------|------|------------------------------|-----------------------------|----------------|-------------------------------------------------------------|-------------------|--------------------------|-----------------------------------------------------------------------------------|------------------|-----------------------------------------------------------------------------------|------------------|-----------------------------------------------------------------------------------|-------------|-----------------------|------------------------|
|  | Width<br><br>W <sub>1</sub><br>±0.05 |      | Height<br><br>W <sub>2</sub> | Pitch<br><br>M <sub>1</sub> | Pitch<br><br>F | Length*<br><br>d <sub>1</sub> ×d <sub>2</sub> ×h<br><br>Max | C<br><br>kN       | C <sub>0</sub><br><br>kN |  |                  |  |                  |  |             | LM<br>block<br><br>kg | LM<br>rail<br><br>kg/m |
|  |                                      |      |                              |                             |                |                                                             |                   |                          | 1<br>block                                                                        | Double<br>blocks | 1<br>block                                                                        | Double<br>blocks | 1<br>block                                                                        |             |                       |                        |
|  | 15                                   | 16   | 15                           | 60                          | 4.5×7.5×5.3    | 3000<br>(1240)                                              | 10.9              | 15.7                     | 0.0945                                                                            | 0.527            | 0.0945                                                                            | 0.527            | 0.0998                                                                            | 0.2         | 1.5                   |                        |
|  | 15                                   | 16   | 15                           | 60                          | 4.5×7.5×5.3    | 3000<br>(1240)                                              | 14.2              | 22.9                     | 0.194                                                                             | 0.984            | 0.194                                                                             | 0.984            | 0.145                                                                             | 0.29        | 1.5                   |                        |
|  | 20                                   | 21.5 | 18                           | 60                          | 6×9.5×8.5      | 3000<br>(1480)                                              | 19.8              | 27.4                     | 0.218                                                                             | 1.2              | 0.218                                                                             | 1.2              | 0.235                                                                             | 0.35        | 2.3                   |                        |
|  | 20                                   | 21.5 | 18                           | 60                          | 6×9.5×8.5      | 3000<br>(1480)                                              | 23.9              | 35.8                     | 0.363                                                                             | 1.87             | 0.363                                                                             | 1.87             | 0.307                                                                             | 0.47        | 2.3                   |                        |
|  | 23                                   | 23.5 | 22                           | 60                          | 7×11×9         | 3000<br>(2020)                                              | 27.6              | 36.4                     | 0.324                                                                             | 1.8              | 0.324                                                                             | 1.8              | 0.366                                                                             | 0.59        | 3.3                   |                        |
|  | 23                                   | 23.5 | 22                           | 60                          | 7×11×9         | 3000<br>(2020)                                              | 35.2              | 51.6                     | 0.627                                                                             | 3.04             | 0.627                                                                             | 3.04             | 0.518                                                                             | 0.75        | 3.3                   |                        |
|  | 28                                   | 31   | 26                           | 80                          | 9×14×12        | 3000<br>(2520)                                              | 40.5              | 53.7                     | 0.599                                                                             | 3.1              | 0.599                                                                             | 3.1              | 0.652                                                                             | 1.1         | 4.8                   |                        |
|  | 28                                   | 31   | 26                           | 80                          | 9×14×12        | 3000<br>(2520)                                              | 48.9              | 70.2                     | 0.995                                                                             | 4.89             | 0.995                                                                             | 4.89             | 0.852                                                                             | 1.3         | 4.8                   |                        |
|  | 34                                   | 33   | 29                           | 80                          | 9×14×12        | 3000<br>(2520)                                              | 53.9              | 70.2                     | 0.895                                                                             | 4.51             | 0.895                                                                             | 4.51             | 1.05                                                                              | 1.6         | 6.6                   |                        |
|  | 34                                   | 33   | 29                           | 80                          | 9×14×12        | 3000<br>(2520)                                              | 65                | 91.7                     | 1.49                                                                              | 7.13             | 1.49                                                                              | 7.13             | 1.37                                                                              | 2.0         | 6.6                   |                        |
|  | 45                                   | 37.5 | 38                           | 105                         | 14×20×17       | 3090                                                        | 82.2<br>100       | 101<br>135               | 1.5<br>2.59                                                                       | 8.37<br>13.4     | 1.5<br>2.59                                                                       | 8.37<br>13.4     | 1.94<br>2.6                                                                       | 2.8<br>3.3  | 11<br>11              |                        |
|  | 53                                   | 43.5 | 44                           | 120                         | 16×23×20       | 3060                                                        | 121<br>148        | 146<br>194               | 2.6<br>4.46                                                                       | 14.1<br>22.7     | 2.6<br>4.46                                                                       | 14.1<br>22.7     | 3.43<br>4.56                                                                      | 4.5<br>5.7  | 15.1<br>15.1          |                        |
|  | 63                                   | 53.5 | 53                           | 150                         | 18×26×22       | 3000                                                        | 195<br>249        | 228<br>323               | 5.08<br>9.81                                                                      | 25<br>45.6       | 5.08<br>9.81                                                                      | 25<br>45.6       | 6.2<br>8.79                                                                       | 8.5<br>10.7 | 22.5<br>22.5          |                        |

Note) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-204**.)

Static permissible moment\* 1 block: the static permissible moment with one LM block

Double blocks: static permissible moment when two LM blocks are in close contact with each other  
The overall block lengths (L) in the dimension table are for when the contamination protection accessory symbol is UU or SS.  
The overall block length (L) will increase if another contamination protection accessory or lubricator is attached.

(See **A1-491** or **A1-512**)

An "M" in the model number indicates the material of the LM block, LM rail, or balls are stainless steel.

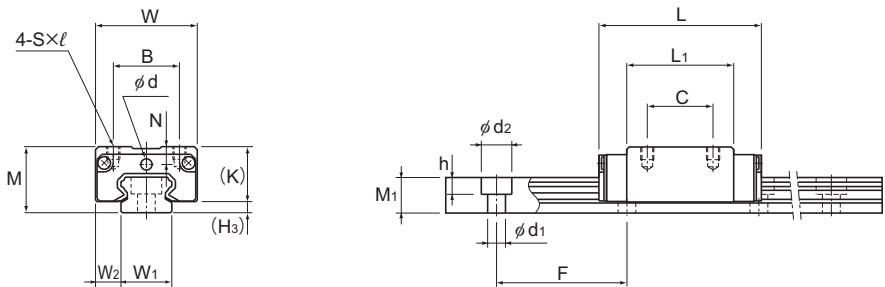
Stainless steel products have superior corrosion resistance and environmental resistance.

\*The diagram shows the side nipple pilot holes for when a grease nipple is desired for a product with LaCS or a QZ Lubricator.

In all other cases, the side nipple pilot holes will not be through holes.

Consult with THK if you desire drilling for grease nipple mounting. (See **A1-430**.)

# Model HSR-RM



Models HSR8RM and 10RM

| Model No. | Outer dimensions |       |        | LM block dimensions |    |          |                |   |      |     |               |               |       | H <sub>3</sub> |
|-----------|------------------|-------|--------|---------------------|----|----------|----------------|---|------|-----|---------------|---------------|-------|----------------|
|           | Height           | Width | Length |                     |    |          |                |   |      |     | Greasing hole | Grease nipple |       |                |
|           | M                | W     | L      | B                   | C  | S×ℓ      | L <sub>1</sub> | T | K    | N   | E             | d             |       |                |
| HSR 8RM   | 11               | 16    | 24     | 10                  | 10 | M2×2.5   | 15             | — | 8.9  | 2.6 | —             | 2.2           | —     | 2.1            |
| HSR 10RM  | 13               | 20    | 31     | 13                  | 12 | M2.6×2.5 | 20.1           | — | 10.8 | 3.5 | —             | 2.5           | —     | 2.2            |
| HSR 12RM  | 20               | 27    | 45     | 15                  | 15 | M4×4.5   | 30.5           | 6 | 16.9 | 5.2 | 4             | —             | PB107 | 3.1            |

## Model number coding

**HSR12 R 2 UU C1 M +670L H T M -II**

Model number  
Type of LM block

No. of LM blocks used on the same rail

Contamination protection accessory symbol (\*1)

Radial clearance symbol (\*2)  
Normal (No symbol)  
Light preload (C1)

Stainless steel LM block

LM rail length (in mm)

Stainless steel LM rail

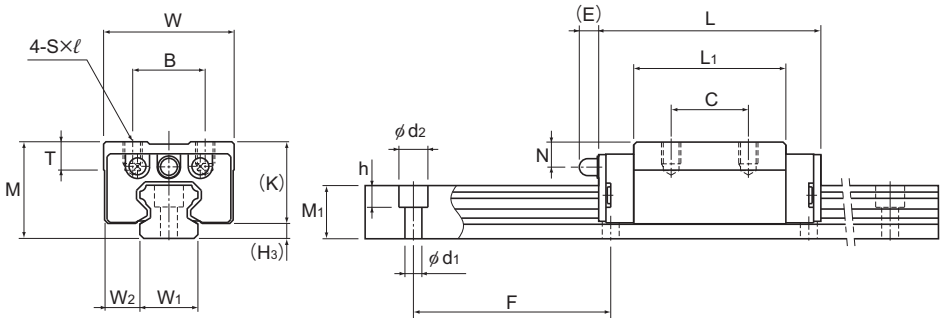
Symbol for LM rail jointed use

Accuracy symbol (\*3)  
Normal grade (No Symbol)/High accuracy grade (H)  
Precision grade (P)/Super precision grade (SP)

Symbol for No. of rails used on the same plane (\*4)

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-72**. (\*3) See **A1-77**. (\*4) See **A1-13**.

Note) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.)



Model HSR12RM

Unit: mm

| LM rail dimensions  |        |       |    |                             |         | Basic load rating |                | Static permissible moment $\text{kN}\cdot\text{m}^*$ |               |         |               |         |  | Mass     |         |
|---------------------|--------|-------|----|-----------------------------|---------|-------------------|----------------|------------------------------------------------------|---------------|---------|---------------|---------|--|----------|---------|
| Width               | Height | Pitch |    |                             | Length* | C                 | C <sub>0</sub> | $M_A$                                                |               | $M_B$   |               | $M_C$   |  | LM block | LM rail |
| $W_1$<br>$\pm 0.05$ | $W_2$  | $M_1$ | F  | $d_1 \times d_2 \times h$   | Max     | kN                | kN             | 1 block                                              | Double blocks | 1 block | Double blocks | 1 block |  | kg       | kg/m    |
| 8                   | 4      | 6     | 20 | $2.4 \times 4.2 \times 2.3$ | (975)   | 1.08              | 2.16           | 0.00492                                              | 0.0319        | 0.00492 | 0.0319        | 0.00727 |  | 0.012    | 0.3     |
| 10                  | 5      | 7     | 25 | $3.5 \times 6 \times 3.3$   | (995)   | 1.96              | 3.82           | 0.0123                                               | 0.0716        | 0.0123  | 0.0716        | 0.0162  |  | 0.025    | 0.45    |
| 12                  | 7.5    | 11    | 40 | $3.5 \times 6 \times 4.5$   | (1240)  | 4.7               | 8.53           | 0.0409                                               | 0.228         | 0.0409  | 0.228         | 0.0445  |  | 0.08     | 0.83    |

Note) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-204**.)

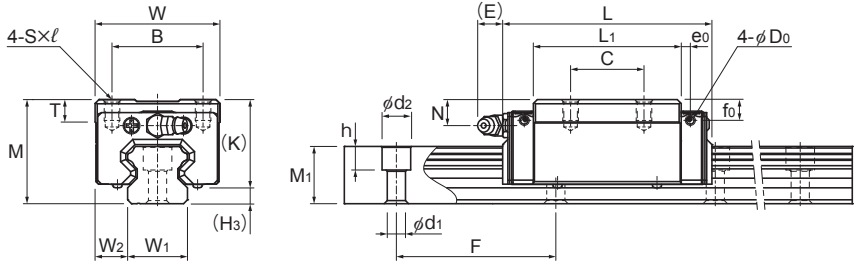
Static permissible moment\* 1 block: the static permissible moment with one LM block

Overall block length dimension (L) Double blocks: static permissible moment when two LM blocks are in close contact with each other  
The overall block lengths (L) in the dimension table are for when the contamination protection accessory symbol is UU or SS.  
The overall block length (L) will increase if another contamination protection accessory or lubricator is attached.

(See **A1-491** or **A1-512**)

An "M" in the model number indicates the material of the LM block, LM rail, or balls are stainless steel.  
Stainless steel products have superior corrosion resistance and environmental resistance.

# Models HSR-R, HSR-RM, HSR-LR, HSR-LRM, HSR-XR and HSR-XLR



Models HSR15 to 35R/LR/RM/LRM

| Model No.             | Outer dimensions |       |              | LM block dimensions |           |          |                |      |      |     |     |               |                | Pilot hole for side nipple |                |                |  |
|-----------------------|------------------|-------|--------------|---------------------|-----------|----------|----------------|------|------|-----|-----|---------------|----------------|----------------------------|----------------|----------------|--|
|                       | Height           | Width | Length       |                     |           |          |                |      |      |     |     | Grease nipple |                |                            |                |                |  |
|                       | M                | W     | L            | B                   | C         | S × ℓ    | L <sub>1</sub> | T    | K    | N   | E   |               | e <sub>0</sub> | f <sub>0</sub>             | D <sub>0</sub> | H <sub>3</sub> |  |
| HSR 15R<br>HSR 15RM   | 28               | 34    | 56.6         | 26                  | 26        | M4 × 5   | 38.8           | 6    | 23.3 | 8.3 | 5.5 | PB1021B       | 3.2            | 7.9                        | 3              | 4.7            |  |
| HSR 15LR<br>HSR 15LRM | 28               | 34    | 74.6         | 26                  | 34        | M4 × 5   | 56.8           | 6    | 23.3 | 8.3 | 5.5 | PB1021B       | 3.2            | 7.9                        | 3              | 4.7            |  |
| HSR 20R<br>HSR 20RM   | 30               | 44    | 74           | 32                  | 36        | M5 × 6   | 50.8           | 8    | 26   | 5   | 12  | B-M6F         | 3.1            | 3.4                        | 3              | 4              |  |
| HSR 20LR<br>HSR 20LRM | 30               | 44    | 90           | 32                  | 50        | M5 × 6   | 66.8           | 8    | 26   | 5   | 12  | B-M6F         | 3.1            | 3.4                        | 3              | 4              |  |
| HSR 25R<br>HSR 25RM   | 40               | 48    | 83.1         | 35                  | 35        | M6 × 8   | 59.5           | 9    | 34.5 | 10  | 12  | B-M6F         | 3.5            | 8                          | 3              | 5.5            |  |
| HSR 25LR<br>HSR 25LRM | 40               | 48    | 102.2        | 35                  | 50        | M6 × 8   | 78.6           | 9    | 34.5 | 10  | 12  | B-M6F         | 3.5            | 8                          | 3              | 5.5            |  |
| HSR 30R<br>HSR 30RM   | 45               | 60    | 98           | 40                  | 40        | M8 × 10  | 70.4           | 9    | 38   | 10  | 12  | B-M6F         | 5.2            | 9.2                        | 5.2            | 7              |  |
| HSR 30LR<br>HSR 30LRM | 45               | 60    | 120.6        | 40                  | 60        | M8 × 10  | 93             | 9    | 38   | 10  | 12  | B-M6F         | 5.2            | 9.2                        | 5.2            | 7              |  |
| HSR 35R<br>HSR 35RM   | 55               | 70    | 109.4        | 50                  | 50        | M8 × 12  | 80.4           | 11.7 | 47.5 | 15  | 12  | B-M6F         | 5.5            | 12.6                       | 5.2            | 7.5            |  |
| HSR 35LR<br>HSR 35LRM | 55               | 70    | 134.8        | 50                  | 72        | M8 × 12  | 105.8          | 11.7 | 47.5 | 15  | 12  | B-M6F         | 5.5            | 12.6                       | 5.2            | 7.5            |  |
| HSR 45R<br>HSR 45LR   | 70               | 86    | 139<br>170.8 | 60                  | 60<br>80  | M10 × 17 | 98<br>129.8    | 15   | 60   | 20  | 16  | B-PT1/8       | 6.1            | 16.6                       | 5.2            | 10             |  |
| HSR 55R<br>HSR 55LR   | 80               | 100   | 163<br>201.1 | 75                  | 75<br>95  | M12 × 18 | 118<br>156.1   | 20.5 | 67   | 21  | 16  | B-PT1/8       | 5.6            | 17.7                       | 5.2            | 13             |  |
| HSR 65XR<br>HSR 65XLR | 90               | 126   | 190.5<br>250 | 76                  | 70<br>120 | M16 × 20 | 138.5<br>198   | 23   | 76   | 19  | 16  | B-PT1/8       | 6.8            | 14.6                       | 5.2            | 14             |  |
| HSR 65R<br>HSR 65LR   | 90               | 126   | 186<br>245.5 | 76                  | 70<br>120 | M16 × 20 | 147<br>206.5   | 23   | 76   | 19  | 16  | B-PT1/8       | —              | —                          | —              | 14             |  |
| HSR 85R<br>HSR 85LR   | 110              | 156   | 245.6<br>303 | 100                 | 80<br>140 | M18 × 25 | 178.6<br>236   | 29   | 94   | 23  | 16  | B-PT1/8       | —              | —                          | —              | 16             |  |

## Model number coding

**HSR35 R 2 QZ SS C0 M +1400L P T M - II**

Model number

Type of LM block

With QZ Lubricator

Contamination protection accessory symbol (\*1)

Stainless steel LM block

LM rail length (in mm)

Stainless steel LM rail

Symbol for LM rail jointed use

Symbol for No. of rails used on the same plane (\*4)

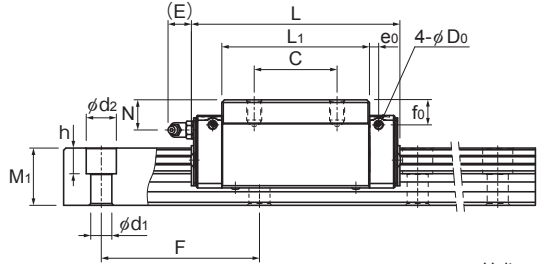
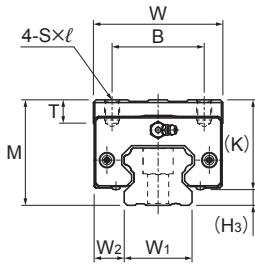
No. of LM blocks used on the same rail

Radial clearance symbol (\*2)  
Normal (No symbol)  
Light preload (C1)  
Medium preload (C0)

Accuracy symbol (\*3)  
Normal grade (No Symbol)/High accuracy grade (H)  
Precision grade (P)/Super precision grade (SP)  
Ultra precision grade (UP)

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-72**. (\*3) See **A1-77**. (\*4) See **A1-13**.

(Note) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.) Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.



Models HSR45 to 85R/LR/XR/XLR

Unit: mm

| LM rail dimensions      |                |                |       |                                   |                | Basic load rating |                | Static permissible moment kN•m * |               |                |               |                |  | Mass       |              |
|-------------------------|----------------|----------------|-------|-----------------------------------|----------------|-------------------|----------------|----------------------------------|---------------|----------------|---------------|----------------|--|------------|--------------|
| Width                   |                | Height         | Pitch |                                   | Length*        | C                 | C <sub>0</sub> | M <sub>A</sub>                   |               | M <sub>B</sub> |               | M <sub>C</sub> |  | LM block   | LM rail      |
| W <sub>1</sub><br>±0.05 | W <sub>2</sub> | M <sub>1</sub> | F     | d <sub>1</sub> ×d <sub>2</sub> ×h | Max            | kN                | kN             | 1 block                          | Double blocks | 1 block        | Double blocks | 1 block        |  | kg         | kg/m         |
| 15                      | 9.5            | 15             | 60    | 4.5×7.5×5.3                       | 3000<br>(1240) | 10.9              | 15.7           | 0.0945                           | 0.527         | 0.0945         | 0.527         | 0.0998         |  | 0.18       | 1.5          |
| 15                      | 9.5            | 15             | 60    | 4.5×7.5×5.3                       | 3000<br>(1240) | 14.2              | 22.9           | 0.194                            | 0.984         | 0.194          | 0.984         | 0.145          |  | 0.26       | 1.5          |
| 20                      | 12             | 18             | 60    | 6×9.5×8.5                         | 3000<br>(1480) | 19.8              | 27.4           | 0.218                            | 1.2           | 0.218          | 1.2           | 0.235          |  | 0.25       | 2.3          |
| 20                      | 12             | 18             | 60    | 6×9.5×8.5                         | 3000<br>(1480) | 23.9              | 35.8           | 0.363                            | 1.87          | 0.363          | 1.87          | 0.307          |  | 0.35       | 2.3          |
| 23                      | 12.5           | 22             | 60    | 7×11×9                            | 3000<br>(2020) | 27.6              | 36.4           | 0.324                            | 1.8           | 0.324          | 1.8           | 0.366          |  | 0.54       | 3.3          |
| 23                      | 12.5           | 22             | 60    | 7×11×9                            | 3000<br>(2020) | 35.2              | 51.6           | 0.627                            | 3.04          | 0.627          | 3.04          | 0.518          |  | 0.67       | 3.3          |
| 28                      | 16             | 26             | 80    | 9×14×12                           | 3000<br>(2520) | 40.5              | 53.7           | 0.599                            | 3.1           | 0.599          | 3.1           | 0.652          |  | 0.9        | 4.8          |
| 28                      | 16             | 26             | 80    | 9×14×12                           | 3000<br>(2520) | 48.9              | 70.2           | 0.995                            | 4.89          | 0.995          | 4.89          | 0.852          |  | 1.1        | 4.8          |
| 34                      | 18             | 29             | 80    | 9×14×12                           | 3000<br>(2520) | 53.9              | 70.2           | 0.895                            | 4.51          | 0.895          | 4.51          | 1.05           |  | 1.5        | 6.6          |
| 34                      | 18             | 29             | 80    | 9×14×12                           | 3000<br>(2520) | 65                | 91.7           | 1.49                             | 7.13          | 1.49           | 7.13          | 1.37           |  | 2          | 6.6          |
| 45                      | 20.5           | 38             | 105   | 14×20×17                          | 3090           | 82.2<br>100       | 101<br>135     | 1.5<br>2.59                      | 8.37<br>13.4  | 1.5<br>2.59    | 8.37<br>13.4  | 1.94<br>2.6    |  | 2.6<br>3.1 | 11           |
| 53                      | 23.5           | 44             | 120   | 16×23×20                          | 3060           | 121<br>148        | 146<br>194     | 2.6<br>4.46                      | 14.1<br>22.7  | 2.6<br>4.46    | 14.1<br>22.7  | 3.43<br>4.56   |  | 4.3<br>5.4 | 15.1         |
| 63                      | 31.5           | 53             | 150   | 18×26×22                          | 3000           | 195<br>249        | 228<br>323     | 5.08<br>9.81                     | 25<br>45.6    | 5.08<br>9.81   | 25<br>45.6    | 6.2<br>8.79    |  | 7.3<br>9.7 | 22.5<br>22.5 |
| 63                      | 31.5           | 53             | 150   | 18×26×22                          | 3000           | 195<br>249        | 228<br>323     | 5.08<br>9.81                     | 25<br>45.6    | 5.08<br>9.81   | 25<br>45.6    | 6.2<br>8.79    |  | 7.3<br>9.3 | 22.5         |
| 85                      | 35.5           | 65             | 180   | 24×35×28                          | 3000           | 304<br>367        | 355<br>464     | 10.2<br>16.9                     | 51.2<br>81    | 10.2<br>16.9   | 51.2<br>81    | 12.8<br>16.7   |  | 13<br>16   | 35.2         |

Note) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-204**.)

Static permissible moment\* 1 block: the static permissible moment with one LM block

Double blocks: static permissible moment when two LM blocks are in close contact with each other.

Overall block length dimension (L)

The overall block lengths (L) in the dimension table are for when the contamination protection accessory symbol is UU or SS. The overall block length (L) will increase if another contamination protection accessory or lubricator is attached.

(See **A1-491** or **A1-512**.)

An "M" in the model number indicates the material of the LM block, LM rail, or balls are stainless steel.

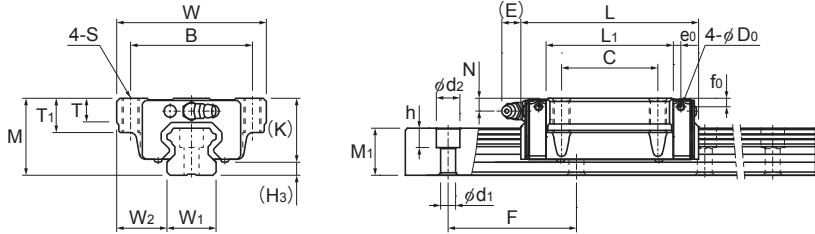
Stainless steel products have superior corrosion resistance and environmental resistance.

\*The diagram shows the side nipple pilot holes for when a grease nipple is desired for a product with LaCS or a QZ Lubricator.

In all other cases, the side nipple pilot holes will not be through holes.

Consult with THK if you desire drilling for grease nipple mounting.

# Models HSR-A and HSR-AM, Models HSR-LA and HSR-LAM



Models HSR15 to 35A/LA/AM/LAM

| Model No.             | Outer dimensions |       |              | LM block dimensions |     |     |                |    |      |                |      |     |     |               |                |                |                | Pilot hole for side nipple |  |  |  |
|-----------------------|------------------|-------|--------------|---------------------|-----|-----|----------------|----|------|----------------|------|-----|-----|---------------|----------------|----------------|----------------|----------------------------|--|--|--|
|                       | Height           | Width | Length       |                     |     |     |                |    |      |                |      |     |     |               |                |                |                |                            |  |  |  |
|                       | M                | W     | L            | B                   | C   | S   | L <sub>1</sub> | t  | T    | T <sub>1</sub> | K    | N   | E   | Grease nipple | e <sub>0</sub> | f <sub>0</sub> | D <sub>0</sub> | H <sub>3</sub>             |  |  |  |
| HSR 15A<br>HSR 15AM   | 24               | 47    | 56.6         | 38                  | 30  | M5  | 38.8           | —  | 7    | 11             | 19.3 | 4.3 | 5.5 | PB1021B       | 3.2            | 3.9            | 3              | 4.7                        |  |  |  |
| HSR 20A<br>HSR 20AM   | 30               | 63    | 74           | 53                  | 40  | M6  | 50.8           | —  | 9.5  | 10             | 26   | 5   | 12  | B-M6F         | 3.1            | 3.4            | 3              | 4                          |  |  |  |
| HSR 20LA<br>HSR 20LAM | 30               | 63    | 90           | 53                  | 40  | M6  | 66.8           | —  | 9.5  | 10             | 26   | 5   | 12  | B-M6F         | 3.1            | 3.4            | 3              | 4                          |  |  |  |
| HSR 25A<br>HSR 25AM   | 36               | 70    | 83.1         | 57                  | 45  | M8  | 59.5           | —  | 11   | 16             | 30.5 | 6   | 12  | B-M6F         | 3.5            | 4              | 3              | 5.5                        |  |  |  |
| HSR 25LA<br>HSR 25LAM | 36               | 70    | 102.2        | 57                  | 45  | M8  | 78.6           | —  | 11   | 16             | 30.5 | 6   | 12  | B-M6F         | 3.5            | 4              | 3              | 5.5                        |  |  |  |
| HSR 30A<br>HSR 30AM   | 42               | 90    | 98           | 72                  | 52  | M10 | 70.4           | —  | 9    | 18             | 35   | 7   | 12  | B-M6F         | 5.2            | 6.2            | 5.2            | 7                          |  |  |  |
| HSR 30LA<br>HSR 30LAM | 42               | 90    | 120.6        | 72                  | 52  | M10 | 93             | —  | 9    | 18             | 35   | 7   | 12  | B-M6F         | 5.2            | 6.2            | 5.2            | 7                          |  |  |  |
| HSR 35A<br>HSR 35AM   | 48               | 100   | 109.4        | 82                  | 62  | M10 | 80.4           | —  | 12   | 21             | 40.5 | 8   | 12  | B-M6F         | 5.5            | 5.6            | 5.2            | 7.5                        |  |  |  |
| HSR 35LA<br>HSR 35LAM | 48               | 100   | 134.8        | 82                  | 62  | M10 | 105.8          | —  | 12   | 21             | 40.5 | 8   | 12  | B-M6F         | 5.5            | 5.6            | 5.2            | 7.5                        |  |  |  |
| HSR 45A<br>HSR 45LA   | 60               | 120   | 139<br>170.8 | 100                 | 80  | M12 | 98<br>129.8    | 25 | 13   | 15             | 50   | 10  | 16  | B-PT1/8       | 6.1            | 6.6            | 5.2            | 10                         |  |  |  |
| HSR 55A<br>HSR 55LA   | 70               | 140   | 163<br>201.1 | 116                 | 95  | M14 | 118<br>156.1   | 29 | 13.5 | 17             | 57   | 11  | 16  | B-PT1/8       | 5.6            | 7.7            | 5.2            | 13                         |  |  |  |
| HSR 65A<br>HSR 65LA   | 90               | 170   | 186<br>245.5 | 142                 | 110 | M16 | 147<br>206.5   | 37 | 21.5 | 23             | 76   | 19  | 16  | B-PT1/8       | —              | —              | —              | 14                         |  |  |  |
| HSR 85A<br>HSR 85LA   | 110              | 215   | 245.6<br>303 | 185                 | 140 | M20 | 178.6<br>236   | 55 | 28   | 30             | 94   | 23  | 16  | B-PT1/8       | —              | —              | —              | 16                         |  |  |  |

## Model number coding

**HSR25 A 2 QZ UU C0 M +1200L P T M -II**

Model number

Type of LM block

With QZ Lubricator

Contamination protection accessory symbol (\*1)

Stainless steel LM block

LM rail length (in mm)

Stainless steel LM rail jointed use

Symbol for No. of rails used on the same plane (\*4)

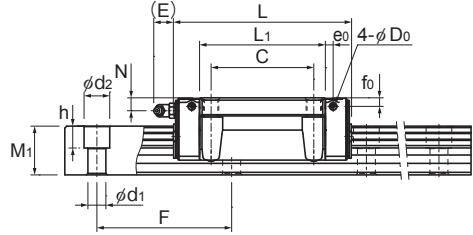
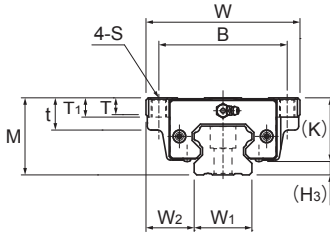
No. of LM blocks used on the same rail

Radial clearance symbol (\*2)  
Normal (No symbol)  
Light preload (C1)  
Medium preload (C0)

Accuracy symbol (\*3)  
Normal grade (No Symbol)/High accuracy grade (H)  
Precision grade (P)/Super precision grade (SP)  
Ultra precision grade (UP)

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-72**. (\*3) See **A1-77**. (\*4) See **A1-13**.

Note) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.) Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.



Models HSR45 to 85A/LA

Unit: mm

|  | LM rail dimensions      |                |                |       |                                   |                | Basic load rating |                | Static permissible moment kN•m * |               |                |               |                |  | Mass        |         |
|--|-------------------------|----------------|----------------|-------|-----------------------------------|----------------|-------------------|----------------|----------------------------------|---------------|----------------|---------------|----------------|--|-------------|---------|
|  | Width                   |                | Height         | Pitch |                                   | Length*        | C                 | C <sub>0</sub> | M <sub>A</sub>                   |               | M <sub>B</sub> |               | M <sub>C</sub> |  | LM block    | LM rail |
|  | W <sub>1</sub><br>±0.05 | W <sub>2</sub> | M <sub>1</sub> | F     | d <sub>1</sub> ×d <sub>2</sub> ×h | Max            | kN                | kN             | 1 block                          | Double blocks | 1 block        | Double blocks | 1 block        |  | kg          | kg/m    |
|  | 15                      | 16             | 15             | 60    | 4.5×7.5×5.3                       | 3000<br>(1240) | 10.9              | 15.7           | 0.0945                           | 0.527         | 0.0945         | 0.527         | 0.0998         |  | 0.2         | 1.5     |
|  | 20                      | 21.5           | 18             | 60    | 6×9.5×8.5                         | 3000<br>(1480) | 19.8              | 27.4           | 0.218                            | 1.2           | 0.218          | 1.2           | 0.235          |  | 0.35        | 2.3     |
|  | 20                      | 21.5           | 18             | 60    | 6×9.5×8.5                         | 3000<br>(1480) | 23.9              | 35.8           | 0.363                            | 1.87          | 0.363          | 1.87          | 0.307          |  | 0.47        | 2.3     |
|  | 23                      | 23.5           | 22             | 60    | 7×11×9                            | 3000<br>(2020) | 27.6              | 36.4           | 0.324                            | 1.8           | 0.324          | 1.8           | 0.366          |  | 0.59        | 3.3     |
|  | 23                      | 23.5           | 22             | 60    | 7×11×9                            | 3000<br>(2020) | 35.2              | 51.6           | 0.627                            | 3.04          | 0.627          | 3.04          | 0.518          |  | 0.75        | 3.3     |
|  | 28                      | 31             | 26             | 80    | 9×14×12                           | 3000<br>(2520) | 40.5              | 53.7           | 0.599                            | 3.1           | 0.599          | 3.1           | 0.652          |  | 1.1         | 4.8     |
|  | 28                      | 31             | 26             | 80    | 9×14×12                           | 3000<br>(2520) | 48.9              | 70.2           | 0.995                            | 4.89          | 0.995          | 4.89          | 0.852          |  | 1.3         | 4.8     |
|  | 34                      | 33             | 29             | 80    | 9×14×12                           | 3000<br>(2520) | 53.9              | 70.2           | 0.895                            | 4.51          | 0.895          | 4.51          | 1.05           |  | 1.6         | 6.6     |
|  | 34                      | 33             | 29             | 80    | 9×14×12                           | 3000<br>(2520) | 65                | 91.7           | 1.49                             | 7.13          | 1.49           | 7.13          | 1.37           |  | 2           | 6.6     |
|  | 45                      | 37.5           | 38             | 105   | 14×20×17                          | 3090           | 82.2<br>100       | 101<br>135     | 1.5<br>2.59                      | 8.37<br>13.4  | 1.5<br>2.59    | 8.37<br>13.4  | 1.94<br>2.6    |  | 2.8<br>3.3  | 11      |
|  | 53                      | 43.5           | 44             | 120   | 16×23×20                          | 3060           | 121<br>148        | 146<br>194     | 2.6<br>4.46                      | 14.1<br>22.7  | 2.6<br>4.46    | 14.1<br>22.7  | 3.43<br>4.56   |  | 4.5<br>5.7  | 15.1    |
|  | 63                      | 53.5           | 53             | 150   | 18×26×22                          | 3000           | 195<br>249        | 228<br>323     | 5.08<br>9.81                     | 25<br>45.6    | 5.08<br>45.6   | 25<br>45.6    | 6.2<br>8.79    |  | 8.5<br>10.7 | 22.5    |
|  | 85                      | 65             | 65             | 180   | 24×35×28                          | 3000           | 304<br>367        | 355<br>464     | 10.2<br>16.9                     | 51.2<br>81    | 10.2<br>16.9   | 51.2<br>81    | 12.8<br>16.7   |  | 17<br>23    | 35.2    |

Note) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-204**.)

Static permissible moment\*

1 block: the static permissible moment with one LM block

Double blocks: static permissible moment when two LM blocks are in close contact with each other

Overall block length dimension (L)

The overall block lengths (L) in the dimension table are for when the contamination protection accessory symbol is UU or SS.

The overall block length (L) will increase if another contamination protection accessory or lubricator is attached.

(See **A1-491** or **A1-512**)

An "M" in the model number indicates the material of the LM block, LM rail, or balls are stainless steel.

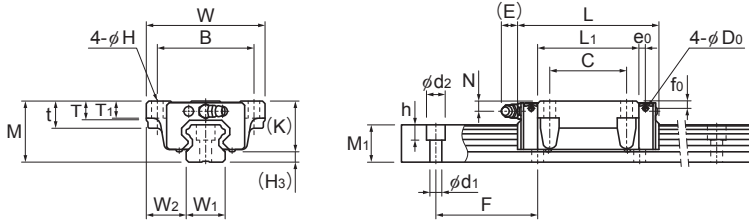
Stainless steel products have superior corrosion resistance and environmental resistance.

\*The diagram shows the side nipple pilot holes for when a grease nipple is desired for a product with LaCS or a QZ Lubricator.

In all other cases, the side nipple pilot holes will not be through holes.

Consult with THK if you desire drilling for grease nipple mounting.

# Models HSR-B, HSR-BM, HSR-LB and HSR-LBM



Models HSR15 to 35B/LB/BM/LBM

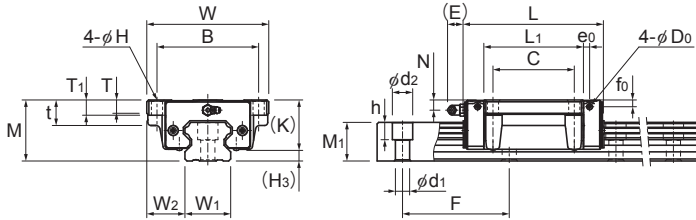
| Model No.             | Outer dimensions |       |              | LM block dimensions |     |     |                |    |      |                |      |     |     |               |                |                | Pilot hole for side nipple |                |  |  |
|-----------------------|------------------|-------|--------------|---------------------|-----|-----|----------------|----|------|----------------|------|-----|-----|---------------|----------------|----------------|----------------------------|----------------|--|--|
|                       | Height           | Width | Length       | B                   | C   | H   | L <sub>1</sub> | t  | T    | T <sub>1</sub> | K    | N   | E   | Grease nipple | e <sub>0</sub> | f <sub>0</sub> | D <sub>0</sub>             | H <sub>3</sub> |  |  |
|                       | M                | W     | L            |                     |     |     |                |    |      |                |      |     |     |               |                |                |                            |                |  |  |
| HSR 15B<br>HSR 15BM   | 24               | 47    | 56.6         | 38                  | 30  | 4.5 | 38.8           | 11 | 7    | 7              | 19.3 | 4.3 | 5.5 | PB1021B       | 3.2            | 3.9            | 3                          | 4.7            |  |  |
| HSR 20B<br>HSR 20BM   | 30               | 63    | 74           | 53                  | 40  | 6   | 50.8           | 10 | 9.5  | 10             | 26   | 5   | 12  | B-M6F         | 3.1            | 3.4            | 3                          | 4              |  |  |
| HSR 20LB<br>HSR 20LBM | 30               | 63    | 90           | 53                  | 40  | 6   | 66.8           | 10 | 9.5  | 10             | 26   | 5   | 12  | B-M6F         | 3.1            | 3.4            | 3                          | 4              |  |  |
| HSR 25B<br>HSR 25BM   | 36               | 70    | 83.1         | 57                  | 45  | 7   | 59.5           | 16 | 11   | 10             | 30.5 | 6   | 12  | B-M6F         | 3.5            | 4              | 3                          | 5.5            |  |  |
| HSR 25LB<br>HSR 25LBM | 36               | 70    | 102.2        | 57                  | 45  | 7   | 78.6           | 16 | 11   | 10             | 30.5 | 6   | 12  | B-M6F         | 3.5            | 4              | 3                          | 5.5            |  |  |
| HSR 30B<br>HSR 30BM   | 42               | 90    | 98           | 72                  | 52  | 9   | 70.4           | 18 | 9    | 10             | 35   | 7   | 12  | B-M6F         | 5.2            | 6.2            | 5.2                        | 7              |  |  |
| HSR 30LB<br>HSR 30LBM | 42               | 90    | 120.6        | 72                  | 52  | 9   | 93             | 18 | 9    | 10             | 35   | 7   | 12  | B-M6F         | 5.2            | 6.2            | 5.2                        | 7              |  |  |
| HSR 35B<br>HSR 35BM   | 48               | 100   | 109.4        | 82                  | 62  | 9   | 80.4           | 21 | 12   | 13             | 40.5 | 8   | 12  | B-M6F         | 5.5            | 5.6            | 5.2                        | 7.5            |  |  |
| HSR 35LB<br>HSR 35LBM | 48               | 100   | 134.8        | 82                  | 62  | 9   | 105.8          | 21 | 12   | 13             | 40.5 | 8   | 12  | B-M6F         | 5.5            | 5.6            | 5.2                        | 7.5            |  |  |
| HSR 45B<br>HSR 45LB   | 60               | 120   | 139<br>170.8 | 100                 | 80  | 11  | 98<br>129.8    | 25 | 13   | 15             | 50   | 10  | 16  | B-PT1/8       | 6.1            | 6.6            | 5.2                        | 10             |  |  |
| HSR 55B<br>HSR 55LB   | 70               | 140   | 163<br>201.1 | 116                 | 95  | 14  | 118<br>156.1   | 29 | 13.5 | 17             | 57   | 11  | 16  | B-PT1/8       | 5.6            | 7.7            | 5.2                        | 13             |  |  |
| HSR 65B<br>HSR 65LB   | 90               | 170   | 186<br>245.5 | 142                 | 110 | 16  | 147<br>206.5   | 37 | 21.5 | 23             | 76   | 19  | 16  | B-PT1/8       | —              | —              | —                          | 14             |  |  |
| HSR 85B<br>HSR 85LB   | 110              | 215   | 245.6<br>303 | 185                 | 140 | 18  | 178.6<br>236   | 55 | 28   | 30             | 94   | 23  | 16  | B-PT1/8       | —              | —              | —                          | 16             |  |  |

## Model number coding

|                                        |                  |                    |                                                                                                 |                          |                        |                                                                                                                                                          |                                |                                                     |          |          |            |
|----------------------------------------|------------------|--------------------|-------------------------------------------------------------------------------------------------|--------------------------|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|-----------------------------------------------------|----------|----------|------------|
| <b>HSR25</b>                           | <b>B</b>         | <b>2</b>           | <b>QZ</b>                                                                                       | <b>UU</b>                | <b>C0</b>              | <b>M</b>                                                                                                                                                 | <b>+1200L</b>                  | <b>P</b>                                            | <b>T</b> | <b>M</b> | <b>-II</b> |
| Model number                           | Type of LM block | With QZ Lubricator | Contamination protection accessory symbol (*1)                                                  | Stainless steel LM block | LM rail length (in mm) | Stainless steel LM rail                                                                                                                                  | Symbol for LM rail jointed use | Symbol for No. of rails used on the same plane (*4) |          |          |            |
| No. of LM blocks used on the same rail |                  |                    | Radial clearance symbol (*2)<br>Normal (No symbol)<br>Light preload (C1)<br>Medium preload (C0) |                          |                        | Accuracy symbol (*3)<br>Normal grade (No Symbol)/High accuracy grade (H)<br>Precision grade (P)/Super precision grade (SP)<br>Ultra precision grade (UP) |                                |                                                     |          |          |            |

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-72**. (\*3) See **A1-77**. (\*4) See **A1-13**.

Note) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.) Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.



Models HSR45 to 85B/LB

Unit: mm

| LM rail dimensions  |       |        |       |                             |                | Basic load rating |                | Static permissible moment $\text{kN}\cdot\text{m}^*$ |               |              |               |              |  | Mass        |         |
|---------------------|-------|--------|-------|-----------------------------|----------------|-------------------|----------------|------------------------------------------------------|---------------|--------------|---------------|--------------|--|-------------|---------|
| Width               |       | Height | Pitch |                             | Length*        | C                 | C <sub>0</sub> | $M_A$                                                |               | $M_B$        |               | $M_C$        |  | LM block    | LM rail |
| $W_1$<br>$\pm 0.05$ | $W_2$ | $M_1$  | F     | $d_1 \times d_2 \times h$   | Max            | kN                | kN             | 1 block                                              | Double blocks | 1 block      | Double blocks | 1 block      |  | kg          | kg/m    |
| 15                  | 16    | 15     | 60    | $4.5 \times 7.5 \times 5.3$ | 3000<br>(1240) | 10.9              | 15.7           | 0.0945                                               | 0.527         | 0.0945       | 0.527         | 0.0998       |  | 0.2         | 1.5     |
| 20                  | 21.5  | 18     | 60    | $6 \times 9.5 \times 8.5$   | 3000<br>(1480) | 19.8              | 27.4           | 0.218                                                | 1.2           | 0.218        | 1.2           | 0.235        |  | 0.35        | 2.3     |
| 20                  | 21.5  | 18     | 60    | $6 \times 9.5 \times 8.5$   | 3000<br>(1480) | 23.9              | 35.8           | 0.363                                                | 1.87          | 0.363        | 1.87          | 0.307        |  | 0.47        | 2.3     |
| 23                  | 23.5  | 22     | 60    | $7 \times 11 \times 9$      | 3000<br>(2020) | 27.6              | 36.4           | 0.324                                                | 1.8           | 0.324        | 1.8           | 0.366        |  | 0.59        | 3.3     |
| 23                  | 23.5  | 22     | 60    | $7 \times 11 \times 9$      | 3000<br>(2020) | 35.2              | 51.6           | 0.627                                                | 3.04          | 0.627        | 3.04          | 0.518        |  | 0.75        | 3.3     |
| 28                  | 31    | 26     | 80    | $9 \times 14 \times 12$     | 3000<br>(2520) | 40.5              | 53.7           | 0.599                                                | 3.1           | 0.599        | 3.1           | 0.652        |  | 1.1         | 4.8     |
| 28                  | 31    | 26     | 80    | $9 \times 14 \times 12$     | 3000<br>(2520) | 48.9              | 70.2           | 0.995                                                | 4.89          | 0.995        | 4.89          | 0.852        |  | 1.3         | 4.8     |
| 34                  | 33    | 29     | 80    | $9 \times 14 \times 12$     | 3000<br>(2520) | 53.9              | 70.2           | 0.895                                                | 4.51          | 0.895        | 4.51          | 1.05         |  | 1.6         | 6.6     |
| 34                  | 33    | 29     | 80    | $9 \times 14 \times 12$     | 3000<br>(2520) | 65                | 91.7           | 1.49                                                 | 7.13          | 1.49         | 7.13          | 1.37         |  | 2           | 6.6     |
| 45                  | 37.5  | 38     | 105   | $14 \times 20 \times 17$    | 3090           | 82.2<br>100       | 101<br>135     | 1.5<br>2.59                                          | 8.37<br>13.4  | 1.5<br>2.59  | 8.37<br>13.4  | 1.94<br>2.6  |  | 2.8<br>3.3  | 11      |
| 53                  | 43.5  | 44     | 120   | $16 \times 23 \times 20$    | 3060           | 121<br>148        | 146<br>194     | 2.6<br>4.46                                          | 14.1<br>22.7  | 2.6<br>4.46  | 14.1<br>22.7  | 3.43<br>4.56 |  | 4.5<br>5.7  | 15.1    |
| 63                  | 53.5  | 53     | 150   | $18 \times 26 \times 22$    | 3000           | 195<br>249        | 228<br>323     | 5.08<br>9.81                                         | 25<br>45.6    | 5.08<br>9.81 | 25<br>45.6    | 6.2<br>8.79  |  | 8.5<br>10.7 | 22.5    |
| 85                  | 65    | 65     | 180   | $24 \times 35 \times 28$    | 3000           | 304<br>367        | 355<br>464     | 10.2<br>16.9                                         | 51.2<br>81    | 10.2<br>16.9 | 51.2<br>81    | 12.8<br>16.7 |  | 17<br>23    | 35.2    |

Note) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-204**.)

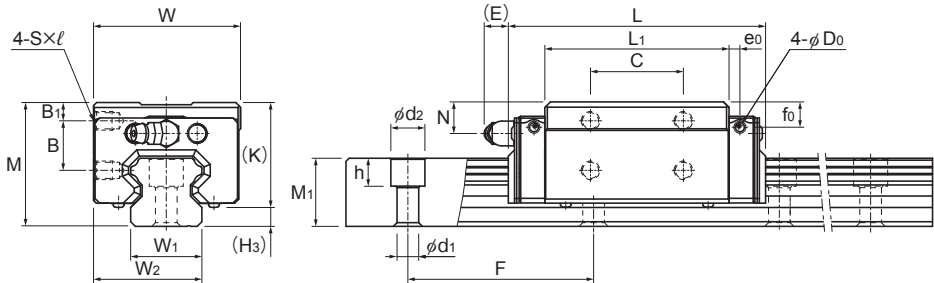
Static permissible moment\* 1 block: the static permissible moment with one LM block

Double blocks: static permissible moment when two LM blocks are in close contact with each other  
The overall block lengths (L) in the dimension table are for when the contamination protection accessory symbol is UU or SS.  
The overall block length (L) will increase if another contamination protection accessory or lubricator is attached.  
(See **A1-491** or **A1-512**)

An "M" in the model number indicates the material of the LM block, LM rail, or balls are stainless steel.  
Stainless steel products have superior corrosion resistance and environmental resistance.

\*The diagram shows the side nipple pilot holes for when a grease nipple is desired for a product with LaCS or a QZ Lubricator.  
In all other cases, the side nipple pilot holes will not be through holes.  
Consult with THK if you desire drilling for grease nipple mounting.

# Models HSR-YR, HSR-YRM and HSR-XYR



Models HSR15 to 35YR/YRM

| Model No.             | Outer dimensions |       |        | LM block dimensions |      |    |        |                |      |     |     |               |                | Pilot hole for side nipple |                |     | H <sub>3</sub> |
|-----------------------|------------------|-------|--------|---------------------|------|----|--------|----------------|------|-----|-----|---------------|----------------|----------------------------|----------------|-----|----------------|
|                       | Height           | Width | Length |                     |      |    |        |                |      |     |     | Grease nipple |                |                            |                |     |                |
|                       | M                | W     | L      | B <sub>1</sub>      | B    | C  | S×ℓ    | L <sub>1</sub> | K    | N   | E   |               | e <sub>0</sub> | f <sub>0</sub>             | D <sub>0</sub> |     |                |
| HSR 15YR<br>HSR 15YRM | 28               | 33.5  | 56.6   | 4.3                 | 11.5 | 18 | M4×5   | 38.8           | 23.3 | 8.3 | 5.5 | PB1021B       | 3.2            | 7.9                        | 3              | 4.7 |                |
| HSR 20YR<br>HSR 20YRM | 30               | 43.5  | 74     | 4                   | 11.5 | 25 | M5×6   | 50.8           | 26   | 5   | 12  | B-M6F         | 3.1            | 3.4                        | 3              | 4   |                |
| HSR 25YR<br>HSR 25YRM | 40               | 47.5  | 83.1   | 6                   | 16   | 30 | M6×6   | 59.5           | 34.5 | 10  | 12  | B-M6F         | 3.5            | 8                          | 3              | 5.5 |                |
| HSR 30YR<br>HSR 30YRM | 45               | 59.5  | 98     | 8                   | 16   | 40 | M6×9   | 70.4           | 38   | 10  | 12  | B-M6F         | 5.2            | 9.2                        | 5.2            | 7   |                |
| HSR 35YR<br>HSR 35YRM | 55               | 69.5  | 109.4  | 8                   | 23   | 43 | M8×10  | 80.4           | 47.5 | 15  | 12  | B-M6F         | 5.5            | 12.6                       | 5.2            | 7.5 |                |
| HSR 45YR              | 70               | 85.5  | 139    | 10                  | 30   | 55 | M10×14 | 98             | 60   | 20  | 16  | B-PT1/8       | 6.1            | 16.6                       | 5.2            | 10  |                |
| HSR 55YR              | 80               | 99.5  | 163    | 12                  | 32   | 70 | M12×15 | 118            | 67   | 21  | 16  | B-PT1/8       | 5.6            | 17.7                       | 5.2            | 13  |                |
| HSR 65XYR             | 90               | 124.5 | 190.5  | 12                  | 35   | 85 | M16×22 | 138.5          | 76   | 19  | 16  | B-PT1/8       | 6.8            | 14.6                       | 5.2            | 14  |                |
| HSR 65YR              | 90               | 124.5 | 186    | 12                  | 35   | 85 | M16×22 | 147            | 76   | 19  | 16  | B-PT1/8       | —              | —                          | —              | 14  |                |

## Model number coding

**HSR25 YR 2 UU C0 M +1200L P T M -II**

Model number

Type of LM block

Contamination protection accessory symbol (\*1)

Stainless steel LM block

LM rail length (in mm)

Stainless steel LM rail

Symbol for No. of rails used on the same plane (\*4)

No. of LM blocks used on the same rail

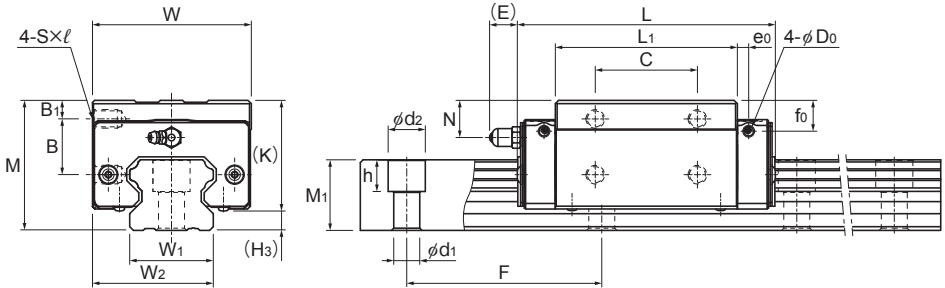
Radial clearance symbol (\*2)  
Normal (No symbol)  
Light preload (C1)  
Medium preload (C0)

Accuracy symbol (\*3)  
Normal grade (No Symbol)/High accuracy grade (H)  
Precision grade (P)/Super precision grade (SP)  
Ultra precision grade (UP)

Symbol for LM rail jointed use

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-72**. (\*3) See **A1-77**. (\*4) See **A1-13**.

Note) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.)



Models HSR45 to 65YR/XYR

Unit: mm

| LM rail dimensions  |        |       |     |                             |                | Basic load rating |                | Static permissible moment $\text{kN}\cdot\text{m}^*$ |               |         |               |         |  | Mass     |         |
|---------------------|--------|-------|-----|-----------------------------|----------------|-------------------|----------------|------------------------------------------------------|---------------|---------|---------------|---------|--|----------|---------|
| Width               | Height | Pitch |     | Length*                     |                | C                 | C <sub>0</sub> | $M_A$                                                |               | $M_B$   |               | $M_C$   |  | LM block | LM rail |
| $W_1$<br>$\pm 0.05$ | $W_2$  | $M_1$ | F   | $d_1 \times d_2 \times h$   | Max            | kN                | kN             | 1 block                                              | Double blocks | 1 block | Double blocks | 1 block |  | kg       | kg/m    |
| 15                  | 24     | 15    | 60  | $4.5 \times 7.5 \times 5.3$ | 3000<br>(1240) | 10.9              | 15.7           | 0.0945                                               | 0.527         | 0.0945  | 0.527         | 0.0998  |  | 0.18     | 1.5     |
| 20                  | 31.5   | 18    | 60  | $6 \times 9.5 \times 8.5$   | 3000<br>(1480) | 19.8              | 27.4           | 0.218                                                | 1.2           | 0.218   | 1.2           | 0.235   |  | 0.25     | 2.3     |
| 23                  | 35     | 22    | 60  | $7 \times 11 \times 9$      | 3000<br>(2020) | 27.6              | 36.4           | 0.324                                                | 1.8           | 0.324   | 1.8           | 0.366   |  | 0.54     | 3.3     |
| 28                  | 43.5   | 26    | 80  | $9 \times 14 \times 12$     | 3000<br>(2520) | 40.5              | 53.7           | 0.599                                                | 3.1           | 0.599   | 3.1           | 0.652   |  | 0.9      | 4.8     |
| 34                  | 51.5   | 29    | 80  | $9 \times 14 \times 12$     | 3000<br>(2520) | 53.9              | 70.2           | 0.895                                                | 4.51          | 0.895   | 4.51          | 1.05    |  | 1.5      | 6.6     |
| 45                  | 65     | 38    | 105 | $14 \times 20 \times 17$    | 3090           | 82.2              | 101            | 1.5                                                  | 8.37          | 1.5     | 8.37          | 1.94    |  | 2.6      | 11      |
| 53                  | 76     | 44    | 120 | $16 \times 23 \times 20$    | 3060           | 121               | 146            | 2.6                                                  | 14.1          | 2.6     | 14.1          | 3.43    |  | 4.3      | 15.1    |
| 63                  | 93     | 53    | 150 | $18 \times 26 \times 22$    | 3000           | 195               | 228            | 5.08                                                 | 25            | 5.08    | 25            | 6.2     |  | 7.3      | 22.5    |
| 63                  | 93     | 53    | 150 | $18 \times 26 \times 22$    | 3000           | 195               | 228            | 5.08                                                 | 25            | 5.08    | 25            | 6.2     |  | 7.3      | 22.5    |

Note) See [A1-455](#) or [A1-457](#) for how to install the HSR-YR and HSR-YRM.

The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See [A1-204](#).)

Static permissible moment\* 1 block: the static permissible moment with one LM block

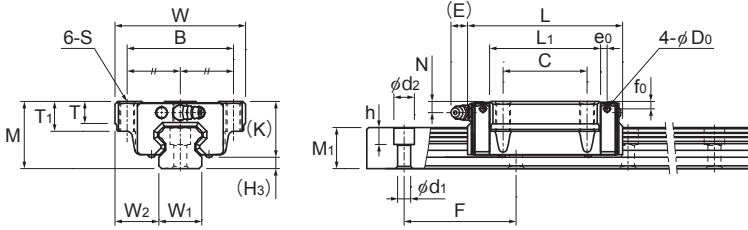
Double blocks: static permissible moment when two LM blocks are in close contact with each other

Total block length L : The total block length L shown in the table is the length with the dust proof parts, code UU or SS. If other contamination protection accessories or lubricant equipment are installed, the total block length will increase.

(See [A1-491](#) or [A1-512](#))

The M in the model number symbol indicates that the LM block, LM rail and balls are made of stainless steel. The stainless steel provides excellent corrosion and environmental resistance.

# Models HSR-CA, HSR-CAM, HSR-HA, HSR-HAM, HSR-XCA and HSR-XHA



Models HSR20 to 35CA/HA/CAM/HAM

| Model No.              | Outer dimensions |       |              | LM block dimensions |     |     |                |    |      |                |      |    |    |               |                | Pilot hole for side nipple |                |                |  |
|------------------------|------------------|-------|--------------|---------------------|-----|-----|----------------|----|------|----------------|------|----|----|---------------|----------------|----------------------------|----------------|----------------|--|
|                        | Height           | Width | Length       |                     |     |     |                |    |      |                |      |    |    | Grease nipple |                |                            |                |                |  |
|                        | M                | W     | L            | B                   | C   | S   | L <sub>1</sub> | t  | T    | T <sub>1</sub> | K    | N  | E  |               | e <sub>0</sub> | f <sub>0</sub>             | D <sub>0</sub> | H <sub>3</sub> |  |
| HSR 20CA<br>HSR 20CAM  | 30               | 63    | 74           | 53                  | 40  | M6  | 50.8           | —  | 9.5  | 10             | 26   | 5  | 12 | B-M6F         | 3.1            | 3.4                        | 3              | 4              |  |
| HSR 20HA<br>HSR 20HAM  | 30               | 63    | 90           | 53                  | 40  | M6  | 66.8           | —  | 9.5  | 10             | 26   | 5  | 12 | B-M6F         | 3.1            | 3.4                        | 3              | 4              |  |
| HSR 25CA<br>HSR 25CAM  | 36               | 70    | 83.1         | 57                  | 45  | M8  | 59.5           | —  | 11   | 16             | 30.5 | 6  | 12 | B-M6F         | 3.5            | 4                          | 3              | 5.5            |  |
| HSR 25HA<br>HSR 25HAM  | 36               | 70    | 102.2        | 57                  | 45  | M8  | 78.6           | —  | 11   | 16             | 30.5 | 6  | 12 | B-M6F         | 3.5            | 4                          | 3              | 5.5            |  |
| HSR 30CA<br>HSR 30CAM  | 42               | 90    | 98           | 72                  | 52  | M10 | 70.4           | —  | 9    | 18             | 35   | 7  | 12 | B-M6F         | 5.2            | 6.2                        | 5.2            | 7              |  |
| HSR 30HA<br>HSR 30HAM  | 42               | 90    | 120.6        | 72                  | 52  | M10 | 93             | —  | 9    | 18             | 35   | 7  | 12 | B-M6F         | 5.2            | 6.2                        | 5.2            | 7              |  |
| HSR 35CA<br>HSR 35CAM  | 48               | 100   | 109.4        | 82                  | 62  | M10 | 80.4           | —  | 12   | 21             | 40.5 | 8  | 12 | B-M6F         | 5.5            | 5.6                        | 5.2            | 7.5            |  |
| HSR 35HA<br>HSR 35HAM  | 48               | 100   | 134.8        | 82                  | 62  | M10 | 105.8          | —  | 12   | 21             | 40.5 | 8  | 12 | B-M6F         | 5.5            | 5.6                        | 5.2            | 7.5            |  |
| HSR 45CA<br>HSR 45HA   | 60               | 120   | 139<br>170.8 | 100                 | 80  | M12 | 98<br>129.8    | 25 | 13   | 15             | 50   | 10 | 16 | B-PT1/8       | 6.1            | 6.6                        | 5.2            | 10             |  |
| HSR 55CA<br>HSR 55HA   | 70               | 140   | 163<br>201.1 | 116                 | 95  | M14 | 118<br>156.1   | 29 | 13.5 | 17             | 57   | 11 | 16 | B-PT1/8       | 5.6            | 7.7                        | 5.2            | 13             |  |
| HSR 65XCA<br>HSR 65XHA | 90               | 170   | 190.5<br>250 | 142                 | 110 | M16 | 138.5<br>198   | 37 | 21.5 | 23             | 76   | 19 | 16 | B-PT1/8       | 6.8            | 14.6                       | 5.2            | 14             |  |
| HSR 65CA<br>HSR 65HA   | 90               | 170   | 186<br>245.5 | 142                 | 110 | M16 | 147<br>206.5   | 37 | 21.5 | 23             | 76   | 19 | 16 | B-PT1/8       | —              | —                          | —              | 14             |  |
| HSR 85CA<br>HSR 85HA   | 110              | 215   | 245.6<br>303 | 185                 | 140 | M20 | 178.6<br>236   | 55 | 28   | 30             | 94   | 23 | 16 | B-PT1/8       | —              | —                          | —              | 16             |  |

## Model number coding

**HSR25 HA 2 QZ KKHH C0 M +1300L P T M -II**

Model number

Type of LM block

With QZ Lubricator

Contamination protection accessory symbol (\*1)

Stainless steel LM block

LM rail length (in mm)

Stainless steel LM rail

No. of LM blocks used on the same rail

Radial clearance symbol (\*2)  
Normal (No symbol)  
Light preload (C1)  
Medium preload (C0)

Accuracy symbol (\*3)  
Normal grade (No Symbol)  
High accuracy grade (H)  
Precision grade (P)  
Super precision grade (SP)  
Ultra precision grade (UP)

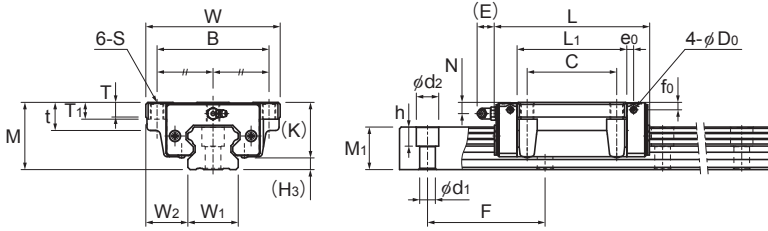
Symbol for LM rail jointed use

Symbol for No. of rails used on the same plane (\*4)

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-72**. (\*3) See **A1-77**. (\*4) See **A1-13**.

Note) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.)

Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.



Models HSR45 to 85CA/HA/XCA/XHA

Unit: mm

|  | LM rail dimensions                   |                |                              |                |                                                |                    | Basic load rating |                          | Static permissible moment kN•m*                                                   |               |                                                                                   |               |                                                                                   |             | Mass               |                     |
|--|--------------------------------------|----------------|------------------------------|----------------|------------------------------------------------|--------------------|-------------------|--------------------------|-----------------------------------------------------------------------------------|---------------|-----------------------------------------------------------------------------------|---------------|-----------------------------------------------------------------------------------|-------------|--------------------|---------------------|
|  | Width<br><br>W <sub>1</sub><br>±0.05 | W <sub>2</sub> | Height<br><br>M <sub>1</sub> | Pitch<br><br>F | Pitch<br><br>d <sub>1</sub> ×d <sub>2</sub> ×h | Length*<br><br>Max | C<br><br>kN       | C <sub>0</sub><br><br>kN |  |               |  |               |  |             | LM block<br><br>kg | LM rail<br><br>kg/m |
|  |                                      |                |                              |                |                                                |                    |                   |                          | 1 block                                                                           | Double blocks | 1 block                                                                           | Double blocks | 1 block                                                                           |             |                    |                     |
|  | 20                                   | 21.5           | 18                           | 60             | 6×9.5×8.5                                      | 3000<br>(1480)     | 19.8              | 27.4                     | 0.218                                                                             | 1.2           | 0.218                                                                             | 1.2           | 0.235                                                                             | 0.35        | 2.3                |                     |
|  | 20                                   | 21.5           | 18                           | 60             | 6×9.5×8.5                                      | 3000<br>(1480)     | 23.9              | 35.8                     | 0.363                                                                             | 1.87          | 0.363                                                                             | 1.87          | 0.307                                                                             | 0.47        | 2.3                |                     |
|  | 23                                   | 23.5           | 22                           | 60             | 7×11×9                                         | 3000<br>(2020)     | 27.6              | 36.4                     | 0.324                                                                             | 1.8           | 0.324                                                                             | 1.8           | 0.366                                                                             | 0.59        | 3.3                |                     |
|  | 23                                   | 23.5           | 22                           | 60             | 7×11×9                                         | 3000<br>(2020)     | 35.2              | 51.6                     | 0.627                                                                             | 3.04          | 0.627                                                                             | 3.04          | 0.518                                                                             | 0.75        | 3.3                |                     |
|  | 28                                   | 31             | 26                           | 80             | 9×14×12                                        | 3000<br>(2520)     | 40.5              | 53.7                     | 0.599                                                                             | 3.1           | 0.599                                                                             | 3.1           | 0.652                                                                             | 1.1         | 4.8                |                     |
|  | 28                                   | 31             | 26                           | 80             | 9×14×12                                        | 3000<br>(2520)     | 48.9              | 70.2                     | 0.995                                                                             | 4.89          | 0.995                                                                             | 4.89          | 0.852                                                                             | 1.3         | 4.8                |                     |
|  | 34                                   | 33             | 29                           | 80             | 9×14×12                                        | 3000<br>(2520)     | 53.9              | 70.2                     | 0.895                                                                             | 4.51          | 0.895                                                                             | 4.51          | 1.05                                                                              | 1.6         | 6.6                |                     |
|  | 34                                   | 33             | 29                           | 80             | 9×14×12                                        | 3000<br>(2520)     | 65                | 91.7                     | 1.49                                                                              | 7.13          | 1.49                                                                              | 7.13          | 1.37                                                                              | 2           | 6.6                |                     |
|  | 45                                   | 37.5           | 38                           | 105            | 14×20×17                                       | 3090               | 82.2<br>100       | 101<br>135               | 1.5<br>2.59                                                                       | 8.37<br>13.4  | 1.5<br>2.59                                                                       | 8.37<br>13.4  | 1.94<br>2.6                                                                       | 2.8<br>3.3  | 11                 |                     |
|  | 53                                   | 43.5           | 44                           | 120            | 16×23×20                                       | 3060               | 121<br>148        | 146<br>194               | 2.6<br>4.46                                                                       | 14.1<br>22.7  | 2.6<br>4.46                                                                       | 14.1<br>22.7  | 3.43<br>4.56                                                                      | 4.5<br>5.7  | 15.1               |                     |
|  | 63                                   | 53.5           | 53                           | 150            | 18×26×22                                       | 3000               | 195<br>249        | 228<br>323               | 5.08<br>9.81                                                                      | 25<br>45.6    | 5.08<br>9.81                                                                      | 25<br>45.6    | 6.2<br>8.79                                                                       | 8.5<br>10.7 | 22.5               |                     |
|  | 63                                   | 53.5           | 53                           | 150            | 18×26×22                                       | 3000               | 195<br>249        | 228<br>323               | 5.08<br>9.81                                                                      | 25<br>45.6    | 5.08<br>9.81                                                                      | 25<br>45.6    | 6.2<br>8.79                                                                       | 8.5<br>10.7 | 22.5               |                     |
|  | 85                                   | 65             | 65                           | 180            | 24×35×28                                       | 3000               | 304<br>367        | 355<br>464               | 10.2<br>16.9                                                                      | 51.2<br>81    | 10.2<br>16.9                                                                      | 51.2<br>81    | 12.8<br>16.7                                                                      | 17<br>23    | 35.2               |                     |

Note) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-204**.)

Static permissible moment\* 1 block: the static permissible moment with one LM block

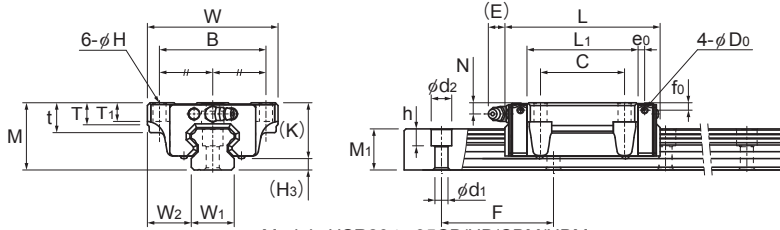
Double blocks: static permissible moment when two LM blocks are in close contact with each other

Total block length L : The total block length L shown in the table is the length with the dust proof parts, code UU or SS.  
If other contamination protection accessories or lubricant equipment are installed, the total block length will increase.

(See **A1-491** or **A1-512**)

The M in the model number symbol indicates that the LM block, LM rail and balls are made of stainless steel. The stainless steel provides excellent corrosion and environmental resistance.

# Models HSR-CB, HSR-CBM, HSR-HB, HSR-HBM, HSR-XCB and HSR-XHB



Models HSR20 to 35CB/HB/CBM/HBM

| Model No.              | Outer dimensions |       |              | LM block dimensions |     |    |                |    |      |                |      |    |    |                |                | Pilot hole for side nipple |                |     |  |
|------------------------|------------------|-------|--------------|---------------------|-----|----|----------------|----|------|----------------|------|----|----|----------------|----------------|----------------------------|----------------|-----|--|
|                        | Height           | Width | Length       |                     |     |    |                |    |      |                |      |    |    | Grease nipple  |                |                            |                |     |  |
|                        | M                | W     | L            | B                   | C   | H  | L <sub>1</sub> | t  | T    | T <sub>1</sub> | K    | N  | E  | e <sub>0</sub> | f <sub>0</sub> | D <sub>0</sub>             | H <sub>3</sub> |     |  |
| HSR 20CB<br>HSR 20CBM  | 30               | 63    | 74           | 53                  | 40  | 6  | 50.8           | 10 | 9.5  | 10             | 26   | 5  | 12 | B-M6F          | 3.1            | 3.4                        | 3              | 4   |  |
| HSR 20HB<br>HSR 20HBM  | 30               | 63    | 90           | 53                  | 40  | 6  | 66.8           | 10 | 9.5  | 10             | 26   | 5  | 12 | B-M6F          | 3.1            | 3.4                        | 3              | 4   |  |
| HSR 25CB<br>HSR 25CBM  | 36               | 70    | 83.1         | 57                  | 45  | 7  | 59.5           | 16 | 11   | 10             | 30.5 | 6  | 12 | B-M6F          | 3.5            | 4                          | 3              | 5.5 |  |
| HSR 25HB<br>HSR 25HBM  | 36               | 70    | 102.2        | 57                  | 45  | 7  | 78.6           | 16 | 11   | 10             | 30.5 | 6  | 12 | B-M6F          | 3.5            | 4                          | 3              | 5.5 |  |
| HSR 30CB<br>HSR 30CBM  | 42               | 90    | 98           | 72                  | 52  | 9  | 70.4           | 18 | 9    | 10             | 35   | 7  | 12 | B-M6F          | 5.2            | 6.2                        | 5.2            | 7   |  |
| HSR 30HB<br>HSR 30HBM  | 42               | 90    | 120.6        | 72                  | 52  | 9  | 93             | 18 | 9    | 10             | 35   | 7  | 12 | B-M6F          | 5.2            | 6.2                        | 5.2            | 7   |  |
| HSR 35CB<br>HSR 35CBM  | 48               | 100   | 109.4        | 82                  | 62  | 9  | 80.4           | 21 | 12   | 13             | 40.5 | 8  | 12 | B-M6F          | 5.5            | 5.6                        | 5.2            | 7.5 |  |
| HSR 35HB<br>HSR 35HBM  | 48               | 100   | 134.8        | 82                  | 62  | 9  | 105.8          | 21 | 12   | 13             | 40.5 | 8  | 12 | B-M6F          | 5.5            | 5.6                        | 5.2            | 7.5 |  |
| HSR 45CB<br>HSR 45HB   | 60               | 120   | 139<br>170.8 | 100                 | 80  | 11 | 98<br>129.8    | 25 | 13   | 15             | 50   | 10 | 16 | B-PT1/8        | 6.1            | 6.6                        | 5.2            | 10  |  |
| HSR 55CB<br>HSR 55HB   | 70               | 140   | 163<br>201.1 | 116                 | 95  | 14 | 118<br>156.1   | 29 | 13.5 | 17             | 57   | 11 | 16 | B-PT1/8        | 5.6            | 7.7                        | 5.2            | 13  |  |
| HSR 65XCB<br>HSR 65XHB | 90               | 170   | 190.5<br>250 | 142                 | 110 | 16 | 138.5<br>198   | 37 | 21.5 | 23             | 76   | 19 | 16 | B-PT1/8        | 6.8            | 14.6                       | 5.2            | 14  |  |
| HSR 65CB<br>HSR 65HB   | 90               | 170   | 186<br>245.5 | 142                 | 110 | 16 | 147<br>206.5   | 37 | 21.5 | 23             | 76   | 19 | 16 | B-PT1/8        | —              | —                          | —              | 14  |  |
| HSR 85CB<br>HSR 85HB   | 110              | 215   | 245.6<br>303 | 185                 | 140 | 18 | 178.6<br>236   | 55 | 28   | 30             | 94   | 23 | 16 | B-PT1/8        | —              | —                          | —              | 16  |  |

## Model number coding

**HSR35 CB 2 QZ ZZHH C0 M +1400L P T M - II**

Model number

Type of LM block

No. of LM blocks used on the same rail

With QZ Lubricator

Radial clearance symbol (\*2)  
Normal (No symbol)  
Light preload (C1)  
Medium preload (C0)

Contamination protection accessory symbol (\*1)

Stainless steel LM block

Accuracy symbol (\*3)  
Normal grade (No Symbol)  
High accuracy grade (H)  
Precision grade (P)  
Super precision grade (SP)  
Ultra precision grade (UP)

LM rail length (in mm)

Stainless steel LM rail

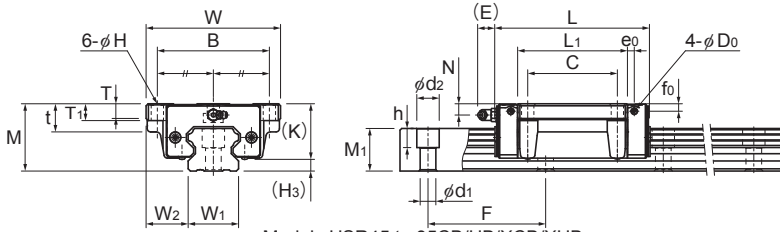
Symbol for LM rail jointed use

Symbol for No. of rails used on the same plane (\*4)

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-72**. (\*3) See **A1-77**. (\*4) See **A1-13**.

Note) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.)

Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.



Models HSR45 to 85CB/HB/XCB/XHB

Unit: mm

| LM rail dimensions  |        |       |     |                           |                |  | Basic load rating |                | Static permissible moment $\text{kN}\cdot\text{m}^*$ |               |              |               |              | Mass        |         |
|---------------------|--------|-------|-----|---------------------------|----------------|--|-------------------|----------------|------------------------------------------------------|---------------|--------------|---------------|--------------|-------------|---------|
| Width               | Height | Pitch |     | Length*                   |                |  | C                 | C <sub>0</sub> | $M_A$                                                |               | $M_B$        |               | $M_C$        | LM block    | LM rail |
| $W_1$<br>$\pm 0.05$ | $W_2$  | $M_1$ | F   | $d_1 \times d_2 \times h$ | Max            |  | kN                | kN             | 1 block                                              | Double blocks | 1 block      | Double blocks | 1 block      | kg          | kg/m    |
| 20                  | 21.5   | 18    | 60  | $6 \times 9.5 \times 8.5$ | 3000<br>(1480) |  | 19.8              | 27.4           | 0.218                                                | 1.2           | 0.218        | 1.2           | 0.235        | 0.35        | 2.3     |
| 20                  | 21.5   | 18    | 60  | $6 \times 9.5 \times 8.5$ | 3000<br>(1480) |  | 23.9              | 35.8           | 0.363                                                | 1.87          | 0.363        | 1.87          | 0.307        | 0.47        | 2.3     |
| 23                  | 23.5   | 22    | 60  | $7 \times 11 \times 9$    | 3000<br>(2020) |  | 27.6              | 36.4           | 0.324                                                | 1.8           | 0.324        | 1.8           | 0.366        | 0.59        | 3.3     |
| 23                  | 23.5   | 22    | 60  | $7 \times 11 \times 9$    | 3000<br>(2020) |  | 35.2              | 51.6           | 0.627                                                | 3.04          | 0.627        | 3.04          | 0.518        | 0.75        | 3.3     |
| 28                  | 31     | 26    | 80  | $9 \times 14 \times 12$   | 3000<br>(2520) |  | 40.5              | 53.7           | 0.599                                                | 3.1           | 0.599        | 3.1           | 0.652        | 1.1         | 4.8     |
| 28                  | 31     | 26    | 80  | $9 \times 14 \times 12$   | 3000<br>(2520) |  | 48.9              | 70.2           | 0.995                                                | 4.89          | 0.995        | 4.89          | 0.852        | 1.3         | 4.8     |
| 34                  | 33     | 29    | 80  | $9 \times 14 \times 12$   | 3000<br>(2520) |  | 53.9              | 70.2           | 0.895                                                | 4.51          | 0.895        | 4.51          | 1.05         | 1.6         | 6.6     |
| 34                  | 33     | 29    | 80  | $9 \times 14 \times 12$   | 3000<br>(2520) |  | 65                | 91.7           | 1.49                                                 | 7.13          | 1.49         | 7.13          | 1.37         | 2           | 6.6     |
| 45                  | 37.5   | 38    | 105 | $14 \times 20 \times 17$  | 3090           |  | 82.2<br>100       | 101<br>135     | 1.5<br>2.59                                          | 8.37<br>13.4  | 1.5<br>2.59  | 8.37<br>13.4  | 1.94<br>2.6  | 2.8<br>3.3  | 11      |
| 53                  | 43.5   | 44    | 120 | $16 \times 23 \times 20$  | 3060           |  | 121<br>148        | 146<br>194     | 2.6<br>4.46                                          | 14.1<br>22.7  | 2.6<br>4.46  | 14.1<br>22.7  | 3.43<br>4.56 | 4.5<br>5.7  | 15.1    |
| 63                  | 53.5   | 53    | 150 | $18 \times 26 \times 22$  | 3000           |  | 195<br>249        | 228<br>323     | 5.08<br>9.81                                         | 25<br>45.6    | 5.08<br>9.81 | 25<br>45.6    | 6.2<br>8.79  | 8.5<br>10.7 | 22.5    |
| 63                  | 53.5   | 53    | 150 | $18 \times 26 \times 22$  | 3000           |  | 195<br>249        | 228<br>323     | 5.08<br>9.81                                         | 25<br>45.6    | 5.08<br>9.81 | 25<br>45.6    | 6.2<br>8.79  | 8.5<br>10.7 | 22.5    |
| 85                  | 65     | 65    | 180 | $24 \times 35 \times 28$  | 3000           |  | 304<br>367        | 355<br>464     | 10.2<br>16.9                                         | 51.2<br>81    | 10.2<br>16.9 | 51.2<br>81    | 12.8<br>16.7 | 17<br>23    | 35.2    |

Note) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-204**.)

Static permissible moment\* 1 block: the static permissible moment with one LM block

Double blocks: static permissible moment when two LM blocks are in close contact with each other

Total block length L : The total block length L shown in the table is the length with the dust proof parts, code UU or SS.

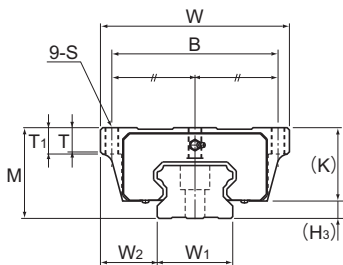
If other contamination protection accessories or lubricant equipment are installed, the total block length will increase.

(See **A1-491** or **A1-512**)

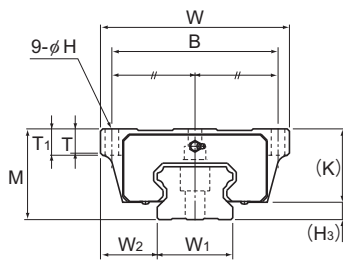
The M in the model number symbol indicates that the LM block, LM rail and balls are made of stainless steel.

The stainless steel provides excellent corrosion and environmental resistance.

# Models HSR-HA, HSR-HB and HSR-HR



Models HSR100 to 150HA



Models HSR100 to 150HB

| Model No.                           | Outer dimensions |                   |        | LM block dimensions |     |              |                       |                |                  |                |     |      |    |         | Grease nipple | H <sub>3</sub> |
|-------------------------------------|------------------|-------------------|--------|---------------------|-----|--------------|-----------------------|----------------|------------------|----------------|-----|------|----|---------|---------------|----------------|
|                                     | Height           | Width             | Length |                     |     |              |                       |                |                  |                |     |      |    |         |               |                |
|                                     | M                | W                 | L      | B                   | C   | H            | S × ℓ                 | L <sub>i</sub> | T                | T <sub>i</sub> | K   | N    | E  |         |               |                |
| HSR 100HA<br>HSR 100HB<br>HSR 100HR | 120              | 250<br>250<br>200 | 334    | 220<br>220<br>130   | 200 | —<br>20<br>— | M18*<br>—<br>M18 × 27 | 261            | 32<br>32<br>33   | 35<br>35<br>—  | 100 | 23   | 16 | B-PT1/4 | 20            |                |
| HSR 120HA<br>HSR 120HB<br>HSR 120HR | 130              | 290<br>290<br>220 | 365    | 250<br>250<br>146   | 210 | —<br>22<br>— | M20*<br>—<br>M20 × 30 | 287            | 34<br>34<br>33.7 | 38<br>38<br>—  | 110 | 26.5 | 16 | B-PT1/4 | 20            |                |
| HSR 150HA<br>HSR 150HB<br>HSR 150HR | 145              | 350<br>350<br>266 | 396    | 300<br>300<br>180   | 230 | —<br>26<br>— | M24*<br>—<br>M24 × 35 | 314            | 36<br>36<br>33   | 40<br>40<br>—  | 123 | 29   | 16 | B-PT1/4 | 22            |                |

Note) "\*" indicates a through hole.

### Model number coding

**HSR150 HR 2 UU C1 +2350L H T -II**

Model number

Type of LM block

Contamination protection accessory symbol (\*1)

LM rail length (in mm)

Symbol for LM rail jointed use

Symbol for No. of rails used on the same plane (\*4)

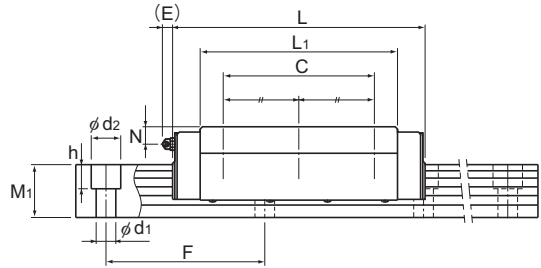
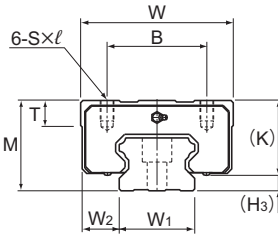
No. of LM blocks used on the same rail

Radial clearance symbol (\*2)  
Normal (No symbol)  
Light preload (C1)  
Medium preload (C0)

Accuracy symbol (\*3)  
Normal grade (No Symbol)/High accuracy grade (H)  
Precision grade (P)/Super precision grade (SP)  
Ultra precision grade (UP)

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-72**. (\*3) See **A1-77**. (\*4) See **A1-13**.

Note) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.)



Models HSR100 to 150HR

Unit: mm

| LM rail dimensions |                  |        |       |                           |         | Basic load rating |                | Static permissible moment kN·m*                                                                  |               |                                                                                                  |               |                                                                                                  |  | Mass     |         |
|--------------------|------------------|--------|-------|---------------------------|---------|-------------------|----------------|--------------------------------------------------------------------------------------------------|---------------|--------------------------------------------------------------------------------------------------|---------------|--------------------------------------------------------------------------------------------------|--|----------|---------|
| Width              |                  | Height | Pitch |                           | Length* | C                 | C <sub>0</sub> |  M <sub>A</sub> |               |  M <sub>B</sub> |               |  M <sub>C</sub> |  | LM block | LM rail |
| $W_1 \pm 0.05$     | $W_2$            | $M_1$  | F     | $d_1 \times d_2 \times h$ | Max     | kN                | kN             | 1 block                                                                                          | Double blocks | 1 block                                                                                          | Double blocks | 1 block                                                                                          |  | kg       | kg/m    |
| 100                | 75<br>75<br>50   | 70     | 210   | 26×39×32                  | 3000    | 441               | 540            | 20.7                                                                                             | 105           | 20.7                                                                                             | 105           | 24.1                                                                                             |  | 32       | 49      |
| 114                | 88<br>88<br>53   | 75     | 230   | 33×48×43                  | 3000    | 540               | 653            | 27.5                                                                                             | 138           | 27.5                                                                                             | 138           | 33.3                                                                                             |  | 43       | 61      |
| 144                | 103<br>103<br>61 | 85     | 250   | 39×58×46                  | 3000    | 518               | 728            | 33.6                                                                                             | 167           | 33.6                                                                                             | 167           | 45.2                                                                                             |  | 62       | 87      |

Note) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-204**.)

Static permissible moment\* 1 block: the static permissible moment with one LM block

Double blocks: static permissible moment when two LM blocks are in close contact with each other

Total block length L

: The total block length L shown in the table is the length with the dust proof parts, code UU or SS. If other contamination protection accessories or lubricant equipment are installed, the total block length will increase.

(See **A1-491** or **A1-512**)

# Standard Length and Maximum Length of the LM Rail

Table1 shows the standard lengths and the maximum lengths of model HSR variations. If the maximum length of the desired LM rail exceeds them, jointed rails will be used. Contact THK for details. For special rail lengths, it is recommended to use a value corresponding to the G,g dimension from the table. As the G,g dimension increases, this portion becomes less stable, and the accuracy performance is severely impacted.

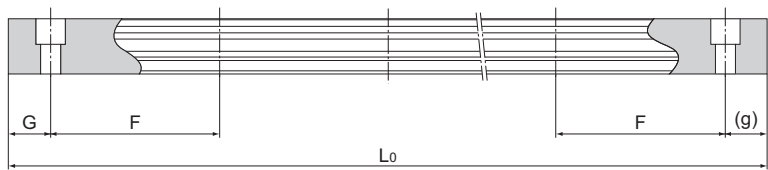


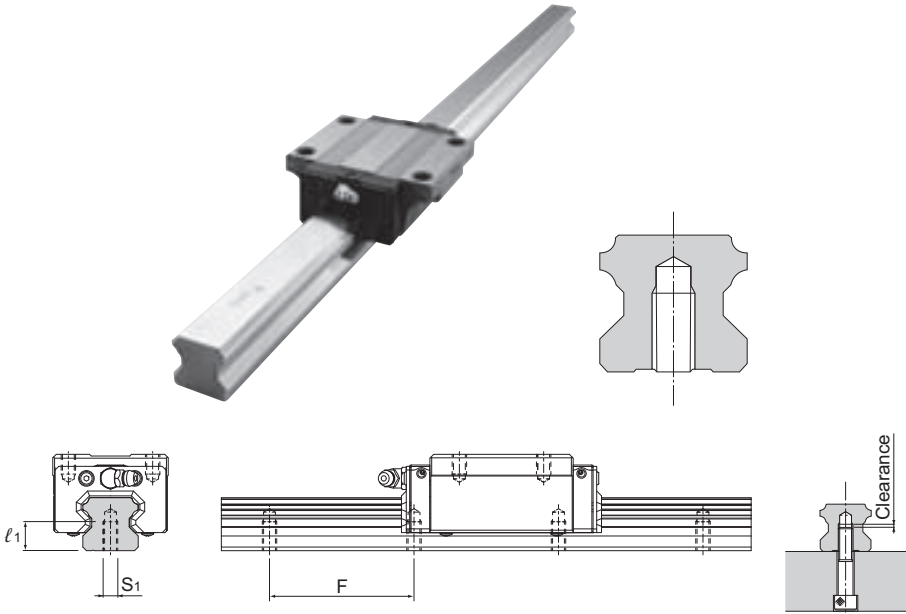
Table1 Standard Length and Maximum Length of the LM Rail for Model HSR Unit: mm

| Model No.                               | HSR 8 | HSR 10 | HSR 12 | HSR 15         | HSR 20         | HSR 25         | HSR 30         | HSR 35         | HSR 45 | HSR 55 | HSR 65 | HSR 85 | HSR 100 | HSR 120 | HSR 150 |
|-----------------------------------------|-------|--------|--------|----------------|----------------|----------------|----------------|----------------|--------|--------|--------|--------|---------|---------|---------|
| LM rail<br>standard length<br>( $L_0$ ) | 35    | 45     | 70     | 160            | 160            | 220            | 280            | 280            | 570    | 780    | 1270   | 1530   | 1340    | 1470    | 1600    |
|                                         | 55    | 70     | 110    | 220            | 220            | 280            | 360            | 360            | 675    | 900    | 1570   | 1890   | 1760    | 1930    | 2100    |
|                                         | 75    | 95     | 150    | 280            | 280            | 340            | 440            | 440            | 780    | 1020   | 2020   | 2250   | 2180    | 2390    | 2350    |
|                                         | 95    | 120    | 190    | 340            | 340            | 400            | 520            | 520            | 885    | 1140   | 2620   | 2610   | 2600    |         |         |
|                                         | 115   | 145    | 230    | 400            | 400            | 460            | 600            | 600            | 990    | 1260   |        |        |         |         |         |
|                                         | 135   | 170    | 270    | 460            | 460            | 520            | 680            | 680            | 1095   | 1380   |        |        |         |         |         |
|                                         | 155   | 195    | 310    | 520            | 520            | 580            | 760            | 760            | 1200   | 1500   |        |        |         |         |         |
|                                         | 175   | 220    | 350    | 580            | 580            | 640            | 840            | 840            | 1305   | 1620   |        |        |         |         |         |
|                                         | 195   | 245    | 390    | 640            | 640            | 700            | 920            | 920            | 1410   | 1740   |        |        |         |         |         |
|                                         | 215   | 270    | 430    | 700            | 700            | 760            | 1000           | 1000           | 1515   | 1860   |        |        |         |         |         |
|                                         | 235   | 295    | 470    | 760            | 760            | 820            | 1080           | 1080           | 1620   | 1980   |        |        |         |         |         |
|                                         | 255   | 320    | 510    | 820            | 820            | 940            | 1160           | 1160           | 1725   | 2100   |        |        |         |         |         |
|                                         | 275   | 345    | 550    | 940            | 940            | 1000           | 1240           | 1240           | 1830   | 2220   |        |        |         |         |         |
|                                         |       | 370    | 590    | 1000           | 1000           | 1060           | 1320           | 1320           | 1935   | 2340   |        |        |         |         |         |
|                                         |       | 395    | 630    | 1060           | 1060           | 1120           | 1400           | 1400           | 2040   | 2460   |        |        |         |         |         |
|                                         |       | 420    | 670    | 1120           | 1120           | 1180           | 1480           | 1480           | 2145   | 2580   |        |        |         |         |         |
|                                         |       | 445    |        | 1180           | 1180           | 1240           | 1560           | 1560           | 2250   | 2700   |        |        |         |         |         |
|                                         |       | 470    |        | 1240           | 1240           | 1300           | 1640           | 1640           | 2355   | 2820   |        |        |         |         |         |
|                                         |       |        |        | 1360           | 1360           | 1360           | 1720           | 1720           | 2460   | 2940   |        |        |         |         |         |
|                                         |       |        |        | 1480           | 1480           | 1420           | 1800           | 1800           | 2565   | 3060   |        |        |         |         |         |
|                                         |       |        |        | 1600           | 1600           | 1480           | 1880           | 1880           | 2670   |        |        |        |         |         |         |
|                                         |       |        |        |                | 1720           | 1540           | 1960           | 1960           | 2775   |        |        |        |         |         |         |
|                                         |       |        |        |                | 1840           | 1600           | 2040           | 2040           | 2880   |        |        |        |         |         |         |
|                                         |       |        |        |                | 1960           | 1720           | 2200           | 2200           | 2985   |        |        |        |         |         |         |
|                                         |       |        |        |                | 2080           | 1840           | 2360           | 2360           | 3090   |        |        |        |         |         |         |
|                                         |       |        |        |                | 2200           | 1960           | 2520           | 2520           |        |        |        |        |         |         |         |
|                                         |       |        |        |                |                | 2080           | 2680           | 2680           |        |        |        |        |         |         |         |
|                                         |       |        |        |                |                | 2200           | 2840           | 2840           |        |        |        |        |         |         |         |
|                                         |       |        |        |                |                | 2320           | 3000           | 3000           |        |        |        |        |         |         |         |
|                                         |       |        |        |                |                | 2440           |                |                |        |        |        |        |         |         |         |
| Standard pitch F                        | 20    | 25     | 40     | 60             | 60             | 60             | 80             | 80             | 105    | 120    | 150    | 180    | 210     | 230     | 250     |
| G,g                                     | 7.5   | 10     | 15     | 20             | 20             | 20             | 20             | 20             | 22.5   | 30     | 35     | 45     | 40      | 45      | 50      |
| Max length                              | (975) | (995)  | (1240) | 3000<br>(1240) | 3000<br>(1480) | 3000<br>(2020) | 3000<br>(2520) | 3000<br>(2520) | 3090   | 3060   | 3000   | 3000   | 3000    | 3000    | 3000    |

Note1) The maximum length varies with accuracy grades. Contact THK for details.  
 Note2) If jointed rails are not allowed and a greater length than the maximum values above is required, contact THK.  
 Note3) The figures in the parentheses indicate the maximum lengths of stainless steel made models.

# Tapped-hole LM Rail Type of Model HSR

HSR model rails also include a type where the LM rail is tapped from the bottom. This type is useful when mounting from the bottom of the base and when increased contamination protection is desired.



- (1) Determine the bolt length so that a clearance of 2 to 5 mm is secured between the bolt end and the bottom of the tap (effective tap depth). (See figure above.)
- (2) A tapped-hole LM rail type is also available for models HSR-YR and HSR-XYR.
- (3) For standard pitches of the taps, see Table1 on **A1-204**.

Table2 Dimensions of the LM Rail Tap

Unit: mm

| Model No. | S <sub>1</sub> | Effective tap depth $l_1$ |
|-----------|----------------|---------------------------|
| HSR 15    | M5             | 8                         |
| HSR 20    | M6             | 10                        |
| HSR 25    | M6             | 12                        |
| HSR 30    | M8             | 15                        |
| HSR 35    | M8             | 17                        |
| HSR 45    | M12            | 24                        |
| HSR 55    | M14            | 24                        |
| HSR 65    | M20            | 30                        |

## Model number coding

**HSR30A2UU +1000LH K**

Symbol for  
tapped-hole LM rail type

## Prevention of LM block from falling off of LM rail

In miniature model HSR, the balls fall out if the LM block comes off the LM rail. For this reason, LM Guide assemblies are delivered with a part which prevents the LM block from coming off the rail. If you remove this part when using the product, please take precautions to avoid overrunning the blocks off of the rail.

## Greasing Hole

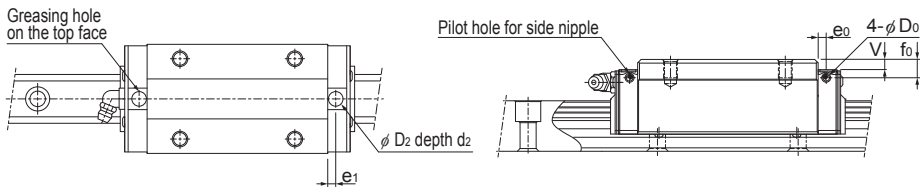
### [Greasing Hole for Model HSR]

The Model HSR LM block can be greased from the side or top surface. In order to prevent foreign material from entering the LM block, greasing holes are not through holes in blocks with regular specifications. Contact THK if these will be used.

In addition, contact THK if you will use an upper surface greasing hole with a Model HSR-R, HSR-XR, HSR-LR, HSR-XLR, HSR-YR, or HSR-XYR, as a lubrication adapter is required.

The lubricant may not reach the raceway if the LM Guide is not installed in a horizontal orientation. Be sure to let THK know the mounting orientation and the position where the grease nipple or plumbing fixture will be attached to each LM block.

See **A1-12** for the mounting orientation and **A24-2** for lubrication.



Unit: mm

| Model No. |                                                                           | Pilot hole for side nipple |                |                | Applicable nipple | Greasing hole on the top face |          |     |                |                |     |     |     |     |
|-----------|---------------------------------------------------------------------------|----------------------------|----------------|----------------|-------------------|-------------------------------|----------|-----|----------------|----------------|-----|-----|-----|-----|
|           |                                                                           | e <sub>0</sub>             | f <sub>0</sub> | D <sub>0</sub> |                   | D <sub>2</sub>                | (O-ring) | V   | e <sub>1</sub> | d <sub>2</sub> |     |     |     |     |
| HSR       | 15C<br>15LC<br>15A<br>15B<br>15CA<br>15HA<br>15CB<br>15HB                 | 3.2                        | 3.9            | 3              | PB107             | 5.1                           | SS4      | 0.3 | 3.2            | 0.65           |     |     |     |     |
|           | 15R<br>15LR<br>15YR                                                       | 3.2                        | 7.9            | 3              |                   |                               |          | 4.3 |                |                |     |     |     |     |
|           | 20C<br>20LC<br>20A<br>20LA<br>20B<br>20LB<br>20CA<br>20HA<br>20CB<br>20HB | 3.1                        | 3.4            | 3              |                   |                               |          | 6   |                |                | SS5 | 0.2 | 4.3 | 0.6 |
|           | 20R<br>20LR<br>20YR                                                       | 3.1                        | 3.4            | 3              |                   |                               |          |     |                |                |     | 0.2 |     |     |

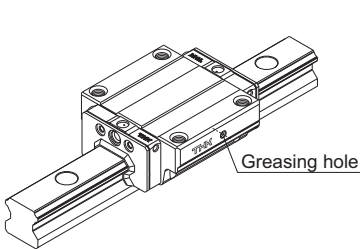
| Model No. |                                                                           | Pilot hole for side nipple |                |                | Applicable nipple | Greasing hole on the top face |          |      |                |                |
|-----------|---------------------------------------------------------------------------|----------------------------|----------------|----------------|-------------------|-------------------------------|----------|------|----------------|----------------|
|           |                                                                           | e <sub>0</sub>             | f <sub>0</sub> | D <sub>0</sub> |                   | D <sub>2</sub>                | (O-ring) | V    | e <sub>1</sub> | d <sub>2</sub> |
| HSR       | 25C<br>25LC<br>25A<br>25LA<br>25B<br>25LB<br>25CA<br>25HA<br>25CB<br>25HB | 3.5                        | 4              | 3              | PB107             | 6.2                           | P3       | 0.4  | 3.9            | 1              |
|           | 25R<br>25LR<br>25YR                                                       | 3.5                        | 8              | 3              |                   |                               |          | 4.4  |                |                |
|           | 30C<br>30LC<br>30A<br>30LA<br>30B<br>30LB<br>30CA<br>30HA<br>30CB<br>30HB | 5.2                        | 6.2            | 5.2            | M6F               | 6.2                           | P3       | 0.4  | 5.2            | 1              |
|           | 30R<br>30LR<br>30YR                                                       | 5.2                        | 9.2            | 5.2            |                   |                               |          | 3.4  |                |                |
|           | 35C<br>35LC<br>35A<br>35LA<br>35B<br>35LB<br>35CA<br>35HA<br>35CB<br>35HB | 5.5                        | 5.6            | 5.2            |                   | 6.2                           | P3       | 0.4  | 5.5            | 1              |
|           | 35R<br>35LR<br>35YR                                                       | 5.5                        | 12.6           | 5.2            |                   |                               |          | 7.4  |                |                |
|           | 45C<br>45LC<br>45A<br>45LA<br>45B<br>45LB<br>45CA<br>45HA<br>45CB<br>45HB | 6.1                        | 6.6            | 5.2            |                   | 10.2                          | P7       | 0.4  | 8.2            | 1              |
|           | 45R<br>45LR<br>45YR                                                       | 6.1                        | 16.6           | 5.2            |                   |                               |          | 10.4 |                |                |
|           | 55C<br>55LC<br>55A<br>55LA<br>55B<br>55LB<br>55CA<br>55HA<br>55CB<br>55HB | 5.6                        | 7.7            | 5.2            |                   | 10.2                          | P7       | 0.4  | 9.1            | 1              |
|           | 55R<br>55LR<br>55YR                                                       | 5.6                        | 17.7           | 5.2            |                   |                               |          | 10.4 |                |                |

| Model No. |                | Pilot hole for side nipple |                |                | Applicable nipple | Greasing hole on the top face |          |     |                |                |
|-----------|----------------|----------------------------|----------------|----------------|-------------------|-------------------------------|----------|-----|----------------|----------------|
|           |                | e <sub>0</sub>             | f <sub>0</sub> | D <sub>0</sub> |                   | D <sub>2</sub>                | (O-ring) | V   | e <sub>1</sub> | d <sub>2</sub> |
| HSR       | 65XC           | 6.8                        | 14.6           | 5.2            | M6F               | 10.2                          | P7       | 5.9 | 9.5            | 1              |
|           | 65XLC          |                            |                |                |                   |                               |          |     |                |                |
|           | 65XR           | 6.8                        | 14.6           | 5.2            |                   |                               |          | 5.9 |                |                |
|           | 65XLR<br>65XYR |                            |                |                |                   |                               |          |     |                |                |

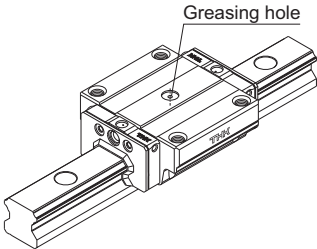
\*Upper surface lubrication is for oil lubrication only. Contact THK if you are considering using the greasing hole on the top face for grease lubrication.

**[Semi-standard Greasing Hole for Model HSR]**

For model HSR, a semi-standard greasing hole is available. Specify the appropriate model number according to the application.



Type with a Greasing Hole Drilled on the Side Surface

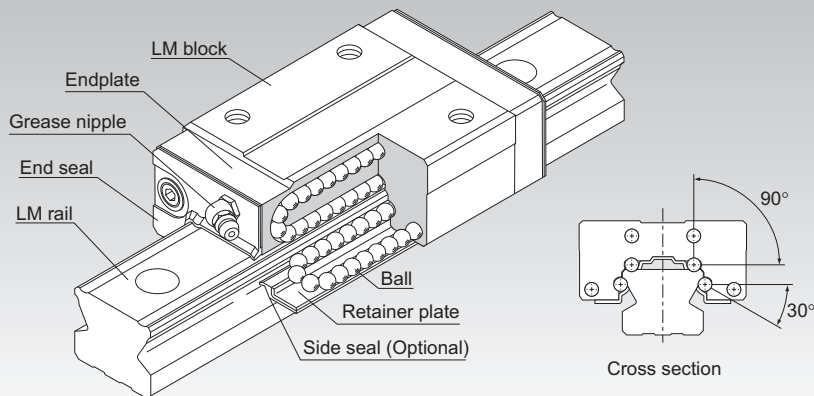


Type with a Greasing Hole Drilled on the Top Face



# SR

## LM Guide Radial Type Model SR



**Point of Selection** **A1-10**

**Point of Design** **A1-454**

**Options** **A1-477**

**Model No.** **A1-543**

**Precautions on Use** **A1-549**

**Accessories for Lubrication** **A24-1**

**Mounting Procedure and Maintenance** **B1-89**

Equivalent moment factor **A1-43**

Rated Loads in All Directions **A1-59**

Equivalent factor in each direction **A1-61**

Radial Clearance **A1-72**

Accuracy Standards **A1-77**

Shoulder Height of the Mounting Base and the Corner Radius **A1-463**

Permissible Error of the Mounting Surface **A1-470**

Dimensions of Each Model with an Option Attached **A1-491**

## Structure and Features

Balls roll in four rows of raceways precision-ground on an LM rail and an LM block, and endplates incorporated in the LM block allow the balls to circulate. Since a retainer plate holds the balls, they will not fall off even if the LM block is removed from the LM rail. With the low sectional height and the high rigidity design of the LM block, this model achieves highly accurate and stable straight motion.

### [Compact, Heavy Load]

Since it is a compact designed model that has a low sectional height and a ball contact structure rigid in the radial direction, this model is optimal for horizontal guide units.

### [Mounting accuracy can easily be achieved]

Since this model is a self-adjusting type capable of easily absorbing an accuracy error in parallelism and level between two rails, highly accurate and smooth motion can be achieved.

### [Low Noise]

The endplate installed at each end of the LM block is designed to ensure the smooth and low-noise circulation of the balls at the turning areas.

### [High Durability]

Even under a preload or excessive biased load, differential slip of balls is minimal. As a result, high wear resistance and long-term maintenance of accuracy are achieved.

### [Stainless Steel Type also Available]

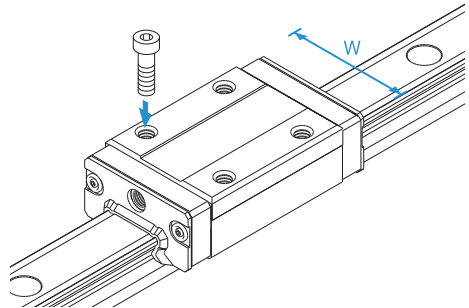
A special type which LM block, LM rail and balls are made of stainless steel is also available.

## Types and Features

### Model SR-W

With this type, the LM block has a smaller width (W) and tapped holes.

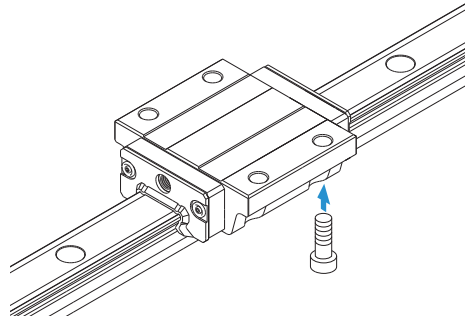
Specification Table⇒ **A1-216**



### Model SR-TB

The LM block has the same height as model SR-W and can be mounted from the bottom.

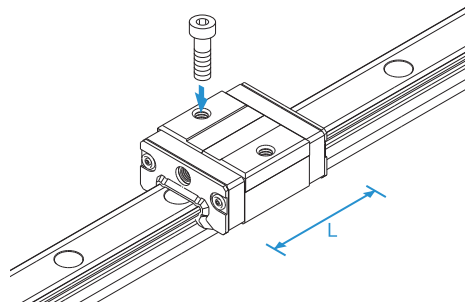
Specification Table⇒ **A1-218**



### Model SR-V

A space-saving type whose LM block has the same cross-sectional shape as model SR-W, but has a smaller overall LM block length (L).

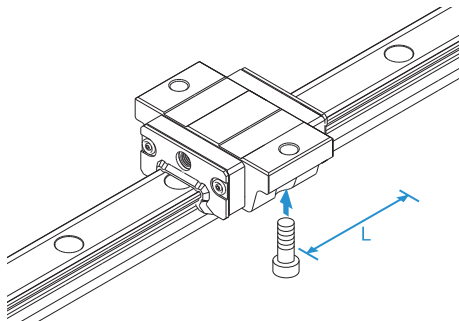
Specification Table⇒ **A1-216**



## Model SR-SB

A space-saving type whose LM block has the same cross-sectional shape as model SR-TB, but has a smaller overall LM block length (L).

Specification Table⇒ **A1-218**



# Characteristics of Model SR

When compared to models having a contact angle of 45°, model SR shows excellent characteristics as indicated below. Using these characteristics, you can design and manufacture highly accurate and highly rigid machines or equipment.

## Difference in Rated Load and Service Life

Since SR has a contact angle of 90°, its rated load and service life are different from those with a contact angle of 45°. When comparing model SR with a model that has a contact angle of 45° and when the same radial load is applied to the two models with the same ball diameter as shown in the figure below, the load applied to SR is 70% of the other model. As a result, the service life of SR is more than twice that of the other model.

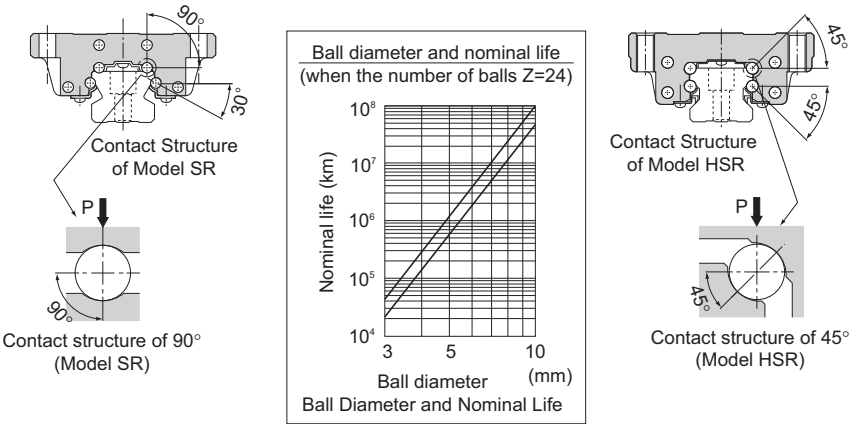


Fig.1

## Difference in Accuracy

If a machining error (grinding error) occurs in the LM rail or LM block, it will affect the running accuracy. Assuming that there is a machining error of  $\Delta$  on the raceway, it results in an error in the radial direction, and the error with the contact angle of 45° (model HSR) is 1.4 times greater than that of the contact angle of 90° (model SR). As for the machining error resulting in horizontal direction error, the error with the contact angle of 45° is 1.22 times greater than the contact angle of 30°.

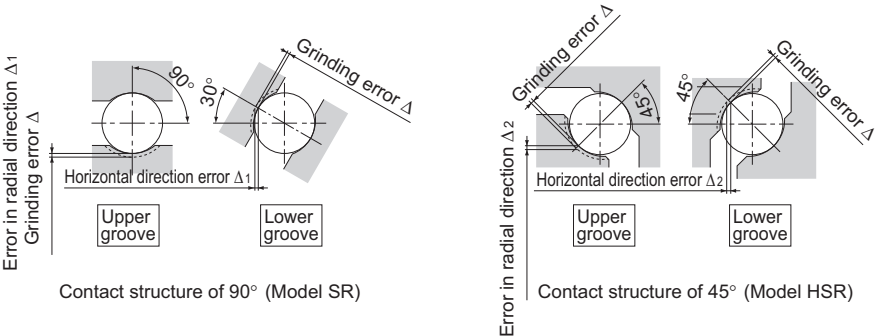


Fig.2 Machining Error and Accuracy

### Difference in Rigidity

The 90° contact angle adopted by model SR has a difference with the 45° contact angle also in rigidity. When the same radial load "P" is applied, the displacement in the radial direction with model SR is only 56% of that with the contact angle of 45°. Accordingly, where high rigidity in the radial direction is required, model SR is more advantageous. The figure below shows the difference in radial load and displacement.

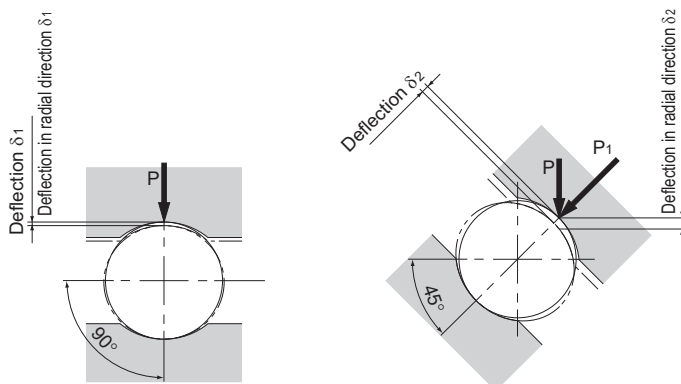


Fig.3 Deflection under a Radial Load

Load and deflection when contact angles are not the same (Da=6.35mm)  
(deflection per ball)

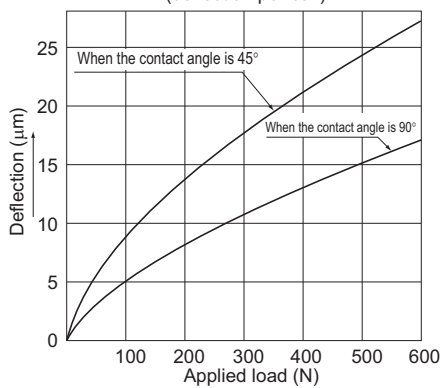


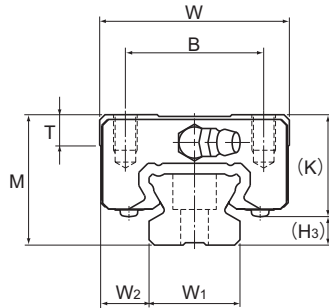
Fig.4 Radial Load and Deflection

### Conclusion

Model SR with this type of 90° contact construction are ideal for locations where the load applied is mostly radial, locations where radial rigidity is required, and locations where accurate motion is demanded in the up, down, left and right directions.

However, if the reverse radial load, the lateral load or the moment is large, we recommend model HSR, which has a contact angle of 45° (4-way equal load).

# Models SR-W, SR-WM, SR-V and SR-VM



| Model No.              | Outer dimensions |       |              | LM block dimensions |         |        |                |      |      |      |               |         | H <sub>3</sub> |
|------------------------|------------------|-------|--------------|---------------------|---------|--------|----------------|------|------|------|---------------|---------|----------------|
|                        | Height           | Width | Length       |                     |         |        |                |      |      |      | Grease nipple |         |                |
|                        | M                | W     | L            | B                   | C       | S×ℓ    | L <sub>1</sub> | T    | K    | N    | E             |         |                |
| SR 15V/VM<br>SR 15W/WM | 24               | 34    | 40.4<br>57   | 26                  | —<br>26 | M4×7   | 22.9<br>39.5   | 5.7  | 18.2 | 6    | 5.5           | PB1021B | 5.8            |
| SR 20V/VM<br>SR 20W/WM | 28               | 42    | 47.3<br>66.2 | 32                  | —<br>32 | M5×8   | 27.8<br>46.7   | 7.2  | 22   | 6    | 12            | B-M6F   | 6              |
| SR 25V/VM<br>SR 25W/WM | 33               | 48    | 59.2<br>83   | 35                  | —<br>35 | M6×9   | 35.2<br>59     | 7.7  | 26   | 7    | 12            | B-M6F   | 7              |
| SR 30V/VM<br>SR 30W/WM | 42               | 60    | 67.9<br>96.8 | 40                  | —<br>40 | M8×12  | 40.4<br>69.3   | 8.5  | 32.5 | 8    | 12            | B-M6F   | 9.5            |
| SR 35V/VM<br>SR 35W/WM | 48               | 70    | 77.6<br>111  | 50                  | —<br>50 | M8×12  | 45.7<br>79     | 12.5 | 36.5 | 8.5  | 12            | B-M6F   | 11.5           |
| SR 45W                 | 60               | 86    | 126          | 60                  | 60      | M10×15 | 90.5           | 15   | 47.5 | 11.5 | 16            | B-PT1/8 | 12.5           |
| SR 55W                 | 68               | 100   | 156          | 75                  | 75      | M12×20 | 117            | 16.7 | 54.5 | 12   | 16            | B-PT1/8 | 13.5           |
| SR 70T                 | 85               | 126   | 194.6        | 90                  | 90      | M16×25 | 147.6          | 24.5 | 70   | 12   | 16            | B-PT1/8 | 15             |
| SR 85T                 | 110              | 156   | 180          | 100                 | 80      | M18×30 | 130            | 25.5 | 91.5 | 27   | 12            | A-PT1/8 | 18.5           |
| SR 100T                | 120              | 178   | 200          | 120                 | 100     | M20×35 | 150            | 29.5 | 101  | 32   | 12            | A-PT1/8 | 19             |
| SR 120T                | 110              | 205   | 235          | 160                 | 120     | M20×35 | 180            | 24   | 95   | 14   | 13.5          | B-PT1/4 | 15             |
| SR 150T                | 135              | 250   | 280          | 200                 | 160     | M20×35 | 215            | 24   | 113  | 17   | 13.5          | B-PT1/4 | 22             |

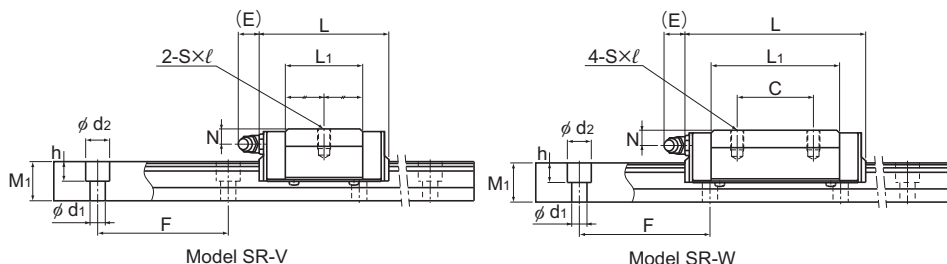
## Model number coding

**SR25 W 2 UU C0 M +1240L Y P T M - II**

|                                        |                              |                                                |                          |                        |                           |                                                  |                                                     |
|----------------------------------------|------------------------------|------------------------------------------------|--------------------------|------------------------|---------------------------|--------------------------------------------------|-----------------------------------------------------|
| Model number                           | Type of LM block             | Contamination protection accessory symbol (*1) | Stainless steel LM block | LM rail length (in mm) | Applied to only 15 and 25 | Stainless steel LM rail                          | Symbol for No. of rails used on the same plane (*4) |
| No. of LM blocks used on the same rail | Radial clearance symbol (*2) | Normal (No symbol)                             | Light preload (C1)       | Medium preload (C0)    | Accuracy symbol (*3)      | Normal grade (No Symbol)/High accuracy grade (H) | Precision grade (P)/Super precision grade (SP)      |
|                                        |                              |                                                |                          |                        |                           | Ultra precision grade (UP)                       |                                                     |

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-72**. (\*3) See **A1-77**. (\*4) See **A1-13**.

(Note) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.)



Unit: mm

|     | LM rail dimensions                   |      |                              |                             |                | Basic load rating                                           |              | Static permissible moment kN·m* |                                                                                   |                  |                                                                                   |                  |                                                                                   | Mass                  |                        |
|-----|--------------------------------------|------|------------------------------|-----------------------------|----------------|-------------------------------------------------------------|--------------|---------------------------------|-----------------------------------------------------------------------------------|------------------|-----------------------------------------------------------------------------------|------------------|-----------------------------------------------------------------------------------|-----------------------|------------------------|
|     | Width<br><br>W <sub>1</sub><br>±0.05 |      | Height<br><br>W <sub>2</sub> | Pitch<br><br>M <sub>1</sub> | Pitch<br><br>F | Length*<br><br>d <sub>1</sub> ×d <sub>2</sub> ×h<br><br>Max | C<br><br>kN  | C <sub>0</sub><br><br>kN        |  |                  |  |                  |  | LM<br>block<br><br>kg | LM<br>rail<br><br>kg/m |
|     |                                      |      |                              |                             |                |                                                             |              |                                 | 1<br>block                                                                        | Double<br>blocks | 1<br>block                                                                        | Double<br>blocks | 1<br>block                                                                        |                       |                        |
|     |                                      |      |                              |                             |                |                                                             |              |                                 |                                                                                   |                  |                                                                                   |                  |                                                                                   |                       |                        |
| 15  | 9.5                                  | 12.5 | 60                           | 3.5×6×4.5                   | (1240)<br>3000 | 9.1<br>13.8                                                 | 11.7<br>20.5 | 0.0344<br>0.0984                | 0.234<br>0.551                                                                    | 0.0215<br>0.0604 | 0.149<br>0.343                                                                    | 0.0694<br>0.122  | 0.12<br>0.2                                                                       | 1.2                   |                        |
| 20  | 11                                   | 15.5 | 60                           | 6×9.5×8.5                   | (1480)<br>3000 | 13.4<br>19.2                                                | 17.2<br>28.6 | 0.064<br>0.167                  | 0.396<br>0.887                                                                    | 0.0397<br>0.102  | 0.25<br>0.55                                                                      | 0.135<br>0.224   | 0.2<br>0.3                                                                        | 2.1                   |                        |
| 23  | 12.5                                 | 18   | 60                           | 7×11×9                      | (2020)<br>3000 | 21.6<br>30.9                                                | 26.8<br>44.7 | 0.125<br>0.326                  | 0.773<br>1.74                                                                     | 0.0774<br>0.2    | 0.488<br>1.08                                                                     | 0.245<br>0.408   | 0.3<br>0.4                                                                        | 2.7                   |                        |
| 28  | 16                                   | 23   | 80                           | 7×11×9                      | (2520)<br>3000 | 29.5<br>45.6                                                | 34.4<br>64.4 | 0.173<br>0.564                  | 1.15<br>2.92                                                                      | 0.108<br>0.346   | 0.735<br>1.8                                                                      | 0.376<br>0.703   | 0.5<br>0.8                                                                        | 4.3                   |                        |
| 34  | 18                                   | 27.5 | 80                           | 9×14×12                     | (2520)<br>3000 | 40.9<br>60.4                                                | 46.7<br>81.8 | 0.275<br>0.785                  | 1.79<br>4.27                                                                      | 0.171<br>0.482   | 1.14<br>2.65                                                                      | 0.615<br>1.08    | 0.8<br>1.2                                                                        | 6.4                   |                        |
| 45  | 20.5                                 | 35.5 | 105                          | 11×17.5×14                  | 3000           | 80.4                                                        | 107          | 1.17                            | 6.34                                                                              | 0.721            | 3.94                                                                              | 1.89             | 2.2                                                                               | 11.3                  |                        |
| 48  | 26                                   | 38   | 120                          | 14×20×17                    | 3000           | 136                                                         | 179          | 2.61                            | 13                                                                                | 1.6              | 8.05                                                                              | 3.33             | 3.6                                                                               | 12.8                  |                        |
| 70  | 28                                   | 47   | 150                          | 18×26×22                    | 3000           | 226                                                         | 282          | 5.03                            | 25.7                                                                              | 3.09             | 15.9                                                                              | 7.47             | 7                                                                                 | 22.8                  |                        |
| 85  | 35.5                                 | 65.5 | 180                          | 18×26×22                    | 3000           | 120                                                         | 224          | 2.54                            | 15.1                                                                              | 1.25             | 7.47                                                                              | 5.74             | 10.1                                                                              | 34.9                  |                        |
| 100 | 39                                   | 70.3 | 210                          | 22×32×25                    | 3000           | 148                                                         | 283          | 3.95                            | 20.9                                                                              | 1.95             | 10.3                                                                              | 8.55             | 14.1                                                                              | 46.4                  |                        |
| 114 | 45.5                                 | 65   | 230                          | 26×39×30                    | 3000           | 279                                                         | 377          | 5.83                            | 32.9                                                                              | 2.87             | 16.2                                                                              | 13.7             | —                                                                                 | —                     |                        |
| 144 | 53                                   | 77   | 250                          | 33×48×36                    | 3000           | 411                                                         | 537          | 9.98                            | 55.8                                                                              | 4.92             | 27.5                                                                              | 24.3             | —                                                                                 | —                     |                        |

Note1) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-220**.)  
Static permissible moment\* 1 block: the static permissible moment with one LM block

Double blocks: static permissible moment when two LM blocks are in close contact with each other  
Total block length L : The total block length L shown in the table is the length with the dust proof parts, code UU or SS.  
If other contamination protection accessories or lubricant equipment are installed, the total block length will increase.  
(See **A1-491** or **A1-512**)

The M in the model number symbol indicates that the LM block, LM rail and balls are made of stainless steel.  
The stainless steel provides excellent corrosion and environmental resistance.

Models SR85T, 100T, 120T and 150T are build to order.

Models SR85T and 100T include a grease nipple on the side face of the LM block. Contact THK for details.

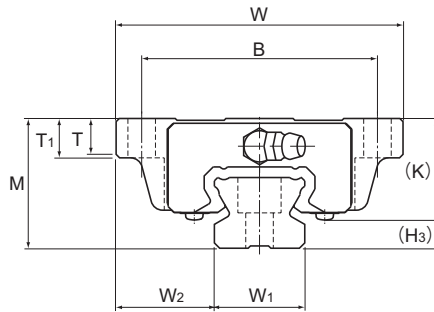
Note2) For models SR15 and 25, two types of rails with different mounting hole dimensions are offered (see Table1).  
When, replacing this model with model SSR, pay attention to the mounting hole dimension of the LM rail.  
Contact THK for details.

Note3) The basic load rating in the dimension table is for a load in the radial direction. Use Table7 on **A1-59** to calculate the load rating for loads in the reverse radial direction or lateral direction.

Table1 The dimension of the rail mounting hole

| Model No. | Standard rail      | Semi-Standard rail |
|-----------|--------------------|--------------------|
| SR 15     | For M3 (No symbol) | For M4 (Symbol Y)  |
| SR 25     | For M6 (Symbol Y)  | For M5 (No symbol) |

# Models SR-TB, SR-TBM, SR-SB and SR-SBM



| Model No.   | Outer dimensions |       |        | LM block dimensions |    |     |                |      |                |      |      |     |         | Grease nipple | H <sub>3</sub> |
|-------------|------------------|-------|--------|---------------------|----|-----|----------------|------|----------------|------|------|-----|---------|---------------|----------------|
|             | Height           | Width | Length |                     |    |     |                |      |                |      |      |     |         |               |                |
|             | M                | W     | L      | B                   | C  | H   | L <sub>1</sub> | T    | T <sub>1</sub> | K    | N    | E   |         |               |                |
| SR 15SB/SBM | 24               | 52    | 40.4   | 41                  | —  | 4.5 | 22.9           | 6.1  | 7              | 18.2 | 6    | 5.5 | PB1021B | 5.8           |                |
| SR 15TB/TBM |                  |       | 57     |                     | 26 |     | 39.5           |      |                |      |      |     |         |               |                |
| SR 20SB/SBM | 28               | 59    | 47.3   | 49                  | —  | 5.5 | 27.8           | 8    | 9              | 22   | 6    | 12  | B-M6F   | 6             |                |
| SR 20TB/TBM |                  |       | 66.2   |                     | 32 |     | 46.7           |      |                |      |      |     |         |               |                |
| SR 25SB/SBM | 33               | 73    | 59.2   | 60                  | —  | 7   | 35.2           | 9.1  | 10             | 26   | 7    | 12  | B-M6F   | 7             |                |
| SR 25TB/TBM |                  |       | 83     |                     | 35 |     | 59             |      |                |      |      |     |         |               |                |
| SR 30SB/SBM | 42               | 90    | 67.9   | 72                  | —  | 9   | 40.4           | 8.7  | 10             | 32.5 | 8    | 12  | B-M6F   | 9.5           |                |
| SR 30TB/TBM |                  |       | 96.8   |                     | 40 |     | 69.3           |      |                |      |      |     |         |               |                |
| SR 35SB/SBM | 48               | 100   | 77.6   | 82                  | —  | 9   | 45.7           | 11.2 | 13             | 36.5 | 8.5  | 12  | B-M6F   | 11.5          |                |
| SR 35TB/TBM |                  |       | 111    |                     | 50 |     | 79             |      |                |      |      |     |         |               |                |
| SR 45TB     | 60               | 120   | 126    | 100                 | 60 | 11  | 90.5           | 12.8 | 15             | 47.5 | 11.5 | 16  | B-PT1/8 | 12.5          |                |
| SR 55TB     | 68               | 140   | 156    | 116                 | 75 | 14  | 117            | 15.3 | 17             | 54.5 | 12   | 16  | B-PT1/8 | 13.5          |                |

## Model number coding

**SR25 TB 2 UU C1 +1200L Y H T -II**

Model number

Type of LM block

Contamination protection accessory symbol (\*1)

LM rail length (in mm)

Applied to only 15 and 25

Symbol for LM rail jointed use

Symbol for No. of rails used on the same plane (\*4)

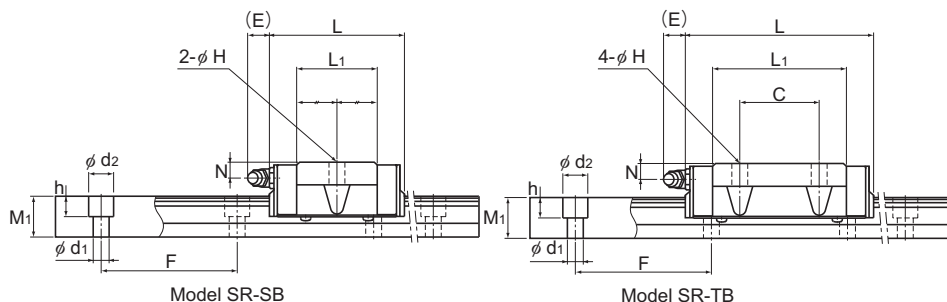
No. of LM blocks used on the same rail

Radial clearance symbol (\*2)  
Normal (No symbol)  
Light preload (C1)  
Medium preload (C0)

Accuracy symbol (\*3)  
Normal grade (No Symbol)/High accuracy grade (H)  
Precision grade (P)/Super precision grade (SP)  
Ultra precision grade (UP)

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-72**. (\*3) See **A1-77**. (\*4) See **A1-13**.

Note) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.)



Unit: mm

| LM rail dimensions  |        |       |     |                            |                | Basic load rating |                | Static permissible moment $\text{kN}\cdot\text{m}^*$ |                |                  |                |                 |                | Mass        |         |
|---------------------|--------|-------|-----|----------------------------|----------------|-------------------|----------------|------------------------------------------------------|----------------|------------------|----------------|-----------------|----------------|-------------|---------|
| Width               | Height | Pitch |     | Length*                    |                | C                 | C <sub>0</sub> | $M_A$                                                |                | $M_B$            |                | $M_C$           |                | LM block    | LM rail |
| $W_1$<br>$\pm 0.05$ | $W_2$  | $M_1$ | F   | $d_1 \times d_2 \times h$  | Max            | kN                | kN             | 1 block                                              | Double blocks  | 1 block          | Double blocks  | 1 block         | Double blocks  | kg          | kg/m    |
| 15                  | 18.5   | 12.5  | 60  | $3.5 \times 6 \times 4.5$  | (1240)<br>3000 | 9.1<br>13.8       | 11.7<br>20.5   | 0.0344<br>0.0984                                     | 0.234<br>0.551 | 0.0215<br>0.0604 | 0.149<br>0.343 | 0.0694<br>0.122 | 0.135<br>0.224 | 0.15<br>0.2 | 1.2     |
| 20                  | 19.5   | 15.5  | 60  | $6 \times 9.5 \times 8.5$  | (1480)<br>3000 | 13.4<br>19.2      | 17.2<br>28.6   | 0.064<br>0.167                                       | 0.396<br>0.887 | 0.0397<br>0.102  | 0.25<br>0.55   | 0.135<br>0.224  | 0.135<br>0.224 | 0.3<br>0.4  | 2.1     |
| 23                  | 25     | 18    | 60  | $7 \times 11 \times 9$     | (2020)<br>3000 | 21.6<br>30.9      | 26.8<br>44.7   | 0.125<br>0.326                                       | 0.773<br>1.74  | 0.0774<br>0.2    | 0.488<br>1.08  | 0.245<br>0.408  | 0.245<br>0.408 | 0.4<br>0.6  | 2.7     |
| 28                  | 31     | 23    | 80  | $7 \times 11 \times 9$     | (2520)<br>3000 | 29.5<br>45.6      | 34.4<br>64.4   | 0.173<br>0.564                                       | 1.15<br>2.92   | 0.108<br>0.346   | 0.735<br>1.8   | 0.376<br>0.703  | 0.376<br>0.703 | 0.8<br>1.1  | 4.3     |
| 34                  | 33     | 27.5  | 80  | $9 \times 14 \times 12$    | (2520)<br>3000 | 40.9<br>60.4      | 46.7<br>81.8   | 0.275<br>0.785                                       | 1.79<br>4.27   | 0.171<br>0.482   | 1.14<br>2.65   | 0.615<br>1.08   | 0.615<br>1.08  | 1<br>1.5    | 6.4     |
| 45                  | 37.5   | 35.5  | 105 | $11 \times 17.5 \times 14$ | 3000           | 80.4              | 107            | 1.17                                                 | 6.34           | 0.721            | 3.94           | 1.89            | 2.5            | 11.3        |         |
| 48                  | 46     | 38    | 120 | $14 \times 20 \times 17$   | 3000           | 136               | 179            | 2.61                                                 | 13             | 1.6              | 8.05           | 3.33            | 4.2            | 12.8        |         |

Note1) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-220**.)

Static permissible moment\* 1 block: the static permissible moment with one LM block

Double blocks: static permissible moment when two LM blocks are in close contact with each other

Total block length L

: The total block length L shown in the table is the length with the dust proof parts, code UU or SS. If other contamination protection accessories or lubricant equipment are installed, the total block length will increase.

(See **A1-491** or **A1-512**)

The M in the model number symbol indicates that the LM block, LM rail and balls are made of stainless steel.

The stainless steel provides excellent corrosion and environmental resistance.

Note2) For models SR15 and 25, two types of rails with different mounting hole dimensions are offered (see Table1).

When, replacing this model with model SSR, pay attention to the mounting hole dimension of the LM rail.

Contact THK for details.

Note3) The basic load rating in the dimension table is for a load in the radial direction. Use Table7 on **A1-59** to calculate the load rating for loads in the reverse radial direction or lateral direction.

Table1 The dimension of the rail mounting hole

| Model No. | Standard rail      | Semi-Standard rail |
|-----------|--------------------|--------------------|
| SR 15     | For M3 (No symbol) | For M4 (Symbol Y)  |
| SR 25     | For M6 (Symbol Y)  | For M5 (No symbol) |

## Standard Length and Maximum Length of the LM Rail

Table1 shows the standard lengths and the maximum lengths of model SR variations. If the maximum length of the desired LM rail exceeds them, jointed rails will be used. Contact THK for details. For special rail lengths, it is recommended to use a value corresponding to the G,g dimension from the table. As the G,g dimension increases, this portion becomes less stable, and the accuracy performance is severely impacted.

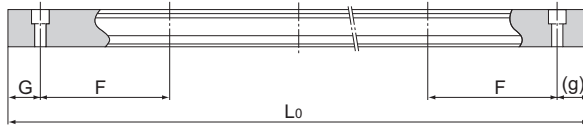


Table1 Standard Length and Maximum Length of the LM Rail for Model SR

Unit: mm

| Model No.                                 | SR 15          | SR 20          | SR 25          | SR 30          | SR 35          | SR 45 | SR 55 | SR 70 | SR 85 | SR 100 | SR 120 | SR 150 |
|-------------------------------------------|----------------|----------------|----------------|----------------|----------------|-------|-------|-------|-------|--------|--------|--------|
| LM rail standard length (L <sub>0</sub> ) | 160            | 220            | 220            | 280            | 280            | 570   | 780   | 1270  | 1520  | 1550   | 1700   | 1600   |
|                                           | 220            | 280            | 280            | 360            | 360            | 675   | 900   | 1570  | 2060  | 1970   | 2390   | 2100   |
|                                           | 280            | 340            | 340            | 440            | 440            | 780   | 1020  | 2020  | 2600  | 2600   |        |        |
|                                           | 340            | 400            | 400            | 520            | 520            | 885   | 1140  | 2620  |       |        |        |        |
|                                           | 400            | 460            | 460            | 600            | 600            | 990   | 1260  |       |       |        |        |        |
|                                           | 460            | 520            | 520            | 680            | 680            | 1095  | 1380  |       |       |        |        |        |
|                                           | 520            | 580            | 580            | 760            | 760            | 1200  | 1500  |       |       |        |        |        |
|                                           | 580            | 640            | 640            | 840            | 840            | 1305  | 1740  |       |       |        |        |        |
|                                           | 640            | 700            | 700            | 920            | 920            | 1410  | 1860  |       |       |        |        |        |
|                                           | 700            | 760            | 760            | 1000           | 1000           | 1515  | 1980  |       |       |        |        |        |
|                                           | 760            | 820            | 820            | 1080           | 1080           | 1725  | 2100  |       |       |        |        |        |
|                                           | 820            | 940            | 940            | 1160           | 1160           | 1830  | 2220  |       |       |        |        |        |
|                                           | 940            | 1000           | 1000           | 1240           | 1240           | 1935  | 2340  |       |       |        |        |        |
|                                           | 1000           | 1060           | 1060           | 1320           | 1320           | 2040  | 2460  |       |       |        |        |        |
|                                           | 1060           | 1120           | 1120           | 1400           | 1400           | 2145  | 2580  |       |       |        |        |        |
|                                           | 1120           | 1180           | 1180           | 1480           | 1480           | 2250  | 2700  |       |       |        |        |        |
|                                           | 1180           | 1240           | 1240           | 1640           | 1640           | 2355  | 2820  |       |       |        |        |        |
|                                           | 1240           | 1300           | 1300           | 1720           | 1720           | 2460  | 2940  |       |       |        |        |        |
|                                           | 1300           | 1360           | 1360           | 1800           | 1800           | 2565  |       |       |       |        |        |        |
|                                           | 1360           | 1420           | 1420           | 1880           | 1880           | 2670  |       |       |       |        |        |        |
|                                           | 1420           | 1480           | 1480           | 1960           | 1960           | 2775  |       |       |       |        |        |        |
|                                           | 1480           | 1540           | 1540           | 2040           | 2040           | 2880  |       |       |       |        |        |        |
|                                           | 1540           | 1600           | 1600           | 2120           | 2120           | 2985  |       |       |       |        |        |        |
|                                           |                | 1660           | 1660           | 2200           | 2200           |       |       |       |       |        |        |        |
|                                           |                | 1720           | 1720           | 2280           | 2280           |       |       |       |       |        |        |        |
|                                           |                | 1780           | 1780           | 2360           | 2360           |       |       |       |       |        |        |        |
|                                           |                | 1840           | 1840           | 2440           | 2440           |       |       |       |       |        |        |        |
|                                           |                | 1900           | 1900           | 2520           | 2520           |       |       |       |       |        |        |        |
|                                           |                | 1960           | 1960           | 2600           | 2600           |       |       |       |       |        |        |        |
|                                           |                | 2020           | 2020           | 2680           | 2680           |       |       |       |       |        |        |        |
|                                           |                | 2080           | 2080           | 2760           | 2760           |       |       |       |       |        |        |        |
|                                           |                | 2140           | 2140           | 2840           | 2840           |       |       |       |       |        |        |        |
|                                           |                |                | 2200           | 2920           | 2920           |       |       |       |       |        |        |        |
|                                           |                |                | 2260           |                |                |       |       |       |       |        |        |        |
|                                           |                |                | 2320           |                |                |       |       |       |       |        |        |        |
|                                           |                |                | 2380           |                |                |       |       |       |       |        |        |        |
|                                           |                |                | 2440           |                |                |       |       |       |       |        |        |        |
| Standard pitch F                          | 60             | 60             | 60             | 80             | 80             | 105   | 120   | 150   | 180   | 210    | 230    | 250    |
| G,g                                       | 20             | 20             | 20             | 20             | 20             | 22.5  | 30    | 35    | 40    | 40     | 45     | 50     |
| Max length                                | 3000<br>(1240) | 3000<br>(1480) | 3000<br>(2020) | 3000<br>(2520) | 3000<br>(2520) | 3000  | 3000  | 3000  | 3000  | 3000   | 3000   | 3000   |

Note1) The maximum length varies with accuracy grades. Contact THK for details.

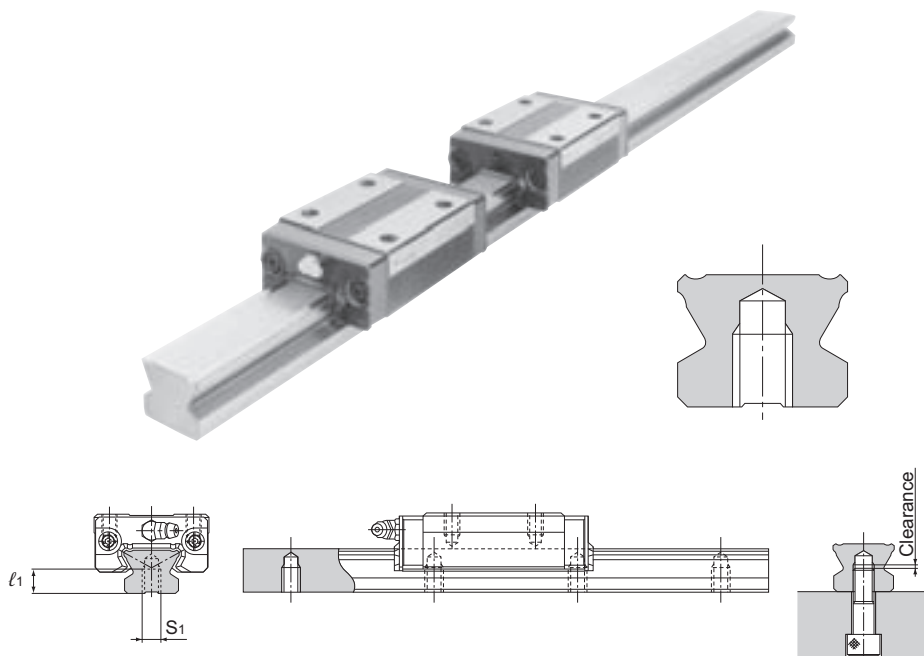
Note2) If jointed rails are not allowed and a greater length than the maximum values above is required, contact THK.

Note3) Those model numbers including and greater than SR85T are semi-standard models. If desiring these models, contact THK.

Note4) The figures in the parentheses indicate the maximum lengths of stainless steel made models.

## Tapped-hole LM Rail Type of Model SR

SR model rails also include a type where the LM rail is tapped from the bottom. This type is useful when mounting from the bottom of the base and when increased contamination protection is desired.



- (1) A tapped-hole LM rail type is available only for high accuracy or lower grades.
- (2) Determine the bolt length so that a clearance of 2 to 5 mm is secured between the bolt end and the bottom of the tap (effective tap depth). (See figure above.)
- (3) For standard pitches of the taps, see Table1 on **A1-220**.

Table2 Dimensions of the LM Rail Tap Unit: mm

| Model No. | S <sub>1</sub> | Effective tap depth $l_1$ |
|-----------|----------------|---------------------------|
| SR 15     | M5             | 7                         |
| SR 20     | M6             | 9                         |
| SR 25     | M6             | 10                        |
| SR 30     | M8             | 14                        |
| SR 35     | M8             | 16                        |
| SR 45     | M12            | 20                        |
| SR 55     | M14            | 22                        |

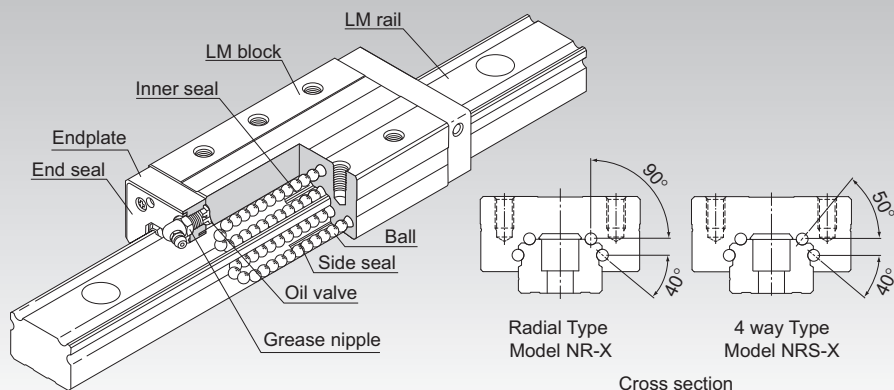
### Model number coding

**SR30 W2UU +1000LH K**

Symbol for  
tapped-hole LM rail type

# NR/NRS-X

LM Guide Ultra-heavy Load Type for Machine Tools Model NR/NRS-X



**Point of Selection** **A1-10**

**Point of Design** **A1-454**

**Options** **A1-477**

**Model No.** **A1-543**

**Precautions on Use** **A1-549**

**Accessories for Lubrication** **A24-1**

**Mounting Procedure and Maintenance** **B1-89**

Equivalent moment factor **A1-43**

Rated Loads in All Directions **A1-59**

Equivalent factor in each direction **A1-61**

Radial Clearance **A1-71**

Accuracy Standards **A1-77**

Shoulder Height of the Mounting Base and the Corner Radius **A1-464**

Permissible Error of the Mounting Surface **A1-470**

Dimensions of Each Model with an Option Attached **A1-491**

## Structure and Features

Balls roll in four rows of raceways precision-ground on an LM rail and an LM block, and endplates incorporated in the LM block allow the balls to circulate. The raceways are cut into deep grooves that have a radius closer to that of the balls than in the conventional design, using special equipment and an extremely precise cutting technique. This design allows high rigidity, high vibration/impact resistance and high damping capacity, all of which are required for machine tools, thus making these models capable of bearing ultra-heavy loads.

\* Due to the extremely high rigidity of the LM guides used in models NR/NRS-X, the construction does not easily absorb the effects of mounting surface misalignment and installation errors. Where such effects arise, there is a risk of reduced operating life and/or malfunction. Contact THK when considering the use of these products.

### [Improved Damping Capacity]

While the machine tool (equipped with NR or NRS) is not cutting a workpiece during operation, the LM Guide travels normally and smoothly. While the machine tool is cutting the workpiece, the cutting force is applied to the LM Guide to increase and the contact area between the balls and the raceway, allowing an appropriate mixture of rolling and sliding motions to be achieved. Accordingly, the friction resistance is increased and the damping capacity is improved.

Since the absolute slip during the rolling and sliding motion is insignificant, it causes little wear and does not affect the service life.

### [Highly Rational LM Guide]

The excessively large differential slip occurring in a Gothic-arch groove does not happen with these models. They smoothly travel and achieve high positioning accuracy during fast feeding. During the cutting operation, appropriate slip occurs according to the cutting load, the rolling resistance is increased and the damping capacity is increased. Thus, models NR and NRS are highly rational LM Guides.

### [High Rigidity]

To increase the rigidity of the LM block and the LM rail, which may deteriorate the overall rigidity of the LM Guide in the reverse radial and lateral directions, THK made full use of FEM to achieve optimal design within the limited dimensional range.

THK offers two identically sized models with different characteristics, namely the Radial Type Model NR-X and 4 way Type Model NRS-X. Users can select the model that best suits their specifications.

### [Ultra-heavy Load]

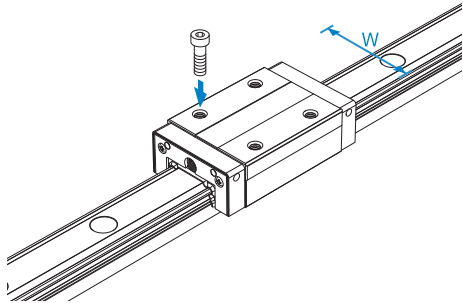
Since the curvature of the raceway is approximated to the ball diameter, the ball contact area under a load is increased and the LM Guide is capable of receiving an ultra-heavy load.

## Types and Features

### Models NR-RX/NRS-RX

With this type, the LM block has a smaller width (W) and tapped holes. Used in places where the space for table width is limited.

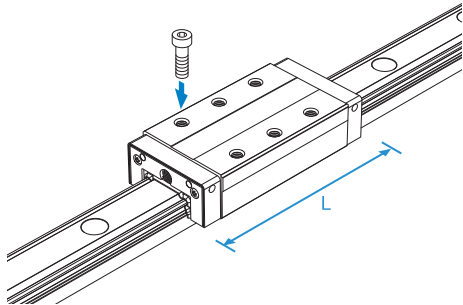
Specification Table⇒ **A1-228/A1-230**



### Models NR-LRX/NRS-LRX

The LM block has the same cross-sectional shape as models NR-RX/NRS-RX, but has a longer overall LM block length (L) and a greater rated load.

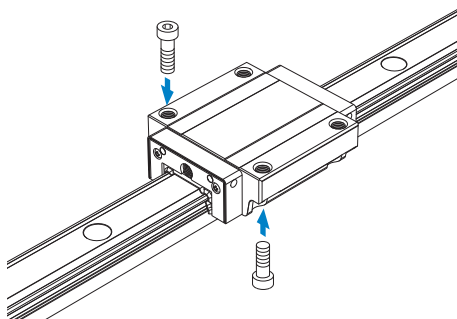
Specification Table⇒ **A1-228/A1-230**



## Models NR-CX/NRS-CX

The flange of the LM block has tapped holes.  
Can be mounted from the top or the bottom.  
Can also be used in places where the table  
cannot have through holes for mounting bolts.

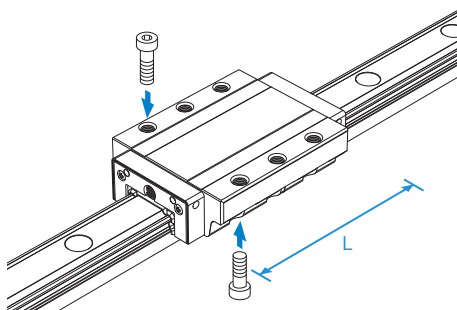
Specification Table⇒ [A1-232](#)/[A1-234](#)



## Models NR-LCX/NRS-LCX

The LM block has the same cross-sectional  
shape as models NR-CX/NRS-CX, but has a  
longer overall LM block length (L) and a greater  
rated load.

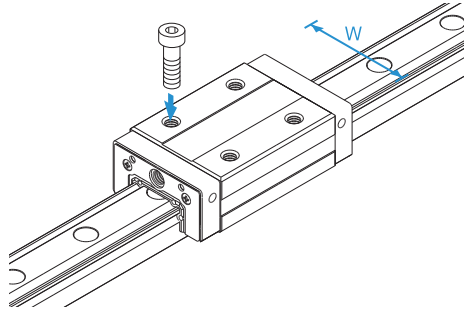
Specification Table⇒ [A1-232](#)/[A1-234](#)



## Models NR-R/NRS-R

With this type, the LM block has a smaller width (W) and tapped holes. Used in places where the space for table width is limited.

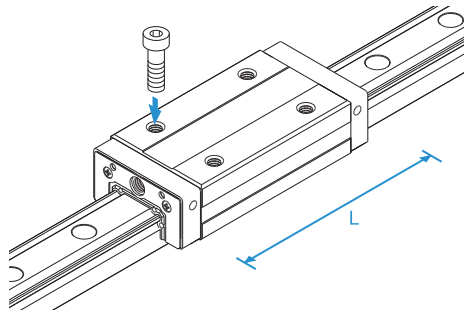
Specification Table⇒[A1-228/A1-230](#)



## Models NR-LR/NRS-LR

The LM block has the same cross-sectional shape as models NR-R/NRS-R, but has a longer overall LM block length (L) and a greater rated load.

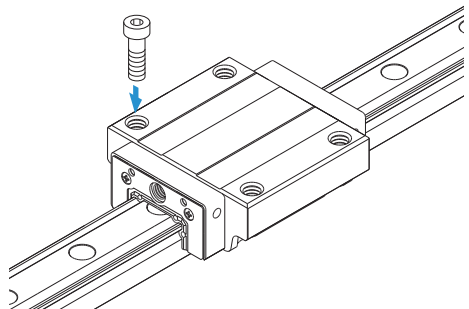
Specification Table⇒[A1-228/A1-230](#)



## Models NR-A/NRS-A

The range of its LM block has tapped holes.

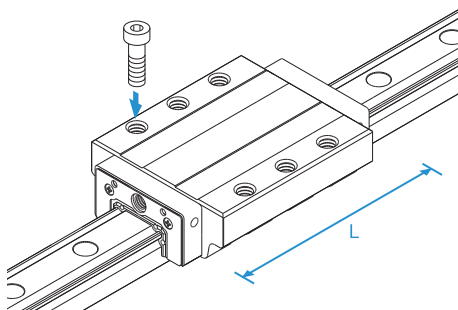
Specification Table⇒[A1-236](#)



## Models NR-LA/NRS-LA

The LM block has the same cross-sectional shape as models NR-A/NRS-A, but has a longer overall LM block length (L) and a greater rated load.

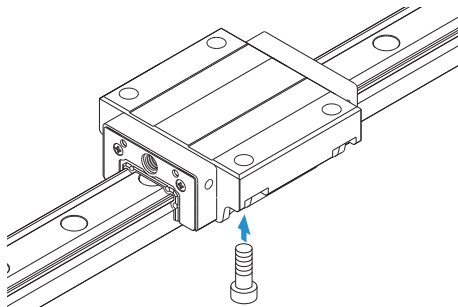
Specification Table⇒ **A1-236**



## Models NR-B/NRS-B

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

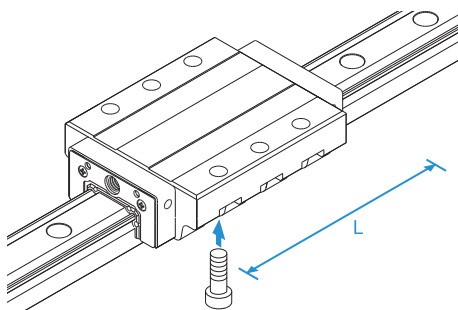
Specification Table⇒ **A1-238**



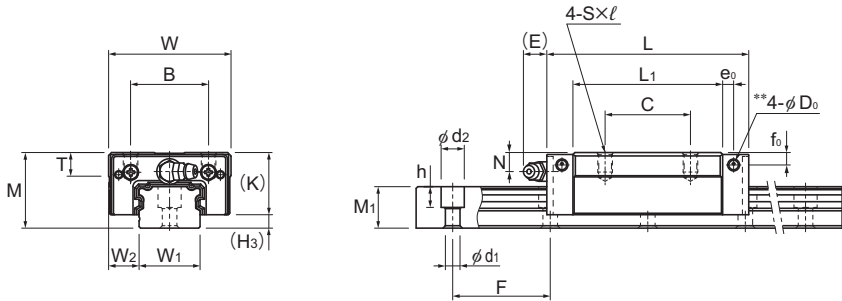
## Models NR-LB/NRS-LB

The LM block has the same cross-sectional shape as models NR-B/NRS-B, but has a longer overall LM block length (L) and a greater rated load.

Specification Table⇒ **A1-238**



# Models NR-RX, NR-LRX, NR-R and NR-LR



Model NR-RX

| Model No.           | Outer dimensions |       |                | LM block dimensions |            |        |                |      |      |      |                |    |                |                |               |      | H <sub>3</sub> |
|---------------------|------------------|-------|----------------|---------------------|------------|--------|----------------|------|------|------|----------------|----|----------------|----------------|---------------|------|----------------|
|                     | Height           | Width | Length         | B                   | C          | S×ℓ    | L <sub>1</sub> | T    | K    | N    | f <sub>0</sub> | E  | e <sub>0</sub> | D <sub>0</sub> | Grease nipple |      |                |
|                     | M                | W     | L              |                     |            |        |                |      |      |      |                |    |                |                |               |      |                |
| NR 25RX<br>NR 25LRX | 31               | 50    | 82.8<br>102    | 32                  | 35<br>50   | M6×8   | 61.4<br>80.6   | 9.7  | 25.5 | 7.8  | 5.1            | 12 | 4.5            | 3.9            | B-M6F         | 5.5  |                |
| NR 30RX<br>NR 30LRX | 38               | 60    | 98<br>120.5    | 40                  | 40<br>60   | M8×10  | 72.1<br>94.6   | 9.7  | 31   | 10.3 | 7              | 12 | 6.5            | 3.9            | B-M6F         | 7    |                |
| NR 35RX<br>NR 35LRX | 44               | 70    | 109.5<br>135   | 50                  | 50<br>72   | M8×12  | 79<br>104.5    | 11.7 | 35   | 12.1 | 8              | 12 | 6              | 5.2            | B-M6F         | 9    |                |
| NR 45RX<br>NR 45LRX | 52               | 86    | 138.2<br>171   | 60                  | 60<br>80   | M10×17 | 105<br>137.8   | 14.7 | 40.4 | 13.9 | 8              | 16 | 8.5            | 5.2            | B-PT1/8       | 11.6 |                |
| NR 55RX<br>NR 55LRX | 63               | 100   | 163.3<br>200.5 | 65                  | 75<br>95   | M12×18 | 123.6<br>160.8 | 17.7 | 49   | 16.6 | 10             | 16 | 10             | 5.2            | B-PT1/8       | 14   |                |
| NR 65RX<br>NR 65LRX | 75               | 126   | 186<br>246     | 76                  | 70<br>110  | M16×20 | 143.6<br>203.6 | 21.6 | 60   | 19   | 15             | 16 | 8.7            | 8.2            | B-PT1/8       | 15   |                |
| NR 75R<br>NR 75LR   | 83               | 145   | 218<br>274     | 95                  | 80<br>130  | M18×25 | 170.2<br>226.2 | 25.3 | 68   | 18   | 17             | 16 | 9              | 8.2            | B-PT1/8       | 15   |                |
| NR 85R<br>NR 85LR   | 90               | 156   | 246.7<br>302.8 | 100                 | 80<br>140  | M18×25 | 194.9<br>251   | 27.3 | 73   | 20   | 20             | 16 | 10             | 8.2            | B-PT1/8       | 17   |                |
| NR 100R<br>NR 100LR | 105              | 200   | 286.2<br>326.2 | 130                 | 150<br>200 | M18×27 | 223.4<br>263.4 | 34.3 | 85   | 23   | 23             | 10 | 12             | 8.2            | B-PT1/4       | 20   |                |

## Model number coding

**NR35 LRX 2 QZ KKHH C0 +1240L P T - II**

Model number

Type of LM block

With QZ Lubricator

Contamination protection accessory symbol (\*1)

LM rail length (in mm)

Symbol for LM rail jointed use

Symbol for No. of rails used on the same plane (\*4)

No. of LM blocks used on the same rail

Radial clearance symbol (\*2)  
Normal (No symbol)  
Light preload (C1)  
Medium preload (C0)

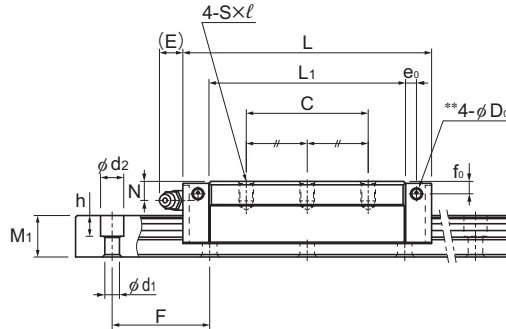
Accuracy symbol (\*3)  
Normal grade (No Symbol)/High accuracy grade (H)  
Precision grade (P)/Super precision grade (SP)  
Ultra precision grade (UP)

(\*1) See contamination protection accessory on **A1-516** (\*2) See **A1-71**. (\*3) See **A1-77**.

(\*4) See **A1-13**.

Note) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.)

Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.



Model NR-LRX

Unit: mm

| LM rail dimensions           |                |       |                                     |               |                | Basic load rating |                | Static permissible moment kN•m* |               |                |              |                | Mass         |      |
|------------------------------|----------------|-------|-------------------------------------|---------------|----------------|-------------------|----------------|---------------------------------|---------------|----------------|--------------|----------------|--------------|------|
| Width                        | Height         | Pitch | Length*                             | C             | C <sub>0</sub> | 1 block           | Double blocks  | 1 block                         | Double blocks | 1 block        | LM block     | LM rail        | kg           | kg/m |
| W <sub>1</sub><br>0<br>-0.05 |                |       |                                     |               |                |                   |                |                                 |               |                |              |                |              |      |
| W <sub>2</sub>               | M <sub>1</sub> | F     | d <sub>1</sub> × d <sub>2</sub> × h | Max           | kN             | kN                | 1 block        | Double blocks                   | 1 block       | Double blocks  | 1 block      | kg             | kg/m         |      |
| 25                           | 12.5           | 17    | 40                                  | 6 × 9.5 × 8.5 | 3000           | 37.1<br>45.4      | 68.1<br>90.8   | 0.57<br>0.989                   | 3.04<br>4.91  | 0.346<br>0.597 | 1.84<br>2.95 | 0.703<br>0.937 | 0.4<br>0.5   | 2.9  |
| 28                           | 16             | 21    | 80                                  | 7 × 11 × 9    | 3000           | 54.7<br>66.9      | 98.1<br>130.8  | 0.986<br>1.71                   | 5.17<br>8.34  | 0.599<br>1.03  | 3.13<br>5.02 | 1.15<br>1.53   | 0.7<br>0.9   | 4.2  |
| 34                           | 18             | 24.5  | 80                                  | 9 × 14 × 12   | 3000           | 72.4<br>89.6      | 124.6<br>169.1 | 1.37<br>2.46                    | 7.38<br>12.1  | 0.835<br>1.49  | 4.48<br>7.3  | 1.74<br>2.36   | 1<br>1.3     | 6    |
| 45                           | 20.5           | 29    | 105                                 | 14 × 20 × 17  | 3090           | 110.2<br>132      | 197.6<br>255.8 | 2.81<br>4.87                    | 14.7<br>23    | 1.72<br>2.94   | 8.95<br>13.8 | 3.72<br>4.81   | 1.8<br>2.3   | 9.5  |
| 53                           | 23.5           | 36.5  | 120                                 | 16 × 23 × 20  | 3060           | 141.9<br>175.1    | 250.2<br>338.4 | 4.22<br>7.27                    | 21.8<br>35.9  | 2.56<br>4.4    | 13.2<br>21.7 | 5.37<br>7.27   | 3.3<br>4.3   | 14   |
| 63                           | 31.5           | 43    | 150                                 | 18 × 26 × 22  | 3000           | 208.7<br>268.9    | 351.7<br>505.5 | 6.87<br>13.8                    | 35<br>65.4    | 4.16<br>8.31   | 21.2<br>39.3 | 8.94<br>12.9   | 6<br>8.5     | 19.6 |
| 75                           | 35             | 44    | 150                                 | 22 × 32 × 26  | 3000           | 271<br>355        | 610<br>800     | 14.4<br>25.4                    | 73.3<br>118   | 8.91<br>15.4   | 44.7<br>71.4 | 19.3<br>25.2   | 8.7<br>11.6  | 24.6 |
| 85                           | 35.5           | 48    | 180                                 | 24 × 35 × 28  | 3000           | 336<br>435        | 751<br>972     | 20.3<br>34.7                    | 102<br>160    | 12.4<br>21     | 62.6<br>96.2 | 26.8<br>34.6   | 12.3<br>15.8 | 30.5 |
| 100                          | 50             | 57    | 210                                 | 26 × 39 × 32  | 3000           | 479<br>599        | 1040<br>1300   | 34<br>47.3                      | 167<br>238    | 20.7<br>29.2   | 101<br>146   | 43.4<br>54.6   | 21.8<br>26.1 | 42.6 |

Note1) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-240**.)

Static permissible moment\* 1 block: the static permissible moment with one LM block

Double blocks: static permissible moment when two LM blocks are in close contact with each other

For oil lubrication, be certain to let THK know the mounting orientation and where the LM block piping joint should be attached.

(Mounting orientation: see **A1-12**, Lubricant: see **A24-2**)

Total block length L

\* If the total block length L shown in the table is the length with the dust proof parts, code UU or SS. If other contamination protection accessories or lubricant equipment are installed, the total block length will increase.

(See **A1-491** or **A1-512**)

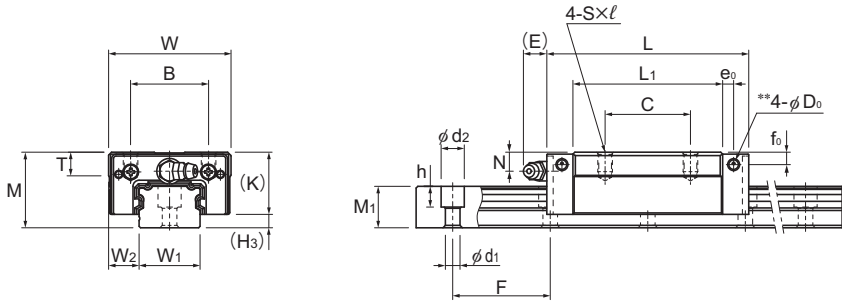
\*\* A pilot hole for side nipples, when a grease nipple for a model equipped with LaCS or QZ Lubricator is needed.

Pilot holes for side nipples are not drilled through for models other than those stated above.

For grease nipple mount machining, contact THK.

Note2) The basic load rating in the dimension table is for a load in the radial direction. Use Table7 on **A1-59** to calculate the load rating for loads in the reverse radial direction or lateral direction.

# Models NRS-RX, NRS-LRX, NRS-R and NRS-LR



Model NRS-RX

| Model No.             | Outer dimensions |       |                | LM block dimensions |            |        |                |      |      |      |                |    |                |                |               |      | H <sub>3</sub> |
|-----------------------|------------------|-------|----------------|---------------------|------------|--------|----------------|------|------|------|----------------|----|----------------|----------------|---------------|------|----------------|
|                       | Height           | Width | Length         | B                   | C          | S×ℓ    | L <sub>1</sub> | T    | K    | N    | f <sub>0</sub> | E  | e <sub>0</sub> | D <sub>0</sub> | Grease nipple |      |                |
|                       | M                | W     | L              |                     |            |        |                |      |      |      |                |    |                |                |               |      |                |
| NRS 25RX<br>NRS 25LRX | 31               | 50    | 82.8<br>102    | 32                  | 35<br>50   | M6×8   | 61.4<br>80.6   | 9.7  | 25.5 | 7.8  | 5.1            | 12 | 4.5            | 3.9            | B-M6F         | 5.5  |                |
| NRS 30RX<br>NRS 30LRX | 38               | 60    | 98<br>120.5    | 40                  | 40<br>60   | M8×10  | 72.1<br>94.6   | 9.7  | 31   | 10.3 | 7              | 12 | 6.5            | 3.9            | B-M6F         | 7    |                |
| NRS 35RX<br>NRS 35LRX | 44               | 70    | 109.5<br>135   | 50                  | 50<br>72   | M8×12  | 79<br>104.5    | 11.7 | 35   | 12.1 | 8              | 12 | 6              | 5.2            | B-M6F         | 9    |                |
| NRS 45RX<br>NRS 45LRX | 52               | 86    | 138.2<br>171   | 60                  | 60<br>80   | M10×17 | 105<br>137.8   | 14.7 | 40.4 | 13.9 | 8              | 16 | 8.5            | 5.2            | B-PT1/8       | 11.6 |                |
| NRS 55RX<br>NRS 55LRX | 63               | 100   | 163.3<br>200.5 | 65                  | 75<br>95   | M12×18 | 123.6<br>160.8 | 17.7 | 49   | 16.6 | 10             | 16 | 10             | 5.2            | B-PT1/8       | 14   |                |
| NRS 65RX<br>NRS 65LRX | 75               | 126   | 186<br>246     | 76                  | 70<br>110  | M16×20 | 143.6<br>203.6 | 21.6 | 60   | 19   | 15             | 16 | 8.7            | 8.2            | B-PT1/8       | 15   |                |
| NRS 75R<br>NRS 75LR   | 83               | 145   | 218<br>274     | 95                  | 80<br>130  | M18×25 | 170.2<br>226.2 | 25.3 | 68   | 18   | 17             | 16 | 9              | 8.2            | B-PT1/8       | 15   |                |
| NRS 85R<br>NRS 85LR   | 90               | 156   | 246.7<br>302.8 | 100                 | 80<br>140  | M18×25 | 194.9<br>251   | 27.3 | 73   | 20   | 20             | 16 | 10             | 8.2            | B-PT1/8       | 17   |                |
| NRS 100R<br>NRS 100LR | 105              | 200   | 286.2<br>326.2 | 130                 | 150<br>200 | M18×27 | 223.4<br>263.4 | 34.3 | 85   | 23   | 23             | 10 | 12             | 8.2            | B-PT1/4       | 20   |                |

## Model number coding

**NRS45 LRX 2 QZ ZZHH C0 +1200L P T - II**

Model number

Type of LM block

With QZ Lubricator

Contamination protection accessory symbol (\*1)

LM rail length (in mm)

Symbol for LM rail jointed use

Symbol for No. of rails used on the same plane (\*4)

No. of LM blocks used on the same rail

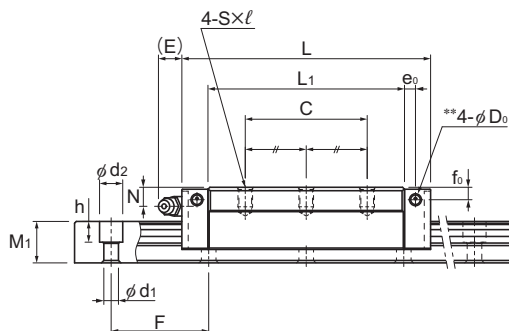
Radial clearance symbol (\*2)  
Normal (No symbol)/Light preload (C1)  
Medium preload (C0)

Accuracy symbol (\*3)  
Normal grade (No Symbol)/High accuracy grade (H)  
Precision grade (P)/Super precision grade (SP)  
Ultra precision grade (UP)

(\*1) See contamination protection accessory on **A1-516** (\*2) See **A1-71**. (\*3) See **A1-77**. (\*4) See **A1-13**.

Note) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.)

Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.



Model NRS-LRX

Unit: mm

|     | LM rail dimensions                        |                              |                             |                |                                                  |                    | Basic load rating |                          | Static permissible moment kN·m*                                                   |                  |                                                                                   |                  |                                                                                   |      | Mass                  |                        |
|-----|-------------------------------------------|------------------------------|-----------------------------|----------------|--------------------------------------------------|--------------------|-------------------|--------------------------|-----------------------------------------------------------------------------------|------------------|-----------------------------------------------------------------------------------|------------------|-----------------------------------------------------------------------------------|------|-----------------------|------------------------|
|     | Width<br><br>W <sub>1</sub><br>0<br>-0.05 | Height<br><br>W <sub>2</sub> | Pitch<br><br>M <sub>1</sub> | Pitch<br><br>F | Length*<br><br>d <sub>1</sub> ×d <sub>2</sub> ×h | Length*<br><br>Max | C<br><br>kN       | C <sub>0</sub><br><br>kN |  |                  |  |                  |  |      | LM<br>block<br><br>kg | LM<br>rail<br><br>kg/m |
|     |                                           |                              |                             |                |                                                  |                    |                   |                          | 1<br>block                                                                        | Double<br>blocks | 1<br>block                                                                        | Double<br>blocks | 1<br>block                                                                        |      |                       |                        |
|     |                                           |                              |                             |                |                                                  |                    |                   |                          |                                                                                   |                  |                                                                                   |                  |                                                                                   |      |                       |                        |
| 25  | 12.5                                      | 17                           | 40                          | 6×9.5×8.5      | 3000                                             | 28.4<br>34.7       | 52.2<br>69.6      | 0.457<br>0.786           | 2.43<br>3.9                                                                       | 0.422<br>0.727   | 2.25<br>3.61                                                                      | 0.552<br>0.732   | 0.4<br>0.5                                                                        | 2.9  |                       |                        |
| 28  | 16                                        | 21                           | 80                          | 7×11×9         | 3000                                             | 41.9<br>51.2       | 75.2<br>100.2     | 0.785<br>1.36            | 4.12<br>6.62                                                                      | 0.726<br>1.26    | 3.82<br>6.13                                                                      | 0.896<br>1.19    | 0.7<br>0.9                                                                        | 4.2  |                       |                        |
| 34  | 18                                        | 24.5                         | 80                          | 9×14×12        | 3000                                             | 55.5<br>68.6       | 95.5<br>129.5     | 1.09<br>1.95             | 5.88<br>9.61                                                                      | 1.01<br>1.81     | 5.45<br>8.9                                                                       | 1.36<br>1.84     | 1<br>1.3                                                                          | 6    |                       |                        |
| 45  | 20.5                                      | 29                           | 105                         | 14×20×17       | 3090                                             | 84.4<br>101.1      | 151.4<br>195.9    | 2.23<br>3.87             | 11.7<br>18.3                                                                      | 2.07<br>3.57     | 10.8<br>16.9                                                                      | 2.9<br>3.75      | 1.8<br>2.3                                                                        | 9.5  |                       |                        |
| 53  | 23.5                                      | 36.5                         | 120                         | 16×23×20       | 3060                                             | 108.7<br>134.1     | 191.6<br>259.3    | 3.36<br>5.76             | 17.4<br>28.4                                                                      | 3.1<br>5.32      | 16.1<br>26.3                                                                      | 4.19<br>5.67     | 3.3<br>4.3                                                                        | 14   |                       |                        |
| 63  | 31.5                                      | 43                           | 150                         | 18×26×22       | 3000                                             | 159.8<br>206       | 269.4<br>387.2    | 5.46<br>10.9             | 27.8<br>51.9                                                                      | 5.05<br>10.1     | 25.8<br>48                                                                        | 6.97<br>10.02    | 6<br>8.5                                                                          | 19.6 |                       |                        |
| 75  | 35                                        | 44                           | 150                         | 22×32×26       | 3000                                             | 212<br>278         | 431<br>566        | 10.6<br>18.6             | 53.8<br>87                                                                        | 10.6<br>18.6     | 53.8<br>87                                                                        | 13.4<br>17.6     | 8.7<br>11.6                                                                       | 24.6 |                       |                        |
| 85  | 35.5                                      | 48                           | 180                         | 24×35×28       | 3000                                             | 264<br>342         | 531<br>687        | 14.9<br>25.4             | 75.3<br>117                                                                       | 14.9<br>25.4     | 75.3<br>117                                                                       | 18.7<br>24.2     | 12.3<br>15.8                                                                      | 30.5 |                       |                        |
| 100 | 50                                        | 57                           | 210                         | 26×39×32       | 3000                                             | 376<br>470         | 737<br>920        | 25.1<br>34.6             | 123<br>174                                                                        | 25.1<br>34.6     | 123<br>174                                                                        | 30.4<br>38.1     | 21.8<br>26.1                                                                      | 42.6 |                       |                        |

Note1) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-240**.)

Static permissible moment\* 1 block: the static permissible moment with one LM block

Double blocks: static permissible moment when two LM blocks are in close contact with each other

For oil lubrication, be certain to let THK know the mounting orientation and where the LM block piping joint should be attached.

(Mounting orientation: see **A1-12**, Lubricant: see **A24-2**)

Total block length L

: The total block length L shown in the table is the length with the dust proof parts, code UU or SS. If other contamination protection accessories or lubricant equipment are installed, the total block length will increase.

(See **A1-491** or **A1-512**)

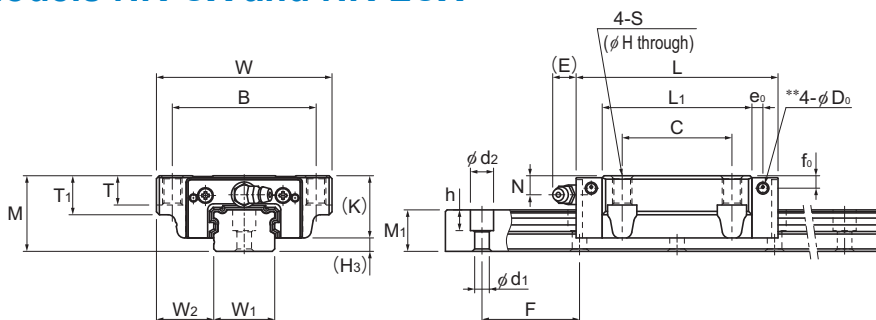
\*\* A pilot hole for side nipples, when a grease nipple for a model equipped with LaCS or QZ Lubricator is needed.

Pilot holes for side nipples are not drilled through for models other than those stated above.

For grease nipple mount machining, contact THK.

Note2) The basic load rating in the dimension table is for a load in the radial direction. Use Table7 on **A1-59** to calculate the load rating for loads in the reverse radial direction or lateral direction.

## Models NR-CX and NR-LCX



Model NR-CX

| Model No.           | Outer dimensions |       |                | LM block dimensions |     |     |      |                |      |                |      |      |                |    |                |                |               | H <sub>3</sub> |
|---------------------|------------------|-------|----------------|---------------------|-----|-----|------|----------------|------|----------------|------|------|----------------|----|----------------|----------------|---------------|----------------|
|                     | Height           | Width | Length         | B                   | C   | S   | H    | L <sub>1</sub> | T    | T <sub>1</sub> | K    | N    | f <sub>0</sub> | E  | e <sub>0</sub> | D <sub>0</sub> | Grease nipple |                |
|                     | M                | W     | L              |                     |     |     |      |                |      |                |      |      |                |    |                |                |               |                |
| NR 25CX<br>NR 25LCX | 31               | 72    | 82.8<br>102    | 59                  | 45  | M8  | 6.8  | 61.4<br>80.6   | 14.8 | 16             | 25.5 | 7.8  | 5.1            | 12 | 4.5            | 3.9            | B-M6F         | 5.5            |
| NR 30CX<br>NR 30LCX | 38               | 90    | 98<br>120.5    | 72                  | 52  | M10 | 8.5  | 72.1<br>94.6   | 16.9 | 18.1           | 31   | 10.3 | 7              | 12 | 6.5            | 3.9            | B-M6F         | 7              |
| NR 35CX<br>NR 35LCX | 44               | 100   | 109.5<br>135   | 82                  | 62  | M10 | 8.5  | 79<br>104.5    | 18.9 | 20.1           | 35   | 12.1 | 8              | 12 | 6              | 5.2            | B-M6F         | 9              |
| NR 45CX<br>NR 45LCX | 52               | 120   | 138.2<br>171   | 100                 | 80  | M12 | 10.5 | 105<br>137.8   | 20.6 | 22.1           | 40.4 | 13.9 | 8              | 16 | 8.5            | 5.2            | B-PT1/8       | 11.6           |
| NR 55CX<br>NR 55LCX | 63               | 140   | 163.3<br>200.5 | 116                 | 95  | M14 | 12.5 | 123.6<br>160.8 | 22.5 | 24             | 49   | 16.6 | 10             | 16 | 10             | 5.2            | B-PT1/8       | 14             |
| NR 65CX<br>NR 65LCX | 75               | 170   | 186<br>246     | 142                 | 110 | M16 | 14.5 | 143.6<br>203.6 | 26   | 28             | 60   | 19   | 15             | 16 | 8.7            | 8.2            | B-PT1/8       | 15             |

## Model number coding

## NR35

**CX**

2

## QZ

KKHH

C0

+1400L

P

—

Г - II

Model  
number

Type of LM block

With QZ  
Lubricator

Contamination protection accessory symbol (\*1)

LM rail length  
(in mm)

Symbol for  
LM rail  
jointed use

Symbol for  
No. of rails used  
on the same  
plane (\*4)

No. of LM blocks  
used on the same rail

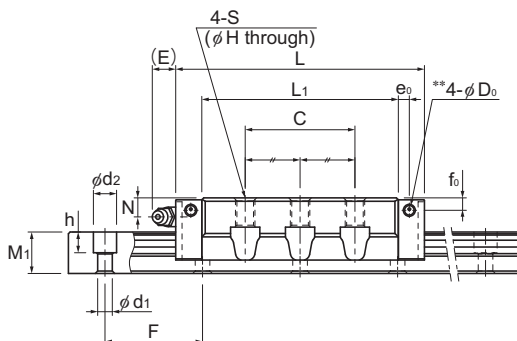
|                              |      |
|------------------------------|------|
| Radial clearance symbol (*2) |      |
| Normal (No symbol)           | Accu |
| Light preload (C1)           | Norm |
| Medium preload (C0)          |      |

Accuracy symbol (\*3)  
Normal grade (No Symbol)/High accuracy grade (H)  
Precision grade (P)/Super precision grade (SP)  
Ultra precision grade (UP)

(\*1) See contamination protection accessory on **A1-516** (\*2) See **A1-71**. (\*3) See **A1-77**.  
(\*4) See **A1-13**.

Note) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.)

Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.



Model NR-LCX

Unit: mm

| LM rail dimensions  |        |       |                           |                           |                | Basic load rating |                | Static permissible moment $\text{kN}\cdot\text{m}^*$ |              |                |              |                | Mass       |      |
|---------------------|--------|-------|---------------------------|---------------------------|----------------|-------------------|----------------|------------------------------------------------------|--------------|----------------|--------------|----------------|------------|------|
| Width               | Height | Pitch | Length*                   | C                         | C <sub>0</sub> | M <sub>A</sub>    | M <sub>B</sub> | M <sub>C</sub>                                       | LM block     | LM rail        |              |                |            |      |
| $W_1$<br>0<br>-0.05 |        |       |                           |                           |                |                   |                |                                                      |              |                |              |                |            |      |
| $W_2$               | $M_1$  | $F$   | $d_1 \times d_2 \times h$ | Max                       | kN             | kN                | 1 block        | Double blocks                                        | 1 block      | Double blocks  | 1 block      | kg             | kg/m       |      |
| 25                  | 23.5   | 17    | 40                        | $6 \times 9.5 \times 8.5$ | 3000           | 37.1<br>45.4      | 68.1<br>90.8   | 0.57<br>0.989                                        | 3.04<br>4.91 | 0.346<br>0.597 | 1.84<br>2.95 | 0.703<br>0.937 | 0.6<br>0.8 | 2.9  |
| 28                  | 31     | 21    | 80                        | $7 \times 11 \times 9$    | 3000           | 54.7<br>66.9      | 98.1<br>130.8  | 0.986<br>1.71                                        | 5.17<br>8.34 | 0.599<br>1.03  | 3.13<br>5.02 | 1.15<br>1.53   | 1.1<br>1.5 | 4.2  |
| 34                  | 33     | 24.5  | 80                        | $9 \times 14 \times 12$   | 3000           | 72.4<br>89.6      | 124.6<br>169.1 | 1.37<br>2.46                                         | 7.38<br>12.1 | 0.835<br>1.49  | 4.48<br>7.3  | 1.74<br>2.36   | 1.6<br>2   | 6    |
| 45                  | 37.5   | 29    | 105                       | $14 \times 20 \times 17$  | 3090           | 110.2<br>132      | 197.6<br>255.8 | 2.81<br>4.87                                         | 14.7<br>23   | 1.72<br>2.94   | 8.95<br>13.8 | 3.72<br>4.81   | 2.7<br>3.6 | 9.5  |
| 53                  | 43.5   | 36.5  | 120                       | $16 \times 23 \times 20$  | 3060           | 141.9<br>175.1    | 250.2<br>338.4 | 4.22<br>7.27                                         | 21.8<br>35.9 | 2.56<br>4.4    | 13.2<br>21.7 | 5.37<br>7.27   | 4.5<br>5.9 | 14   |
| 63                  | 53.5   | 43    | 150                       | $18 \times 26 \times 22$  | 3000           | 208.7<br>268.9    | 351.7<br>505.5 | 6.87<br>13.8                                         | 35<br>65.4   | 4.16<br>8.31   | 21.2<br>39.3 | 8.94<br>12.9   | 7.8<br>11  | 19.6 |

Note1) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-240**.)

Static permissible moment\* 1 block: the static permissible moment with one LM block

Double blocks: static permissible moment when two LM blocks are in close contact with each other

For oil lubrication, be certain to let THK know the mounting orientation and where the LM block piping joint should be attached.

(Mounting orientation: see **A1-12**, Lubricant: see **A24-2**)

Total block length L

: The total block length L shown in the table is the length with the dust proof parts, code UU or SS.

If other contamination protection accessories or lubricant equipment are installed, the total block length will increase.

(See **A1-491** or **A1-512**)

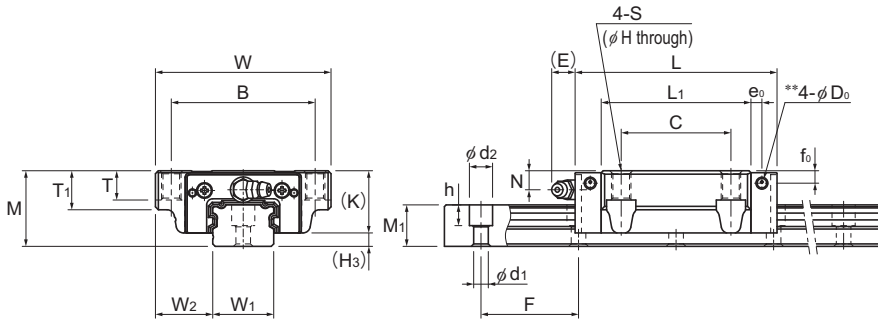
\*\* A pilot hole for side nipples, when a grease nipple for a model equipped with LaCS or QZ Lubricator is needed.

Pilot holes for side nipples are not drilled through for models other than those stated above.

For grease nipple mount machining, contact THK.

Note2) The basic load rating in the dimension table is for a load in the radial direction. Use Table7 on **A1-59** to calculate the load rating for loads in the reverse radial direction or lateral direction.

# Models NRS-CX and NRS-LCX



Model NRS-CX

| Model No.             | Outer dimensions |       |                | LM block dimensions |     |     |      |                |      |                |      |      |                |    |                |                |               |      | H <sub>3</sub> |
|-----------------------|------------------|-------|----------------|---------------------|-----|-----|------|----------------|------|----------------|------|------|----------------|----|----------------|----------------|---------------|------|----------------|
|                       | Height           | Width | Length         | B                   | C   | S   | H    | L <sub>1</sub> | T    | T <sub>1</sub> | K    | N    | f <sub>0</sub> | E  | e <sub>0</sub> | D <sub>0</sub> | Grease nipple |      |                |
|                       | M                | W     | L              |                     |     |     |      |                |      |                |      |      |                |    |                |                |               |      |                |
| NRS 25CX<br>NRS 25LCX | 31               | 72    | 82.8<br>102    | 59                  | 45  | M8  | 6.8  | 61.4<br>80.6   | 14.8 | 16             | 25.5 | 7.8  | 5.1            | 12 | 4.5            | 3.9            | B-M6F         | 5.5  |                |
| NRS 30CX<br>NRS 30LCX | 38               | 90    | 98<br>120.5    | 72                  | 52  | M10 | 8.5  | 72.1<br>94.6   | 16.9 | 18.1           | 31   | 10.3 | 7              | 12 | 6.5            | 3.9            | B-M6F         | 7    |                |
| NRS 35CX<br>NRS 35LCX | 44               | 100   | 109.5<br>135   | 82                  | 62  | M10 | 8.5  | 79<br>104.5    | 18.9 | 20.1           | 35   | 12.1 | 8              | 12 | 6              | 5.2            | B-M6F         | 9    |                |
| NRS 45CX<br>NRS 45LCX | 52               | 120   | 138.2<br>171   | 100                 | 80  | M12 | 10.5 | 105<br>137.8   | 20.6 | 22.1           | 40.4 | 13.9 | 8              | 16 | 8.5            | 5.2            | B-PT1/8       | 11.6 |                |
| NRS 55CX<br>NRS 55LCX | 63               | 140   | 163.3<br>200.5 | 116                 | 95  | M14 | 12.5 | 123.6<br>160.8 | 22.5 | 24             | 49   | 16.6 | 10             | 16 | 10             | 5.2            | B-PT1/8       | 14   |                |
| NRS 65CX<br>NRS 65LCX | 75               | 170   | 186<br>246     | 142                 | 110 | M16 | 14.5 | 143.6<br>203.6 | 26   | 28             | 60   | 19   | 15             | 16 | 8.7            | 8.2            | B-PT1/8       | 15   |                |

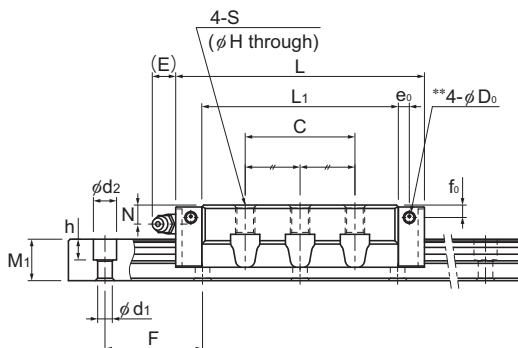
## Model number coding

|              |                  |                                        |                    |                                                |                                                                                                 |                        |                                                                                                                                                          |                                |                                                     |
|--------------|------------------|----------------------------------------|--------------------|------------------------------------------------|-------------------------------------------------------------------------------------------------|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|-----------------------------------------------------|
| <b>NRS45</b> | <b>LCX</b>       | <b>2</b>                               | <b>QZ</b>          | <b>SSHH</b>                                    | <b>C0</b>                                                                                       | <b>+2040L</b>          | <b>P</b>                                                                                                                                                 | <b>T</b>                       | <b>-II</b>                                          |
| Model number | Type of LM block | No. of LM blocks used on the same rail | With QZ Lubricator | Contamination protection accessory symbol (*1) | Radial clearance symbol (*2)<br>Normal (No symbol)<br>Light preload (C1)<br>Medium preload (C0) | LM rail length (in mm) | Accuracy symbol (*3)<br>Normal grade (No Symbol)/High accuracy grade (H)<br>Precision grade (P)/Super precision grade (SP)<br>Ultra precision grade (UP) | Symbol for LM rail jointed use | Symbol for No. of rails used on the same plane (*4) |

(\*1) See contamination protection accessory on **A1-516** (\*2) See **A1-71**. (\*3) See **A1-77**. (\*4) See **A1-13**.

Note) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.)

Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.



Model NRS-LCX

Unit: mm

| LM rail dimensions  |        |       |     |                           |      | Basic load rating |                | Static permissible moment $\text{kN}\cdot\text{m}^*$ |               |                |               |                |  | Mass       |         |
|---------------------|--------|-------|-----|---------------------------|------|-------------------|----------------|------------------------------------------------------|---------------|----------------|---------------|----------------|--|------------|---------|
| Width               | Height | Pitch |     | Length*                   |      | C                 | C <sub>0</sub> | M <sub>A</sub>                                       |               | M <sub>B</sub> |               | M <sub>C</sub> |  | LM block   | LM rail |
| $W_1$<br>0<br>-0.05 | $W_2$  | $M_1$ | F   | $d_1 \times d_2 \times h$ | Max  | kN                | kN             | 1 block                                              | Double blocks | 1 block        | Double blocks | 1 block        |  | kg         | kg/m    |
| 25                  | 23.5   | 17    | 40  | $6 \times 9.5 \times 8.5$ | 3000 | 28.4<br>34.7      | 52.2<br>69.6   | 0.457<br>0.786                                       | 2.43<br>3.9   | 0.422<br>0.727 | 2.25<br>3.61  | 0.552<br>0.732 |  | 0.6<br>0.8 | 2.9     |
| 28                  | 31     | 21    | 80  | $7 \times 11 \times 9$    | 3000 | 41.9<br>51.2      | 75.2<br>100.2  | 0.785<br>1.36                                        | 4.12<br>6.62  | 0.726<br>1.26  | 3.82<br>6.13  | 0.896<br>1.19  |  | 1.1<br>1.5 | 4.2     |
| 34                  | 33     | 24.5  | 80  | $9 \times 14 \times 12$   | 3000 | 55.5<br>68.6      | 95.5<br>129.5  | 1.09<br>1.95                                         | 5.88<br>9.61  | 1.01<br>1.81   | 5.45<br>8.9   | 1.36<br>1.84   |  | 1.6<br>2   | 6       |
| 45                  | 37.5   | 29    | 105 | $14 \times 20 \times 17$  | 3000 | 84.4<br>101.1     | 151.4<br>195.9 | 2.23<br>3.87                                         | 11.7<br>18.3  | 2.07<br>3.57   | 10.8<br>16.9  | 2.9<br>3.75    |  | 2.7<br>3.6 | 9.5     |
| 53                  | 43.5   | 36.5  | 120 | $16 \times 23 \times 20$  | 3000 | 108.7<br>134.1    | 191.6<br>259.3 | 3.36<br>5.76                                         | 17.4<br>28.4  | 3.1<br>5.32    | 16.1<br>26.3  | 4.19<br>5.67   |  | 4.5<br>5.9 | 14      |
| 63                  | 53.5   | 43    | 150 | $18 \times 26 \times 22$  | 3000 | 159.8<br>206      | 269.4<br>387.2 | 5.46<br>10.9                                         | 27.8<br>51.9  | 5.05<br>10.1   | 25.8<br>48    | 6.97<br>10.02  |  | 7.8<br>11  | 19.6    |

Note1) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-240**.)

Static permissible moment\* 1 block: the static permissible moment with one LM block

Double blocks: static permissible moment when two LM blocks are in close contact with each other

For oil lubrication, be certain to let THK know the mounting orientation and where the LM block piping joint should be attached.

(Mounting orientation: see **A1-12**, Lubricant: see **A24-2**)

Total block length L

: The total block length L shown in the table is the length with the dust proof parts, code UU or SS.

If other contamination protection accessories or lubricant equipment are installed, the total block length will increase.

(See **A1-491** or **A1-512**)

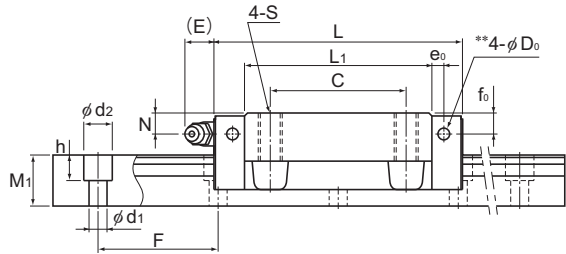
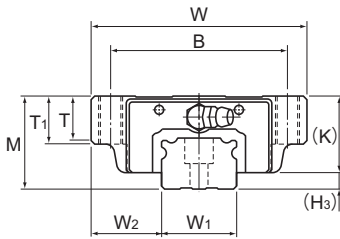
\*\* A pilot hole for side nipples, when a grease nipple for a model equipped with LaCS or QZ Lubricator is needed.

Pilot holes for side nipples are not drilled through for models other than those stated above.

For grease nipple mount machining, contact THK.

Note2) The basic load rating in the dimension table is for a load in the radial direction. Use Table7 on **A1-59** to calculate the load rating for loads in the reverse radial direction or lateral direction.

# Models NR-A, NR-LA, NRS-A and NRS-LA



Models NR-A and NRS-A

| Model No.             | Outer dimensions |       |                | LM block dimensions |            |        |                |    |                |    |    |                |    |                |                |               | H <sub>3</sub> |
|-----------------------|------------------|-------|----------------|---------------------|------------|--------|----------------|----|----------------|----|----|----------------|----|----------------|----------------|---------------|----------------|
|                       | Height           | Width | Length         | B                   | C          | S×ℓ    | L <sub>1</sub> | T  | T <sub>1</sub> | K  | N  | f <sub>0</sub> | E  | e <sub>0</sub> | D <sub>0</sub> | Grease nipple |                |
|                       | M                | W     | L              |                     |            |        |                |    |                |    |    |                |    |                |                |               |                |
| NR 75A<br>NR 75LA     | 83               | 195   | 218<br>274     | 165                 | 130        | M18×30 | 170.2<br>226.2 | 28 | 30             | 68 | 18 | 17             | 16 | 9              | 8.2            | B-PT1/8       | 15             |
| NR 85A<br>NR 85LA     | 90               | 215   | 246.7<br>302.8 | 185                 | 140        | M20×34 | 194.9<br>251   | 32 | 34             | 73 | 20 | 20             | 16 | 10             | 8.2            | B-PT1/8       | 17             |
| NR 100A<br>NR 100LA   | 105              | 260   | 286.2<br>326.2 | 220                 | 150<br>200 | M20×38 | 223.4<br>263.4 | 35 | 38             | 85 | 23 | 23             | 10 | 12             | 8.2            | B-PT1/4       | 20             |
| NRS 75A<br>NRS 75LA   | 83               | 195   | 218<br>274     | 165                 | 130        | M18×30 | 170.2<br>226.2 | 28 | 30             | 68 | 18 | 17             | 16 | 9              | 8.2            | B-PT1/8       | 15             |
| NRS 85A<br>NRS 85LA   | 90               | 215   | 246.7<br>302.8 | 185                 | 140        | M20×34 | 194.9<br>251   | 32 | 34             | 73 | 20 | 20             | 16 | 10             | 8.2            | B-PT1/8       | 17             |
| NRS 100A<br>NRS 100LA | 105              | 260   | 286.2<br>326.2 | 220                 | 150<br>200 | M20×38 | 223.4<br>263.4 | 35 | 38             | 85 | 23 | 23             | 10 | 12             | 8.2            | B-PT1/4       | 20             |

## Model number coding

**NR75 A 2 QZ KKHH C0 +1400L P Z T -II**

Model number

Type of LM block

With QZ Lubricator

Contamination protection accessory symbol (\*1)

LM rail length (in mm)

Symbol for LM rail jointed use

Symbol for No. of rails used on the same plane (\*5)

No. of LM blocks used on the same rail

Radial clearance symbol (\*2)  
Normal (No symbol)  
Light preload (C1)  
Medium preload (C0)

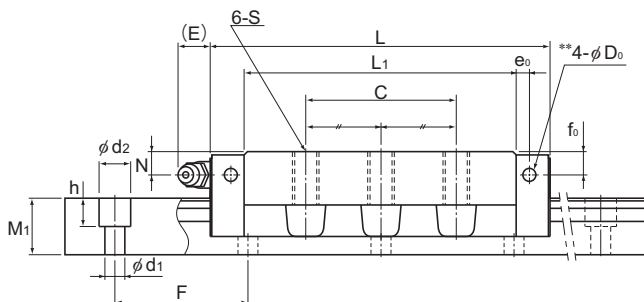
With plate cover or steel tape (\*4)  
Accuracy symbol (\*3)  
Normal grade (No Symbol)/High accuracy grade (H)  
Precision grade (P)/Super precision grade (SP)  
Ultra precision grade (UP)

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-71**. (\*3) See **A1-77**.

(\*4) Specify the plate cover or the steel tape. (\*5) See **A1-13**.

Note) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.)

Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.



Models NR-LA and NRS-LA

Unit: mm

| LM rail dimensions  |        |       |         |                           |      | Basic load rating |              | Static permissible moment $\text{kN}\cdot\text{m}^*$ |               |              |               |              | Mass         |         |
|---------------------|--------|-------|---------|---------------------------|------|-------------------|--------------|------------------------------------------------------|---------------|--------------|---------------|--------------|--------------|---------|
| Width               | Height | Pitch | Length* | $d_1 \times d_2 \times h$ | Max  | C                 | $C_0$        | $M_A$                                                |               | $M_B$        |               | $M_C$        | LM block     | LM rail |
| $W_1$<br>0<br>-0.05 |        |       |         |                           |      | kN                | kN           | 1 block                                              | Double blocks | 1 block      | Double blocks | 1 block      | kg           | kg/m    |
| 75                  | 60     | 44    | 150     | $22 \times 32 \times 26$  | 3000 | 271<br>355        | 610<br>800   | 14.4<br>25.4                                         | 73.3<br>118   | 8.91<br>15.4 | 44.7<br>71.4  | 19.3<br>25.2 | 11.3<br>15   | 24.6    |
| 85                  | 65     | 48    | 180     | $24 \times 35 \times 28$  | 3000 | 336<br>435        | 751<br>972   | 20.3<br>34.7                                         | 102<br>160    | 12.4<br>21   | 62.6<br>96.2  | 26.8<br>34.6 | 16.2<br>20.7 | 30.5    |
| 100                 | 80     | 57    | 210     | $26 \times 39 \times 32$  | 3000 | 479<br>599        | 1040<br>1300 | 34<br>47.3                                           | 167<br>238    | 20.7<br>29.2 | 101<br>146    | 43.4<br>54.6 | 26.7<br>31.2 | 42.6    |
| 75                  | 60     | 44    | 150     | $22 \times 32 \times 26$  | 3000 | 212<br>278        | 431<br>566   | 10.6<br>18.6                                         | 53.8<br>87    | 10.6<br>18.6 | 53.8<br>87    | 13.4<br>17.6 | 11.3<br>15   | 24.6    |
| 85                  | 65     | 48    | 180     | $24 \times 35 \times 28$  | 3000 | 264<br>342        | 531<br>687   | 14.9<br>25.4                                         | 75.3<br>117   | 14.9<br>25.4 | 75.3<br>117   | 18.7<br>24.2 | 16.2<br>20.7 | 30.5    |
| 100                 | 80     | 57    | 210     | $26 \times 39 \times 32$  | 3000 | 376<br>470        | 737<br>920   | 25.1<br>34.6                                         | 123<br>174    | 25.1<br>34.6 | 123<br>174    | 30.4<br>38.1 | 26.7<br>31.2 | 42.6    |

Note1) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-240**.)

Static permissible moment\* 1 block: the static permissible moment with one LM block

Double blocks: static permissible moment when two LM blocks are in close contact with each other

For oil lubrication, be certain to let THK know the mounting orientation and where the LM block piping joint should be attached.

(Mounting orientation: see **A1-12**, Lubricant: see **A24-2**)

Total block length L

: The total block length L shown in the table is the length with the dust proof parts, code UU or SS. If other contamination protection accessories or lubricant equipment are installed, the total block length will increase.

(See **A1-491** or **A1-512**)

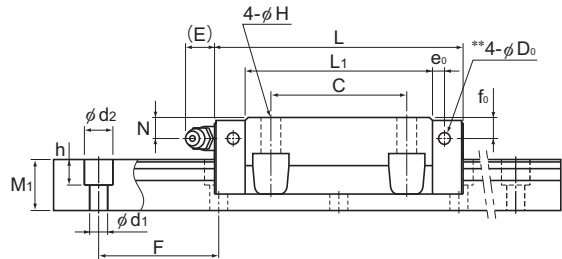
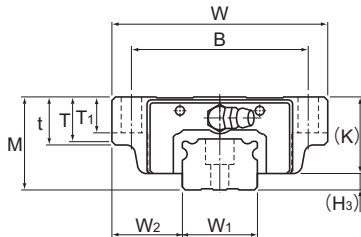
\*\* A pilot hole for side nipples, when a grease nipple for a model equipped with LaCS or QZ Lubricator is needed.

Pilot holes for side nipples are not drilled through for models other than those stated above.

For grease nipple mount machining, contact THK.

Note2) The basic load rating in the dimension table is for a load in the radial direction. Use Table7 on **A1-59** to calculate the load rating for loads in the reverse radial direction or lateral direction.

# Models NR-B, NR-LB, NRS-B and NRS-LB



Models NR-B and NRS-B

| Model No.             | Outer dimensions |       |                | LM block dimensions |            |    |                |    |    |                |    |    |                |    |                |                |               | H <sub>3</sub> |
|-----------------------|------------------|-------|----------------|---------------------|------------|----|----------------|----|----|----------------|----|----|----------------|----|----------------|----------------|---------------|----------------|
|                       | Height           | Width | Length         | B                   | C          | H  | L <sub>1</sub> | t  | T  | T <sub>1</sub> | K  | N  | f <sub>0</sub> | E  | e <sub>0</sub> | D <sub>0</sub> | Grease nipple |                |
|                       | M                | W     | L              |                     |            |    |                |    |    |                |    |    |                |    |                |                |               |                |
| NR 75B<br>NR 75LB     | 83               | 195   | 218<br>274     | 165                 | 130        | 18 | 170.2<br>226.2 | 30 | 28 | 26             | 68 | 18 | 17             | 16 | 9              | 8.2            | B-PT1/8       | 15             |
| NR 85B<br>NR 85LB     | 90               | 215   | 246.7<br>302.8 | 185                 | 140        | 18 | 194.9<br>251   | 34 | 32 | 28             | 73 | 20 | 20             | 16 | 10             | 8.2            | B-PT1/8       | 17             |
| NR 100B<br>NR 100LB   | 105              | 260   | 286.2<br>326.2 | 220                 | 150<br>200 | 20 | 223.4<br>263.4 | 38 | 35 | 32             | 85 | 23 | 23             | 10 | 12             | 8.2            | B-PT1/4       | 20             |
| NRS 75B<br>NRS 75LB   | 83               | 195   | 218<br>274     | 165                 | 130        | 18 | 170.2<br>226.2 | 30 | 28 | 26             | 68 | 18 | 17             | 16 | 9              | 8.2            | B-PT1/8       | 15             |
| NRS 85B<br>NRS 85LB   | 90               | 215   | 246.7<br>302.8 | 185                 | 140        | 18 | 194.9<br>251   | 34 | 32 | 28             | 73 | 20 | 20             | 16 | 10             | 8.2            | B-PT1/8       | 17             |
| NRS 100B<br>NRS 100LB | 105              | 260   | 286.2<br>326.2 | 220                 | 150<br>200 | 20 | 223.4<br>263.4 | 38 | 35 | 32             | 85 | 23 | 23             | 10 | 12             | 8.2            | B-PT1/4       | 20             |

## Model number coding

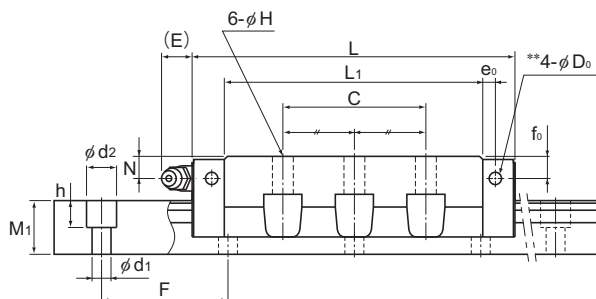
|              |                  |                                        |                                                |                        |                                                                                                 |                                                                                                                                                          |                                |                                                     |          |            |
|--------------|------------------|----------------------------------------|------------------------------------------------|------------------------|-------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|-----------------------------------------------------|----------|------------|
| <b>NR75</b>  | <b>B</b>         | <b>2</b>                               | <b>QZ</b>                                      | <b>DDHH</b>            | <b>C0</b>                                                                                       | <b>+1080L</b>                                                                                                                                            | <b>P</b>                       | <b>Z</b>                                            | <b>T</b> | <b>-II</b> |
| Model number | Type of LM block | With QZ Lubricator                     | Contamination protection accessory symbol (*1) | LM rail length (in mm) | Radial clearance symbol (*2)<br>Normal (No symbol)<br>Light preload (C1)<br>Medium preload (C0) | Accuracy symbol (*3)<br>Normal grade (No Symbol)/High accuracy grade (H)<br>Precision grade (P)/Super precision grade (SP)<br>Ultra precision grade (UP) | Symbol for LM rail jointed use | Symbol for No. of rails used on the same plane (*5) |          |            |
|              |                  | No. of LM blocks used on the same rail |                                                |                        |                                                                                                 | With plate cover or steel tape (*4)                                                                                                                      |                                |                                                     |          |            |

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-71**. (\*3) See **A1-77**.

(\*4) Specify the plate cover or the steel tape. (\*5) See **A1-13**.

Note) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.)

Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.



Models NR-LB and NRS-LB

Unit: mm

| LM rail dimensions  |        |       |     |                           |      | Basic load rating |                | Static permissible moment $\text{kN}\cdot\text{m}^*$ |               |                |               |                | Mass         |         |
|---------------------|--------|-------|-----|---------------------------|------|-------------------|----------------|------------------------------------------------------|---------------|----------------|---------------|----------------|--------------|---------|
| Width               | Height | Pitch |     | Length*                   |      | C                 | C <sub>0</sub> | M <sub>A</sub>                                       |               | M <sub>B</sub> |               | M <sub>C</sub> | LM block     | LM rail |
| $W_1$<br>0<br>-0.05 | $W_2$  | $M_1$ | F   | $d_1 \times d_2 \times h$ | Max  | kN                | kN             | 1 block                                              | Double blocks | 1 block        | Double blocks | 1 block        | kg           | kg/m    |
| 75                  | 60     | 44    | 150 | 22×32×26                  | 3000 | 271<br>355        | 610<br>800     | 14.4<br>25.4                                         | 73.3<br>118   | 8.91<br>15.4   | 44.7<br>71.4  | 19.3<br>25.2   | 11.3<br>15   | 24.6    |
| 85                  | 65     | 48    | 180 | 24×35×28                  | 3000 | 336<br>435        | 751<br>972     | 20.3<br>34.7                                         | 102<br>160    | 12.4<br>21     | 62.6<br>96.2  | 26.8<br>34.6   | 16.2<br>20.7 | 30.5    |
| 100                 | 80     | 57    | 210 | 26×39×32                  | 3000 | 479<br>599        | 1040<br>1300   | 34<br>47.3                                           | 167<br>238    | 20.7<br>29.2   | 101<br>146    | 43.4<br>54.6   | 26.7<br>31.2 | 42.6    |
| 75                  | 60     | 44    | 150 | 22×32×26                  | 3000 | 212<br>278        | 431<br>566     | 10.6<br>18.6                                         | 53.8<br>87    | 10.6<br>18.6   | 53.8<br>87    | 13.4<br>17.6   | 11.3<br>15   | 24.6    |
| 85                  | 65     | 48    | 180 | 24×35×28                  | 3000 | 264<br>342        | 531<br>687     | 14.9<br>25.4                                         | 75.3<br>117   | 14.9<br>25.4   | 75.3<br>117   | 18.7<br>24.2   | 16.2<br>20.7 | 30.5    |
| 100                 | 80     | 57    | 210 | 26×39×32                  | 3000 | 376<br>470        | 737<br>920     | 25.1<br>34.6                                         | 123<br>174    | 25.1<br>34.6   | 123<br>174    | 30.4<br>38.1   | 26.7<br>31.2 | 42.6    |

Note1) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-240**.)

Static permissible moment\* 1 block: the static permissible moment with one LM block

Double blocks: static permissible moment when two LM blocks are in close contact with each other

For oil lubrication, be certain to let THK know the mounting orientation and where the LM block piping joint should be attached.

(Mounting orientation: see **A1-12**, Lubricant: see **A24-2**)

Total block length L

: The total block length L shown in the table is the length with the dust proof parts, code UU or SS. If other contamination protection accessories or lubricant equipment are installed, the total block length will increase.

(See **A1-491** or **A1-512**)

\*\* A pilot hole for side nipples, when a grease nipple for a model equipped with LaCS or QZ Lubricator is needed.

Pilot holes for side nipples are not drilled through for models other than those stated above.

For grease nipple mount machining, contact THK.

Note2) The basic load rating in the dimension table is for a load in the radial direction. Use Table7 on **A1-59** to calculate the load rating for loads in the reverse radial direction or lateral direction.

# Standard Length and Maximum Length of the LM Rail

Table1 shows the standard lengths and the maximum lengths of models NR/NRS-X variations. If the maximum length of the desired LM rail exceeds them, jointed rails will be used. Contact THK for details. For special rail lengths, it is recommended to use a value corresponding to the G,g dimension from the table. As the G,g dimension increases, this portion becomes less stable, and the accuracy performance is severely impacted.

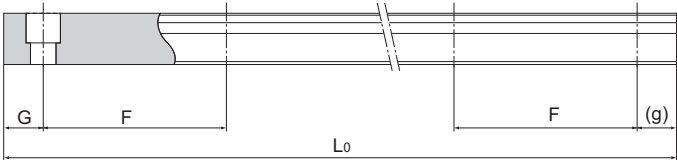


Table1 Standard Length and Maximum Length of the LM Rail for Models NR/NRS-X Unit: mm

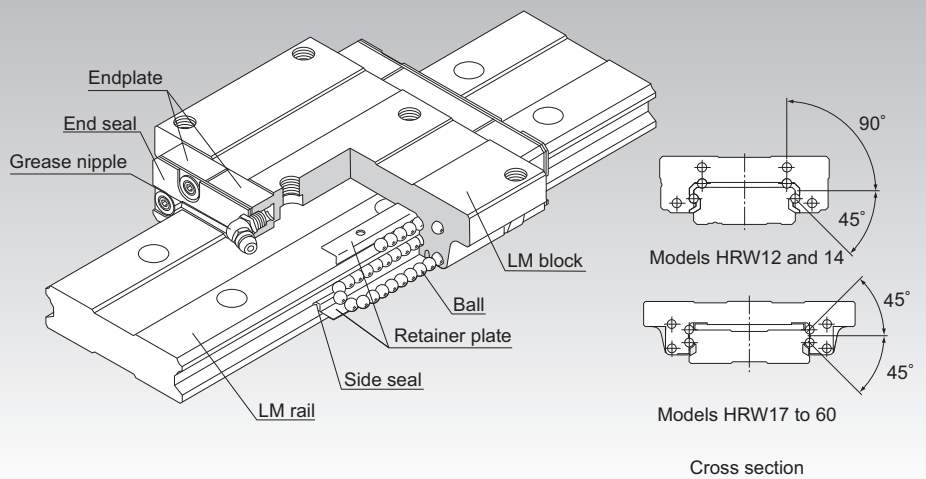
| Model No.                                       | NR/NRS25X | NR/NRS30X | NR/NRS35X | NR/NRS45X | NR/NRS55X | NR/NRS65X | NR/NRS75 | NR/NRS85 | NR/NRS100 |
|-------------------------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|----------|----------|-----------|
| LM rail<br>standard length<br>(L <sub>0</sub> ) | 230       | 280       | 280       | 570       | 780       | 1270      | 1280     | 1530     | 1340      |
|                                                 | 270       | 360       | 360       | 675       | 900       | 1570      | 1580     | 1890     | 1760      |
|                                                 | 350       | 440       | 440       | 780       | 1020      | 2020      | 2030     | 2250     | 2180      |
|                                                 | 390       | 520       | 520       | 885       | 1140      | 2620      | 2630     | 2610     | 2600      |
|                                                 | 470       | 600       | 600       | 990       | 1260      |           |          |          |           |
|                                                 | 510       | 680       | 680       | 1095      | 1380      |           |          |          |           |
|                                                 | 590       | 760       | 760       | 1200      | 1500      |           |          |          |           |
|                                                 | 630       | 840       | 840       | 1305      | 1620      |           |          |          |           |
|                                                 | 710       | 920       | 920       | 1410      | 1740      |           |          |          |           |
|                                                 | 750       | 1000      | 1000      | 1515      | 1860      |           |          |          |           |
|                                                 | 830       | 1080      | 1080      | 1620      | 1980      |           |          |          |           |
|                                                 | 950       | 1160      | 1160      | 1725      | 2100      |           |          |          |           |
|                                                 | 990       | 1240      | 1240      | 1830      | 2220      |           |          |          |           |
|                                                 | 1070      | 1320      | 1320      | 1935      | 2340      |           |          |          |           |
|                                                 | 1110      | 1400      | 1400      | 2040      | 2460      |           |          |          |           |
|                                                 | 1190      | 1480      | 1480      | 2145      | 2580      |           |          |          |           |
|                                                 | 1230      | 1560      | 1560      | 2250      | 2700      |           |          |          |           |
|                                                 | 1310      | 1640      | 1640      | 2355      | 2820      |           |          |          |           |
|                                                 | 1350      | 1720      | 1720      | 2460      | 2940      |           |          |          |           |
|                                                 | 1430      | 1800      | 1800      | 2565      | 3060      |           |          |          |           |
|                                                 | 1470      | 1880      | 1880      | 2670      |           |           |          |          |           |
|                                                 | 1550      | 1960      | 1960      | 2775      |           |           |          |          |           |
|                                                 | 1590      | 2040      | 2040      | 2880      |           |           |          |          |           |
|                                                 | 1710      | 2200      | 2200      | 2985      |           |           |          |          |           |
|                                                 | 1830      | 2360      | 2360      | 3090      |           |           |          |          |           |
|                                                 | 1950      | 2520      | 2520      |           |           |           |          |          |           |
|                                                 | 2070      | 2680      | 2680      |           |           |           |          |          |           |
|                                                 | 2190      | 2840      | 2840      |           |           |           |          |          |           |
|                                                 | 2310      | 3000      | 3000      |           |           |           |          |          |           |
|                                                 | 2430      |           |           |           |           |           |          |          |           |
|                                                 | 2470      |           |           |           |           |           |          |          |           |
| Standard pitch F                                | 40        | 80        | 80        | 105       | 120       | 150       | 150      | 180      | 210       |
| G,g                                             | 15        | 20        | 20        | 22.5      | 30        | 35        | 40       | 45       | 40        |
| Max length                                      | 3000      | 3000      | 3000      | 3090      | 3060      | 3000      | 3000     | 3000     | 3000      |

Note1) The maximum length varies with accuracy grades. Contact THK for details.  
Note2) If jointed rails are not allowed and a greater length than the maximum values above is required, contact THK.



# HRW

## LM Guide Wide Rail Model HRW



**Point of Selection** **A1-10**

**Point of Design** **A1-454**

**Options** **A1-477**

**Model No.** **A1-543**

**Precautions on Use** **A1-549**

**Accessories for Lubrication** **A24-1**

**Mounting Procedure and Maintenance** **B1-89**

Equivalent moment factor **A1-43**

Rated Loads in All Directions **A1-59**

Equivalent factor in each direction **A1-61**

Radial Clearance **A1-72**

Accuracy Standards **A1-77**

Shoulder Height of the Mounting Base and the Corner Radius **A1-467**

Permissible Error of the Mounting Surface **A1-471**

Dimensions of Each Model with an Option Attached **A1-491**

## Structure and Features

Balls roll in four rows of raceways precision-ground on an LM rail and an LM block, and endplates incorporated in the LM block allow the balls to circulate.

Since retainer plates hold the balls, they do not fall off even if the LM rail is pulled out. (except models HRW 12 and 14LR).

Each row of balls is placed at a contact angle of  $45^\circ$  so that the rated loads applied to the LM block are uniform in the four directions (radial, reverse radial and lateral directions), enabling the LM Guide to be used in all orientations. In addition, the LM block can receive a well-balanced preload, increasing the rigidity in four directions while maintaining a constant, low friction coefficient. In a low center of gravity structure with a large rail width and a low overall height, this model can be used in places where space saving is required or high rigidity against a moment is required even in a single axis configuration.

### [Compact, Heavy Load]

Since the number of effective balls is large, this model is highly rigid in all directions. It can adequately receive a moment even in a single rail configuration.

Additionally, since the second moment of inertia of the rail is large, the rigidity in the lateral directions is also high. Accordingly, it does not need reinforcement such as a side support.

### [Self-adjustment Capability]

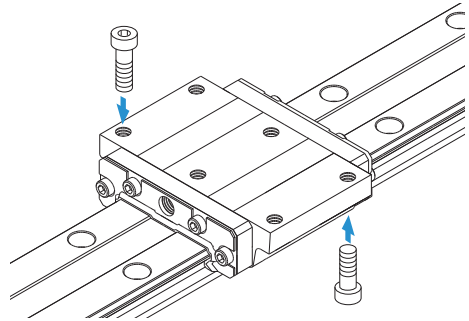
The self-adjustment capability through front-to-front configuration of THK's unique circular-arc grooves (DF set) enables a mounting error to be absorbed even under a preload, thus to achieve highly accurate, smooth straight motion.

## Types and Features

### Model HRW-CA

The flange of this LM block has tapped holes.  
Can be mounted from the top or the bottom.

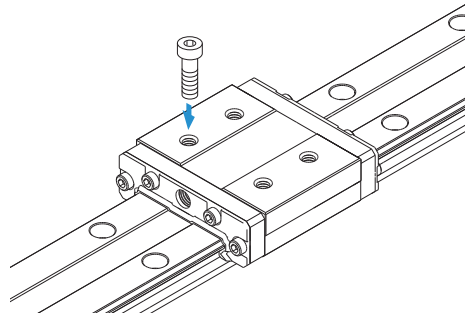
Specification Table⇒ **A1-246**



### Model HRW-CR

The LM block has tapped holes.

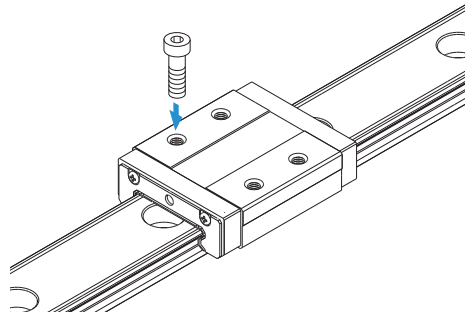
Specification Table⇒ **A1-248**



### Miniature Type Model HRW-LRM

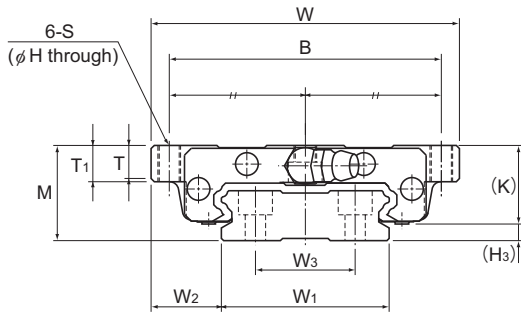
The LM block has tapped holes.

Specification Table⇒ **A1-248**





# Models HRW-CA and HRW-CAM



| Model No.             | Outer dimensions |       |        | LM block dimensions |    |      |     |       |      |    |      |     |    |               | H <sub>3</sub> |
|-----------------------|------------------|-------|--------|---------------------|----|------|-----|-------|------|----|------|-----|----|---------------|----------------|
|                       | Height           | Width | Length |                     |    |      |     |       |      |    |      |     |    | Grease nipple |                |
|                       | M                | W     | L      |                     |    |      |     |       |      |    |      |     |    |               |                |
| HRW 17CA<br>HRW 17CAM | 17               | 60    | 50.8   | 53                  | 26 | 3.3  | M4  | 33.6  | 5.5  | 6  | 14.5 | 4   | 2  | PB107         | 2.5            |
| HRW 21CA<br>HRW 21CAM | 21               | 68    | 58.8   | 60                  | 29 | 4.4  | M5  | 40    | 7.3  | 8  | 18   | 4.5 | 12 | B-M6F         | 3              |
| HRW 27CA<br>HRW 27CAM | 27               | 80    | 72.8   | 70                  | 40 | 5.3  | M6  | 51.8  | 9.5  | 10 | 24   | 6   | 12 | B-M6F         | 3              |
| HRW 35CA<br>HRW 35CAM | 35               | 120   | 106.6  | 107                 | 60 | 6.8  | M8  | 77.6  | 13   | 14 | 31   | 8   | 12 | B-M6F         | 4              |
| HRW 50CA              | 50               | 162   | 140.5  | 144                 | 80 | 8.6  | M10 | 103.5 | 16.5 | 18 | 46.6 | 14  | 16 | B-PT1/8       | 3.4            |
| HRW 60CA              | 60               | 200   | 158.9  | 180                 | 80 | 10.5 | M12 | 117.5 | 23.5 | 25 | 53.5 | 15  | 16 | B-PT1/8       | 6.5            |

## Model number coding

**HRW35 CA 2 UU C1 M +1000L P T M**

Model  
number

Type of  
LM block

Contamination  
protection  
accessory  
symbol (\*1)

Stainless steel  
LM block

LM rail length  
(in mm)

Symbol  
for LM rail  
jointed use

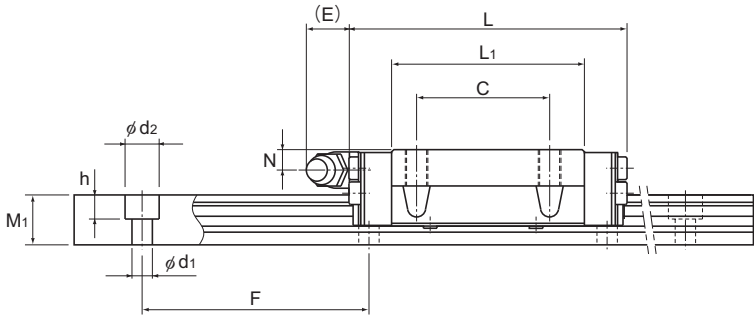
Stainless steel  
LM rail

No. of LM blocks  
used on the same rail

Radial clearance symbol (\*2)  
Normal (No symbol)  
Light preload (C1)  
Medium preload (C0)

Accuracy symbol (\*3)  
Normal grade (No Symbol)/High accuracy grade (H)  
Precision grade (P)/Super precision grade (SP)  
Ultra precision grade (UP)

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-72**. (\*3) See **A1-77**.



Unit: mm

| LM rail dimensions      |                |                |                |       |                                   |                | Basic load rating |                | Static permissible moment kN·m* |               |                |               |                |  | Mass     |         |
|-------------------------|----------------|----------------|----------------|-------|-----------------------------------|----------------|-------------------|----------------|---------------------------------|---------------|----------------|---------------|----------------|--|----------|---------|
| Width                   |                |                | Height         | Pitch |                                   | Length*        | C                 | C <sub>0</sub> | M <sub>A</sub>                  |               | M <sub>B</sub> |               | M <sub>C</sub> |  | LM block | LM rail |
| W <sub>1</sub><br>±0.05 | W <sub>2</sub> | W <sub>3</sub> | M <sub>1</sub> | F     | d <sub>1</sub> ×d <sub>2</sub> ×h | Max            | kN                | kN             | 1 block                         | Double blocks | 1 block        | Double blocks | 1 block        |  | kg       | kg/m    |
| 33                      | 13.5           | 18             | 9              | 40    | 4.5×7.5×5.3                       | 1900<br>(800)  | 5.53              | 9.1            | 0.0464                          | 0.272         | 0.0464         | 0.272         | 0.144          |  | 0.15     | 2.1     |
| 37                      | 15.5           | 22             | 11             | 50    | 4.5×7.5×5.3                       | 3000<br>(1000) | 8.02              | 12.9           | 0.0784                          | 0.445         | 0.0784         | 0.445         | 0.219          |  | 0.25     | 2.9     |
| 42                      | 19             | 24             | 15             | 60    | 4.5×7.5×5.3                       | 3000<br>(1200) | 14.2              | 21.6           | 0.166                           | 0.923         | 0.166          | 0.923         | 0.423          |  | 0.5      | 4.3     |
| 69                      | 25.5           | 40             | 19             | 80    | 7×11×9                            | 3000<br>(2120) | 33.8              | 48.6           | 0.559                           | 3.03          | 0.559          | 3.03          | 1.59           |  | 1.4      | 9.9     |
| 90                      | 36             | 60             | 24             | 80    | 9×14×12                           | 3000           | 62.4              | 86.3           | 1.32                            | 7.08          | 1.32           | 7.08          | 3.67           |  | 4        | 14.6    |
| 120                     | 40             | 80             | 31             | 105   | 11×17.5×14                        | 3000           | 80.3              | 109            | 1.88                            | 10.1          | 1.88           | 10.1          | 6.17           |  | 5.7      | 27.8    |

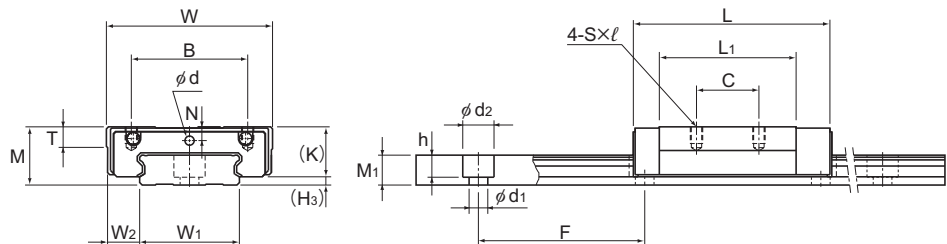
Note) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-250**.)

Static permissible moment\* 1 block: the static permissible moment with one LM block

Double blocks: static permissible moment when two LM blocks are in close contact with each other  
 Total block length L : The total block length L shown in the table is the length with the dust proof parts, code UU or SS.  
 If other contamination protection accessories or lubricant equipment are installed, the total block length will increase.  
 (See **A1-491** or **A1-512**)

The M in the model number symbol indicates that the LM block, LM rail and balls are made of stainless steel.  
 The stainless steel provides excellent corrosion and environmental resistance.

# Models HRW-CR, HRW-CRM and HRW-LRM



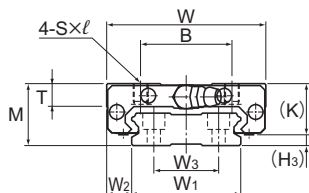
Models HRW12 and 14LRM

| Model No.             | Outer dimensions |       |        | LM block dimensions |    |        |                |    |      |     |    |               |               | H <sub>3</sub> |
|-----------------------|------------------|-------|--------|---------------------|----|--------|----------------|----|------|-----|----|---------------|---------------|----------------|
|                       | Height           | Width | Length |                     |    |        |                |    |      |     |    | Greasing hole | Grease nipple |                |
|                       | M                | W     | L      | B                   | C  | S×ℓ    | L <sub>1</sub> | T  | K    | N   | E  | d             |               |                |
| HRW 12LRM             | 12               | 30    | 37     | 21                  | 12 | M3×3.5 | 27             | 4  | 10   | 2.8 | —  | 2.2           | —             | 2              |
| HRW 14LRM             | 14               | 40    | 45.5   | 28                  | 15 | M3×4   | 32.9           | 5  | 12   | 3.3 | —  | 2.2           | —             | 2              |
| HRW 17CR<br>HRW 17CRM | 17               | 50    | 50.8   | 29                  | 15 | M4×5   | 33.6           | 6  | 14.5 | 4   | 2  | —             | PB107         | 2.5            |
| HRW 21CR<br>HRW 21CRM | 21               | 54    | 58.8   | 31                  | 19 | M5×6   | 40             | 8  | 18   | 4.5 | 12 | —             | B-M6F         | 3              |
| HRW 27CR<br>HRW 27CRM | 27               | 62    | 72.8   | 46                  | 32 | M6×6   | 51.8           | 10 | 24   | 6   | 12 | —             | B-M6F         | 3              |
| HRW 35CR<br>HRW 35CRM | 35               | 100   | 106.6  | 76                  | 50 | M8×8   | 77.6           | 14 | 31   | 8   | 12 | —             | B-M6F         | 4              |
| HRW 50 CR             | 50               | 130   | 140.5  | 100                 | 65 | M10×15 | 103.5          | 18 | 46.6 | 14  | 16 | —             | B-PT1/8       | 3.4            |

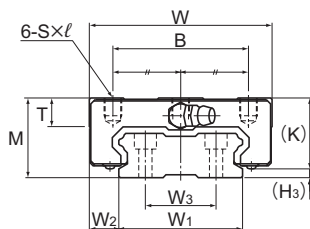
## Model number coding

|                                        |                  |                                                |           |                                                  |                        |                                |          |                         |          |
|----------------------------------------|------------------|------------------------------------------------|-----------|--------------------------------------------------|------------------------|--------------------------------|----------|-------------------------|----------|
| <b>HRW27</b>                           | <b>CR</b>        | <b>2</b>                                       | <b>UU</b> | <b>C1</b>                                        | <b>M</b>               | <b>+820L</b>                   | <b>P</b> | <b>T</b>                | <b>M</b> |
| Model number                           | Type of LM block | Contamination protection accessory symbol (*1) |           | Stainless steel LM block                         | LM rail length (in mm) | Symbol for LM rail jointed use |          | Stainless steel LM rail |          |
| No. of LM blocks used on the same rail |                  | Radial clearance symbol (*2)                   |           | Accuracy symbol (*3)                             |                        |                                |          |                         |          |
|                                        |                  | Normal (No symbol)                             |           | Normal grade (No Symbol)/High accuracy grade (H) |                        |                                |          |                         |          |
|                                        |                  | Light preload (C1)                             |           | Precision grade (P)/Super precision grade (SP)   |                        |                                |          |                         |          |
|                                        |                  | Medium preload (C0)                            |           | Ultra precision grade (UP)                       |                        |                                |          |                         |          |

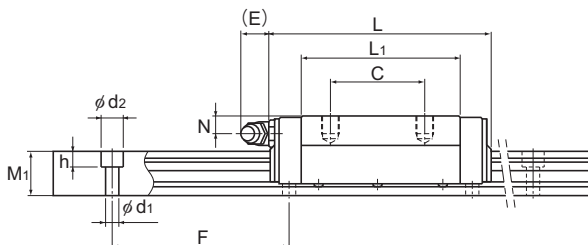
(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-72**. (\*3) See **A1-77**.



Models HRW17 and 21CR/CRM



Models HRW27 to 50CR/CRM



Unit: mm

| LM rail dimensions      |                |                |                |       |                                     |                |      | Basic load rating |                | Static permissible moment kN·m* |               |                |               |                | Mass     |         |
|-------------------------|----------------|----------------|----------------|-------|-------------------------------------|----------------|------|-------------------|----------------|---------------------------------|---------------|----------------|---------------|----------------|----------|---------|
| Width                   |                |                | Height         | Pitch |                                     | Length*        |      | C                 | C <sub>0</sub> | M <sub>a</sub>                  |               | M <sub>b</sub> |               | M <sub>c</sub> | LM block | LM rail |
| W <sub>1</sub><br>±0.05 | W <sub>2</sub> | W <sub>3</sub> | M <sub>1</sub> | F     | d <sub>1</sub> × d <sub>2</sub> × h | Max            | kN   | kN                |                | 1 block                         | Double blocks | 1 block        | Double blocks | 1 block        | kg       | kg/m    |
| 18                      | 6              | —              | 6.5            | 40    | 4.5 × 8 × 4.5                       | (1000)         | 3.29 | 7.16              | 0.0262         | 0.138                           | 0.013         | 0.069          | 0.051         | 0.045          | 0.79     |         |
| 24                      | 8              | —              | 7.2            | 40    | 4.5 × 7.5 × 5.3                     | (1430)         | 5.38 | 11.4              | 0.0499         | 0.273                           | 0.025         | 0.137          | 0.112         | 0.08           | 1.2      |         |
| 33                      | 8.5            | 18             | 9              | 40    | 4.5 × 7.5 × 5.3                     | 1900<br>(800)  | 5.53 | 9.1               | 0.0464         | 0.272                           | 0.0464        | 0.272          | 0.144         | 0.12           | 2.1      |         |
| 37                      | 8.5            | 22             | 11             | 50    | 4.5 × 7.5 × 5.3                     | 3000<br>(1000) | 8.02 | 12.9              | 0.0784         | 0.445                           | 0.0784        | 0.445          | 0.219         | 0.19           | 2.9      |         |
| 42                      | 10             | 24             | 15             | 60    | 4.5 × 7.5 × 5.3                     | 3000<br>(1200) | 14.2 | 21.6              | 0.166          | 0.923                           | 0.166         | 0.923          | 0.423         | 0.37           | 4.3      |         |
| 69                      | 15.5           | 40             | 19             | 80    | 7 × 11 × 9                          | 3000<br>(2120) | 33.8 | 48.6              | 0.559          | 3.03                            | 0.559         | 3.03           | 1.59          | 1.2            | 9.9      |         |
| 90                      | 20             | 60             | 24             | 80    | 9 × 14 × 12                         | 3000           | 62.4 | 86.3              | 1.32           | 7.08                            | 1.32          | 7.08           | 3.67          | 3.2            | 14.6     |         |

Note1) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-250**.)

Static permissible moment\* 1 block: the static permissible moment with one LM block

Double blocks: static permissible moment when two LM blocks are in close contact with each other  
Total block length L : The total block length L shown in the table is the length with the dust proof parts, code UU or SS. If other contamination protection accessories or lubricant equipment are installed, the total block length will increase.  
(See **A1-491** or **A1-512**)

The M in the model number symbol indicates that the LM block, LM rail and balls are made of stainless steel.

The stainless steel provides excellent corrosion and environmental resistance.

Note2) The basic load rating in the dimension table is for a load in the radial direction. Use Table7 on **A1-59** to calculate the load rating for loads in the reverse radial direction or lateral direction for models 12 and 14, as those values are different.

## Standard Length and Maximum Length of the LM Rail

Table1 shows the standard and maximum lengths of the HRW model rail. If a rail length longer than the listed max length is required, rails may be jointed to meet the overall length. Contact THK for details. For special rail lengths, it is recommended to use a value corresponding to the G,g dimension from the table. As the G,g dimension increases, this portion becomes less stable, and the accuracy performance is severely impacted.

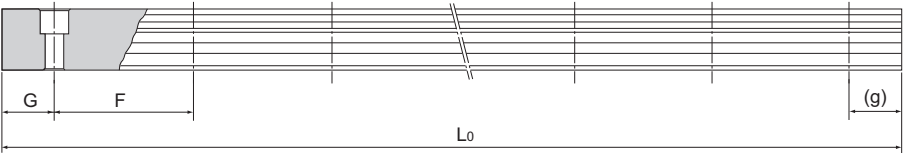


Table1 Standard Length and Maximum Length of the LM Rail for Model HRW

Unit: mm

| Model No.                                       | HRW 12 | HRW 14 | HRW 17        | HRW 21         | HRW 27         | HRW 35         | HRW 50 | HRW 60 |
|-------------------------------------------------|--------|--------|---------------|----------------|----------------|----------------|--------|--------|
| LM rail<br>standard length<br>(L <sub>0</sub> ) | 70     | 70     | 110           | 130            | 160            | 280            | 280    | 570    |
|                                                 | 110    | 110    | 190           | 230            | 280            | 440            | 440    | 885    |
|                                                 | 150    | 150    | 310           | 380            | 340            | 760            | 760    | 1200   |
|                                                 | 190    | 190    | 470           | 480            | 460            | 1000           | 1000   | 1620   |
|                                                 | 230    | 230    | 550           | 580            | 640            | 1240           | 1240   | 2040   |
|                                                 | 270    | 270    |               | 780            | 820            | 1560           | 1640   | 2460   |
|                                                 | 310    | 310    |               |                |                |                | 2040   |        |
|                                                 | 390    | 390    |               |                |                |                |        |        |
|                                                 | 470    | 470    |               |                |                |                |        |        |
|                                                 |        | 550    |               |                |                |                |        |        |
|                                                 |        | 670    |               |                |                |                |        |        |
| Standard pitch F                                | 40     | 40     | 40            | 50             | 60             | 80             | 80     | 105    |
| G,g                                             | 15     | 15     | 15            | 15             | 20             | 20             | 20     | 22.5   |
| Max length                                      | (1000) | (1430) | 1900<br>(800) | 3000<br>(1000) | 3000<br>(1200) | 3000<br>(2120) | 3000   | 3000   |

Note1) The maximum length varies with accuracy grades. Contact THK for details.  
Note2) If jointed rails are not allowed and a greater length than the maximum values above is required, contact THK.  
Note3) The figures in the parentheses indicate the maximum lengths of stainless steel made models.

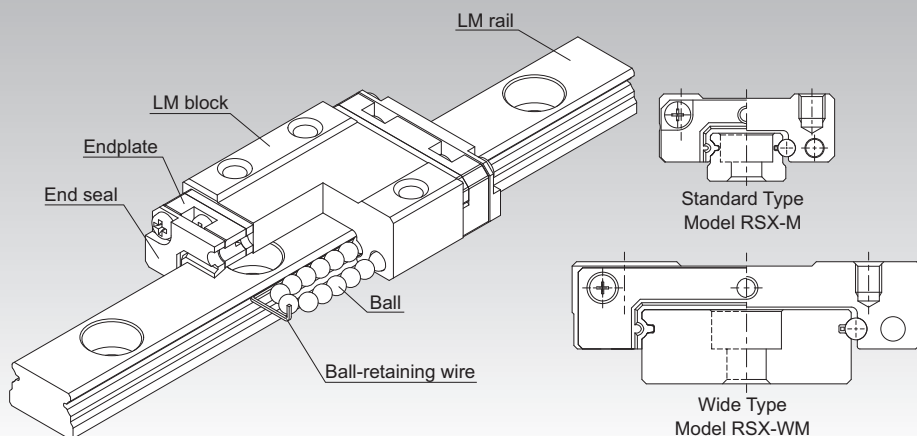
## Prevention of LM block from falling off of LM rail

In miniature model HRW, the balls fall out if the LM block comes off the LM rail. For this reason, LM Guide assemblies are delivered with a part which prevents the LM block from coming off the rail. If you remove this part when using the product, please take precautions to avoid overrunning the blocks off of the rail.



# RSX

## LM Guide Miniature Type Model RSX



**Point of Selection** **A1-10**

**Point of Design** **A1-454**

**Options** **A1-477**

**Model No.** **A1-543**

**Precautions on Use** **A1-549**

**Accessories for Lubrication** **A24-1**

**Mounting Procedure and Maintenance** **B1-89**

**Equivalent Moment Factor** **A1-43**

**Rated Loads in All Directions** **A1-59**

**Equivalent Factor in Each Direction** **A1-61**

**Radial Clearance** **A1-71**

**Accuracy Standards** **A1-83**

**Shoulder Height of the Mounting Base and the Corner Radius** **A1-469**

**Permissible Error of the Mounting Surface** **A1-471**

**Flatness of the Mounting Surface** **A1-472**

**Dimensions of Each Model with an Option Attached** **A1-491**

## Structure and Features

With the Model RSX, balls roll in two rows of raceways precision-ground on an LM rail and an LM block, and end plates incorporated in the LM block allow the balls to circulate. The Model RSX uses two rows of raceways, and it can help reduce the size of a device because it has more compact outer dimensions than models with four raceways. Despite being compact, its ball contact structure is capable of receiving loads in all directions, and it can be used individually in locations where moments are applied.

### [Ultra Compact]

The Model RSX has one raceway on either side of the LM rail, and its compact design with low cross-sectional height allows it to be installed in locations with limited space.

### [Corrosion Prevention]

The Model RSX uses an LM block, LM rail, and balls made of stainless steel, which has high corrosion resistance.

### [Retains Balls]

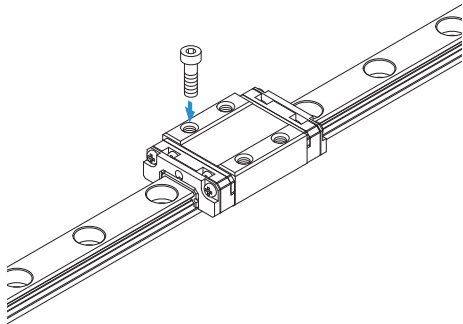
The Model RSX incorporates a ball-retaining wire that prevents balls from falling out when the LM block is removed from the LM rail, making mounting easy.

# Types and Features

## Model RSX-M

A standard type of RSX.

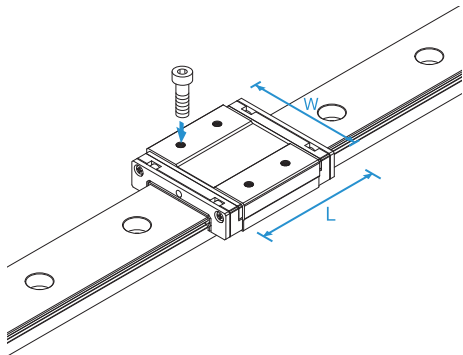
Specification Table⇒A1-256



## Model RSX-WM

Has a longer overall LM block length (L), a greater width and a larger rated load and permissible moment than RSX-M.

Specification Table⇒A1-258



## Flatness of the LM Rail and the LM Block Mounting Surface

Since the Model RSX has Gothic-arch grooves, any precision errors in the mounting surface may negatively affect its operability. Therefore, we recommend using it on mounting surfaces made with high precision.

Table1 Flatness of the LM Rail and the LM Block Mounting Surface

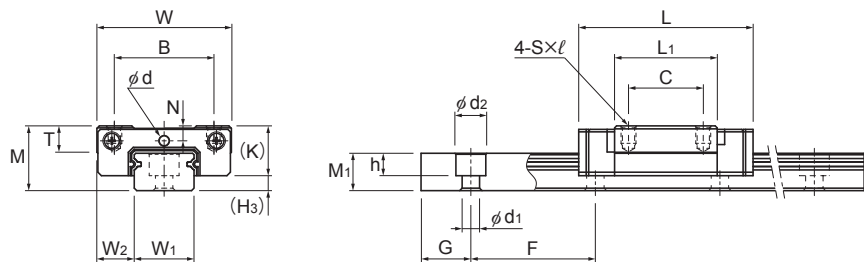
Unit: mm

| Model No. | Flatness error |
|-----------|----------------|
| RSX 7     | 0.025/200      |
| RSX 9     | 0.035/200      |
| RSX 12    | 0.050/200      |
| RSX 15    | 0.060/200      |

Note1) As there are many cases in which the mounting surface precision is affected by a number of factors, we recommend using 70% or less of the values shown.

Note2) The above figures apply to normal clearances. When using two or more rails with C1 clearance, we recommend using 50% or less of the values shown.

# Model RSX-M



Models RSX7 to 12M

| Model No. | Outer dimensions |       |        | LM block dimensions |    |        |                |     |     |     |               |               |       | H <sub>3</sub> |
|-----------|------------------|-------|--------|---------------------|----|--------|----------------|-----|-----|-----|---------------|---------------|-------|----------------|
|           | Height           | Width | Length |                     |    |        |                |     |     |     | Greasing hole | Grease nipple |       |                |
|           | M                | W     | L      | B                   | C  | S×ℓ    | L <sub>1</sub> | T   | K   | N   | E             | d             |       |                |
| RSX 7M    | 8                | 17    | 23.4   | 12                  | 8  | M2×2.6 | 13.4           | —   | 6.5 | 1.7 | —             | 1.2           | —     |                |
| RSX 9M    | 10               | 20    | 30.8   | 15                  | 10 | M3×2.8 | 19.8           | —   | 7.8 | 2.4 | —             | 1.6           | —     |                |
| RSX 12M   | 13               | 27    | 35     | 20                  | 15 | M3×3.5 | 20.6           | 5.3 | 10  | 3   | —             | 2             | —     |                |
| RSX 15M   | 16               | 32    | 42.9   | 25                  | 20 | M3×4   | 25.7           | 5.8 | 12  | 3   | 4             | —             | PB107 |                |

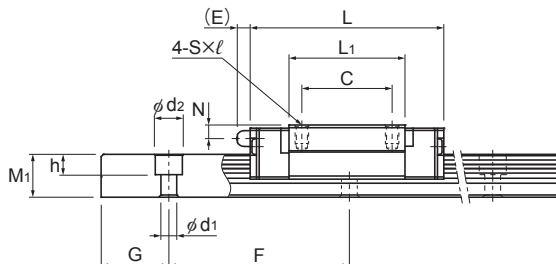
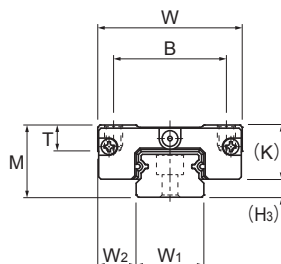
Note) Since stainless steel is used in the LM block, LM rail, and balls, these models are highly resistant to corrosion and environment. Using a greasing hole for anything other than greasing may cause damage.

### Model number coding

|                                             |              |                                                |                                                                          |                        |                         |                                                                                              |                                                     |
|---------------------------------------------|--------------|------------------------------------------------|--------------------------------------------------------------------------|------------------------|-------------------------|----------------------------------------------------------------------------------------------|-----------------------------------------------------|
| 2                                           | RSX12M       | UU                                             | C1                                                                       | +220L                  | P                       | M                                                                                            | -II                                                 |
| No. of LM blocks used on the same rail (*1) | Model number | Contamination protection accessory symbol (*2) | Radial clearance symbol (*3)<br>Normal (No symbol)<br>Light preload (C1) | LM rail length (in mm) | Stainless steel LM rail | Accuracy symbol (*4)<br>Normal grade (No Symbol)/High accuracy grade (H)/Precision grade (P) | Symbol for No. of rails used on the same plane (*5) |

(\*1) No symbol for 1 LM block. (\*2) See contamination protection accessories on **A1-516**. (\*3) See **A1-71**. (\*4) See **A1-83**. (\*5) See **A1-13**.

Note) This model number indicates that a single-rail unit constitutes one set (i.e., the required number of sets when 2 rails are used in parallel is 2 at a minimum).



Model RSX15M

Unit: mm

|  | LM rail dimensions |                |                |       |                                   |         | Basic load rating |                | Static permissible moment N·m*                                                    |          |                                                                                   |          |                                                                                   | Mass     |         |
|--|--------------------|----------------|----------------|-------|-----------------------------------|---------|-------------------|----------------|-----------------------------------------------------------------------------------|----------|-----------------------------------------------------------------------------------|----------|-----------------------------------------------------------------------------------|----------|---------|
|  | Width              |                | Height         | Pitch |                                   | Length* | C                 | C <sub>0</sub> |  |          |  |          |  | LM block | LM rail |
|  |                    |                |                |       |                                   |         |                   |                | 1 block                                                                           | 2 blocks | 1 block                                                                           | 2 blocks | 1 block                                                                           |          |         |
|  | W <sub>1</sub>     | W <sub>2</sub> | M <sub>1</sub> | F     | d <sub>1</sub> ×d <sub>2</sub> ×h | Max     | kN                | kN             |                                                                                   |          |                                                                                   |          |                                                                                   | kg       | kg/m    |
|  | 7                  | 5              | 4.7            | 15    | 2.4×4.2×2.3                       | 480     | 1.16              | 1.54           | 3.27                                                                              | 23.1     | 3.77                                                                              | 26.7     | 5.96                                                                              | 0.008    | 0.227   |
|  | 9                  | 5.5            | 5.5            | 20    | 3.5×6×3.3                         | 1240    | 2.22              | 3.06           | 9.87                                                                              | 57.9     | 11.4                                                                              | 66.9     | 14.1                                                                              | 0.018    | 0.32    |
|  | 12                 | 7.5            | 7.5            | 25    | 3.5×6×4.5                         | 2000    | 3.36              | 4.21           | 14.2                                                                              | 92.5     | 14.2                                                                              | 92.5     | 27.6                                                                              | 0.037    | 0.65    |
|  | 15                 | 8.5            | 9.5            | 40    | 3.5×6×4.5                         | 2000    | 5.59              | 6.78           | 29                                                                                | 186      | 29                                                                                | 186      | 48.1                                                                              | 0.069    | 0.96    |

Note1) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-260**.)

Static permissible moment\* 1 block: The static permissible moment with one LM block

2 blocks: Static permissible moment when two LM blocks are in close contact with each other

Total block length L

: The total block length L shown in the table is the length with the dust-proof parts (code: UU).

Note2) The basic load rating in the dimension table is for a load in the radial direction. Use Table7 on **A1-59** to calculate the load rating for loads in the reverse-radial direction or lateral direction.

- Reference bolt tightening torque when mounting an LM block for model RSX7M is shown in the table below.

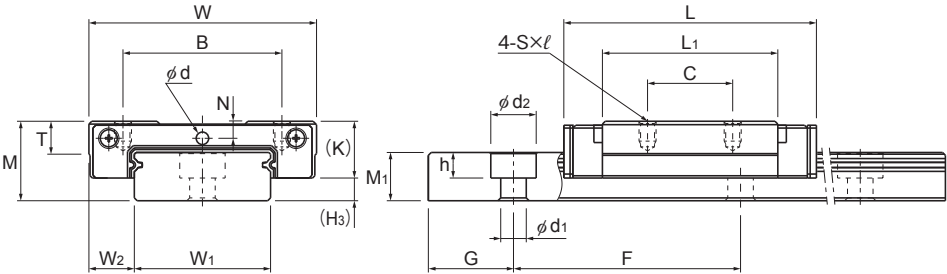
Reference Tightening Torque

| Model No. | Model No. of screw | Screw depth (mm) | Reference tightening torque (N·m)* |
|-----------|--------------------|------------------|------------------------------------|
| RSX 7M    | M2                 | 2.3              | 0.4                                |

\* Tightening above the tightening torque affects accuracy.

Be sure to tighten at or below the defined tightening torque.

# Model RSX-WM



Models RSX7 to 12WM

| Model No. | Outer dimensions |       |        | LM block dimensions |    |        |                |     |     |     |               |               |       | H <sub>3</sub> |
|-----------|------------------|-------|--------|---------------------|----|--------|----------------|-----|-----|-----|---------------|---------------|-------|----------------|
|           | Height           | Width | Length |                     |    |        |                |     |     |     | Greasing hole | Grease nipple |       |                |
|           | M                | W     | L      | B                   | C  | S×ℓ    | L <sub>1</sub> | T   | K   | N   | E             | d             |       |                |
| RSX 7WM   | 9                | 25    | 31     | 19                  | 10 | M3×2.8 | 20.4           | —   | 7   | 1.8 | —             | 1.2           | —     | 2              |
| RSX 9WM   | 12               | 30    | 39     | 21                  | 12 | M3×2.8 | 27             | —   | 8.3 | 2.3 | —             | 1.6           | —     | 3.7            |
| RSX 12WM  | 14               | 40    | 44.5   | 28                  | 15 | M3×3.5 | 30.9           | 4.5 | 10  | 3   | —             | 2             | —     | 4              |
| RSX 15WM  | 16               | 60    | 55.5   | 45                  | 20 | M4×4.5 | 38.9           | 5.6 | 12  | 3   | 4             | —             | PB107 | 4              |

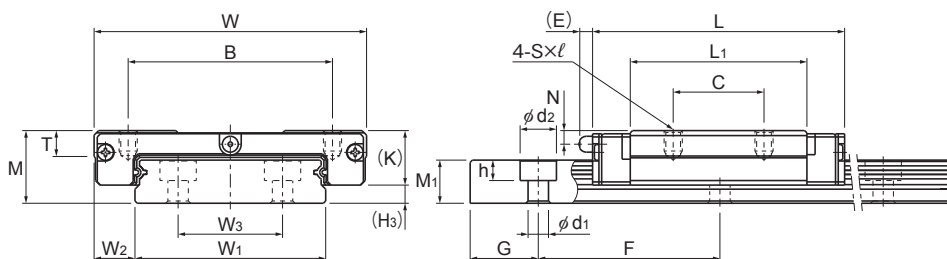
Note) Since stainless steel is used in the LM block, LM rail, and balls, these models are highly resistant to corrosion and environment. Using a greasing hole for anything other than greasing may cause damage.

## Model number coding

|                                             |              |                                                                          |    |                        |                                                                                                 |                         |                                                     |
|---------------------------------------------|--------------|--------------------------------------------------------------------------|----|------------------------|-------------------------------------------------------------------------------------------------|-------------------------|-----------------------------------------------------|
| 2                                           | RSX12WM      | UU                                                                       | C1 | +220L                  | P                                                                                               | M                       | -II                                                 |
|                                             | Model number | Contamination protection accessory symbol (*2)                           |    | LM rail length (in mm) |                                                                                                 | Stainless steel LM rail | Symbol for No. of rails used on the same plane (*5) |
| No. of LM blocks used on the same rail (*1) |              | Radial clearance symbol (*3)<br>Normal (No symbol)<br>Light preload (C1) |    |                        | Accuracy symbol (*4)<br>Normal grade (No Symbol)/High accuracy grade (H)<br>Precision grade (P) |                         |                                                     |

(\*1) No symbol for 1 LM block. (\*2) See contamination protection accessories on **A1-516**. (\*3) See **A1-71**. (\*4) See **A1-83**. (\*5) See **A1-13**.

Note) This model number indicates that a single-rail unit constitutes one set (i.e., the required number of sets when 2 rails are used in parallel is 2 at a minimum).



Model RSX15WM

Unit: mm

|  | LM rail dimensions |                |                |                |       |                                   |         | Basic load rating |                | Static permissible moment N·m*                                                    |          |                                                                                   |          |                                                                                   | Mass     |         |
|--|--------------------|----------------|----------------|----------------|-------|-----------------------------------|---------|-------------------|----------------|-----------------------------------------------------------------------------------|----------|-----------------------------------------------------------------------------------|----------|-----------------------------------------------------------------------------------|----------|---------|
|  | Width              |                |                | Height         | Pitch |                                   | Length* | C                 | C <sub>0</sub> |  |          |  |          |  | LM block | LM rail |
|  | W <sub>1</sub>     | W <sub>2</sub> | W <sub>3</sub> | M <sub>1</sub> | F     | d <sub>1</sub> ×d <sub>2</sub> ×h | Max     | kN                | kN             | 1 block                                                                           | 2 blocks | 1 block                                                                           | 2 blocks | 1 block                                                                           | kg       | kg/m    |
|  | 14                 | 5.5            | —              | 5.2            | 30    | 3.5×6×3.2                         | 480     | 1.63              | 2.51           | 8.08                                                                              | 46.9     | 9.32                                                                              | 54.2     | 18.5                                                                              | 0.018    | 0.54    |
|  | 18                 | 6              | —              | 7.5            | 30    | 3.5×6×4.5                         | 1430    | 2.8               | 4.28           | 18.5                                                                              | 99.3     | 21.4                                                                              | 115      | 40.5                                                                              | 0.035    | 1.01    |
|  | 24                 | 8              | —              | 8.5            | 40    | 4.5×8×4.5                         | 2000    | 4.46              | 6.31           | 30                                                                                | 171      | 30                                                                                | 171      | 79.2                                                                              | 0.075    | 1.52    |
|  | 42                 | 9              | 23             | 9.5            | 40    | 4.5×8×4.5                         | 2000    | 7.43              | 10.1           | 61.4                                                                              | 343      | 61.4                                                                              | 343      | 211                                                                               | 0.17     | 2.87    |

Note1) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-260**.)

Static permissible moment\* 1 block: The static permissible moment with one LM block

2 blocks: The static permissible moment when two LM blocks are in close contact with each other

Total block length L

: The total block length L shown in the table is the length with the dust-proof parts (code: UU).

Note2) The basic load rating in the dimension table is for a load in the radial direction. Use Table7 on **A1-59** to calculate the load rating for loads in the reverse-radial direction or lateral direction.

- Reference bolt tightening torque when mounting an LM block for model RSX7WM is shown in the table below.

Reference Tightening Torque

| Model No. | Model No. of screw | Screw depth (mm) | Reference tightening torque (N·m)* |
|-----------|--------------------|------------------|------------------------------------|
| RSX 7WM   | M2                 | 2.8              | 0.4                                |

\* Tightening above the tightening torque affects accuracy.

Be sure to tighten at or below the defined tightening torque.

# Standard Length and Maximum Length of the LM Rail

Table2 shows the standard lengths and the maximum lengths of model RSX variations. If the maximum length of the desired LM rail exceeds them, jointed rails will be used. Contact THK for details. For special rail lengths, it is recommended to use a value corresponding to the G,g dimension from the table. As the G,g dimension increases, this portion becomes less stable, and the accuracy performance is severely impacted.

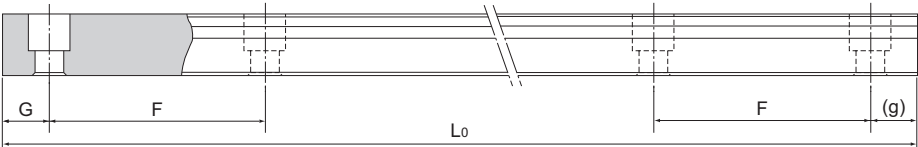
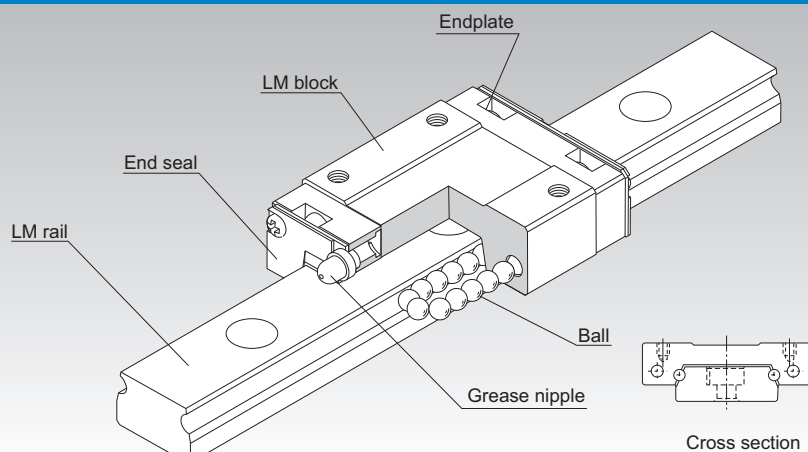


Table2 Standard Length and Maximum Length of the LM Rail for Model RSX Unit: mm

| Model No.                         | RSX 7 | RSX 7W | RSX 9 | RSX 9W | RSX 12 | RSX 12W | RSX 15 | RSX 15W |
|-----------------------------------|-------|--------|-------|--------|--------|---------|--------|---------|
| LM rail standard length ( $L_0$ ) | 40    | 50     | 55    | 50     | 70     | 70      | 70     | 110     |
|                                   | 55    | 80     | 75    | 80     | 95     | 110     | 110    | 150     |
|                                   | 70    | 110    | 95    | 110    | 120    | 150     | 150    | 190     |
|                                   | 85    | 140    | 115   | 140    | 145    | 190     | 190    | 230     |
|                                   | 100   | 170    | 135   | 170    | 170    | 230     | 230    | 270     |
|                                   | 115   | 200    | 155   | 200    | 195    | 270     | 270    | 310     |
|                                   | 130   | 260    | 175   | 260    | 220    | 310     | 310    | 430     |
|                                   |       | 290    | 195   | 290    | 245    | 390     | 350    | 550     |
|                                   |       |        | 275   | 320    | 270    | 470     | 390    | 670     |
|                                   |       |        | 375   |        | 320    | 550     | 430    | 790     |
|                                   |       |        |       |        | 370    |         | 470    |         |
|                                   |       |        |       |        | 470    |         | 550    |         |
|                                   |       |        |       |        | 570    |         | 670    |         |
|                                   |       |        |       |        |        |         | 870    |         |
| Standard pitch F                  | 15    | 30     | 20    | 30     | 25     | 40      | 40     | 40      |
| G,g                               | 5     | 10     | 7.5   | 10     | 10     | 15      | 15     | 15      |
| Max length                        | 480   | 480    | 1240  | 1430   | 2000   | 2000    | 2000   | 2000    |

Note1) The maximum length varies with accuracy grades. Contact THK for details.  
 Note2) If jointed rails are not allowed and a greater length than the maximum values above is required, contact THK.





**Point of Selection** **A1-10**

**Point of Design** **A1-454**

**Options** **A1-477**

**Model No.** **A1-543**

**Precautions on Use** **A1-549**

**Accessories for Lubrication** **A24-1**

**Mounting Procedure and Maintenance** **B1-89**

**Equivalent moment factor** **A1-43**

**Rated Loads in All Directions** **A1-59**

**Equivalent factor in each direction** **A1-61**

**Radial Clearance** **A1-72**

**Accuracy Standards** **A1-83**

**Shoulder Height of the Mounting Base and the Corner Radius** **A1-469**

**Permissible Error of the Mounting Surface** **A1-471**

**Flatness of the Mounting Surface** **A1-472**

**Dimensions of Each Model with an Option Attached** **A1-491**

## Structure and Features

With models RSR and RSR-W, balls roll in two rows of raceways precision-ground on an LM rail and an LM block, and endplates incorporated in the LM block allow the balls to circulate.

Since balls circulate in a compact structure, the LM Block is able to provide infinite straight motion and thus infinite stroke.

The LM block is designed to have a shape with high rigidity in a limited space, and in combination with large-diameter balls, demonstrates high rigidity in all directions.

### [Ultra-Compact]

The absence of cage displacement, a problem that cross-roller guides and types of ball slides with infinite stroke tend to cause, make these models highly reliable LM systems.

### [Capable of Receiving a Load in Any Direction]

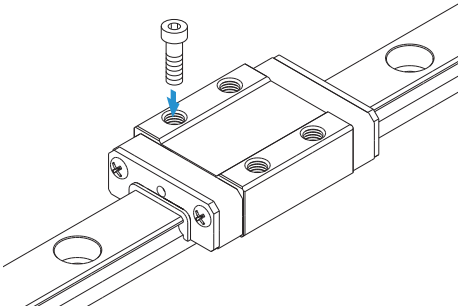
These models are capable of receiving loads in all directions, and a single-rail guide can adequately operate under a small moment load. Model RSR-W, in particular, has a greater number of effective balls and a broader LM rail to increase its rigidity against a moment. Thus, it achieves a more compact structure and more durable straight motion than a pair of linear bushes in parallel use.

### [Stainless Steel Type also Available]

A special type where LM block, LM rail and balls are made of stainless steel is also available.

Model RSR-M

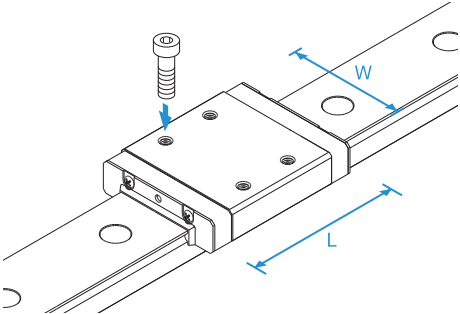
Specification Table⇒A1-268



Models RSR-WM/WVM

These models have greater overall LM block lengths (L), broader widths (W) and greater rated loads and permissible moments than standard types.

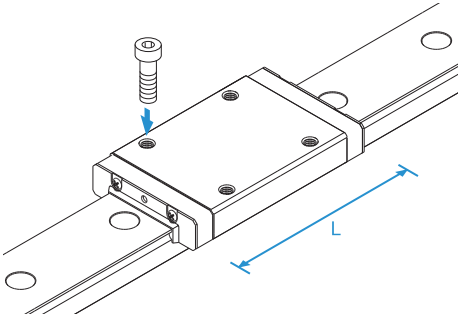
Specification Table⇒A1-268



Model RSR-N

It has a longer overall LM block length (L) and a greater rated load than standard types.

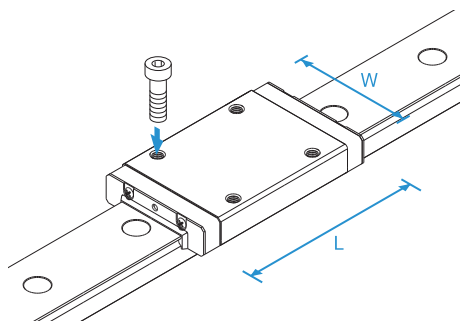
Specification Table⇒A1-268



## Model RSR-WN

It has a longer overall LM block length (L), a greater rated load than standard types. Achieves the greatest load capacity among the miniature type LM Guide models.

Specification Table → **A1-268**



LM Guide

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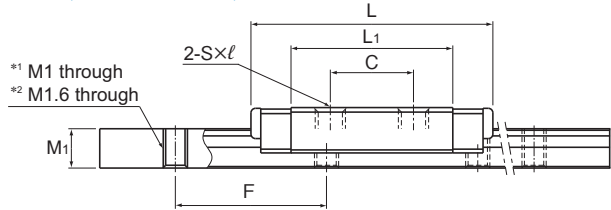
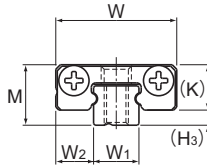
## Accuracy of the Mounting Surface

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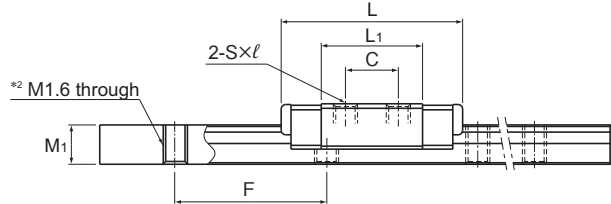
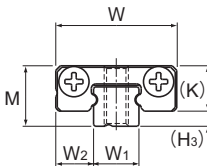
Model RSR uses Gothic arch grooves in the ball raceways. When two rails of RSR are used in parallel, any error in accuracy of the mounting surface may increase rolling resistance and negatively affect the smooth motion of the guide. For specific accuracy of the mounting surface, see [Flatness of the Mounting Surface] on **A1-472**.



# Models RSR-M, RSR-N, RSR-WM, RSR-WN and RSR-WVM



Models RSR2N, RSR3N



Model RSR3M

| Model No.          | Outer dimensions |         |              | LM block dimensions |            |                    |                |   |          |     |   |               |               | H <sub>3</sub> |
|--------------------|------------------|---------|--------------|---------------------|------------|--------------------|----------------|---|----------|-----|---|---------------|---------------|----------------|
|                    | Height           | Width   | Length       |                     |            |                    |                |   |          |     |   | Greasing hole | Grease nipple |                |
|                    | M                | W       | L            | B                   | C          | S×ℓ                | L <sub>1</sub> | T | K        | N   | E | d             |               |                |
| RSR 2N<br>RSR 2WN  | 3.2<br>4         | 6<br>10 | 12.4<br>16.7 | —                   | 4<br>6.5   | M1.4×1.1<br>M2×1.3 | 8.84<br>11.9   | — | 2.5<br>3 | —   | — | —             | —             | 0.7<br>1       |
| RSR 3M<br>RSR 3N   | 4                | 8       | 12<br>16     | —                   | 3.5<br>5.5 | M1.6×1.3<br>M2×1.3 | 6.7<br>10.7    | — | 3        | —   | — | —             | —             | 1              |
| RSR 3WM<br>RSR 3WN | 4.5              | 12      | 14.9<br>19.9 | —                   | 4.5<br>8   | M2×1.7             | 8.5<br>13.3    | — | 3.5      | 0.8 | — | 0.8           | —             | 1              |
| RSR 14WVM          | 15               | 50      | 50           | 35                  | 18         | M4×4.5             | 34.3           | 6 | 11.5     | 3   | 4 | —             | PB107         | 3.5            |

Note) Models RSR2 and 3 do not have an oil hole. When lubricating them, apply a lubricant directly to the LM rail raceways.  
No contamination protection seal for RSR2N/2WN/3M/3N.

## Model number coding

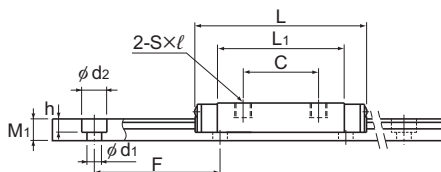
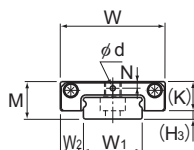
**2 RSR3W M UU C1 +80L P M - II**

2: No. of LM blocks used on the same rail (\*1)  
 RSR3W: Model number  
 M: Contamination protection accessory symbol (\*2)  
 UU: Radial clearance symbol (\*3)  
 C1: Normal (No symbol) Light preload (C1)  
 +80L: LM rail length (in mm)  
 P: Accuracy symbol (\*4) Normal grade (No Symbol)/Precision grade (P)  
 M: Stainless steel LM rail  
 - II: Symbol for No. of rails used on the same plane (\*5)

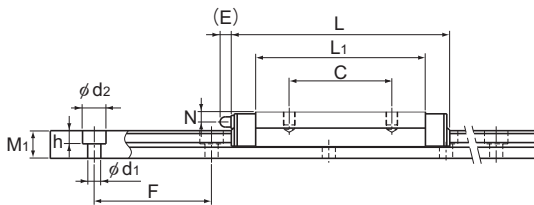
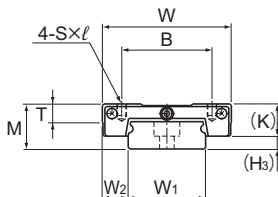
(\*1) No symbol for 1 LM block. (\*2) See contamination protection accessories on **A1-516**.

(\*3) See **A1-72**. (\*4) See **A1-83**. (\*5) See **A1-13**.

Note) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.)



Models RSR2WN, RSR3WM/WN



Model RSR14WVM

Unit: mm

|  | LM rail dimensions |       |        |     |                           |         | Basic load rating |                | Static permissible moment $N \cdot m^*$ |               |                |               |                |                  | Mass     |         |
|--|--------------------|-------|--------|-----|---------------------------|---------|-------------------|----------------|-----------------------------------------|---------------|----------------|---------------|----------------|------------------|----------|---------|
|  | Width              |       | Height |     | Pitch                     | Length* | C                 | $C_0$          | $M_A$                                   |               | $M_B$          |               | $M_C$          |                  | LM block | LM rail |
|  | $W_1$              | $W_2$ | $M_1$  | $F$ | $d_1 \times d_2 \times h$ |         | kN                | kN             | 1 block                                 | Double blocks | 1 block        | Double blocks | 1 block        | Double blocks    | kg       | kg/m    |
|  | 20                 | 23    | 2.6    | 8   | 10                        | 200     | 0.214<br>0.395    | 0.384<br>0.682 | 0.564<br>1.336                          | 2.994<br>7.32 | 0.564<br>1.336 | 2.994<br>7.32 | 0.442<br>1.501 | 0.0008<br>0.0020 | 0.029    | 0.075   |
|  | 30                 | 2.5   | 2.6    | 10  | 10                        | 220     | 0.18<br>0.3       | 0.27<br>0.44   | 0.293<br>0.726                          | 2.11<br>4.33  | 0.293<br>0.726 | 2.11<br>4.33  | 0.45<br>0.73   | 0.0011<br>0.0016 | 0.055    |         |
|  | 60                 | 3     | 2.6    | 15  | 15                        | 335     | 0.25<br>0.39      | 0.47<br>0.75   | 0.668<br>1.57                           | 4.44<br>9.06  | 0.668<br>1.57  | 4.44<br>9.06  | 1.48<br>2.36   | 0.002<br>0.003   | 0.12     |         |
|  | 30                 | 10    | 9      | 40  | 40                        | 1800    | 6.01              | 9.08           | 43.2                                    | 233           | 38.2           | 208           | 110            | 0.096            | 2        |         |

Note1) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-270**.)

Static permissible moment\* 1 block: the static permissible moment with one LM block

Double blocks: static permissible moment when two LM blocks are in close contact with each other

Total block length L : The total block length L shown in the table is the length with the dust-proof parts (code: UU).

The M in the model number symbol indicates that the LM block, LM rail and balls are made of stainless steel.

The stainless steel provides excellent corrosion and environmental resistance.

Please be aware that balls will fall out if the LM block is removed from the LM rail.

Note2) The basic load rating in the dimension table is for a load in the radial direction. Use Table7 on **A1-59** to calculate the load rating for loads in the reverse radial direction or lateral direction.

### ● Recommended tightening torque when mounting the LM rail/block

Table1 shows recommended bolt tightening torques when mounting the LM block and LM rail of models RSR2 and RSR3.

Table1 Recommended Tightening Torques of Mounting Bolts

| Model No.   | Model No. of screw | Recommended tightening torque ( $N \cdot m$ ) |       | Remarks                                                                            |
|-------------|--------------------|-----------------------------------------------|-------|------------------------------------------------------------------------------------|
|             |                    | Block                                         | Rail  |                                                                                    |
| RSR 2N      | M1                 | 0.09                                          | 0.03  | Flathead machine screw designed for use with precision equipment                   |
| RSR 2WN     | M1.6               | 0.28                                          | 0.138 |                                                                                    |
| RSR 3M      | M1.6               | 0.09                                          | 0.09  |                                                                                    |
| RSR 3N      | M2                 | 0.19                                          | 0.19  | Austenite stainless steel hexagonal-socket-head type bolts                         |
|             |                    | 0.19                                          | —     |                                                                                    |
| RSR 3WM/3WN | M2                 | —                                             | 0.25  | Cross-recessed head screws for precision equipment (No. 0 pan head screw, class 1) |

# Standard Length and Maximum Length of the LM Rail

Table2 shows the standard and maximum lengths of the RSR model rail.

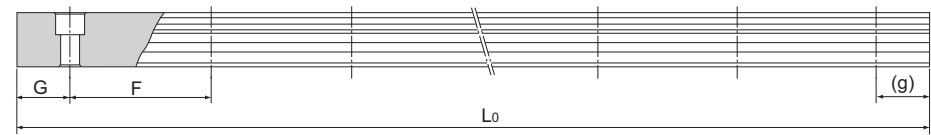


Table2 Standard Length and Maximum Length of the LM Rail for Model RSR/RSR-W Unit: mm

| Model No.                                          | RSR2N | RSR2WN | RSR3 | RSR3W | RSR14W |
|----------------------------------------------------|-------|--------|------|-------|--------|
| LM rail<br>standard<br>length<br>(L <sub>0</sub> ) | 32    | 40     | 30   | 40    | 110    |
|                                                    | 40    | 60     | 40   | 55    | 150    |
|                                                    | 56    | 70     | 60   | 70    | 190    |
|                                                    | 80    | 80     | 80   |       | 230    |
|                                                    | 104   | 100    | 100  |       | 270    |
|                                                    |       | 180    |      |       | 310    |
|                                                    |       |        |      |       | 430    |
|                                                    |       |        |      |       | 550    |
|                                                    |       |        |      |       | 670    |
|                                                    |       |        |      |       | 790    |
| Standard pitch F                                   | 8     | 10     | 10   | 15    | 40     |
| G,g                                                | 4     | 5      | 5    | 5     | 15     |
| Max length                                         | 200   | 200    | 220  | 335   | 1800   |

Note1) The maximum length varies with accuracy grades. Contact THK for details.  
Note2) The LM rail mounting hole of model RSR3 is an M1.6 through hole.

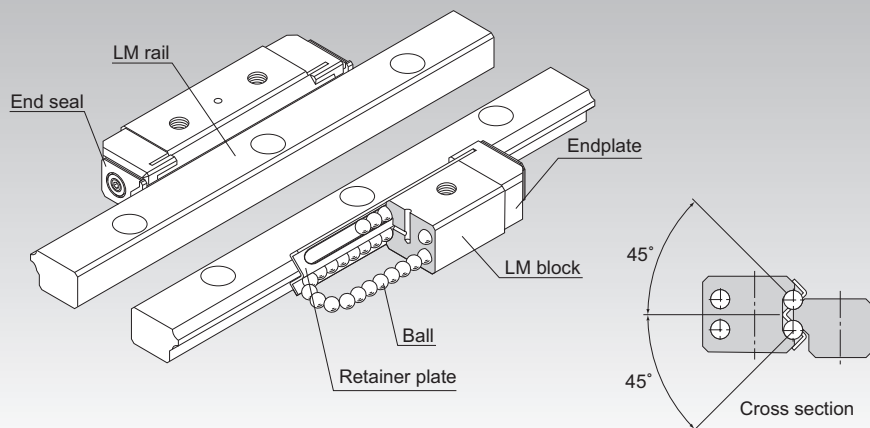
## Prevention of LM block from falling off of LM rail

In model RSR/RSR-W, the balls fall out if the LM block comes off the LM rail.  
For this reason, LM Guide assemblies are delivered with a part which prevents the LM block from coming off the rail. If you remove this part when using the product, please take precautions to avoid overrunning the blocks off of the rail.



# HR

## LM Guide Separate Type (4-way Equal Load) Model HR



**Point of Selection** **A1-10**

**Point of Design** **A1-454**

**Options** **A1-477**

**Model No.** **A1-543**

**Precautions on Use** **A1-549**

**Accessories for Lubrication** **A24-1**

**Mounting Procedure and Maintenance** **B1-89**

Equivalent moment factor **A1-43**

Rated Loads in All Directions **A1-59**

Equivalent factor in each direction **A1-61**

Example of Clearance Adjustment **A1-275**

Accuracy Standards **A1-81**

Shoulder Height of the Mounting Base and the Corner Radius **A1-468**

Permissible Error of the Mounting Surface **A1-471**

Dimensions of Each Model with an Option Attached **A1-491**

## Structure and Features

Balls roll in two rows of raceways precision-ground on an LM rail and an LM block, and endplates incorporated in the LM block allow the balls to circulate. Since retainer plates hold the balls, they do not fall off.

Because of the angular contact structure where two rows of balls rolling on the LM rail each contact the raceway at 45°, the same load can be applied in all directions (radial, reverse radial and lateral directions) if a set of LM rails and LM block is mounted on the same plane (i.e., when two LM rails are combined with an LM block on the same plane). Furthermore, since the sectional height is low, a compact and stable linear guide mechanism is achieved.

This structure makes clearance adjustment relatively easy, and is highly capable of absorbing a mounting error.

### [Easy Installation]

Model HR is easier to adjust a clearance and achieve more accuracy than cross-roller guides.

### [Self-adjustment Capability]

Even if the parallelism or the level between the two rails is poorly established, the self-adjustment capability through front-to-front configuration of THK's unique circular-arc grooves (DF set) enables a mounting error to be absorbed and smooth straight motion to be achieved even under a preload.

### [4-way Equal Load]

When the two rails are mounted in parallel, each row of balls is placed at a contact angle of 45° so that the rated loads applied to the LM block are uniform in the four directions (radial, reverse radial and lateral directions), enabling the LM Guide to be used in various orientations and in applications.

### [Sectional Dimensions Approximate to Cross-roller Guides]

Since model HR utilizes endcaps for recirculation, cage/retainer creep cannot occur as with cross-roller guides. In addition, the sectional shape of model HR is approximate to that of cross-roller guides, therefore, its components are dimensionally interchangeable with that of cross-roller guides.

### [Stainless Steel Type also Available]

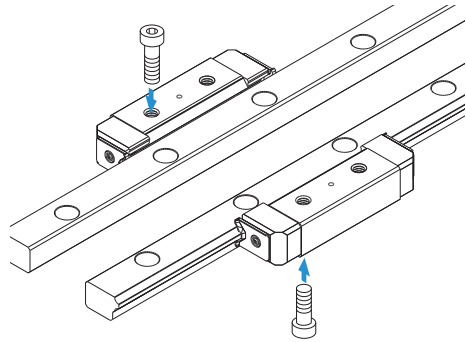
A special type whose LM block, LM rail and balls are made of stainless steel is also available.

## Types and Features

### Model HR - Heavy-load Type

The LM blocks can be mounted from the top and the bottom.

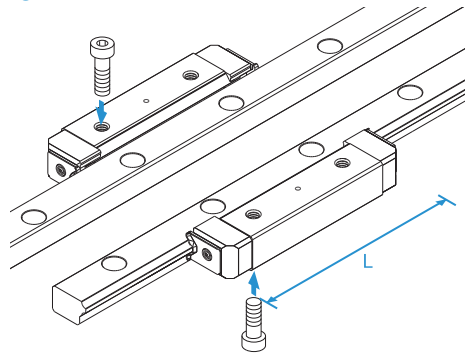
Specification Table⇒A1-278



### Model HR-T-Ultra-heavy Load Type

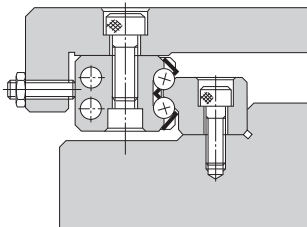
Has the same cross-sectional shape as model HR, but has a greater overall LM block length (L) and a higher load rating.

Specification Table⇒A1-278



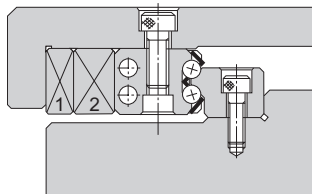
## Example of Clearance Adjustment

Design the clearance adjustment bolt so that it presses the center of the side face of the LM block.



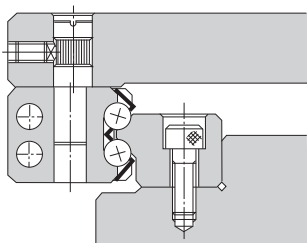
a. Using an adjustment screw

Normally, an adjustment screw is used to press the LM block.



b. Using tapered gibs

When high accuracy and high rigidity are required, use tapered gibs 1) and 2).



c. Using an eccentric pin

A type using an eccentric pin to adjust the clearance is also available.

Comparison of Model Numbers with Cross-roller Guides

Each type of LM Guide model HR has sectional dimensions approximate to that of the corresponding cross roller guide model.

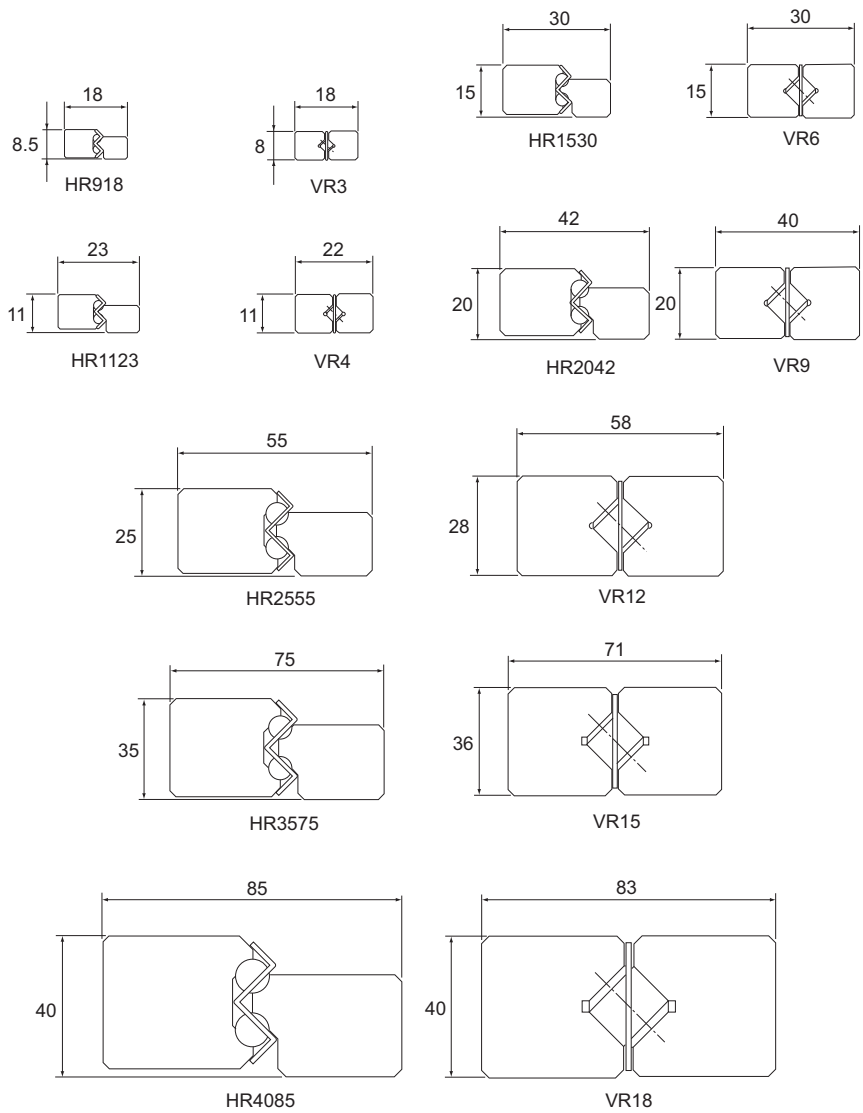
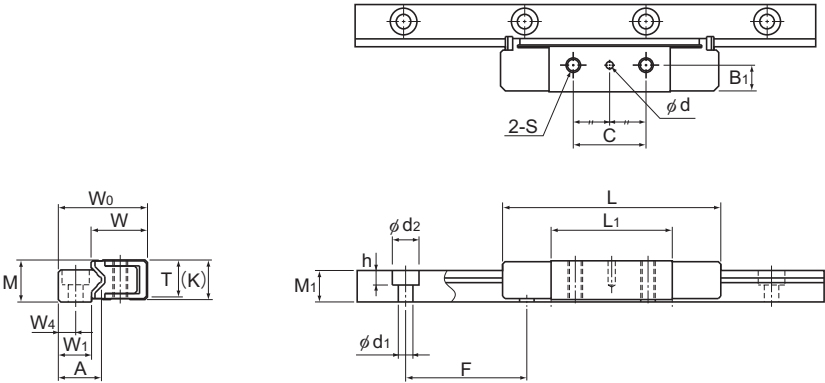


Fig.1



# Models HR, HR-T, HR-M and HR-TM



Models HR918 and 918M

| Model No.             | Outer dimensions |       |                |        | LM block dimensions |    |      |    |                |                |      |    |               |                |
|-----------------------|------------------|-------|----------------|--------|---------------------|----|------|----|----------------|----------------|------|----|---------------|----------------|
|                       | Height           | Width |                | Length |                     |    |      |    |                |                |      |    | Greasing hole |                |
|                       | M                | W     | W <sub>0</sub> | L      | B <sub>1</sub>      | C  | H    | S  | h <sub>2</sub> | L <sub>1</sub> | T    | K  | d             | D <sub>1</sub> |
| HR 918<br>HR 918M     | 8.5              | 11.4  | 18             | 45     | 5.5                 | 15 | —    | M3 | —              | 25             | 7.5  | 8  | 1.5           | —              |
| HR 1123<br>HR 1123M   | 11               | 13.7  | 23             | 52     | 7                   | 15 | 2.55 | M3 | 3              | 30             | 9.5  | 10 | 2             | 5              |
| HR 1530<br>HR 1530M   | 15               | 19.2  | 30             | 69     | 10                  | 20 | 3.3  | M4 | 3.5            | 40             | 13   | 14 | 2             | 6.5            |
| HR 2042<br>HR 2042M   | 20               | 26.3  | 42             | 91.6   | 13                  | 35 | 5.3  | M6 | 5.5            | 56.6           | 17.5 | 19 | 3             | 10             |
| HR 2042T<br>HR 2042TM | 20               | 26.3  | 42             | 110.7  | 13                  | 50 | 5.3  | M6 | 5.5            | 75.7           | 17.5 | 19 | 3             | 10             |
| HR 2555<br>HR 2555M   | 25               | 33.3  | 55             | 121    | 16                  | 45 | 6.8  | M8 | 7              | 80             | 22.5 | 24 | 3             | 11             |
| HR 2555T<br>HR 2555TM | 25               | 33.3  | 55             | 146.4  | 16                  | 72 | 6.8  | M8 | 7              | 105.4          | 22.5 | 24 | 3             | 11             |

## Model number coding

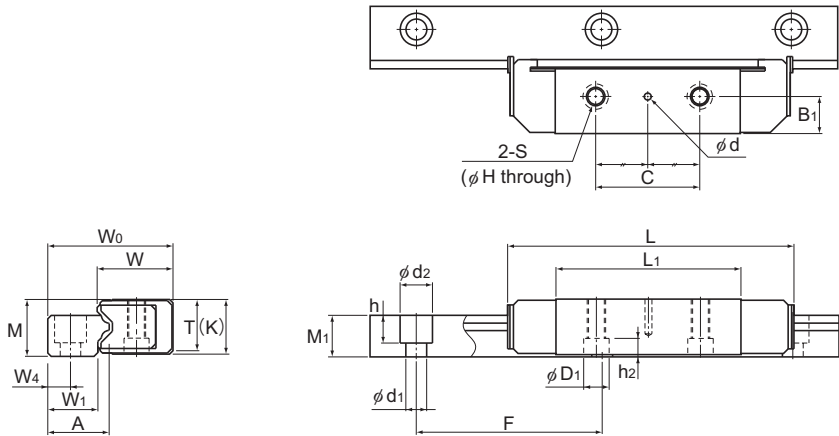
**2** **HR2555** **UU** **M** **+1000L** **P** **T** **M**

Model number  
Contamination protection accessory symbol (\*1)  
LM rail length (in mm)  
Stainless steel LM block  
Symbol for LM rail jointed use  
Stainless steel LM rail

No. of LM blocks used on the same rail  
Accuracy symbol (\*2)  
Normal grade (No Symbol)/High accuracy grade (H)  
Precision grade (P)/Super precision grade (SP)  
Ultra precision grade (UP)

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-81**.

Note) One set of model HR means a combination of two LM rails and an LM blocks used on the same plane.



Models HR1123 to 2555M/T/TM

Unit: mm

|  | LM rail dimensions |                |      |                |       |                                   |                | Basic load rating |                | Static permissible moment kN•m*                                                   |               |                                                                                   |               | Mass     |         |
|--|--------------------|----------------|------|----------------|-------|-----------------------------------|----------------|-------------------|----------------|-----------------------------------------------------------------------------------|---------------|-----------------------------------------------------------------------------------|---------------|----------|---------|
|  | Width              |                |      | Height         | Pitch |                                   | Length*        | C                 | C <sub>0</sub> |  |               |  |               | LM block | LM rail |
|  | W <sub>1</sub>     | W <sub>4</sub> | A    | M <sub>1</sub> | F     | d <sub>1</sub> ×d <sub>2</sub> ×h | Max            | kN                | kN             | 1 block                                                                           | Double blocks | 1 block                                                                           | Double blocks | kg       | kg/m    |
|  | 6.7                | 3.5            | 8.7  | 6.5            | 25    | 3×5.5×3                           | 300<br>(300)   | 2.82              | 3.48           | 0.0261                                                                            | 0.194         | 0.0261                                                                            | 0.194         | 0.01     | 0.3     |
|  | 9.5                | 5              | 11.6 | 8              | 40    | 3.5×6×4.5                         | 500<br>(500)   | 4.09              | 4.93           | 0.0472                                                                            | 0.311         | 0.0472                                                                            | 0.311         | 0.03     | 0.5     |
|  | 10.7               | 6              | 13.5 | 11             | 60    | 3.5×6×4.5                         | 1600<br>(800)  | 7.56              | 8.77           | 0.112                                                                             | 0.733         | 0.112                                                                             | 0.733         | 0.08     | 1       |
|  | 15.6               | 8              | 19.5 | 14.5           | 60    | 6×9.5×8.5                         | 2200<br>(1000) | 17                | 18.2           | 0.325                                                                             | 2.01          | 0.325                                                                             | 2.01          | 0.13     | 1.8     |
|  | 15.6               | 8              | 19.5 | 14.5           | 60    | 6×9.5×8.5                         | 2200<br>(1000) | 20.8              | 24.3           | 0.56                                                                              | 3.16          | 0.56                                                                              | 3.16          | 0.26     | 1.8     |
|  | 22                 | 10             | 27   | 18             | 80    | 9×14×12                           | 3000<br>(1000) | 33.2              | 35.1           | 0.897                                                                             | 5.04          | 0.897                                                                             | 5.04          | 0.43     | 3.2     |
|  | 22                 | 10             | 27   | 18             | 80    | 9×14×12                           | 3000<br>(1000) | 40                | 45.9           | 1.49                                                                              | 7.8           | 1.49                                                                              | 7.8           | 0.5      | 3.2     |

Note) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-282**.)

Static permissible moment\* 1 block: the static permissible moment value with two LM rails, one LM block per rail, used on the same plane

Double blocks: static permissible moment when two LM blocks are in close contact with each other on two LM rails used on the same plane

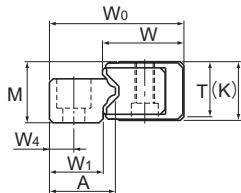
A moment in the M<sub>B</sub> direction can be received if two rails are used in parallel. However, since it depends on the distance between the two rails, it has been omitted.

Total block length L : The total block length L shown in the table is the length with the dust-proof parts (code: UU).

The M in the model number symbol indicates that the LM block, LM rail and balls are made of stainless steel.

The stainless steel provides excellent corrosion and environmental resistance.

# Models HR, HR-T, HR-M and HR-TM



| Model No.             | Outer dimensions |       |                |                | LM block dimensions |            |      |     |                |                |      |    |               |                |
|-----------------------|------------------|-------|----------------|----------------|---------------------|------------|------|-----|----------------|----------------|------|----|---------------|----------------|
|                       | Height           | Width |                | Length         |                     |            |      |     |                |                |      |    | Greasing hole |                |
|                       | M                | W     | W <sub>0</sub> | L              | B <sub>1</sub>      | C          | H    | S   | h <sub>2</sub> | L <sub>1</sub> | T    | K  | d             | D <sub>1</sub> |
| HR 3065<br>HR 3065T   | 30               | 40.3  | 65             | 145<br>173.5   | 19                  | 50<br>80   | 8.6  | M10 | 9              | 90<br>118.5    | 27.5 | 29 | 4             | 14             |
| HR 3575<br>HR 3575T   | 35               | 44.9  | 75             | 154.8<br>182.5 | 21.5                | 60<br>92.5 | 10.5 | M12 | 12             | 103.8<br>131.5 | 32   | 34 | 4             | 18             |
| HR 4085<br>HR 4085T   | 40               | 50.4  | 85             | 177.8<br>215.9 | 24                  | 70<br>110  | 12.5 | M14 | 13             | 120.8<br>158.9 | 36   | 38 | 4             | 20             |
| HR 50105<br>HR 50105T | 50               | 63.4  | 105            | 227<br>274.5   | 30                  | 85<br>130  | 14.5 | M16 | 15.5           | 150<br>197.5   | 45   | 48 | 5             | 23             |
| HR 60125              | 60               | 74.4  | 125            | 329            | 35                  | 160        | 18   | M20 | 18             | 236            | 55   | 58 | 5             | 26             |

## Model number coding

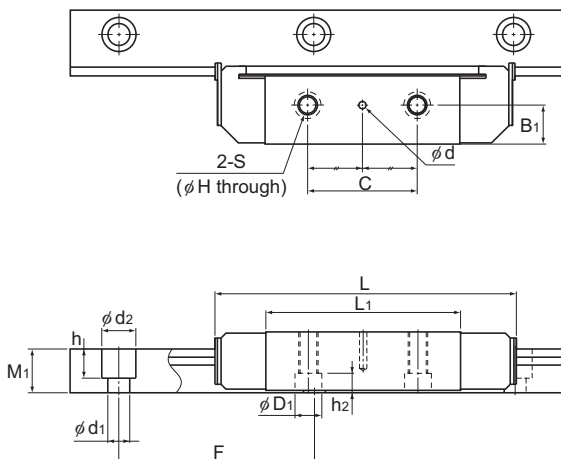
**2** **HR4085T** **UU** **+1500L** **P** **T**

Model number  
Contamination protection accessory symbol (\*1)  
LM rail length (in mm)  
Symbol for LM rail jointed use  
Accuracy symbol (\*2)  
Normal grade (No Symbol)/High accuracy grade (H)  
Precision grade (P)/Super precision grade (SP)  
Ultra precision grade (UP)

No. of LM blocks used on the same rail

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-81**.

Note) One set of model HR means a combination of two LM rails and an LM blocks used on the same plane.



Unit: mm

| LM rail dimensions |                |      |                |       |                                     |         | Basic load rating |                | Static permissible moment kN·m*                                                   |               |                                                                                   |               | Mass        |         |
|--------------------|----------------|------|----------------|-------|-------------------------------------|---------|-------------------|----------------|-----------------------------------------------------------------------------------|---------------|-----------------------------------------------------------------------------------|---------------|-------------|---------|
| Width              |                |      | Height         | Pitch |                                     | Length* | C                 | C <sub>0</sub> |  |               |  |               | LM block    | LM rail |
| W <sub>1</sub>     | W <sub>4</sub> | A    | M <sub>1</sub> | F     | d <sub>1</sub> × d <sub>2</sub> × h | Max     | kN                | kN             | 1 block                                                                           | Double blocks | 1 block                                                                           | Double blocks | kg          | kg/m    |
| 25                 | 12             | 31.5 | 22.5           | 80    | 9 × 14 × 12                         | 3000    | 42.6<br>51.5      | 44.4<br>58.1   | 1.27<br>2.12                                                                      | 7.71<br>11.7  | 1.27<br>2.12                                                                      | 7.71<br>11.7  | 0.7<br>0.9  | 4.6     |
| 30.5               | 14.5           | 37   | 26             | 105   | 11 × 17.5 × 14                      | 3000    | 53.5<br>64.4      | 54.8<br>71.7   | 1.75<br>2.91                                                                      | 10.1<br>15.2  | 1.75<br>2.91                                                                      | 10.1<br>15.2  | 1.05<br>1.4 | 6.4     |
| 35                 | 16             | 42.5 | 29             | 120   | 14 × 20 × 17                        | 3000    | 78.8<br>95.1      | 78.9<br>103    | 3.02<br>5.02                                                                      | 16.6<br>25.7  | 3.02<br>5.02                                                                      | 16.6<br>25.7  | 1.53<br>1.7 | 8       |
| 42                 | 20             | 51.5 | 37             | 150   | 18 × 26 × 22                        | 3000    | 127<br>153        | 123<br>161     | 5.89<br>9.81                                                                      | 33.1<br>51.3  | 5.89<br>9.81                                                                      | 33.1<br>51.3  | 3.06<br>3.5 | 12.1    |
| 51                 | 25             | 65   | 45             | 180   | 22 × 32 × 25                        | 3000    | 226               | 232            | 16                                                                                | 89.5          | 16                                                                                | 89.5          | 7.5         | 19.3    |

Note) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-282**.)

Static permissible moment\* 1 block: the static permissible moment value with two LM rails, one LM block per rail, used on the same plane

Double blocks: static permissible moment when two LM blocks are in close contact with each other on two LM rails used on the same plane

A moment in the M<sub>c</sub> direction can be received if two rails are used in parallel. However, since it depends on the distance between the two rails, it has been omitted.

Total block length L : The total block length L shown in the table is the length with the dust-proof parts (code: UU).

The M in the model number symbol indicates that the LM block, LM rail and balls are made of stainless steel.

The stainless steel provides excellent corrosion and environmental resistance.

# Standard Length and Maximum Length of the LM Rail

Table1 shows the standard lengths and the maximum lengths of model HR variations. If the maximum length of the desired LM rail exceeds them, jointed rails will be used. Contact THK for details. For special rail lengths, it is recommended to use a value corresponding to the G,g dimension from the table. As the G,g dimension increases, this portion becomes less stable, and the accuracy performance is severely impacted.

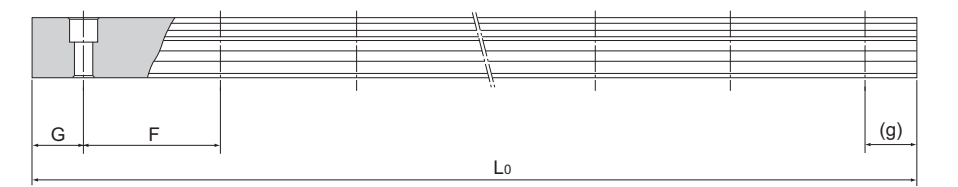


Table1 Standard Length and Maximum Length of the LM Rail for Model HR Unit: mm

| Model No.                          | HR 918 | HR 1123 | HR 1530 | HR 2042 | HR 2555 | HR 3065 | HR 3575 | HR 4085 | HR 50105 | HR 60125 |
|------------------------------------|--------|---------|---------|---------|---------|---------|---------|---------|----------|----------|
| LM rail<br>standard length<br>(L0) | 70     | 110     | 160     | 220     | 280     | 280     | 570     | 780     | 1270     | 1530     |
|                                    | 120    | 230     | 280     | 280     | 440     | 440     | 885     | 1020    | 1570     | 1890     |
|                                    | 220    | 310     | 340     | 340     | 600     | 600     | 1200    | 1260    | 2020     | 2250     |
|                                    | 295    | 390     | 460     | 460     | 760     | 760     | 1620    | 1500    | 2620     | 2610     |
|                                    |        |         | 580     | 640     | 1000    | 1000    | 2040    | 1980    |          |          |
|                                    |        |         |         |         | 1240    | 1240    | 2460    | 2580    |          |          |
| Standard pitch F                   | 25     | 40      | 60      | 60      | 80      | 80      | 105     | 120     | 150      | 180      |
| G,g                                | 10     | 15      | 20      | 20      | 20      | 20      | 22.5    | 30      | 35       | 45       |
| Max length                         | 300    | 500     | 1600    | 2200    | 3000    | 3000    | 3000    | 3000    | 3000     | 3000     |
|                                    | (300)  | (500)   | (800)   | (1000)  | (1000)  |         |         |         |          |          |

Note1) The maximum length varies with accuracy grades. Contact THK for details.  
Note2) If jointed rails are not allowed and a greater length than the maximum values above is required, contact THK.  
Note3) The figures in the parentheses indicate the maximum lengths of stainless steel made models.

## Accessories

### [Dedicated Mounting Bolt]

Normally, when mounting the LM block to adjust a clearance, use the tapped hole provided on the LM block to secure it as shown in Fig.2.

The holes of the bolt ( $d_1$  and  $D_1$ ) must be machined so that they are greater by the adjustment allowance.

If it is inevitable to use the mounting method as indicated by Fig.3 for a structural reason, the dedicated mounting bolt as shown in Fig.4 is required for securing the LM block. Be sure to specify that the dedicated mounting bolt is required when ordering the LM Guide.

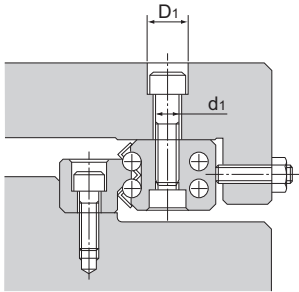


Fig.2

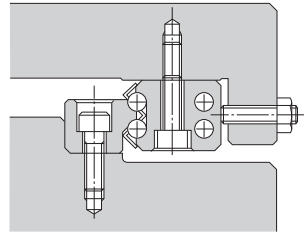


Fig.3

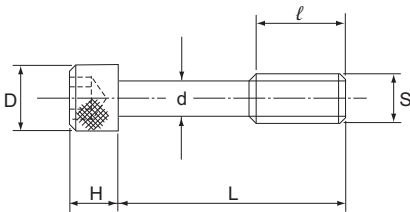


Fig.4

Table2 Dedicated Mounting Bolt

Unit: mm

| Model No. | S   | d    | D   | H  | L  | l  | Supported model number |
|-----------|-----|------|-----|----|----|----|------------------------|
| B 3       | M3  | 2.4  | 5.5 | 3  | 17 | 5  | HR 1530                |
| B 5       | M5  | 4.1  | 8.5 | 5  | 22 | 7  | HR 2042                |
| B 6       | M6  | 4.9  | 10  | 6  | 28 | 9  | HR 2555                |
| B 8       | M8  | 6.6  | 13  | 8  | 34 | 12 | HR 3065                |
| B 10      | M10 | 8.3  | 16  | 10 | 39 | 15 | HR 3575                |
| B 12      | M12 | 10.1 | 18  | 12 | 45 | 18 | HR 4085                |
| B 14      | M14 | 11.8 | 21  | 14 | 55 | 21 | HR 50105               |
| B 16      | M16 | 13.8 | 24  | 16 | 66 | 24 | HR 60125               |

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# Greasing Hole

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**[Lubrication for Model HR]**

The LM block has a greasing hole in the center of its top face. To provide lubrication through this hole, the table must be machined to also have a greasing hole as shown in Fig.5 and attach a grease nipple or the like. When using oil lubrication, it is necessary to identify the lubrication route. Contact THK for details.

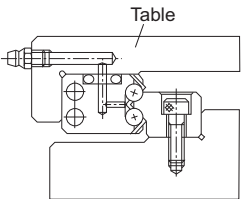
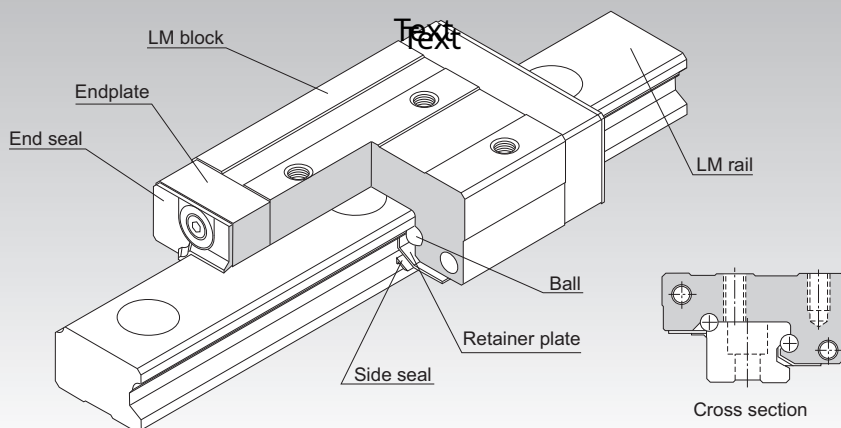


Fig.5 Example of Machining a Greasing Hole





**Point of Selection** **A1-10**

**Point of Design** **A1-454**

**Options** **A1-477**

**Model No.** **A1-543**

**Precautions on Use** **A1-549**

**Accessories for Lubrication** **A24-1**

**Mounting Procedure and Maintenance** **B1-89**

Equivalent moment factor **A1-43**

Rated Loads in All Directions **A1-59**

Equivalent factor in each direction **A1-61**

Example of Clearance Adjustment **A1-289**

Accuracy Standards **A1-82**

Shoulder Height of the Mounting Base and the Corner Radius **A1-468**

Permissible Error of the Mounting Surface **A1-471**

Dimensions of Each Model with an Option Attached **A1-491**

## Structure and Features

Balls roll in two rows of raceways precision-ground on an LM rail and an LM block, and endplates incorporated in the LM block allow the balls to circulate. Since retainer plates hold the balls, they do not fall off.

As the top face of the LM block is inclined, a clearance is eliminated and an appropriate preload is applied simply by securing the LM block with mounting bolts.

Model GSR has a special contact structure using circular-arc grooves. This increases self-adjusting capability and makes GSR an optimal model for places associated with difficulty establishing high accuracy and for general industrial machinery.

\* Model GSR cannot be used in single-axis applications.

### [Interchangeability]

Both the LM block and LM rail are interchangeable and can be stored separately. Therefore, it is possible to store a long-size LM rail and cut it to a desired length before using it.

### [Compact]

Since model GSR has a low center of gravity structure with a low overall height, the machine can be downsized.

### [Capable of Receiving a Load in any Direction]

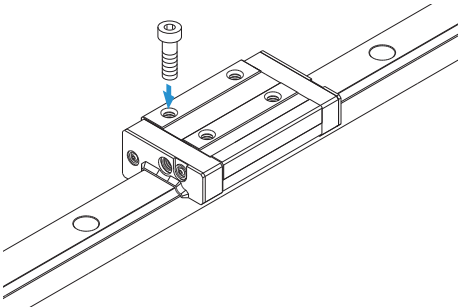
The ball contact angle is designed so that this model can receive a load in any direction. As a result, it can be used in places where a reverse radial load, lateral load or a moment in any direction is applied.

# Types and Features

## Model GSR-T

This model is a standard type.

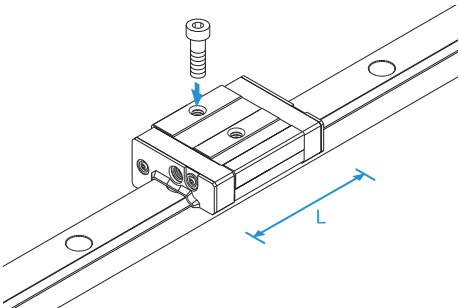
Specification Table⇒A1-290



## Model GSR-V

A space-saving type that has the same cross-sectional shape as GSR-T, but has a shorter overall LM block length (L).

Specification Table⇒A1-290



## Example of Clearance Adjustment

By providing a shoulder maybe on the side face of each LM block and pressing either LM block with a bolt, a preload is applied and the rigidity is increased.

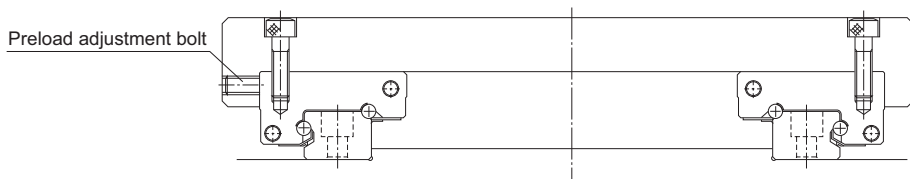
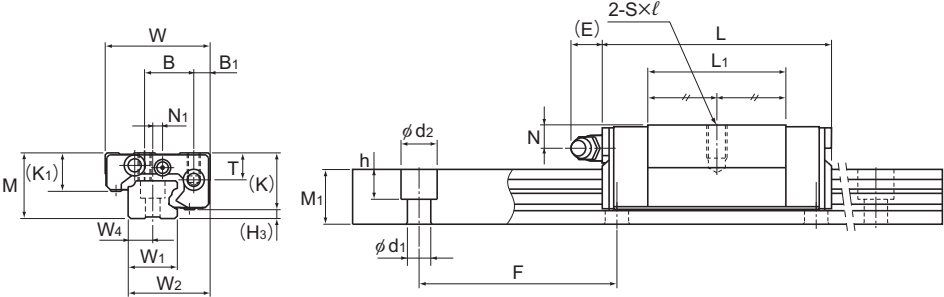


Fig.1 Example of Adjusting a Preload with a Push Bolt

# Models GSR-T and GSR-V



Model GSR15T/V

Models GSR15 to 25V

| Model No.          | Outer dimensions |       |              | LM block dimensions |    |         |       |                |      |      |                |     |                |     |               | H <sub>3</sub> |
|--------------------|------------------|-------|--------------|---------------------|----|---------|-------|----------------|------|------|----------------|-----|----------------|-----|---------------|----------------|
|                    | Height           | Width | Length       |                     |    |         |       |                |      |      |                |     |                |     | Grease nipple |                |
|                    | M                | W     | L            | B <sub>1</sub>      | B  | C       | S×ℓ   | L <sub>1</sub> | T    | K    | K <sub>1</sub> | N   | N <sub>1</sub> | E   |               |                |
| GSR 15V<br>GSR 15T | 20               | 32    | 47.1<br>59.8 | 5                   | 15 | —<br>26 | M4×7  | 27.5<br>40.2   | 8.25 | 16.8 | 12             | 4.5 | 3              | 5.5 | PB107         | 3.2            |
| GSR 20V<br>GSR 20T | 24               | 43    | 58.1<br>74   | 7                   | 20 | —<br>30 | M5×8  | 34.3<br>50.2   | 9.7  | 20.6 | 13.6           | 5   | —              | 12  | B-M6F         | 3.4            |
| GSR 25V<br>GSR 25T | 30               | 50    | 69<br>88     | 7                   | 23 | —<br>40 | M6×10 | 41.2<br>60.2   | 12.7 | 25.4 | 16.8           | 7   | —              | 12  | B-M6F         | 4.6            |
| GSR 30T            | 33               | 57    | 103          | 8                   | 26 | 45      | M8×12 | 70.3           | 14.6 | 28.5 | 18             | 7   | —              | 12  | B-M6F         | 4.5            |
| GSR 35T            | 38               | 68    | 117          | 9                   | 32 | 50      | M8×15 | 80.3           | 15.6 | 32.5 | 20.5           | 8   | —              | 12  | B-M6F         | 5.5            |

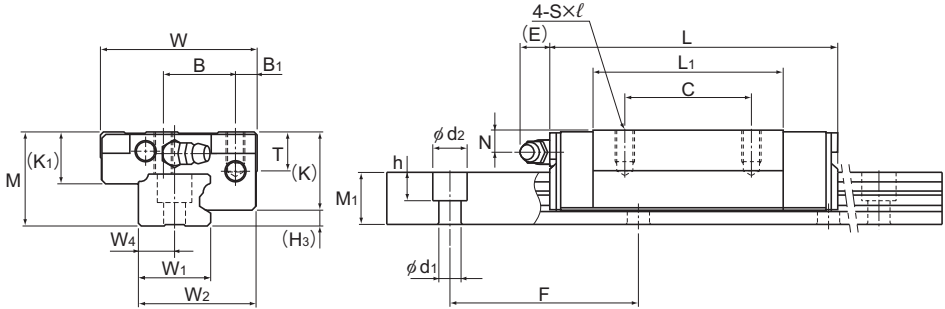
## Model number coding

Combination of LM rail and LM block

|              |                  |                                        |                                                |                        |                                                                                                 |                                |                                     |
|--------------|------------------|----------------------------------------|------------------------------------------------|------------------------|-------------------------------------------------------------------------------------------------|--------------------------------|-------------------------------------|
| <b>GSR25</b> | <b>T</b>         | <b>2</b>                               | <b>UU</b>                                      | <b>+1060L</b>          | <b>H</b>                                                                                        | <b>T</b>                       | <b>K</b>                            |
| Model number | Type of LM block | No. of LM blocks used on the same rail | Contamination protection accessory symbol (*1) | LM rail length (in mm) | Accuracy symbol (*2)<br>Normal grade (No Symbol)/High accuracy grade (H)<br>Precision grade (P) | Symbol for LM rail jointed use | Symbol for tapped-hole LM rail type |

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-82**.

Note) One set of model GSR: This model number indicates that a single-rail unit constitutes one set.



Models GSR20 to 35T, Models GSR20V and 25V

Models GSR15 to 35T

Unit: mm

| LM rail dimensions |       |       |        |       |                             |         | Basic load rating |                | Static permissible moment $\text{kN}\cdot\text{m}^*$ |                |                  |                | Mass         |         |
|--------------------|-------|-------|--------|-------|-----------------------------|---------|-------------------|----------------|------------------------------------------------------|----------------|------------------|----------------|--------------|---------|
| Width              |       |       | Height | Pitch |                             | Length* | C                 | C <sub>0</sub> | $M_A$                                                |                | $M_B$            |                | LM block     | LM rail |
| $W_1$              | $W_2$ | $W_4$ | $M_1$  | F     | $d_1 \times d_2 \times h$   | Max     | kN                | kN             | 1 block                                              | Double blocks  | 1 block          | Double blocks  | kg           | kg/m    |
| 15                 | 25    | 7.5   | 11.5   | 60    | $4.5 \times 7.5 \times 5.3$ | 2000    | 6.51<br>8.42      | 6.77<br>9.77   | 0.0305<br>0.0606                                     | 0.19<br>0.337  | 0.0264<br>0.0523 | 0.165<br>0.29  | 0.08<br>0.13 | 1.2     |
| 20                 | 33    | 10    | 13     | 60    | $6 \times 9.5 \times 8.5$   | 3000    | 10.5<br>13.6      | 10.6<br>15.3   | 0.06<br>0.118                                        | 0.368<br>0.652 | 0.052<br>0.102   | 0.318<br>0.562 | 0.17<br>0.25 | 1.8     |
| 23                 | 38    | 11.5  | 16.5   | 60    | $7 \times 11 \times 9$      | 3000    | 15.5<br>20        | 15.2<br>22     | 0.102<br>0.205                                       | 0.625<br>1.11  | 0.0891<br>0.176  | 0.541<br>0.961 | 0.29<br>0.5  | 2.6     |
| 28                 | 44.5  | 14    | 19     | 80    | $9 \times 14 \times 12$     | 3000    | 27.8              | 29.9           | 0.325                                                | 1.77           | 0.28             | 1.52           | 0.6          | 3.6     |
| 34                 | 54    | 17    | 22     | 80    | $11 \times 17.5 \times 14$  | 3000    | 37                | 39.1           | 0.485                                                | 2.63           | 0.419            | 2.27           | 1            | 5       |

Note1) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-292**.)

Static permissible moment\* 1 block: the static permissible moment with one LM block

Double blocks: static permissible moment when two LM blocks are in close contact with each other

A moment in the  $M_B$  direction can be received if two rails are used in parallel. However, since it depends on the distance between the two rails, it has been omitted.Total block length L : The total block length L shown in the table is the length with the dust proof parts, code UU or SS. If other contamination protection accessories or lubricant equipment are installed, the total block length will increase. (See **A1-491** or **A1-512**)

For oil lubrication, be certain to contact THK with the mounting orientation.

(Mounting orientation: see **A1-12**, Lubricant: see **A24-2**)Note2) The basic load rating in the dimension table is for a load in the radial direction. Use Table7 on **A1-59** to calculate the load rating for loads in the reverse radial direction or lateral direction.**Model number coding**

LM block

**GSR25 T UU**Model  
numberContamination protection  
accessory symbol (\*1)

Type of LM block

LM rail

**GSR25 -1060L H K**Model  
numberLM rail length  
(in mm)Symbol for  
tapped-hole  
LM rail typeAccuracy symbol (\*2)  
Normal grade (No Symbol)  
High accuracy grade (H)  
Precision grade (P)(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-82**.Options⇒ **A1-477****THK A1-291**

# Standard Length and Maximum Length of the LM Rail

Table1 shows the standard lengths and the maximum lengths of model GSR variations. In case the required quantity is large and the lengths are not the same, we recommend preparing an LM rail of the maximum length in stock. This is economical since it allows you to cut the rail to the desired length as necessary.

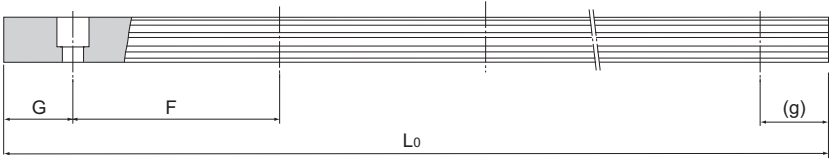


Table1 Standard Length and Maximum Length of the LM Rail for Model GSR Unit: mm

| Model No.                               | GSR 15 | GSR 20 | GSR 25 | GSR 30 | GSR 35 |
|-----------------------------------------|--------|--------|--------|--------|--------|
| LM rail<br>standard length<br>( $L_0$ ) | 460    | 460    | 460    | 1240   | 1240   |
|                                         | 820    | 820    | 820    | 1720   | 1720   |
|                                         | 1060   | 1060   | 1060   | 2200   | 2200   |
|                                         | 1600   | 1600   | 1600   | 3000   | 3000   |
| Standard pitch F                        | 60     | 60     | 60     | 80     | 80     |
| G,g                                     | 20     | 20     | 20     | 20     | 20     |
| Max length                              | 2000   | 3000   | 3000   | 3000   | 3000   |

Note) The maximum length varies with accuracy grades. Contact THK for details.

## Tapped-hole LM Rail Type of Model GSR

- Since the bottom of the LM rail has a tapped hole, this model can easily be installed on an H-shape steel and channel.
- Since the top face of the LM rail has no mounting hole, the sealability is increased and entrance of foreign material (e.g., cutting chips) can be prevented.

- (1) Determine the bolt length so that a clearance of 2 to 3 mm is secured between the bolt end and the bottom of the tap (effective tap depth).
- (2) As shown in Fig.2, a tapered washer is also available that allows GSR to be mounted on a section steel.
- (3) For model number coding, see **A1-290** to **A1-291**.

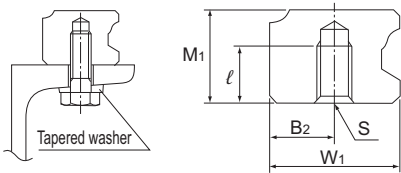


Fig.2

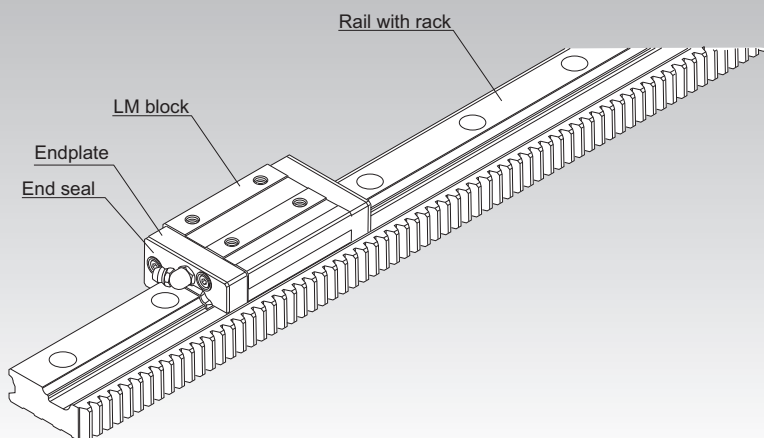
Table2 Tap Position and Depth Shape

| Model No. | $W_1$ | $B_2$ | $M_1$ | $S \times \ell$ |
|-----------|-------|-------|-------|-----------------|
| GSR 15    | 15    | 7.5   | 11.5  | M4×7            |
| GSR 20    | 20    | 10    | 13    | M5×8            |
| GSR 25    | 23    | 11.5  | 16.5  | M6×10           |
| GSR 30    | 28    | 14    | 19    | M8×12           |
| GSR 35    | 34    | 17    | 22    | M10×14          |



# GSR-R

## LM Guide Separate Type (Radial) Model GSR-R



**Point of Selection** **A1-10**

**Point of Design** **A1-454**

**Options** **A1-477**

**Model No.** **A1-543**

**Precautions on Use** **A1-549**

**Accessories for Lubrication** **A24-1**

**Mounting Procedure and Maintenance** **B1-89**

Equivalent moment factor **A1-43**

Rated Loads in All Directions **A1-59**

Equivalent factor in each direction **A1-61**

Accuracy Standards **A1-82**

Shoulder Height of the Mounting Base and the Corner Radius **A1-468**

Permissible Error of the Mounting Surface **A1-471**

Dimensions of Each Model with an Option Attached **A1-491**

## Structure and Features

Balls roll in two rows of raceways precision-ground on an LM rail and an LM block, and endplates incorporated in the LM block allow the balls to circulate. Since retainer plates hold the balls, they do not fall off.

As the top face of the LM block is inclined, a clearance is eliminated and an appropriate preload is applied simply by securing the LM block with mounting bolts.

Model GSR-R is based on model GSR, but has rack teeth on the LM rail. This facilitates the design and assembly of drive mechanisms.

\* Model GSR-R cannot be used in single-axis applications.

### [Reduced Machining and Assembly Costs]

The single-piece structure integrating the LM rail (linear guide) and rack (drive) reduces labor and time for machining the rack mounting surface and assembling and adjusting the guide system, thus to achieve significant cost reduction.

### [Easy Designing]

The travel distance per turn of the pinion is specified by the integer value. This makes it easy to calculate the travel distance per pulse when the LM Guide is used in combination with a stepping motor or servomotor.

### [Space Saving]

Since the rail has a rack, the machine size can be reduced.

### [Long Stroke]

The end faces of the LM rail are machined for jointed use. To obtain a long stroke, simply joint LM rails of the standard length.

### [High Durability]

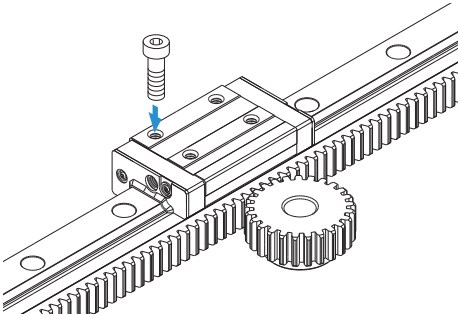
The rack tooth has a width equal to the LM rail height, the rack uses high-grade steel with proven performance and the tooth surface are heat-treated, thereby to ensure high durability.

## Types and Features

### Model GSR-R (Rail with Rack)

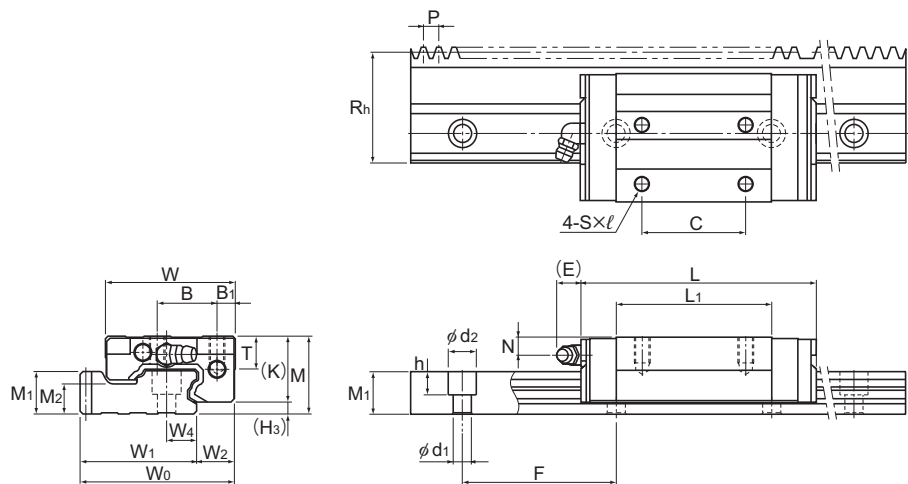
Since the thrust load on the pinion shaft can be kept low due to rack-pinion meshing, it is easy to design systems with pinion shaft bearings and tables that are not so rigid.

Specification Table⇒ **A1-305**





# Model GSR-R



Model GSR-T-R

| Model No.              | Rack                      |        |                   | Outer dimensions |       |                |          | LM block dimensions |    |         |       |                |      |      |   |    |               |     | H <sub>3</sub> |
|------------------------|---------------------------|--------|-------------------|------------------|-------|----------------|----------|---------------------|----|---------|-------|----------------|------|------|---|----|---------------|-----|----------------|
|                        | Reference pitch dimension | Module | Pitch line height | Height           | Width |                | Length   |                     |    |         |       |                |      |      |   |    | Grease nipple |     |                |
|                        | P                         |        | Rh                | M                | W     | W <sub>0</sub> | L        | B <sub>1</sub>      | B  | C       | S × ℓ | L <sub>1</sub> | T    | K    | N | E  |               |     |                |
| GSR 25V-R<br>GSR 25T-R | 6                         | 1.91   | 43                | 30               | 50    | 59.91          | 69<br>88 | 7                   | 23 | —<br>40 | M6×10 | 41.2<br>60.2   | 12.7 | 25.4 | 7 | 12 | B-M6F         | 4.6 |                |
| GSR 30T-R              | 8                         | 2.55   | 48                | 33               | 57    | 67.05          | 103      | 8                   | 26 | 45      | M8×12 | 70.3           | 14.6 | 28.5 | 7 | 12 | B-M6F         | 4.5 |                |
| GSR 35T-R              | 10                        | 3.18   | 57                | 38               | 68    | 80.18          | 117      | 9                   | 32 | 50      | M8×15 | 80.3           | 15.6 | 32.5 | 8 | 12 | B-M6F         | 5.5 |                |

Note) A special type with a module pitch is also available. Contact THK for details.  
For checking the pinion strength, see **A1-302**.

## Model number coding

Single-rail LM Guide

**GSR25T 2 UU +5000L H R T**

Model number

No. of LM blocks

Contamination protection accessory symbol (\*1)

LM rail length (in mm)

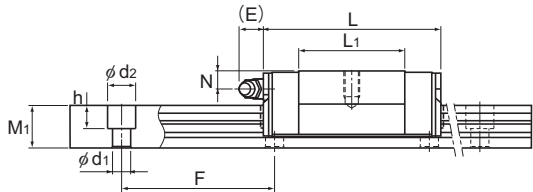
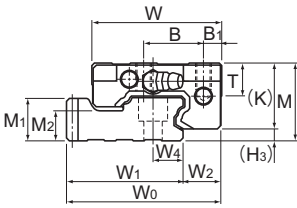
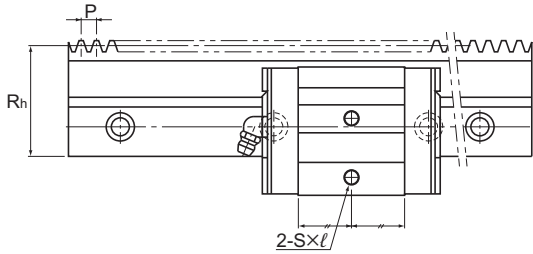
Symbol for LM rail jointed use

Symbol for rail with rack type  
R: Symbol for rail with rack type

Accuracy symbol (\*2)  
Normal grade (No Symbol)/High accuracy grade (H)

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-82**.

Note) This model number indicates that a single-rail unit constitutes one set.



Model GSR25V-R

Unit: mm

| LM rail dimensions |                |                |                |       |                |                                     |  | Basic load rating |                | Static permissible moment kN·m*                                                   |               |                                                                                   |                | Mass        |         |
|--------------------|----------------|----------------|----------------|-------|----------------|-------------------------------------|--|-------------------|----------------|-----------------------------------------------------------------------------------|---------------|-----------------------------------------------------------------------------------|----------------|-------------|---------|
| Width              |                | Height         |                | Pitch |                |                                     |  | C                 | C <sub>0</sub> |  |               |  |                | LM block    | LM rail |
| W <sub>1</sub>     | W <sub>2</sub> | W <sub>4</sub> | M <sub>1</sub> | F     | M <sub>2</sub> | d <sub>1</sub> × d <sub>2</sub> × h |  | kN                | kN             | 1 block                                                                           | Double blocks | 1 block                                                                           | Double blocks  | kg          | kg/m    |
| 44.91              | 15             | 11.5           | 16.5           | 60    | 11.5           | 7 × 11 × 9                          |  | 15.5<br>20        | 15.2<br>22     | 0.102<br>0.205                                                                    | 0.625<br>1.11 | 0.0891<br>0.176                                                                   | 0.541<br>0.961 | 0.29<br>0.5 | 4.7     |
| 50.55              | 16.5           | 14             | 19             | 80    | 12             | 9 × 14 × 12                         |  | 27.8              | 29.9           | 0.325                                                                             | 1.77          | 0.28                                                                              | 1.52           | 0.6         | 5.9     |
| 60.18              | 20             | 17             | 22             | 80    | 14.5           | 11 × 17.5 × 14                      |  | 37                | 39.1           | 0.485                                                                             | 2.63          | 0.419                                                                             | 2.27           | 1           | 8.1     |

Note1) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-300**.)  
 Static permissible moment\* 1 block: the static permissible moment with one LM block  
 Double blocks: static permissible moment when two LM blocks are in close contact with each other  
 A moment in the M<sub>2</sub> direction can be received if two rails are used in parallel. However, since it depends on the distance between the two rails, it has been omitted.  
 Total block length L : The total block length L shown in the table is the length with the dust proof parts, code UU or SS. If other contamination protection accessories or lubricant equipment are installed, the total block length will increase. (See **A1-491** or **A1-512**)  
 For oil lubrication, be certain to contact THK with the mounting orientation.  
 (Mounting orientation: see **A1-12**, Lubricant: see **A24-2**)  
 Note2) The basic load rating in the dimension table is for a load in the radial direction. Use Table7 on **A1-59** to calculate the load rating for loads in the reverse radial direction or lateral direction.

Model number coding

LM block

**GSR25T UU**

Model number

Contamination protection accessory symbol (\*1)

Rail with rack

**GSR25-2004L H R**

Accuracy symbol (\*2)  
 Normal grade (No Symbol)  
 High accuracy grade (H)

R: Symbol for rail with rack type

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-82**.

# Standard Length of the LM Rail

Table1 shows the standard LM rail lengths of model GSR-R variations.

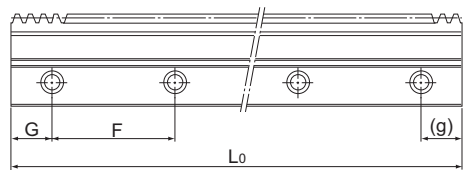


Table1 Standard Length of the LM Rail for Model GSR-R Unit: mm

| Model No.                                       | GSR 25-R |      | GSR 30-R |      | GSR 35-R |      |
|-------------------------------------------------|----------|------|----------|------|----------|------|
| LM rail<br>Standard length<br>(L <sub>0</sub> ) | 1500     | 2004 | 1504     | 2000 | 1500     | 2000 |
| Standard pitch<br>F                             | 60       | 60   | 80       | 80   | 80       | 80   |
| G,g                                             | 30       | 42   | 32       | 40   | 30       | 40   |

## Rack and Pinion

### [Joining Two or More Rails]

The end faces of the rail with rack are machined so that a clearance is left after assembly in order to facilitate the assembly.

Use of a special jig as shown in Fig.1 will make the connection easier.

(THK also offers the rack-aligning jig.)

### [Reworking the Pinion Hole]

Only the teeth of the reworkable pinion-hole-diameter type (type C) are heat-treated. The hole and keyway can therefore be reworked by the user to the desired diameter and shape.

When reworking the pinion hole, be sure to take the following into account.

The material of the reworkable hole diameter type (type C): S45C

- (1) When chucking the teeth of a reworkable hole diameter type, use a jaw scroll chuck or something like it to maintain the tooth profile.
- (2) The pinion is produced using the center of the hole as a reference point. The center of the hole should therefore be used as a reference point when the pinion is aligned. When checking the pinion runout, refer to the boss sides.
- (3) Keep the reworked hole diameter within roughly 60 to 70% of the boss diameter.

### [Lubricating the Rack and Pinion]

To ensure smooth sliding on tooth surfaces and prevent wear, the teeth should be provided with a lubricant.

Note1) Use a lubricant of the same type of thickener as that contained in the LM Guide.

Note2) Unpredictable wear may occur in the rack and pinion according to load conditions and lubrication status. Contact THK when undertaking design.

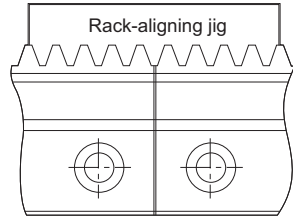


Fig.1 Rack Connection Method

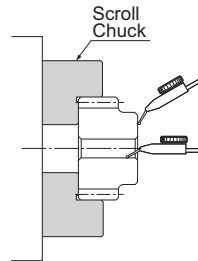


Fig.2

**[Checking Strength]**

The strength of the assembled rack and pinion must be checked in advance.

- (1) Calculate the maximum thrust acting on the pinion.
- (2) Divide the permissible power transmission capacity of the pinion to be used (Table1) by an overload factor (Table2).
- (3) By comparing the thrust acting on the pinion obtained in step 1 with the pinion power transmission capacity obtained in step 2, make sure the applied thrust does not exceed the permissible power transmission capacity.

**[Example of calculation]**

Model GSR-R is used in a horizontal conveyance system receiving a medium impact (assuming external load to be zero).

**● Conditions**

Subject model No. (pinion)      GP6-20A  
Mass (table + work)            m=100kg  
Speed                                v=1 m/s  
Acceleration/deceleration time   T<sub>1</sub> =0.1 s

**● Consideration**

- (1) Calculating the maximum thrust  
Calculated the thrust during acceleration/deceleration.

$$F_{max} = m \cdot \frac{v}{T_1} = 1.00kN$$

- (2) Permissible power transmission capacity of the pinion

$$P_{max} = \frac{\text{Permissible power transmission capacity (see Table 1)}}{\text{Overload factor (see Table 2)}} = \frac{2.33}{1.25} = 1.86kN$$

- (3) Comparison between the maximum thrust and the permissible power transmission capacity of the pinion  
F<sub>max</sub><P<sub>max</sub>

Therefore, it is judged that the subject model number can be used.

Table1 Permissible Power transmission Capacity  
Unit: kN

| Model No. | Permissible Power transmission Capacity | Supported model |
|-----------|-----------------------------------------|-----------------|
| GP 6-20A  | 2.33                                    | GSR 25-R        |
| GP 6-20C  | 2.05                                    |                 |
| GP 6-25A  | 2.73                                    |                 |
| GP 6-25C  | 2.23                                    |                 |
| GP 8-20A  | 3.58                                    | GSR 30-R        |
| GP 8-20C  | 3.15                                    |                 |
| GP 8-25A  | 4.19                                    |                 |
| GP 8-25C  | 3.42                                    |                 |
| GP10-20A  | 5.19                                    | GSR 35-R        |
| GP10-20C  | 4.57                                    |                 |
| GP10-25A  | 6.06                                    |                 |
| GP10-25C  | 4.96                                    |                 |

Table2 Overload Factor

| Impact from the prime mover                                      | Impact from the driven machine |               |              |
|------------------------------------------------------------------|--------------------------------|---------------|--------------|
|                                                                  | Uniform load                   | Medium impact | Large impact |
| Uniform load<br>(electric motor, turbine, hydraulic motor, etc.) | 1.0                            | 1.25          | 1.75         |

(Excerpt from JGMA401-01)

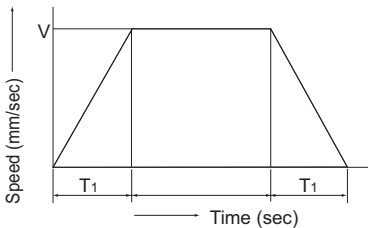
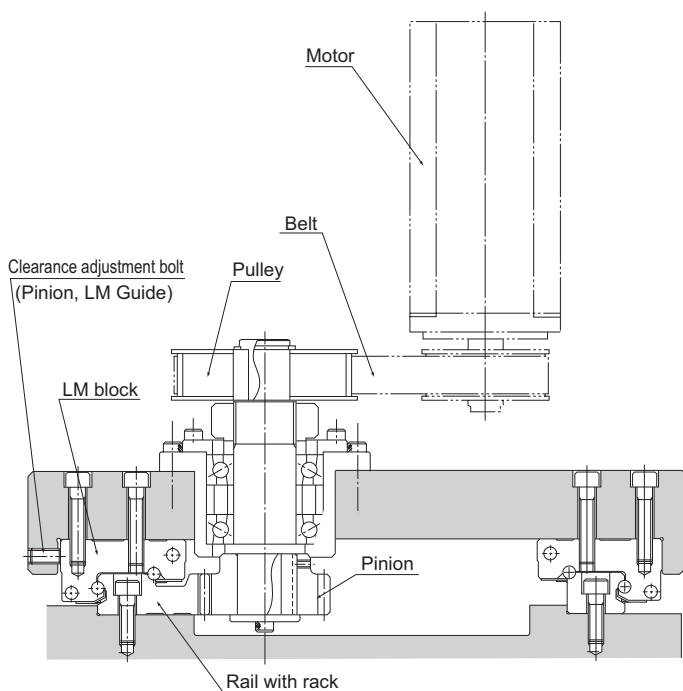
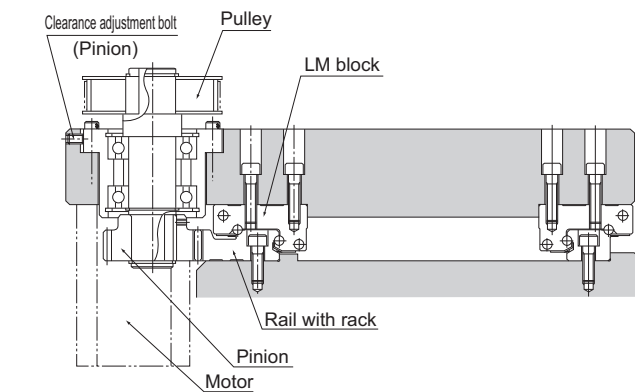


Fig.3

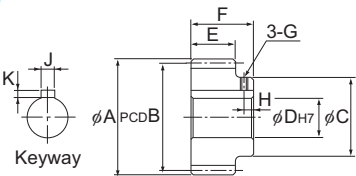
## [Example of Assembling Model GSR-R with the Table]



# Rack and Pinion Dimensional Drawing

[Pinion for rack - type A]

The keyway worked type



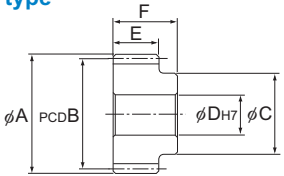
Unit: mm

| Model No. | Pitch | Number of teeth | Tip circle diameter A | Meshing PCD B | Boss diameter C | Hole diameter D | Tooth width E | Overall length F | G  | H | Keyway J×K | Supported model numbers |
|-----------|-------|-----------------|-----------------------|---------------|-----------------|-----------------|---------------|------------------|----|---|------------|-------------------------|
| GP6-20A   | 6     | 20              | 42.9                  | 39            | 30              | 18              | 16.5          | 24.5             | M3 | 4 | 6×2.8      | GSR 25-R                |
| GP6-25A   |       | 25              | 51.9                  | 48            | 35              | 18              |               |                  |    |   |            |                         |
| GP8-20A   | 8     | 20              | 57.1                  | 52            | 40              | 20              | 19            | 26               | M3 | 5 | 8×3.3      | GSR 30-R                |
| GP8-25A   |       | 25              | 69.1                  | 64            | 40              | 20              |               |                  |    |   |            |                         |
| GP10-20A  | 10    | 20              | 70.4                  | 64            | 45              | 25              | 22            | 30               | M4 | 5 | 8×3.3      | GSR 35-R                |
| GP10-25A  |       | 25              | 86.4                  | 80            | 60              | 25              |               |                  |    |   | 10×3.3     |                         |

Note1) When placing an order, specify the model number from the table.

Note2) Non-standard pinions with different numbers of teeth are also available upon request. Contact THK for details.

[Pinion for rack - type C]  
The reworkable hole diameter type

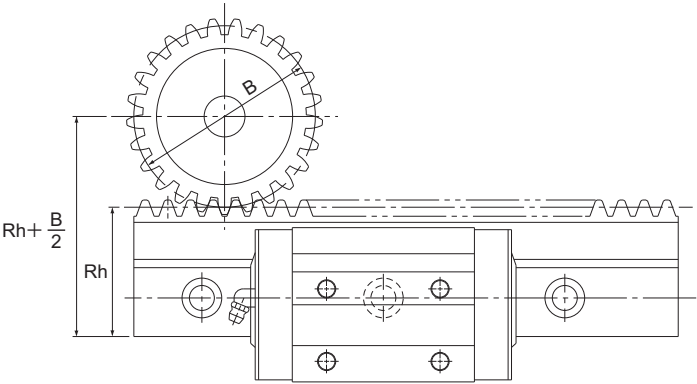


Unit: mm

| Model No. | Pitch | Number of teeth | Tip circle diameter A | Meshing PCD B | Boss diameter C | Hole diameter D | Tooth width E | Overall length F | Supported model numbers |
|-----------|-------|-----------------|-----------------------|---------------|-----------------|-----------------|---------------|------------------|-------------------------|
| GP 6-20C  | 6     | 20              | 42.9                  | 39            | 30              | 12              | 16.5          | 24.5             | GSR 25-R                |
| GP 6-25C  |       | 25              | 51.9                  | 48            | 35              | 15              |               |                  |                         |
| GP 8-20C  | 8     | 20              | 57.1                  | 52            | 40              | 18              | 19            | 26               | GSR 30-R                |
| GP 8-25C  |       | 25              | 69.1                  | 64            | 40              | 18              |               |                  |                         |
| GP10-20C  | 10    | 20              | 70.4                  | 64            | 45              | 18              | 22            | 30               | GSR 35-R                |
| GP10-25C  |       | 25              | 86.4                  | 80            | 60              | 18              |               |                  |                         |

Note1) When placing an order, specify the model number from the table.  
Note2) Non-standard pinions with different numbers of teeth are also available upon request. Contact THK for details.

[The dimension when the LM rail is used in combination with a pinion]

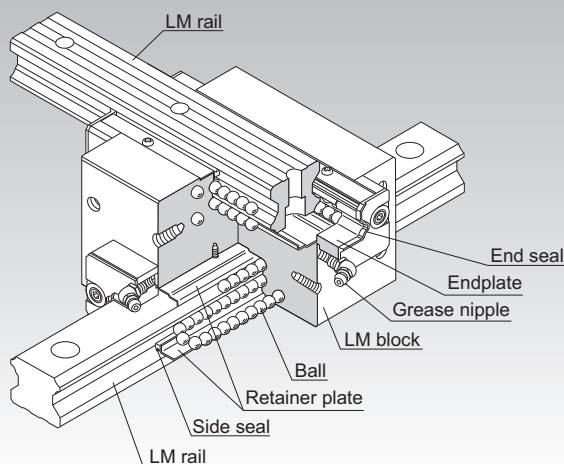


Unit: mm

| Model GSR Model No. | Pinion Model No. | LM rail Pitch line height Rh | Pinion Meshing PCD B | Rh+B/2 |
|---------------------|------------------|------------------------------|----------------------|--------|
| GSR 25-R            | GP 6-20A         | 43                           | 39                   | 62.5   |
|                     | GP 6-20C         |                              |                      |        |
|                     | GP 6-25A         |                              | 48                   | 67     |
|                     | GP 6-25C         |                              |                      |        |
| GSR 30-R            | GP 8-20A         | 48                           | 52                   | 74     |
|                     | GP 8-20C         |                              |                      |        |
|                     | GP 8-25A         |                              | 64                   | 80     |
|                     | GP 8-25C         |                              |                      |        |
| GSR 35-R            | GP 10-20A        | 57                           | 64                   | 89     |
|                     | GP 10-20C        |                              |                      |        |
|                     | GP 10-25A        |                              | 80                   | 97     |
|                     | GP 10-25C        |                              |                      |        |

# CSR

## LM Guide Cross LM Guide Model CSR



**Point of Selection** **A1-10**

**Point of Design** **A1-454**

**Options** **A1-477**

**Model No.** **A1-543**

**Precautions on Use** **A1-549**

**Accessories for Lubrication** **A24-1**

**Mounting Procedure and Maintenance** **B1-89**

Equivalent moment factor **A1-43**

Rated Loads in All Directions **A1-59**

Equivalent factor in each direction **A1-61**

Radial Clearance **A1-72**

Accuracy Standards **A1-80**

Shoulder Height of the Mounting Base and the Corner Radius **A1-463**

Permissible Error of the Mounting Surface **A1-470**

Dimensions of Each Model with an Option Attached **A1-491**

## Structure and Features

Balls roll in four rows of raceways precision-ground on a LM rail and a LM block, and endplates incorporated in the LM block allow the balls to circulate. Since retainer plates hold the balls, they do not fall off even if the LM rail is pulled out.

This model is an integral type of LM Guide that squares an internal structure similar to model HSR, which has a proven track record and is highly reliable, with another and uses two LM rails in combination. It is machined with high precision so that the perpendicularity of the hexahedron of the LM block is within 2  $\mu\text{m}$  per 100 mm in error. The two rails are also machined with high precision in relative straightness. As a result, extremely high accuracy in orthogonality is achieved. Since an orthogonal LM system can be achieved with model CSR alone, a conventionally required saddle is no longer necessary, the structure for X-Y motion can be simplified and the whole system can be downsized.

### [4-way Equal Load]

Each row of balls is placed at a contact angle of 45° so that the rated loads applied to the LM block are uniform in the four directions (radial, reverse radial and lateral directions), enabling the LM Guide to be used in all orientations.

### [High Rigidity]

Since balls are arranged in four rows in a well-balanced manner, this model is stiff against a moment, and smooth straight motion is ensured even a preload is applied to increase the rigidity.

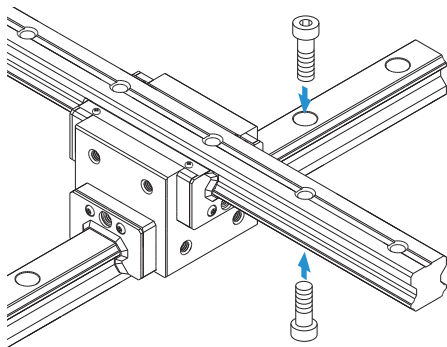
The rigidity of the LM blocks is 50% higher than that of a combination of two HSR LM blocks secured together back-to-back with bolts. Thus, CSR is an optimal LM Guide for building an X-Y table that requires high rigidity.

# Types and Features

## Model CSR-S

This model is a standard type.

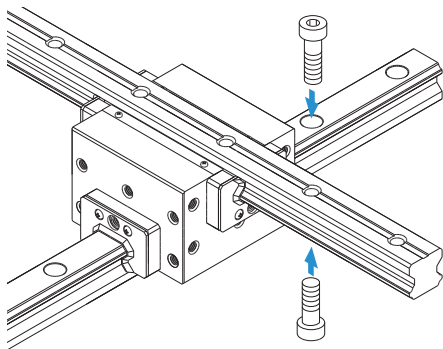
Specification Table⇒A1-310



## Model CSR

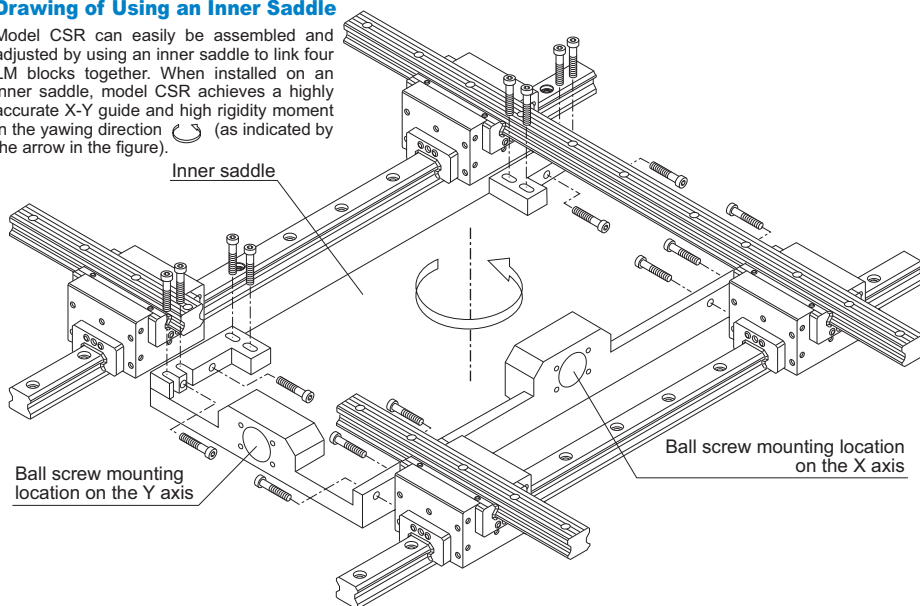
It has a longer overall LM block length (L) and a greater rated load.

Specification Table⇒A1-310

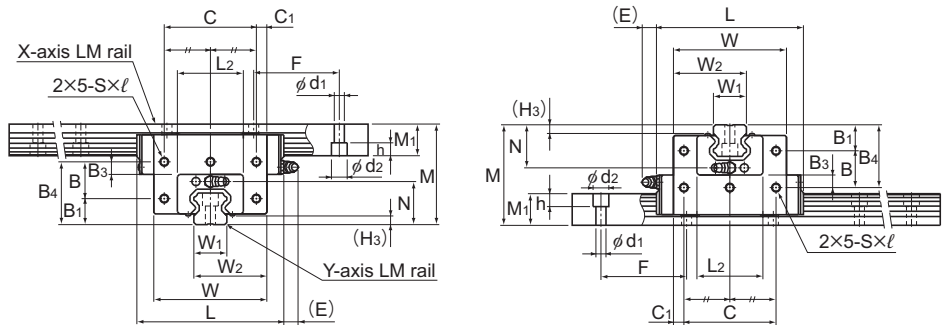


### Drawing of Using an Inner Saddle

Model CSR can easily be assembled and adjusted by using an inner saddle to link four LM blocks together. When installed on an inner saddle, model CSR achieves a highly accurate X-Y guide and high rigidity moment in the yawing direction  (as indicated by the arrow in the figure).



# Model CSR



Models CSR20 to 45

| Model No.         | Outer dimensions |              |               | LM block dimensions |                |                |         |          |                |        |                |                |      |     |               | H <sub>3</sub> |
|-------------------|------------------|--------------|---------------|---------------------|----------------|----------------|---------|----------|----------------|--------|----------------|----------------|------|-----|---------------|----------------|
|                   | Height           | Width        | Length        |                     |                |                |         |          |                |        |                |                |      |     | Grease nipple |                |
|                   | M                | W            | L             | B <sub>1</sub>      | B <sub>3</sub> | B <sub>4</sub> | B       | C        | C <sub>1</sub> | S×ℓ    | L <sub>2</sub> | H <sub>3</sub> | N    | E   |               |                |
| CSR 15            | 47               | 38.8         | 56.6          | —                   | 11.3           | 34.8           | —       | 20       | 9.4            | M4×6   | 32             | 4.7            | 19.7 | 5.5 | PB1021B       | 3.5            |
| CSR 20S<br>CSR 20 | 57               | 50.8<br>66.8 | 74<br>90      | —<br>13             | 13.3<br>7.8    | 42.5<br>37     | —<br>24 | 30<br>56 | 10.4<br>5.4    | M5×8   | 42             | 4              | 25   | 12  | B-M6F         | 4              |
| CSR 25S<br>CSR 25 | 70               | 59.5<br>78.6 | 83.1<br>102.2 | —<br>18             | 17<br>9        | 52<br>44       | —<br>26 | 34<br>64 | 12.75<br>7.3   | M6×10  | 46             | 5.5            | 30   | 12  | B-M6F         | 5.5            |
| CSR 30S<br>CSR 30 | 82               | 70.4<br>93   | 98<br>120.6   | —<br>21             | 20<br>12       | 61<br>53       | —<br>32 | 40<br>76 | 15.2<br>8.5    | M6×10  | 58             | 7              | 35   | 12  | B-M6F         | 7              |
| CSR 35            | 95               | 105.8        | 134.8         | 24                  | 14             | 61             | 37      | 90       | 7.9            | M8×14  | 68             | 7.5            | 40   | 12  | B-M6F         | 7.5            |
| CSR 45            | 118              | 129.8        | 170.8         | 30                  | 16             | 75             | 45      | 110      | 9.9            | M10×15 | 84             | 10             | 50   | 16  | B-PT1/8       | 10             |

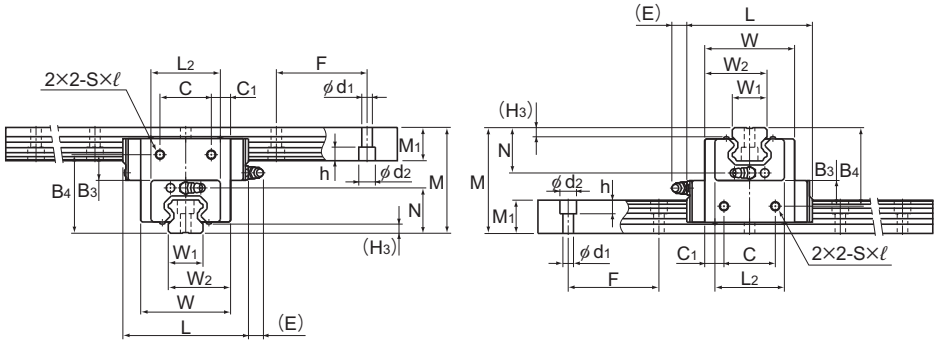
## Model number coding

**4 CSR25 UU C0 +1200/1000L P**

Model number: 4  
Contamination protection accessory symbol (\*1): CSR25  
LM rail length on the X axis (in mm): UU  
LM rail length on the Y axis (in mm): C0  
Radial clearance symbol (\*2): +1200/1000L  
Accuracy symbol (\*3): P

Total No. of LM blocks: 4  
Radial clearance symbol (\*2): Normal (No symbol)/Light preload (C1)  
Medium preload (C0)  
Accuracy symbol (\*3): Precision grade (P)/Super precision grade (SP)  
Ultra precision grade (UP)

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-72**. (\*3) See **A1-80**.



Models CSR15, 20S to 30S

Unit: mm

| LM rail dimensions           |               |                 |              |                             |                |  | Basic load rating |              | Static permissible moment* |                | Mass           |                 |
|------------------------------|---------------|-----------------|--------------|-----------------------------|----------------|--|-------------------|--------------|----------------------------|----------------|----------------|-----------------|
| Width<br>$W_1$<br>$\pm 0.05$ | $W_2$         | Height<br>$M_1$ | Pitch<br>$F$ | $d_1 \times d_2 \times h$   | Length*<br>Max |  | $C$<br>kN         | $C_0$<br>kN  | $M_0$<br>kN·m              | $M_B$<br>kN·m  | LM block<br>kg | LM rail<br>kg/m |
| 15                           | 26.9          | 15              | 60           | $4.5 \times 7.5 \times 5.3$ | 3000           |  | 10.9              | 15.7         | 0.0945                     | 0.0945         | 0.34           | 1.5             |
| 20                           | 35.4<br>43.4  | 18              | 60           | $6 \times 9.5 \times 8.5$   | 3000           |  | 19.8<br>23.9      | 27.4<br>35.8 | 0.218<br>0.307             | 0.218<br>0.363 | 0.73<br>1.3    | 2.3             |
| 23                           | 41.25<br>50.8 | 22              | 60           | $7 \times 11 \times 9$      | 3000           |  | 27.6<br>35.2      | 36.4<br>51.6 | 0.324<br>0.518             | 0.324<br>0.627 | 1.2<br>2.2     | 3.3             |
| 28                           | 49.2<br>60.5  | 26              | 80           | $9 \times 14 \times 12$     | 3000           |  | 40.5<br>48.9      | 53.7<br>70.2 | 0.599<br>0.852             | 0.599<br>0.995 | 2<br>3.6       | 4.8             |
| 34                           | 69.9          | 29              | 80           | $9 \times 14 \times 12$     | 3000           |  | 65                | 91.7         | 1.37                       | 1.49           | 5.3            | 6.6             |
| 45                           | 87.4          | 38              | 105          | $14 \times 20 \times 17$    | 3090           |  | 100               | 135          | 2.59                       | 2.59           | 9.8            | 11              |

Note) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See [A1-312](#).)

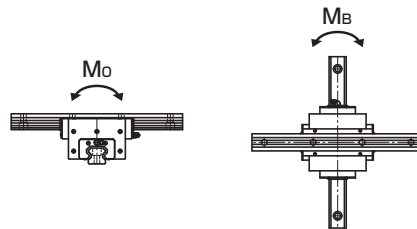
Static permissible moment\* 1 block: the static permissible moment with one LM block

Total block length L

: The total block length L shown in the table is the length with the dust proof parts, code UU or SS.

If other contamination protection accessories or lubricant equipment are installed, the total block length will increase.

(See [A1-491](#) or [A1-512](#))



# Standard Length and Maximum Length of the LM Rail

Table1 shows the standard lengths and the maximum lengths of model CSR variations. For special rail lengths, it is recommended to use a value corresponding to the G,g dimension from the table. As the G,g dimension increases, this portion becomes less stable, and the accuracy performance is severely impacted.

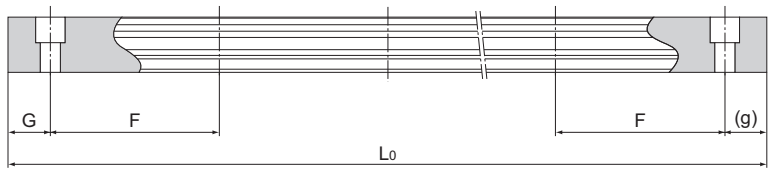


Table1 Standard Length and Maximum Length of the LM Rail for Model CSR

Unit: mm

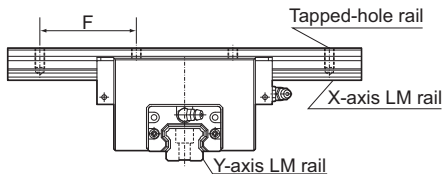
| Model No.                         | CSR 15 | CSR 20 | CSR 25 | CSR 30 | CSR 35 | CSR 45 |
|-----------------------------------|--------|--------|--------|--------|--------|--------|
| LM rail standard length ( $L_0$ ) | 160    | 220    | 220    | 280    | 280    | 570    |
|                                   | 220    | 280    | 280    | 360    | 360    | 675    |
|                                   | 280    | 340    | 340    | 440    | 440    | 780    |
|                                   | 340    | 400    | 400    | 520    | 520    | 885    |
|                                   | 400    | 460    | 460    | 600    | 600    | 990    |
|                                   | 460    | 520    | 520    | 680    | 680    | 1095   |
|                                   | 520    | 580    | 580    | 760    | 760    | 1200   |
|                                   | 580    | 640    | 640    | 840    | 840    | 1305   |
|                                   | 640    | 700    | 700    | 920    | 920    | 1410   |
|                                   | 700    | 760    | 760    | 1000   | 1000   | 1515   |
|                                   | 760    | 820    | 820    | 1080   | 1080   | 1620   |
|                                   | 820    | 940    | 940    | 1160   | 1160   | 1725   |
|                                   | 940    | 1000   | 1000   | 1240   | 1240   | 1830   |
|                                   | 1000   | 1060   | 1060   | 1320   | 1320   | 1935   |
|                                   | 1060   | 1120   | 1120   | 1400   | 1400   | 2040   |
|                                   | 1120   | 1180   | 1180   | 1480   | 1480   | 2145   |
|                                   | 1180   | 1240   | 1240   | 1560   | 1560   | 2250   |
|                                   | 1240   | 1360   | 1300   | 1640   | 1640   | 2355   |
|                                   | 1360   | 1480   | 1360   | 1720   | 1720   | 2460   |
|                                   | 1480   | 1600   | 1420   | 1800   | 1800   | 2565   |
|                                   | 1600   | 1720   | 1480   | 1880   | 1880   | 2670   |
|                                   |        | 1840   | 1540   | 1960   | 1960   | 2775   |
|                                   |        | 1960   | 1600   | 2040   | 2040   | 2880   |
|                                   |        | 2080   | 1720   | 2200   | 2200   | 2985   |
|                                   |        | 2200   | 1840   | 2360   | 2360   | 3090   |
|                                   |        |        | 1960   | 2520   | 2520   |        |
|                                   |        |        | 2080   | 2680   | 2680   |        |
|                                   |        |        | 2200   | 2840   | 2840   |        |
|                                   |        |        | 2320   | 3000   | 3000   |        |
|                                   |        |        | 2440   |        |        |        |
| Standard pitch F                  | 60     | 60     | 60     | 80     | 80     | 105    |
| G,g                               | 20     | 20     | 20     | 20     | 20     | 22.5   |
| Max length                        | 3000   | 3000   | 3000   | 3000   | 3000   | 3090   |

Note) The maximum length varies with accuracy grades. Contact THK for details.

## Tapped-hole LM Rail Type of Model CSR

The model CSR variations include a type with its LM rail bottom tapped. With the X-axis LM rail having tapped holes, this model can be secured with bolts from the top.

Table2 Dimensions of the LM Rail Tap Unit: mm



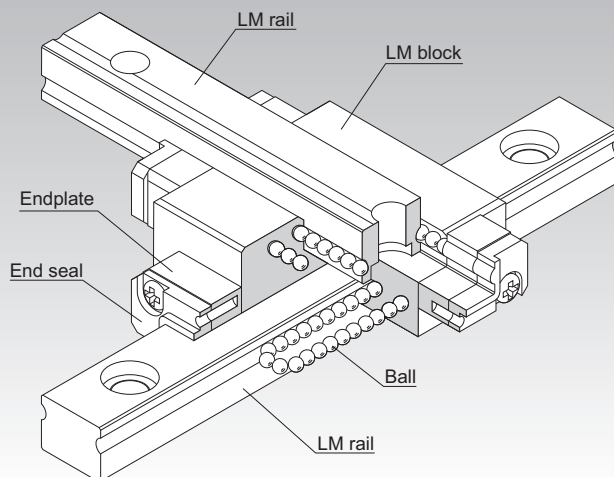
| Model No. | S <sub>1</sub> | Effective tap depth $\ell_1$ |
|-----------|----------------|------------------------------|
| 15        | M5             | 8                            |
| 20        | M6             | 10                           |
| 25        | M6             | 12                           |
| 30        | M8             | 15                           |
| 35        | M8             | 17                           |
| 45        | M12            | 24                           |

### Model number coding

**4 CSR25 UU C0 +1200/1000L P K**

Symbol for  
tapped-hole LM rail type

## LM Guide Miniature Cross Guide Model MX



**Point of Selection** **A1-10**

**Point of Design** **A1-454**

**Options** **A1-477**

**Model No.** **A1-543**

**Precautions on Use** **A1-549**

**Accessories for Lubrication** **A24-1**

**Mounting Procedure and Maintenance** **B1-89**

Equivalent moment factor **A1-43**

Rated Loads in All Directions **A1-59**

Equivalent factor in each direction **A1-61**

Radial Clearance **A1-72**

Accuracy Standards **A1-84**

Shoulder Height of the Mounting Base and the Corner Radius **A1-464**

Dimensions of Each Model with an Option Attached **A1-491**

## Structure and Features

Balls roll in two rows of raceways precision-ground on an LM rail and an LM block, and endplates incorporated in the LM block allow the balls to circulate. This model is an integral type of LM Guide that squares a unit of miniature LM Guide model RSR with another and uses two LM rails in combination. Since an orthogonal LM system with an extremely low height can be achieved with model MX alone, a conventionally required saddle is no longer necessary and the whole system can be downsized.

### [4-way Equal Load]

Each row of balls is placed at a contact angle of  $45^\circ$  so that the rated loads applied to the LM block are uniform in the four directions (radial, reverse radial and lateral directions), enabling the LM Guide to be used in all orientations.

### [Tapped-hole LM Rail Type]

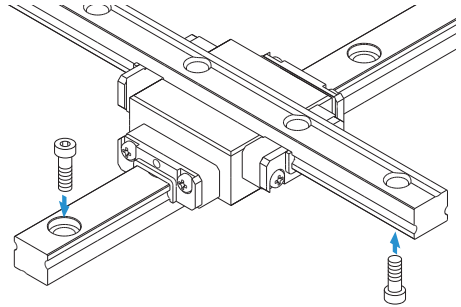
There are two types of the LM rail: one designed to be mounted from the top with bolts, and a semi-standard type whose bottom face has tapped holes, allowing the rail to be mounted from the bottom.

## Types and Features

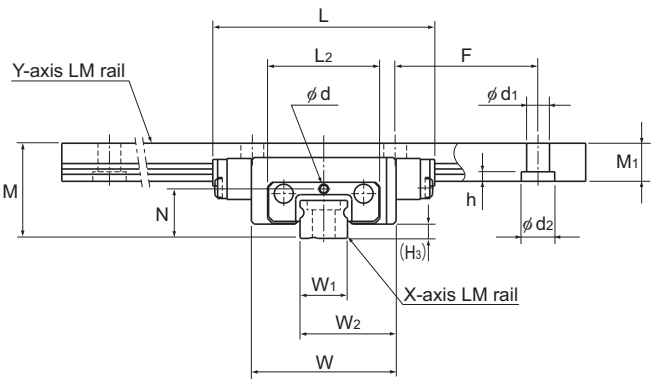
### Model MX

MX is divided into two types: RSR5 cross type and RSR7W cross type.

Specification Table⇒ **A1-316**



# Model MX



| Model No. | Outer dimensions |       |        | LM block dimensions |     |               | H <sub>3</sub> |
|-----------|------------------|-------|--------|---------------------|-----|---------------|----------------|
|           | Height           | Width | Length |                     |     | Greasing hole |                |
|           | M                | W     | L      | L <sub>2</sub>      | N   | d             |                |
| MX 5M     | 10               | 15.2  | 23.3   | 11.8                | 5.2 | 0.8           | 1.5            |
| MX 7WM    | 14.5             | 30.2  | 40.8   | 24.6                | 7.4 | 1.2           | 2              |

## Model number coding

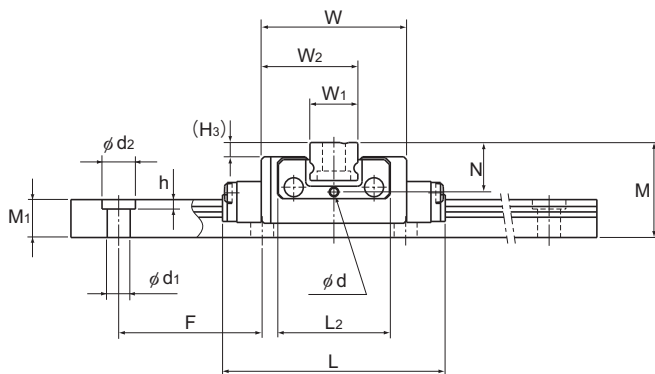
**4 MX7W M UU C1 +120 / 100L P T M**

Model number  
Total No. of LM blocks  
Contamination protection accessory symbol (\*1)  
LM rail length on the X axis (in mm)  
LM rail length on the Y axis (in mm)  
Radial clearance symbol (\*2)  
Normal (No symbol)  
Light preload (C1)  
Accuracy symbol (\*3)  
Normal grade (No Symbol)/Precision grade (P)  
Symbol for LM rail jointed use  
LM rail is made of stainless steel

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-72**. (\*3) See **A1-84**.

Note) If the LM rail mount of a semi-standard model is of a tapped-hole LM rail type, add symbol "K" after the accuracy symbol.

Example: 4 MX7W M UU C1+120/100L P K T M  
T Add symbol K



Unit: mm

|  | LM rail dimensions                |                |                |       |                                   |         | Basic load rating |                | Static Permissible Moment* N•m |                | Mass     |         |
|--|-----------------------------------|----------------|----------------|-------|-----------------------------------|---------|-------------------|----------------|--------------------------------|----------------|----------|---------|
|  | Width                             |                | Height         | Pitch |                                   | Length* | C                 | C <sub>0</sub> | M <sub>0</sub>                 | M <sub>B</sub> | LM block | LM rail |
|  | W <sub>1</sub>                    | W <sub>2</sub> | M <sub>1</sub> | F     | d <sub>1</sub> ×d <sub>2</sub> ×h | Max     | kN                | kN             |                                |                | kg       | kg/m    |
|  | 5 <sup>0</sup> <sub>-0.02</sub>   | 10.1           | 4              | 15    | 2.4×3.5×1                         | 200     | 0.59              | 1.1            | 2.57                           | 2.57           | 0.01     | 0.14    |
|  | 14 <sup>0</sup> <sub>-0.025</sub> | 22.1           | 5.2            | 30    | 3.5×6×3.2                         | 400     | 2.04              | 3.21           | 14.7                           | 14.7           | 0.051    | 0.51    |

Note) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-318**.)

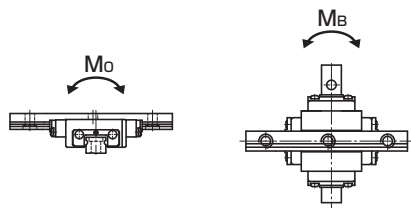
Static permissible moment\* 1 block: the static permissible moment with one LM block

Total block length L : The total block length L shown in the table is the length with the dust-proof parts (code: UU).

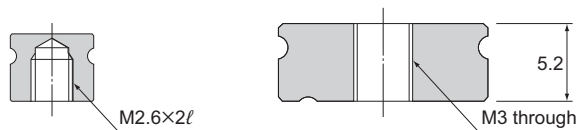
The M in the model number symbol indicates that the LM block, LM rail and balls are made of stainless steel.

The stainless steel provides excellent corrosion and environmental resistance.

Please be aware that balls will fall out if the LM block is removed from the LM rail.



For the LM rail mounting hole, a tapped-hole LM rail type is available as semi-standard.



Model MX5M

Model MX7WM

When mounting the LM rail of model MX7WM, take into account the thread length of the mounting bolt in order not to let the bolt end stick out of the top face of the LM rail.

Standard Length and Maximum Length of the LM Rail

Table1 shows the standard lengths and the maximum lengths of model MX variations.

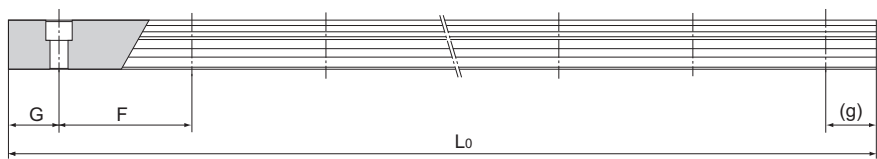


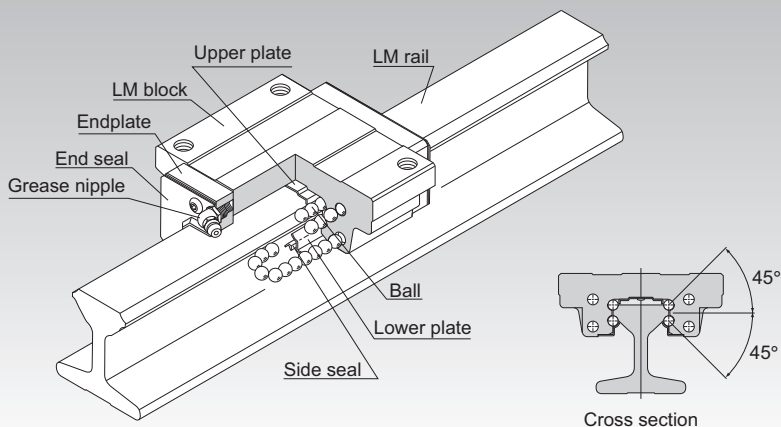
Table1 Standard Length and Maximum Length of the LM Rail for Model MX

Unit: mm

| Model No.                                 | MX 5 | MX 7W |
|-------------------------------------------|------|-------|
| LM rail standard length (L <sub>0</sub> ) | 40   | 50    |
|                                           | 55   | 80    |
|                                           | 70   | 110   |
|                                           | 100  | 140   |
|                                           | 130  | 170   |
|                                           | 160  | 200   |
|                                           |      | 260   |
|                                           |      | 290   |
| Standard pitch F                          | 15   | 30    |
| G,g                                       | 5    | 10    |
| Max length                                | 200  | 400   |

Note) The maximum length varies with accuracy grades. Contact THK for details.





**Point of Selection** **A1-10**

**Point of Design** **A1-454**

**Options** **A1-477**

**Model No.** **A1-543**

**Precautions on Use** **A1-549**

**Accessories for Lubrication** **A24-1**

**Mounting Procedure and Maintenance** **B1-89**

Equivalent moment factor **A1-43**

Rated Loads in All Directions **A1-59**

Equivalent factor in each direction **A1-61**

Radial Clearance **A1-73**

Accuracy Standards **A1-79**

Shoulder Height of the Mounting Base and the Corner Radius **A1-463**

Permissible Error of the Mounting Surface **A1-470**

Dimensions of Each Model with an Option Attached **A1-491**

## Structure and Features

Balls roll in four rows of raceways precision-ground on an LM rail and an LM block, and endplates incorporated in the LM block allow the balls to circulate. Since retainer plates hold the balls, they do not fall off even if the LM rail is pulled out.

Model JR uses the same LM block as model HSR, which has a proven track record and is highly reliable. The LM rail has a sectional shape with high flexural rigidity, and therefore can be used as a structural member.

Unlike the conventional LM Guide type, whose LM rail was secured onto the base with bolts when installed, model JR's LM rail is integrated with the mounting base, and the top of the LM rail has the same structure as LM Guide model HSR. The lower part of the LM rail has a hardness of 25HRC or less, making it easy to cut the rail and enabling the rail to be welded.

When welding the rail, we recommend using welding rods compliant with JIS D 5816. (suggested manufacturer and model number: Kobelco LB-52).

### [4-way Equal Load]

Each row of balls is placed at a contact angle of 45° so that the rated loads applied to the LM block are uniform in the four directions (radial, reverse radial and lateral directions), enabling the LM Guide to be used in all orientations.

### [Can be Mounted Even Under Rough Conditions]

Since the center of the cross-section of the LM rail is slightly thinner, even if the parallelism between two rails is not accurate the LM rail is capable of absorbing the error by bending inward or outward.

### [Sectional Shape with High Flexural Rigidity]

Since the LM rail has a sectional shape with high flexural rigidity, it can also be used as a structural member. In addition, even when the LM rail is partially fastened or supported in cantilever, the distortion is minimal.



Fig. 1

## Second Moment of Inertia of the LM Rail

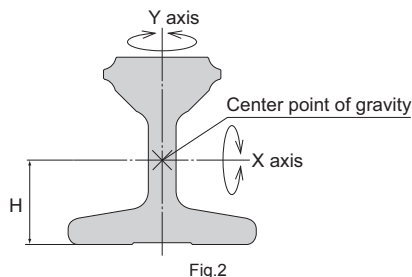


Fig. 2

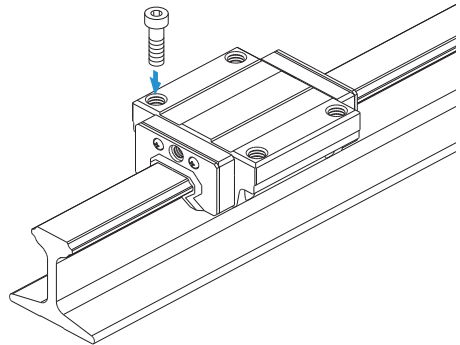
|       | Geometrical moment of inertia<br>$I [\times 10^5 \text{ mm}^4]$ |              | Modulus of section<br>$Z [\times 10^4 \text{ mm}^3]$ |              | Height of gravitational center<br>$H [\text{mm}]$ |
|-------|-----------------------------------------------------------------|--------------|------------------------------------------------------|--------------|---------------------------------------------------|
|       | About X axis                                                    | About Y axis | About X axis                                         | About Y axis |                                                   |
| JR 25 | 1.90                                                            | 0.51         | 0.69                                                 | 0.21         | 19.5                                              |
| JR 35 | 4.26                                                            | 1.32         | 1.43                                                 | 0.49         | 24.3                                              |
| JR 45 | 12.1                                                            | 3.66         | 3.31                                                 | 1.04         | 33.1                                              |
| JR 55 | 27.6                                                            | 6.54         | 5.89                                                 | 1.40         | 43.3                                              |

## Types and Features

### Model JR-A

The flange of its LM block has tapped holes.

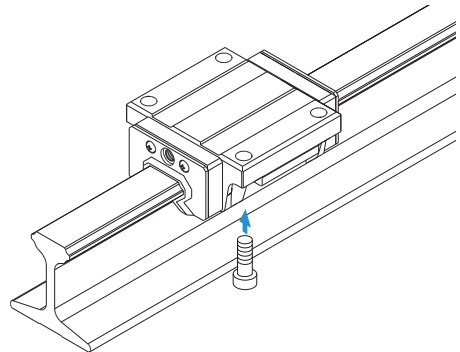
Specification Table⇒A1-324



### Model JR-B

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

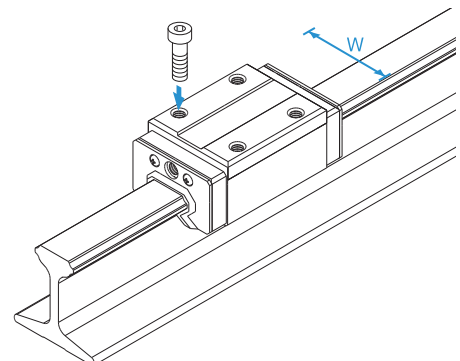
Specification Table⇒A1-324



### Model JR-R

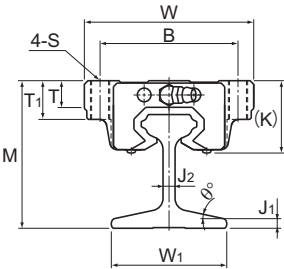
With this type, the LM block has a smaller width (W) and tapped holes. Used in places where the space for table width is limited.

Specification Table⇒A1-324

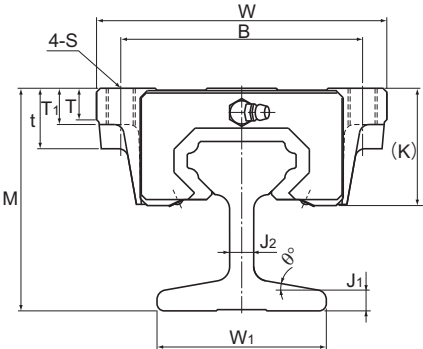




# Models JR-A, JR-B and JR-R



Models JR25 and 35-A



Models JR45 and 55-A

| Model No.                  | Outer dimensions  |                   |        | LM block dimensions |                |              |                     |                |               |                      |                |                      |                |    |         | Grease nipple |
|----------------------------|-------------------|-------------------|--------|---------------------|----------------|--------------|---------------------|----------------|---------------|----------------------|----------------|----------------------|----------------|----|---------|---------------|
|                            | Height            | Width             | Length |                     |                |              |                     |                |               |                      |                |                      |                |    |         |               |
|                            | M                 | W                 | L      | B                   | C              | H            | S×ℓ                 | L <sub>1</sub> | t             | T                    | T <sub>1</sub> | K                    | N              | E  |         |               |
| JR 25A<br>JR 25B<br>JR 25R | 61<br>61<br>65    | 70<br>70<br>48    | 83.1   | 57<br>57<br>35      | 45<br>45<br>35 | —<br>7<br>—  | M8*<br>—<br>M6×8    | 59.5           | —<br>16<br>11 | 11<br>9<br>—         | 16<br>10<br>—  | 30.5<br>30.5<br>34.5 | 6<br>6<br>10   | 12 | B-M6F   |               |
| JR 35A<br>JR 35B<br>JR 35R | 73<br>73<br>80    | 100<br>100<br>70  | 113.6  | 82<br>82<br>50      | 62<br>62<br>50 | —<br>9<br>—  | M10*<br>—<br>M8×12  | 80.4           | —<br>21<br>—  | 12<br>12<br>11.7     | 21<br>13<br>—  | 40<br>40<br>47.4     | 8<br>8<br>15   | 12 | B-M6F   |               |
| JR 45A<br>JR 45B<br>JR 45R | 92<br>92<br>102   | 120<br>120<br>86  | 145    | 100<br>100<br>60    | 80<br>80<br>60 | —<br>11<br>— | M12*<br>—<br>M10×17 | 98             | 25<br>25<br>— | 13<br>13<br>15       | 15<br>15<br>—  | 50<br>50<br>59.4     | 10<br>10<br>20 | 16 | B-PT1/8 |               |
| JR 55A<br>JR 55B<br>JR 55R | 114<br>114<br>124 | 140<br>140<br>100 | 165    | 116<br>116<br>75    | 95<br>95<br>75 | —<br>14<br>— | M14*<br>—<br>M12×18 | 118            | 29<br>29<br>— | 13.5<br>13.5<br>20.5 | 17<br>17<br>—  | 57<br>57<br>67       | 11<br>11<br>21 | 16 | B-PT1/8 |               |

Note) "\*" indicates a through hole.

## Model number coding

JR35

R

2

UU

+1000L

T

Type of LM block

Contamination protection accessory symbol (\*1)

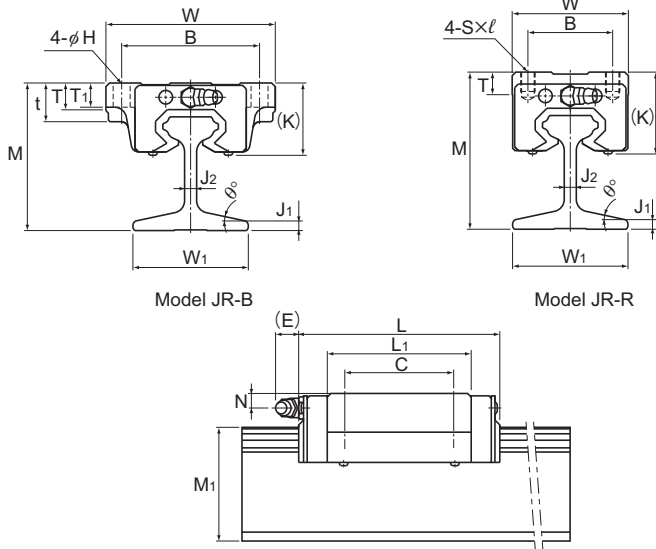
LM rail length (in mm)

Symbol for LM rail jointed use

Model number

No. of LM blocks used on the same rail

(\*1) See contamination protection accessory on **A1-516**



Unit: mm

| LM rail dimensions |                |                |    |                |         | Basic load rating |                | Static permissible moment kN·m* |               |         |               |         |                      | Mass     |         |
|--------------------|----------------|----------------|----|----------------|---------|-------------------|----------------|---------------------------------|---------------|---------|---------------|---------|----------------------|----------|---------|
| Width              |                |                |    | Height         | Length* | C                 | C <sub>0</sub> |                                 |               |         |               |         |                      | LM block | LM rail |
| W <sub>1</sub>     | J <sub>1</sub> | J <sub>2</sub> | θ° | M <sub>1</sub> | Max     | kN                | kN             | 1 block                         | Double blocks | 1 block | Double blocks | 1 block |                      | kg       | kg/m    |
| 48                 | 4              | 5              | 12 | 47             | 2000    | 27.6              | 36.4           | 0.324                           | 1.8           | 0.324   | 1.8           | 0.366   | 0.59<br>0.59<br>0.54 |          | 4.2     |
| 54                 | 7              | 8              | 10 | 54             | 4000    | 53.9              | 70.2           | 0.895                           | 4.51          | 0.895   | 4.51          | 1.05    | 1.6<br>1.6<br>1.5    |          | 8.6     |
| 70                 | 8              | 10             | 10 | 70             | 4000    | 82.2              | 101            | 1.5                             | 8.37          | 1.5     | 8.37          | 1.94    | 2.8<br>2.8<br>2.6    |          | 15.2    |
| 93                 | 4.8            | 11.6           | 12 | 90             | 4000    | 121               | 146            | 2.6                             | 14.1          | 2.6     | 14.1          | 3.43    | 4.5<br>4.5<br>4.3    |          | 18.3    |

Note) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-326**.)

Static permissible moment\* 1 block: the static permissible moment with one LM block

Double blocks: static permissible moment when two LM blocks are in close contact with each other

Total block length L

: The total block length L shown in the table is the length with the dust proof parts, code UU or SS. If other contamination protection accessories or lubricant equipment are installed, the total block length will increase.

(See **A1-491** or **A1-512**)

Standard Length and Maximum Length of the LM Rail

Table1 shows the standard lengths and the maximum lengths of model JR variations. If the maximum length of the desired LM rail exceeds them, jointed rails will be used. Contact THK for details.

Table1 Standard Length and Maximum Length of the LM Rail for Model JRUnit: mm

| Model No.                                 | JR 25 | JR 35 | JR 45 | JR 55 |
|-------------------------------------------|-------|-------|-------|-------|
| LM rail standard length (L <sub>o</sub> ) | 1000  | 1000  | 1000  | 1000  |
|                                           | 1500  | 2000  | 2000  | 2000  |
|                                           | 2000  | 4000  | 4000  | 4000  |
| Max length                                | 2000  | 4000  | 4000  | 4000  |

Note1) If jointed rails are not allowed and a greater length than the maximum values above is required, contact THK.  
Note2) For jointing two or more rails, a metal fitting like the one shown in Fig.3 is available. For the mounting method, see [B 1-99](#).

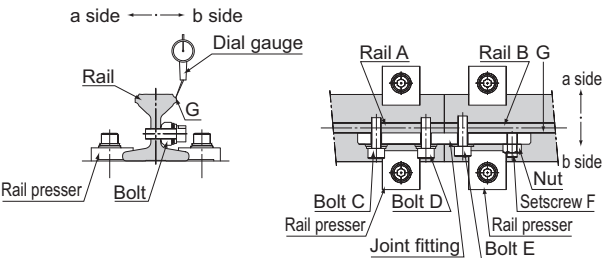
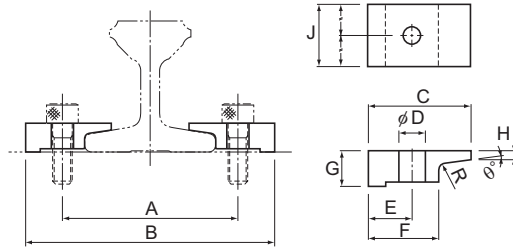


Fig.3

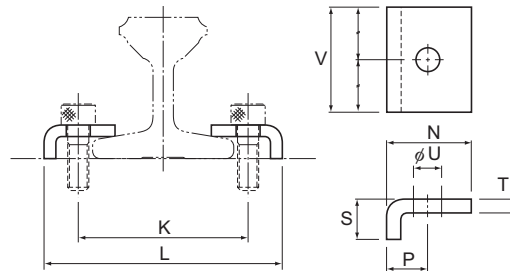
## Model JB frame for LM rail clamps



Unit: mm

| Model No. | Mounting dimensions |     | Clamper dimensions |    |      |    |    |     |    |    |                | Bolt used |
|-----------|---------------------|-----|--------------------|----|------|----|----|-----|----|----|----------------|-----------|
|           | A                   | B   | C                  | D  | E    | F  | G  | H   | R  | J  | $\theta^\circ$ |           |
| JB 25     | 57                  | 78  | 25                 | 7  | 10.5 | 15 | 10 | 3.8 | R2 | 25 | 10             | M 6       |
| JB 35     | 72                  | 102 | 35                 | 9  | 15   | 24 | 12 | 3.1 | R2 | 32 | 8              | M 8       |
| JB 45     | 90                  | 130 | 45                 | 11 | 20   | 30 | 16 | 5.4 | R2 | 40 | 8              | M10       |
| JB 55     | 115                 | 155 | 50                 | 14 | 20   | 30 | 17 | 8.2 | R2 | 50 | 10             | M12       |

## Model JT steel plate for LM rail clamps

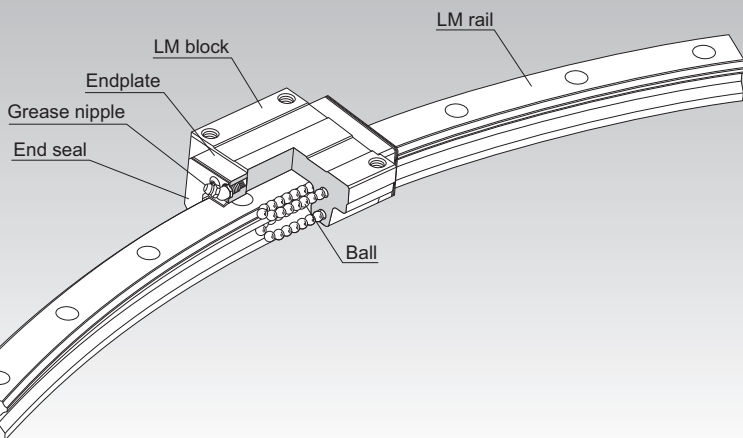


Unit: mm

| Model No. | Mounting dimensions |     | Clamper dimensions |    |    |     |    |    | Bolt used |
|-----------|---------------------|-----|--------------------|----|----|-----|----|----|-----------|
|           | K                   | L   | N                  | P  | S  | T   | U  | V  |           |
| JT 25     | 57                  | 79  | 25                 | 11 | 10 | 4   | 7  | 25 | M 6       |
| JT 35     | 65                  | 91  | 27                 | 13 | 13 | 4.5 | 9  | 40 | M 8       |
| JT 45     | 84                  | 114 | 33                 | 15 | 16 | 6   | 11 | 50 | M10       |
| JT 55     | 110                 | 148 | 50                 | 19 | 15 | 6   | 14 | 50 | M12       |

# HCR

## LM Guide R Guide Model HCR



**Point of Selection** **A1-10**

**Point of Design** **A1-454**

**Options** **A1-477**

**Model No.** **A1-543**

**Precautions on Use** **A1-549**

**Accessories for Lubrication** **A24-1**

**Mounting Procedure and Maintenance** **B1-89**

Equivalent moment factor **A1-43**

Rated Loads in All Directions **A1-59**

Equivalent factor in each direction **A1-61**

Radial Clearance **A1-73**

Accuracy Standards **A1-79**

Shoulder Height of the Mounting Base and the Corner Radius **A1-465**

Dimensions of Each Model with an Option Attached **A1-491**

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## Structure and Features

---

Balls roll in four rows of raceways precision-ground on an LM rail and an LM block, and endplates incorporated in the LM block allow the balls to circulate.

With a structure that is basically the same as four-way equal load type LM Guide model HSR, which has a proven track record, this R Guide is a new concept product that allows highly accurate circular motion.

### [Freedom of Design]

Multiple LM blocks can individually move on the same rail. By arranging LM blocks on the load points, efficient structural design is achieved.

### [Shortened Assembly Time]

This model allows clearance-free, highly accurate circular motion as opposed to sliding guides or cam followers. You can easily assemble this model simply by mounting the LM rail and LM blocks with bolts.

### [Allows Circular Motion of 5m or Longer]

It allows circular motion of 5 m or longer, which is impossible with swivel bearings.

In addition, use of this model makes it easy to assemble, disassemble and reassemble equipment that circularly moves.

### [Capable of Receiving a Load in Any Direction]

This model is capable of receiving loads in all directions since it has a structure that is basically the same as model HSR.

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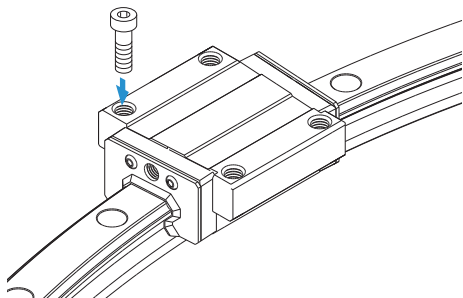
# Types and Features

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## Model HCR

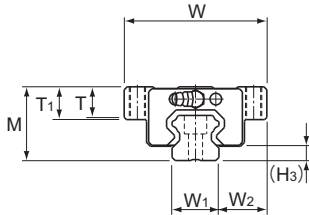
Specification Table⇒A1-332

The range of its LM block has tapped holes.





# R Guide Model HCR



| Model No.        | Outer dimensions |       |        | LM block dimensions |     |     |                |      |                |     |               |         | H <sub>3</sub> |
|------------------|------------------|-------|--------|---------------------|-----|-----|----------------|------|----------------|-----|---------------|---------|----------------|
|                  | Height           | Width | Length |                     |     |     |                |      |                |     | Grease nipple |         |                |
|                  | M                | W     | L      | B                   | C   | S   | L <sub>1</sub> | T    | T <sub>1</sub> | N   | E             |         |                |
| HCR 12A+60/100R  | 18               | 39    | 44.6   | 32                  | 18  | M4  | 30.5           | 4.5  | 5              | 3.4 | 3.5           | PB107   | 3.1            |
| HCR 15A+60/150R  | 24               | 47    | 54.5   | 38                  | 24  | M5  | 38.8           | 10.3 | 11             | 4.5 | 5.5           | PB1021B | 4.8            |
| HCR 15A+60/300R  |                  |       | 55.5   |                     | 28  |     |                |      |                |     |               |         |                |
| HCR 15A+60/400R  |                  |       | 55.8   |                     | 28  |     |                |      |                |     |               |         |                |
| HCR 25A+60/500R  | 36               | 70    | 81.6   | 57                  | 45  | M8  | 59.5           | 14.9 | 16             | 6   | 12            | B-M6F   | 7              |
| HCR 25A+60/750R  |                  |       | 82.3   |                     |     |     |                |      |                |     |               |         |                |
| HCR 25A+60/1000R |                  |       | 82.5   |                     |     |     |                |      |                |     |               |         |                |
| HCR 35A+60/600R  | 48               | 100   | 107.2  | 82                  | 58  | M10 | 80.4           | 19.9 | 21             | 8   | 12            | B-M6F   | 8.5            |
| HCR 35A+60/800R  |                  |       | 107.5  |                     |     |     |                |      |                |     |               |         |                |
| HCR 35A+60/1000R |                  |       | 108.2  |                     |     |     |                |      |                |     |               |         |                |
| HCR 35A+60/1300R |                  |       | 108.5  |                     |     |     |                |      |                |     |               |         |                |
| HCR 45A+60/800R  | 60               | 120   | 136.7  | 100                 | 70  | M12 | 98             | 23.9 | 25             | 10  | 16            | B-PT1/8 | 11.5           |
| HCR 45A+60/1000R |                  |       | 137.3  |                     |     |     |                |      |                |     |               |         |                |
| HCR 45A+60/1200R |                  |       | 137.3  |                     |     |     |                |      |                |     |               |         |                |
| HCR 45A+60/1600R |                  |       | 138    |                     |     |     |                |      |                |     |               |         |                |
| HCR 65A+60/1000R | 90               | 170   | 193.8  | 142                 | 106 | M16 | 147            | 34.9 | 37             | 19  | 16            | B-PT1/8 | 15             |
| HCR 65A+60/1500R |                  |       | 195.4  |                     |     |     |                |      |                |     |               |         |                |
| HCR 65A+45/2000R |                  |       | 195.9  |                     |     |     |                |      |                |     |               |         |                |
| HCR 65A+45/2500R |                  |       | 196.5  |                     |     |     |                |      |                |     |               |         |                |
| HCR 65A+30/3000R |                  |       | 196.5  |                     |     |     |                |      |                |     |               |         |                |

## Model number coding

**HCR25A 2 UU C1 +60 / 1000R H 6 T**

Model number

Contamination protection accessory symbol (\*1)

R-Guide center angle

LM rail radius (in mm)

Symbol for LM rail jointed use (\*5)

No. of LM blocks used on the same rail

Radial clearance symbol (\*2)  
Normal (No symbol)  
Light preload (C1)

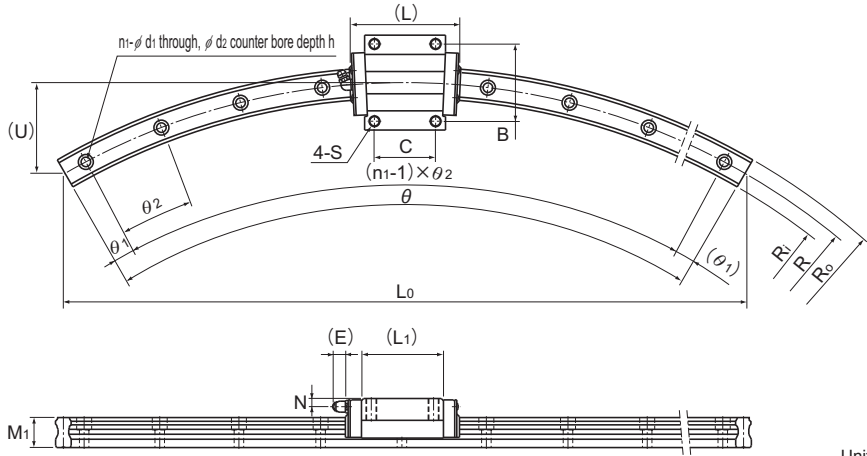
Accuracy symbol (\*3)  
Normal grade (No Symbol)  
High accuracy grade (H)

Number of LM rail joints used on one axis (\*4)

(\*1) See **A1-516** (contamination protection accessories). (\*2) See **A1-73**. (\*3) See **A1-79**.

(\*4) Number of LM rails used for one arc. Contact THK for details.

(\*5) When using joined LM rails for models HCR15 to 65, the dust-proofing seal must be a low-resistance end seal (contamination protection accessory symbol: LL).



Unit: mm

|     | LM rail dimensions |                |                |                |      |                |                |                |             |                                   |                |     | Basic load rating |                  | Static permissible moment kN·m* |                |                                                                                   |         |                                                                                   | Mass    |                                                                                   |                |                 |
|-----|--------------------|----------------|----------------|----------------|------|----------------|----------------|----------------|-------------|-----------------------------------|----------------|-----|-------------------|------------------|---------------------------------|----------------|-----------------------------------------------------------------------------------|---------|-----------------------------------------------------------------------------------|---------|-----------------------------------------------------------------------------------|----------------|-----------------|
|     | R                  | R <sub>0</sub> | R <sub>i</sub> | L <sub>0</sub> | U    | Width          |                | Height         |             | d <sub>1</sub> ×d <sub>2</sub> ×h | n <sub>1</sub> | θ°  | θ <sub>1</sub> °  | θ <sub>2</sub> ° | C                               | C <sub>0</sub> |  |         |  |         |  | LM block<br>kg | LM rail<br>kg/m |
|     |                    |                |                |                |      | W <sub>1</sub> | W <sub>2</sub> | M <sub>1</sub> | 1 block     |                                   |                |     |                   |                  |                                 |                | Double blocks                                                                     | 1 block | Double blocks                                                                     | 1 block |                                                                                   |                |                 |
|     |                    |                |                |                |      |                |                |                |             |                                   |                |     |                   |                  |                                 |                |                                                                                   |         |                                                                                   |         |                                                                                   |                |                 |
| 100 | 106                | 94             | 100            | 13.4           | 12   | 13.5           | 11             | 3.5×6×5        | 3           | 60                                | 7              | 23  | 4.7               | 8.53             | 0.0409                          | 0.228          | 0.0409                                                                            | 0.228   | 0.0445                                                                            | 0.08    | 0.83                                                                              |                |                 |
|     | 150                | 157.5          | 142.5          | 150            | 20.1 |                |                |                | 3           | 60                                | 7              | 23  | 6.66              | 10.8             |                                 |                |                                                                                   |         |                                                                                   |         |                                                                                   |                |                 |
|     | 300                | 307.5          | 292.5          | 300            | 40   | 15             | 16             | 15             | 4.5×7.5×5.3 | 5                                 | 60             | 6   | 12                | 8.33             | 13.5                            | 0.0805         | 0.457                                                                             | 0.0805  | 0.457                                                                             | 0.0844  | 0.2                                                                               | 1.5            |                 |
|     | 400                | 407.5          | 392.5          | 400            | 54   |                |                |                | 7           |                                   | 3              | 9   | 8.33              | 13.5             |                                 |                |                                                                                   |         |                                                                                   |         |                                                                                   |                |                 |
|     | 500                | 511.5          | 488.5          | 500            | 67   |                |                |                | 9           |                                   | 2              | 7   |                   |                  |                                 |                |                                                                                   |         |                                                                                   |         |                                                                                   |                |                 |
|     | 750                | 761.5          | 738.5          | 750            | 100  | 23             | 23.5           | 22             | 7×11×9      | 12                                | 60             | 2.5 | 5                 | 19.9             | 34.4                            | 0.307          | 1.71                                                                              | 0.307   | 1.71                                                                              | 0.344   | 0.59                                                                              | 3.3            |                 |
|     | 1000               | 1011.5         | 988.5          | 1000           | 134  |                |                |                | 15          |                                   | 2              | 4   |                   |                  |                                 |                |                                                                                   |         |                                                                                   |         |                                                                                   |                |                 |
|     | 600                | 617            | 583            | 600            | 80   |                |                |                | 7           |                                   | 3              | 9   |                   |                  |                                 |                |                                                                                   |         |                                                                                   |         |                                                                                   |                |                 |
|     | 800                | 817            | 783            | 800            | 107  | 34             | 33             | 29             | 9×14×12     | 11                                | 60             | 2.5 | 5.5               | 37.3             | 61.1                            | 0.782          | 3.93                                                                              | 0.782   | 3.93                                                                              | 0.905   | 1.6                                                                               | 6.6            |                 |
|     | 1000               | 1017           | 983            | 1000           | 134  |                |                |                | 12          |                                   | 2.5            | 5   |                   |                  |                                 |                |                                                                                   |         |                                                                                   |         |                                                                                   |                |                 |
|     | 1300               | 1317           | 1283           | 1300           | 174  |                |                |                | 17          |                                   | 2              | 3.5 |                   |                  |                                 |                |                                                                                   |         |                                                                                   |         |                                                                                   |                |                 |
|     | 800                | 822.5          | 777.5          | 800            | 107  |                |                |                | 8           |                                   | 2              | 8   |                   |                  |                                 |                |                                                                                   |         |                                                                                   |         |                                                                                   |                |                 |
|     | 1000               | 1022.5         | 977.5          | 1000           | 134  | 45             | 37.5           | 38             | 14×20×17    | 10                                | 60             | 3   | 6                 | 60               | 95.6                            | 1.42           | 7.92                                                                              | 1.42    | 7.92                                                                              | 1.83    | 2.8                                                                               | 11.0           |                 |
|     | 1200               | 1222.5         | 1177.5         | 1200           | 161  |                |                |                | 12          |                                   | 2.5            | 5   |                   |                  |                                 |                |                                                                                   |         |                                                                                   |         |                                                                                   |                |                 |
|     | 1600               | 1622.5         | 1577.5         | 1600           | 214  |                |                |                | 15          |                                   | 2              | 4   |                   |                  |                                 |                |                                                                                   |         |                                                                                   |         |                                                                                   |                |                 |
|     | 1000               | 1031.5         | 968.5          | 1000           | 134  |                |                |                | 8           | 60                                | 2              | 8   |                   |                  |                                 |                |                                                                                   |         |                                                                                   |         |                                                                                   |                |                 |
|     | 1500               | 1531.5         | 1468.5         | 1500           | 201  |                |                |                | 10          | 60                                | 3              | 6   |                   |                  |                                 |                |                                                                                   |         |                                                                                   |         |                                                                                   |                |                 |
|     | 2000               | 2031.5         | 1968.5         | 1531           | 152  | 63             | 53.5           | 53             | 18×26×22    | 12                                | 45             | 0.5 | 4                 | 141              | 215                             | 4.8            | 23.5                                                                              | 4.8     | 23.5                                                                              | 5.82    | 8.5                                                                               | 22.5           |                 |
|     | 2500               | 2531.5         | 2468.5         | 1913           | 190  |                |                |                | 13          | 45                                | 1.5            | 3.5 |                   |                  |                                 |                |                                                                                   |         |                                                                                   |         |                                                                                   |                |                 |
|     | 3000               | 3031.5         | 2968.5         | 1553           | 102  |                |                |                | 10          | 30                                | 1.5            | 3   |                   |                  |                                 |                |                                                                                   |         |                                                                                   |         |                                                                                   |                |                 |

Note) Static permissible moment\*

1 block: the static permissible moment with one LM block

Double blocks: static permissible moment when two LM blocks are in close contact with each other

Total block length L

: The total block length L shown in the table is the length with the dust proof parts, code UU or SS. If other contamination protection accessories or lubricant equipment are installed, the total block length will increase.

(See A1-491 or A1-512)

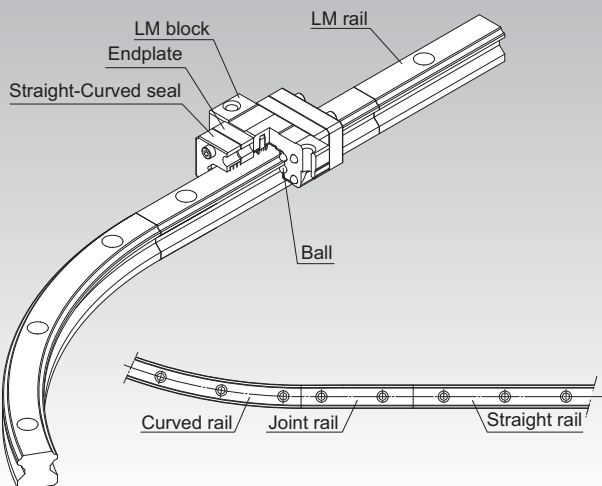
Please be aware that balls will fall out if the LM block is removed from the LM rail.

LM rail radii other than those shown in the table are also available. Contact THK for details.

The θ° in the table represents the maximum manufacturing angle. Exceeding this angle is normally done by using a joint; however, some parts may have LM rails that exceed the maximum manufacturing angle. Contact THK for details.

# HMG

## LM Guide Straight-Curved Guide Model HMG



**Point of Selection** **A1-10**

**Point of Design** **A1-454**

**Options** **A1-477**

**Model No.** **A1-543**

**Precautions on Use** **A1-549**

**Accessories for Lubrication** **A24-1**

**Mounting Procedure and Maintenance** **B1-89**

Equivalent moment factor **A1-43**

Rated Loads in All Directions **A1-59**

Equivalent factor in each direction **A1-61**

Radial Clearance **A1-73**

Accuracy Standards **A1-78**

Shoulder Height of the Mounting Base and the Corner Radius **A1-465**

Dimensions of Each Model with an Option Attached **A1-491**

## Structure and Features

The Straight-Curved Guide HMG is a new straight-curved guide that allows the same type of LM blocks to continuously move on straight and curved rails by combining the technologies of the LM Guide HSR and the R Guide HCR. It achieves drastic cost reduction through improvement of work efficiency at the assembly and conveyance lines and the inspection equipment and simplification of the structure by eliminating a lift and a table.

### [Freedom of Design]

It allows free combinations of straight and curved shapes.

Since LM blocks can smoothly transit between the straight and curved sections, various combinations of straight and curved rails can be joined into various shapes such as O, U, L and S shapes. In addition, HMG allows a large table to be mounted and a heavy object to be carried through combinations of multiple blocks on a single rail or 2 or more LM rails. Thus, it provides great freedom of design.

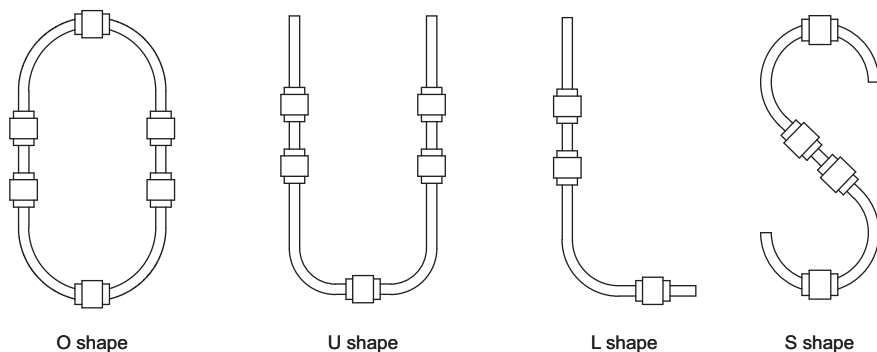


Fig.1 Examples of Joining Rails into Different Shapes

### [Straight-Curved Seals]

The Model HMG is available with seals that can be used for both straight and curved sections to prevent foreign materials from entering. These straight-curved seals provide sealing for both the straight and curved sections, preventing foreign materials from entering the unit.

**[Shortened Transportation Time]**

Unlike the shuttle method, using HMG units in a circulating system allows workpieces to be placed while other workpieces are being inspected or mounted, thus to significantly improve process time. Increasing the number of tables can further shorten process time.

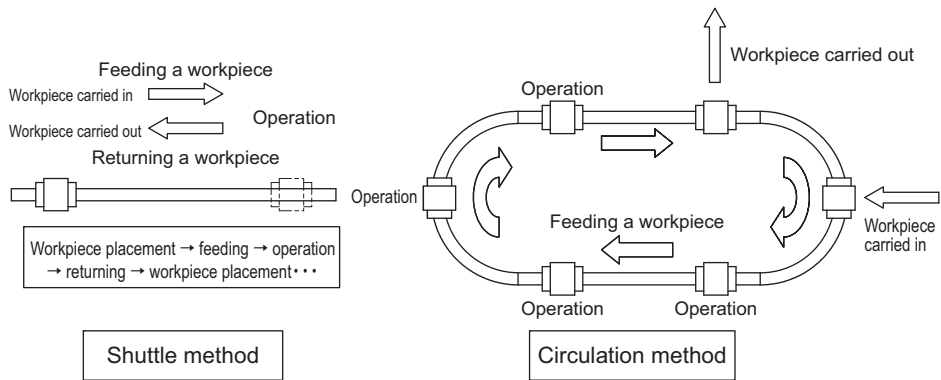


Fig.2 Improved process time

**[Cost Reduction through a Simplified Mechanism]**

Combination of straight and curved rails eliminates a lift and a turntable conventionally used for changing directions in the conveyance and production lines. Therefore, use of HMG simplifies the mechanism and eliminates a large number of parts, allowing the cost to be reduced. Additionally, man-hours in designing can also be reduced.

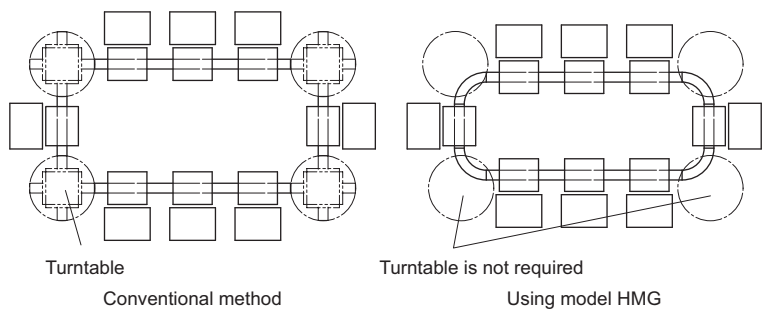


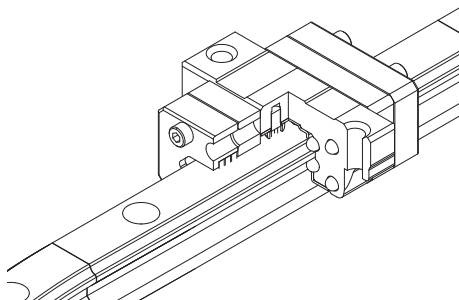
Fig.3

## Types and Features

### Model HMG

The range of the LM block has tapped holes. Can be mounted from the top or the bottom.

Specification Table⇒ **A1-340**



LM Guide

# Examples of Table Mechanisms

The Straight-Curved Guide HMG requires a rotating mechanism or a slide mechanism for the table to rotate the curved sections when 2 or more rails are used or when 2 or more LM blocks are connected on a single rail. Refer to Fig.4 for examples of such mechanisms.

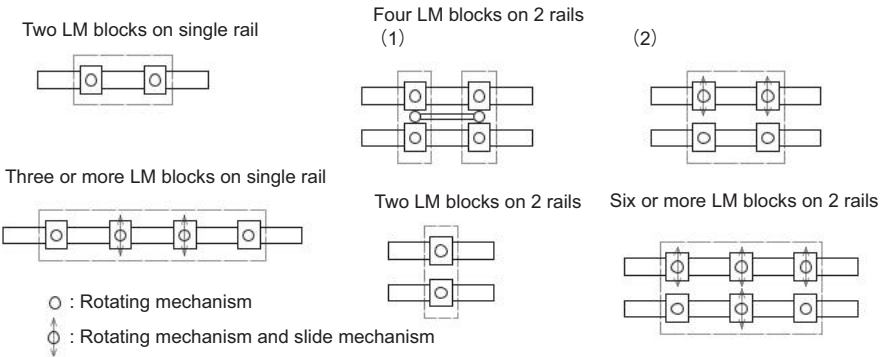


Fig.4 Examples of Table Mechanisms

Fig.5 shows examples of designing a table when units are used on multiple axes. HMG requires a rotating mechanism and a slide mechanism since the table is decentered when an LM block transits from a straight section to a curved section. The amount of decentering differs according to the radius of the curved section and the LM block span. Therefore, it is necessary to design the system in accordance with the corresponding specifications.

Fig.6 shows detail drawings of the slide and rotating mechanisms. In the figure, LM Guides are used in the slide mechanism and Cross-Roller Rings in the rotating mechanism to achieve smooth sliding and rotating motions.

For driving the Straight-Curved Guide, belt drives and chain drives are available.

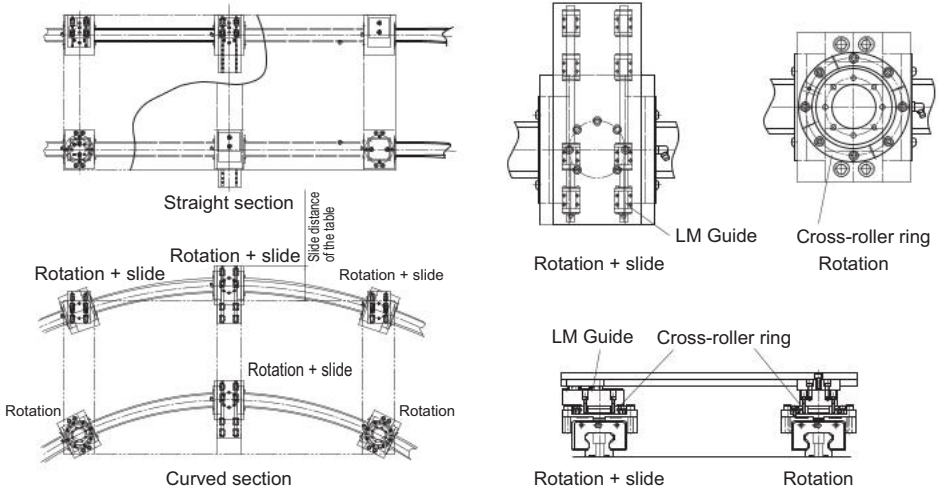
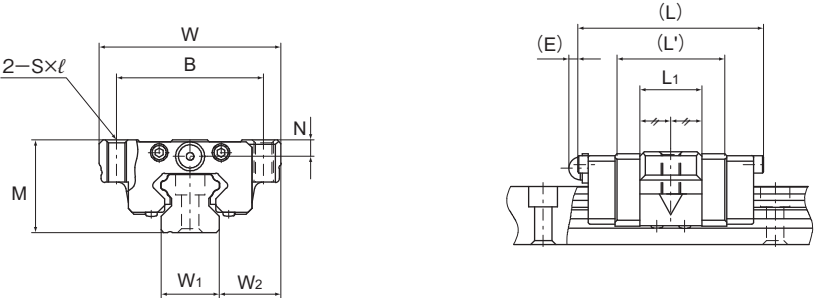


Fig.5

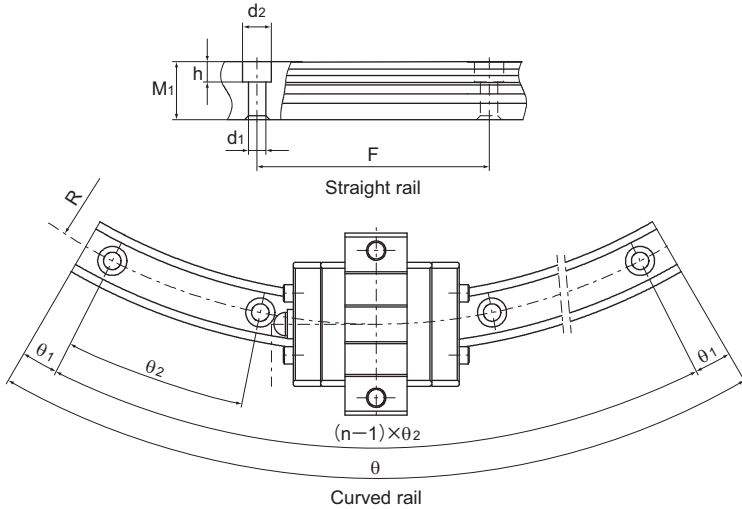
Fig.6



# Model HMG



| Model No. | Outer dimensions |     |       |       | LM block dimensions |        |                |     |     | LM rail dimensions |                |     |                |
|-----------|------------------|-----|-------|-------|---------------------|--------|----------------|-----|-----|--------------------|----------------|-----|----------------|
|           | M                | W   | L     | L'    | B                   | S×ℓ    | L <sub>1</sub> | N   | E   | LM rail            |                |     | Height         |
|           |                  |     |       |       |                     |        |                |     |     | W <sub>1</sub>     | W <sub>2</sub> | F   | M <sub>1</sub> |
| HMG 15A   | 24               | 47  | 48    | 28.8  | 38                  | M5×11  | 16             | 4.3 | 5.5 | 15                 | 16             | 60  | 15             |
| HMG 25A   | 36               | 70  | 62.2  | 42.2  | 57                  | M8×16  | 25.6           | 6   | 12  | 23                 | 23.5           | 60  | 22             |
| HMG 35A   | 48               | 100 | 80.6  | 54.6  | 82                  | M10×21 | 32.6           | 8   | 12  | 34                 | 33             | 80  | 29             |
| HMG 45A   | 60               | 120 | 107.6 | 76.6  | 100                 | M12×25 | 42.6           | 10  | 16  | 45                 | 37.5           | 105 | 38             |
| HMG 65A   | 90               | 170 | 144.4 | 107.4 | 142                 | M16×37 | 63.4           | 19  | 16  | 63                 | 53.5           | 150 | 53             |



Unit: mm

| Mounting hole<br>$d_1 \times d_2 \times h$ | Curved rail |    |                |                  |                  | Basic dynamic<br>load rating (C) | Basic static load rating ( $C_0$ ) |                            |
|--------------------------------------------|-------------|----|----------------|------------------|------------------|----------------------------------|------------------------------------|----------------------------|
|                                            | R           | n  | $\theta^\circ$ | $\theta_1^\circ$ | $\theta_2^\circ$ | Resultant load<br>(C) kN         | Straight section<br>(Cost) kN      | Curved section<br>(Cor) kN |
| 4.5×7.5×5.3                                | 150         | 3  | 60             | 7                | 23               | 2.56                             | 4.23                               | 0.44                       |
|                                            | 300         | 5  | 60             | 6                | 12               |                                  |                                    |                            |
|                                            | 400         | 7  | 60             | 3                | 9                |                                  |                                    |                            |
| 7×11×9                                     | 500         | 9  | 60             | 2                | 7                | 9.41                             | 10.8                               | 6.7                        |
|                                            | 750         | 12 | 60             | 2.5              | 5                |                                  |                                    |                            |
|                                            | 1000        | 15 | 60             | 2                | 4                |                                  |                                    |                            |
| 9×14×12                                    | 600         | 7  | 60             | 3                | 9                | 17.7                             | 19                                 | 11.5                       |
|                                            | 800         | 11 | 60             | 2.5              | 5.5              |                                  |                                    |                            |
|                                            | 1000        | 12 | 60             | 2.5              | 5                |                                  |                                    |                            |
|                                            | 1300        | 17 | 60             | 2                | 3.5              |                                  |                                    |                            |
| 14×20×17                                   | 800         | 8  | 60             | 2                | 8                | 28.1                             | 29.7                               | 18.2                       |
|                                            | 1000        | 10 | 60             | 3                | 6                |                                  |                                    |                            |
|                                            | 1200        | 12 | 60             | 2.5              | 5                |                                  |                                    |                            |
|                                            | 1600        | 15 | 60             | 2                | 4                |                                  |                                    |                            |
| 18×26×22                                   | 1000        | 8  | 60             | 2                | 8                | 66.2                             | 66.7                               | 36.2                       |
|                                            | 1500        | 10 | 60             | 3                | 6                |                                  |                                    |                            |
|                                            | 2000        | 12 | 45             | 0.5              | 4                |                                  |                                    |                            |
|                                            | 2500        | 13 | 45             | 1.5              | 3.5              |                                  |                                    |                            |
|                                            | 3000        | 10 | 30             | 1.5              | 3                |                                  |                                    |                            |

Note) When a moment is applied where one LM block is specified per axis, the LM block may experience non-smooth motion.  
We recommend that multiple LM blocks be used per axis when a moment is applied.  
Static permissible moment (straight/curved components): the static permissible moment value with 1 LM block (see Table1)  
Total block length L: The total block length L shown in the table is the length including the straight-curved seal (code: UU).

Table1 Static Permissible Moments of Model HMG

Unit: kN·m

| Model No. | $M_A$            |                | $M_B$            |                | $M_C$            |                |
|-----------|------------------|----------------|------------------|----------------|------------------|----------------|
|           | Straight section | Curved section | Straight section | Curved section | Straight section | Curved section |
| HMG 15    | 0.008            | 0.007          | 0.008            | 0.01           | 0.027            | 0.003          |
| HMG 25    | 0.1              | 0.04           | 0.1              | 0.05           | 0.11             | 0.07           |
| HMG 35    | 0.22             | 0.11           | 0.22             | 0.12           | 0.29             | 0.17           |
| HMG 45    | 0.48             | 0.2            | 0.48             | 0.22           | 0.58             | 0.34           |
| HMG 65    | 1.47             | 0.66           | 1.47             | 0.73           | 1.83             | 0.94           |

# Jointed LM rail

## [Level Difference Specification for the Joint]

An accuracy error in LM rail installation has influence on the service life of the product. When installing the LM rail, take care to minimize the level difference in the joint within the specification indicated in Table2. For the joint between curved rails and another between the curved section and the joint rail, we recommend using a ushing piece like the one shown in Fig.7. When using the ushing piece, place the xed butt piece on the outer side, push the rail against the butt piece, and then adjust the level difference in the joint section by turning the adjustment screw from the inner side.

Table2 Level Difference Specification for the Joint

Unit: mm

| Model No. | Ball raceway, side face | Upper face | Maximum clearance of the joint section |
|-----------|-------------------------|------------|----------------------------------------|
| 15        | 0.01                    | 0.02       | 0.6                                    |
| 25        | 0.01                    | 0.02       | 0.7                                    |
| 35        | 0.01                    | 0.02       | 1.0                                    |
| 45        | 0.01                    | 0.02       | 1.3                                    |
| 65        | 0.01                    | 0.02       | 1.3                                    |

Note) Place the pin on the outer circumference and the bolt on the inner circumference.

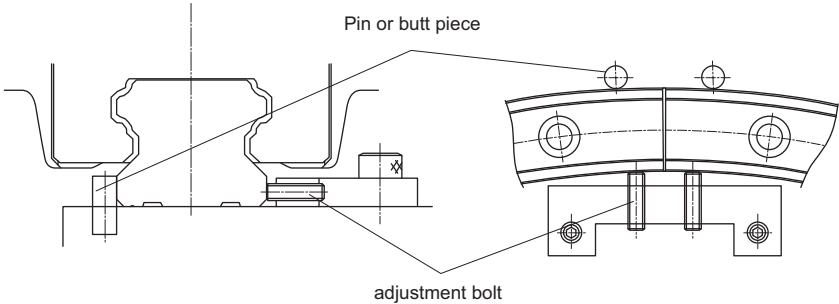


Fig.7 Flush piece

## [About the Curved Section]

The curved section of model HMG has a clearance for a structural reason. Therefore, this model may not be used in applications where highly accurate feed is required. In addition, the curved section cannot withstand a large moment. When a large moment is applied, it is necessary to increase the number of LM blocks or LM rails. For permissible moment values, see Table1 on **A1-341**.

## [Jointed LM Rail]

Model HMG always requires a jointed rail where an LM block travels from the straight section to the curved section and where the curve is inverted such as an S curve. Take this into account when design the system.

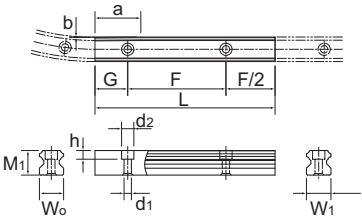


Table3 Dimension of the Jointed Rail

Unit: mm

| Model No. | Dimension of the jointed rail |       |                                   |                |                |              |             |        |
|-----------|-------------------------------|-------|-----------------------------------|----------------|----------------|--------------|-------------|--------|
|           | Height                        | Pitch | Mounting hole                     | Width          |                | Taper length | Taper depth | Radius |
|           | M <sub>1</sub>                | F     | d <sub>1</sub> ×d <sub>2</sub> ×h | W <sub>1</sub> | W <sub>0</sub> | a            | b           | R      |
| 15A       | 15                            | 60    | 4.5×7.5×5.3                       | 15             | 14.78          | 28           | 0.22        | 150    |
|           |                               |       |                                   |                | 14.89          |              | 0.11        | 300    |
|           |                               |       |                                   |                | 14.92          |              | 0.08        | 400    |
| 25A       | 22                            | 60    | 7×11×9                            | 23             | 22.83          | 42           | 0.17        | 500    |
|           |                               |       |                                   |                | 22.89          |              | 0.11        | 750    |
|           |                               |       |                                   |                | 22.92          |              | 0.08        | 1000   |
| 35A       | 29                            | 80    | 9×14×12                           | 34             | 33.77          | 54           | 0.23        | 600    |
|           |                               |       |                                   |                | 33.83          |              | 0.17        | 800    |
|           |                               |       |                                   |                | 33.86          |              | 0.14        | 1000   |
|           |                               |       |                                   |                | 33.9           |              | 0.1         | 1300   |
| 45A       | 38                            | 105   | 14×20×17                          | 45             | 44.71          | 76           | 0.29        | 800    |
|           |                               |       |                                   |                | 44.77          |              | 0.23        | 1000   |
|           |                               |       |                                   |                | 44.81          |              | 0.19        | 1200   |
|           |                               |       |                                   |                | 44.86          |              | 0.14        | 1600   |
| 65A       | 53                            | 150   | 18×26×22                          | 63             | 62.48          | 107          | 0.52        | 1000   |
|           |                               |       |                                   |                | 62.66          |              | 0.34        | 1500   |
|           |                               |       |                                   |                | 62.74          |              | 0.26        | 2000   |
|           |                               |       |                                   |                | 62.8           |              | 0.2         | 2500   |
|           |                               |       |                                   |                | 62.83          |              | 0.17        | 3000   |

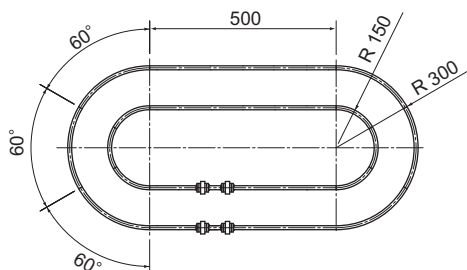


Fig.8 Example of model No.

## Model number coding

| When 2 rails are used                                         |                                                                     |                                        |                                       |                                       |                                      |                                                     |  |
|---------------------------------------------------------------|---------------------------------------------------------------------|----------------------------------------|---------------------------------------|---------------------------------------|--------------------------------------|-----------------------------------------------------|--|
| <b>HMG15A 2 UU C1 +1000L T + 60/150R 6T + 60/300R 6T - II</b> |                                                                     |                                        |                                       |                                       |                                      |                                                     |  |
| Model number                                                  | Contamination protection accessory symbol (*1)                      | Overall linear LM rail length per rail | Center angle of one inner curved rail | No. of inner curved LM rails jointed  | Radius of outer curved rail          | Symbol for No. of rails used on the same plane (*2) |  |
| No. of LM blocks used on the same rail                        | Radial clearance symbol<br>Normal (No symbol)<br>Light preload (C1) | Symbol for linear LM rail joint        | Radius of inner curved rail           | Center angle of one outer curved rail | No. of outer curved LM rails jointed |                                                     |  |

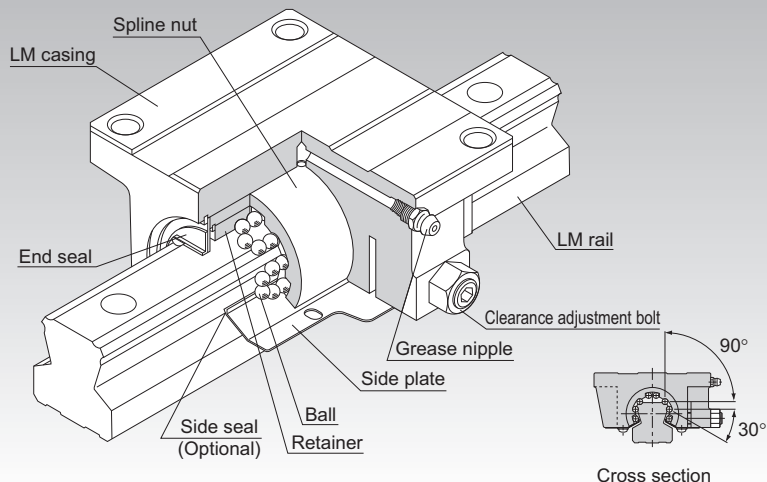
(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-13**.

Note) This model number indicates that an LM block and an LM rail constitute one set (i.e., the required number of sets when 2 rails are used is 2).

The standard Model HMG does not have a seal. To attach a seal, make sure to specify a straight-curved seal (code: UU). For the model number above, use Fig.8.

# NSR-TBC

## LM Guide Self-aligning Type Model NSR-TBC



**Point of Selection** **A1-10**

**Point of Design** **A1-454**

**Options** **A1-477**

**Model No.** **A1-543**

**Precautions on Use** **A1-549**

**Accessories for Lubrication** **A24-1**

**Mounting Procedure and Maintenance** **B1-89**

Equivalent moment factor **A1-43**

Rated Loads in All Directions **A1-59**

Equivalent factor in each direction **A1-61**

Radial Clearance **A1-73**

Accuracy Standards **A1-77**

Shoulder Height of the Mounting Base and the Corner Radius **A1-463**

Permissible Error of the Mounting Surface **A1-471**

Dimensions of Each Model with an Option Attached **A1-491**

## Structure and Features

Model NSR-TBC is the only LM Guide whose casing consists of two pieces instead of a single-piece LM block. The rigid, cast iron casing contains a cylindrical spline nut that is partially cut at an angle of 120°. This enables the model to self-aligning on the mating surface with the casing, thus to permit rough installation.

### [Capable of Receiving a Load in Any Direction]

NSR-TBC has four rows of balls. The balls are arranged in two rows on each shoulder of the LM rail, and can receive loads in all four directions: upward, downward and lateral directions. Due to the self-aligning structure, however, a rotational moment ( $M_c$ ) cannot be applied in a single-rail configuration.

### [Easy Installation and Accuracy Establishment]

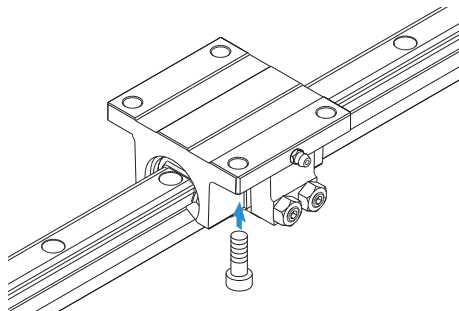
Model NSR-TBC is highly capable of performing self-adjustment and self-alignment. As a result, even if two rails are not mounted with accuracy, the LM casing absorbs the error and it does not affect the traveling performance. Accordingly, the machine performance will not be deteriorated.

## Types and Features

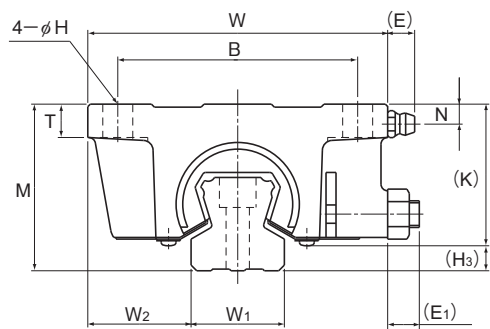
### Model NSR-TBC

Specification Table⇒ **A1-346**

The flange of the LM casing has through holes, allowing the LM Guide to be mounted from the bottom.



# Model NSR-TBC



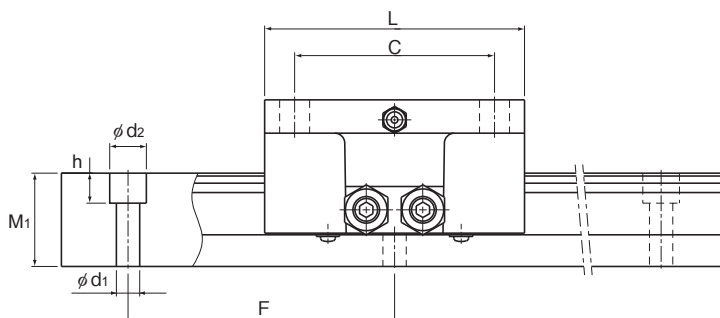
| Model No. | Outer dimensions |       |        | LM casing dimensionees |     |     |    |      |     |     |                |               | H <sub>3</sub> |
|-----------|------------------|-------|--------|------------------------|-----|-----|----|------|-----|-----|----------------|---------------|----------------|
|           | Height           | Width | Length | B                      | C   | H   | T  | K    | N   | E   | E <sub>1</sub> | Grease nipple |                |
|           | M                | W     | L      |                        |     |     |    |      |     |     |                |               |                |
| NSR 20TBC | 40               | 70    | 67     | 55                     | 50  | 6.6 | 8  | 34.5 | 5.5 | 8.5 | 7              | A-M6F         | 5.5            |
| NSR 25TBC | 50               | 90    | 78     | 72                     | 60  | 9   | 10 | 43.5 | 6   | 8.5 | 7.5            | A-M6F         | 6.5            |
| NSR 30TBC | 60               | 100   | 90     | 82                     | 72  | 9   | 12 | 51   | 8   | 8.5 | 9.5            | A-M6F         | 9              |
| NSR 40TBC | 75               | 120   | 110    | 100                    | 80  | 11  | 13 | 64   | 10  | 8.5 | 12             | A-M6F         | 10.5           |
| NSR 50TBC | 82               | 140   | 123    | 116                    | 95  | 14  | 15 | 74   | 9   | 15  | 15             | A-PT1/8       | 8              |
| NSR 70TBC | 105              | 175   | 150    | 150                    | 110 | 14  | 18 | 95.5 | 10  | 15  | 16.5           | A-PT1/8       | 9.5            |

## Model number coding

|                 |                                       |                                                |                                                                                                 |                        |                                                                                                                                                          |                                                     |            |
|-----------------|---------------------------------------|------------------------------------------------|-------------------------------------------------------------------------------------------------|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|------------|
| <b>NSR50TBC</b> | <b>2</b>                              | <b>UU</b>                                      | <b>C1</b>                                                                                       | <b>+1200L</b>          | <b>P</b>                                                                                                                                                 | <b>T</b>                                            | <b>-II</b> |
| Model number    | No. of LM cases used on the same rail | Contamination protection accessory symbol (*1) | Radial clearance symbol (*2)<br>Normal (No symbol)<br>Light preload (C1)<br>Medium preload (C0) | LM rail length (in mm) | Symbol for LM rail jointed use                                                                                                                           | Symbol for No. of rails used on the same plane (*4) |            |
|                 |                                       |                                                |                                                                                                 |                        | Accuracy symbol (*3)<br>Normal grade (No Symbol)/High accuracy grade (H)<br>Precision grade (P)/Super precision grade (SP)<br>Ultra precision grade (UP) |                                                     |            |

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-73**. (\*3) See **A1-77**. (\*4) See **A1-13**.

Note) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.)



Unit: mm

|  | LM rail dimensions      |                |                |       |                                   |         | Basic load rating |                | Static Permissible Moment*<br>kN·m                                                |                                                                                   | Mass      |         |
|--|-------------------------|----------------|----------------|-------|-----------------------------------|---------|-------------------|----------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------|---------|
|  | Width                   |                | Height         | Pitch |                                   | Length* | C                 | C <sub>0</sub> | M <sub>A</sub>                                                                    | M <sub>B</sub>                                                                    | LM casing | LM rail |
|  | W <sub>1</sub><br>±0.05 | W <sub>2</sub> | M <sub>1</sub> | F     | d <sub>1</sub> ×d <sub>2</sub> ×h | Max     | kN                | kN             |  |  | kg        | kg/m    |
|  |                         |                |                |       |                                   |         |                   |                | Double casings                                                                    | Double casings                                                                    |           |         |
|  | 23                      | 23.5           | 23             | 60    | 6×9.5×8.5                         | 2200    | 9.41              | 18.6           | 0.31                                                                              | 0.27                                                                              | 0.62      | 3.1     |
|  | 28                      | 31             | 28             | 80    | 7×11×9                            | 3000    | 14.9              | 26.7           | 0.53                                                                              | 0.46                                                                              | 1.13      | 4.7     |
|  | 34                      | 33             | 34.5           | 80    | 7×11×9                            | 3000    | 22.5              | 38.3           | 0.85                                                                              | 0.74                                                                              | 1.8       | 7.2     |
|  | 45                      | 37.5           | 44.5           | 105   | 9×14×12                           | 3000    | 37.1              | 62.2           | 1.7                                                                               | 1.5                                                                               | 3.5       | 12.2    |
|  | 48                      | 46             | 47.5           | 120   | 11×17.5×14                        | 3000    | 55.1              | 87.4           | 2.7                                                                               | 2.4                                                                               | 5.2       | 14.3    |
|  | 63                      | 56             | 62             | 150   | 14×20×17                          | 3000    | 90.8              | 152            | 9.8                                                                               | 4.9                                                                               | 9.4       | 27.6    |

Note1) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-348**.)

Static permissible moment\* Double casings: the static permissible moment when two LM casings are in close contact with each other

Total block length L : The total block length L shown in the table is the length with the dust proof parts, code UU or SS.

Note2) The basic load rating in the dimension table is for a load in the radial direction. Use Table7 on **A1-59** to calculate the load rating for loads in the reverse radial direction or lateral direction.

# Standard Length and Maximum Length of the LM Rail

Table1 shows the standard lengths and the maximum lengths of model NSR-TBC variations. If the maximum length of the desired LM rail exceeds them, jointed rails will be used. Contact THK for details.

For special rail lengths, it is recommended to use a value corresponding to the G,g dimension from the table. As the G,g dimension increases, this portion becomes less stable, and the accuracy performance is severely impacted.

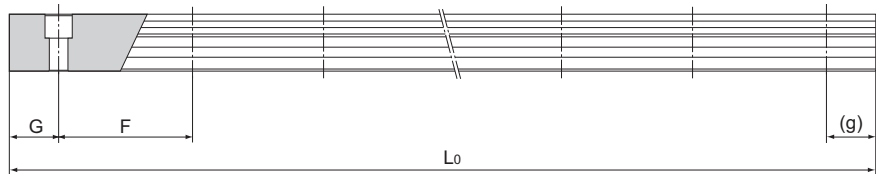


Table1 Standard Length and Maximum Length of the LM Rail for Model NSR-TBC Unit: mm

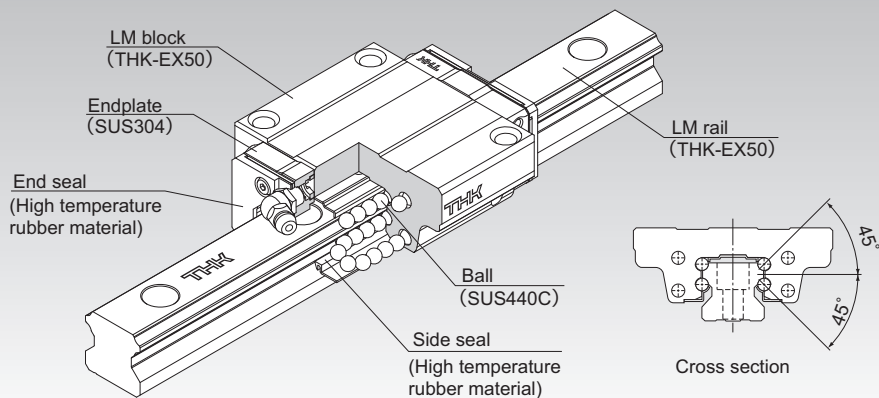
| Model No.                                 | NSR 20TBC | NSR 25TBC | NSR 30TBC | NSR 40TBC | NSR 50TBC | NSR 70TBC |
|-------------------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| LM rail standard length (L <sub>0</sub> ) | 220       | 280       | 280       | 570       | 780       | 1270      |
|                                           | 280       | 440       | 440       | 885       | 1020      | 1570      |
|                                           | 340       | 600       | 600       | 1200      | 1260      | 2020      |
|                                           | 460       | 760       | 760       | 1620      | 1500      | 2620      |
|                                           | 640       | 1000      | 1000      | 2040      | 1980      |           |
|                                           | 820       | 1240      | 1240      | 2460      | 2580      |           |
|                                           | 1000      | 1640      | 1640      | 2985      | 2940      |           |
|                                           | 1240      | 2040      | 2040      |           |           |           |
|                                           | 1600      | 2520      | 2520      |           |           |           |
|                                           |           | 3000      | 3000      |           |           |           |
| Standard pitch F                          | 60        | 80        | 80        | 105       | 120       | 150       |
| G,g                                       | 20        | 20        | 20        | 22.5      | 30        | 35        |
| Max length                                | 2200      | 3000      | 3000      | 3000      | 3000      | 3000      |

Note1) The maximum length varies with accuracy grades. Contact THK for details.  
Note2) If jointed rails are not allowed and a greater length than the maximum values above is required, contact THK.



# HSR-M1

## LM Guide High Temperature Type Model HSR-M1



**Point of Selection** **A1-10**

**Point of Design** **A1-454**

**Options** **A1-477**

**Model No.** **A1-543**

**Precautions on Use** **A1-549**

**Accessories for Lubrication** **A24-1**

**Mounting Procedure and Maintenance** **B1-89**

Equivalent moment factor **A1-43**

Rated Loads in All Directions **A1-59**

Equivalent factor in each direction **A1-61**

Radial Clearance **A1-72**

Accuracy Standards **A1-77**

Shoulder Height of the Mounting Base and the Corner Radius **A1-465**

Permissible Error of the Mounting Surface **A1-470**

Dimensions of Each Model with an Option Attached **A1-491**

## Structure and Features

Balls roll in four rows of raceways precision-ground on an LM rail and an LM block, and endplates incorporated in the LM block allow the balls to circulate.

Each row of balls is placed at a contact angle of 45° so that the rated loads applied to the LM block are uniform in the four directions (radial, reverse radial and lateral directions), enabling the LM Guide to be used in all orientations.

The high temperature type LM Guide is capable of being used at service temperature up to 150°C thanks to THK's unique technologies in material, heat treatment and lubrication.

### [Maximum Service Temperature: 150°C]

Use of stainless steel in the endplates and high temperature rubber in the end seals achieves the maximum service temperature of 150°C.

### [Dimensional Stability]

Since it is dimensionally stabilized, it demonstrates superb dimensional stability after being heated or cooled (note that it shows linear expansion at high temperature).

### [Highly Corrosion Resistant]

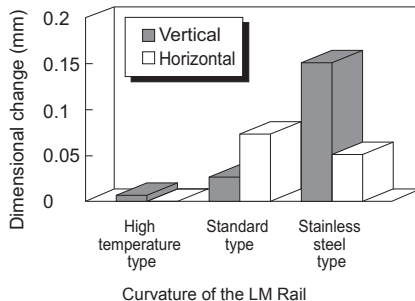
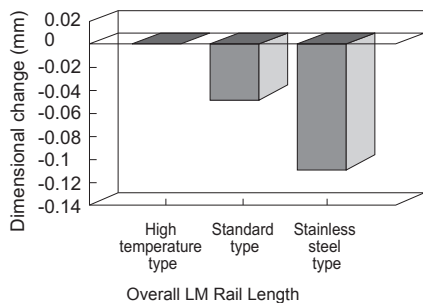
Since the LM block, LM rail and balls use stainless steel, which is highly corrosion resistant, this model is optimal for clean room applications.

### [High Temperature Grease]

This model uses high temperature grease that shows little grease-based fluctuation in rolling resistance even if temperature changes from low to high levels.

## ● Dimensional Stability Data

Since this model has been treated for dimensional stability, its dimensional change after being cooled or heated is only minimal.

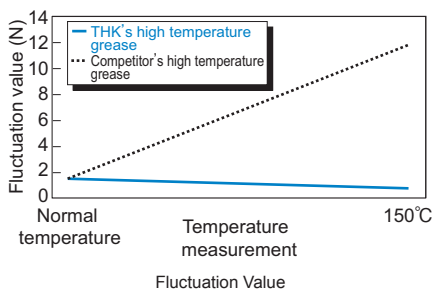
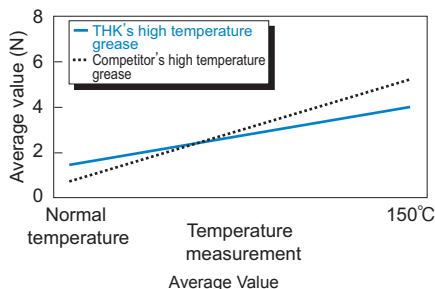


Note1) The above data on overall length and curvature indicate dimensional change when the LM rail is cooled to normal temperature after being heated at 150°C for 100 hours.

Note2) The samples consist of high temperature, standard and stainless steel types of model HSR25 + 580L.

## ● Rolling Resistance Data in Relation to 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.



For the measurements above, model HSR25M1R1C1 is used.

## ● Thermal Characteristics of LM Rail and LM Block Materials

Specific heat capacity: 0.481 J/(g·K)

Thermal conductivity: 20.67 W/(m·K)

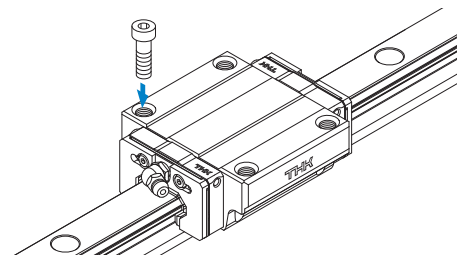
Average coefficient of linear expansion:  $11.8 \times 10^{-6}/^{\circ}\text{C}$

## Types and Features

### Model HSR-M1A

The range of its LM block has tapped holes.

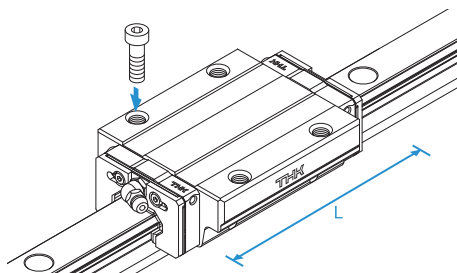
Specification Table⇒A1-356



### Model HSR-M1LA

The LM block has the same cross-sectional shape as model HSR-M1A, but has a longer overall LM block length (L) and a greater rated load.

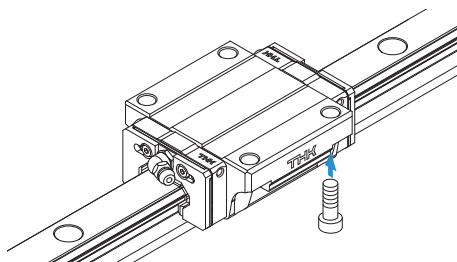
Specification Table⇒A1-356



### Model HSR-M1B

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

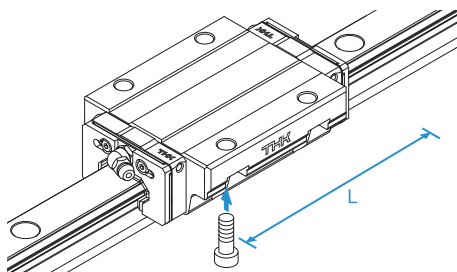
Specification Table⇒A1-358



### Model HSR-M1LB

The LM block has the same sectional shape as model HSR-M1B, but has a longer overall LM block length (L) and a greater rated load.

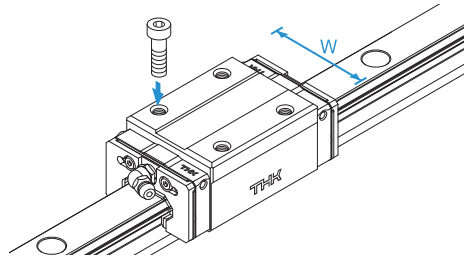
Specification Table⇒A1-358



## Model HSR-M1R

With this type, the LM block has a smaller width (W) and tapped holes. Used in places where the space for table width is limited.

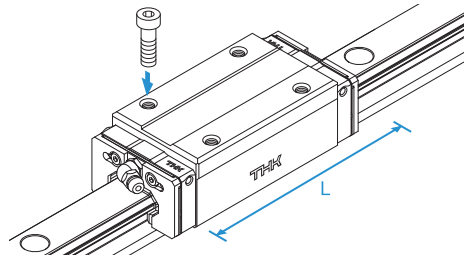
Specification Table⇒**A1-360**



## Model HSR-M1LR

The LM block has the same sectional shape as model HSR-M1R, but has a longer overall LM block length (L) and a greater rated load.

Specification Table⇒**A1-360**



## Model HSR-M1YR

When using two units of LM Guide facing each other, the previous model required much time in machining the table and had difficulty achieving the desired accuracy and adjusting the clearance. Since model HSR-M1YR has tapped holes on the side of the LM block, a simpler structure is gained and significant man-hour cutting and accuracy increase can be achieved.

Specification Table⇒**A1-362**

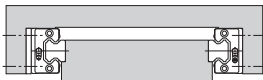
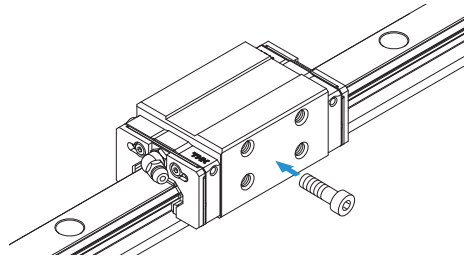


Fig.1 Conventional Structure

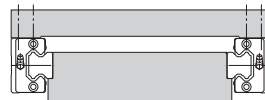


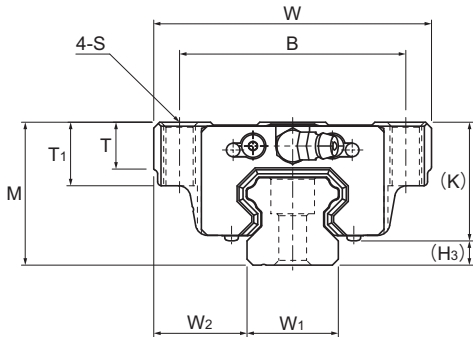
Fig.2 Mounting Structure for Model HSR-M1YR

## Service Life

When using this product in temperatures higher than 100°C, always multiply the basic dynamic load rating by the temperature coefficient when calculating the rated service life. See **A1-65** for details.



# Models HSR-M1A and HSR-M1LA



| Model No.               | Outer dimensions |       |               | LM block dimensions |    |     |                |     |                |      |     |     |               | H <sub>3</sub> |
|-------------------------|------------------|-------|---------------|---------------------|----|-----|----------------|-----|----------------|------|-----|-----|---------------|----------------|
|                         | Height           | Width | Length        |                     |    |     |                |     |                |      |     |     | Grease nipple |                |
|                         | M                | W     | L             | B                   | C  | S   | L <sub>1</sub> | T   | T <sub>1</sub> | K    | N   | E   |               |                |
| HSR 15M1A               | 24               | 47    | 59.6          | 38                  | 30 | M5  | 38.8           | 6.5 | 11             | 19.3 | 4.3 | 5.5 | PB1021B       | 4.7            |
| HSR 20M1A<br>HSR 20M1LA | 30               | 63    | 76<br>92      | 53                  | 40 | M6  | 50.8<br>66.8   | 9.5 | 10             | 26   | 5   | 12  | B-M6F         | 4              |
| HSR 25M1A<br>HSR 25M1LA | 36               | 70    | 83.9<br>103   | 57                  | 45 | M8  | 59.5<br>78.6   | 11  | 16             | 30.5 | 6   | 12  | B-M6F         | 5.5            |
| HSR 30M1A<br>HSR 30M1LA | 42               | 90    | 98.8<br>121.4 | 72                  | 52 | M10 | 70.4<br>93     | 9   | 18             | 35   | 7   | 12  | B-M6F         | 7              |
| HSR 35M1A<br>HSR 35M1LA | 48               | 100   | 112<br>137.4  | 82                  | 62 | M10 | 80.4<br>105.8  | 12  | 21             | 40.5 | 8   | 12  | B-M6F         | 7.5            |

Note) The length L of the high temperature type LM Guide model HSR is longer than normal type of model HSR. (Dimension L<sub>1</sub> is the same.)

## Model number coding

**HSR25 M1 A 2 UU C1 +1240L P T - II**

Model number

Type of LM block

Contamination protection accessory symbol (\*1)

LM rail length (in mm)

Symbol for LM rail jointed use

Symbol for No. of rails used on the same plane (\*4)

Symbol for high temperature type LM Guide

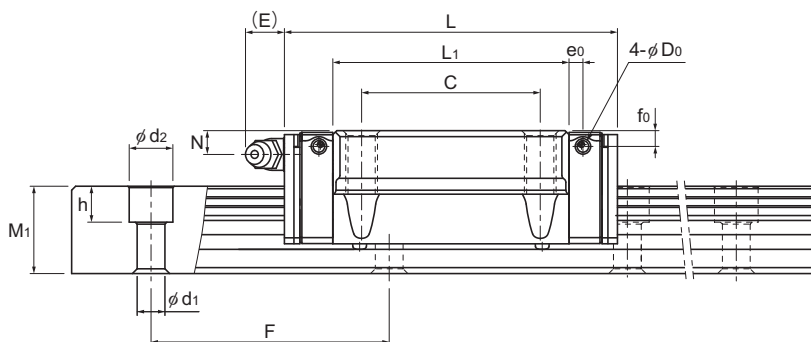
No. of LM blocks used on the same rail

Radial clearance symbol (\*2)  
Normal (No symbol)  
Light preload (C1)  
Medium preload (C0)

Accuracy symbol (\*3)  
Normal grade (No Symbol)/High accuracy grade (H)  
Precision grade (P)/Super precision grade (SP)  
Ultra precision grade (UP)

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-72**. (\*3) See **A1-77**. (\*4) See **A1-13**.

Note) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.)



Unit: mm

| LM rail dimensions  |       |        |       |                             |         | Basic load rating |                | Static permissible moment $\text{kN}\cdot\text{m}^*$ |               |                |               |                |  | Mass         |         |
|---------------------|-------|--------|-------|-----------------------------|---------|-------------------|----------------|------------------------------------------------------|---------------|----------------|---------------|----------------|--|--------------|---------|
| Width               |       | Height | Pitch |                             | Length* | C                 | C <sub>0</sub> | $M_A$                                                |               | $M_B$          |               | $M_C$          |  | LM block     | LM rail |
| $W_1$<br>$\pm 0.05$ | $W_2$ | $M_1$  | F     | $d_1 \times d_2 \times h$   | Max     | kN                | kN             | 1 block                                              | Double blocks | 1 block        | Double blocks | 1 block        |  | kg           | kg/m    |
| 15                  | 16    | 15     | 60    | $4.5 \times 7.5 \times 5.3$ | 1240    | 10.9              | 15.7           | 0.0945                                               | 0.527         | 0.0945         | 0.527         | 0.0998         |  | 0.2          | 1.5     |
| 20                  | 21.5  | 18     | 60    | $6 \times 9.5 \times 8.5$   | 1480    | 19.8<br>23.9      | 27.4<br>35.8   | 0.218<br>0.363                                       | 1.2<br>1.87   | 0.218<br>0.363 | 1.2<br>1.87   | 0.235<br>0.307 |  | 0.35<br>0.47 | 2.3     |
| 23                  | 23.5  | 22     | 60    | $7 \times 11 \times 9$      | 1500    | 27.6<br>35.2      | 36.4<br>51.6   | 0.324<br>0.627                                       | 1.8<br>3.04   | 0.324<br>0.627 | 1.8<br>3.04   | 0.366<br>0.518 |  | 0.59<br>0.75 | 3.3     |
| 28                  | 31    | 26     | 80    | $9 \times 14 \times 12$     | 1500    | 40.5<br>48.9      | 53.7<br>70.2   | 0.599<br>0.995                                       | 3.1<br>4.89   | 0.599<br>0.995 | 3.1<br>4.89   | 0.652<br>0.852 |  | 1.1<br>1.3   | 4.8     |
| 34                  | 33    | 29     | 80    | $9 \times 14 \times 12$     | 1500    | 53.9<br>65        | 70.2<br>91.7   | 0.895<br>1.49                                        | 4.51<br>7.13  | 0.895<br>1.49  | 4.51<br>7.13  | 1.05<br>1.37   |  | 1.6<br>2     | 6.6     |

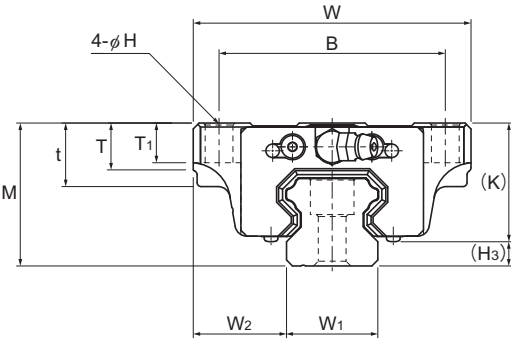
Note) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-364**.)

Static permissible moment\* 1 block: the static permissible moment with one LM block

Double blocks: static permissible moment when two LM blocks are in close contact with each other

Total block length L : The total block length L shown in the table is the length with the dust proof parts, code UU or SS.

# Models HSR-M1B and HSR-M1LB



| Model No.               | Outer dimensions |       |               | LM block dimensions |    |     |                |    |     |                |      |     |     |               | H <sub>3</sub> |
|-------------------------|------------------|-------|---------------|---------------------|----|-----|----------------|----|-----|----------------|------|-----|-----|---------------|----------------|
|                         | Height           | Width | Length        | B                   | C  | H   | L <sub>1</sub> | t  | T   | T <sub>1</sub> | K    | N   | E   | Grease nipple |                |
| HSR 15M1B               | 24               | 47    | 59.6          | 38                  | 30 | 4.5 | 38.8           | 11 | 6.5 | 7              | 19.3 | 4.3 | 5.5 | PB1021B       | 4.7            |
| HSR 20M1B<br>HSR 20M1LB | 30               | 63    | 76<br>92      | 53                  | 40 | 6   | 50.8<br>66.8   | —  | 9.5 | 10             | 26   | 5   | 12  | B-M6F         | 4              |
| HSR 25M1B<br>HSR 25M1LB | 36               | 70    | 83.9<br>103   | 57                  | 45 | 7   | 59.5<br>78.6   | 16 | 11  | 10             | 30.5 | 6   | 12  | B-M6F         | 5.5            |
| HSR 30M1B<br>HSR 30M1LB | 42               | 90    | 98.8<br>121.4 | 72                  | 52 | 9   | 70.4<br>93     | 18 | 9   | 10             | 35   | 7   | 12  | B-M6F         | 7              |
| HSR 35M1B<br>HSR 35M1LB | 48               | 100   | 112<br>137.4  | 82                  | 62 | 9   | 80.4<br>105.8  | 21 | 12  | 13             | 40.5 | 8   | 12  | B-M6F         | 7.5            |

Note) The length L of the high temperature type LM Guide model HSR is longer than normal type of model HSR. (Dimension L<sub>1</sub> is the same.)

## Model number coding

**HSR20 M1 LB 2 UU C0 +1000L P T -II**

Model number

Type of LM block

Contamination protection accessory symbol (\*1)

LM rail length (in mm)

Symbol for LM rail jointed use

Symbol for No. of rails used on the same plane (\*4)

Symbol for high temperature type LM Guide

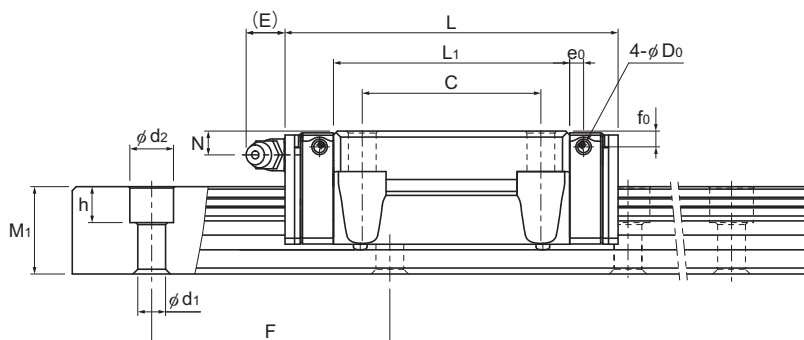
No. of LM blocks used on the same rail

Radial clearance symbol (\*2)  
Normal (No symbol)  
Light preload (C1)  
Medium preload (C0)

Accuracy symbol (\*3)  
Normal grade (No Symbol)/High accuracy grade (H)  
Precision grade (P)/Super precision grade (SP)  
Ultra precision grade (UP)

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-72**. (\*3) See **A1-77**. (\*4) See **A1-13**.

Note) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.)



Unit: mm

|    | LM rail dimensions                   |                              |                             |                |                                                  |                    | Basic load rating |                          | Static permissible moment kN•m*                                                   |                |                                                                                   |                |                                                                                   | Mass |                    |                     |
|----|--------------------------------------|------------------------------|-----------------------------|----------------|--------------------------------------------------|--------------------|-------------------|--------------------------|-----------------------------------------------------------------------------------|----------------|-----------------------------------------------------------------------------------|----------------|-----------------------------------------------------------------------------------|------|--------------------|---------------------|
|    | Width<br><br>W <sub>1</sub><br>±0.05 | Height<br><br>W <sub>2</sub> | Pitch<br><br>M <sub>1</sub> | Pitch<br><br>F | Length*<br><br>d <sub>1</sub> ×d <sub>2</sub> ×h | Length*<br><br>Max | C<br><br>kN       | C <sub>0</sub><br><br>kN |  |                |  |                |  |      | LM block<br><br>kg | LM rail<br><br>kg/m |
|    |                                      |                              |                             |                |                                                  |                    |                   |                          | 1 block                                                                           | Double blocks  | 1 block                                                                           | Double blocks  | 1 block                                                                           |      |                    |                     |
|    |                                      |                              |                             |                |                                                  |                    |                   |                          |                                                                                   |                |                                                                                   |                |                                                                                   |      |                    |                     |
| 15 | 16                                   | 15                           | 60                          | 4.5×7.5×5.3    | 1240                                             | 10.9               | 15.7              | 0.0945                   | 0.527                                                                             | 0.0945         | 0.527                                                                             | 0.0998         | 0.2                                                                               | 1.5  |                    |                     |
| 20 | 21.5                                 | 18                           | 60                          | 6×9.5×8.5      | 1480                                             | 19.8<br>23.9       | 27.4<br>35.8      | 0.218<br>0.363           | 1.2<br>1.87                                                                       | 0.218<br>0.363 | 1.2<br>1.87                                                                       | 0.235<br>0.307 | 0.35<br>0.47                                                                      | 2.3  |                    |                     |
| 23 | 23.5                                 | 22                           | 60                          | 7×11×9         | 1500                                             | 27.6<br>35.2       | 36.4<br>51.6      | 0.324<br>0.627           | 1.8<br>3.04                                                                       | 0.324<br>0.627 | 1.8<br>3.04                                                                       | 0.366<br>0.518 | 0.59<br>0.75                                                                      | 3.3  |                    |                     |
| 28 | 31                                   | 26                           | 80                          | 9×14×12        | 1500                                             | 40.5<br>48.9       | 53.7<br>70.2      | 0.599<br>0.995           | 3.1<br>4.89                                                                       | 0.599<br>0.995 | 3.1<br>4.89                                                                       | 0.652<br>0.852 | 1.1<br>1.3                                                                        | 4.8  |                    |                     |
| 34 | 33                                   | 29                           | 80                          | 9×14×12        | 1500                                             | 53.9<br>65         | 70.2<br>91.7      | 0.895<br>1.49            | 4.51<br>7.13                                                                      | 0.895<br>1.49  | 4.51<br>7.13                                                                      | 1.05<br>1.37   | 1.6<br>2                                                                          | 6.6  |                    |                     |

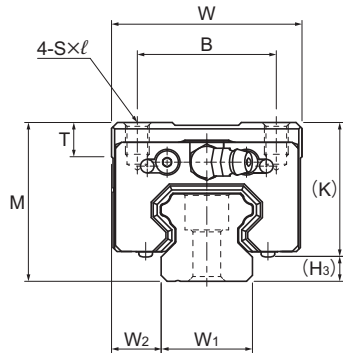
Note) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-364**.)

Static permissible moment\* 1 block: the static permissible moment with one LM block

Double blocks: static permissible moment when two LM blocks are in close contact with each other

Total block length L : The total block length L shown in the table is the length with the dust proof parts, code UU or SS.

# Models HSR-M1R and HSR-M1LR



| Model No.               | Outer dimensions |       |               | LM block dimensions |          |       |                |    |      |     |     |               | H <sub>3</sub> |
|-------------------------|------------------|-------|---------------|---------------------|----------|-------|----------------|----|------|-----|-----|---------------|----------------|
|                         | Height           | Width | Length        |                     |          |       |                |    |      |     |     | Grease nipple |                |
|                         | M                | W     | L             | B                   | C        | S×ℓ   | L <sub>1</sub> | T  | K    | N   | E   |               |                |
| HSR 15M1R               | 28               | 34    | 59.6          | 26                  | 26       | M4×5  | 38.8           | 6  | 23.3 | 8.3 | 5.5 | PB1021B       | 4.7            |
| HSR 20M1R<br>HSR 20M1LR | 30               | 44    | 76<br>92      | 32                  | 36<br>50 | M5×6  | 50.8<br>66.8   | 8  | 26   | 5   | 12  | B-M6F         | 4              |
| HSR 25M1R<br>HSR 25M1LR | 40               | 48    | 83.9<br>103   | 35                  | 35<br>50 | M6×8  | 59.5<br>78.6   | 8  | 34.5 | 10  | 12  | B-M6F         | 5.5            |
| HSR 30M1R<br>HSR 30M1LR | 45               | 60    | 98.8<br>121.4 | 40                  | 40<br>60 | M8×10 | 70.4<br>93     | 8  | 38   | 10  | 12  | B-M6F         | 7              |
| HSR 35M1R<br>HSR 35M1LR | 55               | 70    | 112<br>137.4  | 50                  | 50<br>72 | M8×12 | 80.4<br>105.8  | 10 | 47.5 | 15  | 12  | B-M6F         | 7.5            |

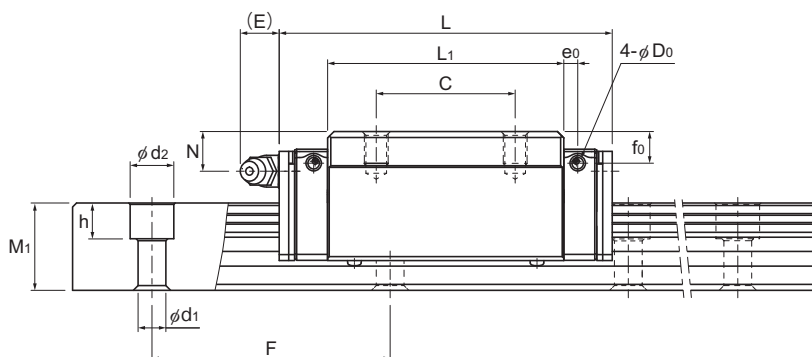
(Note) The length L of the high temperature type LM Guide model HSR is longer than normal type of model HSR. (Dimension L<sub>1</sub> is the same.)

## Model number coding

|                                           |                                        |          |                                                                                                 |           |                                                                                                                                                          |               |                                |                                                     |            |
|-------------------------------------------|----------------------------------------|----------|-------------------------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|--------------------------------|-----------------------------------------------------|------------|
| <b>HSR35</b>                              | <b>M1</b>                              | <b>R</b> | <b>2</b>                                                                                        | <b>UU</b> | <b>C0</b>                                                                                                                                                | <b>+1080L</b> | <b>P</b>                       | <b>T</b>                                            | <b>-II</b> |
| Model number                              | Type of LM block                       |          | Contamination protection accessory symbol (*1)                                                  |           | LM rail length (in mm)                                                                                                                                   |               | Symbol for LM rail jointed use | Symbol for No. of rails used on the same plane (*4) |            |
| Symbol for high temperature type LM Guide | No. of LM blocks used on the same rail |          | Radial clearance symbol (*2)<br>Normal (No symbol)<br>Light preload (C1)<br>Medium preload (C0) |           | Accuracy symbol (*3)<br>Normal grade (No Symbol)/High accuracy grade (H)<br>Precision grade (P)/Super precision grade (SP)<br>Ultra precision grade (UP) |               |                                |                                                     |            |

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-72**. (\*3) See **A1-77**. (\*4) See **A1-13**.

(Note) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.)



Unit: mm

| LM rail dimensions  |       |        |       |                           |         | Basic load rating |                | Static permissible moment<br>kN·m* |               |                |               |                |  | Mass         |         |
|---------------------|-------|--------|-------|---------------------------|---------|-------------------|----------------|------------------------------------|---------------|----------------|---------------|----------------|--|--------------|---------|
| Width               |       | Height | Pitch |                           | Length* | C                 | C <sub>0</sub> |                                    |               |                |               |                |  | LM block     | LM rail |
| $W_1$<br>$\pm 0.05$ | $W_2$ | $M_1$  | $F$   | $d_1 \times d_2 \times h$ | Max     | kN                | kN             | 1 block                            | Double blocks | 1 block        | Double blocks | 1 block        |  | kg           | kg/m    |
| 15                  | 9.5   | 15     | 60    | 4.5×7.5×5.3               | 1240    | 10.9              | 15.7           | 0.0945                             | 0.527         | 0.0945         | 0.527         | 0.0998         |  | 0.2          | 1.5     |
| 20                  | 12    | 18     | 60    | 6×9.5×8.5                 | 1480    | 19.8<br>23.9      | 27.4<br>35.8   | 0.218<br>0.363                     | 1.2<br>1.87   | 0.218<br>0.363 | 1.2<br>1.87   | 0.235<br>0.307 |  | 0.35<br>0.47 | 2.3     |
| 23                  | 12.5  | 22     | 60    | 7×11×9                    | 1500    | 27.6<br>35.2      | 36.4<br>51.6   | 0.324<br>0.627                     | 1.8<br>3.04   | 0.324<br>0.627 | 1.8<br>3.04   | 0.366<br>0.518 |  | 0.59<br>0.75 | 3.3     |
| 28                  | 16    | 26     | 80    | 9×14×12                   | 1500    | 40.5<br>48.9      | 53.7<br>70.2   | 0.599<br>0.995                     | 3.1<br>4.89   | 0.599<br>0.995 | 3.1<br>4.89   | 0.652<br>0.852 |  | 1.1<br>1.3   | 4.8     |
| 34                  | 18    | 29     | 80    | 9×14×12                   | 1500    | 53.9<br>65        | 70.2<br>91.7   | 0.895<br>1.49                      | 4.51<br>7.13  | 0.895<br>1.49  | 4.51<br>7.13  | 1.05<br>1.37   |  | 1.6<br>2     | 6.6     |

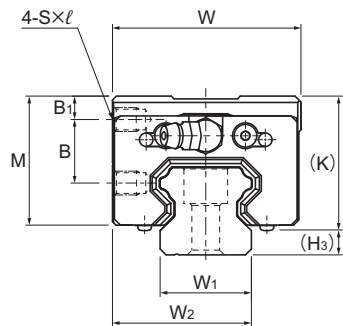
Note) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-364**.)

Static permissible moment\* 1 block: the static permissible moment with one LM block

Double blocks: static permissible moment when two LM blocks are in close contact with each other

Total block length L : The total block length L shown in the table is the length with the dust proof parts, code UU or SS.

# Model HSR-M1YR



| Model No.  | Outer dimensions |       |        | LM block dimensions |      |    |       |                |      |     |               |         | H <sub>3</sub> |
|------------|------------------|-------|--------|---------------------|------|----|-------|----------------|------|-----|---------------|---------|----------------|
|            | Height           | Width | Length |                     |      |    |       |                |      |     | Grease nipple |         |                |
|            | M                | W     | L      | B <sub>1</sub>      | B    | C  | S×ℓ   | L <sub>1</sub> | K    | N   | E             |         |                |
| HSR 15M1YR | 28               | 33.5  | 59.6   | 4.3                 | 11.5 | 18 | M4×5  | 38.8           | 23.3 | 8.3 | 5.5           | PB1021B | 4.7            |
| HSR 20M1YR | 30               | 43.5  | 76     | 4                   | 11.5 | 25 | M5×6  | 50.8           | 26   | 5   | 12            | B-M6F   | 4              |
| HSR 25M1YR | 40               | 47.5  | 83.9   | 6                   | 16   | 30 | M6×6  | 59.5           | 34.5 | 10  | 12            | B-M6F   | 5.5            |
| HSR 30M1YR | 45               | 59.5  | 98.8   | 8                   | 16   | 40 | M6×9  | 70.4           | 38   | 10  | 12            | B-M6F   | 7              |
| HSR 35M1YR | 55               | 69.5  | 112    | 8                   | 23   | 43 | M8×10 | 80.4           | 47.5 | 15  | 12            | B-M6F   | 7.5            |

Note) The length L of the high temperature type LM Guide model HSR-YR is longer than normal type of model HSR-YR.  
(Dimension L<sub>1</sub> is the same.)

## Model number coding

HSR25

M1

YR

2

UU

C0

+1200L

P

T

-II

Model number

Type of LM block

Contamination protection accessory symbol (\*1)

LM rail length (in mm)

Symbol for LM rail jointed use

Symbol for No. of rails used on the same plane (\*4)

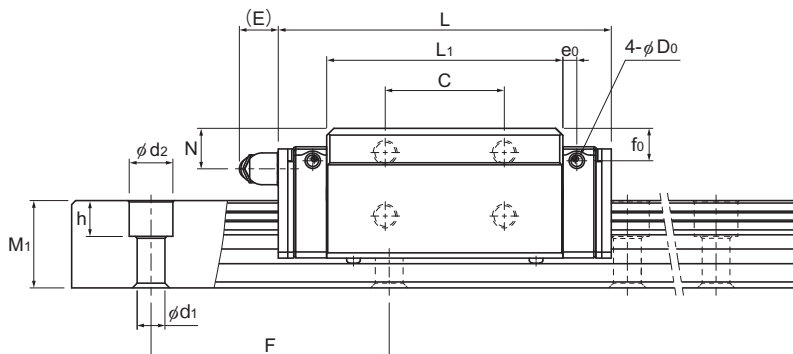
Symbol for high temperature type LM Guide

No. of LM blocks used on the same rail

Radial clearance symbol (\*2)  
Normal (No symbol)  
Light preload (C1)  
Medium preload (C0)

Accuracy symbol (\*3)  
Normal grade (No Symbol)/High accuracy grade (H)  
Precision grade (P)/Super precision grade (SP)  
Ultra precision grade (UP)

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-72**. (\*3) See **A1-77**. (\*4) See **A1-13**.  
Note) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.)



Unit: mm

| LM rail dimensions  |        |       |    |                             |      | Basic load rating |       | Static permissible moment $kN \cdot m^*$ |               |         |               |         | Mass     |         |
|---------------------|--------|-------|----|-----------------------------|------|-------------------|-------|------------------------------------------|---------------|---------|---------------|---------|----------|---------|
| Width               | Height | Pitch |    | Length*                     |      | C                 | $C_0$ | $M_A$                                    |               | $M_B$   |               | $M_C$   | LM block | LM rail |
| $W_1$<br>$\pm 0.05$ | $W_2$  | $M_1$ | F  | $d_1 \times d_2 \times h$   | Max  | kN                | kN    | 1 block                                  | Double blocks | 1 block | Double blocks | 1 block | kg       | kg/m    |
| 15                  | 24     | 15    | 60 | $4.5 \times 7.5 \times 5.3$ | 1240 | 10.9              | 15.7  | 0.0945                                   | 0.527         | 0.0945  | 0.527         | 0.0998  | 0.2      | 1.5     |
| 20                  | 31.5   | 18    | 60 | $6 \times 9.5 \times 8.5$   | 1480 | 19.8              | 27.4  | 0.218                                    | 1.2           | 0.218   | 1.2           | 0.235   | 0.35     | 2.3     |
| 23                  | 35     | 22    | 60 | $7 \times 11 \times 9$      | 1500 | 27.6              | 36.4  | 0.324                                    | 1.8           | 0.324   | 1.8           | 0.366   | 0.59     | 3.3     |
| 28                  | 43.5   | 26    | 80 | $9 \times 14 \times 12$     | 1500 | 40.5              | 53.7  | 0.599                                    | 3.1           | 0.599   | 3.1           | 0.652   | 1.3      | 4.8     |
| 34                  | 51.5   | 29    | 80 | $9 \times 14 \times 12$     | 1500 | 53.9              | 70.2  | 0.895                                    | 4.51          | 0.895   | 4.51          | 1.05    | 1.6      | 6.6     |

Note) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-364**.)

Static permissible moment\* 1 block: the static permissible moment with one LM block

Double blocks: static permissible moment when two LM blocks are in close contact with each other

Total block length L

: The total block length L shown in the table is the length with the dust proof parts, code UU or SS.

## Standard Length and Maximum Length of the LM Rail

Table1 shows the standard lengths and the maximum lengths of model HSR-M1 variations. If the maximum length of the desired LM rail exceeds them, jointed rails will be used. Contact THK for details.

For special rail lengths, it is recommended to use a value corresponding to the G,g dimension from the table. As the G,g dimension increases, this portion becomes less stable, and the accuracy performance is severely impacted.

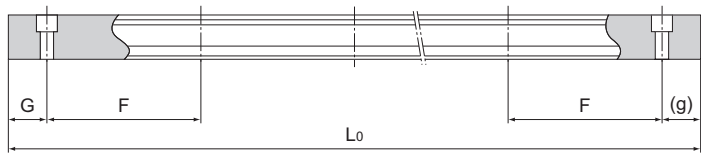


Table1 Standard Length and Maximum Length of the LM Rail for Model HSR-M1

Unit: mm

| Model No.                                 | HSR 15M1 | HSR 20M1 | HSR 25M1 | HSR 30M1 | HSR 35M1 |
|-------------------------------------------|----------|----------|----------|----------|----------|
| LM rail standard length (L <sub>0</sub> ) | 160      | 220      | 220      | 280      | 280      |
|                                           | 220      | 280      | 280      | 360      | 360      |
|                                           | 280      | 340      | 340      | 440      | 440      |
|                                           | 340      | 400      | 400      | 520      | 520      |
|                                           | 400      | 460      | 460      | 600      | 600      |
|                                           | 460      | 520      | 520      | 680      | 680      |
|                                           | 520      | 580      | 580      | 760      | 760      |
|                                           | 580      | 640      | 640      | 840      | 840      |
|                                           | 640      | 700      | 700      | 920      | 920      |
|                                           | 700      | 760      | 760      | 1000     | 1000     |
|                                           | 760      | 820      | 820      | 1080     | 1080     |
|                                           | 820      | 940      | 940      | 1160     | 1160     |
|                                           | 940      | 1000     | 1000     | 1240     | 1240     |
|                                           | 1000     | 1060     | 1060     | 1320     | 1320     |
|                                           | 1060     | 1120     | 1120     | 1400     | 1400     |
|                                           | 1120     | 1180     | 1180     | 1480     | 1480     |
|                                           | 1180     | 1240     | 1240     |          |          |
|                                           | 1240     | 1360     | 1300     |          |          |
|                                           |          | 1480     | 1360     |          |          |
|                                           |          |          | 1420     |          |          |
|                                           |          |          | 1480     |          |          |
| Standard pitch F                          | 60       | 60       | 60       | 80       | 80       |
| G,g                                       | 20       | 20       | 20       | 20       | 20       |
| Max length                                | 1240     | 1480     | 1500     | 1500     | 1500     |

Note1) The maximum length varies with accuracy grades. Contact THK for details.

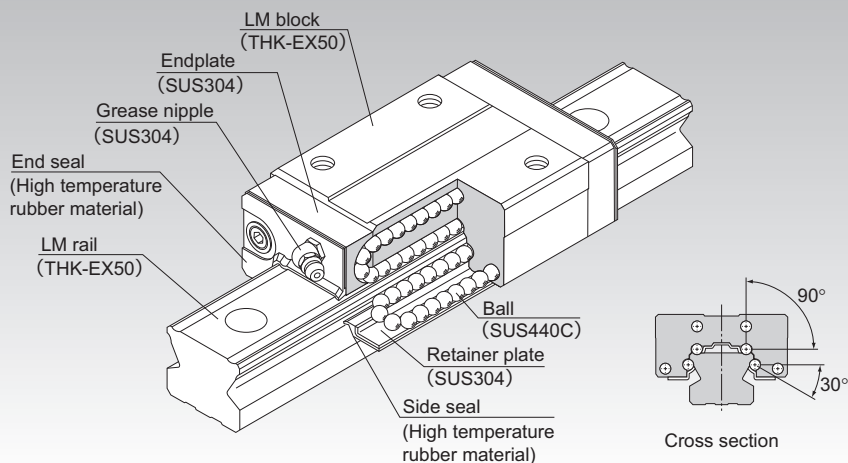
Note2) If jointed rails are not allowed and a greater length than the maximum values above is required, contact THK.

Note3) The values for HSR-M1 also apply to HSR-M1YR.



# SR-M1

## LM Guide High Temperature Type Model SR-M1



**Point of Selection** **A1-10**

**Point of Design** **A1-454**

**Options** **A1-477**

**Model No.** **A1-543**

**Precautions on Use** **A1-549**

**Accessories for Lubrication** **A24-1**

**Mounting Procedure and Maintenance** **B1-89**

Equivalent moment factor **A1-43**

Rated Loads in All Directions **A1-59**

Equivalent factor in each direction **A1-61**

Radial Clearance **A1-72**

Accuracy Standards **A1-77**

Shoulder Height of the Mounting Base and the Corner Radius **A1-463**

Permissible Error of the Mounting Surface **A1-470**

Dimensions of Each Model with an Option Attached **A1-491**

## Structure and Features

Balls roll in four rows of raceways precision-ground on an LM rail and an LM block, and endplates incorporated in the LM block allow the balls to circulate.

Since it is a compactly designed model that has a low sectional height and a ball contact structure rigid in the radial direction, this model is optimal for horizontal guide units.

High temperature type LM Guide model SR-M1 is capable of being used at service temperature up to 150°C thanks to THK's unique technologies in material, heat treatment and lubrication.

### [Maximum Service Temperature: 150°C]

Use of stainless steel in the endplates and high temperature rubber in the end seals achieves the maximum service temperature of 150°C.

### [Dimensional Stability]

Since it is dimensionally stabilized, it demonstrates superb dimensional stability after being heated or cooled (note that it shows linear expansion at high temperature).

### [Highly Corrosion Resistant]

Since the LM block, LM rail and balls use stainless steel, which is highly corrosion resistant, this model is optimal for clean room applications.

### [High Temperature Grease]

This model uses high temperature grease that shows little grease-based fluctuation in rolling resistance even if temperature changes from low to high levels.

## Thermal Characteristics of LM Rail and LM Block Materials

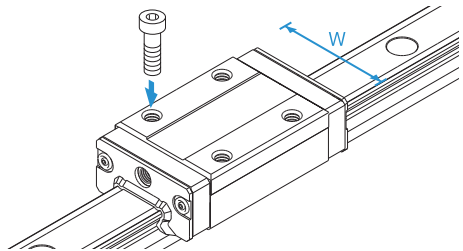
- Specific heat capacity: 0.481 J/(g•K)
- Thermal conductivity: 20.67 W/(m•K)
- Average coefficient of linear expansion:  $11.8 \times 10^{-6}/^{\circ}\text{C}$

## Types and Features

### Model SR-M1W

With this type, the LM block has a smaller width (W) and tapped holes.

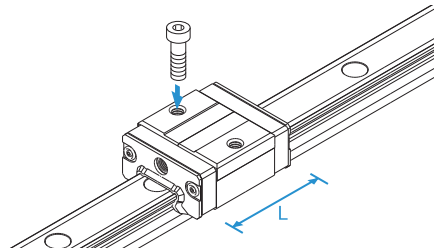
Specification Table⇒ **A1-370**



### Model SR-M1V

A space-saving type whose LM block has the same cross-sectional shape as model SR-M1W, but has a smaller overall LM block length (L).

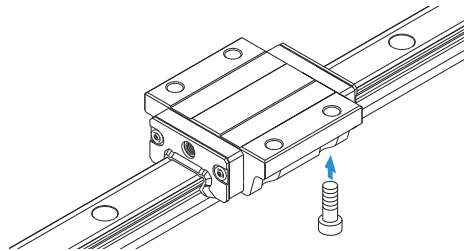
Specification Table⇒ **A1-370**



### Model SR-M1TB

The LM block has the same height as model SR-M1W and can be mounted from the bottom.

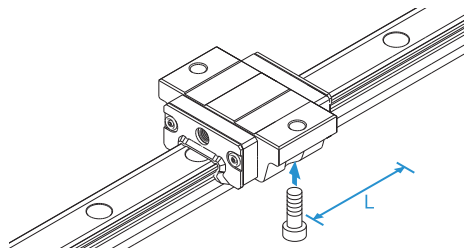
Specification Table⇒ **A1-372**



### Model SR-M1SB

A space-saving type whose LM block has the same sectional shape as model SR-M1TB, but has a smaller overall LM block length (L).

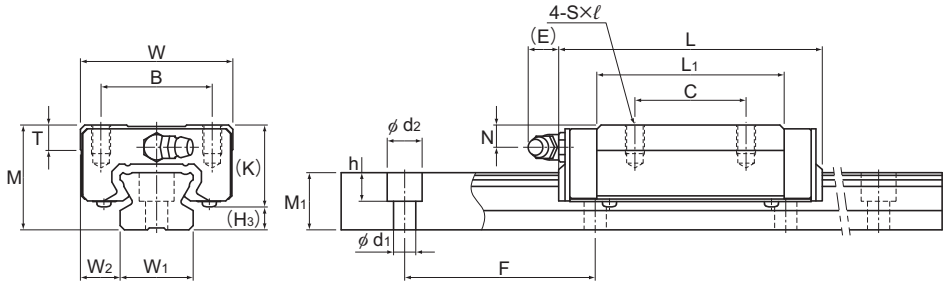
Specification Table⇒ **A1-372**



## Service Life

When using this product in temperatures higher than 100°C, always multiply the basic dynamic load rating by the temperature coefficient when calculating the rated service life. See **A1-65** for details.

# Models SR-M1W and SR-M1V



Model SR-M1W

| Model No.            | Outer dimensions |       |              | LM block dimensions |         |         |                |     |      |     |     |         |      | Grease nipple | H <sub>3</sub> |
|----------------------|------------------|-------|--------------|---------------------|---------|---------|----------------|-----|------|-----|-----|---------|------|---------------|----------------|
|                      | Height           | Width | Length       |                     |         |         |                |     |      |     |     |         |      |               |                |
|                      | M                | W     | L            | B                   | C       | S × l   | L <sub>1</sub> | T   | K    | N   | E   |         |      |               |                |
| SR 15M1V<br>SR 15M1W | 24               | 34    | 40.4<br>57   | 26                  | —<br>26 | M4 × 7  | 22.9<br>39.5   | 6   | 19.5 | 6   | 5.5 | PB1021B | 4.5  |               |                |
| SR 20M1V<br>SR 20M1W | 28               | 42    | 47.3<br>66.2 | 32                  | —<br>32 | M5 × 8  | 27.8<br>46.7   | 7.5 | 22   | 6   | 12  | B-M6F   | 6    |               |                |
| SR 25M1V<br>SR 25M1W | 33               | 48    | 59.2<br>83   | 35                  | —<br>35 | M6 × 9  | 35.2<br>59     | 8   | 26   | 7   | 12  | B-M6F   | 7    |               |                |
| SR 30M1V<br>SR 30M1W | 42               | 60    | 67.9<br>96.8 | 40                  | —<br>40 | M8 × 12 | 40.4<br>69.3   | 9   | 32.5 | 8   | 12  | B-M6F   | 9.5  |               |                |
| SR 35M1V<br>SR 35M1W | 48               | 70    | 77.6<br>111  | 50                  | —<br>50 | M8 × 12 | 45.7<br>79     | 13  | 36.5 | 8.5 | 12  | B-M6F   | 11.5 |               |                |

## Model number coding

**SR30 M1 W 2 UU C0 +1160L Y P T - II**

Model number

Type of LM block

Contamination protection accessory symbol (\*1)

LM rail length (in mm)

Applied to only 15 and 25

Symbol for LM rail jointed use

Symbol for No. of rails used on the same plane (\*4)

Symbol for high temperature type LM Guide

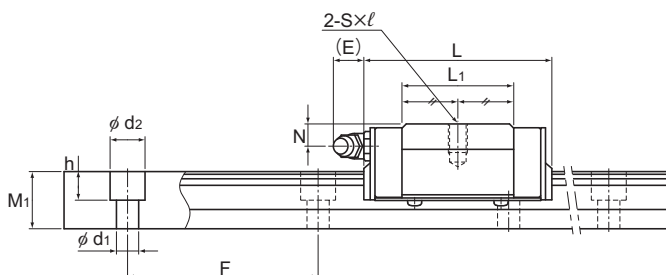
No. of LM blocks used on the same rail

Radial clearance symbol (\*2)  
Normal (No symbol)  
Light preload (C1)  
Medium preload (C0)

Accuracy symbol (\*3)  
Normal grade (No Symbol)/High accuracy grade (H)  
Precision grade (P)/Super precision grade (SP)  
Ultra precision grade (UP)

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-72**. (\*3) See **A1-77**. (\*4) See **A1-13**.

Note) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.)



Model SR-M1V

Unit: mm

|    | LM rail dimensions                   |                              |                             |                                                  |              |                          | Basic load rating                                                                                   |                  | Static permissible moment kN·m*                                                                     |                  |                                                                                                     |                 |                    |                     | Mass |  |
|----|--------------------------------------|------------------------------|-----------------------------|--------------------------------------------------|--------------|--------------------------|-----------------------------------------------------------------------------------------------------|------------------|-----------------------------------------------------------------------------------------------------|------------------|-----------------------------------------------------------------------------------------------------|-----------------|--------------------|---------------------|------|--|
|    | Width<br><br>W <sub>1</sub><br>±0.05 | Height<br><br>W <sub>2</sub> | Pitch<br><br>M <sub>1</sub> | Length*<br><br>d <sub>1</sub> ×d <sub>2</sub> ×h | C<br><br>Max | C <sub>0</sub><br><br>kN | M <sub>A</sub><br> |                  | M <sub>B</sub><br> |                  | M <sub>C</sub><br> |                 | LM block<br><br>kg | LM rail<br><br>kg/m |      |  |
|    |                                      |                              |                             |                                                  |              |                          | 1 block                                                                                             | Double blocks    | 1 block                                                                                             | Double blocks    | 1 block                                                                                             |                 |                    |                     |      |  |
|    |                                      |                              |                             |                                                  |              |                          |                                                                                                     |                  |                                                                                                     |                  |                                                                                                     |                 |                    |                     |      |  |
| 15 | 9.5                                  | 12.5                         | 60                          | 3.5×6×4.5                                        | 1240         | 9.1<br>13.8              | 11.7<br>20.5                                                                                        | 0.0344<br>0.0984 | 0.234<br>0.551                                                                                      | 0.0215<br>0.0604 | 0.149<br>0.343                                                                                      | 0.0694<br>0.122 | 0.12<br>0.2        | 1.2                 |      |  |
| 20 | 11                                   | 15.5                         | 60                          | 6×9.5×8.5                                        | 1500         | 13.4<br>19.2             | 17.2<br>28.6                                                                                        | 0.064<br>0.167   | 0.396<br>0.887                                                                                      | 0.0397<br>0.102  | 0.25<br>0.55                                                                                        | 0.135<br>0.224  | 0.2<br>0.3         | 2.1                 |      |  |
| 23 | 12.5                                 | 18                           | 60                          | 7×11×9                                           | 1500         | 21.6<br>30.9             | 26.8<br>44.7                                                                                        | 0.125<br>0.326   | 0.773<br>1.74                                                                                       | 0.0774<br>0.2    | 0.488<br>1.08                                                                                       | 0.245<br>0.408  | 0.3<br>0.4         | 2.7                 |      |  |
| 28 | 16                                   | 23                           | 80                          | 7×11×9                                           | 1500         | 29.5<br>45.6             | 34.4<br>64.4                                                                                        | 0.173<br>0.564   | 1.15<br>2.92                                                                                        | 0.108<br>0.346   | 0.735<br>1.8                                                                                        | 0.376<br>0.703  | 0.5<br>0.8         | 4.3                 |      |  |
| 34 | 18                                   | 27.5                         | 80                          | 9×14×12                                          | 1500         | 40.9<br>60.4             | 46.7<br>81.8                                                                                        | 0.275<br>0.785   | 1.79<br>4.27                                                                                        | 0.171<br>0.482   | 1.14<br>2.65                                                                                        | 0.615<br>1.08   | 0.8<br>1.2         | 6.4                 |      |  |

Note1) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-374**.)

Static permissible moment\* 1 block: the static permissible moment with one LM block

Double blocks: static permissible moment when two LM blocks are in close contact with each other

Total block length L

: The total block length L shown in the table is the length with the dust proof parts, code UU or SS.

Note2) For models SR15 and 25, two types of rails with different mounting hole dimensions are offered (see Table1).

When, replacing this model with model SSR, pay attention to the mounting hole dimension of the LM rail.

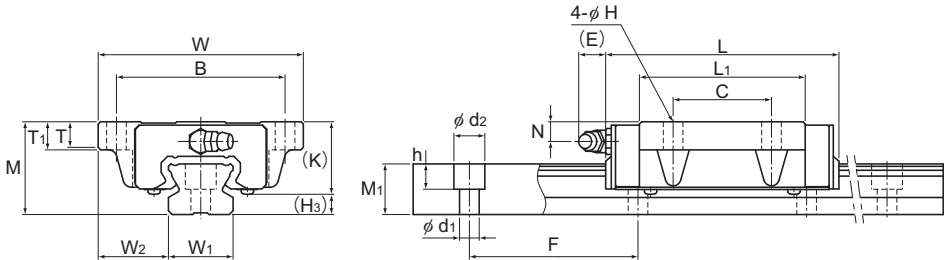
Contact THK for details.

Note3) The basic load rating in the dimension table is for a load in the radial direction. Use Table7 on **A1-59** to calculate the load rating for loads in the reverse radial direction or lateral direction.

Table1 The dimension of the rail mounting hole

| Model No. | Standard rail      | Semi-Standard rail |
|-----------|--------------------|--------------------|
| SR 15     | For M3 (No symbol) | For M4 (Symbol Y)  |
| SR 25     | For M6 (Symbol Y)  | For M5 (No symbol) |

# Models SR-M1TB and SR-M1SB



Model SR-M1TB

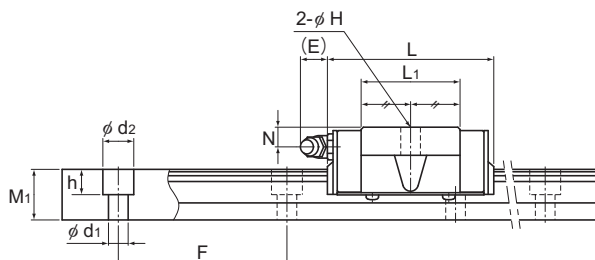
| Model No.              | Outer dimensions |       |              | LM block dimensions |         |     |                |      |                |      |     |     |               | H <sub>3</sub> |
|------------------------|------------------|-------|--------------|---------------------|---------|-----|----------------|------|----------------|------|-----|-----|---------------|----------------|
|                        | Height           | Width | Length       | B                   | C       | H   | L <sub>1</sub> | T    | T <sub>1</sub> | K    | N   | E   | Grease nipple |                |
|                        | M                | W     | L            |                     |         |     |                |      |                |      |     |     |               |                |
| SR 15M1SB<br>SR 15M1TB | 24               | 52    | 40.4<br>57   | 41                  | —<br>26 | 4.5 | 22.9<br>39.5   | 6.1  | 7              | 19.5 | 6   | 5.5 | PB1021B       | 4.5            |
| SR 20M1SB<br>SR 20M1TB | 28               | 59    | 47.3<br>66.2 | 49                  | —<br>32 | 5.5 | 27.8<br>46.7   | 8    | 9              | 22   | 6   | 12  | B-M6F         | 6              |
| SR 25M1SB<br>SR 25M1TB | 33               | 73    | 59.2<br>83   | 60                  | —<br>35 | 7   | 35.2<br>59     | 9    | 10             | 26   | 7   | 12  | B-M6F         | 7              |
| SR 30M1SB<br>SR 30M1TB | 42               | 90    | 67.9<br>96.8 | 72                  | —<br>40 | 9   | 40.4<br>69.3   | 8.7  | 10             | 32.5 | 8   | 12  | B-M6F         | 9.5            |
| SR 35M1SB<br>SR 35M1TB | 48               | 100   | 77.6<br>111  | 82                  | —<br>50 | 9   | 45.7<br>79     | 11.2 | 13             | 36.5 | 8.5 | 12  | B-M6F         | 11.5           |

## Model number coding

|                                           |                                        |                                                                                                 |                                                                                                                                                          |                           |                                |                                                     |          |          |          |            |
|-------------------------------------------|----------------------------------------|-------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|--------------------------------|-----------------------------------------------------|----------|----------|----------|------------|
| <b>SR30</b>                               | <b>M1</b>                              | <b>W</b>                                                                                        | <b>2</b>                                                                                                                                                 | <b>UU</b>                 | <b>C0</b>                      | <b>+1000L</b>                                       | <b>Y</b> | <b>P</b> | <b>T</b> | <b>-II</b> |
| Model number                              | Type of LM block                       | Contamination protection accessory symbol (*1)                                                  | LM rail length (in mm)                                                                                                                                   | Applied to only 15 and 25 | Symbol for LM rail jointed use | Symbol for No. of rails used on the same plane (*4) |          |          |          |            |
| Symbol for high temperature type LM Guide | No. of LM blocks used on the same rail | Radial clearance symbol (*2)<br>Normal (No symbol)<br>Light preload (C1)<br>Medium preload (C0) | Accuracy symbol (*3)<br>Normal grade (No Symbol)/High accuracy grade (H)<br>Precision grade (P)/Super precision grade (SP)<br>Ultra precision grade (UP) |                           |                                |                                                     |          |          |          |            |

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-72**. (\*3) See **A1-77**. (\*4) See **A1-13**.

Note) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.)



Model SR-M1SB

Unit: mm

|    | LM rail dimensions                   |                              |                             |                  |                                                  |              | Basic load rating |                  | Static permissible moment kN•m*                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                       | Mass                   |            |
|----|--------------------------------------|------------------------------|-----------------------------|------------------|--------------------------------------------------|--------------|-------------------|------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------|------------------------|------------|
|    | Width<br><br>W <sub>1</sub><br>±0.05 | Height<br><br>W <sub>2</sub> | Pitch<br><br>M <sub>1</sub> | Length*<br><br>F | Length*<br><br>d <sub>1</sub> ×d <sub>2</sub> ×h | C<br><br>Max | C                 | C <sub>0</sub>   | M <sub>A</sub>                                                                    |                                                                                   | M <sub>B</sub>                                                                    |                                                                                   | M <sub>C</sub>                                                                    | LM<br>block<br><br>kg | LM<br>rail<br><br>kg/m |            |
|    |                                      |                              |                             |                  |                                                  |              |                   |                  |  |  |  |  |  |                       |                        |            |
|    |                                      |                              |                             |                  |                                                  |              |                   |                  |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                       |                        | 1<br>block |
| 15 | 18.5                                 | 12.5                         | 60                          | 3.5×6×4.5        | 1240                                             | 9.1<br>13.8  | 11.7<br>20.5      | 0.0344<br>0.0984 | 0.234<br>0.551                                                                    | 0.0215<br>0.0604                                                                  | 0.149<br>0.343                                                                    | 0.0694<br>0.122                                                                   | 0.12<br>0.2                                                                       | 1.2                   |                        |            |
| 20 | 19.5                                 | 15.5                         | 60                          | 6×9.5×8.5        | 1500                                             | 13.4<br>19.2 | 17.2<br>28.6      | 0.064<br>0.167   | 0.396<br>0.887                                                                    | 0.0397<br>0.102                                                                   | 0.25<br>0.55                                                                      | 0.135<br>0.224                                                                    | 0.2<br>0.3                                                                        | 2.1                   |                        |            |
| 23 | 25                                   | 18                           | 60                          | 7×11×9           | 1500                                             | 21.6<br>30.9 | 26.8<br>44.7      | 0.125<br>0.326   | 0.773<br>1.74                                                                     | 0.0774<br>0.2                                                                     | 0.488<br>1.08                                                                     | 0.245<br>0.408                                                                    | 0.3<br>0.4                                                                        | 2.7                   |                        |            |
| 28 | 31                                   | 23                           | 80                          | 7×11×9           | 1500                                             | 29.5<br>45.6 | 34.4<br>64.4      | 0.173<br>0.564   | 1.15<br>2.92                                                                      | 0.108<br>0.346                                                                    | 0.735<br>1.8                                                                      | 0.376<br>0.703                                                                    | 0.5<br>0.8                                                                        | 4.3                   |                        |            |
| 34 | 33                                   | 27.5                         | 80                          | 9×14×12          | 1500                                             | 40.9<br>60.4 | 46.7<br>81.8      | 0.275<br>0.785   | 1.79<br>4.27                                                                      | 0.171<br>0.482                                                                    | 1.14<br>2.65                                                                      | 0.615<br>1.08                                                                     | 0.8<br>1.2                                                                        | 6.4                   |                        |            |

Note1) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-374**.)

Static permissible moment\* 1 block: the static permissible moment with one LM block

Double blocks: static permissible moment when two LM blocks are in close contact with each other

Total block length L

: The total block length L shown in the table is the length with the dust proof parts, code UU or SS.

Note2) For models SR15 and 25, two types of rails with different mounting hole dimensions are offered (see Table1).

When, replacing this model with model SSR, pay attention to the mounting hole dimension of the LM rail.

Contact THK for details.

Note3) The basic load rating in the dimension table is for a load in the radial direction. Use Table7 on **A1-59** to calculate the load rating for loads in the reverse radial direction or lateral direction.

Table1 The dimension of the rail mounting hole

| Model No. | Standard rail      | Semi-Standard rail |
|-----------|--------------------|--------------------|
| SR 15     | For M3 (No symbol) | For M4 (Symbol Y)  |
| SR 25     | For M6 (Symbol Y)  | For M5 (No symbol) |

# Standard Length and Maximum Length of the LM Rail

Table1 shows the standard lengths and the maximum lengths of model SR-M1 variations. If the maximum length of the desired LM rail exceeds them, jointed rails will be used. Contact THK for details.

For special rail lengths, it is recommended to use a value corresponding to the G,g dimension from the table. As the G,g dimension increases, this portion becomes less stable, and the accuracy performance is severely impacted.

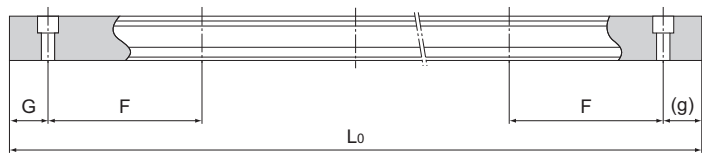


Table1 Standard Length and Maximum Length of the LM Rail for Model SR-M1 Unit: mm

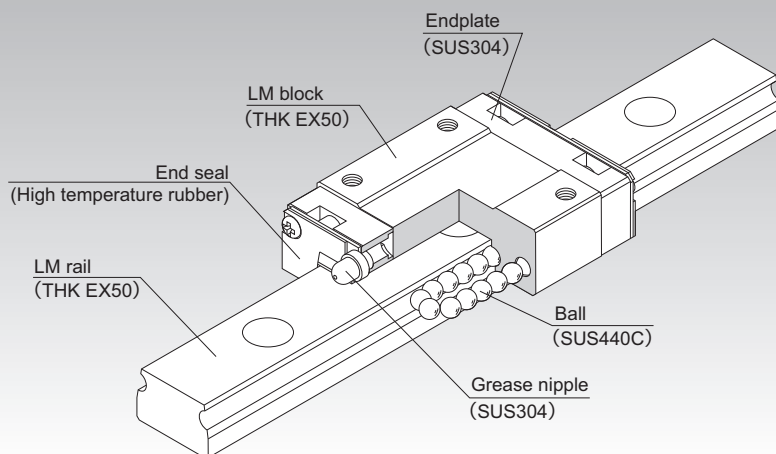
| Model No.                         | SR 15M1 | SR 20M1 | SR 25M1 | SR 30M1 | SR 35M1 |
|-----------------------------------|---------|---------|---------|---------|---------|
| LM rail standard length ( $L_0$ ) | 160     | 220     | 220     | 280     | 280     |
|                                   | 220     | 280     | 280     | 360     | 360     |
|                                   | 280     | 340     | 340     | 440     | 440     |
|                                   | 340     | 400     | 400     | 520     | 520     |
|                                   | 400     | 460     | 460     | 600     | 600     |
|                                   | 460     | 520     | 520     | 680     | 680     |
|                                   | 520     | 580     | 580     | 760     | 760     |
|                                   | 580     | 640     | 640     | 840     | 840     |
|                                   | 640     | 700     | 700     | 920     | 920     |
|                                   | 700     | 760     | 760     | 1000    | 1000    |
|                                   | 760     | 820     | 820     | 1080    | 1080    |
|                                   | 820     | 940     | 940     | 1160    | 1160    |
|                                   | 940     | 1000    | 1000    | 1240    | 1240    |
|                                   | 1000    | 1060    | 1060    | 1320    | 1320    |
|                                   | 1060    | 1120    | 1120    | 1400    | 1400    |
|                                   | 1120    | 1180    | 1240    | 1480    | 1480    |
|                                   | 1180    | 1240    | 1300    |         |         |
|                                   | 1240    | 1300    | 1360    |         |         |
|                                   |         | 1360    | 1420    |         |         |
|                                   |         | 1420    | 1480    |         |         |
| Standard pitch F                  | 60      | 60      | 60      | 80      | 80      |
| G,g                               | 20      | 20      | 20      | 20      | 20      |
| Max length                        | 1240    | 1500    | 1500    | 1500    | 1500    |

Note1) The maximum length varies with accuracy grades. Contact THK for details.  
 Note2) If jointed rails are not allowed and a greater length than the maximum values above is required, contact THK.



# RSR-M1

## LM Guide High Temperature Type Model RSR-M1



**Point of Selection** **A1-10**

**Point of Design** **A1-454**

**Options** **A1-477**

**Model No.** **A1-543**

**Precautions on Use** **A1-549**

**Accessories for Lubrication** **A24-1**

**Mounting Procedure and Maintenance** **B1-89**

Equivalent moment factor **A1-43**

Rated Loads in All Directions **A1-59**

Equivalent factor in each direction **A1-61**

Radial Clearance **A1-72**

Accuracy Standards **A1-83**

Shoulder Height of the Mounting Base and the Corner Radius **A1-469**

Permissible Error of the Mounting Surface **A1-471**

Flatness of the Mounting Surface **A1-472**

Dimensions of Each Model with an Option Attached **A1-491**

## Structure and Features

Balls roll in two rows of raceways precision-ground on an LM rail and an LM block, and endplates incorporated in the LM block allow the balls to circulate.

High temperature type miniature LM Guide model RSR-M1 is capable of being used at service temperature up to 150°C thanks to THK's unique technologies in material, heat treatment and lubrication.

### [Maximum Service Temperature: 150°C]

Use of stainless steel in the endplates and high temperature rubber in the end seals achieves the maximum service temperature of 150°C.

### [Dimensional Stability]

Since it is dimensionally stabilized, it demonstrates superb dimensional stability after being heated or cooled (note that it shows linear expansion at high temperature).

### [Highly Corrosion Resistant]

Since the LM block, LM rail and balls use stainless steel, which is highly corrosion resistant, this model is optimal for clean room applications.

### [High Temperature Grease]

This model uses high temperature grease that shows little grease-based fluctuation in rolling resistance even if temperature changes from low to high levels.

## Thermal Characteristics of LM Rail and LM Block Materials

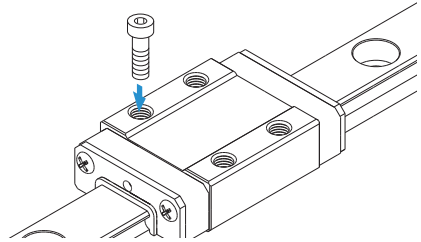
- Specific heat capacity: 0.481 J/(g•K)
- Thermal conductivity: 20.67 W/(m•K)
- Average coefficient of linear expansion:  $11.8 \times 10^{-6}/^{\circ}\text{C}$

## Types and Features

### Models RSR-M1, RSR-M1K, M1V

Specification Table⇒ **A1-380**

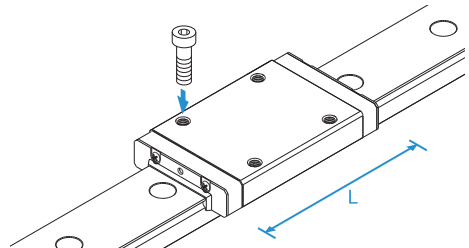
This model is a standard type.



### Model RSR-M1N

Specification Table⇒ **A1-380**

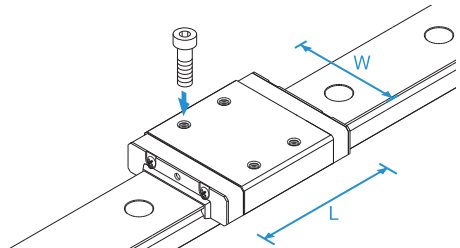
It has a longer overall LM block length (L) and a greater rated load than standard types.



### Models RSR-M1W, M1WV

Specification Table⇒ **A1-382**

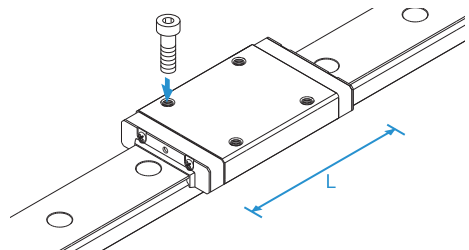
These models have greater overall LM block lengths (L), broader widths (W) and greater rated loads and permissible moments than standard types.



### Model RSR-M1WN

Specification Table⇒ **A1-382**

It has a longer overall LM block length (L), a greater rated load than standard types. Achieves the greatest load capacity among the high temperature type miniature LM Guide models.



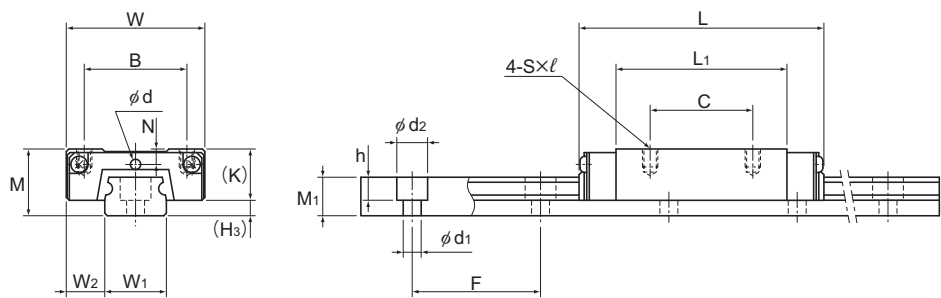
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## Service Life

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When using this product in temperatures higher than 100°C, always multiply the basic dynamic load rating by the temperature coefficient when calculating the rated service life. See **A1-65** for details.

# Models RSR-M1K, RSR-M1V and RSR-M1N



Models RSR9M1K/9M1N and RSR12M1V/M1N

| Model No.              | Outer dimensions |       |              | LM block dimensions |          |        |                |     |      |     |            |               |               | H <sub>3</sub> |
|------------------------|------------------|-------|--------------|---------------------|----------|--------|----------------|-----|------|-----|------------|---------------|---------------|----------------|
|                        | Height           | Width | Length       |                     |          |        |                |     |      |     |            | Greasing hole | Grease nipple |                |
|                        | M                | W     | L            | B                   | C        | S×ℓ    | L <sub>1</sub> | T   | K    | N   | E          | d             |               |                |
| RSR 9M1K<br>RSR 9M1N   | 10               | 20    | 30.8<br>41   | 15                  | 10<br>16 | M3×3   | 19.8<br>29.8   | —   | 7.8  | —   | —          | —             | —             | 2.2            |
| RSR 12M1V<br>RSR 12M1N | 13               | 27    | 35<br>47.7   | 20                  | 15<br>20 | M3×3.5 | 20.6<br>33.3   | —   | 10   | 3   | —          | 2             | —             | 3              |
| RSR 15M1V<br>RSR 15M1N | 16               | 32    | 43<br>61     | 25                  | 20<br>25 | M3×4   | 25.7<br>43.5   | —   | 12   | 3.5 | 3.6<br>3.7 | —             | PB107         | 4              |
| RSR 20M1V<br>RSR 20M1N | 25               | 46    | 66.5<br>86.3 | 38                  | 38       | M4×6   | 45.2<br>65     | 5.7 | 17.5 | 5   | 6.4        | —             | A-M6F         | 7.5            |

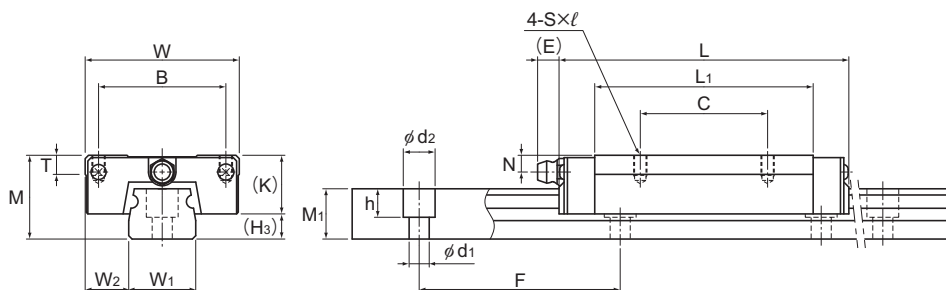
## Model number coding

|                                             |                                           |                  |                                                                          |                        |                                                                                                 |                                |                                                     |          |            |
|---------------------------------------------|-------------------------------------------|------------------|--------------------------------------------------------------------------|------------------------|-------------------------------------------------------------------------------------------------|--------------------------------|-----------------------------------------------------|----------|------------|
| <b>2</b>                                    | <b>RSR15</b>                              | <b>M1</b>        | <b>V</b>                                                                 | <b>UU</b>              | <b>C1</b>                                                                                       | <b>+230L</b>                   | <b>P</b>                                            | <b>T</b> | <b>-II</b> |
| Model number                                |                                           | Type of LM block | Contamination protection accessory symbol (*2)                           | LM rail length (in mm) |                                                                                                 | Symbol for LM rail jointed use | Symbol for No. of rails used on the same plane (*5) |          |            |
| No. of LM blocks used on the same rail (*1) | Symbol for high temperature type LM Guide |                  | Radial clearance symbol (*3)<br>Normal (No symbol)<br>Light preload (C1) |                        | Accuracy symbol (*4)<br>Normal grade (No Symbol)/High accuracy grade (H)<br>Precision grade (P) |                                |                                                     |          |            |

(\*1) No symbol for 1 LM block. (\*2) See contamination protection accessories on **A1-516**.

(\*3) See **A1-72**. (\*4) See **A1-83**. (\*5) See **A1-13**.

Note) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.)



Models RSR15 and 20M1V/M1N

Unit: mm

|    | LM rail dimensions             |                |                |       |                                     |         | Basic load rating |                | Static permissible moment N·m* |               |              |               |              |                | Mass     |         |
|----|--------------------------------|----------------|----------------|-------|-------------------------------------|---------|-------------------|----------------|--------------------------------|---------------|--------------|---------------|--------------|----------------|----------|---------|
|    | Width                          |                | Height         | Pitch |                                     | Length* | C                 | C <sub>0</sub> |                                |               |              |               |              |                | LM block | LM rail |
|    | W <sub>1</sub>                 | W <sub>2</sub> | M <sub>1</sub> | F     | d <sub>1</sub> × d <sub>2</sub> × h | Max     | kN                | kN             | 1 block                        | Double blocks | 1 block      | Double blocks | 1 block      |                | kg       | kg/m    |
| 9  | <sup>0</sup> <sub>-0.02</sub>  | 5.5            | 5.5            | 20    | 3.5 × 6 × 3.3                       | 1240    | 1.47<br>2.6       | 2.25<br>3.96   | 7.34<br>18.4                   | 43.3<br>97    | 7.34<br>18.4 | 43.3<br>97    | 10.4<br>18.4 | 0.018<br>0.027 |          | 0.32    |
| 12 | <sup>0</sup> <sub>-0.025</sub> | 7.5            | 7.5            | 25    | 3.5 × 6 × 4.5                       | 1430    | 2.65<br>4.3       | 4.02<br>6.65   | 11.4<br>28.9                   | 74.9<br>163   | 10.1<br>25.5 | 67.7<br>145   | 19.2<br>31.8 | 0.037<br>0.055 |          | 0.58    |
| 15 | <sup>0</sup> <sub>-0.025</sub> | 8.5            | 9.5            | 40    | 3.5 × 6 × 4.5                       | 1600    | 4.41<br>7.16      | 6.57<br>10.7   | 23.7<br>63.1                   | 149<br>330    | 21.1<br>55.6 | 135<br>293    | 38.8<br>63   | 0.069<br>0.093 |          | 0.925   |
| 20 | <sup>0</sup> <sub>-0.03</sub>  | 13             | 15             | 60    | 6 × 9.5 × 8.5                       | 1800    | 8.82<br>14.2      | 12.7<br>20.6   | 75.4<br>171                    | 435<br>897    | 66.7<br>151  | 389<br>795    | 96.6<br>157  | 0.245<br>0.337 |          | 1.95    |

Note1) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-384**.)

Static permissible moment\* 1 block: the static permissible moment with one LM block

Double blocks: static permissible moment when two LM blocks are in close contact with each other

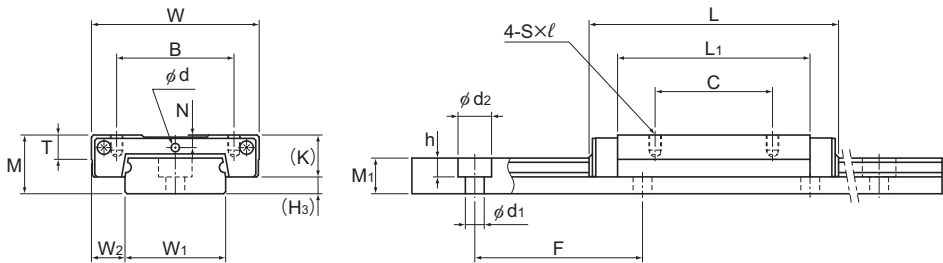
Total block length L

: The total block length L shown in the table is the length with the dust-proof parts (code: UU).

Please be aware that balls will fall out if the LM block is removed from the LM rail.

Note2) The basic load rating in the dimension table is for a load in the radial direction. Use Table7 on **A1-59** to calculate the load rating for loads in the reverse radial direction or lateral direction.

# Models RSR-M1WV and RSR-M1WN



Models RSR9 and 12M1WV/M1WN

| Model No.                | Outer dimensions |       |              | LM block dimensions |          |                |                |     |     |     |               |               |       | H <sub>3</sub> |
|--------------------------|------------------|-------|--------------|---------------------|----------|----------------|----------------|-----|-----|-----|---------------|---------------|-------|----------------|
|                          | Height           | Width | Length       |                     |          |                |                |     |     |     | Greasing hole | Grease nipple |       |                |
|                          | M                | W     | L            | B                   | C        | S×ℓ            | L <sub>1</sub> | T   | K   | N   | E             | d             |       |                |
| RSR 9M1WV<br>RSR 9M1WN   | 12               | 30    | 39<br>50.7   | 21<br>23            | 12<br>24 | M2.6×3<br>M3×3 | 27<br>38.7     | —   | 7.8 | 2   | —             | 1.6           | —     | 4.2            |
| RSR 12M1WV<br>RSR 12M1WN | 14               | 40    | 44.5<br>59.5 | 28                  | 15<br>28 | M3×3.5         | 30.9<br>45.9   | 4.5 | 10  | 3   | —             | 2             | —     | 4              |
| RSR 15M1WV<br>RSR 15M1WN | 16               | 60    | 55.5<br>74.5 | 45                  | 20<br>35 | M4×4.5         | 38.9<br>57.9   | 5.6 | 12  | 3.5 | 3             | —             | PB107 | 4              |

## Model number coding

**2 RSR12 M1 WN UU C1 +310L P T**

- No. of LM blocks used on the same rail (\*1)

Model number
- Symbol for high temperature type LM Guide

Type of LM block
- Contamination protection accessory symbol (\*2)

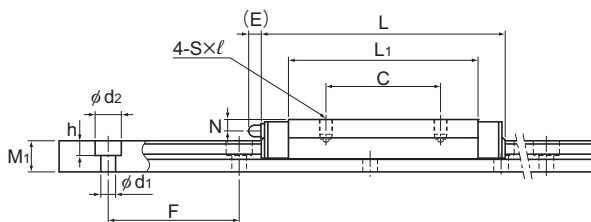
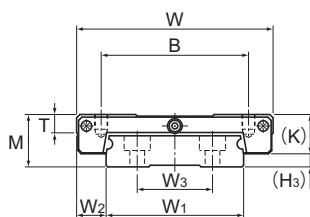
Radial clearance symbol (\*3)

Light preload (C1)
- LM rail length (in mm)
- Accuracy symbol (\*4)

Normal grade (No Symbol)/High accuracy grade (H)

Precision grade (P)
- Symbol for LM rail jointed use

(\*1) No symbol for 1 LM block.  
(\*2) See contamination protection accessories on **A1-516**. (\*3) See **A1-72**. (\*4) See **A1-83**.



Models RSR15M1WV/M1WN

Unit: mm

| LM rail dimensions               |                |                |                |       |                                     |         |              | Basic load rating |  | Static permissible moment N·m* |               |              |               |              |  | Mass           |         |
|----------------------------------|----------------|----------------|----------------|-------|-------------------------------------|---------|--------------|-------------------|--|--------------------------------|---------------|--------------|---------------|--------------|--|----------------|---------|
| Width                            |                |                | Height         | Pitch |                                     | Length* | C            | C <sub>0</sub>    |  |                                |               |              |               |              |  | LM block       | LM rail |
| W <sub>1</sub>                   | W <sub>2</sub> | W <sub>3</sub> | M <sub>1</sub> | F     | d <sub>1</sub> × d <sub>2</sub> × h | Max     | kN           | kN                |  | 1 block                        | Double blocks | 1 block      | Double blocks | 1 block      |  | kg             | kg/m    |
| 18 <sup>0</sup> <sub>-0.05</sub> | 6              | —              | 7.5            | 30    | 3.5 × 6 × 4.5                       | 1430    | 2.45<br>3.52 | 3.92<br>5.37      |  | 16<br>31                       | 92.9<br>161   | 16<br>31     | 92.9<br>161   | 36<br>49.4   |  | 0.035<br>0.051 | 1.08    |
| 24 <sup>0</sup> <sub>-0.05</sub> | 8              | —              | 8.5            | 40    | 4.5 × 8 × 4.5                       | 1600    | 4.02<br>5.96 | 6.08<br>9.21      |  | 24.5<br>53.9                   | 138<br>274    | 21.7<br>47.3 | 123<br>242    | 59.5<br>90.1 |  | 0.075<br>0.101 | 1.5     |
| 42 <sup>0</sup> <sub>-0.05</sub> | 9              | 23             | 9.5            | 40    | 4.5 × 8 × 4.5                       | 1800    | 6.66<br>9.91 | 9.8<br>14.9       |  | 50.3<br>110                    | 278<br>555    | 44.4<br>97.3 | 248<br>490    | 168<br>255   |  | 0.17<br>0.21   | 3       |

Note1) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-384**.)

Static permissible moment\* 1 block: the static permissible moment with one LM block

Double blocks: static permissible moment when two LM blocks are in close contact with each other

Total block length L

: The total block length L shown in the table is the length with the dust-proof parts (code: UU).

Please be aware that balls will fall out if the LM block is removed from the LM rail.

Note2) The basic load rating in the dimension table is for a load in the radial direction. Use Table7 on **A1-59** to calculate the load rating for loads in the reverse radial direction or lateral direction.

# Standard Length and Maximum Length of the LM Rail

Table1 shows the standard and maximum lengths of the RSR M1 model rail.

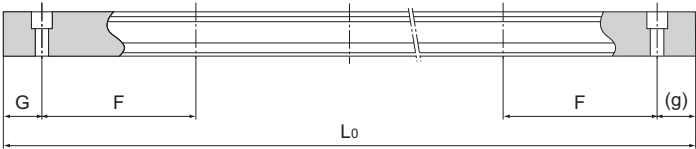


Table1 Standard Length and Maximum Length of the LM Rail for Model RSR-M1 Unit: mm

| Model No.                               | RSR 9M1 | RSR 12M1 | RSR 15M1 | RSR 20M1 | RSR 9M1W | RSR 12M1W | RSR 15M1W |
|-----------------------------------------|---------|----------|----------|----------|----------|-----------|-----------|
| LM rail<br>standard length<br>( $L_0$ ) | 55      | 70       | 70       | 220      | 50       | 70        | 110       |
|                                         | 75      | 95       | 110      | 280      | 80       | 110       | 150       |
|                                         | 95      | 120      | 150      | 340      | 110      | 150       | 190       |
|                                         | 115     | 145      | 190      | 460      | 140      | 190       | 230       |
|                                         | 135     | 170      | 230      | 640      | 170      | 230       | 270       |
|                                         | 155     | 195      | 270      | 880      | 200      | 270       | 310       |
|                                         | 175     | 220      | 310      | 1000     | 260      | 310       | 430       |
|                                         | 195     | 245      | 350      |          | 290      | 390       | 550       |
|                                         | 275     | 270      | 390      |          | 320      | 470       | 670       |
|                                         | 375     | 320      | 430      |          |          | 550       | 790       |
|                                         |         | 370      | 470      |          |          |           |           |
|                                         |         | 470      | 550      |          |          |           |           |
|                                         |         | 570      | 670      |          |          |           |           |
|                                         |         |          | 870      |          |          |           |           |
| Standard pitch F                        | 20      | 25       | 40       | 60       | 30       | 40        | 40        |
| G,g                                     | 7.5     | 10       | 15       | 20       | 10       | 15        | 15        |
| Max length                              | 1240    | 1430     | 1600     | 1800     | 1430     | 1600      | 1800      |

Note) The maximum length varies with accuracy grades. Contact THK for details.

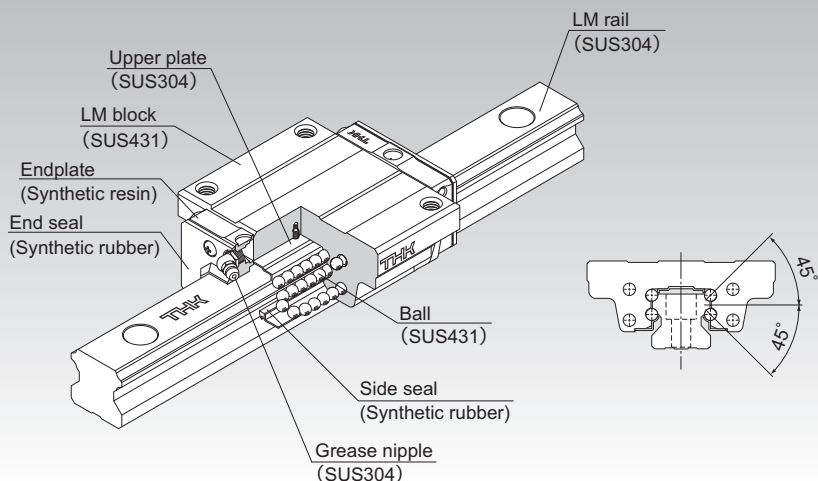
## Prevention of LM block from falling off of LM rail

In models RSR-M1/RSR-M1W, the balls fall out if the LM block comes off the LM rail. For this reason, LM Guide assemblies are delivered with a part which prevents the LM block from coming off the rail. If you remove this part when using the product, please take precautions to avoid overrunning the blocks off of the rail.



# HSR-M2

## LM Guide High Corrosion Resistance Type Model HSR-M2



**Point of Selection** **A1-10**

**Point of Design** **A1-454**

**Options** **A1-477**

**Model No.** **A1-543**

**Precautions on Use** **A1-549**

**Accessories for Lubrication** **A24-1**

**Mounting Procedure and Maintenance** **B1-89**

Equivalent moment factor **A1-43**

Rated Loads in All Directions **A1-59**

Equivalent factor in each direction **A1-61**

Radial Clearance **A1-73**

Accuracy Standards **A1-77**

Shoulder Height of the Mounting Base and the Corner Radius **A1-465**

Permissible Error of the Mounting Surface **A1-470**

Dimensions of Each Model with an Option Attached **A1-491**

## Structure and Features

Balls roll in four rows of raceways precision-ground on an LM rail and an LM block, and endplates incorporated in the LM block allow the balls to circulate.

Each row of balls is placed at a contact angle of  $45^\circ$  so that the rated loads applied to the LM block are uniform in the four directions (radial, reverse radial and lateral directions), enabling the LM Guide to be used in all orientations.

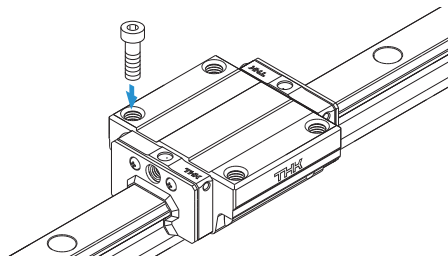
The LM rail, LM block and balls are made of highly corrosion resistant stainless steel and the other metal parts are made of stainless steel, allowing superb corrosion resistance to be achieved. As a result, the need for surface treatment is eliminated.

## Types and Features

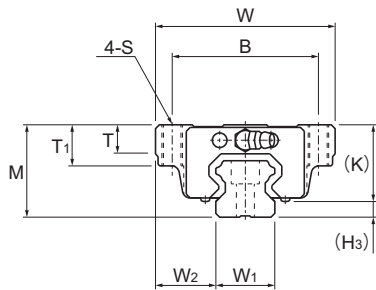
### Model HSR-M2A

The ☐ange of its LM block has tapped holes.

Specification Table⇒ **A1-388**



# Model HSR-M2A



| Model No. | Outer dimensions |       |        | LM block dimensions |    |    |                |     |                |      |     |     |               | H <sub>3</sub> |
|-----------|------------------|-------|--------|---------------------|----|----|----------------|-----|----------------|------|-----|-----|---------------|----------------|
|           | Height           | Width | Length |                     |    |    |                |     |                |      |     |     | Grease nipple |                |
|           | M                | W     | L      | B                   | C  | S  | L <sub>1</sub> | T   | T <sub>1</sub> | K    | N   | E   |               |                |
| HSR 15M2A | 24               | 47    | 56.6   | 38                  | 30 | M5 | 38.8           | 6.5 | 11             | 19.3 | 4.3 | 5.5 | PB1021B       | 4.7            |
| HSR 20M2A | 30               | 63    | 74     | 53                  | 40 | M6 | 50.8           | 9.5 | 10             | 26   | 5   | 12  | B-M6F         | 4              |
| HSR 25M2A | 36               | 70    | 83.1   | 57                  | 45 | M8 | 59.5           | 11  | 16             | 30.5 | 6   | 12  | B-M6F         | 5.5            |

Note) For the high corrosion resistance type LM Guide, a stainless steel end plate is optionally available. (symbol···I)

## Model number coding

**HSR20M2 A 2 UU C1 I +820L P T -II**

Model number  
(high corrosion  
resistance type  
LM Guide)

Type of  
LM block

No. of LM blocks  
used on the same rail

Contamination  
protection  
accessory  
symbol (\*1)

Radial clearance symbol (\*2)  
Normal (No symbol)  
Light preload (C1)

End plate is  
made of  
stainless steel

LM rail length  
(in mm)

Symbol  
for LM rail  
jointed use

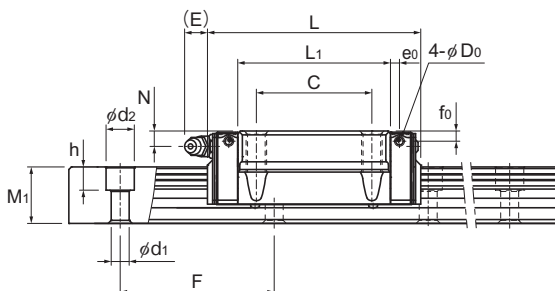
Accuracy symbol (\*3)

Normal grade (No Symbol)/High accuracy grade (H)  
Precision grade (P)/Super precision grade (SP)  
Ultra precision grade (UP)

Symbol for  
No. of rails used  
on the same plane (\*4)

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-73**. (\*3) See **A1-77**. (\*4) See **A1-13**.

Note) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.)



Unit: mm

| LM rail dimensions      |                |                |       |                                   |         | Basic load rating |                | Static permissible moment N•m* |               |                |               |                | Mass     |         |
|-------------------------|----------------|----------------|-------|-----------------------------------|---------|-------------------|----------------|--------------------------------|---------------|----------------|---------------|----------------|----------|---------|
| Width                   |                | Height         | Pitch |                                   | Length* | C                 | C <sub>0</sub> | M <sub>A</sub>                 |               | M <sub>B</sub> |               | M <sub>C</sub> | LM block | LM rail |
| W <sub>1</sub><br>±0.05 | W <sub>2</sub> | M <sub>1</sub> | F     | d <sub>1</sub> ×d <sub>2</sub> ×h | Max     | kN                | kN             | 1 block                        | Double blocks | 1 block        | Double blocks | 1 block        | kg       | kg/m    |
| 15                      | 16             | 15             | 60    | 4.5×7.5×5.3                       | 1000    | 2.11              | 2.04           | 12.1                           | 68.6          | 12.1           | 68.6          | 12.7           | 0.2      | 1.5     |
| 20                      | 21.5           | 18             | 60    | 6×9.5×8.5                         | 1000    | 3.89              | 3.57           | 28.5                           | 156           | 28.5           | 156           | 30.2           | 0.35     | 2.3     |
| 23                      | 23.5           | 22             | 60    | 7×11×9                            | 1000    | 5.57              | 5.15           | 46.1                           | 256.5         | 46.1           | 256.5         | 51.6           | 0.59     | 3.3     |

Note) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-390**.)

Static permissible moment\* 1 block: the static permissible moment with one LM block

Double blocks: static permissible moment when two LM blocks are in close contact with each other

Total block length L

: The total block length L shown in the table is the length with the dust proof parts, code UU or SS.

The basic load rating of the high corrosion resistance type LM Guide is smaller than ordinary stainless steel LM Guides.

Please take care.

## Standard Length and Maximum Length of the LM Rail

Table1 shows the standard lengths and the maximum lengths of model HSR-M2 variations. If the maximum length of the desired LM rail exceeds them, jointed rails will be used. Contact THK for details.

For special rail lengths, it is recommended to use a value corresponding to the G,g dimension from the table. As the G,g dimension increases, this portion becomes less stable, and the accuracy performance is severely impacted.

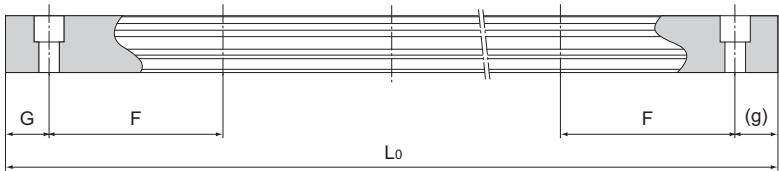


Table1 Standard Length and Maximum Length of the LM Rail for Model HSR-M2

Unit: mm

| Model No.                         | HSR 15M2 | HSR 20M2 | HSR 25M2 |
|-----------------------------------|----------|----------|----------|
| LM rail standard length ( $L_0$ ) | 160      | 280      | 280      |
|                                   | 280      | 460      | 460      |
|                                   | 460      | 640      | 640      |
|                                   | 640      | 820      | 820      |
|                                   |          |          | 1000     |
| Standard pitch F                  | 60       | 60       | 60       |
| G,g                               | 20       | 20       | 20       |
| Max length                        | 1000     | 1000     | 1000     |

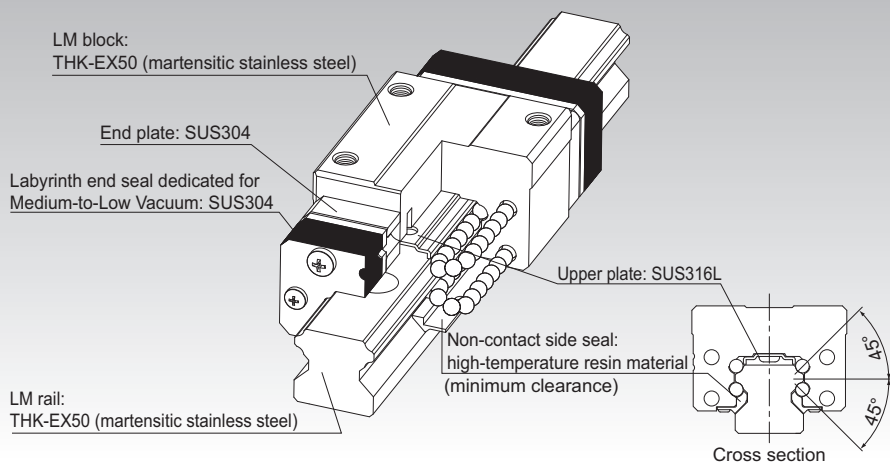
Note1) The maximum length varies with accuracy grades. Contact THK for details.

Note2) If jointed rails are not allowed and a greater length than the maximum values above is required, contact THK.



# HSR-M1VV

## LM Guide Medium-to-low Vacuum Type Model HSR-M1VV



**Point of Selection** **A1-10**

**Point of Design** **A1-454**

**Options** **A1-477**

**Model No.** **A1-543**

**Precautions on Use** **A1-551**

**Accessories for Lubrication** **A24-1**

**Mounting Procedure and Maintenance** **B1-89**

Equivalent moment factor **A1-43**

Rated Loads in All Directions **A1-59**

Equivalent factor in each direction **A1-61**

Radial Clearance **A1-72**

Accuracy Standards **A1-77**

Shoulder Height of the Mounting Base and the Corner Radius **A1-465**

Permissible Error of the Mounting Surface **A1-470**

Flatness of the Mounting Surface **A1-472**

Dimensions of Each Model with an Option Attached **A1-491**

## Structure and Features

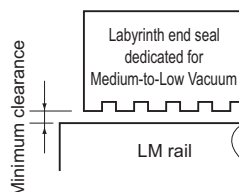
### [Features]

- Operable in various environments at pressure between atmospheric pressure and vacuum ( $10^{-3}$  [Pa]).
- Capable of withstanding baking temperature up to 200°C\*
- Use of a newly developed labyrinth end seal dedicated for Medium-to-Low Vacuum increases grease retention and allows extended use in vacuum.
- Use of grease designed for Medium-to-Low Vacuum achieves a stable rolling resistance.

\* If the baking temperature exceeds 100°C, multiply the basic load rating with the temperature coefficient.

### Structure of the labyrinth end seal dedicated for Medium-to-Low Vacuum

The labyrinth end seal dedicated for Medium-to-Low Vacuum forms a multi-stage space as shown in the figure on the right to minimize the pressure difference between adjacent stages. This reduces the outflow velocity of the oil inside the LM block to a minimum. In addition, the seal will not affect the rolling resistance since it does not contact the LM rail.

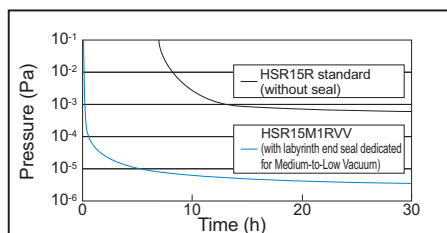


### [Achievable vacuum level]

The LM Guide for Medium-to-Low Vacuum demonstrates an excellent achievable vacuum level.

[Test conditions] Temperature: 25°C (±5°C)

|          | HSR15M1RVV                                            | HSR15R (for reference) |
|----------|-------------------------------------------------------|------------------------|
| Grease   | Grease for Medium-to-Low Vacuum                       | AFB-LF Grease          |
| Seal     | Labyrinth end seal dedicated for Medium-to-Low Vacuum | None                   |
| Endplate | Stainless steel                                       | Resin                  |



Achievable vacuum level

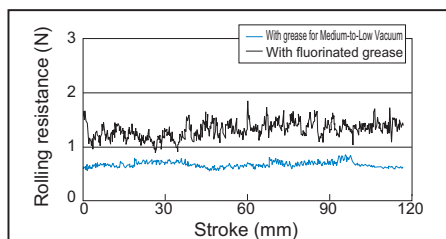
### [Rolling resistance]

The grease used in the LM Guide for Medium-to-Low Vacuum has a smaller rolling resistance than conventional fluorine grease and ensures stable rolling motion.

Specimen: HSR15M1RVV

Temperature: 25°C (±5°C)

Pressure: atmospheric pressure



Rolling resistance fluctuation

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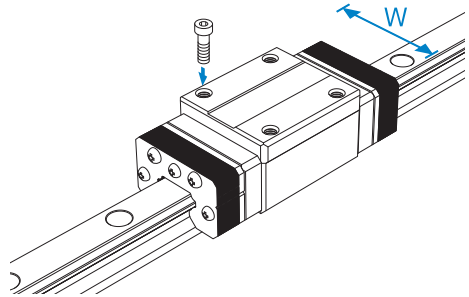
## Types and Features

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### Model HSR-M1RVV

Specification Table⇒ **A1-396**

With this type, the LM block has a smaller width (W) and tapped holes. Used in places where the space for table width is limited.



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## Precautions on Design

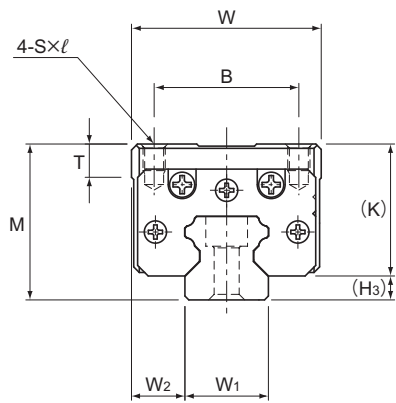
---

If a large moment is applied to a system consisting of one LM rail or one LM block per shaft, the labyrinth end seal may contact the LM rail, which could affect the system's motion.

If a moment is applied, it is recommended to use two rails with two LM blocks per rail. Contact THK for details.

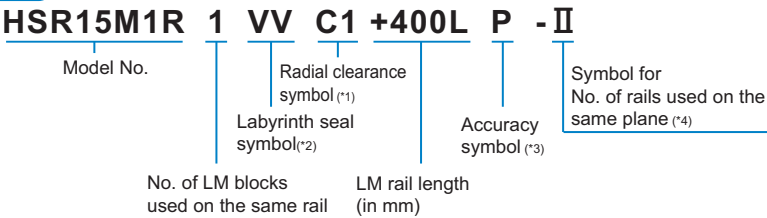


# Model HSR-M1VV



| Model No.   | Outer dimensions |       |        | LM block dimensions |    |      |                |   |      |                |
|-------------|------------------|-------|--------|---------------------|----|------|----------------|---|------|----------------|
|             | Height           | Width | Length |                     |    |      |                |   |      |                |
|             | M                | W     | L      | B                   | C  | S×ℓ  | L <sub>1</sub> | T | K    | H <sub>3</sub> |
| HSR15M1R-VV | 28               | 34    | 75     | 26                  | 26 | M4×5 | 38.8           | 6 | 23.7 | 4.3            |

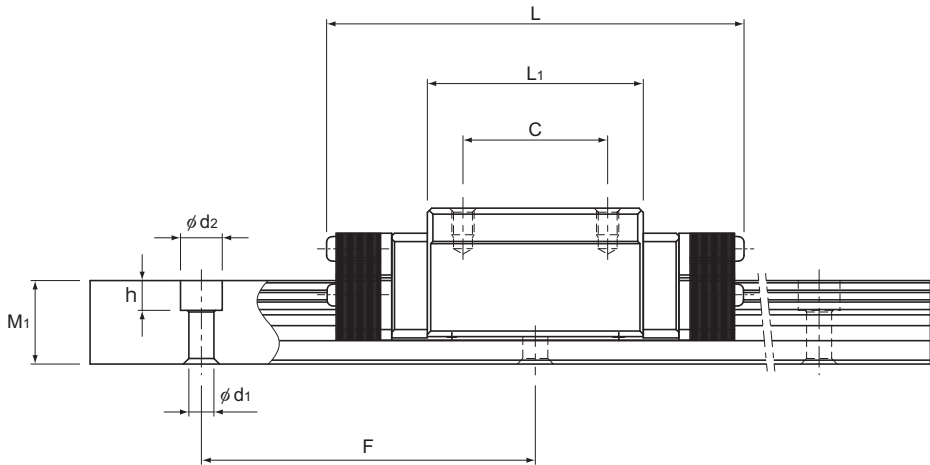
## Model number coding



(\*1) See **A1-72**. (\*2) See **A1-393**. (\*3) See **A1-77**. (\*4) See **A1-13**.

Note1) The radial clearance, maximum LM rail length and accuracy class are equal to that of model HSR.

Note2) With this model, a single-rail unit constitutes one set (i.e., the required number of sets when 2 rails are used in parallel is 2).



Unit: mm

| LM rail dimensions  |        |       |    |                             |      | Basic load rating |                | Static permissible moment $\text{kN}\cdot\text{m}^*$ |               |         |               |         | Mass     |         |
|---------------------|--------|-------|----|-----------------------------|------|-------------------|----------------|------------------------------------------------------|---------------|---------|---------------|---------|----------|---------|
| Width               | Height | Pitch |    | Length*                     |      | C                 | C <sub>0</sub> | $M_A$                                                |               | $M_B$   |               | $M_C$   | LM block | LM rail |
| $W_1$<br>$\pm 0.05$ | $W_2$  | $M_1$ | F  | $d_1 \times d_2 \times h$   | Max  | kN                | kN             | 1 block                                              | Double blocks | 1 block | Double blocks | 1 block | kg       | kg/m    |
| 15                  | 9.5    | 15    | 60 | $4.5 \times 7.5 \times 5.3$ | 1240 | 10.9              | 15.7           | 0.0945                                               | 0.527         | 0.0945  | 0.527         | 0.0998  | 0.27     | 1.5     |

Note) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-398**.)

Static permissible moment\* 1 block: the static permissible moment with one LM block

Double blocks: static permissible moment when two LM blocks are in close contact with each other  
Total block length L : The total block length L shown in the table is the length with the dust-proof parts (code: VV, with labyrinth end seal).

If a large moment is applied to a system consisting of one LM rail or one LM block per shaft, the labyrinth end seal may contact the LM rail, which could affect the system's motion.

If a moment is applied, it is recommended to use two rails with two LM blocks per rail.

Contact THK for details.

# Standard Length and Maximum Length of the LM Rail

Table1 shows the standard and maximum lengths for Model HSR-M1VV rails. If the maximum length of the desired LM rail exceeds these values, contact THK.

For special rail lengths, it is recommended to use a value corresponding to the G,g dimension from the table. As the G,g dimension increases, this portion becomes less stable, and the accuracy performance is severely impacted.

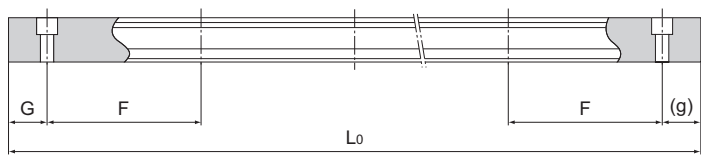


Table1 Standard Length and Maximum Length of the LM Rail for Model HSR-M1VV Unit: mm

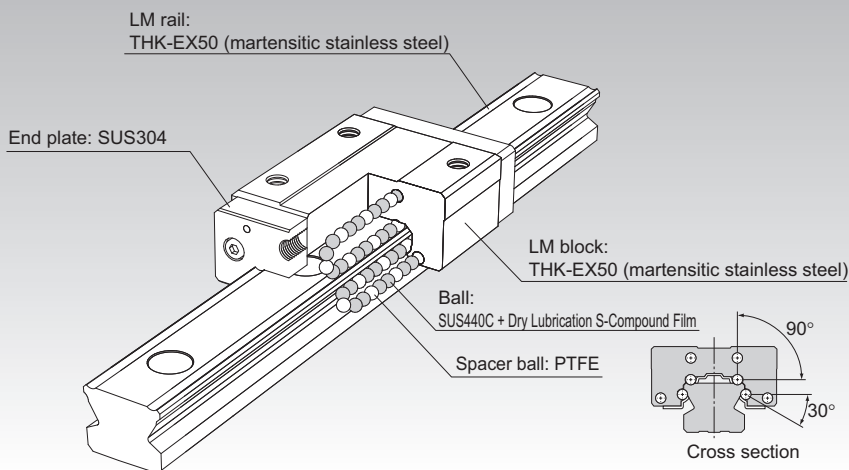
| Model No.                         | HSR15M1R-VV |
|-----------------------------------|-------------|
| LM rail standard length ( $L_0$ ) | 160         |
|                                   | 220         |
|                                   | 280         |
|                                   | 340         |
|                                   | 400         |
|                                   | 460         |
|                                   | 520         |
|                                   | 580         |
|                                   | 640         |
|                                   | 700         |
|                                   | 760         |
|                                   | 820         |
|                                   | 940         |
|                                   | 1000        |
|                                   | 1060        |
|                                   | 1120        |
|                                   | 1180        |
|                                   | 1240        |
| Standard pitch F                  | 60          |
| G,g                               | 20          |
| Max length                        | 1240        |

Note1) The maximum length varies with accuracy grades. Contact THK for details.  
Note2) If a length greater than the above maximum is required, contact THK.



# SR-MS

## LM Guide Oil-Free for Special Environments Model SR-MS



**Point of Selection** **A1-10**

**Point of Design** **A1-454**

**Options** **A1-477**

**Model No.** **A1-543**

**Precautions on Use** **A1-551**

**Accessories for Lubrication** **A24-1**

**Mounting Procedure and Maintenance** **B1-89**

Equivalent moment factor **A1-43**

Rated Loads in All Directions **A1-59**

Equivalent factor in each direction **A1-61**

Radial Clearance **A1-73**

Accuracy Standards **A1-86**

Shoulder Height of the Mounting Base and the Corner Radius **A1-463**

Permissible Error of the Mounting Surface **A1-471**

Flatness of the Mounting Surface **A1-472**

Dimensions of Each Model with an Option Attached **A1-491**

## Structure and Features

### [Structural Characteristics]

1. Uses stainless steel  
All components are composed of parts for special environments such as stainless steel.
2. Degreased and cleaned  
Special solvent is used to de-grease this model.
3. Does not use grease  
Use of highly reliable dry lubricant S-compound film for stainless steel balls achieves grease-free lubrication.



#### Greatest advantage

Suitable for applications where the vacuum level reaches  $10^{-5}$  Pa and chemical contamination (gaseous contamination such as organic matter and moisture) is not allowed.

\* Can be used at temperature up to 150°C (instantaneously 200°C).

### [What is Dry Lubrication S-Compound Film]

Dry Lubrication S-Compound Film is a fully dry lubricant developed for use under atmospheric to high-vacuum environments.

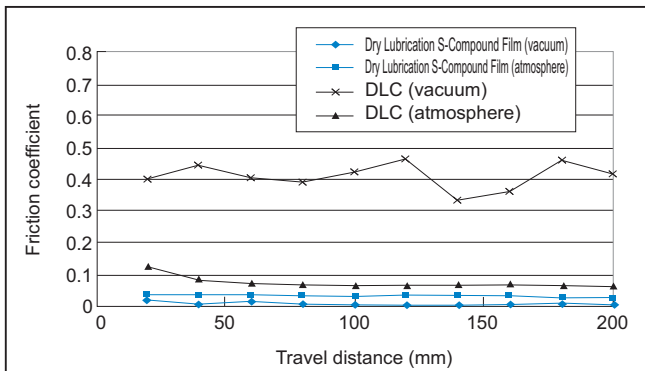
It has superior characteristics in load carrying capacity, wear resistance and sealability to other lubrication systems.

Comparison of dry lubrication material properties

| Item                                  | Friction coefficient<br>(reference value) | Wear resistance | Hardness | Service environment          |
|---------------------------------------|-------------------------------------------|-----------------|----------|------------------------------|
| Molybdenum Disulfide (hexagonal form) | 0.04                                      | △               | △        | Vacuum                       |
| Soft metal                            | 0.05 to 0.5                               | △               | △        | Atmosphere, vacuum           |
| DLC (diamond like carbon)             | 0.08 to 0.15                              | △               | ○        | Atmosphere, H <sub>2</sub> O |
| Dry Lubrication S-Compound Film       | 0.02 to 0.05                              | ○               | ○        | Atmosphere, vacuum           |

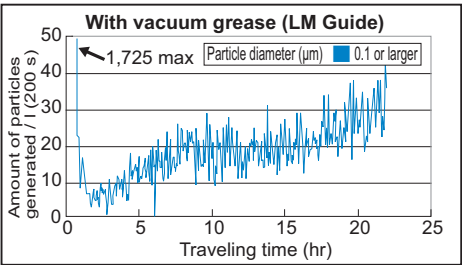
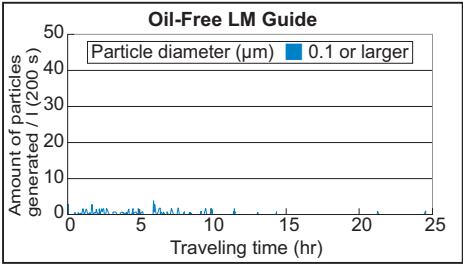
### [Low Friction]

The Oil-Free LM Guide for special environments exerts superbly low frictional properties in atmospheric to vacuum environments.



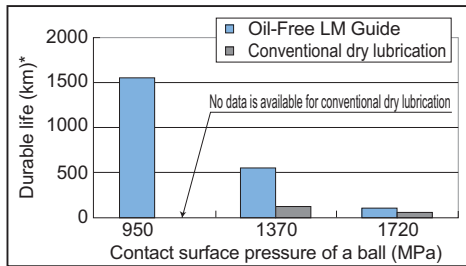
[Low Dust Generation]

The Oil-Free LM Guide for special environments exerts a lower level of dust generation than conventional vacuum grease lubricants.



[Long service life]

The Oil-Free LM Guide for special environments has a longer service life than conventional dry lubrication.



\* The durable life represents the value at a point from which the Dry Lubrication S-Compound Film is no longer effective. Note that the durable life differs from the rated service life of the LM Guide.

[Applications of the Oil-Free LM Guide for Special Environments]

| Industry                                  | Equipment                                                                 | Advantages of the oil-free LM Guide                                                                                                                                            |
|-------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Semiconductor / FPD manufacturing machine | Exposure machine, organic EL manufacturing machine, ion injection machine | <ul style="list-style-type: none"><li>• Little outgassing (water, organic matter)</li><li>• Low dust generation</li><li>• Operable at high temperature (up to 150°C)</li></ul> |

## Nominal Life Equation for the Oil-Free LM Guide

$$L_{10m} = \left( \frac{F_0}{\alpha \cdot P_c} \right)^{1.57} \times 50$$

$L_{10m}$  : Nominal life (km)  
 $F_0$  : Permissible load (N)  
 $P_c$  : Calculated load (N)  
 $\alpha$  : Modified factor

Note) The life here means the service life of the S □lm based on wear.

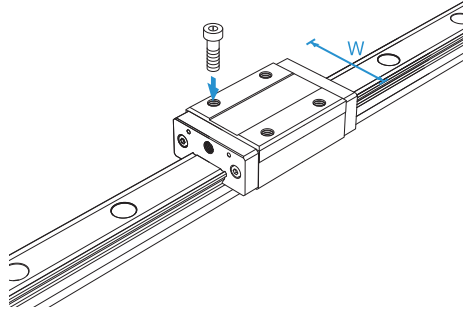
Since the service life of the S □lm may vary according to the environment or the operating conditions, customers are encouraged to evaluate and validate the life under the service environment and operating conditions at their facilities.

## Types and Features

### Model SR-MSW

With this type, the LM block has a smaller width (W) and tapped holes.

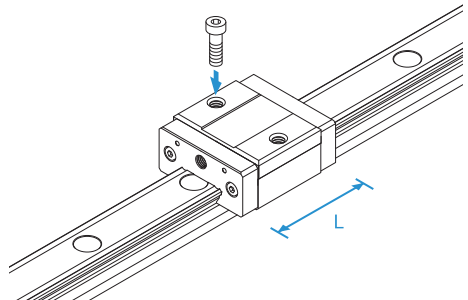
Specification Table⇒ **A1-404**



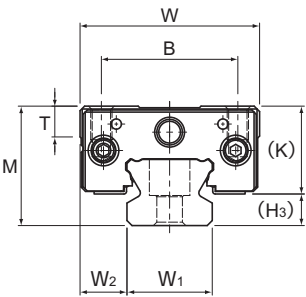
### Model SR-MSV

A space-saving type whose LM block has the same cross-sectional shape as model SR-MSW, but has a smaller overall LM block length (L).

Specification Table⇒ **A1-404**



# Models SR-MSV and SR-MSW



| Model No.          | Outer dimensions |       |              | LM block dimensions |         |        |                |     |      |  | H <sub>3</sub> |
|--------------------|------------------|-------|--------------|---------------------|---------|--------|----------------|-----|------|--|----------------|
|                    | Height           | Width | Length       |                     |         |        |                |     |      |  |                |
|                    | M                | W     | L            | B                   | C       | S × ℓ  | L <sub>1</sub> | T   | K    |  |                |
| SR15MSV<br>SR15MSW | 24               | 34    | 36.6<br>53.2 | 26                  | —<br>26 | M4 × 7 | 22.9<br>39.5   | 5.7 | 19.5 |  | 4.5            |
| SR20MSV<br>SR20MSW | 28               | 42    | 41.3<br>60.2 | 32                  | —<br>32 | M5 × 8 | 27.8<br>46.7   | 7.2 | 22   |  | 6              |

## Model number coding

SR15MSV

1

CS + 340L

Y

P - II

Model No.

No. of LM blocks used on the same rail

LM rail length (mm)  
Radial clearance symbol (\*1)

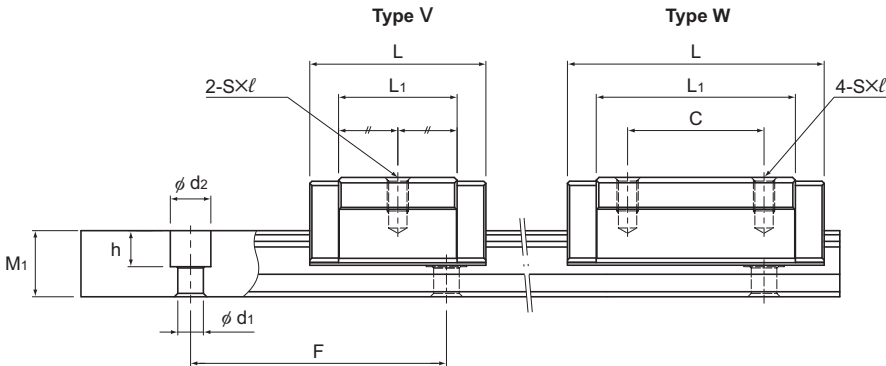
Applied to only 15

Accuracy symbol (\*2)

Symbol for No. of rails used on the same plane (\*3)

(\*1) See **A1-73**. (\*2) See **A1-86**. (\*3) See **A1-13**.

Note) With this model, a single-rail unit constitutes one set (i.e., the required number of sets when 2 rails are used in parallel is 2).



Unit: mm

| LM rail dimensions      |                |                |    |                                   |     | Permissible load | Permissible moment N·m |               |                |               |                | Mass        |         |
|-------------------------|----------------|----------------|----|-----------------------------------|-----|------------------|------------------------|---------------|----------------|---------------|----------------|-------------|---------|
| Width                   | Height         | Pitch          |    | Length*                           |     | F <sub>0</sub>   | M <sub>A</sub>         |               | M <sub>B</sub> |               | M <sub>C</sub> | LM block    | LM rail |
| W <sub>1</sub><br>±0.05 | W <sub>2</sub> | M <sub>1</sub> | F  | d <sub>1</sub> ×d <sub>2</sub> ×h | Max |                  | 1 block                | Double blocks | 1 block        | Double blocks | 1 block        | kg          | kg/m    |
| 15                      | 9.5            | 12.5           | 60 | 3.5×6×4.5                         | 400 | 320<br>570       | 0.80<br>2.35           | 5.43<br>13.0  | 0.51<br>1.47   | 3.60<br>8.31  | 1.16<br>2.08   | 0.12<br>0.2 | 1.2     |
| 20                      | 11             | 15.5           | 60 | 6×9.5×8.5                         | 400 | 430<br>750       | 1.35<br>3.76           | 8.44<br>19.9  | 0.87<br>2.36   | 5.52<br>12.6  | 2.05<br>3.59   | 0.2<br>0.3  | 2.1     |

Note1) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-406**.)  
 Static permissible moment\* 1 block: the static permissible moment with one LM block  
 Double blocks: static permissible moment when two LM blocks are in close contact with each other  
 Please note that model SR-MS does not have contamination protection accessories.  
 The value of permissible load F<sub>0</sub> represents the permissible value for the strength of the dry lubricant S-compound  $\square$ lm.  
 For the durability of the Oil-Free LM Guide for special environment, contact THK.  
 The service life of the S  $\square$ lm may vary according to the environment or the operating conditions. Be sure to evaluate and validate the service life based on the service and operating conditions of the customer.

Note2) For model SR15, two types of rails with different mounting hole dimensions are offered (see Table1).  
 When, replacing this model with model SSR, pay attention to the mounting hole dimension of the LM rail.  
 Contact THK for details.

Note3) The permissible load in the dimension table is for a load in the radial direction. Use Table7 on **A1-59** to calculate the permissible value for loads in the reverse radial direction or lateral direction.

Table1 The dimension of the rail mounting hole

| Model No. | Standard rail      | Semi-Standard rail |
|-----------|--------------------|--------------------|
| SR 15     | For M3 (No symbol) | For M4 (Symbol Y)  |

# Standard Length and Maximum Length of the LM Rail

The following table shows the standard length and the maximum length of the LM rail of the Oil-Free LM Guide for special environments. If the overall rail length exceeds the maximum length, contact THK.

For special rail lengths, it is recommended to use a value corresponding to the G,g dimension from the table. As the G,g dimension increases, this portion becomes less stable, and the accuracy performance is severely impacted.

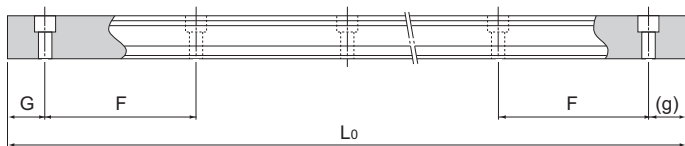


Table1 Standard Length and Maximum Length of the LM Rail for Model SR-MS Unit: mm

| Model No.                                 | SR15MS                          | SR20MS                   |
|-------------------------------------------|---------------------------------|--------------------------|
| LM rail standard length (L <sub>0</sub> ) | 160<br>220<br>280<br>340<br>400 | 220<br>280<br>340<br>400 |
| Standard pitch F                          | 60                              | 60                       |
| G,g                                       | 20                              | 20                       |
| Max length                                | 400                             | 400                      |

Note1) If you desire a rail length larger than the maximum length, contact THK.  
Note2) A connected-rail type is not available.



# Structure and Features of the Caged Roller LM Guide

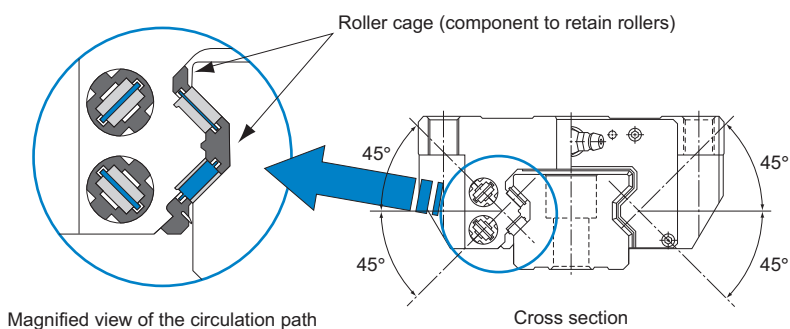
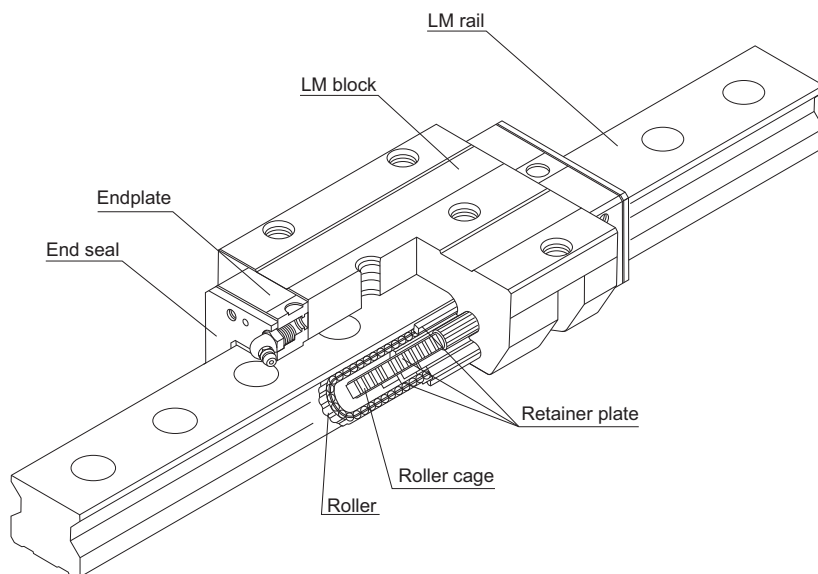


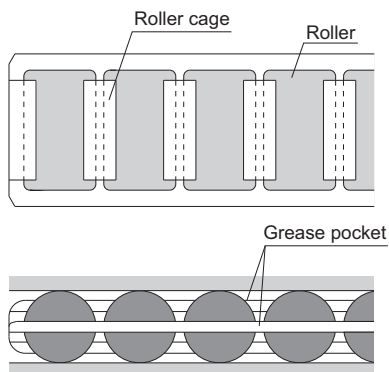
Fig.1 Structural Drawing of the Caged Roller LM Guide Model SRG

Caged Roller LM Guide is a roller guide that achieves low-friction, smooth motion and long-term maintenance-free operation by using a roller cage. In addition, to ensure ultra-high rigidity, rollers with low elastic deformation are used as the rolling elements and the roller diameter and the roller length are optimized.

Furthermore, the lines of rollers are placed at a contact angle of  $45^\circ$  so that the same rated load is applied in all (radial, reverse and lateral) directions.

## Advantages of the Caged Roller Technology

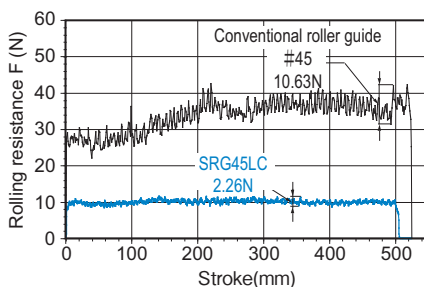
- (1) Evenly spaced and aligned rollers circulate in a way that limits the front-to-back and side-to-side movements of the rollers, preventing the rollers from skewing and minimizing rolling resistance fluctuations. The end result is smooth and stable motion.
- (2) The absence of friction between rollers and the retention of lubrication in grease pockets enable long-term maintenance-free operation.
- (3) The absence of friction between rollers achieves low heat generation and superbly high speed.
- (4) The absence of roller-to-roller collision ensures low noise and acceptable running sound.



### [Smooth Motion]

#### ● Rolling Resistance Data

Evenly spaced and aligned rollers circulate, minimizing rolling resistance fluctuations and achieving smooth and stable motion.

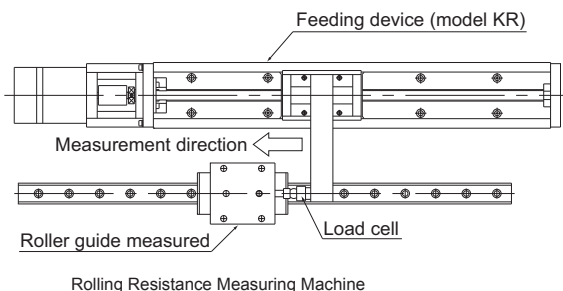


Result of Measuring Rolling Resistance Fluctuations

### [Conditions]

Feeding speed: 10mm/s

Applied load: no load (one block)



**[Long-term Maintenance-free Operation]**

● **High-speed Durability Test Data**

Use of a roller cage eliminates friction between rollers, minimizes heat generation and increases grease retention, thus to achieve long-term maintenance-free operation.

**[Conditions]**

Model No.: SRG45LC

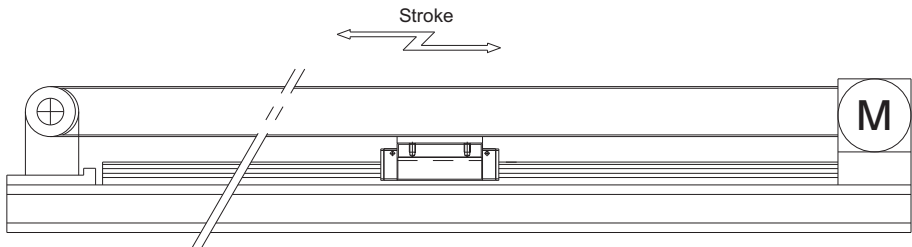
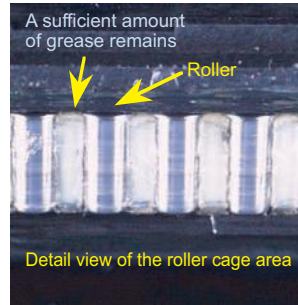
Magnitude of preload: clearance C0

Speed: 180m/min

Acceleration: 1.5G

Stroke: 2300mm

Lubrication : Initial lubrication only  
(THKAFB-LF Grease)



**Test result: No anomaly observed after running 15,000 km**

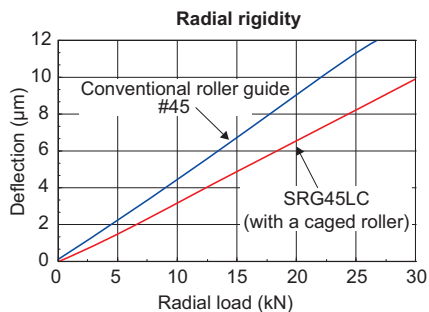
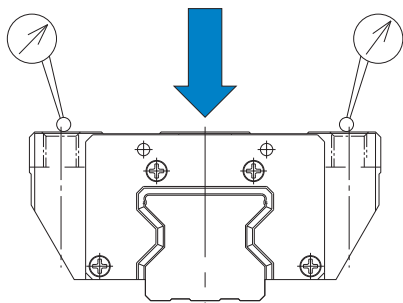
Result of High-speed Durability Test

## [Ultra-high Rigidity]

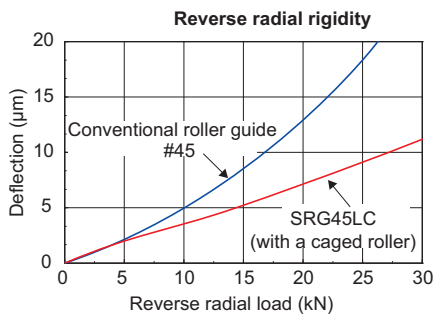
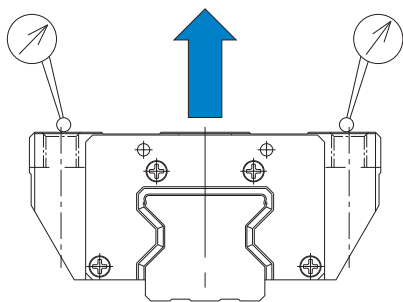
### ● High Rigidity Evaluation Data

[Preload] SRG : radial clearance C0  
Conventional type : radial clearance equivalent to C0

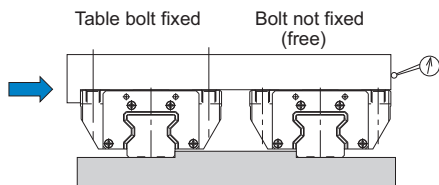
#### Radial rigidity



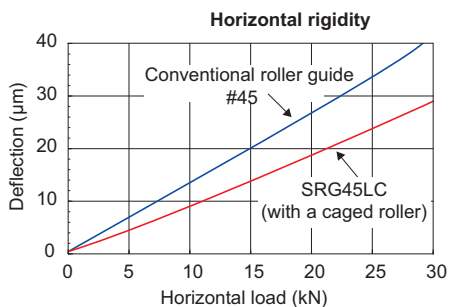
#### Reverse radial rigidity



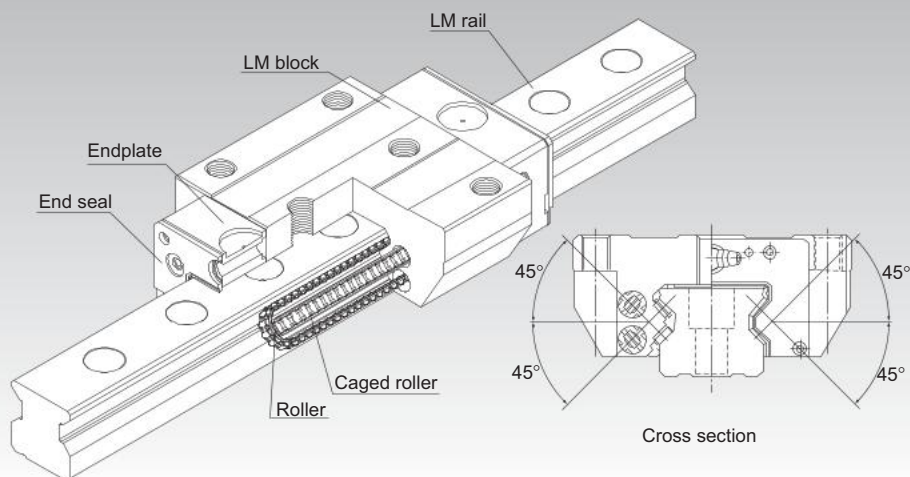
#### Horizontal rigidity



Rigidity is measured with the two axes placed in parallel and one of the axes not fixed with a bolt in order not to apply a moment.



## Caged Roller LM Guide Ultra-high Rigidity Type Model SRG



\*For the caged roller, see **A1-408**.

**Point of Selection** **A1-10**

**Point of Design** **A1-454**

**Options** **A1-477**

**Model No.** **A1-543**

**Precautions on Use** **A1-549**

**Accessories for Lubrication** **A24-1**

**Mounting Procedure and Maintenance** **B1-89**

Equivalent moment factor **A1-43**

Rated Loads in All Directions **A1-59**

Equivalent factor in each direction **A1-61**

Radial Clearance **A1-73**

Accuracy Standards **A1-77**

Shoulder Height of the Mounting Base and the Corner Radius **A1-466**

Error Allowance of the Mounting Surface **A1-417**

Dimensions of Each Model with an Option Attached **A1-491**

## Structure and Features

SRG is an ultra-high rigidity Roller Guide that uses roller cages to allow low-friction, smooth motion and achieve long-term maintenance-free operation.

### [Ultra-high Rigidity]

A higher rigidity is achieved by using highly rigid rollers as the rolling elements and having the overall roller length more than 1.5 times greater than the roller diameter.

### [4-way Equal Load]

Since each row of rollers is arranged at a contact angle of 45° so that the LM block receives an equal load rating in all four directions (radial, reverse radial and lateral directions), high rigidity is ensured in all directions.

### [Smooth Motion through Skewing Prevention]

The roller cage allows rollers to form an evenly spaced line while circulating, thus preventing the rollers from skewing as the block enters an loaded area. As a result, fluctuation of the rolling resistance is minimized, and stable, smooth motion is achieved.

### [Long-term Maintenance-free Operation]

Use of roller cages eliminates friction between rollers and increases grease retention, enabling long-term maintenance-free operation to be achieved.

### [Global Standard Size]

SRG is designed to have dimensions almost the same as that of Full Ball LM Guide model HSR, which THK as a pioneer of the linear motion system has developed and is practically a global standard size.

### [Wide Array of Options]

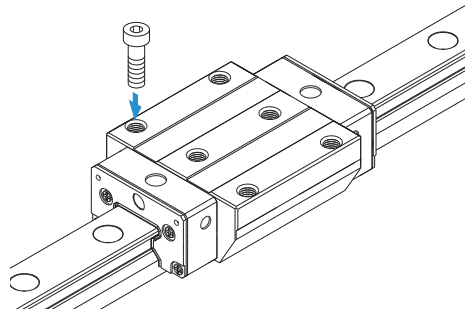
Various options are available, including end seals, inner seals, side seals, Laminated Contact Scraper LaCS, protectors, side scrapers, High Chemical Resistance Fluorine Seal FS, and GC caps, to accommodate various usage environments.

## Types and Features

### Models SRG-15A, 20A

The flange of the LM block has tapped holes.  
Can be mounted from the top or the bottom.

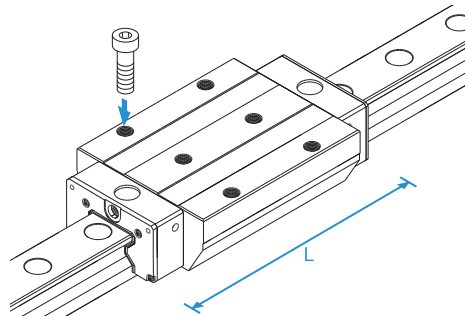
Specification Table⇒A1-418



### Model SRG-20LA

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

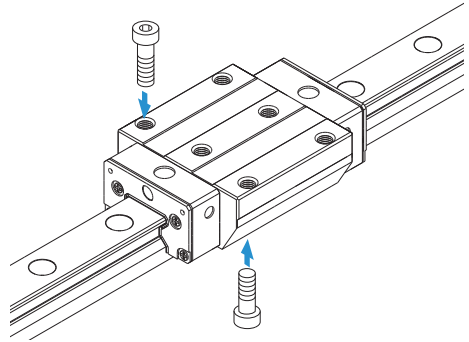
Specification Table⇒A1-418



## Model SRG-C

The range of the LM block has tapped holes.  
Can be mounted from the top or the bottom.  
Used in places where the table cannot have  
through holes for mounting bolts.

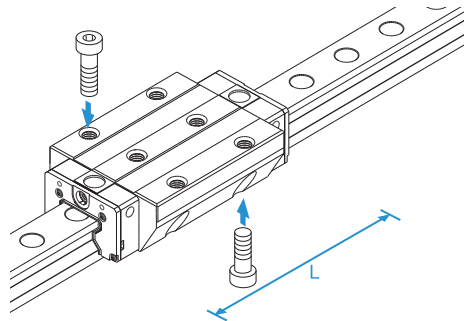
Specification Table → **A1-418**



## Model SRG-LC

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

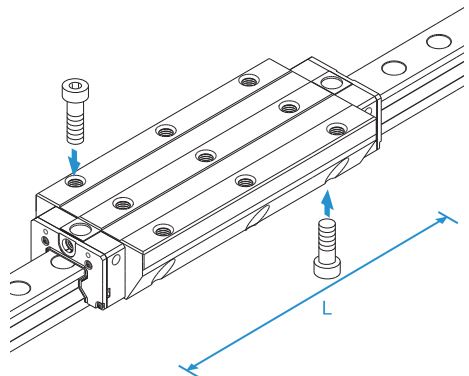
Specification Table → **A1-418**



## Model SRG-SLC

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

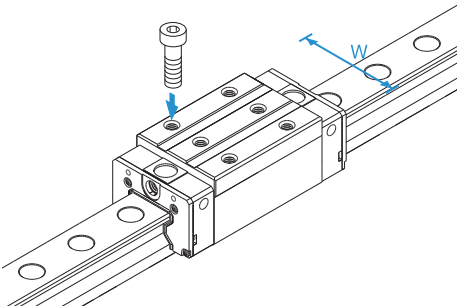
Specification Table → **A1-420**



# Model SRG-R

With this type, the LM block has a smaller width (W) and tapped holes. Used in places where the space for table width is limited.

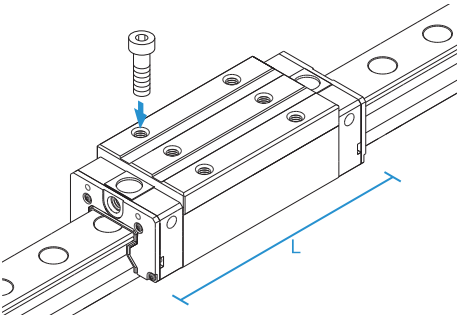
Specification Table⇒A1-424



# Model SRG-LR

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

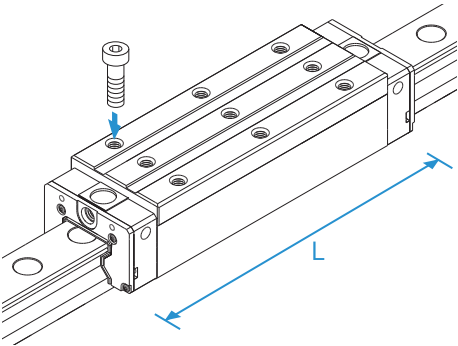
Specification Table⇒A1-424



# Model SRG-SLR

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

Specification Table⇒A1-426



## Error Allowance of the Mounting Surface

The caged roller LM Guide Model SRG features high rigidity since it uses rollers as its rolling element and it also features a cage-retainer which prevents the rollers from skewing. However, high machining accuracy is required in the mounting surface. If the error on the mounting surface is large, it will affect the rolling resistance and the service life. The following shows the maximum permissible value according to the radial clearance.

Table1 Error Allowance in Parallelism (P) between Two Rails

Unit: mm

| Radial clearance<br>Model No. | Normal | C1    | C0    |
|-------------------------------|--------|-------|-------|
| SRG 15                        | 0.005  | 0.003 | 0.003 |
| SRG 20                        | 0.008  | 0.006 | 0.004 |
| SRG 25                        | 0.009  | 0.007 | 0.005 |
| SRG 30                        | 0.011  | 0.008 | 0.006 |
| SRG 35                        | 0.014  | 0.010 | 0.007 |
| SRG 45                        | 0.017  | 0.013 | 0.009 |
| SRG 55                        | 0.021  | 0.014 | 0.011 |
| SRG 65                        | 0.027  | 0.018 | 0.014 |
| SRG 85                        | 0.040  | 0.027 | 0.021 |
| SRG 100                       | 0.045  | 0.031 | 0.024 |



Fig.1

Table2 Error Allowance in Vertical Level (X) between Two Rails

Unit: mm

| Radial clearance                            | Normal   | C1       | C0       |
|---------------------------------------------|----------|----------|----------|
| Permissible error on the mounting surface X | 0.00030a | 0.00021a | 0.00011a |

$X = X_1 + X_2$      $X_1$  : Level difference on the rail mounting surface  
                               $X_2$  : Level difference on the block mounting surface

Example of calculation

Rail span                      when  $a = 500\text{mm}$   
 Error allowance of the mounting surface     $X = 0.0003 \times 500 = 0.15$

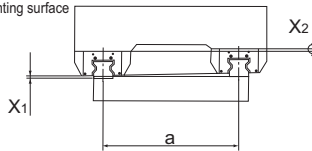


Fig.2

Table3 Error Allowance in Level (Y) in the Axial Direction

Unit: mm

|                                           |           |
|-------------------------------------------|-----------|
| Permissible error on the mounting surface | 0.000036b |
|-------------------------------------------|-----------|

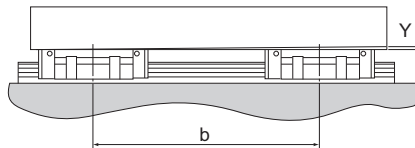
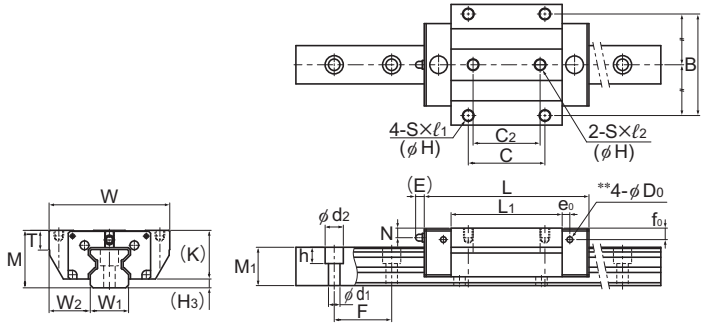


Fig.3

# Models SRG-A, SRG-LA, SRG-C and SRG-LC



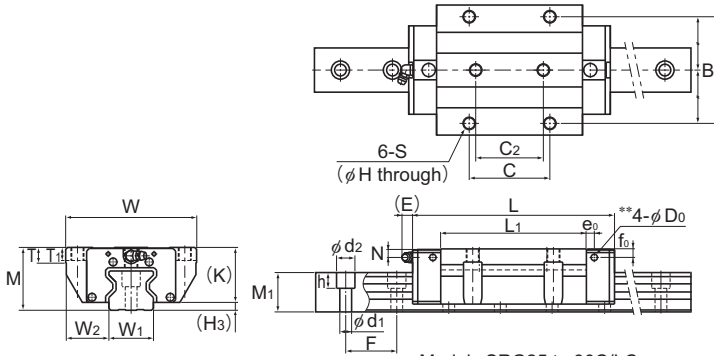
Models SRG15A and 20A/LA

| Model No. | Outer dimensions |       |        | LM block dimensions |    |                |     |       |                |                |                |     |                  |      |     |     |                |                |                |       |               |  |
|-----------|------------------|-------|--------|---------------------|----|----------------|-----|-------|----------------|----------------|----------------|-----|------------------|------|-----|-----|----------------|----------------|----------------|-------|---------------|--|
|           | Height           | Width | Length |                     |    |                |     |       |                |                |                |     |                  |      |     |     |                |                |                |       | Grease nipple |  |
|           | M                | W     | L      | B                   | C  | C <sub>2</sub> | S   | H*    | ℓ <sub>1</sub> | ℓ <sub>2</sub> | L <sub>1</sub> | T   | T <sub>1</sub> * | K    | N   | E   | e <sub>0</sub> | f <sub>0</sub> | D <sub>0</sub> |       |               |  |
| SRG 15A   | 24               | 47    | 69.2   | 38                  | 30 | 26             | M5  | (4.3) | 8              | 7.5            | 45             | 7   | (8)              | 20   | 4   | 4.5 | 4              | 6              | 2.9            | PB107 |               |  |
| SRG 20A   | 30               | 63    | 86.2   | 53                  | 40 | 35             | M6  | (5.4) | 10             | 9              | 58             | 10  | (10)             | 25.4 | 5   | 4.5 | 4              | 6              | 2.9            | PB107 |               |  |
| SRG 20LA  |                  |       | 106.2  |                     |    |                |     |       |                |                |                |     |                  |      |     |     |                |                |                |       |               |  |
| SRG 25C   | 36               | 70    | 95.5   | 57                  | 45 | 40             | M8  | 6.8   | —              | —              | 65.5           | 9.5 | 10               | 31.5 | 5.5 | 12  | 6              | 6.4            | 5.2            | B-M6F |               |  |
| SRG 25LC  |                  |       | 115.1  |                     |    |                |     |       |                |                |                |     |                  |      |     |     |                |                |                |       |               |  |
| SRG 30C   | 42               | 90    | 111    | 72                  | 52 | 44             | M10 | 8.5   | —              | —              | 75             | 12  | 14               | 37   | 6.5 | 12  | 6              | 7.5            | 5.2            | B-M6F |               |  |
| SRG 30LC  |                  |       | 135    |                     |    |                |     |       |                |                |                |     |                  |      |     |     |                |                |                |       |               |  |

## Model number coding

|              |                                        |                              |                                                                 |                                                                                                      |                                |                                                     |          |          |          |            |
|--------------|----------------------------------------|------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------|--------------------------------|-----------------------------------------------------|----------|----------|----------|------------|
| <b>SRG30</b> | <b>LC</b>                              | <b>2</b>                     | <b>QZ</b>                                                       | <b>TTHH</b>                                                                                          | <b>C0</b>                      | <b>+1200L</b>                                       | <b>P</b> | <b>Z</b> | <b>T</b> | <b>-II</b> |
| Model number | Type of LM block                       | With QZ Lubricator           | Contamination protection accessory symbol (*1)                  | LM rail length (in mm)                                                                               | With plate cover               | Symbol for No. of rails used on the same plane (*4) |          |          |          |            |
|              | No. of LM blocks used on the same rail | Radial clearance symbol (*2) | Normal (No symbol)<br>Light preload (C1)<br>Medium preload (C0) | Accuracy symbol (*3)<br>Precision grade (P)/Super precision grade (SP)<br>Ultra precision grade (UP) | Symbol for LM rail jointed use |                                                     |          |          |          |            |

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-73**. (\*3) See **A1-77**. (\*4) See **A1-13**.  
(Note) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.)  
Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.



Models SRG25 to 30C/LC

Unit: mm

| LM rail dimensions |                                       |                |                          |            |                                     |                | Basic load rating* |                      | Static permissible moment kN·m* |                  |                |                  |                | Mass              |                    |
|--------------------|---------------------------------------|----------------|--------------------------|------------|-------------------------------------|----------------|--------------------|----------------------|---------------------------------|------------------|----------------|------------------|----------------|-------------------|--------------------|
| H <sub>3</sub>     | Width<br>W <sub>1</sub><br>0<br>-0.05 | W <sub>2</sub> | Height<br>M <sub>1</sub> | Pitch<br>F | d <sub>1</sub> × d <sub>2</sub> × h | Length*<br>Max | C<br>kN            | C <sub>0</sub><br>kN | M <sub>A</sub>                  |                  | M <sub>B</sub> |                  | M <sub>C</sub> | LM<br>block<br>kg | LM<br>rail<br>kg/m |
|                    |                                       |                |                          |            |                                     |                |                    |                      | 1<br>block                      | Double<br>blocks | 1<br>block     | Double<br>blocks | 1<br>block     |                   |                    |
| 4                  | 15                                    | 16             | 15.5                     | 30         | 4.5 × 7.5 × 5.3                     | 3000           | 11.3               | 25.8                 | 0.21                            | 1.24             | 0.21           | 1.24             | 0.24           | 0.20              | 1.58               |
| 4.6                | 20                                    | 21.5           | 20                       | 30         | 6 × 9.5 × 8.5                       | 3000           | 21<br>26.7         | 46.9<br>63.8         | 0.48<br>0.88                    | 2.74<br>4.49     | 0.48<br>0.88   | 2.74<br>4.49     | 0.58<br>0.79   | 0.42<br>0.57      | 2.58               |
| 4.5                | 23                                    | 23.5           | 23                       | 30         | 7 × 11 × 9                          | 3000           | 27.9<br>34.2       | 57.5<br>75           | 0.641<br>1.07                   | 3.7<br>5.74      | 0.641<br>1.07  | 3.7<br>5.74      | 0.795<br>1.03  | 0.7<br>0.9        | 3.6                |
| 5                  | 28                                    | 31             | 26                       | 40         | 9 × 14 × 12                         | 3000           | 39.3<br>48.3       | 82.5<br>108          | 1.02<br>1.76                    | 6.21<br>9.73     | 1.02<br>1.76   | 6.21<br>9.73     | 1.47<br>1.92   | 1.2<br>1.6        | 4.4                |

Note1) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-428**.)

Static permissible moment\* 1 block: the static permissible moment with one LM block

Double blocks: static permissible moment when two LM blocks are in close contact with each other  
For oil lubrication, be certain to let THK know the mounting orientation and where the LM block piping joint should be attached.

(Mounting orientation: see **A1-12**, Lubricant: see **A24-2**)

Total block length L : The total block length L shown in the table is the length with the dust proof parts, code UU or SS.  
If other contamination protection accessories or lubricant equipment are installed, the total block length will increase.

(See **A1-491** or **A1-512**)

The removing/mounting jig is not provided as standard. Contact THK before use.

\*\* A pilot hole for side nipples, when a grease nipple for a model equipped with LaCS or QZ Lubricator is needed.

Pilot holes for side nipples are not drilled through for models other than those stated above.

For grease nipple mount machining, contact THK. (See **A1-430**)

Note2) H\*, T,\* If the mounting holes (4 holes) of the LM block are back spot-faced, these models can be mounted on the table from the top and the bottom as with the Model SRG-C.

The value in the parentheses represents a dimension if the mounting hole is back spot-faced.

Contact THK for details.

Note3) The basic dynamic load rating of the roller guide is a value based on a nominal life of 100 km.

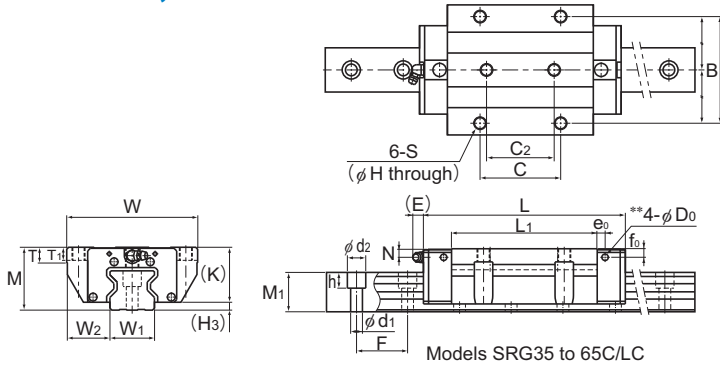
The conversion to basic dynamic load rating for a nominal life of 50 km can be obtained from the following equation.

$$C_{50} = C \times 1.23$$

C<sub>50</sub> : The basic dynamic load rating for a nominal load of 50 km

C : The basic dynamic load rating in the dimensional table

# Models SRG-C, SRG-LC and SRG-SLC



Models SRG35 to 65C/LC

| Model No.                        | Outer dimensions |       |                     | LM block dimensions |                   |                |     |      |                |                |                         |      |                |      |     |    |                |                |                |         | Grease nipple |
|----------------------------------|------------------|-------|---------------------|---------------------|-------------------|----------------|-----|------|----------------|----------------|-------------------------|------|----------------|------|-----|----|----------------|----------------|----------------|---------|---------------|
|                                  | Height           | Width | Length              |                     |                   |                |     |      |                |                |                         |      |                |      |     |    |                |                |                |         |               |
|                                  | M                | W     | L                   | B                   | C                 | C <sub>2</sub> | S   | H    | ℓ <sub>1</sub> | ℓ <sub>2</sub> | L <sub>1</sub>          | T    | T <sub>1</sub> | K    | N   | E  | e <sub>0</sub> | f <sub>0</sub> | D <sub>0</sub> |         |               |
| SRG 35C<br>SRG 35LC<br>SRG 35SLC | 48               | 100   | 125<br>155<br>180.8 | 82                  | 62<br>62<br>100   | 52<br>52<br>—  | M10 | 8.5  | —              | —              | 82.2<br>112.2<br>138.0  | 11.5 | 10             | 42   | 6.5 | 12 | 6              | 6              | 5.2            | B-M6F   |               |
| SRG 45C<br>SRG 45LC<br>SRG 45SLC | 60               | 120   | 155<br>190<br>231.5 | 100                 | 80<br>80<br>120   | 60<br>60<br>—  | M12 | 10.5 | —              | —              | 107<br>142<br>183.5     | 14.5 | 15             | 52   | 10  | 16 | 7              | 7              | 5.2            | B-PT1/8 |               |
| SRG 55C<br>SRG 55LC<br>SRG 55SLC | 70               | 140   | 185<br>235<br>292   | 116                 | 95<br>95<br>150   | 70<br>70<br>—  | M14 | 12.5 | —              | —              | 129.2<br>179.2<br>236.2 | 17.5 | 18             | 60   | 12  | 16 | 9              | 8.5            | 5.2            | B-PT1/8 |               |
| SRG 65C<br>SRG 65LC<br>SRG 65SLC | 90               | 170   | 244.9<br>303<br>380 | 142                 | 110<br>110<br>200 | 82<br>82<br>—  | M16 | 14.5 | —              | —              | 171.7<br>229.8<br>306.8 | 19.5 | 20             | 78.5 | 17  | 16 | 9              | 13.5           | 5.2            | B-PT1/8 |               |

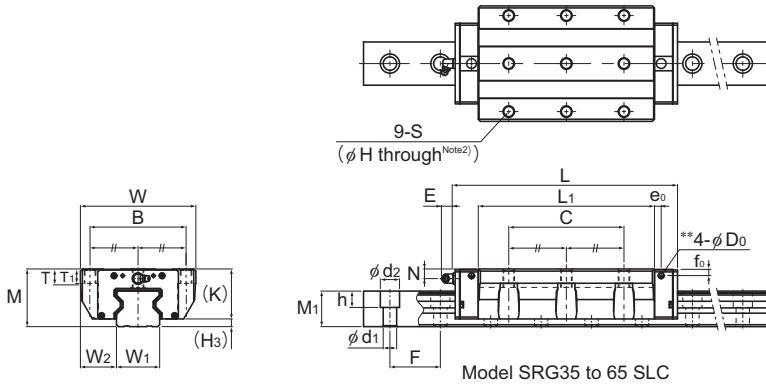
## Model number coding

| SRG45        | LC               | 2                                      | QZ                 | TTHH                                           | C0                                                                                              | +1200L                 | P                                                                                                                             | Z                | T                              | -II                                                 |
|--------------|------------------|----------------------------------------|--------------------|------------------------------------------------|-------------------------------------------------------------------------------------------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------|------------------|--------------------------------|-----------------------------------------------------|
| Model number | Type of LM block | No. of LM blocks used on the same rail | With QZ Lubricator | Contamination protection accessory symbol (*1) | Radial clearance symbol (*2)<br>Normal (No symbol)<br>Light preload (C1)<br>Medium preload (C0) | LM rail length (in mm) | Accuracy symbol (*3)<br>High accuracy grade (H)/Precision grade (P)/<br>Super precision grade (SP)/Ultra precision grade (UP) | With plate cover | Symbol for LM rail jointed use | Symbol for No. of rails used on the same plane (*4) |

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-73**. (\*3) See **A1-77**. (\*4) See **A1-13**.

Note) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.)

Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.



Model SRG35 to 65 SLC

Unit: mm

|  | H <sub>3</sub> | LM rail dimensions                    |                |                          |            |                                   |                | Basic load rating* |                      | Static permissible moment kN•m* |                    |                      |                    |                      | Mass                 |                |                 |
|--|----------------|---------------------------------------|----------------|--------------------------|------------|-----------------------------------|----------------|--------------------|----------------------|---------------------------------|--------------------|----------------------|--------------------|----------------------|----------------------|----------------|-----------------|
|  |                | Width<br>W <sub>1</sub><br>0<br>-0.05 | W <sub>2</sub> | Height<br>M <sub>1</sub> | Pitch<br>F | d <sub>1</sub> ×d <sub>2</sub> ×h | Length*<br>Max | C<br>kN            | C <sub>0</sub><br>kN | <br>M <sub>A</sub>              |                    | <br>M <sub>B</sub>   |                    | <br>M <sub>C</sub>   |                      | LM block<br>kg | LM rail<br>kg/m |
|  |                |                                       |                |                          |            |                                   |                |                    |                      | 1 block                         | Double blocks      | 1 block              | Double blocks      | 1 block              |                      |                |                 |
|  |                |                                       |                |                          |            |                                   |                |                    |                      |                                 |                    |                      |                    |                      |                      |                |                 |
|  | 6              | 34                                    | 33             | 30                       | 40         | 9×14×12                           | 3000           | 59.1<br>76<br>87.9 | 119<br>165<br>199    | 1.66<br>3.13<br>4.53            | 10.1<br>17<br>23.9 | 1.66<br>3.13<br>4.53 | 10.1<br>17<br>23.9 | 2.39<br>3.31<br>4.09 | 1.9<br>2.4<br>3.2    | 6.9            |                 |
|  | 8              | 45                                    | 37.5           | 37                       | 52.5       | 14×20×17                          | 3090           | 91.9<br>115<br>139 | 192<br>256<br>328    | 3.49<br>6.13<br>9.99            | 20<br>32.2<br>50.0 | 3.49<br>6.13<br>9.99 | 20<br>32.2<br>50.0 | 4.98<br>6.64<br>8.91 | 3.7<br>4.5<br>6.3    | 11.6           |                 |
|  | 10             | 53                                    | 43.5           | 43                       | 60         | 16×23×20                          | 3060           | 131<br>167<br>210  | 266<br>366<br>488    | 5.82<br>10.8<br>19.1            | 33<br>57<br>93.7   | 5.82<br>10.8<br>19.1 | 33<br>57<br>93.7   | 8.19<br>11.2<br>15.6 | 5.9<br>7.8<br>10.7   | 15.8           |                 |
|  | 11.5           | 63                                    | 53.5           | 54                       | 75         | 18×26×22                          | 3000           | 219<br>278<br>352  | 441<br>599<br>811    | 12.5<br>22.7<br>41.3            | 72.8<br>120<br>202 | 12.5<br>22.7<br>41.3 | 72.8<br>120<br>202 | 16.8<br>22.1<br>30.9 | 12.5<br>16.4<br>22.3 | 23.7           |                 |

Note1) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-428**.)

Static permissible moment\* 1 block: the static permissible moment with one LM block

Double blocks: static permissible moment when two LM blocks are in close contact with each other

For oil lubrication, be certain to let THK know the mounting orientation and where the LM block piping joint should be attached.

(Mounting orientation: see **A1-12**. Lubricant: see **A24-2**)

Total block length L

: The total block length L shown in the table is the length with the dust proof parts, code UU or SS.

If other contamination protection accessories or lubricant equipment are installed, the total block length will increase.

(See **A1-491** or **A1-512**)

The removing/mounting jig is not provided as standard. Contact THK before use.

\*\* A pilot hole for side nipples, when a grease nipple for a model equipped with LaCS or QZ Lubricator is needed.

Pilot holes for side nipples are not drilled through for models other than those stated above.

For grease nipple mount machining, contact THK. (See **A1-430**)

Note2) The basic dynamic load rating of the roller guide is a value based on a nominal life of 100 km.

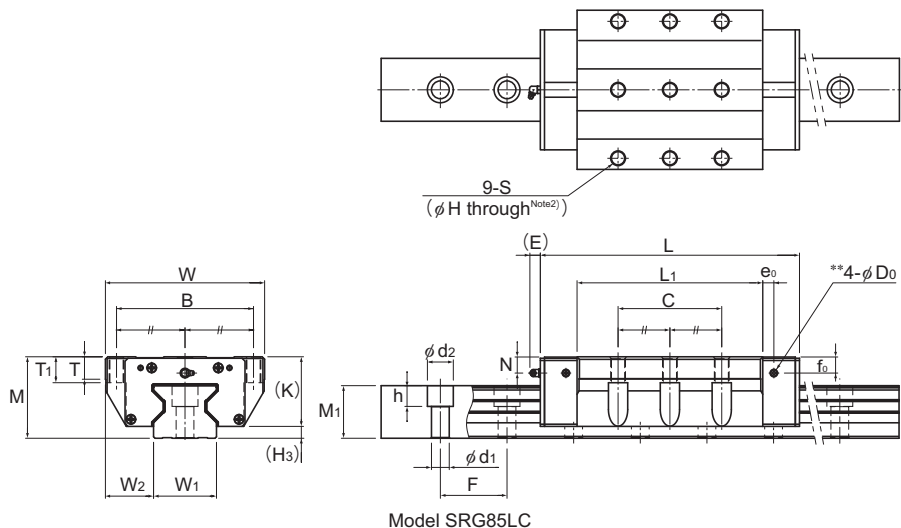
The conversion to basic dynamic load rating for a nominal life of 50 km can be obtained from the following equation.

$$C_{50} = C \times 1.23$$

C<sub>50</sub>: The basic dynamic load rating for a nominal load of 50 km

C: The basic dynamic load rating in the dimensional table

# Model SRG-LC



| Model No. | Outer dimensions |       |        | LM block dimensions |     |     |      |                |    |                |     |    |    |                |                |                |         | Grease nipple |
|-----------|------------------|-------|--------|---------------------|-----|-----|------|----------------|----|----------------|-----|----|----|----------------|----------------|----------------|---------|---------------|
|           | Height           | Width | Length |                     |     |     |      |                |    |                |     |    |    |                |                |                |         |               |
|           | M                | W     | L      | B                   | C   | S   | H    | L <sub>1</sub> | T  | T <sub>1</sub> | K   | N  | E  | e <sub>0</sub> | f <sub>0</sub> | D <sub>0</sub> |         |               |
| SRG 85LC  | 110              | 215   | 350    | 185                 | 140 | M20 | 17.8 | 250.8          | 30 | 35             | 94  | 22 | 16 | 15             | 22             | 8.2            | B-PT1/8 |               |
| SRG 100LC | 120              | 250   | 395    | 220                 | 200 | M20 | 17.8 | 280.2          | 35 | 38             | 104 | 23 | 16 | 15             | 23             | 8.2            | B-PT1/4 |               |

## Model number coding

**SRG85 LC 2 TT C0 +2610L P Z T - II**

Model  
number

Type of  
LM block

No. of LM blocks  
used on the same rail

Contamination  
protection  
accessory  
symbol (\*1)

Radial clearance symbol (\*2)  
Normal (No symbol)  
Light preload (C1)  
Medium preload (C0)

LM rail length  
(in mm)

With plate  
cover

Accuracy symbol (\*3)  
Precision grade (P)/Super precision grade (SP)  
Ultra precision grade (UP)

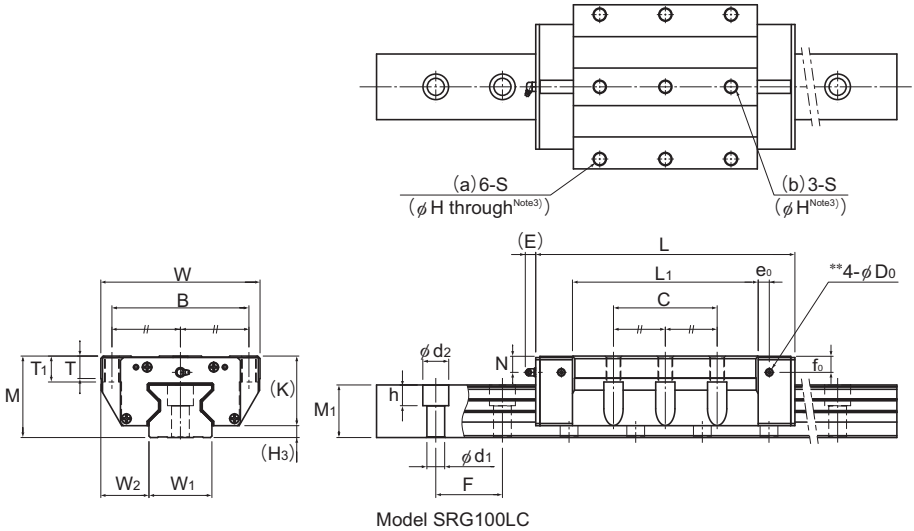
Symbol for LM  
rail jointed use

Symbol for No. of  
rails used on the  
same plane (\*4)

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-73**. (\*3) See **A1-77**. (\*4) See **A1-13**.

Note) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.)

Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.



Unit: mm

|  | H <sub>3</sub> | LM rail dimensions                        |                |                              |                |                                   |                    | Basic load rating* |                          | Static permissible moment kN·m*                                                   |                  |                                                                                   |                  |                                                                                   | Mass |                       |                        |
|--|----------------|-------------------------------------------|----------------|------------------------------|----------------|-----------------------------------|--------------------|--------------------|--------------------------|-----------------------------------------------------------------------------------|------------------|-----------------------------------------------------------------------------------|------------------|-----------------------------------------------------------------------------------|------|-----------------------|------------------------|
|  |                | Width<br><br>W <sub>1</sub><br>0<br>-0.05 | W <sub>2</sub> | Height<br><br>M <sub>1</sub> | Pitch<br><br>F | d <sub>1</sub> ×d <sub>2</sub> ×h | Length*<br><br>Max | C<br><br>kN        | C <sub>0</sub><br><br>kN |  |                  |  |                  |  |      | LM<br>block<br><br>kg | LM<br>rail<br><br>kg/m |
|  |                |                                           |                |                              |                |                                   |                    |                    |                          | 1<br>block                                                                        | Double<br>blocks | 1<br>block                                                                        | Double<br>blocks | 1<br>block                                                                        |      |                       |                        |
|  |                |                                           |                |                              |                |                                   |                    |                    |                          |                                                                                   |                  |                                                                                   |                  |                                                                                   |      |                       |                        |
|  | 16             | 85                                        | 65             | 71                           | 90             | 24×35×28                          | 3000               | 497                | 990                      | 45.3                                                                              | 239              | 45.3                                                                              | 239              | 51.9                                                                              | 26.2 | 35.7                  |                        |
|  | 16             | 100                                       | 75             | 77                           | 105            | 26×39×32                          | 3000               | 601                | 1170                     | 60                                                                                | 319              | 60                                                                                | 319              | 72.3                                                                              | 37.6 | 46.8                  |                        |

Note1) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See [A1-428](#).)

Static permissible moment\* 1 block: the static permissible moment with one LM block

Double blocks: static permissible moment when two LM blocks are in close contact with each other attached.

(Mounting orientation: see [A1-12](#), Lubricant: see [A24-2](#))

Total block length L : The total block length L shown in the table is the length with the dust proof parts, code UU or SS. If other contamination protection accessories or lubricant equipment are installed, the total block length will increase.

(See [A1-491](#) or [A1-512](#))

The removing/mounting jig is not provided as standard. Contact THK before use.

\*\* A pilot hole for side nipples, when a grease nipple for a model equipped with LaCS or QZ Lubricator is needed.

Pilot holes for side nipples are not drilled through for models other than those stated above.

For grease nipple mount machining, contact THK. (See [A1-430](#).)

Note2) The LM block mounting holes (9 holes) of SRG85LC are all through holes (full thread).

Note3) The LM block mounting holes in part (a) (6 holes) of SRG100LC are through holes (full thread).

The LM block mounting holes in part (b) (3 holes) have effective thread depth of 22 mm.

Note4) The basic dynamic load rating of the roller guide is a value based on a nominal life of 100 km.

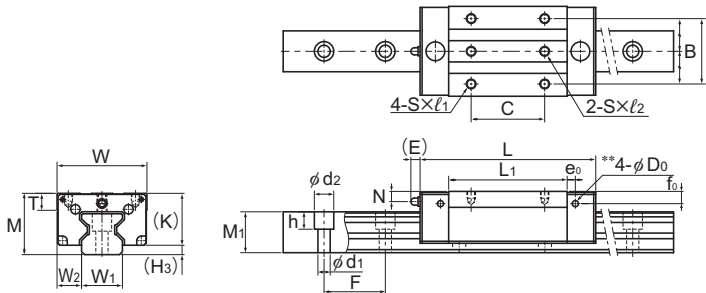
The conversion to basic dynamic load rating for a nominal life of 50 km can be obtained from the following equation.

$$C_{50} = C \times 1.23$$

C<sub>50</sub> : The basic dynamic load rating for a nominal load of 50 km

C : The basic dynamic load rating in the dimensional table

# Models SRG-V, SRG-LV, SRG-R and SRG-LR



Models SRG15V and 20V/LV

| Model No.           | Outer dimensions |       |               | LM block dimensions |          |    |    |                |                |                |     |      |     |     |                |                |                |       | Grease nipple |
|---------------------|------------------|-------|---------------|---------------------|----------|----|----|----------------|----------------|----------------|-----|------|-----|-----|----------------|----------------|----------------|-------|---------------|
|                     | Height           | Width | Length        |                     |          |    |    |                |                |                |     |      |     |     |                |                |                |       |               |
|                     | M                | W     | L             | B                   | C        | S  | ℓ  | ℓ <sub>1</sub> | ℓ <sub>2</sub> | L <sub>1</sub> | T   | K    | N   | E   | e <sub>0</sub> | f <sub>0</sub> | D <sub>0</sub> |       |               |
| SRG 15V             | 24               | 34    | 69.2          | 26                  | 26       | M4 | —  | 5              | 7.5            | 45             | 6   | 20   | 4   | 4.5 | 4              | 6              | 2.9            | PB107 |               |
| SRG 20V<br>SRG 20LV | 30               | 44    | 86.2<br>106.2 | 32                  | 36<br>50 | M5 | —  | 7              | 9              | 58<br>78       | 8   | 25.4 | 5   | 4.5 | 4              | 6              | 2.9            | PB107 |               |
| SRG 25R<br>SRG 25LR | 40               | 48    | 95.5<br>115.1 | 35                  | 35<br>50 | M6 | 9  | —              | —              | 65.5<br>85.1   | 9.5 | 35.5 | 9.5 | 12  | 6              | 10.4           | 5.2            | B-M6F |               |
| SRG 30R<br>SRG 30LR | 45               | 60    | 111<br>135    | 40                  | 40<br>60 | M8 | 10 | —              | —              | 75<br>99       | 12  | 40   | 9.5 | 12  | 6              | 10.5           | 5.2            | B-M6F |               |

## Model number coding

**SRG30 LR 2 QZ TTHH C0 +1200L P Z T -II**

Model number

Type of LM block

With QZ Lubricator

Contamination protection accessory symbol (\*1)

LM rail length (in mm)

With plate cover

Symbol for No. of rails used on the same plane (\*4)

No. of LM blocks used on the same rail

Radial clearance symbol (\*2)  
Normal (No symbol)  
Light preload (C1)  
Medium preload (C0)

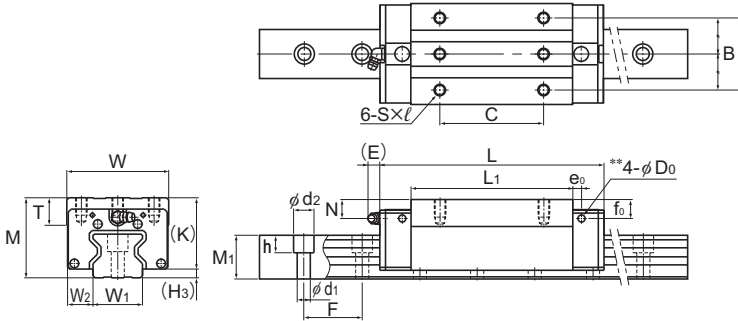
Accuracy symbol (\*3)  
Precision grade (P)/Super precision grade (SP)  
Ultra precision grade (UP)

Symbol for LM rail jointed use

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-73**. (\*3) See **A1-77**. (\*4) See **A1-13**.

Note) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.)

Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.



Models SRG25 to 30R/LR/LV

Unit: mm

| LM rail dimensions |                              |                |                |       |                                     |         | Basic load rating* |                | Static permissible moment kN·m* |               |                |               |                | Mass         |         |
|--------------------|------------------------------|----------------|----------------|-------|-------------------------------------|---------|--------------------|----------------|---------------------------------|---------------|----------------|---------------|----------------|--------------|---------|
| H <sub>3</sub>     | Width                        | Height         |                | Pitch | d <sub>1</sub> × d <sub>2</sub> × h | Length* | C                  | C <sub>0</sub> | M <sub>A</sub>                  |               | M <sub>B</sub> |               | M <sub>C</sub> | LM block     | LM rail |
|                    | W <sub>1</sub><br>0<br>-0.05 | W <sub>2</sub> | M <sub>1</sub> | F     |                                     | Max     | kN                 | kN             | 1 block                         | Double blocks | 1 block        | Double blocks | 1 block        | kg           | kg/m    |
| 4                  | 15                           | 9.5            | 15.5           | 30    | 4.5 × 7.5 × 5.3                     | 3000    | 11.3               | 25.8           | 0.21                            | 1.24          | 0.21           | 1.24          | 0.24           | 0.15         | 1.58    |
| 4.6                | 20                           | 12             | 20             | 30    | 6 × 9.5 × 8.5                       | 3000    | 21<br>26.7         | 46.9<br>63.8   | 0.48<br>0.88                    | 2.74<br>4.49  | 0.48<br>0.88   | 2.74<br>4.49  | 0.58<br>0.79   | 0.28<br>0.38 | 2.58    |
| 4.5                | 23                           | 12.5           | 23             | 30    | 7 × 11 × 9                          | 3000    | 27.9<br>34.2       | 57.5<br>75     | 0.641<br>1.07                   | 3.7<br>5.74   | 0.641<br>1.07  | 3.7<br>5.74   | 0.795<br>1.03  | 0.6<br>0.8   | 3.6     |
| 5                  | 28                           | 16             | 26             | 40    | 9 × 14 × 12                         | 3000    | 39.3<br>48.3       | 82.5<br>108    | 1.02<br>1.76                    | 6.21<br>9.73  | 1.02<br>1.76   | 6.21<br>9.73  | 1.47<br>1.92   | 0.9<br>1.2   | 4.4     |

Note1) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-428**.)  
 Static permissible moment\* 1 block: the static permissible moment with one LM block

Double blocks: static permissible moment when two LM blocks are in close contact with each other attached.

For oil lubrication, be certain to let THK know the mounting orientation and where the LM block piping joint should be attached.

(Mounting orientation: see **A1-12**. Lubricant: see **A24-2**)

Total block length L

: The total block length L shown in the table is the length with the dust proof parts, code UU or SS. If other contamination protection accessories or lubricant equipment are installed, the total block length will increase.

(See **A1-491** or **A1-512**)

The removing/mounting jig is not provided as standard. Contact THK before use.

\*\* A pilot hole for side nipples, when a grease nipple for a model equipped with LaCS or QZ Lubricator is needed.

Pilot holes for side nipples are not drilled through for models other than those stated above.

For grease nipple mount machining, contact THK. (See **A1-430**)

Note2) The basic dynamic load rating of the roller guide is a value based on a nominal life of 100 km.

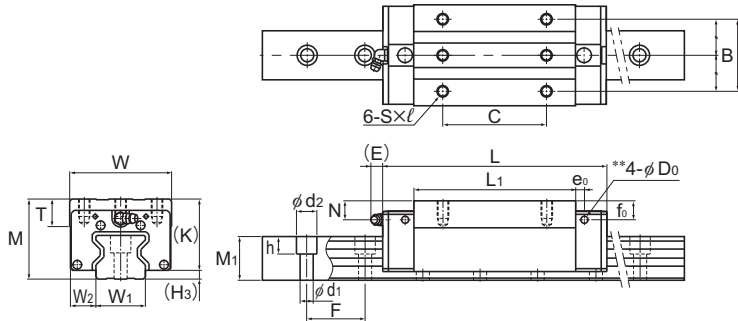
The conversion to basic dynamic load rating for a nominal life of 50 km can be obtained from the following equation.

$$C_{50} = C \times 1.23$$

C<sub>50</sub>: The basic dynamic load rating for a nominal load of 50 km

C: The basic dynamic load rating in the dimensional table

# Models SRG-V, SRG-LV, SRG-SLV, SRG-R, SRG-LR and SRG-SLR



Models SRG35 to 65R/LR/LV

| Model No. | Outer dimensions |       |        | LM block dimensions |     |     |    |                |                |                |      |      |      |    |                |                |                |         | Grease nipple |
|-----------|------------------|-------|--------|---------------------|-----|-----|----|----------------|----------------|----------------|------|------|------|----|----------------|----------------|----------------|---------|---------------|
|           | Height           | Width | Length |                     |     |     |    |                |                |                |      |      |      |    |                |                |                |         |               |
|           | M                | W     | L      | B                   | C   | S   | ℓ  | ℓ <sub>1</sub> | ℓ <sub>2</sub> | L <sub>1</sub> | T    | K    | N    | E  | e <sub>0</sub> | f <sub>0</sub> | D <sub>0</sub> |         |               |
| SRG 35R   | 55               | 70    | 125    | 50                  | 50  | M8  | 12 | —              | —              | 82.2           | 18.5 | 49   | 13.5 | 12 | 6              | 13             | 5.2            | B-M6F   |               |
| SRG 35LR  |                  |       | 155    |                     | 72  |     |    |                |                | 112.2          |      |      |      |    |                |                |                |         |               |
| SRG 35SLR |                  |       | 180.8  |                     | 100 |     |    |                |                | 138.0          |      |      |      |    |                |                |                |         |               |
| SRG 45R   | 70               | 86    | 155    | 60                  | 60  | M10 | 20 | —              | —              | 107            | 24.5 | 62   | 20   | 16 | 7              | 17             | 5.2            | B-PT1/8 |               |
| SRG 45LR  |                  |       | 190    |                     | 80  |     |    |                |                | 142            |      |      |      |    |                |                |                |         |               |
| SRG 45SLR |                  |       | 231.5  |                     | 120 |     |    |                |                | 183.5          |      |      |      |    |                |                |                |         |               |
| SRG 55R   | 80               | 100   | 185    | 75                  | 75  | M12 | 18 | —              | —              | 129.2          | 27.5 | 70   | 22   | 16 | 9              | 18.5           | 5.2            | B-PT1/8 |               |
| SRG 55LR  |                  |       | 235    |                     | 95  |     |    |                |                | 179.2          |      |      |      |    |                |                |                |         |               |
| SRG 55SLR |                  |       | 292    |                     | 150 |     |    |                |                | 236.2          |      |      |      |    |                |                |                |         |               |
| SRG 65V   | 90               | 126   | 244.9  | 76                  | 70  | M16 | 20 | —              | —              | 171.7          | 19.5 | 78.5 | 17   | 16 | 9              | 13.5           | 5.2            | B-PT1/8 |               |
| SRG 65LV  |                  |       | 303    |                     | 120 |     |    |                |                | 229.8          |      |      |      |    |                |                |                |         |               |
| SRG 65SLV |                  |       | 380    |                     | 200 |     |    |                |                | 306.8          |      |      |      |    |                |                |                |         |               |

## Model number coding

**SRG45 LR 2 QZ TTHH C0 +1200L P Z T -II**

Model number

Type of LM block

With QZ Lubricator

Contamination protection accessory symbol (\*1)

LM rail length (in mm)

With plate cover

Symbol for No. of rails used on the same plane (\*4)

No. of LM blocks used on the same rail

Radial clearance symbol (\*2)  
Normal (No symbol)  
Light preload (C1)  
Medium preload (C0)

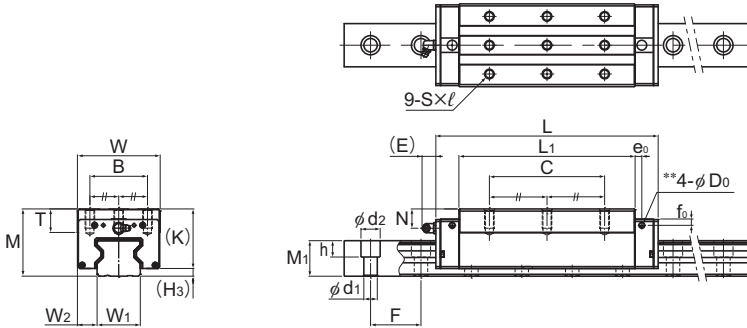
Accuracy symbol (\*3)  
High accuracy grade (H)/Precision grade (P)  
Super precision grade (SP)/Ultra precision grade (UP)

Symbol for LM rail jointed use

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-73**. (\*3) See **A1-77**. (\*4) See **A1-13**.

Note) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.)

Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.



Models SRG35 to 55 SLR

Unit: mm

|  | H <sub>3</sub> | LM rail dimensions                        |                |                              |                |                                         |                    | Basic load rating* |                          | Static permissible moment kN·m*                                                                     |                    |                                                                                                     |                    |                                                                                                     | Mass                |            |
|--|----------------|-------------------------------------------|----------------|------------------------------|----------------|-----------------------------------------|--------------------|--------------------|--------------------------|-----------------------------------------------------------------------------------------------------|--------------------|-----------------------------------------------------------------------------------------------------|--------------------|-----------------------------------------------------------------------------------------------------|---------------------|------------|
|  |                | Width<br><br>W <sub>1</sub><br>0<br>-0.05 | W <sub>2</sub> | Height<br><br>M <sub>1</sub> | Pitch<br><br>F | <br>d <sub>1</sub> × d <sub>2</sub> × h | Length*<br><br>Max | C<br><br>kN        | C <sub>0</sub><br><br>kN | M <sub>A</sub><br> |                    | M <sub>B</sub><br> |                    | M <sub>C</sub><br> | LM<br>block         | LM<br>rail |
|  |                |                                           |                |                              |                |                                         |                    |                    |                          | 1<br>block                                                                                          | Double<br>blocks   | 1<br>block                                                                                          | Double<br>blocks   | 1<br>block                                                                                          | kg                  | kg/m       |
|  |                |                                           |                |                              |                |                                         |                    |                    |                          |                                                                                                     |                    |                                                                                                     |                    |                                                                                                     |                     |            |
|  | 6              | 34                                        | 18             | 30                           | 40             | 9 × 14 × 12                             | 3000               | 59.1<br>76<br>87.9 | 119<br>165<br>199        | 1.66<br>3.13<br>4.53                                                                                | 10.1<br>17<br>23.9 | 1.66<br>3.13<br>4.53                                                                                | 10.1<br>17<br>23.9 | 2.39<br>3.31<br>4.09                                                                                | 1.6<br>2.1<br>2.6   | 6.9        |
|  | 8              | 45                                        | 20.5           | 37                           | 52.5           | 14 × 20 × 17                            | 3090               | 91.9<br>115<br>139 | 192<br>256<br>328        | 3.49<br>6.13<br>9.99                                                                                | 20<br>32.2<br>50.0 | 3.49<br>6.13<br>9.99                                                                                | 20<br>32.2<br>50.0 | 4.98<br>6.64<br>8.91                                                                                | 3.2<br>4.1<br>5.4   | 11.6       |
|  | 10             | 53                                        | 23.5           | 43                           | 60             | 16 × 23 × 20                            | 3060               | 131<br>167<br>210  | 266<br>366<br>488        | 5.82<br>10.8<br>19.1                                                                                | 33<br>57<br>93.7   | 5.82<br>10.8<br>19.1                                                                                | 33<br>57<br>93.7   | 8.19<br>11.2<br>15.6                                                                                | 5<br>6.9<br>9.2     | 15.8       |
|  | 11.5           | 63                                        | 31.5           | 54                           | 75             | 18 × 26 × 22                            | 3000               | 219<br>278<br>352  | 441<br>599<br>811        | 12.5<br>22.7<br>41.3                                                                                | 72.8<br>120<br>202 | 12.5<br>22.7<br>41.3                                                                                | 72.8<br>120<br>202 | 16.8<br>22.1<br>30.9                                                                                | 9.0<br>12.1<br>16.1 | 23.7       |

Note1) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See [A1-428](#).)  
Static permissible moment\* 1 block: the static permissible moment with one LM block

Double blocks: static permissible moment when two LM blocks are in close contact with each other attached.  
For oil lubrication, be certain to let THK know the mounting orientation and where the LM block piping joint should be attached.

(Mounting orientation: see [A1-12](#). Lubricant: see [A24-2](#))

Total block length L

: The total block length L shown in the table is the length with the dust proof parts, code UU or SS. If other contamination protection accessories or lubricant equipment are installed, the total block length will increase.

(See [A1-491](#) or [A1-512](#))

The removing/mounting jig is not provided as standard. Contact THK before use.

\*\* A pilot hole for side nipples, when a grease nipple for a model equipped with LaCS or QZ Lubricator is needed.

Pilot holes for side nipples are not drilled through for models other than those stated above.

For grease nipple mount machining, contact THK. (See [A1-430](#))

Note2) The basic dynamic load rating of the roller guide is a value based on a nominal life of 100 km.

The conversion to basic dynamic load rating for a nominal life of 50 km can be obtained from the following equation.

$$C_{50} = C \times 1.23$$

C<sub>50</sub>: The basic dynamic load rating for a nominal load of 50 km

C: The basic dynamic load rating in the dimensional table

# Standard Length and Maximum Length of the LM Rail

Table4 shows the standard lengths and the maximum lengths of model SRG variations. If the maximum length of the desired LM rail exceeds them, jointed rails will be used. Contact THK for details. For special rail lengths, it is recommended to use a value corresponding to the G,g dimension from the table. As the G,g dimension increases, this portion becomes less stable, and the accuracy performance is severely impacted.

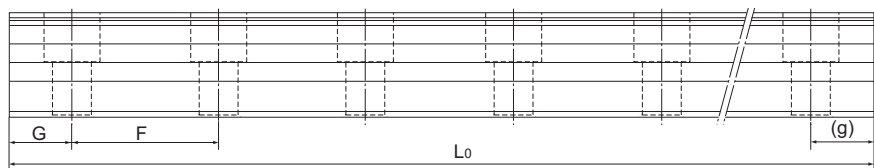


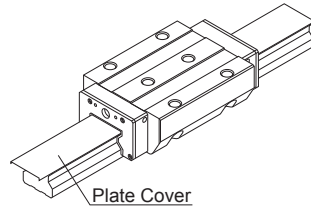
Table4 Standard Length and Maximum Length of the LM Rail for Model SRG Unit: mm

| Model No.                                       | SRG 15 | SRG 20 | SRG 25 | SRG 30 | SRG 35 | SRG 45 | SRG 55 | SRG 65 | SRG 85 | SRG 100 |
|-------------------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
| LM rail<br>standard<br>length (L <sub>0</sub> ) | 160    | 220    | 220    | 280    | 280    | 570    | 780    | 1270   | 1530   | 1340    |
|                                                 | 220    | 280    | 280    | 360    | 360    | 675    | 900    | 1570   | 1890   | 1760    |
|                                                 | 280    | 340    | 340    | 440    | 440    | 780    | 1020   | 2020   | 2250   | 2180    |
|                                                 | 340    | 400    | 400    | 520    | 520    | 885    | 1140   | 2620   | 2610   | 2600    |
|                                                 | 400    | 460    | 460    | 600    | 600    | 990    | 1260   |        |        |         |
|                                                 | 460    | 520    | 520    | 680    | 680    | 1095   | 1380   |        |        |         |
|                                                 | 520    | 580    | 580    | 760    | 760    | 1200   | 1500   |        |        |         |
|                                                 | 580    | 640    | 640    | 840    | 840    | 1305   | 1620   |        |        |         |
|                                                 | 640    | 700    | 700    | 920    | 920    | 1410   | 1740   |        |        |         |
|                                                 | 700    | 760    | 760    | 1000   | 1000   | 1515   | 1860   |        |        |         |
|                                                 | 760    | 820    | 820    | 1080   | 1080   | 1620   | 1980   |        |        |         |
|                                                 | 820    | 940    | 940    | 1160   | 1160   | 1725   | 2100   |        |        |         |
|                                                 | 940    | 1000   | 1000   | 1240   | 1240   | 1830   | 2220   |        |        |         |
|                                                 | 1000   | 1060   | 1060   | 1320   | 1320   | 1935   | 2340   |        |        |         |
|                                                 | 1060   | 1120   | 1120   | 1400   | 1400   | 2040   | 2460   |        |        |         |
|                                                 | 1120   | 1180   | 1180   | 1480   | 1480   | 2145   | 2580   |        |        |         |
|                                                 | 1180   | 1240   | 1240   | 1560   | 1560   | 2250   | 2700   |        |        |         |
|                                                 | 1240   | 1360   | 1300   | 1640   | 1640   | 2355   | 2820   |        |        |         |
|                                                 | 1360   | 1480   | 1360   | 1720   | 1720   | 2460   | 2940   |        |        |         |
|                                                 | 1480   | 1600   | 1420   | 1800   | 1800   | 2565   | 3060   |        |        |         |
|                                                 | 1600   | 1720   | 1480   | 1880   | 1880   | 2670   |        |        |        |         |
|                                                 |        | 1840   | 1540   | 1960   | 1960   | 2775   |        |        |        |         |
|                                                 |        | 1960   | 1600   | 2040   | 2040   | 2880   |        |        |        |         |
|                                                 |        | 2080   | 1720   | 2200   | 2200   | 2985   |        |        |        |         |
|                                                 |        | 2200   | 1840   | 2360   | 2360   | 3090   |        |        |        |         |
|                                                 |        |        | 1960   | 2520   | 2520   |        |        |        |        |         |
|                                                 |        |        | 2080   | 2680   | 2680   |        |        |        |        |         |
|                                                 |        |        | 2200   | 2840   | 2840   |        |        |        |        |         |
|                                                 |        |        | 2320   | 3000   | 3000   |        |        |        |        |         |
|                                                 |        |        | 2440   |        |        |        |        |        |        |         |
| Standard<br>pitch F                             | 30     | 30     | 30     | 40     | 40     | 52.5   | 60     | 75     | 90     | 105     |
| G,g                                             | 20     | 20     | 20     | 20     | 20     | 22.5   | 30     | 35     | 45     | 40      |
| Max length                                      | 3000   | 3000   | 3000   | 3000   | 3000   | 3090   | 3060   | 3000   | 3000   | 3000    |

Note1) The maximum length varies with accuracy grades. Contact THK for details.  
 Note2) If jointed rails are not allowed and a greater length than the maximum values above is required, contact THK.

## Plate Cover

By covering the LM rail's mounting holes with ultra-thin stainless steel (SUS304) plates, the sealability of the end seals increase drastically, helping prevent foreign materials and liquid from entering from the top of the LM rail. Contact THK for further details regarding mounting.



- Note 1) The Model SRG with plate cover is not a standard specification. (Please note it is not possible to add just the plate cover afterwards.)
- Note 2) The LM block must be removed from the LM rail when mounting. When doing this, a removing/mounting jig (see **A1-541**) is required. Please contact THK for details.
- Note 3) Plate covers are available for models SRG 35 to 65.

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## Greasing Hole

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### [Greasing Hole for Model SRG]

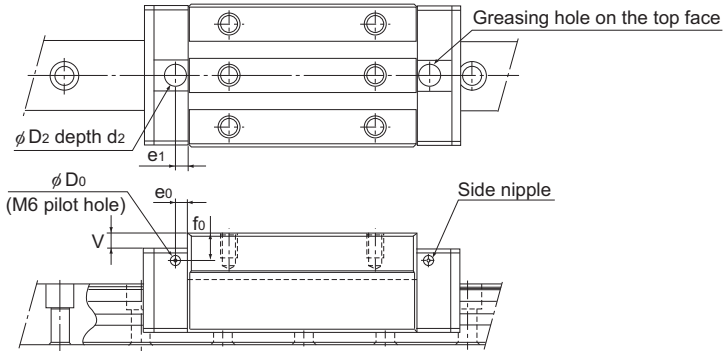
Model SRG allows lubrication from both the side and top faces of the LM block. The greasing hole of standard types is not drilled through in order to prevent foreign material from entering the LM block. When using the greasing hole, contact THK.

When using the greasing hole on the top face of models SRG-R, SRG-LR and SRG-SLR, a greasing adapter is separately required. Contact THK for details.

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

Be sure to let THK know the mounting orientation and the exact position in each LM block where the grease nipple or the piping joint should be attached.

For the mounting orientation and the lubrication, see **A1-12** and **A24-2**, respectively.



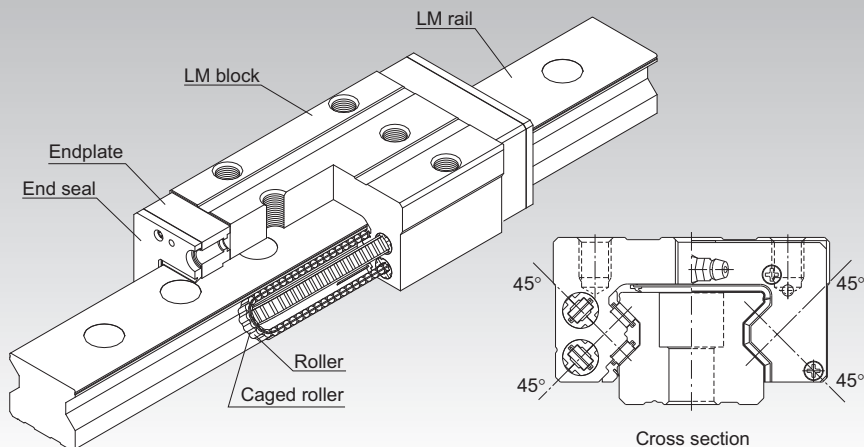
Unit: mm

| Model No. |                      | Pilot hole for side nipple |       |       | Applicable nipple | Greasing hole on the top face |          |      |       |       |
|-----------|----------------------|----------------------------|-------|-------|-------------------|-------------------------------|----------|------|-------|-------|
|           |                      | $e_0$                      | $f_0$ | $D_0$ |                   | $D_2$                         | (O-ring) | $V$  | $e_1$ | $d_2$ |
| SRG       | 15A<br>15V           | 4                          | 6     | 2.9   | PB107             | 9.2                           | (P6)     | 0.5  | 5.5   | 1.5   |
|           | 20A<br>20LA          | 4                          | 6     | 2.9   | PB107             | 9.2                           | (P6)     | 0.5  | 6.5   | 1.5   |
|           | 20V<br>20LV          | 4                          | 6     | 2.9   | PB107             | 9.2                           | (P6)     | 0.5  | 6.5   | 1.5   |
|           | 25C<br>25LC          | 6                          | 6.4   | 5.2   | M6F               | 10.2                          | (P7)     | 0.5  | 6     | 1.5   |
|           | 25R<br>25LR          | 6                          | 10.4  | 5.2   | M6F               | 10.2                          | (P7)     | 4.5  | 6     | 1.5   |
|           | 30C<br>30LC          | 6                          | 7.5   | 5.2   | M6F               | 10.2                          | (P7)     | 0.4  | 6     | 1.4   |
|           | 30R<br>30LR          | 6                          | 10.5  | 5.2   | M6F               | 10.2                          | (P7)     | 3.4  | 6     | 1.4   |
|           | 35C<br>35LC<br>35SLC | 6                          | 6     | 5.2   | M6F               | 10.2                          | (P7)     | 0.4  | 6     | 1.4   |
|           | 35R<br>35LR<br>35SLR | 6                          | 13    | 5.2   | M6F               | 10.2                          | (P7)     | 7.4  | 6     | 1.4   |
|           | 45C<br>45LC<br>45SLC | 7                          | 7     | 5.2   | M6F               | 10.2                          | (P7)     | 0.4  | 7     | 1.4   |
|           | 45R<br>45LR<br>45SLR | 7                          | 17    | 5.2   | M6F               | 10.2                          | (P7)     | 10.4 | 7     | 1.4   |
|           | 55C<br>55LC<br>55SLC | 9                          | 8.5   | 5.2   | M6F               | 10.2                          | (P7)     | 0.4  | 11    | 1.4   |
|           | 55R<br>55LR<br>55SLR | 9                          | 18.5  | 5.2   | M6F               | 10.2                          | (P7)     | 10.4 | 11    | 1.4   |
|           | 65C<br>65LC<br>65SLC | 9                          | 13.5  | 5.2   | M6F               | 10.2                          | (P7)     | 0.4  | 10    | 1.4   |
|           | 65V<br>65LV<br>65SLV | 9                          | 13.5  | 5.2   | M6F               | 10.2                          | (P7)     | 0.4  | 10    | 1.4   |
|           | 85LC                 | 15                         | 22    | 8.2   | PT1/8             | 13                            | (P10)    | 0.4  | 10    | 1     |
|           | 100LC                | 15                         | 23    | 8.2   | PT1/8             | 13                            | (P10)    | 0.4  | 10    | 1     |

Note1) The greasing interval is longer than that of full-roller types because of the roller cage effect. However, the actual greasing interval may vary depending on the service environment, such as a high load and high speed. Contact THK for details.

Note2) Upper surface lubrication is for oil lubrication only. Contact THK if you are considering using the greasing hole on the top face for grease lubrication.

## Caged Roller LM Guide Ultra-high Rigidity Type (Low Center of Gravity) Model SRN



\*For the caged roller, see **A1-408**.

**Point of Selection** **A1-10**

**Point of Design** **A1-454**

**Options** **A1-477**

**Model No.** **A1-543**

**Precautions on Use** **A1-549**

**Accessories for Lubrication** **A24-1**

**Mounting Procedure and Maintenance** **B1-89**

Equivalent moment factor **A1-43**

Rated Loads in All Directions **A1-59**

Equivalent factor in each direction **A1-61**

Radial Clearance **A1-73**

Accuracy Standards **A1-77**

Shoulder Height of the Mounting Base and the Corner Radius **A1-466**

Error Allowance of the Mounting Surface **A1-436**

Dimensions of Each Model with an Option Attached **A1-491**

## Structure and Features

SRN is an ultra-high rigidity Roller Guide that uses roller cages to allow low-friction, smooth motion and achieve long-term maintenance-free operation.

### [Ultra-high Rigidity]

A higher rigidity is achieved by using highly rigid rollers as the rolling elements and having the overall roller length more than 1.5 times greater than the roller diameter.

### [4-way Equal Load]

Since each row of rollers is arranged at a contact angle of 45° so that the LM block receives an equal load rating in all directions (radial, reverse radial and lateral directions), high rigidity is ensured in all directions.

### [Smooth Motion through Skewing Prevention]

The roller cage allows rollers to form an evenly spaced line while circulating, thus preventing the rollers from skewing as the block enters an loaded area. As a result, fluctuation of the rolling resistance is minimized, and stable, smooth motion is achieved.

### [Long-term Maintenance-free Operation]

Use of roller cages eliminates friction between rollers and increases grease retention, enabling long-term maintenance-free operation to be achieved.

### [Low-Profile Low Center of Gravity]

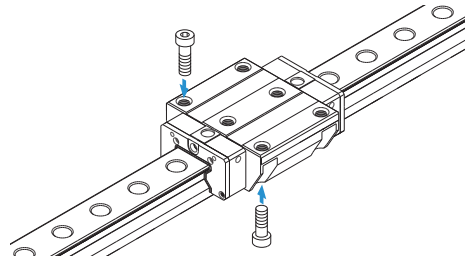
Because it has a lower total height than the Caged Roller LM Guide Model SRG, it is ideal for compact designs.

## Types and Features

### Model SRN-C

The flange of the LM block has tapped holes.  
Can be mounted from the top or the bottom.  
Used in places where the table cannot have through holes for mounting bolts.

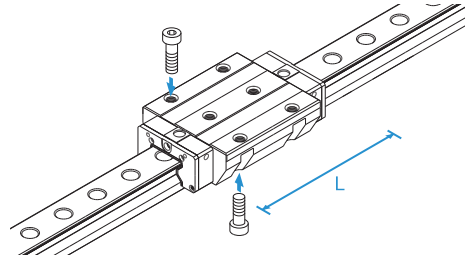
Specification Table⇒ **A1-438**



### Model SRN-LC

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

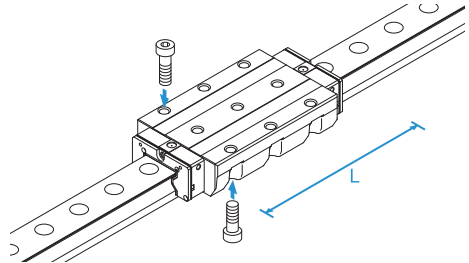
Specification Table⇒ **A1-438**



### Model SRN-SLC

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

Specification Table⇒ **A1-438**

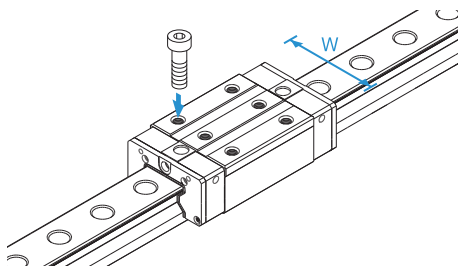


## Model SRN-R

With this type, the LM block has a smaller width (W) and tapped holes.

Used in places where the space for table width is limited.

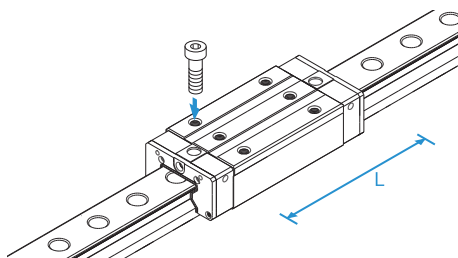
Specification Table⇒ **A1-440**



## Model SRN-LR

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

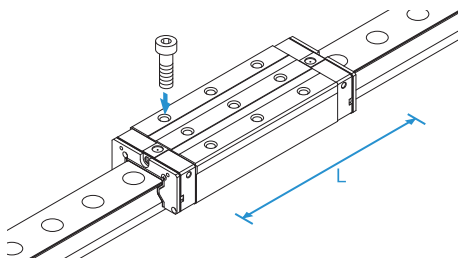
Specification Table⇒ **A1-440**



## Model SRN-SLR

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

Specification Table⇒ **A1-440**



# Error Allowance of the Mounting Surface

The caged roller LM Guide Model SRG features high rigidity since it uses rollers as its rolling element and it also features a cage which prevents the rollers from skewing. However, high machining accuracy is required in the mounting surface. If the error on the mounting surface is large, it will affect the rolling resistance and the service life. The following shows the maximum permissible value according to the radial clearance.

Table1 Error Allowance in Parallelism (P) between Two Rails Unit: mm

| Radial clearance |        |       |       |
|------------------|--------|-------|-------|
| Model No.        | Normal | C1    | C0    |
| SRN 35           | 0.014  | 0.010 | 0.007 |
| SRN 45           | 0.017  | 0.013 | 0.009 |
| SRN 55           | 0.021  | 0.014 | 0.011 |
| SRN 65           | 0.027  | 0.018 | 0.014 |

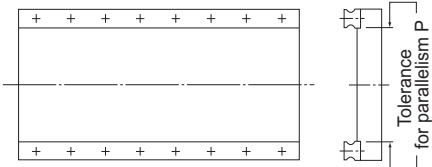


Fig.1

Table2 Error Allowance in Vertical Level (X) between Two Rails Unit: mm

| Radial clearance                            | Normal   | C1       | C0       |
|---------------------------------------------|----------|----------|----------|
| Permissible error on the mounting surface X | 0.00030a | 0.00021a | 0.00011a |

$X=X_1+X_2$      $X_1$  : Level difference on the rail mounting surface  
                           $X_2$  : Level difference on the block mounting surface

Example of calculation

Rail span                    when a = 500mm  
 Error allowance         $X = 0.0003 \times 500$   
 of the mounting        = 0.15  
 surface

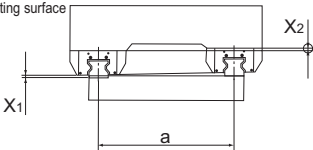


Fig.2

Table3 Error Allowance in Level (Y) in the Axial Direction Unit: mm

|                                           |           |
|-------------------------------------------|-----------|
| Permissible error on the mounting surface | 0.000036b |
|-------------------------------------------|-----------|

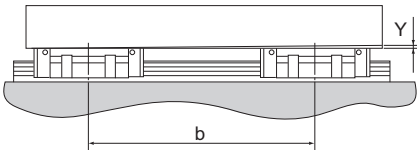
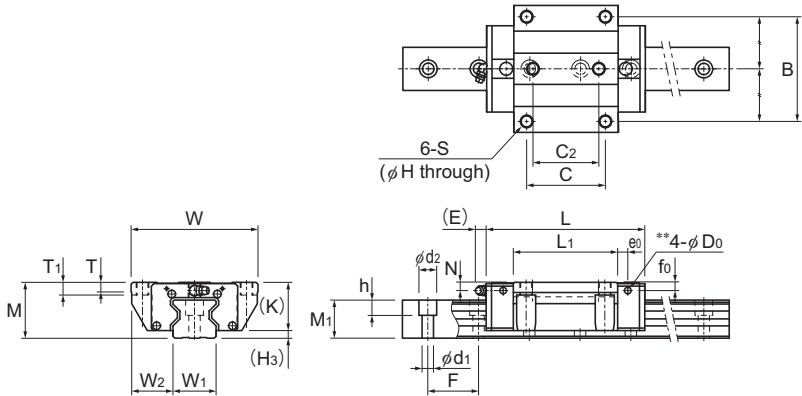


Fig.3



# Models SRN-C, SRN-LC and SRN-SLC



Models SRN35 to 65C/LC

| Model No.                        | Outer dimensions |       |                     | LM block dimensions |            |         |     |      |                         |              |    |    |     |    |     |     |     |         | Grease nipple | H <sub>3</sub> |
|----------------------------------|------------------|-------|---------------------|---------------------|------------|---------|-----|------|-------------------------|--------------|----|----|-----|----|-----|-----|-----|---------|---------------|----------------|
|                                  | Height           | Width | Length              |                     |            |         |     |      |                         |              |    |    |     |    |     |     |     |         |               |                |
|                                  | M                | W     | L                   |                     |            |         |     |      |                         |              |    |    |     |    |     |     |     |         |               |                |
| SRN 35C<br>SRN 35LC<br>SRN 35SLC | 44               | 100   | 125<br>155<br>180.8 | 82                  | 62<br>100  | 52<br>— | M10 | 8.5  | 82.2<br>112.2<br>138    | 11.6<br>11.7 | 10 | 38 | 6.5 | 12 | 8   | 7   | 5.2 | B-M6F   | 6             |                |
| SRN 45C<br>SRN 45LC<br>SRN 45SLC | 52               | 120   | 155<br>190<br>231.5 | 100                 | 80<br>120  | 60<br>— | M12 | 10.5 | 107<br>142<br>183.5     | 16.5         | 15 | 45 | 7   | 12 | 8.5 | 7.6 | 5.2 | B-M6F   | 7             |                |
| SRN 55C<br>SRN 55LC<br>SRN 55SLC | 63               | 140   | 185<br>235<br>292   | 116                 | 95<br>150  | 70<br>— | M14 | 12.5 | 129<br>179.2<br>236.2   | 18.2         | 18 | 53 | 8   | 16 | 10  | 9.8 | 5.2 | B-PT1/8 | 10            |                |
| SRN 65C<br>SRN 65LC<br>SRN 65SLC | 75               | 170   | 244.9<br>303<br>380 | 142                 | 110<br>200 | 82<br>— | M16 | 14.5 | 171.7<br>229.8<br>306.8 | 21.2         | 20 | 65 | 14  | 16 | 9   | 13  | 5.2 | B-PT1/8 | 10            |                |

## Model number coding

**SRN45 C 2 QZ KK C0 +1160L P Z T -II**

Model number

Type of LM block

With QZ lubricator

Contamination protection accessory symbol (\*1)

LM rail length (in mm)

With plate cover

Symbol for No. of rails used on the same plane (\*4)

No. of LM blocks used on the same rail

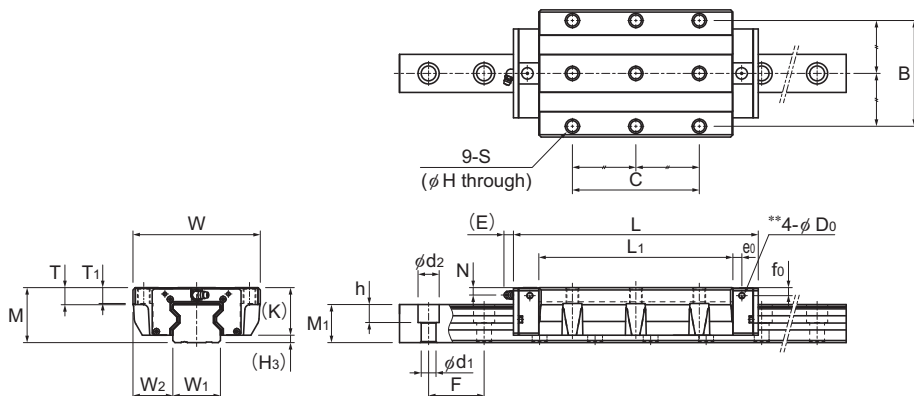
Radial clearance symbol (\*2)  
Normal (No symbol)  
Light preload (C1)  
Medium preload (C0)

Symbol for LM rail jointed use  
Accuracy symbol (\*3)  
Precision grade (P)/Super precision grade (SP)  
Ultra precision grade (UP)

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-73**. (\*3) See **A1-77**. (\*4) See **A1-13**.

Note) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.)

Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.



Models SRN35 to 65SLC

Unit: mm

|  | LM rail dimensions                        |                |                              |                |                                                             |             | Basic load rating*       |                                                                                                     | Static permissible moment kN·m* |                                                                                                     |                      |                                                                                                     |                      | Mass                  |                        |
|--|-------------------------------------------|----------------|------------------------------|----------------|-------------------------------------------------------------|-------------|--------------------------|-----------------------------------------------------------------------------------------------------|---------------------------------|-----------------------------------------------------------------------------------------------------|----------------------|-----------------------------------------------------------------------------------------------------|----------------------|-----------------------|------------------------|
|  | Width<br><br>W <sub>1</sub><br>0<br>-0.05 | W <sub>2</sub> | Height<br><br>M <sub>1</sub> | Pitch<br><br>F | Length*<br><br>d <sub>1</sub> ×d <sub>2</sub> ×h<br><br>Max | C<br><br>kN | C <sub>0</sub><br><br>kN | M <sub>A</sub><br> |                                 | M <sub>B</sub><br> |                      | M <sub>C</sub><br> |                      | LM<br>block<br><br>kg | LM<br>rail<br><br>kg/m |
|  |                                           |                |                              |                |                                                             |             |                          | 1<br>block                                                                                          | Double<br>blocks                | 1<br>block                                                                                          | Double<br>blocks     | 1<br>block                                                                                          |                      |                       |                        |
|  |                                           |                |                              |                |                                                             |             |                          |                                                                                                     |                                 |                                                                                                     |                      |                                                                                                     |                      |                       |                        |
|  | 34                                        | 33             | 30                           | 40             | 9×14×12                                                     | 3000        | 59.1<br>76<br>87.9       | 119<br>165<br>199                                                                                   | 1.66<br>3.13<br>4.53            | 10.1<br>17<br>23.9                                                                                  | 1.66<br>3.13<br>4.53 | 10.1<br>17<br>23.9                                                                                  | 2.39<br>3.31<br>4.09 | 1.5<br>2.3<br>2.8     | 6.9                    |
|  | 45                                        | 37.5           | 36                           | 52.5           | 14×20×17                                                    | 3090        | 91.9<br>115<br>139       | 192<br>256<br>328                                                                                   | 3.49<br>6.13<br>9.99            | 20<br>32.2<br>50.0                                                                                  | 3.49<br>6.13<br>9.99 | 20<br>32.2<br>50.0                                                                                  | 4.98<br>6.64<br>8.91 | 3.1<br>4.1<br>5.4     | 11.3                   |
|  | 53                                        | 43.5           | 43                           | 60             | 16×23×20                                                    | 3060        | 131<br>167<br>210        | 266<br>366<br>488                                                                                   | 5.82<br>10.8<br>19.1            | 33<br>57<br>93.7                                                                                    | 5.82<br>10.8<br>19.1 | 33<br>57<br>93.7                                                                                    | 8.19<br>11.2<br>15.6 | 5.1<br>7.1<br>9.4     | 15.8                   |
|  | 63                                        | 53.5           | 49                           | 75             | 18×26×22                                                    | 3000        | 219<br>278<br>352        | 441<br>599<br>811                                                                                   | 12.5<br>22.7<br>41.3            | 72.8<br>120<br>202                                                                                  | 12.5<br>22.7<br>41.3 | 72.8<br>120<br>202                                                                                  | 16.8<br>22.1<br>30.9 | 10.4<br>13.9<br>18.5  | 21.3                   |

Note1) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-442**.)

Static permissible moment\* 1 block: the static permissible moment with one LM block

Double blocks: static permissible moment when two LM blocks are in close contact with each other

For oil lubrication, be certain to let THK know the mounting orientation and where the LM block piping joint should be attached.

(Mounting orientation: see **A1-12**, Lubricant: see **A24-2**)

Total block length L

: The total block length L shown in the table is the length with the dust proof parts, code UU or SS.

If other contamination protection accessories or lubricant equipment are installed, the total block length will increase.

(See **A1-491** or **A1-512**)

The removing/mounting jig is not provided as standard. Contact THK before use.

\*\* A pilot hole for side nipples, when a grease nipple for a model equipped with LaCS or QZ Lubricator is needed.

Pilot holes for side nipples are not drilled through for models other than those stated above.

For grease nipple mount machining, contact THK. (See **A1-444**)

Note2) The basic dynamic load rating of the roller guide is a value based on a nominal life of 100 km.

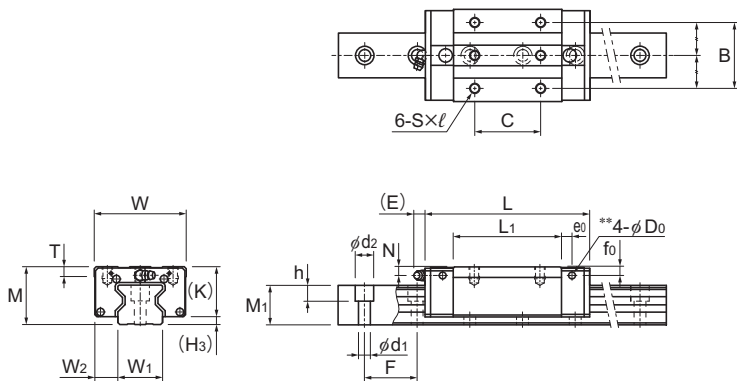
The conversion to basic dynamic load rating for a nominal life of 50 km can be obtained from the following equation.

$$C_{50} = C \times 1.23$$

C<sub>50</sub>: The basic dynamic load rating for a nominal load of 50 km

C: The basic dynamic load rating in the dimensional table

# Models SRN-R, SRN-LR and SRN-SLR



Models SRN35 to 65R/LR

| Model No.                        | Outer dimensions |       |                     | LM block dimensions |                  |        |                         |      |    |     |    |                |                |                |               | H <sub>3</sub> |
|----------------------------------|------------------|-------|---------------------|---------------------|------------------|--------|-------------------------|------|----|-----|----|----------------|----------------|----------------|---------------|----------------|
|                                  | Height           | Width | Length              | B                   | C                | S×ℓ    | L <sub>1</sub>          | T    | K  | N   | E  | e <sub>0</sub> | f <sub>0</sub> | D <sub>0</sub> | Grease nipple |                |
|                                  | M                | W     | L                   |                     |                  |        |                         |      |    |     |    |                |                |                |               |                |
| SRN 35R<br>SRN 35LR<br>SRN 35SLR | 44               | 70    | 125<br>155<br>180.8 | 50                  | 50<br>72<br>100  | M8×9   | 82.2<br>112.2<br>138    | 10.8 | 38 | 6.5 | 12 | 8              | 7              | 5.2            | B-M6F         | 6              |
| SRN 45R<br>SRN 45LR<br>SRN 45SLR | 52               | 86    | 155<br>190<br>231.5 | 60                  | 60<br>80<br>120  | M10×11 | 107<br>142<br>183.5     | 10.8 | 45 | 7   | 12 | 8.5            | 7.6            | 5.2            | B-M6F         | 7              |
| SRN 55R<br>SRN 55LR<br>SRN 55SLR | 63               | 100   | 185<br>235<br>292   | 75                  | 75<br>95<br>150  | M12×13 | 129<br>179.2<br>236.2   | 13.8 | 53 | 8   | 16 | 10             | 9.8            | 5.2            | B-PT1/8       | 10             |
| SRN 65R<br>SRN 65LR<br>SRN 65SLR | 75               | 126   | 244.9<br>303<br>380 | 76                  | 70<br>120<br>200 | M16×16 | 171.7<br>229.8<br>306.8 | 19.5 | 65 | 14  | 16 | 9              | 13             | 5.2            | B-PT1/8       | 10             |

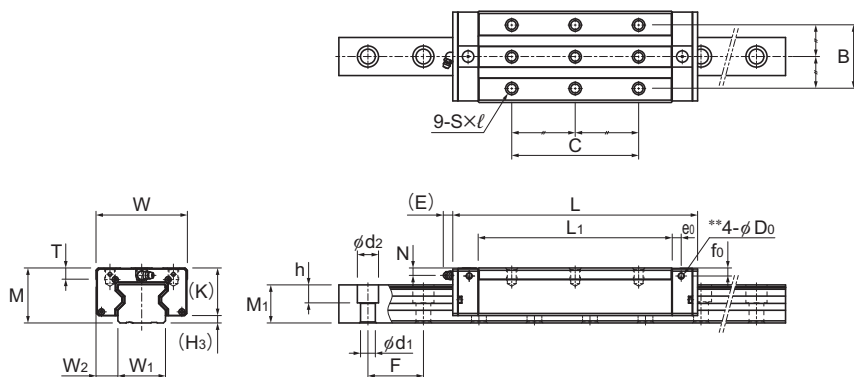
## Model number coding

|              |                  |                                        |                    |                                                |                                                                                                 |                        |                  |                                                                                                      |                                |                                                     |
|--------------|------------------|----------------------------------------|--------------------|------------------------------------------------|-------------------------------------------------------------------------------------------------|------------------------|------------------|------------------------------------------------------------------------------------------------------|--------------------------------|-----------------------------------------------------|
| <b>SRN45</b> | <b>LR</b>        | <b>2</b>                               | <b>QZ</b>          | <b>KK</b>                                      | <b>C0</b>                                                                                       | <b>+1200L</b>          | <b>P</b>         | <b>Z</b>                                                                                             | <b>T</b>                       | <b>- II</b>                                         |
| Model number | Type of LM block | No. of LM blocks used on the same rail | With QZ lubricator | Contamination protection accessory symbol (*1) | Radial clearance symbol (*2)<br>Normal (No symbol)<br>Light preload (C1)<br>Medium preload (C0) | LM rail length (in mm) | With plate cover | Accuracy symbol (*3)<br>Precision grade (P)/Super precision grade (SP)<br>Ultra precision grade (UP) | Symbol for LM rail jointed use | Symbol for No. of rails used on the same plane (*4) |

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-73**. (\*3) See **A1-77**. (\*4) See **A1-13**.

Note) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.)

Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.



Models SRN35 to 65SLR

Unit: mm

| LM rail dimensions           |                |                |      |                                     |      | Basic load rating* |                | Static permissible moment kN·m* |               |                |               |                | Mass     |         |
|------------------------------|----------------|----------------|------|-------------------------------------|------|--------------------|----------------|---------------------------------|---------------|----------------|---------------|----------------|----------|---------|
| Width                        | Height         | Pitch          |      | Length*                             |      | C                  | C <sub>0</sub> | M <sub>a</sub>                  |               | M <sub>b</sub> |               | M <sub>c</sub> | LM block | LM rail |
| W <sub>1</sub><br>0<br>-0.05 | W <sub>2</sub> | M <sub>1</sub> | F    | d <sub>1</sub> × d <sub>2</sub> × h | Max  | kN                 | kN             | 1 block                         | Double blocks | 1 block        | Double blocks | 1 block        | kg       | kg/m    |
| 34                           | 18             | 30             | 40   | 9 × 14 × 12                         | 3000 | 59.1               | 119            | 1.66                            | 10.1          | 1.66           | 10.1          | 2.39           | 1.1      | 6.9     |
|                              |                |                |      |                                     |      | 76                 | 165            | 3.13                            | 17            | 3.13           | 17            | 3.31           | 1.5      |         |
|                              |                |                |      |                                     |      | 87.9               | 199            | 4.53                            | 23.9          | 4.53           | 23.9          | 4.09           | 1.8      |         |
| 45                           | 20.5           | 36             | 52.5 | 14 × 20 × 17                        | 3090 | 91.9               | 192            | 3.49                            | 20            | 3.49           | 20            | 4.98           | 2        | 11.3    |
|                              |                |                |      |                                     |      | 115                | 256            | 6.13                            | 32.2          | 6.13           | 32.2          | 6.64           | 2.6      |         |
|                              |                |                |      |                                     |      | 139                | 328            | 9.99                            | 50.0          | 9.99           | 50.0          | 8.91           | 3.4      |         |
| 53                           | 23.5           | 43             | 60   | 16 × 23 × 20                        | 3060 | 131                | 266            | 5.82                            | 33            | 5.82           | 33            | 8.19           | 3.3      | 15.8    |
|                              |                |                |      |                                     |      | 167                | 366            | 10.8                            | 57            | 10.8           | 57            | 11.2           | 4.6      |         |
|                              |                |                |      |                                     |      | 210                | 488            | 19.1                            | 93.7          | 19.1           | 93.7          | 15.6           | 5        |         |
| 63                           | 31.5           | 49             | 75   | 18 × 26 × 22                        | 3000 | 219                | 441            | 12.5                            | 72.8          | 12.5           | 72.8          | 16.8           | 7.1      | 21.3    |
|                              |                |                |      |                                     |      | 278                | 599            | 22.7                            | 120           | 22.7           | 120           | 22.1           | 9.4      |         |
|                              |                |                |      |                                     |      | 352                | 811            | 41.3                            | 202           | 41.3           | 202           | 30.9           | 12.6     |         |

Note1) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See [A1-442](#).)

Static permissible moment\* 1 block: the static permissible moment with one LM block

Double blocks: static permissible moment when two LM blocks are in close contact with each other  
For oil lubrication, be certain to let THK know the mounting orientation and where the LM block piping joint should be attached.

(Mounting orientation: see [A1-12](#), Lubricant: see [A24-2](#))

Total block length L : The total block length L shown in the table is the length with the dust proof parts, code UU or SS.  
If other contamination protection accessories or lubricant equipment are installed, the total block length will increase.

(See [A1-491](#) or [A1-512](#))

The removing/mounting jig is not provided as standard. Contact THK before use.

\*\* A pilot hole for side nipples, when a grease nipple for a model equipped with LaCS or QZ Lubricator is needed.

Pilot holes for side nipples are not drilled through for models other than those stated above.

For grease nipple mount machining, contact THK. (See [A1-444](#))

Note2) The basic dynamic load rating of the roller guide is a value based on a nominal life of 100 km.

The conversion to basic dynamic load rating for a nominal life of 50 km can be obtained from the following equation.

$$C_{50} = C \times 1.23$$

C<sub>50</sub> :The basic dynamic load rating for a nominal load of 50 km

C :The basic dynamic load rating in the dimensional table

# Standard Length and Maximum Length of the LM Rail

Table4 shows the standard lengths and the maximum lengths of model SRN variations. If the maximum length of the desired LM rail exceeds them, jointed rails will be used. Contact THK for details. For special rail lengths, it is recommended to use a value corresponding to the G,g dimension from the table. As the G,g dimension increases, this portion becomes less stable, and the accuracy performance is severely impacted.

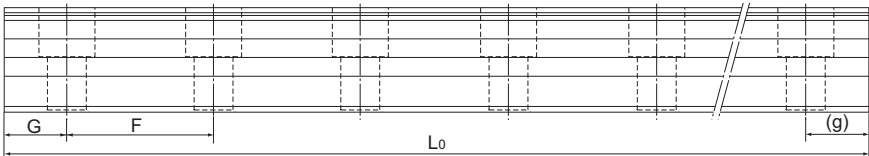


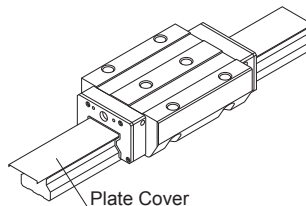
Table4 Standard Length and Maximum Length of the LM Rail for Model SRN Unit: mm

| Model No.                         | SRN 35 | SRN 45 | SRN 55 | SRN 65 |
|-----------------------------------|--------|--------|--------|--------|
| LM rail standard length ( $L_0$ ) | 280    | 570    | 780    | 1270   |
|                                   | 360    | 675    | 900    | 1570   |
|                                   | 440    | 780    | 1020   | 2020   |
|                                   | 520    | 885    | 1140   | 2620   |
|                                   | 600    | 990    | 1260   |        |
|                                   | 680    | 1095   | 1380   |        |
|                                   | 760    | 1200   | 1500   |        |
|                                   | 840    | 1305   | 1620   |        |
|                                   | 920    | 1410   | 1740   |        |
|                                   | 1000   | 1515   | 1860   |        |
|                                   | 1080   | 1620   | 1980   |        |
|                                   | 1160   | 1725   | 2100   |        |
|                                   | 1240   | 1830   | 2220   |        |
|                                   | 1320   | 1935   | 2340   |        |
|                                   | 1400   | 2040   | 2460   |        |
|                                   | 1480   | 2145   | 2580   |        |
|                                   | 1560   | 2250   | 2700   |        |
|                                   | 1640   | 2355   | 2820   |        |
|                                   | 1720   | 2460   | 2940   |        |
|                                   | 1800   | 2565   | 3060   |        |
|                                   | 1880   | 2670   |        |        |
|                                   | 1960   | 2775   |        |        |
|                                   | 2040   | 2880   |        |        |
|                                   | 2200   | 2985   |        |        |
|                                   | 2360   | 3090   |        |        |
|                                   | 2520   |        |        |        |
|                                   | 2680   |        |        |        |
|                                   | 2840   |        |        |        |
|                                   | 3000   |        |        |        |
| Standard pitch F                  | 40     | 52.5   | 60     | 75     |
| G,g                               | 20     | 22.5   | 30     | 35     |
| Max length                        | 3000   | 3090   | 3060   | 3000   |

Note1) The maximum length varies with accuracy grades. Contact THK for details.  
Note2) If jointed rails are not allowed and a greater length than the maximum values above is required, contact THK.

## Plate Cover

By covering the LM rail's mounting holes with ultra-thin stainless steel (SUS304) plates, the sealability of the end seals increase drastically, helping prevent foreign materials and liquid from entering from the top of the LM rail. Contact THK for further details regarding mounting.



Note 1) The Model SRN with plate cover is not a standard specification. (Please note it is not possible to add just the plate cover afterwards.)

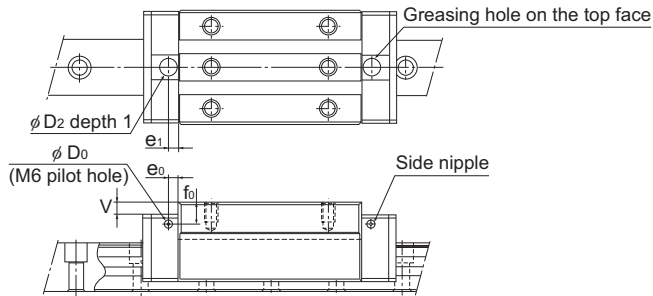
Note 2) The LM block must be removed from the LM rail when mounting. When doing this, a removing/mounting jig (see **A1-541**) is required. Please contact THK for details.

Note 3) Plate covers are available for models SRN 35 to 65.

# Greasing Hole

## [Greasing Hole for Model SRN]

Model SRN allows lubrication from both the side and top faces of the LM block. The greasing hole of standard types is not drilled through in order to prevent foreign material from entering the LM block. When using the greasing hole, contact THK.



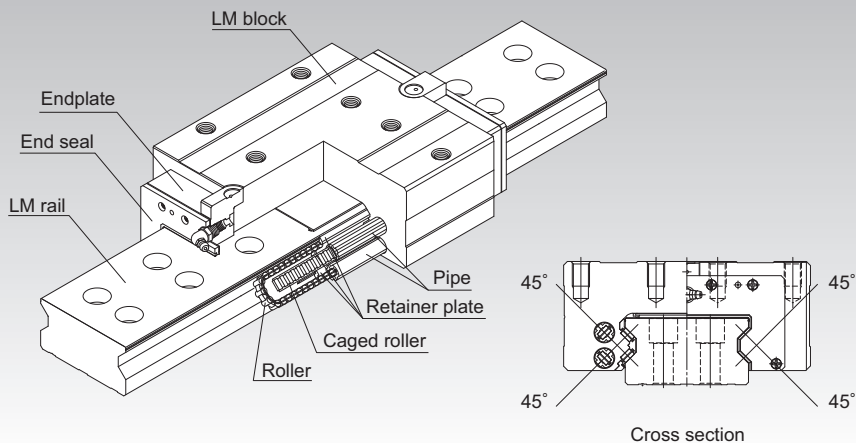
Unit: mm

| Model No. |       | Pilot hole for side nipple |                |                | Applicable nipple | Greasing hole on the top face |          |     |                |
|-----------|-------|----------------------------|----------------|----------------|-------------------|-------------------------------|----------|-----|----------------|
|           |       | e <sub>0</sub>             | f <sub>0</sub> | D <sub>0</sub> |                   | D <sub>2</sub>                | (O-ring) | V   | e <sub>1</sub> |
| SRN       | 35C   | 8                          | 7.0            | 5.2            | M6F               | 10.2                          | (P7)     | 0.4 | 6              |
|           | 35LC  |                            |                |                |                   |                               |          |     |                |
|           | 35SLC |                            |                |                |                   |                               |          |     |                |
|           | 35R   | 8                          | 7.0            | 5.2            | M6F               | 10.2                          | (P7)     | 0.4 | 6              |
|           | 35LR  |                            |                |                |                   |                               |          |     |                |
|           | 35SLR |                            |                |                |                   |                               |          |     |                |
|           | 45C   | 8.5                        | 7.6            | 5.2            | M6F               | 10.2                          | (P7)     | 0.4 | 7              |
|           | 45LC  |                            |                |                |                   |                               |          |     |                |
|           | 45SLC |                            |                |                |                   |                               |          |     |                |
|           | 45R   | 8.5                        | 7.6            | 5.2            | M6F               | 10.2                          | (P7)     | 0.4 | 7              |
|           | 45LR  |                            |                |                |                   |                               |          |     |                |
|           | 45SLR |                            |                |                |                   |                               |          |     |                |
|           | 55C   | 10                         | 9.8            | 5.2            | M6F               | 10.2                          | (P7)     | 0.4 | 11             |
|           | 55LC  |                            |                |                |                   |                               |          |     |                |
|           | 55SLC |                            |                |                |                   |                               |          |     |                |
|           | 55R   | 10                         | 9.8            | 5.2            | M6F               | 10.2                          | (P7)     | 0.4 | 11             |
|           | 55LR  |                            |                |                |                   |                               |          |     |                |
|           | 55SLR |                            |                |                |                   |                               |          |     |                |
|           | 65C   | 9                          | 13             | 5.2            | M6F               | 10.2                          | (P7)     | 0.4 | 10             |
|           | 65LC  |                            |                |                |                   |                               |          |     |                |
|           | 65SLC |                            |                |                |                   |                               |          |     |                |
|           | 65R   | 9                          | 13             | 5.2            | M6F               | 10.2                          | (P7)     | 0.4 | 10             |
|           | 65LR  |                            |                |                |                   |                               |          |     |                |
|           | 65SLR |                            |                |                |                   |                               |          |     |                |

- Note1) The greasing interval is longer than that of full-roller types because of the roller cage effect. However, the actual greasing interval may vary depending on the service environment, such as a high load and high speed. Contact THK for details.
- Note2) Upper surface lubrication is for oil lubrication only. Contact THK if you are considering using the greasing hole on the top face for grease lubrication.



## Caged Roller LM Guide Ultra-high Rigidity Type (Wide) Model SRW



\*For the caged roller, see **A1-408**.

**Point of Selection** **A1-10**

**Point of Design** **A1-454**

**Options** **A1-477**

**Model No.** **A1-543**

**Precautions on Use** **A1-549**

**Accessories for Lubrication** **A24-1**

**Mounting Procedure and Maintenance** **B1-89**

Equivalent moment factor **A1-43**

Rated Loads in All Directions **A1-59**

Equivalent factor in each direction **A1-61**

Radial Clearance **A1-73**

Accuracy Standards **A1-85**

Shoulder Height of the Mounting Base and the Corner Radius **A1-466**

Permissible Error of the Mounting Surface **A1-449**

Dimensions of Each Model with an Option Attached **A1-491**

## Structure and Features

Based on Caged Roller LM Guide model SRG, this model has a wider rail and two rows of LM rail mounting holes to achieve high mounting strength and mounting stability. SRW is an ultra-high rigidity Roller Guide that uses roller cages to allow low-friction, smooth motion and achieve long-term maintenance-free operation.

### [Ultra-high Rigidity]

Since it has a wide rail and can be secured on the table using two rows of mounting bolts, the mounting strength is significantly increased. In addition, since the crosswise raceway distance (L) is large, model SRW is structurally strong against a moment load (Mc moment) in the rolling direction. Furthermore, model SRW uses rollers that show little elastic deformation as its rolling elements, and the overall length of each roller is 1.5 times greater than the diameter, thus to increase the rigidity.

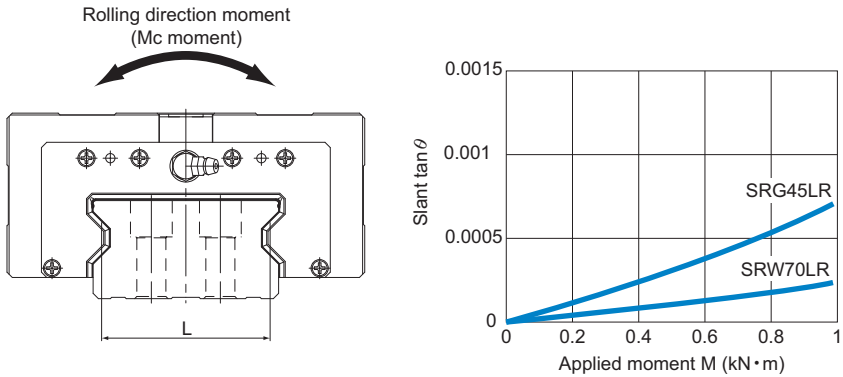


Fig.1 Result of Comparison between Models SRW and SRG in Moment Rigidity in the Rolling Direction (Mc Moment)

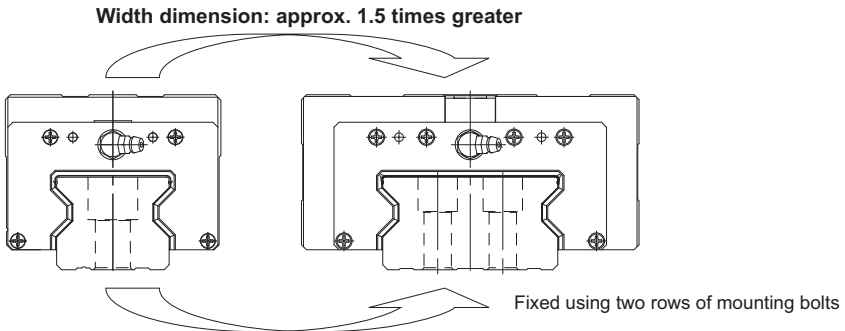


Fig.2 Comparison between Models SRW and SRG in Cross Section

**[Smoothness Achieved through Skewing Prevention]**

The roller cage allows rollers to form an evenly spaced line while circulating, thus preventing the rollers from skewing as the block enters an loaded area. As a result, fluctuation of the rolling resistance is minimized, and stable, smooth motion is achieved.

**[Long-term Maintenance-free Operation]**

Use of the roller cage eliminates friction between rollers and enables the lubricant to be retained in grease pockets formed between adjacent rollers. As the rollers circulate, the grease pocket serves to provide the required amount of lubricant to the contact curvature of the spacer and the roller, thus to achieve long-term maintenance-free operation.

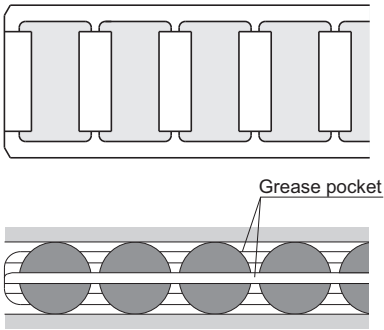


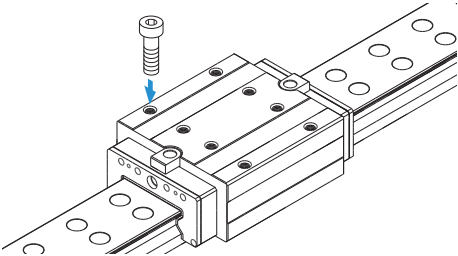
Fig.3

**Types and Features**

**Model SRW-LR**

The LM block has tapped holes.

Specification Table⇒A1-450



## Permissible Error of the Mounting Surface

The Caged Roller LM Guide Model SRW features high rigidity since the raceway is made up of rollers, preventing roller skew due to the roller cage. However, high machining accuracy is required in the mounting surface. If the error on the mounting surface is large, it will affect the rolling resistance and the service life. The following shows the maximum permissible value (limit value) according to the radial clearance.

Table1 Error in Parallelism (P) between Two Rails

Unit: mm

| Radial clearance<br>Model No. | Normal | C1    | C0    |
|-------------------------------|--------|-------|-------|
| SRW 70                        | 0.013  | 0.009 | 0.007 |
| SRW 85                        | 0.016  | 0.011 | 0.008 |
| SRW 100                       | 0.020  | 0.014 | 0.011 |
| SRW 130                       | 0.026  | 0.018 | 0.014 |
| SRW 150                       | 0.030  | 0.021 | 0.016 |

Table2 Error in Level (X) between Two Rails

Unit: mm

| Radial clearance                   | Normal   | C1       | C0        |
|------------------------------------|----------|----------|-----------|
| Accuracy of the mounting surface X | 0.00020a | 0.00014a | 0.000072a |

$$X = X_1 + X_2$$

$X_1$ : Level difference on the rail mounting surface

$X_2$ : Level difference on the block mounting surface

### Example of calculation

When the rail span :

$$a = 500\text{mm}$$

Accuracy of the mounting surface

$$X = 0.0002 \times 500$$

$$= 0.1$$

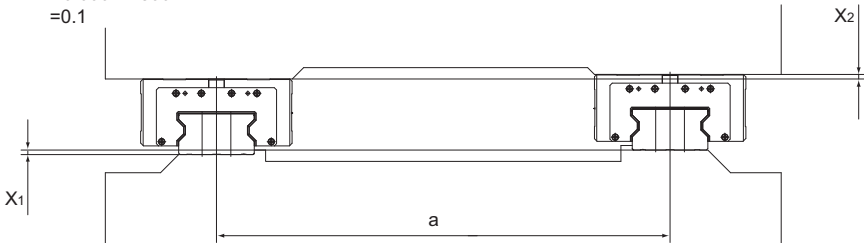


Fig.5

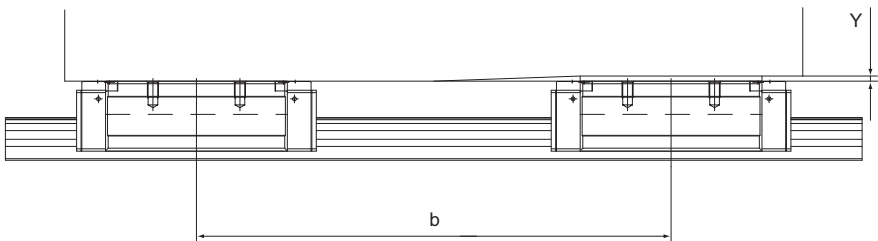


Fig.6

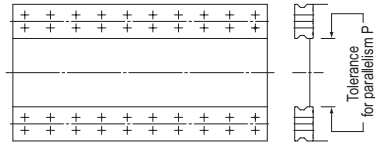


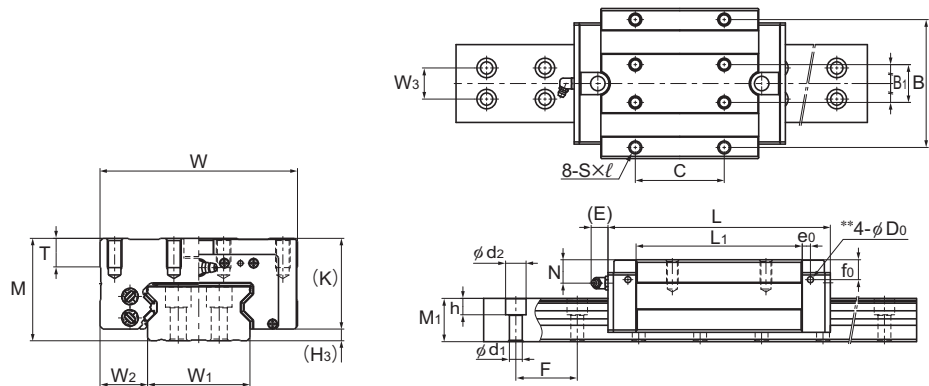
Fig.4

Table3 Error in Level (Y) in the Axial Direction

Unit: mm

|                                  |           |
|----------------------------------|-----------|
| Accuracy of the mounting surface | 0.000036b |
|----------------------------------|-----------|

# Model SRW-LR



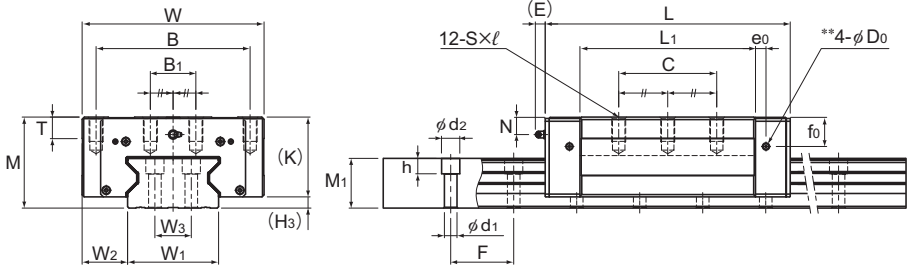
Models SRW70 to 100LR

| Model No. | Outer dimensions |       |        | LM block dimensions |                |     |        |                |    |      |      |    |                |                |                |         | Grease nipple | H <sub>3</sub> |
|-----------|------------------|-------|--------|---------------------|----------------|-----|--------|----------------|----|------|------|----|----------------|----------------|----------------|---------|---------------|----------------|
|           | Height           | Width | Length |                     |                |     |        |                |    |      |      |    |                |                |                |         |               |                |
|           | M                | W     | L      | B                   | B <sub>1</sub> | C   | S×ℓ    | L <sub>1</sub> | T  | K    | N    | E  | e <sub>0</sub> | f <sub>0</sub> | D <sub>0</sub> |         |               |                |
| SRW 70LR  | 70               | 135   | 190    | 115                 | 34             | 80  | M10×20 | 142            | 20 | 62   | 20   | 16 | 7              | 19             | 5.2            | B-PT1/8 | 8             |                |
| SRW 85LR  | 80               | 165   | 235    | 140                 | 40             | 95  | M12×19 | 179.2          | 28 | 70   | 22   | 16 | 9              | 19.5           | 5.2            | B-PT1/8 | 10            |                |
| SRW 100LR | 100              | 200   | 303    | 172                 | 50             | 110 | M14×20 | 229.8          | 20 | 88.5 | 27   | 16 | 9              | 26             | 5.2            | B-PT1/8 | 11.5          |                |
| SRW 130LR | 130              | 260   | 350    | 220                 | 65             | 140 | M20×35 | 250.8          | 30 | 114  | 25   | 16 | 15             | 42             | 8.2            | B-PT1/8 | 16            |                |
| SRW 150LR | 150              | 300   | 395    | 260                 | 75             | 200 | M20×40 | 280.2          | 35 | 134  | 28.8 | 16 | 15             | 53             | 8.2            | B-PT1/4 | 16            |                |

## Model number coding

|                |                                        |                    |                                                |                                                                                                 |                        |                                                                                                      |                  |                                |                                                     |
|----------------|----------------------------------------|--------------------|------------------------------------------------|-------------------------------------------------------------------------------------------------|------------------------|------------------------------------------------------------------------------------------------------|------------------|--------------------------------|-----------------------------------------------------|
| <b>SRW70LR</b> | <b>2</b>                               | <b>QZ</b>          | <b>KKHH</b>                                    | <b>C0</b>                                                                                       | <b>+1200L</b>          | <b>P</b>                                                                                             | <b>Z</b>         | <b>T</b>                       | <b>-II</b>                                          |
| Model number   | No. of LM blocks used on the same rail | With QZ Lubricator | Contamination protection accessory symbol (*1) | Radial clearance symbol (*2)<br>Normal (No symbol)<br>Light preload (C1)<br>Medium preload (C0) | LM rail length (in mm) | Accuracy symbol (*3)<br>Precision grade (P)/Super precision grade (SP)<br>Ultra precision grade (UP) | With plate cover | Symbol for LM rail jointed use | Symbol for No. of rails used on the same plane (*4) |

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-73**. (\*3) See **A1-85**. (\*4) See **A1-13**.  
(Note) Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.



Models SRW130 and 150LR

Unit: mm

| LM rail dimensions  |       |       |        |       |                           |         | Basic load rating* |                | Static permissible moment kN·m* |               |         |               |         | Mass     |         |
|---------------------|-------|-------|--------|-------|---------------------------|---------|--------------------|----------------|---------------------------------|---------------|---------|---------------|---------|----------|---------|
| Width               |       |       | Height | Pitch |                           | Length* | C                  | C <sub>0</sub> | $M_A$                           |               | $M_B$   |               | $M_C$   | LM block | LM rail |
| $W_1$<br>0<br>-0.05 | $W_2$ | $W_3$ | $M_1$  | F     | $d_1 \times d_2 \times h$ | Max     | kN                 | kN             | 1 block                         | Double blocks | 1 block | Double blocks | 1 block | kg       | kg/m    |
| 70                  | 32.5  | 28    | 37     | 52.5  | 11×17.5×14                | 3090    | 115                | 256            | 6.13                            | 32.2          | 6.13    | 32.2          | 10.2    | 6.3      | 18.6    |
| 85                  | 40    | 32    | 43     | 60    | 14×20×17                  | 3060    | 167                | 366            | 10.8                            | 57            | 10.8    | 57            | 17.5    | 11.0     | 26.7    |
| 100                 | 50    | 38    | 54     | 75    | 16×23×20                  | 3000    | 278                | 599            | 22.7                            | 120           | 22.7    | 120           | 33.9    | 21.6     | 35.9    |
| 130                 | 65    | 52    | 71     | 90    | 18×26×22                  | 3000    | 497                | 990            | 45.3                            | 239           | 45.3    | 239           | 74.2    | 41.7     | 61.0    |
| 150                 | 75    | 60    | 77     | 105   | 24×35×28                  | 3000    | 601                | 1170           | 60                              | 319           | 60      | 319           | 101.6   | 65.1     | 74.4    |

Note1) The maximum length under "Length\*" indicates the standard maximum length of an LM rail. (See **A1-452**.)

Static permissible moment\* 1 block: the static permissible moment with one LM block

Double blocks: static permissible moment when two LM blocks are in close contact with each other. For oil lubrication, be certain to let THK know the mounting orientation and where the LM block piping joint should be attached.

(Mounting orientation: see **A1-12**, Lubricant: see **A24-2**)

Total block length L : The total block length L shown in the table is the length with the dust proof parts, code UU or SS. If other contamination protection accessories or lubricant equipment are installed, the total block length will increase.

(See **A1-491** or **A1-512**)

The removing/mounting jig is not provided as standard. Contact THK before use.

\*\* A pilot hole for side nipples, when a grease nipple for a model equipped with LaCS or QZ Lubricator is needed.

Pilot holes for side nipples are not drilled through for models other than those stated above.

For grease nipple mount machining, contact THK. (See **A1-453**)

Note2) The basic dynamic load rating of the roller guide is a value based on a nominal life of 100 km.

The conversion to basic dynamic load rating for a nominal life of 50 km can be obtained from the following equation.

$$C_{50} = C \times 1.23$$

$C_{50}$  : The basic dynamic load rating for a nominal load of 50 km

$C$  : The basic dynamic load rating in the dimensional table

# Standard Length and Maximum Length of the LM Rail

Table4 shows the standard lengths and the maximum lengths of model SRW variations. If the maximum length of the desired LM rail exceeds them, jointed rails will be used.

For special rail lengths, it is recommended to use a value corresponding to the G,g dimension from the table. As the G,g dimension increases, this portion becomes less stable, and the accuracy performance is severely impacted.

If desiring jointed use of this model, be sure to indicate the overall length so that we can manufacture the product without leaving a level difference in the joint.

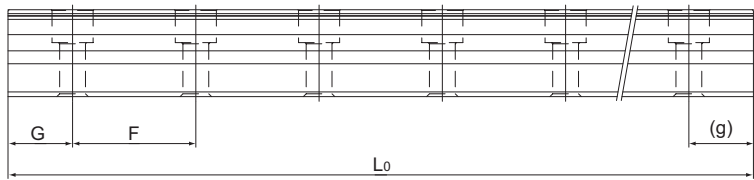


Table4 Standard Length and Maximum Length of the LM Rail for Model SRW Unit: mm

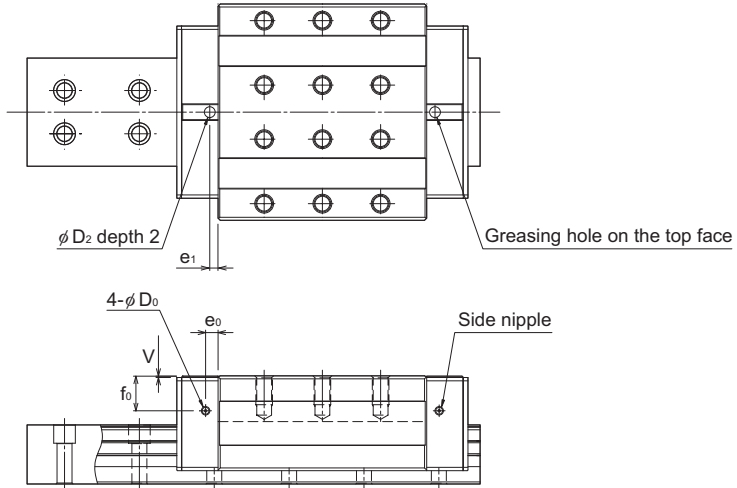
| Model No.                                 | SRW 70 | SRW 85 | SRW 100 | SRW 130 | SRW 150 |
|-------------------------------------------|--------|--------|---------|---------|---------|
| LM rail standard length (L <sub>0</sub> ) | 570    | 780    | 1270    | 1530    | 1340    |
|                                           | 675    | 900    | 1570    | 1890    | 1760    |
|                                           | 780    | 1020   | 2020    | 2250    | 2180    |
|                                           | 885    | 1140   | 2620    | 2610    | 2600    |
|                                           | 990    | 1260   |         |         |         |
|                                           | 1095   | 1380   |         |         |         |
|                                           | 1200   | 1500   |         |         |         |
|                                           | 1305   | 1620   |         |         |         |
|                                           | 1410   | 1740   |         |         |         |
|                                           | 1515   | 1860   |         |         |         |
|                                           | 1620   | 1980   |         |         |         |
|                                           | 1725   | 2100   |         |         |         |
|                                           | 1830   | 2220   |         |         |         |
|                                           | 1935   | 2340   |         |         |         |
|                                           | 2040   | 2460   |         |         |         |
|                                           | 2145   | 2580   |         |         |         |
|                                           | 2250   | 2700   |         |         |         |
|                                           | 2355   | 2820   |         |         |         |
|                                           | 2460   | 2940   |         |         |         |
|                                           | 2565   | 3060   |         |         |         |
|                                           | 2670   |        |         |         |         |
|                                           | 2775   |        |         |         |         |
|                                           | 2880   |        |         |         |         |
|                                           | 2985   |        |         |         |         |
| Standard pitch F                          | 52.5   | 60     | 75      | 90      | 105     |
| G,g                                       | 22.5   | 30     | 35      | 45      | 40      |
| Max length                                | 3090   | 3060   | 3000    | 3000    | 3000    |

Note1) The maximum length varies with accuracy grades. Contact THK for details.  
 Note2) If jointed rails are not allowed and a greater length than the maximum values above is required, contact THK.

## Greasing Hole

### [Greasing Hole for Model SRW]

Model SRW allows lubrication from both the side and top faces of the LM block. The greasing hole of standard types is not drilled through in order to prevent foreign material from entering the LM block. When using the greasing hole, contact THK.



Unit: mm

| Model No. |     | Pilot hole for side nipple |                |                | Applicable nipple | Greasing hole on the top face |     |                |
|-----------|-----|----------------------------|----------------|----------------|-------------------|-------------------------------|-----|----------------|
|           |     | e <sub>0</sub>             | f <sub>0</sub> | D <sub>0</sub> |                   | D <sub>2</sub><br>(O-ring)    | V   | e <sub>1</sub> |
| SRW       | 70  | 7                          | 17             | 5.2            | M6F               | 13<br>(P10)                   | 0.4 | 2.7            |
|           | 85  | 9                          | 18.5           | 5.2            | M6F               | 13<br>(P10)                   | 0.4 | 9.9            |
|           | 100 | 9                          | 23.5           | 5.2            | M6F               | 13<br>(P10)                   | 0.4 | 10.1           |
|           | 130 | 15                         | 42             | 8.2            | PT1/8             | 13<br>(P10)                   | 0.4 | 10             |
|           | 150 | 15                         | 53             | 8.2            | PT1/8             | 13<br>(P10)                   | 0.4 | 10             |

Note1) The greasing interval is longer than that of full-roller types because of the roller cage effect. However, the actual greasing interval may vary depending on the service environment, such as a high load and high speed. Contact THK for details.

Note2) Upper surface lubrication is for oil lubrication only. Contact THK if you are considering using the greasing hole on the top face for grease lubrication.

## Designing the Guide System

THK offers various types of LM Guides in order to meet diversified conditions. Supporting ordinary horizontal mount, vertical mount, inverted mount, slant mount, wall mount and single-axis mount, the wide array of LM Guide types makes it easy to achieve a linear guide system with a long service life and high rigidity while minimizing the required space for installation.

It is necessary to consider the position in the LM block where the grease nipple or the piping joint should be attached according to the mounting orientation.

If the mounting orientation is other than horizontal use, the lubricant may not reach the raceway completely. Be sure to let THK know the mounting orientation and the exact position in each LM block where the grease nipple or the piping joint should be attached.

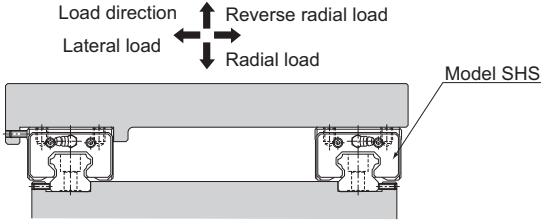
Even with an LM Guide with seals, the internal lubricant gradually seeps out during operation. Therefore, the system needs to be lubricated at an appropriate interval according to the conditions.

For the mounting orientation and the lubrication, see **A1-12** and **A24-2**, respectively.

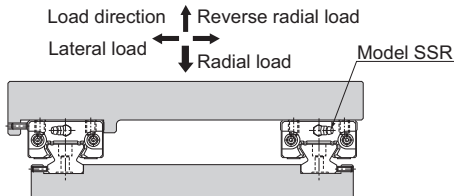
## Examples of Arrangements of the Guide System

The following are representative guide systems and arrangements when installing the LM Guide.  
(For indication of the reference surface, see **A1-475**.)

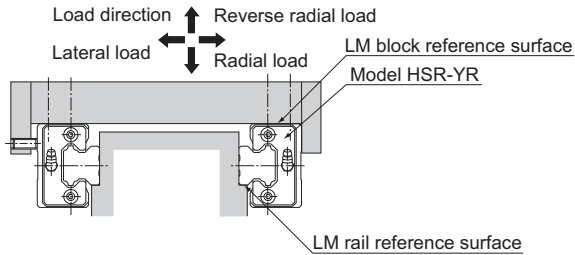
Double-rail configuration when high rigidity is required in all directions



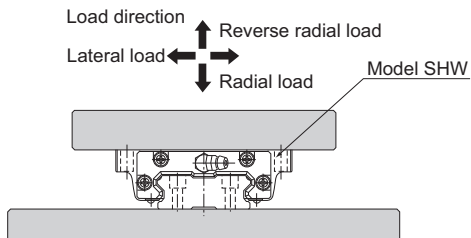
Double-rail configuration when high rigidity is required in the radial direction



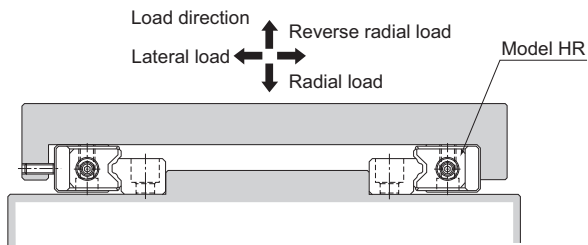
When high rigidity is required in all directions and the installation space is limited in height



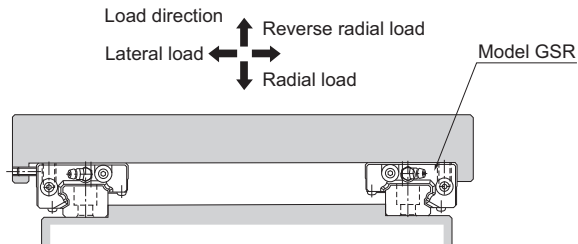
## Single-rail configuration



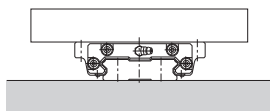
When the minimum possible height of the equipment is allowed (Adjustable preload type)



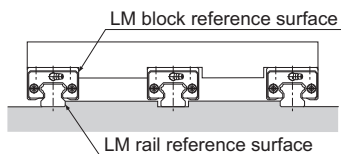
When a medium load is applied and the mounting surface is rough (Preload, self-adjusting type)



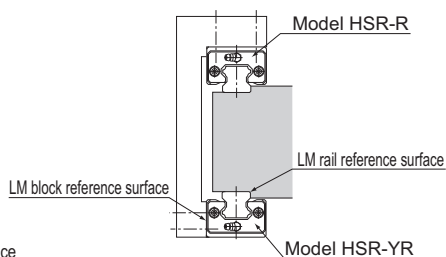
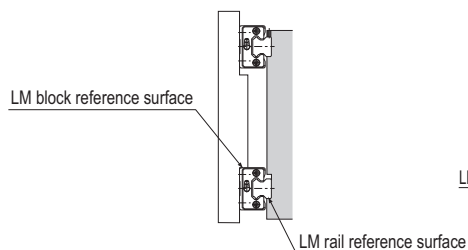
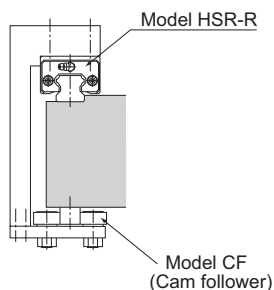
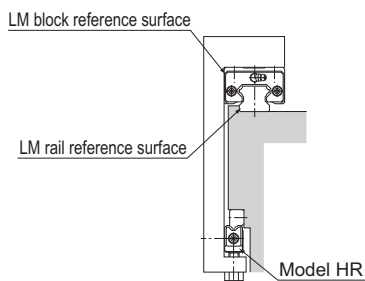
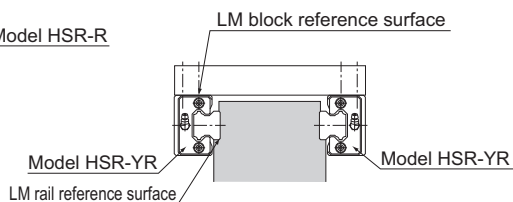
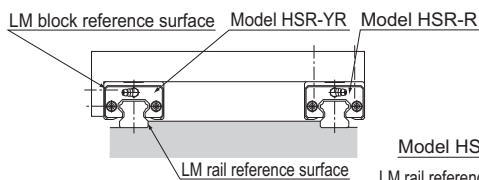
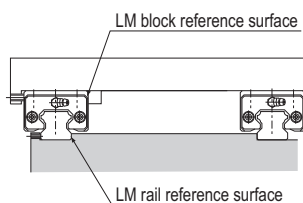
Single-rail configuration



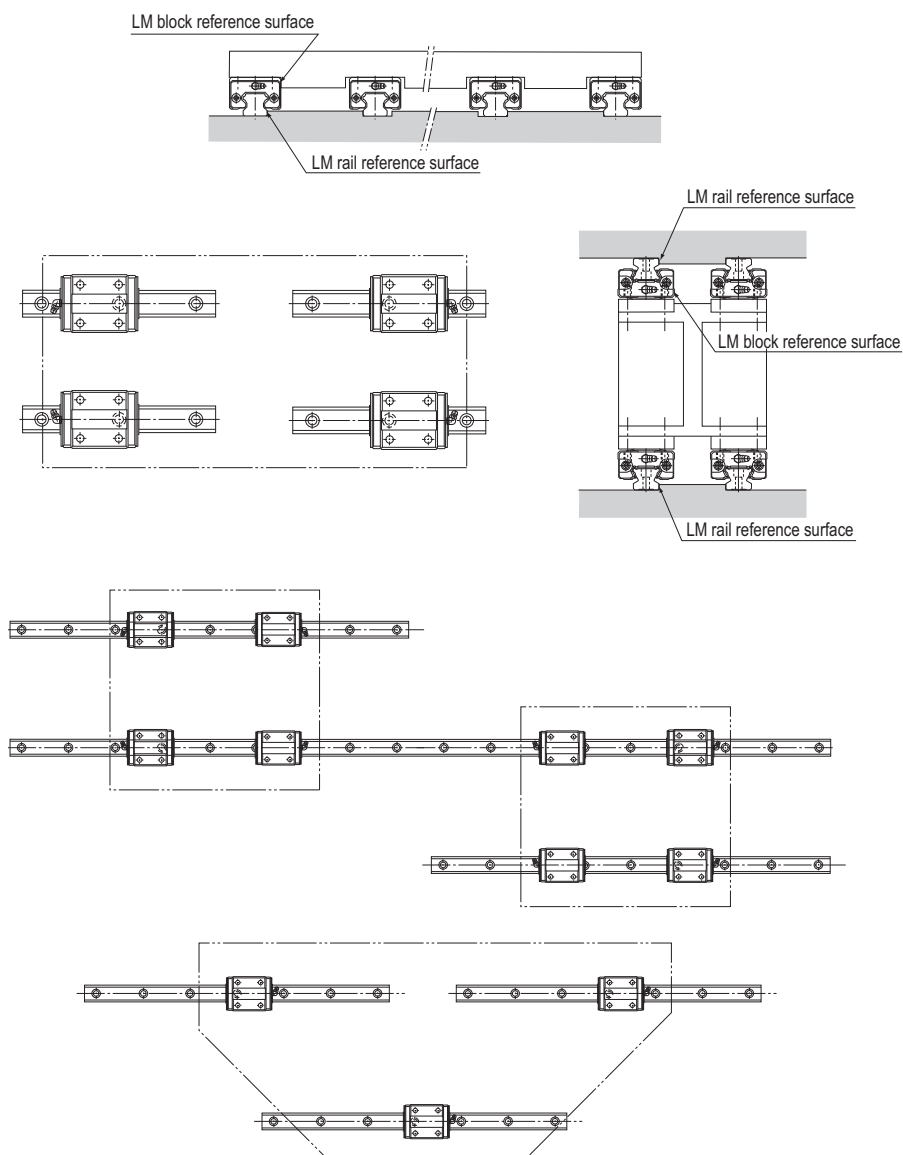
Triple-rail configuration



Double-rail configuration



# Multi-rail configuration



Method for Securing an LM Guide to Meet the Conditions

LM Guides are categorized into groups of types by mounting space and structure: a group of types to be mounted with bolts from the top, and another of types to be mounted from the bottom. LM rails are also divided into types secured with bolts and those secured with clamps (model JR). This wide array of types allows you to make a choice according to the application.

There are several ways of mounting the LM Guide as shown in Table1. When the machine is subject to vibrations that may cause the LM rail(s) or LM blocks to loosen, we recommend the securing method indicated by Fig.1 on **A1-460**. (If 2 or more rails are used in parallel, only the LM block on the master rail should be secured in the crosswise direction.) If this method is not applicable for a structural reason, hammer in knock pins to secure the LM block(s) as shown in Table2 on **A1-460** When using knock pins, machine the top/bottom surfaces of the LM rail by 2 to 3 mm using a carbide end mill before drilling the holes since the surfaces are hardened.

Table1 Major Securing Methods on the Master-rail Side

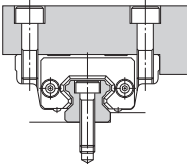
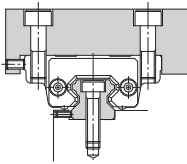
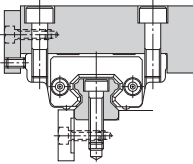
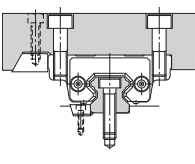
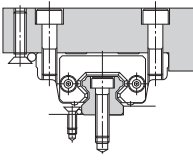
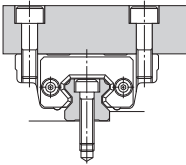
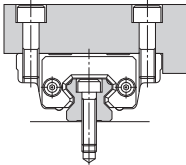
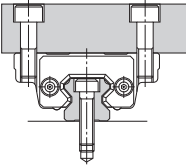
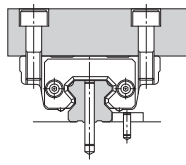
| (a) Secured only with side reference surfaces                                       | (b) Secured with set screws                                                        |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
|    |   |
| (c) Secured with a presser plate                                                    | (d) Secured with tapered gibs                                                      |
|   |  |
| (e) Secured with pins                                                               |                                                                                    |
|  |                                                                                    |

Table2 Major Securing Methods on the Subsidiary-rail Side

| (a) Secured only with the side reference surface of the rail                      | (b) Secured only with the side reference surface of the block                     |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
|  |  |
| (c) Secured without a side reference surface                                      | (d) Secured with dowel pins                                                       |
|  |  |

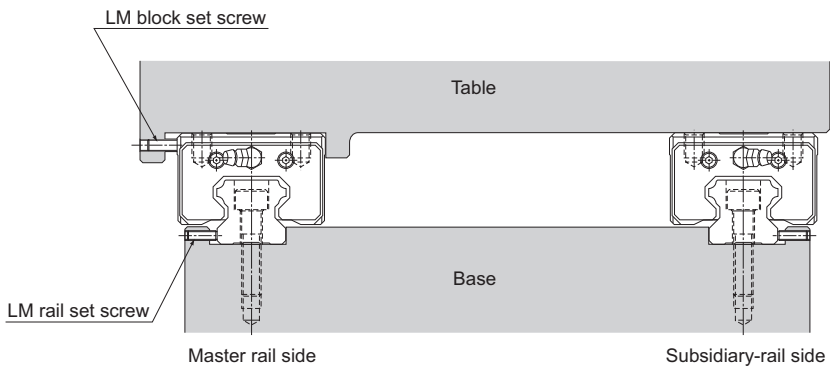
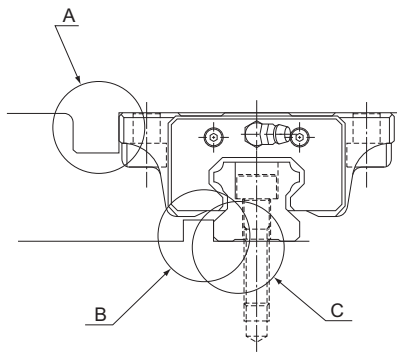


Fig.1 When the Machine Receives Vibrations or Impact

# Designing a Mounting Surface

## Designing a Mounting Surface

If particularly high accuracy is required for the machine to which an LM Guide is to be mounted, it is necessary to mount the LM rail with high accuracy. To achieve the desired accuracy, be sure to design the mounting surface while taking the following points into account.



### [Corner Shape]

If the corner on the surface on which the LM rail or LM block is to be mounted is machined to be shaped R, which is greater than the chamfer dimension of the LM rail or LM block, then the rail or the block may not closely contact its reference surface. Therefore, when designing a mounting surface, it is important to carefully read the description on the “corner shape” of the subject model. (Fig.2)

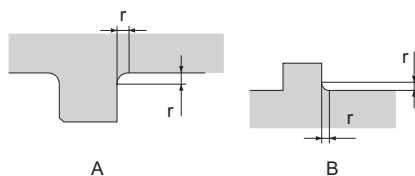


Fig.2

### [Perpendicularity with the Reference Surface]

If the perpendicularity between the base mounting surface for the LM rail or the LM block and the reference surface is not accurate, the rail or the block may not closely contact the reference surface. Therefore, it is important to take into account an error of the perpendicularity between the mounting surface and the reference surface. (Fig.3)

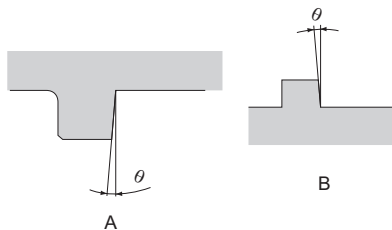


Fig.3

#### [Dimensions of the Reference Surface]

When designing the reference surface, be sure to take into account the height and the thickness of the datum area. If the datum area is too high, it may interfere with the LM block. If it is too low, the LM rail or the LM block may not closely contact the reference-surface depending on the chamfer of the rail or the block. Additionally, if the datum area is too thin, the desired accuracy may not be obtained due to poor rigidity of the datum area when a lateral load is applied or when performing positioning using a lateral mounting bolt. (Fig.4)

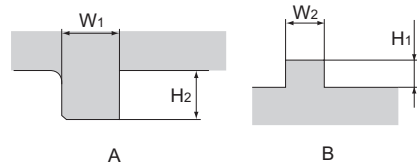


Fig.4

#### [Dimensional Tolerance between the Reference Surface and the Mounting Hole]

If the dimensional tolerance between the reference surface of the LM rail or the LM block and the mounting hole is too large, the rail or the block may not closely contact the reference surface when mounted on the base.

Normally, the tolerance should be within  $\pm 0.1$  mm depending on the model. (Fig.5)

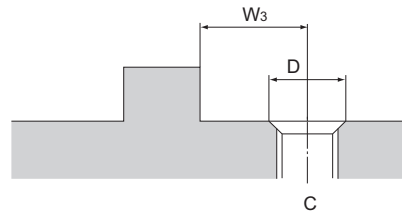


Fig.5

#### [Chamfer of the Tapped Mounting Hole]

To mount the LM rail, the mounting surface needs to be tapped and the tapped hole has to be chamfered. If the chamfer of the tapped hole is too large or too small, it may affect the accuracy. (Fig.6)

Guidelines for the chamfer dimension:

Chamfer diameter  $D$  = nominal diameter of the bolt + pitch

Example: Chamfer diameter  $D$  with M6 (pitch):

$$D = 6 + 1 = 7$$

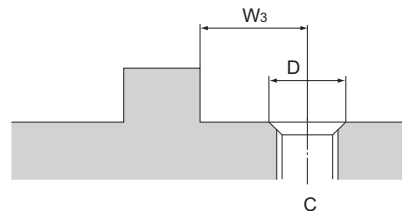
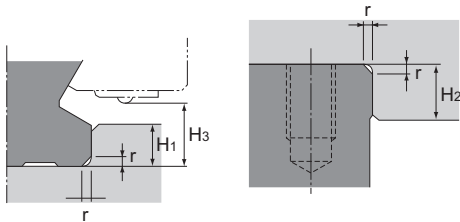


Fig.6

# Shoulder Height of the Mounting Base and the Corner Radius

Normally, the mounting base for the LM rail and the LM block has a reference-surface on the side face of the shoulder of the base in order to allow easy installation and highly accurate positioning. The height of the datum shoulder varies with model numbers. See **A1-463** to **A1-469** for details.

The corner of the mounting shoulder must be machined to have a recess, or machined to be smaller than the corner radius “r,” to prevent interference with the chamfer of the LM rail or the LM block. The corner radius varies with model numbers. See **A1-463** to **A1-469** for details.



Shoulder for the LM Rail

Shoulder for the LM Block (LM casing)

Fig.7

## [Models SR, SR-M1]

Unit: mm

| Model No. | Corner radius<br>r(max) | Shoulder height for the LM rail<br>H <sub>1</sub> | Maximum shoulder height for the LM block<br>H <sub>2</sub> | H <sub>3</sub> |
|-----------|-------------------------|---------------------------------------------------|------------------------------------------------------------|----------------|
| 15        | 0.5                     | 3.8                                               | 4                                                          | 5.8            |
| 20        | 0.5                     | 5                                                 | 5                                                          | 6              |
| 25        | 1                       | 5.5                                               | 5                                                          | 7              |
| 30        | 1                       | 8                                                 | 6                                                          | 9.5            |
| 35        | 1                       | 9                                                 | 6                                                          | 11.5           |
| 45        | 1                       | 10                                                | 8                                                          | 12.5           |
| 55        | 1.5                     | 11                                                | 8                                                          | 13.5           |
| 70        | 1.5                     | 12                                                | 10                                                         | 15             |
| 85        | 1.2                     | 8                                                 | 12                                                         | 18.5           |
| 100       | 1.2                     | 10                                                | 15                                                         | 19             |
| 120       | 1.2                     | 12                                                | 20                                                         | 15             |
| 150       | 1.2                     | 12                                                | 20                                                         | 22             |

## [Model JR]

Unit: mm

| Model No. | Corner radius<br>r(max) | Shoulder height for the LM block<br>H <sub>2</sub> |
|-----------|-------------------------|----------------------------------------------------|
| 25        | 1                       | 5                                                  |
| 35        | 1                       | 6                                                  |
| 45        | 1                       | 8                                                  |
| 55        | 1.5                     | 10                                                 |

## [Model CSR]

Unit: mm

| Model No. | Corner radius<br>r(max) | Shoulder height for the LM rail<br>H <sub>1</sub> | H <sub>3</sub> |
|-----------|-------------------------|---------------------------------------------------|----------------|
| 15        | 0.5                     | 3                                                 | 4.7            |
| 20        | 0.5                     | 3.5                                               | 4              |
| 25        | 1                       | 5                                                 | 5.5            |
| 30        | 1                       | 5                                                 | 7              |
| 35        | 1                       | 6                                                 | 7.5            |
| 45        | 1                       | 8                                                 | 10             |

## [Model SR-MS]

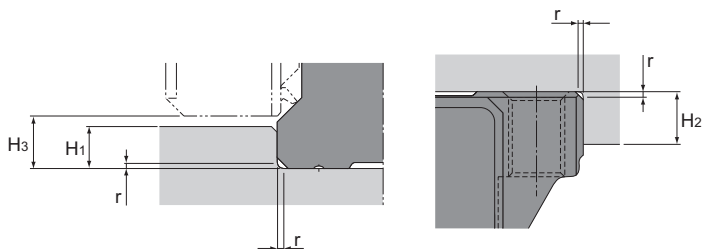
Unit: mm

| Model No. | Corner radius<br>r(max) | Shoulder height for the LM rail<br>H <sub>1</sub> | Shoulder height for the LM block<br>H <sub>2</sub> | H <sub>3</sub> |
|-----------|-------------------------|---------------------------------------------------|----------------------------------------------------|----------------|
| 15        | 0.5                     | 3.8                                               | 4                                                  | 4.5            |
| 20        | 0.5                     | 5                                                 | 5                                                  | 6              |

## [Model NSR-TBC]

Unit: mm

| Model No. | Corner radius<br>r(max) | Shoulder height for the LM rail<br>H <sub>1</sub> | Shoulder height for the LM block<br>H <sub>2</sub> | H <sub>3</sub> |
|-----------|-------------------------|---------------------------------------------------|----------------------------------------------------|----------------|
| 20        | 1                       | 5                                                 | 5                                                  | 5.5            |
| 25        | 1                       | 6                                                 | 6                                                  | 6.5            |
| 30        | 1                       | 7                                                 | 6                                                  | 9              |
| 40        | 1                       | 7                                                 | 8                                                  | 10.5           |
| 50        | 1                       | 7                                                 | 8                                                  | 8              |
| 70        | 1                       | 7                                                 | 10                                                 | 9.5            |



Shoulder for the LM Rail

Shoulder for the LM Block

Fig.8

**[Model SHS]**

Unit: mm

| Model No. | Corner radius<br>r(max) | Shoulder height for the LM rail<br>H <sub>1</sub> | Shoulder height for the LM block<br>H <sub>2</sub> | H <sub>3</sub> |
|-----------|-------------------------|---------------------------------------------------|----------------------------------------------------|----------------|
| 15        | 0.5                     | 2.5                                               | 4                                                  | 3              |
| 20        | 0.5                     | 3.5                                               | 5                                                  | 4.6            |
| 25        | 1                       | 5                                                 | 5                                                  | 5.8            |
| 30        | 1                       | 5                                                 | 5                                                  | 7              |
| 35        | 1                       | 6                                                 | 6                                                  | 7.5            |
| 45        | 1                       | 7.5                                               | 8                                                  | 8.9            |
| 55        | 1.5                     | 10                                                | 10                                                 | 12.7           |
| 65        | 1.5                     | 15                                                | 10                                                 | 19             |

**[Model SCR]**

Unit: mm

| Model No. | Corner radius<br>r(max) | Shoulder height for the LM rail<br>H <sub>1</sub> | H <sub>3</sub> |
|-----------|-------------------------|---------------------------------------------------|----------------|
| 15        | 0.5                     | 2.5                                               | 3              |
| 20        | 0.5                     | 3.5                                               | 4.6            |
| 25        | 1                       | 5                                                 | 5.8            |
| 30        | 1                       | 5                                                 | 7              |
| 35        | 1                       | 6                                                 | 7.5            |
| 45        | 1                       | 7.5                                               | 8.9            |
| 65        | 1.5                     | 15                                                | 19             |

**[Models SVR/SVS and NR/NRS-X]**

Unit: mm

| Model No. | Corner radius<br>r(max) | Shoulder height for the LM rail<br>H <sub>1</sub> | Shoulder height for the LM block<br>H <sub>2</sub> | H <sub>3</sub> |
|-----------|-------------------------|---------------------------------------------------|----------------------------------------------------|----------------|
| 25        | 0.5                     | 4                                                 | 5                                                  | 5.5            |
| 30        | 1                       | 5                                                 | 5                                                  | 7              |
| 35        | 1                       | 6                                                 | 6                                                  | 9              |
| 45        | 1                       | 8                                                 | 8                                                  | 11.6           |
| 55        | 1.5                     | 10                                                | 10                                                 | 14             |
| 65        | 1.5                     | 10                                                | 10                                                 | 15             |

**[Models NR/NRS]**

Unit: mm

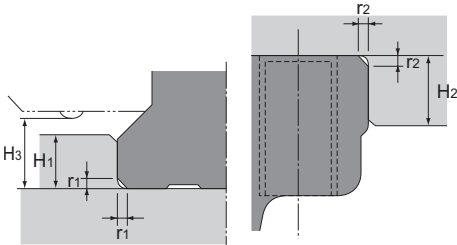
| Model No. | Corner radius<br>r(max) | Shoulder height for the LM rail<br>H <sub>1</sub> | Shoulder height for the LM block<br>H <sub>2</sub> | H <sub>3</sub> |
|-----------|-------------------------|---------------------------------------------------|----------------------------------------------------|----------------|
| 75        | 1.5                     | 12                                                | 12                                                 | 15             |
| 85        | 1.5                     | 14                                                | 14                                                 | 17             |
| 100       | 2                       | 16                                                | 16                                                 | 20             |

**[Model MX]**

Unit: mm

| Model No. | Corner radius for the LM rail<br>r(max) | Shoulder height for the LM rail<br>H <sub>1</sub> | H <sub>3</sub> |
|-----------|-----------------------------------------|---------------------------------------------------|----------------|
| 5         | 0.1                                     | 1.2                                               | 1.5            |
| 7W        | 0.1                                     | 1.7                                               | 2              |

Note) If the optional side scraper or protector is attached, dimensions H<sub>1</sub> and H<sub>3</sub> differ from that without the options. For the dimensions after they are attached, see **■1-486 to ■1-487**.



Shoulder for the LM Rail      Shoulder for the LM Block  
Fig.9

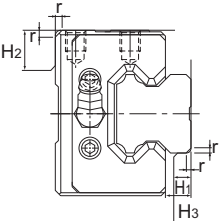


Fig.10

[Models HSR, HSR-M1 and HSR-M2]      Unit: mm

| Model No. | Corner radius for the LM rail<br>$r_1(\text{max})$ | Corner radius for the LM block<br>$r_2(\text{max})$ | Shoulder height for the LM rail<br>$H_1$ | Shoulder height for the LM block<br>$H_2$ | $H_3$ |
|-----------|----------------------------------------------------|-----------------------------------------------------|------------------------------------------|-------------------------------------------|-------|
| 8         | 0.3                                                | 0.5                                                 | 1.6                                      | 6                                         | 2.1   |
| 10        | 0.3                                                | 0.5                                                 | 1.7                                      | 5                                         | 2.2   |
| 12        | 0.8                                                | 0.5                                                 | 2.6                                      | 4                                         | 3.1   |
| 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    |
| 120       | 2.5                                                | 2.5                                                 | 17                                       | 18                                        | 20    |
| 150       | 2.5                                                | 2.5                                                 | 20                                       | 20                                        | 22    |

[Model HCR]      Unit: mm

| Model No. | Corner radius for the LM rail<br>$r_1(\text{max})$ | Corner radius for the LM block<br>$r_2(\text{max})$ | Shoulder height for the LM rail<br>$H_1$ | Maximum shoulder height for the LM block<br>$H_2$ | $H_3$ |
|-----------|----------------------------------------------------|-----------------------------------------------------|------------------------------------------|---------------------------------------------------|-------|
| 12        | 0.8                                                | 0.5                                                 | 2.6                                      | 6                                                 | 3.1   |
| 15        | 0.5                                                | 0.5                                                 | 3                                        | 4                                                 | 4.8   |
| 25        | 1                                                  | 1                                                   | 5                                        | 5                                                 | 7     |
| 35        | 1                                                  | 1                                                   | 6                                        | 6                                                 | 8.5   |
| 45        | 1                                                  | 1                                                   | 8                                        | 8                                                 | 11.5  |
| 65        | 1.5                                                | 1.5                                                 | 10                                       | 10                                                | 15    |

[Model HMG]      Unit: mm

| Model No. | Corner radius for the LM rail<br>$r_1(\text{max})$ | Corner radius for the LM block<br>$r_2(\text{max})$ | Shoulder height for the LM rail<br>$H_1$ | Maximum shoulder height for the LM block<br>$H_2$ | $H_3$ |
|-----------|----------------------------------------------------|-----------------------------------------------------|------------------------------------------|---------------------------------------------------|-------|
| 15        | 0.5                                                | 0.5                                                 | 3                                        | 4                                                 | 3.5   |
| 25        | 1                                                  | 1                                                   | 5                                        | 5                                                 | 5.5   |
| 35        | 1                                                  | 1                                                   | 6                                        | 6                                                 | 7.5   |
| 45        | 1                                                  | 1                                                   | 8                                        | 8                                                 | 11    |
| 65        | 1.5                                                | 1.5                                                 | 10                                       | 10                                                | 16    |

[Model EPF]      Unit: mm

| Model No. | Corner radius for the LM rail<br>$r_1(\text{max})$ | Corner radius for the LM block<br>$r_2(\text{max})$ | Shoulder height for the LM rail<br>$H_1$ | Maximum shoulder height for the LM block<br>$H_2$ | $H_3$ |
|-----------|----------------------------------------------------|-----------------------------------------------------|------------------------------------------|---------------------------------------------------|-------|
| 7M        | 0.2                                                | 0.4                                                 | 1                                        | 3                                                 | 1.5   |
| 9M        | 0.2                                                | 0.6                                                 | 1                                        | 5                                                 | 1.5   |
| 12M       | 0.5                                                | 0.6                                                 | 1.5                                      | 6                                                 | 2     |
| 15M       | 0.5                                                | 0.8                                                 | 2.5                                      | 6.8                                               | 3     |

[Model HSR-YR]      Unit: mm

| Model No. | Corner radius<br>$r(\text{max})$ | Shoulder height for the LM rail<br>$H_1$ | Shoulder height for the LM block<br>$H_2$ | $H_3$ |
|-----------|----------------------------------|------------------------------------------|-------------------------------------------|-------|
| 15        | 0.5                              | 3                                        | 4                                         | 3.5   |
| 20        | 0.5                              | 3.5                                      | 5                                         | 4     |
| 25        | 1                                | 5                                        | 5                                         | 5.5   |
| 30        | 1                                | 5                                        | 5                                         | 7     |
| 35        | 1                                | 6                                        | 6                                         | 7.5   |
| 45        | 1                                | 8                                        | 8                                         | 10    |
| 55        | 1.5                              | 10                                       | 10                                        | 13    |
| 65        | 1.5                              | 10                                       | 10                                        | 14    |

[Model HSR-M1VV]      Unit: mm

| Model No. | Corner radius for the LM rail<br>$r_1(\text{max})$ | Corner radius for the LM block<br>$r_2(\text{max})$ | Shoulder height for the LM rail<br>$H_1$ | Maximum shoulder height for the LM block<br>$H_2$ | $H_3$ |
|-----------|----------------------------------------------------|-----------------------------------------------------|------------------------------------------|---------------------------------------------------|-------|
| 15        | 0.5                                                | 0.5                                                 | 3                                        | 4                                                 | 4.3   |

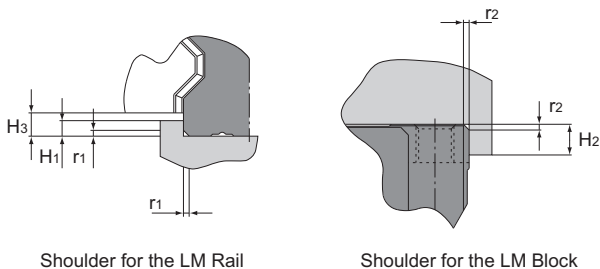


Fig.11

**[Model SRG]**

Unit: mm

| Model No. | Corner radius for the LM rail<br>$r_1(\text{max})$ | Corner radius for the LM block<br>$r_2(\text{max})$ | Shoulder height for the LM rail<br>$H_1$ | Shoulder height for the LM block<br>$H_2$ | $H_3$ |
|-----------|----------------------------------------------------|-----------------------------------------------------|------------------------------------------|-------------------------------------------|-------|
| 15        | 0.5                                                | 0.5                                                 | 2.5                                      | 4                                         | 4     |
| 20        | 0.5                                                | 0.5                                                 | 3.5                                      | 5                                         | 4.6   |
| 25        | 1                                                  | 1                                                   | 4                                        | 5                                         | 4.5   |
| 30        | 1                                                  | 1                                                   | 4.5                                      | 5                                         | 5     |
| 35        | 1                                                  | 1                                                   | 5                                        | 6                                         | 6     |
| 45        | 1.5                                                | 1.5                                                 | 6                                        | 8                                         | 8     |
| 55        | 1.5                                                | 1.5                                                 | 8                                        | 10                                        | 10    |
| 65        | 1.5                                                | 2                                                   | 9                                        | 10                                        | 11.5  |
| 85        | 1.5                                                | 1.5                                                 | 12                                       | 14                                        | 16    |
| 100       | 2                                                  | 2                                                   | 12                                       | 16                                        | 16    |

**[Model SRN]**

Unit: mm

| Model No. | Corner radius for the LM rail<br>$r_1(\text{max})$ | Corner radius for the LM block<br>$r_2(\text{max})$ | Shoulder height for the LM rail<br>$H_1$ | Shoulder height for the LM block<br>$H_2$ | $H_3$ |
|-----------|----------------------------------------------------|-----------------------------------------------------|------------------------------------------|-------------------------------------------|-------|
| 35        | 1                                                  | 1                                                   | 5                                        | 6                                         | 6     |
| 45        | 1.5                                                | 1.5                                                 | 6                                        | 8                                         | 7     |
| 55        | 1.5                                                | 1.5                                                 | 8                                        | 10                                        | 10    |
| 65        | 1.5                                                | 2                                                   | 8                                        | 10                                        | 10    |

Note) If the optional side scraper or protector is attached, dimensions  $H_1$  and  $H_3$  differ from that without the options. For the dimensions after they are attached, see **A1-486** to **A1-487**.

**[Model SRW]**

Unit: mm

| Model No. | Corner radius for the LM rail<br>$r_1(\text{max})$ | Corner radius for the LM block<br>$r_2(\text{max})$ | Shoulder height for the LM rail<br>$H_1$ | Shoulder height for the LM block<br>$H_2$ | $H_3$ |
|-----------|----------------------------------------------------|-----------------------------------------------------|------------------------------------------|-------------------------------------------|-------|
| 70        | 1.5                                                | 1.5                                                 | 6                                        | 8                                         | 8     |
| 85        | 1.5                                                | 1.5                                                 | 8                                        | 10                                        | 10    |
| 100       | 1.5                                                | 2                                                   | 9                                        | 10                                        | 11.5  |
| 130       | 1.5                                                | 1.5                                                 | 12                                       | 14                                        | 16    |
| 150       | 2                                                  | 2                                                   | 12                                       | 16                                        | 16    |

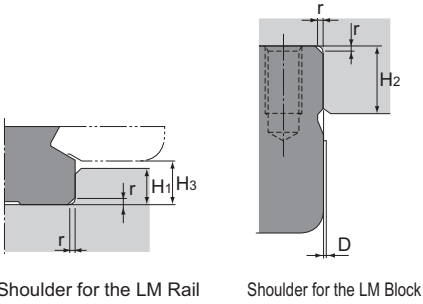


Fig. 12

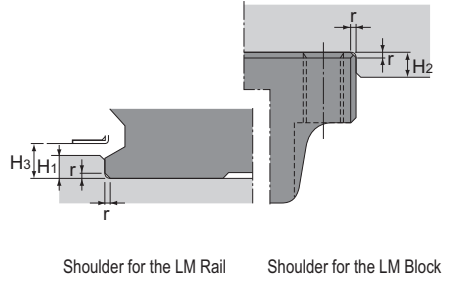


Fig. 13

[Model SSR]

Unit: mm

| Model No. | Corner radius<br>$r(\max)$ | Shoulder height for the LM rail<br>$H_1$ | Maximum shoulder height for the LM block<br>$H_2$ | $H_3$ | D   |
|-----------|----------------------------|------------------------------------------|---------------------------------------------------|-------|-----|
| 15 X      | 0.5                        | 3.8                                      | 5.5                                               | 4.5   | 0.3 |
| 20 X      | 0.5                        | 5                                        | 7.5                                               | 6     | 0.3 |
| 25 X      | 1                          | 5.5                                      | 8                                                 | 6.8   | 0.4 |
| 30 X      | 1                          | 8                                        | 11.5                                              | 9.5   | 0.4 |
| 35 X      | 1                          | 9                                        | 16                                                | 11.5  | 0.4 |

Note) When closely contacting the LM block with the datum shoulder, the resin layer may stick out from the overall width of the LM block by the dimension D. To avoid this, machine the datum shoulder to have a recess or limit the datum shoulder's height below the dimension  $H_2$ .

[Models SHW and HRW]

Unit: mm

| Model No. | Corner radius<br>$r(\max)$ | Shoulder height for the LM rail<br>$H_1$ | Shoulder height for the LM block<br>$H_2$ | $H_3$ |
|-----------|----------------------------|------------------------------------------|-------------------------------------------|-------|
| 12        | 0.5                        | 1.5                                      | 4                                         | 2     |
| 14        | 0.5                        | 1.5                                      | 5                                         | 2     |
| 17        | 0.4                        | 2                                        | 4                                         | 2.5   |
| 21        | 0.4                        | 2.5                                      | 5                                         | 3     |
| 27        | 0.4                        | 2.5                                      | 5                                         | 3     |
| 35        | 0.8                        | 3.5                                      | 5                                         | 4     |
| 50        | 0.8                        | 3                                        | 6                                         | 3.4   |
| 60        | 1                          | 5                                        | 8                                         | 6.5   |

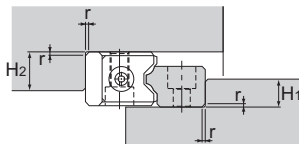


Fig.14

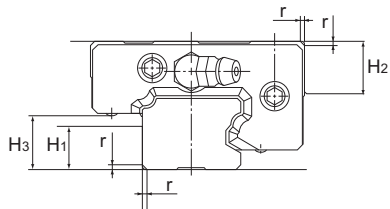


Fig.15

### [Model HR]

Unit: mm

| Model No. | Corner radius<br>$r(\max)$ | Shoulder height for the LM rail<br>$H_1$ | Shoulder height for the LM block<br>$H_2$ |
|-----------|----------------------------|------------------------------------------|-------------------------------------------|
| 918       | 0.3                        | 5                                        | 6                                         |
| 1123      | 0.5                        | 6                                        | 7                                         |
| 1530      | 0.5                        | 8                                        | 10                                        |
| 2042      | 0.5                        | 11                                       | 15                                        |
| 2555      | 1                          | 13                                       | 18                                        |
| 3065      | 1                          | 16                                       | 20                                        |
| 3575      | 1                          | 18                                       | 26                                        |
| 4085      | 1.5                        | 21                                       | 30                                        |
| 50105     | 1.5                        | 26                                       | 32                                        |
| 60125     | 1.5                        | 31                                       | 40                                        |

### [Model GSR]

Unit: mm

| Model No. | Corner radius<br>$r(\max)$ | Shoulder height for the LM rail<br>$H_1$ | Shoulder height for the LM block<br>$H_2$ | $H_3$ |
|-----------|----------------------------|------------------------------------------|-------------------------------------------|-------|
| 15        | 0.6                        | 7                                        | 7                                         | 8     |
| 20        | 0.8                        | 9                                        | 8                                         | 10.4  |
| 25        | 0.8                        | 11                                       | 11                                        | 13.2  |
| 30        | 1.2                        | 11                                       | 13                                        | 15    |
| 35        | 1.2                        | 13                                       | 14                                        | 17.5  |

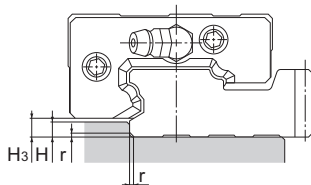
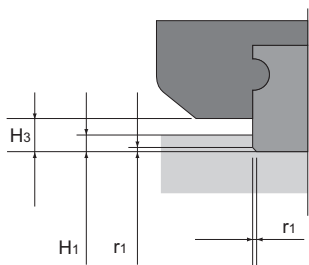


Fig.16

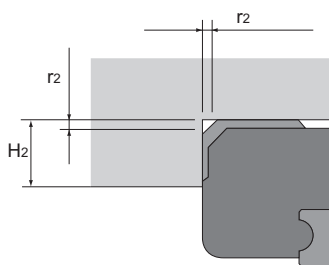
### [Model GSR-R]

Unit: mm

| Model No. | Corner radius<br>$r(\max)$ | Shoulder height for the LM rail<br>$H$ | $H_3$ |
|-----------|----------------------------|----------------------------------------|-------|
| 25        | 0.8                        | 4                                      | 4.5   |
| 30        | 1.2                        | 4                                      | 4.5   |
| 35        | 1.2                        | 4.5                                    | 5.5   |



Shoulder for the LM Rail



Shoulder for the LM Block

Fig.17

### [Model SRS]

Unit: mm

| Model No.     | Corner radius for the LM rail<br>$r_1(\text{max})$ | Corner radius for the LM block<br>$r_2(\text{max})$ | Shoulder height for the LM rail<br>$H_1$ | Shoulder height for the LM block<br>$H_2$ | $H_3$ |
|---------------|----------------------------------------------------|-----------------------------------------------------|------------------------------------------|-------------------------------------------|-------|
| 5 M/N         | 0.1                                                | 0.3                                                 | 1.2                                      | 2                                         | 1.5   |
| 5 WM/ WN      | 0.1                                                | 0.2                                                 | 1.2                                      | 2.5                                       | 1.5   |
| 7 S/M/N       | 0.1                                                | 0.2                                                 | 0.9                                      | 3.3                                       | 1.3   |
| 7 WS/ WM/ WN  | 0.1                                                | 0.1                                                 | 1.4                                      | 3.8                                       | 1.8   |
| 9 XS/ XM/ XN  | 0.1                                                | 0.3                                                 | 1.1                                      | 4.5                                       | 1.5   |
| 9 WS/ WM/ WN  | 0.1                                                | 0.5                                                 | 2.5                                      | 4.9                                       | 2.9   |
| 12 S/M/N      | 0.3                                                | 0.2                                                 | 1.5                                      | 5.7                                       | 2.1   |
| 12 WS/ WM/ WN | 0.3                                                | 0.3                                                 | 2.5                                      | 5.7                                       | 3     |
| 15 S/M/N      | 0.3                                                | 0.4                                                 | 2.2                                      | 6.5                                       | 2.7   |
| 15 WS/ WM/ WN | 0.3                                                | 0.3                                                 | 2.2                                      | 6.5                                       | 2.7   |
| 20 M          | 0.3                                                | 0.5                                                 | 3                                        | 8.7                                       | 3.4   |
| 25 M          | 0.5                                                | 0.5                                                 | 4.5                                      | 10.5                                      | 5     |

### [Model RSX]

Unit: mm

| Model No. | Corner radius for the LM rail<br>$r_1(\text{max})$ | Corner radius for the LM block<br>$r_2(\text{max})$ | Shoulder height for the LM rail<br>$H_1$ | Shoulder height for the LM block<br>$H_2$ | $H_3$ |
|-----------|----------------------------------------------------|-----------------------------------------------------|------------------------------------------|-------------------------------------------|-------|
| 7         | 0.3                                                | 0.4                                                 | 1.2                                      | 2.4                                       | 1.5   |
| 7W        | 0.3                                                | 0.3                                                 | 1.7                                      | 2.9                                       | 2     |
| 9         | 0.3                                                | 0.5                                                 | 1.9                                      | 3.3                                       | 2.2   |
| 9W        | 0.3                                                | 0.8                                                 | 3.3                                      | 3.3                                       | 3.7   |
| 12        | 0.5                                                | 0.5                                                 | 1.6                                      | 5.3                                       | 3     |
| 12W       | 0.5                                                | 0.5                                                 | 3.7                                      | 5.8                                       | 4     |
| 15        | 0.5                                                | 0.5                                                 | 2.5                                      | 5.8                                       | 4     |
| 15W       | 0.5                                                | 1                                                   | 3.7                                      | 5.7                                       | 4     |

### [Model RSR]

Unit: mm

| Model No.     | Corner radius for the LM rail<br>$r_1(\text{max})$ | Corner radius for the LM block<br>$r_2(\text{max})$ | Shoulder height for the LM rail<br>$H_1$ | Shoulder height for the LM block<br>$H_2$ | $H_3$ |
|---------------|----------------------------------------------------|-----------------------------------------------------|------------------------------------------|-------------------------------------------|-------|
| 2 N           | 0.1                                                | 0.3                                                 | 0.6                                      | 2.3                                       | 0.7   |
| 2 WN          | 0.1                                                | 0.3                                                 | 0.9                                      | 2.9                                       | 1     |
| 3 M/N/ WM/ WN | 0.1                                                | 0.3                                                 | 0.8                                      | 1.2                                       | 1     |
| 14 WVM        | 0.3                                                | 0.3                                                 | 3.2                                      | 5                                         | 3.5   |

### [Model RSR-M1]

Unit: mm

| Model No.     | Corner radius for the LM rail<br>$r_1(\text{max})$ | Corner radius for the LM block<br>$r_2(\text{max})$ | Shoulder height for the LM rail<br>$H_1$ | Shoulder height for the LM block<br>$H_2$ | $H_3$ |
|---------------|----------------------------------------------------|-----------------------------------------------------|------------------------------------------|-------------------------------------------|-------|
| 9 M1K/ M1N    | 0.3                                                | 0.5                                                 | 1.9                                      | 3                                         | 2.2   |
| 9 M1WV/ M1WN  | 0.1                                                | 0.1                                                 | 3.9                                      | 3                                         | 4.2   |
| 12 M1V/ M1N   | 0.3                                                | 0.3                                                 | 1.4                                      | 4                                         | 3     |
| 12 M1WV/ M1WN | 0.3                                                | 0.3                                                 | 3.7                                      | 4                                         | 4     |
| 15 M1V/ M1N   | 0.3                                                | 0.3                                                 | 2.3                                      | 5                                         | 4     |
| 15 M1WV/ M1WN | 0.3                                                | 0.3                                                 | 3.7                                      | 5                                         | 4     |
| 20 M1V/ M1N   | 0.5                                                | 0.5                                                 | 5.5                                      | 5                                         | 7.5   |

# Permissible Error 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. The following tables show approximate error allowances in parallelism (P) between two rails in general use.

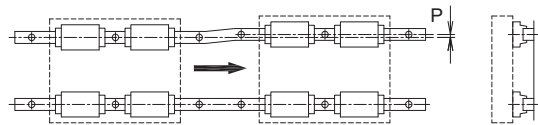


Fig.18 Error Allowance in Parallelism (P) between Two Rails

### [Models SHS, SCR, HSR, CSR, HSR-M1, HSR-M2, and HSR-M1VV]

Unit:  $\mu\text{m}$

| Model No. | Normal clearance | Clearance C1 | Clearance C0 |
|-----------|------------------|--------------|--------------|
| 8         | 13               | 10           | —            |
| 10        | 16               | 12           | —            |
| 12        | 20               | 15           | —            |
| 15        | 25               | 18           | —            |
| 20        | 25               | 20           | 18           |
| 25        | 30               | 22           | 20           |
| 30        | 40               | 30           | 27           |
| 35        | 50               | 35           | 30           |
| 45        | 60               | 40           | 35           |
| 55        | 70               | 50           | 45           |
| 65        | 80               | 60           | 55           |
| 85        | 90               | 75           | 70           |
| 100       | 100              | 90           | 85           |
| 120       | 120              | 110          | 100          |
| 150       | 140              | 130          | 115          |

### [Model JR]

Unit:  $\mu\text{m}$

| Model No. | —   |
|-----------|-----|
| 25        | 100 |
| 35        | 200 |
| 45        | 300 |
| 55        | 400 |

### [Models SSR, SR, SR-M1]

Unit:  $\mu\text{m}$

| Model No. | Normal clearance | Clearance C1 | Clearance C0 |
|-----------|------------------|--------------|--------------|
| 15        | 35               | 25           | —            |
| 20        | 40               | 30           | 25           |
| 25        | 50               | 35           | 30           |
| 30        | 60               | 40           | 35           |
| 35        | 70               | 50           | 45           |
| 45        | 80               | 60           | 55           |
| 55        | 100              | 70           | 65           |
| 70        | 110              | 80           | 65           |
| 85        | 120              | 90           | 80           |
| 100       | 130              | 100          | 90           |
| 120       | 140              | 110          | 100          |
| 150       | 150              | 120          | 110          |

### [Models SVR, NR-X and NR]

Unit:  $\mu\text{m}$

| Model No. | Normal clearance | Clearance C1 | Clearance C0 |
|-----------|------------------|--------------|--------------|
| 25        | 21               | 15           | 14           |
| 30        | 28               | 21           | 19           |
| 35        | 35               | 25           | 21           |
| 45        | 42               | 28           | 25           |
| 55        | 49               | 35           | 32           |
| 65        | 56               | 42           | 39           |
| 75        | 60               | 47           | 44           |
| 85        | 63               | 53           | 49           |
| 100       | 70               | 63           | 60           |

## [Models SVS, NRS-X and NRS]

Unit:  $\mu\text{m}$ 

| Model No. | Normal clearance | Clearance C1 | Clearance C0 |
|-----------|------------------|--------------|--------------|
| 25        | 15               | 11           | 10           |
| 30        | 20               | 15           | 14           |
| 35        | 25               | 18           | 15           |
| 45        | 30               | 20           | 18           |
| 55        | 35               | 25           | 23           |
| 65        | 40               | 30           | 28           |
| 75        | 43               | 34           | 31           |
| 85        | 45               | 38           | 35           |
| 100       | 50               | 45           | 43           |

## [Models SHW and HRW]

Unit:  $\mu\text{m}$ 

| Model No. | Normal clearance | Clearance C1 | Clearance C0 |
|-----------|------------------|--------------|--------------|
| 12        | 13               | 10           | —            |
| 14        | 16               | 12           | —            |
| 17        | 20               | 15           | —            |
| 21        | 25               | 18           | —            |
| 27        | 25               | 20           | —            |
| 35        | 30               | 22           | 20           |
| 50        | 40               | 30           | 27           |
| 60        | 50               | 35           | 30           |

## [Models SRS, RSX, RSR, RSR-W and RSR-M1]

Unit:  $\mu\text{m}$ 

| Model No. | Normal clearance | Clearance C1 |
|-----------|------------------|--------------|
| 2         | 2                | —            |
| 3         | 2                | —            |
| 5         | 2                | —            |
| 7         | 3                | —            |
| 9         | 4                | 3            |
| 12        | 9                | 5            |
| 14        | 10               | 6            |
| 15        | 10               | 6            |
| 20        | 13               | 8            |
| 25        | 15               | 10           |

## [Model SR-MS]

Unit:  $\mu\text{m}$ 

| Model No. | Clearance CS |
|-----------|--------------|
| 15        | 8            |
| 20        | 8            |

## [Model HR]

Unit:  $\mu\text{m}$ 

| Model No. | Normal clearance | Clearance C1 | Clearance C0 |
|-----------|------------------|--------------|--------------|
| 918       | 10               | 7            | —            |
| 1123      | 14               | 8            | —            |
| 1530      | 18               | 12           | —            |
| 2042      | 20               | 15           | 14           |
| 2555      | 35               | 24           | 20           |
| 3065      | 38               | 26           | 22           |
| 3575      | 42               | 28           | 24           |
| 4085      | 50               | 35           | 30           |
| 50105     | 55               | 42           | 38           |
| 60125     | 65               | 55           | 50           |

## [Models GSR and GSR-R]

Unit:  $\mu\text{m}$ 

| Model No. | —  |
|-----------|----|
| 15        | 30 |
| 20        | 40 |
| 25        | 50 |
| 30        | 60 |
| 35        | 70 |

## [Model NSR-TBC]

Unit:  $\mu\text{m}$ 

| Model No. | Normal clearance | Clearance C1 |
|-----------|------------------|--------------|
| 20        | 50               | 40           |
| 25        | 70               | 50           |
| 30        | 80               | 60           |
| 40        | 90               | 70           |
| 50        | 110              | 80           |
| 70        | 130              | 90           |

### [Flatness of the Mounting Surface]

The flatness of the LM Guide mounting surface may affect the service life. The reference tolerance values for the mounting surface flatness of models SRS, RSR and RSR-W (general use) are indicated here. Note that the service life of models not shown here may also be affected if the mounting surface is not flat.

#### [Model SRS]

Unit: mm

| Model No. | Flatness error |
|-----------|----------------|
| 5         | 0.015/200      |
| 7         | 0.025/200      |
| 9         | 0.035/200      |
| 12        | 0.050/200      |
| 15        | 0.060/200      |
| 20        | 0.070/200      |
| 25        | 0.070/200      |

#### [Model SR-MS]

Unit: mm

| Model No. | Flatness error |
|-----------|----------------|
| 15        | 0.020/200      |
| 20        | 0.020/200      |

#### [Models RSX, RSX-W, RSR, RSR-W and RSR-M1]

Unit: mm

| Model No. | Flatness error |
|-----------|----------------|
| 2         | 0.012/200      |
| 3         | 0.012/200      |
| 7         | 0.025/200      |
| 9         | 0.035/200      |
| 12        | 0.050/200      |
| 14        | 0.060/200      |
| 15        | 0.060/200      |
| 20        | 0.110/200      |

Note 1) As many factors can affect the mounting precision, we recommend using values 70% or less than those shown.

Note 2) The figures shown apply to normal clearances. When using two or more rails with clearance C1, we recommend using 50% or less of the values shown.

[Error Allowance in Vertical Level between Two Rails]

The flatness of the LM Guide mounting surface may affect the service life. **A1-473** and **A1-474** feature several tables. The values in those tables represent error allowances in vertical level between two rails per axis-to-axis distance of 500 mm (200 mm for models SRS and RSR) and are proportionate to axis-to-axis distances.

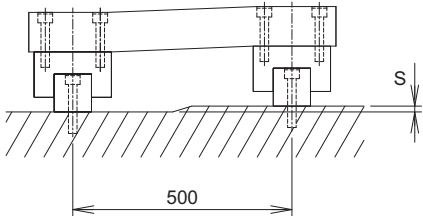


Fig.19 Error Allowance in Vertical Level (S) between Two Rails

[Models SHS, HSR, SCR, CSR, HSR-M1, HSR-M2 and HSR-M1VV]

Unit:  $\mu\text{m}$

| Model No. | Normal clearance | Clearance C1 | Clearance C0 |
|-----------|------------------|--------------|--------------|
| 8         | 40               | 11           | —            |
| 10        | 50               | 16           | —            |
| 12        | 65               | 20           | —            |
| 15        | 130              | 85           | —            |
| 20        | 130              | 85           | 50           |
| 25        | 130              | 85           | 70           |
| 30        | 170              | 110          | 90           |
| 35        | 210              | 150          | 120          |
| 45        | 250              | 170          | 140          |
| 55        | 300              | 210          | 170          |
| 65        | 350              | 250          | 200          |
| 85        | 400              | 290          | 240          |
| 100       | 450              | 330          | 280          |
| 120       | 500              | 370          | 320          |
| 150       | 550              | 410          | 360          |

[Models SSR, SR, SR-M1]

Unit:  $\mu\text{m}$

| Model No. | Normal clearance | Clearance C1 | Clearance C0 |
|-----------|------------------|--------------|--------------|
| 15        | 180              | 100          | —            |
| 20        | 180              | 100          | 80           |
| 25        | 200              | 120          | 100          |
| 30        | 240              | 150          | 120          |
| 35        | 300              | 210          | 170          |
| 45        | 360              | 240          | 200          |
| 55        | 420              | 300          | 250          |
| 70        | 480              | 350          | 300          |
| 85        | 540              | 420          | 350          |
| 100       | 600              | 480          | 400          |
| 120       | 720              | 540          | 450          |
| 150       | 780              | 600          | 500          |

[Models SVR, NR-X and NR]

Unit:  $\mu\text{m}$

| Model No. | Normal clearance | Clearance C1 | Clearance C0 |
|-----------|------------------|--------------|--------------|
| 25        | 65               | 43           | 35           |
| 30        | 85               | 55           | 45           |
| 35        | 105              | 75           | 60           |
| 45        | 125              | 85           | 70           |
| 55        | 150              | 105          | 85           |
| 65        | 175              | 125          | 100          |
| 75        | 188              | 135          | 110          |
| 85        | 200              | 145          | 120          |
| 100       | 225              | 165          | 140          |

[Model JR]

Unit:  $\mu\text{m}$

| Model No. | —    |
|-----------|------|
| 25        | 400  |
| 35        | 500  |
| 45        | 800  |
| 55        | 1000 |

### [Models SVS, NRS-X and NRS]

Unit:  $\mu\text{m}$

| Model No. | Normal clearance | Clearance C1 | Clearance C0 |
|-----------|------------------|--------------|--------------|
| 25        | 91               | 60           | 49           |
| 30        | 119              | 77           | 63           |
| 35        | 147              | 105          | 84           |
| 45        | 175              | 119          | 98           |
| 55        | 210              | 147          | 119          |
| 65        | 245              | 175          | 140          |
| 75        | 263              | 189          | 154          |
| 85        | 280              | 203          | 168          |
| 100       | 315              | 231          | 196          |

### [Models SRS, SRS-W, RSX, RSX-W, RSR, RSR-W and RSR-M1]

Unit:  $\mu\text{m}$

| Model No. | Normal clearance | Clearance C1 |
|-----------|------------------|--------------|
| 3         | 15               | —            |
| 5         | 20               | —            |
| 7         | 25               | —            |
| 9         | 35               | 6            |
| 12        | 50               | 12           |
| 14        | 60               | 20           |
| 15        | 60               | 20           |
| 20        | 70               | 30           |
| 25        | 80               | 40           |

### [Models SHW and HRW]

Unit:  $\mu\text{m}$

| Model No. | Normal clearance | Clearance C1 | Clearance C0 |
|-----------|------------------|--------------|--------------|
| 12        | 40               | 11           | —            |
| 14        | 50               | 16           | —            |
| 17        | 65               | 20           | —            |
| 21        | 130              | 85           | —            |
| 27        | 130              | 85           | —            |
| 35        | 130              | 85           | 70           |
| 50        | 170              | 110          | 90           |
| 60        | 210              | 150          | 120          |

### [Model HR]

Unit:  $\mu\text{m}$

| Model No. | Normal clearance | Clearance C1 | Clearance C0 |
|-----------|------------------|--------------|--------------|
| 918       | 45               | 15           | —            |
| 1123      | 50               | 20           | —            |
| 1530      | 90               | 60           | —            |
| 2042      | 90               | 60           | 50           |
| 2555      | 150              | 100          | 85           |
| 3065      | 165              | 110          | 95           |
| 3575      | 175              | 120          | 100          |
| 4085      | 210              | 150          | 120          |
| 50105     | 245              | 175          | 140          |
| 60125     | 280              | 200          | 170          |

### [Models GSR and GSR-R]

Unit:  $\mu\text{m}$

| Model No. | —   |
|-----------|-----|
| 15        | 240 |
| 20        | 300 |
| 25        | 360 |
| 30        | 420 |
| 35        | 480 |

### [Model NSR-TBC]

Unit:  $\mu\text{m}$

| Model No. | Normal clearance | Clearance C1 |
|-----------|------------------|--------------|
| 20        | 300              | 210          |
| 25        | 360              | 240          |
| 30        | 420              | 270          |
| 40        | 540              | 360          |
| 50        | 600              | 420          |
| 70        | 660              | 480          |

### [Model SR-MS]

Unit: mm

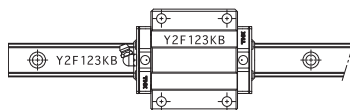
| Model No. | Clearance CS |
|-----------|--------------|
| 15        | 0.020/200    |
| 20        | 0.020/200    |

## Marking on the Master LM Guide and Combined Use

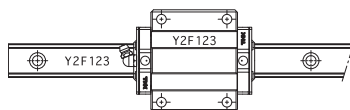
### [Marking on the Master LM Guide]

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 Fig.20)

Normal grade LM Guides 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.



Master LM Guide



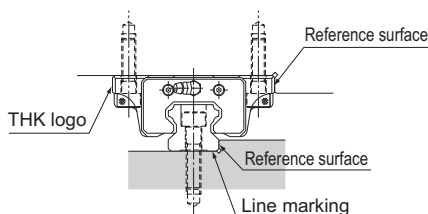
Subsidiary LM Guide

Y2F123 KB  
 Master mark  
 Serial number

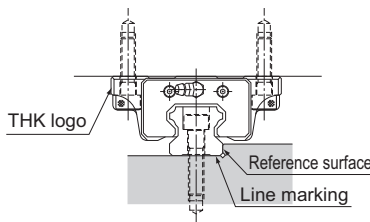
Fig.20 Master and Subsidiary LM Guides (E.g. Model HSR-B)

### [Markings 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 that of the LM rail is on the surface marked with a line (see Fig.21). If it is necessary to reverse the reference surface of the LM rail and block, or if the grease nipple must be oriented in the opposite direction, specify it.



Master LM Guide



Subsidiary LM Guide

Fig.21 Markings on the Reference Surface

**[Serial Number Marking and Combined Use of an LM Rail and LM Blocks]**

An LM rail and LM block(s) 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. (Fig.22)

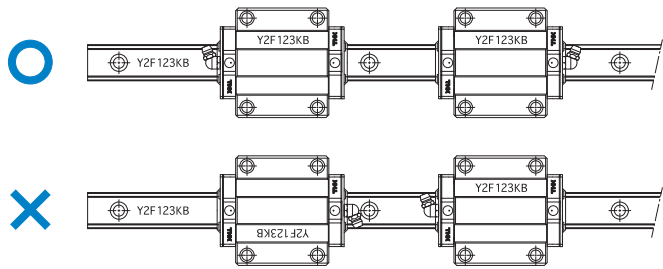


Fig.22 Serial Number Marking and Combined Use of an LM Rail and LM Blocks (E.g. Model HSR-A)

**[Use of Jointed Rails]**

When a long LM rail is ordered, two or more rails will be jointed together to the desired length. When jointing rails, make sure that the joint match marks shown in Fig.23 are correctly positioned. When two LM Guides with connected 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.

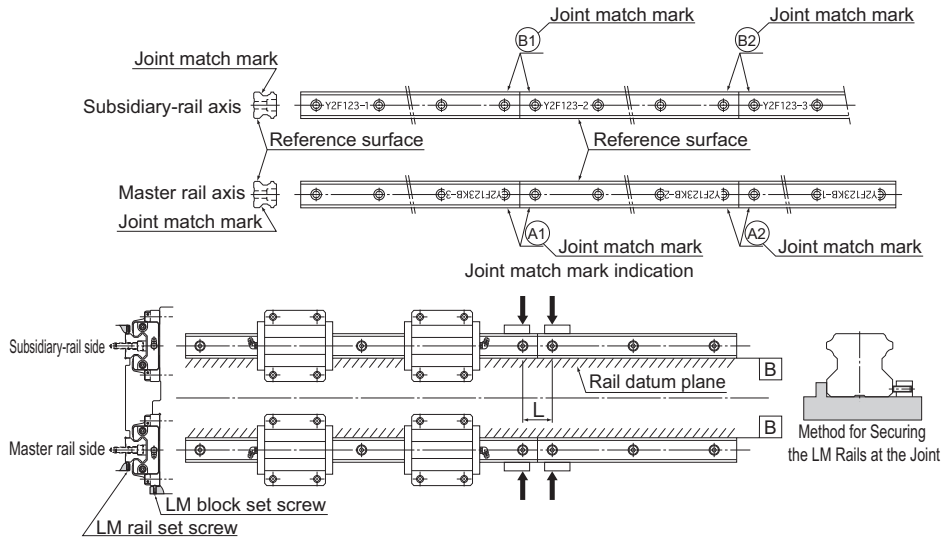


Fig.23 Use of Jointed Rails

## LM Guide Options

|                                                                              |        |
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| Side Scraper .....                                                           | A1-486 |
| Protector .....                                                              | A1-487 |
| Light-Resistance Contact Seal LiCS .....                                     | A1-489 |
| High Chemical Resistance Fluorine Seal FS ..                                 | A1-490 |
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| • Incremental Dimension with Grease Nipple (When LaCS is Attached) ..        | A1-499 |
| • LM Block Dimension (Dimension L) with LiCS Attached ..                     | A1-501 |
| • Incremental Dimension with Grease Nipple (When LiCS is Attached) ..        | A1-502 |
| • Overall block length with fluorine seals and other accessories attached .. | A1-503 |
| • Maximum Seal Resistance .....                                              | A1-504 |
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| • Maximum seal resistance of FS .....                                        | A1-508 |
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| • Oil-Free LM Guide .....                                                    | A1-551 |
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| • Light Contact Seal LiCS for LM Guides ..                                   | A1-553 |
| • High Chemical Resistance Fluorine Seal FS for the LM Guide ..              | A1-553 |
| • Cap GC .....                                                               | A1-553 |

# Table of Supported Options by Models

| Model No.  |            | Type        | Contamination Protection |           |            |                                     |                                         |                                                     |                                                         |      |              |                      |                          |                         |  |
|------------|------------|-------------|--------------------------|-----------|------------|-------------------------------------|-----------------------------------------|-----------------------------------------------------|---------------------------------------------------------|------|--------------|----------------------|--------------------------|-------------------------|--|
|            |            |             | End seal                 | Side seal | Inner seal | End seal + Side seal (+ Inner seal) | Double seals + Side seal (+ Inner seal) | End seal + Side seal (+ Inner seal) + Metal scraper | Double seals + Side seal (+ Inner seal) + Metal scraper | LaCS | Side Scraper | End seal + Protector | Double seals + Protector | Low-resistance end seal |  |
|            |            | Symbol      | UU                       | —         | —          | SS                                  | DD                                      | ZZ                                                  | KK                                                      | HH   | YY           | JJ                   | TT                       | LL                      |  |
| Caged Ball | SHS        | 15 to 65    | ○                        | ○         | ○          | ○*                                  | ○                                       | ○                                                   | ○                                                       | ○    | —            | —                    | —                        | —                       |  |
|            | SSR        | 15 to 35    | ○*                       | ○         | —          | ○                                   | ○                                       | ○                                                   | ○                                                       | ○    | —            | —                    | —                        | —                       |  |
|            | SVR/SVS    | 25 to 65    | ○                        | ○         | ○          | ○                                   | ○                                       | ○                                                   | ○                                                       | ○    | ○            | ○                    | ○                        | —                       |  |
|            | SHW        | 12,14       | ○                        | ○         | —          | ○                                   | —                                       | —                                                   | —                                                       | ○    | —            | —                    | —                        | —                       |  |
|            |            | 17          | ○                        | ○         | —          | ○                                   | ○                                       | ○                                                   | ○                                                       | ○    | —            | —                    | —                        | —                       |  |
|            |            | 21 to 50    | ○                        | ○         | ○          | ○                                   | ○                                       | ○                                                   | ○                                                       | ○    | —            | —                    | —                        | —                       |  |
|            | SRS        | 5           | ○*                       | —         | —          | —                                   | —                                       | —                                                   | —                                                       | —    | —            | —                    | —                        | —                       |  |
|            |            | 7           | ○*                       | ○         | —          | ○                                   | —                                       | —                                                   | —                                                       | —    | —            | —                    | —                        | —                       |  |
|            |            | 9 to 25     | ○*                       | ○         | —          | ○                                   | —                                       | —                                                   | —                                                       | ○    | —            | —                    | —                        | —                       |  |
|            | SCR        | 15 to 65    | ○                        | ○         | ○          | ○                                   | ○                                       | ○                                                   | ○                                                       | ○    | —            | —                    | —                        | —                       |  |
|            | EPF        | 7 to 15     | —                        | —         | —          | —                                   | —                                       | —                                                   | —                                                       | —    | —            | —                    | —                        | —                       |  |
| Full-ball  | HSR        | 8,10,12     | ○                        | —         | —          | —                                   | —                                       | —                                                   | —                                                       | —    | —            | —                    | —                        | —                       |  |
|            |            | 15,20,25    | ○                        | ○         | —          | ○*                                  | ○                                       | ○*                                                  | ○*                                                      | ○    | —            | —                    | —                        | ○                       |  |
|            |            | 30,35       | ○                        | ○         | —*         | ○*                                  | ○                                       | ○                                                   | ○                                                       | ○    | —            | —                    | —                        | ○                       |  |
|            |            | 45,55,65    | ○                        | ○         | —*         | ○*                                  | ○                                       | ○                                                   | ○                                                       | ○    | —            | —                    | —                        | ○                       |  |
|            |            | 85          | ○                        | ○         | —*         | ○*                                  | ○                                       | ○                                                   | ○                                                       | ○    | —            | —                    | —                        | —                       |  |
|            |            | 100,120,150 | ○                        | ○         | —          | ○*                                  | —                                       | —                                                   | —                                                       | —    | —            | —                    | —                        | —                       |  |
|            | SR         | 15 to 25    | ○                        | ○         | —          | ○                                   | ○                                       | ○*                                                  | ○*                                                      | —    | —            | —                    | —                        | ○                       |  |
|            |            | 30 to 70    | ○                        | ○         | —          | ○                                   | ○                                       | ○                                                   | ○                                                       | —    | —            | —                    | —                        | —                       |  |
|            |            | 85 to 150   | ○                        | ○         | —          | ○                                   | —                                       | —                                                   | —                                                       | —    | —            | —                    | —                        | —                       |  |
|            | NR-X/NRS-X | 25 to 65    | ○                        | ○         | ○          | ○                                   | ○                                       | ○                                                   | ○                                                       | ○    | ○            | ○                    | ○                        | —                       |  |
|            |            | 75,85       | ○                        | ○         | ○          | ○                                   | ○                                       | ○                                                   | ○                                                       | ○    | —            | —                    | —                        | —                       |  |
|            |            | 100         | ○                        | ○         | ○          | ○                                   | ○*                                      | ○*                                                  | ○*                                                      | ○*   | —            | —                    | —                        | —                       |  |
|            | HRW        | 12,14       | ○*                       | ○         | —          | ○                                   | —                                       | —                                                   | —                                                       | —    | —            | —                    | —                        | —                       |  |
|            |            | 17,21       | ○*                       | —         | —          | —                                   | ○*                                      | ○                                                   | ○*                                                      | —    | —            | —                    | —                        | —                       |  |
|            |            | 27 to 60    | ○*                       | ○         | —          | ○                                   | ○                                       | ○                                                   | ○                                                       | —    | —            | —                    | —                        | —                       |  |

- \*1 Model SHS : Dedicated GC cap --- not applicable to model 15, Stainless steel LM Guide --- applicable only to models 15 through 25
- \*2 Model SSR : Dedicated GC cap --- applicable to all models except model SSR15, Stainless steel LM Guide --- applicable to XV, XW
- \*3 Models SVR and SVS : GG, PP --- applicable to models 25 and 30
- \*4 Model SHW : GG, PP --- applicable to models SHW21 and 27, Dedicated GC cap --- applicable to models SHW35, 50, Dedicated CV cap --- applicable to models SHW35, 50
- \*5 Model SRS : Dedicated cap C --- applicable to models SRS9W, 12, 15, 20, 25, Dedicated cap CV --- applicable to models SRS20, 25
- \*6 Model SCR : Dedicated cap GC --- applicable to all models except model SCR15, Dedicated cap CV --- applicable to all models except model SCR15
- \*7 Model HSR : ZZ, KK --- grease nipple cannot be attached to model HSR15, GG --- applicable to model HSR25, Steel tape SP --- applicable to models HSR15 to 100, Dedicated cap C --- applicable to models HSR12 to 100, Dedicated cap GC --- applicable to models HSR20 to 100, Dedicated LM cover --- applicable to models HSR25 to 55, Inner seal --- applicable to models HSR30 to 85, Dedicated cap CV --- applicable to all models except model HSR 15, Side nipple --- applicable to C/LC, XC/XLC, R/LR, XR/XLR
- \*8 Model SR : ZZ, KK --- grease nipple cannot be attached to models SR15, 20, Dedicated cap C --- applicable to models SR15 to 85, Dedicated cap GC --- applicable to models SR20 to 85, Stainless steel LM Guides --- applicable to models SR15 to 35, Dedicated cap CV --- applicable to all models except models SR15, 20, 100, 120, 150
- \*9 Model NR/NRS : DD, KK --- NR/NRS100 cannot be equipped with a standard grease nipple. Please contact THK if a grease nipple is required. ZZ, HH --- Side nipple required for NR/NRS100. Plate cover SV --- Compatible with NR/NRS75. Dedicated GC caps --- Compatible with all models except NR/NRS75.

Table of Supported Options by Models

Symbols in the table ○: Applicable △: Applicable depending on model (see note)  
★: Recommended by THK (standard stock item)

|  | Low resistance<br>end seal<br>+ side seal | LICS | LICS<br>+ Side seal<br>(+ Inner seal) | High<br>Chemical<br>Resistance<br>Fluorine Seal | Plate<br>Cover SV | Steel tape<br>SP | Dedicated<br>cap CV | Dedicated<br>cap C | Dedicated<br>cap GC | Dedicated<br>bellows | Dedicated<br>LM Cover   | Tapped-<br>hole LM<br>Rail Type | Lubrication |                                          | Corrosion Prevention     |                                |
|--|-------------------------------------------|------|---------------------------------------|-------------------------------------------------|-------------------|------------------|---------------------|--------------------|---------------------|----------------------|-------------------------|---------------------------------|-------------|------------------------------------------|--------------------------|--------------------------------|
|  | RR                                        | GG   | PP                                    | FS                                              | Z                 | Z                | —                   | —                  | —                   | —                    | TPH (dedicated for HSR) | K                               | QZ          | End plate<br>with/without<br>side nipple | AP-HC,<br>AP-C,<br>AP-CF | Stainless<br>Steel<br>LM Guide |
|  | —                                         | ○    | ○                                     | —                                               | —                 | ○                | ○                   | ○                  | △*1                 | ○                    | —                       | ○                               | ○           | ○                                        | ○                        | △*1                            |
|  | —                                         | ○    | ○                                     | —                                               | —                 | ○                | ○                   | ○                  | △*2                 | ○                    | —                       | ○                               | ○           | ○                                        | ○                        | △*2                            |
|  | —                                         | △*3  | △*3                                   | —                                               | —                 | —                | ○                   | ○                  | ○                   | ○                    | —                       | —                               | ○           | ○                                        | ○                        | —                              |
|  | —                                         | —    | —                                     | —                                               | —                 | —                | —                   | ○                  | —                   | —                    | —                       | —                               | ○           | —                                        | ○                        | ○                              |
|  | —                                         | —    | —                                     | —                                               | —                 | —                | —                   | ○                  | —                   | ○                    | —                       | —                               | ○           | —                                        | ○                        | ○                              |
|  | —                                         | △*4  | △*4                                   | —                                               | —                 | —                | △*4                 | ○                  | △*4                 | ○                    | —                       | —                               | ○           | —                                        | ○                        | —                              |
|  | —                                         | —    | —                                     | —                                               | —                 | —                | —                   | —                  | —                   | —                    | —                       | —                               | —           | —                                        | —                        | ○                              |
|  | —                                         | —    | —                                     | —                                               | —                 | —                | —                   | —                  | —                   | —                    | —                       | —                               | ○           | —                                        | —                        | ○                              |
|  | —                                         | —    | —                                     | —                                               | —                 | —                | △*5                 | △*5                | —                   | —                    | —                       | —                               | ○           | —                                        | —                        | ○                              |
|  | —                                         | —    | —                                     | —                                               | —                 | —                | △*6                 | ○                  | △*6                 | —                    | —                       | ○                               | ○           | ○                                        | ○                        | —                              |
|  | —                                         | —    | —                                     | —                                               | —                 | —                | —                   | —                  | —                   | —                    | —                       | —                               | —           | —                                        | —                        | —                              |
|  | —                                         | —    | —                                     | —                                               | —                 | —                | —                   | △*7                | —                   | —                    | —                       | —                               | —           | —                                        | ○                        | ○                              |
|  | ○                                         | △*7  | —                                     | —                                               | —                 | ○                | △*7                 | ○                  | △*7                 | ○                    | △*7                     | ○                               | ○           | △                                        | ○                        | ○                              |
|  | ○                                         | —    | —                                     | —                                               | —                 | ○                | ○                   | ○                  | ○                   | ○                    | ○                       | ○                               | ○           | ○                                        | △                        | ○                              |
|  | ○                                         | —    | —                                     | —                                               | —                 | ○                | ○                   | ○                  | ○                   | ○                    | △*7                     | ○                               | ○           | △*7                                      | ○                        | —                              |
|  | —                                         | —    | —                                     | —                                               | —                 | ○                | —                   | ○                  | ○                   | ○                    | —                       | —                               | ○           | —                                        | ○                        | —                              |
|  | —                                         | —    | —                                     | —                                               | —                 | △*7              | —                   | △*7                | △*7                 | —                    | —                       | —                               | —           | —                                        | ○                        | —                              |
|  | ○                                         | —    | —                                     | —                                               | —                 | ○                | △*8                 | ○                  | △*8                 | ○                    | —                       | ○                               | —           | —                                        | ○                        | ○                              |
|  | —                                         | —    | —                                     | —                                               | —                 | ○                | ○                   | ○                  | ○                   | ○                    | —                       | ○                               | —           | —                                        | ○                        | △*8                            |
|  | —                                         | —    | —                                     | —                                               | —                 | —                | △*8                 | △*8                | △*8                 | —                    | —                       | —                               | —           | —                                        | ○                        | —                              |
|  | —                                         | —    | —                                     | —                                               | —                 | —                | ○                   | ○                  | ○                   | ○                    | —                       | —                               | ○           | ○                                        | ○                        | —                              |
|  | —                                         | —    | —                                     | —                                               | △*9               | ○                | —                   | ○                  | △*9                 | ○                    | —                       | —                               | —           | ○                                        | ○                        | —                              |
|  | —                                         | —    | —                                     | —                                               | —                 | ○                | —                   | ○                  | ○                   | ○                    | —                       | —                               | ○           | ○                                        | ○                        | —                              |
|  | —                                         | —    | —                                     | —                                               | —                 | —                | —                   | ○                  | —                   | —                    | —                       | —                               | —           | —                                        | ○                        | ○                              |
|  | —                                         | —    | —                                     | —                                               | —                 | —                | —                   | ○                  | —                   | ○                    | —                       | —                               | —           | —                                        | ○                        | ○                              |
|  | —                                         | —    | —                                     | —                                               | —                 | —                | △*10                | ○                  | △*10                | △*10                 | —                       | —                               | —           | —                                        | ○                        | △*10                           |

\*10 Model HRW : DD, KK --- grease nipple cannot be attached to model HRW17,  
Dedicated cap C --- applicable to models HRW14 to 60,  
Dedicated cap GC --- applicable to models HRW35, 50, 60,  
Dedicated bellows --- applicable to models HRW17 to 50,  
Stainless steel LM Guides --- applicable to models HRW12 to 35,  
Dedicated cap CV --- applicable to models HRW35, 50, 60 only

Note) Those models equipped with QZ Lubricator cannot have a grease nipple.  
When desiring a grease nipple for a model attached with QZ, contact THK.

| Model No.    |        | Type             | Contamination Protection |           |            |                                     |                                         |                                                     |                                                         |      |              |                      |                          |                         |  |
|--------------|--------|------------------|--------------------------|-----------|------------|-------------------------------------|-----------------------------------------|-----------------------------------------------------|---------------------------------------------------------|------|--------------|----------------------|--------------------------|-------------------------|--|
|              |        |                  | End seal                 | Side seal | Inner seal | End seal + Side seal (+ Inner seal) | Double seals + Side seal (+ Inner seal) | End seal + Side seal (+ Inner seal) + Metal scraper | Double seals + Side seal (+ Inner seal) + Metal scraper | LaCS | Side Scraper | End seal + Protector | Double seals + Protector | Low-resistance end seal |  |
|              |        | Symbol           | UU                       | —         | —          | SS                                  | DD                                      | ZZ                                                  | KK                                                      | HH   | YY           | JJ                   | TT                       | LL                      |  |
| Full-ball    | RSX    | 7,7W,9           | ○                        | —         | —          | —                                   | —                                       | —                                                   | —                                                       | —    | —            | —                    | —                        | —                       |  |
|              |        | 9W,12,12W,15,15W | ○                        | —         | —          | —                                   | —                                       | —                                                   | —                                                       | —    | —            | —                    | —                        | —                       |  |
|              | RSR    | 2,3              | —                        | —         | —          | —                                   | —                                       | —                                                   | —                                                       | —    | —            | —                    | —                        | —                       |  |
|              |        | 3W,14            | ○                        | —         | —          | —                                   | —                                       | —                                                   | —                                                       | —    | —            | —                    | —                        | —                       |  |
|              | HR     | 918 to 2555      | ○                        | —         | —          | —                                   | —                                       | —                                                   | —                                                       | —    | —            | —                    | —                        | —                       |  |
|              |        | 3065 to 60125    | ○                        | —         | —          | —                                   | —                                       | —                                                   | —                                                       | —    | —            | —                    | —                        | —                       |  |
|              | GSR    | 15 to 35         | ○*                       | ○         | —          | ○                                   | ○                                       | ○                                                   | ○                                                       | —    | —            | —                    | —                        | —                       |  |
|              | GSR-R  | 25 to 35         | ○                        | ○         | —          | ○                                   | ○                                       | ○                                                   | ○                                                       | —    | —            | —                    | —                        | —                       |  |
|              | CSR    | 15 to 25         | ○                        | ○         | —          | ○                                   | ○                                       | ○*16                                                | ○*16                                                    | —    | —            | —                    | —                        | ○                       |  |
|              |        | 30 to 45         | ○                        | ○         | ○          | ○                                   | ○                                       | ○                                                   | ○                                                       | —    | —            | —                    | —                        | ○                       |  |
|              | MX     | 5,7              | ○                        | —         | —          | —                                   | —                                       | —                                                   | —                                                       | —    | —            | —                    | —                        | —                       |  |
|              | JR     | 25 to 55         | ○                        | ○         | —          | ○                                   | ○                                       | ○                                                   | ○                                                       | —    | —            | —                    | —                        | —                       |  |
|              | HCR    | 12               | ○                        | —         | —          | —                                   | —                                       | —                                                   | —                                                       | —    | —            | —                    | —                        | —                       |  |
|              |        | 15 to 65         | ○                        | ○         | —          | ○                                   | ○                                       | ○*17                                                | ○*17                                                    | —    | —            | —                    | —                        | ○*18                    |  |
|              | HMG    | 15 to 65         | ○*21                     | —         | —          | —                                   | —                                       | —                                                   | —                                                       | —    | —            | —                    | —                        | —                       |  |
|              | NSR    | 20 to 70         | ○                        | ○         | —          | ○                                   | —                                       | —                                                   | —                                                       | —    | —            | —                    | —                        | —                       |  |
|              | HSR-M1 | 15 to 35         | ○                        | ○         | —          | ○                                   | —                                       | —                                                   | —                                                       | —    | —            | —                    | —                        | —                       |  |
|              | SR-M1  | 15 to 35         | ○                        | ○         | —          | ○                                   | —                                       | —                                                   | —                                                       | —    | —            | —                    | —                        | —                       |  |
| Caged Roller | SRG    | 15               | ○                        | ○         | ○          | ○                                   | ○                                       | —                                                   | —                                                       | —    | —            | —                    | —                        | —                       |  |
|              |        | 20,25,30         | ○                        | ○         | ○          | ○                                   | ○                                       | ○                                                   | ○                                                       | ○    | —            | —                    | —                        | —                       |  |
|              |        | 35,45,55,65      | ○                        | ○         | ○          | ○                                   | ○                                       | ○                                                   | ○                                                       | ○    | ○            | ○                    | ○                        | —                       |  |
|              |        | 85,100           | ○                        | ○         | ○          | ○                                   | ○*20                                    | ○                                                   | ○                                                       | ○    | —            | —                    | —                        | —                       |  |
|              | SRN    | 35 to 65         | ○                        | ○         | ○          | ○                                   | ○                                       | ○                                                   | ○                                                       | ○    | —            | —                    | —                        | —                       |  |
|              | SRW    | 70 to 100        | ○                        | ○         | ○          | ○                                   | ○                                       | ○                                                   | ○                                                       | ○    | —            | —                    | —                        | —                       |  |
|              |        | 130,150          | ○                        | ○         | ○          | ○                                   | ○                                       | ○                                                   | ○                                                       | —    | —            | —                    | —                        | —                       |  |
|              | SRG    | 15               | ○                        | ○         | ○          | ○                                   | ○                                       | —                                                   | —                                                       | —    | —            | —                    | —                        | —                       |  |
|              |        | 20,25,30         | ○                        | ○         | ○          | ○                                   | ○                                       | ○                                                   | ○                                                       | ○    | —            | —                    | —                        | —                       |  |
|              |        | 35,45,55,65      | ○                        | ○         | ○          | ○                                   | ○                                       | ○                                                   | ○                                                       | ○    | ○            | ○                    | ○                        | —                       |  |
|              |        | 85,100           | ○                        | ○         | ○          | ○                                   | ○*20                                    | ○                                                   | ○                                                       | ○    | —            | —                    | —                        | —                       |  |
|              | SRN    | 35 to 65         | ○                        | ○         | ○          | ○                                   | ○                                       | ○                                                   | ○                                                       | ○    | —            | —                    | —                        | —                       |  |
|              | SRW    | 70 to 100        | ○                        | ○         | ○          | ○                                   | ○                                       | ○                                                   | ○                                                       | ○    | —            | —                    | —                        | —                       |  |
|              |        | 130,150          | ○                        | ○         | ○          | ○                                   | ○                                       | ○                                                   | ○                                                       | —    | —            | —                    | —                        | —                       |  |

\*11 Model RSX : Dedicated C cap --- applicable to models 9W, 12, 15

\*12 Model RSR : Dedicated cap C --- applicable to model RSR14W

\*13 Model HR : Dedicated cap C --- applicable to models HR1123 to 50105,  
Dedicated cap GC --- applicable to models HR2042 to 50105,  
Dedicated cap CV --- applicable to models HR2042 to 50105

\*14 Model GSR : Dedicated cap GC --- applicable to all models except model GSR15,  
Dedicated cap CV --- applicable to all models except model GSR15

\*15 Model GSR-R : AP-HC treatment of rack rail is not applicable

\*16 Model CSR : ZZ, KK --- grease nipple cannot be attached to model CSR15,  
Dedicated cap GC --- applicable to all models except model CSR15,  
Dedicated cap CV --- applicable to all models except model CSR15

Table of Supported Options by Models

Symbols in the table ○: Applicable △: Applicable depending on model (see note)  
★: Recommended by THK (standard stock item)

|  | Low resistance<br>end seal<br>+ side seal | LiCS | LiCS<br>+ Side seal<br>(+ Inner seal) | High<br>Chemical<br>Resistance<br>Fluorine Seal | Plate<br>Cover | Steel tape<br>SP | Dedicated<br>cap CV | Dedicated<br>cap C | Dedicated<br>cap GC | Dedicated<br>bellows | Dedicated<br>LM Cover        | Tapped-<br>hole LM<br>Rail Type | Lubrication           |                                          | Corrosion Prevention     |                                |
|--|-------------------------------------------|------|---------------------------------------|-------------------------------------------------|----------------|------------------|---------------------|--------------------|---------------------|----------------------|------------------------------|---------------------------------|-----------------------|------------------------------------------|--------------------------|--------------------------------|
|  |                                           |      |                                       |                                                 |                |                  |                     |                    |                     |                      |                              |                                 | QZ<br>Lubri-<br>cator | End plate<br>with/without<br>side nipple | AP-HC,<br>AP-C,<br>AP-CF | Stainless<br>Steel<br>LM Guide |
|  | RR                                        | GG   | PP                                    | FS                                              | Z              | Z                | —                   | —                  | —                   | —                    | TPH (dedi-<br>cated for HSR) | K                               | QZ                    | —                                        | F                        | M                              |
|  | —                                         | —    | —                                     | —                                               | —              | —                | —                   | —                  | —                   | —                    | —                            | —                               | —                     | —                                        | —                        | —                              |
|  | —                                         | —    | —                                     | —                                               | —              | —                | —                   | ○*11               | —                   | —                    | —                            | —                               | —                     | —                                        | —                        | —                              |
|  | —                                         | —    | —                                     | —                                               | —              | —                | —                   | —                  | —                   | —                    | —                            | —                               | —                     | —                                        | ○                        | ○                              |
|  | —                                         | —    | —                                     | —                                               | —              | —                | —                   | △*12               | —                   | —                    | —                            | —                               | —                     | —                                        | ○                        | ○                              |
|  | —                                         | —    | —                                     | —                                               | —              | —                | △*13                | △*13               | △*13                | —                    | —                            | —                               | —                     | —                                        | ○                        | ○                              |
|  | —                                         | —    | —                                     | —                                               | —              | —                | △*13                | △*13               | △*13                | —                    | —                            | —                               | —                     | —                                        | ○                        | —                              |
|  | —                                         | —    | —                                     | —                                               | —              | —                | △*14                | ○                  | △*14                | —                    | —                            | —                               | —                     | —                                        | ○                        | —                              |
|  | —                                         | —    | —                                     | —                                               | —              | —                | —                   | ○                  | ○                   | —                    | —                            | —                               | —                     | —                                        | △*15                     | —                              |
|  | ○                                         | —    | —                                     | —                                               | —              | —                | △*16                | ○                  | △*16                | —                    | —                            | ○                               | —                     | —                                        | ○                        | —                              |
|  | ○                                         | —    | —                                     | —                                               | —              | —                | ○                   | ○                  | ○                   | —                    | —                            | ○                               | —                     | —                                        | ○                        | —                              |
|  | —                                         | —    | —                                     | —                                               | —              | —                | —                   | —                  | —                   | —                    | —                            | ○                               | —                     | —                                        | ○                        | ○                              |
|  | —                                         | —    | —                                     | —                                               | —              | —                | —                   | —                  | —                   | —                    | —                            | —                               | —                     | —                                        | ○                        | —                              |
|  | —                                         | —    | —                                     | —                                               | —              | —                | —                   | —                  | —                   | —                    | —                            | —                               | —                     | —                                        | ○                        | —                              |
|  | ○                                         | —    | —                                     | —                                               | —              | —                | △*18                | —                  | —                   | —                    | —                            | —                               | —                     | —                                        | ○                        | —                              |
|  | —                                         | —    | —                                     | —                                               | —              | —                | △*19                | ○                  | △*19                | —                    | —                            | —                               | —                     | —                                        | ○                        | —                              |
|  | —                                         | —    | —                                     | —                                               | —              | —                | ○                   | ○                  | ○                   | ○                    | —                            | —                               | —                     | —                                        | ○                        | —                              |
|  | —                                         | —    | —                                     | —                                               | —              | —                | —                   | ○*22               | —                   | —                    | —                            | —                               | —                     | —                                        | ○                        | △                              |
|  | —                                         | —    | —                                     | —                                               | —              | —                | —                   | ○*22               | —                   | —                    | —                            | —                               | —                     | —                                        | ○                        | △                              |
|  | —                                         | —    | —                                     | —                                               | —              | —                | —                   | ○*22               | —                   | —                    | —                            | —                               | —                     | —                                        | ○                        | △                              |
|  | —                                         | —    | —                                     | —                                               | —              | —                | —                   | —                  | —                   | —                    | —                            | —                               | —                     | —                                        | ○                        | △                              |
|  | —                                         | —    | —                                     | —                                               | —              | —                | —                   | ○                  | —                   | —                    | —                            | —                               | —                     | —                                        | ○                        | △                              |
|  | —                                         | ○    | ○                                     | —                                               | —              | —                | —                   | ○                  | —                   | ○                    | —                            | —                               | ○                     | ○                                        | ○*24                     | —                              |
|  | —                                         | ○    | ○                                     | —                                               | △*20           | —                | ○                   | ○                  | ○                   | ○                    | —                            | —                               | ○                     | ○                                        | ○*24                     | —                              |
|  | —                                         | —    | —                                     | ○                                               | △*20           | —                | ○                   | ○                  | ○                   | ○                    | —                            | —                               | ○                     | ○                                        | ○*24                     | —                              |
|  | —                                         | —    | —                                     | —                                               | ○*20           | —                | —                   | ○                  | ○                   | ○                    | —                            | —                               | ○                     | ○                                        | ○*24                     | —                              |
|  | —                                         | —    | —                                     | —                                               | ○*23           | —                | —                   | ○                  | ○                   | ○                    | —                            | —                               | ○                     | ○                                        | ○                        | —                              |
|  | —                                         | —    | —                                     | —                                               | ○              | —                | —                   | ○                  | ○                   | ○                    | —                            | —                               | ○                     | ○                                        | ○                        | —                              |
|  | —                                         | —    | —                                     | —                                               | ○              | —                | △*24                | ○                  | ○                   | ○                    | —                            | —                               | ○                     | ○                                        | ○                        | —                              |

\*17 Model HCR : ZZ, KK --- grease nipple cannot be attached to model HCR15.

\*18 Model HCR : When using joined LM rails, the contamination prevention seal must be a low-resistance seal (contamination protection code: LL).

Dedicated cap CV --- applicable to all models except model HCR15

\*19 Model HMG : Dedicated cap GC --- applicable to model HMG25,

Dedicated cap CV --- applicable to all models except model HMG15

\*20 Model SRG : DD --- side nipple required for Model SRG100.

Plate cover (see **A1-429**) --- suitable for Models 35 to 65

\*21 Model HMG : Straight-curved seal (code: UU) required.

\*22 Model HSR/SR/RSR-M1 (for High Temperatures) : Dedicated cap C --- only work at room temperature

\*23 Model SRN : Plate cover SV --- suitable for models 35 to 65

Plate cover (**A1-443**) --- suitable for models 35 to 65

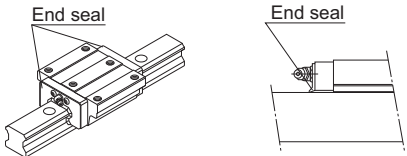
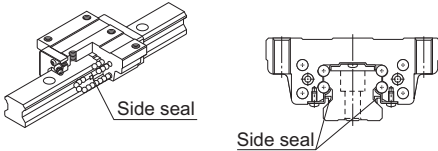
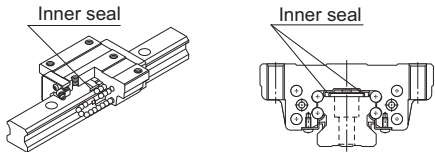
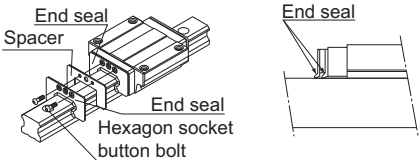
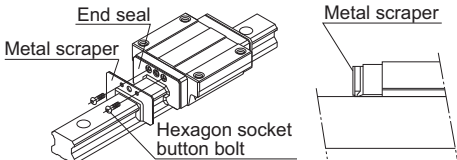
\*24 : AP-HC surface treatment is not available,

Dedicated cap CV --- applicable to model 130 only

Note) Those models equipped with QZ Lubricator cannot have a grease nipple.  
When desiring a grease nipple for a model attached with QZ, contact THK.

# Seal and Metal scraper

- For the supported models, see the table of options by model number on [A1-478](#).
- For the LM block dimension (dimension L) with seal attached, see [A1-491](#) to [A1-498](#).
- For the maximum seal resistance, see [A1-504](#) to [A1-506](#).

| Item name                   | Schematic diagram / mounting location                                               | Purpose/location of use                                                                                                               |
|-----------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| End Seal                    |    | Used in locations exposed to dust                                                                                                     |
| Side Seal                   |    | Used in locations where dust may enter the LM block from the side or bottom surface, such as vertical, horizontal and inverted mounts |
| Inner Seal                  |    | Used in locations severely exposed to dust or cutting chips                                                                           |
| Double Seals                |   | Used in locations exposed to much dust or many cutting chips                                                                          |
| Metal Scraper (Non-contact) |  | Used in locations where welding spatter may adhere to the LM rail                                                                     |

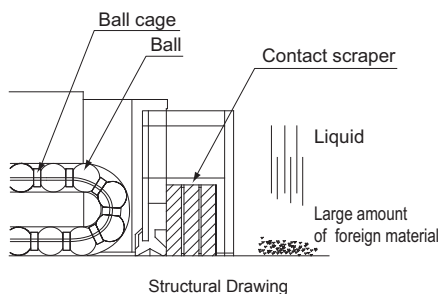
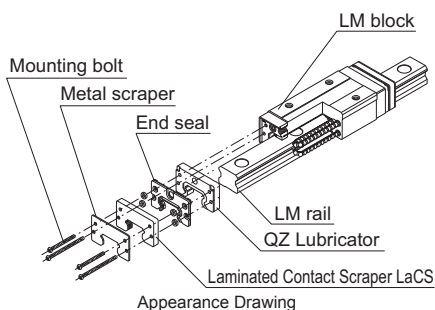
| Symbol | Contamination Protection Accessories                        |
|--------|-------------------------------------------------------------|
| UU     | With end seal                                               |
| SS     | With end seal + side seal + inner seal*                     |
| DD     | With double seals + side seal + inner seal*                 |
| ZZ     | With end seal + side seal + inner seal* + metal scraper     |
| KK     | With double seals + side seal + inner seal* + metal scraper |

\* Some models are not equipped with inner seals.(See **A1-478**)

# Laminated Contact Scraper LaCS

- For the supported models, see the table of options by model number on [A1-478](#).
- For the LM block dimension (dimension L) with LaCS attached, see [A1-491](#) to [A1-498](#).
- For the resistance of LaCS, see [A1-507](#).
- For notes regarding how to handle the LaCS, refer to [A1-552](#).

For locations with adverse environment, Laminated Contact Scraper LaCS is available. LaCS removes minute foreign material adhering to the LM rail in multiple stages and prevents it from entering the LM block with laminated contact structure (3-layer scraper).



## [Features]

- Since the 3 layers of scrapers fully contact the LM rail, LaCS is highly capable of removing minute foreign material.
- Since it uses oil-impregnated, foam synthetic rubber with a self-lubricating function, low friction resistance is achieved.

| Symbol             | Contamination Protection Accessories                                                                        |
|--------------------|-------------------------------------------------------------------------------------------------------------|
| SSHH               | With end seal + side seal + inner seal* <sup>1</sup> + LaCS                                                 |
| DDHH               | With double seals + side seal + inner seal * <sup>1</sup> + LaCS                                            |
| ZZHH               | With end seal + side seal + inner seal * <sup>1</sup> + metal scraper + LaCS                                |
| KKHH               | With double seals + side seal + inner seal * <sup>1</sup> + metal scraper + LaCS                            |
| JJHH* <sup>2</sup> | With end seal + side seal + inner seal* <sup>1</sup> + LaCS + protector (serving also as metal scraper)     |
| TTHH* <sup>2</sup> | With double seals + side seal + inner seal* <sup>1</sup> + LaCS + protector (serving also as metal scraper) |

\*<sup>1</sup> Some models are not equipped with inner seals.(See [A1-478](#))

\*<sup>2</sup> JJHH and TTTH are only available for models SVR/SVS, NR/NRS-X and SRG.

(Note) HH type (with LaCS) for models SVR/SVS, NR/NRS-X, and SRG comes with a protector (see [A1-487](#)). Contact THK if you want to use the Protector with other options.

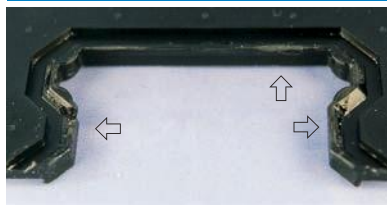
### ● Test under an Environment with a Water-soluble Coolant

[Test conditions] Test environment: water-soluble coolant

| Item                     | Description                     |                                       |
|--------------------------|---------------------------------|---------------------------------------|
| Tested model             | No.1                            | SHS45R1SS+3000L (end seal only)       |
|                          | No.2                            | SHS45R1SSHH+3000L (end seal and LaCS) |
| Maximum speed            | 200m/min                        |                                       |
| Environmental conditions | Coolant sprayed: 5 time per day |                                       |

#### Magnified view of the end seal lip

No. 1: without LaCS - lip fractured at 1,700 km



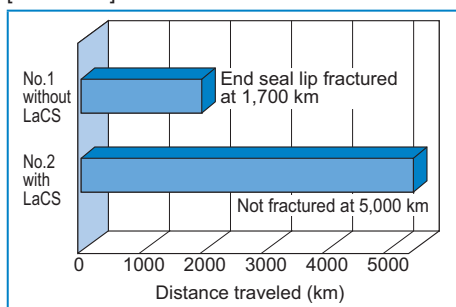
⇐ Areas marked with arrow are fractured

No. 2: with LaCS - no anomaly observed after traveling 5,000 km



Lip has not been fractured

[Test result]



### ● Test under an Environment with Minute Foreign Matter

[Test conditions] Test environment: minute foreign material

| Item                        | Description                                            |                                                      |
|-----------------------------|--------------------------------------------------------|------------------------------------------------------|
| Tested model                | No.1                                                   | Caged Ball LM Guide #45R (DD+600L) double seals only |
|                             | No.2                                                   | Caged Ball LM Guide #45R (HH+600L) LaCS only         |
| Max speed/acceleration      | 60m/min, 1G                                            |                                                      |
| External load               | 9.6kN                                                  |                                                      |
| Foreign material conditions | Type: FCD450#115 (particle diameter: 125 μm or less)   |                                                      |
|                             | Sprayed amount: 1g/1hour (total sprayed amount: 120 g) |                                                      |

No. 1 Traveled 100 km (double-seal configuration)



Large amount of foreign matter has entered the raceway

No. 2 Traveled 100 km (LaCS only)



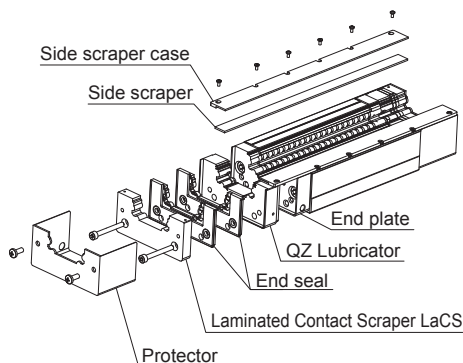
No foreign matter entering the raceway observed

[Test result] Amount of foreign material entering the raceway

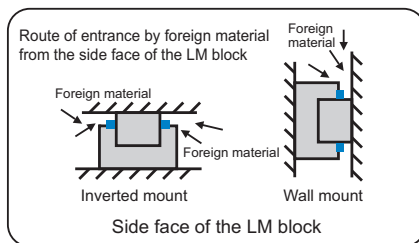
| Seal configuration                                                    |                | Amount of foreign material entering the raceway g |
|-----------------------------------------------------------------------|----------------|---------------------------------------------------|
| Double-seal configuration<br>(2 end seals superposed with each other) | Tested model 1 | 0.3                                               |
|                                                                       | Tested model 2 | 0.3                                               |
|                                                                       | Tested model 3 | 0.3                                               |
| LaCS                                                                  | Tested model 1 | 0                                                 |
|                                                                       | Tested model 2 | 0                                                 |
|                                                                       | Tested model 3 | 0                                                 |

# Side Scraper

- Applicable models: models SVR/SVS, NR/NRS-X and SRG
- For the resistance of side scraper, see [A1-508](#).
- For the LM block dimension (dimension L) with side scraper attached, see [A1-491](#).
- For notes regarding how to handle the side scraper, see [A1-552](#).

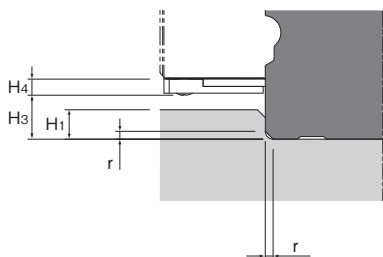


Outline view  
(Ex: in case of QZTTHYY type)



## [Features]

- Minimizes foreign material entering from the side of the LM Guide in a harsh environment.
- Demonstrates a dust protection effect in inverted or wall mount.



Side view of the LM block after the side scraper is mounted

Note) Note that the side scraper is not sold alone.

The shoulder height of the mounting surface and the corner radius of model SVR/SVS or NR/NRS-X after side scraper is mounted

Unit: mm

| Model No. | Corner radius r(max) | Shoulder height of the LM rail H <sub>1</sub> | H <sub>3</sub> | Side scraper thickness H <sub>4</sub> |
|-----------|----------------------|-----------------------------------------------|----------------|---------------------------------------|
| 25        | 0.5                  | 2                                             | 2.9            | 2.6                                   |
| 30        | 1                    | 3.5                                           | 4.4            |                                       |
| 35        | 1                    | 5.5                                           | 6.4            |                                       |
| 45        | 1                    | 8                                             | 9              |                                       |
| 55        | 1.5                  | 10.5                                          | 11.4           |                                       |
| 65        | 1.5                  | 11                                            | 12.3           |                                       |

The shoulder height of the mounting surface and the corner radius after the side scraper of model SRG is mounted

Unit: mm

| Model No. | Corner radius r(max) | Shoulder height of the LM rail H <sub>1</sub> | H <sub>3</sub> | Side scraper thickness H <sub>4</sub> |
|-----------|----------------------|-----------------------------------------------|----------------|---------------------------------------|
| 35        | 1                    | 3                                             | 4              | 2                                     |
| 45        | 1                    | 3.5                                           | 5.5            | 2.5                                   |
| 55        | 1.5                  | 5.5                                           | 7.5            | 2.5                                   |
| 65        | 1.5                  | 6                                             | 8.5            | 3                                     |

## Model number coding

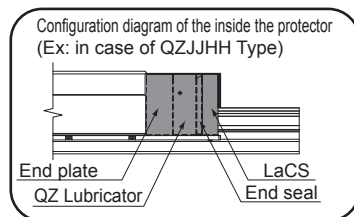
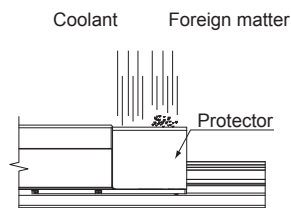
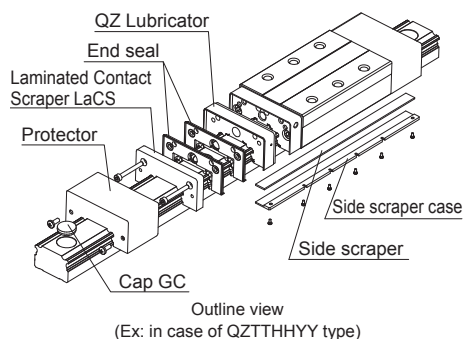
**SVR45 LR 1 QZ JJHH YY C1 +1200L**

With side scraper\*

\* The side scraper can accommodate various options of dust control accessories and lubrication accessories. For details, contact THK.

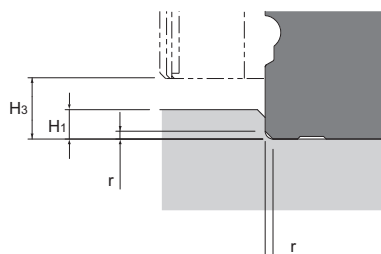
# Protector

- Applicable models: models SVR/SVS, NR/NRS-X and SRG
- HH type (with LaCS) for models SVR/SVS, NR/NRS-X and SRG is provided with the protector.
- For the LM block dimension (dimension L) with protector attached, see **A1-491**.



## [Features]

- The protector minimizes the entrance of foreign material even in harsh environments where foreign material such as particles and liquids are present.



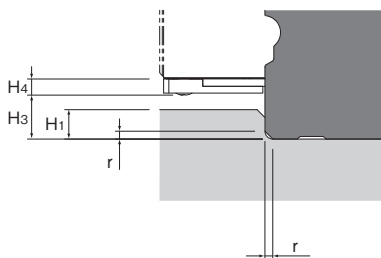
Side view of the LM block after the protector is mounted

The shoulder height of the mounting surface and the corner radius of model SVR/SVS or NR/NRS-X after protector is mounted  
Unit: mm

| Model No. | Corner radius<br>$r(\max)$ | Shoulder height<br>of the LM rail<br>$H_1$ | $H_3$ |
|-----------|----------------------------|--------------------------------------------|-------|
| 25        | 0.5                        | 4                                          | 5.5   |
| 30        | 1                          | 5                                          | 7     |
| 35        | 1                          | 6                                          | 9     |
| 45        | 1                          | 8                                          | 11.6  |
| 55        | 1.5                        | 10                                         | 14    |
| 65        | 1.5                        | 10                                         | 15    |

The shoulder height of the mounting surface and the corner radius after the protector of model SRG is mounted  
Unit: mm

| Model No. | Corner radius<br>$r(\max)$ | Shoulder height<br>of the LM rail<br>$H_1$ | $H_3$ |
|-----------|----------------------------|--------------------------------------------|-------|
| 35        | 1                          | 5                                          | 6     |
| 45        | 1.5                        | 6                                          | 8     |
| 55        | 1.5                        | 8                                          | 10    |
| 65        | 1.5                        | 9                                          | 11.5  |



Side view of the LM block after the protector and side scraper are mounted

The shoulder height of the mounting surface and the corner radius of Model SVR/SVS or NR/NRS-X after the protector and side scraper are mounted

Unit: mm

| Model No. | Corner radius $r(\text{max})$ | Shoulder height of the LM rail $H_1$ | $H_3$ | Side scraper thickness $H_4$ |
|-----------|-------------------------------|--------------------------------------|-------|------------------------------|
| 25        | 0.5                           | 2                                    | 2.9   | 2.6                          |
| 30        | 1                             | 3.5                                  | 4.4   |                              |
| 35        | 1                             | 5.5                                  | 6.4   |                              |
| 45        | 1                             | 8                                    | 9     |                              |
| 55        | 1.5                           | 10.5                                 | 11.4  |                              |
| 65        | 1.5                           | 11                                   | 12.3  |                              |

The shoulder height of the mounting surface and the corner radius after the protector and side scraper of Model SRG are mounted

Unit: mm

| Model No. | Corner radius $r(\text{max})$ | Shoulder height of the LM rail $H_1$ | $H_3$ | Side scraper thickness $H_4$ |
|-----------|-------------------------------|--------------------------------------|-------|------------------------------|
| 35        | 1                             | 3                                    | 4     | 2                            |
| 45        | 1                             | 3.5                                  | 5.5   | 2.5                          |
| 55        | 1.5                           | 5.5                                  | 7.5   | 2.5                          |
| 65        | 1.5                           | 6                                    | 8.5   | 3                            |

Note1) Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.

Note2) Contact THK if you want to use the protector with other options.

# Light-Resistance Contact Seal LiCS

- For the supported models, see the table of options by model number on [A1-478](#).
- For the LM block dimension (dimension L) with LiCS attached, see [A1-501](#).
- For the resistance of LiCS, see [A1-508](#).
- For notes regarding how to handle the LiCS, see [A1-553](#).

LiCS is a light sliding resistance contact seal. It is effective in removing dust on the raceway and retaining a lubricant such as grease. It achieves extremely low drag and smooth, stable motion.

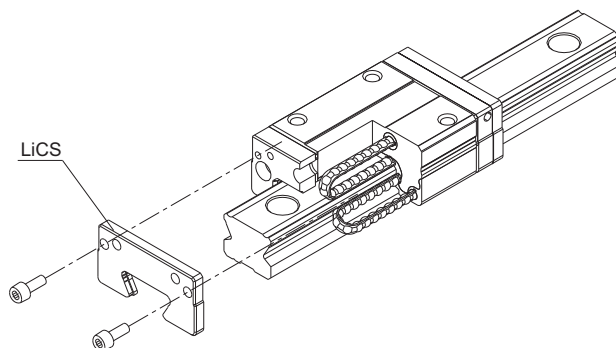


Fig.1 Structural Drawing of SSR + LiCS

## [Features]

Light-Resistance Contact Seal LiCS is a seal that uses a light-resistance material in its sealing element and contacts the LM rail raceway to achieve low drag resistance. It is optimal for applications where low drag resistance is required, such as semiconductor-related devices, inspection devices and OA equipment all of which are used in favorable environments.

- Since the sealing element contacts the LM rail raceway, it is effective in removing dust on the raceway.
- Use of oil-impregnated, expanded synthetic rubber, which has excellent self-lubricating property, achieves low drag resistance.

## Model number coding

| SSR20                 | XW               | 2                                      | GG                          | C1                                                                                         | +600L                  | P                                              | - II                                                                                                                                                    |
|-----------------------|------------------|----------------------------------------|-----------------------------|--------------------------------------------------------------------------------------------|------------------------|------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| LM Guide model number | Type of LM block | No. of LM blocks used on the same rail | With LiCS seal on both ends | Radial clearance symbol<br>Normal (No symbol)<br>Light preload (C1)<br>Medium preload (C0) | LM rail length (in mm) | Symbol for No. of rails used on the same plane | Accuracy symbol<br>Normal grade (No Symbol) / High accuracy grade (H)<br>Precision grade (P) / Super precision grade (SP)<br>Ultra precision grade (UP) |

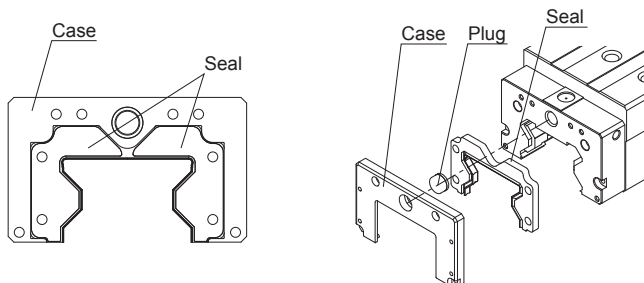
| Symbol | Contamination Protection Accessories |
|--------|--------------------------------------|
| GG     | LiCS                                 |
| PP     | With LiCS + side seal + inner seal*  |

\* Some models are not equipped with inner seals. (See [A1-478](#))

# High Chemical Resistance Fluorine Seal FS

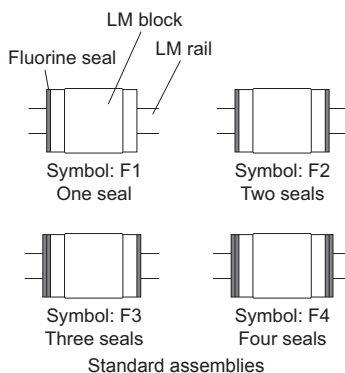
- Applicable models: models SRG35, SRG45, SRG55 and SRG65
- For the LM block dimension (L dimension) with a Fluorine seal attached, see A1-503.
- For the resistance value of the Fluorine seal, see A1-508.
- For precautions on using the Fluorine seal, see A1-553.

The Fluorine seal is made of Fluororubber and has excellent chemical resistance.  
The Fluorine seal can be inserted from the upper surface of the LM rail and is easy to install.



Components/Structure

| Symbol | Contamination Protection Accessories                                     |
|--------|--------------------------------------------------------------------------|
| F2     | Fluorine seals + side seals + inner seals                                |
| FZ2    | Fluorine seals + side seals + inner seals + metal scrapers               |
| FJ2    | Fluorine seals + side seals + inner seals + protectors                   |
| F4     | Fluorine seals (double) + side seals + inner seals                       |
| FZ4    | Fluorine seals (double) + side seals + inner seals + metal scrapers      |
| FJ4    | Fluorine seals (double) + side seals + inner seals + protectors          |
| QZF2   | Fluorine seals + side seals + inner seals + QZ                           |
| QZFZ2  | Fluorine seals + side seals + inner seals + metal scrapers + QZ          |
| QZFFJ2 | Fluorine seals + side seals + inner seals + QZ + protectors              |
| QZF4   | Fluorine seals (double) + side seals + inner seals + QZ                  |
| QZFFZ4 | Fluorine seals (double) + side seals + inner seals + metal scrapers + QZ |
| QZFFJ4 | Fluorine seals (double) + side seals + inner seals + QZ + protectors     |



## Model number coding

<When purchasing in a set with an LM Guide>

(Example) SRG45LR2QZ **F2** C0 + 1200LZ- II

Fluorine seal symbol (see the standard assemblies diagram)

\*Contact THK if you require seals on individual blocks in configurations that differ from those in the standard assemblies diagram.

<When purchasing fluorine seals individually>

(Example) SRG45-F1-Z

Fluorine seal symbol (F1 only for individual purchase)

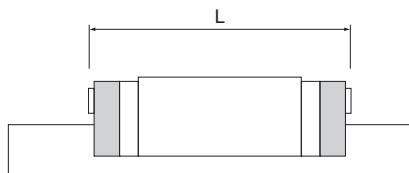
\*Individual purchases come in a set with the fluorine seal, a case, and a plug.

Note1) If this product will be used in special environments, such as in a vacuum or at very low or high temperatures, contact THK.

Note2) This seal cannot be used in combination with an end seal or a Laminated Contact Scraper (LaCS).

# Dimensions of Each Model with an Option Attached

## The LM Block Dimension (Dimension L) with LaCS and Seals Attached



Unit: mm

| Model No. |            | L     |       |       |       |       |       |       |       |       |
|-----------|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|           |            | UU    | SS    | DD    | ZZ    | KK    | SSHH  | DDHH  | ZZHH  | KKHH  |
| SHS       | 15C/V/R    | 64.4  | 64.4  | 69.8  | 66.8  | 72.2  | 78.6  | 84    | 79.8  | 85.2  |
|           | 15LC/LV    | 79.4  | 79.4  | 84.8  | 81.8  | 87.2  | 93.6  | 99    | 94.8  | 100.2 |
|           | 20C/V      | 79    | 79    | 85.4  | 83    | 89.4  | 93.6  | 100   | 96    | 102.4 |
|           | 20LC/LV    | 98    | 98    | 104.4 | 102   | 108.4 | 112.6 | 119   | 115   | 121.4 |
|           | 25C/V/R    | 92    | 92    | 101.6 | 100.4 | 107.6 | 112   | 119.2 | 114.4 | 121.6 |
|           | 25LC/LV/LR | 109   | 109   | 118.6 | 117.4 | 124.6 | 129   | 136.2 | 131.4 | 138.6 |
|           | 30C/V/R    | 106   | 106   | 116   | 113.8 | 122.4 | 129.4 | 138   | 131.8 | 140.4 |
|           | 30LC/LV/LR | 131   | 131   | 141   | 138.8 | 147.4 | 154.4 | 163   | 156.8 | 165.4 |
|           | 35C/V/R    | 122   | 122   | 134.8 | 132.4 | 142.2 | 148   | 157.8 | 150.4 | 160.2 |
|           | 35LC/LV/LR | 152   | 152   | 164.8 | 162.4 | 172.2 | 178   | 187.8 | 180.4 | 190.2 |
|           | 45C/V/R    | 140   | 140   | 152.8 | 151.2 | 161   | 169   | 178.8 | 172.2 | 182   |
|           | 45LC/LV/LR | 174   | 174   | 186.8 | 185.2 | 195   | 203   | 212.8 | 206.2 | 216   |
|           | 55C/V/R    | 171   | 171   | 186.6 | 184.2 | 195.4 | 202   | 213.2 | 205.2 | 216.4 |
|           | 55LC/LV/LR | 213   | 213   | 228.6 | 226.2 | 237.4 | 244   | 255.2 | 247.2 | 258.4 |
| SSR       | 65C/V      | 221   | 221   | 238.6 | 236.2 | 248.6 | 258   | 270.4 | 261.2 | 273.6 |
|           | 65LC/LV    | 272   | 272   | 289.6 | 287.2 | 299.6 | 309   | 321.4 | 312.2 | 324.6 |
|           | 15XVY/XSBY | 40.3  | 40.3  | 47.3  | 44.9  | 50.7  | 59.5  | 65.3  | 60.7  | 66.5  |
|           | 15XWY/XTB  | 56.9  | 56.9  | 63.9  | 61.5  | 67.3  | 76.1  | 81.9  | 77.3  | 83.1  |
|           | 20XV/XSB   | 47.7  | 47.7  | 54.6  | 53.4  | 60.3  | 67.7  | 74.6  | 70.1  | 77    |
|           | 20XW/XTB   | 66.5  | 66.5  | 73.4  | 72.2  | 79.1  | 86.5  | 93.4  | 88.9  | 95.8  |
|           | 25XVY/XSBY | 60    | 60    | 67.4  | 65.7  | 73.1  | 80    | 87.4  | 82.4  | 89.8  |
|           | 25XWY/XTB  | 83    | 83    | 90.4  | 88.7  | 96.1  | 103   | 110.4 | 105.4 | 112.8 |
|           | 30XV/XSB   | 66.7  | 66.7  | 74.8  | 72.4  | 80.5  | 90.7  | 98.8  | 93.1  | 101.2 |
|           | 30XW/XTB   | 97    | 97    | 105.1 | 102.7 | 110.8 | 121   | 129.1 | 123.4 | 131.5 |
|           | 35XV/XSB   | 77.5  | 77.5  | 86.5  | 84.3  | 93.3  | 103.5 | 112.5 | 105.9 | 114.9 |
|           | 35XW/XTB   | 110.9 | 110.9 | 119.9 | 117.7 | 126.7 | 136.9 | 145.9 | 139.3 | 148.3 |
| SHW       | 12CAM/CRM  | 37    | 37    | —     | —     | —     | 48    | —     | —     | —     |
|           | 12HRM      | 50.4  | 50.4  | —     | —     | —     | 61.4  | —     | —     | —     |
|           | 14CAM/CRM  | 45.5  | 45.5  | —     | —     | —     | 60.7  | —     | —     | —     |
|           | 17CAM/CRM  | 51    | 51    | 54    | 53.4  | 56.4  | 66.2  | 69.2  | 67.4  | 70.4  |
|           | 21CA/CR    | 59    | 59    | 64    | 63.2  | 68.2  | 75.6  | 80.6  | 77.2  | 82.2  |
|           | 27CA/CR    | 72.8  | 72.8  | 78.6  | 77.8  | 83.6  | 89.4  | 95.2  | 91.8  | 97.6  |
|           | 35CA/CR    | 107   | 107   | 114.4 | 112   | 119.4 | 129   | 136.4 | 131.4 | 138.8 |
|           | 50CA/CR    | 141   | 141   | 149.2 | 147.4 | 155.6 | 166   | 174.2 | 168.4 | 176.6 |

Unit: mm

| Model No. |      | L    |      |       |       |       |       |       |       |       |
|-----------|------|------|------|-------|-------|-------|-------|-------|-------|-------|
|           |      | UU   | SS   | DD    | ZZ    | KK    | SSHH  | DDHH  | ZZHH  | KKHH  |
| SRS       | 5M   | 16.9 | —    | —     | —     | —     | —     | —     | —     | —     |
|           | 5N   | 20.1 | —    | —     | —     | —     | —     | —     | —     | —     |
|           | 5WM  | 22.1 | —    | —     | —     | —     | —     | —     | —     | —     |
|           | 5WN  | 28.1 | —    | —     | —     | —     | —     | —     | —     | —     |
|           | 7S   | 19   | 19   | —     | —     | —     | —     | —     | —     | —     |
|           | 7M   | 23.4 | 23.4 | —     | —     | —     | —     | —     | —     | —     |
|           | 7N   | 31   | 31   | —     | —     | —     | —     | —     | —     | —     |
|           | 7WS  | 22.5 | 22.5 | —     | —     | —     | —     | —     | —     | —     |
|           | 7WM  | 31   | 31   | —     | —     | —     | —     | —     | —     | —     |
|           | 7WN  | 40.9 | 40.9 | —     | —     | —     | —     | —     | —     | —     |
|           | 9XS  | 21.5 | 21.5 | —     | —     | —     | 33.1  | —     | —     | —     |
|           | 9XM  | 30.8 | 30.8 | —     | —     | —     | 42.4  | —     | —     | —     |
|           | 9XN  | 40.8 | 40.8 | —     | —     | —     | 52.4  | —     | —     | —     |
|           | 9WS  | 26.5 | 26.5 | —     | —     | —     | 38.1  | —     | —     | —     |
|           | 9WM  | 39   | 39   | —     | —     | —     | 50.6  | —     | —     | —     |
|           | 9WN  | 50.7 | 50.7 | —     | —     | —     | 62.3  | —     | —     | —     |
|           | 12S  | 25   | 25   | —     | —     | —     | 36.6  | —     | —     | —     |
|           | 12M  | 34.4 | 34.4 | —     | —     | —     | 46    | —     | —     | —     |
|           | 12N  | 47.1 | 47.1 | —     | —     | —     | 58.7  | —     | —     | —     |
|           | 12WS | 30.5 | 30.5 | —     | —     | —     | 42.1  | —     | —     | —     |
|           | 12WM | 44.5 | 44.5 | —     | —     | —     | 56.1  | —     | —     | —     |
|           | 12WN | 59.5 | 59.5 | —     | —     | —     | 71.1  | —     | —     | —     |
|           | 15S  | 32   | 32   | —     | —     | —     | 46.2  | —     | —     | —     |
|           | 15M  | 43   | 43   | —     | —     | —     | 57.2  | —     | —     | —     |
|           | 15N  | 60.8 | 60.8 | —     | —     | —     | 75    | —     | —     | —     |
|           | 15WS | 41.5 | 41.5 | —     | —     | —     | 55.7  | —     | —     | —     |
|           | 15WM | 55.5 | 55.5 | —     | —     | —     | 69.7  | —     | —     | —     |
|           | 15WN | 74.5 | 74.5 | —     | —     | —     | 88.7  | —     | —     | —     |
|           | 20M  | 50   | 50   | —     | —     | —     | 65.2  | —     | —     | —     |
|           | 25M  | 77   | 77   | —     | —     | —     | 92.6  | —     | —     | —     |
| SCR       | 15S  | 64.4 | 64.4 | 69.8  | 66.8  | 72.2  | 78.9  | 84.4  | 79.9  | 85.2  |
|           | 20S  | 79   | 79   | 85.4  | 83    | 89.4  | 94    | 100   | 96    | 102.5 |
|           | 20   | 98   | 98   | 104.4 | 102   | 108.4 | 113   | 119   | 115   | 121.5 |
|           | 25   | 109  | 109  | 118.6 | 117.4 | 124.6 | 129   | 136.2 | 131.4 | 138.6 |
|           | 30   | 131  | 131  | 141   | 138.8 | 147.4 | 154.4 | 163   | 156.8 | 165.4 |
|           | 35   | 152  | 152  | 164.8 | 162.4 | 172.2 | 178   | 187.8 | 180.4 | 190.2 |
|           | 45   | 174  | 174  | 186.8 | 185.2 | 195   | 203   | 212.8 | 206.2 | 216   |
|           | 65   | 272  | 272  | 289.6 | 287.2 | 299.6 | 309   | 321.4 | 312.2 | 324.6 |

| Model No. |                     | L     |       |       |       |       |       |       |       |       |
|-----------|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|           |                     | UU    | SS    | DD    | ZZ    | KK    | SSHH  | DDHH  | ZZHH  | KKHH  |
| HSR       | 8RM                 | 24    | —     | —     | —     | —     | —     | —     | —     | —     |
|           | 10RM                | 31    | —     | —     | —     | —     | —     | —     | —     | —     |
|           | 12RM                | 45    | —     | —     | —     | —     | —     | —     | —     | —     |
|           | 15C/R/A/B/YR        | 56.6  | 56.6  | 61.8  | 58.2* | 63.4* | 76    | 81.2  | 77.2  | 82.4  |
|           | 15LC/LR             | 74.6  | 74.6  | 79.8  | 76.2  | 81.4  | 94    | 99.2  | 95.2  | 100.4 |
|           | 20C/R/A/B/CA/CB/YR  | 74    | 74    | 80.6  | 76.6  | 83.2  | 92    | 98.6  | 95.2  | 101.8 |
|           | 20LC/LR/LA/LB/HA/HB | 90    | 90    | 96.6  | 92.6  | 99.2  | 108   | 114.6 | 111.2 | 117.8 |
|           | 25C/R/A/B/CA/CB/YR  | 83.1  | 83.1  | 90.7  | 86.7  | 94.3  | 101   | 108.6 | 105.3 | 112.9 |
|           | 25LC/LR/LA/LB/HA/HB | 102.2 | 102.2 | 109.8 | 105.8 | 113.4 | 120.1 | 127.7 | 124.4 | 132   |
|           | 30C/R/A/B/CA/CB/YR  | 98    | 98    | 105.6 | 101.6 | 109.2 | 119.9 | 127.5 | 124.2 | 131.8 |
|           | 30LC/LR/LA/LB/HA/HB | 120.6 | 120.6 | 128.2 | 124.2 | 131.8 | 142.5 | 150.1 | 146.8 | 154.4 |
|           | 35C/R/A/B/CA/CB/YR  | 109.4 | 109.4 | 117   | 113   | 120.6 | 132.4 | 140   | 135.6 | 143.2 |
|           | 35LC/LR/LA/LB/HA/HB | 134.8 | 134.8 | 142.4 | 138.4 | 146   | 157.8 | 165.4 | 161   | 168.6 |
|           | 45C/R/A/B/CA/CB/YR  | 139   | 139   | 146.2 | 144.2 | 151.4 | 168   | 175.2 | 171.2 | 178.4 |
|           | 45LC/LR/LA/LB/HA/HB | 170.8 | 170.8 | 178   | 176   | 183.2 | 199.8 | 207   | 203   | 210.2 |
|           | 55C/R/A/B/CA/CB/YR  | 163   | 163   | 170.2 | 168.2 | 175.4 | 192.6 | 199.8 | 195.8 | 203   |
|           | 55LC/LR/LA/LB/HA/HB | 201.1 | 201.1 | 208.3 | 206.3 | 213.5 | 230.7 | 237.9 | 233.9 | 241.1 |
|           | 65XC/XR/XCA/XCB/XYR | 190.5 | 190.5 | 197.7 | 195.3 | 202.5 | 224.3 | 231.5 | 227.5 | 234.7 |
|           | 65A/B/CA/CB/YR      | 186   | 186   | 193.2 | 191.2 | 198.4 | 223   | 229   | 225   | 232.2 |
|           | 65XLC/XLR/XHA/XHB   | 250   | 250   | 257.2 | 254.8 | 262   | 283.8 | 291   | 287   | 294.2 |
|           | 65LA/LB/HA/HB       | 245.5 | 245.5 | 252.7 | 250.7 | 257.9 | 282.5 | 288.5 | 284.5 | 291.7 |
|           | 85R/A/B/CA/CB/YR    | 245.6 | 245.6 | 252.8 | 252.4 | 259.6 | 278.8 | 286   | 283.4 | 290.6 |
|           | 85LR/LA/LB/HA/HB    | 303   | 303   | 310.2 | 309.8 | 317   | 336.2 | 343.4 | 340.8 | 348   |
|           | 100HR/HA/HB         | 334   | 334   | —     | —     | —     | —     | —     | —     | —     |
|           | 120HR/HA/HB         | 365   | 365   | —     | —     | —     | —     | —     | —     | —     |
|           | 150HR/HA/HB         | 396   | 396   | —     | —     | —     | —     | —     | —     | —     |
| SR        | 15W/TB              | 57    | 57    | 62.2  | 58.4* | 63.6* | —     | —     | —     | —     |
|           | 15V/SB              | 40.4  | 40.4  | 45.6  | 41.8* | 47*   | —     | —     | —     | —     |
|           | 20W/TB              | 66.2  | 66.2  | 72.8  | 70.6* | 77.2* | —     | —     | —     | —     |
|           | 20V/SB              | 47.3  | 47.3  | 53.9  | 51.7* | 58.3* | —     | —     | —     | —     |
|           | 25WY/TBY            | 83    | 83    | 90.6  | 87.4  | 95    | —     | —     | —     | —     |
|           | 25VY/SBY            | 59.2  | 59.2  | 66.8  | 63.6  | 71.2  | —     | —     | —     | —     |
|           | 30W/TB              | 96.8  | 96.8  | 104.4 | 99.4  | 107   | —     | —     | —     | —     |
|           | 30V/SB              | 67.9  | 67.9  | 75.5  | 70.5  | 78.1  | —     | —     | —     | —     |
|           | 35W/TB              | 111   | 111   | 118.6 | 113.6 | 121.2 | —     | —     | —     | —     |
|           | 35V/SB              | 77.6  | 77.6  | 85.2  | 80.2  | 87.8  | —     | —     | —     | —     |
|           | 45W/TB              | 126   | 126   | 134.6 | 129.4 | 138   | —     | —     | —     | —     |
|           | 55W/TB              | 156   | 156   | 164.6 | 159.4 | 168   | —     | —     | —     | —     |
|           | 70T                 | 194.6 | 194.6 | 201.8 | 200.8 | 208   | —     | —     | —     | —     |
|           | 85T                 | 180   | 180   | —     | —     | —     | —     | —     | —     | —     |
|           | 100T                | 200   | 200   | —     | —     | —     | —     | —     | —     | —     |
|           | 120T                | 235   | 235   | —     | —     | —     | —     | —     | —     | —     |
|           | 150T                | 280   | 280   | —     | —     | —     | —     | —     | —     | —     |

\* Grease nipple cannot be installed.

Unit: mm

| Model No.     |             | L     |       |       |       |       |      |      |      |      |
|---------------|-------------|-------|-------|-------|-------|-------|------|------|------|------|
|               |             | UU    | SS    | DD    | ZZ    | KK    | SSHH | DDHH | ZZHH | KKHH |
| NR/<br>NRS    | 75R/A/B     | 218   | 218   | 229   | 226.6 | 237.6 | —    | —    | —    | —    |
|               | 75LR/LA/LB  | 274   | 274   | 285   | 282.6 | 293.6 | —    | —    | —    | —    |
|               | 85R/A/B     | 246.7 | 246.7 | 257.7 | 256.1 | 267.1 | —    | —    | —    | —    |
|               | 85LR/LA/LB  | 302.8 | 302.8 | 313.8 | 312.2 | 323.2 | —    | —    | —    | —    |
|               | 100R/A/B    | 286.2 | 286.2 | 297.8 | 295.6 | 307.2 | —    | —    | —    | —    |
|               | 100LR/LA/LB | 326.2 | 326.2 | 337.8 | 335.6 | 347.2 | —    | —    | —    | —    |
| HRW           | 12LRM       | 37    | 37    | —     | —     | —     | —    | —    | —    | —    |
|               | 14LRM       | 45.5  | 45.5  | —     | —     | —     | —    | —    | —    | —    |
|               | 17CA/CR     | 50.8  | —     | 54    | 53.6  | 58.6  | —    | —    | —    | —    |
|               | 21CA/CR     | 58.8  | —     | 64.2  | 62.8  | 69    | —    | —    | —    | —    |
|               | 27CA/CR     | 72.8  | 72.8  | 79    | 75.6  | 81.8  | —    | —    | —    | —    |
|               | 35CA/CR     | 106.6 | 106.6 | 113.8 | 112   | 119.2 | —    | —    | —    | —    |
|               | 50CA/CR     | 140.5 | 140.5 | 147.7 | 143.3 | 150.5 | —    | —    | —    | —    |
|               | 60CA        | 158.9 | 158.9 | 169.7 | 165.1 | 175.9 | —    | —    | —    | —    |
| RSR/<br>RSR-W | 2M          | —     | —     | —     | —     | —     | —    | —    | —    | —    |
|               | 2N          | —     | —     | —     | —     | —     | —    | —    | —    | —    |
|               | 3M          | —     | —     | —     | —     | —     | —    | —    | —    | —    |
|               | 3N          | —     | —     | —     | —     | —     | —    | —    | —    | —    |
|               | 3WM         | 14.9  | —     | —     | —     | —     | —    | —    | —    | —    |
|               | 3WN         | 19.9  | —     | —     | —     | —     | —    | —    | —    | —    |
|               | 14WVM       | 50    | —     | —     | —     | —     | —    | —    | —    | —    |

| Model No. |         | L     |       |       |       |       |      |      |      |      |
|-----------|---------|-------|-------|-------|-------|-------|------|------|------|------|
|           |         | UU    | SS    | DD    | ZZ    | KK    | SSHH | DDHH | ZZHH | KKHH |
| HR        | 918     | 45    | —     | —     | —     | —     | —    | —    | —    | —    |
|           | 1123    | 52    | —     | —     | —     | —     | —    | —    | —    | —    |
|           | 1530    | 69    | —     | —     | —     | —     | —    | —    | —    | —    |
|           | 2042    | 91.6  | —     | —     | —     | —     | —    | —    | —    | —    |
|           | 2042T   | 110.7 | —     | —     | —     | —     | —    | —    | —    | —    |
|           | 2555    | 121   | —     | —     | —     | —     | —    | —    | —    | —    |
|           | 2555T   | 146.4 | —     | —     | —     | —     | —    | —    | —    | —    |
|           | 3065    | 145   | —     | —     | —     | —     | —    | —    | —    | —    |
|           | 3065T   | 173.5 | —     | —     | —     | —     | —    | —    | —    | —    |
|           | 3575    | 154.8 | —     | —     | —     | —     | —    | —    | —    | —    |
|           | 3575T   | 182.5 | —     | —     | —     | —     | —    | —    | —    | —    |
|           | 4085    | 177.8 | —     | —     | —     | —     | —    | —    | —    | —    |
|           | 4085T   | 215.9 | —     | —     | —     | —     | —    | —    | —    | —    |
|           | 50105   | 227   | —     | —     | —     | —     | —    | —    | —    | —    |
|           | 50105T  | 274.5 | —     | —     | —     | —     | —    | —    | —    | —    |
| GSR       | 60125   | 329   | —     | —     | —     | —     | —    | —    | —    | —    |
|           | 15T     | 59.8  | 59.8  | 65*   | 65.8* | 71*   | —    | —    | —    | —    |
|           | 15V     | 47.1  | 47.1  | 52.3* | 53.1* | 58.3* | —    | —    | —    | —    |
|           | 20T     | 74    | 74    | 80.6  | 77.6  | 84.2  | —    | —    | —    | —    |
|           | 20V     | 58.1  | 58.1  | 64.7  | 61.7  | 68.3  | —    | —    | —    | —    |
|           | 25T     | 88    | 88    | 95    | 91.6  | 98.6  | —    | —    | —    | —    |
|           | 25V     | 69    | 69    | 76    | 72.6  | 79.6  | —    | —    | —    | —    |
|           | 30T     | 103   | 103   | 110.6 | 107.2 | 114.8 | —    | —    | —    | —    |
| GSR-R     | 35T     | 117   | 117   | 124.6 | 121.2 | 128.8 | —    | —    | —    | —    |
|           | 25T-R   | 88    | 88    | 95    | 91.6  | 98.6  | —    | —    | —    | —    |
|           | 25V-R   | 69    | 69    | 76    | 72.6  | 79.6  | —    | —    | —    | —    |
|           | 30T-R   | 103   | 103   | 110.6 | 107.2 | 114.8 | —    | —    | —    | —    |
| CSR       | 35T-R   | 117   | 117   | 124.6 | 121.2 | 128.8 | —    | —    | —    | —    |
|           | 15      | 56.6  | 56.6  | 61.8  | 58.2* | 63.4* | —    | —    | —    | —    |
|           | 20S     | 74    | 74    | 80.6  | 76.6  | 83.2  | —    | —    | —    | —    |
|           | 20      | 90    | 90    | 96.6  | 92.6  | 99.2  | —    | —    | —    | —    |
|           | 25S     | 83.1  | 83.1  | 90.7  | 86.7  | 94.3  | —    | —    | —    | —    |
|           | 25      | 102.2 | 102.2 | 109.8 | 105.8 | 113.4 | —    | —    | —    | —    |
|           | 30S     | 98    | 98    | 105.6 | 101.6 | 109.2 | —    | —    | —    | —    |
|           | 30      | 120.6 | 120.6 | 128.2 | 124.2 | 131.8 | —    | —    | —    | —    |
|           | 35      | 134.8 | 134.8 | 142.4 | 138.4 | 146   | —    | —    | —    | —    |
|           | 45      | 170.8 | 170.8 | 178   | 176   | 183.2 | —    | —    | —    | —    |
| MX        | 5M      | 23.3  | —     | —     | —     | —     | —    | —    | —    | —    |
|           | 7WM     | 40.8  | —     | —     | —     | —     | —    | —    | —    | —    |
| JR        | 25A/B/R | 83.1  | 83.1  | 90.7  | 89.4  | 97    | —    | —    | —    | —    |
|           | 35A/B/R | 113.6 | 113.6 | 125.6 | 122   | 134   | —    | —    | —    | —    |
|           | 45A/B/R | 145   | 145   | 159   | 150.8 | 164.8 | —    | —    | —    | —    |
|           | 55A/B/R | 165   | 165   | 175.4 | 170.4 | 180.8 | —    | —    | —    | —    |

\* Grease nipple cannot be installed.

Unit: mm

| Model No. |                    | L     |       |       |       |       |      |      |      |      |
|-----------|--------------------|-------|-------|-------|-------|-------|------|------|------|------|
|           |                    | UU    | SS    | DD    | ZZ    | KK    | SSHH | DDHH | ZZHH | KKHH |
| HCR       | 12A+60/100R        | 44.6  | —     | —     | —     | —     | —    | —    | —    | —    |
|           | 15A+60/150R        | 54.5  | 54.5  | 59.7  | —     | —     | —    | —    | —    | —    |
|           | 15A+60/300R        | 55.5  | 55.5  | 60.7  | 57.1* | 62.3* | —    | —    | —    | —    |
|           | 15A+60/400R        | 55.8  | 55.8  | 61    | 57.3* | 62.5* | —    | —    | —    | —    |
|           | 25A+60/500R        | 81.6  | 81.6  | 89.2  | 85.5  | 93.1  | —    | —    | —    | —    |
|           | 25A+60/750R        | 82.3  | 82.3  | 89.9  | 86    | 93.6  | —    | —    | —    | —    |
|           | 25A+60/1000R       | 82.5  | 82.5  | 90.1  | 86.2  | 93.8  | —    | —    | —    | —    |
|           | 35A+60/600R        | 107.2 | 107.2 | 114.8 | 111.2 | 118.8 | —    | —    | —    | —    |
|           | 35A+60/800R        | 107.5 | 107.5 | 115.1 | 111.5 | 119.1 | —    | —    | —    | —    |
|           | 35A+60/1000R       | 108.2 | 108.2 | 115.8 | 112   | 119.6 | —    | —    | —    | —    |
|           | 35A+60/1300R       | 108.5 | 108.5 | 116.1 | 112.3 | 119.8 | —    | —    | —    | —    |
|           | 45A+60/800R        | 136.7 | 136.7 | 143.9 | 142.1 | 149.2 | —    | —    | —    | —    |
|           | 45A+60/1000R       | 137.3 | 137.3 | 144.5 | 142.7 | 149.9 | —    | —    | —    | —    |
|           | 45A+60/1200R       | 137.3 | 137.3 | 144.5 | 142.7 | 149.9 | —    | —    | —    | —    |
|           | 45A+60/1600R       | 138   | 138   | 145.2 | 143.3 | 150.5 | —    | —    | —    | —    |
|           | 65A+60/1000R       | 193.8 | 193.8 | 201   | 199.4 | 206.6 | —    | —    | —    | —    |
|           | 65A+60/1500R       | 195.4 | 195.4 | 202.6 | 200.8 | 208   | —    | —    | —    | —    |
|           | 65A+45/2000R       | 195.9 | 195.9 | 203.1 | 201.3 | 208.5 | —    | —    | —    | —    |
|           | 65A+45/2500R       | 196.5 | 196.5 | 203.7 | 201.8 | 209   | —    | —    | —    | —    |
|           | 65A+30/3000R       | 196.5 | 196.5 | 203.7 | 201.8 | 209   | —    | —    | —    | —    |
| HMG       | 15A                | 48    | —     | —     | —     | —     | —    | —    | —    | —    |
|           | 25A                | 62.2  | —     | —     | —     | —     | —    | —    | —    | —    |
|           | 35A                | 80.6  | —     | —     | —     | —     | —    | —    | —    | —    |
|           | 45A                | 107.6 | —     | —     | —     | —     | —    | —    | —    | —    |
|           | 65A                | 144.4 | —     | —     | —     | —     | —    | —    | —    | —    |
| NSR-TBC   | 20TBC              | 67    | —     | —     | —     | —     | —    | —    | —    | —    |
|           | 25TBC              | 78    | —     | —     | —     | —     | —    | —    | —    | —    |
|           | 30TBC              | 90    | —     | —     | —     | —     | —    | —    | —    | —    |
|           | 40TBC              | 110   | 110   | —     | —     | —     | —    | —    | —    | —    |
|           | 50TBC              | 123   | 123   | —     | —     | —     | —    | —    | —    | —    |
|           | 70TBC              | 150   | 150   | —     | —     | —     | —    | —    | —    | —    |
| HSR-M1    | 15M1A/M1B/M1R/M1YR | 59.6  | 59.6  | —     | —     | —     | —    | —    | —    | —    |
|           | 20M1A/M1B/M1R/M1YR | 76    | 76    | —     | —     | —     | —    | —    | —    | —    |
|           | 20M1LA/M1LB/M1LR   | 92    | 92    | —     | —     | —     | —    | —    | —    | —    |
|           | 25M1A/M1B/M1R/M1YR | 83.9  | 83.9  | —     | —     | —     | —    | —    | —    | —    |
|           | 25M1LA/M1LB/M1LR   | 103   | 103   | —     | —     | —     | —    | —    | —    | —    |
|           | 30M1A/M1B/M1R/M1YR | 98.8  | 98.8  | —     | —     | —     | —    | —    | —    | —    |
|           | 30M1LA/M1LB/M1LR   | 121.4 | 121.4 | —     | —     | —     | —    | —    | —    | —    |
|           | 35M1A/M1B/M1R/M1YR | 112   | 112   | —     | —     | —     | —    | —    | —    | —    |
|           | 35M1LA/M1LB/M1LR   | 137.4 | 137.4 | —     | —     | —     | —    | —    | —    | —    |
| SR-M1     | 15M1W/M1TB         | 57    | 57    | —     | —     | —     | —    | —    | —    | —    |
|           | 15M1V/M1SB         | 40.4  | 40.4  | —     | —     | —     | —    | —    | —    | —    |
|           | 20M1W/M1TB         | 66.2  | 66.2  | —     | —     | —     | —    | —    | —    | —    |
|           | 20M1V/M1SB         | 47.3  | 47.3  | —     | —     | —     | —    | —    | —    | —    |
|           | 25M1W/M1TB         | 83    | 83    | —     | —     | —     | —    | —    | —    | —    |
|           | 25M1V/M1SB         | 59.2  | 59.2  | —     | —     | —     | —    | —    | —    | —    |

\* Grease nipple cannot be installed.

| Model No. |            | L     |       |       |       |       |       |       |       |       |
|-----------|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|           |            | UU    | SS    | DD    | ZZ    | KK    | SSHH  | DDHH  | ZZHH  | KKHH  |
| SR-M1     | 30M1W/M1TB | 96.8  | 96.8  | —     | —     | —     | —     | —     | —     | —     |
|           | 30M1V/M1SB | 67.9  | 67.9  | —     | —     | —     | —     | —     | —     | —     |
|           | 35M1W/M1TB | 111   | 111   | —     | —     | —     | —     | —     | —     | —     |
|           | 35M1V/M1SB | 77.6  | 77.6  | —     | —     | —     | —     | —     | —     | —     |
| RSR-M1    | 9M1K       | 30.8  | —     | —     | —     | —     | —     | —     | —     | —     |
|           | 9M1N       | 41    | —     | —     | —     | —     | —     | —     | —     | —     |
|           | 9M1WV      | 39    | —     | —     | —     | —     | —     | —     | —     | —     |
|           | 9M1WN      | 50.7  | —     | —     | —     | —     | —     | —     | —     | —     |
|           | 12M1V      | 35    | —     | —     | —     | —     | —     | —     | —     | —     |
|           | 12M1N      | 47.7  | —     | —     | —     | —     | —     | —     | —     | —     |
|           | 12M1WV     | 44.5  | —     | —     | —     | —     | —     | —     | —     | —     |
|           | 12M1WN     | 59.5  | —     | —     | —     | —     | —     | —     | —     | —     |
|           | 15M1V      | 43    | —     | —     | —     | —     | —     | —     | —     | —     |
|           | 15M1N      | 61    | —     | —     | —     | —     | —     | —     | —     | —     |
|           | 15M1WV     | 55.5  | —     | —     | —     | —     | —     | —     | —     | —     |
|           | 15M1WN     | 74.5  | —     | —     | —     | —     | —     | —     | —     | —     |
| HSR-M2    | 20M1V      | 66.5  | —     | —     | —     | —     | —     | —     | —     | —     |
|           | 20M1N      | 86.3  | —     | —     | —     | —     | —     | —     | —     | —     |
|           | 15M2A      | 56.6  | 56.6  | —     | —     | —     | —     | —     | —     | —     |
|           | 20M2A      | 74    | 74    | —     | —     | —     | —     | —     | —     | —     |
|           | 25M2A      | 83.1  | 83.1  | —     | —     | —     | —     | —     | —     | —     |
| SRN       | 35C/R      | 125   | 125   | 132.8 | 131.4 | 139.2 | 148.6 | 156.4 | 151   | 158.8 |
|           | 35LC/LR    | 155   | 155   | 162.8 | 161.4 | 169.2 | 178.6 | 186.4 | 181   | 188.8 |
|           | 35SLC/SLR  | 180.8 | 180.8 | 188.6 | 186.5 | 194.3 | 204.4 | 212.2 | 206.8 | 214.6 |
|           | 45C/R      | 155   | 155   | 164.2 | 162.2 | 171.4 | 182   | 191.2 | 185.2 | 194.4 |
|           | 45LC/LR    | 190   | 190   | 199.2 | 197.2 | 206.4 | 217   | 226.2 | 220.2 | 229.4 |
|           | 45SLC/SLR  | 231.5 | 231.5 | 240.7 | 238   | 247.2 | 258.5 | 267.7 | 261.7 | 270.9 |
|           | 55C/R      | 185   | 185   | 194.2 | 192.2 | 201.4 | 212   | 221.2 | 215.2 | 224.4 |
|           | 55LC/LR    | 235   | 235   | 244.2 | 242.2 | 251.4 | 262   | 271.2 | 265.2 | 274.4 |
|           | 55SLC/SLR  | 292   | 292   | 301.2 | 298.5 | 307.7 | 319   | 328.2 | 322.2 | 331.4 |
|           | 65C/R      | 244.9 | 244.9 | 256.1 | 252.5 | 263.7 | 277.3 | 288.5 | 280.5 | 291.7 |
|           | 65LC/LR    | 303   | 303   | 314.2 | 311.4 | 322.6 | 335.4 | 346.6 | 338.6 | 349.8 |
|           | 65SLC/SLR  | 380   | 380   | 391.2 | 387.6 | 398.8 | 412.4 | 423.6 | 415.6 | 426.8 |
| SRW       | 70LR       | 190   | 190   | 199.2 | 197.2 | 206.4 | 217   | 226.2 | 220.2 | 229.4 |
|           | 85LR       | 235   | 235   | 244.2 | 242.2 | 251.4 | 262   | 271.2 | 265.2 | 274.4 |
|           | 100LR      | 303   | 303   | 314.2 | 311.4 | 322.6 | 335.4 | 346.6 | 338.6 | 349.8 |
|           | 130LR      | 350   | 350   | 361.2 | 361   | 372.2 | —     | —     | —     | —     |
|           | 150LR      | 395   | 395   | 406.2 | 411   | 422.2 | —     | —     | —     | —     |

Unit: mm

| Model No.                     |                 | L     |       |       |       |       |        |        |        |        |        |        |
|-------------------------------|-----------------|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------|--------|
|                               |                 | UU    | SS    | DD    | ZZ    | KK    | SSHH   | DDHH   | ZZHH   | KKHH   | JJHH   | TTHH   |
| SVR/<br>SVS<br>NR-X/<br>NRS-X | 25R/C           | 82.8  | 82.8  | 88    | 89.2  | 94.4  | 96.8*  | 102.0* | —      | —      | 102.5* | 107.7* |
|                               | 25LR/LC         | 102   | 102   | 107.2 | 108.4 | 113.6 | 116.0* | 121.2* | —      | —      | 121.7* | 126.9* |
|                               | 30R/C           | 98    | 98    | 104.6 | 104.4 | 111   | 115.2* | 121.8* | —      | —      | 120.9* | 127.5* |
|                               | 30LR/LC         | 120.5 | 120.5 | 127.1 | 126.9 | 133.5 | 137.7* | 144.3* | —      | —      | 143.4* | 150.0* |
|                               | 35R/C/RH/CH     | 109.5 | 109.5 | 116.5 | 117.1 | 124.1 | 126.7* | 133.7* | —      | —      | 133.5* | 140.5* |
|                               | 35LR/LC/LRH/LCH | 135   | 135   | 142   | 142.6 | 149.6 | 152.2* | 159.2* | —      | —      | 159.0* | 166.0* |
|                               | 45R/C/RH/CH     | 138.2 | 138.2 | 145.2 | 146.6 | 153.6 | 158.2* | 165.2* | —      | —      | 165.8* | 172.8* |
|                               | 45LR/LC/LRH/LCH | 171   | 171   | 178   | 179.4 | 186.4 | 191.0* | 198.0* | —      | —      | 198.6* | 205.6* |
|                               | 55R/C/RH/CH     | 163.3 | 163.3 | 168.4 | 169.8 | 176.8 | 182.4* | 189.4* | —      | —      | 191.1* | 198.1* |
|                               | 55LR/LC/LRH/LCH | 200.5 | 200.5 | 205.6 | 207   | 214   | 219.6* | 226.6* | —      | —      | 228.3* | 235.3* |
| SRG                           | 65R/C           | 186   | 186   | 191.8 | 194.2 | 201.6 | 208.8* | 216.2* | —      | —      | 217.5* | 224.9* |
|                               | 65LR/LC         | 246   | 246   | 251.8 | 254.2 | 261.6 | 268.8* | 276.2* | —      | —      | 277.5* | 284.9* |
|                               | 15A/V           | 69.2  | 69.2  | 71.2  | —     | —     | —      | —      | —      | —      | —      | —      |
|                               | 20A/V           | 86.2  | 86.2  | 88.2  | 89.6  | 91.6  | 105.2* | 107.2* | 107.6* | 109.6* | —      | —      |
|                               | 20LA/LV         | 106.2 | 106.2 | 108.2 | 109.6 | 111.6 | 125.2* | 127.2* | 127.6* | 129.6* | —      | —      |
|                               | 25C/R           | 95.5  | 95.5  | 100.5 | 100.5 | 105.5 | 115.3* | 120.3* | 117.7* | 122.7* | —      | —      |
|                               | 25LC/LR         | 115.1 | 115.1 | 120.1 | 120.1 | 125.1 | 134.9* | 139.9* | 137.3* | 142.3* | —      | —      |
|                               | 30C/R           | 111   | 111   | 118   | 116   | 123   | 130.8* | 137.8* | 133.2* | 140.2* | —      | —      |
|                               | 30LC/LR         | 135   | 135   | 142   | 140   | 147   | 154.8* | 161.8* | 157.2* | 164.2* | —      | —      |
|                               | 35C/R           | 125   | 125   | 132.8 | 130.7 | 138.5 | 142.6* | 150.4* | 151*   | 158.8* | 150.8* | 158.6* |
|                               | 35LC/LR         | 155   | 155   | 162.8 | 160.7 | 168.5 | 172.6* | 180.4* | 181*   | 188.8* | 180.8* | 188.6* |
|                               | 35SLC/SLR       | 180.8 | 180.8 | 188.6 | 186.5 | 194.3 | 198.4* | 206.2* | 206.8* | 214.6* | 206.6* | 214.4* |
|                               | 45C/R           | 155   | 155   | 164.2 | 161.5 | 170.7 | 175.6* | 184.8* | 184.8* | 194*   | 184.6* | 193.8* |
|                               | 45LC/LR         | 190   | 190   | 199.2 | 196.5 | 205.7 | 210.6* | 219.8* | 219.8* | 229*   | 219.6* | 228.8* |
|                               | 45SLC/SLR       | 231.5 | 231.5 | 240.7 | 238   | 247.2 | 252.1* | 261.3* | 261.3* | 270.5* | 261.1* | 270.3* |
|                               | 55C/R           | 185   | 185   | 194.2 | 191.5 | 200.7 | 205.6* | 214.8* | 214.8* | 224*   | 214.6* | 223.8* |
|                               | 55LC/LR         | 235   | 235   | 244.2 | 241.5 | 250.7 | 255.6* | 264.8* | 264.8* | 274*   | 264.6* | 273.8* |
|                               | 55SLC/SLR       | 292   | 292   | 301.2 | 298.5 | 307.7 | 312.6* | 321.8* | 321.8* | 331*   | 321.6* | 330.8* |
|                               | 65C/V           | 244.9 | 244.9 | 256.1 | 252.5 | 263.7 | 268.9* | 280.1* | 280.1* | 291.3* | 279.9* | 291.1* |
|                               | 65LC/LV         | 303   | 303   | 314.2 | 310.6 | 321.8 | 327*   | 338.2* | 338.2* | 349.4* | 338*   | 349.2* |
|                               | 65SLC/SLV       | 380   | 380   | 391.2 | 387.6 | 398.8 | 404*   | 415.2* | 415.2* | 426.4* | 415*   | 426.2* |
|                               | 85LC            | 350   | 350   | 361.2 | 361   | 372.2 | —      | —      | —      | —      | —      | —      |
|                               | 100LC           | 395   | 395   | 406.2 | 411   | 422.2 | —      | —      | —      | —      | —      | —      |

\* The overall LM block length (L) of YY type (with side scraper) is also the same.

Note1) The standard overall length may include the dimension of the end seal depending on the model. If you are considering using a type without an end seal, contact THK for details.

Note2) It is recommended to use a protector with models SVR/SVS, NR/NRS-X, and SRG. Please contact THK regarding the dimensions for ZZHH and KKHH. See **A1-516** for details regarding the codes for the various options.

### Model number coding

**SHS25 LC 2 QZ KKHH C0 +1200L P Z T -II**

Model  
number

Type of  
LM block

With QZ  
Lubricator (\*1)

No. of LM blocks  
used on the same  
rail

Contamination  
protection  
accessory  
symbol (\*2)

LM rail length  
(in mm)

Radial clearance  
symbol (\*3)  
Normal (No symbol)  
Light preload (C1)  
Medium preload (C0)

With  
steel  
tape

Symbol  
for LM rail  
jointed use

Symbol for No.  
of rails used on  
the same plane (\*5)

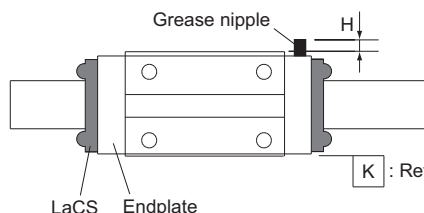
Accuracy symbol (\*4)  
Normal grade (No Symbol)  
High accuracy grade (H)  
Precision grade (P)/Super precision grade (SP)  
Ultra precision grade (UP)

(\*1) See **A1-509**. (\*2) See **A1-516**. (\*3) See **A1-71**. (\*4) See **A1-76**. (\*5) See **A1-13**.

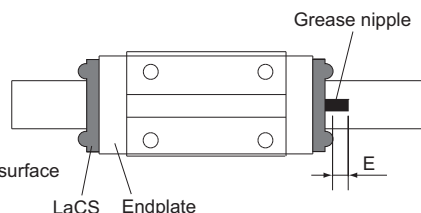
Note) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.)

Those models equipped with QZ Lubricator cannot have a grease nipple.

## Incremental Dimension with Grease Nipple (When LaCS is Attached)



Grease nipple mounting location  
for models SHS, SSR, SVR/SVS, SRG and NR/NRS-X



Grease nipple mounting location  
for models SHW, SRS and HSR

Unit: mm

| Model No.                  |               | Incremental dimension with grease nipple<br>H | Nipple type |
|----------------------------|---------------|-----------------------------------------------|-------------|
| SHS                        | 15C/LC        | —                                             | PB107       |
|                            | 15R/V/LV      | 4.7                                           | PB107       |
|                            | 20C/LC        | —                                             | PB107       |
|                            | 20V/LV        | 4.5                                           | PB107       |
|                            | 25C/LC        | —                                             | PB107       |
|                            | 25R/LR/V/LV   | 4.7                                           | PB107       |
|                            | 30C/LC        | —                                             | A-M6F       |
|                            | 30R/LR/V/LV   | 7.4                                           | A-M6F       |
|                            | 35C/LC        | —                                             | A-M6F       |
|                            | 35R/LR/V/LV   | 7.4                                           | A-M6F       |
|                            | 45C/LC        | —                                             | A-M6F       |
|                            | 45R/LR/V/LV   | 7.7                                           | A-M6F       |
|                            | 55C/LC        | —                                             | A-M6F       |
|                            | 55R/LR/V/LV   | 7.4                                           | A-M6F       |
|                            | 65C/LC        | —                                             | A-M6F       |
|                            | 65V/LV        | 6.9                                           | A-M6F       |
| SSR                        | 15XVY/XWY     | 4.4                                           | PB107       |
|                            | 15XTBY/XSBY   | —                                             | PB107       |
|                            | 20XV/XW       | 4.6                                           | PB107       |
|                            | 20XTB/XSB     | —                                             | PB107       |
|                            | 25XVY/XWY     | 4.5                                           | PB107       |
|                            | 25XTBY/XSBY   | —                                             | PB107       |
|                            | 30XV/XW       | 5                                             | PB1021B     |
|                            | 30XTB/XSB     | —                                             | PB1021B     |
|                            | 35XV/XW       | 5                                             | PB1021B     |
|                            | 35XTB/XSB     | —                                             | PB1021B     |
| SVR/SVS<br>NR-X/<br>NRS-X* | 25R/LR        | 5.5                                           | PB1021B     |
|                            | 30R/LR        | 5.5                                           | PB1021B     |
|                            | 35R/LR/RH/LRH | 9                                             | A-M6F       |
|                            | 45R/LR/RH/LRH | 9                                             | A-M6F       |
|                            | 55R/LR/RH/LRH | 9                                             | A-M6F       |
|                            | 65R/LR        | 12                                            | A-PT1/8     |

Unit: mm

| Model No. |      | Incremental dimension with grease nipple<br>H | Nipple type |
|-----------|------|-----------------------------------------------|-------------|
| SRG       | 35LC | —                                             | A-M6F       |
|           | 35LR | 7.2                                           | A-M6F       |
|           | 45LC | —                                             | A-M6F       |
|           | 45LR | 7.2                                           | A-M6F       |
|           | 55LC | —                                             | A-M6F       |
|           | 55LR | 7.2                                           | A-M6F       |
|           | 65LC | —                                             | A-M6F       |
|           | 65LR | 6.2                                           | A-M6F       |

\* The incremental dimension of the grease nipple when the side scraper and the protector are attached (SVR/SVS and SRG only) is also the same.

Unit: mm

| Model No. |                  | Incremental dimension with grease nipple<br>E | Nipple type |
|-----------|------------------|-----------------------------------------------|-------------|
| SHW       | 21CA/CR          | 4.2                                           | PB1021B     |
|           | 27CA/CR          | 10.7                                          | B-M6F       |
|           | 35CA/CR          | 10                                            | B-M6F       |
|           | 50CA/CR          | 21                                            | B-PT1/8     |
| SRS       | 25               | 4                                             | PB1021B     |
| HSR       | 15A/B/R/YR       | 2.9                                           | PB1021B     |
|           | 15LC/LR          | 2.9                                           | PB1021B     |
|           | 20A/B/R/CA/CB/YR | 9.4                                           | B-M6F       |
|           | 20LA/LB/LR/HA/HB | 9.4                                           | B-M6F       |
|           | 25A/B/R/CA/CB/YR | 9                                             | B-M6F       |
|           | 25LA/LB/LR/HA/HB | 9                                             | B-M6F       |
|           | 30A/B/R/CA/CB/YR | 9                                             | B-M6F       |
|           | 30LA/LB/LR/HA/HB | 9                                             | B-M6F       |
|           | 35A/B/R/CA/CB/YR | 8                                             | B-M6F       |
|           | 35LA/LB/LR/HA/HB | 8                                             | B-M6F       |

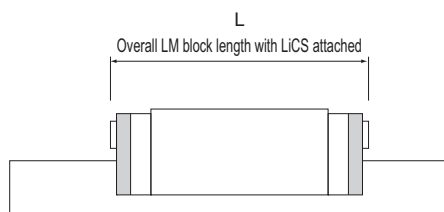
Note1) When desiring the mounting location for the grease nipple other than the above, contact THK.

Note2) Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring both QZ Lubricator and a grease nipple, contact THK.

Note3) When desiring a grease nipple for model SHW or SRS without QZ Lubricator, indicate "with grease nipple" when placing an order. (If not, a grease nipple will not be attached.)

Note4) Model HSR15 attached with ZZ or KK cannot have a grease nipple. Contact THK for details.

## LM Block Dimension (Dimension L) with LiCS Attached



Unit: mm

| Model No. |            | L     |       |
|-----------|------------|-------|-------|
|           |            | GG    | PP    |
| SSR       | 15XVY/XSBY | 48.7  | 48.7  |
|           | 15XWY/XTBY | 65.3  | 65.3  |
|           | 20XV/XSB   | 55.8  | 55.8  |
|           | 20XW/XTB   | 74.6  | 74.6  |
|           | 25XVY/XSBY | 67.6  | 67.6  |
|           | 25XWY/XTBY | 90.6  | 90.6  |
|           | 30XV/XSB   | 76.4  | 76.4  |
|           | 30XW/XTB   | 106.7 | 106.7 |
|           | 35XV/XSB   | 88.3  | 88.3  |
|           | 35XW/XTB   | 121.7 | 121.7 |
| SRG       | 15A        | 77    | 77    |
|           | 15V        | 77    | 77    |

### Model number coding

**SSR20 XW 2 GG C1 +600L P T -II**

Model  
number

Type of  
LM block

No. of LM blocks  
used on the same rail

With LiCS  
(\*1)

LM rail length  
(in mm)

Radial clearance  
symbol (\*2)  
Normal (No symbol)  
Light preload (C1)  
Medium preload (C0)

Symbol  
for LM rail  
jointed use

Accuracy symbol (\*3)  
Normal grade (No Symbol)/High accuracy grade (H)  
Precision grade (P) /Super precision grade (SP)  
Ultra precision grade (UP)

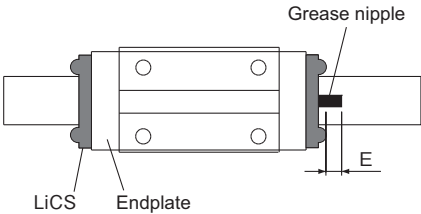
Symbol for No. of rails used on  
the same plane (\*4)

(\*1) See **A1-489** (\*2) See **A1-71** (\*3) See **A1-76** (\*4) See **A1-13**

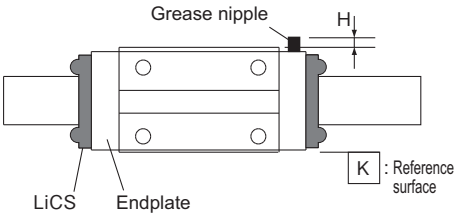
Note) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.)

Those models equipped with QZ Lubricator cannot have a grease nipple.

# Incremental Dimension with Grease Nipple (When LiCS is Attached)



Model SSR  
Location for mounting the grease nipple



Model SRG  
Location for mounting the grease nipple

Unit: mm

| Model No. |            | Incremental dimension with grease nipple |     | Nipple type |
|-----------|------------|------------------------------------------|-----|-------------|
|           |            | E                                        | H   |             |
| SSR       | 15XVY      | 2.9                                      | —   | PB1021B     |
|           | 15XWY/XUBY | 2.9                                      | —   | PB1021B     |
|           | 20XV       | 9                                        | —   | B-M6F       |
|           | 20XW/XUB   | 9                                        | —   | B-M6F       |
|           | 25XVY      | 9                                        | —   | B-M6F       |
|           | 25XWY/XUBY | 9                                        | —   | B-M6F       |
|           | 30XV/XW    | 9                                        | —   | B-M6F       |
|           | 30XUB/XSB  | 9                                        | —   | B-M6F       |
| SRG       | 35XV/XW    | 8                                        | —   | B-M6F       |
|           | 35XUB/XSB  | 8                                        | —   | B-M6F       |
|           | 15A        | —                                        | —*  | PB107       |
|           | 15V        | —                                        | 4.5 | PB107       |

\* Because this model features a range, it projects beyond the block end surface.

## Model number coding

**SSR20 XW 2 GG C1 +600L H -II**

Model  
number

Type of  
LM block

No. of LM blocks  
used on the same rail

With LiCS  
(\*1)

LM rail length  
(in mm)

Radial clearance  
symbol (\*2)  
Normal (No symbol)  
Light preload (C1)  
Medium preload (C0)

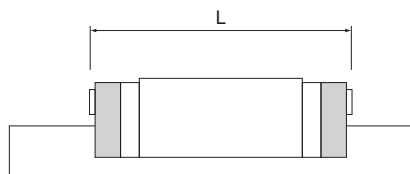
Symbol for No. of rails  
used on the same plane (\*4)

Accuracy symbol (\*3)  
Normal grade (No Symbol)  
High accuracy grade (H)/Precision grade (P)  
Super precision grade (SP)/Ultra precision grade (UP)

(\*1) See A1-489 (\*2) See A1-71 (\*3) See A1-76 (\*4) SeeA1-13

Note) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.)  
Those models equipped with QZ Lubricator cannot have a grease nipple.

## Overall block length with Fluorine seals and other accessories attached



Unit: mm

| Model No. |           | L              |                         |                                 |                                          |                             |                                      |
|-----------|-----------|----------------|-------------------------|---------------------------------|------------------------------------------|-----------------------------|--------------------------------------|
|           |           | F2             | F4                      | FZ2                             | FZ4                                      | FJ2                         | FJ4                                  |
|           |           | Fluorine seals | Fluorine seals (double) | Fluorine seals + metal scrapers | Fluorine seals (double) + metal scrapers | Fluorine seals + protectors | Fluorine seals (double) + protectors |
| SRG       | 35C/R     | 129            | 140.8                   | 137.4                           | 149.2                                    | 137.4                       | 149.2                                |
|           | 35LC/LR   | 159            | 170.8                   | 167.4                           | 179.2                                    | 167.4                       | 179.2                                |
|           | 35SLC/SLR | 184.8          | 196.6                   | 193.2                           | 205                                      | 193.2                       | 205                                  |
|           | 45C/R     | 159            | 172.2                   | 168.2                           | 181.4                                    | 168                         | 181.2                                |
|           | 45LC/LR   | 194            | 207.2                   | 203.2                           | 216.4                                    | 203                         | 216.2                                |
|           | 45SLC/SLR | 235.5          | 248.7                   | 244.7                           | 257.9                                    | 244.5                       | 257.7                                |
|           | 55C/R     | 189            | 202.2                   | 198.2                           | 211.4                                    | 198                         | 211.2                                |
|           | 55LC/LR   | 239            | 252.2                   | 248.2                           | 261.4                                    | 248                         | 261.2                                |
|           | 55SLC/SLR | 296            | 309.2                   | 305.2                           | 318.4                                    | 305                         | 318.2                                |
|           | 65C/V     | 249.3          | 264.9                   | 260.5                           | 276.1                                    | 260.3                       | 275.9                                |
|           | 65LC/LV   | 307.4          | 323                     | 318.6                           | 334.2                                    | 318.4                       | 334                                  |
|           | 65SLC/SLV | 384.4          | 400                     | 395.6                           | 411.2                                    | 395.4                       | 411                                  |

| Model No. |           | L                   |                              |                                      |                                               |                                  |                                           |
|-----------|-----------|---------------------|------------------------------|--------------------------------------|-----------------------------------------------|----------------------------------|-------------------------------------------|
|           |           | QZF2                | QZF4                         | QZFZ2                                | QZFZ4                                         | QZFJ2                            | QZFJ4                                     |
|           |           | QZ + Fluorine seals | QZ + Fluorine seals (double) | QZ + Fluorine seals + metal scrapers | QZ + Fluorine seals (double) + metal scrapers | QZ + Fluorine seals + protectors | QZ + Fluorine seals (double) + protectors |
| SRG       | 35C/R     | 159                 | 170.8                        | 167.4                                | 179.2                                         | 167.4                            | 179.2                                     |
|           | 35LC/LR   | 189                 | 200.8                        | 197.4                                | 209.2                                         | 197.4                            | 209.2                                     |
|           | 35SLC/SLR | 214.8               | 226.6                        | 223.2                                | 235                                           | 223.2                            | 235                                       |
|           | 45C/R     | 189                 | 202.2                        | 198.2                                | 211.4                                         | 198                              | 211.2                                     |
|           | 45LC/LR   | 224                 | 237.2                        | 233.2                                | 246.4                                         | 233                              | 246.2                                     |
|           | 45SLC/SLR | 265.5               | 278.7                        | 274.7                                | 287.9                                         | 274.5                            | 287.7                                     |
|           | 55C/R     | 229                 | 242.2                        | 238.2                                | 251.4                                         | 238                              | 251.2                                     |
|           | 55LC/LR   | 279                 | 292.2                        | 288.2                                | 301.4                                         | 288                              | 301.2                                     |
|           | 55SLC/SLR | 336                 | 349.2                        | 345.2                                | 358.4                                         | 345                              | 358.2                                     |
|           | 65C/V     | 289.3               | 304.9                        | 300.5                                | 316.1                                         | 300.3                            | 315.9                                     |
|           | 65LC/LV   | 347.4               | 363                          | 358.6                                | 374.2                                         | 358.4                            | 374                                       |
|           | 65SLC/SLV | 424.4               | 440                          | 435.6                                | 451.2                                         | 435.4                            | 451                                       |

# Maximum Seal Resistance

This shows the maximum resistance value of the seals per LM block with a lubricant applied.

| Unit: N   |         |             |                         | Unit: N   |         |             |                         |
|-----------|---------|-------------|-------------------------|-----------|---------|-------------|-------------------------|
| Model No. |         | Seal symbol | Maximum Seal Resistance | Model No. |         | Seal symbol | Maximum Seal Resistance |
| SHS       | 15      | SS          | 4.5                     | SRS       | 5M/5N   | UU          | 0.06                    |
|           | 20      |             | 7.0                     |           | 5WM/5WN |             | 0.08                    |
|           | 25      |             | 10.5                    |           | 7S      | SS          | 0.14                    |
|           | 30      |             | 17.0                    |           | 7M      |             | 0.16                    |
|           | 35      |             | 20.5                    |           | 7N      |             | 0.19                    |
|           | 45      |             | 30.0                    |           | 7WS     |             | 0.48                    |
|           | 55      |             | 31.5                    |           | 7WM     |             | 0.52                    |
|           | 65      |             | 43.0                    |           | 7WN     |             | 0.55                    |
| SSR       | 15X     | UU          | 2.0                     |           | 9XS     |             | 0.15                    |
|           | 20X     |             | 2.6                     |           | 9XM     |             | 0.2                     |
|           | 25X     |             | 3.5                     |           | 9XN     |             | 0.25                    |
|           | 30X     |             | 4.9                     |           | 9WS     |             | 0.89                    |
|           | 35X     |             | 6.3                     |           | 9WM     |             | 0.95                    |
| SVR/SVS   | 25      | SS          | 10                      |           | 9WN     |             | 1                       |
|           | 30      |             | 14                      |           | 12S     |             | 0.49                    |
|           | 35      |             | 18                      |           | 12M     |             | 0.55                    |
|           | 45      |             | 22                      |           | 12N     |             | 0.6                     |
|           | 55      |             | 26                      |           | 12WS    |             | 1.21                    |
|           | 65      |             | 31                      |           | 12WM    |             | 1.3                     |
| SHW       | 12CA/CR | UU          | 1.0                     |           | 12WN    |             | 1.35                    |
|           | 12HR    |             | 1.0                     |           | 15S     |             | 0.92                    |
|           | 14      |             | 1.2                     | SCR       | 15M     | UU          | 1                       |
|           | 17      |             | 1.4                     |           | 15N     |             | 1.1                     |
|           | 21      |             | 4.9                     |           | 15WS    |             | 1.45                    |
|           | 27      |             | 4.9                     |           | 15WM    |             | 1.55                    |
|           | 35      |             | 9.8                     |           | 15WN    |             | 1.6                     |
|           | 50      |             | 14.7                    |           | 20M     |             | 1.25                    |
|           | 12CA/CR | SS          | 1.4                     |           | 25M     |             | 1.6                     |
|           | 12HR    |             | 1.8                     |           | 15      |             | 2.5                     |
|           | 14      |             | 1.8                     |           | 20      |             | 3                       |
|           | 17      |             | 2.2                     |           | 25      |             | 5                       |
|           | 21      |             | 6.9                     |           | 30      |             | 10                      |
|           | 27      |             | 8.9                     |           | 35      |             | 12                      |
|           | 35      |             | 15.8                    |           | 45      |             | 20                      |
|           | 50      |             | 22.7                    |           | 65      |             | 30                      |

Dimensions of Each Model with an Option Attached

Unit: N

Unit: N

| Model No. |     | Seal symbol | Maximum Seal Resistance |
|-----------|-----|-------------|-------------------------|
| HSR       | 8   | UU          | 0.5                     |
|           | 10  |             | 0.8                     |
|           | 12  |             | 1.2                     |
|           | 15  |             | 2.0                     |
|           | 20  |             | 2.5                     |
|           | 25  |             | 3.9                     |
|           | 30  |             | 7.8                     |
|           | 35  |             | 11.8                    |
|           | 45  |             | 19.6                    |
|           | 55  |             | 19.6                    |
|           | 65  |             | 34.3                    |
|           | 85  |             | 34.3                    |
| SR        | 15  | UU          | 2.5                     |
|           | 20  |             | 3.4                     |
|           | 25  |             | 4.4                     |
|           | 30  |             | 8.8                     |
|           | 35  |             | 11.8                    |
|           | 45  |             | 12.7                    |
|           | 55  |             | 15.7                    |
|           | 70  |             | 19.6                    |
| NR/NRS-X  | 25  | SS          | 10                      |
|           | 30  |             | 14                      |
|           | 35  |             | 18                      |
|           | 45  |             | 22                      |
|           | 55  |             | 26                      |
|           | 65  |             | 31                      |
| NR/NRS    | 75  | UU          | 42                      |
|           | 85  |             | 42                      |
|           | 100 |             | 51                      |
| HRW       | 12  | UU          | 0.2                     |
|           | 14  |             | 0.3                     |
|           | 17  |             | 2.9                     |
|           | 21  |             | 4.9                     |
|           | 27  |             | 4.9                     |
|           | 35  |             | 9.8                     |
|           | 50  |             | 14.7                    |
|           | 60  |             | 19.6                    |

| Model No. |       | Seal symbol | Maximum Seal Resistance |
|-----------|-------|-------------|-------------------------|
| RSR       | 14W   | UU          | 1.2                     |
| HR        | 918   | UU          | 0.5                     |
|           | 1123  |             | 0.7                     |
|           | 1530  |             | 1.0                     |
|           | 2042  |             | 2.0                     |
|           | 2555  |             | 2.9                     |
|           | 3065  |             | 3.4                     |
|           | 3575  |             | 3.9                     |
|           | 4085  |             | 4.4                     |
|           | 50105 |             | 5.9                     |
|           | 60125 |             | 9.8                     |
| GSR       | 15    | UU          | 2.5                     |
|           | 20    |             | 3.1                     |
|           | 25    |             | 4.4                     |
|           | 30    |             | 6.3                     |
|           | 35    |             | 7.6                     |
|           | 25-R  |             | 4.4                     |
|           | 30-R  |             | 6.3                     |
| CSR       | 35-R  |             | 7.6                     |
|           | 15    | UU          | 2.0                     |
|           | 20    |             | 2.5                     |
|           | 25    |             | 3.9                     |
|           | 30    |             | 7.8                     |
|           | 35    |             | 11.8                    |
| MX        | 45    |             | 19.6                    |
|           | 5     | UU          | 0.06                    |
|           | 7W    |             | 0.4                     |
| JR        | 25    | UU          | 3.9                     |
|           | 35    |             | 11.8                    |
|           | 45    |             | 19.6                    |
|           | 55    |             | 19.6                    |
| HCR       | 12    | UU          | 1.2                     |
|           | 15    |             | 2.0                     |
|           | 25    |             | 3.9                     |
|           | 35    |             | 11.8                    |
|           | 45    |             | 19.6                    |
|           | 65    |             | 34.3                    |

Unit: N

| Model No. |       | Seal symbol | Maximum Seal Resistance |
|-----------|-------|-------------|-------------------------|
| HMG       | 15    | UU          | 3                       |
|           | 25    |             | 6                       |
|           | 35    |             | 8                       |
|           | 45    |             | 12                      |
|           | 65    |             | 40                      |
| NSR       | 20TBC | UU          | 4.9                     |
|           | 25TBC |             | 4.9                     |
|           | 30TBC |             | 6.9                     |
|           | 40TBC |             | 9.8                     |
|           | 50TBC |             | 14.7                    |
|           | 70TBC |             | 24.5                    |
| HSR       | 15M1  | UU          | 2.0                     |
|           | 20M1  |             | 2.5                     |
|           | 25M1  |             | 3.9                     |
|           | 30M1  |             | 7.8                     |
|           | 35M1  |             | 11.8                    |
|           |       |             |                         |
| SR        | 15M1  | UU          | 2.5                     |
|           | 20M1  |             | 3.4                     |
|           | 25M1  |             | 4.4                     |
|           | 30M1  |             | 8.8                     |
|           | 35M1  |             | 11.8                    |
| RSX       | 7     | UU          | 0.08                    |
|           | 7W    |             | 0.4                     |
|           | 9     |             | 0.1                     |
|           | 9W    |             | 0.8                     |
|           | 12    |             | 0.4                     |
|           | 12W   |             | 1.1                     |
|           | 15    |             | 0.8                     |
|           | 15W   |             | 1.3                     |
| RSR       | 9M1   | UU          | 0.1                     |
|           | 12M1  |             | 0.4                     |
|           | 15M1  |             | 0.8                     |
|           | 20M1  |             | 1.0                     |
|           | 9M1W  |             | 0.8                     |
|           | 12M1W |             | 1.1                     |
|           | 15M1W |             | 1.3                     |
| HSR       | 15M2  | UU          | 2.0                     |
|           | 20M2  |             | 2.5                     |
|           | 25M2  |             | 3.9                     |

Unit: N

| Model No. |     | Seal symbol | Maximum Seal Resistance |
|-----------|-----|-------------|-------------------------|
| SRG       | 15  | SS          | 13                      |
|           | 20  |             | 18                      |
|           | 25  |             | 19                      |
|           | 30  |             | 22                      |
|           | 35  |             | 30                      |
|           | 45  |             | 30                      |
|           | 55  |             | 34                      |
|           | 65  |             | 40                      |
|           | 85  |             | 47                      |
| SRN       | 100 |             | 53                      |
|           | 35  | SS          | 30                      |
|           | 45  |             | 30                      |
|           | 55  |             | 35                      |
| SRW       | 65  |             | 40                      |
|           | 70  | SS          | 32                      |
|           | 85  |             | 37                      |
|           | 100 |             | 43                      |
|           | 130 |             | 50                      |
|           | 150 |             | 57                      |

## Maximum resistance for LaCS

Unit: N

| Model No.           |     | Maximum resistance for LaCS |
|---------------------|-----|-----------------------------|
| SHS                 | 15  | 5.2                         |
|                     | 20  | 6.5                         |
|                     | 25  | 11.7                        |
|                     | 30  | 18.2                        |
|                     | 35  | 20.8                        |
|                     | 45  | 26.0                        |
|                     | 55  | 32.5                        |
| SSR                 | 65  | 39.0                        |
|                     | 15  | 5.9                         |
|                     | 20  | 6.9                         |
|                     | 25  | 8.1                         |
|                     | 30  | 12.8                        |
| SVR/SVS<br>NR/NRS-X | 35  | 15.1                        |
|                     | 25  | 8.1                         |
|                     | 30  | 13.4                        |
|                     | 35  | 15.5                        |
|                     | 45  | 23.3                        |
|                     | 55  | 28.6                        |
|                     | 65  | 39.6                        |
| NR/NRS              | 85  | 52.7                        |
| NR                  | 75  | 38.0                        |
|                     | 100 | 65.0                        |
| SHW                 | 12  | 2.6                         |
|                     | 14  | 3.9                         |
|                     | 17  | 3.9                         |
|                     | 21  | 3.9                         |
|                     | 27  | 6.5                         |
|                     | 35  | 13.0                        |
|                     | 50  | 19.5                        |
| SRS                 | 9   | 2.3                         |
|                     | 9W  | 3.3                         |
|                     | 12  | 3.5                         |
|                     | 12W | 4.2                         |

Unit: N

| Model No. |     | Maximum resistance for LaCS |
|-----------|-----|-----------------------------|
| SRS       | 15  | 5.1                         |
|           | 15W | 7.5                         |
|           | 20  | 5.2                         |
|           | 25  | 7.8                         |
| SCR       | 15  | 5.2                         |
|           | 20  | 6.5                         |
|           | 25  | 11.7                        |
|           | 30  | 18.2                        |
|           | 35  | 20.8                        |
| HSR       | 45  | 26.0                        |
|           | 65  | 39.0                        |
|           | 15  | 3.8                         |
|           | 20  | 5.6                         |
|           | 25  | 7.5                         |
|           | 30  | 14.9                        |
|           | 35  | 22.4                        |
|           | 45  | 32.1                        |
|           | 55  | 36.5                        |
| SRG       | 65  | 43.8                        |
|           | 85  | 69.5                        |
|           | 20  | 6.1                         |
|           | 25  | 6.9                         |
|           | 30  | 8.2                         |
|           | 35  | 9.1                         |
|           | 45  | 14.3                        |
| SRN       | 55  | 18.2                        |
|           | 65  | 26.0                        |
|           | 35  | 9.1                         |
|           | 45  | 14.3                        |
| SRW       | 55  | 18.2                        |
|           | 65  | 22.1                        |
|           | 70  | 32.8                        |
|           | 85  | 39.7                        |
|           | 100 | 58.3                        |

Note1) Each resistance value in the table only consists of that of LaCS, and does not include sliding resistances of seals and other accessories.

Note2) For the maximum service speed of LaCS, contact THK.

Note3) HH type (with LaCS) for models SVR/SVS and SRG is provided with the protector (see **A1-487**).  
Contact THK if you want to use the Protector with other options.

Maximum resistance for LiCS

Unit: N

| Model No. |     | Maximum resistance for LiCS |
|-----------|-----|-----------------------------|
| SSR       | 15X | 1                           |
|           | 20X | 1.1                         |
|           | 25X | 1.6                         |
|           | 30X | 1.6                         |
|           | 35X | 2                           |
| SRG       | 15  | 0.7                         |

Note) The value indicates the sliding resistance of two LiCS units per LM block and does not include the sliding resistances of the LM block and the side seals.

Maximum seal resistance of FS

Unit: N

| Model No. |    | Seal symbol | Maximum Seal Resistance |
|-----------|----|-------------|-------------------------|
| SRG       | 35 | Model F2    | 30                      |
|           | 45 |             | 30                      |
|           | 55 |             | 34                      |
|           | 65 |             | 40                      |

Note) This is the sliding resistance of two fluorine seals and one inner seal on one LM block and excludes the sliding resistance of the block.

Maximum resistance for the side scraper

Unit: N

| Model No.                   |     | Maximum Resistance for the side scraper (KKHHYY/TTHHYY Option) |
|-----------------------------|-----|----------------------------------------------------------------|
| SVR/<br>SVS<br>NR/<br>NRS-X | 25  | 4.4                                                            |
|                             | 25L | 5.2                                                            |
|                             | 30  | 4.7                                                            |
|                             | 30L | 5.5                                                            |
|                             | 35  | 4.6                                                            |
|                             | 35L | 5.5                                                            |
|                             | 45  | 5.1                                                            |
|                             | 45L | 6.1                                                            |
|                             | 55  | 5.3                                                            |
|                             | 55L | 6.3                                                            |
|                             | 65  | 5.4                                                            |
|                             | 65L | 6.9                                                            |

Unit: N

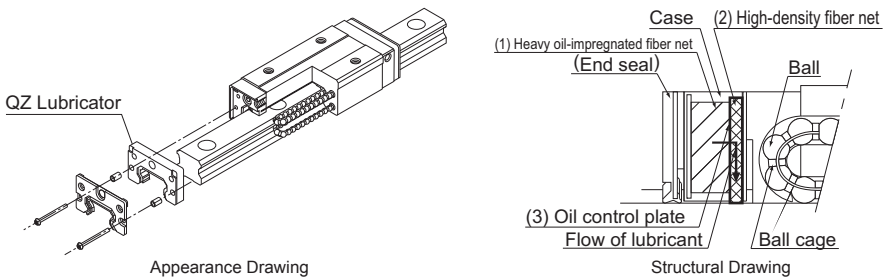
| Model No. |      | Maximum Resistance for the side scraper (DDHHYY Option) |
|-----------|------|---------------------------------------------------------|
| SRG       | 35   | 2.9                                                     |
|           | 35L  | 3.4                                                     |
|           | 35SL | 3.9                                                     |
|           | 45   | 4.7                                                     |
|           | 45L  | 5.6                                                     |
|           | 45SL | 6.8                                                     |
|           | 55   | 5.5                                                     |
|           | 55L  | 6.8                                                     |
|           | 55SL | 8.3                                                     |
|           | 65   | 7.2                                                     |
|           | 65L  | 8.7                                                     |
|           | 65SL | 10.9                                                    |

# QZ Lubricator

- For the supported models, see the table of options by model number on **A1-478**.
- For the LM block dimension with QZ attached, see **A1-512** to **A1-515**.
- For notes regarding how to handle the QZ, see **A1-552**.

QZ Lubricator feeds the right amount of lubricant to the raceway on the LM rail. This allows an oil film to continuously be formed between the rolling element and the raceway, and drastically extends the lubrication and maintenance intervals.

The structure of QZ Lubricator consists of three major components: (1) a heavy oil-impregnated fiber net (function to store lubricant), (2) a high-density fiber net (function to apply lubricant to the raceway) and (3) an oil-control plate (function to adjust oil flow). The lubricant contained in QZ Lubricator is fed by the capillary phenomenon, which is used also in felt pens and many other products, as the fundamental principle.



**[Features]**

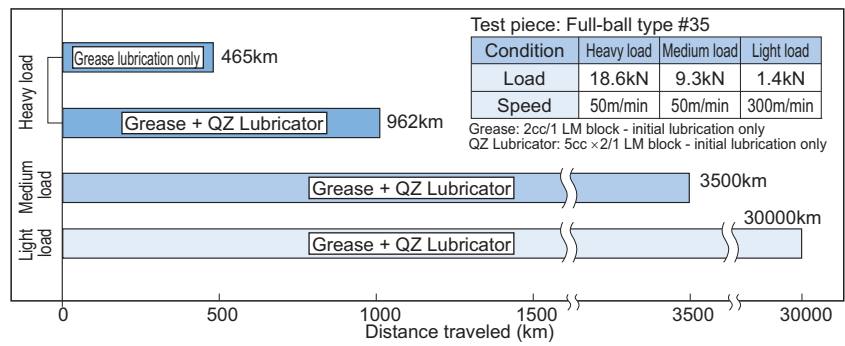
- Since it supplements an oil loss, the lubrication maintenance interval can be significantly extended.
- Eco-friendly lubrication system that does not contaminate the surrounding area since it feeds the right amount of lubricant to the ball raceway.

| Symbol  | Contamination Protection Accessories                                                                 |
|---------|------------------------------------------------------------------------------------------------------|
| QZUU    | With end seal + QZ                                                                                   |
| QZSS    | With end seal + side seal + inner seal*1 + QZ                                                        |
| QZDD    | With double seals + side seal + inner seal*1 + QZ                                                    |
| QZZZ    | With end seal + side seal + inner seal*1 + metal scraper + QZ                                        |
| QZKK    | With double seals + side seal + inner seal*1 + metal scraper + QZ                                    |
| QZGG    | With LiCS + QZ                                                                                       |
| QZPP    | With LiCS + side seal + inner seal*1 + QZ                                                            |
| QZSSH   | With end seal + side seal + inner seal*1 + LaCS + QZ                                                 |
| QZDDH   | With double seals + side seal + inner seal*1 + LaCS + QZ                                             |
| QZZZH   | With end seal + side seal + inner seal*1 + metal scraper + LaCS + QZ                                 |
| QZKHH   | With double seals + side seal + inner seal*1 + metal scraper + LaCS + QZ                             |
| QZJHH*2 | With end seal + side seal + inner seal*1 + LaCS + QZ + protector (serving also as metal scraper)     |
| QZTTH*2 | With double seals + side seal + inner seal*1 + LaCS + QZ + protector (serving also as metal scraper) |

\*1 Some models are not equipped with inner seals. (See **A1-478**)  
 \*2 QZJHH and QZTTH are available only for models SVR/SVS, NR/NRS-X and SRG.  
 Note1) HH type (with LaCS) for models SVR/SVS, NR/NRS-X, and SRG comes with a protector (see **A1-487**). Contact THK if you want to use the Protector with other options.  
 Note2) Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.

● Significantly Extended Maintenance Interval

Attaching QZ Lubricator helps extend the maintenance interval throughout the whole load range from the light load area to the heavy load area.

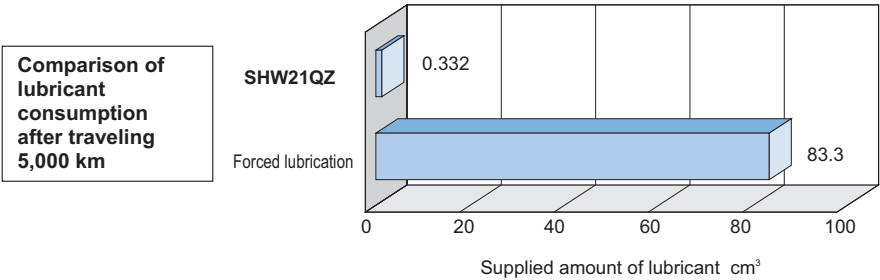


LM Guide Running Test without Replenishment of Lubricant

● Effective Use of Lubricant

Since the lubricator feeds the right amount of lubricant to the ball raceway, lubricant can be used efficiently.

[Test conditions] speed: 300 m/min



Amount of oil contained in QZ Lubricator  
0.166cm³/ 2 units  
(attached to both ends of the LM block)  
=0.332cm³

Compared

Forced lubrication  
0.03cm³/6min × 16667min  
=83.3cm³

Lubricant consumption is 1/250 less than forced lubrication.

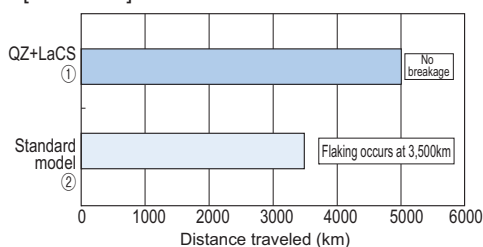
### ● Effective in Helping Lubrication under Severe Environments

A 5,000 km durability test was conducted under severe environments (containing coolant and contaminated environment).

[Test conditions]

| Model No.        | ① Caged Ball LM Guide #45     | ② Full-ball type #45                                                                  |
|------------------|-------------------------------|---------------------------------------------------------------------------------------|
| Load             | 8kN                           | 6kN                                                                                   |
| Speed            | 60m/min                       |                                                                                       |
| Coolant          | Immersed 48 hrs, dried 96 hrs |                                                                                       |
| Foreign material | Foundry dust (125 μm or less) |                                                                                       |
| Lubrication      | AFA Grease + QZ               | Super Multi 68<br>Oiling cycle:<br>0.1cc/shot<br>Periodically lubricated every 16 min |

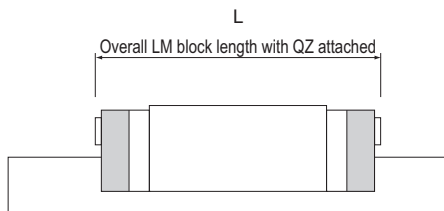
[Test result]



LM Guide (Options)

\* When using the LM system under severe environment, use QZ Lubricator and Laminated Contact Scraper LaCS (see "Laminated Contact Scraper LaCS" on **A1-484**) in combination.

## LM Block Dimension (Dimension L) with QZ Attached



Unit: mm

| Model No. |            | L     |       |       |       |       |       |       |       |       |
|-----------|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|           |            | QZUU  | QZSS  | QZDD  | QZZZ  | QZKK  | QZSSH | QZDDH | QZZZH | QZKKH |
| SHS       | 15C/V/R    | 84.4  | 84.4  | 89.8  | 86.8  | 92.2  | 100   | 105.4 | 101.2 | 106.6 |
|           | 15LC/LV    | 99.4  | 99.4  | 104.8 | 101.8 | 107.2 | 115   | 120.4 | 116.2 | 121.6 |
|           | 20C/V      | 99    | 99    | 105.4 | 103   | 109.4 | 115.4 | 121.8 | 117.8 | 124.2 |
|           | 20LC/LV    | 118   | 118   | 124.4 | 122   | 128.4 | 134.4 | 140.8 | 136.8 | 143.2 |
|           | 25C/V/R    | 114.4 | 114.4 | 121.6 | 120.4 | 127.6 | 132   | 139.2 | 134.4 | 141.6 |
|           | 25LC/LV/LR | 131.4 | 131.4 | 138.6 | 137.4 | 144.6 | 149   | 156.2 | 151.4 | 158.6 |
|           | 30C/V/R    | 127.4 | 127.4 | 136   | 133.8 | 142.4 | 149.4 | 158   | 151.8 | 160.4 |
|           | 30LC/LV/LR | 152.4 | 152.4 | 161   | 158.8 | 167.4 | 174.4 | 183   | 176.8 | 185.4 |
|           | 35C/V/R    | 145   | 145   | 154.8 | 152.4 | 162.2 | 168   | 177.8 | 170.4 | 180.2 |
|           | 35LC/LV/LR | 175   | 175   | 184.8 | 182.4 | 192.2 | 198   | 207.8 | 200.4 | 210.2 |
|           | 45C/V/R    | 173   | 173   | 182.8 | 181.2 | 191   | 199   | 208.8 | 202.2 | 212   |
|           | 45LC/LV/LR | 207   | 207   | 216.8 | 215.2 | 225   | 233   | 242.8 | 236.2 | 246   |
|           | 55C/V/R    | 205.4 | 205.4 | 216.6 | 214.2 | 225.4 | 232   | 243.2 | 235.2 | 246.4 |
|           | 55LC/LV/LR | 247.4 | 247.4 | 258.6 | 256.2 | 267.4 | 274   | 285.2 | 277.2 | 288.4 |
| SSR       | 65C/V      | 256.2 | 256.2 | 268.6 | 266.2 | 278.6 | 288   | 300.4 | 291.2 | 303.6 |
|           | 65LC/LV    | 307.2 | 307.2 | 319.6 | 317.2 | 329.6 | 339   | 351.4 | 342.2 | 354.6 |
|           | 15XVY/XSBY | 59.3  | 59.3  | 65.1  | 62.7  | 68.5  | 75.5  | 81.3  | 76.7  | 82.5  |
|           | 15XWY/XTBY | 75.9  | 75.9  | 81.7  | 79.3  | 85.1  | 92.1  | 97.9  | 93.3  | 99.1  |
|           | 20XV/XSB   | 66.2  | 66.2  | 73.1  | 72.1  | 79    | 83.7  | 90.6  | 86.1  | 93    |
|           | 20XW/XTB   | 85    | 85    | 91.9  | 90.9  | 97.8  | 102.5 | 109.4 | 104.9 | 111.8 |
|           | 25XVY/XSBY | 82.6  | 82.6  | 90    | 88.4  | 95.8  | 100   | 107.4 | 102.4 | 109.8 |
|           | 25XWY/XTBY | 105.6 | 105.6 | 113   | 111.4 | 118.8 | 123   | 130.4 | 125.4 | 132.8 |
|           | 30XV/XSB   | 89.4  | 89.4  | 97.5  | 95.1  | 103.2 | 110.7 | 118.8 | 113.1 | 121.2 |
|           | 30XW/XTB   | 119.7 | 119.7 | 127.8 | 125.4 | 133.5 | 141   | 149.1 | 143.4 | 151.5 |
| SHW       | 35XV/XSB   | 100.9 | 100.9 | 109.9 | 107.9 | 116.9 | 123.5 | 132.5 | 125.9 | 134.9 |
|           | 35XW/XTB   | 134.3 | 134.3 | 143.3 | 141.3 | 150.3 | 156.9 | 165.9 | 159.3 | 168.3 |
|           | 12CAM/CRM  | 47    | 47    | —     | —     | —     | 58    | —     | —     | —     |
|           | 12HRM      | 60.4  | 60.4  | —     | —     | —     | 71.4  | —     | —     | —     |
|           | 14CAM/CRM  | 55.5  | 55.5  | —     | —     | —     | 70.7  | —     | —     | —     |
|           | 17CAM/CRM  | 63    | 63    | 66    | 65.4  | 68.4  | 78.2  | 81.2  | 79.4  | 82.4  |
|           | 21CA/CR    | 75    | 75    | 80    | 78.6  | 83.6  | 91.6  | 96.6  | 93.2  | 98.2  |
|           | 27CA/CR    | 92.8  | 92.8  | 98.6  | 97.2  | 103   | 109.4 | 115.2 | 111.8 | 117.6 |
|           | 35CA/CR    | 127   | 127   | 134.4 | 132   | 139.4 | 149   | 156.4 | 151.4 | 158.8 |
|           | 50CA/CR    | 161   | 161   | 169.2 | 167.4 | 175.6 | 186   | 194.2 | 188.4 | 196.6 |

Note) Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.

| Model No. |      | L     |       |       |       |       |       |        |        |        |
|-----------|------|-------|-------|-------|-------|-------|-------|--------|--------|--------|
|           |      | QZUU  | QZSS  | QZDD  | QZZZ  | QZKK  | QZSSH | QZDDHH | QZZZHH | QZKKHH |
| SRS       | 7S   | 29    | 29    | —     | —     | —     | —     | —      | —      | —      |
|           | 7M   | 33.4  | 33.4  | —     | —     | —     | —     | —      | —      | —      |
|           | 7N   | 41    | 41    | —     | —     | —     | —     | —      | —      | —      |
|           | 7WS  | 32.5  | 32.5  | —     | —     | —     | —     | —      | —      | —      |
|           | 7WM  | 41    | 41    | —     | —     | —     | —     | —      | —      | —      |
|           | 7WN  | 50.9  | 50.9  | —     | —     | —     | —     | —      | —      | —      |
|           | 9XS  | 31.5  | 31.5  | —     | —     | —     | 43.1  | —      | —      | —      |
|           | 9XM  | 40.8  | 40.8  | —     | —     | —     | 52.4  | —      | —      | —      |
|           | 9XN  | 50.8  | 50.8  | —     | —     | —     | 62.4  | —      | —      | —      |
|           | 9WS  | 36.5  | 36.5  | —     | —     | —     | 48.1  | —      | —      | —      |
|           | 9WM  | 49    | 49    | —     | —     | —     | 60.6  | —      | —      | —      |
|           | 9WN  | 60.7  | 60.7  | —     | —     | —     | 72.3  | —      | —      | —      |
|           | 12S  | 35    | 35    | —     | —     | —     | 46.6  | —      | —      | —      |
|           | 12M  | 44.4  | 44.4  | —     | —     | —     | 56    | —      | —      | —      |
|           | 12N  | 57.1  | 57.1  | —     | —     | —     | 69.1  | —      | —      | —      |
|           | 12WS | 40.5  | 40.5  | —     | —     | —     | 52.1  | —      | —      | —      |
|           | 12WM | 54.5  | 54.5  | —     | —     | —     | 66.1  | —      | —      | —      |
|           | 12WN | 69.5  | 69.5  | —     | —     | —     | 81.1  | —      | —      | —      |
|           | 15S  | 44    | 44    | —     | —     | —     | 58.2  | —      | —      | —      |
|           | 15M  | 55    | 55    | —     | —     | —     | 69.2  | —      | —      | —      |
|           | 15N  | 72.8  | 72.8  | —     | —     | —     | 87    | —      | —      | —      |
|           | 15WS | 53.5  | 53.5  | —     | —     | —     | 67.7  | —      | —      | —      |
|           | 15WM | 67.5  | 67.5  | —     | —     | —     | 81.7  | —      | —      | —      |
|           | 15WN | 86.5  | 86.5  | —     | —     | —     | 100.9 | —      | —      | —      |
| SCR       | 20M  | 66    | 66    | —     | —     | —     | 81.2  | —      | —      | —      |
|           | 25M  | 97    | 97    | —     | —     | —     | 112.6 | —      | —      | —      |
|           | 15S  | 84.4  | 84.4  | 89.8  | 86.8  | 92.2  | 100.4 | 105.4  | 101.4  | 106.9  |
|           | 20S  | 99    | 99    | 105.4 | 103   | 109.4 | 115.5 | 122    | 118    | 124.5  |
|           | 20   | 118   | 118   | 124.4 | 122   | 128.4 | 134.5 | 141    | 137    | 143.5  |
|           | 25   | 131.4 | 131.4 | 138.6 | 137.4 | 144.6 | 149   | 156.2  | 151.4  | 158.6  |
|           | 30   | 152.4 | 152.4 | 161   | 158.8 | 167.4 | 174.4 | 183    | 176.8  | 185.4  |
|           | 35   | 175   | 175   | 184.8 | 182.4 | 192.2 | 198   | 207.8  | 200.4  | 210.2  |
|           | 45   | 207   | 207   | 216.8 | 215.2 | 225   | 233   | 242.8  | 236.2  | 246    |
|           | 65   | 307.2 | 307.2 | 319.6 | 317.2 | 329.6 | 339   | 351.4  | 342.2  | 354.6  |

Note) Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.

Unit: mm

| Model No. |                     | L     |       |       |       |       |       |       |       |       |
|-----------|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|           |                     | QZUU  | QZSS  | QZDD  | QZZZ  | QZKK  | QZSSH | QZDDH | QZZZH | QZKHH |
| HSR       | 15C/R/A/B/YR        | 76.6  | 76.6  | 84.6  | 81.2  | 89.2  | 95.8  | 103.8 | 97    | 105   |
|           | 15LC/LR             | 94.6  | 94.6  | 102.6 | 99.2  | 107.2 | 113.8 | 121.8 | 115   | 123   |
|           | 20C/R/A/B/CA/CB/YR  | 93    | 93    | 101.2 | 98.8  | 107   | 110.4 | 118.6 | 112.8 | 121   |
|           | 20LC/LR/LA/LB/HA/HB | 109   | 109   | 117.2 | 114.8 | 123   | 126.4 | 134.6 | 128.8 | 137   |
|           | 25C/R/A/B/CA/CB/YR  | 100.9 | 100.9 | 108.9 | 106.6 | 114.6 | 118.2 | 126.2 | 120.6 | 128.6 |
|           | 25LC/LR/LA/LB/HA/HB | 120   | 120   | 128   | 125.7 | 133.7 | 137.3 | 145.3 | 139.5 | 147.7 |
|           | 30C/R/A/B/CA/CB/YR  | 115.8 | 115.8 | 123.8 | 121.5 | 129.5 | 137.1 | 145.1 | 139.5 | 147.5 |
|           | 30LC/LR/LA/LB/HA/HB | 138.4 | 138.4 | 146.4 | 144.1 | 152.1 | 159.7 | 167.7 | 162.1 | 170.1 |
|           | 35C/R/A/B/CA/CB/YR  | 129   | 129   | 138.8 | 135.8 | 145.6 | 151.4 | 161.2 | 153.8 | 163.6 |
|           | 35LC/LR/LA/LB/HA/HB | 154.4 | 154.4 | 164.2 | 161.2 | 171   | 176.8 | 186.6 | 179.2 | 189   |
|           | 45C/R/A/B/CA/CB/YR  | 168.6 | 168.6 | 178.4 | 176.8 | 186.6 | 197.4 | 207.2 | 200.6 | 210.4 |
|           | 45LC/LR/LA/LB/HA/HB | 200.4 | 200.4 | 210.2 | 208.6 | 218.4 | 229.2 | 239   | 232.4 | 242.2 |
|           | 55C/R/A/B/CA/CB/YR  | 193.4 | 193.4 | 204.6 | 202.2 | 213.4 | 223.4 | 234.6 | 226.6 | 237.8 |
|           | 55LC/LR/LA/LB/HA/HB | 231.5 | 231.5 | 242.7 | 240.3 | 251.5 | 261.5 | 272.7 | 264.7 | 275.9 |
|           | 65XC/XR/XCA/XCB/XYR | 223.9 | 223.9 | 236.3 | 233.7 | 246.1 | 259.5 | 271.9 | 262.7 | 275.1 |
| SRN       | 65A/B/CA/CB/YR      | 221.4 | 221.4 | 233.8 | 226.6 | 239   | 257   | 269.4 | 260.2 | 272.6 |
|           | 65XLC/XLR/XHA/XHB   | 283.4 | 283.4 | 295.8 | 293.2 | 305.6 | 319   | 331.4 | 322.2 | 334.6 |
|           | 65LA/LB/HA/HB       | 280.9 | 280.9 | 293.3 | 286.1 | 298.5 | 316.5 | 328.9 | 319.7 | 332.1 |
|           | 35C/R               | 155   | 155   | 162.8 | 163.4 | 171.2 | 178.6 | 186.4 | 181   | 188.8 |
|           | 35LC/LR             | 185   | 185   | 192.8 | 193.4 | 201.2 | 208.6 | 216.4 | 211   | 218.8 |
|           | 35SLC/SLR           | 210.8 | 210.8 | 218.6 | 219.2 | 227   | 234.4 | 242.2 | 236.8 | 244.6 |
|           | 45C/R               | 185   | 185   | 194.2 | 194.2 | 203.4 | 212   | 221.2 | 215.2 | 224.5 |
|           | 45LC/LR             | 220   | 220   | 229.2 | 229.2 | 238.4 | 247   | 256.2 | 250.2 | 259.4 |
|           | 45SLC/SLR           | 261.5 | 261.5 | 270.7 | 270.7 | 279.9 | 288.5 | 297.7 | 291.7 | 300.9 |
|           | 55C/R               | 225   | 225   | 234.2 | 234.2 | 243.4 | 252   | 261.2 | 255.2 | 264.4 |
|           | 55LC/LR             | 275   | 275   | 284.2 | 284.2 | 293.4 | 302   | 311.2 | 305.2 | 314.4 |
|           | 55SLC/SLR           | 332   | 332   | 341.2 | 341.2 | 350.4 | 359   | 368.2 | 362.2 | 371.4 |
|           | 65C/R               | 284.9 | 284.9 | 296.1 | 296.1 | 307.3 | 317.3 | 328.5 | 320.5 | 331.7 |
|           | 65LC/LR             | 343   | 343   | 354.2 | 354.2 | 370.4 | 380.4 | 391.6 | 378.6 | 389.8 |
|           | 65SLC/SLR           | 420   | 420   | 431.2 | 431.2 | 442.4 | 452.4 | 463.6 | 455.6 | 466.8 |
| SRW       | 70                  | 220   | 220   | 229.2 | 229.2 | 238.4 | 247   | 256.2 | 250.2 | 259.4 |
|           | 85                  | 275   | 275   | 284.2 | 284.2 | 293.4 | 302   | 311.2 | 305.2 | 314.4 |
|           | 100                 | 343   | 343   | 354.2 | 354.2 | 370.4 | 380.4 | 391.6 | 378.6 | 389.8 |

Note) Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.

| Model No.                   |                 | L     |       |       |       |       |        |        |        |        |        |        |
|-----------------------------|-----------------|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------|--------|
|                             |                 | QZUU  | QZSS  | QZDD  | QZZZ  | QZKK  | QZSSHH | QZDDHH | QZZZHH | QZKKHH | QZJJHH | QZTTHH |
| SVS/<br>SVR<br>NR/<br>NRS-X | 25R/C           | 102.8 | 102.8 | 108   | 108.5 | 113.7 | 116.8  | 122.0  | —      | —      | 122.5* | 127.7* |
|                             | 25LR/LC         | 122   | 122   | 127.2 | 127.7 | 132.9 | 136.0  | 141.2  | —      | —      | 141.7* | 146.9* |
|                             | 30R/C           | 118   | 118   | 124.6 | 123.7 | 130.3 | 135.2  | 141.8  | —      | —      | 140.9* | 147.5* |
|                             | 30LR/LC         | 140.5 | 140.5 | 147.1 | 146.2 | 152.8 | 157.7  | 164.3  | —      | —      | 163.4* | 170.0* |
|                             | 35R/C/RH/CH     | 139.5 | 139.5 | 146.5 | 146.3 | 153.3 | 156.7  | 163.7  | —      | —      | 163.5* | 170.5* |
|                             | 35LR/LC/LRH/LCH | 165   | 165   | 172   | 171.8 | 178.8 | 182.2  | 189.2  | —      | —      | 189.0* | 196.0* |
|                             | 45R/C/RH/CH     | 168.2 | 168.2 | 175.2 | 175.8 | 182.8 | 188.2  | 195.2  | —      | —      | 195.8* | 202.8* |
|                             | 45LR/LC/LRH/LCH | 201   | 201   | 208   | 208.6 | 215.6 | 221.0  | 228.0  | —      | —      | 228.6* | 235.6* |
|                             | 55R/C/RH/CH     | 201.4 | 201.4 | 208.4 | 209.0 | 216.0 | 222.4  | 229.4  | —      | —      | 231.1* | 238.1* |
|                             | 55LR/LC/LRH/LCH | 238.6 | 238.6 | 245.6 | 246.2 | 253.2 | 259.6  | 266.6  | —      | —      | 268.3* | 275.3* |
| SRG                         | 65R/C           | 224.4 | 224.4 | 231.8 | 233.1 | 240.5 | 248.8  | 256.2  | —      | —      | 257.5* | 264.9* |
|                             | 65LR/LC         | 284.4 | 284.4 | 291.8 | 293.1 | 300.5 | 308.8  | 316.2  | —      | —      | 317.5* | 324.9* |
|                             | 15A/V           | 90.6  | 90.6  | 92.6  | —     | —     | —      | —      | —      | —      | —      | —      |
|                             | 20A/V           | 107.6 | 107.6 | 109.6 | 111   | 113   | 125.2  | 127.2  | 127.6  | 129.6  | —      | —      |
|                             | 20LA/LV         | 127.6 | 127.6 | 129.6 | 131   | 133   | 145.2  | 147.2  | 147.6  | 149.6  | —      | —      |
|                             | 25C/R           | 125.5 | 125.5 | 130.5 | 130.5 | 135.5 | 145.3  | 151.7  | 147.7  | 154.1  | —      | —      |
|                             | 25LC/LR         | 145.1 | 145.1 | 150.1 | 150.1 | 155.1 | 164.9  | 171.3  | 167.3  | 173.7  | —      | —      |
|                             | 30C/R           | 141   | 141   | 148   | 146   | 153   | 160.8  | 169.2  | 164.6  | 171.6  | —      | —      |
|                             | 30LC/LR         | 165   | 165   | 172   | 170   | 177   | 184.8  | 193.2  | 188.6  | 195.6  | —      | —      |
|                             | 35C/R           | 155   | 155   | 162.8 | 163.4 | 171.2 | 172.6  | 180.4  | 181    | 188.8  | 180.8* | 188.6* |
|                             | 35LC/LR         | 185   | 185   | 192.8 | 193.4 | 201.2 | 202.6  | 210.4  | 211    | 218.8  | 210.8* | 218.6* |
|                             | 35SLC/SLR       | 210.8 | 210.8 | 218.6 | 219.2 | 227   | 228.4  | 236.2  | 236.8  | 244.6  | 236.6* | 244.4* |
|                             | 45C/R           | 185   | 185   | 194.2 | 194.2 | 203.4 | 205.6  | 214.8  | 214.8  | 224    | 214.6* | 223.8* |
|                             | 45LC/LR         | 220   | 220   | 229.2 | 229.2 | 238.4 | 240.6  | 249.8  | 249.8  | 259    | 249.6* | 258.8* |
|                             | 45SLC/SLR       | 261.5 | 261.5 | 270.7 | 270.7 | 279.9 | 282.1  | 291.3  | 291.3  | 300.5  | 291.1* | 300.3* |
|                             | 55C/R           | 225   | 225   | 234.2 | 234.2 | 243.4 | 245.6  | 254.8  | 254.8  | 264    | 254.6* | 263.8* |
|                             | 55LC/LR         | 275   | 275   | 284.2 | 284.2 | 293.4 | 295.6  | 304.8  | 304.8  | 314    | 304.6* | 313.8* |
|                             | 55SLC/SLR       | 332   | 332   | 341.2 | 341.2 | 350.4 | 352.6  | 361.8  | 361.8  | 371    | 361.6* | 370.8* |
|                             | 65C/V           | 284.9 | 284.9 | 296.1 | 296.1 | 307.3 | 308.9  | 320.1  | 320.1  | 331.3  | 319.9* | 331.1* |
|                             | 65LC/LV         | 343   | 343   | 354.2 | 354.2 | 365.4 | 367    | 378.2  | 378.2  | 389.4  | 378*   | 389.2* |
|                             | 65LC/SLV        | 420   | 420   | 431.2 | 431.2 | 442.4 | 444    | 455.2  | 455.2  | 466.4  | 455*   | 466.2* |

\* The overall LM block length (L) of YY type (with side scraper) is also the same.

Note1) For models SVR/SVS and SRG, we recommend attaching a protector. For the dimensions of QZZZHH and QZKKHH, contact THK. For details of the symbols of options, see **A1-516**.

Note2) Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.

### Model number coding

| SHS25        | LC               | 2                                      | QZ                      | KKHH                                           | C0 +1200L                                                                                       | P               | Z                              | T                                                                                                                                   | -II                                                 |
|--------------|------------------|----------------------------------------|-------------------------|------------------------------------------------|-------------------------------------------------------------------------------------------------|-----------------|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|
| Model number | Type of LM block | No. of LM blocks used on the same rail | With QZ Lubricator (*1) | Contamination protection accessory symbol (*2) | LM rail length (in mm)                                                                          | With steel tape | Symbol for LM rail jointed use | Accuracy symbol (*4)                                                                                                                | Symbol for No. of rails used on the same plane (*5) |
|              |                  |                                        |                         |                                                | Radial clearance symbol (*3)<br>Normal (No symbol)<br>Light preload (C1)<br>Medium preload (C0) |                 |                                | Normal grade (No Symbol)<br>High accuracy grade (H)<br>Precision grade (P)/Super precision grade (SP)<br>Ultra precision grade (UP) |                                                     |

(\*1) See **A1-509**. (\*2) See **A1-516**. (\*3) See **A1-71**. (\*4) See **A1-76**. (\*5) See **A1-13**.

Note) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.)

Those models equipped with QZ Lubricator cannot have a grease nipple.

# List of Parts Symbols

- For supported model numbers, see the correspondence table of options by model number on **A1-478**.
- For the overall block length (dimension L) of each model with seal options attached, see **A1-491** to **A1-498**.
- For the overall block length (dimension L) with the QZ option attached, see **A1-512** to **A1-515**.

## [Symbols for Seals and Metal Scraper]

| Symbol    | Configuration of seal and metal scraper                     |
|-----------|-------------------------------------------------------------|
| No Symbol | Without seal                                                |
| UU        | End seal                                                    |
| SS        | With end seal + side seal + inner seal*                     |
| DD        | With double seals + side seal + inner seal*                 |
| ZZ        | With end seal + side seal + inner seal* + metal scraper     |
| KK        | With double seals + side seal + inner seal* + metal scraper |

\* Some models are not equipped with inner seals.(See **A1-478**)

## [Symbols for QZ Lubricator and Laminated Contract Scraper LaCS]

| Symbol      | Configuration of options                                 | Example  |
|-------------|----------------------------------------------------------|----------|
| * * HH      | (Seal and metal scraper) + LaCS                          | UUHH     |
| * * HHYY    | (Seal and metal scraper) + LaCS + side scraper           | DDHHYY   |
| QZ * *      | With QZ + (seal and metal scraper)                       | QZZZ     |
| QZ * * HH   | With QZ + (seal and metal scraper) + LaCS                | QZZZHH   |
| QZ * * HHYY | With QZ + (seal and metal scraper) + LaCS + side scraper | QZKKHHYY |

Note1) \* \* in the table represents the symbol for a seal and metal scraper.

Note2) Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.

## [Symbols for Light-Resistance Contact Seal LiCS]

| Symbol | Configuration of options                 |
|--------|------------------------------------------|
| GG     | LiCS                                     |
| PP     | With LiCS + side seal + inner seal*      |
| QZGG   | With QZ + LiCS                           |
| QZPP   | With QZ + LiCS + side seal + inner seal* |

\* Some models are not equipped with inner seals.(See **A1-478**)

Note) Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.

**[High Chemical Resistance Fluorine Seal FS Symbol]**

| Symbol | Configuration of options                                                 |
|--------|--------------------------------------------------------------------------|
| F2     | Fluorine seals + side seals + inner seals                                |
| FZ2    | Fluorine seals + side seals + inner seals + metal scrapers               |
| FJ2    | Fluorine seals + side seals + inner seals + protectors                   |
| F4     | Fluorine seals (double) + side seals + inner seals                       |
| FZ4    | Fluorine seals (double) + side seals + inner seals + metal scrapers      |
| FJ4    | Fluorine seals (double) + side seals + inner seals + protectors          |
| QZF2   | Fluorine seals + side seals + inner seals + QZ                           |
| QZFZ2  | Fluorine seals + side seals + inner seals + metal scrapers + QZ          |
| QZFJ2  | Fluorine seals + side seals + inner seals + QZ + protectors              |
| QZF4   | Fluorine seals (double) + side seals + inner seals + QZ                  |
| QZFZ4  | Fluorine seals (double) + side seals + inner seals + metal scrapers + QZ |
| QZFJ4  | Fluorine seals (double) + side seals + inner seals + QZ + protectors     |

**[Symbols for Protector]**

\* Supported models: SVR/SVS, SRG, NR/NRS, and NR-X/NRS-X

| Symbol   | Configuration of options                                                                                               |
|----------|------------------------------------------------------------------------------------------------------------------------|
| JJHH     | With End seal + side seal + inner seal* + LaCS + protector (also has a metal scraper function)                         |
| TTHH     | With Double seals + side seal + inner seal* + LaCS + protector (also has a metal scraper function)                     |
| JJHHYY   | With End seal + side seal + inner seal* + LaCS + protector (also has a metal scraper function) + side scraper          |
| TTHHYY   | With Double seals + side seal + inner seal* + LaCS + protector (also has a metal scraper function) + side scraper      |
| QZJJHH   | With QZ + end seal + side seal + inner seal* + LaCS + protector (also has a metal scraper function)                    |
| QZTTHH   | With QZ + double seals + side seal + inner seal* + LaCS + protector (also has a metal scraper function)                |
| QZJJHHYY | With QZ + end seal + side seal + inner seal* + LaCS + protector (also has a metal scraper function) + side scraper     |
| QZTTHHYY | With QZ + double seals + side seal + inner seal* + LaCS + protector (also has a metal scraper function) + side scraper |

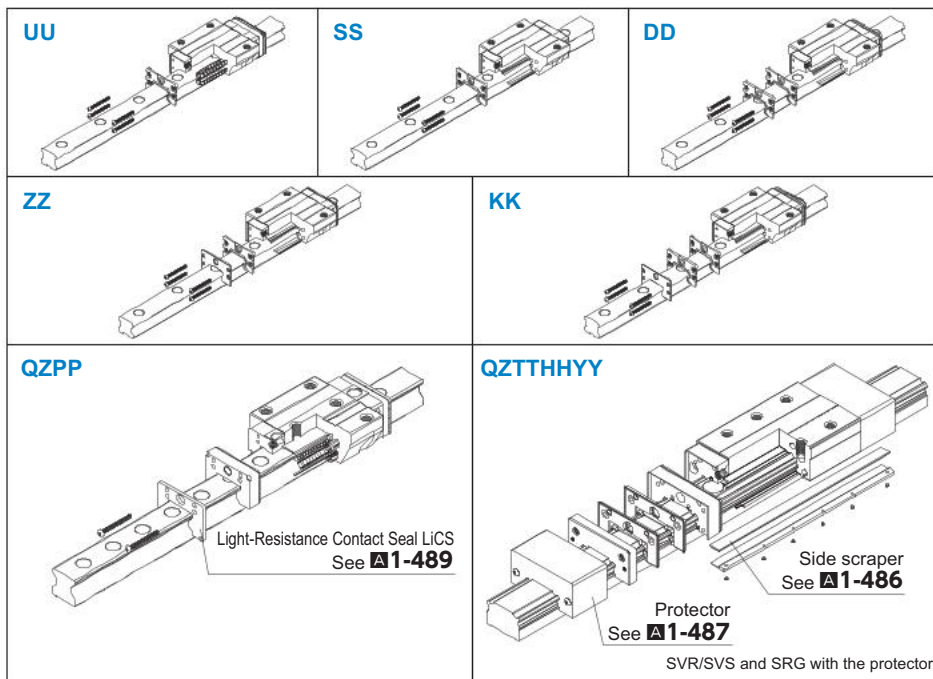
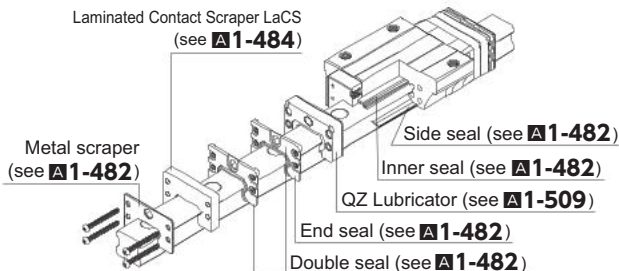
\* Some models are not equipped with inner seals. (See **■ 1-478**)

Note1) HH type (with LaCS) for models SVR/SVS, SRG, NR/NRS, and NR-X/NRS-X comes with a protector (see **■ 1-487**). The protector also acts as a metal scraper.

Contact THK if you want to use the Protector with other options.

Note2) Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.

## QZZZHH



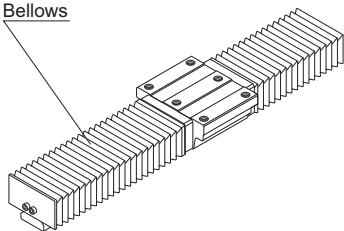
### Model number coding

| SVR45     | LR               | 2                                      | QZ                 | TTHH                            | C0                                                                                          | +1200L                 | P                              | T                                                                                                                                                     | -II                                            |
|-----------|------------------|----------------------------------------|--------------------|---------------------------------|---------------------------------------------------------------------------------------------|------------------------|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|
| Model No. | Type of LM block | No. of LM blocks used on the same rail | With QZ Lubricator | Symbol for dust-proof accessory | Radial clearance symbol<br>Normal (No symbol)/<br>Light preload (C1)<br>Medium preload (C0) | LM rail length (in mm) | Symbol for LM rail jointed use | Accuracy symbol<br>Normal grade (No Symbol)/High accuracy grade (H)/<br>Precision grade (P)/Super precision grade (SP)/<br>Ultra precision grade (UP) | Symbol for No. of rails used on the same plane |

Note) Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.

# Dedicated Bellows

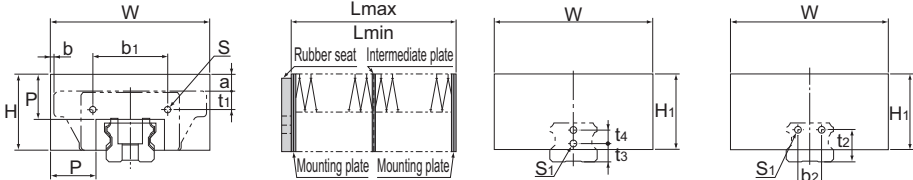
- For the supported models, see the table of options by model number on A1-478.
- For the dedicated bellows dimensions, see A1-520 to A1-531.

| Item name         | Schematic diagram / mounting location                                             | Purpose/location of use                            |
|-------------------|-----------------------------------------------------------------------------------|----------------------------------------------------|
| Dedicated Bellows |  | Used in locations exposed to dust or cutting chips |

# Bellows

## [Dedicated Bellows JSH for Model SHS]

The table below shows the dimensions of dedicated bellows JSH for model SHS. Specify the corresponding model number of the desired bellows from the table.



Models SHS15 to 30

Models SHS35 to 65

Unit: mm

| Model No. |    | Main dimensions |      |                |    |                |                |      |      |                |                |                |                | Supported model numbers |    |
|-----------|----|-----------------|------|----------------|----|----------------|----------------|------|------|----------------|----------------|----------------|----------------|-------------------------|----|
|           |    | W               | H    | H <sub>1</sub> | P  | b <sub>1</sub> | t <sub>1</sub> |      |      | b <sub>2</sub> | t <sub>2</sub> | t <sub>3</sub> | t <sub>4</sub> |                         |    |
|           |    |                 |      |                |    |                | C              | V    | R    |                |                |                |                |                         |    |
| JSH       | 15 | 53              | 26   | 26             | 15 | 22.4           | 4              | 4    | 8    | —              | —              | 8              | —              | SHS                     | 15 |
|           | 20 | 60              | 30   | 30             | 17 | 27.6           | 7.5            | 7.5  | —    | —              | —              | 8              | 6              |                         | 20 |
|           | 25 | 75              | 36   | 36             | 20 | 38             | 9.1            | 9.1  | 13.1 | —              | —              | 9              | 7              |                         | 25 |
|           | 30 | 80              | 38   | 38             | 20 | 44             | 11             | 11   | 14   | —              | —              | 11             | 8              |                         | 30 |
|           | 35 | 86              | 40.5 | 40.5           | 20 | 50             | 11             | 11   | 18   | 20             | 21.5           | —              | —              |                         | 35 |
|           | 45 | 97              | 46   | 46             | 20 | 64.6           | 13.5           | 13.5 | 23.5 | 26             | 26.5           | —              | —              |                         | 45 |
|           | 55 | 105             | 48   | 48             | 20 | 68             | 13             | 13   | 23   | 30             | 31.5           | —              | —              |                         | 55 |
|           | 65 | 126             | 63   | 63             | 25 | 80             | 18             | 18   | —    | 34             | 45             | —              | —              |                         | 65 |

Unit: mm

| Supported<br>model<br>numbers |    | Other dimensions |                |    |    |     |       |      |      | A<br>$\left(\begin{smallmatrix} L_{\max} \\ L_{\min} \end{smallmatrix}\right)$ |
|-------------------------------|----|------------------|----------------|----|----|-----|-------|------|------|--------------------------------------------------------------------------------|
|                               |    | Mounting bolt    |                | a  |    |     | b     |      |      |                                                                                |
|                               |    | S                | S <sub>1</sub> | C  | V  | R   | C     | V    | R    |                                                                                |
| SHS                           | 15 | *M2×8ℓ           | M4×8ℓ          | 5  | 5  | 1   | 3     | 9.5  | 9.5  | 5                                                                              |
|                               | 20 | M2.6×8ℓ          | M3×6ℓ          | 5  | 5  | —   | −1.5  | 8    | —    | 6                                                                              |
|                               | 25 | M3×8ℓ            | M3×6ℓ          | 6  | 6  | 2   | 2.5   | 13.5 | 13.5 | 7                                                                              |
|                               | 30 | M3×10ℓ           | M3×6ℓ          | 3  | 3  | 0   | −5    | 10   | 10   | 7                                                                              |
|                               | 35 | M4×10ℓ           | M4×8ℓ          | 0  | 0  | −7  | −7    | 8    | 8    | 7                                                                              |
|                               | 45 | M4×12ℓ           | M4×8ℓ          | −5 | −5 | −15 | −11.7 | 5.5  | 5.5  | 7                                                                              |
|                               | 55 | M5×12ℓ           | M5×10ℓ         | −9 | −9 | −19 | −17.5 | 2.5  | 2.5  | 7                                                                              |
|                               | 65 | M6×14ℓ           | M6×12ℓ         | −8 | −8 | —   | −22   | 0    | —    | 9                                                                              |

\* Use self-tapping screws as the mounting screws on the LM block side of the JSH15.  
Note1) When desiring to use the dedicated bellows other than in horizontal mount (i.e., vertical, wall and inverted mount), or when desiring a heat-resistant type of bellows, contact THK.  
Note2) For lubrication when using the dedicated bellows, contact THK.  
Note3) When using the dedicated bellows, the LM block and LM rail need to be machined so that the bellows can be mounted. Be sure to indicate that the dedicated bellows is required when ordering the LM Guide.

## Model number coding

### JSH35 - 60/420

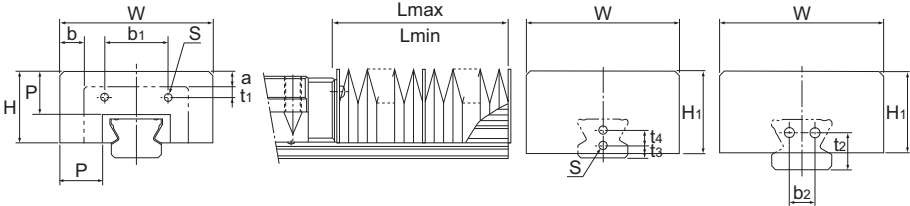
Model number of bellows for SHS35      Dimensions of the bellows (length when compressed / length when extended)

Note) The length of the bellows is calculated as follow.

$$L_{min} = \frac{S}{(A-1)} \quad S: \text{Stroke length (mm)}$$
$$L_{max} = L_{min} \cdot A \quad A: \text{Extension rate}$$

**[Dedicated Bellows JSSR-X for Model SSR]**

The table below shows the dimensions of dedicated bellows JSSR-X for model SSR. Specify the corresponding model number of the desired bellows from the table.



Models SSR15X to 25X    Models SSR30X and 35X

Unit: mm

| Model No. |     | Main dimensions |      |                |    |                |                |                |                |                |                |                       |   |       | A<br>$\left(\frac{L_{\max}}{L_{\min}}\right)$ | Supported<br>model<br>numbers |     |     |
|-----------|-----|-----------------|------|----------------|----|----------------|----------------|----------------|----------------|----------------|----------------|-----------------------|---|-------|-----------------------------------------------|-------------------------------|-----|-----|
|           |     | W               | H    | H <sub>1</sub> | P  | b <sub>1</sub> | t <sub>1</sub> | b <sub>2</sub> | t <sub>2</sub> | t <sub>3</sub> | t <sub>4</sub> | Mounting<br>bolt<br>S | a | b     |                                               |                               |     |     |
|           |     |                 |      |                |    |                |                |                |                |                |                |                       |   | XW/XV |                                               |                               |     | XTB |
| JSSR      | 15X | 51              | 24   | 26             | 15 | 20.5           | 4.7            | —              | —              | 8              | —              | M3×5ℓ                 | 5 | 8.5   | −0.5                                          | 5                             | SSR | 15X |
|           | 20X | 58              | 26   | 30             | 15 | 25             | 4.2            | —              | —              | 6              | 6              | M3×5ℓ                 | 4 | 8     | −0.5                                          | 5                             |     | 20X |
|           | 25X | 71              | 33   | 38             | 20 | 29             | 5              | —              | —              | 6              | 7              | M3×5ℓ                 | 7 | 11.5  | −1                                            | 7                             |     | 25X |
|           | 30X | 76              | 37.5 | 37.5           | 20 | 35             | 9              | 12             | 17             | —              | —              | M4×6ℓ                 | 3 | 8     | —                                             | 7                             |     | 30X |
|           | 35X | 84              | 39   | 39             | 20 | 44             | 7              | 14             | 20             | —              | —              | M5×10ℓ                | 2 | 7     | —                                             | 7                             |     | 35X |

Note1) When desiring to use the dedicated bellows other than in horizontal mount (i.e., vertical, wall and inverted mount), or when desiring a heat-resistant type of bellows, contact THK.

Note2) For lubrication when using the dedicated bellows, contact THK.

Note3) When using the dedicated bellows, the LM block and LM rail need to be machined so that the bellows can be mounted. Be sure to indicate that the dedicated bellows is required when ordering the LM Guide.

**Model number coding****JSSR35X - 60/420**

Model number of  
bellows for SSR35X

Dimensions of the bellows  
(length when compressed  
/ length when extended)

Note) The length of the bellows  
is calculated as follow.

$$L_{min} = \frac{S}{(A-1)} \quad S: \text{Stroke length (mm)}$$

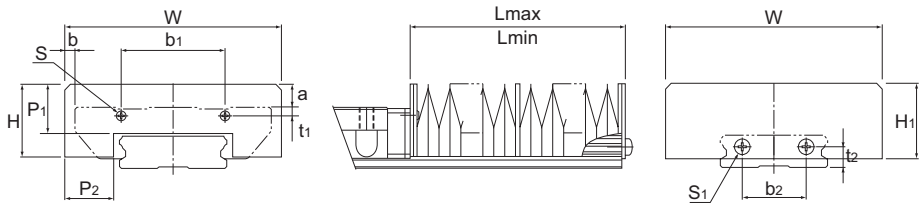
$$L_{max} = L_{min} \cdot A \quad A: \text{Extension rate}$$

**[Model JSV Dedicated Bellows for Models SVR/SVS/NR-X/NRS-X]**

For models SVR/SVS and NR/NRS-X, the model JSV simplified bellows is available. Contact THK for details.

[Dedicated Bellows JSHW for Model SHW]

The table below shows the dimensions of dedicated bellows JSHW for model SHW. Specify the corresponding model number of the desired bellows from the table.



Unit: mm

| Model No. |    | Main dimensions |      |                |                |                |                |                |                |                | Supported model numbers |    |
|-----------|----|-----------------|------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-------------------------|----|
|           |    | W               | H    | H <sub>1</sub> | P <sub>1</sub> | P <sub>2</sub> | b <sub>1</sub> | t <sub>1</sub> | b <sub>2</sub> | t <sub>2</sub> |                         |    |
| JSHW      | 17 | 68              | 22   | 23             | 15             | 15.4           | 39             | 2.6            | 18             | 6              | SHW                     | 17 |
|           | 21 | 75              | 25   | 26             | 17             | 17             | 35.8           | 2.9            | 22             | 7              |                         | 21 |
|           | 27 | 85              | 33.5 | 33.5           | 20             | 20             | 25             | 3.5            | 20             | 10             |                         | 27 |
|           | 35 | 120             | 35   | 35             | 20             | 20             | 75             | 7.5            | 40             | 13             |                         | 35 |
|           | 50 | 164             | 42   | 42             | 20             | 20             | 89.4           | 14             | 50             | 16             |                         | 50 |

Unit: mm

| Model No. |    | Other dimensions |                |    |          |          | A<br>$\left(\frac{L_{\max}}{L_{\min}}\right)$ |
|-----------|----|------------------|----------------|----|----------|----------|-----------------------------------------------|
|           |    | Mounting bolt    |                | a  | b        |          |                                               |
|           |    |                  |                |    | Model CA | Model CR |                                               |
|           |    | *S               | S <sub>1</sub> |    |          |          |                                               |
| JSHW      | 17 | M2×4ℓ            | M3×6ℓ          | 8  | 4        | 9        | 5                                             |
|           | 21 | M2×5ℓ            | M3×6ℓ          | 8  | 3.5      | 10.5     | 6                                             |
|           | 27 | M2.6×6ℓ          | M3×6ℓ          | 10 | 2.5      | 11.5     | 7                                             |
|           | 35 | M3×8ℓ            | M3×6ℓ          | 6  | 0        | 10       | 7                                             |
|           | 50 | M4×12ℓ           | M4×8ℓ          | —  | 1        | 17       | 7                                             |

- Note1) When desiring to use the dedicated bellows other than in horizontal mount (i.e., vertical, wall and inverted mount), or when desiring a heat-resistant type of bellows, contact THK.
- Note2) For lubrication when using the dedicated bellows, contact THK.
- Note3) For the mounting bolts marked with "\*", use tapping screws.
- Note4) When using the dedicated bellows, the LM block and LM rail need to be machined so that the bellows can be mounted. Be sure to indicate that the dedicated bellows is required when ordering the LM Guide.

Model number coding

**JSHW21 - 60/360**

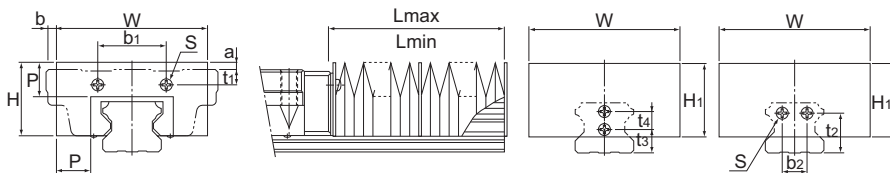
Model number of bellows for SHW21      Dimensions of the bellows (length when compressed / length when extended)

Note) The length of the bellows is calculated as follow.

$$L_{min} = \frac{S}{(A-1)} \quad S: \text{Stroke length (mm)}$$
$$L_{max} = L_{min} \cdot A \quad A: \text{Extension rate}$$

**[Dedicated Bellows JH for Model HSR]**

The table below shows the dimensions of dedicated bellows JH for model HSR. Specify the corresponding model number of the desired bellows from the table.



Models HSR15 to 30    Models HSR35 to 85

Unit: mm

| Model No. |    | Main dimensions |    |                |    |                |                |     |                |                |                |                |                 |       |     |       |       | A<br>$\left(\frac{L_{\max}}{L_{\min}}\right)$ | Supported model numbers |    |
|-----------|----|-----------------|----|----------------|----|----------------|----------------|-----|----------------|----------------|----------------|----------------|-----------------|-------|-----|-------|-------|-----------------------------------------------|-------------------------|----|
|           |    | W               | H  | H <sub>1</sub> | P  | b <sub>1</sub> | t <sub>1</sub> |     | b <sub>2</sub> | t <sub>2</sub> | t <sub>3</sub> | t <sub>4</sub> | Mounting bolt S | a     |     | b     |       |                                               |                         |    |
|           |    |                 |    |                |    |                | A/B/C          | R   |                |                |                |                |                 | A/B/C | R   | A/B/C | R     |                                               |                         |    |
| JH        | 15 | 55              | 27 | 30             | 15 | 25             | 2.5            | 6.5 | —              | —              | 10             | —              | *M4×8ℓ          | 7.5   | 3.5 | —4    | —10.5 | 5                                             | HSR                     | 15 |
|           | 20 | 66              | 32 | 35             | 17 | 34             | 5              | 5   | —              | —              | 6              | 8              | M3×6ℓ           | 7     | 7   | —1.5  | —11   | 6                                             |                         | 20 |
|           | 25 | 78              | 38 | 38             | 20 | 30             | 7              | 11  | —              | —              | 10             | 8              | M3×6ℓ           | 8.5   | 4.5 | —4    | —15   | 7                                             |                         | 25 |
|           | 30 | 84              | 42 | 42             | 20 | 40             | 8              | 11  | —              | —              | 11             | 10             | M4×8ℓ           | 7     | 4   | 3     | —12   | 7                                             |                         | 30 |
|           | 35 | 88              | 43 | 43             | 20 | 40             | 9              | 16  | 14             | 23             | —              | —              | M4×8ℓ           | 4     | —   | 6     | —9    | 7                                             |                         | 35 |
|           | 45 | 100             | 51 | 51             | 20 | 58             | 10             | 20  | 20             | 29             | —              | —              | M5×10ℓ          | —     | —   | 10    | —7    | 7                                             |                         | 45 |
|           | 55 | 108             | 54 | 54             | 20 | 66             | 11             | 21  | 26             | 35             | —              | —              | M5×10ℓ          | —     | —   | 16    | —4    | 7                                             |                         | 55 |
|           | 65 | 132             | 68 | 68             | 20 | 80             | 19             | 19  | 32             | 42             | —              | —              | M6×12ℓ          | —     | —   | 19    | —3    | 7                                             |                         | 65 |
|           | 85 | 170             | 88 | 88             | 30 | 105            | 23             | 23  | 44             | 50             | —              | —              | M6×12ℓ          | —     | —   | 22.5  | —7    | 10                                            |                         | 85 |

Note1) For model JH15's location marked with "\*", mounting bolts are used only on the LM rail side while the LM block side uses M2 x 5 (nominal) tapping screws.

Note2) When desiring to use the dedicated bellows other than in horizontal mount (i.e., vertical, wall and inverted mount), or when desiring a heat-resistant type of bellows, contact THK.

Note3) For lubrication when using the dedicated bellows, contact THK.

Note4) When using the dedicated bellows, the LM block and LM rail need to be machined so that the bellows can be mounted. Be sure to indicate that the dedicated bellows is required when ordering the LM Guide.

**Model number coding****JH25 - 60/420**

Model number of bellows for HSR25    Dimensions of the bellows (length when compressed / length when extended)

Note) The length of the bellows is calculated as follow.

$$L_{min} = \frac{S}{(A-1)} \quad S: \text{Stroke length (mm)}$$

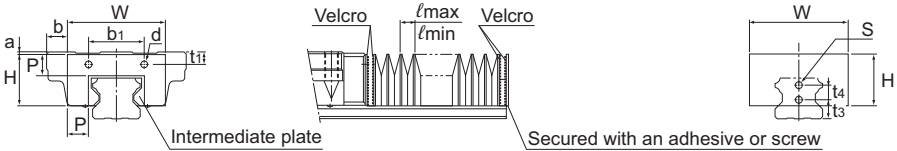
$$L_{max} = L_{min} \cdot A \quad A: \text{Extension rate}$$

[Dedicated Bellows DH for Model HSR]

For models HSR15, 20 and 25, bellows DH, which has the following features, is also available other than the dedicated bellows JH. Specify the corresponding model number of the desired bellows from the table.

● Features

- (1) Has a width and height smaller than the conventional product so that any part of the bellows does not stick out of the top face of the LM block. The extension rate is equal to or greater than that of the conventional type.
  - (2) Has an intermediate plate for each crest so that it will not easily lift and the bellows can be used with vertical mount, wall mount and slant mount.
  - (3) Operable at high speed, at up to 120 m/min.
  - (4) Since a Velcro tape can be used to install the bellows, a regular-size model can be cut to the desired length, or two or more regular-size bellows can be taped together.
  - (5) Can be installed using screws just as bellows JH.
- In this case, a plate (thickness: 1.6 mm) must be placed between the bellows and the LM block. Contact THK for details.



Unit: mm

| Model No. |    | Main dimensions |      |     |                |                |     |                |                |      |      |       |   |       |      |                  |                  |                |   | Supported model numbers |     |    |  |
|-----------|----|-----------------|------|-----|----------------|----------------|-----|----------------|----------------|------|------|-------|---|-------|------|------------------|------------------|----------------|---|-------------------------|-----|----|--|
|           |    |                 |      |     |                | t <sub>1</sub> |     |                |                |      |      | a     |   | b     |      |                  |                  | Extension rate |   |                         |     |    |  |
|           |    | W               | H    | P   | b <sub>1</sub> | A/B/C          | R   | t <sub>3</sub> | t <sub>4</sub> | d    | s    | A/B/C | R | A/B/C | R    | l <sub>max</sub> | l <sub>min</sub> | A              | E | k                       |     |    |  |
| DH        | 15 | 35              | 19.5 | 8.5 | 25             | 2.5            | 6.5 | 10             | —              | φ2.5 | φ5   | 0     | 4 | 6     | −0.5 | 10               | 2.5              | 4              | 2 | 1.2                     |     | 15 |  |
|           | 20 | 45              | 25   | 10  | 34             | 5              | 5   | 6              | 8              | φ4   | φ4   | 0     | 0 | 9     | −0.5 | 13               | 2.5              | 5              | 2 | 1.3                     | HSR | 20 |  |
|           | 25 | 52              | 29.5 | 12  | 30             | 7              | 11  | 10             | 8              | φ3.5 | φ3.5 | 0     | 4 | 9     | −2   | 15               | 3                | 5              | 2 | 1.3                     |     | 25 |  |

Note1) For lubrication when using the dedicated bellows, contact THK.  
Note2) When using the dedicated bellows, the LM block and LM rail need to be machined so that the bellows can be mounted. Be sure to indicate that the dedicated bellows is required when ordering the LM Guide.

Model number coding

DH20 - 50/250

Model number of bellows for HSR20

Dimensions of the bellows (length when compressed / length when extended)

Note) The maximum length of the bellows itself is calculated as follows.  
 $L_{max} (L_{min}) = l_{max} (l_{min}) \times 200$   
Example of calculating bellows dimensions:  
When the stroke of model HSR20 is:  $l_s=530\text{mm}$

$$L_{min} = \frac{l_s}{(A-1)} = \frac{530}{4} = 132.5 \div 135$$
$$L_{max} = A \cdot L_{min} = 5 \times 135 = 675$$

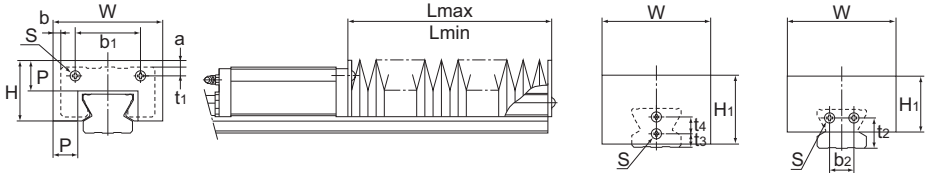
Number of required crests n

$$n = \frac{L_{max}}{P \cdot k} = \frac{675}{10 \times 1.3} = 51.9 \div 52 \text{ crests}$$
$$L_{min} = n \cdot l_{min} + E = 52 \times 2.5 + 2 = 132$$

(E indicates the plate thickness of 2)  
Therefore, the model number of the required bellows is DH20-132/675.

**[Dedicated Bellows JS for Model SR]**

The table below shows the dimensions of dedicated bellows JS for model SR. Specify the corresponding model number of the desired bellows from the table.



Models SR15 to 25      Models SR30 to 70

Unit: mm

| Model No. |    | Main dimensions |      |                |    |                |                |                |                |                |                |                       |      |      |       | $\frac{A}{\left(\frac{L_{\max}}{L_{\min}}\right)}$ | Supported<br>model<br>numbers |    |
|-----------|----|-----------------|------|----------------|----|----------------|----------------|----------------|----------------|----------------|----------------|-----------------------|------|------|-------|----------------------------------------------------|-------------------------------|----|
|           |    | W               | H    | H <sub>1</sub> | P  | b <sub>1</sub> | t <sub>1</sub> | b <sub>2</sub> | t <sub>2</sub> | t <sub>3</sub> | t <sub>4</sub> | Mounting<br>bolt<br>S | a    | b    |       |                                                    |                               |    |
|           |    |                 |      |                |    |                |                |                |                |                |                |                       |      | W/V  | TB/SB |                                                    |                               |    |
| JS        | 15 | 51              | 24   | 26             | 15 | 22             | 3.4            | —              | —              | 8              | —              | M3×6ℓ                 | 5    | 8.5  | −0.5  | 5                                                  | SR                            | 15 |
|           | 20 | 58              | 26   | 30             | 15 | 25             | 4.2            | —              | —              | 6              | 6              | M3×6ℓ                 | 4    | 8    | −0.5  | 5                                                  |                               | 20 |
|           | 25 | 71              | 33   | 38             | 20 | 29             | 5              | —              | —              | 6              | 7              | M3×6ℓ                 | 7    | 11.5 | −1    | 7                                                  |                               | 25 |
|           | 30 | 76              | 37.5 | 37.5           | 20 | 42             | 5              | 12             | 17             | —              | —              | M4×8ℓ                 | 3    | 8    | −7    | 7                                                  |                               | 30 |
|           | 35 | 84              | 39   | 39             | 20 | 44             | 6.5            | 14             | 20             | —              | —              | M5×10ℓ                | 1.5  | 7    | −8    | 7                                                  |                               | 35 |
|           | 45 | 95              | 47.5 | 47.5           | 20 | 60             | 8              | 22             | 27             | —              | —              | M5×10ℓ                | −1.5 | 5    | −12.5 | 7                                                  |                               | 45 |
|           | 55 | 108             | 55.5 | 55.5           | 25 | 70             | 10             | 24             | 28             | —              | —              | M6×12ℓ                | −0.5 | 4    | −16   | 9                                                  |                               | 55 |
|           | 70 | 144             | 67   | 67             | 30 | 90             | 13             | 34             | 35             | —              | —              | M6×12ℓ                | −3   | 9    | —     | 10                                                 |                               | 70 |

Note1) When desiring to use the dedicated bellows other than in horizontal mount (i.e., vertical, wall and inverted mount), or when desiring a heat-resistant type of bellows, contact THK.

Note2) For lubrication when using the dedicated bellows, contact THK.

Note3) When using the dedicated bellows, the LM block and LM rail need to be machined so that the bellows can be mounted. Be sure to indicate that the dedicated bellows is required when ordering the LM Guide.

**Model number coding****JS55 - 60/540**

Model number of  
bellows for SR55

Dimensions of the bellows  
(length when compressed  
/ length when extended)

Note) The length of the bellows  
is calculated as follow.

$$L_{\min} = \frac{S}{(A-1)} \quad S: \text{Stroke length (mm)}$$

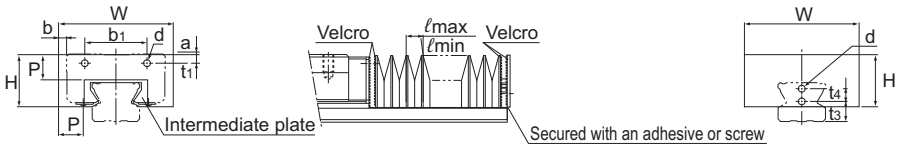
$$L_{\max} = L_{\min} \cdot A \quad A: \text{Extension rate}$$

[Dedicated Bellows DS for Model SR]

For models SR15, 20 and 25, bellows DS, which has the following features, is also available other than the dedicated bellows JS. Specify the corresponding model number of the desired bellows from the table.

● Features

- (1) Has a width and height smaller than the conventional product so that any part of the bellows does not stick out of the top face of the LM block. The extension rate is equal to or greater than that of the conventional type.
  - (2) Has an intermediate plate for each crest so that it will not easily lift and the bellows can be used with vertical mount, wall mount and slant mount.
  - (3) Operable at high speed, at up to 120 m/min.
  - (4) Since a Velcro tape can be used to install the bellows, a regular-size model can be cut to the desired length, or two or more regular-size bellows can be taped together.
  - (5) Can be installed using screws just as the conventional type.
- In this case, a plate (thickness: 1.6 mm) must be placed between the bellows and the LM block. Contact THK for details.



Unit: mm

| Model No. |    | Main dimensions |    |    |                |                |                |                |     |   |     |       |                  |                  |                     |   |             | Supported model numbers |    |
|-----------|----|-----------------|----|----|----------------|----------------|----------------|----------------|-----|---|-----|-------|------------------|------------------|---------------------|---|-------------|-------------------------|----|
|           |    | W               | H  | P  | b <sub>1</sub> | t <sub>1</sub> | t <sub>3</sub> | t <sub>4</sub> | d   | a | b   |       | ℓ <sub>max</sub> | ℓ <sub>min</sub> | Extension rate<br>A | E | Factor<br>k |                         |    |
|           |    |                 |    |    |                |                |                |                |     |   | W/V | TB/SB |                  |                  |                     |   |             |                         |    |
|           |    |                 |    |    |                |                |                |                |     |   |     |       |                  |                  |                     |   |             |                         |    |
| DS        | 15 | 38              | 19 | 10 | 22             | 3.4            | 8              | —              | 3.5 | 0 | 2   | −7    | 13               | 2.5              | 5                   | 2 | 1.3         | SR                      | 15 |
|           | 20 | 49              | 22 | 10 | 25             | 4.2            | 6              | 6              | 4   | 0 | 3.5 | −5    | 13               | 2.5              | 5                   | 2 | 1.3         |                         | 20 |
|           | 25 | 56              | 26 | 12 | 29             | 5              | 6              | 7              | 4   | 0 | 4   | −8.5  | 15               | 3                | 5                   | 2 | 1.3         |                         | 25 |

Note1) For lubrication when using the dedicated bellows, contact THK.  
Note2) When using the dedicated bellows, the LM block and LM rail need to be machined so that the bellows can be mounted. Be sure to indicate that the dedicated bellows is required when ordering the LM Guide.

Model number coding

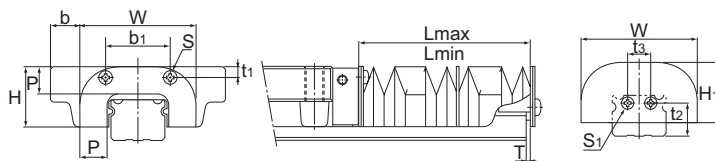
DS20 - 50/250

Model number of bellows for SR20      Dimensions of the bellows (length when compressed / length when extended)

Note) The maximum length of the bellows itself is calculated as follows.  
 $L_{max} (L_{min}) = \ell_{max} (\ell_{min}) \times 200$   
Example of calculating bellows dimensions:  
When the stroke of model SR20 is:  $\ell_s=530\text{mm}$   
$$L_{min} = \frac{\ell_s}{(A-1)} = \frac{530}{4} = 132.5 \div 135$$
  
$$L_{max} = A \cdot L_{min} = 5 \times 135 = 675$$
  
Number of required crests n  
$$n = \frac{L_{max}}{P \cdot k} = \frac{675}{10 \times 1.3} = 51.9 \div 52 \text{ crests}$$
  
$$L_{min} = n \cdot \ell_{min} + E = 52 \times 2.5 + 2 = 132$$
  
(E indicates the plate thickness of 2)  
Therefore, the model number of the required bellows is DS20-132/675.

**[Simplified Bellows JN Dedicated for Models NR/NRS]**

For models NR/NRS, bellows are available. Fig.1 To gain a higher contamination protection effect, attach a telescopic cover outside the bellows after the bellows are mounted.



Models NR/NRS 75 to 100

Unit: mm

| Model No. |     | Main dimensions |      |                |    |                |                |                |                |               |                |                   | T   | A<br>$\left(\frac{L_{max}}{L_{min}}\right)$ | Supported model numbers |     |
|-----------|-----|-----------------|------|----------------|----|----------------|----------------|----------------|----------------|---------------|----------------|-------------------|-----|---------------------------------------------|-------------------------|-----|
|           |     | W               | H    | H <sub>1</sub> | P  | b <sub>1</sub> | t <sub>1</sub> | t <sub>2</sub> | t <sub>3</sub> | Mounting bolt |                | b<br>A,LA<br>B,LB |     |                                             |                         |     |
|           |     |                 |      |                |    |                |                |                |                | S             | S <sub>1</sub> |                   |     |                                             |                         |     |
| JN        | 75  | 145             | 64   | 64             | 30 | 80             | 10.5           | 34.2           | 26             | M6×12ℓ        | M6×5ℓ          | 25                | 3.2 | 20                                          | NR/<br>NRS              | 75  |
|           | 85  | 156             | 70.5 | 70.5           | 30 | 110            | 15.5           | 39.5           | 28             | M6×12ℓ        | M6×5ℓ          | 39.5              | 3.2 | 20                                          |                         | 85  |
|           | 100 | 200             | 82   | 82             | 30 | 140            | 15             | 40             | 34             | M8×16ℓ        | M6×5ℓ          | 30                | 3.2 | 20                                          |                         | 100 |

Note1) When desiring to use the bellows other than in horizontal mount (i.e., vertical, wall and inverted mount), or when desiring a heat-resistant type of bellows, contact THK.

Note2) For lubrication when using the bellows, contact THK.

Note3) When using the bellows, the LM block and LM rail need to be machined so that the bellows can be mounted. Be sure to indicate that the bellows is required when ordering the LM Guide.

**Model number coding****JN75 - 60/420**

Model number of  
bellows for NR/NRS

Dimensions of the bellows  
(length when compressed  
/ length when extended)

Note) The length of the bellows  
is calculated as follow.

$$L_{min} = \frac{S}{(A-1)} \quad S: \text{Stroke length (mm)}$$

$$L_{max} = L_{min} \cdot A \quad A: \text{Extension rate}$$

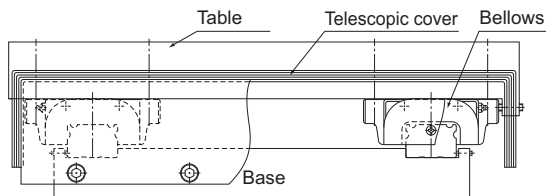
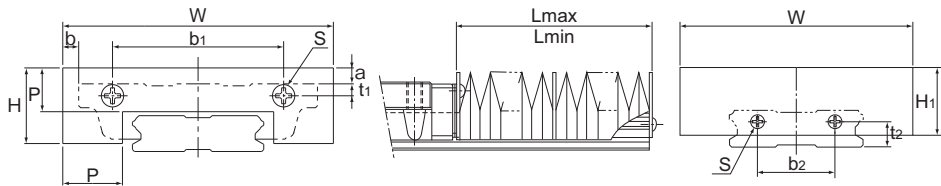


Fig.1 Example of Mounting the Bellows

[Dedicated Bellows JHRW for Model HRW]

The table below shows the dimensions of dedicated bellows JHRW for model HRW. Specify the corresponding model number of the desired bellows from the table.



Unit: mm

| Model No. |    | Main dimensions |      |                |    |                |                |                |                |                       |    |             |             | $\left(\frac{A}{L_{\max}}\right)$<br>$\left(\frac{L_{\max}}{L_{\min}}\right)$ | Supported<br>model<br>numbers |    |
|-----------|----|-----------------|------|----------------|----|----------------|----------------|----------------|----------------|-----------------------|----|-------------|-------------|-------------------------------------------------------------------------------|-------------------------------|----|
|           |    | W               | H    | H <sub>1</sub> | P  | b <sub>1</sub> | t <sub>1</sub> | b <sub>2</sub> | t <sub>2</sub> | Mounting<br>bolt<br>S | a  | b           |             |                                                                               |                               |    |
|           |    |                 |      |                |    |                |                |                |                |                       |    | Model<br>CA | Model<br>CR |                                                                               |                               |    |
| JHRW      | 17 | 68              | 22   | 23             | 15 | 43             | 3              | 18             | 6              | *M3×6ℓ                | 8  | 4           | 9           | 5                                                                             | HRW                           | 17 |
|           | 21 | 75              | 25   | 26             | 17 | 48             | 3              | 22             | 7              | M3×6ℓ                 | 8  | 3.5         | 10.5        | 6                                                                             |                               | 21 |
|           | 27 | 85              | 33.5 | 33.5           | 20 | 48             | 3              | 20             | 10             | M3×6ℓ                 | 10 | 2.5         | 11.5        | 7                                                                             |                               | 27 |
|           | 35 | 120             | 35   | 35             | 20 | 75             | 3.5            | 40             | 13             | M3×6ℓ                 | 6  | 0           | 10          | 7                                                                             |                               | 35 |
|           | 50 | 164             | 42   | 42             | 20 | 100            | 9              | 50             | 16             | M4×8ℓ                 | −3 | 1           | 17          | 7                                                                             |                               | 50 |

- Note1) For model JHRW17's location marked with "\*", mounting bolts are used only on the LM rail side while the LM block side uses M2.5 x 8 (nominal) tapping screws.
- Note2) When desiring to use the dedicated bellows other than in horizontal mount (i.e., vertical, wall and inverted mount), or when desiring a heat-resistant type of bellows, contact THK.
- Note3) For lubrication when using the dedicated bellows, contact THK.
- Note4) When using the dedicated bellows, the LM block and LM rail need to be machined so that the bellows can be mounted. Be sure to indicate that the dedicated bellows is required when ordering the LM Guide.

Model number coding

JHRW21 - 60/360

Model number of  
bellows for HRW21

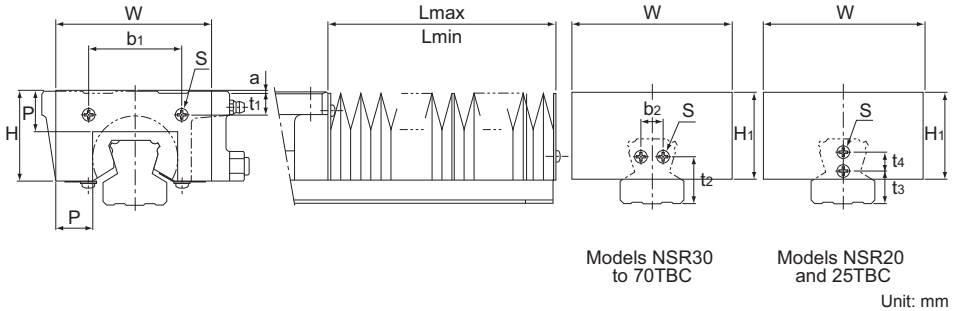
Dimensions of the bellows  
(length when compressed  
/ length when extended)

Note) The length of the bellows  
is calculated as follow.

$$L_{\min} = \frac{S}{(A-1)} \quad S: \text{Stroke length (mm)}$$
$$L_{\max} = L_{\min} \cdot A \quad A: \text{Extension rate}$$

**[Dedicated Bellows J for Model NSR-TBC]**

The table below shows the dimensions of dedicated bellows J for model NSR-TBC. Specify the corresponding model number of the desired bellows from the table.



| Model No. |    | Main dimensions |    |                |    |                |                |                |                |                |                |                 |   |   | $\frac{A}{L_{\max} - L_{\min}}$ | Supported model numbers |  |
|-----------|----|-----------------|----|----------------|----|----------------|----------------|----------------|----------------|----------------|----------------|-----------------|---|---|---------------------------------|-------------------------|--|
|           |    | W               | H  | H <sub>1</sub> | P  | b <sub>1</sub> | t <sub>1</sub> | b <sub>2</sub> | t <sub>2</sub> | t <sub>3</sub> | t <sub>4</sub> | Mounting bolt S | a |   |                                 |                         |  |
| J         | 20 | 65              | 39 | 43             | 20 | 26             | 8              | —              | —              | 9              | 8              | M4×8ℓ           | 8 | 7 | NSR                             | 20TBC                   |  |
|           | 25 | 75              | 43 | 45             | 20 | 40             | 11             | —              | —              | 12             | 8              | M4×8ℓ           | 3 | 7 |                                 | 25TBC                   |  |
|           | 30 | 85              | 46 | 46             | 20 | 50             | 12             | 12             | 25             | —              | —              | M4×8ℓ           | — | 7 |                                 | 30TBC                   |  |
|           | 40 | 115             | 59 | 59             | 25 | 60             | 13             | 16             | 32             | —              | —              | M5×10ℓ          | — | 9 |                                 | 40TBC                   |  |
|           | 50 | 115             | 66 | 66             | 25 | 75             | 11             | 20             | 32             | —              | —              | M5×10ℓ          | — | 9 |                                 | 50TBC                   |  |
|           | 70 | 124             | 84 | 78             | 25 | 96             | 16             | 36             | 40             | —              | —              | M6×12ℓ          | — | 9 |                                 | 70TBC                   |  |

Note1) When desiring to use the dedicated bellows other than in horizontal mount (i.e., vertical, wall and inverted mount), or when desiring a heat-resistant type of bellows, contact THK.

Note2) For lubrication when using the dedicated bellows, contact THK.

Note3) When using the dedicated bellows, the LM block and LM rail need to be machined so that the bellows can be mounted. Be sure to indicate that the dedicated bellows is required when ordering the LM Guide.

**Model number coding****J50 - 60/540**

Model number of bellows for NSR50TBC

Dimensions of the bellows (length when compressed / length when extended)

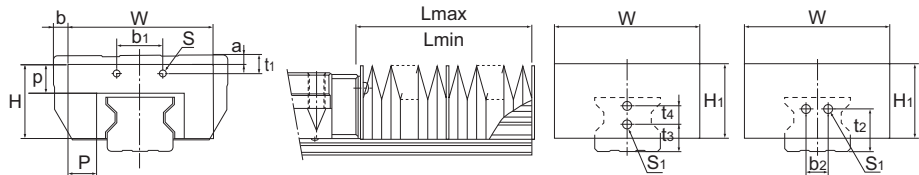
Note) The length of the bellows is calculated as follow.

$$L_{\min} = \frac{S}{(A-1)} \quad S: \text{Stroke length (mm)}$$

$$L_{\max} = L_{\min} \cdot A \quad A: \text{Extension rate}$$

[Dedicated Bellows JSRG for Model SRG]

The table below shows the dimensions of dedicated bellows JSRG for model SRG. Specify the corresponding model number of the desired bellows from the table.



Models SRG15 and 30      Models SRG35 to 100

Unit: mm

| Model No. |     | Main dimensions |      |                |      |      |                |                |      |                |                |                |                |              |                              |      |      |      | $\frac{A}{\left(\frac{L_{max}}{L_{min}}\right)}$ | Supported model numbers |     |     |
|-----------|-----|-----------------|------|----------------|------|------|----------------|----------------|------|----------------|----------------|----------------|----------------|--------------|------------------------------|------|------|------|--------------------------------------------------|-------------------------|-----|-----|
|           |     | W               | H    | H <sub>1</sub> | P    | p    | b <sub>1</sub> | t <sub>1</sub> |      | b <sub>2</sub> | t <sub>2</sub> | t <sub>3</sub> | t <sub>4</sub> | Screw size S | Mounting bolt S <sub>1</sub> | a    |      | b    |                                                  |                         |     |     |
|           |     |                 |      |                |      |      |                | A/C            | R/V  |                |                |                |                |              |                              | A/C  | R/V  | A/C  |                                                  |                         |     | R/V |
| JSRG      | 15  | 55              | 27   | 27             | 14.2 | 12.7 | 28             | 10.3           | 10.3 | —              | —              | 10.6           | —              | M2           | M4                           | 7    | 7    | 4    | 10.5                                             | 5                       | SRG | 15  |
|           | 20  | 66              | 32   | 32             | 17   | 15   | 38.5           | 9.6            | 9.6  | —              | —              | 7.4            | 8              | M2           | M3                           | 6.6  | 6.6  | 1.5  | 11                                               | 6                       |     | 20  |
|           | 25  | 78              | 38   | 38             | 23   | 18   | 27.6           | 3.9            | 7.9  | —              | —              | 10             | 8              | M2           | M3×6ℓ                        | -6.5 | -2.5 | 4    | 15                                               | 6                       |     | 25  |
|           | 30  | 84              | 42   | 42             | 22   | 19   | 37.4           | 10.4           | 13.4 | —              | —              | 11             | 10             | M3           | M4×8ℓ                        | -5   | -2   | 3    | 12                                               | 7                       |     | 30  |
|           | 35  | 88              | 42   | 42             | 22   | 15   | 35             | 5              | 12   | 13             | 23             | —              | —              | M3           | M4×4ℓ                        | 0    | 7    | 6    | -9                                               | 5                       |     | 35  |
|           | 45  | 100             | 51   | 51             | 20   | 20   | 32             | 7              | 17   | 15             | 29             | —              | —              | M3           | M5×4ℓ                        | 0    | 10   | 10   | -7                                               | 7                       |     | 45  |
|           | 55  | 108             | 57   | 57             | 20   | 20   | 36             | 10             | 20   | 25             | 35             | —              | —              | M3           | M5×4ℓ                        | 3    | 13   | 16   | -4                                               | 7                       |     | 55  |
|           | 65  | 132             | 75.5 | 75.5           | 28.5 | 25   | 46             | 9              | 9    | 28             | 42             | —              | —              | M4           | M6×5ℓ                        | 3    | 3    | 19   | -3                                               | 9                       |     | 65  |
|           | 85  | 168             | 91   | 91             | 35.5 | 30   | 120            | 15             | —    | 30             | 55             | —              | —              | M6           | M6×8ℓ                        | 3    | —    | 23.5 | —                                                | 9                       |     | 85  |
|           | 100 | 198             | 100  | 100            | 43   | 33   | 152            | 13.3           | —    | 36             | 60             | —              | —              | M6           | M6×8ℓ                        | 4    | —    | 26   | —                                                | 9                       |     | 100 |

- Note1) When desiring to use the dedicated bellows other than in horizontal mount (i.e., vertical, wall and inverted mount), or when desiring a heat-resistant type of bellows, contact THK.
- Note2) For lubrication when using the dedicated bellows, contact THK.
- Note3) When using the dedicated bellows, the LM block and LM rail need to be machined so that the bellows can be mounted. Be sure to indicate that the dedicated bellows is required when ordering the LM Guide.
- Note4) In case of oil lubrication, be sure to let THK know the mounting orientation and the exact position in each LM block where the piping joint should be attached.
- For the mounting orientation and the lubrication, see **A1-12** and **A24-2**, respectively.

Model number coding

JSRG35 - 60/420

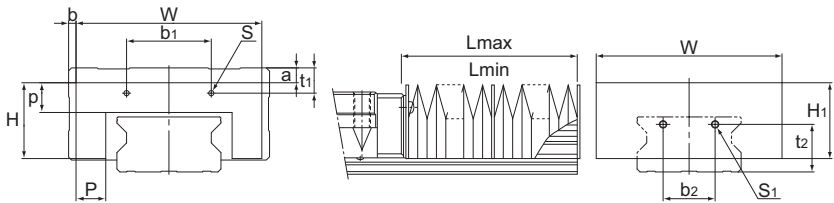
Model number of bellows for SRG35      Dimensions of the bellows (length when compressed / length when extended)

Note) The length of the bellows is calculated as follow.

$$L_{min} = \frac{S}{(A-1)} \quad S: \text{Stroke length (mm)}$$
$$L_{max} = L_{min} \cdot A \quad A: \text{Extension rate}$$

[Dedicated Bellows JSRW for Model SRW]

The table below shows the dimensions of dedicated bellows JSRW for model SRW. Specify the corresponding model number of the desired bellows from the table.



Unit: mm

| Model No. |     | Main dimensions |      |                |      |    |                |                |                |                |                 |                                 |    |      | $\frac{A}{\left(\frac{L_{max}}{L_{min}}\right)}$ | Supported model numbers |     |
|-----------|-----|-----------------|------|----------------|------|----|----------------|----------------|----------------|----------------|-----------------|---------------------------------|----|------|--------------------------------------------------|-------------------------|-----|
|           |     | W               | H    | H <sub>1</sub> | P    | p  | b <sub>1</sub> | t <sub>1</sub> | b <sub>2</sub> | t <sub>2</sub> | Screw size<br>S | Mounting bolt<br>S <sub>1</sub> | a  | b    |                                                  |                         |     |
| JSRW      | 70  | 125             | 51   | 51             | 20   | 20 | 57             | 17             | 35             | 32             | M3              | M5×4L                           | 10 | 5    | 7                                                | SRW                     | 70  |
|           | 85  | 138             | 57   | 57             | 20   | 20 | 68             | 20             | 42             | 36             | M3              | M5×4L                           | 13 | 13.5 | 7                                                |                         | 85  |
|           | 100 | 169             | 75.5 | 75.5           | 28.5 | 25 | 83             | 19             | 50             | 46             | M4              | M6×5L                           | 13 | 15.5 | 9                                                |                         | 100 |
|           | 130 | 220             | 96   | 96             | 36.5 | 35 | 165            | 35             | 60             | 55             | M6              | M6×8L                           | 18 | 20   | 9                                                |                         | 130 |
|           | 150 | 260             | 114  | 114            | 49   | 47 | 200            | 43.3           | 70             | 60             | M6              | M6×8L                           | 20 | 20   | 9                                                |                         | 150 |

Note1) For lubrication when using the dedicated bellows, contact THK.  
Note2) When desiring to use the dedicated bellows other than in horizontal mount (i.e., vertical, wall and inverted mount), or when desiring a heat-resistant type of bellows, contact THK.

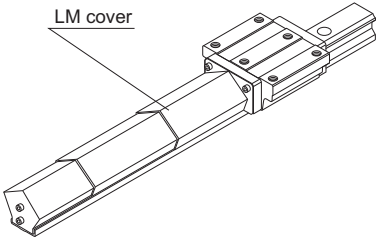
Model number coding

JSRW70 - 60/420

Model number of bellows for SRW70      Dimensions of the bellows (length when compressed / length when extended)

# Dedicated LM Cover

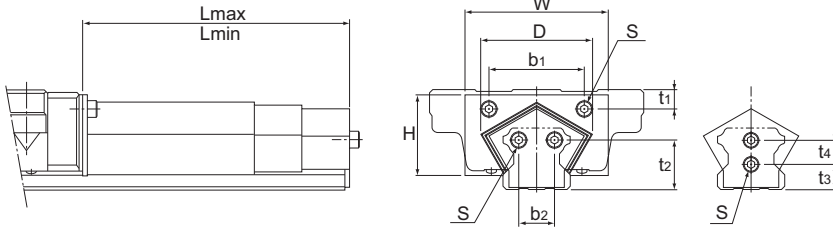
- For the supported models, see the table of options by model number on **A1-478**.
- For the dedicated LM cover dimensions, see **A1-533**.

| Item name          | Schematic diagram / mounting location                                             | Purpose/location of use                                                                                                                |
|--------------------|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Dedicated LM Cover |  | Used in locations exposed to dust or cutting chips<br>Used in locations where high temperature foreign material such as flying spatter |

## LM Cover

### [Dedicated LM Cover TPH for Model HSR]

The tables below show the dimensions of dedicated LM cover TPH for model HSR. Specify the corresponding model number of the desired bellows from the table.



Models HSR25 and 30

Unit: mm

| Model No. |    | Main dimensions |         |    |                |                |                |                |                |                |                 | Supported model numbers |
|-----------|----|-----------------|---------|----|----------------|----------------|----------------|----------------|----------------|----------------|-----------------|-------------------------|
|           |    | W               | D (max) | H  | b <sub>1</sub> | t <sub>1</sub> | b <sub>2</sub> | t <sub>2</sub> | t <sub>3</sub> | t <sub>4</sub> | Mounting bolt S |                         |
| TPH       | 25 | 55              | 42      | 28 | 30             | 7              | —              | —              | 10             | 8              | M3×6 $\ell$     | 25                      |
|           | 30 | 60              | 48      | 34 | 40             | 8              | —              | —              | 11             | 10             | M4×8 $\ell$     | 30                      |
|           | 35 | 70              | 55      | 38 | 40             | 9              | 14             | 23             | —              | —              | M4×8 $\ell$     | 35                      |
|           | 45 | 90              | 75      | 48 | 58             | 10             | 20             | 29             | —              | —              | M5×10 $\ell$    | 45                      |
|           | 55 | 100             | 88      | 55 | 66             | 11             | 26             | 35             | —              | —              | M5×10 $\ell$    | 55                      |

Unit: mm

Unit: mm

| Model No. |    | Stage | L   |     | Stroke |
|-----------|----|-------|-----|-----|--------|
|           |    |       | min | max |        |
| TPH       | 25 | 3     | 200 | 530 | 330    |
|           |    | 3     | 150 | 380 | 230    |
|           |    | 3     | 100 | 230 | 130    |
|           | 30 | 3     | 250 | 680 | 430    |
|           |    | 3     | 200 | 530 | 330    |
|           |    | 3     | 150 | 380 | 230    |
|           | 35 | 3     | 300 | 830 | 530    |
|           |    | 3     | 250 | 680 | 430    |
|           |    | 3     | 200 | 530 | 330    |
|           |    | 3     | 150 | 380 | 230    |

| Model No. |    | Stage | L   |      | Stroke |
|-----------|----|-------|-----|------|--------|
|           |    |       | min | max  |        |
| TPH       | 45 | 3     | 350 | 980  | 630    |
|           |    | 3     | 300 | 830  | 530    |
|           |    | 3     | 250 | 680  | 430    |
|           |    | 3     | 200 | 530  | 330    |
|           |    | 3     | 150 | 380  | 230    |
|           | 55 | 4     | 400 | 1460 | 1060   |
|           |    | 4     | 350 | 1330 | 980    |
|           |    | 4     | 300 | 1060 | 760    |
|           |    | 4     | 250 | 860  | 610    |
|           |    | 4     | 200 | 680  | 430    |

Note1) For lubrication when using the dedicated LM cover, contact THK.

Note2) When using the dedicated LM cover, the LM block and LM rail need to be machined so that the bellows can be mounted. Be sure to indicate that the dedicated bellows is required when ordering the LM Guide.

### Model number coding

## TPH55 - 400/1460

Model number of  
LM cover for HSR55

Lmax  
(cover length when extended)

Lmin (cover length when compressed)

# Dedicated Cap for LM Rail Mounting Holes

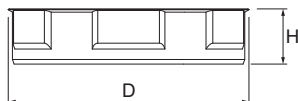
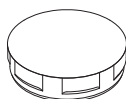
Using dedicated caps to cover the LM rail mounting holes helps prevent foreign material from entering the mounting holes and LM block.



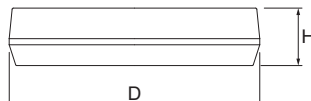
## ● Cap CV/Cap C

The caps are made of a special synthetic resin.

The CV cap is the successor to the C cap, and its new structure makes it easier to insert.



Cap CV



Cap C

Dimensions and Supported Model Numbers

| Model No. | Bolt used | Main dimensions(mm) |     | Supported model number |        |                    |        |                     |     |                     |         |     |      |           |         |             |       |       |         |
|-----------|-----------|---------------------|-----|------------------------|--------|--------------------|--------|---------------------|-----|---------------------|---------|-----|------|-----------|---------|-------------|-------|-------|---------|
|           |           | D                   | H   | SSR                    | SR     | SVR SVS NR-X NRS-X | NR NRS | SHS HSR SCR CSR HCR | HMG | SHW HRW             | SRG SRN | SRW | GSR  | HR        | SRS RSR | SRS-W RSR-W | RSX   | RSX-W | NSR-TBC |
| C3        | M3        | 6.3                 | 1.2 | —                      | 15     | —                  | —      | 12                  | —   | —                   | —       | —   | —    | 1123 1530 | 12 15   | 9           | 12 15 | 9     | —       |
| C4        | M4        | 7.9                 | 1.0 | 15Y                    | —      | —                  | —      | 15                  | 15  | 12*, 14, 17, 21, 27 | 15      | —   | 15   | —         | —       | 14          | —     | —     | —       |
| CV5       | M5        | 9.8                 | 2.6 | 20 25                  | 20 25  | 25                 | —      | 20                  | —   | —                   | 20      | —   | 20   | 2042      | 20      | —           | —     | —     | 20      |
| CV6       | M6        | 11.4                | 2.6 | 25Y 30                 | 25Y 30 | 30                 | —      | 25                  | 25  | 35                  | 25      | —   | 25   | —         | 25      | —           | —     | —     | 25 30   |
| CV8       | M8        | 14.4                | 3.3 | 35                     | 35     | 35                 | —      | 30 35               | 35  | 50                  | 30 35   | —   | 30   | 2555 3065 | —       | —           | —     | —     | 40      |
| CV10      | M10       | 17.9                | 3.3 | —                      | 45     | —                  | —      | —                   | 60  | —                   | 70      | 35  | 3575 | —         | —       | —           | —     | —     | 50      |
| CV12      | M12       | 20.4                | 3.4 | —                      | 55     | 45                 | —      | 45                  | 45  | —                   | 45      | 85  | —    | 4085      | —       | —           | —     | —     | 70      |
| CV14      | M14       | 23.4                | 5.5 | —                      | —      | 55                 | —      | 55                  | —   | —                   | 55      | 100 | —    | —         | —       | —           | —     | —     | —       |
| CV16      | M16       | 26.4                | 5.6 | —                      | 70 85  | 65                 | —      | 65                  | 65  | —                   | 65      | 130 | —    | 50105     | —       | —           | —     | —     | —       |
| C20       | M20       | 32.3                | 5.7 | —                      | —      | —                  | 75     | —                   | —   | —                   | —       | —   | —    | —         | —       | —           | —     | —     | —       |
| C22       | M22       | 35.5                | 5.7 | —                      | —      | —                  | 85     | 85                  | —   | —                   | 85      | 150 | —    | —         | —       | —           | —     | —     | —       |
| C24       | M24       | 39.5                | 7.7 | —                      | —      | —                  | 100    | 100                 | —   | —                   | 100     | —   | —    | —         | —       | —           | —     | —     | —       |

\*#12 applies to SHW only.

Note1) Contact THK if this product will be used in special environments such as in a vacuum, at very low or high temperatures, or with coolants or corrosive solvents.

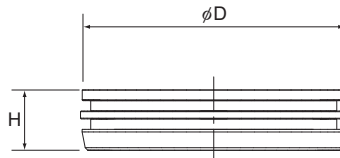
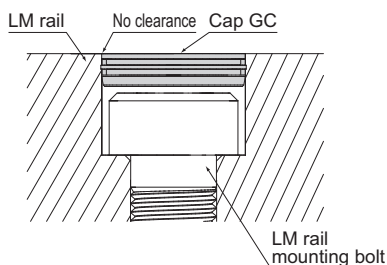
Note2) CV caps and C caps must be arranged separately from the LM Guide.

Note3) Contact THK if caps C5 to 16 are desired.

## ● Cap GC

GC caps are made of metal. (They are RoHS compliant.)

GC caps adhere closer to the counterbore than CV caps and C caps, so there is no clearance once they are inserted.



Dimensions and Supported Model Numbers

| Model No. | Bolt used | Main dimensions(mm) |     | LM Guide model number |        |                    |        |             |         |         |         |     |     |           |         |
|-----------|-----------|---------------------|-----|-----------------------|--------|--------------------|--------|-------------|---------|---------|---------|-----|-----|-----------|---------|
|           |           | D                   | H   | SSR                   | SR     | SVR SVS NR-X NRS-X | NR NRS | SHS HSR HCR | SCR CSR | SHW HRW | SRG SRN | SRW | GSR | HR        | NSR-TBC |
| GC5       | M5        | 9.86                | 2.5 | 20                    | 20     | 25                 | —      | 20          | 20      | —       | 20      | —   | 20  | 2042      | 20      |
| GC6       | M6        | 11.36               | 2.5 | 25Y 30                | 25Y 30 | 30                 | —      | 25          | 25      | 35      | 25      | —   | 25  | —         | 25 30   |
| GC8       | M8        | 14.36               | 3.5 | 35                    | 35     | 35                 | —      | 30 35       | 30 35   | 50      | 30 35   | —   | 30  | 2555 3065 | 40      |
| GC10      | M10       | 17.86               | 3.5 | —                     | 45     | —                  | —      | —           | —       | 60      | —       | 70  | 35  | 3575      | 50      |
| GC12      | M12       | 20.36               | 4.6 | —                     | 55     | 45                 | —      | 45          | 45      | —       | 45      | 85  | —   | 4085      | 70      |
| GC14      | M14       | 23.36               | 5.0 | —                     | —      | 55                 | —      | 55          | —       | —       | 55      | 100 | —   | —         | —       |
| GC16      | M16       | 26.36               | 5.0 | —                     | 70 85  | 65                 | —      | 65          | 65      | —       | 65      | 130 | —   | 50105     | —       |
| GC22      | M22       | 35.36               | 5.0 | —                     | —      | —                  | 85     | 85          | —       | —       | 85      | 150 | —   | —         | —       |
| GC24      | M24       | 39.36               | 5.0 | —                     | 120    | —                  | 100    | 100         | —       | —       | 100     | —   | —   | —         | —       |

Note1) GC caps are only sold with LM Guides. They are not sold separately.

The LM Guide model number code will have "GC" at the end when it is delivered.

(Example 1) Multiple axes: SVR45LR+1200L - II GC

GC caps attached  
Symbol for No. of rails used on the same plane (2 axes)

(Example 2) One axis: SVR45LR+1200L GC

GC caps attached

Note2) GC caps cannot be used with LM rails that are made of stainless steel or rails that have undergone surface treatment.

Note3) LM rail mounting holes for GC caps are special. (The mouth is not chamfered.)

Note4) Be careful not to injure your hand when inserting GC caps.

Note5) Be sure to make the GC caps level with the upper surface of the LM rail and clean (wipe) that surface after insertion.

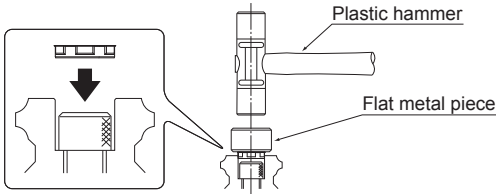
Note6) If this product will be used in special environments, such as in a vacuum or at very low or high temperatures, contact THK.

● Guidelines for use in extreme environments

| Extreme environment                      |                                                                  | Cap C<br>Cap CV | GC cap | Example of use                    |
|------------------------------------------|------------------------------------------------------------------|-----------------|--------|-----------------------------------|
| Foreign matter<br>concentration:<br>Low  | Metal powder, sputtering                                         | ○               | ◎      | Welding machines, robots          |
|                                          | Wood shavings, coolant<br>(Environments that strip<br>away oils) | ○               | ◎      | Woodworking machinery,<br>washers |
|                                          | Metal powder + coolant                                           | ○               | ◎      | Lathes, machining centers         |
| Foreign matter<br>concentration:<br>High | Metal powder, sputtering                                         | △               | ◎      | Welding machines, robots          |
|                                          | Wood shavings, coolant<br>(Environments that strip<br>away oils) | △               | ◎      | Woodworking machinery,<br>washers |
|                                          | Metal powder + coolant                                           | △               | ◎      | Lathes, machining centers         |

◎:Particularly effective ○:Effective △:Not particularly effective

● Cap insertion method

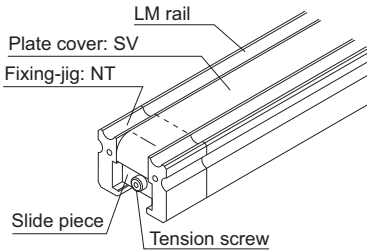
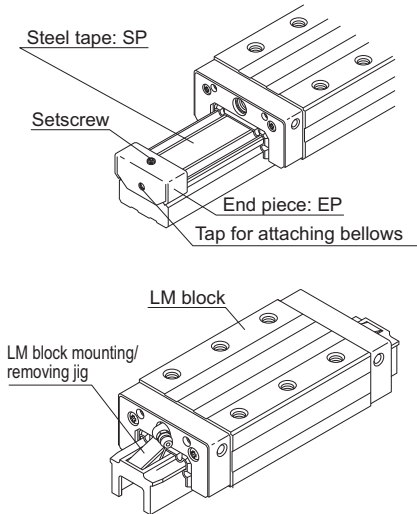


For best performance, caps must be inserted so that they are level with the rail surface. Have a flat aligning fitting and plastic hammer available.

- ① Set the cap on the LM rail mounting hole and place the alignment fitting on top.
- ② Use the plastic hammer to gradually drive the cap in until it is level with the upper surface of the LM rail.
- ③ As necessary, remove any slight burrs that appear.

# Plate Cover SV Steel Tape SP

●For the supported models, see the table of options by model number on **A1-478**.

| Item name      | Schematic diagram / mounting location                                                                                                                                                                                                | Purpose/location of use                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Plate Cover SV |  <p>LM rail</p> <p>Plate cover: SV</p> <p>Fixing-jig: NT</p> <p>Slide piece</p> <p>Tension screw</p>                                                | <p>For the LM Guide, steel tapes are available as a means of contamination protection for machine tools. By covering the LM rail mounting holes with an ultra-thin stainless steel (SUS304) plate, the plate cover SV drastically increases sealability, thus to prevent the penetration of a coolant or cutting chips from the top face of the LM rail.</p> <p>For the mounting method, see <b>A1-538</b>.</p> <p>Note) When mounting the plate cover, the LM rail needs to be machined. Indicate that the plate cover is required when ordering the LM Guide.</p>                                                                                       |
| Steel Tape SP  |  <p>Steel tape: SP</p> <p>Setscrew</p> <p>End piece: EP</p> <p>Tap for attaching bellows</p> <p>LM block</p> <p>LM block mounting/removing jig</p> | <p>For the LM Guide, steel tapes are available as a means of contamination protection for machine tools. By covering the LM rail mounting holes with an ultra-thin stainless steel (SUS304) plate, the steel tape SP drastically increases sealability, thus to prevent the penetration of a coolant or cutting chips from the top face of the LM rail. (When mounting the steel tape, end piece EP can be used as a means to secure the cover.)</p> <p>For the mounting method, see <b>A1-539</b>.</p> <p>Note) When mounting the steel tape, the LM rail needs to be machined. Indicate that the steel tape is required when ordering the LM Guide.</p> |

## [Mounting Procedure for Plate Cover SV]

- (1) Attach slide pieces to the plate cover.

Place the slide pieces on the plate cover with their chamfered sides facing outward, hold the plate cover with the slide pieces and the securing plates, and then secure them with countersunk screws.

- (2) Use an LM block mounting/removing jig to remove the LM block from the LM rail, and then mount the □xing-jigs onto the LM rail.
- (3) Temporarily secure either slide piece.

Insert either slide piece into one of the □xing-jigs, then attach the slide piece to the LM rail's end face using the tension adjustment bolt until the bolt head is inside the □xing-jig.

- (4) Temporarily secure the other slide piece.

Temporarily secure the other slide piece in the same manner as above.

- (5) Apply tension to the plate cover.

Apply tension to the plate cover by evenly securing the tension adjustment bolts on both ends of the LM rail. Make sure there is only a small difference between the H and H' dimensions in Fig.5. If the difference is too large, there may be no interference left on either end.

- (6) Mount the LM block on the LM rail.

Identify the reference surface of the LM rail and the LM block, then insert the LM rail into the LM block using the LM block mounting / removing jig.

Note1) When removing or the mounting the LM block, use much care not to let the balls fall off.

Note2) The plate cover is an ultra-thin stainless steel (SUS304) plate. When handling it, use much care not to bend it.

Note3) The plate cover is available for model NR/NRS 75.

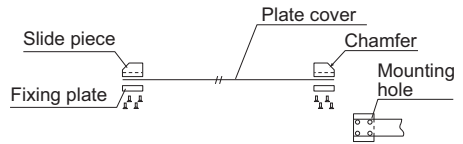


Fig.1



Fig.2

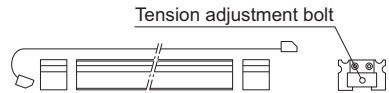


Fig.3



Fig.4



Fig.5

**[Mounting Procedure for Steel Tape SP]**

- (1) Use an LM block mounting/removing jig to remove the LM block from the LM rail.
- (2) Thoroughly degrease and clean the top face of the LM rail, to which the steel tape is to be adhered. For degreasing, use an adequately volatile detergent (e.g., industrial alcohol).
- (3) Carefully adhere the steel tape from the end with care not to let it bend or sag, while gradually peeling the release paper from the steel tape.
- (4) Have the steel tape settle on the rail by rubbing the tape. The adhesive strength increases with time. The adhering tape can be peeled off by pulling its end upward.
- (5) Mount the LM block onto the LM rail using the LM block mounting/removing jig.
- (6) Attach the end pieces on both ends of the LM rail and further secure the steel tape. When securing the end pieces, fasten only the setscrew on the top face of each end piece.

(The tap on the end face of the end piece is used for mounting bellows.)

Note1) The setscrew on the side face is used to lightly secure the bent steel tape. Be sure to stop fastening the screw as soon as it hits the end face, and do not force the screw further.

Note2) Since the steel tape is a thin steel plate, mishandling it may cause an accident such as cutting your finger. When handling it, take an effective safety measure such as wearing rubber gloves.

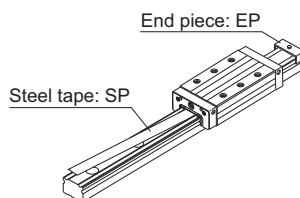


Fig.6

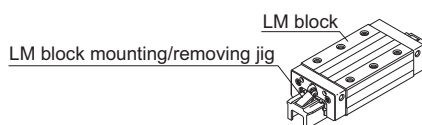


Fig.7

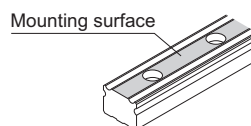


Fig.8

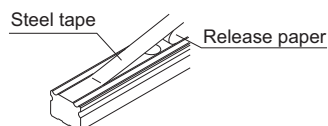


Fig.9

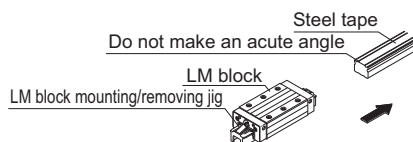


Fig.10

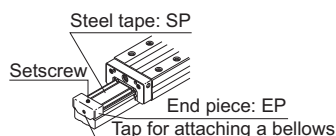


Fig.11

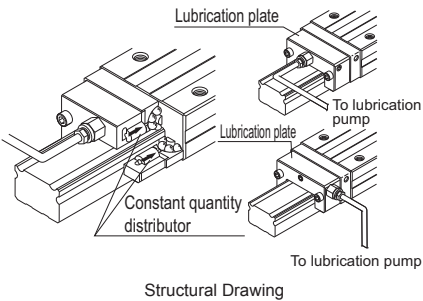
# Lubrication Adapter

An oil lubricant-only lubrication adapter is available for models NR/NRS. Even if the LM Guide is installed in an orientation where oil lubrication is difficult, such as wall mount and inversed mount, the adapter is capable of feeding a constant quantity of lubricant to the four raceways.

### [Features]

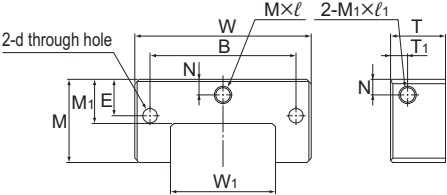
The dedicated lubrication adapter for models NR-NRS is built in with a constant quantity distributor. Therefore, the adapter can accurately feed a constant quantity of lubricant to each raceway regardless of the mounting orientation. The adapter is economical since it is capable of constantly feeding the optimum amount of lubricant and helping eliminate the supply of surplus lubricant.

To provide pipe arrangement, simply connect an intermittent lubrication pump widely used for ordinary machine tools to the greasing holes (M8) on the front and the side of the lubrication adapter.



### [Specifications]

|                                   |                                         |
|-----------------------------------|-----------------------------------------|
| Viscosity range of lubricant used | 32 to 64 mm <sup>2</sup> /s recommended |
| Discharge                         | 0.03×4, 0.06×4cc/1shot                  |
| Diameter of pipe connected        | φ4, φ6                                  |
| Material                          | Aluminum alloy                          |



Dimension Table

Unit: mm

| Model No. | Main dimensions |          |    |                |                |     |      |      |                |     |      |                                | Quantity per shot (cc/shot) |
|-----------|-----------------|----------|----|----------------|----------------|-----|------|------|----------------|-----|------|--------------------------------|-----------------------------|
|           | Width W         | Height M | T  | W <sub>1</sub> | M <sub>1</sub> | B   | E    | N    | T <sub>1</sub> | d   | M×ℓ  | M <sub>1</sub> ×ℓ <sub>1</sub> |                             |
| A30N      | 56              | 29       | 25 | 29             | 14.5           | 46  | 14   | 5    | 5.3            | 3.5 | M8×8 | M8×8                           | 0.03×4                      |
| A35N      | 66              | 33       | 25 | 35             | 17             | 54  | 16.5 | 6    | 5.3            | 4.5 | M8×8 | M8×8                           |                             |
| A45N      | 81              | 38       | 25 | 48             | 20             | 67  | 16.5 | 7    | 7.8            | 6.6 | M8×8 | M8×8                           |                             |
| A55N      | 94              | 45.5     | 25 | 56             | 22             | 76  | 20.5 | 7    | 7.8            | 6.6 | M8×8 | M8×8                           | 0.06×4                      |
| A65N      | 119             | 55.5     | 25 | 67             | 26.3           | 92  | 25.5 | 11.5 | 7.8            | 9   | M8×8 | M8×8                           |                             |
| A85N      | 147             | 68.5     | 25 | 92             | 34             | 114 | 32   | 15.5 | 7.8            | 9   | M8×8 | M8×8                           |                             |

# Removing/mounting Jig

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

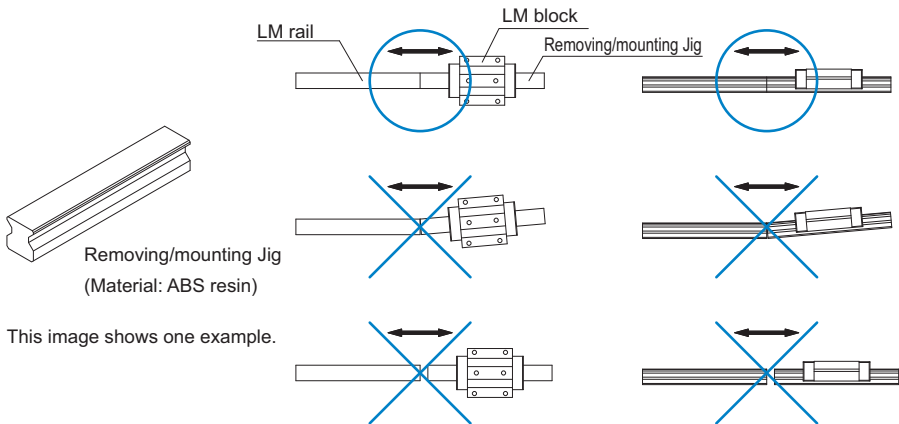
Mounting the LM block without using the removing/mounting jig may cause rolling elements to fall from the LM block due to contamination by foreign material, damage to internal components or slight inclination. Mounting the LM block with some of the rolling elements missing may also cause damage to the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

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

The removing/mounting jig may not be available, depending on model. If this is the case, use a spare LM rail. Contact THK for details.

If any of the rolling elements falls from the LM block, contact THK instead of using the product.

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



# End Piece EP

For those models whose balls may fall if the LM rail is pulled out of the LM block, an end piece is attached to the product to prevent the LM block from being removed from the LM rail.

For models that can use the end piece, see the table below.

If removing the end piece when using the LM Guide, be sure that the LM block will not overshoot.

The end piece can also be used as a ☐xing jig for a steel tape, and is available also for the LM rail of models SSR, SR and HSR.

Table1 Dimension Table for End Piece EP for Models NR/NRS  
Unit: mm

| Model No.  | A     | B  | C  | T   |
|------------|-------|----|----|-----|
| NR/NRS 75  | 81.7  | 28 | 56 | 3.2 |
| NR/NRS 85  | 91.4  | 22 | 68 | 3.2 |
| NR/NRS 100 | 106.4 | 25 | 73 | 3.2 |

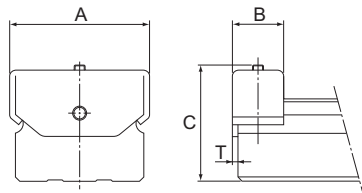


Fig.1 End Piece EP for Models NR/NRS

Model Number Coding

Model number configurations differ depending on the model features. Refer to the corresponding sample model number configuration.

[LM Guide]

- Models SHS, SSR, SVR/SVS, SHW, HSR, SR, NR/NRS-X, NR/NRS, HRW, JR, NSR-TBC, HSR-M1, SR-M1 and HSR-M2

| SHS25     | LC                                     | 2                  | QZ                                                                                              | KKHH | C0                                   | F                                                           | S                                                                                                                                                              | +1200L | P               | Z                              | T | F                                   | S                                                          | -II |
|-----------|----------------------------------------|--------------------|-------------------------------------------------------------------------------------------------|------|--------------------------------------|-------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-----------------|--------------------------------|---|-------------------------------------|------------------------------------------------------------|-----|
| Model No. | Type of LM block                       | With QZ Lubricator | Contamination protection accessory symbol (*1)                                                  |      |                                      |                                                             | LM rail length (in mm)                                                                                                                                         |        |                 | Symbol for LM rail jointed use |   |                                     | Symbol for No. of rails used on the same plane (*5)        |     |
|           | No. of LM blocks used on the same rail |                    | Radial clearance symbol (*2)<br>Normal (No symbol)<br>Light preload (C1)<br>Medium preload (C0) |      |                                      | LM block special feature symbol<br>Standard (No Symbol)/E/S |                                                                                                                                                                |        | With steel tape |                                |   |                                     | LM rail special feature symbol<br>Standard (No Symbol)/E/S |     |
|           |                                        |                    |                                                                                                 |      | LM block with surface treatment (*3) |                                                             | Accuracy symbol (*4)<br>Normal grade (No Symbol)<br>High accuracy grade (H)<br>Precision grade (P)<br>Super precision grade (SP)<br>Ultra precision grade (UP) |        |                 |                                |   | LM rail with surface treatment (*3) |                                                            |     |

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-71**.  
(\*3) See **B0-20**. (\*4) See **A1-76**. (\*5) See **A1-13**.

Note1) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.)  
Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.  
Note2) Contact THK for details about the special features of LM blocks and LM rails.

● Model EPF

| EPF7M     | 16                        | +55L | P                                            | M |
|-----------|---------------------------|------|----------------------------------------------|---|
| Model No. | LM rail length (in mm)    |      | Rail material:<br>Stainless steel (standard) |   |
|           | Guaranteed stroke (in mm) |      | Accuracy symbol (*1)                         |   |

(\*1) See **A1-86**.

Note) This model number indicates that a single-rail unit constitutes one set.

## [Caged Roller LM Guide]

### ● Models SRG, SRN, and SRW

| SRG45                                                                                                                                                             | LC               | 2                  | QZ                                             | TTHH                                                                                            | C0 | F                                    | S                                                           | +1200L                                                                                                                             | P | Z                              | T                | F | S                                                          | - II                                                |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|--------------------|------------------------------------------------|-------------------------------------------------------------------------------------------------|----|--------------------------------------|-------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|---|--------------------------------|------------------|---|------------------------------------------------------------|-----------------------------------------------------|
| Model No.                                                                                                                                                         | Type of LM block | With QZ Lubricator | Contamination protection accessory symbol (*1) | Radial clearance symbol (*2)<br>Normal (No symbol)<br>Light preload (C1)<br>Medium preload (C0) |    | LM block with surface treatment (*3) | LM block special feature symbol<br>Standard (No Symbol)/E/S | LM rail length (in mm)                                                                                                             |   | Symbol for LM rail jointed use | With plate cover |   | LM rail special feature symbol<br>Standard (No Symbol)/E/S | Symbol for No. of rails used on the same plane (*5) |
| No. of LM blocks used on the same rail                                                                                                                            |                  |                    |                                                |                                                                                                 |    |                                      |                                                             | Accuracy symbol (*4)<br>High accuracy grade (H)<br>Precision grade (P)<br>Super precision grade (SP)<br>Ultra precision grade (UP) |   |                                |                  |   |                                                            | LM rail with surface treatment (*3)                 |
| (*1) See contamination protection accessory on <b>A1-516</b> . (*2) See <b>A1-71</b> .<br>(*3) See <b>B0-20</b> . (*4) See <b>A1-76</b> . (*5) See <b>A1-13</b> . |                  |                    |                                                |                                                                                                 |    |                                      |                                                             |                                                                                                                                    |   |                                |                  |   |                                                            |                                                     |

Note1) Models SRG35 to 65 are available in high accuracy grade and above. Other models are only available in precision grade or above. (Normal grade is not available.)

Note2) Models SRN and SRW are available in precision grade or above. (Normal and H grade are not available.)  
This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.)

Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.

Note3) Contact THK for details about the special features of LM blocks and LM rails.

## [Miniature Type LM Guide]

### ● Models SRS, RSX, RSR, and RSR-M1

| 2                                           | SRS20M             | QZ                                             | UU                                                                       | C1                                   | F                      | S                                                          | +220L                   | P                                                                                                          | M                                                   | F                                                          | S | - II |
|---------------------------------------------|--------------------|------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------|------------------------|------------------------------------------------------------|-------------------------|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|------------------------------------------------------------|---|------|
| Model No.                                   | With QZ Lubricator | Contamination protection accessory symbol (*2) | Radial clearance symbol (*3)<br>Normal (No symbol)<br>Light preload (C1) | LM block with surface treatment (*4) | LM rail length (in mm) | LM rail special feature symbol<br>Standard (No Symbol)/E/S | Stainless steel LM rail | Accuracy symbol (*5)<br>Normal grade (No Symbol) LM rail<br>High accuracy grade (H)<br>Precision grade (P) | Symbol for No. of rails used on the same plane (*6) | LM rail special feature symbol<br>Standard (No Symbol)/E/S |   |      |
| No. of LM blocks used on the same rail (*1) |                    |                                                |                                                                          |                                      |                        |                                                            |                         |                                                                                                            |                                                     |                                                            |   |      |

(\*1) No symbol for 1 LM block. (\*2) See contamination protection accessories on **A1-516**.  
(\*3) See **A1-71**. (\*4) See **B0-20**. (\*5) See **A1-76**. (\*6) See **A1-13**.

Note1) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.)

Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.

Note2) Contact THK for details about the special features of LM blocks and LM rails.

## [Cross LM Guide]

### ● Models SCR, CSR, and MX

| 4                      | SCR25                                          | QZ                                                                                           | KKHH                                                                                                 | C0 | +1200/1000L | P |
|------------------------|------------------------------------------------|----------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|----|-------------|---|
| Model No.              | Contamination protection accessory symbol (*1) | LM rail length on the X axis (in mm)                                                         | LM rail length on the Y axis (in mm)                                                                 |    |             |   |
| Total No. of LM blocks | With QZ Lubricator                             | Radial clearance symbol (*2)<br>Normal (No symbol)/Light preload (C1)<br>Medium preload (C0) | Accuracy symbol (*3)<br>Precision grade (P)/Super precision grade (SP)<br>Ultra precision grade (UP) |    |             |   |

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-71**. (\*3) See **A1-76**.

Note) Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.

## [Separate LM Guides]

## ● Model HR

| 2                                      | HR2555                                         | UU                                                                   | M                              | +1000L                  | P | T | M |
|----------------------------------------|------------------------------------------------|----------------------------------------------------------------------|--------------------------------|-------------------------|---|---|---|
| Model No.                              | Contamination protection accessory symbol (*1) | LM rail length (in mm)                                               | Symbol for LM rail jointed use | Stainless steel LM rail |   |   |   |
| No. of LM blocks used on the same rail | Stainless steel LM block                       | Accuracy symbol (*2)                                                 |                                |                         |   |   |   |
|                                        |                                                | Normal grade (No Symbol)/High accuracy grade (H)/Precision grade (P) |                                |                         |   |   |   |
|                                        |                                                | Super precision grade (SP)/Ultra precision grade (UP)                |                                |                         |   |   |   |

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-76**.

Note) One set of model HR means a combination of two LM rails and an LM blocks used on the same plane.

## ● Model GSR

## ● LM block

| GSR25        | T                                              | UU               |
|--------------|------------------------------------------------|------------------|
| Model number | Contamination protection accessory symbol (*1) | Type of LM block |

## ● LM rail

| GSR25        | -1060L                 | H                                   | K |
|--------------|------------------------|-------------------------------------|---|
| Model number | LM rail length (in mm) | Symbol for tapped-hole LM rail type |   |
|              |                        | Accuracy symbol (*2)                |   |
|              |                        | Normal grade (No Symbol)            |   |
|              |                        | High accuracy grade (H)             |   |
|              |                        | Precision grade (P)                 |   |

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-76**.

## ● Combination of LM rail and LM block

| GSR25                                  | T                | 2                                                                    | UU                     | +1060L                         | H                                   | T | K |
|----------------------------------------|------------------|----------------------------------------------------------------------|------------------------|--------------------------------|-------------------------------------|---|---|
| Model No.                              | Type of LM block | Contamination protection accessory symbol (*1)                       | LM rail length (in mm) | Symbol for LM rail jointed use | Symbol for tapped-hole LM rail type |   |   |
| No. of LM blocks used on the same rail |                  | Accuracy symbol (*2)                                                 |                        |                                |                                     |   |   |
|                                        |                  | Normal grade (No Symbol)/High accuracy grade (H)/Precision grade (P) |                        |                                |                                     |   |   |

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-76**.

Note) One set of model GSR: This model number indicates that a single-rail unit constitutes one set.

## [R Guide]

## ● Model HCR

| HCR25A                                 | 2                                              | UU                                               | C1                     | +60 / 1000R                         | H | 6 | T |
|----------------------------------------|------------------------------------------------|--------------------------------------------------|------------------------|-------------------------------------|---|---|---|
| Model No.                              | Contamination protection accessory symbol (*1) | R-Guide center angle                             | LM rail radius (in mm) | Symbol for LM rail jointed use (*5) |   |   |   |
| No. of LM blocks used on the same rail | Radial clearance symbol (*2)                   | Accuracy symbol (*3)                             |                        |                                     |   |   |   |
|                                        | Normal (No symbol)/Light preload (C1)          | Normal grade (No Symbol)/High accuracy grade (H) |                        |                                     |   |   |   |
|                                        |                                                |                                                  |                        |                                     |   |   |   |

(\*1) See **A1-516** (contamination protection accessories). (\*2) See **A1-71**. (\*3) See **A1-76**.

(\*4) Number of LM rails used on one arc. Contact THK for details.

(\*5) When using joined LM rails, the dust prevention seal must be a low-resistance seal (dust prevention code: LL).

[Straight-Curved Guide]

● Model HMG

| When 2 rails are used                                                  |                                                               |                                        |                                       |                                       |                                      |                                                     |
|------------------------------------------------------------------------|---------------------------------------------------------------|----------------------------------------|---------------------------------------|---------------------------------------|--------------------------------------|-----------------------------------------------------|
| HMG15A 2 UU C1 +1000L T + 60/150R 6T + 60/300R 6T - II                 |                                                               |                                        |                                       |                                       |                                      |                                                     |
| Model No.                                                              | Contamination protection accessory symbol (*1)                | Overall linear LM rail length per rail | Center angle of one inner curved rail | No. of inner curved LM rails jointed  | Radius of outer curved rail          | Symbol for No. of rails used on the same plane (*2) |
| No. of LM blocks used on the same rail                                 | Radial clearance symbol Normal (No symbol)/Light preload (C1) | Symbol for linear LM rail joint        | Radius of inner curved rail           | Center angle of one outer curved rail | No. of outer curved LM rails jointed |                                                     |
| (*1) See contamination protection accessory on A1-516. (*2) See A1-13. |                                                               |                                        |                                       |                                       |                                      |                                                     |

Note) This model number denotes one set consists of an LM block and LM rail. (i.e. If you are using 2 shafts, the required number of sets is 2.)  
The standard Model HMG does not have a seal. To attach a seal, make sure to specify a straight-curved seal (code: UU).

[LM Guide for Medium-to-Low Vacuum]

● Model HSR-M1VV

|                                   |                            |                              |                        |                      |                                                     |
|-----------------------------------|----------------------------|------------------------------|------------------------|----------------------|-----------------------------------------------------|
| HSR15M1R 1 VV C1 +400L P - II     |                            |                              |                        |                      |                                                     |
| Model No.                         |                            | Radial clearance symbol (*1) |                        |                      | Symbol for No. of rails used on the same plane (*4) |
|                                   | Labyrinth seal symbol (*2) |                              |                        | Accuracy symbol (*3) |                                                     |
| No. of LM blocks used on one rail |                            |                              | LM rail length (in mm) |                      |                                                     |

(\*1) See A1-71. (\*2) See A1-393. (\*3) See A1-76. (\*4) See A1-13.

Note1) The radial clearance, maximum LM rail length and accuracy class are equal to that of model HSR.  
Note2) With this model, a single-rail unit constitutes one set (i.e., the required number of sets when 2 rails are used in parallel is 2).

[Oil-Free LM Guide for Special Environments]

● Model SR-MS

|                                   |                              |                        |                      |                                                     |
|-----------------------------------|------------------------------|------------------------|----------------------|-----------------------------------------------------|
| SR15MSV 1 CS +340L P - II         |                              |                        |                      |                                                     |
| Model No.                         |                              | LM rail length (in mm) |                      | Symbol for No. of rails used on the same plane (*3) |
|                                   | Radial clearance symbol (*1) |                        |                      |                                                     |
| No. of LM blocks used on one rail |                              |                        | Accuracy symbol (*2) |                                                     |

(\*1) See A1-71. (\*2) See A1-76. (\*3) See A1-13.

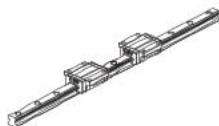
Note) With this model, a single-rail unit constitutes one set (i.e., the required number of sets when 2 rails are used in parallel is 2).

## Notes on Ordering

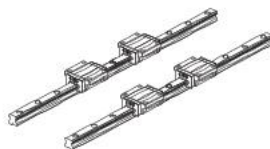
### [Order units]

Note that the number of items that constitute one set differs depending on the type of LM guide. Check the sample model number configurations and the accompanying notes.

#### ● Sample LM guide orders

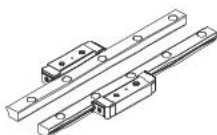


SHS25C2SSC1+640L 1 set



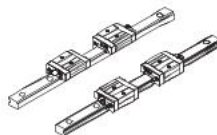
SHS25C2SSC1+640L-II 2 sets

#### ● Sample model HR orders



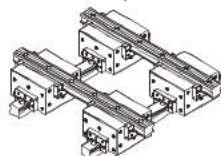
HR2555UU+600L 1 set

#### ● Sample model GSR and GSR-R orders



GSR25T2UU+1060L 2 sets

#### ● Sample cross LM guide orders (SCR, CSR and MX)



4SCR25UU+1200/1000LP 1 set

#### ● Sample model HMG orders



HMG15A2 UU C1 + 1000L T + 60/150R 6T + 60/300R 6T - II 2 sets

Note) When ordering model HMG, attach a reference diagram clearly showing the positioning of the LM block and LM rail.

#### [Mounted orientation and lubrication method]

When placing an order, be sure to let THK know the mounting orientation and the exact position in each LM block where the grease nipple or the piping joint should be attached.

For the mounting orientation and the lubrication, see **A1-12** and **A24-2**, respectively.

#### [Supported options]

The supported options differ depending on the model number. Check the available options when ordering.

See **A1-478**.

#### [Maximum manufactured lengths for LM rails]

Where a high degree of precision is required, limits apply to the maximum manufactured lengths for LM rails. In such situations, contact THK.

## Precautions on Using the LM Guide

### [Handling]

- (1) Please use at least two people to move any product weighing 20 kg or more, or use a dolly or another conveyance. Doing so may cause injury or damage.
- (2) Do not disassemble the parts. This will result in loss of functionality.
- (3) Tilting an LM block or LM rail may cause them to fall by their own weight.
- (4) Take care not to drop or strike the LM Guide. Doing so may cause injury or damage. Giving an impact to it could also cause damage to its function even if the product looks intact.
- (5) Do not remove the LM block from the LM rail during setup.
- (6) Do not insert hands or fingers into the mounting holes on the LM rail, as they could get caught between the rail and the LM block, resulting in injury.
- (7) To ensure personal safety, wear gloves and protective footwear when handling this product.

### [Precautions on Use]

- (1) Prevent foreign material, such as cutting chips or coolant, from entering the product. Failure to do so may cause damage.
- (2) If the product is used in an environment where cutting chips, coolant, corrosive solvents, water, etc., may enter the product, use bellows, covers, etc., to prevent them from entering the product.
- (3) Do not use this product if the external temperature exceeds 80°C. Unless the unit is specially designed to be heat-resistant, exposure to such temperatures may deform or damage plastic and rubber parts.
- (4) If foreign material such as cutting chips adheres to the product, replenish the lubricant after cleaning the product.
- (5) Micro-strokes tend to obstruct oil film to form on the raceway in contact with the rolling element, and may lead to fretting corrosion. Take consideration using grease offering excellent fretting prevention. It is also recommended that a stroke movement corresponding to the length of the LM block be made on a regular basis to make sure oil film is formed between the raceway and rolling element.
- (6) Do not use undue force when fitting parts (pin, key, etc.) to the product. This may generate permanent deformation on the raceway, leading to loss of functionality.
- (7) If, for operational reasons, it becomes absolutely necessary to remove the LM block from the LM rail and reattach it, a special mounting jig must be used for this purpose. (The mounting jig is not included with standard versions of the product. To obtain one, please contact THK.)
- (8) Position the mounting jig so that one end abuts the end of the LM rail. When the rail and the jig are exactly aligned, the LM block can be loaded onto the rail.
- (9) Take care to keep the LM block straight. Loading the block at an angle can introduce foreign matter, damage internal components, or cause balls to fall out.
- (10) The LM block must contain all its internal rolling elements (balls) when mounted on the LM rail. Using a block with any balls removed may result in premature damage.
- (11) Please contact THK if any balls fall out of the LM block; do not use the block if any balls are missing.

- (12) If the LM Guide breaks due to an accident or other cause, the block may come off of the rail and fall. For the safe use of this product, take precautions such as adding a mechanism to prevent the block from falling.
- (13) Insufficient rigidity or accuracy of mounting members causes the bearing load to concentrate on one point and the bearing performance will drop significantly. Accordingly, give sufficient consideration to the rigidity/accuracy of the housing and base and strength of the fixing bolts.
- (14) 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.

#### [Lubrication]

- (1) Thoroughly remove anti-rust oil and feed lubricant before using the product.
- (2) Do not mix different lubricants. Mixing greases using the same type of thickening agent may still cause adverse interaction between the two greases if they use different additives, etc.
- (3) When using the product in locations exposed to constant vibrations or in special environments such as clean rooms, vacuum and low/high temperature, use the grease appropriate for the specification/environment.
- (4) When lubricating the product having no grease nipple or oil hole, apply grease directly on the raceway and stroke the product several times to let the grease spread inside.
- (5) The consistency of grease changes according to the temperature. Take note that the slide resistance of the LM Guide also changes as the consistency of grease changes.
- (6) After lubrication, the slide resistance of the LM Guide may increase due to the agitation resistance of grease. Be sure to perform a break-in to let the grease spread fully, before operating the machine.
- (7) Excess grease may scatter immediately after lubrication, so wipe off scattered grease as necessary.
- (8) The properties of grease deteriorate and its lubrication performance drops over time, so grease must be checked and added properly according to the use frequency of the machine.
- (9) Although the lubrication interval may vary according to use conditions and the service environment, lubrication should be performed approximately every 100 km in travel distance (three to six months). Set the final lubrication interval/amount based on the actual machine.
- (10) If the mounting orientation is other than horizontal use, the lubricant may not reach the raceway completely. For the mounting orientation and the lubrication, see **B1-28** and **B24-2**, respectively.
- (11) When adopting oil lubrication, the lubricant may not be distributed throughout the LM block depending on the mounting orientation of the block. Contact THK in advance for details.

#### [Storage]

When storing the LM Guide, enclose it in a package designated by THK and store it in a room in a horizontal orientation while avoiding high temperature, low temperature and high humidity. After the product has been in storage for an extended period of time, lubricant inside may have deteriorated, so add new lubricant before use.

#### [Disposal]

Dispose of the product properly as industrial waste.

# Precautions on Handling the LM Guide for Special Environment

## LM Guide for Medium-to-Low Vacuum

### [Handling]

- (1) This product has been thoroughly cleaned and degreased and then sealed in moisture-proof packaging. If possible, open the package immediately prior to using the product.
- (2) Once the packaging has been opened, store the product inside a clean, dry receptacle accompanied by silica gel or another drying agent. Do not use anti-rust oil or corrosion- or tarnish-preventive paper or fluid with this product.
- (3) Wear protective rubber or vinyl gloves while handling this product and make sure the surrounding environment is relatively clean.

## Oil-Free LM Guide

### [Handling]

- (1) The Oil-Free LM Guide is suitable for use at high temperatures, under atmospheric pressure or in a high-vacuum environment of  $10^{-6}$  Pa, and is designed for ultra-low dust emission. It is not intended for use in locations requiring rigidity. Because a preload would affect the strength of its Dry Lubrication S-Compound Film, it does not support preloads.
- (2) The product can be used in temperatures ranging from  $-20$  to  $150^{\circ}\text{C}$ .
- (3) To ensure proper function of the Dry Lubrication S-Compound Film, use this product in an environment free from condensation, at a humidity level of 40% or less.
- (4) This product is not intended for joint use.
- (5) Great care must be taken in the installation of the Oil-Free LM Guide, which requires greater precision compared to standard LM Guides.
- (6) If the LM block is removed from the LM rail, balls may fall out, and the Dry Lubrication S-Compound Film can be damaged when the block is remounted. If it becomes necessary to remove the LM block from the LM rail, please contact THK.
- (7) This product should be stored in a horizontal position, in its original wrapping and package, in a controlled, stable environment free from abnormal high or low temperatures or high humidity. THK recommends storing it at room temperature ( $25\pm 5^{\circ}\text{C}$ ), with a humidity level of 40% RH or lower and an air-purity level of 10,000 or lower.
- (8) This product has been thoroughly cleaned and degreased and then sealed in moisture-proof packaging. If possible, open the package immediately prior to using the product.
- (9) Once the packaging has been opened, store the product inside a clean, dry receptacle accompanied by silica gel or another drying agent. Do not use anti-rust oil or corrosion- or tarnish-preventive paper or fluid with this product.
- (10) Wear protective rubber or vinyl gloves while handling this product and make sure the surrounding environment is relatively clean.

# Precautions on Using Options for the LM Guide

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## QZ Lubricator for the LM Guide

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For details regarding the QZ, see **A1-509**.

### [Precaution on Selection]

Secure a stroke longer than the overall LM block with QZ Lubricator attached.

### [Handling]

Take care not to drop or strike this product. This could cause injury or product damage.

Do not block the vent hole with grease or the like.

The QZ device supplies oil only to the raceway, so use it in combination with regular greasing/lubrication. If the product is used in an environment exposed to coolant, cutting chips or other foreign material, oil on the raceway is lost easily. Accordingly, be sure to also use covers, bellows, etc.

### [Service environment]

Be sure the service temperature of this product is between -10 to 50°C, and do not clean the product by immersing it in an organic solvent or white kerosene, or leave it unpacked.

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## Laminated Contact Scraper LaCS, Side Scraper for LM Guides

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For details regarding the LaCS, see **A1-484**. For details regarding the side scraper, see **A1-486**.

### [Handling]

The lubricant impregnated into the scraper is used to increase its sliding capability. For lubrication of the LM Guide, attach QZ Lubricator, or the grease nipple on the side face of the end plate of the LM block, before providing a lubricant.

When using the product, be sure to attach the rail cap C or the plate cover.

### [Service environment]

Be sure the service temperature of this product is between -20 to +80°C, and do not clean the product by immersing it in an organic solvent or white kerosene, or leave it unpacked.

### [Notes on the Product Functions]

It is specially designed to provide dust prevention capability to remove foreign material and liquid.

To seal oil, an end seal is required.

## Light Contact Seal LiCS for LM Guides

For details regarding the LiCS, see **A1-489**.

### [Handling]

The lubricant impregnated into LiCS is used to increase its sliding capability. For lubrication of the LM Guide, attach the grease nipple on the end plate of the LM block before providing a lubricant.

### [Service environment]

Be sure the service temperature of this product is between -20 to +80°C, and do not clean the product by immersing it in an organic solvent or white kerosene, or leave it unpacked.

It contacts only with the LM rail raceway. Do not use it in harsh environments.

## High Chemical Resistance Fluorine Seal FS for the LM Guide

For details about the fluorine seal, see **A1-490**.

### [Handling]

Be careful not to twist the seal portion when attaching the fluorine seal to the LM Guide. Also, do not store the product in a way that may deform the seal, such as by stacking it. This may cause damage or reduce the seal's functionality.

### [Service environment]

The service temperature range is between -20°C and 80°C. Avoid cleaning with organic solvents or kerosene, and do not store unwrapped for extended periods of time.

## Cap GC

For details regarding the GC cap, see **A1-535**.

### [Handling]

If GC caps are specified for the product, the edges of the LM rail mounting hole openings will be sharp. Take great care not to injure your fingers or hands while working.

When fitting GC caps, use a flat aligning tool to gradually punch the cap into the hole until it is level with the upper surface of the LM rail. Then run an oil stone over the rail until the upper surface of the rail and the GC caps are completely flat.





# LM Guide®

**THK** General Catalog

# LM Guide

THK General Catalog

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Features of the LM Guide

Functions Required for Linear Guide Surface

Large permissible load  
Highly rigid in all directions  
High positioning repeatability  
Running accuracy can be obtained easily  
High accuracy can be maintained over a long period

Smooth motion with no clearance  
Superbly high speed  
Easy maintenance  
Can be used in various environments

Features of the LM Guide

**Large permissible load and high rigidity**

Accuracy averaging effect by absorbing mounting surface error

Ideal four raceway, circular-arc groove, two point contact structure

**Superb error-absorbing capability with the DF design**

**Low friction coefficient**

Wide array of options (QZ lubricator, Laminated contact scraper LaCS, etc.)

As a result, the following  
features are achieved.

**Easy maintenance**

**Improved productivity of the machine**

**Substantial energy savings**

**Low total cost**

**Higher accuracy of the machine**

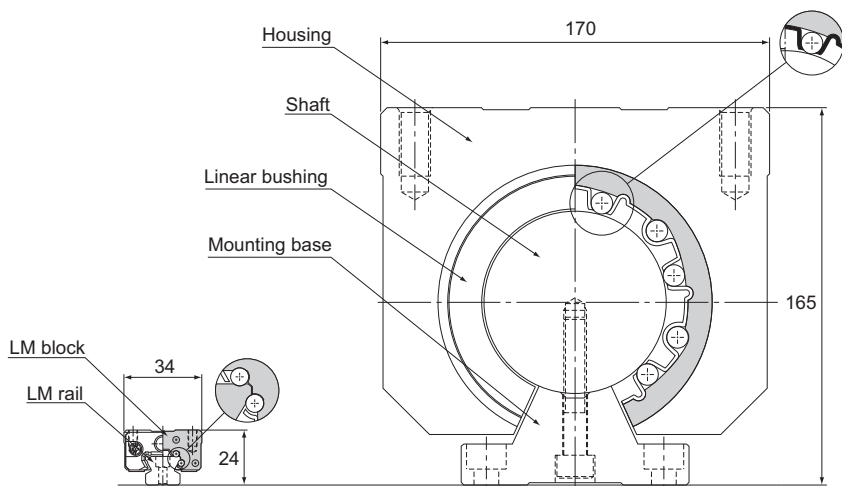
**Higher efficiency in machine design**

## Large Permissible Load and High Rigidity

### [Large Permissible Load]

The LM Guide has raceway grooves with a radius almost equal to the ball radius, which is significantly different from the linear bushing. As shown in Fig.1, which compares size between the LM Guide and the linear bushing with similar basic dynamic load ratings, the LM Guide is much smaller than the linear bushing, indicating that the LM Guide allows a significantly compact design.

The reason for this space saving is the greater difference in permissible load between the R-groove contact structure and the surface contact structure. The R-groove contact structure (radius: 52% of the ball radius) can bear a load per ball 13 times greater than the surface contact structure. Since service life is proportional to the cube of the permissible load, this increased ball-bearing load translates into a service life that is approximately 2,200 longer than the linear bushing.



**LM Guide model SSR15XW**  
Basic dynamic load rating: 14.7 kN

**Linear Bushing model LM80 OP**  
Basic dynamic load rating: 7.35 kN

Fig.1 Comparison between the LM Guide and the Linear Bushing

Table1 Load Capacity per Ball (P and P<sub>1</sub>)

Permissible contact surface pressure: 4,200 MPa

|                    | R-groove (P) | Flat surface (P <sub>1</sub> ) | P/P <sub>1</sub> |
|--------------------|--------------|--------------------------------|------------------|
| φ 3.175 (1/8'')    | 0.90 kN      | 0.07 kN                        | 13               |
| φ 4.763 (3/16'')   | 2.03 kN      | 0.16 kN                        | 13               |
| φ 6.350 (1/4'')    | 3.61 kN      | 0.28 kN                        | 13               |
| φ 7.938 (5/16'')   | 5.64 kN      | 0.44 kN                        | 13               |
| φ 11.906 (15/32'') | 12.68 kN     | 0.98 kN                        | 13               |

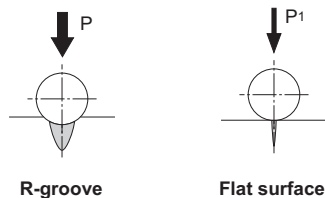


Fig.2 Load Capacity per Ball

[High Rigidity]

The LM Guide is capable of bearing vertical and horizontal loads. Additionally, due to the circular-arc groove design, it is capable of carrying a preload as necessary to increase its rigidity. When compared with a feed screw shaft system and a spindle in rigidity, the guide surface using an LM Guide has higher rigidity.

- **Example of comparing static rigidity between the LM Guide, a feed screw shaft system and a spindle**  
(vertical machining center with the main shaft motor of 7.5 kW)

Table2 Comparison of Static Rigidity Unit: N/μm

[Components]

- LM Guide: SVR45LC/C0  
(C0 clearance: preload = 11.11kN)
- Ball Screw: BNFN4010-5/G0  
(G0 clearance: preload = 2.64kN)
- Spindle: general-purpose cutting spindle

| Components | X-axis direction | Y-axis direction | Z-axis direction                       |
|------------|------------------|------------------|----------------------------------------|
| LM Guide   | —                | 2400             | 9400 (radial)<br>7400 (reverse radial) |
| Ball screw | 330              | —                | —                                      |
| Spindle    | 250              | 250              | 280                                    |

Note) The rigidity of the feed screw shaft system includes rigidity of the shaft end support bearing.

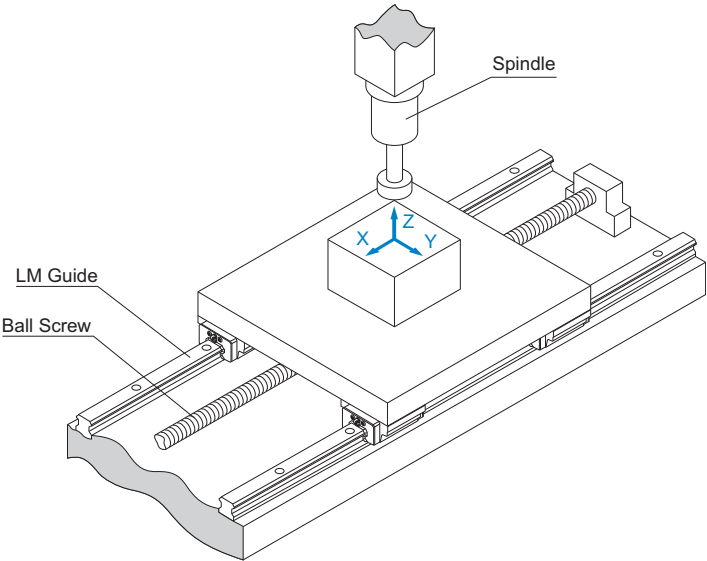
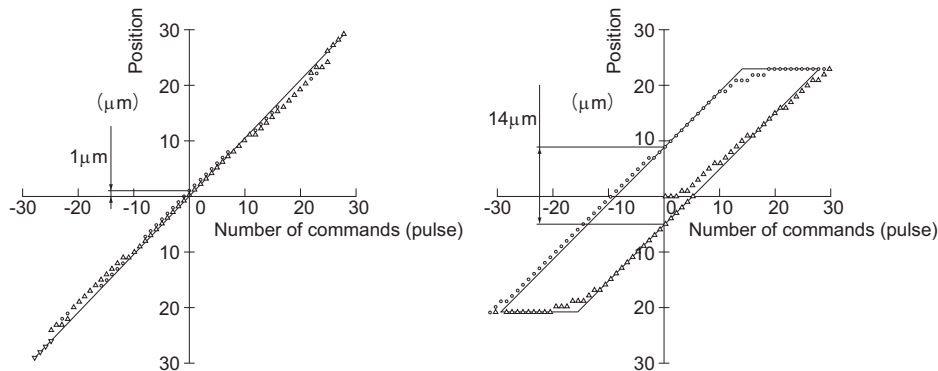


Fig.3

# High Precision of Motion

## [Small lost motion]

The LM Guide is provided with an ideal rolling mechanism. Therefore, the difference between dynamic and static friction is minimal and lost motion hardly occurs.



LM Guide model HSR45

Square slide + Turcite

(Measurements are taken with the single-axis table loaded with a 500-kg weight)

Fig.4 Comparison of Lost Motion between the LM Guide and a Slide Guide

Table3 Lost Motion Comparison

Unit: μm

| Type                   | Clearance                      | Test method       |           |            |                               |
|------------------------|--------------------------------|-------------------|-----------|------------|-------------------------------|
|                        |                                | As per JIS B 6330 |           |            | Based on minimum unit feeding |
|                        |                                | 10mm/min          | 500mm/min | 4000mm/min |                               |
| LM Guide (HSR45)       | C1 clearance (see table below) | 2.3               | 5.3       | 3.9        | 0                             |
|                        | C0 clearance (see table below) | 3.6               | 4.4       | 3.1        | 1                             |
| Square slide + turcite | 0.02mm                         | 10.7              | 15        | 14.1       | 14                            |
|                        | 0.005mm                        | 8.7               | 13.1      | 12.1       | 13                            |

Radial clearance of the LM Guide

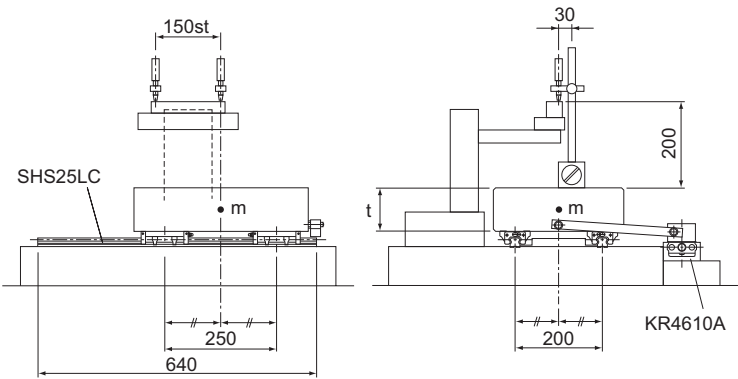
Unit: μm

| Symbol           | C1         | C0         |
|------------------|------------|------------|
| Radial clearance | -25 to -10 | -40 to -25 |

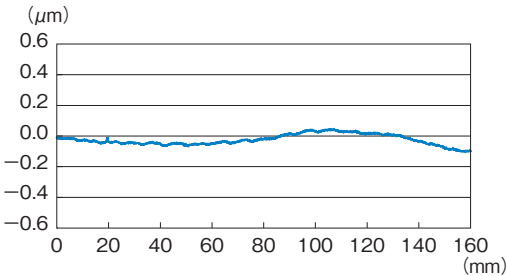
[High running accuracy]

Use of the LM Guide allows you to achieve high running accuracy.

[Measurement method]



Pitching accuracy



Yawing accuracy

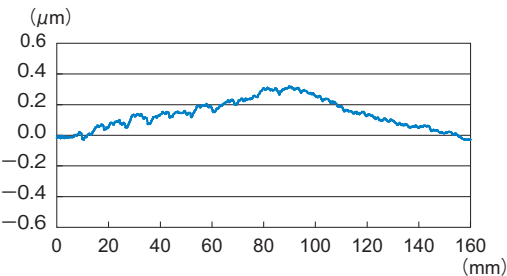


Fig.5 Dynamic Accuracy of a Single-axis Table

### [High accuracy maintained over a long period]

As the LM Guide employs an ideal rolling mechanism, wear is negligible and high precision is maintained for long periods of time. As shown in Fig.6, when the LM Guide operates under both a pre-load and a normal load, more than 90% of the preload remains even after running 2,000 km.

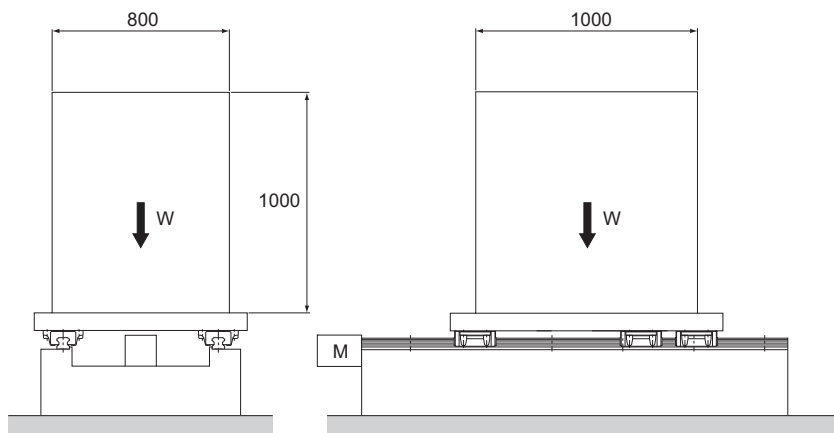


Fig.6 Condition

### [Conditions]

Model No. : HSR65LA3SSC0 + 2565LP-II

Radial clearance

: C0 (preload: 15.7 kN)

Stroke : 1,050mm

Speed : 15 m/min (stops 5 sec at both ends)

Acceleration/deceleration time in rapid motion

: 300 ms (acceleration:  $\alpha = 0.833 \text{ m/s}^2$ )

Mass : 6000kg

Drive : Ball Screws

Lubrication : Lithium soap-based grease No. 2  
(greased every 100 km)

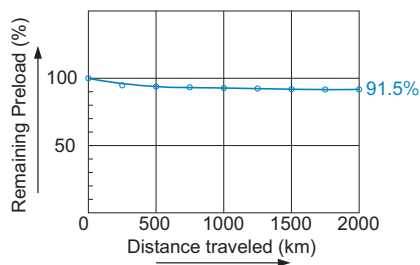


Fig.7 Distance Traveled and Remaining Preload

Accuracy Averaging Effect by Absorbing Mounting Surface Error

The LM Guide contains highly spherical balls and has a constrained structure with no clearance. In addition, it uses LM rails in parallel on multiple axes to form a guide system with multiple-axis configuration. Thus, the LM Guide is capable of absorbing misalignment in straightness, flatness or parallelism that would occur in the machining of the base to which the LM Guide is to be mounted or in the installation of the LM Guide by averaging these errors.

The magnitude of the averaging effect varies according to the length or size of the misalignment, the preload applied on the LM Guide and the number of axes in the multiple-axis configuration. When misalignment is given to one of the LM rails of the table as shown in Fig.8, the magnitude of misalignment and the actual dynamic accuracy of the table (straightness in the horizontal direction) are as shown in Fig.9.

By applying such characteristics obtained with the averaging effect, you can easily establish a guide system with high precision of motion.

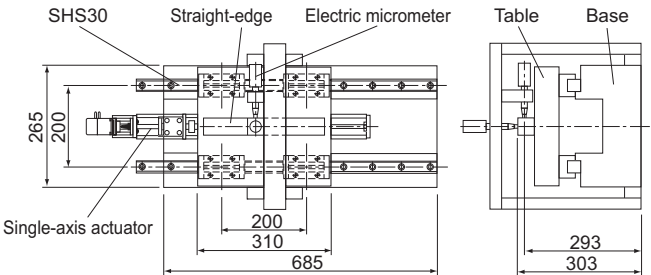


Fig.8

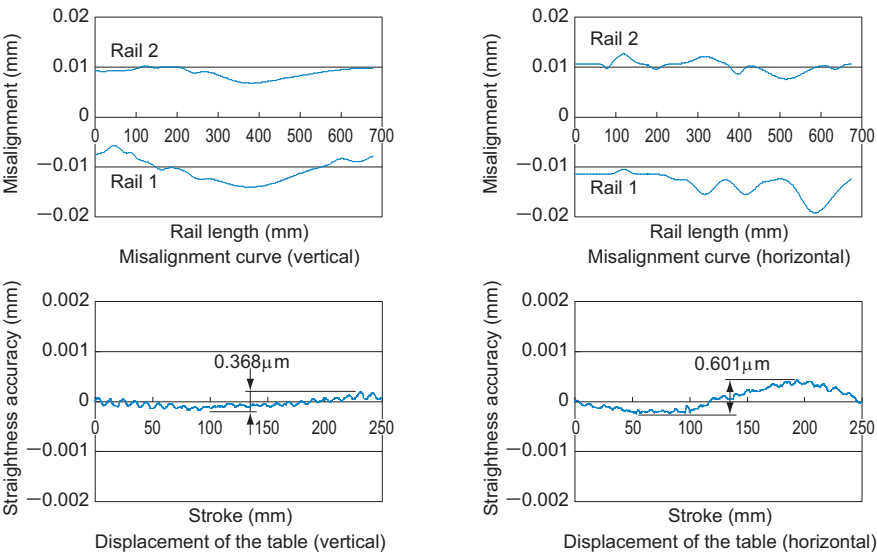


Fig.9

Even on a roughly milled mounting surface, the LM Guide drastically increases running accuracy of the top face of the table.

[Example of Installation]

When comparing the mounting surface accuracy (a) and the table running accuracy (b), the results are :

|            |        |   |      |   |     |
|------------|--------|---|------|---|-----|
| Vertical   | 92.5μm | → | 15μm | = | 1/6 |
| Horizontal | 28μm   | → | 4μm  | = | 1/7 |

Table4 Actual Measurement of Mounting-Surface Accuracy  
Unit: μm

| Direction  | Mounting surface | Straightness | Average (a) |
|------------|------------------|--------------|-------------|
| Vertical   | Bottom surface   | A            | 80          |
|            |                  | B            | 105         |
| Horizontal | Side surface     | C            | 40          |
|            |                  | D            | 16          |

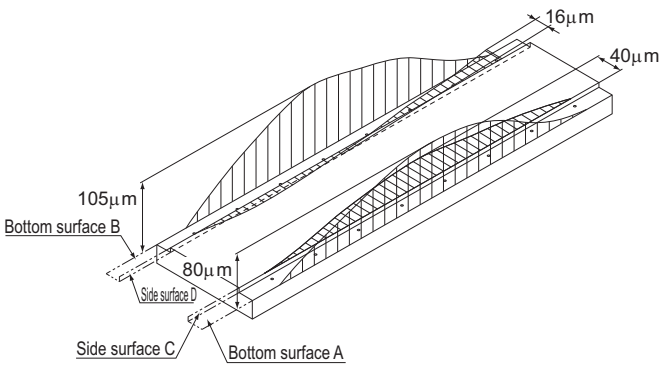


Fig.10 Surface Accuracy of the LM Guide Mounting Base (Milled Surface Only)

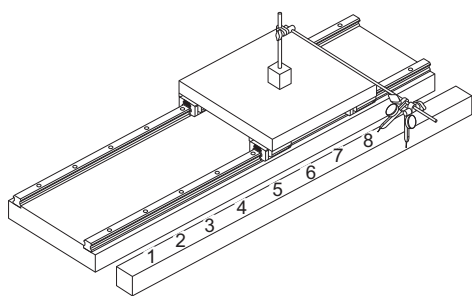


Fig.11 Running Accuracy After the LM Guide Is Mounted

Table5 Actual Measurement of Running Accuracy on the Table (Based on Measurement in Fig.10 and Fig.11)

| Direction  | Measurement point |    |    |     |     |    |    |   | Straightness (b) |
|------------|-------------------|----|----|-----|-----|----|----|---|------------------|
|            | 1                 | 2  | 3  | 4   | 5   | 6  | 7  | 8 |                  |
| Vertical   | 0                 | +2 | +8 | +13 | +15 | +9 | +5 | 0 | 15               |
| Horizontal | 0                 | +1 | +2 | +3  | +2  | +2 | -1 | 0 | 4                |

---

## Easy Maintenance

---

Unlike with sliding guides, the LM Guide does not incur abnormal wear. As a result, sliding surfaces do not need to be reconditioned, and precision needs not be altered. Regarding lubrication, sliding guides require forced circulation of a large amount of lubricant so as to maintain an oil film on the sliding surfaces, whereas the LM Guide only needs periodical replenishing of a small amount of grease or lubricant. Maintenance is that simple. This also helps keep the work environment clean.

## Substantial Energy Savings

As shown in Table6, the LM Guide has a substantial energy saving effect.

Table6 Comparative Data on Sliding and Rolling Characteristics

| Machine Specifications            |                                                      |                                                                        |
|-----------------------------------|------------------------------------------------------|------------------------------------------------------------------------|
| Type of machine                   | Single-axis surface grinding machine (sliding guide) | Three-axis surface grinding machine (rolling guide)                    |
| Overall length<br>× overall width | 13m×3.2m                                             | 12.6m×2.6m                                                             |
| Total mass                        | 17000kg                                              | 16000kg                                                                |
| Table mass                        | 5000kg                                               | 5000kg                                                                 |
| Grinding area                     | 0.7m×5m                                              | 0.7m×5m                                                                |
| Table guide                       | Rolling through V-V guide                            | Rolling through LM Guide installation                                  |
| No. of grinding stone axes        | Single axis (5.5 kW)                                 | Three axes (5.5 kW + 3.7 kW x 2)<br>Grinding capacity: 3 times greater |

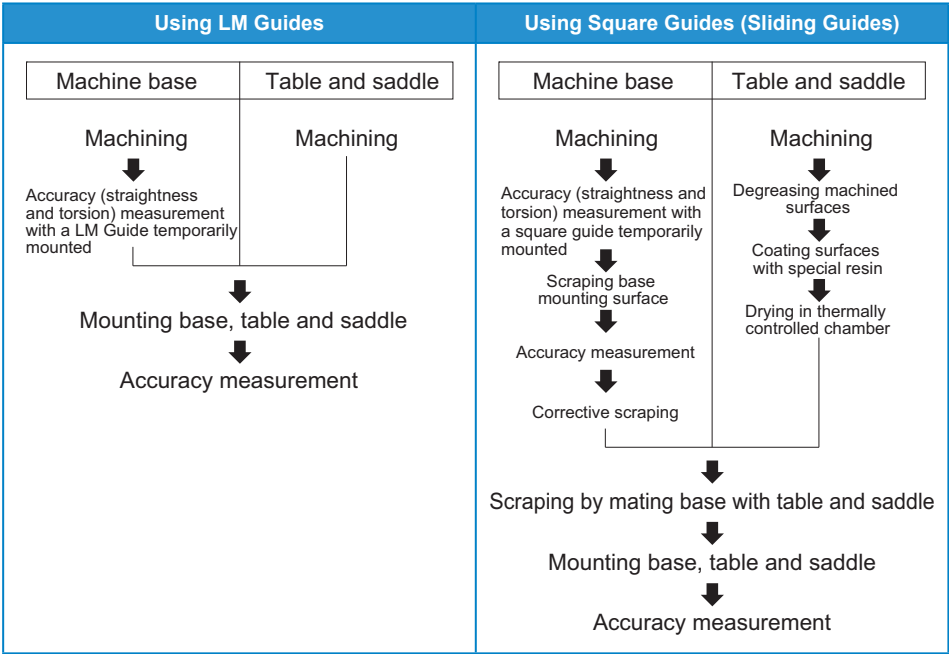
| Table Drive Specifications               |                                 |                                | Ratio |
|------------------------------------------|---------------------------------|--------------------------------|-------|
| Motor used                               | 38.05kW                         | 3.7kW                          | 10.3  |
| Drive hydraulic pressure                 | Bore diameter $\phi$ 160×1.2MPa | Bore diameter $\phi$ 65×0.7MPa | —     |
| Thrust                                   | 23600N                          | 2270N                          | 10.4  |
| Electric Power consumption               | 38kWH                           | 3.7kWH                         | 10.3  |
| Drive hydraulic pressure oil consumption | 400ℓ/year                       | 250ℓ/year                      | 1.6   |
| Lubricant consumption                    | 60 ℓ/year (oil)                 | 3.6 ℓ/year (grease)            | 16.7  |

Low Total Cost

Compared with a sliding guide, the LM Guide is easier to assemble and does not require highly skilled technicians to perform the adjustment work. Thus, the assembly man-hours for the LM Guide are reduced, and machines and systems incorporating the LM Guide can be produced at lower cost. The figure below shows an example of difference in the procedure of assembling a machining center between using siding guides and using LM Guides.

Normally, with a sliding guide, the surface on which the guide is installed must be given a very smooth finish by grinding. However, the LM Guide can offer high precision even if the surface is milled or planed. Using the LM Guide thus cuts down on machining man-hours and lowers machining costs as a whole.

[Assembly Procedure for a Machining Center]

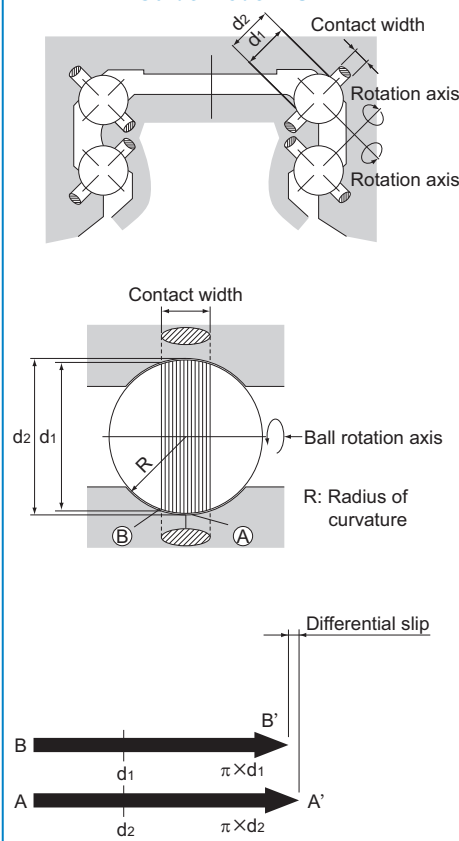
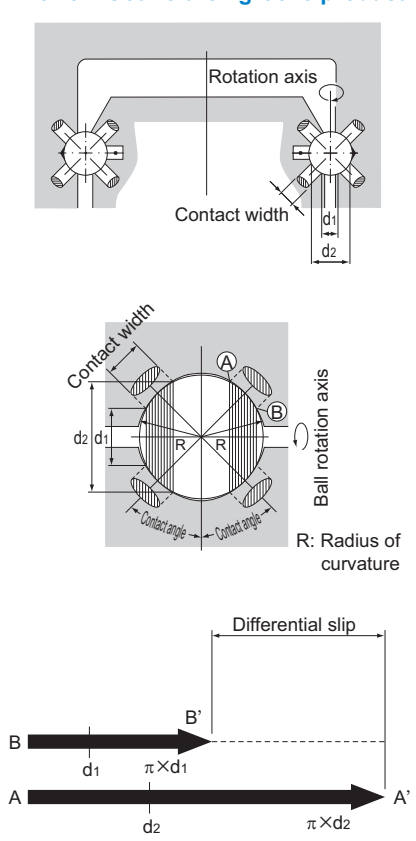


When extremely high precision is not required (e.g., running accuracy), the LM Guide can be attached to the steel plate even if the black scale on it is not removed.

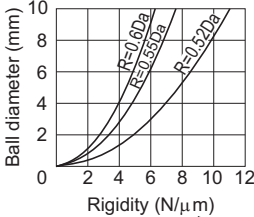
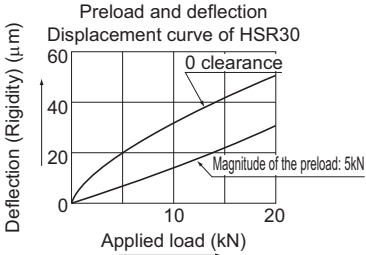
## Ideal Four Raceway, Circular-Arc Groove, Two-Point Contact Structure

The LM Guide has a self-adjusting capability that competitors' products do not have. This feature is achieved with an ideal four raceway, circular-arc groove, two-point contact structure.

### [Comparison of Characteristics between the LM Guide and Similar Products]

| LM Guide: Four Raceway, Circular-arc Groove, Two-point Contact Structure                                                          | Other Product: Two-row, Gothic-arch Groove Four Point Contact Structure                                                                             |
|-----------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>LM Guide Model HSR</b></p>  <p>Fig. 12</p> | <p><b>Two-row Gothic-arch groove product</b></p>  <p>Fig. 13</p> |

As indicated in Fig. 12 and Fig. 13, when the ball rotates one revolution, the ball slips by the difference between the circumference of the diameter of inner surface ( $\pi d_1$ ) and that of the outer contact diameter ( $\pi d_2$ ). (This slip is called differential slip.) If the difference is large, the ball rotates while slipping, the friction coefficient increases more than 10 times and the friction resistance steeply increases.

| Four Raceway, Circular-Arc Groove,<br>Two-Point Contact Structure                                                                                                                                                                                                                                                                                                                                                                                                 | Two-Row, Gothic-Arch Groove,<br>Four Point Contact Structure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Smooth Motion</b>                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Since the balls contact the raceway at two points in the load direction as shown in Fig. 12 and Fig. 13 on <b>B1-19</b> whether under preload or normal load, the difference between $d_1$ and $d_2$ is small, as is the differential slip, allowing a smooth rolling motion.                                                                                                                                                                                     | <p>The difference between <math>d_1</math> and <math>d_2</math> in the contact area is large as shown in Fig. 12 and Fig. 13 on <b>B1-19</b>. Therefore, if any of the following occurs, the ball will generate differential slip, causing friction almost as large as sliding resistance and shortening the service as a result of abnormal friction.</p> <ol style="list-style-type: none"> <li>(1) A preload is applied</li> <li>(2) A lateral load is applied.</li> <li>(3) If two or more rails are mounted and they are not properly aligned</li> <li>(4) If spinning occurs</li> </ol> |
| <b>Accuracy of the Mounting Surface</b>                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| In the ideal two-point contact structure, four rows of circular arc grooves are given appropriate contact angles. With this structure, a light distortion of the mounting surface would be absorbed within the LM block due to elastic deformation of the balls and moving of the contact points to allow unforced, smooth motion. This eliminates the need for a robust mounting base with high rigidity and accuracy for machinery such as a conveyance system. | With the Gothic-arch groove product, each ball contacts the groove at four points, preventing itself from being elastically deformed and the contact points from moving (i.e., no self-adjusting capability). Therefore, even a slight distortion of the mounting surface or an accuracy error of the rail bed cannot be absorbed and smooth motion cannot be achieved. Accordingly, it is necessary to machine a highly rigid mounting base with high precision and mount a high precision rail.                                                                                             |
| <b>Rigidity</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| With the two-point contact, even if a relatively large preload is applied, the rolling resistance does not abnormally increase and high rigidity is obtained.                                                                                                                                                                                                                                                                                                     | Since differential slip occurs due to the four-point contact, a sufficient preload cannot be applied and high rigidity cannot be obtained.                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Load Rating</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Since the curvature radius of the ball raceway is 51 to 52% of the ball diameter, a large rated load can be obtained.                                                                                                                                                                                                                                                                                                                                             | Since the curvature radius of the Gothic-arch groove has to be 55 to 60% of the ball diameter, the rated load is reduced to approx. 50% of that of the circular arc groove.                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Difference in Rigidity</b>                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| As shown in Fig.14, the rigidity widely varies according to the difference in curvature radius or difference in preload.                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <p><b>Curvature radius and rigidity</b></p> <p>Comparison of rigidity by curvature (per ball)</p>                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Fig.14                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Difference in Service Life</b>                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Since the load rating of the gothic arch groove is reduced to approx. 50% of that of the circular arc groove, the service life also decreases to 87.5%.                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

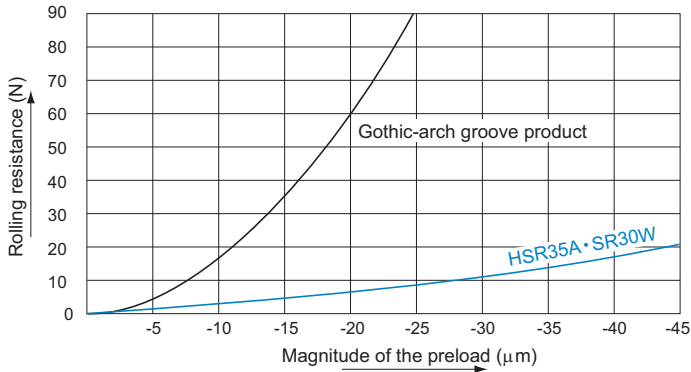
# [Accuracy Error of the Mounting Surface and Test Data on Rolling Resistance]

The difference between the contact structures translates into a rolling resistance. In the gothic arch groove contact structure, each ball contacts at four points and differential slip or spinning occurs if a preload is applied to increase rigidity or an error in the mounting precision is large. This sharply increases the rolling resistance and causes abnormal wear in an early stage. The following are test data obtained by comparing an LM Guide having the four raceway, circular-arc groove two-point contact structure and a product having the two-row, Gothic-arch, four-point contact structure.

| [Sample]                                                                               | [Conditions]                                                                                             |
|----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| (1) LM Guide<br>SR30W (radial type) 2 sets<br>HSR35A (4-way equal-load type) 2 sets    | Radial clearance: $\pm 0\mu\text{m}$<br>Without seal<br>Without lubrication<br>Load: table mass of 30 kg |
| (2) Two-row Gothic-arch groove product<br>Type with dimensions similar to HSR30 2 sets |                                                                                                          |

## Data 1: Preload and rolling resistance

When a preload is applied, the rolling resistance of the Gothic-arch groove product steeply increases and differential slip occurs. Even under a preload, the rolling resistance of the LM Guide does not increase.



### Data 2: Error in parallelism between two axes and rolling resistance

As shown in the Fig.15, part of the rails mounted in parallel is parallelly displaced and the rolling resistance at that point is measured.

With the Gothic-arch groove product, the rolling resistance is 34 N when the parallelistic error is 0.03 mm and 62 N when the error is 0.04 mm. These resistances are equivalent to the slip friction coefficients, indicating that the balls are in sliding contact with the groove.

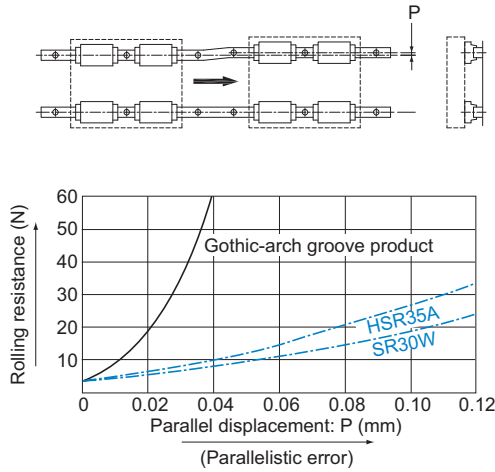
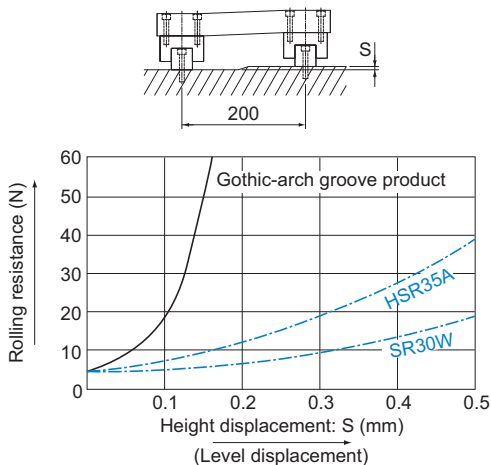


Fig. 15

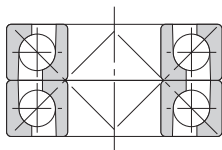
### Data 3: Difference between the levels of the top and bottom rails and rolling resistance

Displace the bottom of either rail vertically by  $S$  and create the height difference between the two axes. Then, measure the rolling resistance. If there is a height difference between the rails, moment will act on the LM block. If the LM Guide's groove is the Gothic-arch groove, this will cause spinning. The LM Guide with the circular-arc groove is capable of absorbing the error caused by the height difference between rails as great as 0.3/200 mm, where its rolling resistance will not increase significantly.

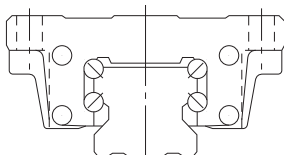


## Superb Error-Absorbing Capability with the DF Design

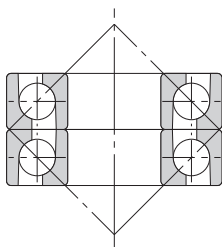
Since the LM Guide has a contact structure similar to the front-to-front mount of angular ball bearings, it has superb self-adjusting capability.



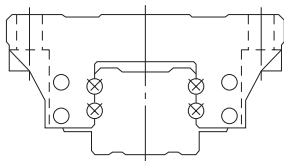
Angular Ball Bearings Mounted Front-to-Front (DF Type)  
As the distance  $l$  between the application points is small, the allowable tilt angle is large. (Highly self-adjustable)



DF Type Four-Row Angular Contact (LM Guide)  
An internal structure that will not be easily affected by inconsistencies on the mounting surface.



Angular Ball Bearings Mounted Back-to-Back (DB Type)  
As the distance between the application points is large, the allowable tilt angle is small.

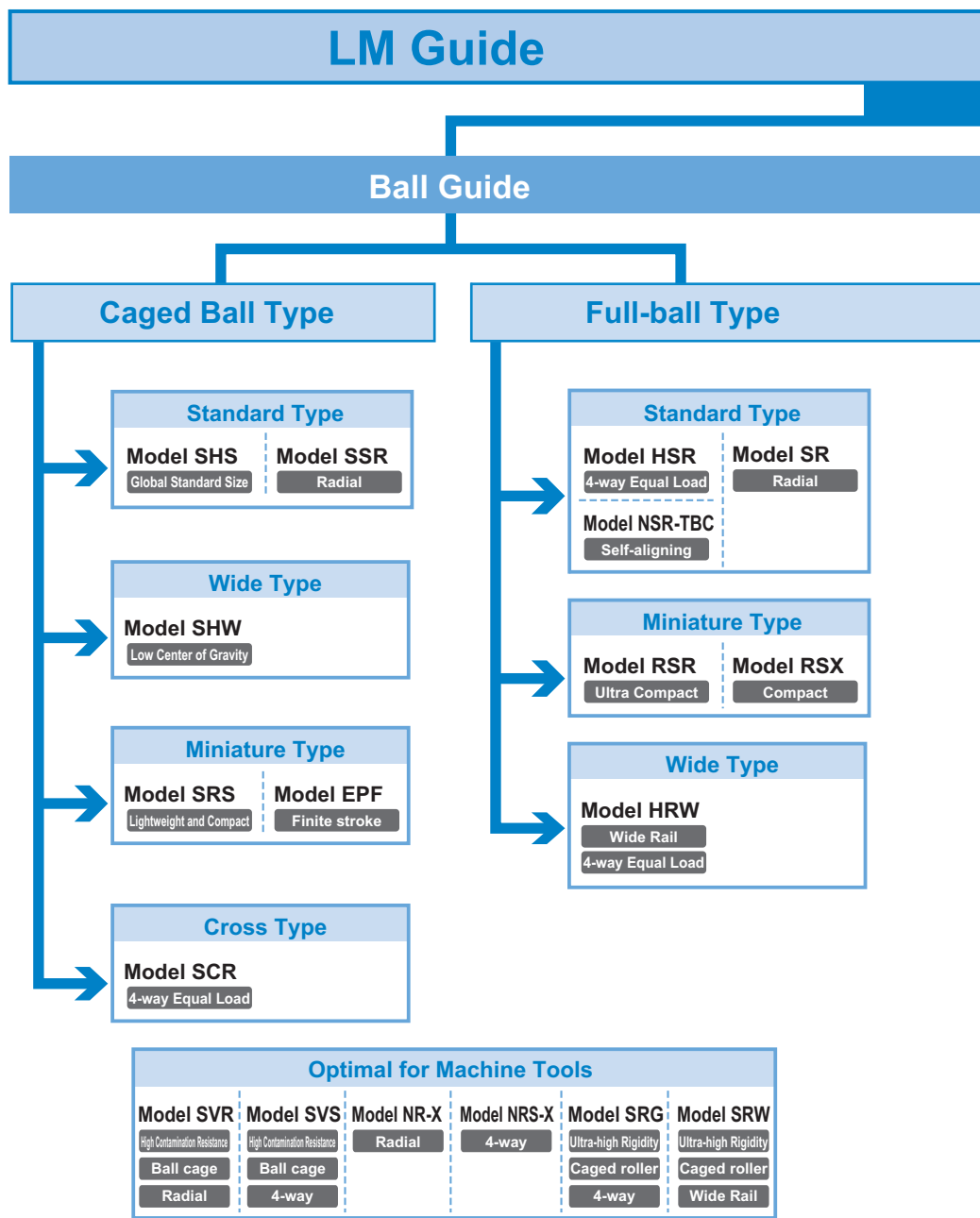


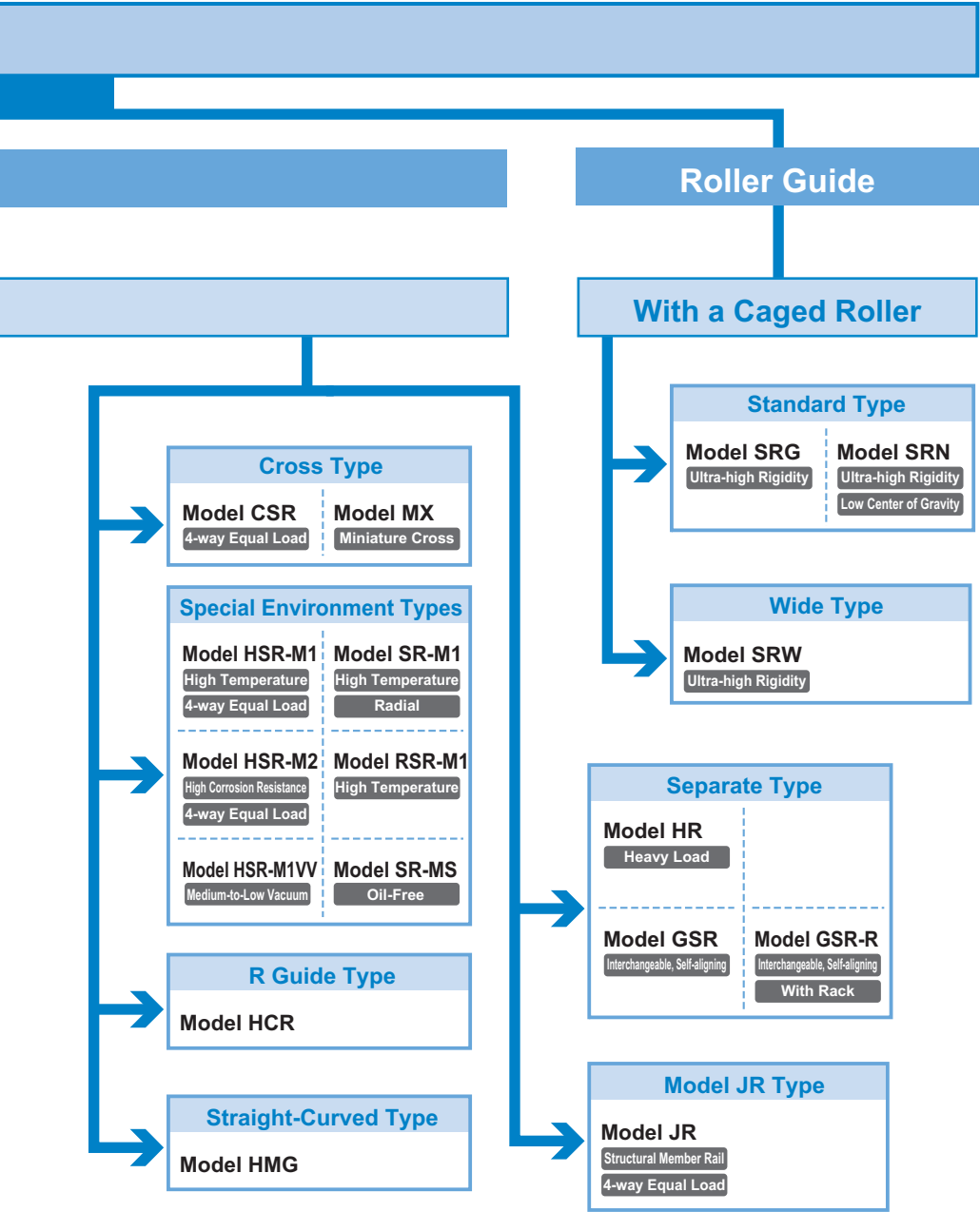
Four-Row Gothic-Arch Contact  
Requires a high mounting precision.

An LM ball guide mounted on a plane receives a moment ( $M$ ) due to an error in flatness or in level or a deflection of the table. Therefore, it is essential for the guide to have self-adjusting capability.

| LM Guide Model HSR                                                                                                                                                                                        | Similar Product of a Competitor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <p>Since the distance between the application points of the bearings is small, the internal load generated from inconsistencies in the mounting surface is small, allowing movement to remain smooth.</p> | <p>Since the distance from the application point of the bearing is large, the internal load generated from a mounting error is large and the self-adjusting capability is small. With an LM ball guide having angular ball bearings mounted back-to-back, if there is an error in flatness or a deflection in the table, the internal load applied to the block is approx. 6 times greater than that of the front-to-front mount structure and the service life is much shorter. In addition, the fluctuation in sliding resistance is greater.</p> |

# Classification Table of the LM Guides

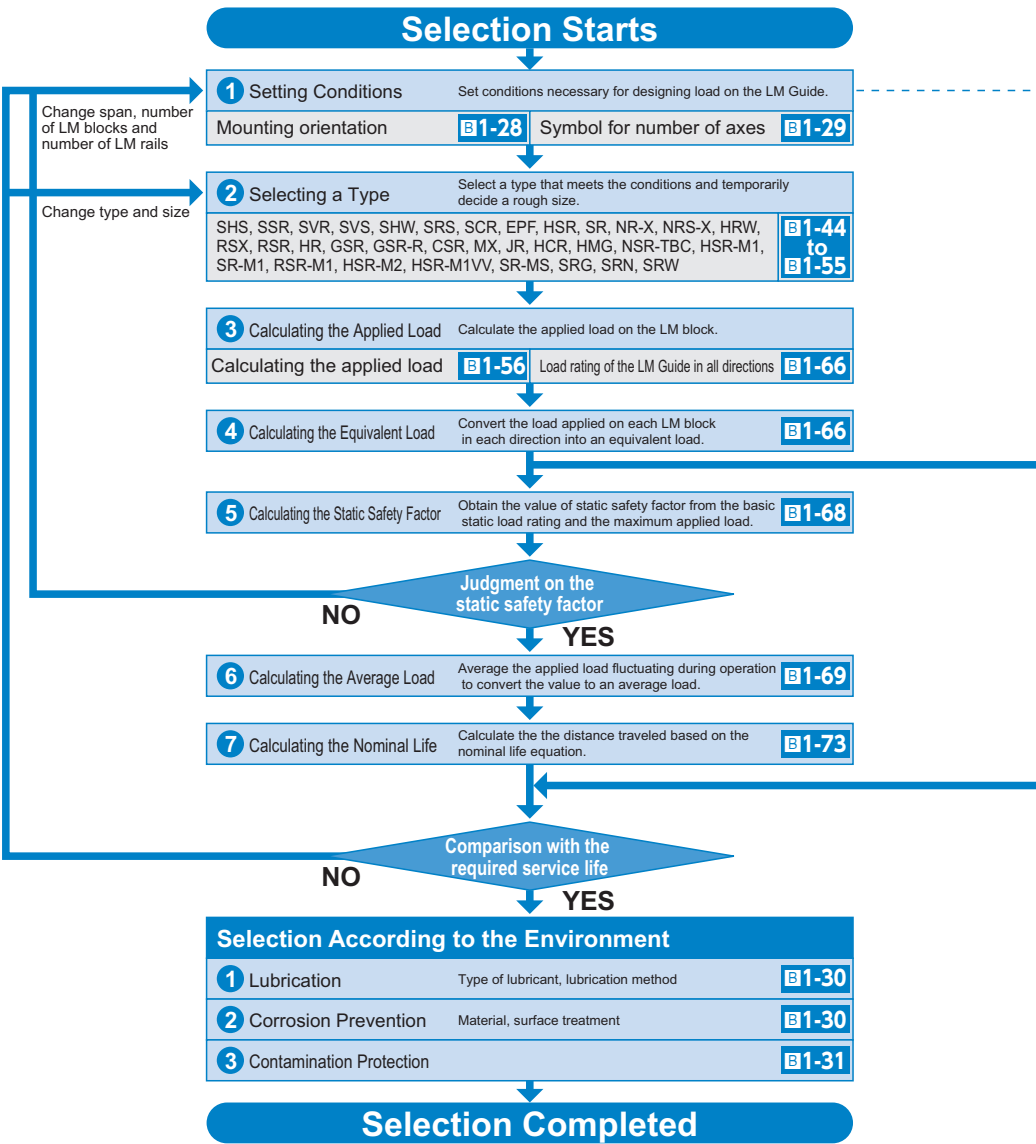




# Flowchart for Selecting an LM Guide

[Steps for Selecting an LM Guide]

The following flowchart can be used as reference for selecting an LM Guide.



- Space in the guide section
- Dimensions (span, number of LM blocks, number of LM rails, thrust)
- Installation direction (horizontal, vertical, slant mount, wall mount, suspended)
- Magnitude, direction and position of the working load
- Operating frequency (duty cycle)
- Speed (acceleration)
- Stroke length
- Required service life
- Precision of motion
- Environment
- In a special environment (vacuum, clean room, high temperature, environment exposed to contaminated environment, etc.), it is necessary to take into account material, surface treatment, lubrication and contamination protection.

| Prediction the Rigidity                    |        |
|--------------------------------------------|--------|
| 1 Selecting a Radial Clearance (Preload)   | B1-85  |
| 2 Service Life with a Preload Considered   | B1-86  |
| 3 Rigidity                                 | B1-86  |
| 4 Radial Clearance Standard for Each Model | A1-71  |
| 5 Designing the Guide System               | A1-454 |

| Determining the Accuracy                         |        |
|--------------------------------------------------|--------|
| 1 Accuracy Standards                             | B1-87  |
| 2 Guidelines for Accuracy Grades by Machine Type | B1-88  |
| 3 Accuracy Standard for Each Model               | A1-76~ |

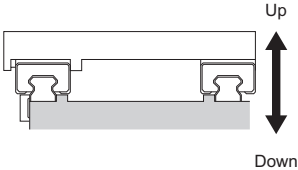
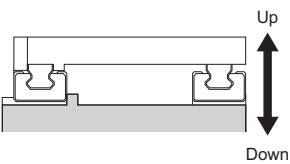
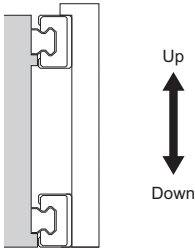
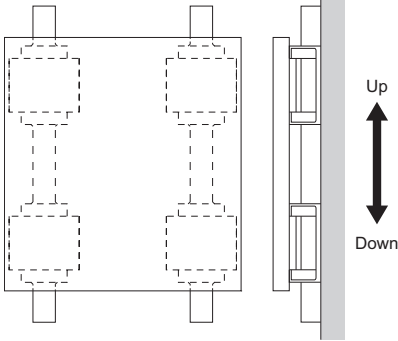
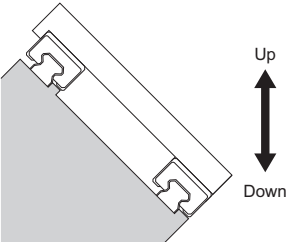
# Setting Conditions

## Conditions of the LM Guide

### [Mounting Orientation]

The LM Guide can be mounted in the following 5 orientations.  
If the mounting orientation 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 should be attached.  
For the lubrication, see **A24-2**.

### [Mounting Orientation]

| Horizontal (symbol: H)                                                             | Inverted (symbol: R)                                                                | Wall mount (symbol: K)                                                            |
|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
|    |    |  |
| Vertical (symbol: V)                                                               | Slant mount (symbol: T)                                                             |                                                                                   |
|  |  |                                                                                   |

[Symbol for Number of Axes]

If two or more units of the LM Guide are parallelly used in combination on the same plane, specify the number of the LM rails (symbol for number of axes) used in combination in advance.  
(For accuracy standards and radial clearance standards, see **A1-76** and **A1-71**, respectively.)

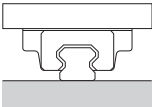
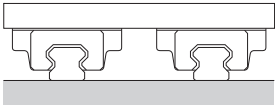
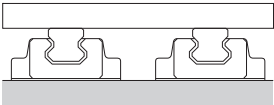
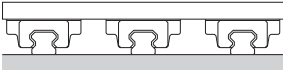
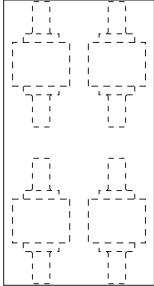
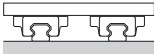
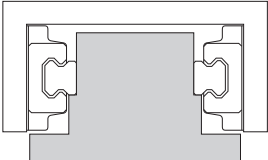
Model number coding

**SHS25C2SSCO+1000LP - II**

Model number (details are given on the corresponding page of the model)

Symbol for number of axes  
("II" indicates 2 axes. No symbol for a single axis)

[Symbol for Number of Axes]

| Symbol for number of axes: none                                                                                                                                                                         | Symbol for number of axes: II                                                                                                                                                                                                                                                              | Symbol for number of axes: II                                                                                                                                                                          |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Required number of axes: 1</p>                                                                                      | <p>Required number of axes: 2</p>  <p>Note:<br/>When placing an order, specify the number in multiple of 2 axes.</p>                                                                                      | <p>Required number of axes: 2</p>  <p>Note:<br/>When placing an order, specify the number in multiple of 2 axes.</p> |
| Symbol for number of axes: III                                                                                                                                                                          | Symbol for number of axes: IV                                                                                                                                                                                                                                                              | Other                                                                                                                                                                                                  |
| <p>Required number of axes: 3</p>  <p>Note:<br/>When placing an order, specify the number in multiple of 3 axes.</p> | <p>Required number of axes: 4</p>   <p>Note:<br/>When placing an order, specify the number in multiple of 4 axes.</p> | <p>Required number of axes: 2</p>  <p>Using 2 axes opposed to each other</p>                                       |

## [Service environment]

### ● Lubrication

When using an LM system, it is necessary to provide effective lubrication. Without lubrication, the rolling elements or the raceway may be worn faster and the service life may be shortened.

A lubricant has effects such as the following.

- (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 to prevent rust formation.

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

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

Be sure to let THK know the mounting orientation and the exact position in each LM block where the grease nipple or the piping joint should be attached. For the mounting orientation and the lubrication, see **B1-28** and **B24-2**, respectively.

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 conditions.

### ● Corrosion Prevention

#### ■Determining a Material

Any LM system requires a material that meets the environments. For use in environments where corrosion resistance is required, some LM system models can use martensite stainless steel.

(Martensite stainless steel can be used for LM Guide models SHS, SSR, SHW, SRS, HSR, SR, HRW, RSX, RSR and HR.)

The HSR series includes HSR-M2, a highly corrosion resistant LM Guide using austenite stainless steel, which has high anti-corrosive effect. For details, see **A1-386**.

#### ■Surface Treatment

The surfaces of the rails and shafts of LM systems can be treated for anti-corrosive or aesthetic purposes.

THK offers THK-AP treatment, which is the optimum surface treatment for LM systems.

There are roughly three types of THK-AP treatment: AP-HC, AP-C and AP-CF. (See **B0-20**.)

### ● Contamination Protection

When foreign material enters an LM system, it will cause abnormal wear or shorten the service life, and it is necessary to prevent foreign material from entering the system. When entrance of foreign material is predicted, it is important to select an effective sealing device or dust-control device that meets the environment conditions.

THK offers contamination protection accessories for LM Guides by model number, such as end seals made of special synthetic rubber with high wear resistance, and side seals and inner seals for further increasing dust-prevention effect.

In addition, for locations with adverse environment, Laminated Contact Scraper LaCS and dedicated bellows are available by model number. Also, THK offers dedicated caps for LM rail mounting holes, designed to prevent cutting chips from entering the LM rail mounting holes.

When it is required to provide contamination protection for a Ball Screw in an environment exposed to cutting chips and moisture, we recommend using a telescopic cover that protects the whole system or a large bellows.

For the options, see **B1-103**.

# Clean Room

In a clean environment generation of dust from the LM system has to be reduced and anti-rust 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-CA and AFF Grease

Use environmentally clean grease that produces little dust.

### ■ Measure to Reduce Dust Generation Resulting from Metallic Abrasion Dust

#### Caged Ball LM Guide

Use 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 martensite stainless steel, which has corrosion resistant effect.

#### Highly Corrosion Resistant LM Guide

It uses austenite stainless steel, which has a high corrosion resistant effect, in its LM rail.

### ■ Measure Through Surface Treatment

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

The LM system is surface treated to increase corrosion resistance.

## Caged Ball LM Guide

Supported models

SHS SSR SVR/SVS  
SHW SRS SCR EPF

## Caged Roller LM Guide

Supported models

SRG SRN SRW

## Stainless Steel LM Guide

Supported models

SHS SSR SHW SRS HSR  
SR HRW HR RSX RSR

## LM Guides for Special Environment

Supported models

High Corrosion Resistance HSR-M2  
Oil-Free SR-MS

## Surface Treatment

## Grease

|                                                                                                                                   |                                                                                                                               |                                                                                                                            |                                                                                                                   |                                                                                                                   |
|-----------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>SHS</b><br><br><b>A1-92</b>                   | <b>SSR</b><br><br><b>A1-104</b>              | <b>SVR/SVS</b><br><br><b>A1-118</b>       | <b>SHW</b><br><br><b>A1-138</b> |                                                                                                                   |
| <b>SRS</b><br><br><b>A1-148</b>                  | <b>SCR</b><br><br><b>A1-164</b>              | <b>EPF</b><br><br><b>A1-172</b>           |                                                                                                                   |                                                                                                                   |
| <b>SRG</b><br><br><b>A1-412</b>                  | <b>SRN</b><br><br><b>A1-432</b>              | <b>SRW</b><br><br><b>A1-446</b>          |                                                                                                                   |                                                                                                                   |
| <b>SHS</b><br><br><b>A1-92</b>                   | <b>SSR</b><br><br><b>A1-104</b>              | <b>SHW</b><br><br><b>A1-138</b>           | <b>SRS</b><br><br><b>A1-148</b>  | <b>HSR</b><br><br><b>A1-180</b> |
| <b>SR</b><br><br><b>A1-210</b>                   | <b>HRW</b><br><br><b>A1-242</b>              | <b>HR</b><br><br><b>A1-272</b>            | <b>RSX</b><br><br><b>A1-252</b>  | <b>RSR</b><br><br><b>A1-262</b> |
| <b>HSR-M2</b><br><br><b>A1-386</b>              | <b>SR-MS</b><br><br><b>A1-400</b>           |                                                                                                                            |                                                                                                                   |                                                                                                                   |
| <b>THK AP-HC Treatment</b><br><br><b>B0-20</b> |                                                                                                                               |                                                                                                                            |                                                                                                                   |                                                                                                                   |
| <b>THK AFE-CA Grease</b><br><br><b>A24-13</b>  | <b>THK AFF Grease</b><br><br><b>A24-15</b> | <b>L100 Grease</b><br><br><b>A24-25</b> |                                                                                                                   |                                                                                                                   |

## Vacuum

In a vacuum environment, measures are required to prevent gas from being emitted from a resin and the scattering of grease. Anti-rust 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

The endplate (ball circulation path normally made of resin) of the LM block is made of stainless steel 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 lubricity. Therefore, use a vacuum grease that uses fluorine based oil, whose vapor pressure is low, as the base oil.

### ■ Corrosion Prevention

#### Stainless Steel LM Guide

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

#### High Temperature LM Guide

If high temperature is predicted 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 austenite stainless steel, which has a high anti-corrosion effect, in the LM rail.

## Oil-Free

In environments susceptible to liquid lubricants, a lubrication method other than grease or oil is required.

### ■ Dry Lubricant

#### Dry Lubrication S-Compound Film

Dry Lubrication S-Compound Film is a fully dry lubricant developed for use under atmospheric to high-vacuum environments. It has superior characteristics in load carrying capacity, wear resistance and sealability to other lubrication systems.

## High Temperature LM Guide



HSR-M1 SR-M1  
RSR-M1

## LM Guides for Special Environment



For Medium-to-Low Vacuum HSR-M1VV  
Oil-Free SR-MS

## Highly Corrosion Resistant LM Guide

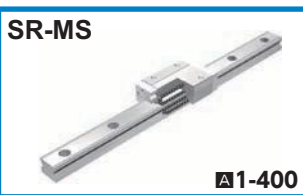
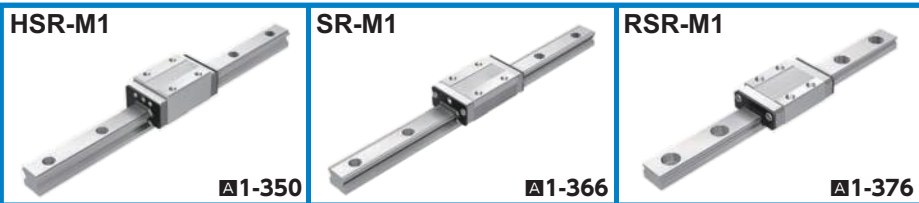
## Stainless Steel LM Guide



HSR SR HRW HR  
RSX RSR

## Vacuum Grease

## Oil-Free LM Guide



# 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 martensite stainless steel, which has an anti-corrosion effect.

### Highly Corrosion Resistant LM Guide

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

## ■ Measure Through Surface Treatment

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

The LM system is surface treated to increase corrosion resistance.

## Stainless Steel LM Guide



SHS SSR SHW SRS HSR  
SR HRW HR RSX RSR

## Highly Corrosion Resistant LM Guide

## Surface Treatment

|                                                                                                                                   |                                                                                                                  |                                                                                                                  |                                                                                                                   |
|-----------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>SHS</b><br><br><b>A1-92</b>                   | <b>SSR</b><br><br><b>A1-104</b> | <b>SHW</b><br><br><b>A1-138</b> | <b>SRS</b><br><br><b>A1-148</b> |
| <b>HSR</b><br><br><b>A1-180</b>                  | <b>SR</b><br><br><b>A1-210</b>  | <b>HRW</b><br><br><b>A1-242</b> | <b>HR</b><br><br><b>A1-272</b>  |
| <b>RSX</b><br><br><b>A1-252</b>                  | <b>RSR</b><br><br><b>A1-262</b> |                                                                                                                  |                                                                                                                   |
| <b>HSR-M2</b><br><br><b>A1-386</b>               |                                                                                                                  |                                                                                                                  |                                                                                                                   |
| <b>THK AP-HC Treatment</b><br><br><b>B0-20</b>  |                                                                                                                  |                                                                                                                  |                                                                                                                   |
| <b>THK AP-C Treatment</b><br><br><b>B0-20</b>  |                                                                                                                  |                                                                                                                  |                                                                                                                   |
| <b>THK AP-CF Treatment</b><br><br><b>B0-20</b> |                                                                                                                  |                                                                                                                  |                                                                                                                   |

# 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.

### THK AFA Grease, AFJ Grease

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

## ■ Measure to Improve Lubrication

### QZ Lubricator

Continuous oil lubrication ensures that 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 Guide

Supported models

SHS SSR SVR/SVS  
SHW SRS SCR EPF

## Caged Roller LM Guide

Supported models

SRG SRN SRW

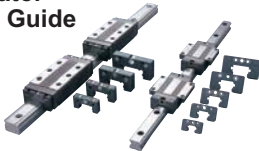
## QZ Lubricator

## Grease

|                                                                                                                  |                                                                                                                  |                                                                                                                      |                                                                                                                   |
|------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>SHS</b><br><br><b>A1-92</b>  | <b>SSR</b><br><br><b>A1-104</b> | <b>SVR/SVS</b><br><br><b>A1-118</b> | <b>SHW</b><br><br><b>A1-138</b> |
| <b>SRS</b><br><br><b>A1-148</b> | <b>SCR</b><br><br><b>A1-164</b> | <b>EPF</b><br><br><b>A1-172</b>     |                                                                                                                   |

|                                                                                                                  |                                                                                                                  |                                                                                                                  |
|------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| <b>SRG</b><br><br><b>A1-412</b> | <b>SRN</b><br><br><b>A1-432</b> | <b>SRW</b><br><br><b>A1-446</b> |
|------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|

**QZ Lubricator  
for the LM Guide**



**A1-509**

|                                                                                                                              |                                                                                                                               |
|------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| <b>THK AFA Grease</b><br><br><b>A24-7</b> | <b>THK AFJ Grease</b><br><br><b>A24-21</b> |
|------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|

## High Temperature

In a high temperature environment, dimensional alterations caused by heat is problematic. Use a High Temperature LM Guide, which is heat resistant and has minimal dimensional alterations after being heated. Also, use a high temperature grease.

### ■ Heat Resistance

#### High Temperature LM Guide

A special heat treatment to maintain dimensional stability minimizes dimensional variations due to heating and cooling.

### ■ Grease

#### High Temperature Grease

Use a high temperature grease with which the rolling resistance of the LM system is consistent even at high temperature.

## Low Temperature

In a low temperature environment, use an LM system with a minimal amount of resin components and a grease that minimize fluctuations in rolling resistance, 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 is consistent even at low temperature.

## Micro Motion

Micro strokes cause the oil film to break, resulting in poor lubrication and 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.

## High Temperature LM Guide

Supported models

HSR-M1 SR-M1 RSR-M1  
HSR-M1VV

## High Temperature Grease

## Stainless Steel LM Guide

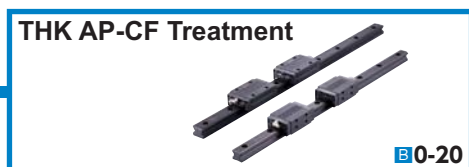
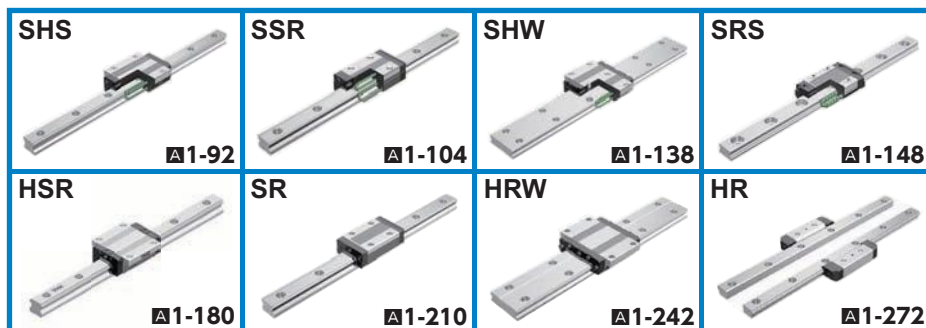
Supported models

SHS SSR SHW SRS HSR  
SR HRW HR RSX RSR

## Surface Treatment

## Low Temperature Grease

## Grease



# 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 small foreign matter or a water-soluble coolant that a telescopic cover or a bellows cannot remove, it is necessary to attach a contamination protection 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 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 contamination protection effect against small 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.

## ■ Metal Cap Dedicated for LM Rail Mounting Holes GC Cap

GC cap is a metallic cap that plugs the LM rail mounting hole (article compliant with the RoHS Directives). It prevents the entrance of foreign material and coolant from the LM rail top face (mounting hole) under harsh environments, and significantly increases the dust control performance of the LM Guide if used with a dust control seal.

## ■ Protector

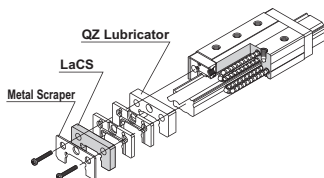
The protector minimizes the entrance of foreign material even in harsh environments where foreign material such as fine particles and liquids are present.

## LM Guide

+Metal scraper

+Contact scraper LaCS

+Cap GC, etc.



B 1-103

Supported models

**Caged Ball LM Guide**

SHS SSR SVR/SVS SHW SRS

**Full Ball LM Guide**

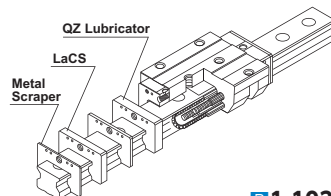
HSR NR/NRS-X

## Caged Roller LM Guide

+Metal scraper

+Contact scraper LaCS

+Cap GC, etc.



B 1-103

Supported models

**SRG**

Caged Ball LM Guide

|                                                                                                                          |                                                                                                                                                      |                                                                                                                           |
|--------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| <p><b>SHS</b></p>  <p><b>A1-92</b></p>  | <p><b>SSR</b></p>  <p><b>A1-104</b></p>                             | <p><b>SHW</b></p>  <p><b>A1-138</b></p> |
| <p><b>SRS</b></p>  <p><b>A1-148</b></p> | <p><b>SVR/SVS</b></p>  <p>Featuring the protector <b>A1-118</b></p> |                                                                                                                           |

Full ball LM Guide

|                                                                                                                           |                                                                                                                                |
|---------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| <p><b>HSR</b></p>  <p><b>A1-180</b></p> | <p><b>NR/NRS-X</b></p>  <p><b>A1-222</b></p> |
|---------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|

Caged Roller LM Guide

**SRG**

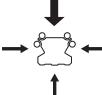
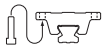
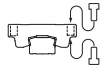
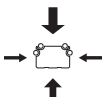
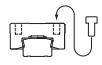
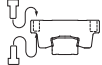
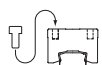


Featuring the protector **A1-412**

# Selecting a Type

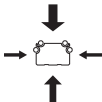
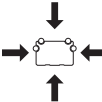
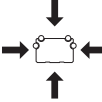
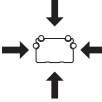
## Types of LM Guides

THK offers a wide array of types and dimensions with LM Guides as standard so that you can select the optimal product for any application. With the unit structure of each model, you can easily obtain high running accuracy with no clearance simply by mounting the product on a plane surface with bolts. We have a proven track record and know-how in extensive applications with LM Guides.

| Classification |                                                                                  | Type                                                                                |         | Specification Table* | Load capacity diagram                                                               | Basic load rating (kN)    |                          |
|----------------|----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------|----------------------|-------------------------------------------------------------------------------------|---------------------------|--------------------------|
|                |                                                                                  |                                                                                     |         |                      |                                                                                     | Basic dynamic load rating | Basic static load rating |
| Radial type    | Caged Ball LM Guide                                                              |    | SSR-XW  | ▶B1-108              |    | 14.7 to 64.6              | 16.5 to 71.6             |
|                |                                                                                  |                                                                                     | SSR-XV  | ▶B1-110              |                                                                                     | 9.1 to 48.3               | 9.7 to 46.7              |
|                |                                                                                  |    | SSR-XTB | ▶B1-112              |                                                                                     | 14.7 to 64.6              | 16.5 to 71.6             |
|                |                                                                                  |                                                                                     | SSR-XSB | ▶B1-114              |                                                                                     | 9.1 to 48.3               | 9.7 to 46.7              |
|                | Full-Complement Ball LM Guides                                                   |    | SR-W    | ▶B1-216              |                                                                                     | 13.8 to 411               | 20.5 to 537              |
|                |                                                                                  |                                                                                     | SR-M1W  | ▶B1-370              |                                                                                     | 13.8 to 60.4              | 20.5 to 81.8             |
|                |                                                                                  |                                                                                     | SR-V    | ▶B1-216              |                                                                                     | 9.1 to 40.9               | 11.7 to 46.7             |
|                |                                                                                  |                                                                                     | SR-M1V  | ▶B1-370              |                                                                                     | 9.1 to 40.9               | 11.7 to 46.7             |
|                |                                                                                  |    | SR-TB   | ▶B1-218              |                                                                                     | 13.8 to 136               | 20.5 to 179              |
|                |                                                                                  |                                                                                     | SR-M1TB | ▶B1-372              |                                                                                     | 13.8 to 60.4              | 20.5 to 81.8             |
|                |                                                                                  |                                                                                     | SR-SB   | ▶B1-218              |                                                                                     | 9.1 to 40.9               | 11.7 to 46.7             |
|                |                                                                                  |                                                                                     | SR-M1SB | ▶B1-372              |                                                                                     | 9.1 to 40.9               | 11.7 to 46.7             |
|                | Oil-Free LM Guides for Special Environments                                      |  | SR-MSV  | ▶B1-404              |                                                                                     | —                         | —                        |
|                |                                                                                  |                                                                                     | SR-MSW  | ▶B1-404              |                                                                                     | —                         | —                        |
|                | Caged Ball LM Guides for Machine Tools high-rigidity model for ultra-heavy loads |  | SVR-C   | ▶B1-128              |  | 48 to 260                 | 68 to 328                |
|                |                                                                                  |                                                                                     | SVR-LC  | ▶B1-128              |                                                                                     | 57 to 340                 | 86 to 481                |
|                |                                                                                  |  | SVR-R   | ▶B1-124              |                                                                                     | 48 to 260                 | 68 to 328                |
|                |                                                                                  |                                                                                     | SVR-LR  | ▶B1-124              |                                                                                     | 57 to 340                 | 86 to 481                |
|                |                                                                                  |  | SVR-CH  | ▶B1-134              |                                                                                     | 90 to 177                 | 115 to 238               |
|                |                                                                                  |                                                                                     | SVR-LCH | ▶B1-134              |                                                                                     | 108 to 214                | 159 to 312               |
|                |                                                                                  |  | SVR-RH  | ▶B1-132              |                                                                                     | 90 to 177                 | 115 to 238               |
|                |                                                                                  |                                                                                     | SVR-LRH | ▶B1-132              |                                                                                     | 108 to 214                | 159 to 312               |

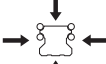
\* For specification tables for each model, please see "B1 Product Descriptions."

|  | External dimensions (mm) |            | Features                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Major application                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|--|--------------------------|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | Height                   | Width      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|  | 24 to 48                 | 34 to 70   | <ul style="list-style-type: none"><li>Long service life, long-term maintenance-free operation</li><li>Low dust generation, low noise, acceptable running sound</li><li>Superbly high speed</li><li>Smooth motion in all mounting orientations</li><li>Thin, compact design, large radial load capacity</li><li>Superb in planar running accuracy</li><li>Superb capability of absorbing mounting error</li><li>Stainless steel type also available as standard</li></ul>                                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"><li>Surface grinder table</li><li>Tool grinder table</li><li>Electric discharge machine</li><li>Printed circuit board drilling machine</li><li>Chip mounter</li><li>High-speed transfer equipment</li><li>Traveling unit of robots</li><li>Machining center</li><li>NC lathe</li><li>Five axis milling machine</li><li>Conveyance system</li><li>Mold guide of pressing machines</li><li>Inspection equipment</li><li>Testing machine</li><li>Food-related machine</li><li>Medical equipment</li><li>3D measuring instrument</li><li>Packaging machine</li><li>Injection molding machine</li><li>Woodworking machine</li><li>Ultra precision table</li><li>Semiconductor/liquid crystal manufacturing equipment</li></ul> |
|  | 24 to 48                 | 34 to 70   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|  | 24 to 48                 | 52 to 100  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|  | 24 to 48                 | 52 to 100  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|  | 24 to 135                | 34 to 250  | <ul style="list-style-type: none"><li>Thin, compact design, large radial load capacity</li><li>Superb in planar running accuracy</li><li>Superb capability of absorbing mounting error</li><li>Stainless steel type also available as standard</li><li>Type M1, achieving max service temperature of 150℃, also available</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|  | 24 to 48                 | 34 to 70   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|  | 24 to 48                 | 34 to 70   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|  | 24 to 48                 | 34 to 70   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|  | 24 to 68                 | 52 to 140  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|  | 24 to 48                 | 52 to 100  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|  | 24 to 48                 | 52 to 100  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|  | 24 to 48                 | 52 to 100  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|  | 24 to 28                 | 34 to 42   | <ul style="list-style-type: none"><li>Minimum generation of outgases (water, organic matter)</li><li>Small amount of particles generated</li><li>Can be used at high temperature (up to 150℃)</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>Photolithography machine</li><li>Organic EL display manufacturing machine</li><li>Ion implantation equipment</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|  | 24 to 28                 | 34 to 42   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|  | 31 to 75                 | 72 to 170  | <ul style="list-style-type: none"><li>Long service life, long-term maintenance-free operation</li><li>Low dust generation, low noise, acceptable running sound</li><li>Superbly high speed</li><li>Smooth motion in all mounting orientations</li><li>Ultra-heavy load capacity optimal for machine tools</li><li>Thin, compact design, large radial load capacity</li><li>High vibration resistance and impact resistance due to improved damping characteristics</li><li>Superb in planar running accuracy</li><li>High vibration resistance and impact resistance due to improved damping characteristics</li><li>Superb in planar running accuracy</li><li>Has dimensions almost the same as that of the full-ball type LM Guide model HSR, which is practically a global standard size</li></ul> | <ul style="list-style-type: none"><li>Machining center</li><li>NC lathe</li><li>Grinding machine</li><li>Five axis milling machine</li><li>Jig borer</li><li>Drilling machine</li><li>NC milling machine</li><li>Horizontal milling machine</li><li>Mold processing machine</li><li>Graphite working machine</li><li>Electric discharge machine</li><li>Wire-cut electric discharge machine</li></ul>                                                                                                                                                                                                                                                                                                                                                       |
|  | 31 to 75                 | 72 to 170  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|  | 31 to 75                 | 50 to 126  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|  | 31 to 75                 | 50 to 126  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|  | 48 to 70                 | 100 to 140 | <ul style="list-style-type: none"><li>Long service life, long-term maintenance-free operation</li><li>Low dust generation, low noise, acceptable running sound</li><li>Superbly high speed</li><li>Smooth motion in all mounting orientations</li><li>Ultra-heavy load capacity optimal for machine tools</li><li>Large radial load capacity</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|  | 48 to 70                 | 100 to 140 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|  | 55 to 80                 | 70 to 100  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|  | 55 to 80                 | 70 to 100  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

| Classification        |                                                                                            | Type                                                                                |         | Specification Table*     | Load capacity diagram                                                               | Basic load rating (kN)    |                          |
|-----------------------|--------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------|--------------------------|-------------------------------------------------------------------------------------|---------------------------|--------------------------|
|                       |                                                                                            |                                                                                     |         |                          |                                                                                     | Basic dynamic load rating | Basic static load rating |
| Radial type           | Full-Complement Ball LM Guides for Machine Tools high-rigidity model for ultra-heavy loads |    | NR-RX   | ▶ <a href="#">■1-228</a> |    | 37.1 to 208.7             | 68.1 to 351.7            |
|                       |                                                                                            |                                                                                     | NR-LRX  | ▶ <a href="#">■1-228</a> |                                                                                     | 45.4 to 268.9             | 90.8 to 505.5            |
|                       |                                                                                            |    | NR-CX   | ▶ <a href="#">■1-232</a> |                                                                                     | 37.1 to 208.7             | 68.1 to 351.7            |
|                       |                                                                                            |                                                                                     | NR-LCX  | ▶ <a href="#">■1-232</a> |                                                                                     | 45.4 to 268.9             | 90.8 to 505.5            |
|                       |                                                                                            |    | NR-R    | ▶ <a href="#">■1-228</a> |                                                                                     | 271 to 479                | 610 to 1040              |
|                       |                                                                                            |                                                                                     | NR-LR   | ▶ <a href="#">■1-228</a> |                                                                                     | 355 to 599                | 800 to 1300              |
|                       |                                                                                            |    | NR-A    | ▶ <a href="#">■1-236</a> |                                                                                     | 271 to 479                | 610 to 1040              |
|                       |                                                                                            |                                                                                     | NR-LA   | ▶ <a href="#">■1-236</a> |                                                                                     | 355 to 599                | 800 to 1300              |
|                       |                                                                                            |    | NR-B    | ▶ <a href="#">■1-238</a> |                                                                                     | 271 to 479                | 610 to 1040              |
|                       |                                                                                            |                                                                                     | NR-LB   | ▶ <a href="#">■1-238</a> |                                                                                     | 355 to 599                | 800 to 1300              |
| 4-way type            | LM Guides for Machine Tools high-rigidity model for ultra-heavy loads                      |    | SVS-R   | ▶ <a href="#">■1-126</a> |   | 37 to 199                 | 52 to 251                |
|                       |                                                                                            |                                                                                     | SVS-LR  | ▶ <a href="#">■1-126</a> |                                                                                     | 44 to 261                 | 66 to 368                |
|                       |                                                                                            |    | SVS-C   | ▶ <a href="#">■1-130</a> |                                                                                     | 37 to 199                 | 52 to 251                |
|                       |                                                                                            |                                                                                     | SVS-LC  | ▶ <a href="#">■1-130</a> |                                                                                     | 44 to 261                 | 66 to 368                |
|                       |                                                                                            |    | SVS-RH  | ▶ <a href="#">■1-132</a> |                                                                                     | 69 to 136                 | 88 to 182                |
|                       |                                                                                            |                                                                                     | SVS-LRH | ▶ <a href="#">■1-132</a> |                                                                                     | 83 to 164                 | 122 to 239               |
|                       |                                                                                            |   | SVS-CH  | ▶ <a href="#">■1-134</a> |                                                                                     | 69 to 136                 | 88 to 182                |
|                       |                                                                                            |                                                                                     | SVS-LCH | ▶ <a href="#">■1-134</a> |                                                                                     | 83 to 164                 | 122 to 239               |
|                       | Full-Complement Ball LM Guides for Machine Tools high-rigidity model for ultra-heavy loads |  | NRS-CX  | ▶ <a href="#">■1-234</a> |  | 28.4 to 159.8             | 52.2 to 269.4            |
|                       |                                                                                            |                                                                                     | NRS-LCX | ▶ <a href="#">■1-234</a> |                                                                                     | 34.7 to 206               | 69.6 to 387.2            |
|                       |                                                                                            |  | NRS-RX  | ▶ <a href="#">■1-230</a> |                                                                                     | 28.4 to 159.8             | 52.2 to 269.4            |
|                       |                                                                                            |                                                                                     | NRS-LRX | ▶ <a href="#">■1-230</a> |                                                                                     | 34.7 to 206               | 69.6 to 387.2            |
| 4-way equal load type | Full-Complement Ball LM Guides for Machine Tools high-rigidity model for ultra-heavy loads |  | NRS-A   | ▶ <a href="#">■1-236</a> |  | 212 to 376                | 431 to 737               |
|                       |                                                                                            |                                                                                     | NRS-LA  | ▶ <a href="#">■1-236</a> |                                                                                     | 278 to 470                | 566 to 920               |
|                       |                                                                                            |  | NRS-B   | ▶ <a href="#">■1-238</a> |                                                                                     | 212 to 376                | 431 to 737               |
|                       |                                                                                            |                                                                                     | NRS-LB  | ▶ <a href="#">■1-238</a> |                                                                                     | 278 to 470                | 566 to 920               |
|                       |                                                                                            |  | NRS-R   | ▶ <a href="#">■1-230</a> |                                                                                     | 212 to 376                | 431 to 737               |
|                       |                                                                                            |                                                                                     | NRS-LR  | ▶ <a href="#">■1-230</a> |                                                                                     | 278 to 470                | 566 to 920               |

\* For specification tables for each model, please see "■ Product Descriptions."

| External dimensions (mm) |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Features                                                                                                                                                                                                                                                                                                                                                                                                                      | Major application |
|--------------------------|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| Height                   | Width      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| 31 to 75                 | 50 to 126  | <ul style="list-style-type: none"><li>• Low dust generation, low noise, acceptable running sound</li><li>• Superbly high speed</li><li>• Smooth motion in all mounting orientations</li><li>• Ultra-heavy load capacity optimal for machine tools</li><li>• Thin, compact design, large radial load capacity</li><li>• High vibration resistance and impact resistance due to improved damping characteristics</li><li>• Superb in planar running accuracy</li></ul>                                                                                                                                                                | <ul style="list-style-type: none"><li>• Machining center</li><li>• NC lathe</li><li>• Grinding machine</li><li>• Five axis milling machine</li><li>• Jig borer</li><li>• Drilling machine</li><li>• NC milling machine</li><li>• Horizontal milling machine</li><li>• Mold processing machine</li><li>• Graphite working machine</li><li>• Electric discharge machine</li><li>• Wire-cut electric discharge machine</li></ul> |                   |
| 31 to 75                 | 50 to 126  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| 31 to 75                 | 72 to 170  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| 31 to 75                 | 72 to 170  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| 83 to 105                | 145 to 200 | <ul style="list-style-type: none"><li>• Ultra-heavy load capacity optimal for machine tools</li><li>• High vibration resistance and impact resistance due to improved damping characteristics</li><li>• Thin, compact design, large radial load capacity</li><li>• Superb in planar running accuracy</li></ul>                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| 83 to 105                | 145 to 200 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| 83 to 105                | 195 to 260 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| 83 to 105                | 195 to 260 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| 83 to 105                | 195 to 260 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| 83 to 105                | 195 to 260 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| 31 to 75                 | 50 to 126  | <ul style="list-style-type: none"><li>• Long service life, long-term maintenance-free operation</li><li>• Low dust generation, low noise, acceptable running sound</li><li>• Superbly high speed</li><li>• Smooth motion in all mounting orientations</li><li>• Ultra-heavy load capacity optimal for machine tools</li><li>• Low profile, compact 4-way type</li><li>• High vibration resistance and impact resistance due to improved damping characteristics</li></ul>                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| 31 to 75                 | 50 to 126  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| 31 to 75                 | 72 to 170  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| 31 to 75                 | 72 to 170  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| 55 to 80                 | 70 to 100  | <ul style="list-style-type: none"><li>• Long service life, long-term maintenance-free operation</li><li>• Low dust generation, low noise, acceptable running sound</li><li>• Superbly high speed</li><li>• Smooth motion in all mounting orientations</li><li>• Ultra-heavy load capacity optimal for machine tools</li></ul> <ul style="list-style-type: none"><li>• 4-way type</li><li>• High vibration resistance and impact resistance due to improved damping characteristics</li><li>• Has dimensions almost the same as that of the full-ball type LM Guide model HSR, which is practically a global standard size</li></ul> |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| 55 to 80                 | 70 to 100  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| 48 to 70                 | 100 to 140 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| 48 to 70                 | 100 to 140 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| 31 to 75                 | 72 to 170  | <ul style="list-style-type: none"><li>• Low dust generation, low noise, acceptable running sound</li><li>• Superbly high speed</li><li>• Smooth motion in all mounting orientations</li><li>• Ultra-heavy load capacity optimal for machine tools</li><li>• Low profile, compact 4-way type</li><li>• High vibration resistance and impact resistance due to improved damping characteristics</li></ul>                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| 31 to 75                 | 72 to 170  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| 31 to 75                 | 50 to 126  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| 31 to 75                 | 50 to 126  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| 83 to 105                | 195 to 260 | <ul style="list-style-type: none"><li>• Ultra-heavy load capacity optimal for machine tools</li><li>• High vibration resistance and impact resistance due to improved damping characteristics</li><li>• Low-Profile compact design, 4-way equal load</li></ul>                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| 83 to 105                | 195 to 260 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| 83 to 105                | 195 to 260 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| 83 to 105                | 195 to 260 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| 83 to 105                | 145 to 200 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| 83 to 105                | 145 to 200 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |

| Classification        |                                                                     | Type                                                                                |            | Specification Table* | Load capacity diagram                                                              | Basic load rating (kN)    |                          |
|-----------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------|----------------------|------------------------------------------------------------------------------------|---------------------------|--------------------------|
|                       |                                                                     |                                                                                     |            |                      |                                                                                    | Basic dynamic load rating | Basic static load rating |
| 4-way equal load type | Caged Roller LM Guide - super ultra-heavy-load, high rigidity types |    | SRG-A, C   | ▶B1-418              |   | 11.3 to 131               | 25.8 to 266              |
|                       |                                                                     |                                                                                     | SRG-LA, LC | ▶B1-418              |                                                                                    | 26.7 to 278               | 63.8 to 599              |
|                       |                                                                     |    | SRG-R, V   | ▶B1-424              |                                                                                    | 11.3 to 131               | 25.8 to 266              |
|                       |                                                                     |                                                                                     | SRG-LR, LV | ▶B1-424              |                                                                                    | 26.7 to 601               | 63.8 to 1170             |
|                       |                                                                     |    | SRN-C      | ▶B1-438              |                                                                                    | 59.1 to 219               | 119 to 441               |
|                       |                                                                     |                                                                                     | SRN-LC     | ▶B1-438              |                                                                                    | 76 to 278                 | 165 to 599               |
|                       |                                                                     |                                                                                     | SRN-SLC    | ▶B1-438              |                                                                                    | 87.9 to 352               | 199 to 811               |
|                       |                                                                     |    | SRN-R      | ▶B1-440              |                                                                                    | 59.1 to 219               | 119 to 441               |
|                       |                                                                     |                                                                                     | SRN-LR     | ▶B1-440              |                                                                                    | 76 to 278                 | 165 to 599               |
|                       |                                                                     |                                                                                     | SRN-SLR    | ▶B1-440              |                                                                                    | 87.9 to 352               | 199 to 811               |
|                       |                                                                     |    | SRW-LR     | ▶B1-450              |                                                                                    | 115 to 601                | 256 to 1170              |
|                       | Caged Ball LM Guide - heavy-load, high rigidity types               |    | SHS-C      | ▶B1-96               |  | 14.2 to 205               | 24.2 to 320              |
|                       |                                                                     |                                                                                     | SHS-LC     | ▶B1-96               |                                                                                    | 17.2 to 253               | 31.9 to 408              |
|                       |                                                                     |  | SHS-V      | ▶B1-98               |                                                                                    | 14.2 to 205               | 24.2 to 320              |
|                       |                                                                     |                                                                                     | SHS-LV     | ▶B1-98               |                                                                                    | 17.2 to 253               | 31.9 to 408              |
|                       |                                                                     |                                                                                     | SHS-R      | ▶B1-100              |                                                                                    | 14.2 to 128               | 24.2 to 197              |
|                       |                                                                     |                                                                                     | SHS-LR     | ▶B1-100              |                                                                                    | 36.8 to 161               | 64.7 to 259              |
|                       |                                                                     |                                                                                     |            |                      |                                                                                    |                           |                          |
|                       |                                                                     |                                                                                     |            |                      |                                                                                    |                           |                          |

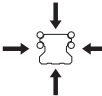
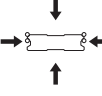
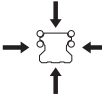
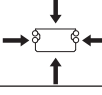
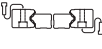
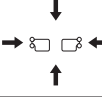
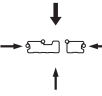
\* For specification tables for each model, please see "B1 Product Descriptions."

| External dimensions (mm) |            | Features                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Major application                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------------|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Height                   | Width      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 24 to 70                 | 47 to 140  | <ul style="list-style-type: none"> <li>Long service life, long-term maintenance-free operation</li> <li>Low noise, acceptable running sound</li> <li>Superbly high speed</li> <li>Smooth motion due to prevention of rollers from skewing</li> <li>Ultra-heavy load capacity optimal for machine tools</li> </ul>                                                                                                                                                                            | <ul style="list-style-type: none"> <li>Machining center</li> <li>NC lathe</li> <li>Grinding machine</li> <li>Five axis milling machine</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 30 to 120                | 63 to 250  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 24 to 80                 | 34 to 100  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 30 to 90                 | 44 to 126  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 44 to 75                 | 100 to 170 | <ul style="list-style-type: none"> <li>Long service life, long-term maintenance-free operation</li> <li>Low noise, acceptable running sound</li> <li>Superbly high speed</li> <li>Smooth motion due to prevention of rollers from skewing</li> <li>Ultra-heavy load capacity optimal for machine tools</li> <li>Low center of gravity, ultra-high rigidity</li> </ul>                                                                                                                        | <ul style="list-style-type: none"> <li>Jig borer</li> <li>Drilling machine</li> <li>NC milling machine</li> <li>Horizontal milling machine</li> <li>Mold processing machine</li> <li>Graphite working machine</li> <li>Electric discharge machine</li> <li>Wire-cut electric discharge machine</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 44 to 75                 | 100 to 170 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 44 to 75                 | 100 to 170 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 44 to 75                 | 70 to 126  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 44 to 75                 | 70 to 126  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 44 to 75                 | 70 to 126  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 70 to 150                | 135 to 300 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 24 to 90                 | 47 to 170  | <ul style="list-style-type: none"> <li>Long service life, long-term maintenance-free operation</li> <li>Low dust generation, low noise, acceptable running sound</li> <li>Superbly high speed</li> <li>Smooth motion in all mounting orientations</li> <li>Heavy load, high rigidity</li> <li>Has dimensions almost the same as that of the full-ball type LM Guide model HSR, which is practically a global standard size</li> <li>Superb capability of absorbing mounting error</li> </ul> | <ul style="list-style-type: none"> <li>Machining center</li> <li>NC lathe</li> <li>XYZ axes of heavy cutting machine tools</li> <li>Grinding head feeding axis of grinding machines</li> <li>Components requiring a heavy moment and high accuracy</li> <li>NC milling machine</li> <li>Horizontal milling machine</li> <li>Gantry five axis milling machine</li> <li>Z axis of electric discharge machines</li> <li>Wire-cut electric discharge machine</li> <li>Car elevator</li> <li>Food-related machine</li> <li>Testing machine</li> <li>Vehicle doors</li> <li>Printed circuit board drilling machine</li> <li>ATC</li> <li>Construction equipment</li> <li>Shield machine</li> <li>Semiconductor/liquid crystal manufacturing equipment</li> </ul> |
| 24 to 90                 | 47 to 170  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 24 to 90                 | 34 to 126  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 24 to 90                 | 34 to 126  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 28 to 80                 | 34 to 100  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 28 to 80                 | 34 to 100  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

| Classification        |                                                                 | Type                                                                                |            | Specification Table*     | Load capacity diagram                                                               | Basic load rating (kN)    |                          |
|-----------------------|-----------------------------------------------------------------|-------------------------------------------------------------------------------------|------------|--------------------------|-------------------------------------------------------------------------------------|---------------------------|--------------------------|
|                       |                                                                 |                                                                                     |            |                          |                                                                                     | Basic dynamic load rating | Basic static load rating |
| 4-way equal load type | Full-Complement Ball LM Guide - heavy-load, high rigidity types |    | HSR-C/XC   | ▶ <a href="#">■1-186</a> |    | 10.9 to 195               | 15.7 to 228              |
|                       |                                                                 |                                                                                     | HSR-LC/XLC | ▶ <a href="#">■1-186</a> |                                                                                     | 14.2 to 249               | 22.9 to 323              |
|                       |                                                                 |    | HSR-A      | ▶ <a href="#">■1-192</a> |                                                                                     | 10.9 to 304               | 15.7 to 355              |
|                       |                                                                 |                                                                                     | HSR-M1A    | ▶ <a href="#">■1-356</a> |                                                                                     | 10.9 to 53.9              | 15.7 to 70.2             |
|                       |                                                                 |                                                                                     | HSR-LA     | ▶ <a href="#">■1-192</a> |                                                                                     | 23.9 to 367               | 35.8 to 464              |
|                       |                                                                 |                                                                                     | HSR-M1LA   | ▶ <a href="#">■1-356</a> |                                                                                     | 23.9 to 65                | 35.8 to 91.7             |
|                       |                                                                 |                                                                                     | HSR-CA/XCA | ▶ <a href="#">■1-198</a> |                                                                                     | 19.8 to 304               | 27.4 to 355              |
|                       |                                                                 |                                                                                     | HSR-HA/XHA | ▶ <a href="#">■1-198</a> |                                                                                     | 23.9 to 518               | 35.8 to 728              |
|                       |                                                                 |    | HSR-B      | ▶ <a href="#">■1-194</a> |                                                                                     | 10.9 to 304               | 15.7 to 355              |
|                       |                                                                 |                                                                                     | HSR-M1B    | ▶ <a href="#">■1-358</a> |                                                                                     | 10.9 to 53.9              | 15.7 to 70.2             |
|                       |                                                                 |                                                                                     | HSR-LB     | ▶ <a href="#">■1-194</a> |                                                                                     | 23.9 to 367               | 35.8 to 464              |
|                       |                                                                 |                                                                                     | HSR-M1LB   | ▶ <a href="#">■1-358</a> |                                                                                     | 23.9 to 65                | 35.8 to 91.7             |
|                       |                                                                 |                                                                                     | HSR-CB/XCB | ▶ <a href="#">■1-200</a> |                                                                                     | 19.8 to 304               | 27.4 to 355              |
|                       |                                                                 |                                                                                     | HSR-HB/XHB | ▶ <a href="#">■1-200</a> |                                                                                     | 23.9 to 518               | 35.8 to 728              |
|                       |                                                                 |   | HSR-R/XR   | ▶ <a href="#">■1-190</a> |                                                                                     | 1.08 to 304               | 2.16 to 355              |
|                       |                                                                 |                                                                                     | HSR-M1R    | ▶ <a href="#">■1-360</a> |                                                                                     | 10.9 to 53.9              | 15.7 to 70.2             |
|                       |                                                                 |                                                                                     | HSR-LR/XLR | ▶ <a href="#">■1-190</a> |                                                                                     | 23.9 to 367               | 35.8 to 464              |
|                       |                                                                 |                                                                                     | HSR-M1LR   | ▶ <a href="#">■1-360</a> |                                                                                     | 23.9 to 65                | 35.8 to 91.7             |
|                       |                                                                 |                                                                                     | HSR-HR     | ▶ <a href="#">■1-202</a> |                                                                                     | 441 to 518                | 540 to 728               |
|                       | LM Guide for Medium-to-Low Vacuum                               |                                                                                     | HSR-M1VV   | ▶ <a href="#">■1-396</a> |                                                                                     | 10.9                      | 15.7                     |
|                       | Full-ball LM Guide - side mount types                           |  | HSR-YR/XYR | ▶ <a href="#">■1-196</a> |                                                                                     | 10.9 to 195               | 15.7 to 228              |
|                       |                                                                 |                                                                                     | HSR-M1YR   | ▶ <a href="#">■1-362</a> |                                                                                     | 10.9 to 53.9              | 15.7 to 70.2             |
|                       | Full-Complement LM Guides - special LM rail types               |  | JR-A       | ▶ <a href="#">■1-324</a> |  | 27.6 to 121               | 36.4 to 146              |
|                       |                                                                 |  | JR-B       | ▶ <a href="#">■1-324</a> |                                                                                     | 27.6 to 121               | 36.4 to 146              |
|                       |                                                                 |  | JR-R       | ▶ <a href="#">■1-324</a> |                                                                                     | 27.6 to 121               | 36.4 to 146              |

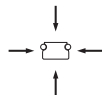
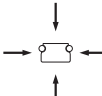
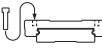
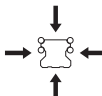
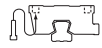
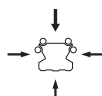
\* For specification tables for each model, please see "■ Product Descriptions."

| External dimensions (mm) |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Features                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Major application |
|--------------------------|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| Height                   | Width         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                   |
| 24 to 90                 | 47 to 170     | <ul style="list-style-type: none"><li>Heavy load, high rigidity</li><li>Practically a global standard size</li><li>Superb capability of absorbing mounting error</li><li>Stainless steel type also available as standard</li><li>Type M1, achieving max service temperature of 150°C, also available</li><li>Type M2, with high corrosion resistance, also available (Basic dynamic load rating: 2.33 to 5.57 kN) (Basic static load rating: 2.03 to 5.16 kN)</li></ul> | <ul style="list-style-type: none"><li>Machining center</li><li>NC lathe</li><li>XYZ axes of heavy cutting machine tools</li><li>Grinding head feeding axis of grinding machines</li><li>Components requiring a heavy moment and high accuracy</li><li>NC milling machine</li><li>Horizontal milling machine</li><li>Gantry five axis milling machine</li><li>Z axis of electric discharge machines</li><li>Wire-cut electric discharge machine</li><li>Car elevator</li><li>Food-related machine</li><li>Testing machine</li><li>Vehicle doors</li><li>Printed circuit board drilling machine</li><li>ATC</li><li>Construction equipment</li><li>Shield machine</li><li>Semiconductor/liquid crystal manufacturing equipment</li></ul> |                   |
| 24 to 90                 | 47 to 170     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                   |
| 24 to 110                | 47 to 215     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                   |
| 24 to 48                 | 47 to 100     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                   |
| 30 to 110                | 63 to 215     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                   |
| 30 to 48                 | 63 to 100     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                   |
| 30 to 110                | 63 to 215     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                   |
| 30 to 145                | 63 to 350     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                   |
| 24 to 110                | 47 to 215     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                   |
| 24 to 48                 | 47 to 100     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                   |
| 30 to 110                | 63 to 215     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                   |
| 30 to 48                 | 63 to 100     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                   |
| 30 to 110                | 63 to 215     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                   |
| 30 to 145                | 63 to 350     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                   |
| 11 to 110                | 16 to 156     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                   |
| 28 to 55                 | 34 to 70      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                   |
| 30 to 110                | 44 to 156     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                   |
| 30 to 55                 | 44 to 70      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                   |
| 120 to 145               | 250 to 266    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                   |
| 28                       | 34            | <ul style="list-style-type: none"><li>Can be used in various environments at atmospheric pressure to vacuum (<math>10^{-3}</math> [Pa])</li><li>Allows baking temperature of 200°C* at a maximum</li><li>* If the baking temperature exceeds 100°C, multiply the basic load rating with the temperature coefficient.</li></ul>                                                                                                                                          | <ul style="list-style-type: none"><li>Medical equipment</li><li>Semiconductor/liquid crystal manufacturing equipment</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                   |
| 28 to 90                 | 33.5 to 124.5 | <ul style="list-style-type: none"><li>Easy mounting and reduced mounting height when using 2 units opposed to each other since the side faces of the LM block have mounting holes</li><li>Heavy load, high rigidity</li><li>Superb capability of absorbing mounting error</li><li>Stainless steel type also available as standard</li><li>Type M1, achieving max service temperature of 150°C, also available</li></ul>                                                 | <ul style="list-style-type: none"><li>Cross rails of gantry machine tools</li><li>Z axis of woodworking machines</li><li>Z axis of measuring instruments</li><li>Components opposed to each other</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                   |
| 28 to 55                 | 33.5 to 69.5  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                   |
| 61 to 114                | 70 to 140     | <ul style="list-style-type: none"><li>Since the central part of the LM rail is thinly structured, the LM Guide is capable of absorbing an error and achieving smooth motion if the parallelism between the two axes is poor</li><li>Since the LM rail has a highly rigid sectional shape, it can be used as a structural member</li></ul>                                                                                                                               | <ul style="list-style-type: none"><li>Automated warehouse</li><li>Garage</li><li>Gantry robot</li><li>FMS traveling rail</li><li>Lift</li><li>Conveyance system</li><li>Welding machine</li><li>Lifter</li><li>Crane</li><li>Forklift</li><li>Coating machine</li><li>Shield machine</li><li>Stage setting</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |
| 61 to 114                | 70 to 140     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                   |
| 65 to 124                | 48 to 100     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                   |

| Classification          |                                                                   | Type                                                                                |             | Specification Table* | Load capacity diagram                                                               | Basic load rating (kN)    |                                                                    |
|-------------------------|-------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------|----------------------|-------------------------------------------------------------------------------------|---------------------------|--------------------------------------------------------------------|
|                         |                                                                   |                                                                                     |             |                      |                                                                                     | Basic dynamic load rating | Basic static load rating                                           |
| 4-way equal load type   | Caged Ball Cross LM Guide                                         |    | SCR         | ▶ <b>■1-168</b>      |    | 36.8 to 253               | 64.7 to 408                                                        |
|                         | Full-Complement LM Guide orthogonal type                          |                                                                                     | CSR         | ▶ <b>■1-310</b>      |                                                                                     | 10.9 to 100               | 15.7 to 135                                                        |
|                         | Caged Ball LM Guide - wide, low center of gravity types           |    | SHW-CA      | ▶ <b>■1-142</b>      |    | 4.31 to 70.2              | 5.66 to 91.4                                                       |
|                         |                                                                   |    | SHW-CR, HR  | ▶ <b>■1-144</b>      |                                                                                     | 4.31 to 70.2              | 5.66 to 91.4                                                       |
|                         | Full-Complement Ball LM Guide - wide, low center of gravity types |    | HRW-CA      | ▶ <b>■1-246</b>      |                                                                                     | 5.53 to 80.3              | 9.1 to 109                                                         |
|                         |                                                                   |    | HRW-CR, LRM | ▶ <b>■1-248</b>      |                                                                                     | 3.29 to 62.4              | 7.16 to 86.3                                                       |
|                         | Full-ball Straight - Curved Guide                                 |    | HMG         | ▶ <b>■1-340</b>      |    | 2.56 to 66.2              | Straight section<br>4.23 to 66.7<br>Curved section<br>0.44 to 36.2 |
|                         | Caged Ball LM Guides Finite stroke                                |   | EPF         | ▶ <b>■1-176</b>      |   | 0.90 to 3.71              | 1.60 to 5.88                                                       |
|                         | Full-Complement Ball LM Guide - separate types                    |  | HR, HR-T    | ▶ <b>■1-278</b>      |  | 2.82 to 226               | 3.48 to 232                                                        |
|                         |                                                                   |  | GSR-T       | ▶ <b>■1-290</b>      |  | 8.42 to 37                | 9.77 to 39.1                                                       |
|                         |                                                                   |                                                                                     | GSR-V       | ▶ <b>■1-290</b>      |  | 6.51 to 15.5              | 6.77 to 15.2                                                       |
| Interchangeable designs | Full-Complement Ball LM Guides - LM rail-rack integrated type     |  | GSR-R       | ▶ <b>■1-298</b>      |  | 15.5 to 37                | 15.2 to 39.1                                                       |

\* For specification tables for each model, please see "■ Product Descriptions."

| External dimensions (mm) |                | Features                                                                                                                                                                                                                                                                                                                                                                                                      | Major application                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Height                   | Width          |                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 70 to 180                | 88 to 226      | <ul style="list-style-type: none"> <li>A compact XY structure is allowed due to an XY orthogonal, single-piece LM block</li> <li>Since a saddle-less structure is allowed, the machine can be lightweighted and compactly designed</li> <li>Long service life, long-term maintenance-free operation</li> <li>Low dust generation, low noise, acceptable running sound</li> <li>Superbly high speed</li> </ul> | <ul style="list-style-type: none"> <li>Low center of gravity, precision XY table</li> <li>NC lathe</li> <li>Optical measuring instrument</li> <li>Automatic lathe</li> <li>Inspection equipment</li> <li>Cartesian coordinate robot</li> <li>Bonding machine</li> <li>Wire-cut electric discharge machine</li> <li>Hollow table</li> <li>Printed circuit board assembler</li> <li>Machine tool table</li> <li>Electric discharge machine</li> <li>XY axes of horizontal machining center</li> </ul> |
| 47 to 118                | 38.8 to 129.8  | <ul style="list-style-type: none"> <li>A compact XY structure is allowed due to an XY orthogonal, single-piece LM block</li> <li>Since a saddle-less structure is allowed, the machine can be lightweighted and compactly designed</li> </ul>                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 12 to 50                 | 40 to 162      | <ul style="list-style-type: none"> <li>Long service life, long-term maintenance-free operation</li> <li>Low dust generation, low noise, acceptable running sound</li> <li>Superbly high speed</li> <li>Smooth motion in all mounting orientations</li> <li>Wide, low center of gravity, space saving structure</li> <li>Stainless steel type also available as standard</li> </ul>                            | <ul style="list-style-type: none"> <li>Z axis of IC printed circuit board drilling machine</li> <li>Z axis of small electric discharge machine</li> <li>Loader</li> <li>Machining center</li> <li>NC lathe</li> <li>Robot</li> <li>Wire-cut electric discharge machine</li> <li>APC</li> <li>Semiconductor/liquid crystal manufacturing equipment</li> <li>Measuring instrument</li> <li>Wafer transfer equipment</li> <li>Construction equipment</li> <li>Railroad vehicle</li> </ul>              |
| 12 to 50                 | 30 to 130      |                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 17 to 60                 | 60 to 200      | <ul style="list-style-type: none"> <li>4-way equal load, thin and highly rigid</li> <li>Wide, low center of gravity, space saving structure</li> <li>Stainless steel type also available as standard</li> </ul>                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 12 to 50                 | 30 to 130      |                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 24 to 90                 | 47 to 170      | <ul style="list-style-type: none"> <li>Freedom of design</li> <li>Cost reduction through simplified structure</li> </ul>                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"> <li>Large swivel base</li> <li>Pendulum vehicle for railroad</li> <li>Pantagraph</li> <li>Control unit</li> <li>Optical measuring machine</li> <li>Tool grinder</li> <li>X-Ray machine</li> <li>CT scanner</li> <li>Medical equipment</li> <li>Stage setting</li> <li>Car elevator</li> <li>Amusement machine</li> <li>Turntable</li> <li>Tool changer</li> </ul>                                                                                                |
| 8 to 16                  | 17 to 32       | <ul style="list-style-type: none"> <li>Caged ball effect using a cage</li> <li>Smooth movement with minimal rolling variation</li> <li>4-groove construction in a compact body</li> </ul>                                                                                                                                                                                                                     | <ul style="list-style-type: none"> <li>Semiconductor manufacturing equipment</li> <li>Medical equipment</li> <li>Inspection equipment</li> <li>Industrial machinery</li> </ul>                                                                                                                                                                                                                                                                                                                      |
| 8.5 to 60                | 18 to 125      | <ul style="list-style-type: none"> <li>Low-Profile high rigidity, space saving structure</li> <li>Interchangeable with Cross-Roller Guide</li> <li>Preload can be adjusted</li> <li>Stainless steel type also available as standard</li> </ul>                                                                                                                                                                | <ul style="list-style-type: none"> <li>XYZ axes of electric discharge machine</li> <li>Precision table</li> <li>XZ axes of NC lathe</li> <li>Assembly robot</li> <li>Conveyance system</li> <li>Machining center</li> <li>Wire-cut electric discharge machine</li> <li>Tool changer</li> <li>Woodworking machine</li> </ul>                                                                                                                                                                         |
| 20 to 38                 | 32 to 68       | <ul style="list-style-type: none"> <li>LM block and LM rail are both interchangeable</li> <li>Preload can be adjusted</li> <li>Capable of absorbing vertical level error and horizontal tolerance for parallelism</li> </ul>                                                                                                                                                                                  | <ul style="list-style-type: none"> <li>Industrial robot</li> <li>Various conveyance systems</li> <li>Automated warehouse</li> <li>Palette changer</li> <li>ATC</li> <li>Door closing device</li> <li>Guide using an aluminum mold base</li> <li>Welding machine</li> <li>Coating machine</li> <li>Car washing machine</li> </ul>                                                                                                                                                                    |
| 20 to 30                 | 32 to 50       |                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 30 to 38                 | 59.91 to 80.18 | <ul style="list-style-type: none"> <li>LM rail-rack integrated design eliminates assembly and adjustment work</li> <li>LM rail-rack integrated design enables a space-saving structure to be achieved</li> <li>Capable of supporting long strokes</li> </ul>                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

| Classification      |                                                 | Type                                                                                |           | Specification Table* | Load capacity diagram                                                               | Basic load rating (kN)    |                          |
|---------------------|-------------------------------------------------|-------------------------------------------------------------------------------------|-----------|----------------------|-------------------------------------------------------------------------------------|---------------------------|--------------------------|
|                     |                                                 |                                                                                     |           |                      |                                                                                     | Basic dynamic load rating | Basic static load rating |
| Miniature types     | Caged Ball LM Guides                            |    | SRS-S     | ▶ <b>■1-154</b>      |    | 1.09 to 4.5               | 0.964 to 3.39            |
|                     |                                                 |                                                                                     | SRS-M     |                      |                                                                                     | 0.439 to 16.5             | 0.468 to 20.2            |
|                     |                                                 |                                                                                     | SRS-N     |                      |                                                                                     | 0.515 to 9.71             | 0.586 to 8.55            |
|                     |                                                 |    | SRS-WS    | ▶ <b>■1-158</b>      |                                                                                     | 1.38 to 6.64              | 1.35 to 5.94             |
|                     |                                                 |                                                                                     | SRS-WM    |                      |                                                                                     | 0.584 to 9.12             | 0.703 to 8.55            |
|                     |                                                 |                                                                                     | SRS-WN    |                      |                                                                                     | 0.746 to 12.4             | 0.996 to 12.1            |
|                     | Full-Complement Ball LM Guides                  |    | RSX-M     | ▶ <b>■1-256</b>      |    | 1.16 to 5.59              | 1.54 to 6.78             |
|                     |                                                 |                                                                                     | RSX-WM    | ▶ <b>■1-258</b>      |                                                                                     | 1.63 to 7.43              | 2.51 to 10.18            |
|                     |                                                 |                                                                                     | RSR-M     | ▶ <b>■1-268</b>      |                                                                                     | 0.18 to 8.82              | 0.27 to 12.7             |
|                     |                                                 |                                                                                     | RSR-M1V   | ▶ <b>■1-380</b>      |                                                                                     | 1.47 to 8.82              | 2.25 to 12.7             |
|                     |                                                 |                                                                                     | RSR-N     | ▶ <b>■1-268</b>      |                                                                                     | 0.3 to 14.2               | 0.44 to 20.6             |
|                     |                                                 |                                                                                     | RSR-M1N   | ▶ <b>■1-380</b>      |                                                                                     | 2.6 to 14.2               | 3.96 to 20.6             |
|                     | Full-Complement Ball LM Guide - wide types      |    | RSR-WM/WV | ▶ <b>■1-268</b>      |                                                                                     | 0.25 to 6.66              | 0.47 to 9.8              |
|                     |                                                 |                                                                                     | RSR-M1WV  | ▶ <b>■1-382</b>      |                                                                                     | 2.45 to 6.66              | 3.92 to 9.8              |
|                     |                                                 |                                                                                     | RSR-WN    | ▶ <b>■1-268</b>      |                                                                                     | 0.39 to 9.91              | 0.75 to 14.9             |
|                     |                                                 |                                                                                     | RSR-M1WN  | ▶ <b>■1-382</b>      |                                                                                     | 3.52 to 9.91              | 5.37 to 14.9             |
|                     | Full Complement Ball LM Guide - orthogonal type |  | MX        | ▶ <b>■1-316</b>      |                                                                                     | 0.59 to 2.04              | 1.1 to 3.21              |
| Circular arc types  | Full-Complement Ball LM Guides                  |  | HCR       | ▶ <b>■1-332</b>      |  | 4.7 to 141                | 8.53 to 215              |
| Self-aligning types | Full-Complement Ball LM Guides                  |  | NSR-TBC   | ▶ <b>■1-346</b>      |  | 9.41 to 90.8              | 18.6 to 152              |

\* For specification tables for each model, please see "■ Product Descriptions."

|  | External dimensions (mm) |              | Features                                                                                                                                                                                                                                                                                                                                        | Major application                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                 |
|--|--------------------------|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | Height                   | Width        |                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                 |
|  | 8 to 16                  | 17 to 32     | <ul style="list-style-type: none"><li>Long service life, long-term maintenance-free operation</li><li>Low dust generation, low noise, acceptable running sound</li><li>Superbly high speed</li><li>Smooth motion in all mounting orientations</li><li>Stainless steel type also available as standard</li><li>Lightweight and compact</li></ul> | <ul style="list-style-type: none"><li>IC/LSI manufacturing machine</li><li>Hard disc drive</li><li>Slide unit of OA equipment</li><li>Wafer transfer equipment</li><li>Printed circuit board assembly table</li></ul>                                                                                                                                                                                                                         | <ul style="list-style-type: none"><li>Medical equipment</li><li>Electronic components of electron microscope</li><li>Optical stage</li><li>Stepper</li><li>Plotting machine</li><li>Feed mechanism of IC bonding machine</li><li>Inspection equipment</li></ul> |
|  | 6 to 25                  | 17 to 48     |                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                 |
|  | 6 to 16                  | 12 to 32     |                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                 |
|  | 9 to 16                  | 25 to 60     |                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                 |
|  | 6.5 to 16                | 17 to 60     |                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                 |
|  | 8 to 16                  | 17 to 32     | <ul style="list-style-type: none"><li>Lightweight and compact</li><li>Smooth motion in all mounting orientations</li><li>Stainless steel type also available as standard</li></ul>                                                                                                                                                              | <ul style="list-style-type: none"><li>IC/LSI manufacturing machine</li><li>Hard disc drive</li><li>Slide unit of OA equipment</li><li>Wafer transfer equipment</li><li>Printed circuit board assembly table</li><li>Medical equipment</li><li>Electronic components of electron microscope</li><li>Optical stage</li><li>Stepper</li><li>Plotting machine</li><li>Feed mechanism of IC bonding machine</li><li>Inspection equipment</li></ul> |                                                                                                                                                                                                                                                                 |
|  | 9 to 16                  | 25 to 60     |                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                 |
|  | 4 to 25                  | 8 to 46      | <ul style="list-style-type: none"><li>Ultra-compact</li><li>Stainless steel type also available as standard</li><li>Long type with increased load capacity also offered as standard</li><li>Type M1, achieving max service temperature of 150°C, also available</li></ul>                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                 |
|  | 10 to 25                 | 20 to 46     |                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                 |
|  | 4 to 25                  | 8 to 46      |                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                 |
|  | 10 to 25                 | 20 to 46     | <ul style="list-style-type: none"><li>Stainless steel type also available as standard</li><li>Long type with increased load capacity also offered as standard</li><li>Type M1, achieving max service temperature of 150°C, also available</li></ul>                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                 |
|  | 4.5 to 16                | 12 to 60     |                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                 |
|  | 12 to 16                 | 30 to 60     |                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                 |
|  | 4.5 to 16                | 12 to 60     |                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                 |
|  | 12 to 16                 | 30 to 60     | <ul style="list-style-type: none"><li>A compact XY structure is allowed due to an XY orthogonal, single-piece LM block</li><li>Stainless steel type also available as standard</li></ul>                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                 |
|  | 10 to 14.5               | 15.2 to 30.2 |                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                 |
|  | 18 to 90                 | 39 to 170    | <ul style="list-style-type: none"><li>Circular motion guide in a 4-way equal load design</li><li>Highly accurate circular motion without play</li><li>Allows an efficient design with the LM block placed in the loading point</li><li>Large circular motion easily achieved</li></ul>                                                          | <ul style="list-style-type: none"><li>Large swivel base</li><li>Pendulum vehicle for railroad</li><li>Pantagraph</li><li>Control unit</li><li>Optical measuring machine</li><li>Tool grinder</li></ul>                                                                                                                                                                                                                                        | <ul style="list-style-type: none"><li>X-Ray machine</li><li>CT scanner</li><li>Medical equipment</li><li>Stage setting</li><li>Car elevator</li><li>Amusement machine</li><li>Turntable</li><li>Tool changer</li></ul>                                          |
|  | 40 to 105                | 70 to 175    | <ul style="list-style-type: none"><li>Can be used in rough mount due to self-aligning on the flat surface of the case</li><li>Preload can be adjusted</li><li>Can be mounted on a black steel sheet</li></ul>                                                                                                                                   | <ul style="list-style-type: none"><li>XY axes of ordinary industrial machinery</li><li>Various conveyance systems</li><li>Automated warehouse</li><li>Palette changer</li><li>Automatic coating machine</li><li>Various welding machines</li></ul>                                                                                                                                                                                            |                                                                                                                                                                                                                                                                 |

# Calculating the Applied Load

The LM Guide is capable of receiving loads and moments in all directions that are generated due to the mounting orientation, alignment, gravity center position of a traveling object, thrust position and cutting resistance.

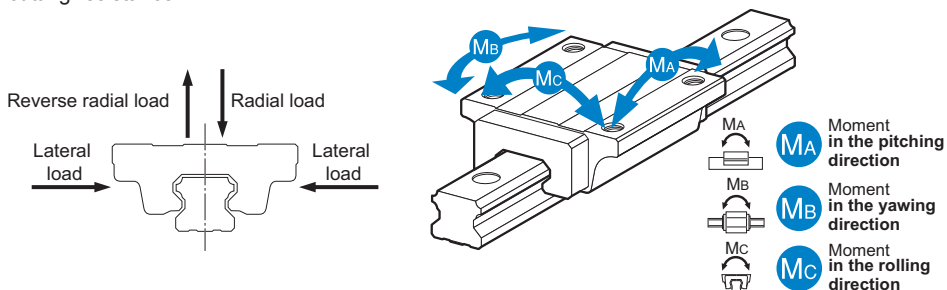


Fig.1 Directions of the Loads Applied on the LM Guide

## Calculating an Applied Load

### [Single-Axis Use]

#### ● Moment Equivalence

When the installation space for the LM Guide is limited, you may have to use only one LM block, or double LM blocks closely contacting with each other. In such a setting, the load distribution is not uniform and, as a result, an excessive load is applied in localized areas (i.e., both ends) as shown in Fig.2. Continued use under such conditions may result in ☐aking in those areas, consequently shortening the service life. In such a case, calculate the actual load by multiplying the moment value by any one of the equivalent-moment factors specified in Table1 to Table6 **A1-43**.

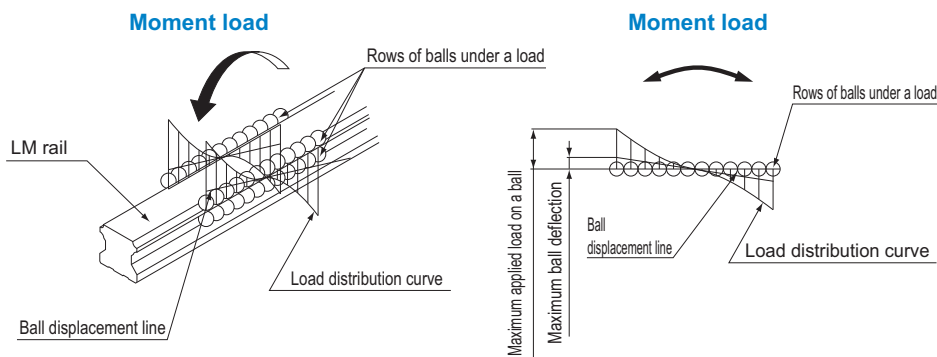


Fig.2 Ball Load when a Moment is Applied

An equivalent-load equation applicable when a moment acts on an LM Guide is shown below.

$$P = K \cdot M$$

P : Equivalent load per LM Guide (N)

K : Equivalent moment factor

M : Applied moment (N•mm)

## ● Equivalent Factor

Since the rated load is equivalent to the permissible moment, the equivalent factor to be multiplied when equalizing the  $M_A$ ,  $M_B$  and  $M_C$  moments to the applied load per block is obtained by dividing the rated loads in the corresponding directions.

With those models other than 4-way equal load types, however, the load ratings in the 4 directions differ from each other. Therefore, the equivalent factor values for the  $M_A$  and  $M_C$  moments also differ depending on whether the direction is radial or reverse radial.

### ■ Equivalent Factors for the $M_A$ Moment

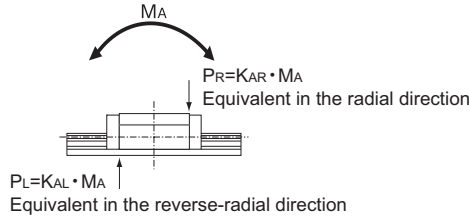


Fig.3 Equivalent Factors for the  $M_A$  Moment

Equivalent factors for the  $M_A$  Moment

|                                                   |                               |
|---------------------------------------------------|-------------------------------|
| Equivalent factor in the radial direction         | $K_{AR} = \frac{C_0}{M_A}$    |
| Equivalent factor in the reverse radial direction | $K_{AL} = \frac{C_{0L}}{M_A}$ |

$$\frac{C_0}{K_{AR} \cdot M_A} = \frac{C_{0L}}{K_{AL} \cdot M_A} = 1$$

### ■ Equivalent Factors for the $M_B$ Moment

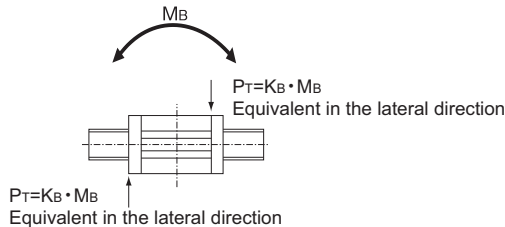


Fig.4 Equivalent Factors for the  $M_B$  Moment

Equivalent factors for the  $M_B$  Moment

|                                             |                            |
|---------------------------------------------|----------------------------|
| Equivalent factor in the lateral directions | $K_B = \frac{C_{0T}}{M_B}$ |
|---------------------------------------------|----------------------------|

$$\frac{C_{0T}}{K_B \cdot M_B} = 1$$

### ■Equivalent Factors for the $M_c$ Moment

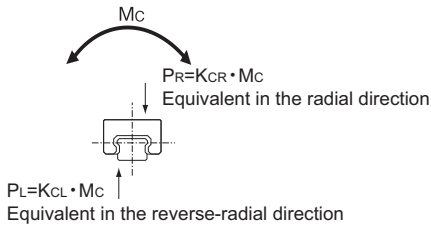


Fig.5 Equivalent Factors for the  $M_c$  Moment

Equivalent factors for the  $M_c$  Moment

|                                                      |                               |
|------------------------------------------------------|-------------------------------|
| Equivalent factor<br>in the radial direction         | $K_{CR} = \frac{C_0}{M_c}$    |
| Equivalent factor in the<br>reverse radial direction | $K_{CL} = \frac{C_{0L}}{M_c}$ |

$$\frac{C_0}{K_{CR} \cdot M_c} = \frac{C_{0L}}{K_{CL} \cdot M_c} = 1$$

- $C_0$  : Basic static load rating (radial direction) (N)
- $C_{0L}$  : Basic static load rating (reverse radial direction) (N)
- $C_{0T}$  : Basic static load rating (lateral direction) (N)
- $P_R$  : Calculated load (radial direction) (N)
- $P_L$  : Calculated load (reverse radial direction) (N)
- $P_T$  : Calculated load (lateral direction) (N)

## Example of calculation

### When one LM block is used

Model No.: SSR20XV1

Gravitational acceleration  $g=9.8 \text{ (m/s}^2\text{)}$

Mass  $m=10 \text{ (kg)}$

$\ell_1=200 \text{ (mm)}$

$\ell_2=100 \text{ (mm)}$

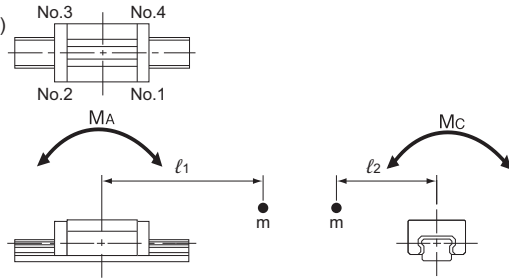


Fig.6 When One LM Block is Used

$$\text{No.1 } P_1 = mg + K_{AR1} \cdot mg \cdot \ell_1 + K_{CR} \cdot mg \cdot \ell_2 = 98 + 0.275 \times 98 \times 200 + 0.129 \times 98 \times 100 = 6752 \text{ (N)}$$

$$\text{No.2 } P_2 = mg - K_{AL1} \cdot mg \cdot \ell_1 + K_{CR} \cdot mg \cdot \ell_2 = 98 - 0.137 \times 98 \times 200 + 0.129 \times 98 \times 100 = -1323 \text{ (N)}$$

$$\text{No.3 } P_3 = mg - K_{AL1} \cdot mg \cdot \ell_1 - K_{CL} \cdot mg \cdot \ell_2 = 98 - 0.137 \times 98 \times 200 - 0.0644 \times 98 \times 100 = -3218 \text{ (N)}$$

$$\text{No.4 } P_4 = mg + K_{AR1} \cdot mg \cdot \ell_1 - K_{CL} \cdot mg \cdot \ell_2 = 98 + 0.275 \times 98 \times 200 - 0.0644 \times 98 \times 100 = 4857 \text{ (N)}$$

### When two LM blocks are used in close contact with each other

Model No.: SVS25R2

Gravitational acceleration  $g=9.8 \text{ (m/s}^2\text{)}$

Mass  $m=5 \text{ (kg)}$

$\ell_1=200 \text{ (mm)}$

$\ell_2=150 \text{ (mm)}$

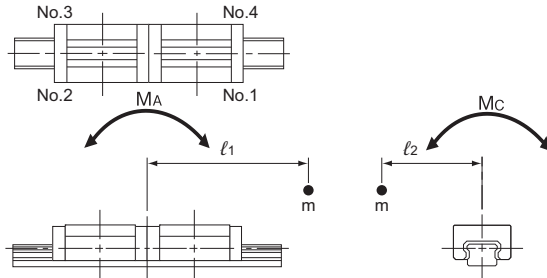


Fig.7 When Two LM Blocks are Used in Close Contact with Each Other

$$\text{No.1 } P_1 = \frac{mg}{2} + K_{AR2} \cdot mg \cdot \ell_1 + K_{CR} \cdot \frac{mg \cdot \ell_2}{2} = \frac{49}{2} + 0.0217 \times 49 \times 200 + 0.0995 \times \frac{49 \times 150}{2} = 602.9 \text{ (N)}$$

$$\text{No.2 } P_2 = \frac{mg}{2} - K_{AL2} \cdot mg \cdot \ell_1 + K_{CR} \cdot \frac{mg \cdot \ell_2}{2} = \frac{49}{2} - 0.0182 \times 49 \times 200 + 0.0995 \times \frac{49 \times 150}{2} = 211.9 \text{ (N)}$$

$$\text{No.3 } P_3 = \frac{mg}{2} - K_{AL2} \cdot mg \cdot \ell_1 - K_{CL} \cdot \frac{mg \cdot \ell_2}{2} = \frac{49}{2} - 0.0182 \times 49 \times 200 - 0.0835 \times \frac{49 \times 150}{2} = -460.7 \text{ (N)}$$

$$\text{No.4 } P_4 = \frac{mg}{2} + K_{AR2} \cdot mg \cdot \ell_1 - K_{CL} \cdot \frac{mg \cdot \ell_2}{2} = \frac{49}{2} + 0.0217 \times 49 \times 200 - 0.0835 \times \frac{49 \times 150}{2} = -69.7 \text{ (N)}$$

Note1) Since an LM Guide used in vertical installation receives only a moment load, there is no need to apply a load force (mg).

## [Double-axis Use]

### ● Setting Conditions

Set the conditions needed to calculate the LM system's applied load and service life in hours. The conditions consist of the following items.

- (1) Mass:  $m$  (kg)
- (2) Direction of the working load
- (3) Position of the working point (e.g., center of gravity):  $\ell_2, \ell_3, h_1$ (mm)
- (4) Thrust position:  $\ell_4, h_2$ (mm)
- (5) LM system arrangement:  $\ell_0, \ell_1$ (mm)  
(No. of units and axes)
- (6) Velocity diagram  
Speed:  $V$  (mm/s)  
Time constant:  $t_n$  (s)  
Acceleration:  $\alpha_n$ (mm/s<sup>2</sup>)

$$(\alpha_n = \frac{V}{t_n})$$

- (7) Duty cycle  
Number of reciprocations per minute:  $N_1$ (min<sup>-1</sup>)
- (8) Stroke length:  $\ell_s$ (mm)
- (9) Average speed:  $V_m$ (m/s)
- (10) Required service life in hours:  $L_h$ (h)

Gravitational acceleration  $g=9.8$  (m/s<sup>2</sup>)

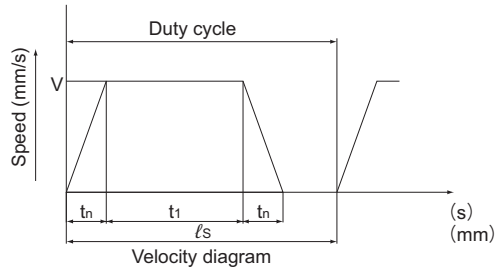
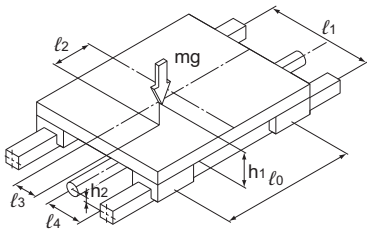


Fig.8 Condition

### ● Applied Load Equation

The load applied to the LM Guide varies with the external force, such as the position of the gravity center of an object, thrust position, inertia generated from acceleration/deceleration during start or stop, and cutting force.

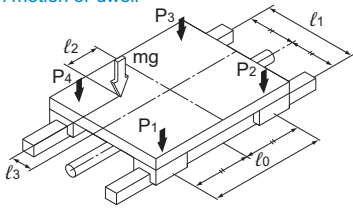
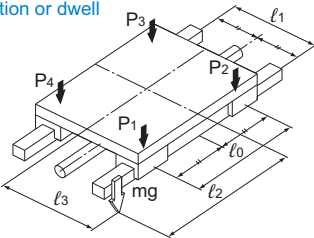
In selecting an LM Guide, it is necessary to obtain the value of the applied load while taking into account these conditions.

Calculate the load applied to the LM Guide in each of the examples 1 to 10 shown below.

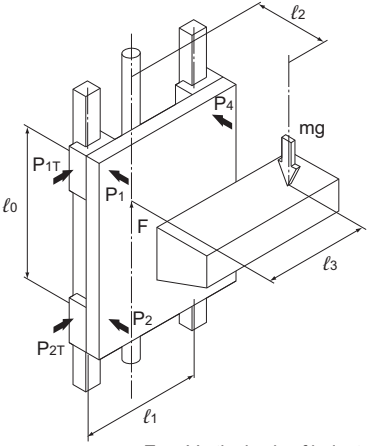
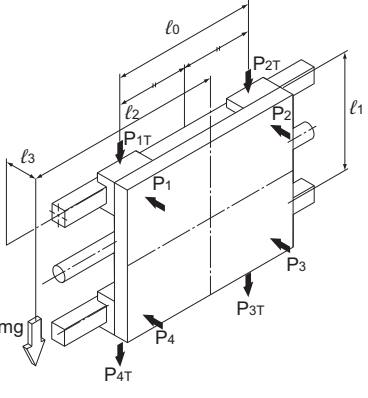
|            |                                                  |                     |
|------------|--------------------------------------------------|---------------------|
| m          | : Mass                                           | (kg)                |
| $\ell_n$   | : Distance                                       | (mm)                |
| $F_n$      | : External force                                 | (N)                 |
| $P_n$      | : Applied load (radial/reverse radial direction) | (N)                 |
| $P_{nT}$   | : Applied load (lateral directions)              | (N)                 |
| g          | : Gravitational acceleration                     | (m/s <sup>2</sup> ) |
|            | (g = 9.8m/s <sup>2</sup> )                       |                     |
| V          | : Speed                                          | (m/s)               |
| $t_n$      | : Time constant                                  | (s)                 |
| $\alpha_n$ | : Acceleration                                   | (m/s <sup>2</sup> ) |

$$(\alpha_n = \frac{V}{t_n})$$

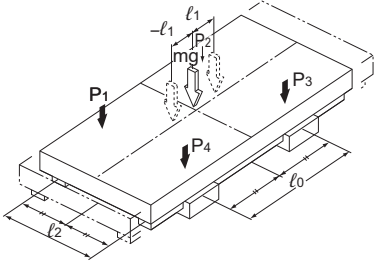
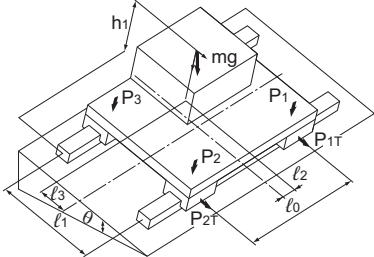
### [Example]

|   | Condition                                                                                                                                                                        | Applied Load Equation                                                                                                                                                                                                                                                                                                                                                                                                       |
|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | <p>Horizontal mount<br/>(with the block traveling)<br/>Uniform motion or dwell</p>             | $P_1 = \frac{mg}{4} + \frac{mg \cdot \ell_2}{2 \cdot \ell_0} - \frac{mg \cdot \ell_3}{2 \cdot \ell_1}$ $P_2 = \frac{mg}{4} - \frac{mg \cdot \ell_2}{2 \cdot \ell_0} - \frac{mg \cdot \ell_3}{2 \cdot \ell_1}$ $P_3 = \frac{mg}{4} - \frac{mg \cdot \ell_2}{2 \cdot \ell_0} + \frac{mg \cdot \ell_3}{2 \cdot \ell_1}$ $P_4 = \frac{mg}{4} + \frac{mg \cdot \ell_2}{2 \cdot \ell_0} + \frac{mg \cdot \ell_3}{2 \cdot \ell_1}$ |
| 2 | <p>Horizontal mount, overhung<br/>(with the block traveling)<br/>Uniform motion or dwell</p>  | $P_1 = \frac{mg}{4} + \frac{mg \cdot \ell_2}{2 \cdot \ell_0} + \frac{mg \cdot \ell_3}{2 \cdot \ell_1}$ $P_2 = \frac{mg}{4} - \frac{mg \cdot \ell_2}{2 \cdot \ell_0} + \frac{mg \cdot \ell_3}{2 \cdot \ell_1}$ $P_3 = \frac{mg}{4} - \frac{mg \cdot \ell_2}{2 \cdot \ell_0} - \frac{mg \cdot \ell_3}{2 \cdot \ell_1}$ $P_4 = \frac{mg}{4} + \frac{mg \cdot \ell_2}{2 \cdot \ell_0} - \frac{mg \cdot \ell_3}{2 \cdot \ell_1}$ |

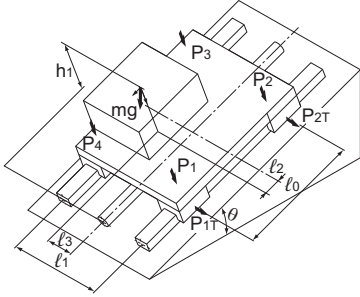
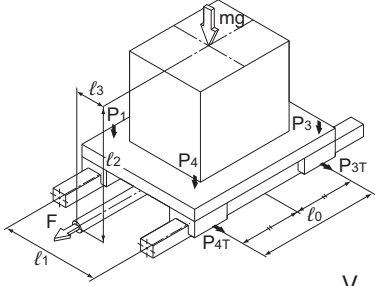
Note) Load is positive in the direction of the arrow.

|   | Condition                                                                                                                                                                                                                   | Applied Load Equation                                                                                                                                                                                                                   |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3 | <b>Vertical mount</b><br><b>Uniform motion or dwell</b>  <p>E.g.: Vertical axis of industrial robot, automatic coating machine, lifter</p> | $P_1 = P_4 = - \frac{mg \cdot l_2}{2 \cdot l_0}$ $P_2 = P_3 = \frac{mg \cdot l_2}{2 \cdot l_0}$ $P_{1T} = P_{4T} = \frac{mg \cdot l_3}{2 \cdot l_0}$ $P_{2T} = P_{3T} = - \frac{mg \cdot l_3}{2 \cdot l_0}$                             |
| 4 | <b>Wall mount</b><br><b>Uniform motion or dwell</b>  <p>E.g.: Travel axis of cross-rail loader</p>                                        | $P_1 = P_2 = - \frac{mg \cdot l_3}{2 \cdot l_1}$ $P_3 = P_4 = \frac{mg \cdot l_3}{2 \cdot l_1}$ $P_{1T} = P_{4T} = \frac{mg}{4} + \frac{mg \cdot l_2}{2 \cdot l_0}$ $P_{2T} = P_{3T} = \frac{mg}{4} - \frac{mg \cdot l_2}{2 \cdot l_0}$ |

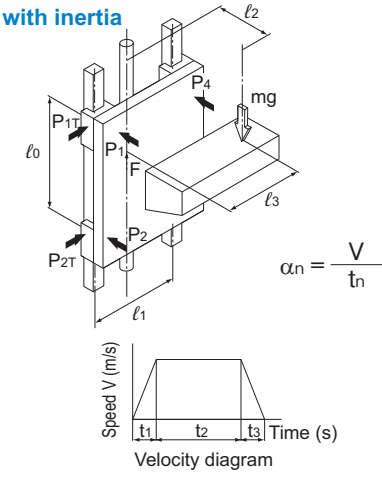
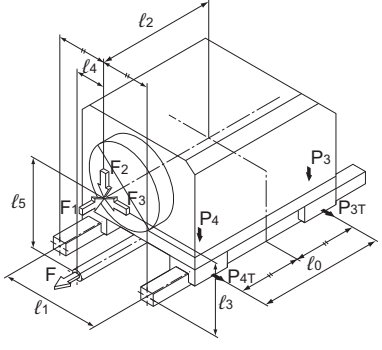
Note) Load is positive in the direction of the arrow.

|   | Condition                                                                                                                                                                                | Applied Load Equation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5 | <p><b>With the LM rails movable</b><br/><b>Horizontal mount</b></p>  <p>E.g.: XY table sliding fork</p> | $P_1 \text{ to } P_4 (\max) = \frac{mg}{4} + \frac{mg \cdot l_1}{2 \cdot l_0}$ $P_1 \text{ to } P_4 (\min) = \frac{mg}{4} - \frac{mg \cdot l_1}{2 \cdot l_0}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 6 | <p><b>Laterally tilt mount</b></p>  <p>E.g.: NC lathe Carriage</p>                                     | $P_1 = + \frac{mg \cdot \cos \theta}{4} + \frac{mg \cdot \cos \theta \cdot l_2}{2 \cdot l_0} - \frac{mg \cdot \cos \theta \cdot l_3}{2 \cdot l_1} + \frac{mg \cdot \sin \theta \cdot h_1}{2 \cdot l_1}$ $P_{1T} = \frac{mg \cdot \sin \theta}{4} + \frac{mg \cdot \sin \theta \cdot l_2}{2 \cdot l_0}$ $P_2 = + \frac{mg \cdot \cos \theta}{4} - \frac{mg \cdot \cos \theta \cdot l_2}{2 \cdot l_0} - \frac{mg \cdot \cos \theta \cdot l_3}{2 \cdot l_1} + \frac{mg \cdot \sin \theta \cdot h_1}{2 \cdot l_1}$ $P_{2T} = \frac{mg \cdot \sin \theta}{4} - \frac{mg \cdot \sin \theta \cdot l_2}{2 \cdot l_0}$ $P_3 = + \frac{mg \cdot \cos \theta}{4} - \frac{mg \cdot \cos \theta \cdot l_2}{2 \cdot l_0} + \frac{mg \cdot \cos \theta \cdot l_3}{2 \cdot l_1} - \frac{mg \cdot \sin \theta \cdot h_1}{2 \cdot l_1}$ $P_{3T} = \frac{mg \cdot \sin \theta}{4} - \frac{mg \cdot \sin \theta \cdot l_2}{2 \cdot l_0}$ $P_4 = + \frac{mg \cdot \cos \theta}{4} + \frac{mg \cdot \cos \theta \cdot l_2}{2 \cdot l_0} + \frac{mg \cdot \cos \theta \cdot l_3}{2 \cdot l_1} - \frac{mg \cdot \sin \theta \cdot h_1}{2 \cdot l_1}$ $P_{4T} = \frac{mg \cdot \sin \theta}{4} + \frac{mg \cdot \sin \theta \cdot l_2}{2 \cdot l_0}$ |

Note) Load is positive in the direction of the arrow.

|   | Condition                                                                                                                                                                                                                                                                    | Applied Load Equation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7 | <b>Longitudinally tilt mount</b>  <p>E.g.: NC lathe<br/>Tool rest</p>                                                                                                                       | $P_1 = + \frac{mg \cdot \cos \theta}{4} + \frac{mg \cdot \cos \theta \cdot \ell_2}{2 \cdot \ell_0}$ $- \frac{mg \cdot \cos \theta \cdot \ell_3}{2 \cdot \ell_1} + \frac{mg \cdot \sin \theta \cdot h_1}{2 \cdot \ell_0}$ $P_{1T} = + \frac{mg \cdot \sin \theta \cdot \ell_3}{2 \cdot \ell_0}$ $P_2 = + \frac{mg \cdot \cos \theta}{4} - \frac{mg \cdot \cos \theta \cdot \ell_2}{2 \cdot \ell_0}$ $- \frac{mg \cdot \cos \theta \cdot \ell_3}{2 \cdot \ell_1} - \frac{mg \cdot \sin \theta \cdot h_1}{2 \cdot \ell_0}$ $P_{2T} = - \frac{mg \cdot \sin \theta \cdot \ell_3}{2 \cdot \ell_0}$ $P_3 = + \frac{mg \cdot \cos \theta}{4} - \frac{mg \cdot \cos \theta \cdot \ell_2}{2 \cdot \ell_0}$ $+ \frac{mg \cdot \cos \theta \cdot \ell_3}{2 \cdot \ell_1} - \frac{mg \cdot \sin \theta \cdot h_1}{2 \cdot \ell_0}$ $P_{3T} = - \frac{mg \cdot \sin \theta \cdot \ell_3}{2 \cdot \ell_0}$ $P_4 = + \frac{mg \cdot \cos \theta}{4} + \frac{mg \cdot \cos \theta \cdot \ell_2}{2 \cdot \ell_0}$ $+ \frac{mg \cdot \cos \theta \cdot \ell_3}{2 \cdot \ell_1} + \frac{mg \cdot \sin \theta \cdot h_1}{2 \cdot \ell_0}$ $P_{4T} = + \frac{mg \cdot \sin \theta \cdot \ell_3}{2 \cdot \ell_0}$ |
| 8 | <b>Horizontal mount with inertia</b>  <p>E.g.: Conveyance truck</p> <p>Velocity diagram</p> <p>Speed <math>V</math> (m/s)</p> <p>Time (s)</p> <p><math>\alpha_n = \frac{V}{t_n}</math></p> | <p>During acceleration</p> $P_1 = P_4 = \frac{mg}{4} - \frac{m \cdot \alpha_1 \cdot \ell_2}{2 \cdot \ell_0}$ $P_2 = P_3 = \frac{mg}{4} + \frac{m \cdot \alpha_1 \cdot \ell_2}{2 \cdot \ell_0}$ $P_{1T} = P_{4T} = \frac{m \cdot \alpha_1 \cdot \ell_3}{2 \cdot \ell_0}$ $P_{2T} = P_{3T} = - \frac{m \cdot \alpha_1 \cdot \ell_3}{2 \cdot \ell_0}$ <p>During uniform motion</p> $P_1 \text{ to } P_4 = \frac{mg}{4}$ <p>During deceleration</p> $P_1 = P_4 = \frac{mg}{4} + \frac{m \cdot \alpha_3 \cdot \ell_2}{2 \cdot \ell_0}$ $P_2 = P_3 = \frac{mg}{4} - \frac{m \cdot \alpha_3 \cdot \ell_2}{2 \cdot \ell_0}$ $P_{1T} = P_{4T} = - \frac{m \cdot \alpha_3 \cdot \ell_3}{2 \cdot \ell_0}$ $P_{2T} = P_{3T} = \frac{m \cdot \alpha_3 \cdot \ell_3}{2 \cdot \ell_0}$                                                                                                                                                                                                                                                                                                                                                                                                                     |

Note) Load is positive in the direction of the arrow.

|    | Condition                                                                                                                                                                                                                         | Applied Load Equation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 9  | <p><b>Vertical mount with inertia</b></p>  <p>E.g.: Conveyance lift</p>                                                                          | <p>During acceleration</p> $P_1 = P_4 = - \frac{m(g + \alpha_1)l_2}{2 \cdot l_0}$ $P_2 = P_3 = \frac{m(g + \alpha_1)l_3}{2 \cdot l_0}$ $P_{1T} = P_{4T} = \frac{m(g + \alpha_1)l_3}{2 \cdot l_0}$ $P_{2T} = P_{3T} = - \frac{m(g + \alpha_1)l_3}{2 \cdot l_0}$ <p>During uniform motion</p> $P_1 = P_4 = - \frac{mg \cdot l_2}{2 \cdot l_0}$ $P_2 = P_3 = \frac{mg \cdot l_3}{2 \cdot l_0}$ $P_{1T} = P_{4T} = \frac{mg \cdot l_3}{2 \cdot l_0}$ $P_{2T} = P_{3T} = - \frac{mg \cdot l_3}{2 \cdot l_0}$ <p>During deceleration</p> $P_1 = P_4 = - \frac{m(g - \alpha_3)l_2}{2 \cdot l_0}$ $P_2 = P_3 = \frac{m(g - \alpha_3)l_3}{2 \cdot l_0}$ $P_{1T} = P_{4T} = \frac{m(g - \alpha_3)l_3}{2 \cdot l_0}$ $P_{2T} = P_{3T} = - \frac{m(g - \alpha_3)l_3}{2 \cdot l_0}$ |
| 10 | <p><b>Horizontal mount with external force</b></p>  <p>E.g.: Drill unit, Milling machine, Lathe, Machining center and other cutting machine</p> | <p>Under force F1</p> $P_1 = P_4 = - \frac{F_1 \cdot l_5}{2 \cdot l_0}$ $P_2 = P_3 = \frac{F_1 \cdot l_5}{2 \cdot l_0}$ $P_{1T} = P_{4T} = \frac{F_1 \cdot l_4}{2 \cdot l_0}$ $P_{2T} = P_{3T} = - \frac{F_1 \cdot l_4}{2 \cdot l_0}$ <p>Under force F2</p> $P_1 = P_4 = \frac{F_2}{4} + \frac{F_2 \cdot l_2}{2 \cdot l_0}$ $P_2 = P_3 = \frac{F_2}{4} - \frac{F_2 \cdot l_2}{2 \cdot l_0}$ <p>Under force F3</p> $P_1 = P_2 = \frac{F_3 \cdot l_3}{2 \cdot l_1}$ $P_3 = P_4 = - \frac{F_3 \cdot l_3}{2 \cdot l_1}$ $P_{1T} = P_{4T} = - \frac{F_3}{4} - \frac{F_3 \cdot l_2}{2 \cdot l_0}$ $P_{2T} = P_{3T} = - \frac{F_3}{4} + \frac{F_3 \cdot l_2}{2 \cdot l_0}$                                                                                                    |

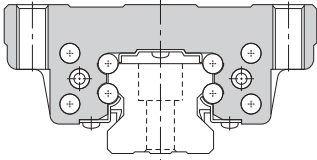
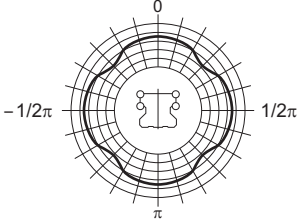
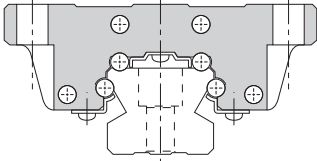
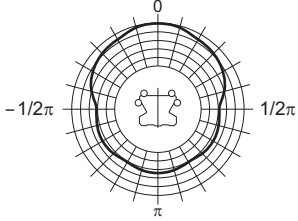
Note) Load is positive in the direction of the arrow.

# Calculating the Equivalent Load

## Rated Load of an LM Guide in Each Direction

The LM Guide is categorized into roughly two types: the 4-way equal load type, which has the same rated load in the radial, reverse radial and lateral directions, and the radial type, which has a large rated load in the radial direction. With the radial type LM Guide, the rated load in the radial direction is different from that in the reverse-radial and lateral directions. The basic load rating in the radial direction is indicated in the specification table. The values in the reverse-radial and lateral directions are obtained from Table7 on **A1-59**.

### [Rated Loads in All Directions]

| Type                                                                                                                  | Load Distribution Curve                                                           |
|-----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| <p><b>4-way Equal Load Type</b></p>  |  |
| <p><b>Radial Type</b></p>            |  |

### [Equivalent Load $P_e$ ]

The LM Guide can bear loads and moments in all directions, including a radial load (PR), reverse radial load (PL) and lateral loads (PT), simultaneously.

When two or more loads (e.g., radial load and lateral load) are simultaneously applied to the LM Guide, the service life and the static safety factor are calculated using equivalent load values obtained by converting all the loads into radial load or reverse-radial load.

**[Equivalent Load Equation]**

When the LM block of the LM Guide receives loads simultaneously in the radial and lateral directions, or the reverse radial and lateral directions, the equivalent load is obtained from the equation below.

$$P_E = X \cdot P_{R(L)} + Y \cdot P_T$$

- $P_E$  : Equivalent load (N)  
 ·Radial direction  
 ·Reverse radial direction  
 $P_L$  : Reverse radial load (N)  
 $P_T$  : Lateral load (N)  
 $X, Y$  : Equivalent factor  
 (see Table8 on **A1-61**)

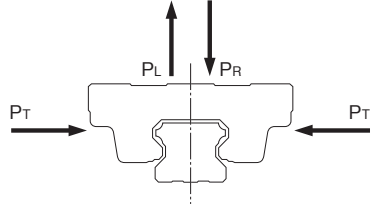


Fig.9 Equivalent of Load of the LM Guide

# Calculating the Static Safety Factor

To calculate a load applied to the LM Guide, the average load required for calculating the service life and the maximum load needed for calculating the static safety factor must be obtained □rst. In a system subject to frequent starts and stops, placed under cutting forces or under a large moment caused by an overhang load, an excessively large load may apply to the LM Guide. When selecting a model number, make sure that the desired model is capable of receiving the required maximum load (whether stationary or in motion). Table1 shows reference values for the static safety factor.

Table1 Reference Values for the Static Safety Factor (f<sub>s</sub>)

| Machine using the LM Guide   | Load conditions             | Lower limit of f <sub>s</sub> |
|------------------------------|-----------------------------|-------------------------------|
| General industrial machinery | Without vibration or impact | 1.0 to 3.5                    |
|                              | With vibration or impact    | 2.0 to 5.0                    |
| Machine tool                 | Without vibration or impact | 1.0 to 4.0                    |
|                              | With vibration or impact    | 2.5 to 7.0                    |

|                                       |                                                             |
|---------------------------------------|-------------------------------------------------------------|
| When the radial load is large         | $\frac{f_H \cdot f_T \cdot f_C \cdot C_0}{P_R} \geq f_s$    |
| When the reverse radial load is large | $\frac{f_H \cdot f_T \cdot f_C \cdot C_{OL}}{P_L} \geq f_s$ |
| When the lateral loads are large      | $\frac{f_H \cdot f_T \cdot f_C \cdot C_{OT}}{P_T} \geq f_s$ |

- f<sub>s</sub> : Static safety factor  
C<sub>0</sub> : Basic static load rating (radial direction) (N)  
C<sub>OL</sub> : Basic static load rating (reverse-radial direction) (N)  
C<sub>OT</sub> : Basic static load rating (lateral direction) (N)  
P<sub>R</sub> : Calculated load (radial direction) (N)  
P<sub>L</sub> : Calculated load (reverse-radial direction) (N)  
P<sub>T</sub> : Calculated load (lateral direction) (N)  
f<sub>H</sub> : Hardness factor (see Fig.10 on B1-75)  
f<sub>T</sub> : Temperature factor (see Fig.11 on B1-75)  
f<sub>C</sub> : Contact factor (see Table2 on B1-75)

# Calculating the Average Load

In cases where the load applied to each LM block fluctuates under different conditions, such as an industrial robot holding a work with its arm as it advances and receding with its arm empty, and a machine tool handling various workpieces, it is necessary to calculate the service life of the LM Block while taking into account such fluctuating loading conditions.

The average load ( $P_m$ ) is the load under which the service life of the LM Guide is equivalent to that under varying loads applied to the LM blocks.

$$P_m = \sqrt[i]{\frac{1}{L} \cdot \sum_{n=1}^n (P_n^i \cdot L_n)}$$

$P_m$  : Average Load (N)

$P_n$  : Varying load (N)

$L$  : Total travel distance (mm)

$L_n$  : Distance traveled under load  $P_n$  (mm)

$i$  : Constant determined by rolling element

Note) The above equation or the equation (1) below applies when the rolling elements are balls.

(1) When the load fluctuates stepwise

LM Guide Using Balls ( $i=3$ )

$$P_m = \sqrt[3]{\frac{1}{L} (P_1^3 \cdot L_1 + P_2^3 \cdot L_2 \cdots + P_n^3 \cdot L_n)} \cdots \cdots (1)$$

$P_m$  : Average load (N)

$P_n$  : Varying load (N)

$L$  : Total travel distance (mm)

$L_n$  : Distance traveled under  $P_n$  (mm)

LM Guide Using Rollers ( $i = \frac{10}{3}$ )

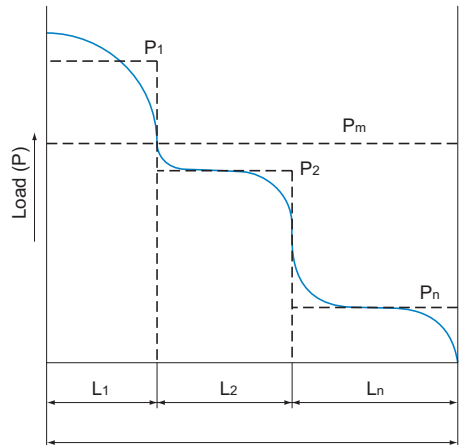
$$P_m = \sqrt[\frac{10}{3}]{\frac{1}{L} (P_1^{\frac{10}{3}} \cdot L_1 + P_2^{\frac{10}{3}} \cdot L_2 \cdots + P_n^{\frac{10}{3}} \cdot L_n)} \cdots \cdots (2)$$

$P_m$  : Average Load (N)

$P_n$  : Varying load (N)

$L$  : Total travel distance (mm)

$L_n$  : Distance traveled under  $P_n$  (mm)

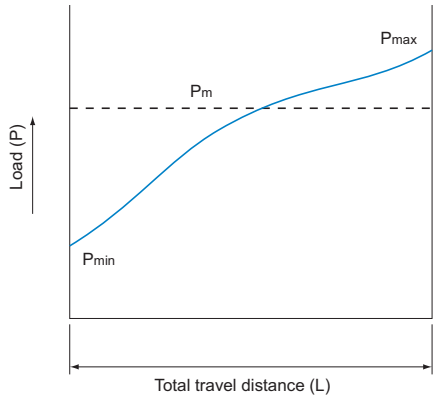


Total travel distance (L)

(2) When the load fluctuates monotonically

$$P_m \doteq \frac{1}{3} (P_{min} + 2 \cdot P_{max}) \dots\dots\dots(3)$$

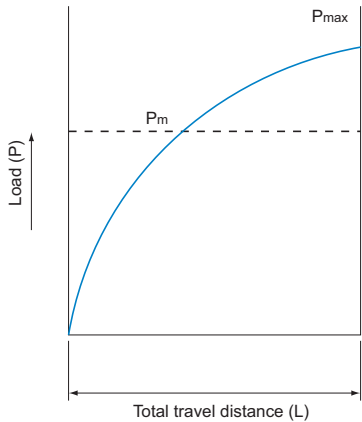
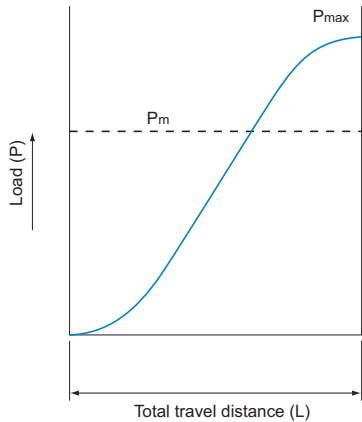
$P_{min}$  : Minimum load (N)  
 $P_{max}$  : Maximum load (N)



(3) When the load fluctuates sinusoidally

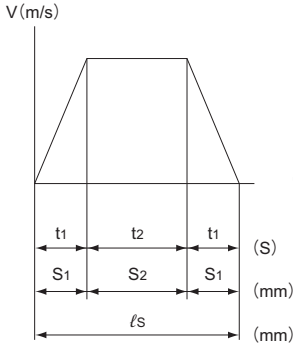
(a)  $P_m \doteq 0.65P_{max} \dots\dots\dots(4)$

(b)  $P_m \doteq 0.75P_{max} \dots\dots\dots(5)$

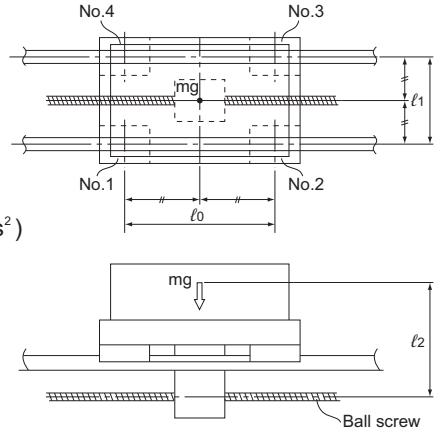


## Example of Calculating the Average Load (1) - with Horizontal Mount and Acceleration/Deceleration Considered -

### [Conditions]



$$\alpha_1 = \frac{v}{t_1} \text{ (m/s}^2\text{)}$$



### [Load Applied to the LM Block]

#### ● During uniform motion

$$P_1 = + \frac{mg}{4}$$

$$P_2 = + \frac{mg}{4}$$

$$P_3 = + \frac{mg}{4}$$

$$P_4 = + \frac{mg}{4}$$

#### ● During acceleration

$$Pa_1 = P_1 + \frac{m \cdot \alpha_1 \cdot l_2}{2 \cdot l_0}$$

$$Pa_2 = P_2 - \frac{m \cdot \alpha_1 \cdot l_2}{2 \cdot l_0}$$

$$Pa_3 = P_3 - \frac{m \cdot \alpha_1 \cdot l_2}{2 \cdot l_0}$$

$$Pa_4 = P_4 + \frac{m \cdot \alpha_1 \cdot l_2}{2 \cdot l_0}$$

#### ● During deceleration

$$Pd_1 = P_1 - \frac{m \cdot \alpha_1 \cdot l_2}{2 \cdot l_0}$$

$$Pd_2 = P_2 + \frac{m \cdot \alpha_1 \cdot l_2}{2 \cdot l_0}$$

$$Pd_3 = P_3 + \frac{m \cdot \alpha_1 \cdot l_2}{2 \cdot l_0}$$

$$Pd_4 = P_4 - \frac{m \cdot \alpha_1 \cdot l_2}{2 \cdot l_0}$$

### [Average load]

$$P_{m1} = \sqrt[3]{\frac{1}{l_s} (Pa_1^3 \cdot s_1 + P_1^3 \cdot s_2 + Pd_1^3 \cdot s_3)}$$

$$P_{m2} = \sqrt[3]{\frac{1}{l_s} (Pa_2^3 \cdot s_1 + P_2^3 \cdot s_2 + Pd_2^3 \cdot s_3)}$$

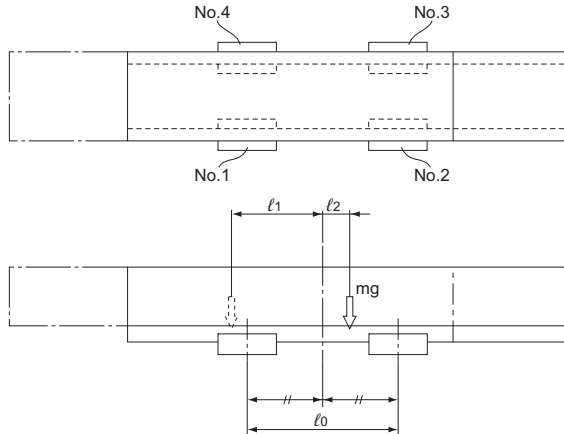
$$P_{m3} = \sqrt[3]{\frac{1}{l_s} (Pa_3^3 \cdot s_1 + P_3^3 \cdot s_2 + Pd_3^3 \cdot s_3)}$$

$$P_{m4} = \sqrt[3]{\frac{1}{l_s} (Pa_4^3 \cdot s_1 + P_4^3 \cdot s_2 + Pd_4^3 \cdot s_3)}$$

Note) Pa<sub>n</sub> and Pd<sub>n</sub> represent loads applied to each LM block.  
The suffix "n" indicates the block number in the diagram above.

## Example of Calculating the Average Load (2) - When the Rails are Movable

[Conditions]



[Load Applied to the LM Block]

●At the left of the arm

$$P_{l1} = + \frac{mg}{4} + \frac{mg \cdot l_1}{2 \cdot l_0}$$

$$P_{l2} = + \frac{mg}{4} - \frac{mg \cdot l_1}{2 \cdot l_0}$$

$$P_{l3} = + \frac{mg}{4} - \frac{mg \cdot l_1}{2 \cdot l_0}$$

$$P_{l4} = + \frac{mg}{4} + \frac{mg \cdot l_1}{2 \cdot l_0}$$

●At the right of the arm

$$P_{r1} = + \frac{mg}{4} - \frac{mg \cdot l_2}{2 \cdot l_0}$$

$$P_{r2} = + \frac{mg}{4} + \frac{mg \cdot l_2}{2 \cdot l_0}$$

$$P_{r3} = + \frac{mg}{4} + \frac{mg \cdot l_2}{2 \cdot l_0}$$

$$P_{r4} = + \frac{mg}{4} - \frac{mg \cdot l_2}{2 \cdot l_0}$$

[Average load]

$$P_{m1} = \frac{1}{3} (2 \cdot |P_{l1}| + |P_{r1}|)$$

$$P_{m2} = \frac{1}{3} (2 \cdot |P_{l2}| + |P_{r2}|)$$

$$P_{m3} = \frac{1}{3} (2 \cdot |P_{l3}| + |P_{r3}|)$$

$$P_{m4} = \frac{1}{3} (2 \cdot |P_{l4}| + |P_{r4}|)$$

Note)  $P_n$  and  $P_m$  represent loads applied to each LM block. The suffix "n" indicates the block number in the diagram above.

# Calculating the Nominal Life

The service life of an LM Guide is subject to variations even under the same operational conditions. Therefore, it is necessary to use the nominal life defined below as a reference value for obtaining the service life of the LM Guide. The nominal life means the total travel distance that 90% of a group of units of the same LM Guide model can achieve without flaking (scale-like pieces on the metal surface) after individually running under the same conditions.

## Calculating the Nominal Life

The nominal life ( $L_{10}$ ) of an LM Guide is obtained from the following formula using the basic dynamic load rating (C), which is based on a reference distance of 50 km for an LM Guide with balls and 100 km for an LM Guide with rollers, and the calculated load acting on the LM Guide ( $P_c$ ).

- LM Guide with balls (Using a basic dynamic load rating based on a nominal life of 50 km)

$$L_{10} = \left( \frac{C}{P_c} \right)^3 \times 50 \dots\dots\dots (1)$$

$L_{10}$  : Nominal life (km)  
 C : Basic dynamic load rating (N)  
 $P_c$  : Calculated load (N)

- LM Guide with rollers (Using a basic dynamic load rating based on a nominal life of 100 km)

$$L_{10} = \left( \frac{C}{P_c} \right)^{\frac{10}{3}} \times 100 \dots\dots\dots (2)$$

\* These nominal life formulas may not apply if the length of the stroke is less than or equal to twice the length of the LM block.

When comparing the nominal life ( $L_{10}$ ), you must take into account whether the basic dynamic load rating was defined based on 50 km or 100 km. Convert the basic dynamic load rating based on ISO 14728-1 as necessary.

ISO-regulated basic dynamic load rating conversion formulas:

- LM Guide with balls

$$C_{100} = \frac{C_{50}}{1.26}$$

$C_{50}$  : Basic dynamic load rating based on a nominal life of 50 km

$C_{100}$  : Basic dynamic load rating based on a nominal life of 100 km

- LM Guide with rollers

$$C_{100} = \frac{C_{50}}{1.23}$$

# Calculating the Modified Nominal Life

During use, an LM Guide may be subjected to vibrations and shocks as well as fluctuating loads, which are difficult to detect. In addition, the surface hardness of the raceways, the operating temperature, and having LM blocks arranged directly behind one another will have a decisive impact on the service life. Taking these factors into account, the modified nominal life ( $L_{10m}$ ) can be calculated according to the following formulas (3) and (4).

•Modified factor  $\alpha$

$$\alpha = \frac{f_H \cdot f_T \cdot f_C}{f_W}$$

- $\alpha$  : Modified factor
- $f_H$  : Hardness factor (see Fig.10 on B1-75)
- $f_T$  : Temperature factor (see Fig.11 on B1-75)
- $f_C$  : Contact factor (see Table2 on B1-75)
- $f_W$  : Load factor (see Table3 on B1-76)

•Modified nominal life  $L_{10m}$

• LM Guide with balls

$$L_{10m} = \left( \alpha \times \frac{C}{P_c} \right)^3 \times 50 \dots\dots\dots(3)$$

- $L_{10m}$  : Modified nominal life (km)
- $C$  : Basic dynamic load rating (N)
- $P_c$  : Calculated load (N)

• LM Guide with rollers

$$L_{10m} = \left( \alpha \times \frac{C}{P_c} \right)^{\frac{10}{3}} \times 100 \dots\dots\dots(4)$$

Once the nominal life ( $L_{10}$ ) has been obtained, the service life time can be obtained using the following equation if the stroke length and the number reciprocations are constant.

$$L_h = \frac{L_{10} \times 10^6}{2 \times \ell_s \times n_1 \times 60}$$

- $L_h$  : Service life time (h)
- $\ell_s$  : Stroke length (mm)
- $n_1$  : Number of reciprocations per minute ( $\text{min}^{-1}$ )

# Nominal Life Equation for the Oil-Free LM Guide

$$L_{10m} = \left( \frac{F_0}{\alpha \cdot P_c} \right)^{1.57} \times 50$$

- $L_{10m}$  : Nominal life (km)
- $F_0$  : Permissible load (N)
- $P_c$  : Calculated load (N)
- $\alpha$  : Modified factor

Note) The life here means the service life of the S-ilm based on wear.  
Since the service life of the S-ilm may vary according to the environment or the operating conditions, customers are encouraged to evaluate and validate the life under the service environment and operating conditions at their facilities.

**[f<sub>H</sub>: Hardness Factor]**

To ensure the achievement of the optimum load capacity of the LM Guide, the raceway hardness must be between 58 and 64 HRC.

If the hardness is lower than this range, the basic dynamic load rating and the basic static load rating decrease. Therefore, it is necessary to multiply each rating by the respective hardness factor (f<sub>H</sub>).

Since the LM Guide has sufficient hardness, the f<sub>H</sub> value for the LM Guide is normally 1.0 unless otherwise specified.

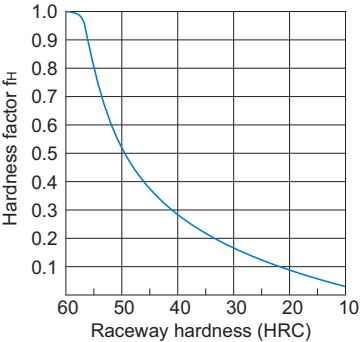


Fig.10 Hardness Factor (f<sub>H</sub>)

**[f<sub>T</sub>:Temperature Factor]**

If the temperature of the environment surrounding the operating LM Guide exceeds 100°C, take into account the adverse effect of the high temperature and multiply the basic load ratings by the temperature factor indicated in Fig.11.

In addition, the selected LM Guide must also be of a high temperature type.

Note) LM guides not designed to withstand high temperatures should be used at 80°C or less. Please contact THK if application requirements exceed 80°C.

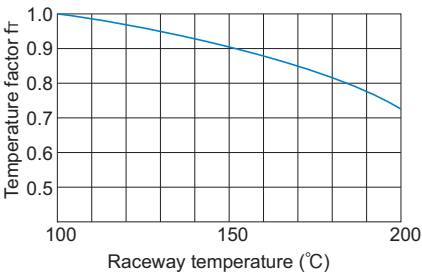


Fig.11 Temperature Factor (f<sub>T</sub>)

**[f<sub>c</sub>: Contact Factor]**

When multiple LM blocks are used in close contact with each other, it is difficult to achieve uniform load distribution due to moment loads and mounting-surface accuracy. When using multiple blocks in close contact with each other, multiply the basic load rating (C or C<sub>0</sub>) by the corresponding contact factor indicated in Table2.

Note) If uneven load distribution is expected in a large machine, take into account the respective contact factor indicated in Table2.

Table2 Contact Factor (f<sub>c</sub>)

| Number of blocks used in close contact | Contact factor f <sub>c</sub> |
|----------------------------------------|-------------------------------|
| 2                                      | 0.81                          |
| 3                                      | 0.72                          |
| 4                                      | 0.66                          |
| 5                                      | 0.61                          |
| 6 or greater                           | 0.6                           |
| Normal use                             | 1                             |

**[f<sub>w</sub>: 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 Table3, which contains empirically obtained data.

Table3 Load Factor (f<sub>w</sub>)

| Vibrations/<br>impact | Speed (V)               | f <sub>w</sub> |
|-----------------------|-------------------------|----------------|
| Faint                 | Very low<br>V ≤ 0.25m/s | 1 to 1.2       |
| Weak                  | Slow<br>0.25 < V ≤ 1m/s | 1.2 to 1.5     |
| Medium                | Medium<br>1 < V ≤ 2m/s  | 1.5 to 2       |
| Strong                | High<br>V > 2m/s        | 2 to 3.5       |

## Example of Calculating the Nominal Life (1) - with Horizontal Mount and High-speed Acceleration

[Conditions]

Model No. : HSR35LA2SS+2500LP-Ⅱ  
(basic dynamic load rating:  $C = 65.0 \text{ kN}$ )  
(basic static load rating:  $C_0 = 91.7 \text{ kN}$ )

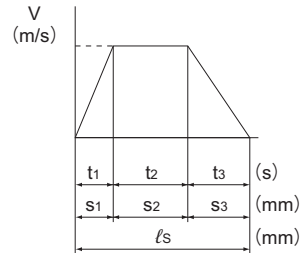
Mass :  $m_1 = 800 \text{ kg}$  Distance:  $\ell_0 = 600 \text{ mm}$   
 $m_2 = 500 \text{ kg}$   $\ell_1 = 400 \text{ mm}$

Speed :  $V = 0.5 \text{ m/s}$   $\ell_2 = 120 \text{ mm}$

Time :  $t_1 = 0.05 \text{ s}$   $\ell_3 = 50 \text{ mm}$   
 $t_2 = 2.8 \text{ s}$   $\ell_4 = 200 \text{ mm}$   
 $t_3 = 0.15 \text{ s}$   $\ell_5 = 350 \text{ mm}$

Acceleration :  $\alpha_1 = 10 \text{ m/s}^2$   
 $\alpha_3 = 3.333 \text{ m/s}^2$

Stroke :  $\ell_s = 1450 \text{ mm}$



Gravitational acceleration  $g = 9.8 \text{ (m/s}^2\text{)}$

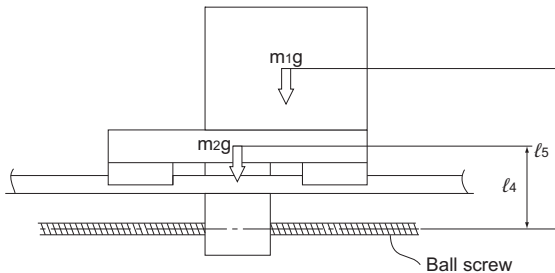
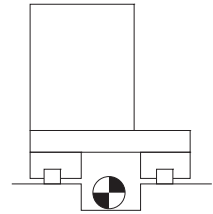
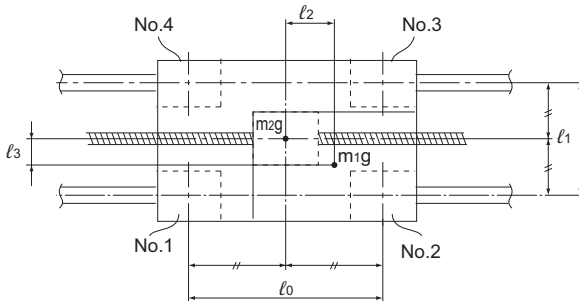


Fig.12 Condition

### [Load Applied to the LM Block]

Calculate the load applied to each LM block.

#### ● During uniform motion

##### ■ Applied load in the radial direction $P_n$

$$P_1 = + \frac{m_1 g}{4} - \frac{m_1 g \cdot \ell_2}{2 \cdot \ell_0} + \frac{m_1 g \cdot \ell_3}{2 \cdot \ell_1} + \frac{m_2 g}{4} = +2891 \text{ N}$$

$$P_2 = + \frac{m_1 g}{4} + \frac{m_1 g \cdot \ell_2}{2 \cdot \ell_0} + \frac{m_1 g \cdot \ell_3}{2 \cdot \ell_1} + \frac{m_2 g}{4} = +4459 \text{ N}$$

$$P_3 = + \frac{m_1 g}{4} + \frac{m_1 g \cdot \ell_2}{2 \cdot \ell_0} - \frac{m_1 g \cdot \ell_3}{2 \cdot \ell_1} + \frac{m_2 g}{4} = +3479 \text{ N}$$

$$P_4 = + \frac{m_1 g}{4} - \frac{m_1 g \cdot \ell_2}{2 \cdot \ell_0} - \frac{m_1 g \cdot \ell_3}{2 \cdot \ell_1} + \frac{m_2 g}{4} = +1911 \text{ N}$$

#### ● During leftward acceleration

##### ■ Applied load in the radial direction $P^l a_n$

$$P^l a_1 = P_1 - \frac{m_1 \cdot \alpha_1 \cdot \ell_5}{2 \cdot \ell_0} - \frac{m_2 \cdot \alpha_1 \cdot \ell_4}{2 \cdot \ell_0} = - 275.6 \text{ N}$$

$$P^l a_2 = P_2 + \frac{m_1 \cdot \alpha_1 \cdot \ell_5}{2 \cdot \ell_0} + \frac{m_2 \cdot \alpha_1 \cdot \ell_4}{2 \cdot \ell_0} = + 7625.6 \text{ N}$$

$$P^l a_3 = P_3 + \frac{m_1 \cdot \alpha_1 \cdot \ell_5}{2 \cdot \ell_0} + \frac{m_2 \cdot \alpha_1 \cdot \ell_4}{2 \cdot \ell_0} = + 6645.6 \text{ N}$$

$$P^l a_4 = P_4 - \frac{m_1 \cdot \alpha_1 \cdot \ell_5}{2 \cdot \ell_0} - \frac{m_2 \cdot \alpha_1 \cdot \ell_4}{2 \cdot \ell_0} = - 1255.6 \text{ N}$$

##### ■ Applied load in the lateral direction $P^l a_n$

$$P^l a_1 = - \frac{m_1 \cdot \alpha_1 \cdot \ell_3}{2 \cdot \ell_0} = - 333.3 \text{ N}$$

$$P^l a_2 = + \frac{m_1 \cdot \alpha_1 \cdot \ell_3}{2 \cdot \ell_0} = + 333.3 \text{ N}$$

$$P^l a_3 = + \frac{m_1 \cdot \alpha_1 \cdot \ell_3}{2 \cdot \ell_0} = + 333.3 \text{ N}$$

$$P^l a_4 = - \frac{m_1 \cdot \alpha_1 \cdot \ell_3}{2 \cdot \ell_0} = - 333.3 \text{ N}$$

#### ● During leftward deceleration

##### ■ Applied load in the radial direction $P^l d_n$

$$P^l d_1 = P_1 + \frac{m_1 \cdot \alpha_3 \cdot \ell_5}{2 \cdot \ell_0} + \frac{m_2 \cdot \alpha_3 \cdot \ell_4}{2 \cdot \ell_0} = + 3946.6 \text{ N}$$

$$P^l d_2 = P_2 - \frac{m_1 \cdot \alpha_3 \cdot \ell_5}{2 \cdot \ell_0} - \frac{m_2 \cdot \alpha_3 \cdot \ell_4}{2 \cdot \ell_0} = + 3403.4 \text{ N}$$

$$P^l d_3 = P_3 - \frac{m_1 \cdot \alpha_3 \cdot \ell_5}{2 \cdot \ell_0} - \frac{m_2 \cdot \alpha_3 \cdot \ell_4}{2 \cdot \ell_0} = + 2423.4 \text{ N}$$

$$P^l d_4 = P_4 + \frac{m_1 \cdot \alpha_3 \cdot \ell_5}{2 \cdot \ell_0} + \frac{m_2 \cdot \alpha_3 \cdot \ell_4}{2 \cdot \ell_0} = + 2966.6 \text{ N}$$

■ Applied load in the lateral direction  $P_{tld_n}$

$$P_{tld_1} = + \frac{m_1 \cdot \alpha_3 \cdot \ell_3}{2 \cdot \ell_0} = + 111.1 \text{ N}$$

$$P_{tld_2} = - \frac{m_1 \cdot \alpha_3 \cdot \ell_3}{2 \cdot \ell_0} = - 111.1 \text{ N}$$

$$P_{tld_3} = - \frac{m_1 \cdot \alpha_3 \cdot \ell_3}{2 \cdot \ell_0} = - 111.1 \text{ N}$$

$$P_{tld_4} = + \frac{m_1 \cdot \alpha_3 \cdot \ell_3}{2 \cdot \ell_0} = + 111.1 \text{ N}$$

● During rightward acceleration

■ Applied load in the radial direction  $P_{ra_n}$

$$P_{ra_1} = P_1 + \frac{m_1 \cdot \alpha_1 \cdot \ell_5}{2 \cdot \ell_0} + \frac{m_2 \cdot \alpha_1 \cdot \ell_4}{2 \cdot \ell_0} = + 6057.6 \text{ N}$$

$$P_{ra_2} = P_2 - \frac{m_1 \cdot \alpha_1 \cdot \ell_5}{2 \cdot \ell_0} - \frac{m_2 \cdot \alpha_1 \cdot \ell_4}{2 \cdot \ell_0} = + 1292.4 \text{ N}$$

$$P_{ra_3} = P_3 - \frac{m_1 \cdot \alpha_1 \cdot \ell_5}{2 \cdot \ell_0} - \frac{m_2 \cdot \alpha_1 \cdot \ell_4}{2 \cdot \ell_0} = + 312.4 \text{ N}$$

$$P_{ra_4} = P_4 + \frac{m_1 \cdot \alpha_1 \cdot \ell_5}{2 \cdot \ell_0} + \frac{m_2 \cdot \alpha_1 \cdot \ell_4}{2 \cdot \ell_0} = + 5077.6 \text{ N}$$

■ Applied load in the lateral direction  $P_{tra_n}$

$$P_{tra_1} = + \frac{m_1 \cdot \alpha_1 \cdot \ell_3}{2 \cdot \ell_0} = + 333.3 \text{ N}$$

$$P_{tra_2} = - \frac{m_1 \cdot \alpha_1 \cdot \ell_3}{2 \cdot \ell_0} = - 333.3 \text{ N}$$

$$P_{tra_3} = - \frac{m_1 \cdot \alpha_1 \cdot \ell_3}{2 \cdot \ell_0} = - 333.3 \text{ N}$$

$$P_{tra_4} = + \frac{m_1 \cdot \alpha_1 \cdot \ell_3}{2 \cdot \ell_0} = + 333.3 \text{ N}$$

● During rightward deceleration

■ Applied load in the radial direction  $P_{rd_n}$

$$P_{rd_1} = P_1 - \frac{m_1 \cdot \alpha_3 \cdot \ell_5}{2 \cdot \ell_0} - \frac{m_2 \cdot \alpha_3 \cdot \ell_4}{2 \cdot \ell_0} = + 1835.4 \text{ N}$$

$$P_{rd_2} = P_2 + \frac{m_1 \cdot \alpha_3 \cdot \ell_5}{2 \cdot \ell_0} + \frac{m_2 \cdot \alpha_3 \cdot \ell_4}{2 \cdot \ell_0} = + 5514.6 \text{ N}$$

$$P_{rd_3} = P_3 + \frac{m_1 \cdot \alpha_3 \cdot \ell_5}{2 \cdot \ell_0} + \frac{m_2 \cdot \alpha_3 \cdot \ell_4}{2 \cdot \ell_0} = + 4534.6 \text{ N}$$

$$P_{rd_4} = P_4 - \frac{m_1 \cdot \alpha_3 \cdot \ell_5}{2 \cdot \ell_0} - \frac{m_2 \cdot \alpha_3 \cdot \ell_4}{2 \cdot \ell_0} = + 855.4 \text{ N}$$

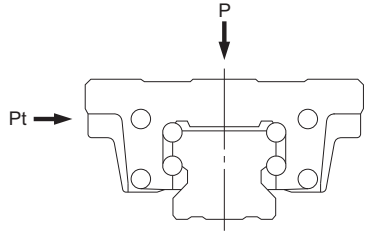
### ■ Applied load in the lateral direction Ptrd.

$$Ptrd_1 = - \frac{m_1 \cdot \alpha_3 \cdot \ell_3}{2 \cdot \ell_0} = -111.1 \text{ N}$$

$$Ptrd_2 = + \frac{m_1 \cdot \alpha_3 \cdot \ell_3}{2 \cdot \ell_0} = +111.1 \text{ N}$$

$$Ptrd_3 = + \frac{m_1 \cdot \alpha_3 \cdot \ell_3}{2 \cdot \ell_0} = +111.1 \text{ N}$$

$$Ptrd_4 = + \frac{m_1 \cdot \alpha_3 \cdot \ell_3}{2 \cdot \ell_0} = -111.1 \text{ N}$$



### [Combined Radial And Thrust Load]

The combined radial and thrust load is calculated for each block only on the groove where the load is greatest.

Under these operating conditions, for each block, the groove for which the load is greatest is groove 1.\*<sup>1</sup> Because groove 1 bears  $P^{*2} > 0$  and  $Pt > 0$  loads, it is 0 N when  $P < 0$  and  $Pt < 0$  loads are applied. When calculating for the groove that will bear  $P < 0$  and  $Pt < 0$  loads, use the absolute value of the load.

\*<sup>1</sup> The reason that groove 1 has the greatest load is that mass  $m_1$  is applied unevenly to the table and is not distributed equally to all grooves in the block.

\*<sup>2</sup>  $P$  refers to the radial load that each groove bears.

#### ● During uniform motion

$$P_{E1} = P_1 = 2891 \text{ N}$$

$$P_{E2} = P_2 = 4459 \text{ N}$$

$$P_{E3} = P_3 = 3479 \text{ N}$$

$$P_{E4} = P_4 = 1911 \text{ N}$$

#### ● During leftward acceleration

$$P_{El a_1} = |P_{l a_1}| + |Pt_{l a_1}| = 608.9 \text{ N}$$

$$P_{El a_2} = |P_{l a_2}| + |Pt_{l a_2}| = 7958.9 \text{ N}$$

$$P_{El a_3} = |P_{l a_3}| + |Pt_{l a_3}| = 6978.9 \text{ N}$$

$$P_{El a_4} = |P_{l a_4}| + |Pt_{l a_4}| = 1588.9 \text{ N}$$

$$P_{l a_1}, Pt_{l a_1}, P_{l a_4}, \text{ and } Pt_{l a_4} = 0 \text{ N}$$

#### ● During leftward deceleration

$$P_{El d_1} = |P_{l d_1}| + |Pt_{l d_1}| = 4057.7 \text{ N}$$

$$P_{El d_2} = |P_{l d_2}| + |Pt_{l d_2}| = 3514.5 \text{ N}$$

$$P_{El d_3} = |P_{l d_3}| + |Pt_{l d_3}| = 2534.5 \text{ N}$$

$$P_{El d_4} = |P_{l d_4}| + |Pt_{l d_4}| = 3077.7 \text{ N}$$

$$Pt_{l d_2} \text{ and } Pt_{l d_3} = 0 \text{ N}$$

#### ● During rightward acceleration

$$P_{Er a_1} = |P_{r a_1}| + |P_{t r a_1}| = 6390.9 \text{ N}$$

$$P_{Er a_2} = |P_{r a_2}| + |P_{t r a_2}| = 1625.7 \text{ N}$$

$$P_{Er a_3} = |P_{r a_3}| + |P_{t r a_3}| = 645.7 \text{ N}$$

$$P_{Er a_4} = |P_{r a_4}| + |P_{t r a_4}| = 5410.9 \text{ N}$$

$$P_{t r a_2} \text{ and } P_{t r a_3} = 0 \text{ N}$$

#### ● During rightward deceleration

$$P_{Er d_1} = |P_{r d_1}| + |P_{t r d_1}| = 1946.5 \text{ N}$$

$$P_{Er d_2} = |P_{r d_2}| + |P_{t r d_2}| = 5625.7 \text{ N}$$

$$P_{Er d_3} = |P_{r d_3}| + |P_{t r d_3}| = 4645.7 \text{ N}$$

$$P_{Er d_4} = |P_{r d_4}| + |P_{t r d_4}| = 966.5 \text{ N}$$

$$P_{t r a_1} \text{ and } P_{t r a_4} = 0 \text{ N}$$

### [Static Safety Factor]

As indicated above, the maximum load is applied to the LM Guide during the leftward acceleration of the second LM block. Therefore, the static safety factor ( $f_s$ ) is obtained in the following equation.

$$f_s = \frac{C_0}{P_{El a_2}} = \frac{91.7 \times 10^3}{7958.9} = 11.5$$

**[Average Load  $P_{mn}$ ]**

Obtain the average load applied to each LM block.

$$P_{m1} = \sqrt[3]{\frac{1}{2 \cdot \ell_s} (P_{E\ell} a_1^3 \cdot S_1 + P_{E1}^3 \cdot S_2 + P_{E\ell} d_1^3 \cdot S_3 + P_{Era1}^3 \cdot S_1 + P_{E1}^3 \cdot S_2 + P_{Erd1}^3 \cdot S_3)}$$

$$= \sqrt[3]{\frac{1}{2 \times 1450} (608.9^3 \times 12.5 + 2891^3 \times 1400 + 4057.7^3 \times 37.5 + 6390.9^3 \times 12.5 + 2891^3 \times 1400 + 1946.5^3 \times 37.5)}$$

$$= 2940.1N$$

$$P_{m2} = \sqrt[3]{\frac{1}{2 \cdot \ell_s} (P_{E\ell} a_2^3 \cdot S_1 + P_{E2}^3 \cdot S_2 + P_{E\ell} d_2^3 \cdot S_3 + P_{Era2}^3 \cdot S_1 + P_{E2}^3 \cdot S_2 + P_{Erd2}^3 \cdot S_3)}$$

$$= \sqrt[3]{\frac{1}{2 \times 1450} (7958.9^3 \times 12.5 + 4459^3 \times 1400 + 3514.5^3 \times 37.5 + 1625.7^3 \times 12.5 + 4459^3 \times 1400 + 5625.7^3 \times 37.5)}$$

$$= 4492.2N$$

$$P_{m3} = \sqrt[3]{\frac{1}{2 \cdot \ell_s} (P_{E\ell} a_3^3 \cdot S_1 + P_{E3}^3 \cdot S_2 + P_{E\ell} d_3^3 \cdot S_3 + P_{Era3}^3 \cdot S_1 + P_{E3}^3 \cdot S_2 + P_{Erd3}^3 \cdot S_3)}$$

$$= \sqrt[3]{\frac{1}{2 \times 1450} (6978.9^3 \times 12.5 + 3479^3 \times 1400 + 2534.5^3 \times 37.5 + 645.7^3 \times 12.5 + 3479^3 \times 1400 + 4645.7^3 \times 37.5)}$$

$$= 3520.4N$$

$$P_{m4} = \sqrt[3]{\frac{1}{2 \cdot \ell_s} (P_{E\ell} a_4^3 \cdot S_1 + P_{E4}^3 \cdot S_2 + P_{E\ell} d_4^3 \cdot S_3 + P_{Era4}^3 \cdot S_1 + P_{E4}^3 \cdot S_2 + P_{Erd4}^3 \cdot S_3)}$$

$$= \sqrt[3]{\frac{1}{2 \times 1450} (1588.9^3 \times 12.5 + 1911^3 \times 1400 + 3077.7^3 \times 37.5 + 5410.9^3 \times 12.5 + 1911^3 \times 1400 + 966.5^3 \times 37.5)}$$

$$= 1985.5N$$

**[Nominal Life  $L_{10mn}$ ]**

The nominal life of the four LM blocks is obtained from the corresponding nominal life equations shown below.

$$L_{10m1} = \left( \alpha \times \frac{C}{P_{m1}} \right)^3 \times 50 = 160000 \text{ km}$$

$$L_{10m2} = \left( \alpha \times \frac{C}{P_{m2}} \right)^3 \times 50 = 44800 \text{ km}$$

$$L_{10m3} = \left( \alpha \times \frac{C}{P_{m3}} \right)^3 \times 50 = 93200 \text{ km}$$

$$L_{10m4} = \left( \alpha \times \frac{C}{P_{m4}} \right)^3 \times 50 = 519700 \text{ km}$$

$$\alpha = \frac{1}{f_w} \text{ (where } f_w = 1.5)$$

Therefore, the service life of the LM Guide used in a machine or equipment under the conditions stated above is equivalent to the nominal life of the second LM block, which is 44,800 km.

## Example of Calculating the Nominal Life (2) - with Vertical Mount

[Conditions]

Model No. : HSR25CA2SS+1500L- II  
 (basic dynamic load rating:  $C = 27.6 \text{ kN}$ )  
 (basic static load rating:  $C_0 = 36.4 \text{ kN}$ )

|        |                              |                                      |
|--------|------------------------------|--------------------------------------|
| Mass   | : $m_0 = 100 \text{ kg}$     | Distance : $\ell_0 = 300 \text{ mm}$ |
|        | $m_1 = 200 \text{ kg}$       | $\ell_1 = 80 \text{ mm}$             |
|        | $m_2 = 100 \text{ kg}$       | $\ell_2 = 50 \text{ mm}$             |
| Stroke | : $\ell_s = 1000 \text{ mm}$ | $\ell_3 = 280 \text{ mm}$            |
|        |                              | $\ell_4 = 150 \text{ mm}$            |
|        |                              | $\ell_5 = 250 \text{ mm}$            |

The mass ( $m_0$ ) is loaded only during ascent; it is removed during descent.

Gravitational acceleration  $g = 9.8 \text{ (m/s}^2\text{)}$

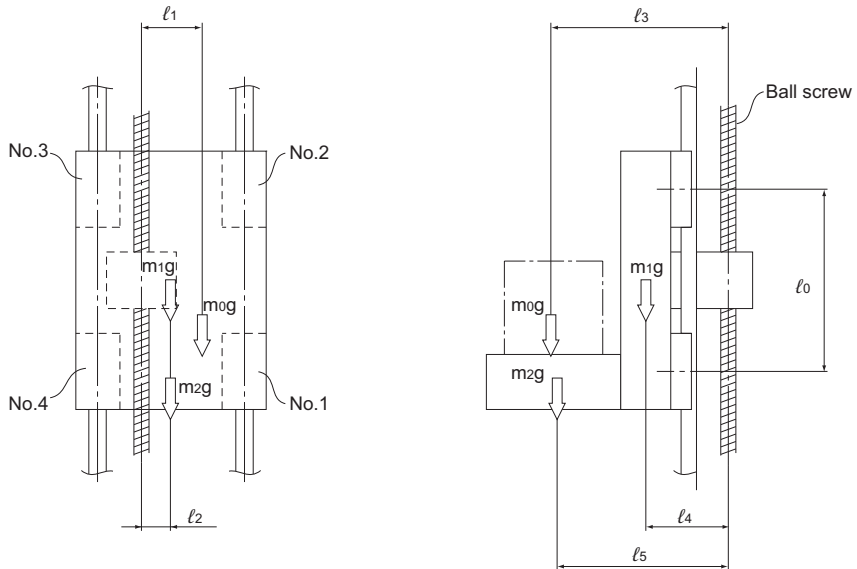


Fig.13 Condition

[Load Applied to the LM Block]

● During Ascent

■ Load applied to each LM block in the radial direction  $Pu_n$  during ascent

$$Pu_1 = + \frac{m_1 g \cdot \ell_4}{2 \cdot \ell_0} + \frac{m_2 g \cdot \ell_5}{2 \cdot \ell_0} + \frac{m_0 g \cdot \ell_3}{2 \cdot \ell_0} = + 1355.6 \text{ N}$$

$$Pu_2 = - \frac{m_1 g \cdot \ell_4}{2 \cdot \ell_0} - \frac{m_2 g \cdot \ell_5}{2 \cdot \ell_0} - \frac{m_0 g \cdot \ell_3}{2 \cdot \ell_0} = - 1355.6 \text{ N}$$

$$Pu_3 = - \frac{m_1 g \cdot \ell_4}{2 \cdot \ell_0} - \frac{m_2 g \cdot \ell_5}{2 \cdot \ell_0} - \frac{m_0 g \cdot \ell_3}{2 \cdot \ell_0} = - 1355.6 \text{ N}$$

$$Pu_4 = + \frac{m_1 g \cdot \ell_4}{2 \cdot \ell_0} + \frac{m_2 g \cdot \ell_5}{2 \cdot \ell_0} + \frac{m_0 g \cdot \ell_3}{2 \cdot \ell_0} = + 1355.6 \text{ N}$$

■ Load applied to each LM block in the lateral direction  $Ptu_n$  during ascent

$$Ptu_1 = + \frac{m_1 g \cdot \ell_2}{2 \cdot \ell_0} + \frac{m_2 g \cdot \ell_2}{2 \cdot \ell_0} + \frac{m_0 g \cdot \ell_1}{2 \cdot \ell_0} = + 375.7 \text{ N}$$

$$Ptu_2 = - \frac{m_1 g \cdot \ell_2}{2 \cdot \ell_0} - \frac{m_2 g \cdot \ell_2}{2 \cdot \ell_0} - \frac{m_0 g \cdot \ell_1}{2 \cdot \ell_0} = - 375.7 \text{ N}$$

$$Ptu_3 = - \frac{m_1 g \cdot \ell_2}{2 \cdot \ell_0} - \frac{m_2 g \cdot \ell_2}{2 \cdot \ell_0} - \frac{m_0 g \cdot \ell_1}{2 \cdot \ell_0} = - 375.7 \text{ N}$$

$$Ptu_4 = + \frac{m_1 g \cdot \ell_2}{2 \cdot \ell_0} + \frac{m_2 g \cdot \ell_2}{2 \cdot \ell_0} + \frac{m_0 g \cdot \ell_1}{2 \cdot \ell_0} = + 375.7 \text{ N}$$

● During Descent

■ Load applied to each LM block in the radial direction  $Pd_n$  during descent

$$Pd_1 = + \frac{m_1 g \cdot \ell_4}{2 \cdot \ell_0} + \frac{m_2 g \cdot \ell_5}{2 \cdot \ell_0} = + 898.3 \text{ N}$$

$$Pd_2 = - \frac{m_1 g \cdot \ell_4}{2 \cdot \ell_0} - \frac{m_2 g \cdot \ell_5}{2 \cdot \ell_0} = - 898.3 \text{ N}$$

$$Pd_3 = - \frac{m_1 g \cdot \ell_4}{2 \cdot \ell_0} - \frac{m_2 g \cdot \ell_5}{2 \cdot \ell_0} = - 898.3 \text{ N}$$

$$Pd_4 = + \frac{m_1 g \cdot \ell_4}{2 \cdot \ell_0} + \frac{m_2 g \cdot \ell_5}{2 \cdot \ell_0} = + 898.3 \text{ N}$$

■ Load applied to each LM block in the lateral direction  $Ptd_n$  during descent

$$Ptd_1 = + \frac{m_1 g \cdot \ell_2}{2 \cdot \ell_0} + \frac{m_2 g \cdot \ell_2}{2 \cdot \ell_0} = + 245 \text{ N}$$

$$Ptd_2 = - \frac{m_1 g \cdot \ell_2}{2 \cdot \ell_0} - \frac{m_2 g \cdot \ell_2}{2 \cdot \ell_0} = - 245 \text{ N}$$

$$Ptd_3 = - \frac{m_1 g \cdot \ell_2}{2 \cdot \ell_0} - \frac{m_2 g \cdot \ell_2}{2 \cdot \ell_0} = - 245 \text{ N}$$

$$Ptd_4 = + \frac{m_1 g \cdot \ell_2}{2 \cdot \ell_0} + \frac{m_2 g \cdot \ell_2}{2 \cdot \ell_0} = + 245 \text{ N}$$

### [Combined Radial And Thrust Load]

#### ● During Ascent

$$P_{Eu1} = |P_{u1}| + |P_{t_{u1}}| = 1731.3 \text{ N}$$

$$P_{Eu2} = |P_{u2}| + |P_{t_{u2}}| = 1731.3 \text{ N}$$

$$P_{Eu3} = |P_{u3}| + |P_{t_{u3}}| = 1731.3 \text{ N}$$

$$P_{Eu4} = |P_{u4}| + |P_{t_{u4}}| = 1731.3 \text{ N}$$

#### ● During Descent

$$P_{Ed1} = |P_{d1}| + |P_{t_{d1}}| = 1143.3 \text{ N}$$

$$P_{Ed2} = |P_{d2}| + |P_{t_{d2}}| = 1143.3 \text{ N}$$

$$P_{Ed3} = |P_{d3}| + |P_{t_{d3}}| = 1143.3 \text{ N}$$

$$P_{Ed4} = |P_{d4}| + |P_{t_{d4}}| = 1143.3 \text{ N}$$

### [Static Safety Factor]

The static safety factor ( $f_s$ ) of the LM Guide used in a machine or equipment under the conditions stated above is obtained as follows.

$$f_s = \frac{C_0}{P_{Eu2}} = \frac{36.4 \times 10^3}{1731.3} = 21.0$$

### [Average Load $P_{mn}$ ]

Obtain the average load applied to each LM block.

$$P_{m1} = \sqrt[3]{\frac{1}{2 \cdot \ell_s} (P_{Eu1}^3 \cdot \ell_s + P_{Ed1}^3 \cdot \ell_s)} = 1495.1 \text{ N}$$

$$P_{m2} = \sqrt[3]{\frac{1}{2 \cdot \ell_s} (P_{Eu2}^3 \cdot \ell_s + P_{Ed2}^3 \cdot \ell_s)} = 1495.1 \text{ N}$$

$$P_{m3} = \sqrt[3]{\frac{1}{2 \cdot \ell_s} (P_{Eu3}^3 \cdot \ell_s + P_{Ed3}^3 \cdot \ell_s)} = 1495.1 \text{ N}$$

$$P_{m4} = \sqrt[3]{\frac{1}{2 \cdot \ell_s} (P_{Eu4}^3 \cdot \ell_s + P_{Ed4}^3 \cdot \ell_s)} = 1495.1 \text{ N}$$

### [Nominal Life $L_{10mn}$ ]

The nominal life of the four LM blocks is obtained from the corresponding nominal life equations shown below.

$$L_{10m1} = \left( \alpha \times \frac{C}{P_{m1}} \right)^3 \times 50 = 182000 \text{ km}$$

$$L_{10m2} = \left( \alpha \times \frac{C}{P_{m2}} \right)^3 \times 50 = 182000 \text{ km}$$

$$L_{10m3} = \left( \alpha \times \frac{C}{P_{m3}} \right)^3 \times 50 = 182000 \text{ km}$$

$$L_{10m4} = \left( \alpha \times \frac{C}{P_{m4}} \right)^3 \times 50 = 182000 \text{ km}$$

$$\alpha = \frac{1}{f_w} \text{ (where } f_w = 1.2 \text{)}$$

Therefore, the service life of the LM Guide used in a machine or equipment under the conditions stated above is 182,000 km.

# Predicting the Rigidity

## Selecting a Radial Clearance (Preload)

Since the radial clearance of an LM Guide greatly affects the running accuracy, load carrying capacity and rigidity of the LM Guide, it is important to select an appropriate clearance according to the application. In general, selecting a negative clearance (i.e., a preload\* is applied) while taking into account possible vibrations and impact generated from reciprocating motion favorably affects the service life and the accuracy.

For specific radial clearances, contact THK. We will help you select the optimal clearance according to the conditions.

The clearances of all LM Guide models (except model HR, GSR and GSR-R, which are separate types) are adjusted as specified before shipment, and therefore they do not need further preload adjustment.

\*Preload is an internal load applied to the rolling elements (balls, rollers, etc.) of an LM block in advance in order to increase its rigidity.

Table4 Types of Radial Clearance

|                          | Normal Clearance                                                                                                                                                                                                                                                                                                                                                 | Clearance C1 (Light Preload)                                                                                                                                                                                                                                                                                                                                                                                                           | Clearance C0 (Medium Preload)                                                                                                                                                                                                                                                   |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Condition                | <ul style="list-style-type: none"> <li>The loading direction is fixed, impact and vibrations are minimal and 2 rails are installed in parallel.</li> <li>Very high precision is not required, and the sliding resistance must be as low as possible.</li> </ul>                                                                                                  | <ul style="list-style-type: none"> <li>An overhang load or moment load is applied.</li> <li>LM Guide is used in a single-rail configuration.</li> <li>Light load and high accuracy are required.</li> </ul>                                                                                                                                                                                                                            | <ul style="list-style-type: none"> <li>High rigidity is required and vibrations and impact are applied.</li> <li>Heavy-cutting machine tool</li> </ul>                                                                                                                          |
| Examples of applications | <ul style="list-style-type: none"> <li>Beam-welding machine</li> <li>Book-binding machine</li> <li>Automatic packaging machine</li> <li>XY axes of general industrial machinery</li> <li>Automatic sash-manufacturing machine</li> <li>Welding machine</li> <li>Flame cutting machine</li> <li>Tool changer</li> <li>Various kinds of material feeder</li> </ul> | <ul style="list-style-type: none"> <li>Grinding machine table feed axis</li> <li>Automatic coating machine</li> <li>Industrial robot</li> <li>various kinds of material high speed feeder</li> <li>NC drilling machine</li> <li>Vertical axis of general industrial machinery</li> <li>Printed circuit board drilling machine</li> <li>Electric discharge machine</li> <li>Measuring instrument</li> <li>Precision XY table</li> </ul> | <ul style="list-style-type: none"> <li>Machining center</li> <li>NC lathe</li> <li>Grinding stone feed axis of grinding machine</li> <li>Milling machine</li> <li>Vertical/horizontal boring machine</li> <li>Tool rest guide</li> <li>Vertical axis of machine tool</li> </ul> |

# Service Life with a Preload Considered

When using an LM Guide under a medium preload (clearance C0), it is necessary to calculate the service life while taking into account the magnitude of the preload.  
To identify the appropriate preload for any selected LM Guide model, contact THK.

## Rigidity

When a load is applied to an LM Guide, the bearings and LM block will elastically deform within the allowable load range. The ratio of displacement to applied load is referred to as "rigidity." The radial internal clearance (preload) for the LM Guide can be specified in order to reduce displacement. By using balls larger than the width of the race, they will naturally deform elastically as they roll, allowing the load to be maintained for longer while limiting displacement in the LM Guide. The effect of the preload can be up to 2.8 times greater than the size of the preload itself. If that level is exceeded, the preload is released and the effect of the preload is lost. When a preloaded LM Guide takes an external load, the displacement will be linear. The level of displacement will be approximately half that of an LM Guide with no preload. The preload, in addition to reducing displacement, helps prevent premature failure due to vibration and impact/shock.

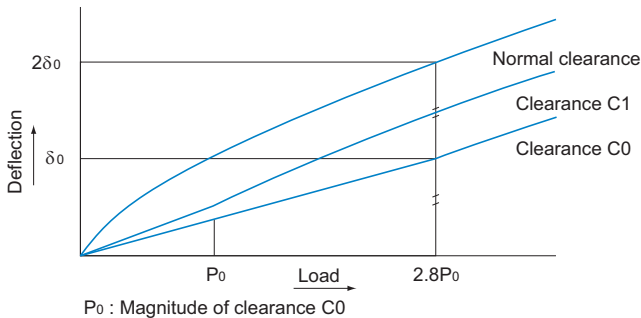


Fig.14 Rigidity Data

$$K=\frac{P}{\delta}$$

|   |                   |        |
|---|-------------------|--------|
| K | : Rigidity value  | (N/μm) |
| δ | : Deflection      | (μm)   |
| P | : Calculated load | (N)    |

# Determining the Accuracy

## Accuracy Standards

Accuracy of the LM Guide is specified in terms of running parallelism, dimensional tolerance for height and width, and height and width difference between a pair when 2 or more LM blocks are used on one rail or when 2 or more rails are mounted on the same plane.

For details, see “Accuracy Standard for Each Model” on **A1-76** to **A1-86**.

### [Running of Parallelism]

It refers to the tolerance for parallelism between the LM block and the LM rail reference surface when the LM block travels the whole length of the LM rail with the LM rail secured on the reference surface using bolts.

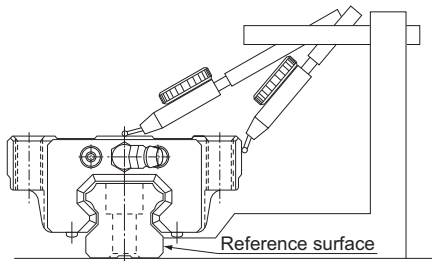


Fig.15 Running of Parallelism

### [Difference in Height M]

Indicates a difference between the minimum and maximum values of height (M) of each of the LM blocks used on the same plane in combination.

### [Difference in Width $W_2$ ]

Indicates a difference between the minimum and maximum values of the width ( $W_2$ ) between each of the LM blocks, mounted on one LM rail in combination, and the LM rail.

Note 1) When two or more rails are used on the same plane in parallel, this applies only to the difference in width ( $W_2$ ) and dimensional tolerance of the master rail. Please specify if you wish for it to apply to the difference in width and dimensional tolerance of the subsidiary rail as well. Master LM rails will have a serial number ending with “KB” printed on them. However, this is not the case for standard grade products.

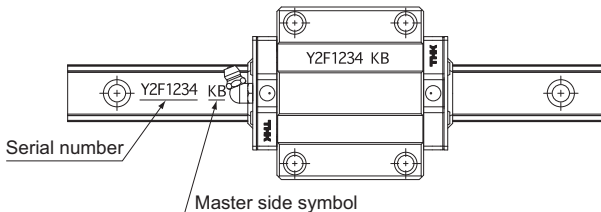


Fig.16 Master LM Rail (E.g. Model HSR-A)

Note 2) Accuracy measurements each represent the average value of the central point or the central area of the LM block.

Note 3) If it is mounted on a less rigid base such as an aluminum base, the curve of the rail will affect the accuracy of the machine. Therefore, it is necessary to define straightness of the rail in advance.

# Guidelines for Accuracy Grades by Machine Type

Table5 shows guidelines for selecting an accuracy grade of the LM Guide according to the machine type.

Table5 Guideline for Accuracy Grades by Machine Type

| Type of machine                       |                                        | Accuracy grades |   |   |    |    |
|---------------------------------------|----------------------------------------|-----------------|---|---|----|----|
|                                       |                                        | Normal          | H | P | SP | UP |
| Machine tool                          | Machining center                       |                 |   | ● | ●  |    |
|                                       | Lathe                                  |                 |   | ● | ●  |    |
|                                       | Milling machine                        |                 |   | ● | ●  |    |
|                                       | Boring machine                         |                 |   | ● | ●  |    |
|                                       | Jig borer                              |                 |   |   | ●  | ●  |
|                                       | Grinding machine                       |                 |   |   | ●  | ●  |
|                                       | Electric discharge machine             |                 |   | ● | ●  | ●  |
|                                       | Punching press                         |                 | ● | ● |    |    |
|                                       | Laser beam machine                     |                 | ● | ● | ●  |    |
|                                       | Woodworking machine                    | ●               | ● | ● |    |    |
|                                       | NC drilling machine                    |                 | ● | ● |    |    |
|                                       | Tapping center                         |                 | ● | ● |    |    |
|                                       | Palette changer                        | ●               |   |   |    |    |
|                                       | ATC                                    | ●               |   |   |    |    |
|                                       | Wire cutting machine                   |                 |   | ● | ●  |    |
|                                       | Dressing machine                       |                 |   |   | ●  | ●  |
| Industrial robot                      | Cartesian coordinate                   | ●               | ● | ● |    |    |
|                                       | Cylindrical coordinate                 | ●               | ● |   |    |    |
| Semiconductor manufacturing equipment | Wire bonding machine                   |                 |   | ● | ●  |    |
|                                       | Prober                                 |                 |   |   | ●  | ●  |
|                                       | Electronic component inserter          |                 | ● | ● |    |    |
|                                       | Printed circuit board drilling machine |                 | ● | ● | ●  |    |
| Other equipment                       | Injection molding machine              | ●               | ● |   |    |    |
|                                       | 3D measuring instrument                |                 |   |   | ●  | ●  |
|                                       | Office equipment                       | ●               | ● |   |    |    |
|                                       | Conveyance system                      | ●               | ● |   |    |    |
|                                       | XY table                               |                 | ● | ● | ●  |    |
|                                       | Coating machine                        | ●               | ● |   |    |    |
|                                       | Welding machine                        | ●               | ● |   |    |    |
|                                       | Medical equipment                      | ●               | ● |   |    |    |
|                                       | Digitizer                              |                 | ● | ● | ●  |    |
|                                       | Inspection equipment                   |                 |   | ● | ●  | ●  |

Normal : Normal grade  
 H : High accuracy grade  
 P : Precision grade

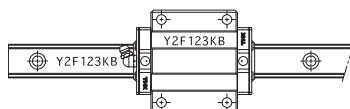
SP : Super precision grade  
 UP : Ultra precision grade

## Mounting the LM Guide

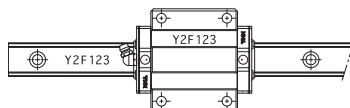
### Marking on the Master LM Guide and Combined Use

#### [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 Fig.1)  
Normal grade LM Guides 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.



Master LM Guide



Subsidiary LM Guide

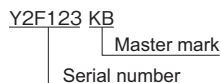
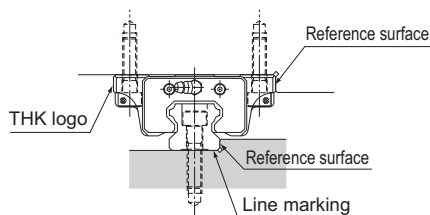


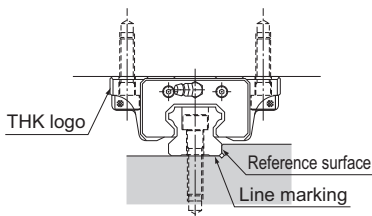
Fig.1 Master and Subsidiary LM Guides (E.g. Model HSR-B)

#### [Markings 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 that of the LM rail is on the surface marked with a line (see Fig.2). If it is necessary to reverse the reference surface of the LM rail and block, or if the grease nipple must be oriented in the opposite direction, specify it.



Master LM Guide



Subsidiary LM Guide

Fig.2 Markings on the Reference Surface

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

An LM rail and LM block(s) 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. (Fig.3)

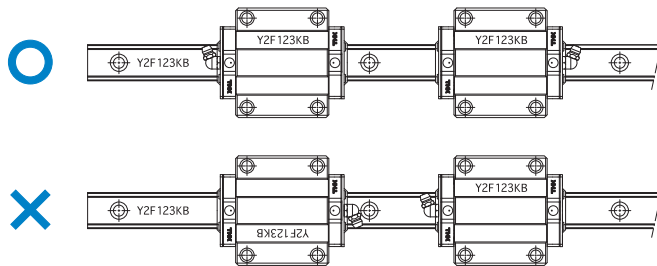


Fig.3 Serial Number Marking and Combined Use of an LM Rail and LM Blocks (E.g. Model HSR-A)

### [Use of Jointed Rails]

When a long LM rail is ordered, two or more rails will be jointed together to the desired length. When jointing rails, make sure that the joint match marks shown in Fig.4 are correctly positioned.

When two LM Guides with connected 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 joint section by pressing the LM rail against the datum plane using a set screw or the like and keeping the L dimension as short as possible (Fig.4). For details, contact THK.

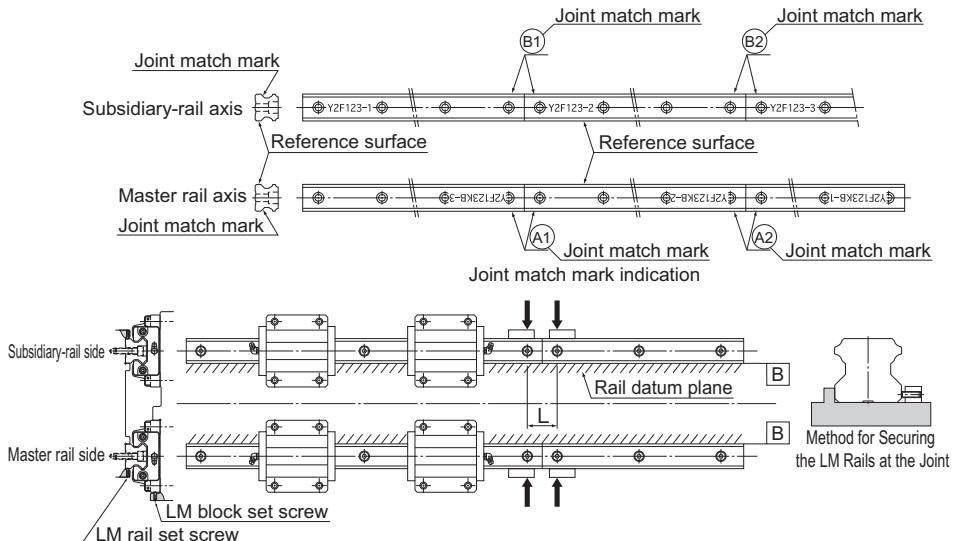


Fig.4 Use of Jointed Rails

### Mounting Procedure

[Example of Mounting the LM Guide When an Impact Load is Applied to the Machine and therefore Rigidity and High Accuracy are Required]

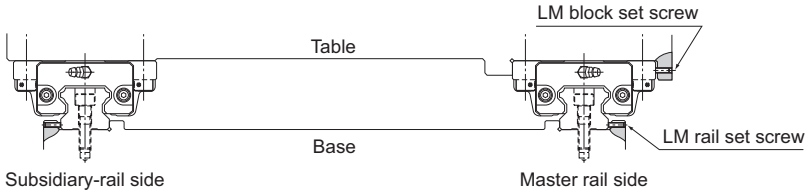


Fig.5 When an Impact Load is Applied to the Machine

#### ● Mounting the LM Rail(s)

- (1) Be sure to remove burr, dent and dust from the mounting surface of the machine to which the LM Guide is to be mounted before installing the LM Guide. (Fig.6)

Note) Since the LM 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.

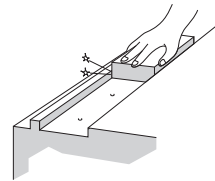


Fig.6 Checking the Mounting Surface

- (2) Gently place the LM rail onto the base, and temporarily secure the bolts to the extent that the LM rail lightly contacts the mounting surface (align the line-marked side of the LM rail with the side reference-surface of the base). (Fig.7)

Note) The bolts for securing the LM Guide must be clean. When placing the bolts into the mounting holes of the LM rail, check if the bolt holes are displaced. (Fig.8) Forcibly tightening the bolt into a displaced hole may deteriorate the accuracy.

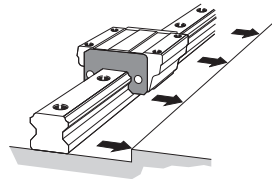


Fig.7 Aligning the LM Rail with the Reference-Surface

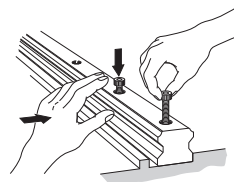


Fig.8 Checking with the Bolt for an Allowance

- (3) Secure the set screws for the LM rail in order with a tightening force just enough to have the rail closely contact the side mounting surface. (Fig.9)

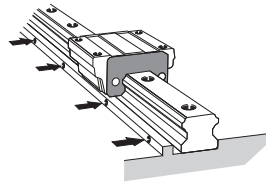


Fig.9 Tightening the Set screws

- (4) Tighten the mounting bolts at the designated torque using a torque wrench. (See Fig.10, and Table1 and Table2 on **B1-101**.)

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

- (5) Mount the other rail in the same manner to complete the installation 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.

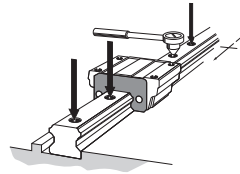


Fig.10 Fully Fastening the Mounting Bolts

### ● 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 to the side reference surface of the table using set screws and position the table. (See Fig.5 on **B1-91**.)
- (3) Fully fasten the mounting bolts on the master side and the subsidiary side to complete the installation.

Note) To evenly secure the table, tighten the mounting bolts in diagonal order as shown in Fig.11.

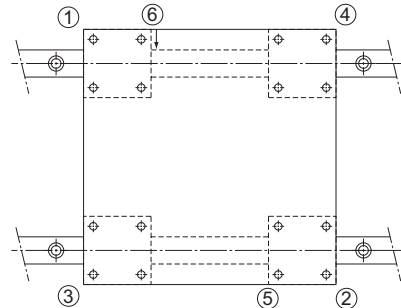


Fig.11 Sequence of Tightening the LM Blocks

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

### [Example of Mounting the LM Guide When the Master LM Rail is not Provided with Set screws]

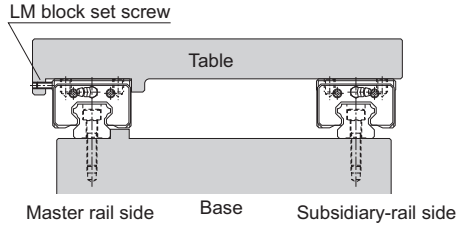


Fig.12 When the Master LM Rail is not Provided with Set screws

#### ● 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 vice and fully fasten the bolt. Perform this in order from either rail end to the other. (Fig.13)

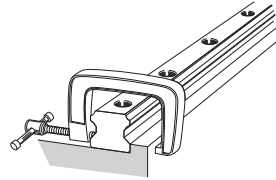


Fig.13

#### ● Mounting the Subsidiary LM Rail

To mount the subsidiary LM rail in parallel with the master LM rail, which has been correctly installed, 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 order while achieving straightness of the subsidiary rail with the straight edge as the reference by using the dial gauge. (Fig.14)

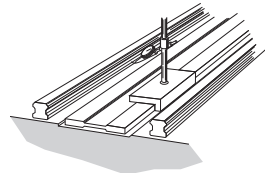


Fig.14

### ■Using Parallelism of the Table

Secure the two LM blocks on the master LM rail with the table (or a temporary table for measurement), and temporarily fasten the LM rail and the LM block on the subsidiary LM rail with the table. Place a dial gauge to the side face of the LM block on the subsidiary rail from the dial stand fixed on the table top, then fasten the bolts in order while achieving parallelism of the subsidiary LM rail by moving the table from the rail end. (Fig.15)

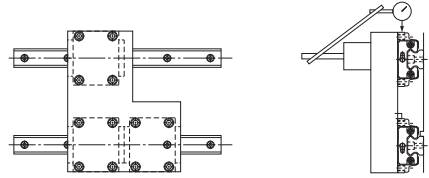


Fig.15

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

Place the table on the 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 tighten the mounting bolts on the subsidiary LM rail in order while temporarily fastening the remaining LM block on the subsidiary LM rail. (Fig.16)

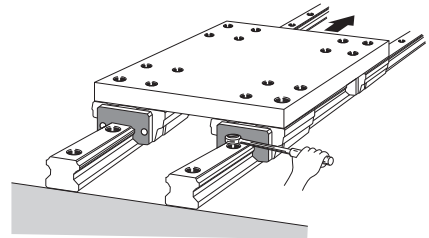


Fig.16

### ■Using a Jig

Use a jig like the one shown in Fig.17 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. (Fig.17)

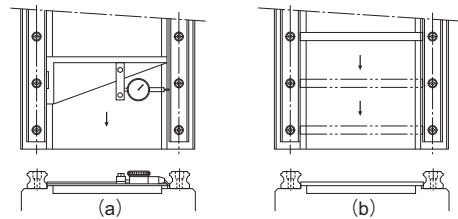


Fig.17

[Example of Mounting the LM Guide When the Master LM Rail Does not Have a Reference Surface]

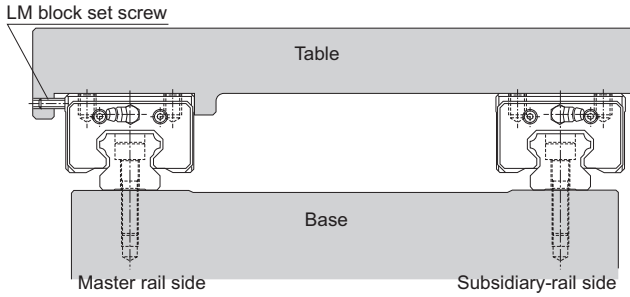


Fig.18

### ● Mounting the Master LM Rail

#### ■ Using a Temporary Reference Surface

You can temporarily set a reference surface 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 attached to a measurement plate, as shown in Fig.19.

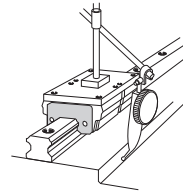


Fig.19

#### ■ 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 LM rail from the rail end, and at the same time, fully fasten the mounting bolts.(Fig.20)

To mount the subsidiary LM rail, follow the procedure described on [B1-93](#).

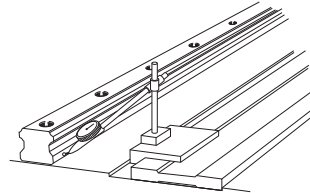


Fig.20

### [Procedure for Assembling Model HR]

The following procedure is recommended for assembling model HR.

- (1) Remove burr or knots from the LM rail mounting surface of the base using an oil-stone. (Fig.21)
- (2) Use a small vice to press the two LM rails to the base so that they closely contact the reference surface, then tighten the mounting bolts to the recommended torque (see **B1-101**). (Fig.22)
  - a. Check if any of the bolts has a sinking.
  - b. Use a torque wrench to tighten the bolts in order from the center to both ends.
- (3) Mount the LM blocks on the table, then install them onto the LM rails. Be sure the mounting bolts for the LM blocks are temporarily fastened.
- (4) Tighten the clearance adjustment bolt alternately to adjust the clearance.

If a relatively large preload is applied in order to achieve high rigidity, control the tightening torque or the rolling resistance.

  - a. It is preferable to use three clearance adjustment bolts for each LM block as shown in Fig.23.
  - b. To obtain a favorable result of the clearance adjustment, set the tightening torque of the two outside screws at approx. 90% of that of the enter screw.
- (5) Secure each LM block by gradually tightening the two LM block mounting bolts, which have temporarily been fastened, while sliding the table. (Fig.24)

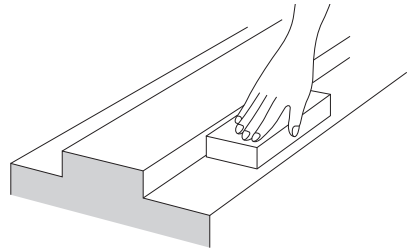


Fig.21

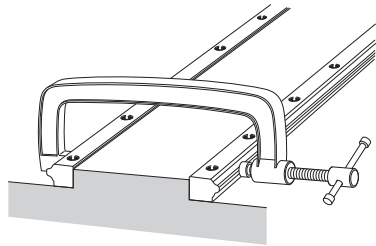


Fig.22

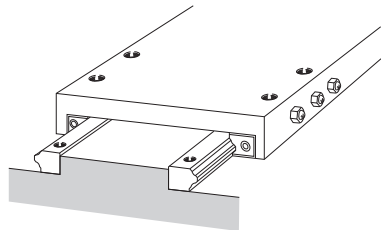


Fig.23

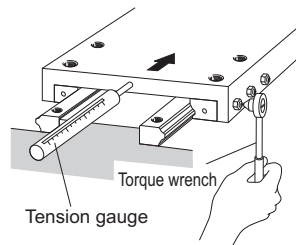


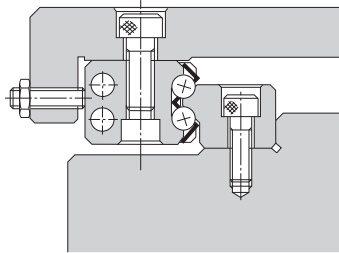
Fig.24

### ● Example of Clearance Adjustment

Design the clearance adjustment bolt so that it presses the center of the side face of the LM block.

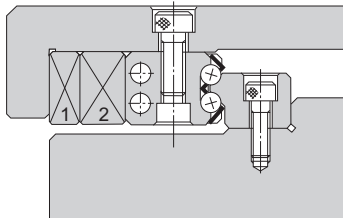
#### a. Using an adjustment screw

Normally, an adjustment screw is used to press the LM block.



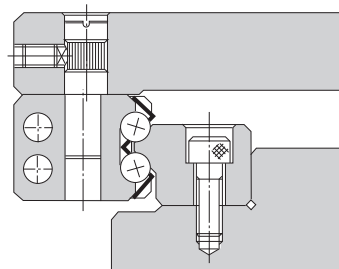
#### b. Using tapered gibs

When high accuracy and high rigidity are required, use tapered gibs 1) and 2).



#### c. Using an eccentric pin

A type using an eccentric pin to adjust the clearance is also available.



### [Procedure for Assembling Model GSR]

The procedure for assembling model GSR is as follows:

- (1) Align the table with the reference-surface of each LM block and fully fasten the mounting bolts to secure the blocks.  
Both ends of the table must have a datum surface. (Fig.25)
- (2) Place LM rail A onto the base and align the rail with a straight-edge.  
Fully fasten the mounting bolts using a torque wrench. (Fig.26)
- (3) Temporarily secure LM rail B onto the base, then mount the blocks on the rail by sliding the blocks.  
Temporarily fasten LM rail B while pressing it toward the LM blocks. (Fig.27)
- (4) Slide the table a few strokes to fit the LM blocks to LM rail B, then fully fasten LM rail B using a torque wrench. (Fig.28)

If there are more GSR units to be assembled, we recommend producing a jig like the one shown in Fig.29 first. You can easily mount LM rails while achieving parallelism of the LM rails using the jig.

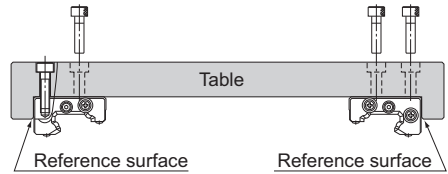


Fig.25

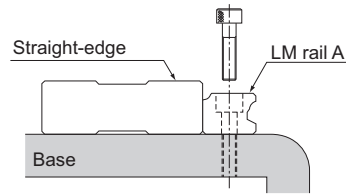


Fig.26

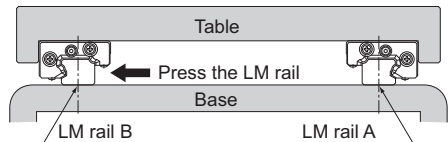


Fig.27

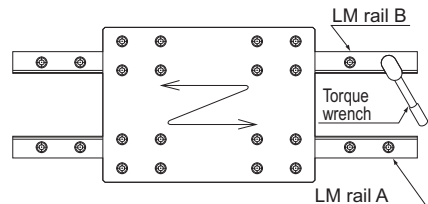


Fig.28

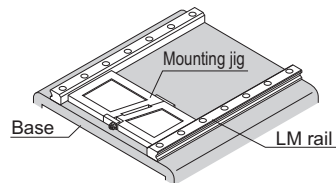


Fig.29

### [Procedure for Assembling Model JR]

#### ● Mounting the LM Rails

When two LM rails are to be used in parallel as shown in Fig.30, first secure one LM rail on the base, and place a dial gauge on the LM block. Then, place the pointer of the dial gauge on the side face and top face of the other LM rail to simultaneously adjust the parallelism and the level, thus to complete mounting the LM rails.

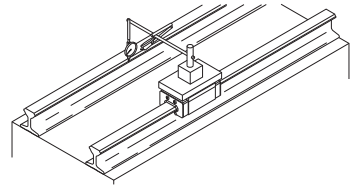


Fig.30

#### ● Jointing LM Rails

When two or more LM rails are to be jointed, a special metal fitting as shown in Fig.31 is available. For such applications, specify this fitting when ordering the LM Guide (the rail will be tapped for attaching a joint fitting).

##### Installation Procedure

- (1) Temporarily fasten the rail presser bolt.
- (2) Secure rail A and the joint fitting with bolts C and D.
- (3) Apply a dial gauge to side G of the joint between rails A and B. Adjust the left and right level differences using bolt E and set screw F on rail B.  
If bolt E is tightened, rail B will move toward b side.  
If set screw F is tightened, rail B will move toward a side.
- (4) When the adjustment using set screw F is finished, secure set screw F with the nut.
- (5) Adjust and secure the vertical direction using the rail presser.

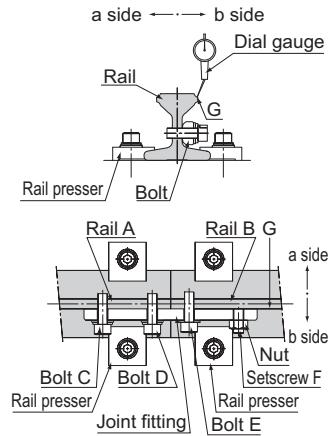


Fig.31

### ● Welding the LM Rail

When welding the LM rail, it is best to weld the LM rail while clamping it at the welding point with a small vice or the like as shown in Fig.32. For effective welding, we recommend the following welding conditions. (During welding the LM rail, take care to prevent spatter from contacting the LM rail raceway.)

[Welding conditions]

Preheating temperature: 200°C

Postheating temperature: 350°C

Note) If the temperature exceeds 750°C, the LM rail may be hardened again.

[For shielded metal arc welding]

Welding rod: LB-52 (Kobelco)

[For carbon dioxide arc welding]

Wire: YGW12

Electric current: 200A

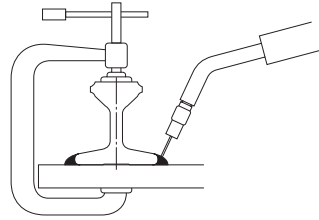


Fig.32

### [Procedure for Assembling Model HCR]

To install the LM rails of R Guide model HCR, we recommend having any form of datum point (such as a pin) on the reference side (inside) of the LM rail, and pressing the LM rail to the datum point then stopping the LM rail with a presser plate from the counter-reference surface.

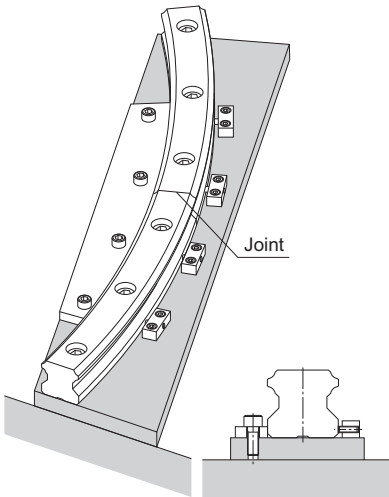


Fig.33 Method for Securing the LM Rails at the Joint

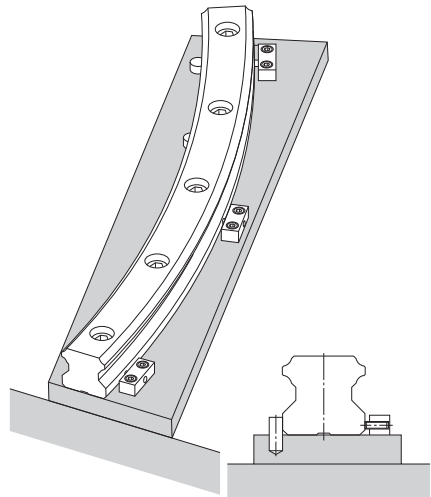


Fig.34 Method for Securing the LM Rail Using a Pin as a Datum Point

## Methods for Measuring Accuracy after Installation

### [When Measuring 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 Fig.35. When using a dial gauge, we recommend placing the straight-edge as close as possible to the LM block in order to perform accurate measurement.

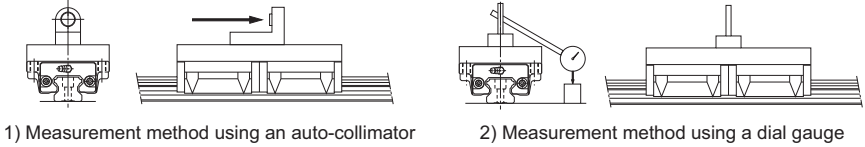


Fig.35 Methods for Measuring Accuracy after Installation

## Recommended Tightening Torque for LM Rails

With high-precision LM rails for the LM Guide, their raceways are ground and accuracy is inspected with the rails tightened with bolts. When mounting a high-precision LM rail on a machine, we recommend using the corresponding tightening torque indicated in Table1 or Table2

Table1 Tightening Torques when Pan Head Screws are Used  
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     |

Table2 Tightening Torques when Hexagonal-Socket-Head Type Bolts are Used  
Unit: N•cm

| Screw model No. | Tightening torque |           |          |
|-----------------|-------------------|-----------|----------|
|                 | Steel             | Cast Iron | 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            | 11800             | 7840      | 5880     |
| M 14            | 15700             | 10500     | 7840     |
| M 16            | 19600             | 13100     | 9800     |
| M 20            | 38200             | 25500     | 19100    |
| M 22            | 51900             | 34800     | 26000    |
| M 24            | 65700             | 44100     | 32800    |
| M 30            | 130000            | 87200     | 65200    |

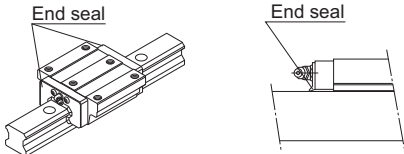
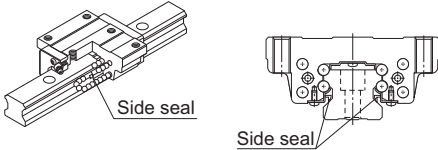
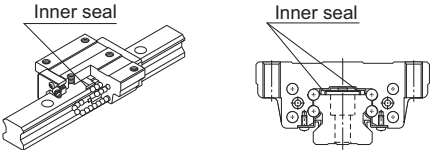
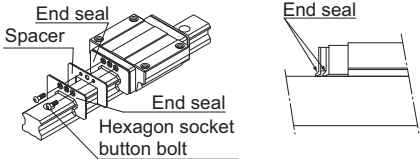
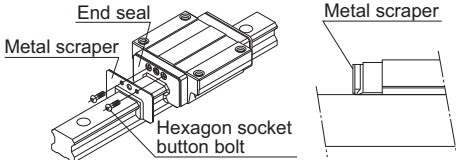


## LM Guide Options

|                                                                 |         |
|-----------------------------------------------------------------|---------|
| <b>Options</b> .....                                            | B 1-103 |
| Seal and Metal scraper.....                                     | B 1-104 |
| Laminated Contact Scraper LaCS.....                             | B 1-106 |
| Side Scraper.....                                               | B 1-108 |
| Protector .....                                                 | B 1-109 |
| Light-Resistance Contact Seal LiCS .....                        | B 1-110 |
| High Chemical Resistance Fluorine Seal FS..                     | B 1-111 |
| Dedicated bellows .....                                         | B 1-112 |
| Dedicated LM Cover.....                                         | B 1-112 |
| Dedicated Cap for LM Rail Mounting Holes..                      | B 1-113 |
| Plate Cover SV Steel Tape SP .....                              | B 1-115 |
| QZ Lubricator.....                                              | B 1-118 |
| Lubrication Adapter.....                                        | B 1-121 |
| Removing/mounting Jig .....                                     | B 1-122 |
| End Piece EP .....                                              | B 1-123 |
| <b>Model No.</b> .....                                          | B 1-124 |
| • Model Number Coding.....                                      | B 1-124 |
| • Notes on Ordering.....                                        | B 1-128 |
| <b>Precautions on Use</b> .....                                 | B 1-130 |
| Precautions on Using the LM Guide.....                          | B 1-130 |
| Precautions on Handling the LM Guide for Special Environment .. | B 1-132 |
| • LM Guide for Medium-to-Low Vacuum .....                       | B 1-132 |
| • Oil-Free LM Guide .....                                       | B 1-132 |
| Precautions on Using Options for the LM Guide ..                | B 1-133 |
| • QZ Lubricator for the LM Guide.....                           | B 1-133 |
| • Laminated Contact Scraper LaCS, Side Scraper for LM Guides .. | B 1-133 |
| • Light Contact Seal LiCS for LM Guides .....                   | B 1-134 |
| • High Chemical Resistance Fluorine Seal FS for the LM Guide..  | B 1-134 |
| • Cap GC .....                                                  | B 1-134 |

# Seal and Metal scraper

- For the supported models, see the table of options by model number on [A1-478](#).
- For the LM block dimension (dimension L) with seal attached, see [A1-491](#) to [A1-498](#).
- For the maximum seal resistance, see [A1-504](#) to [A1-506](#).

| Item name                   | Schematic diagram / mounting location                                               | Purpose/location of use                                                                                                               |
|-----------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| End Seal                    |    | Used in locations exposed to dust                                                                                                     |
| Side Seal                   |    | Used in locations where dust may enter the LM block from the side or bottom surface, such as vertical, horizontal and inverted mounts |
| Inner Seal                  |    | Used in locations severely exposed to dust or cutting chips                                                                           |
| Double Seals                |   | Used in locations exposed to much dust or many cutting chips                                                                          |
| Metal Scraper (Non-contact) |  | Used in locations where welding spatter may adhere to the LM rail                                                                     |

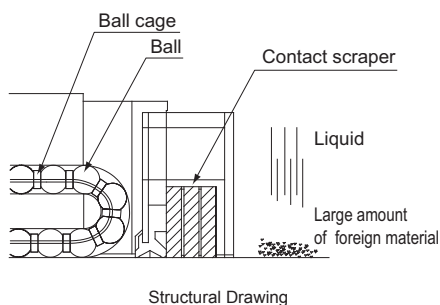
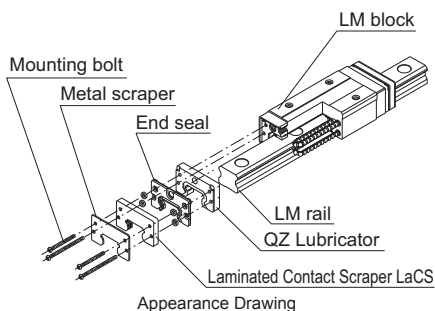
| Symbol | Contamination Protection Accessories                        |
|--------|-------------------------------------------------------------|
| UU     | With end seal                                               |
| SS     | With end seal + side seal + inner seal*                     |
| DD     | With double seals + side seal + inner seal*                 |
| ZZ     | With end seal + side seal + inner seal* + metal scraper     |
| KK     | With double seals + side seal + inner seal* + metal scraper |

\* Some models are not equipped with inner seals.(See **A1-478**)

# Laminated Contact Scraper LaCS

- For the supported models, see the table of options by model number on [A1-478](#).
- For the LM block dimension (dimension L) with LaCS attached, see [A1-491](#) to [A1-498](#).
- For the resistance of LaCS, see [A1-507](#).
- For notes regarding how to handle the LaCS, see [B1-133](#).

For locations with adverse environment, Laminated Contact Scraper LaCS is available. LaCS removes minute foreign material adhering to the LM rail in multiple stages and prevents it from entering the LM block with laminated contact structure (3-layer scraper).



## [Features]

- Since the 3 layers of scrapers fully contact the LM rail, LaCS is highly capable of removing minute foreign material.
- Since it uses oil-impregnated, foam synthetic rubber with a self-lubricating function, low friction resistance is achieved.

| Symbol             | Contamination Protection Accessories                                                                        |
|--------------------|-------------------------------------------------------------------------------------------------------------|
| SSHH               | With end seal + side seal + inner seal* <sup>1</sup> + LaCS                                                 |
| DDHH               | With double seals + side seal + inner seal * <sup>1</sup> + LaCS                                            |
| ZZHH               | With end seal + side seal + inner seal * <sup>1</sup> + metal scraper + LaCS                                |
| KKHH               | With double seals + side seal + inner seal * <sup>1</sup> + metal scraper + LaCS                            |
| JJHH* <sup>2</sup> | With end seal + side seal + inner seal* <sup>1</sup> + LaCS + protector (serving also as metal scraper)     |
| TTHH* <sup>2</sup> | With double seals + side seal + inner seal* <sup>1</sup> + LaCS + protector (serving also as metal scraper) |

\*<sup>1</sup> Some models are not equipped with inner seals.(See [A1-478](#))

\*<sup>2</sup> JJHH and TTHH are only available for models SVR/SVS, NR/NRS-X and SRG.

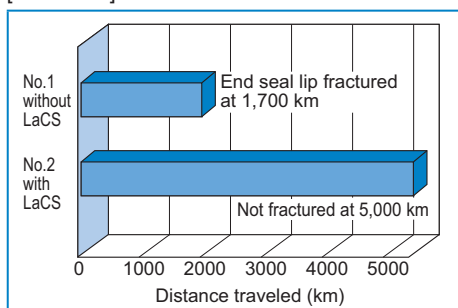
Note) HH type (with LaCS) for models SVR/SVS, NR/NRS-X, and SRG comes with a protector (see [B1-109](#)). Contact THK if you want to use the Protector with other options.

### ● Test under an Environment with a Water-soluble Coolant

[Test conditions] Test environment: water-soluble coolant

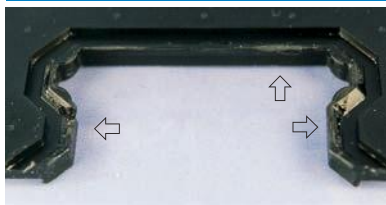
| Item                     | Description                     |                                       |
|--------------------------|---------------------------------|---------------------------------------|
| Tested model             | No.1                            | SHS45R1SS+3000L (end seal only)       |
|                          | No.2                            | SHS45R1SSHH+3000L (end seal and LaCS) |
| Maximum speed            | 200m/min                        |                                       |
| Environmental conditions | Coolant sprayed: 5 time per day |                                       |

[Test result]



#### Magnified view of the end seal lip

No. 1: without LaCS - lip fractured at 1,700 km



⇐ Areas marked with arrow are fractured

No. 2: with LaCS - no anomaly observed after traveling 5,000 km



Lip has not been fractured

### ● Test under an Environment with Minute Foreign Matter

[Test conditions] Test environment: minute foreign material

| Item                        | Description                                            |                                                      |
|-----------------------------|--------------------------------------------------------|------------------------------------------------------|
| Tested model                | No.1                                                   | Caged Ball LM Guide #45R (DD+600L) double seals only |
|                             | No.2                                                   | Caged Ball LM Guide #45R (HH+600L) LaCS only         |
| Max speed/acceleration      | 60m/min, 1G                                            |                                                      |
| External load               | 9.6kN                                                  |                                                      |
| Foreign material conditions | Type: FCD450#115 (particle diameter: 125 μm or less)   |                                                      |
|                             | Sprayed amount: 1g/1hour (total sprayed amount: 120 g) |                                                      |

[Test result] Amount of foreign material entering the raceway

| Seal configuration                                                 |                | Amount of foreign material entering the raceway g |
|--------------------------------------------------------------------|----------------|---------------------------------------------------|
| Double-seal configuration (2 end seals superposed with each other) | Tested model 1 | 0.3                                               |
|                                                                    | Tested model 2 | 0.3                                               |
|                                                                    | Tested model 3 | 0.3                                               |
| LaCS                                                               | Tested model 1 | 0                                                 |
|                                                                    | Tested model 2 | 0                                                 |
|                                                                    | Tested model 3 | 0                                                 |

No. 1 Traveled 100 km (double-seal configuration)



Large amount of foreign matter has entered the raceway

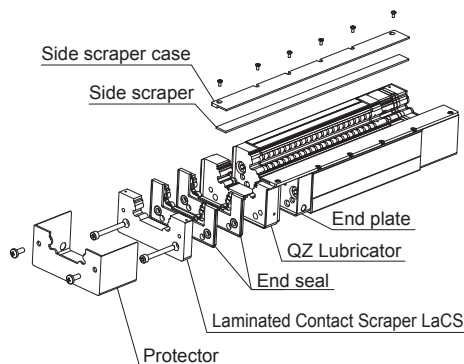
No. 2 Traveled 100 km (LaCS only)



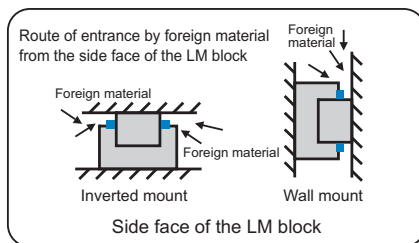
No foreign matter entering the raceway observed

# Side Scraper

- For the supported models: models SVR/SVS, NR/NRS-X and SRG
- For the resistance of side scraper, see [A1-508](#).
- For the LM block dimension (dimension L) with side scraper attached, see [A1-491](#).
- For notes regarding how to handle the side scraper, see [A1-133](#).



Outline view  
(Ex: in case of QZTTHYY type)



## [Features]

- Minimizes foreign material entering from the side of the LM Guide in a harsh environment.
- Demonstrates a dust protection effect in inverted or wall mount.

## Model number coding

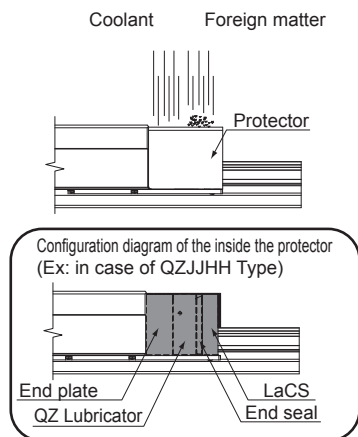
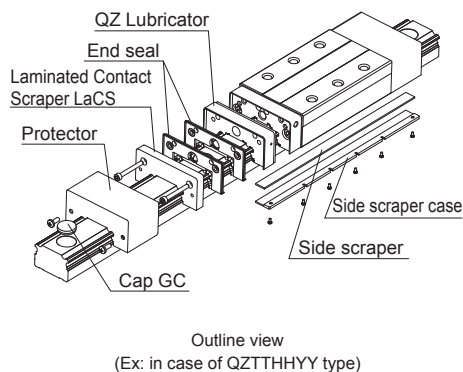
**SVR45 LR 1 QZ JJHH YY C1 +1200L**

With side scraper\*

\* The side scraper can accommodate various options of dust control accessories and lubrication accessories. For details, contact THK.

# Protector

- Applicable models: models SVR/SVS, NR/NRS-X and SRG
- HH type (with LaCS) for models SVR/SVS, NR/NRS-X and SRG is provided with the protector.
- For the LM block dimension (dimension L) with protector attached, see **▢ 1-491**.



## [Features]

- The protector minimizes the entrance of foreign material even in harsh environments where foreign material such as ne particles and liquids are present.

Note1) Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.

Note2) Contact THK if you want to use the protector with other options.

# Light-Resistance Contact Seal LiCS

- For the supported models, see the table of options by model number on [A1-478](#).
- For the LM block dimension (dimension L) with LiCS attached, see [A1-501](#).
- For the resistance of LiCS, see [A1-508](#).
- For notes regarding how to handle the LiCS, see [B1-134](#).

LiCS is a light sliding resistance contact seal. It is effective in removing dust on the raceway and retaining a lubricant such as grease. It achieves extremely low drag and smooth, stable motion.

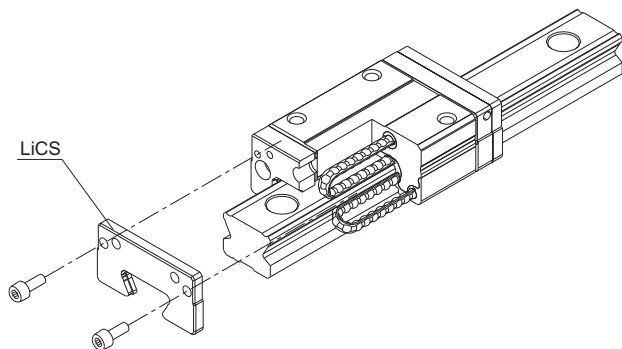


Fig.1 Structural Drawing of SSR + LiCS

## [Features]

Light-Resistance Contact Seal LiCS is a seal that uses a light-resistance material in its sealing element and contacts the LM rail raceway to achieve low drag resistance. It is optimal for applications where low drag resistance is required, such as semiconductor-related devices, inspection devices and OA equipment all of which are used in favorable environments.

- Since the sealing element contacts the LM rail raceway, it is effective in removing dust on the raceway.
- Use of oil-impregnated, expanded synthetic rubber, which has excellent self-lubricating property, achieves low drag resistance.

## Model number coding

| SSR20                 | XW                                     | 2                           | GG                                                                                         | C1                     | +600L | P                                              | - II                                                                                                                                                    |
|-----------------------|----------------------------------------|-----------------------------|--------------------------------------------------------------------------------------------|------------------------|-------|------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| LM Guide model number | Type of LM block                       | With LiCS seal on both ends | Radial clearance symbol<br>Normal (No symbol)<br>Light preload (C1)<br>Medium preload (C0) | LM rail length (in mm) |       | Symbol for No. of rails used on the same plane | Accuracy symbol<br>Normal grade (No Symbol) / High accuracy grade (H)<br>Precision grade (P) / Super precision grade (SP)<br>Ultra precision grade (UP) |
|                       | No. of LM blocks used on the same rail |                             |                                                                                            |                        |       |                                                |                                                                                                                                                         |

| Symbol | Contamination Protection Accessories |
|--------|--------------------------------------|
| GG     | LiCS                                 |
| PP     | With LiCS + side seal + inner seal*  |

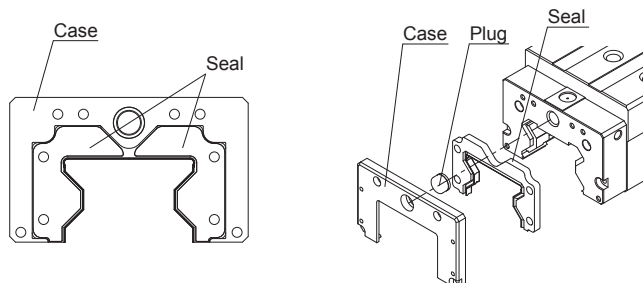
\* Some models are not equipped with inner seals. (See [A1-478](#))

# High Chemical Resistance Fluorine Seal FS

- Applicable models: models SRG35, SRG45, SRG55 and SRG65
- For the LM block dimension (L dimension) with a fluorine seal attached, see B1-503.
- For the resistance value of the fluorine seal, see B1-508.
- For precautions on using the fluorine seal, see B1-134.

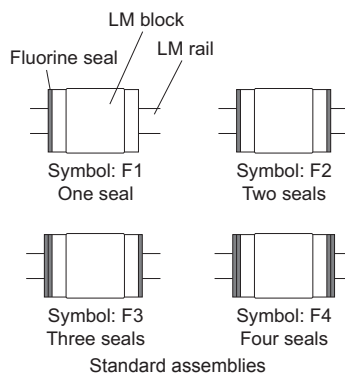
The fluorine seal is made of fluororubber and has excellent chemical resistance.

The fluorine seal can be inserted from the upper surface of the LM rail and is easy to install.



Components/Structure

| Symbol | Contamination Protection Accessories                                     |
|--------|--------------------------------------------------------------------------|
| F2     | Fluorine seals + side seals + inner seals                                |
| FZ2    | Fluorine seals + side seals + inner seals + metal scrapers               |
| FJ2    | Fluorine seals + side seals + inner seals + protectors                   |
| F4     | Fluorine seals (double) + side seals + inner seals                       |
| FZ4    | Fluorine seals (double) + side seals + inner seals + metal scrapers      |
| FJ4    | Fluorine seals (double) + side seals + inner seals + protectors          |
| QZF2   | Fluorine seals + side seals + inner seals + QZ                           |
| QZFZ2  | Fluorine seals + side seals + inner seals + metal scrapers + QZ          |
| QZPJ2  | Fluorine seals + side seals + inner seals + QZ + protectors              |
| QZF4   | Fluorine seals (double) + side seals + inner seals + QZ                  |
| QZFZ4  | Fluorine seals (double) + side seals + inner seals + metal scrapers + QZ |
| QZPJ4  | Fluorine seals (double) + side seals + inner seals + QZ + protectors     |



Standard assemblies

## Model number coding

<When purchasing in a set with an LM Guide>

(Example) SRG45LR2QZ **F2** C0 + 1200LZ-II

Fluorine seal symbol (see the standard assemblies diagram)

\*Contact THK if you require seals on individual blocks in configurations that differ from those in the standard assemblies diagram.

<When purchasing fluorine seals individually>

(Example) SRG45-**F1**-Z

Fluorine seal symbol (F1 only for individual purchase)

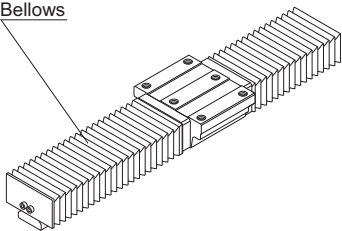
\*Individual purchases come in a set with the fluorine seal, a case, and a plug.

Note1) If this product will be used in special environments, such as in a vacuum or at very low or high temperatures, contact THK.

Note2) This seal cannot be used in combination with an end seal or a Laminated Contact Scraper (LaCS).

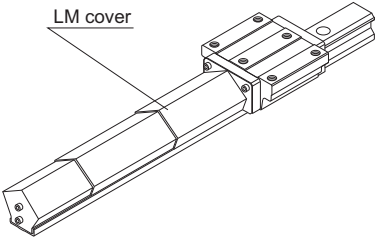
# Dedicated bellows

- For the supported models, see the table of options by model number on [A1-478](#).
- For the dedicated bellows dimensions, see [A1-520](#) to [A1-531](#).

| Item name         | Schematic diagram / mounting location                                             | Purpose/location of use                            |
|-------------------|-----------------------------------------------------------------------------------|----------------------------------------------------|
| Dedicated Bellows |  | Used in locations exposed to dust or cutting chips |

# Dedicated LM Cover

- For the supported models, see the table of options by model number on [A1-478](#).
- For the dedicated LM cover dimensions, see [A1-533](#).

| Item name          | Schematic diagram / mounting location                                               | Purpose/location of use                                                                                                                           |
|--------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| Dedicated LM Cover |  | <p>Used in locations exposed to dust or cutting chips</p> <p>Used in locations where high temperature foreign material such as flying spatter</p> |

# Dedicated Cap for LM Rail Mounting Holes

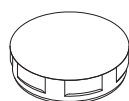
Using dedicated caps to cover the LM rail mounting holes helps prevent foreign material from entering the mounting holes and LM block.



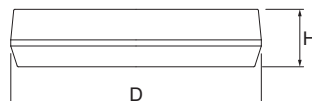
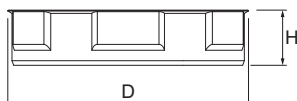
## ● Cap CV/Cap C

The caps are made of a special synthetic resin.

The CV cap is the successor to the C cap, and its new structure makes it easier to insert.



Cap CV



Cap C

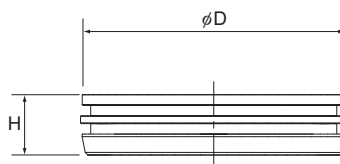
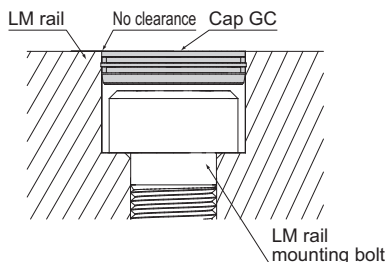
Note1) Contact THK if this product will be used in special environments such as in a vacuum, at very low or high temperatures, or with coolants or corrosive solvents.

Note2) CV caps and C caps must be arranged separately from the LM Guide.

## ● Cap GC

GC caps are made of metal. (They are RoHS compliant.)

GC caps adhere closer to the counterbore than CV caps and C caps, so there is no clearance once they are inserted.



Note1) GC caps are only sold with LM Guides. They are not sold separately.  
The LM Guide model number code will have "GC" at the end when it is delivered.

(Example 1) Multiple axes: SVR45LR+1200L - II GC

GC caps attached

Symbol for No. of rails used on the same plane (2 axes)

(Example 2) One axis: SVR45LR+1200L GC

GC caps attached

Note2) GC caps cannot be used with LM rails that are made of stainless steel or rails that have undergone surface treatment.

Note3) LM rail mounting holes for GC caps are special. (The mouth is not chamfered.)

Note4) Be careful not to injure your hand when inserting GC caps.

Note5) Be sure to make the GC caps level with the upper surface of the LM rail and clean (wipe) that surface after insertion.

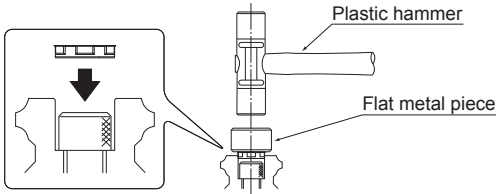
Note6) If this product will be used in special environments, such as in a vacuum or at very low or high temperatures, contact THK.

● **Guidelines for use in extreme environments**

| Extreme environment                      |                                                                  | Cap C<br>Cap CV | GC cap | Example of use                    |
|------------------------------------------|------------------------------------------------------------------|-----------------|--------|-----------------------------------|
| Foreign matter<br>concentration:<br>Low  | Metal powder, sputtering                                         | ○               | ◎      | Welding machines, robots          |
|                                          | Wood shavings, coolant<br>(Environments that strip<br>away oils) | ○               | ◎      | Woodworking machinery,<br>washers |
|                                          | Metal powder + coolant                                           | ○               | ◎      | Lathes, machining centers         |
| Foreign matter<br>concentration:<br>High | Metal powder, sputtering                                         | △               | ◎      | Welding machines, robots          |
|                                          | Wood shavings, coolant<br>(Environments that strip<br>away oils) | △               | ◎      | Woodworking machinery,<br>washers |
|                                          | Metal powder + coolant                                           | △               | ◎      | Lathes, machining centers         |

◎:Particularly effective ○:Effective △:Not particularly effective

● **Cap insertion method**

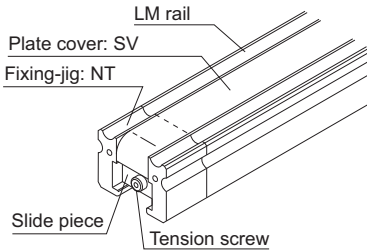
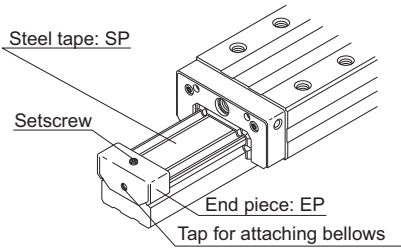
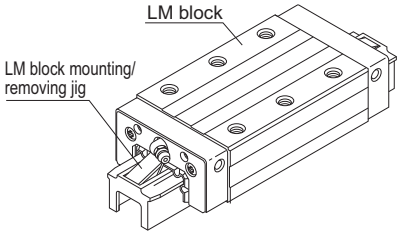


For best performance, caps must be inserted so that they are level with the rail surface. Have a flat aligning fitting and plastic hammer available.

- ① Set the cap on the LM rail mounting hole and place the alignment fitting on top.
- ② Use the plastic hammer to gradually drive the cap in until it is level with the upper surface of the LM rail.
- ③ As necessary, remove any slight burrs that appear.

# Plate Cover SV Steel Tape SP

●For the supported models, see the table of options by model number on **B1-478**.

| Item name      | Schematic diagram / mounting location                                                                                                                                                                                                                                                                                       | Purpose/location of use                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Plate Cover SV |  <p>LM rail</p> <p>Plate cover: SV</p> <p>Fixing-jig: NT</p> <p>Slide piece</p> <p>Tension screw</p>                                                                                                                                       | <p>For the LM Guide, steel tapes are available as a means of contamination protection for machine tools. By covering the LM rail mounting holes with an ultra-thin stainless steel (SUS304) plate, the plate cover SV drastically increases sealability, thus to prevent the penetration of a coolant or cutting chips from the top face of the LM rail.</p> <p>For the mounting method, see <b>B1-116</b>.</p> <p>Note) When mounting the plate cover, the LM rail needs to be machined. Indicate that the plate cover is required when ordering the LM Guide.</p>                                                                                       |
| Steel Tape SP  |  <p>Steel tape: SP</p> <p>Setscrew</p> <p>End piece: EP</p> <p>Tap for attaching bellows</p><br> <p>LM block</p> <p>LM block mounting/removing jig</p> | <p>For the LM Guide, steel tapes are available as a means of contamination protection for machine tools. By covering the LM rail mounting holes with an ultra-thin stainless steel (SUS304) plate, the steel tape SP drastically increases sealability, thus to prevent the penetration of a coolant or cutting chips from the top face of the LM rail. (When mounting the steel tape, end piece EP can be used as a means to secure the cover.)</p> <p>For the mounting method, see <b>B1-117</b>.</p> <p>Note) When mounting the steel tape, the LM rail needs to be machined. Indicate that the steel tape is required when ordering the LM Guide.</p> |

## [Mounting Procedure for Plate Cover SV]

- (1) Attach slide pieces to the plate cover.

Place the slide pieces on the plate cover with their chamfered sides facing outward, hold the plate cover with the slide pieces and the securing plates, and then secure them with countersunk screws.

- (2) Use an LM block mounting/removing jig to remove the LM block from the LM rail, and then mount the □xing-jigs onto the LM rail.
- (3) Temporarily secure either slide piece.

Insert either slide piece into one of the □xing-jigs, then attach the slide piece to the LM rail's end face using the tension adjustment bolt and gently secure the bolt until the bolt head is inside the □xing-jig.

- (4) Temporarily secure the other slide piece.
- Temporarily secure the other slide piece in the same manner as above.

- (5) Apply tension to the plate cover.

Apply tension to the plate cover by evenly securing the tension adjustment bolts on both ends of the LM rail. Make sure there is only a small difference between the H and H' dimensions in Fig.5. If the difference is too large, there may be no interference left on either end.

- (6) Mount the LM block on the LM rail.
- Identify the reference surface of the LM rail and the LM block, then insert the LM rail into the LM block using the LM block mounting / removing jig.

Note1) When removing or the mounting the LM block, use much care not to let the balls fall off.

Note2) The plate cover is an ultra-thin stainless steel (SUS304) plate. When handling it, use much care not to bend it.

Note3) The plate cover is available for model NR/NRS 75.

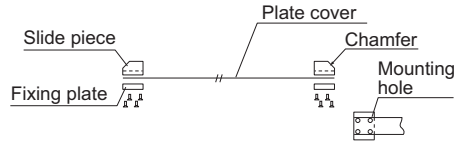


Fig.1



Fig.2

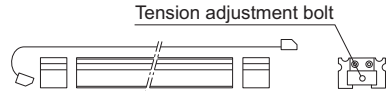


Fig.3

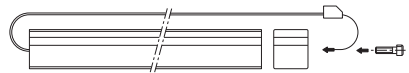


Fig.4



Fig.5

**[Mounting Procedure for Steel Tape SP]**

- (1) Use an LM block mounting/removing jig to remove the LM block from the LM rail.
- (2) Thoroughly degrease and clean the top face of the LM rail, to which the steel tape is to be adhered. For degreasing, use an adequately volatile detergent (e.g., industrial alcohol).
- (3) Carefully adhere the steel tape from the end with care not to let it bend or sag, while gradually peeling the release paper from the steel tape.
- (4) Have the steel tape settle on the rail by rubbing the tape. The adhesive strength increases with time. The adhering tape can be peeled off by pulling its end upward.
- (5) Mount the LM block onto the LM rail using the LM block mounting/removing jig.
- (6) Attach the end pieces on both ends of the LM rail and further secure the steel tape. When securing the end pieces, fasten only the setscrew on the top face of each end piece.

(The tap on the end face of the end piece is used for mounting bellows.)

Note1) The setscrew on the side face is used to lightly secure the bent steel tape. Be sure to stop fastening the screw as soon as it hits the end face, and do not force the screw further.

Note2) Since the steel tape is a thin steel plate, mishandling it may cause an accident such as cutting your finger. When handling it, take an effective safety measure such as wearing rubber gloves.

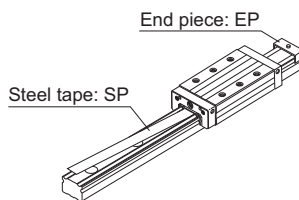


Fig. 6

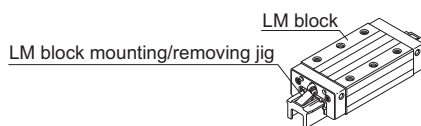


Fig. 7

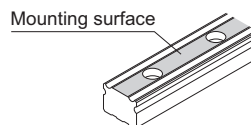


Fig. 8

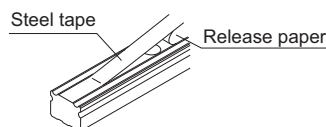


Fig. 9

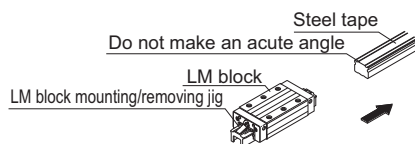


Fig. 10

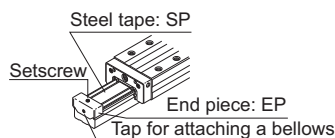


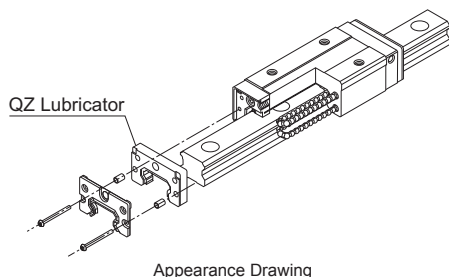
Fig. 11

# QZ Lubricator

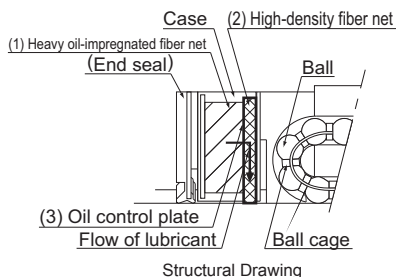
- For the supported models, see the table of options by model number on [A1-478](#).
- For the LM block dimension with QZ attached, see [A1-512](#) to [A1-515](#).
- For notes regarding how to handle the QZ, see [B1-133](#).

QZ Lubricator feeds the right amount of lubricant to the raceway on the LM rail. This allows an oil film to continuously be formed between the rolling element and the raceway, and drastically extends the lubrication and maintenance intervals.

The structure of QZ Lubricator consists of three major components: (1) a heavy oil-impregnated fiber net (function to store lubricant), (2) a high-density fiber net (function to apply lubricant to the raceway) and (3) an oil-control plate (function to adjust oil flow). The lubricant contained in QZ Lubricator is fed by the capillary phenomenon, which is used also in felt pens and many other products, as the fundamental principle.



Appearance Drawing



Structural Drawing

## Features

- Since it supplements an oil loss, the lubrication maintenance interval can be significantly extended.
- Eco-friendly lubrication system that does not contaminate the surrounding area since it feeds the right amount of lubricant to the ball raceway.

| Symbol               | Contamination Protection Accessories                                                                             |
|----------------------|------------------------------------------------------------------------------------------------------------------|
| QZUU                 | With end seal + QZ                                                                                               |
| QZSS                 | With end seal + side seal + inner seal* <sup>1</sup> + QZ                                                        |
| QZDD                 | With double seals + side seal + inner seal* <sup>1</sup> + QZ                                                    |
| QZZZ                 | With end seal + side seal + inner seal* <sup>1</sup> + metal scraper + QZ                                        |
| QZKK                 | With double seals + side seal + inner seal* <sup>1</sup> + metal scraper + QZ                                    |
| QZGG                 | With LiCS + QZ                                                                                                   |
| QZPP                 | With LiCS + side seal + inner seal* <sup>1</sup> + QZ                                                            |
| QZSSHH               | With end seal + side seal + inner seal* <sup>1</sup> + LaCS + QZ                                                 |
| QZDDHH               | With double seals + side seal + inner seal* <sup>1</sup> + LaCS + QZ                                             |
| QZZZHH               | With end seal + side seal + inner seal* <sup>1</sup> + metal scraper + LaCS + QZ                                 |
| QZKKHH               | With double seals + side seal + inner seal* <sup>1</sup> + metal scraper + LaCS + QZ                             |
| QZJJHH* <sup>2</sup> | With end seal + side seal + inner seal* <sup>1</sup> + LaCS + QZ + protector (serving also as metal scraper)     |
| QZTTHH* <sup>2</sup> | With double seals + side seal + inner seal* <sup>1</sup> + LaCS + QZ + protector (serving also as metal scraper) |

\*1 Some models are not equipped with inner seals. (See [A1-478](#))

\*2 QZJJHH and QZTTHH are available only for models SVR/SVS, NR/NRS-X and SRG.

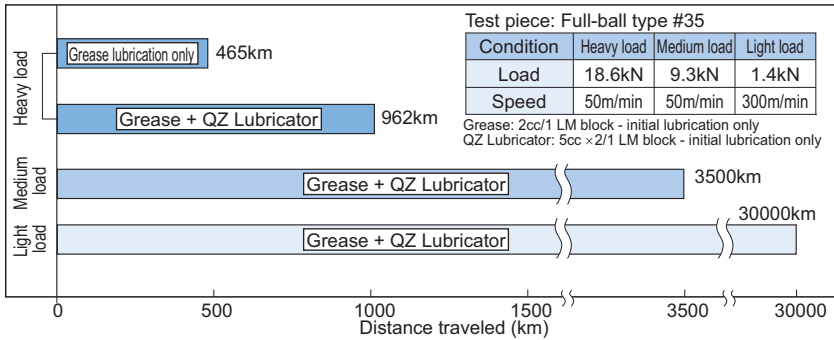
Note1) HH type (with LaCS) for models SVR/SVS, NR/NRS-X, and SRG comes with a protector (see [B1-109](#)).

Contact THK if you want to use the Protector with other options.

Note2) Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.

### ● Significantly Extended Maintenance Interval

Attaching QZ Lubricator helps extend the maintenance interval throughout the whole load range from the light load area to the heavy load area.

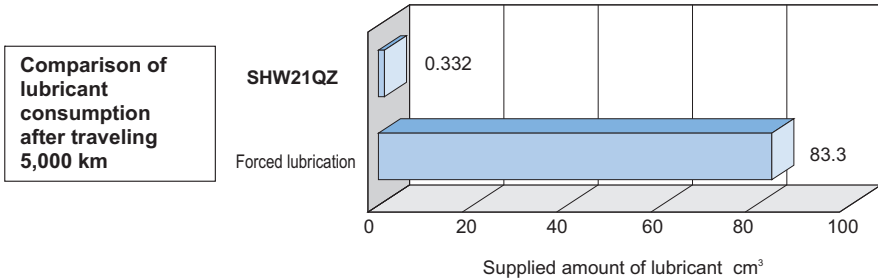


LM Guide Running Test without Replenishment of Lubricant

### ● Effective Use of Lubricant

Since the lubricator feeds the right amount of lubricant to the ball raceway, lubricant can be used efficiently.

[Test conditions] speed: 300 m/min



Amount of oil contained in QZ Lubricator  
0.166cm<sup>3</sup>/ 2 units  
(attached to both ends of the LM block)  
=0.332cm<sup>3</sup>



Forced lubrication  
0.03cm<sup>3</sup>/6min × 16667min  
=83.3cm<sup>3</sup>

Lubricant consumption is 1/250 less than forced lubrication.

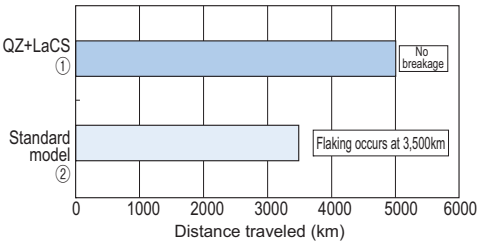
● **Effective in Helping Lubrication under Severe Environments**

A 5,000 km durability test was conducted under severe environments (containing coolant and contaminated environment).

[Test conditions]

| Model No.        | ① Caged Ball LM Guide #45     | ② Full-ball type #45                                                                  |
|------------------|-------------------------------|---------------------------------------------------------------------------------------|
| Load             | 8kN                           | 6kN                                                                                   |
| Speed            | 60m/min                       |                                                                                       |
| Coolant          | Immersed 48 hrs, dried 96 hrs |                                                                                       |
| Foreign material | Foundry dust (125 μm or less) |                                                                                       |
| Lubrication      | AFA Grease + QZ               | Super Multi 68<br>Oiling cycle:<br>0.1cc/shot<br>Periodically lubricated every 16 min |

[Test result]



\* When using the LM system under severe environment, use QZ Lubricator and Laminated Contact Scraper LaCS (see “Laminated Contact Scraper LaCS” on [B1-106](#)) in combination.

# Lubrication Adapter

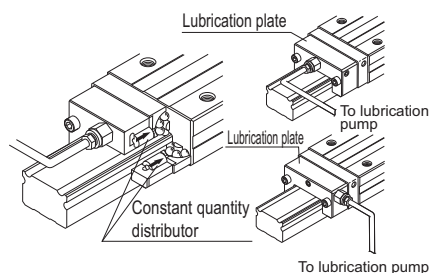
An oil lubricant-only lubrication adapter is available for models NR/NRS.

Even if the LM Guide is installed in an orientation where oil lubrication is difficult, such as wall mount and inversed mount, the adapter is capable of feeding a constant quantity of lubricant to the four raceways.

## [Features]

The dedicated lubrication adapter for models NR-NRS is built in with a constant quantity distributor. Therefore, the adapter can accurately feed a constant quantity of lubricant to each raceway regardless of the mounting orientation. The adapter is economical since it is capable of constantly feeding the optimum amount of lubricant and helping eliminate the supply of surplus lubricant.

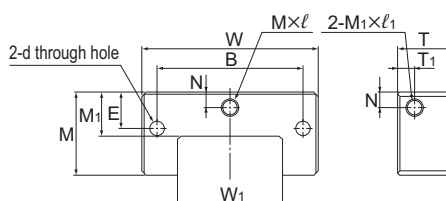
To provide pipe arrangement, simply connect an intermittent lubrication pump widely used for ordinary machine tools to the greasing holes (M8) on the front and the side of the lubrication adapter.



Structural Drawing

## [Specifications]

|                                   |                                         |
|-----------------------------------|-----------------------------------------|
| Viscosity range of lubricant used | 32 to 64 mm <sup>2</sup> /s recommended |
| Discharge                         | 0.03×4, 0.06×4cc/1shot                  |
| Diameter of pipe connected        | φ4, φ6                                  |
| Material                          | Aluminum alloy                          |



# Removing/mounting Jig

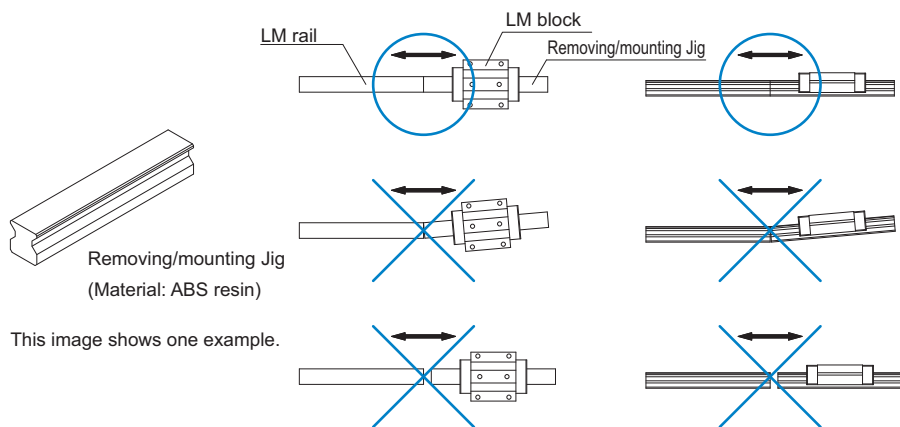
When assembling the guide, do not remove the LM block from the LM rail whenever possible. If it is inevitable to remove the LM block due to the plate cover type or the assembly procedure, be sure to use the removing/mounting jig.

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 also cause damage to the LM block at an early stage.

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

If any of the rolling elements falls from the LM block, contact THK instead of using the product.

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



# End Piece EP

For those models whose balls may fall if the LM rail is pulled out of the LM block, an end piece is attached to the product to prevent the LM block from being removed from the LM rail.

For models that can use the end piece, see the table below.

If removing the end piece when using the LM Guide, be sure that the LM block will not overshoot.

The end piece can also be used as a fixing jig for a steel tape, and is available also for the LM rail of models SSR, SR and HSR.

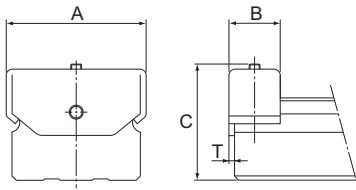


Fig.1 End Piece EP for Models NR/NRS

Model Number Coding

Model number configurations differ depending on the model features. Refer to the corresponding sample model number configuration.

[LM Guide]

- Models SHS, SSR, SVR/SVS, SHW, HSR, SR, NR/NRS-X, NR/NRS, HRW, JR, NSR-TBC, HSR-M1, SR-M1 and HSR-M2

| SHS25     | LC                                     | 2                  | QZ                                                                                              | KKHH | C0                                   | F                                                           | S                                                                                                                                                              | +1200L                 | P | Z                              | T | F                                   | S                                                          | -II |
|-----------|----------------------------------------|--------------------|-------------------------------------------------------------------------------------------------|------|--------------------------------------|-------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|---|--------------------------------|---|-------------------------------------|------------------------------------------------------------|-----|
| Model No. | Type of LM block                       | With QZ Lubricator | Contamination protection accessory symbol (*1)                                                  |      |                                      |                                                             |                                                                                                                                                                | LM rail length (in mm) |   | Symbol for LM rail jointed use |   |                                     | Symbol for No. of rails used on the same plane (*5)        |     |
|           | No. of LM blocks used on the same rail |                    | Radial clearance symbol (*2)<br>Normal (No symbol)<br>Light preload (C1)<br>Medium preload (C0) |      |                                      | LM block special feature symbol<br>Standard (No Symbol)/E/S |                                                                                                                                                                |                        |   | With steel tape                |   |                                     | LM rail special feature symbol<br>Standard (No Symbol)/E/S |     |
|           |                                        |                    |                                                                                                 |      | LM block with surface treatment (*3) |                                                             | Accuracy symbol (*4)<br>Normal grade (No Symbol)<br>High accuracy grade (H)<br>Precision grade (P)<br>Super precision grade (SP)<br>Ultra precision grade (UP) |                        |   |                                |   | LM rail with surface treatment (*3) |                                                            |     |

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-71**.  
(\*3) See **B0-20**. (\*4) See **A1-76**. (\*5) See **A1-13**.

Note1) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.)  
Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.  
Note2) Contact THK for details about the special features of LM blocks and LM rails.

● Model EPF

| EPF7M     | 16                        | +55L | P                                            | M |
|-----------|---------------------------|------|----------------------------------------------|---|
| Model No. | LM rail length (in mm)    |      | Rail material:<br>Stainless steel (standard) |   |
|           | Guaranteed stroke (in mm) |      | Accuracy symbol (*1)                         |   |

(\*1) See **A1-86**.

Note) This model number indicates that a single-rail unit constitutes one set.

**[Caged Roller LM Guide]**● **Models SRG, SRN, and SRW**

| SRG45                                  | LC               | 2                                                                                               | QZ                                             | TTHH | C0                                   | F                                                           | S                      | +1200L                                                                                                                             | P                | Z                              | T | F                                                          | S                                                   | -II |
|----------------------------------------|------------------|-------------------------------------------------------------------------------------------------|------------------------------------------------|------|--------------------------------------|-------------------------------------------------------------|------------------------|------------------------------------------------------------------------------------------------------------------------------------|------------------|--------------------------------|---|------------------------------------------------------------|-----------------------------------------------------|-----|
| Model No.                              | Type of LM block | With QZ Lubricator                                                                              | Contamination protection accessory symbol (*1) |      |                                      |                                                             | LM rail length (in mm) |                                                                                                                                    |                  | Symbol for LM rail jointed use |   |                                                            | Symbol for No. of rails used on the same plane (*5) |     |
| No. of LM blocks used on the same rail |                  | Radial clearance symbol (*2)<br>Normal (No symbol)<br>Light preload (C1)<br>Medium preload (C0) |                                                |      |                                      | LM block special feature symbol<br>Standard (No Symbol)/E/S |                        | Accuracy symbol (*4)<br>High accuracy grade (H)<br>Precision grade (P)<br>Super precision grade (SP)<br>Ultra precision grade (UP) | With plate cover |                                |   | LM rail special feature symbol<br>Standard (No Symbol)/E/S |                                                     |     |
|                                        |                  |                                                                                                 |                                                |      | LM block with surface treatment (*3) |                                                             |                        |                                                                                                                                    |                  |                                |   | LM rail with surface treatment (*3)                        |                                                     |     |

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-71**.(\*3) See **B0-20**. (\*4) See **A1-76**. (\*5) See **A1-13**.

Note1) Models SRG35 to 65 are available in high accuracy grade and above. Other models are only available in precision grade or above. (Normal grade is not available.)

Models SRN and SRW are available in precision grade or above. (Normal and H grade are not available.)

Note2) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.)

Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.

Note3) Contact THK for details about the special features of LM blocks and LM rails.

**[Miniature Type LM Guide]**● **Models SRS, RSX, RSR, and RSR-M1**

| 2                                           | SRS20M             | QZ                                                                       | UU | C1 | F                                                           | S                      | +220L                                                                                              | P                       | M | F | S                                                          | -II |
|---------------------------------------------|--------------------|--------------------------------------------------------------------------|----|----|-------------------------------------------------------------|------------------------|----------------------------------------------------------------------------------------------------|-------------------------|---|---|------------------------------------------------------------|-----|
| Model No.                                   | With QZ Lubricator | Contamination protection accessory symbol (*2)                           |    |    |                                                             | LM rail length (in mm) |                                                                                                    | Stainless steel LM rail |   |   | Symbol for No. of rails used on the same plane (*6)        |     |
| No. of LM blocks used on the same rail (*1) |                    | Radial clearance symbol (*3)<br>Normal (No symbol)<br>Light preload (C1) |    |    | LM block special feature symbol<br>Standard (No Symbol)/E/S |                        | Accuracy symbol (*5)<br>Normal grade (No Symbol)<br>High accuracy grade (H)<br>Precision grade (P) |                         |   |   | LM rail special feature symbol<br>Standard (No Symbol)/E/S |     |
|                                             |                    |                                                                          |    |    | LM block with surface treatment (*4)                        |                        |                                                                                                    |                         |   |   | LM rail with surface treatment (*4)                        |     |

(\*1) No symbol for 1 LM block. (\*2) See contamination protection accessories on **A1-516**.(\*3) See **A1-71**. (\*4) See **B0-20**. (\*5) See **A1-76**. (\*6) See **A1-13**.

Note1) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.)

Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.

Note2) Contact THK for details about the special features of LM blocks and LM rails.

**[Cross LM Guide]**● **Models SCR, CSR, and MX**

| 4                      | SCR25              | QZ                                                                                           | KKHH | C0 | +1200/1000L                          | P                                                                                                    |
|------------------------|--------------------|----------------------------------------------------------------------------------------------|------|----|--------------------------------------|------------------------------------------------------------------------------------------------------|
| Model No.              |                    | Contamination protection accessory symbol (*1)                                               |      |    | LM rail length on the X axis (in mm) | LM rail length on the Y axis (in mm)                                                                 |
| Total No. of LM blocks | With QZ Lubricator | Radial clearance symbol (*2)<br>Normal (No symbol)/Light preload (C1)<br>Medium preload (C0) |      |    |                                      | Accuracy symbol (*3)<br>Precision grade (P)/Super precision grade (SP)<br>Ultra precision grade (UP) |

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-71**. (\*3) See **A1-76**.

Note) Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.

[Separate LM Guides]

● Model HR

|                                        |                                                |                          |          |                        |                                                                      |                                |                         |
|----------------------------------------|------------------------------------------------|--------------------------|----------|------------------------|----------------------------------------------------------------------|--------------------------------|-------------------------|
| <b>2</b>                               | <b>HR2555</b>                                  | <b>UU</b>                | <b>M</b> | <b>+1000L</b>          | <b>P</b>                                                             | <b>T</b>                       | <b>M</b>                |
| Model No.                              | Contamination protection accessory symbol (*1) |                          |          | LM rail length (in mm) |                                                                      | Symbol for LM rail jointed use | Stainless steel LM rail |
| No. of LM blocks used on the same rail |                                                | Stainless steel LM block |          |                        | Accuracy symbol (*2)                                                 |                                |                         |
|                                        |                                                |                          |          |                        | Normal grade (No Symbol)/High accuracy grade (H)/Precision grade (P) |                                |                         |
|                                        |                                                |                          |          |                        | Super precision grade (SP)/Ultra precision grade (UP)                |                                |                         |

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-76**.

Note) One set of model HR means a combination of two LM rails and an LM blocks used on the same plane.

● Model GSR

● LM block

|              |                  |                                                |
|--------------|------------------|------------------------------------------------|
| <b>GSR25</b> | <b>T</b>         | <b>UU</b>                                      |
| Model number |                  | Contamination protection accessory symbol (*1) |
|              | Type of LM block |                                                |

● LM rail

|              |                        |                          |                                     |
|--------------|------------------------|--------------------------|-------------------------------------|
| <b>GSR25</b> | <b>-1060L</b>          | <b>H</b>                 | <b>K</b>                            |
| Model number | LM rail length (in mm) |                          | Symbol for tapped-hole LM rail type |
|              |                        | Accuracy symbol (*2)     |                                     |
|              |                        | Normal grade (No Symbol) |                                     |
|              |                        | High accuracy grade (H)  |                                     |
|              |                        | Precision grade (P)      |                                     |

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-76**.

● Combination of LM rail and LM block

|              |                                        |          |                                                |                                                                      |          |                                |                                     |
|--------------|----------------------------------------|----------|------------------------------------------------|----------------------------------------------------------------------|----------|--------------------------------|-------------------------------------|
| <b>GSR25</b> | <b>T</b>                               | <b>2</b> | <b>UU</b>                                      | <b>+1060L</b>                                                        | <b>H</b> | <b>T</b>                       | <b>K</b>                            |
| Model No.    | Type of LM block                       |          | Contamination protection accessory symbol (*1) | LM rail length (in mm)                                               |          | Symbol for LM rail jointed use | Symbol for tapped-hole LM rail type |
|              | No. of LM blocks used on the same rail |          |                                                | Accuracy symbol (*2)                                                 |          |                                |                                     |
|              |                                        |          |                                                | Normal grade (No Symbol)/High accuracy grade (H)/Precision grade (P) |          |                                |                                     |

(\*1) See contamination protection accessory on **A1-516**. (\*2) See **A1-76**.

Note) One set of model GSR: This model number indicates that a single-rail unit constitutes one set.

[R Guide]

● Model HCR

|               |                                        |                                                |                                       |                      |                                                  |          |                                                |
|---------------|----------------------------------------|------------------------------------------------|---------------------------------------|----------------------|--------------------------------------------------|----------|------------------------------------------------|
| <b>HCR25A</b> | <b>2</b>                               | <b>UU</b>                                      | <b>C1</b>                             | <b>+60 / 1000R</b>   | <b>H</b>                                         | <b>6</b> | <b>T</b>                                       |
| Model No.     |                                        | Contamination protection accessory symbol (*1) |                                       | R-Guide center angle | LM rail radius (in mm)                           |          | Symbol for LM rail jointed use (*5)            |
|               | No. of LM blocks used on the same rail |                                                | Radial clearance symbol (*2)          |                      | Accuracy symbol (*3)                             |          | Number of LM rail joints used on one axis (*4) |
|               |                                        |                                                | Normal (No symbol)/Light preload (C1) |                      | Normal grade (No Symbol)/High accuracy grade (H) |          |                                                |

(\*1) See **A1-516** (contamination protection accessories). (\*2) See **A1-71**. (\*3) See **A1-76**.

(\*4) Number of LM rails used on one arc. Contact THK for details.

(\*5) When using joined LM rails, the dust prevention seal must be a low-resistance seal (dust prevention code: LL).

**[Straight-Curved Guide]**● **Model HMG**

| When 2 rails are used                                                                  |                                                                  |                                        |                                       |                                       |                                      |                                                     |
|----------------------------------------------------------------------------------------|------------------------------------------------------------------|----------------------------------------|---------------------------------------|---------------------------------------|--------------------------------------|-----------------------------------------------------|
| <b>HMG15A</b>                                                                          | <b>2 UU</b>                                                      | <b>C1</b>                              | <b>+1000L</b>                         | <b>T</b>                              | <b>+ 60/150R 6T</b>                  | <b>+ 60/300R 6T - II</b>                            |
| Model No.                                                                              | Contamination protection accessory symbol (*1)                   | Overall linear LM rail length per rail | Center angle of one inner curved rail | No. of inner curved LM rails jointed  | Radius of outer curved rail          | Symbol for No. of rails used on the same plane (*2) |
| No. of LM blocks used on the same rail                                                 | Radial clearance symbol<br>Normal (No symbol)/Light preload (C1) | Symbol for linear LM rail joint        | Radius of inner curved rail           | Center angle of one outer curved rail | No. of outer curved LM rails jointed |                                                     |
| (*1) See contamination protection accessory on <b>A1-516</b> . (*2) See <b>A1-13</b> . |                                                                  |                                        |                                       |                                       |                                      |                                                     |

Note) This model number denotes one set consists of an LM block and LM rail. (i.e. If you are using 2 shafts, the required number of sets is 2.)

The standard Model HMG does not have a seal. To attach a seal, make sure to specify a straight-curved seal (code: UU).

**[LM Guide for Medium-to-Low Vacuum]**● **Model HSR-M1VV**

|                                   |          |                              |                        |              |                      |                                                     |
|-----------------------------------|----------|------------------------------|------------------------|--------------|----------------------|-----------------------------------------------------|
| <b>HSR15M1R</b>                   | <b>1</b> | <b>VV</b>                    | <b>C1</b>              | <b>+400L</b> | <b>P</b>             | <b>- II</b>                                         |
| Model No.                         |          | Radial clearance symbol (*1) |                        |              |                      | Symbol for No. of rails used on the same plane (*4) |
|                                   |          | Labyrinth seal symbol (*2)   |                        |              | Accuracy symbol (*3) |                                                     |
| No. of LM blocks used on one rail |          |                              | LM rail length (in mm) |              |                      |                                                     |

(\*1) See **A1-71**. (\*2) See **A1-393**. (\*3) See **A1-76**. (\*4) See **A1-13**.

Note1) The radial clearance, maximum LM rail length and accuracy class are equal to that of model HSR.

Note2) With this model, a single-rail unit constitutes one set (i.e., the required number of sets when 2 rails are used in parallel is 2).

**[Oil-Free LM Guide for Special Environments]**● **Model SR-MS**

|                                   |          |                              |                      |          |                                                     |
|-----------------------------------|----------|------------------------------|----------------------|----------|-----------------------------------------------------|
| <b>SR15MSV</b>                    | <b>1</b> | <b>CS</b>                    | <b>+340L</b>         | <b>P</b> | <b>- II</b>                                         |
| Model No.                         |          | LM rail length (in mm)       |                      |          | Symbol for No. of rails used on the same plane (*3) |
|                                   |          | Radial clearance symbol (*1) |                      |          |                                                     |
| No. of LM blocks used on one rail |          |                              | Accuracy symbol (*2) |          |                                                     |

(\*1) See **A1-71**. (\*2) See **A1-76**. (\*3) See **A1-13**.

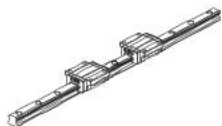
Note) With this model, a single-rail unit constitutes one set (i.e., the required number of sets when 2 rails are used in parallel is 2).

## Notes on Ordering

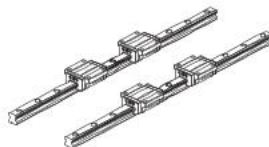
### [Order units]

Note that the number of items that constitute one set differs depending on the type of LM guide. Check the sample model number configurations and the accompanying notes.

#### ● Sample LM guide orders

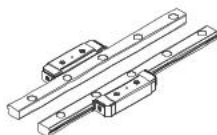


SHS25C2SSC1+640L 1 set



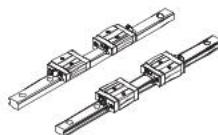
SHS25C2SSC1+640L-II 2 sets

#### ● Sample model HR orders



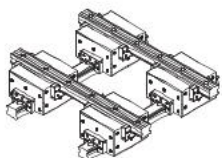
HR2555UU+600L 1 set

#### ● Sample model GSR and GSR-R orders



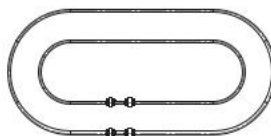
GSR25T2UU+1060L 2 sets

#### ● Sample cross LM guide orders (SCR, CSR and MX)



4SCR25UU+1200/1000LP 1 set

#### ● Sample model HMG orders



HMG15A 2 UU C1 +1000L T + 60/150R 6T + 60/300R 6T - II 2 sets

Note) When ordering model HMG, attach a reference diagram clearly showing the positioning of the LM block and LM rail.

**[Mounted orientation and lubrication method]**

When placing an order, be sure to let THK know the mounting orientation and the exact position in each LM block where the grease nipple or the piping joint should be attached.

For the mounting orientation and the lubrication, see **B1-28** and **B24-2**, respectively.

**[Supported options]**

The supported options differ depending on the model number. Check the available options when ordering.

See **A1-478**.

**[Maximum manufactured lengths for LM rails]**

Where a high degree of precision is required, limits apply to the maximum manufactured lengths for LM rails. In such situations, contact THK.

## Precautions on Using the LM Guide

### [Handling]

- (1) Please use at least two people to move any product weighing 20 kg or more, or use a dolly or another conveyance. Doing so may cause injury or damage.
- (2) Do not disassemble the parts. This will result in loss of functionality.
- (3) Tilting an LM block or LM rail may cause them to fall by their own weight.
- (4) Take care not to drop or strike the LM Guide. Doing so may cause injury or damage. Giving an impact to it could also cause damage to its function even if the product looks intact.
- (5) Do not remove the LM block from the LM rail during setup.
- (6) Do not insert hands or fingers into the mounting holes on the LM rail, as they could get caught between the rail and the LM block, resulting in injury.
- (7) To ensure personal safety, wear gloves and protective footwear when handling this product.

### [Precautions on Use]

- (1) Prevent foreign material, such as cutting chips or coolant, from entering the product. Failure to do so may cause damage.
- (2) If the product is used in an environment where cutting chips, coolant, corrosive solvents, water, etc., may enter the product, use bellows, covers, etc., to prevent them from entering the product.
- (3) Do not use this product if the external temperature exceeds 80°C. Unless the unit is specially designed to be heat-resistant, exposure to such temperatures may deform or damage plastic and rubber parts.
- (4) If foreign material such as cutting chips adheres to the product, replenish the lubricant after cleaning the product.
- (5) Micro-strokes tend to obstruct oil film to form on the raceway in contact with the rolling element, and may lead to fretting corrosion. Take consideration using grease offering excellent fretting prevention. It is also recommended that a stroke movement corresponding to the length of the LM block be made on a regular basis to make sure oil film is formed between the raceway and rolling element.
- (6) Do not use undue force when fitting parts (pin, key, etc.) to the product. This may generate permanent deformation on the raceway, leading to loss of functionality.
- (7) If, for operational reasons, it becomes absolutely necessary to remove the LM block from the LM rail and reattach it, a special mounting jig must be used for this purpose. (The mounting jig is not included with standard versions of the product. To obtain one, please contact THK.)
- (8) Position the mounting jig so that one end abuts the end of the LM rail. When the rail and the jig are exactly aligned, the LM block can be loaded onto the rail.
- (9) Take care to keep the LM block straight. Loading the block at an angle can introduce foreign matter, damage internal components, or cause balls to fall out.
- (10) The LM block must contain all its internal rolling elements (balls) when mounted on the LM rail. Using a block with any balls removed may result in premature damage.
- (11) Please contact THK if any balls fall out of the LM block; do not use the block if any balls are missing.

- (12) If the LM Guide breaks due to an accident or other cause, the block may come off of the rail and fall. For the safe use of this product, take precautions such as adding a mechanism to prevent the block from falling.
- (13) Insufficient rigidity or accuracy of mounting members causes the bearing load to concentrate on one point and the bearing performance will drop significantly. Accordingly, give sufficient consideration to the rigidity/accuracy of the housing and base and strength of the fixing bolts.
- (14) 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.

#### [Lubrication]

- (1) Thoroughly remove anti-rust oil and feed lubricant before using the product.
- (2) Do not mix different lubricants. Mixing greases using the same type of thickening agent may still cause adverse interaction between the two greases if they use different additives, etc.
- (3) When using the product in locations exposed to constant vibrations or in special environments such as clean rooms, vacuum and low/high temperature, use the grease appropriate for the specification/environment.
- (4) When lubricating the product having no grease nipple or oil hole, apply grease directly on the raceway and stroke the product several times to let the grease spread inside.
- (5) The consistency of grease changes according to the temperature. Take note that the slide resistance of the LM Guide also changes as the consistency of grease changes.
- (6) After lubrication, the slide resistance of the LM Guide may increase due to the agitation resistance of grease. Be sure to perform a break-in to let the grease spread fully, before operating the machine.
- (7) Excess grease may scatter immediately after lubrication, so wipe off scattered grease as necessary.
- (8) The properties of grease deteriorate and its lubrication performance drops over time, so grease must be checked and added properly according to the use frequency of the machine.
- (9) Although the lubrication interval may vary according to use conditions and the service environment, lubrication should be performed approximately every 100 km in travel distance (three to six months). Set the final lubrication interval/amount based on the actual machine.
- (10) If the mounting orientation is other than horizontal use, the lubricant may not reach the raceway completely. For the mounting orientation and the lubrication, see **B 1-28** and **B 24-2**, respectively.
- (11) When adopting oil lubrication, the lubricant may not be distributed throughout the LM block depending on the mounting orientation of the block. Contact THK in advance for details.

#### [Storage]

When storing the LM Guide, enclose it in a package designated by THK and store it in a room in a horizontal orientation while avoiding high temperature, low temperature and high humidity. After the product has been in storage for an extended period of time, lubricant inside may have deteriorated, so add new lubricant before use.

#### [Disposal]

Dispose of the product properly as industrial waste.

# Precautions on Handling the LM Guide for Special Environment

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## LM Guide for Medium-to-Low Vacuum

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### [Handling]

- (1) This product has been thoroughly cleaned and degreased and then sealed in moisture-proof packaging. If possible, open the package immediately prior to using the product.
- (2) Once the packaging has been opened, store the product inside a clean, dry receptacle accompanied by silica gel or another drying agent. Do not use anti-rust oil or corrosion- or tarnish-preventive paper or fluid with this product.
- (3) Wear protective rubber or vinyl gloves while handling this product and make sure the surrounding environment is relatively clean.

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## Oil-Free LM Guide

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### [Handling]

- (1) The Oil-Free LM Guide is suitable for use at high temperatures, under atmospheric pressure or in a high-vacuum environment of  $10^{-6}$  Pa, and is designed for ultra-low dust emission. It is not intended for use in locations requiring rigidity. Because a preload would affect the strength of its Dry Lubrication S-Compound Film, it does not support preloads.
- (2) The product can be used in temperatures ranging from  $-20$  to  $150^{\circ}\text{C}$ .
- (3) To ensure proper function of the Dry Lubrication S-Compound Film, use this product in an environment free from condensation, at a humidity level of 40% or less.
- (4) This product is not intended for joint use.
- (5) Great care must be taken in the installation of the Oil-Free LM Guide, which requires greater precision compared to standard LM Guides.
- (6) If the LM block is removed from the LM rail, balls may fall out, and the Dry Lubrication S-Compound Film can be damaged when the block is remounted. If it becomes necessary to remove the LM block from the LM rail, please contact THK.
- (7) This product should be stored in a horizontal position, in its original wrapping and package, in a controlled, stable environment free from abnormal high or low temperatures or high humidity. THK recommends storing it at room temperature ( $25\pm 5^{\circ}\text{C}$ ), with a humidity level of 40% RH or lower and an air-purity level of 10,000 or lower.
- (8) This product has been thoroughly cleaned and degreased and then sealed in moisture-proof packaging. If possible, open the package immediately prior to using the product.
- (9) Once the packaging has been opened, store the product inside a clean, dry receptacle accompanied by silica gel or another drying agent. Do not use anti-rust oil or corrosion- or tarnish-preventive paper or fluid with this product.
- (10) Wear protective rubber or vinyl gloves while handling this product and make sure the surrounding environment is relatively clean.

# Precautions on Using Options for the LM Guide

## QZ Lubricator for the LM Guide

For details regarding the QZ, see **B1-118**.

### [Precaution on Selection]

Secure a stroke longer than the overall LM block with QZ Lubricator attached.

### [Handling]

Take care not to drop or strike this product. This could cause injury or product damage.

Do not block the vent hole with grease or the like.

The QZ device supplies oil only to the raceway, so use it in combination with regular greasing/lubrication. If the product is used in an environment exposed to coolant, cutting chips or other foreign material, oil on the raceway is lost easily. Accordingly, be sure to also use covers, bellows, etc.

### [Service environment]

Be sure the service temperature of this product is between  $-10$  to  $50^{\circ}\text{C}$ , and do not clean the product by immersing it in an organic solvent or white kerosene, or leave it unpacked.

## Laminated Contact Scraper LaCS, Side Scraper for LM Guides

For details regarding the LaCS, see **B1-106**. For details regarding the side scraper, see **B1-108**.

### [Handling]

The lubricant impregnated into the scraper is used to increase its sliding capability. For lubrication of the LM Guide, attach QZ Lubricator, or the grease nipple on the side face of the end plate of the LM block, before providing a lubricant.

When using the product, be sure to attach the rail cap C or the plate cover.

### [Service environment]

Be sure the service temperature of this product is between  $-20$  to  $+80^{\circ}\text{C}$ , and do not clean the product by immersing it in an organic solvent or white kerosene, or leave it unpacked.

### [Notes on the Product Functions]

It is specifically designed to provide dust prevention capability to remove foreign material and liquid. To seal oil, an end seal is required.

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## Light Contact Seal LiCS for LM Guides

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For details regarding the LiCS, see **B1-110**.

### [Handling]

The lubricant impregnated into LiCS is used to increase its sliding capability. For lubrication of the LM Guide, attach the grease nipple on the end plate of the LM block before providing a lubricant.

### [Service environment]

Be sure the service temperature of this product is between -20 to +80°C, and do not clean the product by immersing it in an organic solvent or white kerosene, or leave it unpacked.

It contacts only with the LM rail raceway. Do not use it in harsh environments.

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## High Chemical Resistance Fluorine Seal FS for the LM Guide

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For details about the Fluorine seal, see **B1-111**.

### [Handling]

Be careful not to twist the seal portion when attaching the Fluorine seal to the LM Guide. Also, do not store the product in a way that may deform the seal, such as by stacking it. This may cause damage or reduce the seal's functionality.

### [Service environment]

The service temperature range is between -20°C and 80°C. Avoid cleaning with organic solvents or kerosene, and do not store unwrapped for extended periods of time.

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## Cap GC

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For details regarding the GC cap, see **B1-113**.

### [Handling]

If GC caps are specified for the product, the edges of the LM rail mounting hole openings will be sharp. Take great care not to injure your fingers or hands while working.

When fitting GC caps, use a flat aligning tool to gradually punch the cap into the hole until it is level with the upper surface of the LM rail. Then run an oil stone over the rail until the upper surface of the rail and the GC caps are completely flat.