# Preface

A linear guideway allows a type of linear motion that utilizes rolling elements such as balls or rollers. By using re-circulating rolling elements between the rail and the block, a linear guideway can achieve high precision linear motion. Compared to a traditional slide, the coefficient of friction for a linear guideway is only 1/50. Because of the restraint effect between the rails and the blocks, linear guideways can take up loads in both the up/down and the left/right directions. With these features, linear guideways can greatly enhance moving accuracy, especially, when accompanied with precise ball screws.

# 1.General Information

## 1-1 Advantages and Features of Linear Guideways

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

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

(3) High speed motion is possible with a low driving force
Because linear guideways have little friction resistance, only a small driving force is needed to move a load.This results in greater power savings, especially in the moving parts of a system. This is especially true for the reciprocating parts.

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

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

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

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





## 1-2 Selecting Linear Guideways

Identify the condition
- ☐ Type of equipment
- ☐ Space limitations
- ☐ Accuracy
- ☐ Stiffness
- ☐ Travel length
- ☐ Magnitude and direction of loads
- ☐ Moving speed, acceleration
- ☐ Duty cycle
- ☐ Service life
- ☐ Environment

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Selection of series
- ☐ H series-Grinding,Milling,and Drilling machine,Lathe,Electric discharge machine,Wire cutting machine,Wood cutting machine,Precision measure equipment,Machine center
- ☐ E series-Automatic equipment,Semiconductor equipment,Laser engraving machine, High speed transfer machine,Packing machine,Medical equipment
- ☐ QE/QH-series-High precision measure equipment,Semiconductor equipment,Automatic equipment, can be widely applied in high-tech industry required high speed,low noise,low dust generation
- ☐ R series-CNC machining centers,Heavy duty cutting machine,CNC grinding machine
- ☐ MN/MW Series-Miniature device,semiconductor equipment,3D printer

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Selection of accuracy
- ☐ Classes : C, H, P, SP, UP depends on the accuracy of equipment

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Determines the size & the number of blocks
- ☐ Dynamic load condition
- ☐ If accompanied with a ballscrew, the size should be similar to the diameter of ballscrew. For example, if the diameter of the ballscrew is 35mm, then the model size of linear guideway should be HH35

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Calculate the max. load of block
- ☐ Make reference to load calculation examples, and calculate the max load.
- ☐ Be sure that the static safety factor of selected guideway is larger than the rated static safety factor

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Choosing preload
- ☐ Depends on the stiffness requirement and accuracy of mounting surface

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Identify stiffness
- ☐ Calculate the deformation (δ) by using the table of stiffness values, choosing heavier preload and larger size linear guideways to enhance the stiffness

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Calculating service life
- ☐ Calculate the life time requirement by using the moving speed and frequency.
- ☐ Make reference to the life calculation example

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Selection of lubrication
- ☐ Grease supplied by grease nipple
- ☐ Oil supplied by piping joint

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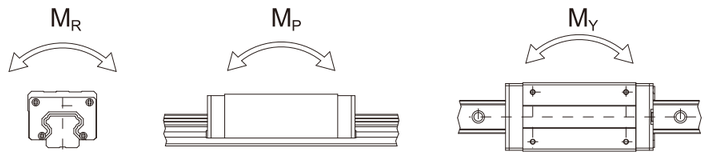
Completion of selection

## 1-3 Basic Load Ratings of Linear Guideways

### 1-3-1 Basic Static Load

(1) Static load rating ($C_0$)
Localized permanent deformation will be caused between the raceway surface and the rolling elements when a linear guideway is subjected to an excessively large load or an impact load while either at rest or in motion. If the amount of this permanent deformation exceeds a certain limit, it becomes an obstacle to the smooth operation of the linear guideway. Generally, the definition of the basic static load rating is a static load of constant magnitude and direction resulting in a total permanent deformation of 0.0001 times the diameter of the rolling element and the raceway at the contact point subjected to the largest stress. The value is described in the dimension tables for each linear guideway. A designer can select a suitable linear guideway by referring to these tables. The maximum static load applied to a linear guideway must not exceed the basic static load rating.

(2) Static permissible moment ($M_0$)
The static permissible moment refers to a moment in a given direction and magnitude when the largest stress of the rolling elements in an applied system equals the stress induced by the Static Load Rating. The static permissible moment in linear motion systems is defined for three directions: $M_R$, $M_P$ and $M_Y$.




(3) Static safety factor
This condition applys when the guideway system is static or under low speed motion. The static safety factor, which depends on environmental and operating conditions, must be taken into consideration. A larger safety factor is especially important for guideways subject to impact loads (See Table 1-1). The static load can be obtained by using Eq. 1.1

Table **1-1**Static Safety Factor

| Load Condition | $f_{SL}$ , $f_{SM}$ (Min.) |
|---|---|
| Normal Load | 1.0~3.0 |
| With impacts/vibrations | 3.0~5.0 |

$$f_{SL}=\frac{C_0}{P} \text{ or } f_{SM}=\frac{M_0}{M} \qquad \text{Eq.1.1}$$

$f_{SL}$ : Static safety factor for simple load
$f_{SM}$ : Static safety factor for moment
$C_0$ : Static load rating (kN)
$M_0$ : Static permissible moment (kN·mm)
P : Calculated working load (kN)
M : Calculated appling moment (kN·mm)

### 1-3-2 Basic Dynamic Load

(1) Dynamic load rating (C)
The basic dynamic load rating is an important factor used for calculation of service life of linear guideway. It is defined as the maximum load when the load that does not change in direction or magnitude and results in a nominal life of 50km of operation for a ball type linear guideway and 100km for a roller type linear guideway. The values for the basic dynamic load rating of each guideway are shown in dimension tables. They can be used to predict the service life for a selected linear guideway.



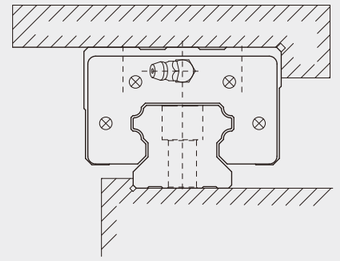




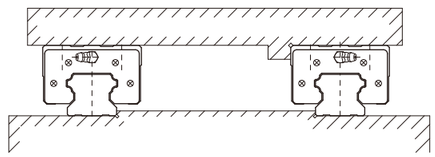
## 1-4 Mounting Conigurations

Linear guideways have equal load ratings in the radial, reverse radial and lateral directions.
The application depends on the machine requirements and load directions.
Typical layouts for linear guideways are shown below:

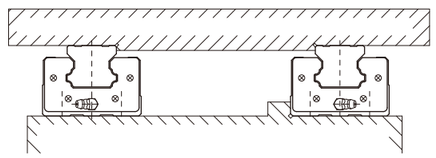
Use of one rail and mounting reference side



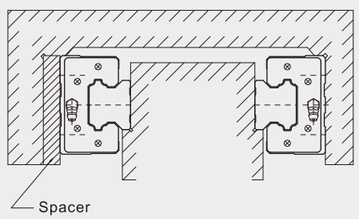
use of two rails(block movement)



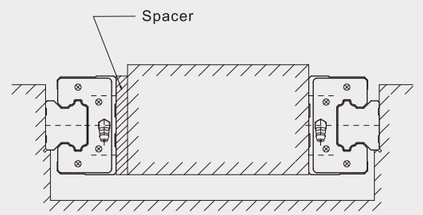
use of two rails(block fixed)



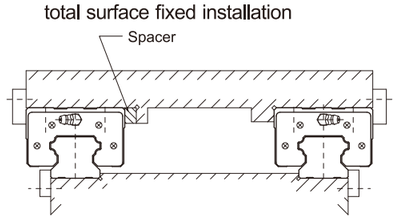
use of two external rails



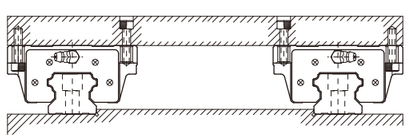

use of two internal rails




total surface fixed installation




HW type block with mounting holes in different directions.

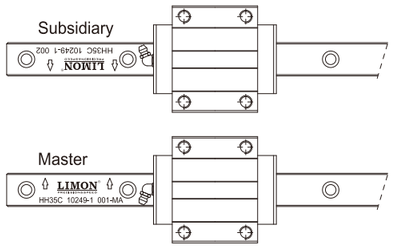


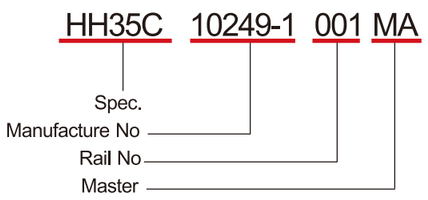
## 1-5 Mounting Procedures

Three installation methods are recommended based on the required running accuracy and the degree of impacts and vibrations.

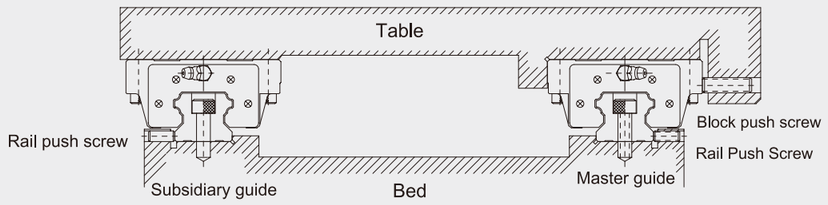
### 1-5-1 Master and Subsidiary Guide

For non-interchangeable type Linear Guideways, there are some differences between the master guide and subsidiary guide. The accuracy of the master guide's datum plane is better than the subsidiary's and it can be a reference side for installation. There is a mark "MA" printed on the rail, as shown in the figure below.



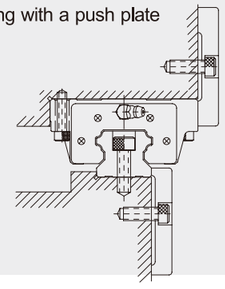

### 1-5-2 Installation to Achieve High Accuracy and Rigidity



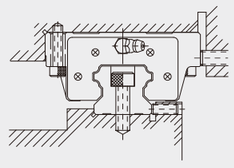

(1) Mounting methods

It is possible that the rails and the blocks will be displaced when the machine is subjected to vibrations and impacts. To eliminate these difficulties and achieve high running accuracy, the following four methods are recommended for fixing.

Mounting with a push plate



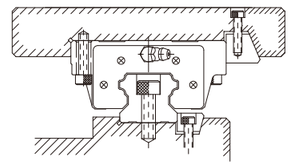
Mounting with push screws



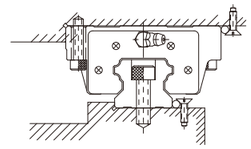




Mounting with taper gib

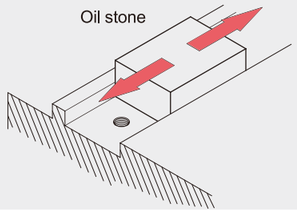


Mounting with needle roller

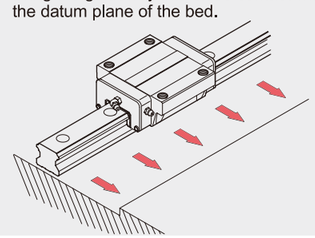


(2) Procedure of rail installation

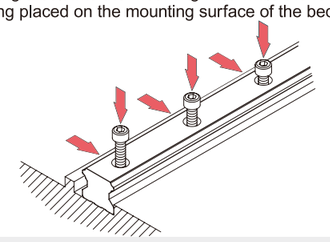
1 Before starting, remove all dirt from the mounting surface of the machine.



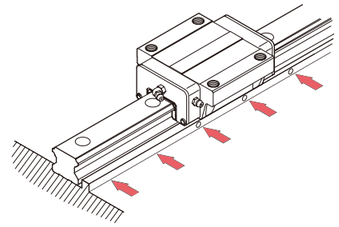

2 Place the linear guideway gently on the bed. Bring the guideway into close contact with the datum plane of the bed.



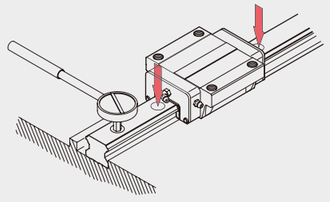
3 Check for correct thread engagement when inserting a bolt into the mounting hole while the rail is being placed on the mounting surface of the bed.



4 Tighten the push screws sequentially to ensure close contact between the rail and the side datum plane.

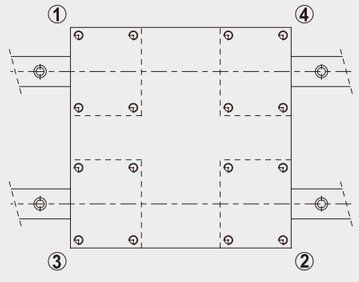


5 Tighten the mounting bolts with a torque wrench to the specified torque.



6 Install the remaining linear guideway in the same way.

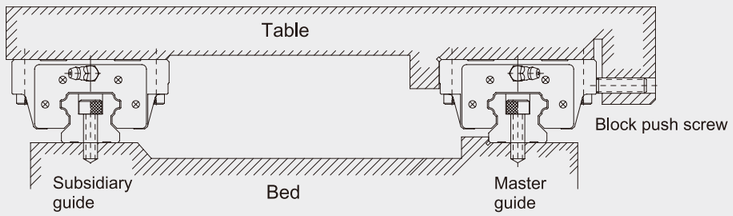
(3) Procedure of block installation



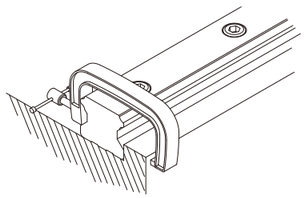

- ☐ Place the table gently on the blocks. Next, tighten the block mounting bolts temporarily.
- ☐ Push the blocks against the datum plane of the table and position the table by tightening the push screws.
- ☐ The table can be fixed uniformly by tightening the mounting bolts on master guide side and subsidiary side in 1 to 4 sequences.

## 1-5-3 Installation of the Master Guide without Push Screws

To ensure parallelism between the subsidiary guide and the master guide without push screws, the following rail installation methods are recommended. The block installation is the same as mentioned previously.

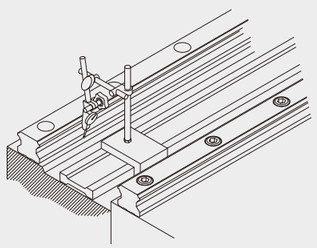



(1) Installation of the rail on the subsidiary guide side

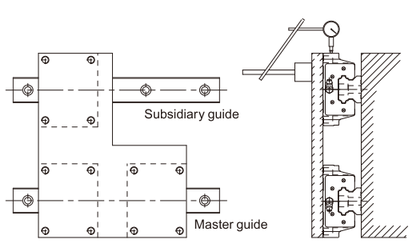


□ Using a vice
Place the rail into the mounting plane of the bed. Tighten the mounting bolts temporarily; then use a vice to push the rail against the side datum plane of the bed. Tighten the mounting bolts in sequence to the specified torque.

(2) Installation of the rail on the subsidiary guide side



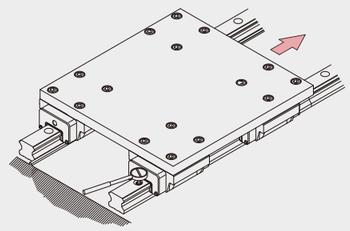
□ Method with use of a straight edge
Set a straight edge between the rails parallel to the side datum plane of the rail on the master guide side by using a dial gauge. Use the dial gauge to obtain the straight alignment of the rail on the subsidiary guide side. When the rail on the subsidiary guide side is parallel to the master side, tighten the mounting bolts in sequence from one end of the rail to the other.



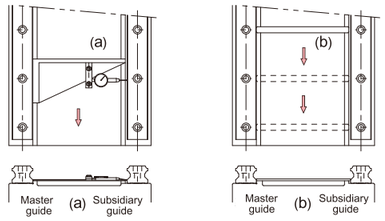

□ Method with use of a table
Fix two blocks on the master guide side to the table. Temporarily fix the rail and one block on the subsidiary guide side to the bed and the table. Fix a dial gauge stand on the table surface and bring it into contact with the side of the block on the subsidiary guide side. Move the table from one end of the rail to the other. While aligning the rail on the subsidiary side parallel to the rail on the master guide side, tighten the bolts in sequence.







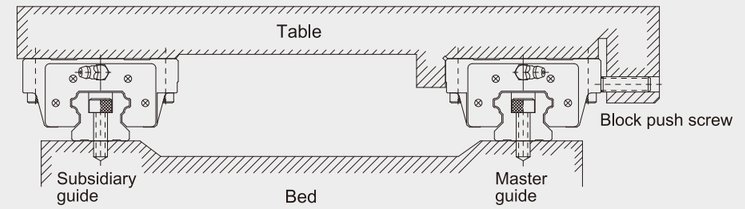
□ Method following the master guide side
When a rail on the master guide side is correctly tightened, fix both blocks on the master guide side and one of the two blocks on the subsidiary guide side completely to the table.
When moving the table from one end of the rail, tighten the mounting bolts on the subsidiary guide side completely.



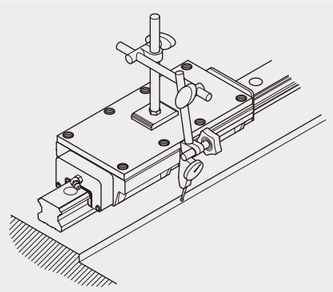

□ Method with use of a jig
Use a special jig to ensure the rail position on the subsidiary guide side. Tighten the mounting bolts to the specified torque in sequence.

## 1-5-4 When there is no Side Surface of the Bed on the Master Guide Side

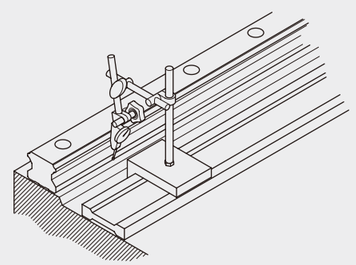
To ensure parallelism between the subsidiary guide and the master guide when there is no side surface, the following rail installation method is recommended. The installation of the blocks is the same as mentioned previously.




(1) Installation of the rail on the master guide side



□ Using a provisional datum plane
Two blocks are fixed in close contact by the measuring plate. A datum plane provided on the bed is used for straight alignment of the rail from one end to the other. Move the blocks and tighten the mounting bolts to the specified torque in sequence.



□ Method with use of a straight edge
Use a dial gauge and a straight edge to confirm the straightness of the side datum plane of the rail from one end to the other. Make sure the mounting bolts are tightened securely in sequence.

(2) Installation of the rail on the subsidiary guide side
The method of installation for the rail on the subsidiary guide side is the same as the case without push screws.

## 2. LIMON Linear Guideway Classification

In an effort to meet customer's requirement and service needs LIMON offers several different types of guides. We supply the H series which is suitable for CNC machineries, the E series for automation industries, the R series for high rigidity applications, and the miniature series MN/MW for medical devices and semiconductor equipment, also for high technology industries, LIMON has developed the H and E series with high speed and quiet characteristics.

(1) Types & series

**Table 2-1** Types & Series

| Series | Assembly Height | Load | Square Tap hole | Flange Tap hole | Flange Drilled hole | Flange Combination |
|---|---|---|---|---|---|---|
| H | High | Heavy Load | HH-CA | - | - | - |
| | | Super Heavy Load | HH-HA | - | - | - |
| | Low | Heavy Load | HL-CA | HW-CA | HW-CB | HW-CC |
| | | Super Heavy Load | HL-HA | HW-HA | HW-HB | HW-HC |
| E | Low | Medium Load | EH -SA | EW-SA | EW-SB | EW-SC |
| | | Heavy Load | EH -CA | EW-CA | EW-CB | EW-CC |
| MN | - | Standard | MN-M-C-O | - | - | - |
| | | Long | MN-M-H-O | - | - | - |
| MW | - | Standard | MW-M-C-O | - | - | - |
| | | Long | MW-M-H-O | - | - | - |
| QH | High | Heavy Load | HH-CA | - | - | - |
| | | Super Heavy Load | HH-HA | - | - | - |
| | Low | Heavy Load | - | QHW-CA | QHW-CB | QHW-CC |
| | | Super Heavy Load | - | QHW-HA | QHW-HB | QHW-HC |
| QE | Low | Medium Load | QEH -SA | QEW-SA | QEW-SB | - |
| | | Heavy Load | QEH -CA | QEW-CA | QEW-CB | - |
| R | High | Heavy Load | RH-CA | - | - | - |
| | | Super Heavy Load | RH-HA | - | - | - |
| | Low | Heavy Load | RL-CA | - | - | RW-CC |
| | | Super Heavy Load | RL-HA | - | - | RW-HC |







## 2-1 H Series - Heavy Load Ball Type Linear Guideway

H series linear guideways are designed with load capacity and rigidity higher than other similar products with circular-arc groove and structure optimization. It features equal load ratings in the radial, reverse radial and lateral directions, and self-aligning to absorb installation-error. Thus, LIMON H series linear guideways can achieve a long life with high speed, high accuracy and smooth linear motion.

### 2-1-1 Features of H Series

(1) Self-aligning capability

By design, the circular-arc groove has contact points at 45 degrees. H series can absorb most installation errors due to surface irregularities and provide smooth linear motion through the elastic deformation of rolling elements and the shift of contact points. Self-aligning capability, high accuracy and smooth operation can be obtained with an easy installation.

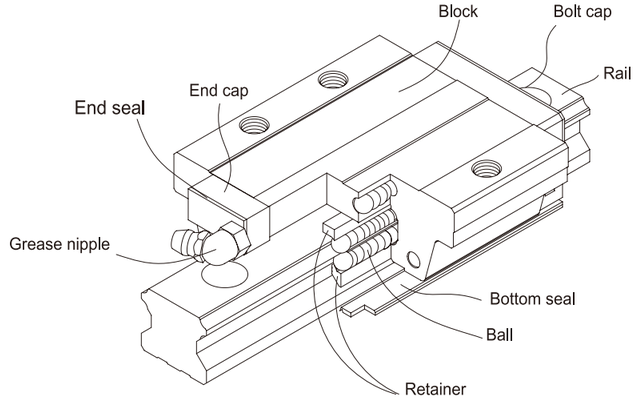
(2) Interchangeability

Because of precision dimensional control, the dimensional tolerance of H series can be kept in a reasonable range, which means that any blocks and any rails in a specific series can be used together while maintaining dimensional tolerance. And a retainer is added to prevent the balls from falling out when the blocks are removed from the rail.

(3) High rigidity in all four directions

Because of the four-row design, the H series linear guideway has equal load ratings in the radial, reverse radial and lateral directions. Furthermore, the circular-arc groove provides a wide-contact width between the balls and the groove raceway allowing large permissible loads and high rigidity.

### 2-1-2 Construction of H Series




- ☐ Rolling circulation system: Block, Rail, End Cap and Retainer
- ☐ Lubrication system: Grease Nipple and Piping Joint
- ☐ Dust protection system: End seal, Bottom Seal, Bolt Cap, Double Seals and Scraper

### 2-1-3 Model Number of H Series

H series guideways can be classified into non-interchangeable and interchangeable types. The sizes are identical. The only difference between the two types is that the interchangeable type of blocks and rails can be freely exchanged, and their accuracy can reach up to P class. The model number of H series contains the size, type, accuracy class, preload class, etc..

(1) Non-interchangeable type

**H W 25 C A E 2 R 1600 E ZA P II + DD/E2/RC**

- H Series
- Block Type
  W : Flange Type
  H : Square Type
  L : Square Type (Low)[3]
- Model size
  15, 20, 25, 30, 35, 45, 55, 65
- Load Type
  C : Heavy Load
  H : Super Heavy Load
- Block Mounting
  A : Mounting From Top
  B : Bottom
  C : Top or Bottom
- E: Special Block
  None: Standard Block
- No. of Blocks per Rail
- Rail Mounting Type
  R : Mounting From Top
  T : Bottom
- Rail Length (mm)
- E: Special Rail
  None: Standard Rail
- Preload Code: Z0, ZA, ZB
- Precision Code:
  C, H, P, SP, UP
- No.of rails per axis set[1]
- Dust Protection[2]
- E2: Self-Lubricant
  SE: Metallic End Cap
- RC:Reinforced Cap

Note: 1. The roman numerals express a matched set of rails.
2. No symbol indicates standard protection (end seal and bottom seal).
ZZ : End seal, bottom seal and scraper
KK: Double seals, bottom seal and scraper.
DD: Double seals and bottom seal
3. Block type HL is the low profile design of HH (square type), the assembled height is same as HW (flange type) in same size.

(2) Interchangeable type

☐ Model Number of H Block

**H W 25 C A E ZA P + ZZ/E2**

- H Series
- Block Type
  W : Flange Type
  H : Square Type
  L : Square Type (Low)[3]
- Model size
  15, 20, 25, 30, 35, 45, 55, 65
- Load Type
  C : Heavy Load
  H : Super Heavy Load
- Block Mounting Type
  A : Mounting From Top
  B : Bottom, C : Top or Bottom
- E: Special Block
  None: Standard Block
- Preload Code : Z0, ZA, ZB
- Precision Code : C, H, P
- Dust Protection[2]
- E2: Self-Lubricant
  SE: Metallic End Cap

☐ Model Number of H Rail

**H R 25 R 1200 E P + RC**

- H Series
- Interchangeable Rail
- Model size
  15, 20, 25, 30, 35, 45, 55, 65
- Rail Mounting Type
  R : Mounting From Top
  T : Bottom
- Rail Length (mm)
- E: Special Rail,
  None: Standard Rail
- Precision Code : C, H, P
- RC:Reinforced Cap





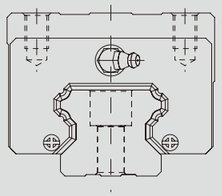
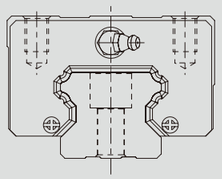
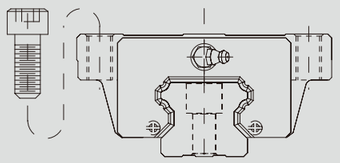
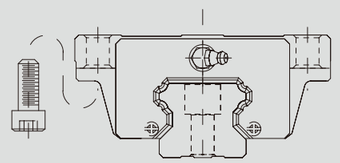
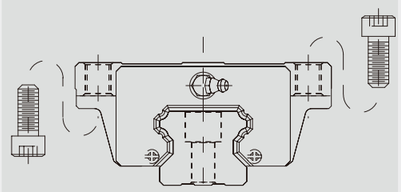


## 2-1-4 Types

(1) Block types

There're two types of blocks:flange and square. The flange type is suitable for heavy moment load application because of the lower assembly height and wider mounting surface.

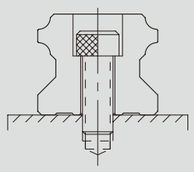
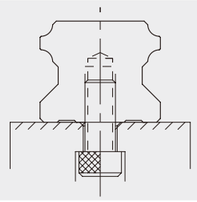
**Table 2-1-1** Block Types

| Type | Model | Shape | Height (mm) | Rail Length (mm) | Main Application |
|---|---|---|---|---|---|
| Square | HH-CA<br>HH-HA |  | 28<br>↓<br>90 | 100<br>↓<br>4000 | ☐ Machine Centers<br>☐ NC Lathes<br>☐ Grinding Machines<br>☐ Precision Machining Machines<br>☐ Heavy Cutting Machines<br>☐ Automation Devices<br>☐ Transportation Equipment<br>☐ Measuring Equipment<br>☐ Devices Requiring High Positional Accuracy |
| | HL-CA<br>HL-HA |  | 24<br>↓<br>70 | 100<br>↓<br>4000 | |
| Flange | HW-CA<br>HW-HA |  | 24<br>↓<br>90 | 100<br>↓<br>4000 | |
| | HW-CB<br>HW-HB |  | 24<br>↓<br>90 | 100<br>↓<br>4000 | |
| | HW-CC<br>HW-HC |  | 24<br>↓<br>90 | 100<br>↓<br>4000 | |

(2) Rail types

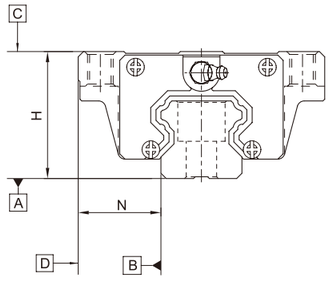
Besides the standard top mounting type, the bottom mounting type is also available.

**Table 2-1-2** Rail Types

| Mounting from Top | Mounting from bottom |
|---|---|
|  |  |

## 2-1-5 Accuracy

The accuracy of H series can be classified into normal (C), high (H), precision (P), super precision (SP), ultra precision (UP), five classes. Please choose the class by referring the accuracy of applied equipment.




(1) Accuracy of non-interchangeable guideways

**Table 2-1-3** Accuracy Standards Unit: mm

| Item | H - 15, 20 | | | | |
|---|---|---|---|---|---|
| Accuracy Classes | Normal (C) | High (H) | Precision (P) | Super Precision (SP) | Ultra Precision (UP) |
| Dimensional tolerance of height H | ± 0.1 | ± 0.03 | 0<br>- 0.03 | 0<br>- 0.015 | 0<br>- 0.008 |
| Dimensional tolerance of width N | ± 0.1 | ± 0.03 | 0<br>- 0.03 | 0<br>- 0.015 | 0<br>- 0.008 |
| Variation of height H | 0.02 | 0.01 | 0.006 | 0.004 | 0.003 |
| Variation of width N | 0.02 | 0.01 | 0.006 | 0.004 | 0.003 |
| Running parallelism of block surface C to surface A | See Table 2-1-7 | | | | |
| Running parallelism of block surface D to surface B | See Table 2-1-7 | | | | |

**Table 2-1-4** Accuracy Standards Unit: mm

| Item | H - 25, 30, 35 | | | | |
|---|---|---|---|---|---|
| Accuracy Classes | Normal (C) | High (H) | Precision (P) | Super Precision (SP) | Ultra Precision (UP) |
| Dimensional tolerance of height H | ± 0.1 | ± 0.04 | 0<br>- 0.04 | 0<br>- 0.02 | 0<br>- 0.01 |
| Dimensional tolerance of width N | ± 0.1 | ± 0.04 | 0<br>- 0.04 | 0<br>- 0.02 | 0<br>- 0.01 |
| Variation of height H | 0.02 | 0.015 | 0.007 | 0.005 | 0.003 |
| Variation of width N | 0.03 | 0.015 | 0.007 | 0.005 | 0.003 |
| Running parallelism of block surface C to surface A | See Table 2-1-7 | | | | |
| Running parallelism of block surface D to surface B | See Table 2-1-7 | | | | |







**Table 2-1-5** Accuracy Standards Unit: mm

| Item | H - 45, 55 | | |
|---|---|---|---|
| Accuracy Classes | Normal (C) | High (H) | Precision (P) |
| Dimensional tolerance of height H | ± 0.1 | ± 0.05 | ± 0.025 |
| Dimensional tolerance of width N | ± 0.1 | ± 0.05 | ± 0.025 |
| Variation of height H | 0.03 | 0.015 | 0.007 |
| Variation of width N | 0.03 | 0.02 | 0.01 |
| Running parallelism of block surface C to surface A | See Table 2-1-7 | | |
| Running parallelism of block surface D to surface B | See Table 2-1-7 | | |

**Table 2-1-6** Accuracy Standards Unit: mm

| Item | H - 65 | | |
|---|---|---|---|
| Accuracy Classes | Normal (C) | High (H) | Precision (P) |
| Dimensional tolerance of height H | ± 0.1 | ± 0.07 | ± 0.035 |
| Dimensional tolerance of width N | ± 0.1 | ± 0.07 | ± 0.035 |
| Variation of height H | 0.03 | 0.02 | 0.01 |
| Variation of width N | 0.03 | 0.025 | 0.015 |
| Running parallelism of block surface C to surface A | See Table 2-1-7 | | |
| Running parallelism of block surface D to surface B | See Table 2-1-7 | | |

(2) Accuracy of running parallelism

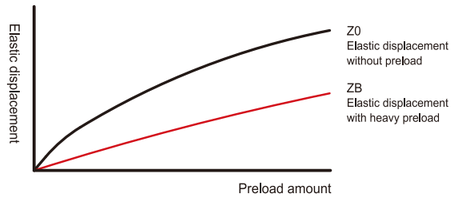
**Table 2-1-7** Accuracy of Running Parallelism

| Rail Length (mm) | Accuracy (μm) | | | | |
|---|---|---|---|---|---|
| | C | H | P | SP | UP |
| ~ 100 | 12 | 7 | 3 | 2 | 2 |
| 100 ~ 200 | 14 | 9 | 4 | 2 | 2 |
| 200 ~ 300 | 15 | 10 | 5 | 3 | 2 |
| 300 ~ 500 | 17 | 12 | 6 | 3 | 2 |
| 500 ~ 700 | 20 | 13 | 7 | 4 | 2 |
| 700 ~ 900 | 22 | 15 | 8 | 5 | 3 |
| 900 ~ 1,100 | 24 | 16 | 9 | 6 | 3 |
| 1,100 ~ 1,500 | 26 | 18 | 11 | 7 | 4 |
| 1,500 ~ 1,900 | 28 | 20 | 13 | 8 | 4 |
| 1,900 ~ 2,500 | 31 | 22 | 15 | 10 | 5 |
| 2,500 ~ 3,100 | 33 | 25 | 18 | 11 | 6 |
| 3,100 ~ 3,600 | 36 | 27 | 20 | 14 | 7 |
| 3,600 ~ 4,000 | 37 | 28 | 21 | 15 | 7 |

## 2-1-6 Preload

(1) Definition

A preload can be applied to each guideway. Oversized balls are used. Generally, a linear motion guideway has a negative clearance between groove and balls in order to improve stiffness and maintain high precision. The figure shows the load is multiplied by the preload, the rigidity is doubled and the deflection is reduced by one half. The preload no larger than ZA would be recommended for the model size under H20 to avoid an over-preload affecting the guideway's life.




(2) Preload classes

LIMON offers three classes of standard preload for various applications and conditions.

**Table 2-1-8** Preload Classes

| Class | Code | Preload | Condition | Examples of Application |
|---|---|---|---|---|
| Light Preload | Z0 | 0~ 0.02C | Certain load direction,low impact, low precision required | Transportation devices, auto-packing machines, X-Y axis for general industrial machines, welding machines, welders |
| Medium Preload | ZA | 0.05C~0.07C | High precision required | Machining centers, Z axis for general industrial, machines, EDM, NC lathes, Precision X-Y tables, measuring equipment |
| Heavy Preload | ZB | 0.10C~ 0.12C | High rigidity required, with vibration and impact | Machining centers, grinding machines, NC lathes, horizontal and vertical milling machines, Z axis of machine tools, Heavy cutting machines |

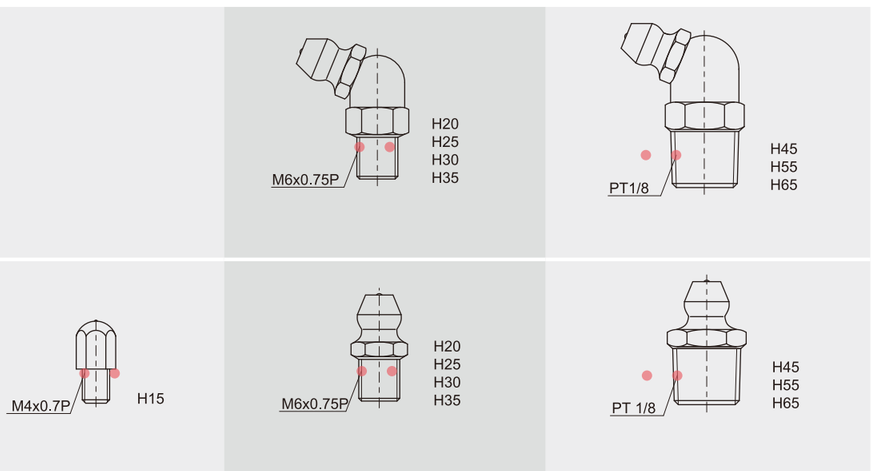
| Class | Interchangeable Guideway | Non-Interchangeable Guideway |
|---|---|---|
| Preload classes | Z0, ZA | Z0, ZA, ZB |

Note: The "C" in the preload column denotes basic dynamic load rating.

## 2-1-7 Lubrication

(1) Grease

☐ Grease nipple










☐ Mounting location

The standard location of the grease fitting is at both ends of the block, but the nipple can be mounted at each side of block. For lateral installation, we recommend that the nipple be mounted at the non-reference side, otherwise please contact us. It is possible to perform lubrication by using the oil-piping joint.

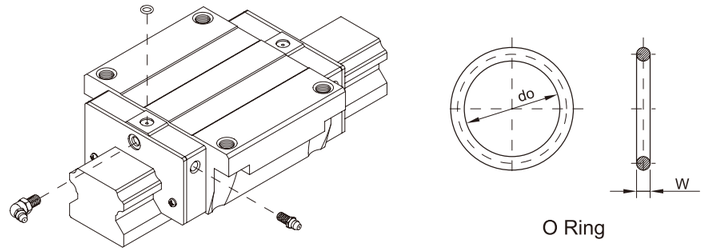
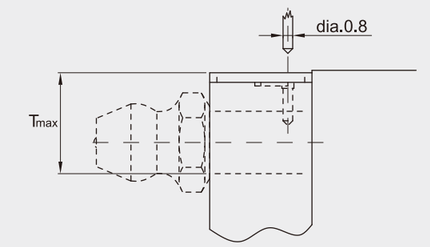



**Table 2-1-9** O-Ring size and max. permissible depth for piercing

| Size | O-Ring | | Lube hole at top: max. permissible depth for piercing |
|---|---|---|---|
| | do (mm) | W (mm) | $T_{max}$ (mm) |
| H15 | 2.5±0.15 | 1.5±0.15 | 3.75 |
| H20 | 4.5±0.15 | 1.5±0.15 | 5.7 |
| H25 | 4.5±0.15 | 1.5±0.15 | 5.8 |
| H30 | 4.5±0.15 | 1.5±0.15 | 6.3 |
| H35 | 4.5±0.15 | 1.5±0.15 | 8.8 |
| H45 | 4.5±0.15 | 1.5±0.15 | 8.2 |
| H55 | 4.5±0.15 | 1.5±0.15 | 11.8 |
| H65 | 4.5±0.15 | 1.5±0.15 | 10.8 |




☐ The lubricant amount for a block filled with grease

**Table 2-1-10** The lubricant Amount for a Block Filled with Grease

| Size | Heavy load ($cm^3$) | Super heavy load ($cm^3$) | Size | Heavy load ($cm^3$) | Super heavy load ($cm^3$) |
|---|---|---|---|---|---|
| H15 | 1 | - | H35 | 10 | 12 |
| H20 | 2 | 3 | H45 | 17 | 21 |
| H25 | 5 | 6 | H55 | 26 | 33 |
| H30 | 7 | 8 | H65 | 50 | 61 |

☐ Frequency of replenishment

Check the grease every 100 km, or every 3-6 months.

☐ Oil refilling rate

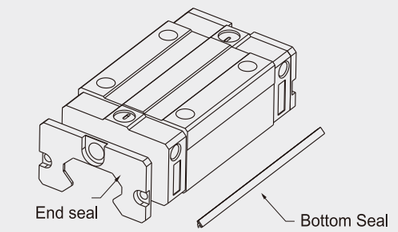
**Table 2-1-11**

| Size | Refilling rate ($cm^3$/hr) | Size | Refilling rate ($cm^3$/hr) |
|---|---|---|---|
| H15 | 0.2 | H35 | 0.3 |
| H20 | 0.2 | H45 | 0.4 |
| H25 | 0.3 | H55 | 0.5 |
| H30 | 0.3 | H65 | 0.6 |

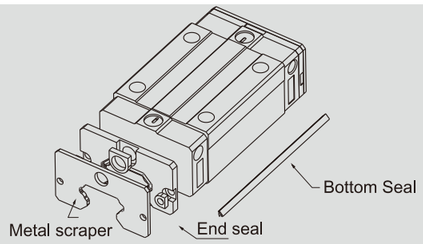
## 2-1-8 Dust Proof Accessories

(1) Codes of standard dust proof accessories

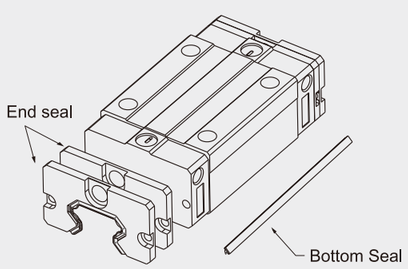
If the following accessories are needed, please add the code followed by the model number.



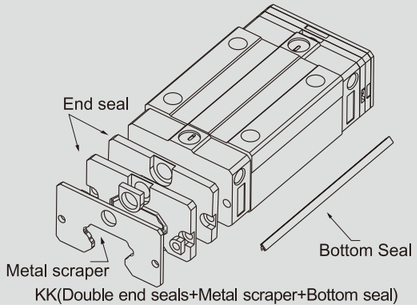

No symbol:Standard Protection(End seal+Bottom Seal)




ZZ(End seal+Metal scraper+Bottom Seal)




DD(Double end seals+Bottom seal)




KK(Double end seals+Metal scraper+Bottom seal)

**Table 2-1-12**

unit:mm

| | Overall block length (L) | | | |
|---|---|---|---|---|
| Size | SS | ZZ | DD | KK |
| H15C | 60.5 | 64.1 | 65.5 | 69.1 |
| H20C | 76.7 | 80.3 | 82.5 | 86.1 |
| H20H | 91.4 | 95 | 97.2 | 100.8 |
| H25C | 84 | 87.6 | 90 | 93.6 |
| H25H | 104.6 | 108.2 | 110.6 | 114.2 |
| H30C | 98.4 | 102 | 104.6 | 108.2 |
| H30H | 121.4 | 125 | 127.6 | 131.2 |
| H35C | 112.4 | 116 | 118.8 | 122.4 |
| H35H | 138.2 | 141.8 | 144.6 | 148.2 |
| H45C | 137.4 | 141 | 145.4 | 149 |
| H45H | 169.2 | 172.8 | 177.2 | 180.8 |







(4) Fuction of dust proof accessories

☐ End seal and bottom seal

To prevent life reduction caused by iron chips or dust entering the block.

☐ Double seals

Enhances the wiping effect, foreign matter can be completely wiped off.

**Table 2-1-13** Dimensions of end seal

| Size | Thickness (t1) (mm) | Size | Thickness (t1) (mm) |
|---|---|---|---|
| H15 ES | 3 | H35 ES | 3.2 |
| H20 ES | 3.5 | H45 ES | 4.5 |
| H25 ES | 3.5 | H55 ES | 4.5 |
| H30 ES | 3.2 | H65 ES | 6 |

☐ Scraper

The scraper removes high-temperature iron chips and larger foreign objects.

**Table 2-1-14** Dimensions of scraper

| Size | Thickness (t2) (mm) | Size | Thickness (t2) (mm) |
|---|---|---|---|
| H15 SC | 1.5 | H35 SC | 1.5 |
| H20 SC | 1.5 | H45 SC | 1.5 |
| H25 SC | 1.5 | H55 SC | 1.5 |
| H30 SC | 1.5 | H65 SC | 1.5 |

☐ Top Seal

Top seal can efficiently avoid dust from the surface of rail or tapping hole getting inside the block.

Bolt caps for rail mounting holes

Caps are used to cover the mounting holes to prevent chips or other foreign objects from collecting in the holes. The caps will be enclosed in each rail package.

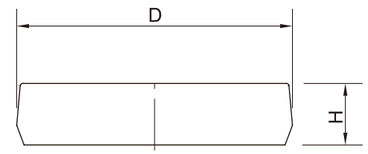
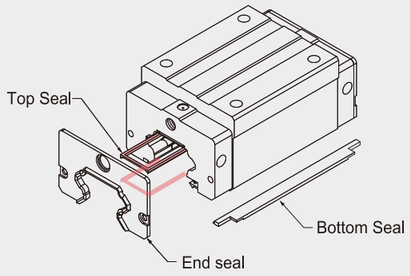



**Table 2-1-15** Dimensions of Bolt Caps for Rail Mounting Holes

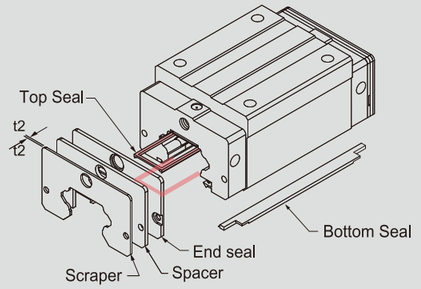
| Rail size | Bolt size | Diameter(D) (mm) | Thickness(H) (mm) | Rail size | Bolt size | Diameter(D) (mm) | Thickness(H) (mm) |
|---|---|---|---|---|---|---|---|
| HR15 | M4 | 7.65 | 1.1 | HR35 | M8 | 14.25 | 3.3 |
| HR20 | M5 | 9.65 | 2.2 | HR45 | M12 | 20.25 | 4.6 |
| HR25 | M6 | 11.2 | 2.5 | HR55 | M14 | 23.5 | 5.5 |
| HR30 | M8 | 14.25 | 3.3 | HR65 | M16 | 26.6 | 5.5 |

(2) Codes of high-dust proof accessories

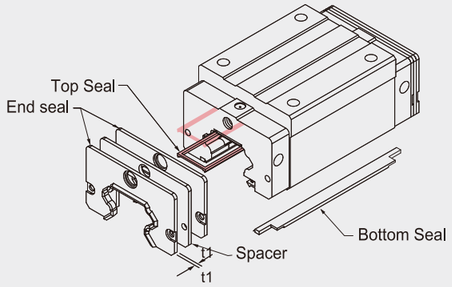
LIMON develops many kinds of dust proof accessories for different application and working environment to avoid dust or debris. If the following accessories are needed, please add the code followed by the model number.



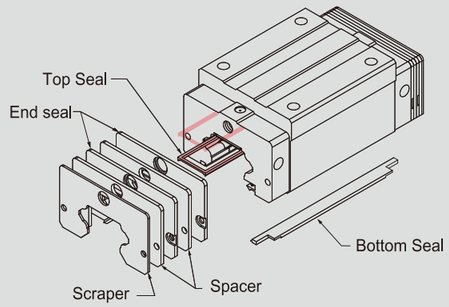

SH{End Seal (High-Dust Proof)
+ Bottom Seal (High Dust Proof) + Top Seal




ZH {End Seal (High-Dust Proof)
+Bottom Seal (High Dust Proof) + Top Seal + Spacer




DH{Double End Seal (High Dust Proof)
+Bottom Seal (High Dust Proof) + Top Seal




KH {Double End Seal (High Dust Proof)
+ Bottom Seal (High Dust Proof) +Top Seal +Scraper

Note: 1. The available size for high dust proof accessories are HH20(C/H), 25(C/H), 30(C/H), 35(C/H) and 45C.
2. The value of fricton force will increase 0.6~1.2 kgf.





## 2-1-9 Friction

The maximum value of resistance per end seal are as shown in the table.

**Table 2-1-16** Seal Resistance

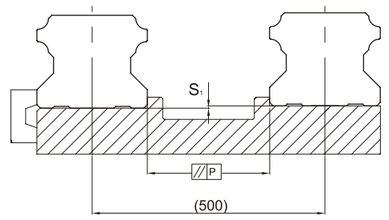
| Size | Resistance N (kgf) | Size | Resistance N (kgf) |
|---|---|---|---|
| H15 | 1 (0.1) | H35 | 3 (0.31) |
| H20 | 1.7 (0.1) | H45 | 4 (0.41) |
| H25 | 2 (0.2) | H55 | 5 (0.51) |
| H30 | 2.6 (0.27) | H65 | 6 (0.61) |

Note:1kgf=9.81N

## 2-1-10 The Accuracy Tolerance of Mounting Surface

(1) The accuracy tolerance of rail-mounting surface

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




(2) The parallelism tolerance of reference surface (P)

**Table 2-1-17** Max. Parallelism Tolerance (P) unit: μm

| Size | Preload classes | | |
|---|---|---|---|
| | Z0 | ZA | ZB |
| H15 | 25 | 18 | 13 |
| H20 | 25 | 20 | 18 |
| H25 | 30 | 22 | 20 |
| H30 | 40 | 30 | 27 |
| H35 | 50 | 35 | 30 |
| H45 | 60 | 40 | 35 |
| H55 | 70 | 50 | 45 |
| H65 | 80 | 60 | 55 |

(3) The accuracy tolerance of reference surface height

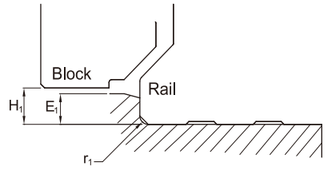
**Table 2-1-18** Max. Tolerance of Reference Surface Height ($S_1$) unit: μm

| Size | Preload classes | | |
|---|---|---|---|
| | Z0 | ZA | ZB |
| H15 | 130 | 85 | 35 |
| H20 | 130 | 85 | 50 |
| H25 | 130 | 85 | 70 |
| H30 | 170 | 110 | 90 |
| H35 | 210 | 150 | 120 |
| H45 | 250 | 170 | 140 |
| H55 | 300 | 210 | 170 |
| H65 | 350 | 250 | 200 |

## 2-1-11 Cautions for Installation

(1) Shoulder heights and fillets

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



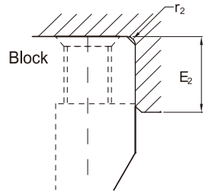




**Table 2-1-19** Shoulder Heights and Fillets

| Size | Max. radius of fillets | Max. radius of fillets | Shoulder height of the rail | Shoulder height of the block | Clearance under block |
|---|---|---|---|---|---|
| | $r_1$ (mm) | $r_2$ (mm) | $E_1$ (mm) | $E_2$ (mm) | $H_1$ (mm) |
| H15 | 0.5 | 0.5 | 3 | 4 | 4.3 |
| H20 | 0.5 | 0.5 | 3.5 | 5 | 4.6 |
| H25 | 1.0 | 1 | 5 | 5 | 5.5 |
| H30 | 1.0 | 1 | 5 | 5 | 6 |
| H35 | 1.0 | 1 | 6 | 6 | 7.5 |
| H45 | 1.0 | 1 | 8 | 8 | 9.5 |
| H55 | 1.5 | 1.5 | 10 | 10 | 13 |
| H65 | 1.5 | 1.5 | 10 | 10 | 15 |

(2) Tightening Torque of Bolts for Installation

Improper tightening of bolts will seriously influence the accuracy of Linear Guideway installation. The following tightening torques for different sizes of bolts are recommended.

**Table 2-1-20** Mounting Torque

| Size | Bolt size | Torque N-cm (kgf-cm) | | |
|---|---|---|---|---|
| | | Iron | Casting | Aluminum |
| H15 | M4×0.7P×16L | 392 (40) | 274 (28) | 206 (21) |
| H20 | M5×0.8P×16L | 883 (90) | 588 (60) | 441 (45) |
| H25 | M6×1P×20L | 1373 (140) | 921 (94) | 686 (70) |
| H30 | M8×1.25P×25L | 3041 (310) | 2010 (205) | 1470 (150) |
| H35 | M8×1.25P×25L | 3041 (310) | 2010 (205) | 1470 (150) |
| H45 | M12×1.75P×35L | 11772 (1200) | 7840 (800) | 5880 (600) |
| H55 | M14×2P×45L | 15696 (1600) | 10500 (1100) | 7840 (800) |
| H65 | M16×2P×50L | 19620 (2000) | 13100 (1350) | 9800 (1000) |

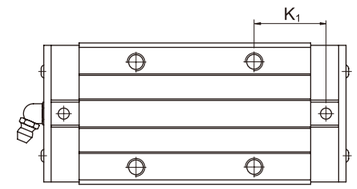


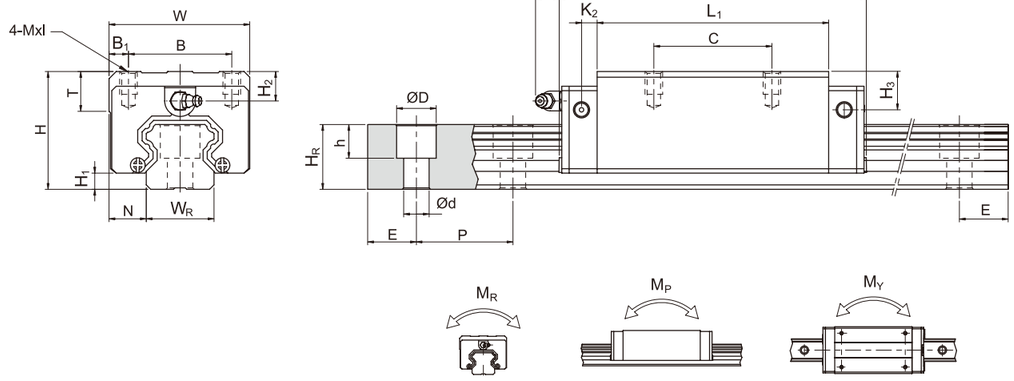




## 2-1-12 Dimensions for H Series

(1) HH-CA / HH-HA

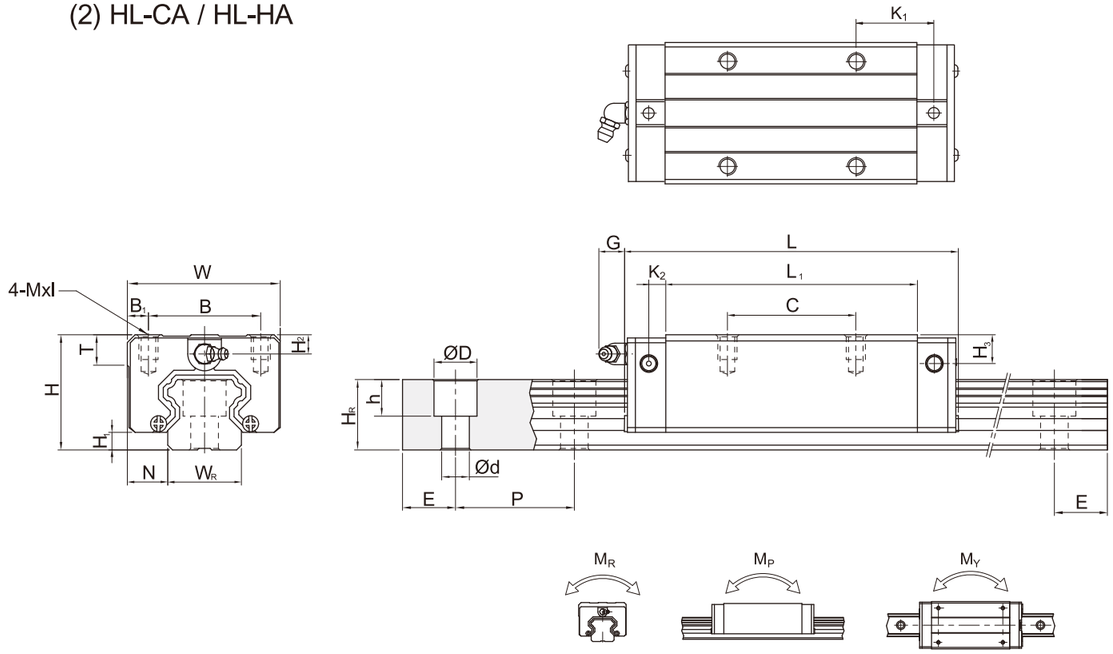



| Model No. | Dimensions of Assembly (mm) | | | Dimensions of Block (mm) | | | | | | | | | | | | Dimensions of Rail (mm) | | | | | | | Mounting Bolt for Rail | Basic Dynamic Load Rating | Basic Static Load Rating | Static Rated Moment | | | Weight | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | H | $H_1$ | N | W | B | $B_1$ | C | $L_1$ | L | $K_1$ | $K_2$ | G | MxI | T | $H_2$ | $H_3$ | $W_R$ | $H_R$ | D | h | d | P | E | (mm) | C(kN) | $C_0$ (kN) | $M_R$ kN-m | $M_P$ kN-m | $M_Y$ kN-m | Block kg | Rail kg/m |
| HH15CA | 28 | 4.3 | 9.5 | 34 | 26 | 4 | 26 | 39.4 | 61.4 | 10 | 4.85 | 5.3 | M4x5 | 6 | 7.95 | 7.7 | 15 | 15 | 7.5 | 5.3 | 4.5 | 60 | 20 | M4x16 | 14.7 | 23.47 | 0.12 | 0.10 | 0.10 | 0.18 | 1.45 |
| HH20CA | 30 | 4.6 | 12 | 44 | 32 | 6 | 36 | 50.5 | 77.5 | 12.25 | 6 | 12 | M5x6 | 8 | 6 | 6 | 20 | 17.5 | 9.5 | 8.5 | 6 | 60 | 20 | M5x16 | 27.1 | 36.68 | 0.27 | 0.20 | 0.20 | 0.30 | 2.21 |
| HH20HA | | | | | | | 50 | 65.2 | 92.2 | 12.6 | | | | | | | | | | | | | | | 32.7 | 47.96 | 0.35 | 0.35 | 0.35 | 0.39 | |
| HH25CA | 40 | 5.5 | 12.5 | 48 | 35 | 6.5 | 35 | 58 | 84 | 15.7 | 6 | 12 | M6x8 | 8 | 10 | 9 | 23 | 22 | 11 | 9 | 7 | 60 | 20 | M6x20 | 34.9 | 52.82 | 0.42 | 0.33 | 0.33 | 0.51 | 3.21 |
| HH25HA | | | | | | | 50 | 78.6 | 104.6 | 18.5 | | | | | | | | | | | | | | | 42.2 | 69.07 | 0.56 | 0.57 | 0.57 | 0.69 | |
| HH30CA | 45 | 6 | 16 | 60 | 40 | 10 | 40 | 70 | 97.4 | 20.25 | 6 | 12 | M8x10 | 8.5 | 9.5 | 13.8 | 28 | 26 | 14 | 12 | 9 | 80 | 20 | M8x25 | 48.5 | 71.87 | 0.66 | 0.53 | 0.53 | 0.88 | 4.47 |
| HH30HA | | | | | | | 60 | 93 | 120.4 | 21.75 | | | | | | | | | | | | | | | 58.6 | 93.99 | 0.88 | 0.92 | 0.92 | 1.16 | |
| HH35CA | 55 | 7.5 | 18 | 70 | 50 | 10 | 50 | 80 | 112.4 | 20.6 | 7 | 12 | M8x12 | 10.2 | 16 | 19.6 | 34 | 29 | 14 | 12 | 9 | 80 | 20 | M8x25 | 64.6 | 93.88 | 1.16 | 0.81 | 0.81 | 1.45 | 6.30 |
| HH35HA | | | | | | | 72 | 105.8 | 138.2 | 22.5 | | | | | | | | | | | | | | | 77.9 | 122.77 | 1.54 | 1.40 | 1.40 | 1.92 | |
| HH45CA | 70 | 9.5 | 20.5 | 86 | 60 | 13 | 60 | 97 | 139.4 | 23 | 10 | 12.9 | M10x17 | 16 | 18.5 | 30.5 | 45 | 38 | 20 | 17 | 14 | 105 | 22.5 | M12x35 | 103.8 | 146.71 | 1.98 | 1.55 | 1.55 | 2.73 | 10.41 |
| HH45HA | | | | | | | 80 | 128.8 | 171.2 | 28.9 | | | | | | | | | | | | | | | 125.3 | 191.85 | 2.63 | 2.68 | 2.68 | 3.61 | |
| HH55CA | 80 | 13 | 23.5 | 100 | 75 | 12.5 | 75 | 117.7 | 166.7 | 27.35 | 11 | 12.9 | M12x18 | 17.5 | 22 | 29 | 53 | 44 | 23 | 20 | 16 | 120 | 30 | M14x45 | 153.2 | 211.23 | 3.69 | 2.64 | 2.64 | 4.17 | 15.08 |
| HH55HA | | | | | | | 95 | 155.8 | 204.8 | 36.4 | | | | | | | | | | | | | | | 184.9 | 276.23 | 4.88 | 4.57 | 4.57 | 5.49 | |
| HH65CA | 90 | 15 | 31.5 | 126 | 76 | 25 | 70 | 144.2 | 200.2 | 43.1 | 14 | 12.9 | M16x20 | 25 | 15 | 15 | 63 | 53 | 26 | 22 | 18 | 150 | 35 | M16x50 | 213.2 | 287.48 | 6.65 | 4.27 | 4.27 | 7.00 | 21.18 |
| HH65HA | | | | | | | 120 | 203.6 | 259.6 | 47.8 | | | | | | | | | | | | | | | 277.8 | 420.17 | 9.38 | 7.38 | 7.38 | 9.82 | |

Note : 1 kgf = 9.81 N

## (2) HL-CA / HL-HA



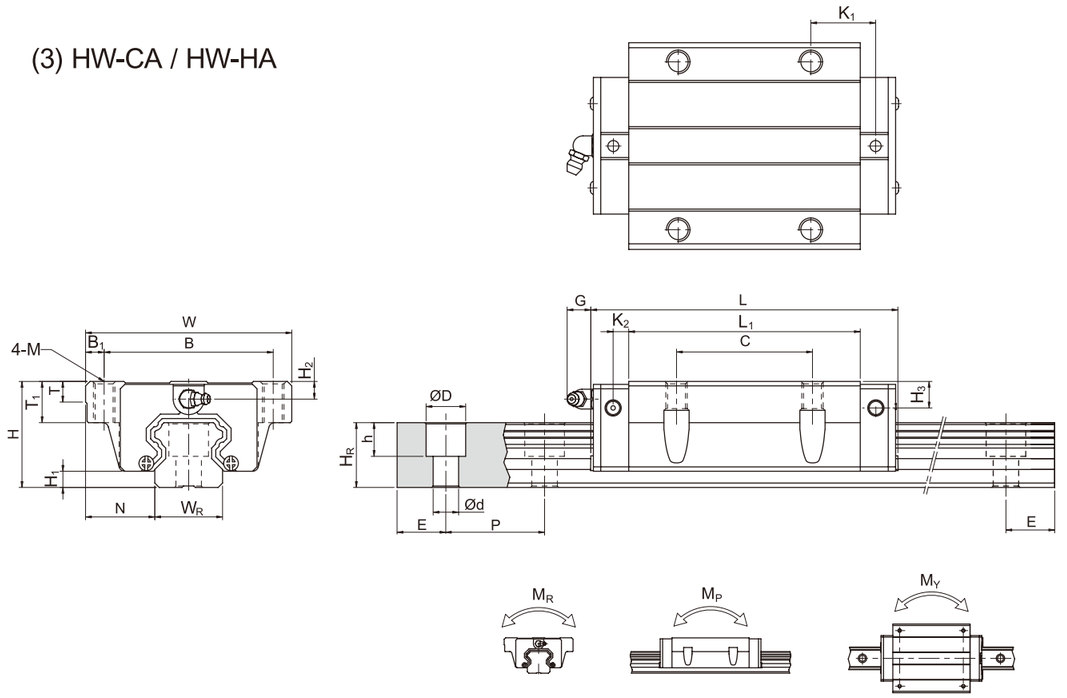

| Model No. | Dimensions of Assembly (mm) | | | Dimensions of Block (mm) | | | | | | | | | | | | | Dimensions of Rail (mm) | | | | | | | Mounting Bolt for Rail | Basic Dynamic Load Rating | Basic Static Load Rating | Static Rated Moment | | | Weight | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | H | $H_1$ | N | W | B | $B_1$ | C | $L_1$ | L | $K_1$ | $K_2$ | G | MxI | T | $H_2$ | $H_3$ | $W_R$ | $H_R$ | D | h | d | P | E | | | | $M_R$ | $M_P$ | $M_Y$ | Block | Rail |
| | | | | | | | | | | | | | | | | | | | | | | | | (mm) | C(kN) | $C_0$ (kN) | kN-m | kN-m | kN-m | kg | kg/m |
| HL15CA | 24 | 4.3 | 9.5 | 34 | 26 | 4 | 26 | 39.4 | 61.4 | 10 | 4.85 | 5.3 | M4x4 | 6 | 3.95 | 3.7 | 15 | 15 | 7.5 | 5.3 | 4.5 | 60 | 20 | M4x16 | 14.7 | 23.47 | 0.12 | 0.10 | 0.10 | 0.14 | 1.45 |
| HL25CA | 36 | 5.5 | 12.5 | 48 | 35 | 6.5 | 35 | 58 | 84 | 15.7 | 6 | 12 | M6x6 | 8 | 6 | 5 | 23 | 22 | 11 | 9 | 7 | 60 | 20 | M6x20 | 34.9 | 52.82 | 0.42 | 0.33 | 0.33 | 0.42 | 3.21 |
| HL25HA | | | | | | | 50 | 78.6 | 104.6 | 18.5 | | | | | | | | | | | | | | | 42.2 | 69.07 | 0.56 | 0.57 | 0.57 | 0.57 | |
| HL30CA | 42 | 6 | 16 | 60 | 40 | 10 | 40 | 70 | 97.4 | 20.25 | 6 | 12 | M8x10 | 8.5 | 6.5 | 10.8 | 28 | 26 | 14 | 12 | 9 | 80 | 20 | M8x25 | 48.5 | 71.87 | 0.66 | 0.53 | 0.53 | 0.78 | 4.47 |
| HL30HA | | | | | | | 60 | 93 | 120.4 | 21.75 | | | | | | | | | | | | | | | 58.6 | 93.99 | 0.88 | 0.92 | 0.92 | 1.03 | |
| HL35CA | 48 | 7.5 | 18 | 70 | 50 | 10 | 50 | 80 | 112.4 | 20.6 | 7 | 12 | M8x12 | 10.2 | 9 | 12.6 | 34 | 29 | 14 | 12 | 9 | 80 | 20 | M8x25 | 64.6 | 93.88 | 1.16 | 0.81 | 0.81 | 1.14 | 6.30 |
| HL35HA | | | | | | | 72 | 105.8 | 138.2 | 22.5 | | | | | | | | | | | | | | | 77.9 | 122.77 | 1.54 | 1.40 | 1.40 | 1.52 | |
| HL45CA | 60 | 9.5 | 20.5 | 86 | 60 | 13 | 60 | 97 | 139.4 | 23 | 10 | 12.9 | M10x17 | 16 | 8.5 | 20.5 | 45 | 38 | 20 | 17 | 14 | 105 | 22.5 | M12x35 | 103.8 | 146.71 | 1.98 | 1.55 | 1.55 | 2.08 | 10.41 |
| HL45HA | | | | | | | 80 | 128.8 | 171.2 | 28.9 | | | | | | | | | | | | | | | 125.3 | 191.85 | 2.63 | 2.68 | 2.68 | 2.75 | |
| HL55CA | 70 | 13 | 23.5 | 100 | 75 | 12.5 | 75 | 117.7 | 166.7 | 27.35 | 11 | 12.9 | M12x18 | 17.5 | 12 | 19 | 53 | 44 | 23 | 20 | 16 | 120 | 30 | M14x45 | 153.2 | 211.23 | 3.69 | 2.64 | 2.64 | 3.25 | 15.08 |
| HL55HA | | | | | | | 95 | 155.8 | 204.8 | 36.4 | | | | | | | | | | | | | | | 184.9 | 276.23 | 4.88 | 4.57 | 4.57 | 4.27 | |

Note : 1 kgf = 9.81 N





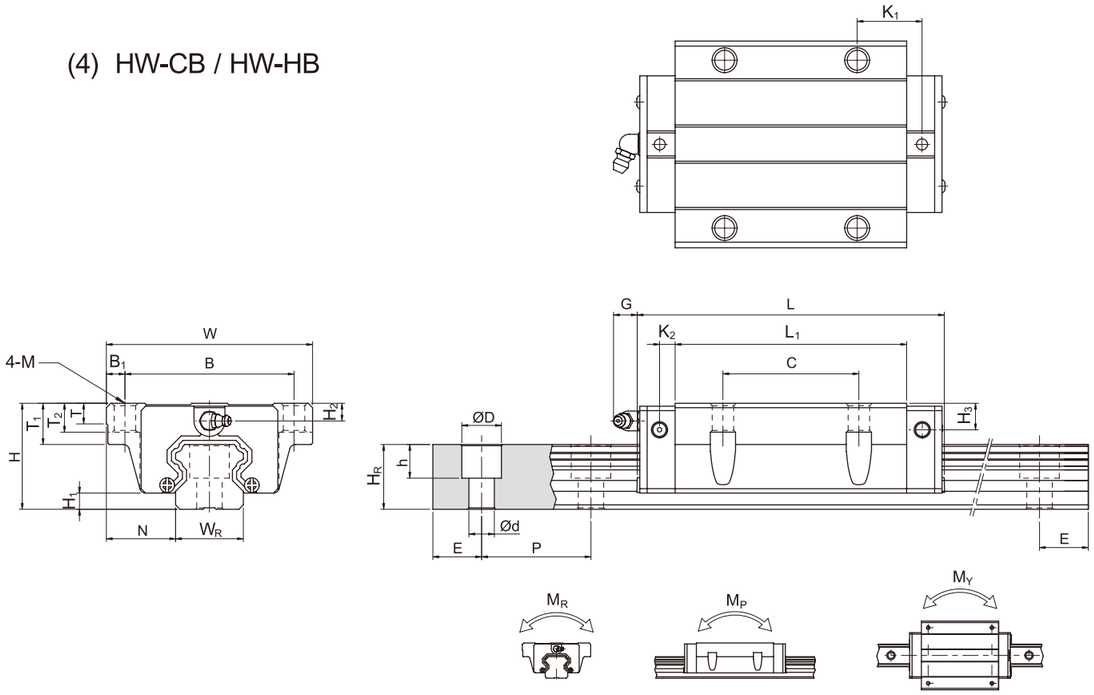
## (3) HW-CA / HW-HA




| Model No. | Dimensions of Assembly (mm) | | | Dimensions of Block (mm) | | | | | | | | | | | | | | | Dimensions of Rail (mm) | | | | | | | Mounting Bolt for Rail | Basic Dynamic Load Rating | Basic Static Load Rating | Static Rated Moment | | | Weight | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | H | $H_1$ | N | W | B | $B_1$ | C | $L_1$ | L | $K_1$ | $K_2$ | G | M | T | $T_1$ | $H_2$ | $H_3$ | $W_R$ | $H_R$ | D | h | d | P | E | | | | $M_R$ | $M_P$ | $M_Y$ | Block | Rail |
| | | | | | | | | | | | | | | | | | | | | | | | | | (mm) | C(kN) | $C_0$(kN) | kN-m | kN-m | kN-m | kg | kg/m |
| HW15CA | 24 | 4.3 | 16 | 47 | 38 | 4.5 | 30 | 39.4 | 61.4 | 8 | 4.85 | 5.3 | M5 | 6 | 8.9 | 3.95 | 3.7 | 15 | 15 | 7.5 | 5.3 | 4.5 | 60 | 20 | M4x16 | 14.7 | 23.47 | 0.12 | 0.10 | 0.10 | 0.17 | 1.45 |
| HW20CA | 30 | 4.6 | 21.5 | 63 | 53 | 5 | 40 | 50.5 | 77.5 | 10.25 | 6 | 12 | M6 | 8 | 10 | 6 | 6 | 20 | 17.5 | 9.5 | 8.5 | 6 | 60 | 20 | M5x16 | 27.1 | 36.68 | 0.27 | 0.20 | 0.20 | 0.40 | 2.21 |
| HW20HA | | | | | | | | 65.2 | 92.2 | 17.6 | | | | | | | | | | | | | | | | 32.7 | 47.96 | 0.35 | 0.35 | 0.35 | 0.52 | |
| HW25CA | 36 | 5.5 | 23.5 | 70 | 57 | 6.5 | 45 | 58 | 84 | 10.7 | 6 | 12 | M8 | 8 | 14 | 6 | 5 | 23 | 22 | 11 | 9 | 7 | 60 | 20 | M6x20 | 34.9 | 52.82 | 0.42 | 0.33 | 0.33 | 0.59 | 3.21 |
| HW25HA | | | | | | | | 78.6 | 104.6 | 21 | | | | | | | | | | | | | | | | 42.2 | 69.07 | 0.56 | 0.57 | 0.57 | 0.80 | |
| HW30CA | 42 | 6 | 31 | 90 | 72 | 9 | 52 | 70 | 97.4 | 14.25 | 6 | 12 | M10 | 8.5 | 16 | 6.5 | 10.8 | 28 | 26 | 14 | 12 | 9 | 80 | 20 | M8x25 | 48.5 | 71.87 | 0.66 | 0.53 | 0.53 | 1.09 | 4.47 |
| HW30HA | | | | | | | | 93 | 120.4 | 25.75 | | | | | | | | | | | | | | | | 58.6 | 93.99 | 0.88 | 0.92 | 0.92 | 1.44 | |
| HW35CA | 48 | 7.5 | 33 | 100 | 82 | 9 | 62 | 80 | 112.4 | 14.6 | 7 | 12 | M10 | 10.1 | 18 | 9 | 12.6 | 34 | 29 | 14 | 12 | 9 | 80 | 20 | M8x25 | 64.6 | 93.88 | 1.16 | 0.81 | 0.81 | 1.56 | 6.30 |
| HW35HA | | | | | | | | 105.8 | 138.2 | 27.5 | | | | | | | | | | | | | | | | 77.9 | 122.77 | 1.54 | 1.40 | 1.40 | 2.06 | |
| HW45CA | 60 | 9.5 | 37.5 | 120 | 100 | 10 | 80 | 97 | 139.4 | 13 | 10 | 12.9 | M12 | 15.1 | 22 | 8.5 | 20.5 | 45 | 38 | 20 | 17 | 14 | 105 | 22.5 | M12x35 | 103.8 | 146.71 | 1.98 | 1.55 | 1.55 | 2.79 | 10.41 |
| HW45HA | | | | | | | | 128.8 | 171.2 | 28.9 | | | | | | | | | | | | | | | | 125.3 | 191.85 | 2.63 | 2.68 | 2.68 | 3.69 | |
| HW55CA | 70 | 13 | 43.5 | 140 | 116 | 12 | 95 | 117.7 | 166.7 | 17.35 | 11 | 12.9 | M14 | 17.5 | 26.5 | 12 | 19 | 53 | 44 | 23 | 20 | 16 | 120 | 30 | M14x45 | 153.2 | 211.23 | 3.69 | 2.64 | 2.64 | 4.52 | 15.08 |
| HW55HA | | | | | | | | 155.8 | 204.8 | 36.4 | | | | | | | | | | | | | | | | 184.9 | 276.23 | 4.88 | 4.57 | 4.57 | 5.96 | |
| HW65CA | 90 | 15 | 53.5 | 170 | 142 | 14 | 110 | 144.2 | 200.2 | 23.1 | 14 | 12.9 | M16 | 25 | 37.5 | 15 | 15 | 63 | 53 | 26 | 22 | 18 | 150 | 35 | M16x50 | 213.2 | 287.48 | 6.65 | 4.27 | 4.27 | 9.17 | 21.18 |
| HW65HA | | | | | | | | 203.6 | 259.6 | 52.8 | | | | | | | | | | | | | | | | 277.8 | 420.17 | 9.38 | 7.38 | 7.38 | 12.89 | |

Note : 1 kgf = 9.81 N

## (4) HW-CB / HW-HB



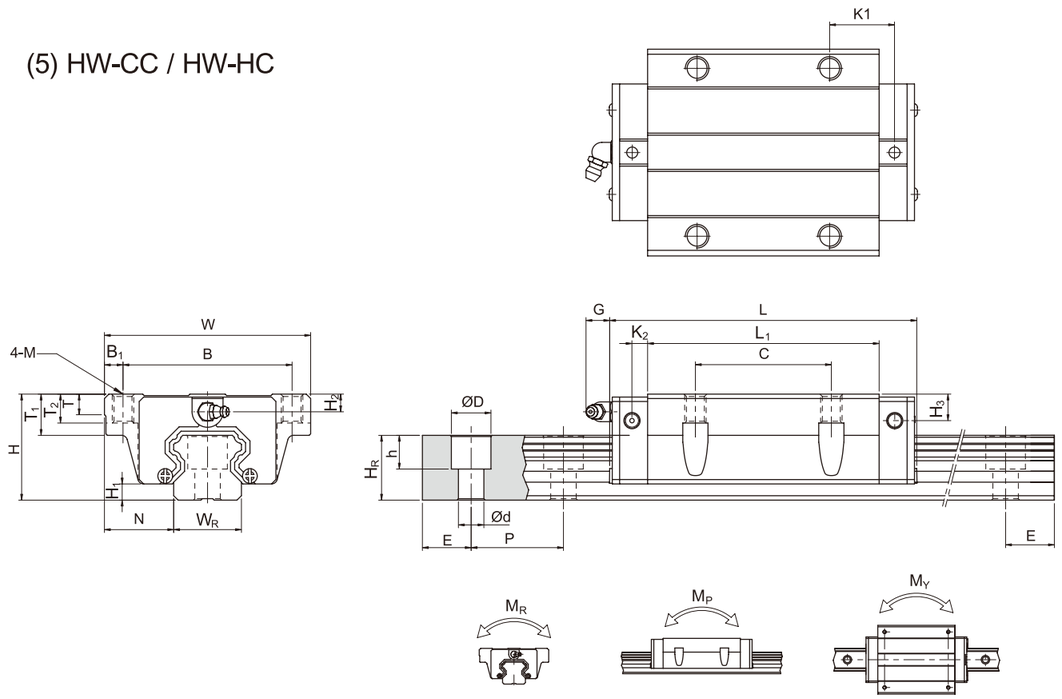

| Model No. | Dimensions of Assembly (mm) | | | Dimensions of Block (mm) | | | | | | | | | | | | | | Dimensions of Rail (mm) | | | | | | | Mounting Bolt for Rail | Basic Dynamic Load Rating | Basic Static Load Rating | Static Rated Moment | | | Weight | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | H | $H_1$ | N | W | B | $B_1$ | C | $L_1$ | L | $K_1$ | $K_2$ | G | M | T | $T_1$ | $T_2$ | $H_2$ | $H_3$ | $W_R$ | $H_R$ | D | h | d | P | E | (mm) | C(kN) | $C_0$ (kN) | $M_R$ kN-m | $M_P$ kN-m | $M_Y$ kN-m | Block kg | Rail kg/m |
| HW15CB | 24 | 4.3 | 16 | 47 | 38 | 4.5 | 30 | 39.4 | 61.4 | 8 | 4.85 | 5.3 | Ø4.5 | 6 | 8.9 | 6.95 | 3.95 | 3.7 | 15 | 15 | 7.5 | 5.3 | 4.5 | 60 | 20 | M4x16 | 14.7 | 23.47 | 0.12 | 0.10 | 0.10 | 0.17 | 1.45 |
| HW20CB | 30 | 4.6 | 21.5 | 63 | 53 | 5 | 40 | 50.5 | 77.5 | 10.25 | 6 | 12 | Ø6 | 8 | 10 | 9.5 | 6 | 6 | 20 | 17.5 | 9.5 | 8.5 | 6 | 60 | 20 | M5x16 | 27.1 | 36.68 | 0.27 | 0.20 | 0.20 | 0.40 | 2.21 |
| HW20HB | | | | | | | | 65.2 | 92.2 | 17.6 | | | | | | | | | | | | | | | | | 32.7 | 47.96 | 0.35 | 0.35 | 0.35 | 0.52 | |
| HW25CB | 36 | 5.5 | 23.5 | 70 | 57 | 6.5 | 45 | 58 | 84 | 10.7 | 6 | 12 | Ø7 | 8 | 14 | 10 | 6 | 5 | 23 | 22 | 11 | 9 | 7 | 60 | 20 | M6x20 | 34.9 | 52.82 | 0.42 | 0.33 | 0.33 | 0.59 | 3.21 |
| HW25HB | | | | | | | | 78.6 | 104.6 | 21 | | | | | | | | | | | | | | | | | 42.2 | 69.07 | 0.56 | 0.57 | 0.57 | 0.80 | |
| HW30CB | 42 | 6 | 31 | 90 | 72 | 9 | 52 | 70 | 97.4 | 14.25 | 6 | 12 | Ø9 | 8.5 | 16 | 10 | 6.5 | 10.8 | 28 | 26 | 14 | 12 | 9 | 80 | 20 | M8x25 | 48.5 | 71.87 | 0.66 | 0.53 | 0.53 | 1.09 | 4.47 |
| HW30HB | | | | | | | | 93 | 120.4 | 25.75 | | | | | | | | | | | | | | | | | 58.6 | 93.99 | 0.88 | 0.92 | 0.92 | 1.44 | |
| HW35CB | 48 | 7.5 | 33 | 100 | 82 | 9 | 62 | 80 | 112.4 | 14.6 | 7 | 12 | Ø9 | 10.1 | 18 | 13 | 9 | 12.6 | 34 | 29 | 14 | 12 | 9 | 80 | 20 | M8x25 | 64.6 | 93.88 | 1.16 | 0.81 | 0.81 | 1.56 | 6.30 |
| HW35HB | | | | | | | | 105.8 | 138.2 | 27.5 | | | | | | | | | | | | | | | | | 77.9 | 122.77 | 1.54 | 1.40 | 1.40 | 2.06 | |
| HW45CB | 60 | 9.5 | 37.5 | 120 | 100 | 10 | 80 | 97 | 139.4 | 13 | 10 | 12.9 | Ø11 | 15.1 | 22 | 15 | 8.5 | 20.5 | 45 | 38 | 20 | 17 | 14 | 105 | 22.5 | M12x35 | 103.8 | 146.71 | 1.98 | 1.55 | 1.55 | 2.79 | 10.41 |
| HW45HB | | | | | | | | 128.8 | 171.2 | 28.9 | | | | | | | | | | | | | | | | | 125.3 | 191.85 | 2.63 | 2.68 | 2.68 | 3.69 | |
| HW55CB | 70 | 13 | 43.5 | 140 | 116 | 12 | 95 | 117.7 | 166.7 | 17.35 | 11 | 12.9 | Ø14 | 17.5 | 26.5 | 17 | 12 | 19 | 53 | 44 | 23 | 20 | 16 | 120 | 30 | M14x45 | 153.2 | 211.23 | 3.69 | 2.64 | 2.64 | 4.52 | 15.08 |
| HW55HB | | | | | | | | 155.8 | 204.8 | 36.4 | | | | | | | | | | | | | | | | | 184.9 | 276.23 | 4.88 | 4.57 | 4.57 | 5.96 | |
| HW65CB | 90 | 15 | 53.5 | 170 | 142 | 14 | 110 | 144.2 | 200.2 | 23.1 | 14 | 12.9 | Ø16 | 25 | 37.5 | 23 | 15 | 15 | 63 | 53 | 26 | 22 | 18 | 150 | 35 | M16x50 | 213.2 | 287.48 | 6.65 | 4.27 | 4.27 | 9.17 | 21.18 |
| HW65HB | | | | | | | | 203.6 | 259.6 | 52.8 | | | | | | | | | | | | | | | | | 277.8 | 420.17 | 9.38 | 7.38 | 7.38 | 12.89 | |

Note : 1 kgf = 9.81 N





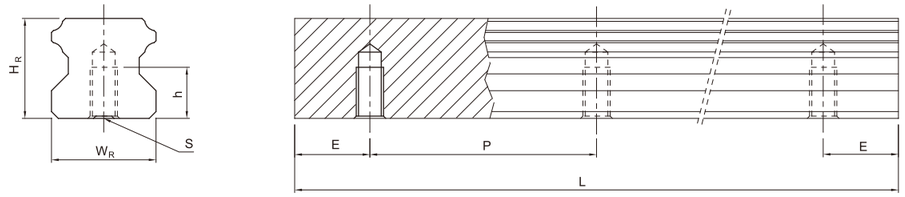
## (5) HW-CC / HW-HC




| Model No. | Dimensions of Assembly (mm) | | | Dimensions of Block (mm) | | | | | | | | | | | | | | Dimensions of Rail (mm) | | | | | | | Mounting Bolt for Rail | Basic Dynamic Load Rating | Basic Static Load Rating | Static Rated Moment | | | Weight | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | H | $H_1$ | N | W | B | $B_1$ | C | $L_1$ | L | $K_1$ | $K_2$ | G | M | T | $T_1$ | $T_2$ | $H_2$ | $H_3$ | $W_R$ | $H_R$ | D | h | d | P | E | (mm) | C(kN) | $C_0$ (kN) | $M_R$ kN-m | $M_P$ kN-m | $M_Y$ kN-m | Block kg | Rail kg/m |
| HW15CC | 24 | 4.3 | 16 | 47 | 38 | 4.5 | 30 | 39.4 | 61.4 | 8 | 4.85 | 5.3 | M5 | 6 | 8.9 | 6.95 | 3.95 | 3.7 | 15 | 15 | 7.5 | 5.3 | 4.5 | 60 | 20 | M4x16 | 14.7 | 23.47 | 0.12 | 0.10 | 0.10 | 0.17 | 1.45 |
| HW20CC | 30 | 4.6 | 21.5 | 63 | 53 | 5 | 40 | 50.5 | 77.5 | 10.25 | 6 | 12 | M6 | 8 | 10 | 9.5 | 6 | 6 | 20 | 17.5 | 9.5 | 8.5 | 6 | 60 | 20 | M5x16 | 27.1 | 36.68 | 0.27 | 0.20 | 0.20 | 0.40 | 2.21 |
| HW20HC | | | | | | | | 65.2 | 92.2 | 17.6 | | | | | | | | | | | | | | | | | 32.7 | 47.96 | 0.35 | 0.35 | 0.35 | 0.52 | |
| HW25CC | 36 | 5.5 | 23.5 | 70 | 57 | 6.5 | 45 | 58 | 84 | 10.7 | 6 | 12 | M8 | 8 | 14 | 10 | 6 | 5 | 23 | 22 | 11 | 9 | 7 | 60 | 20 | M6x20 | 34.9 | 52.82 | 0.42 | 0.33 | 0.33 | 0.59 | 3.21 |
| HW25HC | | | | | | | | 78.6 | 104.6 | 21 | | | | | | | | | | | | | | | | | 42.2 | 69.07 | 0.56 | 0.57 | 0.57 | 0.80 | |
| HW30CC | 42 | 6 | 31 | 90 | 72 | 9 | 52 | 70 | 97.4 | 14.25 | 6 | 12 | M10 | 8.5 | 16 | 10 | 6.5 | 10.8 | 28 | 26 | 14 | 12 | 9 | 80 | 20 | M8x25 | 48.5 | 71.87 | 0.66 | 0.53 | 0.53 | 1.09 | 4.47 |
| HW30HC | | | | | | | | 93 | 120.4 | 25.75 | | | | | | | | | | | | | | | | | 58.6 | 93.99 | 0.88 | 0.92 | 0.92 | 1.44 | |
| HW35CC | 48 | 7.5 | 33 | 100 | 82 | 9 | 62 | 80 | 112.4 | 14.6 | 7 | 12 | M10 | 10.1 | 18 | 13 | 9 | 12.6 | 34 | 29 | 14 | 12 | 9 | 80 | 20 | M8x25 | 64.6 | 93.88 | 1.16 | 0.81 | 0.81 | 1.56 | 6.30 |
| HW35HC | | | | | | | | 105.8 | 138.2 | 27.5 | | | | | | | | | | | | | | | | | 77.9 | 122.77 | 1.54 | 1.40 | 1.40 | 2.06 | |
| HW45CC | 60 | 9.5 | 37.5 | 120 | 100 | 10 | 80 | 97 | 139.4 | 13 | 10 | 12.9 | M12 | 15.1 | 22 | 15 | 8.5 | 20.5 | 45 | 38 | 20 | 17 | 14 | 105 | 22.5 | M12x35 | 103.8 | 146.71 | 1.98 | 1.55 | 1.55 | 2.79 | 10.41 |
| HW45HC | | | | | | | | 128.8 | 171.2 | 28.9 | | | | | | | | | | | | | | | | | 125.3 | 191.85 | 2.63 | 2.68 | 2.68 | 3.69 | |
| HW55CC | 70 | 13 | 43.5 | 140 | 116 | 12 | 95 | 117.7 | 166.7 | 17.35 | 11 | 12.9 | M14 | 17.5 | 26.5 | 17 | 12 | 19 | 53 | 44 | 23 | 20 | 16 | 120 | 30 | M14x45 | 153.2 | 211.23 | 3.69 | 2.64 | 2.64 | 4.52 | 15.08 |
| HW55HC | | | | | | | | 155.8 | 204.8 | 36.4 | | | | | | | | | | | | | | | | | 184.9 | 276.23 | 4.88 | 4.57 | 4.57 | 5.96 | |
| HW65CC | 90 | 15 | 53.5 | 170 | 142 | 14 | 110 | 144.2 | 200.2 | 23.1 | 14 | 12.9 | M16 | 25 | 37.5 | 23 | 15 | 15 | 63 | 53 | 26 | 22 | 18 | 150 | 35 | M16x50 | 213.2 | 287.48 | 6.65 | 4.27 | 4.27 | 9.17 | 21.18 |
| HW65HC | | | | | | | | 203.6 | 259.6 | 52.8 | | | | | | | | | | | | | | | | | 277.8 | 420.17 | 9.38 | 7.38 | 7.38 | 12.89 | |

Note : 1 kgf = 9.81 N

(6) Dimesions for HR-T (Rail Mounting from Bottom)




| Model No. | Dimensions of Rail (mm) | | | | | | Weight |
|---|---|---|---|---|---|---|---|
| | $W_R$ | $H_R$ | S | h | P | E | (kg/m) |
| HR15T | 15 | 15 | M5 x 0.8P | 8 | 60 | 20 | 1.48 |
| HR20T | 20 | 17.5 | M6 x 1P | 10 | 60 | 20 | 2.29 |
| HR25T | 23 | 22 | M6 x 1P | 12 | 60 | 20 | 3.35 |
| HR30T | 28 | 26 | M8 x 1.25P | 15 | 80 | 20 | 4.67 |
| HR35T | 34 | 29 | M8x1.25P | 17 | 80 | 20 | 6.51 |
| HR45T | 45 | 38 | M12 x 1.75P | 24 | 105 | 22.5 | 10.87 |
| HR55T | 53 | 44 | M14 x 2P | 24 | 120 | 30 | 15.67 |
| HR65T | 63 | 53 | M20 x 2.5P | 30 | 150 | 35 | 21.73 |





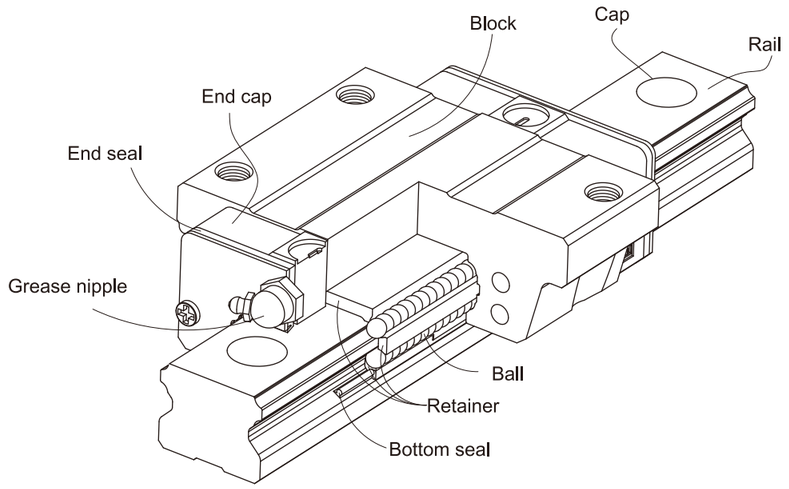


## 2–2 E Series – Low Profile Ball Type Linear Guideway

### 2-2-1 Features of E Series

The design of the E series offers a low profile, high load capacity, and high rigidity. It also features an equal load rating in all four directions and self-aligning capability to absorb installation-error, allowing for higher accuracies. Additionally, the lower assembly height and the shorter length make the E series more suitable for high-speed, automation machines and applications where space is limited.
The retainer is designed to hold the balls in the block even when it is removed from the rail.

### 2-2-2 Construction of E Series

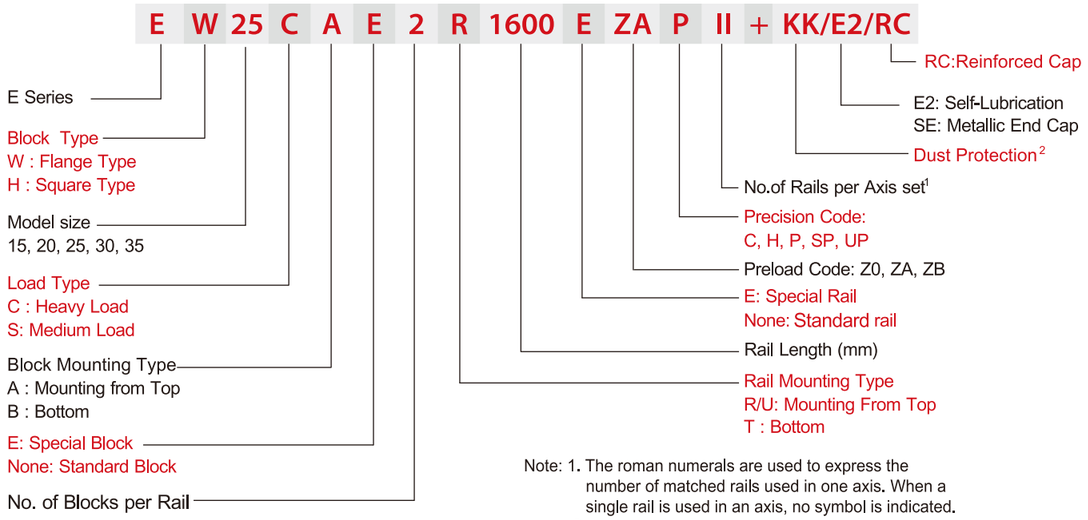



- ☐ Rolling circulation system: Block, rail, end cap and retainer
- ☐ Lubrication system: Grease nipple and piping Joint
- ☐ Dust protection system: End seal, bottom seal, cap and scraper

### 2-2-3 Model Number of E Series

E series linear guideways are classified into non-interchangeable and interchangeable types. The sizes of these two types are the same as one another. The main difference is that the interchangeable type of blocks and rails can be freely exchanged and they can maintain P-class accuracy. Because of strict dimensional control, the interchangeable type linear guideways are a wise choice for customers when rails do not need to be matched for an axis. The model number of the E series identifies the size, type, accuracy class, preload class, etc.

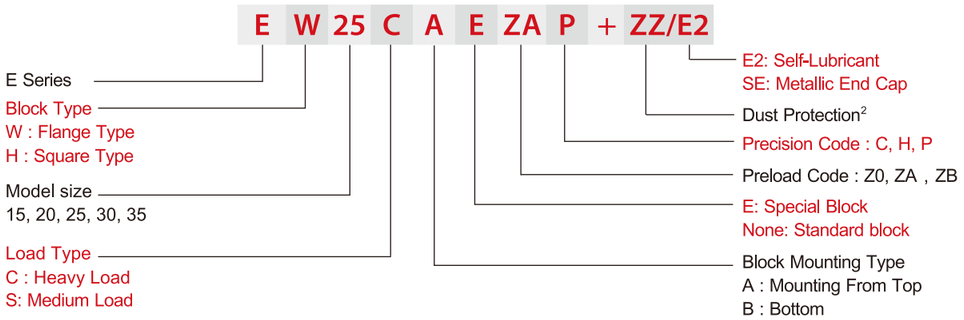
(1) Non-interchangeable type



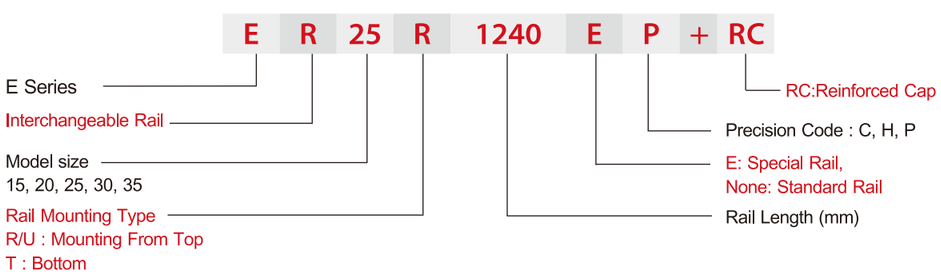

Note: 1. The roman numerals are used to express the number of matched rails used in one axis. When a single rail is used in an axis, no symbol is indicated.
2. No symbol indicates standard protection (end seal and bottom seal).
ZZ : End seal, bottom seal and scraper
KK: Double seals, bottom seal and scraper.
DD: Double seals and bottom seal

(2) Interchangeable type

☐ Model Number of E Block




☐ Model Number of E Rail





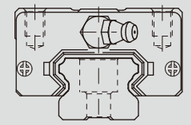
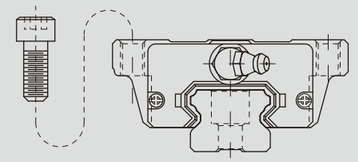





## 2-2-4 Types

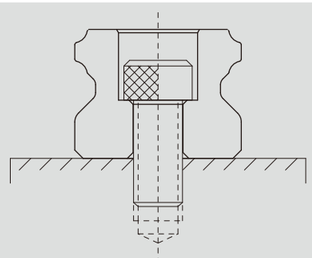
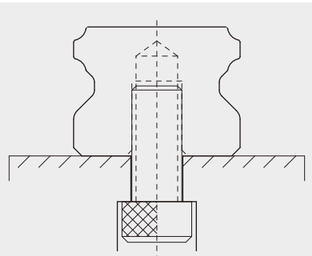
(1) Block types
LIMON offers two types of linear guideways, flange and square types.

**Table 2-2-1** Block Types

| Type | Model | Shape | Height (mm) | Rail Length (mm) | Main Applications |
|---|---|---|---|---|---|
| Square | EH-SA<br>EH-CA |  | 24<br>↓<br>48 | 100<br>↓<br>4000 | ☐ Automation devices<br>☐ High-speed transportation equipment<br>☐ Precision measuring equipment<br>☐ Semiconductor manufacturing equipment |
| Flange | EW-SA<br>EW-CA |  | 24<br>↓<br>48 | 100<br>↓<br>4000 | |
| | EW-SB<br>EW-CB |  | 24<br>↓<br>48 | 100<br>↓<br>4000 | |

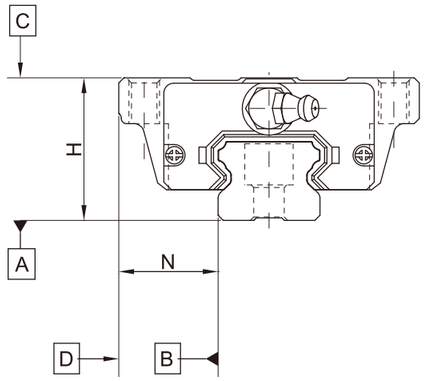
(2) Rail types
Besides the standard top mounting type, LIMON also offers bottom mounting type rails.

**Table 2-2-2** Rail Types

| Mounting from Top | Mounting from Bottom |
|---|---|
|  |  |

## 2-2-5 Accuracy

The accuracy of the E series can be classified into 5 classes: normal(C), high(H), precision(P), super precision(SP), and ultra precision(UP). Choose the class by referencing the accuracy of selected equipment.




(1) Accuracy of non-interchangeable guideways

**Table 2-2-3** Accuracy Standards Unit: mm

| Item | E - 15, 20 | | | | |
|---|---|---|---|---|---|
| Accuracy Classes | Normal (C) | High (H) | Precision (P) | Super Precision (SP) | Ultra Precision (UP) |
| Dimensional tolerance of height H | ± 0.1 | ± 0.03 | 0<br>- 0.03 | 0<br>- 0.015 | 0<br>- 0.008 |
| Dimensional tolerance of width N | ± 0.1 | ± 0.03 | 0<br>- 0.03 | 0<br>- 0.015 | 0<br>- 0.008 |
| Variation of height H | 0.02 | 0.01 | 0.006 | 0.004 | 0.003 |
| Variation of width N | 0.02 | 0.01 | 0.006 | 0.004 | 0.003 |
| Running parallelism of block surface C to surface A | See Table 2-2-7 | | | | |
| Running parallelism of block surface D to surface B | See Table 2-2-7 | | | | |

**Table 2-2-4** Accuracy Standards Unit: mm

| Item | E - 25, 30, 35 | | | | |
|---|---|---|---|---|---|
| Accuracy Classes | Normal (C) | High (H) | Precision (P) | Super Precision (SP) | Ultra Precision (UP) |
| Dimensional tolerance of height H | ± 0.1 | ± 0.04 | 0<br>- 0.04 | 0<br>- 0.02 | 0<br>- 0.01 |
| Dimensional tolerance of width N | ± 0.1 | ± 0.04 | 0<br>- 0.04 | 0<br>- 0.02 | 0<br>- 0.01 |
| Variation of height H | 0.02 | 0.015 | 0.007 | 0.005 | 0.003 |
| Variation of width N | 0.03 | 0.015 | 0.007 | 0.005 | 0.003 |
| Running parallelism of block surface C to surface A | See Table 2-2-7 | | | | |
| Running parallelism of block surface D to surface B | See Table 2-2-7 | | | | |





(2) Accuracy of interchangeable guideways

**Table 2-2-5** Accuracy Standards Unit: mm

| Item | E - 15, 20 | | |
|---|---|---|---|
| Accuracy Classes | Normal (C) | High (H) | Precision (P) |
| Dimensional tolerance of height H | ± 0.1 | ± 0.03 | ± 0.015 |
| Dimensional tolerance of width N | ± 0.1 | ± 0.03 | ± 0.015 |
| Variation of height H | 0.02 | 0.01 | 0.006 |
| Variation of width N | 0.02 | 0.01 | 0.006 |
| Running parallelism of block surface C to surface A | See Table 2-2-7 | | |
| Running parallelism of block surface D to surface B | See Table 2-2-7 | | |

**Table 2-2-6** Accuracy Standards Unit: mm

| Item | E - 25, 30, 35 | | |
|---|---|---|---|
| Accuracy Classes | Normal (C) | High (H) | Precision (P) |
| Dimensional tolerance of height H | ± 0.1 | ± 0.04 | ± 0.02 |
| Dimensional tolerance of width N | ± 0.1 | ± 0.04 | ± 0.02 |
| Variation of height H | 0.02 | 0.015 | 0.007 |
| Variation of width N | 0.03 | 0.015 | 0.007 |
| Running parallelism of block surface C to surface A | See Table 2-2-7 | | |
| Running parallelism of block surface D to surface B | See Table 2-2-7 | | |

(3) Accuracy of running parallelism

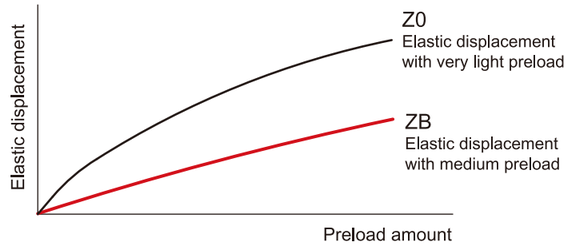
**Table 2-2-7** Accuracy of Running Parallelism

| Rail Length (mm) | Accuracy (μm) | | | | |
|---|---|---|---|---|---|
| | C | H | P | SP | UP |
| ~ 100 | 12 | 7 | 3 | 2 | 2 |
| 100 ~ 200 | 14 | 9 | 4 | 2 | 2 |
| 200 ~ 300 | 15 | 10 | 5 | 3 | 2 |
| 300 ~ 500 | 17 | 12 | 6 | 3 | 2 |
| 500 ~ 700 | 20 | 13 | 7 | 4 | 2 |
| 700 ~ 900 | 22 | 15 | 8 | 5 | 3 |
| 900 ~ 1,100 | 24 | 16 | 9 | 6 | 3 |
| 1,100 ~ 1,500 | 26 | 18 | 11 | 7 | 4 |
| 1,500 ~ 1,900 | 28 | 20 | 13 | 8 | 4 |
| 1,900 ~ 2,500 | 31 | 22 | 15 | 10 | 5 |
| 2,500 ~ 3,100 | 33 | 25 | 18 | 11 | 6 |
| 3,100 ~ 3,600 | 36 | 27 | 20 | 14 | 7 |
| 3,600 ~ 4,000 | 37 | 28 | 21 | 15 | 7 |

## 2-2-6 Preload

(1) Definition

A preload can be applied to each guideway. Generally, a linear motion guideway has a negative clearance between the groove and balls in order to improve stiffness and maintain high precision. The figure shows that adding a preload can improve stiffness of the linear guideway. A preload no greater than ZA would be recommended for model sizes smaller than E20. This will avoid an over-loaded condition that would affect guideway life.




(2) Preload classes

LIMON offers three standard preloads for various applications and conditions.

**Table 2-2-8** Preload Classes

| Class | Code | Preload | Condition |
|---|---|---|---|
| Very Light Preload | Z0 | 0~ 0.02C | Certain load direction,low impact, low precision required |
| Light Preload | ZA | 0.03C~0.05C | low load and high precision required |
| Medium Preload | ZB | 0.06C~ 0.08C | High rigidity required, with vibration and impact |

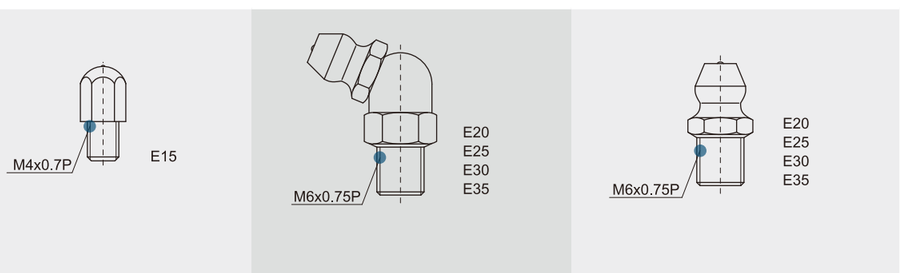
| Class | Interchangeable Guideway | Non-Interchangeable Guideway |
|---|---|---|
| Preload classes | Z0, ZA | Z0, ZA, ZB |

Note: The “C” in the preload column denotes basic dynamic load rating.

## 2-2-7 Lubrication

(1) Grease

☐ Grease nipple










☐ Mounting location

The standard location of the grease fitting is at both ends of the block, the nipple may be mounted in the side or top of the block. For lateral installation, we recommend that the nipple be mounted to the non-reference side, otherwise please contact us. When lubricating from above, in the recess for the O-ring, a smaller, preformed recess can be found. Preheat the 0.8 mm diameter metal tip. Carefully open the small recess with the metal tip and pierce through it. Insert a round sealing ring into the recess. (The round sealing ring is not supplied with the block) Do not open the small recess with a drill bit this may introduce the danger of contamination. It is possible to carry out the lubrication by using the oil-piping joint.

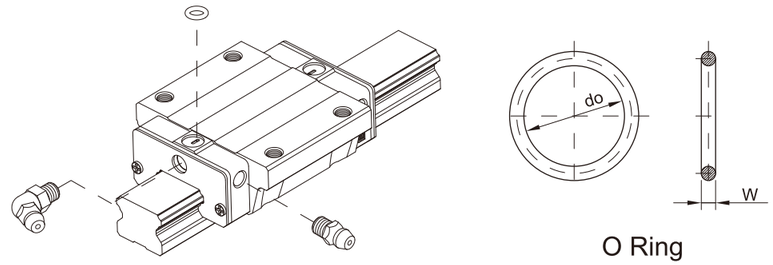
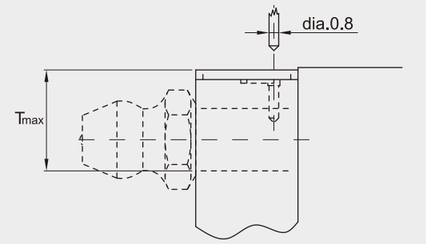



**Table 2-2-9** O-Ring size and max. permissible depth for piercing

| Size | O-Ring | | Lube hole at top: max. permissible depth for piercing |
|---|---|---|---|
| | do(mm) | W (mm) | $T_{max}$(mm) |
| E15 | 2.5 ± 0.15 | 1.5 ± 0.15 | 6.9 |
| E20 | 4.5 ± 0.15 | 1.5 ± 0.15 | 8.4 |
| E25 | 4.5 ± 0.15 | 1.5 ± 0.15 | 10.4 |
| E30 | 4.5 ± 0.15 | 1.5 ± 0.15 | 10.4 |
| E35 | 4.5 ± 0.15 | 1.5 ± 0.15 | 10.8 |




☐ The oil amount for a block filled with grease

**Table 2-2-10** The oil amount for a block illed with grease

| Size | Medium Load ($cm^3$) | Heavy Load ($cm^3$) |
|---|---|---|
| E15 | 0.8 | 1.4 |
| E20 | 1.5 | 2.4 |
| E25 | 2.8 | 4.6 |
| E30 | 3.7 | 6.3 |
| E35 | 5.6 | 6.6 |

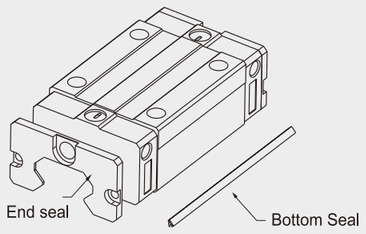
Frequency of replenishment

Check the grease every 100 km, or every 3-6 months.

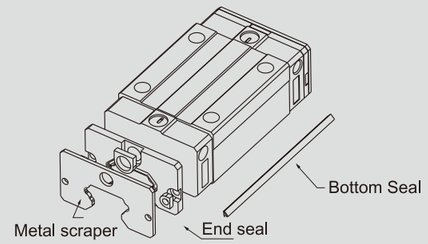
## 2-2-8 Dust Proof Accessories

(1) Codes of accessories

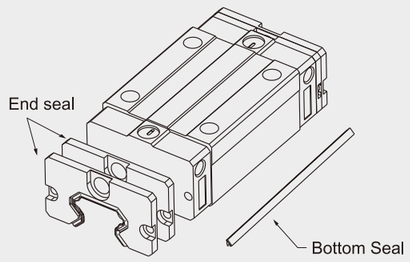
If the following accessories is needed, please indicate the code followed by the model number.



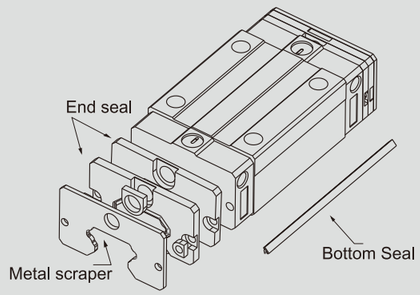

No symbol:Standard Protection(End seal+Bottom Seal)




ZZ(End seal+Metal scraper+Bottom Seal)




DD(Double end seals+Bottom seal)




KK(Double end seals+Metal scraper+Bottom seal)

(2) End seal and bottom seal

Protects against contaminants entering the block. Reduces potential for groove damage resulting in a reduction of life ratings.

(3) Double seals

Removing foreign matters from the rail to prevent contaminants from entering the block.

**Table 2-2-11** Dimensions of end seal

| Size | Thickness (t1) (mm) |
|---|---|
| E15 ES | 2 |
| E20 ES | 2 |
| E25 ES | 2 |
| E30 ES | 2 |
| E35 ES | 2 |







(4) Scraper

Clears larger contaminants, such as weld spatter and metal cuttings, from the rail. Metal scraper protects end seals from excessive damage.

**Table 2-2-12** Dimensions of Scraper

| Size | Thickness (t2) (mm) |
|---|---|
| E 15 SC | 0.8 |
| E 20 SC | 0.8 |
| E 25 SC | 1 |
| E 30 SC | 1 |
| E 35 SC | 1.5 |

(5) Bolt caps for rail mounting holes

Rail mounting hole caps prevent foreign matter from accumulating in the mounting holes. Caps are included with the rail package.

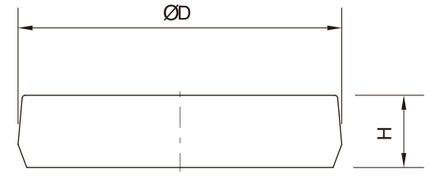



**Table 2-2-13** Dimensions of Bolt Caps for Rail Mounting Holes

| Rail size | Bolt size | Diameter(D) (mm) | Thickness(H) (mm) |
|---|---|---|---|
| ER15R | M3 | 6.15 | 1.2 |
| ER20R | M5 | 9.65 | 2.5 |
| ER25R | M6 | 11.15 | 2.5 |
| ER30R | M6 | 11.15 | 2.5 |
| ER35R | M8 | 14.20 | 3.5 |
| ER15U | M4 | 7.65 | 1.1 |
| ER30U | M8 | 14.20 | 3.5 |

(6) Dimensions of block equipped with the dustproof parts

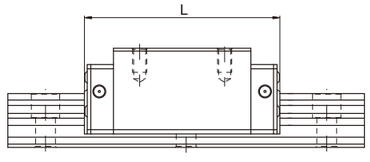



**Table 2-2-14** Overall block length

Unit: mm

| Size | Overall block length (L) | | | |
|---|---|---|---|---|
| | SS | ZZ | DD | KK |
| E15S | 41.1 | 43.7 | 46.1 | 48.7 |
| E15C | 57.8 | 60.4 | 62.8 | 65.4 |
| E20S | 51.2 | 53.8 | 56.4 | 59 |
| E20C | 70.3 | 72.9 | 75.5 | 78.1 |
| E25S | 59.7 | 62.3 | 65.7 | 68.3 |
| E25C | 85.2 | 87.8 | 91.2 | 93.8 |
| E30S | 71.9 | 74.5 | 78.1 | 80.7 |
| E30C | 100.4 | 103 | 106.6 | 109.2 |
| E35S | 76 | 79 | 80 | 83 |
| E35C | 108 | 111 | 112 | 115 |

## 2-2-9 Friction

The maximum value of resistance per end seal are as shown in the table.

**Table 2-2-15** Seal Resistance

| Size | Resistance N (kgf) |
|---|---|
| E15 | 1 (0.1) |
| E20 | 1.2 (0.17) |
| E25 | 2 (0.2) |
| E30 | 2.6 (0.27) |
| E35 | 3.5 (0.36) |

Note:1kgf=9.81N

## 2-2-10 The Accuracy Tolerance of Mounting Surface

Because of the circular-arc contact design, the E linear guideway can withstand surface-error installation and deliver smooth linear motion. When the mounting surface meets the accuracy requirements of the installation, the high accuracy and rigidity of the guideway will be obtained without any difficulty. For faster installation and smoother movement, LIMON offers a preload with normal clearance because of its ability to absorb higher deviations in mounting surface inaccuracies.

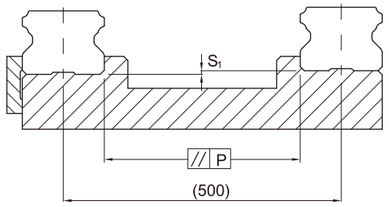



**Table 2-2-16** Max. Parallelism Tolerance (P)

unit: μm

| Size | Preload classes | | |
|---|---|---|---|
| | Z0 | ZA | ZB |
| E15 | 25 | 18 | - |
| E20 | 25 | 20 | 18 |
| E25 | 30 | 22 | 20 |
| E30 | 40 | 30 | 27 |
| E35 | 50 | 35 | 30 |

**Table 2-2-17** Max. Tolerance of Reference Surface Height ($S_1$)

unit: μm

| Size | Preload classes | | |
|---|---|---|---|
| | Z0 | ZA | ZB |
| E15 | 130 | 85 | - |
| E20 | 130 | 85 | 50 |
| E25 | 130 | 85 | 70 |
| E30 | 170 | 110 | 90 |
| E35 | 210 | 150 | 120 |







## 2-2-11 Cautions for Installation

(1) Shoulder heights and chamfers

Improper shoulder heights and chamfers of mounting surfaces will cause deviations in accuracy and rail or block interference with the chamfered part.

When recommended shoulder heights and chamfers are used, problems with installation accuracy should be eliminated.

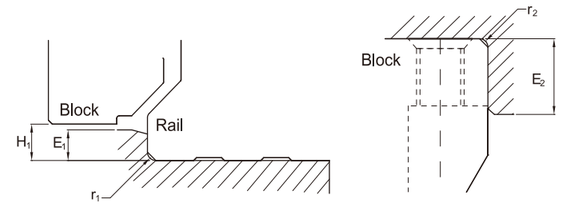



**Table 2-2-18** Shoulder Heights and Chamfers

unit: mm

| Size | Max. radius of fillets $r_1$ (mm) | Max. radius of fillets $r_2$ (mm) | Shoulder height of the rail $E_1$ (mm) | Shoulder height of the block $E_2$ (mm) | Clearance under block $H_1$ (mm) |
|---|---|---|---|---|---|
| E15 | 0.5 | 0.5 | 2.7 | 5.0 | 4.5 |
| E20 | 0.5 | 0.5 | 5.0 | 7.0 | 6.0 |
| E25 | 1.0 | 1.0 | 5.0 | 7.5 | 7.0 |
| E30 | 1.0 | 1.0 | 7.0 | 7.0 | 10.0 |
| E35 | 1.0 | 1.0 | 7.5 | 9.5 | 11.0 |

(2) Tightening Torque of Bolts for Installation

Improperly tightened mounting bolts will seriously affect the accuracy of linear guide installations. The following tightening torques for different sizes of bolts are recommended.

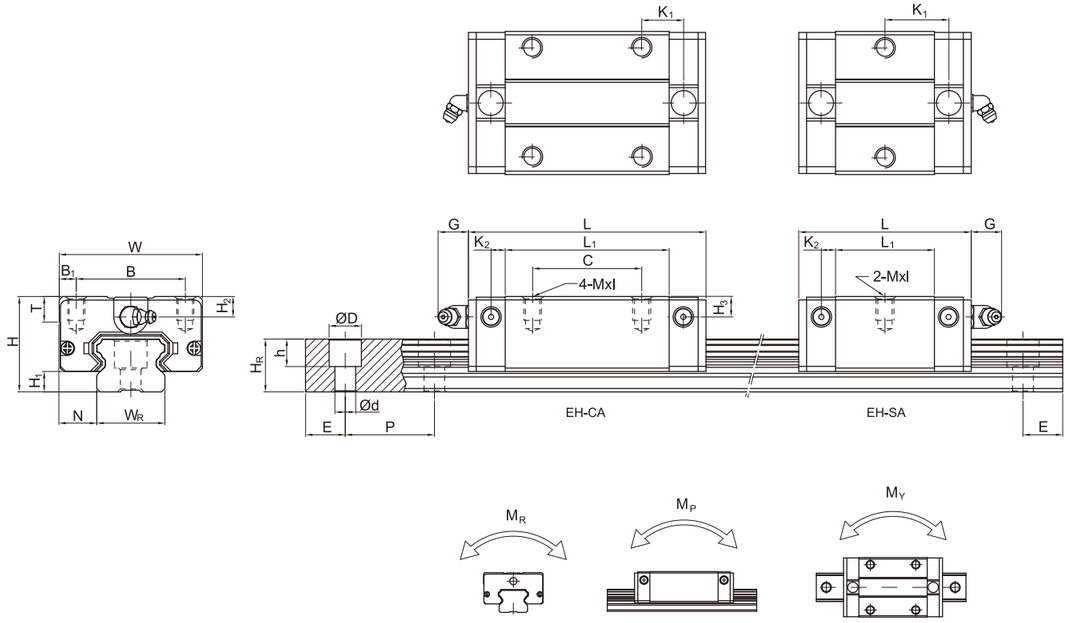
**Table 2-2-19** Tightening Torque

| Size | Bolt size | Torque N-cm(kgf-cm) | | |
|---|---|---|---|---|
| | | Iron | Casting | Aluminum |
| E15 | M3×0.5P×16L | 186 (19) | 127 (13) | 98 (10) |
| E20 | M5×0.8P×16L | 883 (90) | 588 (60) | 441 (45) |
| E25 | M6×1P×20L | 1373 (140) | 921 (94) | 686 (70) |
| E30 | M6×1P×25L | 1373 (140) | 921 (94) | 686 (70) |
| E35 | M8×1.25P×25L | 3041 (310) | 2010 (205) | 1470 (150) |

Note: 1 kgf = 9.81 N

## 2-2-12 Dimensions for E Series

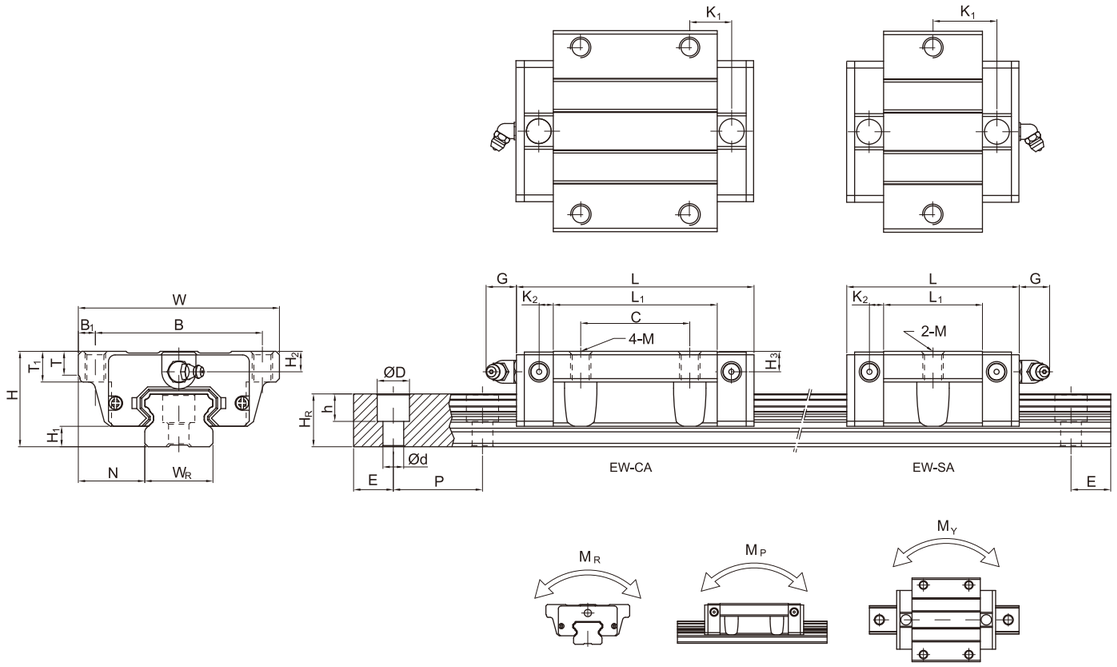
### (1) EH-SA / EH-CA




| Model No. | Dimensions of Assembly (mm) | | | Dimensions of Block (mm) | | | | | | | | | | | | Dimensions of Rail (mm) | | | | | | Mounting Bolt for Rail | Basic Dynamic Load Rating | Basic Static Load Rating | Static Rated Moment | | | Weight | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | H | $H_1$ | N | W | B | $B_1$ | C | $L_1$ | L | $K_1$ | $K_2$ | G | MxI | T | $H_2$ | $H_3$ | $W_R$ | $H_R$ | D | h | d | P | E | | | $M_R$ | $M_P$ | $M_Y$ | Block | Rail |
| | | | | | | | | | | | | | | | | | | | | | | | | (mm) | C(kN) | $C_0$ (kN) | kN-m | kN-m | kN-m | kg | kg/m |
| EH15SA | 24 | 4.5 | 9.5 | 34 | 26 | 4 | - | 23.1 | 40.1 | 14.8 | 3.5 | 5.7 | M4x6 | 6 | 5.5 | 6 | 15 | 12.5 | 6 | 4.5 | 3.5 | 60 | 20 | M3x16 | 5.35 | 9.40 | 0.08 | 0.04 | 0.04 | 0.09 | 1.25 |
| EH15CA | | | | | | | 26 | 39.8 | 56.8 | 10.15 | | | | | | | | | | | | | | | 7.83 | 16.19 | 0.13 | 0.10 | 0.10 | 0.15 | |
| EH20SA | 28 | 6 | 11 | 42 | 32 | 5 | - | 29 | 50 | 18.75 | 4.15 | 12 | M5x7 | 7.5 | 6 | 6 | 20 | 15.5 | 9.5 | 8.5 | 6 | 60 | 20 | M5x16 | 7.23 | 12.74 | 0.13 | 0.06 | 0.06 | 0.15 | 2.08 |
| EH20CA | | | | | | | 32 | 48.1 | 69.1 | 12.3 | | | | | | | | | | | | | | | 10.31 | 21.13 | 0.22 | 0.16 | 0.16 | 0.24 | |
| EH25SA | 33 | 7 | 12.5 | 48 | 35 | 6.5 | - | 35.5 | 59.1 | 21.9 | 4.55 | 12 | M6x9 | 8 | 8 | 8 | 23 | 18 | 11 | 9 | 7 | 60 | 20 | M6x20 | 11.40 | 19.50 | 0.23 | 0.12 | 0.12 | 0.25 | 2.67 |
| EH25CA | | | | | | | 35 | 59 | 82.6 | 16.15 | | | | | | | | | | | | | | | 16.27 | 32.40 | 0.38 | 0.32 | 0.32 | 0.41 | |
| EH30SA | 42 | 10 | 16 | 60 | 40 | 10 | - | 41.5 | 69.5 | 26.75 | 6 | 12 | M8x12 | 9 | 8 | 9 | 28 | 23 | 11 | 9 | 7 | 80 | 20 | M6x25 | 16.42 | 28.10 | 0.40 | 0.21 | 0.21 | 0.45 | 4.35 |
| EH30CA | | | | | | | 40 | 70.1 | 98.1 | 21.05 | | | | | | | | | | | | | | | 23.70 | 47.46 | 0.68 | 0.55 | 0.55 | 0.76 | |
| EH35SA | 48 | 11 | 18 | 70 | 50 | 10 | - | 45 | 75 | 28.5 | 7 | 12 | M8x12 | 10 | 8.5 | 8.5 | 34 | 27.5 | 14 | 12 | 9 | 80 | 20 | M8x25 | 22.66 | 37.38 | 0.56 | 0.31 | 0.31 | 0.66 | 6.14 |
| EH35CA | | | | | | | 50 | 78 | 108 | 20 | | | | | | | | | | | | | | | 33.35 | 64.84 | 0.98 | 0.69 | 0.69 | 1.13 | |

Note : 1 kgf = 9.81 N

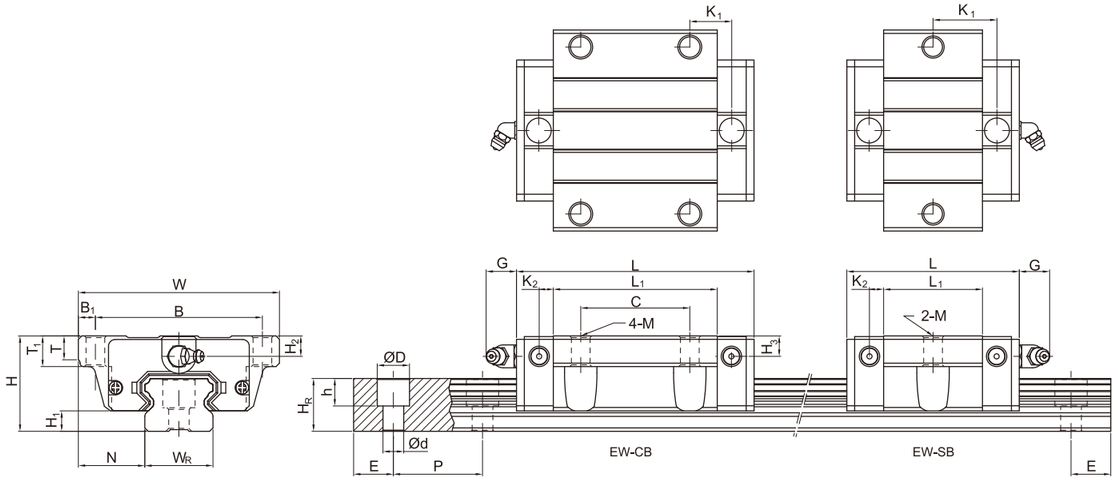
### (2) EW-SA / EW-CA

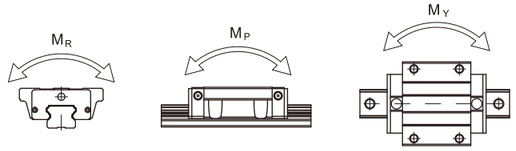



| Model No. | Dimensions of Assembly (mm) | | | Dimensions of Block (mm) | | | | | | | | | | | | | | Dimensions of Rail (mm) | | | | | | | Mounting Bolt for Rail | Basic Dynamic Load Rating | Basic Static Load Rating | Static Rated Moment | | | Weight | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | H | $H_1$ | N | W | B | $B_1$ | C | $L_1$ | L | $K_1$ | $K_2$ | G | M | T | $T_1$ | $H_2$ | $H_3$ | $W_R$ | $H_R$ | D | h | d | P | E | | | | $M_R$ | $M_P$ | $M_Y$ | Block | Rail |
| | | | | | | | | | | | | | | | | | | | | | | | | | (mm) | C(kN) | $C_0$ (kN) | kN-m | kN-m | kN-m | kg | kg/m |
| EW15SA | 24 | 4.5 | 18.5 | 52 | 41 | 5.5 | - | 23.1 | 40.1 | 14.8 | 3.5 | 5.7 | M5 | 5 | 7 | 5.5 | 6 | 15 | 12.5 | 6 | 4.5 | 3.5 | 60 | 20 | M3x16 | 5.35 | 9.40 | 0.08 | 0.04 | 0.04 | 0.12 | 1.25 |
| EW15CA | | | | | | | 26 | 39.8 | 56.8 | 10.15 | | | | | | | | | | | | | | | | 7.83 | 16.19 | 0.13 | 0.10 | 0.10 | 0.21 | |
| EW20SA | 28 | 6 | 19.5 | 59 | 49 | 5 | - | 29 | 50 | 18.75 | 4.15 | 12 | M6 | 7 | 9 | 6 | 6 | 20 | 15.5 | 9.5 | 8.5 | 6 | 60 | 20 | M5x16 | 7.23 | 12.74 | 0.13 | 0.06 | 0.06 | 0.19 | 2.08 |
| EW20CA | | | | | | | 32 | 48.1 | 69.1 | 12.3 | | | | | | | | | | | | | | | | 10.31 | 21.13 | 0.22 | 0.16 | 0.16 | 0.32 | |
| EW25SA | 33 | 7 | 25 | 73 | 60 | 6.5 | - | 35.5 | 59.1 | 21.9 | 4.55 | 12 | M8 | 7.5 | 10 | 8 | 8 | 23 | 18 | 11 | 9 | 7 | 60 | 20 | M6x20 | 11.40 | 19.50 | 0.23 | 0.12 | 0.12 | 0.35 | 2.67 |
| EW25CA | | | | | | | 35 | 59 | 82.6 | 16.15 | | | | | | | | | | | | | | | | 16.27 | 32.40 | 0.38 | 0.32 | 0.32 | 0.59 | |
| EW30SA | 42 | 10 | 31 | 90 | 72 | 9 | - | 41.5 | 69.5 | 26.75 | 6 | 12 | M10 | 7 | 10 | 8 | 9 | 28 | 23 | 11 | 9 | 7 | 80 | 20 | M6x25 | 16.42 | 28.10 | 0.40 | 0.21 | 0.21 | 0.62 | 4.35 |
| EW30CA | | | | | | | 40 | 70.1 | 98.1 | 21.05 | | | | | | | | | | | | | | | | 23.70 | 47.46 | 0.68 | 0.55 | 0.55 | 1.04 | |
| EW35SA | 48 | 11 | 33 | 100 | 82 | 9 | - | 45 | 75 | 28.5 | 7 | 12 | M10 | 10 | 13 | 8.5 | 8.5 | 34 | 27.5 | 14 | 12 | 9 | 80 | 20 | M8x25 | 22.66 | 37.38 | 0.56 | 0.31 | 0.31 | 0.84 | 6.14 |
| EW35CA | | | | | | | 50 | 78 | 108 | 20 | | | | | | | | | | | | | | | | 33.35 | 64.84 | 0.98 | 0.69 | 0.69 | 1.45 | |

Note : 1 kgf = 9.81 N

## (3) EW-SB / EW-CB



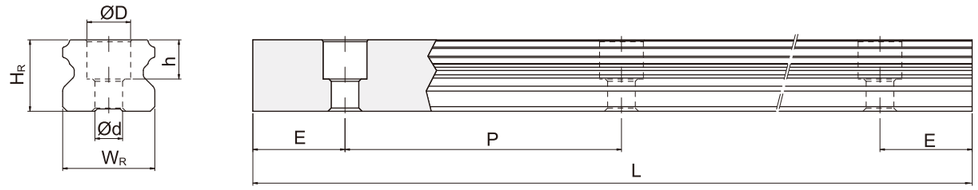

| Model No. | Dimensions of Assembly (mm) | | | Dimensions of Block (mm) | | | | | | | | | | | | | Dimensions of Rail (mm) | | | | | | Mounting Bolt for Rail | Basic Dynamic Load Rating | Basic Static Load Rating | Static Rated Moment | | | Weight | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | H | $H_1$ | N | W | B | $B_1$ | C | $L_1$ | L | $K_1$ | $K_2$ | G | M | T | $T_1$ | $H_2$ | $H_3$ | $W_R$ | $H_R$ | D | h | d | P | E | (mm) | C(kN) | $C_0$ (kN) | $M_R$ kN-m | $M_P$ kN-m | $M_Y$ kN-m | Block kg | Rail kg/m |
| EW15SB | 24 | 4.5 | 18.5 | 52 | 41 | 5.5 | - | 23.1 | 40.1 | 14.8 | 3.5 | 5.7 | Ø4.5 | 5 | 7 | 5.5 | 6 | 15 | 12.5 | 6 | 4.5 | 3.5 | 60 | 20 | M3x16 | 5.35 | 9.40 | 0.08 | 0.04 | 0.04 | 0.12 | 1.25 |
| EW15CB | | | | | | | 26 | 39.8 | 56.8 | 10.15 | | | | | | | | | | | | | | | | 7.83 | 16.19 | 0.13 | 0.10 | 0.10 | 0.21 | |
| EW20SB | 28 | 6 | 19.5 | 59 | 49 | 5 | - | 29 | 50 | 18.75 | 4.15 | 12 | Ø5.5 | 7 | 9 | 6 | 6 | 20 | 15.5 | 9.5 | 8.5 | 6 | 60 | 20 | M5x16 | 7.23 | 12.74 | 0.13 | 0.06 | 0.06 | 0.19 | 2.08 |
| EW20CB | | | | | | | 32 | 48.1 | 69.1 | 12.3 | | | | | | | | | | | | | | | | 10.31 | 21.13 | 0.22 | 0.16 | 0.16 | 0.32 | |
| EW25SB | 33 | 7 | 25 | 73 | 60 | 6.5 | - | 35.5 | 59.1 | 21.9 | 4.55 | 12 | Ø7 | 7.5 | 10 | 8 | 8 | 23 | 18 | 11 | 9 | 7 | 60 | 20 | M6x20 | 11.40 | 19.50 | 0.23 | 0.12 | 0.12 | 0.35 | 2.67 |
| EW25CB | | | | | | | 35 | 59 | 82.6 | 16.15 | | | | | | | | | | | | | | | | 16.27 | 32.40 | 0.38 | 0.32 | 0.32 | 0.59 | |
| EW30SB | 42 | 10 | 31 | 90 | 72 | 9 | - | 41.5 | 69.5 | 26.75 | 6 | 12 | Ø9 | 7 | 10 | 8 | 9 | 28 | 23 | 11 | 9 | 7 | 80 | 20 | M6x25 | 16.42 | 28.10 | 0.40 | 0.21 | 0.21 | 0.62 | 4.35 |
| EW30CB | | | | | | | 40 | 70.1 | 98.1 | 21.05 | | | | | | | | | | | | | | | | 23.70 | 47.46 | 0.68 | 0.55 | 0.55 | 1.04 | |
| EW35SB | 48 | 11 | 33 | 100 | 82 | 9 | - | 45 | 75 | 28.5 | 7 | 12 | Ø9 | 10 | 13 | 8.5 | 8.5 | 34 | 27.5 | 14 | 12 | 9 | 80 | 20 | M8x25 | 22.66 | 37.38 | 0.56 | 0.31 | 0.31 | 0.84 | 6.14 |
| EW35CB | | | | | | | 50 | 78 | 108 | 20 | | | | | | | | | | | | | | | | 33.35 | 64.84 | 0.98 | 0.69 | 0.69 | 1.45 | |

Note : 1 kgf = 9.81 N



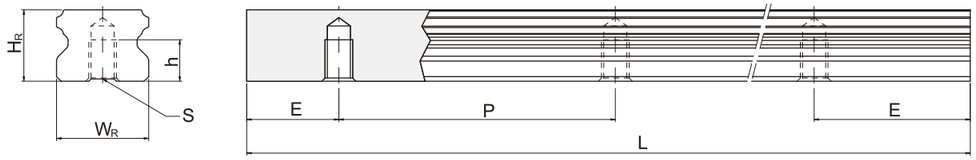


## (4) Dimensions for ER-U (large mounting hole, rail mounting from top)




| Model No. | Mounting Bolt for Rail(mm) | Dimensions of Rail (mm) | | | | | | | Weight |
|---|---|---|---|---|---|---|---|---|---|
| | | $W_R$ | $H_R$ | D | h | d | P | E | (kg/m) |
| ER15U | M4x16 | 15 | 12.5 | 7.5 | 5.3 | 4.5 | 60 | 20 | 1.23 |
| ER30U | M8x25 | 28 | 23 | 14 | 12 | 9 | 80 | 20 | 4.23 |

## (5) Dimensions for ER-T (rail mounting from bottom)




| Model No. | Dimensions of Rail (mm) | | | | | | Weight |
|---|---|---|---|---|---|---|---|
| | $W_R$ | $H_R$ | S | h | P | E | (kg/m) |
| ER15T | 15 | 12.5 | M5 x 0.8P | 7 | 60 | 20 | 1.26 |
| ER20T | 20 | 15.5 | M6 x 1P | 9 | 60 | 20 | 2.15 |
| ER25T | 23 | 18 | M6 x 1P | 10 | 60 | 20 | 2.79 |
| ER30T | 28 | 23 | M8 x 1.25P | 14 | 80 | 20 | 4.42 |
| ER35T | 34 | 27.5 | M8 x 1.25P | 17 | 80 | 20 | 6.34 |

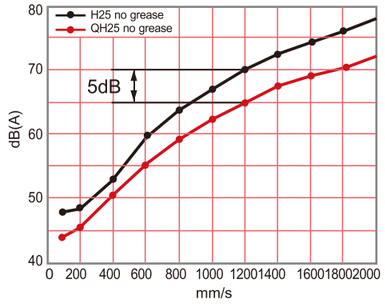
## 2-3 QH Series – Quiet Linear Guideway, with SynchMotion™ Technology

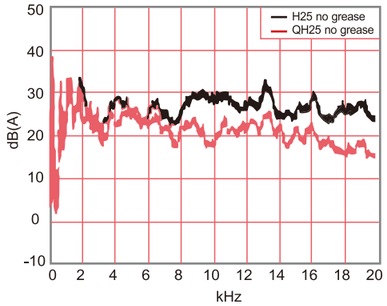
The development of LIMON-QH linear guideway is based on a four-row circular-arc contact. The LIMON-QH series linear guideway with SynchMotion™ Technology offers smooth movement, superior lubrication, quieter operation and longer running life. Therefore the LIMON-QH linear guideway has broad industrial applicability. In the high-tech industry where high speed, low noise, and reduced dust generation is required, the LIMON-QH series is interchangeable with the LIMON-H series.

### 2-3-1 Features of QH Series

(1) Low Noise Design

With SynchMotion™ technology, rolling elements are interposed between the partitions of SynchMotion™ to provide impoved circulation. Due to the elimination of contact between the rolling elements, collision noise and sound levels are drastically reduced.

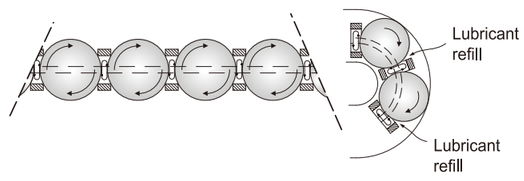



(2) Self-Lubricant Design

The partition is a grouping of hollow ring-like structures formed with a through hole to facilitate circulation of the lubricant. Because of the special lubrication path design, the lubricant of the partition storage space can be refilled. Therefore, the frequency of lubricant refilling can be decreased.

The QH-series linear guideway is pre-lubricated. Performance testing at a 0.2C (basic dynamic load) shows that after running 4,000km no damage was apparent to either the rolling elements or the raceway.







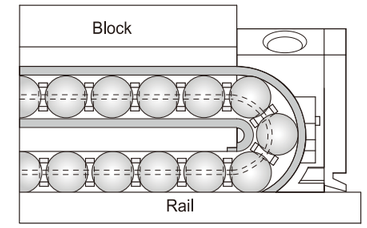



(3) Smooth Movement

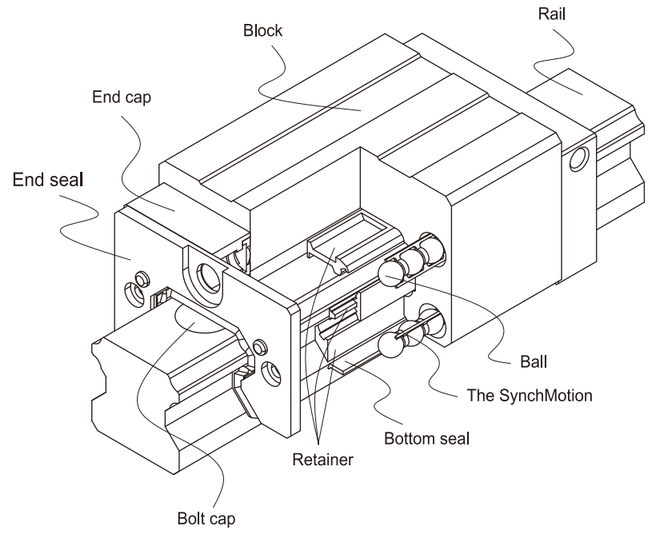
In standard linear guideways, rolling elements on the load side of the guide block begin rolling and push their way through the raceway. When they contact other rolling elements they create counter-rotational friction. This results in a great variation of rolling resistance. The QH linear guideway, with SynchMotion™ technology prevents this condition. As the block starts to move, the rolling elements begin rolling consecutively and remain separated to prevent contact with one another thus keeping the element's kinetic energy extremely stable in order to effectively reduce fluctuations in rolling resistance.

(4) High Speed Performance

The LIMON-QH series offers excellent high-speed performance due to the partitions of the SynchMotion™ structure. They are employed to separate the adjacent balls thereby resulting in low rolling traction and the metallic friction between adjacent balls is eliminated.



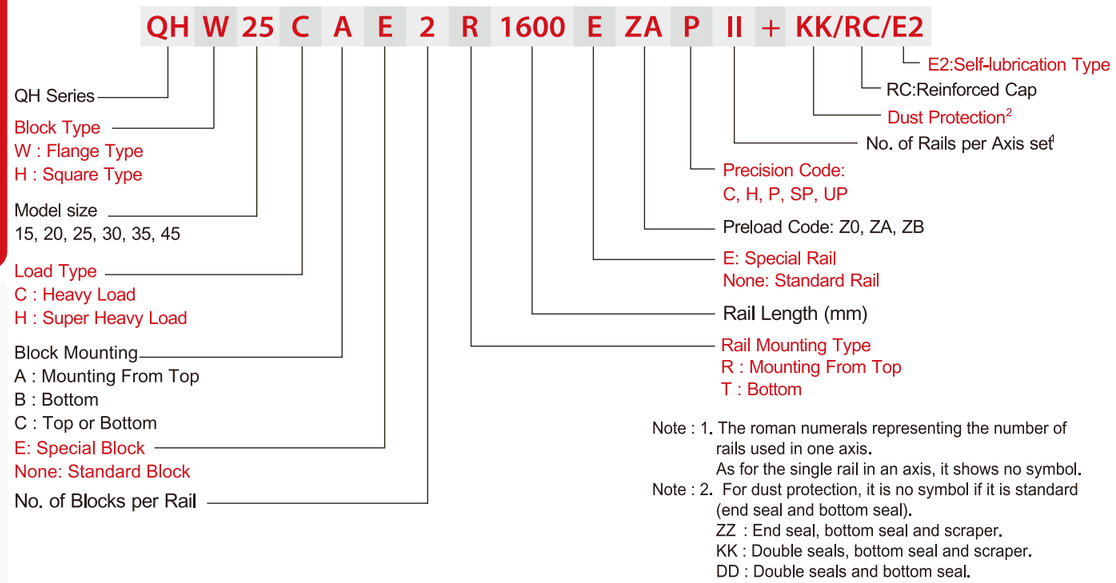

### 2-3-2 Construction of QH Series




### 2-3-3 Model Number of QH Series

LIMON-QH series guideway can be classified into non-interchangeable and interchangeable types. The sizes are identical. The main difference is that the interchangeable blocks and rails can be freely exchanged. Because of dimensional control, the interchangeable type linear guideway is a perfect choice for the client when rails do not need to be paired for an axis. And since the QH and H share the identical rails, the customer does not need to redesign when choosing the QH series. Therefore the LIMON-QH linear guideway has increased applicability.

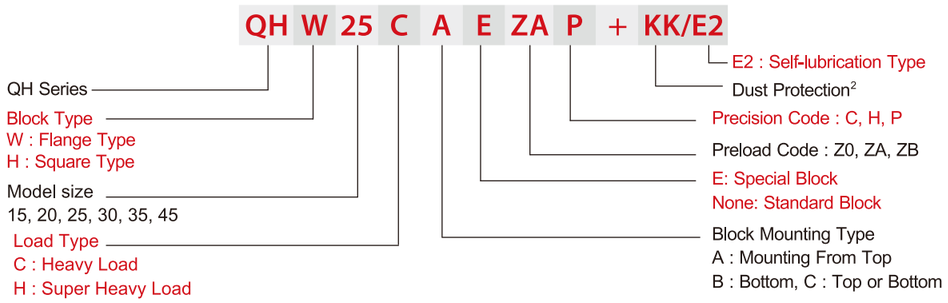
(1) Non-interchangeable type



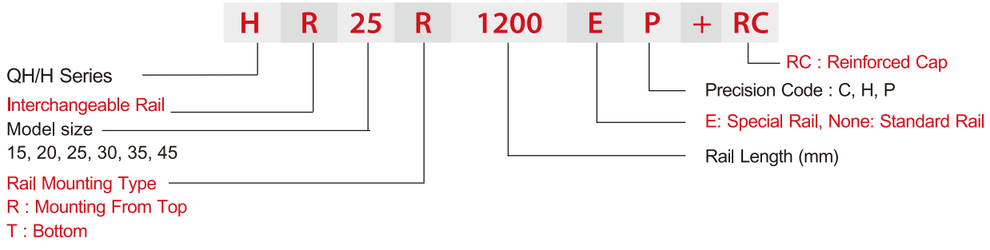

Note : 1. The roman numerals representing the number of rails used in one axis.
As for the single rail in an axis, it shows no symbol.
Note : 2. For dust protection, it is no symbol if it is standard (end seal and bottom seal).
ZZ : End seal, bottom seal and scraper.
KK : Double seals, bottom seal and scraper.
DD : Double seals and bottom seal.

(2) Interchangeable type

☐ Model Number of QH Block




☐ Model Number of QH Rail (QH and H share the identical rails)







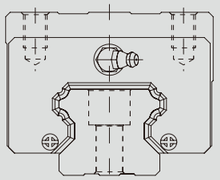
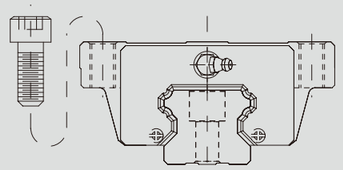
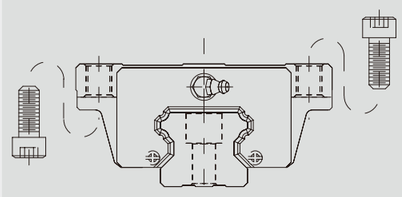



## 2-3-4 Types

(1) Block types

LIMON offers two types of linear guideways, flange and square types.

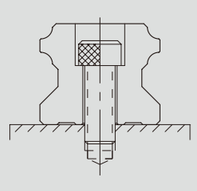
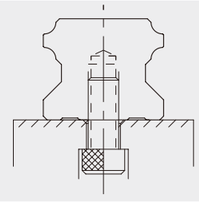
**Table 2-3-1** Block Types

| Type | Model | Shape | Height (mm) | Rail Length (mm) | Main Applications |
|---|---|---|---|---|---|
| Square | QHH-CA<br>QHH-HA |  | 28<br>↓<br>70 | 100<br>↓<br>4000 | ☐ Automation devices<br>☐ High-speed transportation equipment<br>☐ Precision measuring equipment<br>☐ Semiconductor manufacturing equipment |
| Flange | QHW-CA<br>QHW-HA |  | 24<br>↓<br>60 | 100<br>↓<br>4000 | |
| | QHW-CB<br>QHW-HB |  | 24<br>↓<br>60 | 100<br>↓<br>4000 | |
| | QHW-CC<br>QHW-HC |  | 24<br>↓<br>60 | 100<br>↓<br>4000 | |

(2) Rail types

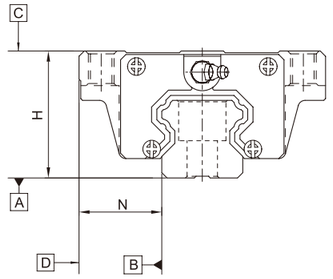
Besides the standard top mounting type, the bottom mounting type is also available.

**Table 2-3-2** Rail Types

| Mounting from Top | Mounting from bottom |
|---|---|
|  |  |

## 2-3-5 Accuracy

The accuracy of QH series can be classified into normal (C), high (H), precision (P), super precision (SP), ultra precision (UP), five classes. Please choose the class by referring the accuracy of applied equipment.




### (1) Accuracy of non-interchangeable

**Table 2-3-3** Accuracy Standards

Unit: mm

| Item | QH - 15, 20 | | | | |
|---|---|---|---|---|---|
| Accuracy Classes | Normal (C) | High (H) | Precision (P) | Super Precision (SP) | Ultra Precision (UP) |
| Dimensional tolerance of height H | ± 0.1 | ± 0.03 | 0<br>- 0.03 | 0<br>- 0.015 | 0<br>- 0.008 |
| Dimensional tolerance of width N | ± 0.1 | ± 0.03 | 0<br>- 0.03 | 0<br>- 0.015 | 0<br>- 0.008 |
| Variation of height H | 0.02 | 0.01 | 0.006 | 0.004 | 0.003 |
| Variation of width N | 0.02 | 0.01 | 0.006 | 0.004 | 0.003 |
| Running parallelism of block surface C to surface A | See Table 2-3-9 | | | | |
| Running parallelism of block surface D to surface B | See Table 2-3-9 | | | | |

**Table 2-3-4** Accuracy Standards

Unit: mm

| Item | QH - 25, 30, 35 | | | | |
|---|---|---|---|---|---|
| Accuracy Classes | Normal (C) | High (H) | Precision (P) | Super Precision (SP) | Ultra Precision (UP) |
| Dimensional tolerance of height H | ± 0.1 | ± 0.04 | 0<br>- 0.04 | 0<br>- 0.02 | 0<br>- 0.01 |
| Dimensional tolerance of width N | ± 0.1 | ± 0.04 | 0<br>- 0.04 | 0<br>- 0.02 | 0<br>- 0.01 |
| Variation of height H | 0.02 | 0.015 | 0.007 | 0.005 | 0.003 |
| Variation of width N | 0.03 | 0.015 | 0.007 | 0.005 | 0.003 |
| Running parallelism of block surface C to surface A | See Table 2-3-9 | | | | |
| Running parallelism of block surface D to surface B | See Table 2-3-9 | | | | |

**Table 2-3-5** Accuracy Standards

Unit: mm

| Item | QH - 45 | | | | |
|---|---|---|---|---|---|
| Accuracy Classes | Normal (C) | High (H) | Precision (P) | Super Precision (SP) | Ultra Precision (UP) |
| Dimensional tolerance of height H | ± 0.1 | ± 0.05 | 0<br>- 0.05 | 0<br>- 0.03 | 0<br>- 0.02 |
| Dimensional tolerance of width N | ± 0.1 | ± 0.05 | 0<br>- 0.05 | 0<br>- 0.03 | 0<br>- 0.02 |
| Variation of height H | 0.03 | 0.015 | 0.007 | 0.005 | 0.003 |
| Variation of width N | 0.03 | 0.02 | 0.01 | 0.007 | 0.005 |
| Running parallelism of block surface C to surface A | See Table 2-3-9 | | | | |
| Running parallelism of block surface D to surface B | See Table 2-3-9 | | | | |





### (2) Accuracy of interchangeable

**Table 2-3-6** Accuracy Standards

Unit: mm

| Item | QH - 15, 20 | | |
|---|---|---|---|
| Accuracy Classes | Normal (C) | High (H) | Precision (P) |
| Dimensional tolerance of height H | ± 0.1 | ± 0.03 | ± 0.015 |
| Dimensional tolerance of width N | ± 0.1 | ± 0.03 | ± 0.015 |
| Variation of height H | 0.02 | 0.01 | 0.006 |
| Variation of width N | 0.02 | 0.01 | 0.006 |
| Running parallelism of block surface C to surface A | See Table 2-3-9 | | |
| Running parallelism of block surface D to surface B | See Table 2-3-9 | | |

**Table 2-3-7** Accuracy Standards

Unit: mm

| Item | QH - 25, 30, 35 | | |
|---|---|---|---|
| Accuracy Classes | Normal (C) | High (H) | Precision (P) |
| Dimensional tolerance of height H | ± 0.1 | ± 0.04 | ± 0.02 |
| Dimensional tolerance of width N | ± 0.1 | ± 0.04 | ± 0.02 |
| Variation of height H | 0.02 | 0.015 | 0.007 |
| Variation of width N | 0.03 | 0.015 | 0.007 |
| Running parallelism of block surface C to surface A | See Table 2-3-9 | | |
| Running parallelism of block surface D to surface B | See Table 2-3-9 | | |

**Table 2-3-8** Accuracy Standards

Unit: mm

| Item | QH - 45 | | |
|---|---|---|---|
| Accuracy Classes | Normal (C) | High (H) | Precision (P) |
| Dimensional tolerance of height H | ± 0.1 | ± 0.05 | ± 0.025 |
| Dimensional tolerance of width N | ± 0.1 | ± 0.05 | ± 0.025 |
| Variation of height H | 0.03 | 0.015 | 0.007 |
| Variation of width N | 0.03 | 0.02 | 0.01 |
| Running parallelism of block surface C to surface A | See Table 2-3-9 | | |
| Running parallelism of block surface D to surface B | See Table 2-3-9 | | |

(3) Accuracy of running parallelism

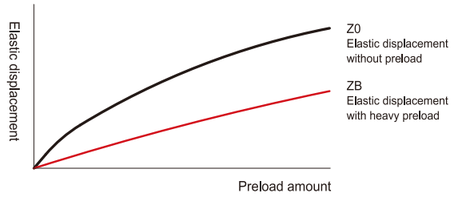
**Table 2-3-9** Accuracy of Running Parallelism

| Rail Length (mm) | Accuracy (μm) | | | | |
|---|---|---|---|---|---|
| | C | H | P | SP | UP |
| ~ 100 | 12 | 7 | 3 | 2 | 2 |
| 100 ~ 200 | 14 | 9 | 4 | 2 | 2 |
| 200 ~ 300 | 15 | 10 | 5 | 3 | 2 |
| 300 ~ 500 | 17 | 12 | 6 | 3 | 2 |
| 500 ~ 700 | 20 | 13 | 7 | 4 | 2 |
| 700 ~ 900 | 22 | 15 | 8 | 5 | 3 |
| 900 ~ 1,100 | 24 | 16 | 9 | 6 | 3 |
| 1,100 ~ 1,500 | 26 | 18 | 11 | 7 | 4 |
| 1,500 ~ 1,900 | 28 | 20 | 13 | 8 | 4 |
| 1,900 ~ 2,500 | 31 | 22 | 15 | 10 | 5 |
| 2,500 ~ 3,100 | 33 | 25 | 18 | 11 | 6 |
| 3,100 ~ 3,600 | 36 | 27 | 20 | 14 | 7 |
| 3,600 ~ 4,000 | 37 | 28 | 21 | 15 | 7 |

## 2-3-6 Preload

(1) Definition

A preload can be applied to each guideway. Oversized balls are used. Generally, a linear motion guideway has a negative clearance between groove and balls in order to improve stiffness and maintain high precision. The figure shows the load is multiplied by the preload, the rigidity is doubled and the deflection is reduced by one half. The preload no larger than ZA would be recommended for the model size under QH20 to avoid an over-preload affecting the guideway's life.




(2) Preload classes

LIMON offers three classes of standard preload for various applications and conditions.

**Table 2-3-10** Preload Classes

| Class | Code | Preload | Condition | Examples of Application |
|---|---|---|---|---|
| Light Preload | Z0 | 0~ 0.02C | Certain load direction,low impact, low precision required | Transportation devices, auto-packing machines, X-Y axis for general industrial machines, welding machines, welders |
| Medium Preload | ZA | 0.05C~0.07C | High precision required | Machining centers, Z axis for general industrial, machines, EDM, NC lathes, Precision X-Y tables, measuring equipment |
| Heavy Preload | ZB | 0.10C~ 0.12C | High rigidity required, with vibration and impact | Machining centers, grinding machines, NC lathes, horizontal and vertical milling machines, Z axis of machine tools, Heavy cutting machines |

| Class | Interchangeable Guideway | Non-Interchangeable Guideway |
|---|---|---|
| Preload classes | Z0, ZA | Z0, ZA, ZB |

Note: The "C" in the preload column denotes basic dynamic load rating.

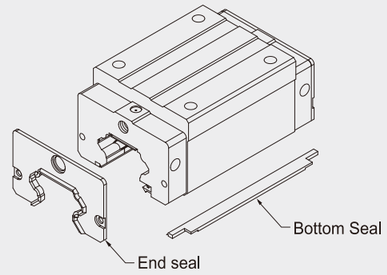




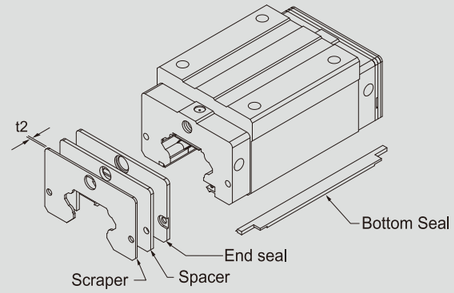
## 2-3-7 Dust Proof Accessories

(1) Codes of accessories

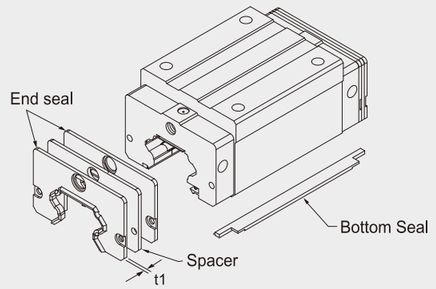
If the following accessories are needed, please add the code followed by the model number.



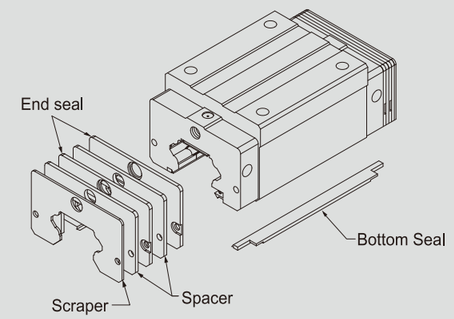

No symbol: Standard Protection (End seal + Bottom Seal)




ZZ (End seal + Bottom Seal + Scraper)




DD (Double seals + Bottom Seal)




KK (Double seals + Bottom Seal + Scraper)

(2) End seal and bottom seal

To prevent life reduction caused by iron chips or dust entering the block.

(3) Double seals

Enhances the wiping effect, foreign matter can be completely wiped off.

**Table 2-3-11** Dimensions of end seal

| Size | Thickness (t1) (mm) | Size | Thickness (t1) (mm) |
|---|---|---|---|
| QH15 ES | 3 | QH30 ES | 3.2 |
| QH20 ES | 2.5 | QH35 ES | 2.5 |
| QH25 ES | 2.5 | QH45 ES | 3.6 |

(4) Scraper

The scraper removes high-temperature iron chips and larger foreign objects.

**Table 2-3-12** Dimensions of scraper

| Size | Thickness (t2) (mm) | Size | Thickness (t2) (mm) |
|---|---|---|---|
| QH15 SC | 1.5 | QH30 SC | 1.5 |
| QH20 SC | 1.5 | QH35 SC | 1.5 |
| QH25 SC | 1.5 | QH45 SC | 1.5 |

(5) Dimensions of block equipped with the dustproof parts

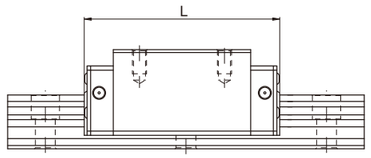



**Table 2-3-13** Overall block length

unit: mm

| Size | Overall block length (L) | | | |
|---|---|---|---|---|
| | SS | ZZ | DD | KK |
| QH15C | 60.5 | 64.1 | 65.5 | 69.1 |
| QH20C | 76.7 | 80.3 | 82.5 | 86.1 |
| QH20H | 91.4 | 95 | 97.2 | 100.8 |
| QH25C | 84 | 87.6 | 90 | 93.6 |
| QH25H | 104.6 | 108.2 | 110.6 | 114.2 |
| QH30C | 98.4 | 102 | 104.6 | 108.2 |
| QH30H | 121.4 | 125 | 127.6 | 131.2 |
| QH35C | 112.4 | 116 | 118.8 | 122.4 |
| QH35H | 138.2 | 141.8 | 144.6 | 148.2 |
| QH45C | 137.4 | 141 | 145.4 | 149 |
| QH45H | 169.2 | 172.8 | 177.2 | 180.8 |

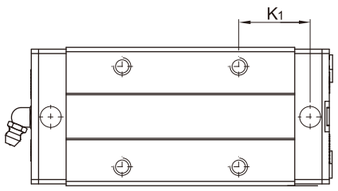
Note : The marking of "( )" denotes the maximum block length with screws, lips of end seals, etc.

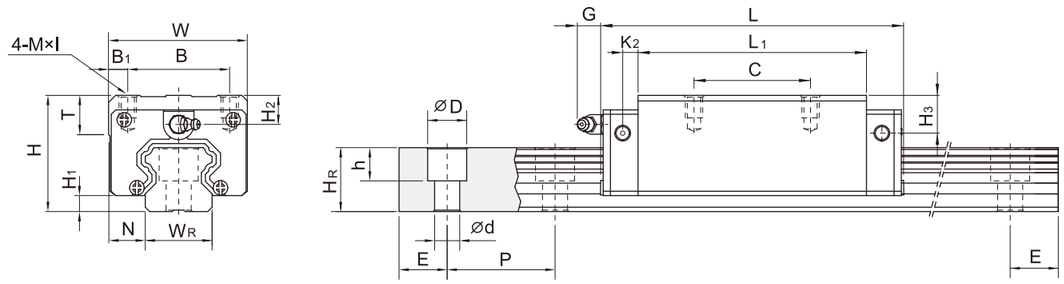


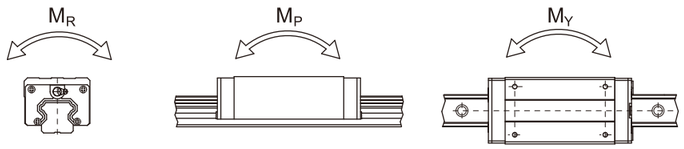


## 2-3-8 Dimensions for QH Series

(1) QHH-CA / QHH-HA



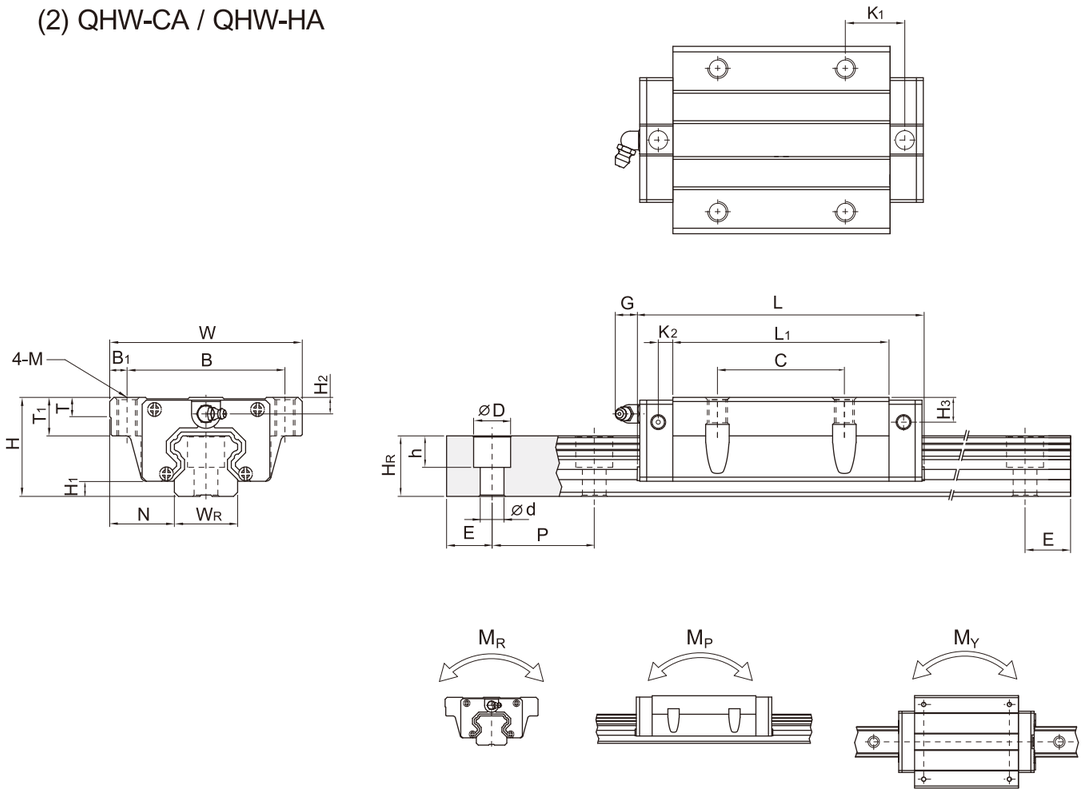




| Model No. | Dimensions of Assembly (mm) | | | Dimensions of Block (mm) | | | | | | | | | | | | | Dimensions of Rail (mm) | | | | | | | Mounting Bolt for Rail | Basic Dynamic Load Rating | Basic Static Load Rating | Static Rated Moment | | | Weight | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | H | $H_1$ | N | W | B | $B_1$ | C | $L_1$ | L | $K_1$ | $K_2$ | G | MxI | T | $H_2$ | $H_3$ | $W_R$ | $H_R$ | D | h | d | P | E | (mm) | C(kN) | $C_0$ (kN) | $M_R$ kN-m | $M_P$ kN-m | $M_Y$ kN-m | Block kg | Rail kg/m |
| QHH15CA | 28 | 4 | 9.5 | 34 | 26 | 4 | 26 | 39.4 | 61.4 | 10 | 5 | 5.3 | M4 x 5 | 6 | 7.95 | 8.2 | 15 | 15 | 7.5 | 5.3 | 4.5 | 60 | 20 | M4x16 | 17.94 | 19.86 | 0.10 | 0.08 | 0.08 | 0.18 | 1.45 |
| QHH20CA | 30 | 4.6 | 12 | 44 | 32 | 6 | 36 | 50.5 | 76.7 | 11.75 | 6 | 12 | M5 x 6 | 8 | 6 | 6 | 20 | 17.5 | 9.5 | 8.5 | 6 | 60 | 20 | M5x16 | 35.26 | 33.86 | 0.26 | 0.19 | 0.19 | 0.29 | 2.21 |
| QHH20HA | | | | | | | 50 | 65.2 | 91.4 | 12.1 | | | | | | | | | | | | | | | 42.52 | 42.31 | 0.31 | 0.27 | 0.27 | 0.38 | |
| QHH25CA | 40 | 5.5 | 12.5 | 48 | 35 | 6.5 | 35 | 58 | 83.4 | 15.7 | 6 | 12 | M6 x8 | 8 | 10 | 9 | 23 | 22 | 11 | 9 | 7 | 60 | 20 | M6x20 | 41.9 | 48.75 | 0.39 | 0.31 | 0.31 | 0.50 | 3.21 |
| QHH25HA | | | | | | | 50 | 78.6 | 104 | 18.5 | | | | | | | | | | | | | | | 50.61 | 60.94 | 0.50 | 0.45 | 0.45 | 0.68 | |
| QHH30CA | 45 | 6 | 16 | 60 | 40 | 10 | 40 | 70 | 97.4 | 19.5 | 6.25 | 12 | M8x10 | 8.5 | 9.5 | 9 | 28 | 26 | 14 | 12 | 9 | 80 | 20 | M8x25 | 58.26 | 66.34 | 0.60 | 0.5 | 0.50 | 0.87 | 4.47 |
| QHH30HA | | | | | | | 60 | 93 | 120.4 | 21.75 | | | | | | | | | | | | | | | 70.32 | 88.45 | 0.83 | 0.89 | 0.89 | 1.15 | |
| QHH35CA | 55 | 7.5 | 18 | 70 | 50 | 10 | 50 | 80 | 113.6 | 19 | 7.5 | 12 | M8x12 | 10.2 | 15.5 | 13.5 | 34 | 29 | 14 | 12 | 9 | 80 | 20 | M8x25 | 78.89 | 86.66 | 1.07 | 0.76 | 0.76 | 1.44 | 6.30 |
| QHH35HA | | | | | | | 72 | 105.8 | 139.4 | 20.9 | | | | | | | | | | | | | | | 95.23 | 115.55 | 1.45 | 1.33 | 1.33 | 1.90 | |
| QHH45CA | 70 | 9.2 | 20.5 | 86 | 60 | 13 | 60 | 97 | 139.4 | 23 | 10 | 12.9 | M10x17 | 16 | 18.5 | 20 | 45 | 38 | 20 | 17 | 14 | 105 | 22.5 | M12×35 | 119.4 | 135.42 | 1.83 | 1.38 | 1.38 | 2.72 | 10.41 |
| QHH45HA | | | | | | | 80 | 128.8 | 171.2 | 29.09 | | | | | | | | | | | | | | | 144.13 | 180.56 | 2.47 | 2.41 | 2.41 | 3.59 | |

Note : 1 kgf = 9.81 N

## (2) QHW-CA / QHW-HA



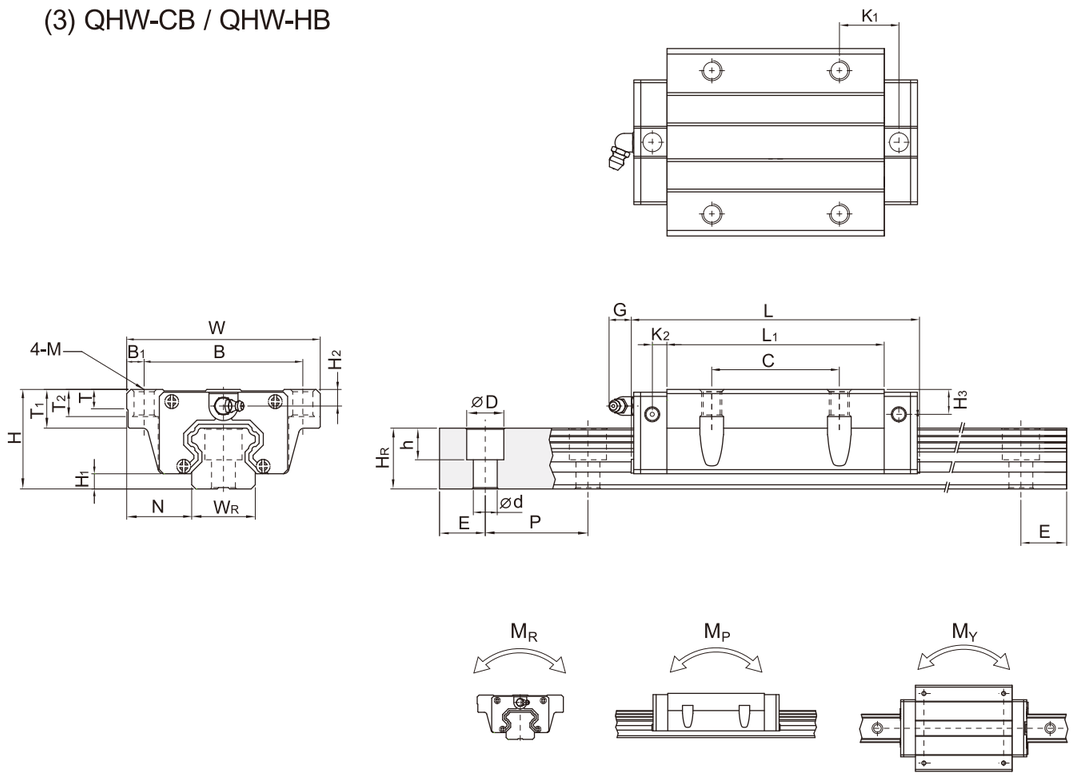

| Model No. | Dimensions of Assembly (mm) | | | Dimensions of Block (mm) | | | | | | | | | | | | | | | | | | | | Dimensions of Rail (mm) | | | | | Mounting Bolt for Rail | Basic Dynamic Load Rating | Basic Static Load Rating | Static Rated Moment | | | Weight | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | H | $H_1$ | N | W | B | $B_1$ | C | $L_1$ | L | $K_1$ | $K_2$ | G | M | T | $T_1$ | $H_2$ | $H_3$ | $W_R$ | $H_R$ | D | h | d | P | E | | | | | | | | $M_R$ | $M_P$ | $M_Y$ | Block | Rail |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | (mm) | C(kN) | $C_0$ (kN) | kN-m | kN-m | kN-m | kg | kg/m |
| QHW15CA | 24 | 4 | 16 | 47 | 38 | 4.5 | 30 | 39.4 | 61.4 | 8 | 5 | 5.3 | M5 | 6 | 8.9 | 3.95 | 4.2 | 15 | 15 | 7.5 | 5.3 | 4.5 | 60 | 20 | | | | | | M4x16 | 17.94 | 19.86 | 0.1 | 0.08 | 0.08 | 0.17 | 1.45 |
| QHW20CA | 30 | 4.6 | 21.5 | 63 | 53 | 5 | 40 | 50.5 | 76.7 | 9.75 | 6 | 12 | M6 | 8 | 10 | 6 | 6 | 20 | 17.5 | 9.5 | 8.5 | 6 | 60 | 20 | | | | | | M5x16 | 35.26 | 33.86 | 0.26 | 0.19 | 0.19 | 0.40 | 2.21 |
| QHW20HA | | | | | | | | 65.2 | 91.4 | 17.1 | | | | | | | | | | | | | | | | | | | | | 42.52 | 42.31 | 0.31 | 0.27 | 0.27 | 0.52 | |
| QHW25CA | 36 | 5.5 | 23.5 | 70 | 57 | 6.5 | 45 | 58 | 83.4 | 10.7 | 6 | 12 | M8 | 8 | 14 | 6 | 5 | 23 | 22 | 11 | 9 | 7 | 60 | 20 | | | | | | M6x20 | 41.9 | 48.75 | 0.39 | 0.31 | 0.31 | 0.59 | 3.21 |
| QHW25HA | | | | | | | | 78.6 | 104 | 21 | | | | | | | | | | | | | | | | | | | | | 50.61 | 60.94 | 0.5 | 0.45 | 0.45 | 0.80 | |
| QHW30CA | 42 | 6 | 31 | 90 | 72 | 9 | 52 | 70 | 97.4 | 13.5 | 6.25 | 12 | M10 | 8.5 | 16 | 6.5 | 6 | 28 | 26 | 14 | 12 | 9 | 80 | 20 | | | | | | M8x25 | 58.26 | 66.34 | 0.6 | 0.5 | 0.5 | 1.09 | 4.47 |
| QHW30HA | | | | | | | | 93 | 120.4 | 25.75 | | | | | | | | | | | | | | | | | | | | | 70.32 | 88.45 | 0.83 | 0.89 | 0.89 | 1.44 | |
| QHW35CA | 48 | 7.5 | 33 | 100 | 82 | 9 | 62 | 80 | 113.6 | 13 | 7.5 | 12 | M10 | 10.1 | 18 | 8.5 | 6.5 | 34 | 29 | 14 | 12 | 9 | 80 | 30 | | | | | | M8x25 | 78.89 | 86.66 | 1.07 | 0.76 | 0.76 | 1.56 | 6.30 |
| QHW35HA | | | | | | | | 105.8 | 139.4 | 25.9 | | | | | | | | | | | | | | | | | | | | | 95.23 | 115.55 | 1.45 | 1.33 | 1.33 | 2.06 | |
| QHW45CA | 60 | 9.2 | 37.5 | 120 | 100 | 10 | 80 | 97 | 139.4 | 13 | 10 | 12.9 | M12 | 15.1 | 22 | 8.5 | 10 | 45 | 38 | 20 | 17 | 14 | 105 | 22.5 | | | | | | M12x35 | 119.4 | 135.42 | 1.83 | 1.38 | 1.38 | 2.79 | 10.41 |
| QHW45HA | | | | | | | | 128.8 | 171.2 | 28.9 | | | | | | | | | | | | | | | | | | | | | 144.13 | 180.56 | 2.47 | 2.41 | 2.41 | 3.69 | |

Note : 1 kgf = 9.81 N





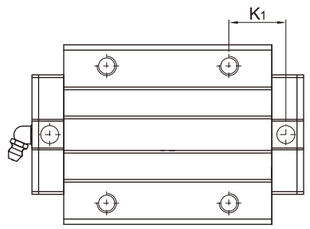
## (3) QHW-CB / QHW-HB

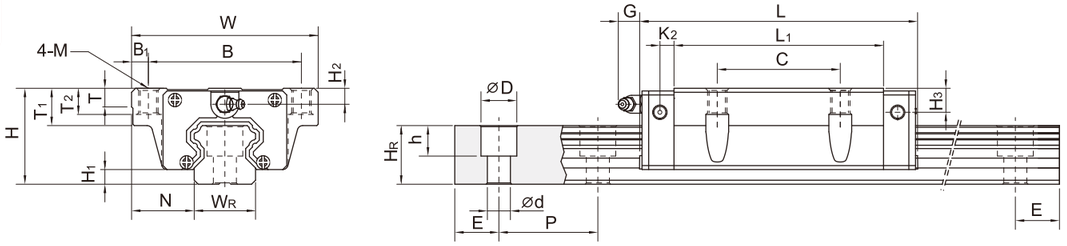


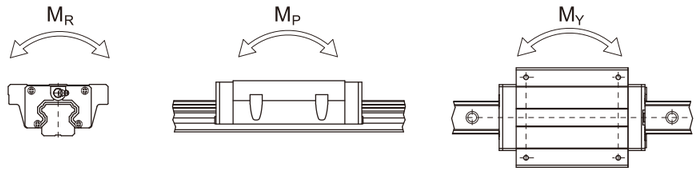

| Model No. | Dimensions of Assembly (mm) | | | Dimensions of Block (mm) | | | | | | | | | | | | | | | | | | | | Dimensions of Rail (mm) | | | | | Mounting Bolt for Rail | Basic Dynamic Load Rating | Basic Static Load Rating | Static Rated Moment | | | Weight | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | H | $H_1$ | N | W | B | $B_1$ | C | $L_1$ | L | $K_1$ | $K_2$ | G | M | T | $T_1$ | $T_2$ | $H_2$ | $H_3$ | $W_R$ | $H_R$ | D | h | d | P | E | | | | | | | | $M_R$ | $M_P$ | $M_Y$ | Block | Rail |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | (mm) | C(kN) | $C_0$ (kN) | kN-m | kN-m | kN-m | kg | kg/m |
| QHW15CB | 24 | 4 | 16 | 47 | 38 | 4.5 | 30 | 39.4 | 61.4 | 8 | 5 | 5.3 | Ø4.5 | 6 | 8.9 | 6.95 | 3.95 | 4.2 | 15 | 15 | 7.5 | 5.3 | 4.5 | 60 | 20 | | | | | | M4x16 | 17.94 | 19.86 | 0.1 | 0.08 | 0.08 | 0.17 | 1.45 |
| QHW20CB | 30 | 4.6 | 21.5 | 63 | 53 | 5 | 40 | 50.5 | 76.7 | 9.75 | 6 | 12 | Ø6 | 8 | 10 | 9.5 | 6 | 6 | 20 | 17.5 | 9.5 | 8.5 | 6 | 60 | 20 | | | | | | M5x16 | 35.26 | 33.86 | 0.26 | 0.19 | 0.19 | 0.40 | 2.21 |
| QHW20HB | | | | | | | | 65.2 | 91.4 | 17.1 | | | | | | | | | | | | | | | | | | | | | 42.52 | 42.31 | 0.31 | 0.27 | 0.27 | 0.52 | |
| QHW25CB | 36 | 5.5 | 23.5 | 70 | 57 | 6.5 | 45 | 58 | 83.4 | 10.7 | 6 | 12 | Ø7 | 8 | 14 | 10 | 6 | 5 | 23 | 22 | 11 | 9 | 7 | 60 | 20 | | | | | | M6x20 | 41.9 | 48.75 | 0.39 | 0.31 | 0.31 | 0.59 | 3.21 |
| QHW25HB | | | | | | | | 78.6 | 104 | 21 | | | | | | | | | | | | | | | | | | | | | 50.61 | 60.94 | 0.5 | 0.45 | 0.45 | 0.80 | |
| QHW30CB | 42 | 6 | 31 | 90 | 72 | 9 | 52 | 70 | 97.4 | 13.5 | 6.25 | 12 | Ø9 | 8.5 | 16 | 10 | 6.5 | 6 | 28 | 26 | 14 | 12 | 9 | 80 | 20 | | | | | | M8x25 | 58.26 | 66.34 | 0.6 | 0.5 | 0.5 | 1.09 | 4.47 |
| QHW30HB | | | | | | | | 93 | 120.4 | 25.75 | | | | | | | | | | | | | | | | | | | | | 70.32 | 88.45 | 0.83 | 0.89 | 0.89 | 1.44 | |
| QHW35CB | 48 | 7.5 | 33 | 100 | 82 | 9 | 62 | 80 | 113.6 | 13 | 7.5 | 12 | Ø9 | 10.1 | 18 | 13 | 8.5 | 6.5 | 34 | 29 | 14 | 12 | 9 | 80 | 30 | | | | | | M8x25 | 78.89 | 86.66 | 1.07 | 0.76 | 0.76 | 1.56 | 6.30 |
| QHW35HB | | | | | | | | 105.8 | 139.4 | 25.9 | | | | | | | | | | | | | | | | | | | | | 95.23 | 115.55 | 1.45 | 1.33 | 1.33 | 2.06 | |
| QHW45CB | 60 | 9.2 | 37.5 | 120 | 100 | 10 | 80 | 97 | 139.4 | 13 | 10 | 12.9 | Ø11 | 15.1 | 22 | 15 | 8.5 | 10 | 45 | 38 | 20 | 17 | 14 | 105 | 22.5 | | | | | | M12x35 | 119.4 | 135.42 | 1.83 | 1.38 | 1.38 | 2.79 | 10.41 |
| QHW45HB | | | | | | | | 128.8 | 171.2 | 28.9 | | | | | | | | | | | | | | | | | | | | | 144.13 | 180.56 | 2.47 | 2.41 | 2.41 | 3.69 | |

Note : 1 kgf = 9.81 N

(4) QHW-CC / QHW-HC




| Model No. | Dimensions of Assembly (mm) | | | Dimensions of Block (mm) | | | | | | | | | | | | | | Dimensions of Rail (mm) | | | | | | | Mounting Bolt for Rail | Basic Dynamic Load Rating | Basic Static Load Rating | Static Rated Moment | | | Weight | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | H | $H_1$ | N | W | B | $B_1$ | C | $L_1$ | L | $K_1$ | $K_2$ | G | M | T | $T_1$ | $T_2$ | $H_2$ | $H_3$ | $W_R$ | $H_R$ | D | h | d | P | E | (mm) | C(kN) | $C_0$ (kN) | $M_R$ kN-m | $M_P$ kN-m | $M_Y$ kN-m | Block kg | Rail kg/m |
| QHW15CC | 24 | 4 | 16 | 47 | 38 | 4.5 | 30 | 39.4 | 61.4 | 8 | 5 | 5.3 | M5 | 6 | 8.9 | 6.95 | 3.95 | 4.2 | 15 | 15 | 7.5 | 5.3 | 4.5 | 60 | 20 | M4x16 | 17.94 | 19.86 | 0.1 | 0.08 | 0.08 | 0.17 | 1.45 |
| QHW20CC | 30 | 4.6 | 21.5 | 63 | 53 | 5 | 40 | 50.5 | 76.7 | 9.75 | 6 | 12 | M6 | 8 | 10 | 9.5 | 6 | 6 | 20 | 17.5 | 9.5 | 8.5 | 6 | 60 | 20 | M5x16 | 35.26 | 33.86 | 0.26 | 0.19 | 0.19 | 0.40 | 2.21 |
| QHW20HC | | | | | | | | 65.2 | 91.4 | 17.1 | | | | | | | | | | | | | | | | | 42.52 | 42.31 | 0.31 | 0.27 | 0.27 | 0.52 | |
| QHW25CC | 36 | 5.5 | 23.5 | 70 | 57 | 6.5 | 45 | 58 | 83.4 | 10.7 | 6 | 12 | M8 | 8 | 14 | 10 | 6 | 5 | 23 | 22 | 11 | 9 | 7 | 60 | 20 | M6x20 | 41.9 | 48.75 | 0.39 | 0.31 | 0.31 | 0.59 | 3.21 |
| QHW25HC | | | | | | | | 78.6 | 104 | 21 | | | | | | | | | | | | | | | | | 50.61 | 60.94 | 0.5 | 0.45 | 0.45 | 0.80 | |
| QHW30CC | 42 | 6 | 31 | 90 | 72 | 9 | 52 | 70 | 97.4 | 13.5 | 6.25 | 12 | M10 | 8.5 | 16 | 10 | 6.5 | 6 | 28 | 26 | 14 | 12 | 9 | 80 | 20 | M8x25 | 58.26 | 66.34 | 0.6 | 0.5 | 0.5 | 1.09 | 4.47 |
| QHW30HC | | | | | | | | 93 | 120.4 | 25.75 | | | | | | | | | | | | | | | | | 70.32 | 88.45 | 0.83 | 0.89 | 0.89 | 1.44 | |
| QHW35CC | 48 | 7.5 | 33 | 100 | 82 | 9 | 62 | 80 | 113.6 | 13 | 7.5 | 12 | M10 | 10.1 | 18 | 13 | 8.5 | 6.5 | 34 | 29 | 14 | 12 | 9 | 80 | 30 | M8x25 | 78.89 | 86.66 | 1.07 | 0.76 | 0.76 | 1.56 | 6.30 |
| QHW35HC | | | | | | | | 105.8 | 139.4 | 25.9 | | | | | | | | | | | | | | | | | 95.23 | 115.55 | 1.45 | 1.33 | 1.33 | 2.06 | |
| QHW45CC | 60 | 9.2 | 37.5 | 120 | 100 | 10 | 80 | 97 | 139.4 | 13 | 10 | 12.9 | M12 | 15.1 | 22 | 15 | 8.5 | 10 | 45 | 38 | 20 | 17 | 14 | 105 | 22.5 | M12x35 | 119.4 | 135.42 | 1.83 | 1.38 | 1.38 | 2.79 | 10.41 |
| QHW45HC | | | | | | | | 128.8 | 171.2 | 28.9 | | | | | | | | | | | | | | | | | 144.13 | 180.56 | 2.47 | 2.41 | 2.41 | 3.69 | |

Note : 1 kgf = 9.81 N



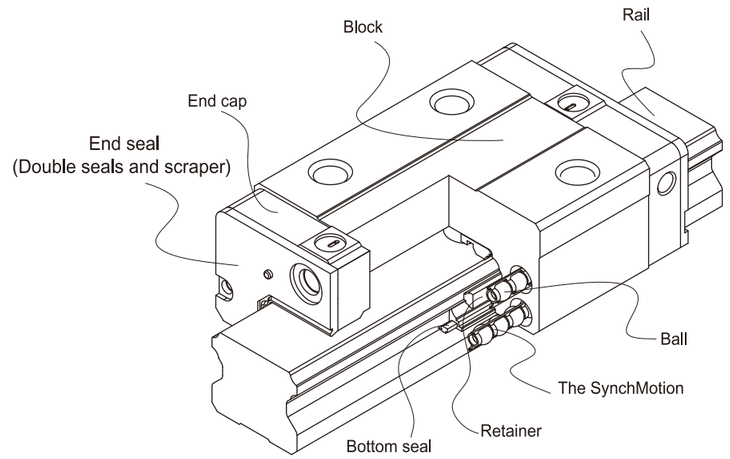




## 2-4 QE Series – Low Profile Linear Guideway, with SynchMotion™ Technology

The development of LIMON-QE linear guideway is based on a four-row circular-arc contact. The LIMON-QE series linear guideway with SynchMotion™ Technology offers smooth movement, superior lubrication, quieter operation and longer running life. Therefore the LIMON-QE linear guideway has broad industrial applicability. In the high-tech industry where high speed, low noise, and reduced dust generation is required, the LIMON-QE series is interchangeable with the LIMON-E series.

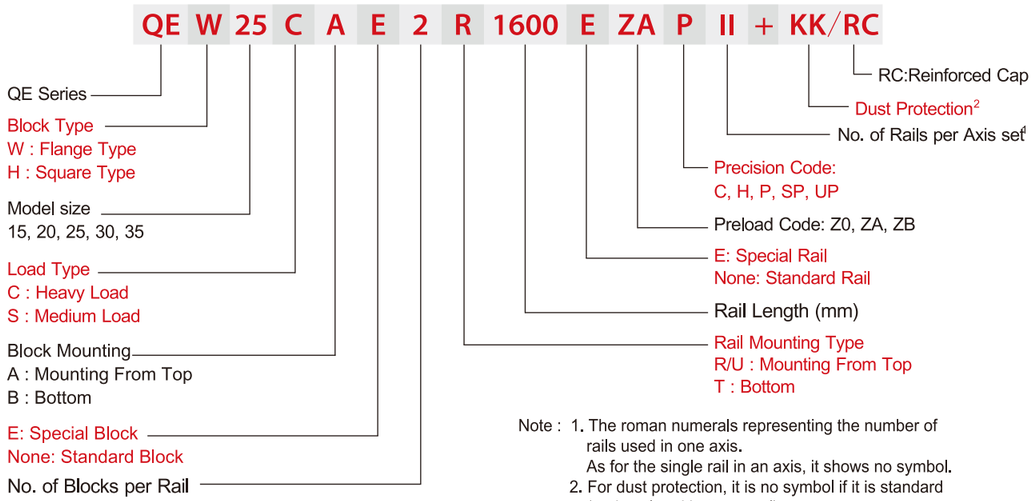
### 2-4-1 Construction of QE Series




### 2-4-2 Model Number of QE Series

LIMON-QE series guideway can be classified into non-interchangeable and interchangeable types. The sizes are identical. The main difference is that the interchangeable blocks and rails can be freely exchanged. Because of dimensional control, the interchangeable type linear guideway is a perfect choice for the client when rails do not need to be paired for an axis. And since the QE and E share the identical rails, the customer does not need to redesign when choosing the QE series. Therefore the LIMON-QE linear guideway has increased applicability.

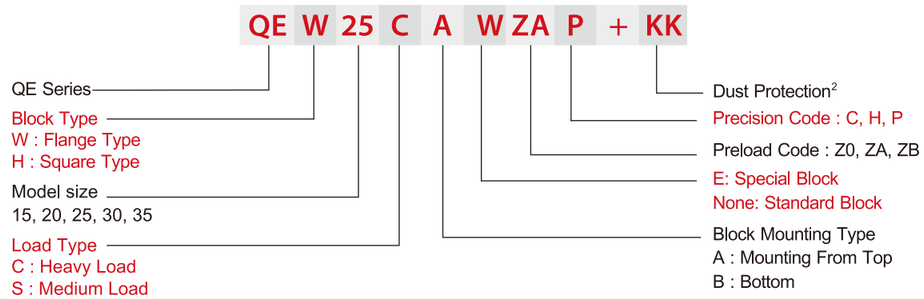
(1) Non-interchangeable type



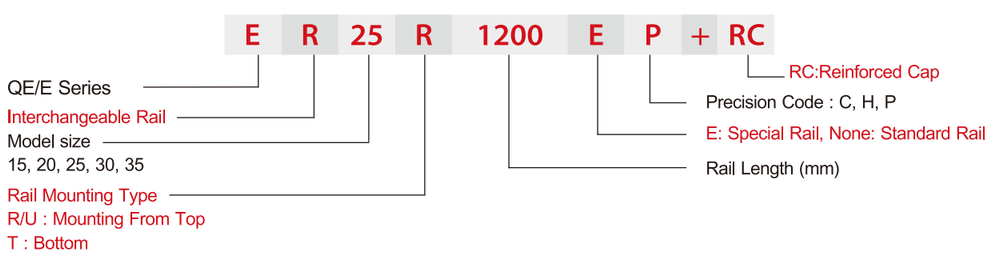

Note : 1. The roman numerals representing the number of rails used in one axis.
As for the single rail in an axis, it shows no symbol.
2. For dust protection, it is no symbol if it is standard (end seal and bottom seal).
ZZ : End seal, bottom seal and scraper.
KK : Double seals, bottom seal and scraper.
DD : Double seals and bottom seal.

(2) Interchangeable type

☐ Model Number of QE Block




☐ Model Number of QE Rail (QE and E share the identical rails)







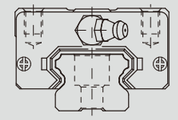
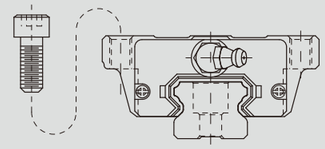
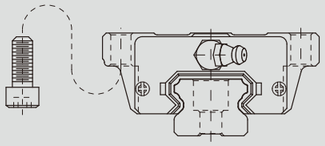



## 2-4-3 Types

(1) Block types

LIMON offers two types of linear guideways, flange and square types.

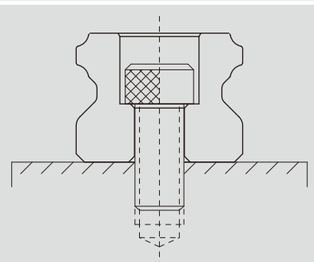
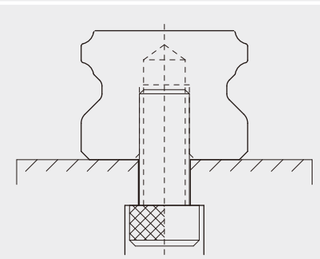
**Table 2-4-1** Block Type

| Type | Model | Shape | Height (mm) | Rail Length (mm) | Main Applications |
|---|---|---|---|---|---|
| Square | QEH-SA<br>QEH-CA |  | 24<br>↓<br>48 | 100<br>↓<br>4000 | ☐ Automation devices<br>☐ High-speed transportation equipment<br>☐ Precision measuring equipment<br>☐ Semiconductor manufacturing equipment |
| Flange | QEW-SA<br>QEW-CA |  | 24<br>↓<br>48 | 100<br>↓<br>4000 | |
| | QEW-SB<br>QEW-CB |  | 24<br>↓<br>48 | 100<br>↓<br>4000 | |

(2) Rail types

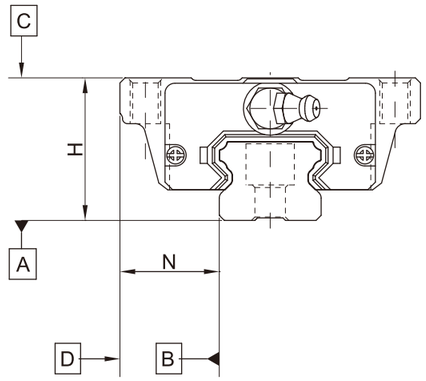
Besides the standard top mounting type, the bottom mounting type is also available.

**Table 2-4-2** Rail Types

| Mounting from Top | Mounting from bottom |
|---|---|
|  |  |

## 2-4-4 Accuracy

The accuracy of the QE series can be classified into 5 classes: normal(C), high(H), precision(P), super precision(SP), and ultra precision(UP). Choose the class by referencing the accuracy of selected equipment.




### (1) Accuracy of non-interchangeable guideways

**Table 2-4-3** Accuracy Standards

Unit: mm

| Item | QE - 15, 20 | | | | |
|---|---|---|---|---|---|
| Accuracy Classes | Normal (C) | High (H) | Precision (P) | Super Precision (SP) | Ultra Precision (UP) |
| Dimensional tolerance of height H | ± 0.1 | ± 0.03 | 0<br>- 0.03 | 0<br>- 0.015 | 0<br>- 0.008 |
| Dimensional tolerance of width N | ± 0.1 | ± 0.03 | 0<br>- 0.03 | 0<br>- 0.015 | 0<br>- 0.008 |
| Variation of height H | 0.02 | 0.01 | 0.006 | 0.004 | 0.003 |
| Variation of width N | 0.02 | 0.01 | 0.006 | 0.004 | 0.003 |
| Running parallelism of block surface C to surface A | See Table 2-4-7 | | | | |
| Running parallelism of block surface D to surface B | See Table 2-4-7 | | | | |

**Table 2-4-4** Accuracy Standards

Unit: mm

| Item | QE - 25, 30, 35 | | | | |
|---|---|---|---|---|---|
| Accuracy Classes | Normal (C) | High (H) | Precision (P) | Super Precision (SP) | Ultra Precision (UP) |
| Dimensional tolerance of height H | ± 0.1 | ± 0.04 | 0<br>- 0.04 | 0<br>- 0.02 | 0<br>- 0.01 |
| Dimensional tolerance of width N | ± 0.1 | ± 0.04 | 0<br>- 0.04 | 0<br>- 0.02 | 0<br>- 0.01 |
| Variation of height H | 0.02 | 0.015 | 0.007 | 0.005 | 0.003 |
| Variation of width N | 0.03 | 0.015 | 0.007 | 0.005 | 0.003 |
| Running parallelism of block surface C to surface A | See Table 2-4-7 | | | | |
| Running parallelism of block surface D to surface B | See Table 2-4-7 | | | | |







### (2) Accuracy of interchangeable guideways

**Table 2-4-5** Accuracy Standards

Unit: mm

| Item | QE - 15, 20 | | |
|---|---|---|---|
| Accuracy Classes | Normal (C) | High (H) | Precision (P) |
| Dimensional tolerance of height H | ± 0.1 | ± 0.03 | ± 0.015 |
| Dimensional tolerance of width N | ± 0.1 | ± 0.03 | ± 0.015 |
| Variation of height H | 0.02 | 0.01 | 0.006 |
| Variation of width N | 0.02 | 0.01 | 0.006 |
| Running parallelism of block surface C to surface A | See Table 2-4-7 | | |
| Running parallelism of block surface D to surface B | See Table 2-4-7 | | |

**Table 2-4-6** Accuracy Standards

Unit: mm

| Item | QE - 25, 30, 35 | | |
|---|---|---|---|
| Accuracy Classes | Normal (C) | High (H) | Precision (P) |
| Dimensional tolerance of height H | ± 0.1 | ± 0.04 | ± 0.02 |
| Dimensional tolerance of width N | ± 0.1 | ± 0.04 | ± 0.02 |
| Variation of height H | 0.02 | 0.015 | 0.007 |
| Variation of width N | 0.03 | 0.015 | 0.007 |
| Running parallelism of block surface C to surface A | See Table 2-4-7 | | |
| Running parallelism of block surface D to surface B | See Table 2-4-7 | | |

### (3) Accuracy of running parallelism

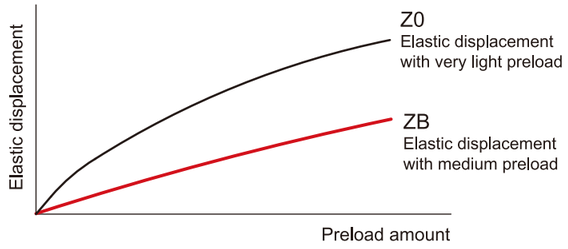
**Table 2-4-7** Accuracy of Running Parallelism

| Rail Length (mm) | Accuracy (μm) | | | | |
|---|---|---|---|---|---|
| | C | H | P | SP | UP |
| ~ 100 | 12 | 7 | 3 | 2 | 2 |
| 100 ~ 200 | 14 | 9 | 4 | 2 | 2 |
| 200 ~ 300 | 15 | 10 | 5 | 3 | 2 |
| 300 ~ 500 | 17 | 12 | 6 | 3 | 2 |
| 500 ~ 700 | 20 | 13 | 7 | 4 | 2 |
| 700 ~ 900 | 22 | 15 | 8 | 5 | 3 |
| 900 ~ 1,100 | 24 | 16 | 9 | 6 | 3 |
| 1,100 ~ 1,500 | 26 | 18 | 11 | 7 | 4 |
| 1,500 ~ 1,900 | 28 | 20 | 13 | 8 | 4 |
| 1,900 ~ 2,500 | 31 | 22 | 15 | 10 | 5 |
| 2,500 ~ 3,100 | 33 | 25 | 18 | 11 | 6 |
| 3,100 ~ 3,600 | 36 | 27 | 20 | 14 | 7 |
| 3,600 ~ 4,000 | 37 | 28 | 21 | 15 | 7 |

## 2-4-5 Preload

(1) Definition

A preload can be applied to each guideway. Generally, a linear motion guideway has a negative clearance between the groove and balls in order to improve stiffness and maintain high precision. The figure shows that adding a preload can improve stiffness of the linear guideway. A preload no greater than ZA would be recommended for model sizes smaller than QE20. This will avoid an over-loaded condition that would affect guideway life.




(2) Preload classes

LIMON offers three standard preloads for various applications and conditions.

**Table 2-4-8** Preload Classes

| Class | Code | Preload | Condition |
|---|---|---|---|
| Very Light Preload | Z0 | 0~ 0.02C | Certain load direction,low impact, low precision required |
| Light Preload | ZA | 0.03C~0.05C | low load and high precision required |
| Medium Preload | ZB | 0.06C~ 0.08C | High rigidity required, with vibration and impact |

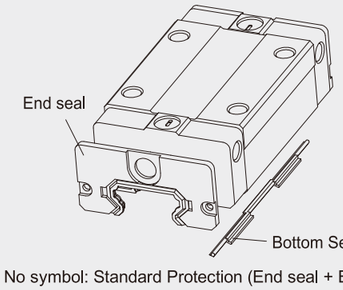
| Class | Interchangeable Guideway | Non-Interchangeable Guideway |
|---|---|---|
| Preload classes | Z0, ZA | Z0, ZA, ZB |

Note: The “C” in the preload column denotes basic dynamic load rating.

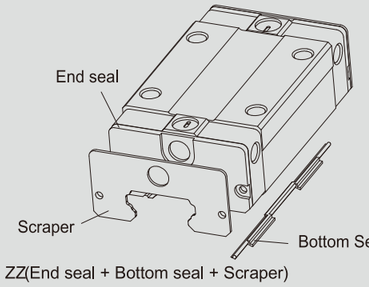
## 2-4-6 Dust Proof Accessories

(1) Codes of accessories

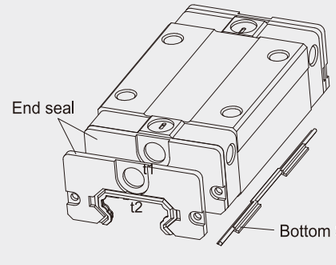
If the following accessories is needed, please indicate the code followed by the model number.



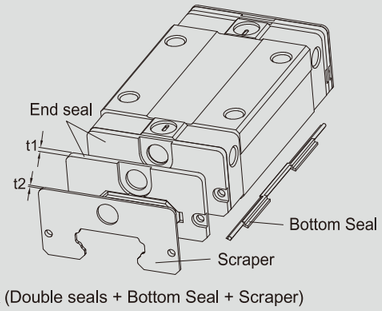

No symbol: Standard Protection (End seal + Bottom seal)




ZZ(End seal + Bottom seal + Scraper)




DD (Double seals + Bottom Seal)




KK (Double seals + Bottom Seal + Scraper)





(2) End seal and bottom seal

To prevent life reduction caused by iron chips or dust entering the block

(3) Double seals

Removes foreign matter from the rail preventing contaminants from entering the block.

**Table 2-4-9** Dimensions of end seal

| Size | Thickness (t1) (mm) | Size | Thickness (t1) (mm) |
|---|---|---|---|
| QE15 ES | 2 | QE30 ES | 2.5 |
| QE20 ES | 2 | QE35 ES | 2 |
| QE25 ES | 2.5 | | |

(4) Scraper

Clears larger contaminants, such as weld spatter and metal cuttings, from the rail. Metal scraper protects end seals from excessive damage.

**Table 2-4-10** Dimensions of Scraper

| Size | Thickness (t2) (mm) |
|---|---|
| QE15 SC | 1 |
| QE20 SC | 1 |
| QE25 SC | 1 |
| QE30 SC | 1 |
| QE35 SC | 1.5 |

(5) Dimensions of block equipped with the dustproof parts

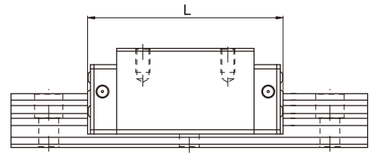



**Table 2-4-11** Overall block length

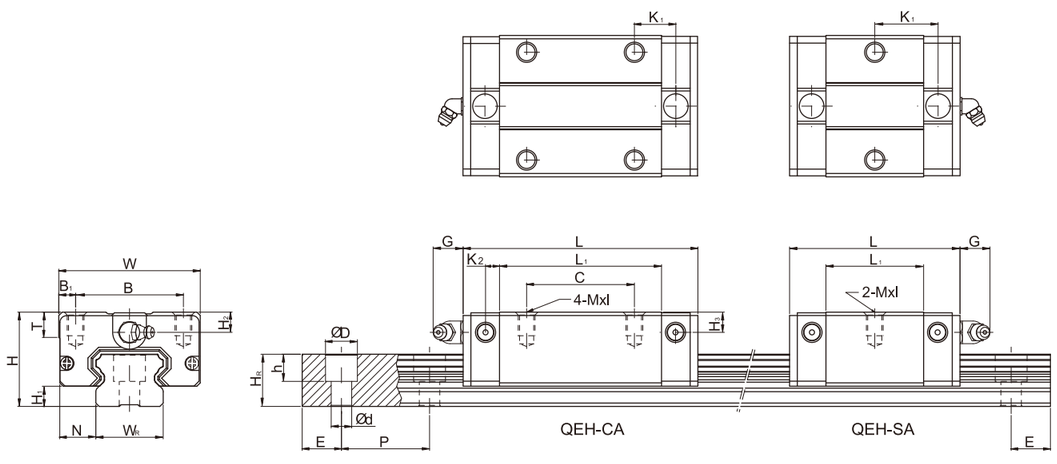
unit: mm

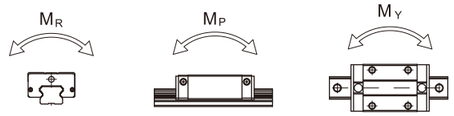
| Size | Overall block length (L) | | | |
|---|---|---|---|---|
| | SS | ZZ | DD | KK |
| QE15S | 41.1 | 42.1 | 44.1 | 46.1 |
| QE15C | 56.8 | 57.8 | 60.8 | 62.8 |
| QE20S | 50 | 51.2 | 54 | 56 |
| QE20C | 69.1 | 71.1 | 73.1 | 75.1 |
| QE25S | 60.1 | 62.1 | 65.1 | 67.1 |
| QE25C | 83.6 | 85.6 | 88.6 | 90.6 |
| QE30S | 67.5 | 69.5 | 72.5 | 74.5 |
| QE30C | 96.1 | 98.1 | 101.1 | 103.1 |
| QE35S | 76 | 79 | 80 | 83 |
| QE35C | 108 | 111 | 112 | 115 |

Note : The marking of “( )” denotes the maximum block length with screws, lips of end seals, etc.

## 2-4-7 Dimensions for QE Series

### (1) QEH-CA / QEH-SA

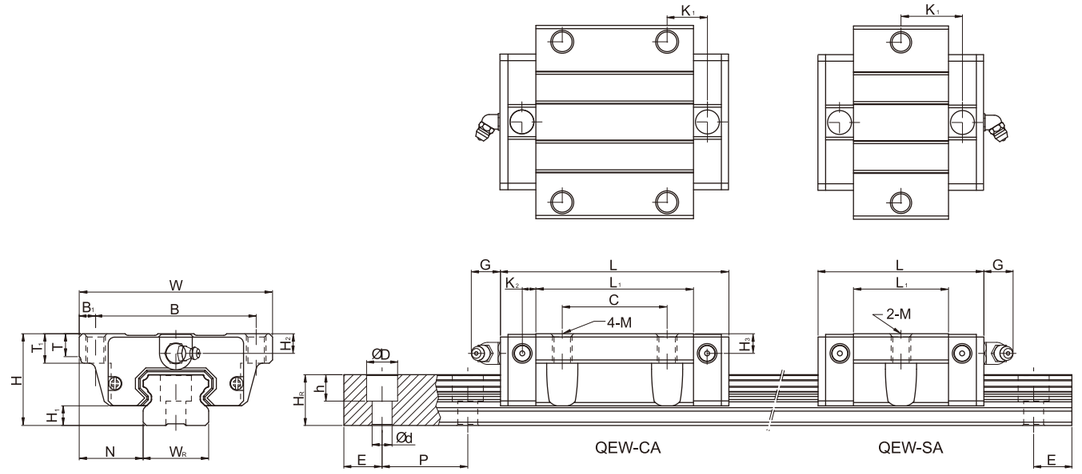


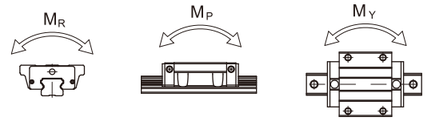




| Model No. | Dimensions of Assembly (mm) | | | Dimensions of Block (mm) | | | | | | | | | | | | Dimensions of Rail (mm) | | | | | | | Mounting Bolt for Rail | Basic Dynamic Load Rating | Basic Static Load Rating | Static Rated Moment | | | Weight | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | H | $H_1$ | N | W | B | $B_1$ | C | $L_1$ | L | $K_1$ | $K_2$ | G | MxI | T | $H_2$ | $H_3$ | $W_R$ | $H_R$ | D | h | d | P | E | (mm) | C(kN) | $C_0$ (kN) | $M_R$ kN-m | $M_P$ kN-m | $M_Y$ kN-m | Block kg | Rail kg/m |
| QEH15SA | 24 | 4 | 9.5 | 34 | 26 | 4 | - | 23.1 | 40.1 | 14.8 | 3.5 | 5.7 | M4x6 | 6 | 5.5 | 6 | 15 | 12.5 | 6 | 4.5 | 3.5 | 60 | 20 | M3x16 | 8.56 | 8.79 | 0.07 | 0.03 | 0.03 | 0.09 | 1.25 |
| QEH15CA | | | | | | | 26 | 39.8 | 56.8 | 10.15 | | | | | | | | | | | | | | | 12.53 | 15.28 | 0.12 | 0.09 | 0.09 | 0.15 | |
| QEH20SA | 28 | 6 | 11 | 42 | 32 | 5 | - | 29 | 50 | 18.75 | 4.15 | 12 | M5x7 | 7.5 | 6 | 6.5 | 20 | 15.5 | 9.5 | 8.5 | 6 | 60 | 20 | M5x16 | 11.57 | 12.18 | 0.13 | 0.05 | 0.05 | 0.15 | 2.08 |
| QEH20CA | | | | | | | 32 | 48.1 | 69.1 | 12.3 | | | | | | | | | | | | | | | 16.50 | 20.21 | 0.21 | 0.15 | 0.15 | 0.23 | |
| QEH25SA | 33 | 6.2 | 12.5 | 48 | 35 | 6.5 | - | 35.5 | 60.1 | 21.9 | 5 | 12 | M6x9 | 8 | 8 | 8 | 23 | 18 | 11 | 9 | 7 | 60 | 20 | M6x20 | 18.24 | 18.90 | 0.22 | 0.10 | 0.10 | 0.24 | 2.67 |
| QEH25CA | | | | | | | 35 | 59 | 83.6 | 16.15 | | | | | | | | | | | | | | | 26.03 | 31.49 | 0.37 | 0.29 | 0.29 | 0.40 | |
| QEH30SA | 42 | 10 | 16 | 60 | 40 | 10 | - | 41.5 | 67.5 | 25.75 | 6 | 12 | M8x12 | 9 | 8 | 9 | 28 | 23 | 11 | 9 | 7 | 80 | 20 | M6x25 | 26.27 | 27.82 | 0.40 | 0.18 | 0.18 | 0.44 | 4.35 |
| QEH30CA | | | | | | | 40 | 70.1 | 96.1 | 20.05 | | | | | | | | | | | | | | | 37.92 | 46.63 | 0.67 | 0.51 | 0.51 | 0.75 | |
| QEH35SA | 48 | 11 | 18 | 70 | 50 | 10 | - | 51 | 76 | 30.3 | 6.25 | 12 | M8x12 | 10 | 8.5 | 8.5 | 34 | 27.5 | 14 | 12 | 9 | 80 | 20 | M8x25 | 36.39 | 36.43 | 0.61 | 0.33 | 0.33 | 0.77 | 6.14 |
| QEH35CA | | | | | | | 50 | 83 | 108 | 21.3 | | | | | | | | | | | | | | | 51.18 | 59.28 | 1.00 | 0.75 | 0.75 | 1.19 | |

Note : 1 kgf = 9.81 N

### (2) QEW-CA / QEW-SA

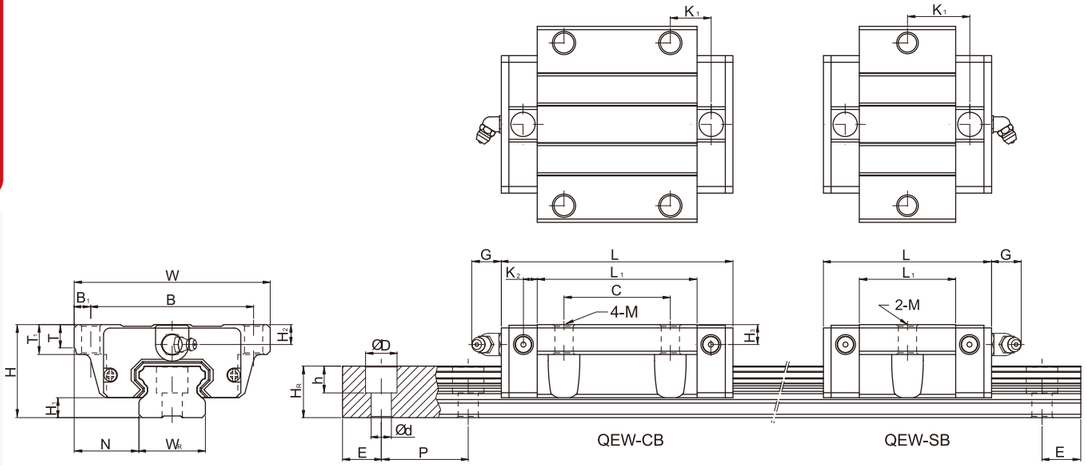


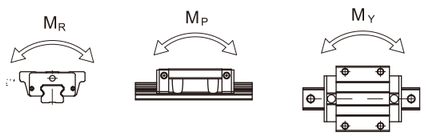




| Model No. | Dimensions of Assembly (mm) | | | Dimensions of Block (mm) | | | | | | | | | | | | | | Dimensions of Rail (mm) | | | | | | | Mounting Bolt for Rail | Basic Dynamic Load Rating | Basic Static Load Rating | Static Rated Moment | | | Weight | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | H | $H_1$ | N | W | B | $B_1$ | C | $L_1$ | L | $K_1$ | $K_2$ | G | M | T | $T_1$ | $H_2$ | $H_3$ | $W_R$ | $H_R$ | D | h | d | P | E | (mm) | C(kN) | $C_0$ (kN) | $M_R$ kN-m | $M_P$ kN-m | $M_Y$ kN-m | Block kg | Rail kg/m |
| QEW15SA | 24 | 4 | 18.5 | 52 | 41 | 5.5 | - | 23.1 | 40.1 | 14.8 | 3.5 | 5.7 | M5 | 5 | 7 | 5.5 | 6 | 15 | 12.5 | 6 | 4.5 | 3.5 | 60 | 20 | M3×16 | 8.56 | 8.79 | 0.07 | 0.03 | 0.03 | 0.12 | 1.25 |
| QEW15CA | | | | | | | 26 | 39.8 | 56.8 | 10.15 | | | | | | | | | | | | | | | | 12.53 | 15.28 | 0.12 | 0.09 | 0.09 | 0.21 | |
| QEW20SA | 28 | 6 | 19.5 | 59 | 49 | 5 | - | 29 | 50 | 18.75 | 4.15 | 12 | M6 | 7 | 9 | 6 | 6.5 | 20 | 15.5 | 9.5 | 8.5 | 6 | 60 | 20 | M5×16 | 11.57 | 12.18 | 0.13 | 0.05 | 0.05 | 0.19 | 2.08 |
| QEW20CA | | | | | | | 32 | 48.1 | 69.1 | 12.3 | | | | | | | | | | | | | | | | 16.50 | 20.21 | 0.21 | 0.15 | 0.15 | 0.31 | |
| QEW25SA | 33 | 6.2 | 25 | 73 | 60 | 6.5 | - | 35.5 | 60.1 | 21.9 | 5 | 12 | M8 | 7.5 | 10 | 8 | 8 | 23 | 18 | 11 | 9 | 7 | 60 | 20 | M6×20 | 18.24 | 18.90 | 0.22 | 0.10 | 0.10 | 0.34 | 2.67 |
| QEW25CA | | | | | | | 35 | 59 | 83.6 | 16.15 | | | | | | | | | | | | | | | | 26.03 | 31.49 | 0.37 | 0.29 | 0.29 | 0.58 | |
| QEW30SA | 42 | 10 | 31 | 90 | 72 | 9 | - | 41.5 | 67.5 | 25.75 | 6 | 12 | M10 | 7 | 10 | 8 | 9 | 28 | 23 | 11 | 9 | 7 | 80 | 20 | M6×25 | 26.27 | 27.82 | 0.40 | 0.18 | 0.18 | 0.61 | 4.35 |
| QEW30CA | | | | | | | 40 | 70.1 | 96.1 | 20.05 | | | | | | | | | | | | | | | | 37.92 | 46.63 | 0.67 | 0.51 | 0.51 | 1.03 | |
| QEW35SA | 48 | 11 | 33 | 100 | 82 | 9 | - | 51 | 76 | 30.3 | 6.25 | 12 | M10 | 10 | 13 | 8.5 | 8.5 | 34 | 27.5 | 14 | 12 | 9 | 80 | 20 | M8×25 | 36.39 | 36.43 | 0.61 | 0.33 | 0.33 | 0.77 | 6.14 |
| QEW35CA | | | | | | | 50 | 83 | 108 | 21.3 | | | | | | | | | | | | | | | | 51.18 | 59.28 | 1.00 | 0.75 | 0.75 | 1.19 | |

Note : 1 kgf = 9.81 N

(3) QEW-CB / QEW-SB




| Model No. | Dimensions of Assembly (mm) | | | Dimensions of Block (mm) | | | | | | | | | | | | | Dimensions of Rail (mm) | | | | | | | Mounting Bolt for Rail | Basic Dynamic Load Rating | Basic Static Load Rating | Static Rated Moment | | | Weight | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | H | $H_1$ | N | W | B | $B_1$ | C | $L_1$ | L | $K_1$ | $K_2$ | G | M | T | $T_1$ | $H_2$ | $H_3$ | $W_R$ | $H_R$ | D | h | d | P | E | (mm) | C(kN) | $C_0$ (kN) | $M_R$ kN-m | $M_P$ kN-m | $M_Y$ kN-m | Block kg | Rail kg/m |
| QEW15SB | 24 | 4 | 18.5 | 52 | 41 | 5.5 | - | 23.1 | 40.1 | 14.8 | 3.5 | 5.7 | Ø4.5 | 5 | 7 | 5.5 | 6 | 15 | 12.5 | 6 | 4.5 | 3.5 | 60 | 20 | M3x16 | 8.56 | 8.79 | 0.07 | 0.03 | 0.03 | 0.12 | 1.25 |
| QEW15CB | | | | | | | 26 | 39.8 | 56.8 | 10.15 | | | | | | | | | | | | | | | | 12.53 | 15.28 | 0.12 | 0.09 | 0.09 | 0.21 | |
| QEW20SB | 28 | 6 | 19.5 | 59 | 49 | 5 | - | 29 | 50 | 18.75 | 4.15 | 12 | Ø5.5 | 7 | 9 | 6 | 6.5 | 20 | 15.5 | 9.5 | 8.5 | 6 | 60 | 20 | M5x16 | 11.57 | 12.18 | 0.13 | 0.05 | 0.05 | 0.19 | 2.08 |
| QEW20CB | | | | | | | 32 | 48.1 | 69.1 | 12.3 | | | | | | | | | | | | | | | | 16.50 | 20.21 | 0.21 | 0.15 | 0.15 | 0.31 | |
| QEW25SB | 33 | 6.2 | 25 | 73 | 60 | 6.5 | - | 35.5 | 60.1 | 21.9 | 5 | 12 | Ø7 | 7.5 | 10 | 8 | 8 | 23 | 18 | 11 | 9 | 7 | 60 | 20 | M6x20 | 18.24 | 18.90 | 0.22 | 0.10 | 0.10 | 0.34 | 2.67 |
| QEW25CB | | | | | | | 35 | 59 | 83.6 | 16.15 | | | | | | | | | | | | | | | | 26.03 | 31.49 | 0.37 | 0.29 | 0.29 | 0.58 | |
| QEW30SB | 42 | 10 | 31 | 90 | 72 | 9 | - | 41.5 | 67.5 | 25.75 | 6 | 12 | Ø9 | 7 | 10 | 8 | 9 | 28 | 23 | 11 | 9 | 7 | 80 | 20 | M6x25 | 26.27 | 27.82 | 0.40 | 0.18 | 0.18 | 0.61 | 4.35 |
| QEW30CB | | | | | | | 40 | 70.1 | 96.1 | 20.05 | | | | | | | | | | | | | | | | 37.92 | 46.63 | 0.67 | 0.51 | 0.51 | 1.03 | |
| QEW35SB | 48 | 11 | 33 | 100 | 82 | 9 | - | 51 | 76 | 30.3 | 6.25 | 12 | Ø9 | 10 | 13 | 8.5 | 8.5 | 34 | 27.5 | 14 | 12 | 9 | 80 | 20 | M8x25 | 36.39 | 36.43 | 0.61 | 0.33 | 0.33 | 0.77 | 6.14 |
| QEW35CB | | | | | | | 50 | 83 | 108 | 21.3 | | | | | | | | | | | | | | | | 51.18 | 59.28 | 1.00 | 0.75 | 0.75 | 1.19 | |

Note : 1 kgf = 9.81 N







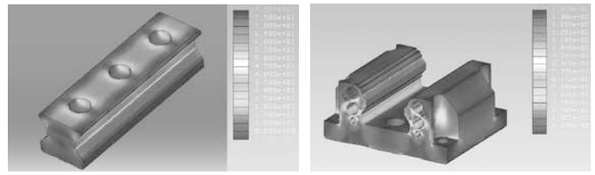
## 2-5 R Series – High Rigidity Roller Type Linear Guideway

### 2-5-1 Advantages and Features of R Series

The new R series from LIMON features a roller as the rolling element instead of steel balls. The roller series offers super high rigidity and very high load capacities. The R series is designed with a 45-degree angle of contact. Elastic deformation of the linear contact surface, during load, is greatly reduced thereby offering greater rigidity and higher load capacities in all 4 load directions.The R series linear guideway offers high performance for high-precision manufacturing and achieving longer service life.

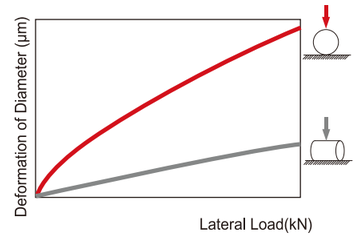
(1) Optimal design

FEM analysis was performed to determine the optimal structure of the block and the rail. The unique design of the circulation path allows the R series linear guideway to offer smoother linear motion.



(2) Super high rigidity

The R series is a type of linear guideway that uses rollers as the rolling elements. Rollers have a greater contact area than balls so that the roller guideway features higher load capacity and greater rigidity. The figure shows the rigidity of a roller and a ball with equal volume.

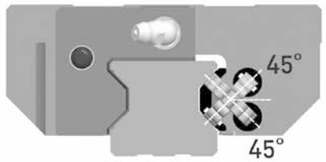



(3) Super high load capacity

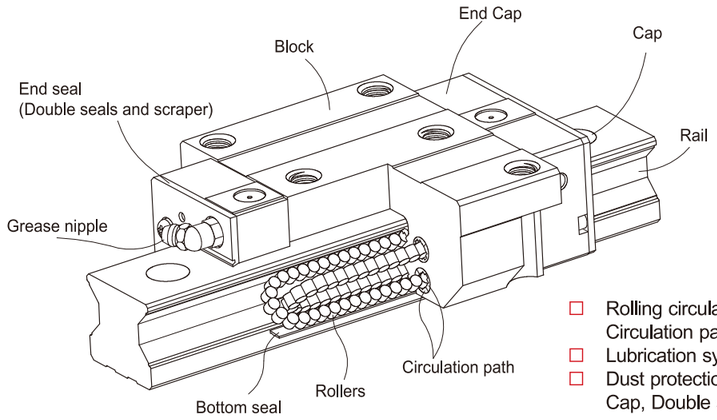
With the four rows of rollers arranged at a contact angle of 45-degrees, the R series linear guideway has equal load ratings in the radial, reverse radial and lateral directions. The R series has a higher load capacity in a smaller size than conventional, ball-type linear guideways.

(4) Operating life increased

Compare with the ball element, the contact pressure of rolling element is distributed on the line region. Therefore, stress concentration was reduced siginificantly and the R series offers longer running life. The nominal life of R series can be calculated by using Eq.




### 2-5-2 Construction of R Series

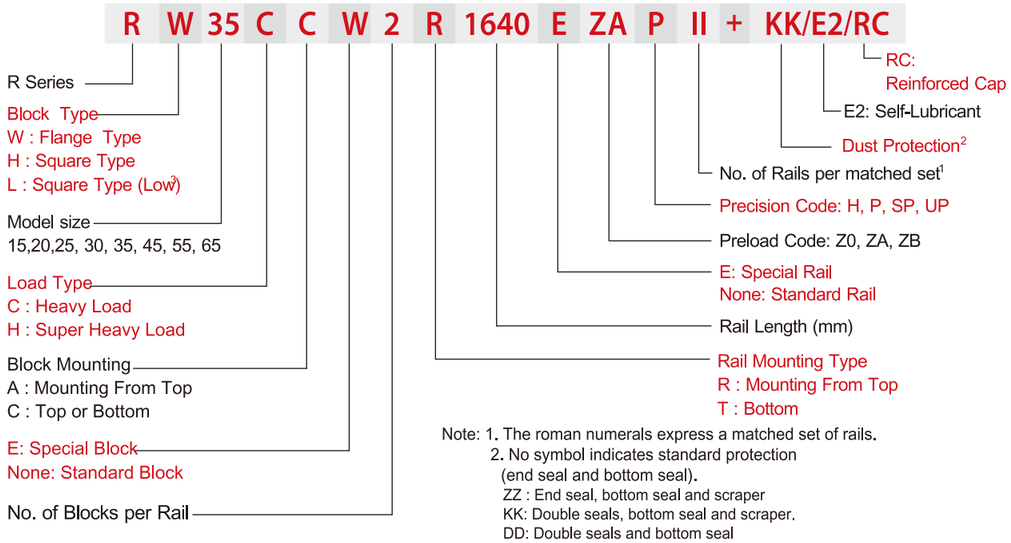



- ☐ Rolling circulation system: Block, Rail, End cap, Circulation path, rollers
- ☐ Lubrication system: Grease nipple and piping joint
- ☐ Dust protection system: End seal, Bottom seal, Cap, Double seals and Scraper

## 2-5-3 Model Number of R series

R series linear guideways are classified into non-interchangeable and interchangeable types. The sizes of these two types are the same as one another. The main difference is that the interchangeable type of blocks and rails can be freely exchanged and they can maintain P-class accuracy. Because of strict dimensional control, the interchangeable type linear guideways are a wise choice for customers when rails do not need to be matched for an axis. The model number of the R series identifies the size, type, accuracy class, preload class, etc.

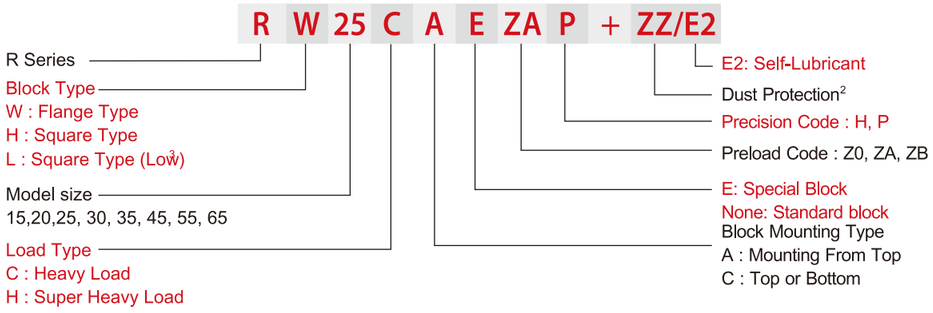
(1) Non-interchangeable type



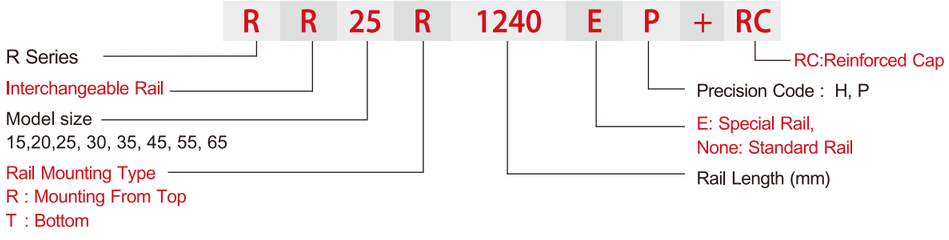

Note: 1. The roman numerals express a matched set of rails.
2. No symbol indicates standard protection (end seal and bottom seal).
ZZ : End seal, bottom seal and scraper
KK: Double seals, bottom seal and scraper.
DD: Double seals and bottom seal
3. Block type RL is the low profile design of RH (square type), the assembled height is same as RW (flange type) in same size.

(2) Interchangeable type

☐ Model Number of R Block




☐ Model Number of R Rail





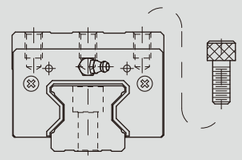
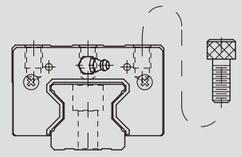
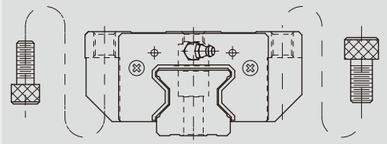



## 2-5-4 Types

(1) Block types

LIMON offers two types of guide blocks, flange and square type. Because of the low assembly height and large mounting surface, the flange type is excellent for heavy moment load applications.

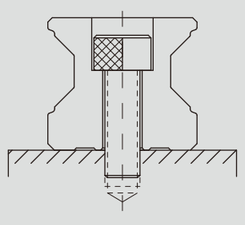
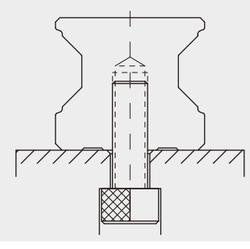
**Table 2-5-1** Block Types

| Type | Model | Shape | Height (mm) | Rail Length (mm) | Main Applications |
|---|---|---|---|---|---|
| Square | RH-CA<br>RH-HA |  | 28<br>↓<br>90 | 100<br>↓<br>4000 | ☐ Automation Systems<br>☐ Transportation equipment<br>☐ CNC machining centers<br>☐ Heavy duty cutting machines<br>☐ CNC grinding machines<br>☐ Injection molding machines<br>☐ Plano millers<br>☐ Devices requiring high rigidity<br>☐ Devices requiring high load capacity<br>☐ Electric discharge machines |
| Square | RL-CA<br>RL-HA |  | 24<br>↓<br>70 | 100<br>↓<br>4000 | |
| Flange | RW-CC<br>RW-HC |  | 24<br>↓<br>90 | 100<br>↓<br>4000 | |

(2) Rail types

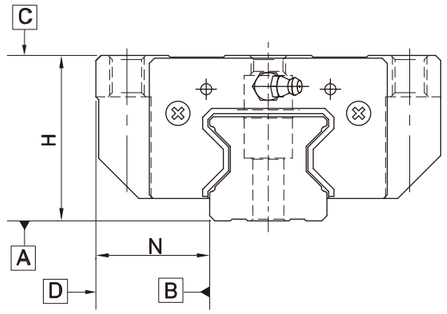
In addition to the standard top mounting type, LIMON also offers the bottom mounting type of rails.

**Table 2-5-2** Rail Types

| Mounting from Top | Mounting from Bottom |
|---|---|
|  |  |

## 2-5-5 Accuracy

The accuracy of the R series can be classified into four classes: high (H), precision (P), super precision (SP) and ultra precision (UP). Customers may choose the class by referencing the accuracy requirements of the applied equipment.




(1) Accuracy of non-interchangeable

**Table 2-5-3** Accuracy Standards

Unit: mm

| Item | R - 15, 20 | | | |
|---|---|---|---|---|
| Accuracy Classes | High (H) | Precision (P) | Super Precision (SP) | Ultra Precision (UP) |
| Dimensional tolerance of height H | ± 0.03 | 0<br>- 0.03 | 0<br>- 0.015 | 0<br>- 0.008 |
| Dimensional tolerance of width N | ± 0.03 | 0<br>- 0.03 | 0<br>- 0.015 | 0<br>- 0.008 |
| Variation of height H | 0.01 | 0.006 | 0.004 | 0.003 |
| Variation of width N | 0.01 | 0.006 | 0.004 | 0.003 |
| Running parallelism of block surface C to surface A | See Table 2-5-11 | | | |
| Running parallelism of block surface D to surface B | See Table 2-5-11 | | | |

**Table 2-5-4** Accuracy Standards

Unit: mm

| Item | R - 25, 30, 35 | | | |
|---|---|---|---|---|
| Accuracy Classes | High (H) | Precision (P) | Super Precision (SP) | Ultra Precision (UP) |
| Dimensional tolerance of height H | ± 0.04 | 0<br>- 0.04 | 0<br>- 0.02 | 0<br>- 0.01 |
| Dimensional tolerance of width N | ± 0.04 | 0<br>- 0.04 | 0<br>- 0.02 | 0<br>- 0.01 |
| Variation of height H | 0.015 | 0.007 | 0.005 | 0.003 |
| Variation of width N | 0.015 | 0.007 | 0.005 | 0.003 |
| Running parallelism of block surface C to surface A | See Table 2-5-11 | | | |
| Running parallelism of block surface D to surface B | See Table 2-5-11 | | | |

**Table 2-5-5** Accuracy Standards

Unit: mm

| Item | R - 45, 55 | | | |
|---|---|---|---|---|
| Accuracy Classes | High (H) | Precision (P) | Super Precision (SP) | Ultra Precision (UP) |
| Dimensional tolerance of height H | ± 0.05 | 0<br>- 0.05 | 0<br>- 0.03 | 0<br>- 0.02 |
| Dimensional tolerance of width N | ± 0.05 | 0<br>- 0.05 | 0<br>- 0.03 | 0<br>- 0.02 |
| Variation of height H | 0.015 | 0.007 | 0.005 | 0.003 |
| Variation of width N | 0.02 | 0.01 | 0.007 | 0.005 |
| Running parallelism of block surface C to surface A | See Table 2-5-11 | | | |
| Running parallelism of block surface D to surface B | See Table 2-5-11 | | | |







**Table 2-5-6** Accuracy Standards

Unit: mm

| Item | R - 65 | | | |
|---|---|---|---|---|
| Accuracy Classes | High (H) | Precision (P) | Super Precision (SP) | Ultra Precision (UP) |
| Dimensional tolerance of height H | ± 0.07 | 0<br>- 0.07 | 0<br>- 0.05 | 0<br>- 0.03 |
| Dimensional tolerance of width N | ± 0.07 | 0<br>- 0.07 | 0<br>- 0.05 | 0<br>- 0.03 |
| Variation of height H | 0.02 | 0.01 | 0.007 | 0.005 |
| Variation of width N | 0.025 | 0.015 | 0.01 | 0.007 |
| Running parallelism of block surface C to surface A | See Table 2-5-11 | | | |
| Running parallelism of block surface D to surface B | See Table 2-5-11 | | | |

(2) Accuracy of interchangeable

**Table 2-5-7** Accuracy Standards

Unit: mm

| Item | R - 15, 20 | |
|---|---|---|
| Accuracy Classes | High (H) | Precision (P) |
| Dimensional tolerance of height H | ± 0.03 | ± 0.015 |
| Dimensional tolerance of width N | ± 0.03 | ± 0.015 |
| Variation of height H | 0.01 | 0.006 |
| Variation of width N | 0.01 | 0.006 |
| Running parallelism of block surface C to surface A | See Table 2-5-11 | |
| Running parallelism of block surface D to surface B | See Table 2-5-11 | |

**Table 2-5-8** Accuracy Standards

Unit: mm

| Item | R - 25, 30, 35 | |
|---|---|---|
| Accuracy Classes | High (H) | Precision (P) |
| Dimensional tolerance of height H | ± 0.04 | ± 0.02 |
| Dimensional tolerance of width N | ± 0.04 | ± 0.02 |
| Variation of height H | 0.015 | 0.007 |
| Variation of width N | 0.015 | 0.007 |
| Running parallelism of block surface C to surface A | See Table 2-5-11 | |
| Running parallelism of block surface D to surface B | See Table 2-5-11 | |

**Table 2-5-9** Accuracy Standards

Unit: mm

| Item | R - 45, 55 | |
|---|---|---|
| Accuracy Classes | High (H) | Precision (P) |
| Dimensional tolerance of height H | ± 0.05 | ± 0.025 |
| Dimensional tolerance of width N | ± 0.05 | ± 0.025 |
| Variation of height H | 0.015 | 0.007 |
| Variation of width N | 0.02 | 0.01 |
| Running parallelism of block surface C to surface A | See Table 2-5-11 | |
| Running parallelism of block surface D to surface B | See Table 2-5-11 | |

**Table 2-5-10** Accuracy Standards

Unit: mm

| Item | R - 65 | |
|---|---|---|
| Accuracy Classes | High (H) | Precision (P) |
| Dimensional tolerance of height H | ± 0.07 | ± 0.035 |
| Dimensional tolerance of width N | ± 0.07 | ± 0.035 |
| Variation of height H | 0.02 | 0.01 |
| Variation of width N | 0.025 | 0.015 |
| Running parallelism of block surface C to surface A | See Table 2-5-11 | |
| Running parallelism of block surface D to surface B | See Table 2-5-11 | |

### (3) Accuracy of running parallelism

**Table 2-5-11** Accuracy of Running Parallelism

| Rail Length (mm) | Accuracy (μm) H | P | SP | UP |
|---|---|---|---|---|
| ~ 100 | 7 | 3 | 2 | 2 |
| 100 ~ 200 | 9 | 4 | 2 | 2 |
| 200 ~ 300 | 10 | 5 | 3 | 2 |
| 300 ~ 500 | 12 | 6 | 3 | 2 |
| 500 ~ 700 | 13 | 7 | 4 | 2 |
| 700 ~ 900 | 15 | 8 | 5 | 3 |
| 900 ~ 1,100 | 16 | 9 | 6 | 3 |
| 1,100 ~ 1,500 | 18 | 11 | 7 | 4 |
| 1,500 ~ 1,900 | 20 | 13 | 8 | 4 |
| 1,900 ~ 2,500 | 22 | 15 | 10 | 5 |
| 2,500 ~ 3,100 | 25 | 18 | 11 | 6 |
| 3,100 ~ 3,600 | 27 | 20 | 14 | 7 |
| 3,600 ~ 4,000 | 28 | 21 | 15 | 7 |

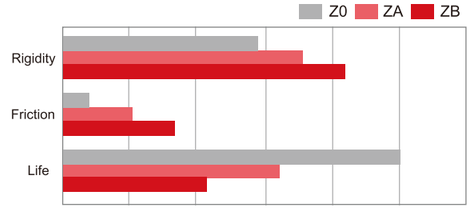
## 2-5-6 Preload

A preload can be applied to each guideway using oversized rollers. Generally, a linear motion guideway has negative clearance between the raceway and rollers to improve stiffness and maintain high precision. The R series linear guideway offers three standard preloads for various applications and conditions.

**Table 2-5-12**

| Class | Code | Preload | Condition |
|---|---|---|---|
| Light Preload | Z0 | 0.02C~ 0.04C | Certain load direction, low impact, low precision required |
| Medium Preload | ZA | 0.07C~0.09C | High rigidity required, high precision required |
| Heavy Preload | ZB | 0.12C~ 0.14C | Super high rigidity required, with vibration and impact |

The figure shows the relationship between the rigidity, friction and nominal life. A preload no larger than ZA would be recommended for smaller model sizes to avoid over-preload affecting the life of the guideway.





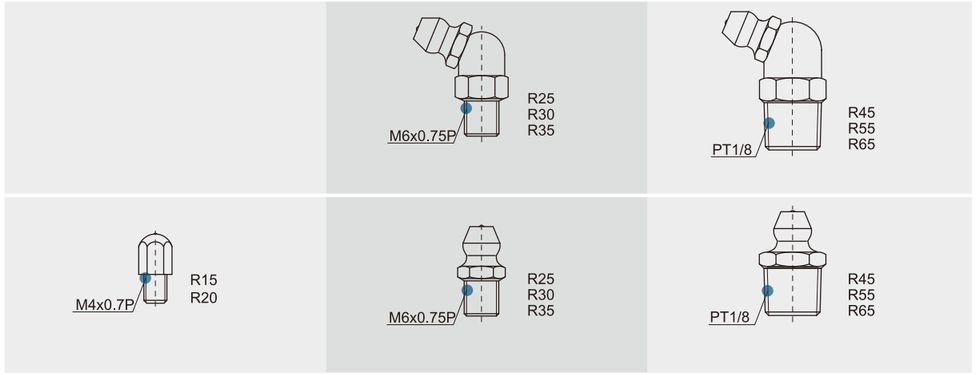





## 2-5-7 Lubrication

### (1) Grease

☐ Grease nipple




☐ Mounting location

The standard location of the grease fitting is at both ends of the block, but the nipple can be mounted in the side or the top of block. For lateral installation, we recommend that the nipple be mounted at the non-reference side, otherwise please contact us. It is possible to carry out the lubrication by using an oil-piping joint. The figure shows the locations of the grease fitting.

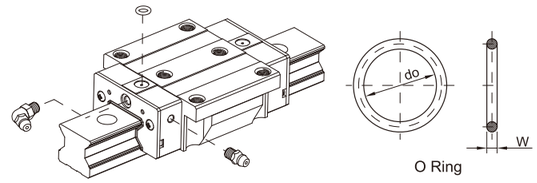
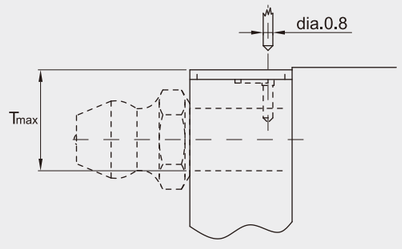



**Table 2-5-13** O-Ring size and max. permissible depth for piercing

| Size | O-Ring | | Lube hole at top: max. permissible depth for piercing |
|---|---|---|---|
| | do (mm) | W (mm) | $T_{max}$ (mm) |
| R15 | 2.5±0.15 | 1.5±0.15 | 3.45 |
| R20 | 2.5±0.15 | 1.5±0.15 | 4 |
| R25 | 7.5±0.15 | 1.5±0.15 | 5.8 |
| R30 | 7.5±0.15 | 1.5±0.15 | 6.2 |
| R35 | 7.5±0.15 | 1.5±0.15 | 8.65 |
| R45 | 7.5±0.15 | 1.5±0.15 | 9.5 |
| R55 | 7.5±0.15 | 1.5±0.15 | 11.6 |
| R65 | 7.5±0.15 | 1.5±0.15 | 14.5 |




☐ The oil amount for a block filled with grease

**Table 2-5-14** The oil amount for a block illed with grease

| Size | Heavy Load($cm^3$) | Super Heavy Load($cm^3$) | Size | Heavy Load($cm^3$) | Super Heavy Load($cm^3$) |
|---|---|---|---|---|---|
| R15 | 3 | - | R35 | 12 | 14 |
| R20 | 5 | 6 | R45 | 19 | 23 |
| R25 | 7 | 8 | R55 | 28 | 35 |
| R30 | 9 | 10 | R65 | 52 | 63 |

Frequency of replenishment

Check the grease every 100 km, or every 3-6 months.

(2) Oil
The recommended viscosity of oil is about 32~150cSt. If you need to use oil-type lubrication, please inform us.

□ Oil feeding rate

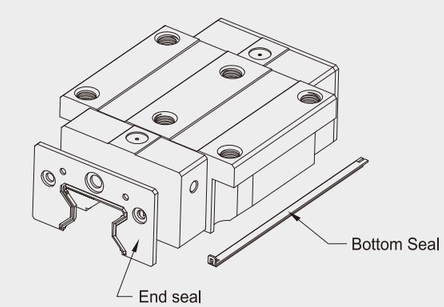
**Table 2-5-15** oil feed rate

| Size | Feed rate ($cm^3$/hr) |
|---|---|
| R15 | 0.14 |
| R20 | 0.14 |
| R25 | 0.167 |
| R30 | 0.2 |
| R35 | 0.23 |
| R45 | 0.3 |
| R55 | 0.367 |
| R65 | 0.433 |

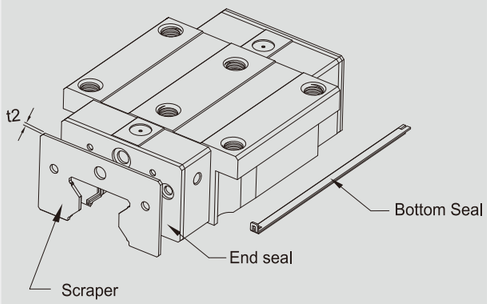
## 2-5-8 Dust Proof Accessories

(1) Codes of accessories
If the following accessories are needed, please add the code followed by the model number.

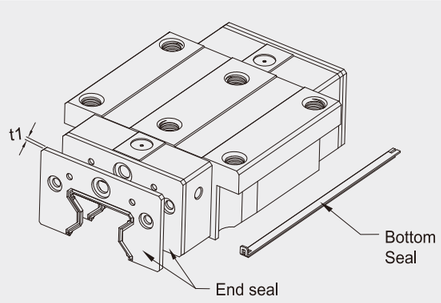
**Table 2-5-16**



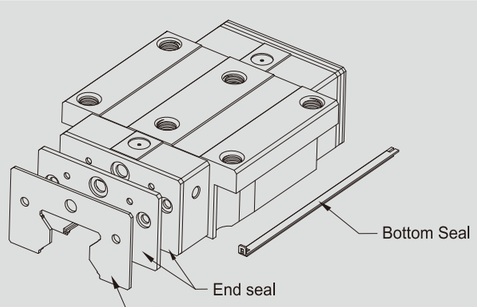

No symbol: Standard Protection (End seal + Bottom Seal)




ZZ (End seal + Bottom Seal + Scraper)




DD (Double seals + Bottom Seal)




KK (Double seals + Bottom Seal + Scraper)





(2) End seal and bottom seal
To prevent life reduction caused by iron chips or dust entering the block.

(3) Double seals
Enhances the wiping effect, foreign matter can be completely wiped off.

**Table 2-5-17** Dimensions of end seal

| Size | Thickness (t1) (mm) | Size | Thickness (t1) (mm) |
|---|---|---|---|
| R15 ES | 2.2 | R35 ES | 2.5 |
| R20 ES | 2.2 | R45 ES | 3.6 |
| R25 ES | 2.2 | R55 ES | 3.6 |
| R30 ES | 2.4 | R65 ES | 4.4 |

(4) Scraper
The scraper removes high-temperature iron chips and larger foreign objects.

**Table 2-5-18** Dimensions of scraper

| Size | Thickness (t2) (mm) | Size | Thickness (t2) (mm) |
|---|---|---|---|
| R15 SC | 1.0 | R35 SC | 1.5 |
| R20 SC | 1.0 | R45 SC | 1.5 |
| R25 SC | 1.0 | R55 SC | 1.5 |
| R30 SC | 1.5 | R65 SC | 1.5 |

(5) Bolt caps for rail mounting holes
Caps are used to cover the mounting holes to prevent chips or other foreign objects from collecting in the holes. The caps will be enclosed in each rail package.

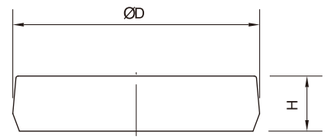



**Table 2-5-19** Dimensions of Bolt Caps for Rail Mounting Holes

| Rail size | Bolt size | Diameter(D) (mm) | Thickness(H) (mm) | Rail size | Bolt size | Diameter(D) (mm) | Thickness(H) (mm) |
|---|---|---|---|---|---|---|---|
| RR 15 | M4 | 7.65 | 1.1 | RR 35 | M8 | 14.2 | 3.3 |
| RR 20 | M5 | 9.65 | 2.2 | RR 45 | M12 | 20.25 | 4.6 |
| RR 25 | M6 | 11.15 | 2.5 | RR 55 | M14 | 23.5 | 5.5 |
| RR 30 | M8 | 14.2 | 3.3 | RR 65 | M16 | 26.6 | 5.5 |

(6) Dimensions of block equipped with the dustproof parts

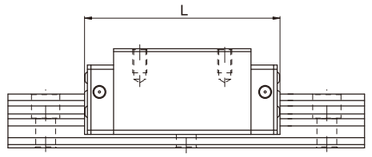



**Table 2-5-20** Overall block length

unit: mm

| Size | Overall block length (L) | | | |
|---|---|---|---|---|
| | SS | ZZ | DD | KK |
| R15C | 68.0 (70.4) | 70.0 (74.4) | 72.4 (74.8) | 74.4 (78.8) |
| R20C | 86.0 (88.4) | 88.0 (92.4) | 90.4 (92.8) | 92.4 (96.8) |
| R20H | 106.0 (108.4) | 108.0 (112.4) | 110.4 (112.8) | 112.4 (116.8) |
| R25C | 97.9 (101.5) | 99.9 (105.9) | 102.3 (105.9) | 104.3 (110.3) |
| R25H | 114.4 (118) | 116.4 (122.4) | 118.8 (122.4) | 120.8 (126.8) |
| R30C | 109.8 (113.4) | 112.8 (118.8) | 114.6 (118.2) | 117.6 (123.6) |
| R30H | 131.8 (135.4) | 134.8 (140.8) | 136.6 (140.2) | 139.6 (145.6) |
| R35C | 124.0 (129.4) | 127.0 (135.0) | 129.0 (134.4) | 132.0 (140.0) |
| R35H | 151.5 (156.9) | 154.5 (162.5) | 156.5 (161.9) | 159.5 (167.5) |
| R45C | 153.2 (156.4) | 156.2 (164.2) | 160.4 (163.6) | 163.4 (171.4) |
| R45H | 187.0 (190.2) | 190.0 (198.0) | 194.2 (197.4) | 197.2 (205.2) |
| R55C | 183.7 (186.9) | 186.7 (194.7) | 190.9 (194.1) | 193.9 (201.9) |
| R55H | 232.0 (235.2) | 235.0 (243.0) | 239.2 (242.4) | 242.2 (250.2) |
| R65C | 232.0 (236.0) | 235.0 (245.0) | 240.8 (244.8) | 243.8 (253.8) |
| R65H | 295.0 (299.0) | 298.0 (308.0) | 303.8 (307.8) | 306.8 (316.8) |

Note : The marking of "( )" denotes the maximum block length with screws, lips of end seals, etc.

## 2-5-9 Friction

The maximum value of resistance per end seal are as shown in the table.

**Table 2-5-21** Seal Resistance

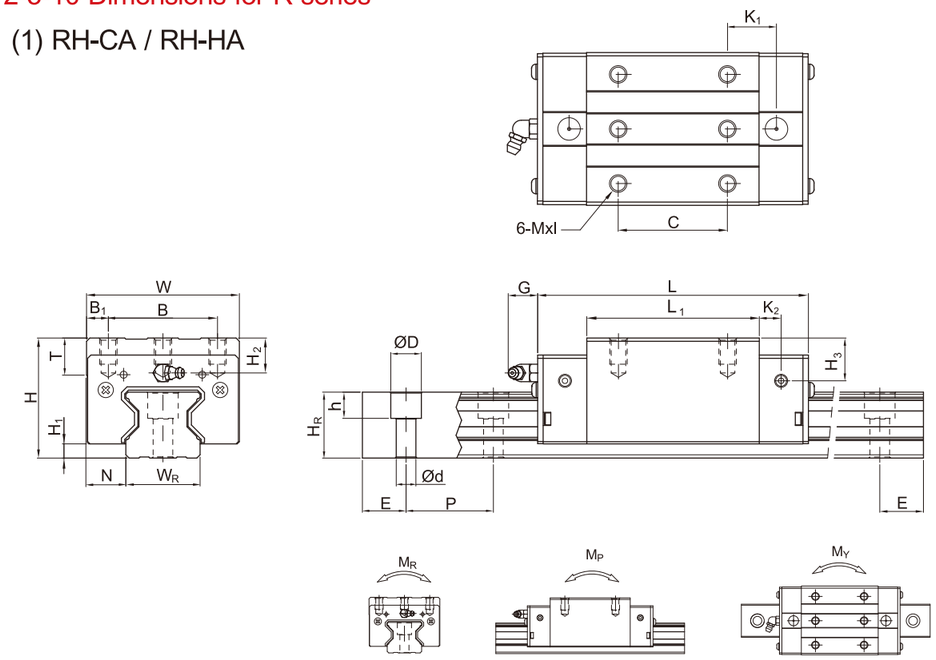
| Size | Resistance N (kgf) | Size | Resistance N (kgf) |
|---|---|---|---|
| R15 | 1.96 (0.2) | R35 | 3.53 (0.36) |
| R20 | 2.45 (0.25) | R45 | 4.21 (0.43) |
| R25 | 2.74 (0.28) | R55 | 5.09 (0.52) |
| R30 | 3.31 (0.31) | R65 | 6.66 (0.68) |





## 2-5-10 Dimensions for R series

(1) RH-CA / RH-HA

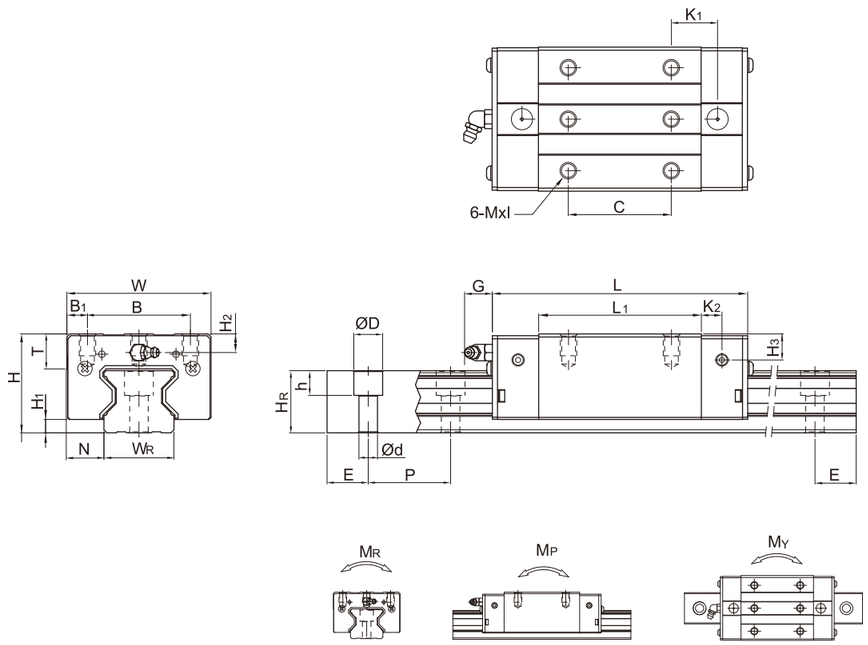



| Model No. | Dimensions of Assembly (mm) | | | Dimensions of Block (mm) | | | | | | | | | | | | | Dimensions of Rail (mm) | | | | | | | Mounting Bolt for Rail | Basic Dynamic Load Rating | Basic Static Load Rating | Static Rated Moment | | | Weight | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | H | $H_1$ | N | W | B | $B_1$ | C | $L_1$ | L | $K_1$ | $K_2$ | G | MxI | T | $H_2$ | $H_3$ | $W_R$ | $H_R$ | D | h | d | P | E | (mm) | C(kN) | $C_0$ (kN) | $M_R$ kN-m | $M_P$ kN-m | $M_Y$ kN-m | Block kg | Rail kg/m |
| RH15CA | 28 | 4 | 9.5 | 34 | 26 | 4 | 26 | 45 | 68 | 13.4 | 4.7 | 5.3 | M4 x 8 | 6 | 7.6 | 10.1 | 15 | 16.5 | 7.5 | 5.7 | 4.5 | 30 | 20 | M4 x16 | 11.3 | 24 | 0.311 | 0.173 | 0.173 | 0.20 | 1.8 |
| RH20CA | 34 | 5 | 12 | 44 | 32 | 6 | 36 | 57.5 | 86 | 15.8 | 6 | 5.3 | M5 x 8 | 8 | 8.3 | 8.3 | 20 | 21 | 9.5 | 8.5 | 6 | 30 | 20 | M5 x20 | 21.3 | 46.7 | 0.647 | 0.46 | 0.46 | 0.40 | 2.76 |
| RH20HA | | | | | | | 50 | 77.5 | 106 | 18.8 | | | | | | | | | | | | | | | 26.9 | 63 | 0.872 | 0.837 | 0.837 | 0.53 | |
| RH25CA | 40 | 5.5 | 12.5 | 48 | 35 | 6.5 | 35 | 64.5 | 97.9 | 20.75 | 7.25 | 12 | M6 x 8 | 9.5 | 10.2 | 10 | 23 | 23.6 | 11 | 9 | 7 | 30 | 20 | M6 x20 | 27.7 | 57.1 | 0.758 | 0.605 | 0.605 | 0.61 | 3.08 |
| RH25HA | | | | | | | 50 | 81 | 114.4 | 21.5 | | | | | | | | | | | | | | | 33.9 | 73.4 | 0.975 | 0.991 | 0.991 | 0.75 | |
| RH30CA | 45 | 6 | 16 | 60 | 40 | 10 | 40 | 71 | 109.8 | 23.5 | 8 | 12 | M8 x10 | 9.5 | 9.5 | 10.3 | 28 | 28 | 14 | 12 | 9 | 40 | 20 | M8 x25 | 39.1 | 82.1 | 1.445 | 1.06 | 1.06 | 0.90 | 4.41 |
| RH30HA | | | | | | | 60 | 93 | 131.8 | 24.5 | | | | | | | | | | | | | | | 48.1 | 105 | 1.846 | 1.712 | 1.712 | 1.16 | |
| RH35CA | 55 | 6.5 | 18 | 70 | 50 | 10 | 50 | 79 | 124 | 22.5 | 10 | 12 | M8 x12 | 12 | 16 | 19.6 | 34 | 30.2 | 14 | 12 | 9 | 40 | 20 | M8 x25 | 57.9 | 105.2 | 2.17 | 1.44 | 1.44 | 1.57 | 6.06 |
| RH35HA | | | | | | | 72 | 106.5 | 151.5 | 25.25 | | | | | | | | | | | | | | | 73.1 | 142 | 2.93 | 2.6 | 2.6 | 2.06 | |
| RH45CA | 70 | 8 | 20.5 | 86 | 60 | 13 | 60 | 106 | 153.2 | 31 | 10 | 12.9 | M10x17 | 16 | 20 | 24 | 45 | 38 | 20 | 17 | 14 | 52.5 | 22.5 | M12 x35 | 92.6 | 178.8 | 4.52 | 3.05 | 3.05 | 3.18 | 9.97 |
| RH45HA | | | | | | | 80 | 139.8 | 187 | 37.9 | | | | | | | | | | | | | | | 116 | 230.9 | 6.33 | 5.47 | 5.47 | 4.13 | |
| RH55CA | 80 | 10 | 23.5 | 100 | 75 | 12.5 | 75 | 125.5 | 183.7 | 37.75 | 12.5 | 12.9 | M12x18 | 17.5 | 22 | 27.5 | 53 | 44 | 23 | 20 | 16 | 60 | 30 | M14 x45 | 130.5 | 252 | 8.01 | 5.4 | 5.4 | 4.89 | 13.98 |
| RH55HA | | | | | | | 95 | 173.8 | 232 | 51.9 | | | | | | | | | | | | | | | 167.8 | 348 | 11.15 | 10.25 | 10.25 | 6.68 | |
| RH65CA | 90 | 12 | 31.5 | 126 | 76 | 25 | 70 | 160 | 232 | 60.8 | 15.8 | 12.9 | M16 x20 | 25 | 15 | 15 | 63 | 53 | 26 | 22 | 18 | 75 | 35 | M16x50 | 213 | 411.6 | 16.20 | 11.59 | 11.59 | 8.89 | 20.22 |
| RH65HA | | | | | | | 120 | 223 | 295 | 67.3 | | | | | | | | | | | | | | | 275.3 | 572.7 | 22.55 | 22.17 | 22.17 | 12.13 | |

Note : 1. 1 kgf = 9.81 N

2. The theoretical dynamic rated load is $C_{100R}$, if necessary $C_{50R}$ conversion formula is as follows : $C_{50R} = 1.23 \times C_{100R}$

## (2) RL-CA / RL-HA




| Model No. | Dimensions of Assembly (mm) | | | Dimensions of Block (mm) | | | | | | | | | | | | | Dimensions of Rail (mm) | | | | | | Mounting Bolt for Rail | Basic Dynamic Load Rating | Basic Static Load Rating | Static Rated Moment | | | Weight | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | H | $H_1$ | N | W | B | $B_1$ | C | $L_1$ | L | $K_1$ | $K_2$ | G | MxI | T | $H_2$ | $H_3$ | $W_R$ | $H_R$ | D | h | d | P | E | (mm) | C(kN) | $C_0$ (kN) | $M_R$ kN-m | $M_P$ kN-m | $M_Y$ kN-m | Block kg | Rail kg/m |
| RL15CA | 24 | 4 | 9.5 | 34 | 26 | 4 | 26 | 45 | 68 | 13.4 | 4.7 | 5.3 | M4X5.5 | 6 | 3.6 | 6.1 | 15 | 16.5 | 7.5 | 5.7 | 4.5 | 30 | 20 | M4x16 | 11.3 | 24 | 0.311 | 0.173 | 0.173 | 0.15 | 1.8 |
| RL20CA | 30 | 5 | 12 | 44 | 32 | 6 | 36 | 57.5 | 86 | 15.8 | 6 | 5.3 | M5X6 | 8 | 4.3 | 4.3 | 20 | 21 | 9.5 | 8.5 | 6 | 30 | 20 | M5x20 | 21.3 | 46.7 | 0.647 | 0.46 | 0.46 | 0.32 | 2.76 |
| RL20HA | | | | | | | 50 | 77.5 | 106 | 18.8 | | | | | | | | | | | | | | | 26.9 | 63 | 0.872 | 0.837 | 0.837 | 0.42 | |
| RL25CA | 36 | 5.5 | 12.5 | 48 | 35 | 6.5 | 35 | 64.5 | 97.9 | 20.75 | 7.25 | 12 | M6x8 | 9.5 | 6.2 | 6 | 23 | 23.6 | 11 | 9 | 7 | 30 | 20 | M6x20 | 27.7 | 57.1 | 0.758 | 0.605 | 0.605 | 0.51 | 3.08 |
| RL25HA | | | | | | | 50 | 81 | 114.4 | 21.5 | | | | | | | | | | | | | | | 33.9 | 73.4 | 0.975 | 0.991 | 0.991 | 0.63 | |
| RL30CA | 42 | 6 | 16 | 60 | 40 | 10 | 40 | 71 | 109.8 | 23.5 | 8 | 12 | M8x10 | 9.5 | 6.5 | 7.3 | 28 | 28 | 14 | 12 | 9 | 40 | 20 | M8x25 | 39.1 | 82.1 | 1.445 | 1.06 | 1.06 | 0.80 | 4.41 |
| RL30HA | | | | | | | 60 | 93 | 131.8 | 24.5 | | | | | | | | | | | | | | | 48.1 | 105 | 1.846 | 1.712 | 1.712 | 1.03 | |
| RL35CA | 48 | 6.5 | 18 | 70 | 50 | 10 | 50 | 79 | 124 | 22.5 | 10 | 12 | M8x12 | 12 | 9 | 12.6 | 34 | 30.2 | 14 | 12 | 9 | 40 | 20 | M8x25 | 57.9 | 105.2 | 2.17 | 1.44 | 1.44 | 1.27 | 6.06 |
| RL35HA | | | | | | | 72 | 106.5 | 151.5 | 25.25 | | | | | | | | | | | | | | | 73.1 | 142 | 2.93 | 2.6 | 2.6 | 1.65 | |
| RL45CA | 60 | 8 | 20.5 | 86 | 60 | 13 | 60 | 106 | 153.2 | 31 | 10 | 12.9 | M10x17 | 16 | 10 | 14 | 45 | 38 | 20 | 17 | 14 | 52.5 | 22.5 | M12x35 | 92.6 | 178.8 | 4.52 | 3.05 | 3.05 | 2.47 | 9.97 |
| RL45HA | | | | | | | 80 | 139.8 | 187 | 37.9 | | | | | | | | | | | | | | | 116 | 230.9 | 6.33 | 5.47 | 5.47 | 3.20 | |
| RL55CA | 70 | 10 | 23.5 | 100 | 75 | 12.5 | 75 | 125.5 | 183.7 | 37.75 | 12.5 | 12.9 | M12x18 | 17.5 | 12 | 17.5 | 53 | 44 | 23 | 20 | 16 | 60 | 30 | M14x45 | 130.5 | 252 | 8.01 | 5.4 | 5.4 | 3.91 | 13.98 |
| RL55HA | | | | | | | 95 | 173.8 | 232 | 51.9 | | | | | | | | | | | | | | | 167.8 | 348 | 11.15 | 10.25 | 10.25 | 5.32 | |

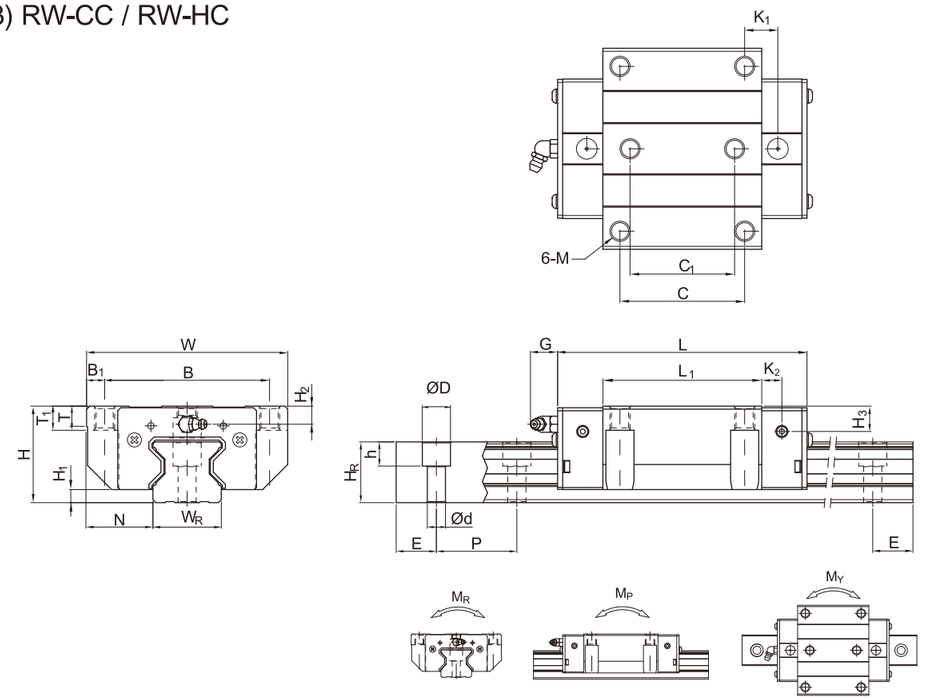
Note : 1. 1 kgf = 9.81 N
2. The theoretical dynamic rated load is $C_{100R}$, if necessary $C_{50R}$conversion formula is as follows : $C_{50R}$= 1.23 x $C_{100R}$







## (3) RW-CC / RW-HC

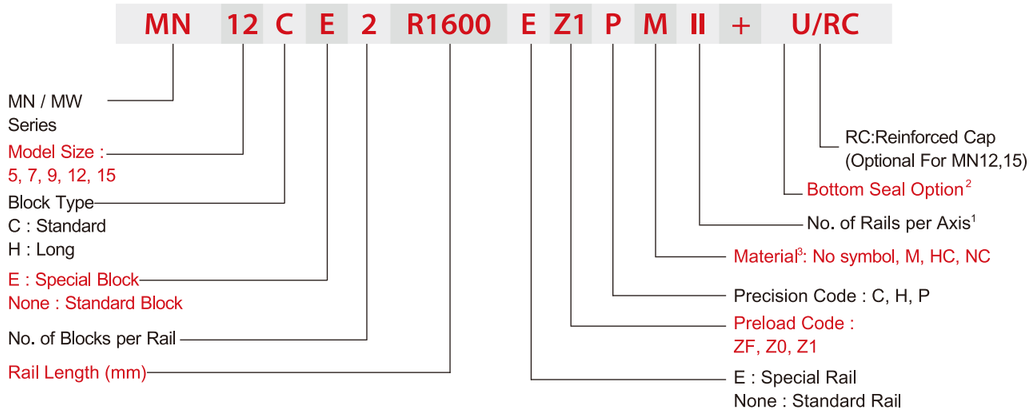



| Model No. | Dimensions of Assembly (mm) | | | Dimensions of Block (mm) | | | | | | | | | | | | | | | Dimensions of Rail (mm) | | | | | | | Mounting Bolt for Rail | Basic Dynamic Load Rating | Basic Static Load Rating | Static Rated Moment | | | Weight | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | H | $H_1$ | N | W | B | $B_1$ | C | $C_1$ | $L_1$ | L | $K_1$ | $K_2$ | G | M | T | $T_1$ | $H_2$ | $H_3$ | $W_R$ | $H_R$ | D | h | d | P | E | (mm) | C(kN) | $C_0$ (kN) | $M_R$ kN-m | $M_P$ kN-m | $M_Y$ kN-m | Block kg | Rail kg/m |
| RW15CC | 24 | 4 | 16 | 47 | 38 | 4.5 | 30 | 26 | 45 | 68 | 11.4 | 4.7 | 5.3 | M5 | 6 | 6.95 | 3.6 | 6.1 | 15 | 16.5 | 7.5 | 5.7 | 4.5 | 30 | 20 | M4x16 | 11.3 | 24 | 0.311 | 0.173 | 0.173 | 0.22 | 1.8 |
| RW20CC | 30 | 5 | 21.5 | 63 | 53 | 5 | 40 | 35 | 57.5 | 86 | 13.8 | 6 | 5.3 | M6 | 8 | 10 | 4.3 | 4.3 | 20 | 21 | 9.5 | 8.5 | 6 | 30 | 20 | M5x20 | 21.3 | 46.7 | 0.647 | 0.46 | 0.46 | 0.47 | 2.76 |
| RW20HC | | | | | | | | | 77.5 | 106 | 23.8 | | | | | | | | | | | | | | | | 26.9 | 63 | 0.872 | 0.837 | 0.837 | 0.63 | |
| RW25CC | 36 | 5.5 | 23.5 | 70 | 57 | 6.5 | 45 | 40 | 64.5 | 97.9 | 15.75 | 7.25 | 12 | M8 | 9.5 | 10 | 6.2 | 6 | 23 | 23.6 | 11 | 9 | 7 | 30 | 20 | M6x20 | 27.7 | 57.1 | 0.758 | 0.605 | 0.605 | 0.72 | 3.08 |
| RW25HC | | | | | | | | | 81 | 114.4 | 24 | | | | | | | | | | | | | | | | 33.9 | 73.4 | 0.975 | 0.991 | 0.991 | 0.91 | |
| RW30CC | 42 | 6 | 31 | 90 | 72 | 9 | 52 | 44 | 71 | 109.8 | 17.5 | 8 | 12 | M10 | 9.5 | 10 | 6.5 | 7.3 | 28 | 28 | 14 | 12 | 9 | 40 | 20 | M8x25 | 39.1 | 82.1 | 1.445 | 1.06 | 1.06 | 1.16 | 4.41 |
| RW30HC | | | | | | | | | 93 | 131.8 | 28.5 | | | | | | | | | | | | | | | | 48.1 | 105 | 1.846 | 1.712 | 1.712 | 1.52 | |
| RW35CC | 48 | 6.5 | 33 | 100 | 82 | 9 | 62 | 52 | 79 | 124 | 16.5 | 10 | 12 | M10 | 12 | 13 | 9 | 12.6 | 34 | 30.2 | 14 | 12 | 9 | 40 | 20 | M8x25 | 57.9 | 105.2 | 2.17 | 1.44 | 1.44 | 1.75 | 6.06 |
| RW35HC | | | | | | | | | 106.5 | 151.5 | 30.25 | | | | | | | | | | | | | | | | 73.1 | 142 | 2.93 | 2.6 | 2.6 | 2.40 | |
| RW45CC | 60 | 8 | 37.5 | 120 | 100 | 10 | 80 | 60 | 106 | 153.2 | 21 | 10 | 12.9 | M12 | 14 | 15 | 10 | 14 | 45 | 38 | 20 | 17 | 14 | 52.5 | 22.5 | M12x35 | 92.6 | 178.8 | 4.52 | 3.05 | 3.05 | 3.43 | 9.97 |
| RW45HC | | | | | | | | | 139.8 | 187 | 37.9 | | | | | | | | | | | | | | | | 116 | 230.9 | 6.33 | 5.47 | 5.47 | 4.57 | |
| RW55CC | 70 | 10 | 43.5 | 140 | 116 | 12 | 95 | 70 | 125.5 | 183.7 | 27.75 | 12.5 | 12.9 | M14 | 16 | 17 | 12 | 17.5 | 53 | 44 | 23 | 20 | 16 | 60 | 30 | M14x45 | 130.5 | 252 | 8.01 | 5.4 | 5.4 | 5.43 | 13.98 |
| RW55HC | | | | | | | | | 173.8 | 232 | 51.9 | | | | | | | | | | | | | | | | 167.8 | 348 | 11.15 | 10.25 | 10.25 | 7.61 | |
| RW 65CC | 90 | 12 | 53.5 | 170 | 142 | 14 | 110 | 82 | 160 | 232 | 40.8 | 15.8 | 12.9 | M16 | 22 | 23 | 15 | 15 | 63 | 53 | 26 | 22 | 18 | 75 | 35 | M16x50 | 213 | 411.6 | 16.20 | 11.59 | 11.59 | 11.63 | 20.22 |
| RW 65HC | | | | | | | | | 223 | 295 | 72.3 | | | | | | | | | | | | | | | | 275.3 | 572.7 | 22.55 | 22.17 | 22.17 | 16.58 | |

Note : 1. 1 kgf = 9.81 N
2. The theoretical dynamic rated load is $C_{100R}$, if necessary $C_{50R}$ conversion formula is as follows : $C_{50R}$= 1.23 x $C_{100R}$

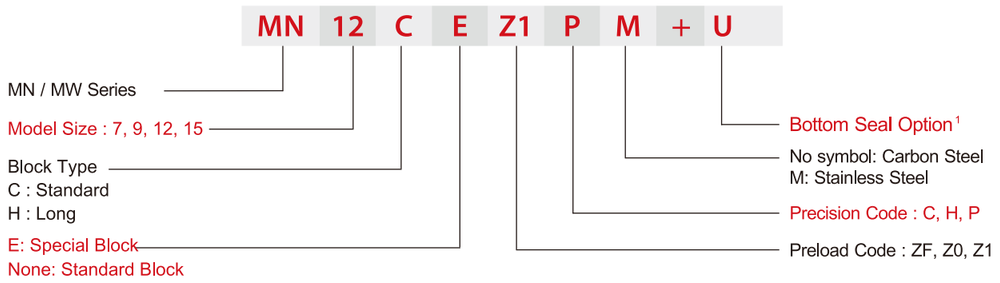
## 2-6 M Series - Miniature Type Linear Guideway

(1) Non-interchangeable type

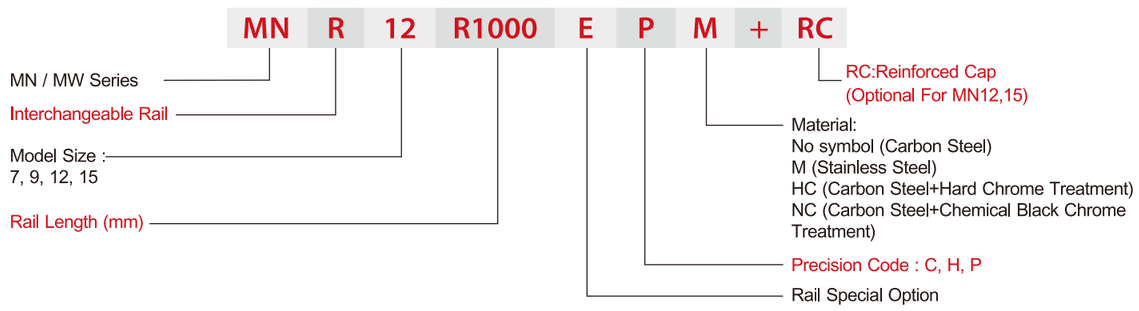



(2) Interchangeable type

☐ Interchangeable Block




☐ Interchangeable Rail

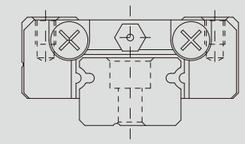
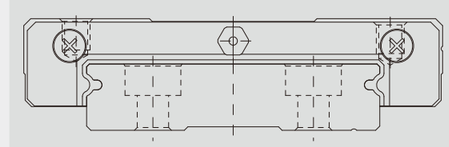



## 2-6-1 Types

(1) Block types

LIMON offers two types of linear guideways, standard and widen types.

**Table 2-6-1** Block Types

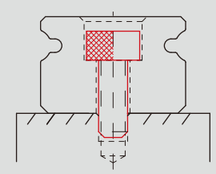
| Type | Model | Shape | Height (mm) | Rail Length (mm) | Main Applications |
|---|---|---|---|---|---|
| standard | MN-C<br>MN-H |  | 8<br>↓<br>16 | 100<br>↓<br>2000 | ☐ Printer<br>☐ Robotics<br>☐ Precision measure equipment<br>☐ Semiconductor equipment |
| widen | MW-C<br>MW-H |  | 9<br>↓<br>16 | 100<br>↓<br>2000 | |

*Please refer to the chapter 2-6-5 for the dimensional detail.

(2) Rail types

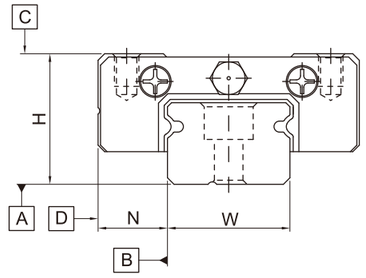
LIMON offers standard top mounting type.

**Table 2-6-2** Rail Types

| Mounting from Top |
|---|
|  |

## 2-6-2 Accuracy

The accuracy of MN/MW series can be classified into three classes: normal (C), high (H), precision (P). Choices for different accuracy classes are available according to various requirements.




### (1) Accuracy of non-interchangeable guideways

**Table 2-6-3** Accuracy Standard of Non-interchangeable Type

Unit: mm

| Accuracy Classes | Normal (C) | High (H) | Precision (P) |
|---|---|---|---|
| Dimensional tolerance of height H | ± 0.04 | ± 0.02 | ± 0.01 |
| Dimensional tolerance of width N | ± 0.04 | ± 0.025 | ± 0.015 |
| Pair Variation of height H | 0.03 | 0.015 | 0.007 |
| Pair Variation of width N (Master Rail) | 0.03 | 0.02 | 0.01 |
| Running parallelism of block surface C to surface A | See Table 2-6-5 | | |
| Running parallelism of block surface D to surface B | See Table 2-6-5 | | |

### (2) Accuracy of interchangeable guideways

**Table 2-6-4** Accuracy Standard of Interchangeable Type

Unit: mm

| Accuracy Classes | | Normal (C) | High (H) | Precision (P) |
|---|---|---|---|---|
| Dimensional tolerance of height H | | ± 0.04 | ± 0.02 | ± 0.01 |
| Dimensional tolerance of width N | | ± 0.04 | ± 0.025 | ± 0.015 |
| One Set | Pair Variation of height H | 0.03 | 0.015 | 0.007 |
| | Pair Variation of width N | 0.03 | 0.02 | 0.01 |
| Pair Variation of width N (Master Rail) | | 0.07 | 0.04 | 0.02 |
| Running parallelism of block surface C to surface A | | See Table 2-6-5 | | |
| Running parallelism of block surface D to surface B | | See Table 2-6-5 | | |





### (3) Accuracy of running parallelism

The running parallelism C to A and D to B are related to the rail length.

**Table 2-6-5** Accuracy of Running Parallelism

| Rail Length (mm) | Accuracy (μm) (C) | (H) | (P) | Rail Length (mm) | Accuracy (μm) (C) | (H) | (P) |
|---|---|---|---|---|---|---|---|
| ~ 50 | 12 | 6 | 2 | 1,000 ~ 1,200 | 25 | 18 | 11 |
| 50 ~ 80 | 13 | 7 | 3 | 1,200 ~ 1,300 | 25 | 18 | 11 |
| 80 ~ 125 | 14 | 8 | 3.5 | 1,300 ~ 1,400 | 26 | 19 | 12 |
| 125 ~ 200 | 15 | 9 | 4 | 1,400 ~ 1,500 | 27 | 19 | 12 |
| 200 ~ 250 | 16 | 10 | 5 | 1,500 ~ 1,600 | 28 | 20 | 13 |
| 250 ~ 315 | 17 | 11 | 5 | 1,600 ~ 1,700 | 29 | 20 | 14 |
| 315 ~ 400 | 18 | 11 | 6 | 1,700 ~ 1,800 | 30 | 21 | 14 |
| 400 ~ 500 | 19 | 12 | 6 | 1,800 ~ 1,900 | 30 | 21 | 15 |
| 500 ~ 630 | 20 | 13 | 7 | 1,900 ~ 2,000 | 31 | 22 | 15 |
| 630 ~ 800 | 22 | 14 | 8 | 2,000 ~ | 31 | 22 | 16 |
| 800 ~ 1,000 | 23 | 16 | 9 | | | | |

## 2-6-3 Preload

MN/MW series provides three different preload levels for various applications.

**Table 2-6-6** Preload Classes

| Class | Code | Preload | Accuracy |
|---|---|---|---|
| Light Clearance | ZF | Clearance 4~10μm | C |
| Very Light Preload | Z0 | 0 | C~P |
| Light Preload | Z1 | 0.02C | C~P |

Note: “C” in column preload means basic dynamic load rating.

## 2-6-4 Dust Proof Accessories

End seals and standard accessories fixed on both sides of the block can prevent dust from entering the block, so the accuracy and service life of a linear guideway can be maintained. Bottom seals are fixed under the skirt portion of the block to prevent dust from entering. Customers can order bottom seals by adding the mark “+U” followed by the model number. Sizes 9, 12 and 15 provide bottom seals as an option, but size 5, 7 do not offer the option due to the space limit of $H_1$. Note that “H1” would reduced if bottom seals are attached, be aware of possible interference between block and mounting surface.

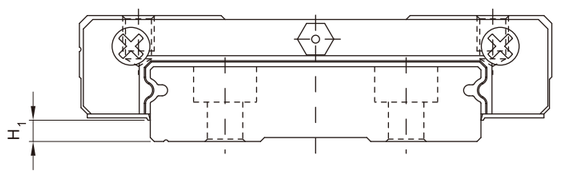


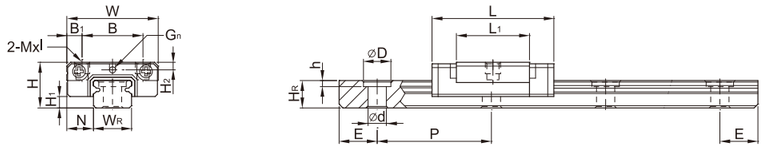

**Table 2-6-7**

| Size | Bottom seal | $H_1$ mm | Size | Bottom seal | $H_1$ mm |
|---|---|---|---|---|---|
| MN 5 | - | - | MW 5 | - | - |
| MN 7 | - | - | MW 7 | - | - |
| MN 9 | • | 1 | MW 9 | • | 1.9 |
| MN 12 | • | 2 | MW 12 | • | 2.4 |
| MN 15 | • | 3 | MW 15 | • | 2.4 |

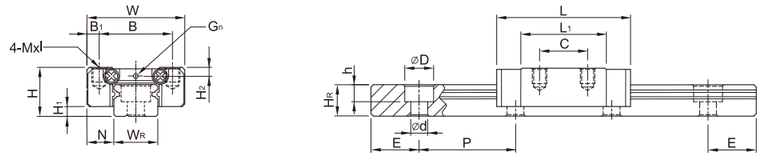
## 2-6-5 Dimensions for MN/MW Series

### (1) MN-C / MN-H

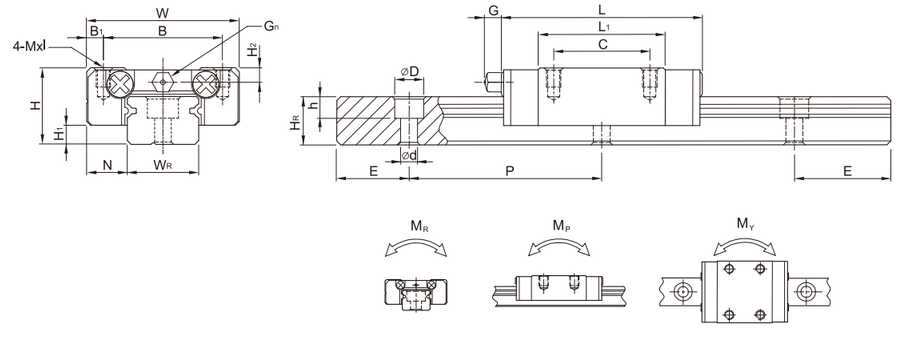
MN5




MN7, MN9, MN12




MN15

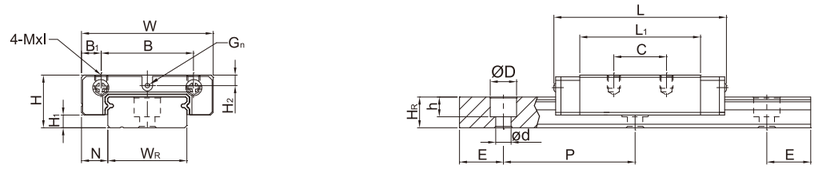



| Model No. | Dimensions of Assembly (mm) | | | Dimensions of Block (mm) | | | | | | | | | Dimensions of Rail (mm) | | | | | | | Mounting Bolt for Rail | Basic Dynamic Load Rating | Basic Static Load Rating | Static Rated Moment | | | Weight | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | H | $H_1$ | N | W | B | $B_1$ | C | $L_1$ | L | G | $G_n$ | MxI | $H_2$ | $W_R$ | $H_R$ | D | h | d | P | E | (mm) | C(kN) | $C_0$ (kN) | $M_R$ N-m | $M_P$ N-m | $M_Y$ N-m | Block kg | Rail kg/m |
| MN5C | 6 | 1.5 | 3.5 | 12 | 8 | 2 | - | 9.6 | 16 | - | Ø0.8 | M2x1.5 | 1 | 5 | 3.6 | 3.6 | 0.8 | 2.4 | 15 | 5 | M2x6 | 0.54 | 0.86 | 2 | 1.3 | 1.3 | 0.008 | 0.15 |
| MN7C | 8 | 1.5 | 5 | 17 | 12 | 2.5 | 8 | 13.5 | 22.5 | - | Ø1.2 | M2x2.5 | 1.5 | 7 | 4.8 | 4.2 | 2.3 | 2.4 | 15 | 5 | M2x6 | 0.98 | 1.24 | 4.70 | 2.84 | 2.84 | 0.010 | 0.22 |
| MN7H | | | | | | | 13 | 21.8 | 30.8 | | | | | | | | | | | | | 1.37 | 1.96 | 7.64 | 4.80 | 4.80 | 0.015 | |
| MN9C | 10 | 2 | 5.5 | 20 | 15 | 2.5 | 10 | 18.9 | 28.9 | - | Ø1.4 | M3x3 | 1.8 | 9 | 6.5 | 6 | 3.5 | 3.5 | 20 | 7.5 | M3x8 | 1.86 | 2.55 | 11.76 | 7.35 | 7.35 | 0.016 | 0.38 |
| MN9H | | | | | | | 16 | 29.9 | 39.9 | | | | | | | | | | | | | 2.55 | 4.02 | 19.60 | 18.62 | 18.62 | 0.026 | |
| MN12C | 13 | 3 | 7.5 | 27 | 20 | 3.5 | 15 | 21.7 | 34.7 | - | Ø2 | M3x3.5 | 2.5 | 12 | 8 | 6 | 4.5 | 3.5 | 25 | 10 | M3x8 | 2.84 | 3.92 | 25.48 | 13.72 | 13.72 | 0.034 | 0.65 |
| MN12H | | | | | | | 20 | 32.4 | 45.4 | | | | | | | | | | | | | 3.72 | 5.88 | 38.22 | 36.26 | 36.26 | 0.054 | |
| MN15C | 16 | 4 | 8.5 | 32 | 25 | 3.5 | 20 | 26.7 | 42.1 | 4.5 | M3 | M3x4 | 3 | 15 | 10 | 6 | 4.5 | 3.5 | 40 | 15 | M3x10 | 4.61 | 5.59 | 45.08 | 21.56 | 21.56 | 0.059 | 1.06 |
| MN15H | | | | | | | 25 | 43.4 | 58.8 | | | | | | | | | | | | | 6.37 | 9.11 | 73.50 | 57.82 | 57.82 | 0.092 | |

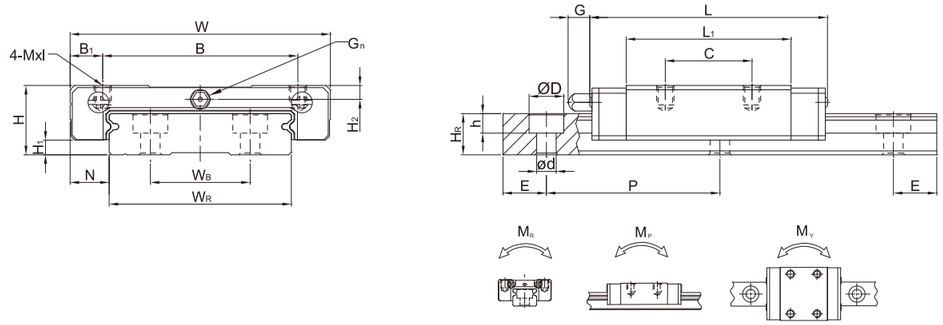
Note : 1 kgf = 9.81 N

### (2) MW-C / MW-H

MW7, MW9, MW12




MW15




| Model No. | Dimensions of Assembly (mm) | | | Dimensions of Block (mm) | | | | | | | | | | Dimensions of Rail (mm) | | | | | | | | Mounting Bolt for Rail | Basic Dynamic Load Rating | Basic Static Load Rating | Static Rated Moment | | | Weight | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | H | $H_1$ | N | W | B | $B_1$ | C | $L_1$ | L | G | $G_n$ | MxI | $H_2$ | $W_R$ | $W_B$ | $H_R$ | D | h | d | P | E | (mm) | C(kN) | $C_0$ (kN) | $M_R$ N-m | $M_P$ N-m | $M_Y$ N-m | Block kg | Rail kg/m |
| MW7C | 9 | 1.9 | 5.5 | 25 | 19 | 3 | 10 | 21 | 31.2 | - | Ø1.2 | M3x3 | 1.85 | 14 | - | 5.2 | 6 | 3.2 | 3.5 | 30 | 10 | M3x6 | 1.37 | 2.06 | 15.70 | 7.14 | 7.14 | 0.020 | 0.51 |
| MW7H | | | | | | | 19 | 30.8 | 41 | | | | | | | | | | | | | | 1.77 | 3.14 | 23.45 | 15.53 | 15.53 | 0.029 | |
| MW9C | 12 | 2.9 | 6 | 30 | 21 | 4.5 | 12 | 27.5 | 39.3 | - | Ø1.2 | M3x3 | 2.4 | 18 | - | 7 | 6 | 4.5 | 3.5 | 30 | 10 | M3x8 | 2.75 | 4.12 | 40.12 | 18.96 | 18.96 | 0.040 | 0.91 |
| MW9H | | | | | 23 | 3.5 | 24 | 38.5 | 50.7 | | | | | | | | | | | | | | 3.43 | 5.89 | 54.54 | 34.00 | 34.00 | 0.057 | |
| MW12C | 14 | 3.4 | 8 | 40 | 28 | 6 | 15 | 31.3 | 46.1 | - | Ø1.2 | M3x3.6 | 2.8 | 24 | - | 8.5 | 8 | 4.5 | 4.5 | 40 | 15 | M4x8 | 3.92 | 5.59 | 70.34 | 27.80 | 27.80 | 0.071 | 1.49 |
| MW12H | | | | | | | 28 | 45.6 | 60.4 | | | | | | | | | | | | | | 5.10 | 8.24 | 102.70 | 57.37 | 57.37 | 0.103 | |
| MW15C | 16 | 3.4 | 9 | 60 | 45 | 7.5 | 20 | 38 | 54.8 | 5.2 | M3 | M4x4.2 | 3.2 | 42 | 23 | 9.5 | 8 | 4.5 | 4.5 | 40 | 15 | M4x10 | 6.77 | 9.22 | 199.34 | 56.66 | 56.66 | 0.143 | 2.86 |
| MW15H | | | | | | | 35 | 57 | 73.8 | | | | | | | | | | | | | | 8.93 | 13.38 | 299.01 | 122.60 | 122.60 | 0.215 | |

Note : 1 kgf = 9.81 N