



LM Guide and Ball Screw Series



Introduction

LM guides utilize rolling guidance with steel balls circulating endlessly between the carriage and the rail. This design allows the load platform to move linearly with high precision along the rail. Compared to traditional sliding guides, LM guides reduce the friction coefficient to 1/5 by decreasing starting friction and minimizing ineffective movement, thus achieving micron-level feeding and positioning. Additionally, the design of the carriage and rail includes constraint elements that enable the LM guide to support loads in all directions—up, down, left, and right. These features surpass the capabilities of traditional sliding guides. Therefore, when combined with ball screws, LM guides can greatly enhance machine accuracy and performance.

I、Basic Information

1-1 Advantages and Disadvantages of HZS LM Guide

1-1-1 Advantages

(1) High Positioning Accuracy

LM Guides use rolling friction, reducing the friction coefficient to 1/50 of that in sliding guides. This minimizes slippage and enables micron-level accuracy.

(2) Low Wear and Long-Term Precision

LM Guides experience minimal wear compared to sliding guides, which can suffer from lubrication issues and wear, ensuring sustained precision.

(3) High-Speed Motion and Reduced Power

Minimal friction in LM Guides allows smooth, low-power movement, reducing energy consumption and heat generation, ideal for high-speed applications.

(4) Load Support in All Directions

LM Guides can support loads from all directions—up, down, left, and right—providing versatility and effectiveness in various applications.

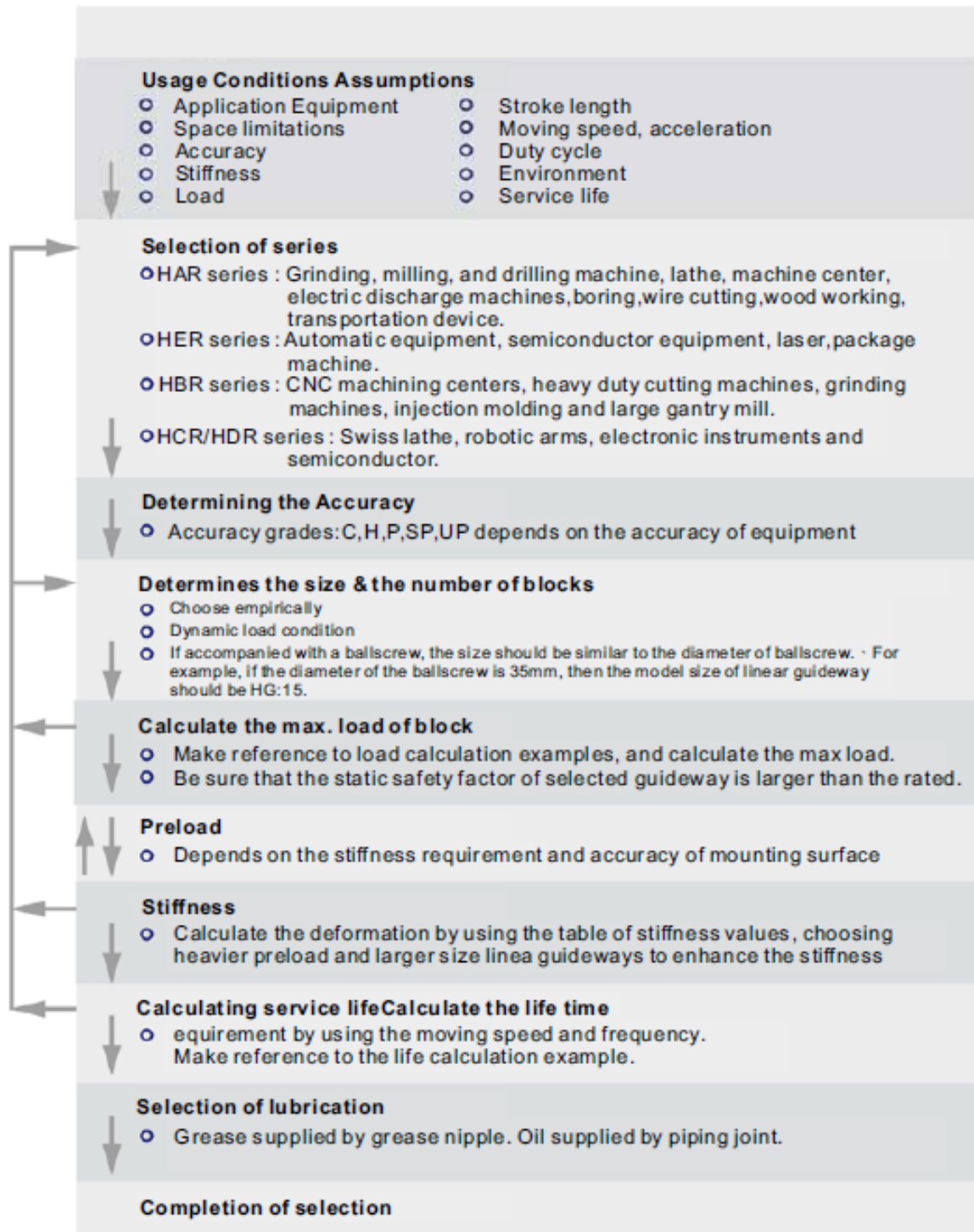
(5) Easy Assembly and Interchangeability

LM Guides are easy to assemble and interchange. Milling or grinding the mounting surfaces on the machine bed and securing the guides and carriages with specified torque ensures precision is maintained. In contrast, traditional sliding guides require labor-intensive scraping and re-scraping if precision degrades. LM Guides allow for easy replacement of carriages, rails, or the entire assembly, quickly restoring high precision.

(6) Simple Lubrication

Linear guides feature lubrication nipples for easy grease injection or connection to automatic lubrication systems, simplifying maintenance compared to sliding guides that require complex lubrication setups.

1-2 Selection Criteria



1-3 Rated load

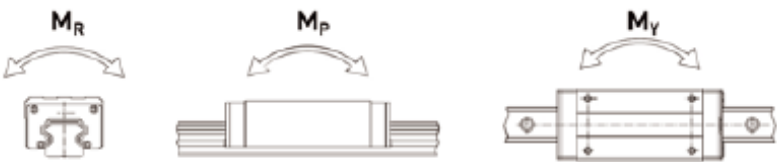
1-3-1 Basic Static Load

(1) Static Load Rating (Co)

The static load rating (Co) defines the maximum load a linear motion (LM) guide can endure without causing permanent deformation exceeding 0.0001 times the rolling element's diameter. This value, listed in LM guide dimension tables, helps designers choose an appropriate LM guide. The maximum static load should not exceed the basic static load rating.

(2) Static Permissible Moment (M)

The static permissible moment is the maximum moment that can be applied in each of three directions (MR, MP, MY) without exceeding the stress limits defined by the static load rating.



(3) Static safety factor

This condition applies when the LM guide 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 LM guide subject to impact loads.

Table 1 Static safety factor

Load Condition	(Min)
Normal Load	1.0-3.0
With impacts/vibrations	3.0-5.0

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

- f_{SL} : Static safety factor for simple load
- f_{SM} : Static safety factor to moment
- C₀ : Static load rating (kN)
- M₀ : Static permissible moment (kN·mm)
- P : Calculated working load (kN)
- M : Calculated applying moment (kN·mm)

1-3-2 Dynamic load rating (C)

(1)Dynamic load rating (C)

The basic dynamic load rating 1s an important factor used for calculation of service life of LM guide. 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 LM guide and 100km for a roller type LM guide. The values for the basic dynamic load rating of each LM guide are shown in dimension tables. They can be used to predict the service life for a selected LM guide.

1-4 Service Life of LM Guide

1-4-1 Service Life

When an LM Guide's raceway and rolling elements are subjected to repeated stresses, surface fatigue may develop, leading to flaking. This phenomenon, known as fatigue flaking, marks the end of the LM Guide's service life, defined as the distance traveled until flaking occurs.

1-4-2 Nominal Life (L)

Service life can vary significantly even among LM Guides of the same type and operating under identical conditions. To predict service life, the nominal life is used, representing the distance that 90% of a group of identical LM Guides can travel before flaking occurs. For LM Guides under the basic dynamic rated load, the nominal life is 50 km.

1-4-3 Calculation of Nominal Life

The raceway surface must have a hardness of HRC 58-62 at an appropriate depth. Insufficient hardness reduces permissible load and nominal life. In such cases, the basic dynamic and static load ratings should be adjusted by the hardness factor in calculations.

(1) The nominal life of ball-type and roller-type LM Guides is calculated using Eq. 1.2 and Eq. 1.3, respectively.

$$L = \left(\frac{C}{P} \right)^3 \cdot 50 \text{ km} = \left(\frac{C}{P} \right)^3 \cdot 31 \text{ mile} \quad \text{Eq.1.2}$$

L : Nominal life

C : Basic dynamic load rating

P : Actual load

(2) Environmental factors, including motion conditions, raceway hardness, and operating temperature, significantly impact the nominal life of an LM Guide.

$$L = \left(\frac{f_h \cdot f_t \cdot C}{f_w \cdot P_c} \right)^3 \cdot 50 \text{ km} = \left(\frac{f_h \cdot f_t \cdot C}{f_w \cdot P_c} \right)^3 \cdot 31 \text{ mile} \quad \text{Eq.1.3}$$

L : Nominal life

f_h : Hardness factor

C : Basic dynamic load rating

f_t : Temperature factor

P_c : Calculated load

f_w : Load factor

1-4-4 Factors of Normal Life

(1) Hardness factor (f_h)

In general, the raceway surface in contact with rolling elements should have a hardness of HRC 58-62 to an adequate depth. If this hardness is not achieved, the permissible load is reduced and the nominal life decreases. In such cases, the basic dynamic and static load ratings should be adjusted by multiplying with the hardness factor.

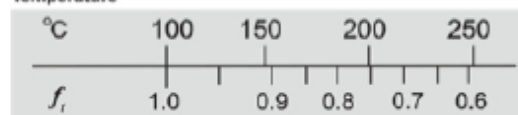
Raceway hardness

HRC	60	50	40	30	20	10
f_h	1.0	0.6	0.3	0.2	0.1	0.03

(2) Temperature factor (ft)

Temperature affects the material of linear guides; therefore, when operating above 100°C, the permissible load and nominal service life are reduced. The basic dynamic and static load ratings must be adjusted using a temperature factor. Additionally, since some accessories are plastic and cannot withstand high temperatures, it is recommended to keep the working environment below 100°C.

Temperature

**(3) Load factor (fw)**

The loads on an LM guide include the slide weight, inertia during start/stop, and moment loads from overhangs. Estimating these loads can be challenging due to vibrations and impacts. Therefore, the load should be divided by an empirical factor to account for these uncertainties.

Table 2 Load factor

Loading Condition	Service Speed	f_w
No impacts & vibration	$V \leq 15$ m/min	1 ~ 1.2
Small impacts	$15 \text{ m/min} < V \leq 60 \text{ m/min}$	1.2 ~ 1.5
Normal load	$60 \text{ m/min} < V \leq 120 \text{ m/min}$	1.5 ~ 2.0
With impacts & vibration	$V > 120$ m/min	2.0 ~ 3.5

1-4-5 Calculation of Service Life

Transform the nominal life into the service life time by using speed and frequency.

$$L_h = \frac{L \cdot 10^3}{V_e \cdot 60} = \frac{\left(\frac{C}{P}\right)^3 \cdot 50 \cdot 10^3}{V_e \cdot 60} \text{ hr} \quad \text{Eq.1.4}$$

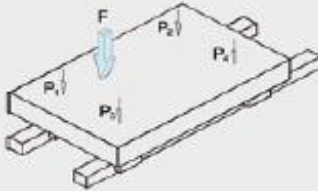
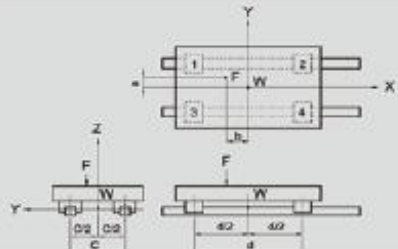
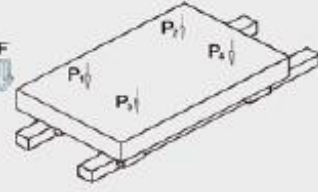
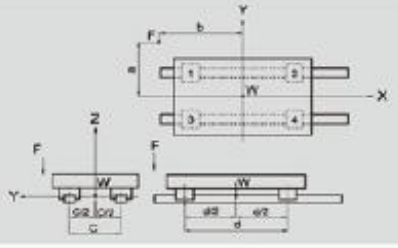
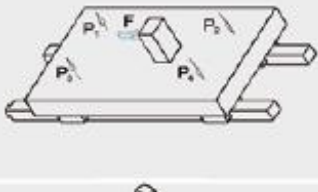
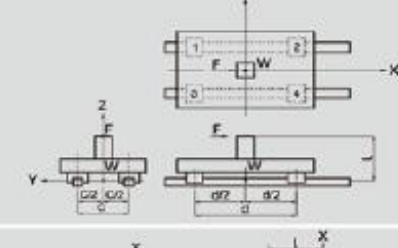
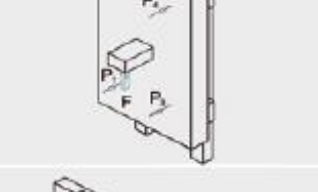
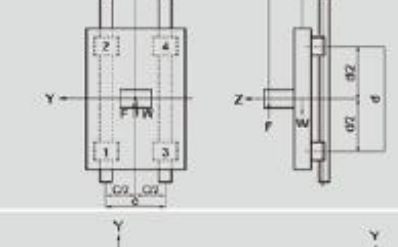
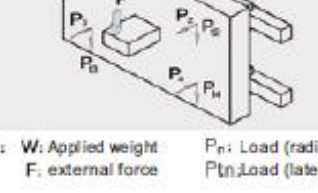
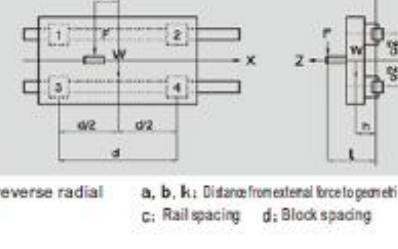
L_h : Service life(hr)
 L : Nominal life(km)
 V_e : Speed(m/min)
 C/P : Load factor

1-5 Applied Loads**1-5-1 Calculation of Load**

Several factors influence the calculation of loads on an LM guide, including the object's center of gravity, thrust position, and inertial forces during start and stop. To determine the accurate load value, each load condition must be carefully evaluated.

(1) Load on one block

Table 3 Calculation example of loads on block

Patterns	Loads layout	Load on one block
		$P_1 = \frac{W}{4} + \frac{F}{4} + \frac{F \cdot a}{2c} + \frac{F \cdot b}{2d}$ $P_2 = \frac{W}{4} + \frac{F}{4} + \frac{F \cdot a}{2c} - \frac{F \cdot b}{2d}$ $P_3 = \frac{W}{4} + \frac{F}{4} - \frac{F \cdot a}{2c} + \frac{F \cdot b}{2d}$ $P_4 = \frac{W}{4} + \frac{F}{4} - \frac{F \cdot a}{2c} - \frac{F \cdot b}{2d}$
		$P_1 = \frac{W}{4} + \frac{F}{4} + \frac{F \cdot a}{2c} + \frac{F \cdot b}{2d}$ $P_2 = \frac{W}{4} + \frac{F}{4} + \frac{F \cdot a}{2c} - \frac{F \cdot b}{2d}$ $P_3 = \frac{W}{4} + \frac{F}{4} - \frac{F \cdot a}{2c} + \frac{F \cdot b}{2d}$ $P_4 = \frac{W}{4} + \frac{F}{4} - \frac{F \cdot a}{2c} - \frac{F \cdot b}{2d}$
		$P_1 = P_2 = \frac{W}{4} + \frac{F \cdot l}{2d}$ $P_3 = P_4 = \frac{W}{4} + \frac{F \cdot l}{2d}$
		$P_1 - P_2 = -\frac{W \cdot h}{2d} + \frac{F \cdot l}{2d}$
		$P_1 - P_2 = -\frac{W \cdot h}{2c} - \frac{F \cdot l}{2c}$ $P_{11} = P_{12} = \frac{W}{4} + \frac{F}{4} + \frac{F \cdot k}{2d}$ $P_{21} = P_{22} = \frac{W}{4} + \frac{F}{4} - \frac{F \cdot k}{2d}$

注: W: Applied weight
F: external force

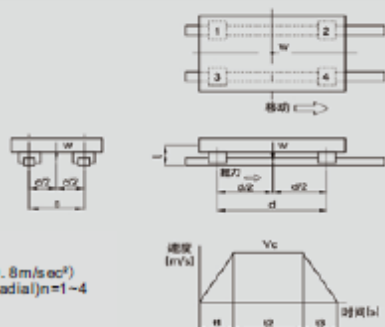
P_n: Load (radial, reverse radial)
P_{tn}: Load (lateral)

a, b, k: Distance from external force to geometric center
c: Rail spacing d: Block spacing

l: Distance from external force to driver
h: Distance from center of gravity to driver

(2) Loads with inertia forces

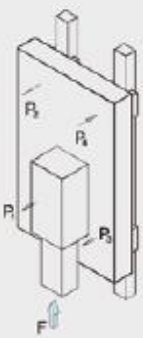
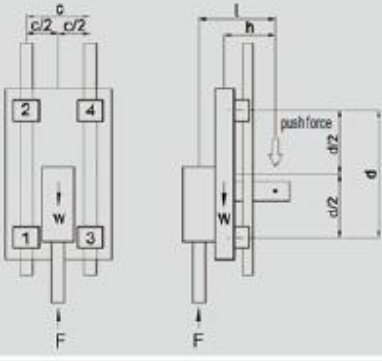
Table 4 Calculation Examples for Loads with Inertia Forces

Considering the acceleration and deceleration	Load on one block
 F : Push Force (N) W : Weight (N) g : gravity acceleration (9.8m/sec²) P_n : Load (Radial, reverse radial) n=1~4 V_c : Speed t_n : Limit time n=1~3 c, d, l : distance	- Constant velocity $P_1 \sim P_4 = \frac{W}{4}$ - Acceleration $P_1 = P_3 = \frac{W}{4} + \frac{1}{2} \cdot \frac{W}{g} \cdot \frac{V_c}{t_1} \cdot \frac{l}{d}$ $P_2 = P_4 = \frac{W}{4} - \frac{1}{2} \cdot \frac{W}{g} \cdot \frac{V_c}{t_1} \cdot \frac{l}{d}$ - Deceleration $P_1 = P_3 = \frac{W}{4} - \frac{1}{2} \cdot \frac{W}{g} \cdot \frac{V_c}{t_3} \cdot \frac{l}{d}$ $P_2 = P_4 = \frac{W}{4} + \frac{1}{2} \cdot \frac{W}{g} \cdot \frac{V_c}{t_3} \cdot \frac{l}{d}$

1-5-2 Calculation of The Mean Load for Variable Loading

When the load on a LM guide fluctuates greatly, the variable load condition must be considered in the life calculation. The definition of the mean load is the load equal to the bearing fatigue load under the variable loading conditions.

Table 6 Calculation Example for Service Life

Model	Machine	Operation Condition
Model:HAR 30H C:38.74kN C _e :52.19kN Preload:ZO	d:600mm c:400mm h:200mm l:250mm	Weight(W):15kN Acting Force(F):1kN Temperature: Ambient temperature Load status: normal load
 		
- Calculation of acting loads $P_1 \sim P_4 = \frac{W \times h}{2d} + \frac{F \times l}{2d} = \frac{15 \times 200}{2 \times 600} + \frac{1 \times 250}{2 \times 600} = 2.29(\text{kN})$ $P_{\max} = P_1 \sim P_4 = 2.29(\text{kN})$ - Because preload is ZO, $P_c = P_{\max} = 2.29(\text{kN})$ Note: The larger preload (ZA, AB) will increase the rigidity, but decrease the nominal life of guideway. - Calculation for life $L = \left(\frac{f_h \times f_t \times C}{f_w \times P_c} \right)^3 \times 50 = \left(\frac{1 \times 1 \times 38.74}{2 \times 2.29} \right)^3 \times 50 = 30,258(\text{km})$		

1-6 Friction

As noted in the preface, an LM guide employs rolling motion via balls or rollers, resulting in a coefficient of friction as low as 1/50 of that of a traditional slide. Typically, the coefficient of friction for ball-type LM guides is around 0.004, while for roller-type LM guides, it is approximately 0.003.

$$F = \mu \cdot W + S \quad \text{Eq.1.8}$$

F: Friction (kN)
S: Friction resistance (kN)
 μ : Coefficient of friction
W: Normal loads (kN)

1-7 Lubrication

Supplying insufficient lubrication to the LM guide will greatly reduce the service life due to an increase in rolling friction. The lubricant provides the following functions:

- Reduces the rolling friction between the contact surfaces to avoid abrasion and surface burning of the LM guide.
- Generates a lubricant film between the rolling surfaces and decreases fatigue.
- Anti-corrosion.

1-7-1 GREASE

The LM Guide should be lubricated with lithium soap-based grease prior to installation. After installation, it is recommended to re-lubricate the LM Guide every 100 km. Lubrication can be performed through the grease nipple. For speeds up to 60 m/min, grease is suitable; for higher speeds, a high-viscosity oil is required as the lubricant.

$$T = \frac{100 \cdot 1000}{V_s \cdot 60} \text{ hr} \quad \dots\dots\dots \text{Eq.1.9}$$

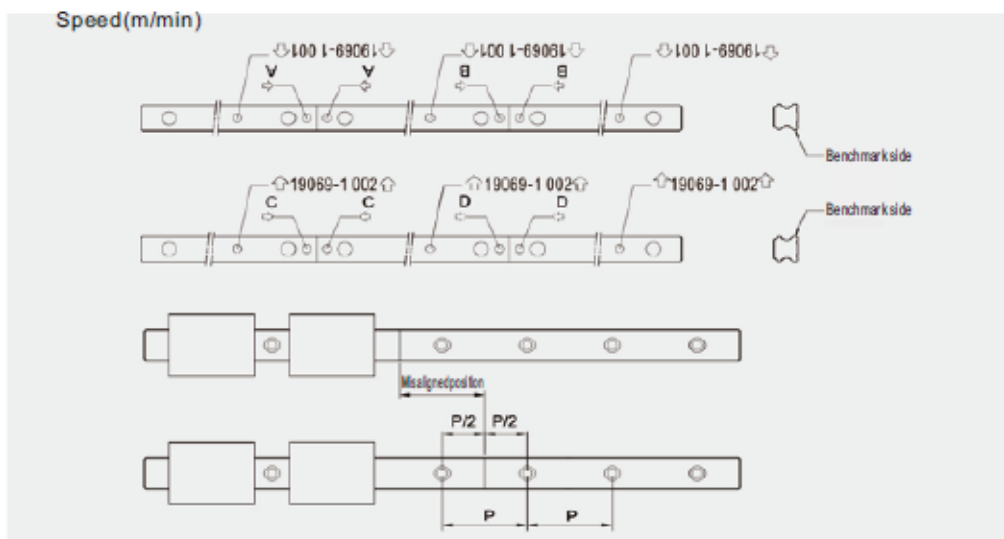
T : Oil refilling rate (hour)
V_s : Speed (m/min)

1-7-2 OIL

The recommended oil viscosity is approximately 30-150 cSt. An oil piping joint can replace the standard grease nipple for oil lubrication. Since oil evaporates more quickly than grease, the recommended oil feed rate is about 0.3 cm³/hr.

1-8 The Butt-joint Rail

Jointed rails should be installed according to the arrow signs and ordinal numbers marked on the rail surfaces. For matched pairs of jointed rails, the joint positions should be staggered.



1-9 Installation

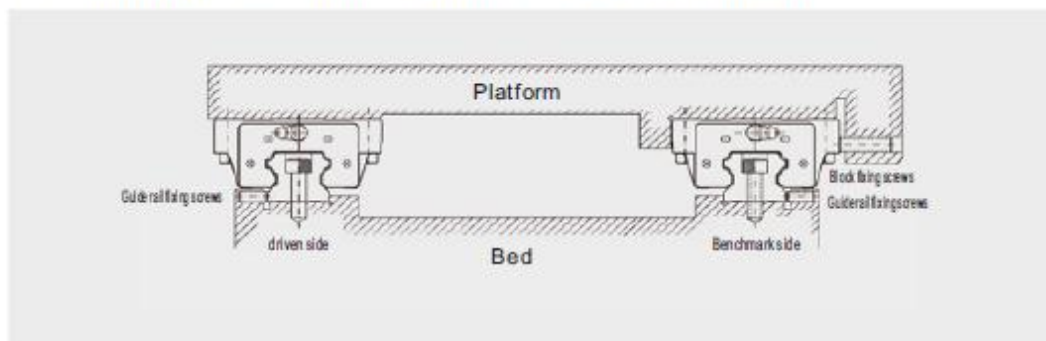
Installation methods are recommended based on the desired running accuracy and the levels of impact and vibration.

1-9-1 Master and Subsidiary Guides

In non-interchangeable LM Guides, there are distinctions between the master guide and the subsidiary guide. The master guide has a more precise datum plane and serves as the reference side for installation. It is identified by the "MA" mark printed on the rail, as shown in the figure below

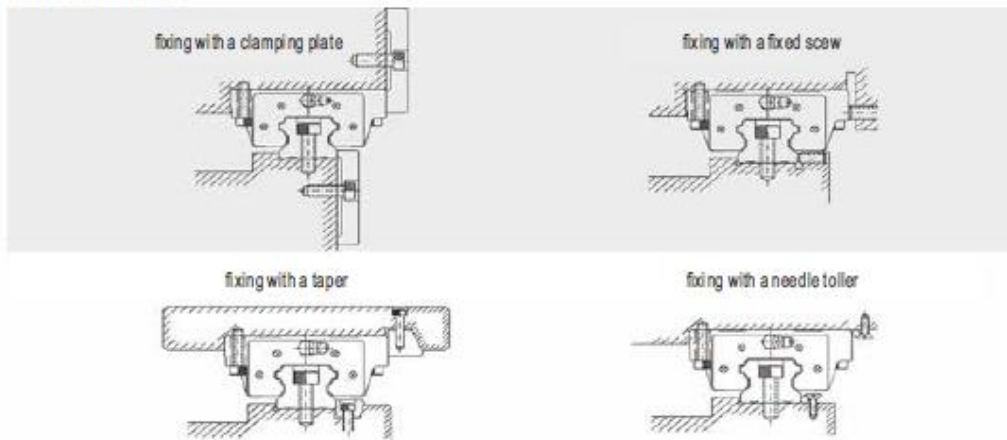


1-9-1 Installation to Achieve High Accuracy and Rigidity

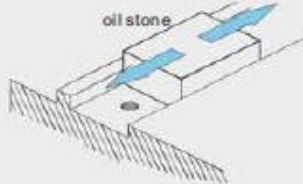


(1) Mounting method

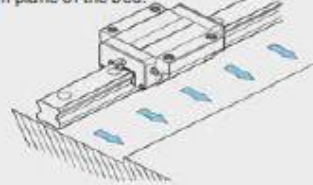
Rails and blocks may shift due to vibrations and impacts during machine operation. To address these issues and achieve high running accuracy, the following four methods for securing the components are recommended.

**(2) Rail installation**

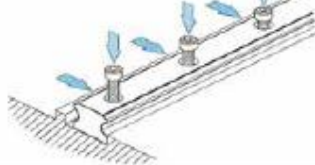
- 1 Clean the Mounting Surface: Remove all dirt from the machine's mounting surface before starting.



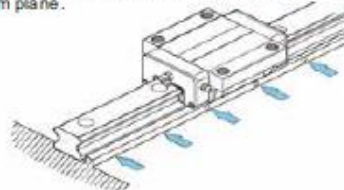
- 2 Position the LM Guide: Gently place the LM guide on the bed, ensuring it makes close contact with the datum plane of the bed.



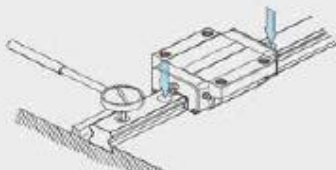
- 3 Check Thread Engagement: Verify correct thread engagement when inserting a bolt into the mounting hole as the rail is positioned on the bed's mounting surface.



- 4 Push Screws: Sequentially tighten the push screws to ensure the rail is in close contact with the side datum plane.

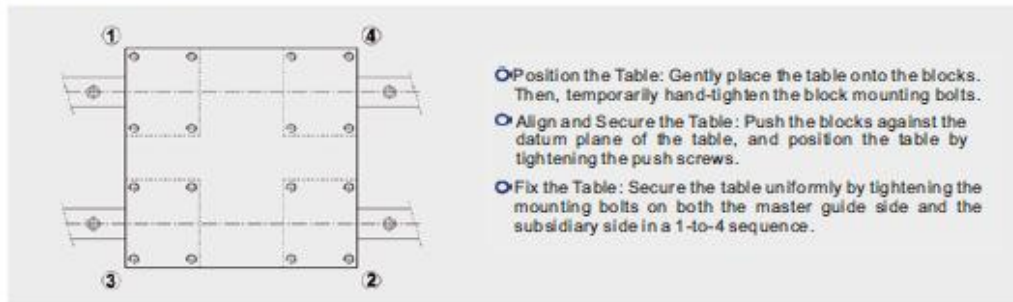


- 5 Torque the Bolts: Use a torque wrench to tighten the mounting bolts to the specified torque.



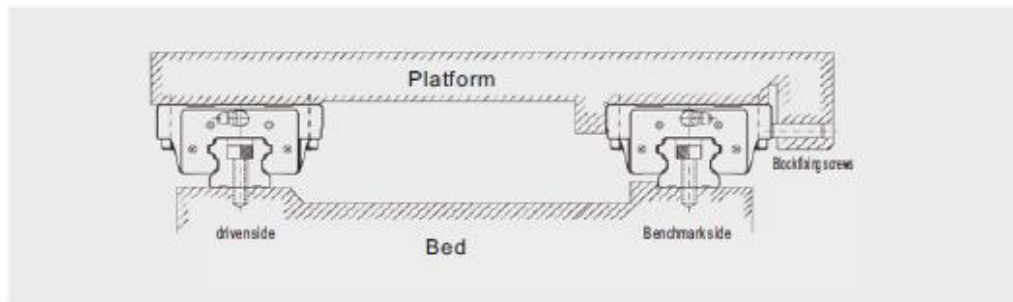
- 6 Install Additional LM Guides: Install any remaining LM guides using the same procedure.

(3) Block installation

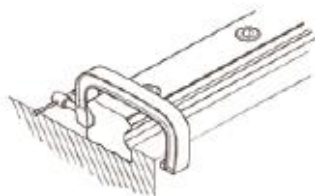


1-9-3 Installation of the Master Guide without Push Screws

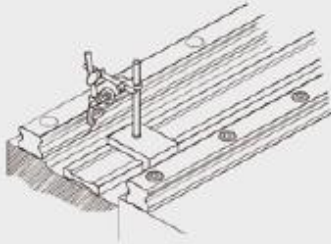
To ensure parallelism between the subsidiary and master guides without using push screws, the following rail installation methods are recommended. The block installation procedure remains the same as described previously.



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

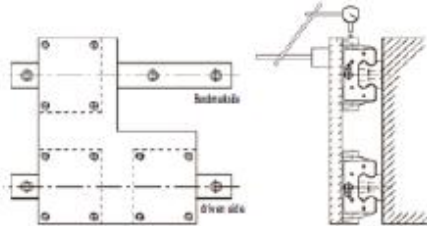


- ① Using a vice
Place the rail on the bed's mounting plane and temporarily tighten the mounting bolts. Use a vice to push the rail against the side datum plane of the bed. Then, tighten the mounting bolts in sequence to the specified torque.

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

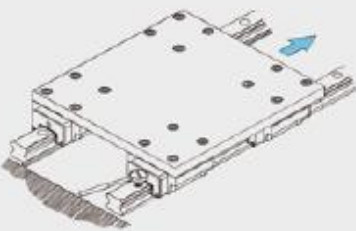
- Method with use of a straight edge

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.



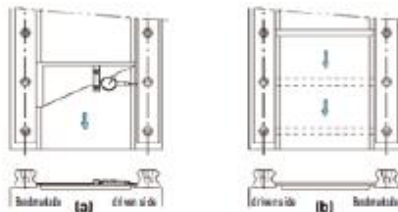
- Method with use of a table

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.

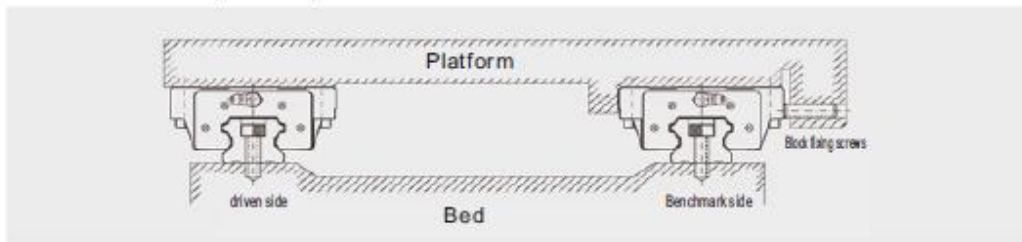


- Method with use of a jig

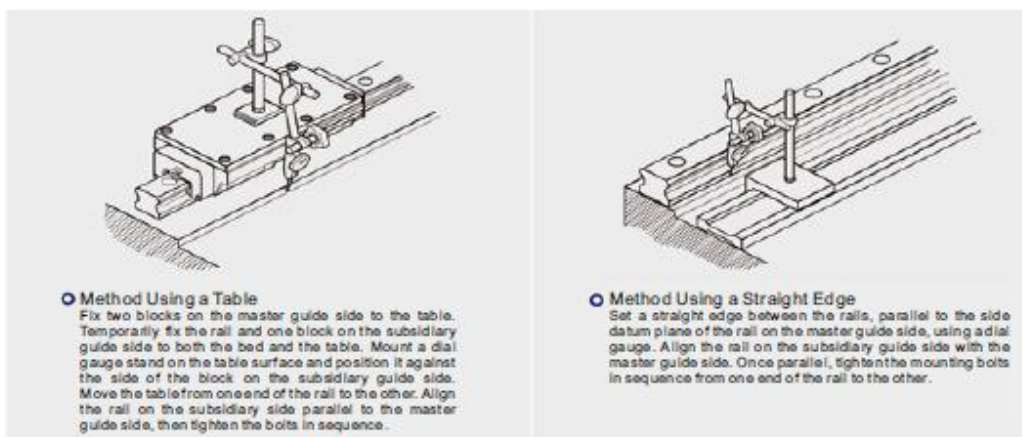
Use a special jig to ensure the rail position on the subsidiary guide side. Tighten the mounting bolts to the specified torque in sequence.

1-9-4 Installation Without Side Surface

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



(2) Method Following the Master Guide Side

Once the rail on the master guide side is correctly tightened, fix both blocks on the master guide side and one block on the subsidiary guide side securely to the table. Move the table from one end of the rail to the other and tighten the mounting bolts on the subsidiary guide side completely.

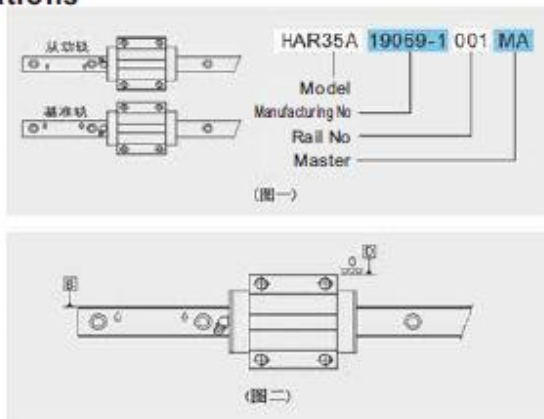
Utilize a special jig to position the rail on the subsidiary guide side. Tighten the mounting bolts to the specified torque in sequence.

1-9-5 LM Guide Mounting Notifications

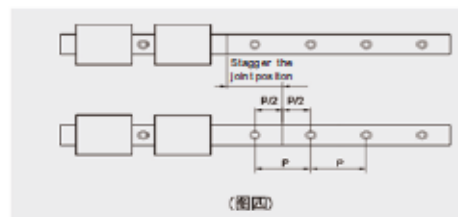
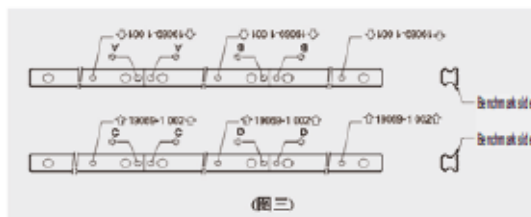
1. Rust-Proof Oil: LM Guides are coated with rust-proof oil before shipping. Please clean the oil off before moving or operating the blocks.

2. Master and Subsidiary Rails: In non-interchangeable LM Guides, the master rail differs from the subsidiary rail in accuracy. The master rail has a more precise datum plane and serves as a reference for installation. Look for the "MA" mark on the rail to identify the master rail. The master rail will have an odd-numbered designation, while the subsidiary rail will have an even-numbered designation. Install the rails according to these markings and follow the sequence for multiple rails (e.g., 001 pairs with 002; 003 pairs with 004, etc.).

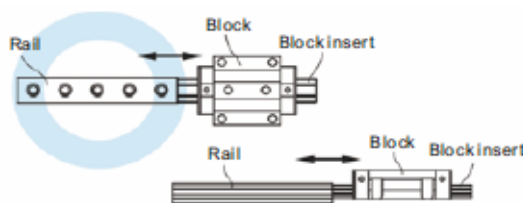
3. Datum Plane Recognition: The datum plane (B) of the rail is indicated by the arrow marked on the top surface of the rail. The datum plane of the block is the smooth ground surface, as shown as "D" in Figure 2.



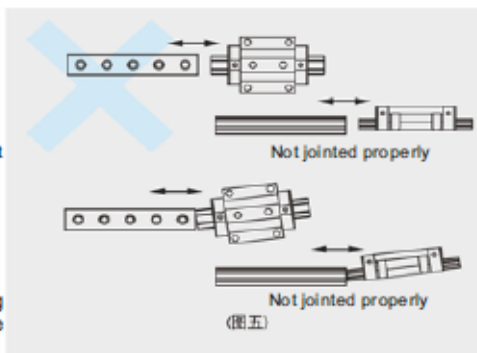
4. Butt-Joint Rails: Install butt-joint rails according to the arrow signs and ordinal numbers marked on each rail surface, as shown in Figure 3. To prevent accuracy issues due to discrepancies between rails, stagger the joint positions for matched pair butt-joint rails, as illustrated in Figure 4.



5. Handling Blocks: Do not remove blocks from the rails during assembly. If removal or mounting of blocks is necessary, use block inserts as shown in Figure 5.



6. Avoid Mixing Units: For non-interchangeable types, do not mix block units and rails to prevent installation issues.
7. Ensuring Rail Straightness: Tighten the mounting bolts sequentially with a torque wrench to the specified torque to ensure rail straightness.



1-9-6 Linear guide maintenance precautions

1. Lubricate the blocks after assembling the guideways using lithium soap-base grease or oil.
2. The guideways are pre-treated with anti-corrosion oil. If cleaned before installation, lubricate them afterward, ensuring compatibility between the lubricant and anti-rust oil.
3. Avoid prolonged exposure of the block's plastic parts to organic solvents to prevent damage.
4. Prevent foreign objects from entering the block to avoid damage.
5. Do not disassemble parts, as it may introduce foreign objects and reduce precision.
6. Handle guideways horizontally to prevent block detachment.
7. Avoid impacts on the blocks to protect guideway function.
8. For special conditions, use appropriate surface treatments or consult the Haozhi Technical Information catalog.

II、HZS Series

To address diverse customer needs, we offer several product series: the HAR series for general machine tools, the HER series for automation, the HBR series for high rigidity requirements, and the HCR/HDR series for micro-sized semiconductor applications.

(1) Categories

Table 7 Categories

Series	Assembly Height	Load Type	4-Way Type	Flange Type
HAR	High	Heavy load	HAR-H	-
		Ultra-heavy load	HAR-LH	-
	Low	Heavy load	HAR-E	HAR-A
		Ultra-heavy load	HAR-LE	HAR-LA
HER	Low	Medium load	HER-SH	HER-SA
		Heavy load	HER-H	HER-A
HCR	-	Standard	HCR-C	-
		Longer	HCR-L	-
HDR	-	Standard	HDR-C	-
		Longer	HDR-L	-
HBR	High	Heavy load	HBR-H	-
		Ultra-heavy load	HBR-LH	-
	Low	Heavy load	-	HBR-A
		Ultra-heavy load	-	HBR-LA

(2) Accuracy Grades

Table 8 Accuracy Grades

Series	Non-interchangeable					Type Interchangeable Type		
	Normal (C)	High (H)	Precision (P)	Super Precision (SP)	Ultra Precision (UP)	Normal (C)	High (H)	Precision (P)
HAR	●	●	●	●	●	●	●	●
HER	●	●	●	●	●	●	●	●
HCR	●	●	●	-	-	●	●	●
HDR	●	●	●	-	-	●	●	●
HBR	-	●	●	●	●	-	●	●

(3) Classification of preload

Table 9 Preload

Series	Non-interchangeable Type			Interchangeable Type	
	Very light Preload (Z0)	light Preload (ZA)	Medium Preload (ZB)	Without Preload (Z0)	light Preload (ZA)
HAR	●	●	●	●	●
HER	●	●	●	●	●

Series	Non-interchangeable			Type Interchangeable Type	
	Light preload (Z0)	Medium Preload (ZA)	Heavy Preload (ZB)	Light preload (Z0)	Medium Preload (ZA)
HBR	●	●	●	●	●

Series	Non-interchangeable			Type Interchangeable Type		
	Very light Preload (ZF)	Without Preload (Z0)	Light preload (Z1)	Very light Preload (ZF)	Without Preload (Z0)	Light preload (Z1)
HCR	●	●	●	●	●	●
HDR	●	●	●	●	●	●

HAR Series

Heavy Load Ball Type LM Guide

2-1 HAR Series-Heavy Load Ball Type LM Guide

The HAR series LM guides are engineered to offer superior load capacity and rigidity compared to similar products, thanks to their circular-arc groove design and structural optimization. They provide equal load ratings in radial, reverse radial, and lateral directions, and feature self-aligning capabilities to accommodate installation errors. This design ensures long life, high speed, high accuracy, and smooth linear motion.

2-1-1 Features of HAR Series

(1) Self-Aligning Capability

The circular-arc groove design features contact points at 45 degrees, allowing the HAR series to absorb most installation errors due to surface irregularities. The elastic deformation of rolling elements and the shifting of contact points enable smooth linear motion, ensuring high accuracy and ease of installation.

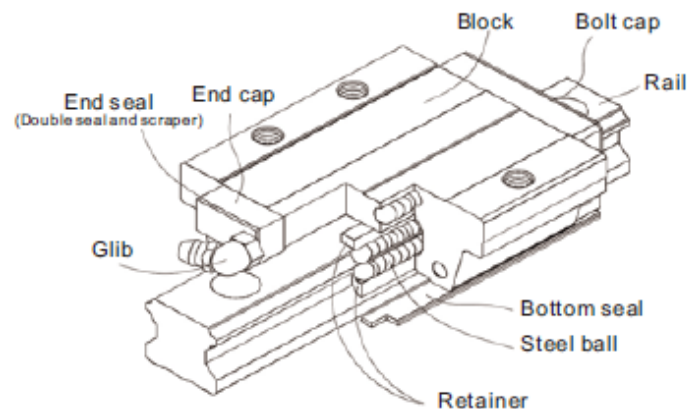
(2) Interchangeability

Precision dimensional control maintains the dimensional tolerance within a reasonable range, allowing any blocks and rails within the same series to be used interchangeably. Additionally, a retainer prevents the balls from falling out when blocks are removed from the rail.

(3) High Rigidity in All Directions

The four-row design of the HAR series LM guide provides equal load ratings in radial, reverse radial, and lateral directions. The circular-arc groove design offers a wide contact width between the balls and the groove raceway, allowing for large permissible loads and high rigidity.

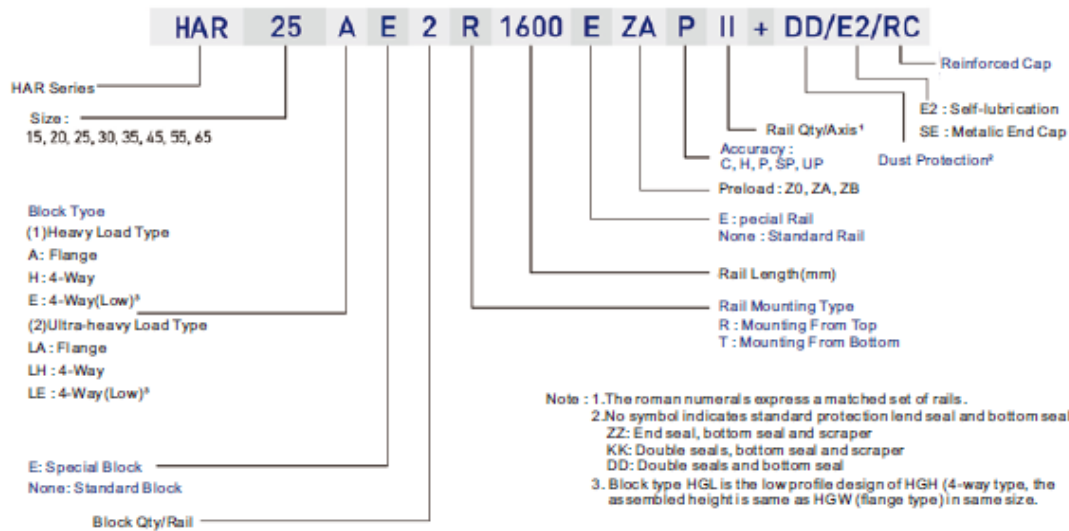
2-1-2 Construction of HAR Series



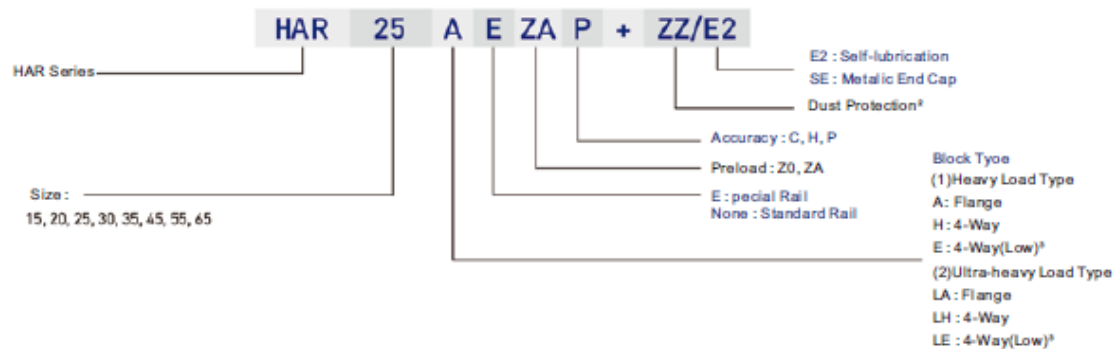
- Rolling circulation system: Block, Rail, End Cap and Retainer.
- Lubrication system: Grease Nipple and Piping Joint
- Dust protection system: End seal, Bottom Seal, Bolt Cap, Double Seals and Scraper

2-1-3 Product Descriptions

The HAR series is available in non-interchangeable and interchangeable types, with identical sizes. The primary distinction is that the interchangeable type allows for the free exchange of blocks and rails, achieving accuracy up to P class. The model number of the HAR series includes details such as size, type, accuracy class, and preload class.

(1) Non-interchangeable type**(2) Interchangeable type**

Interchangeable type

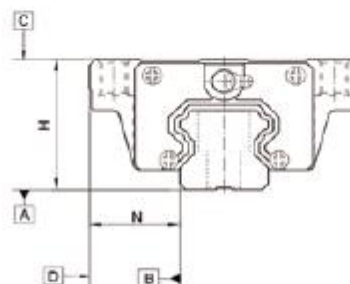


HAR Series

Heavy Load Ball Type LM Guide

2-1-4 Accuracy Grades

Accuracy Grades: normal (C), high (H), precision (P), super precision (SP), ultra precision (UP).



(1) Non-interchangeable Type accuracy

Table 2-1-3 Assembly Accuracy

Unit: mm

Model	HAR-15,20				
Accuracy Grades	Normal (C)	High (H)	Precision (P)	Super Precision (SP)	Ultra Precision (UP)
Dimensional tolerance of height H	± 0.1	± 0.03	0 -0.03	0 -0.015	0 -0.008
Dimensional tolerance of width N	± 0.1	± 0.03	0 -0.03	0 -0.015	0 -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 2-1-11				
Running parallelism of block surface D to surface B	See Table 2-1-11				

Table 2-1-4 Assembly Accuracy

Unit: mm

Model	HAR-25,30,35				
Accuracy Grades	Normal (C)	High (H)	Precision (P)	Super Precision (SP)	Ultra Precision (UP)
Dimensional tolerance of height H	± 0.1	± 0.04	0 -0.04	0 -0.02	0 -0.01
Dimensional tolerance of width N	± 0.1	± 0.04	0 -0.04	0 -0.02	0 -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 2-1-11				
Running parallelism of block surface D to surface B	See Table 2-1-11				

HAR Series

Heavy Load Ball Type LM Guide

Table 2-1-5 Assembly Accuracy

Unit: mm

Model	HAR-45,55				
Accuracy Grades	Normal (C)	High (H)	Precision (P)	Super Precision (SP)	Ultra Precision (UP)
Dimensional tolerance of height H	± 0.1	± 0.05	0 - 0.05	0 - 0.03	0 - 0.02
Dimensional tolerance of width N	± 0.1	± 0.05	0 - 0.05	0 - 0.03	0 - 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 2-1-11				
Running parallelism of block surface D to surface B	See Table 2-1-11				

Table 2-1-6 Assembly Accuracy

Unit: mm

Model	HAR-65				
Accuracy Grades	Normal (C)	High (H)	Precision (P)	Super Precision (SP)	Ultra Precision (UP)
Dimensional tolerance of height H	± 0.1	± 0.07	0 - 0.07	0 - 0.05	0 - 0.03
Dimensional tolerance of width N	± 0.1	± 0.07	0 - 0.07	0 - 0.05	0 - 0.03
Variation of height H	0.03	0.02	0.01	0.007	0.005
Variation of width N	0.03	0.025	0.015	0.01	0.007
Running parallelism of block surface C to surface A	See Table 2-1-11				
Running parallelism of block surface D to surface B	See Table 2-1-11				

(2) Interchangeable type accuracy

Table 2-1-7 Individual Part Accuracy

Unit: mm

Model	HAR-15,20		
Accuracy Grades	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 2-1-11		
Running parallelism of block surface D to surface B	See Table 2-1-11		

Table 2-1-8 Individual Part Accuracy

Unit: mm

Model	HAR-25,30,35		
Accuracy Grades	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 2-1-11		
Running parallelism of block surface D to surface B	See Table 2-1-11		

HAR Series

Heavy Load Ball Type LM Guide

Table 2-1-9 Individual Part Accuracy

Unit: mm

Model	HAR-45,55		
Accuracy Grades	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 2-1-11		
Running parallelism of block surface D to surface B	See Table 2-1-11		

Table 2-1-10 Individual Part Accuracy

Unit: mm

Model	HAR-65		
Accuracy Grades	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 2-1-11		
Running parallelism of block surface D to surface B	See Table 2-1-11		

(3) Travel Parallelism Accuracy

Table 2-1-11 Travel Parallelism Accuracy

Rail Length(mm)	Accuracy Grades (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

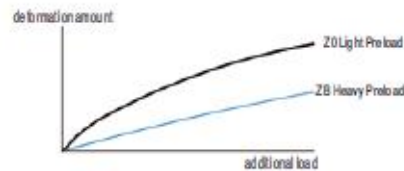
HAR Series

Heavy Load Ball Type LM Guide

2-1-5 Preload

(1) Definition

Preload can be applied to each guideway using oversized balls. Typically, a linear motion guideway is designed with negative clearance between the groove and the balls to enhance stiffness and maintain high precision. As shown in the figure, applying preload increases the load capacity, doubles rigidity, and reduces deflection by half. For model sizes under HG20, a preload no greater than ZA is recommended to prevent excessive preload from negatively impacting the guideway's lifespan.



(2) Preload classes

Three classes of standard preload for various applications and conditions.

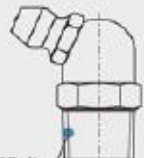
Table 2-1-12 Preload Classes

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 fines, 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	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 Class	Z0, ZA		Z0, ZA, ZB	

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

2-1-6 Lubrication

(1) Grease

O Grease nipple			
 M4x0.7P HAR15 NO.34310002	 M6x0.75P NO.34320001	 PT1/8 NO.34320003	HAR20 HAR25 HAR30 HAR35
			HAR45 HAR55 HAR65
 M4x0.7P HAR15 NO.34310002	 M6x0.75P NO.34310003(OPTION)	 PT1/8 NO.34310008(OPTION)	HAR20 HAR25 HAR30 HAR35
			HAR45 HAR55 HAR65

HAR Series

Heavy Load Ball Type LM Guide

○ Mounting location

Mounting the nipple on the top of the block requires an adaptor or o-ring depending on different series. We will pre-drill the holes to accommodate the application's requirement. For non-standard location, please contact us.

Oil piping joints may also be used at these locations for lubrication. For customers who need to lubricate from the top on a standard block, We will pre-tap the block and add a recessed o-ring.

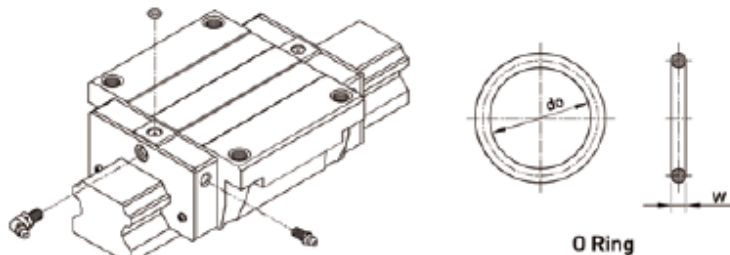
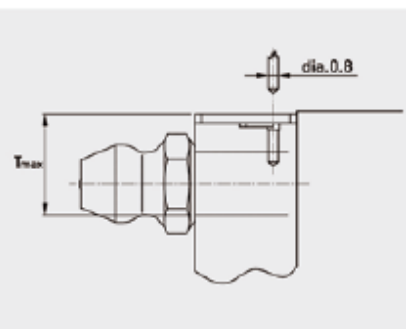


Table 2-1-13 O-Ring size and max. permissible depth for piercing

Type	O-ring Type		Lube hole at top: max. permissible depth for piercing T_{max} (mm)
	$\phi 0$ (mm)	W (mm)	
HAR15	2.5 ± 0.15	1.5 ± 0.15	3.75
HAR20	4.5 ± 0.15	1.5 ± 0.15	5.7
HAR25	4.5 ± 0.15	1.5 ± 0.15	5.8
HAR30	4.5 ± 0.15	1.5 ± 0.15	6.3
HAR35	4.5 ± 0.15	1.5 ± 0.15	8.8
HAR45	4.5 ± 0.15	1.5 ± 0.15	8.2
HAR55	4.5 ± 0.15	1.5 ± 0.15	11.8
HAR65	4.5 ± 0.15	1.5 ± 0.15	10.8



○ The lubricant amount for a block filled with grease

Table 2-1-14 Lubrication Grease Amount for a Single Block

Type	Heavy Load (cm ³)	Ultra-heavy Load (cm ³)	Type	Heavy Load (cm ³)	Ultra-heavy Load (cm ³)
HAR15	1	-	HAR35	10	12
HAR20	2	3	HAR45	17	21
HAR25	5	6	HAR55	26	33
HAR30	7	8	HAR65	50	61

○ Frequency of replenishment

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

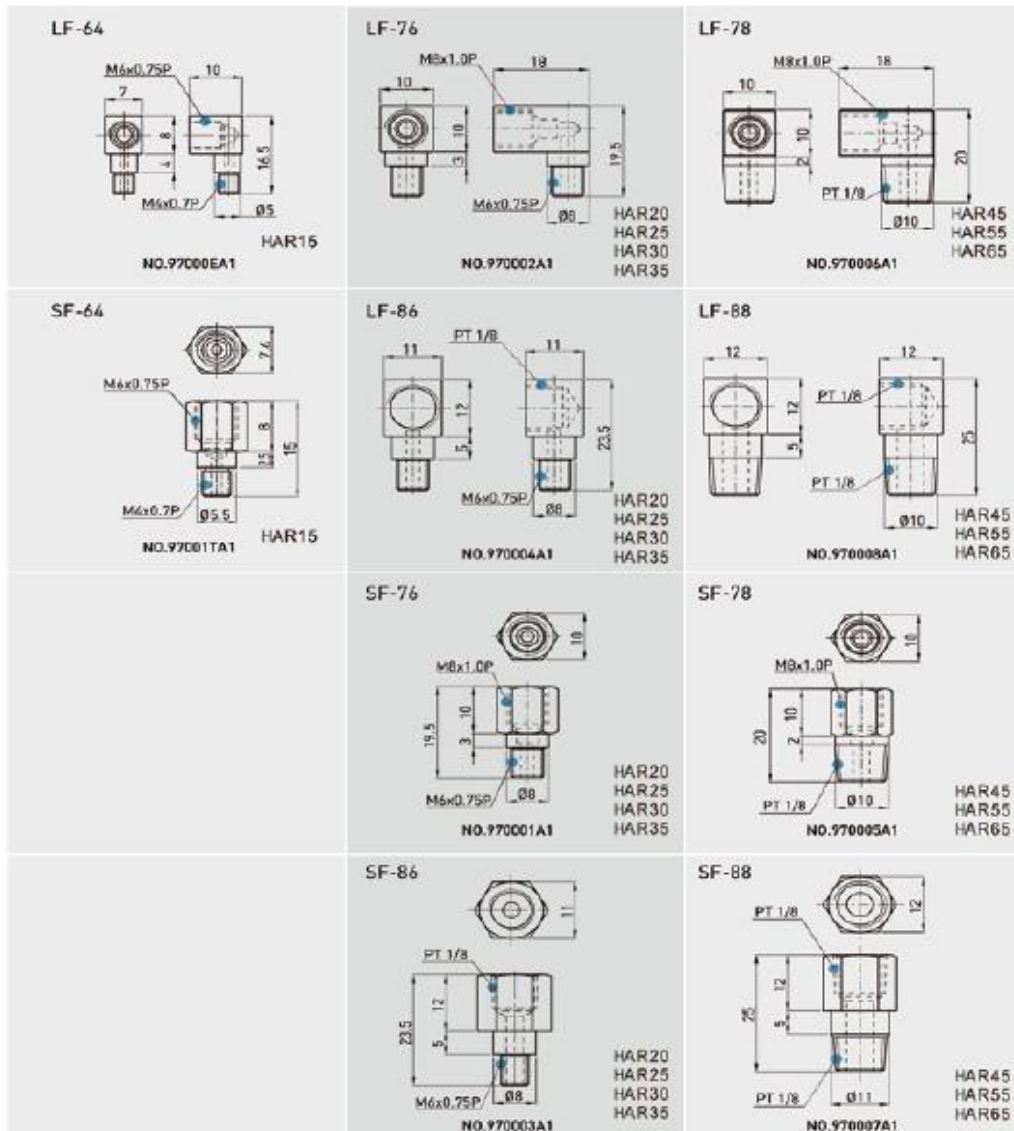
HAR Series

Heavy Load Ball Type LM Guide

(2) Oil

The recommended viscosity of oil is about 30-150 cSt. If customer need to use oil-type lubrication, please inform us.

○ Types of oil piping joint



HAR Series

Heavy Load Ball Type LM Guide

Oil refilling rate

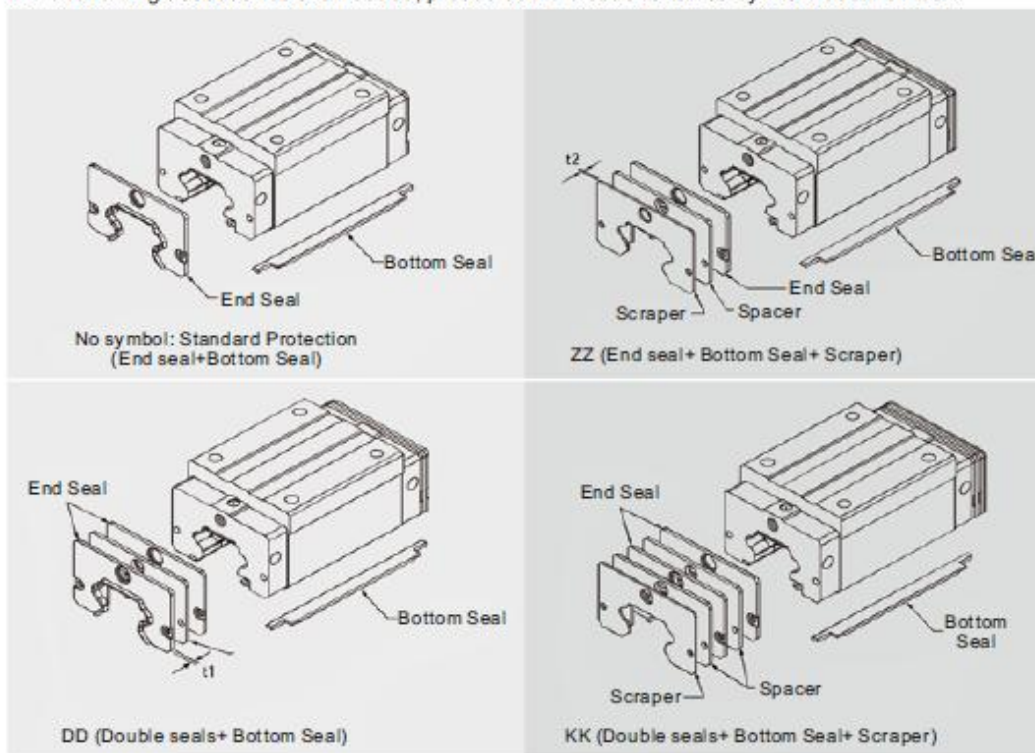
Table 2-1-15 Oil refilling rate

Type	Refilling rate (cm ³ /hr)	Type	Refilling rate (cm ³ /hr)
HAR15	0.2	HAR35	0.3
HAR20	0.2	HAR45	0.4
HAR25	0.3	HAR55	0.5
HAR30	0.3	HAR65	0.6

2-1-7 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.

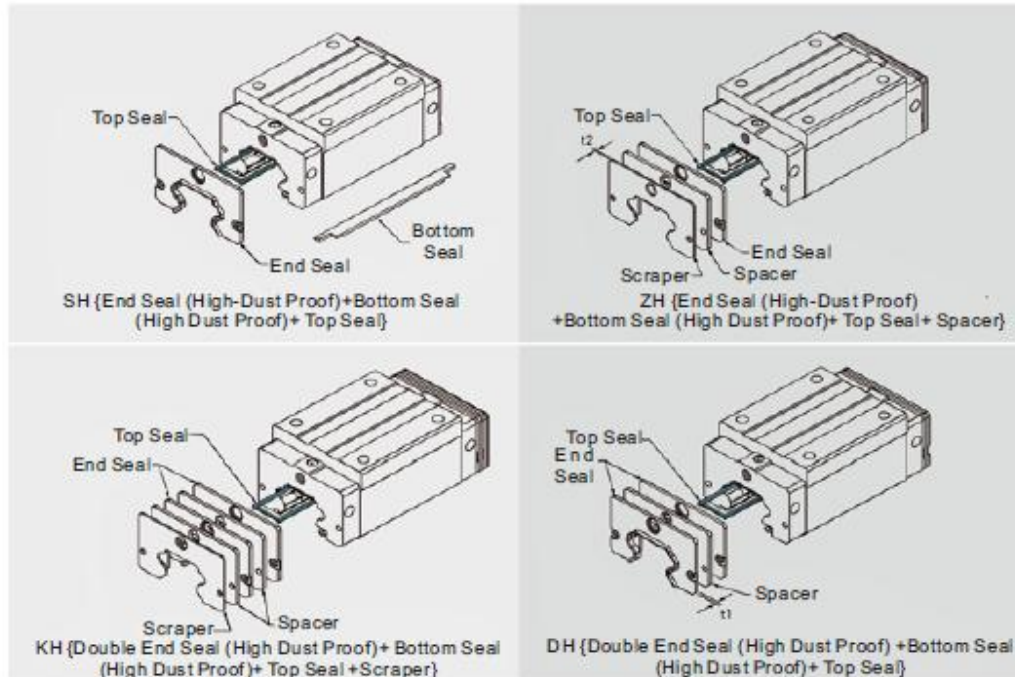


HAR Series

Heavy Load Ball Type LM Guide

(2) Codes of high-dust proof accessories

HZS is 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.



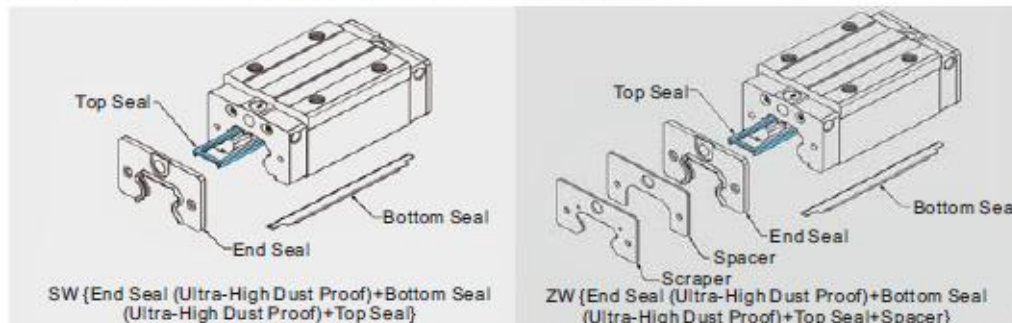
Note: 1. The available size for high dust proof accessories are HAR20,HAR25,HAR30, FAR35, FAR45)
 2. The value of friction force will increase 0.6-1.2 kgf.
 3. If higher dust proof accessories is needed, please contact US.

HAR Series

Heavy Load Ball Type LM Guide

(3) Codes of ultra-high dust proof accessories

HZS series are designed for environments with high dust and particle exposure, such as woodworking machinery and glass/stone machining equipment. These accessories provide excellent dust protection. To specify these accessories, add the HZS code after the model number.



Note: 1. The available size for high dust proof accessories are HAR20, HAR25, HAR30, FAR35, FAR45
2. The friction force value will increase by 1.5 to 4.0 kgf.
3. The MGN5 model is available only with the End Seal (Ultra-high dustproof)

(4) Function 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 2-1-16 Dimensions of end seal

Type	Thickness(t1) (mm)	Type	Thickness(t1) (mm)
HAR15	3	HAR35	3.2
HAR20	3.5	HAR45	4.5
HAR25	3.5	HAR55	4.5
HAR30	3.2	HAR65	6

● Scraper

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

Table 2-1-17 Dimensions of scraper

Type	Thickness(t2) (mm)	Type	Thickness(t2) (mm)
HAR15	1.5	HAR35	1.5
HAR20	1.5	HAR45	1.5
HAR25	1.5	HAR55	1.5
HAR30	1.5	HAR65	1.5

● Top Seal

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

HAR Series

Heavy Load Ball Type LM Guide

● 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.

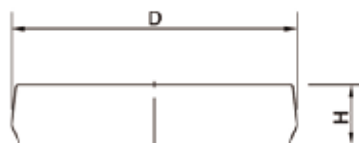


Table 2-1-18 Dimensions of Bolt Caps for Rail Mounting Holes

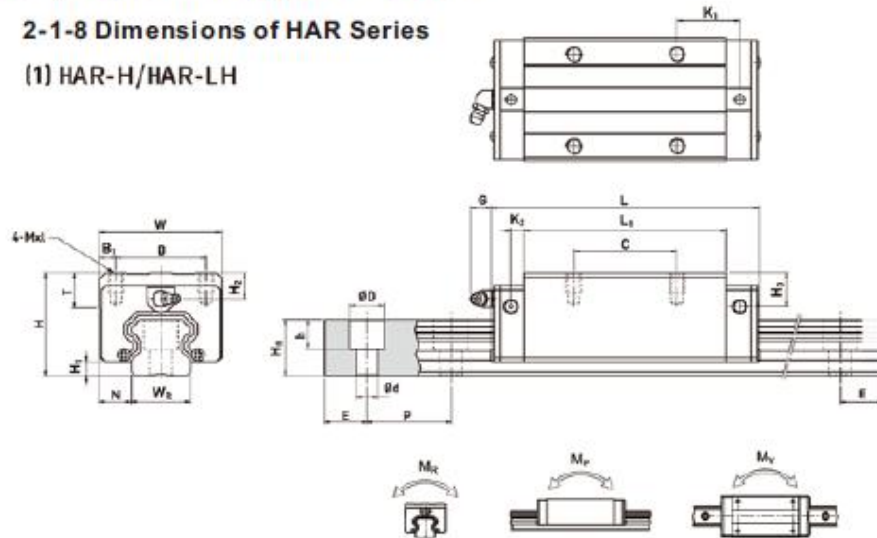
Type	Bolt	Diameter (D) (mm)	Thickness (H) (mm)	Type	Bolt	Diameter (D) (mm)	Thickness (H) (mm)
HARR15	M4	7.65	1.1	HARR35	M8	14.20	3.5
HARR20	M5	9.65	2.5	HARR45	M12	20.25	4.5
HARR25	M6	11.15	2.5	HARR55	M14	23.25	5.0
HARR30	M8	14.20	3.5	HARR65	M16	26.35	5.0

HAR Series

Heavy Load Ball Type LM Guide

2-1-8 Dimensions of HAR Series

(1) HAR-H/HAR-LH

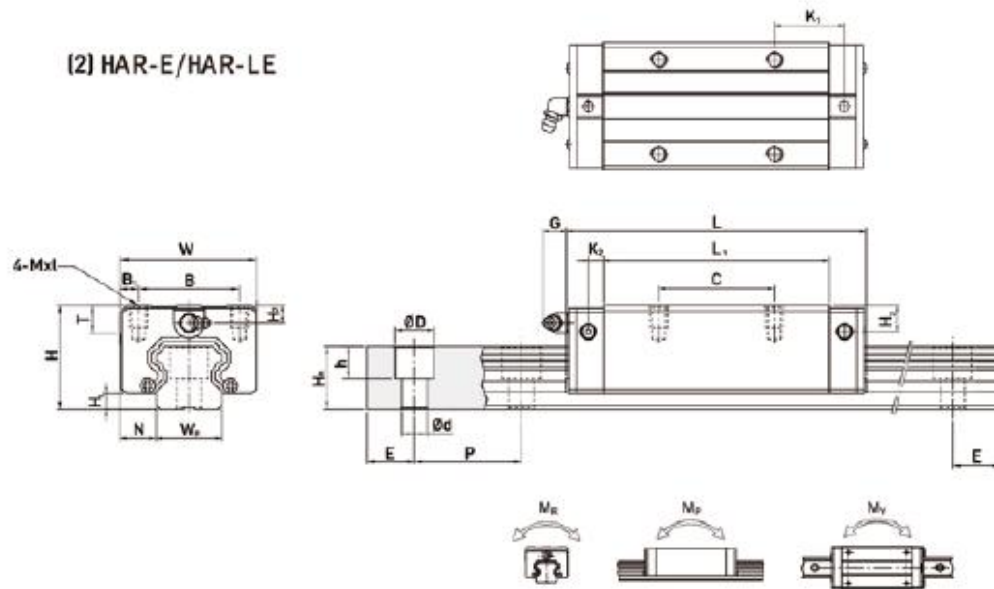


Model	Assembly Dimension (mm)		Block Dimension (mm)														Rail Dimension (mm)										Mounting Slot for Rail	Basic Dynamic Load Rating	Basic Static Load Rating	Static Rated Moment				Weight	
			H	H ₁	N	W	B	B ₁	C	L	L ₁	K ₁	K ₂	Ø	MxL	T	H ₁	H ₂	W _b	H _b	D	b	d	P	E	M _x				M _y	M _z	Rail	Block		
	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)			
HAR15H	26	4.3	9.5	34	26	4	24	39.4	41.4	16	4.85	5.3	M4x5	6	7.95	7.7	15	15	7.5	5.3	4.5	50	20	M4x16	14.7	23.47	0.12	0.10	0.10	0.16	1.45				
HAR20H	30	4.4	12	44	32	6	36	50.5	77.5	12.75	6	12	M5x6	8	6	6	20	17.5	9.5	8.5	6	50	20	M5x16	27.1	36.68	0.27	0.20	0.20	0.30	2.21				
HAR20LH								50	65.2	12.2															6	32.7	47.94	0.26	0.26	0.26		0.39			
HAR25H	40	5.5	12.5	48	35	6.5	35	58	16	15.7	6	12	M6x8	8	10	9	23	22	11	9	7	50	20	M6x20	34.9	52.82	0.42	0.33	0.33	0.51	3.21				
HAR25LH							50	78.6	104.6	18.5															42.2	69.07	0.56	0.57	0.57	0.69					
HAR30H	45	6	16	40	40	10	40	70	97.4	20.25	6	12	M8x10	8.5	9.5	12.8	28	26	14	12	9	80	20	M8x25	48.5	71.87	0.66	0.53	0.53	0.88	4.47				
HAR30LH							40	92	129.4	21.75															68.6	93.95	0.88	0.72	0.72	1.14					
HAR35H	55	5.5	19	70	50	10	50	80	117.4	20.6	7	12	M8x12	10.2	16	19.4	34	29	14	12	9	80	20	M8x25	44.4	93.88	1.16	0.81	0.81	1.45	6.30				
HAR35LH							72	105.6	139.2	22.5															77.9	122.97	1.54	1.40	1.40	1.92					
HAR45H	70	5.5	20.5	84	60	13	40	97	139.4	23	10	12.9	M10x17	14	18.5	30.5	45	38	26	17	14	105	22.5	M12x35	103.8	144.71	1.98	1.55	1.55	2.73	19.43				
HAR45LH							80	126.6	171.2	28.9															125.3	191.05	2.63	2.60	2.66	3.61					
HAR55H	80	13	22.5	100	75	12.5	75	112.7	164.7	27.35	11	12.9	M12x18	17.5	22	29	53	44	23	20	16	120	30	M14x45	153.2	211.28	3.69	2.64	2.64	4.17	15.08				
HAR55LH							95	155.8	204.8	36.4															184.9	275.25	4.88	4.57	4.57	5.49					
HAR65H	90	15	31.5	125	75	25	70	144.2	209.2	43.1	14	12.9	M16x20	25	15	63	53	24	22	18	150	35	M16x50	213.2	287.48	6.65	4.27	4.27	7.80	21.19					
HAR65LH							120	263.6	259.6	47.8														277.8	429.17	9.38	7.30	7.36	9.52						

Note: 1.1 kgf=9.81 N

HAR Series

Heavy Load Ball Type LM Guide



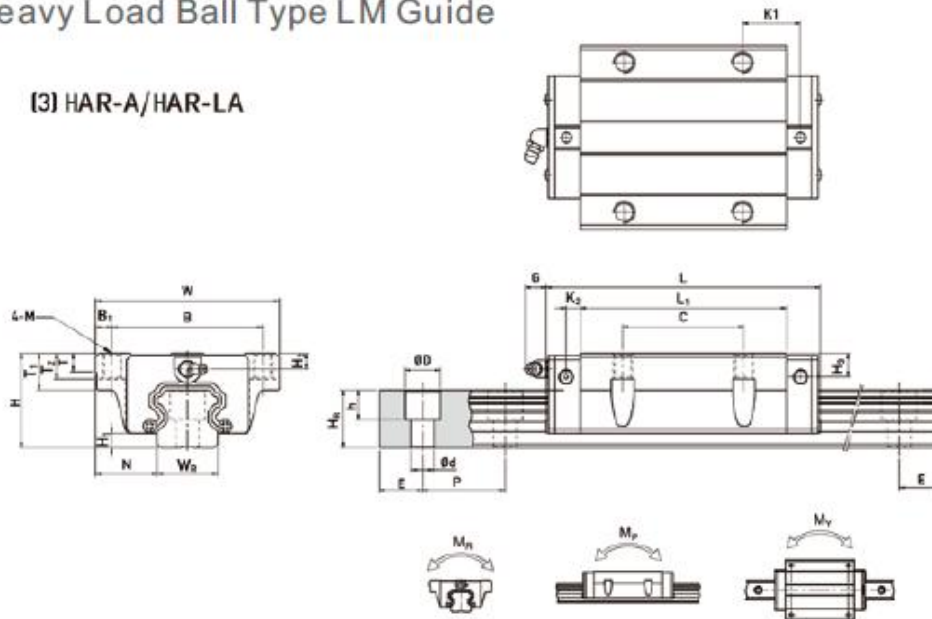
Model	Assembly Dimension (mm)		Block Dimension (mm)														Rail Dimension (mm)										Mounting Bracket Rail	Basic Dynamic Load Rating	Basic Static Load Rating	Static Rated Moment			Weight																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
			H	H ₁	N	W	B	S	C	L ₁	L	K ₁	K ₂	G	Mx1	T	H ₁	H ₂	H ₃	W ₁	H ₄	D	h	d	P	E				M _x	M _y	M _z	Rail	Block																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)

Note: 1.1 kgf=9.81 N

HAR Series

Heavy Load Ball Type LM Guide

[3] HAR-A/HAR-LA



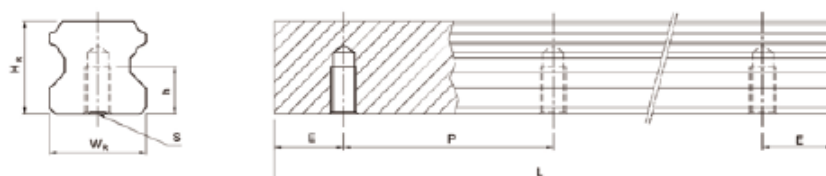
Model	Assembly Dimension (mm)	Block Dimension (mm)														Rail Dimension (mm)														Mounting Bolt for Rail	Basic Dynamic Load Rating	Basic Static Load Rating	Static Rated Moment			Weight		
		H	H ₁	N	W	B	B ₁	C	L ₁	L	K ₁	K ₂	Ø	M	T	T ₁	T ₂	H ₁	H ₂	W ₁	W ₂	H ₃	D	h	d	P	E	(mm)	C (kN)				C ₀ (kN)	M ₀ (kN-m)	M ₁ (kN-m)	M ₂ (kN-m)	Rail	Block
HAR15A	24	4.3	16	47	38	4.5	30	31.4	51.4	8	4.85	5.3	M6	6	8.9	4.15	3.15	3.7	15	15	7.5	5.2	4.5	40	20	M4x16	14.7	23.47	0.11	0.19	0.10	6.17	1.45					
HAR20A	38	4.6	21.3	63	53	5	40	56.5	72.5	16.25	6	12	M6	8	10	9.5	6	6	20	17.5	9.5	8.5	6	40	20	M5x16	27.1	36.68	0.21	0.29	0.20	0.40	2.21					
HAR20LA								61.2	12.2	17.6																M6x16	32.7	47.96	0.25	0.35	0.35	0.52						
HAR25A	34	5.5	23.5	70	57	6.5	45	58	84	13.7	6	12	M8	8	14	19	6	5	23	22	11	9	7	40	20	M6x20	34.9	52.80	0.31	0.39	0.33	0.59	3.21					
HAR25LA								78.4	104.6	21																M6x20	42.2	69.07	0.54	0.57	0.57	0.80						
HAR30A	43	6	31	90	73	9	52	70	92.4	14.25	6	12	M10	8.5	16	19	6.5	10.8	18	14	12	9	80	20	M8x25	48.5	71.87	0.44	0.53	0.53	1.09	4.47						
HAR30LA								93	126.4	25.15															M8x25	58.5	93.99	0.88	0.92	0.92	1.44							
HAR35A	48	7.5	33	100	82	9	62	80	112.4	14.6	7	12	M10	10.1	18	13	9	12.6	14	29	14	12	9	80	20	M8x25	64.4	93.88	1.14	0.81	0.81	1.56	6.30					
HAR35LA								105.8	138.2	27.5																M8x25	77.9	122.77	1.54	1.48	1.40	2.06						
HAR45A	64	9.5	37.5	120	100	10	80	97	131.4	13	10	12.9	M12	15.1	22	15	8.5	20.5	45	38	23	17	14	105	22.5	M12x35	103.8	144.71	1.98	1.55	1.55	2.79	16.41					
HAR45LA								129.8	171.2	28.9																M12x35	125.3	191.85	2.61	2.68	2.68	3.49						
HAR55A	78	13	43.5	140	116	12	95	117.7	154.7	17.35	11	12.9	M14	17.5	24.5	17	12	11	53	44	23	20	15	123	30	M14x45	153.2	211.23	3.51	2.54	2.54	4.52	15.08					
HAR55LA								155.8	204.8	36.4																M14x45	184.9	274.23	4.98	4.57	4.57	5.96						
HAR65A	98	15	53.5	170	142	14	110	144.2	208.2	23.1	14	12.9	M16	23	31.5	23	13	15	63	53	25	22	18	139	35	M16x50	213.2	287.48	6.55	4.27	4.27	5.17	21.18					
HAR65LA								203.6	259.6	52.8																M16x50	277.8	426.17	9.38	7.38	7.38	12.81						

Note: 1.1 kgf=9.81 N

HAR Series

Heavy Load Ball Type LM Guide

(4) Dimensions for HARR-T (Rail Mounting from Bottom)



Model	Dimensions of Rail (mm)						Weight
	W _R	H _R	S	h	P	E	(kg/m)
HARR16T	15	15	M5 x 0.8P	8	60	20	1.48
HARR20T	20	17.5	M6 x 1P	10	60	20	2.29
HARR25T	23	22	M6 x 1P	12	60	20	3.35
HARR30T	26	26	M8 x 1.25P	15	80	20	4.67
HARR35T	34	29	M8 x 1.25P	17	80	20	6.51
HARR45T	45	38	M12 x 1.75P	24	105	22.5	10.87
HARR55T	53	44	M14 x 2P	24	120	30	15.67
HARR65T	63	53	M20 x 2.5P	30	150	35	21.73

HBR Series

High Rigidity Roller Type LM Guide

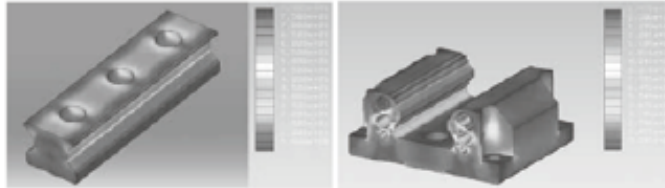
2-2 HBR Series—Roller Type Linear Guide Rail

2-2-1 Features of the HBR Series Linear Guide Rail

The HBR series linear guide rail features a roller-type rolling element instead of steel balls, and is designed to achieve ultra-high rigidity and ultra-heavy load bearing capacity. Due to the linear contact between the rolling element and the guide rail and slider, the rolling element only undergoes slight elastic deformation when subjected to high loads. Moreover, it is designed with a 45° contact angle, providing outstanding physical characteristics such as high rigidity and high load bearing capacity in four directions. Thanks to the ultra-high rigidity, machining accuracy can be greatly improved. High-precision demands can also be satisfied due to its ultra-heavy load bearing capability, thus extending the service life of the guide rail. It is therefore excellently suited for use in high-speed automatic industrial machinery and equipment with high rigidity demands.

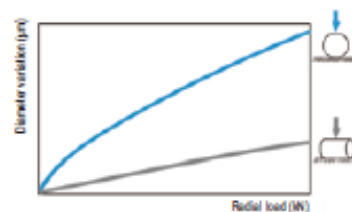
(1) Optimal Design

The reflow module of the HBR series linear guide rail ensures that the rolling element can roll smoothly in an infinite cycle. Structural stress analysis is carried out using an advanced finite element method to find the optimum design of the slider and guide rail structure.



(2) Ultra-high rigidity in four directions

The HBR series linear guide rail features a roller-type rolling element instead of steel balls. Due to the linear contact between the rolling element and the guide rail and slider, the rolling element only undergoes slight elastic deformation when subjected to high loads. This not only greatly improves the rigidity of the linear guide rail, but also ensures high-precision machining. The figure on the right shows the rigidity of balls and rollers of equal volume.



(3) Ultra-heavy load bearing capacity in four directions

The HBR series linear guide rail features a DB (45°-45°) combination, which can withstand loads in the up, down, left and right directions, ensuring the linear guide rail always maintains an ultra-high load bearing capacity. Under the same workload requirements, the HBR guide rail can achieve a smaller size than ball-type linear guide rails, and can evenly withstand high loads.



(4) Longer service life

The basic dynamic load rating of the HBR series linear guide rail is calculated according to the ISO Standard (ISO14728-1), and is based on a rated life of 100 kilometers. The service life of the linear guide rail varies depending on the actual workload, and can be calculated according to the basic dynamic rated load and workload of the selected linear guide rail.

- Disregarding environmental factors, the lifespan calculation is as follows

$$L = \left(\frac{C}{P} \right)^{\frac{10}{3}} \cdot 100\text{km} = \left(\frac{C}{P} \right)^{\frac{10}{3}} \cdot 62\text{mile} \quad \text{Eq. 2.5}$$

- The nominal life is influenced by the acting load, which is determined based on the basic dynamic rated load and the actual load. Environmental factors such as motion conditions, raceway hardness, and temperature also affect the nominal life, as expressed in Eq.2.6.

$$L = \left(\frac{f_h \cdot f_t \cdot C}{f_w \cdot P} \right)^{\frac{10}{3}} \cdot 100\text{km} = \left(\frac{f_h \cdot f_t \cdot C}{f_w \cdot P} \right)^{\frac{10}{3}} \cdot 62\text{mile} \quad \text{Eq. 2.6}$$

L : Nominal life

f_h : Hardness factor

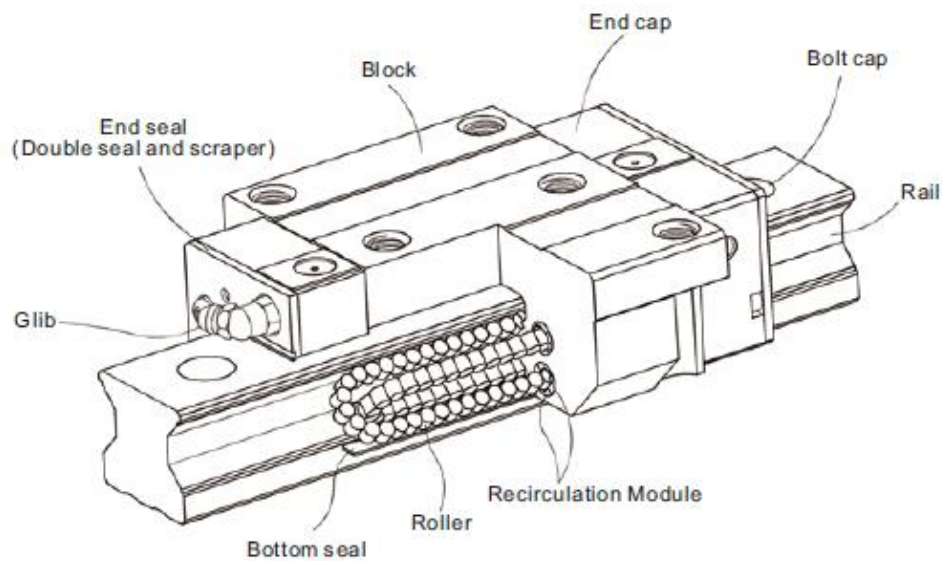
P : Actual load

f_t : Temperature factor

C : Basic dynamic load rating

f_w : Load factor

The HBR Series LM Guide is available in non-interchangeable and interchangeable types, with identical sizes for both. The primary distinction is that the interchangeable type allows for the free exchange of blocks and rails, offering greater flexibility in maintenance and replacement.

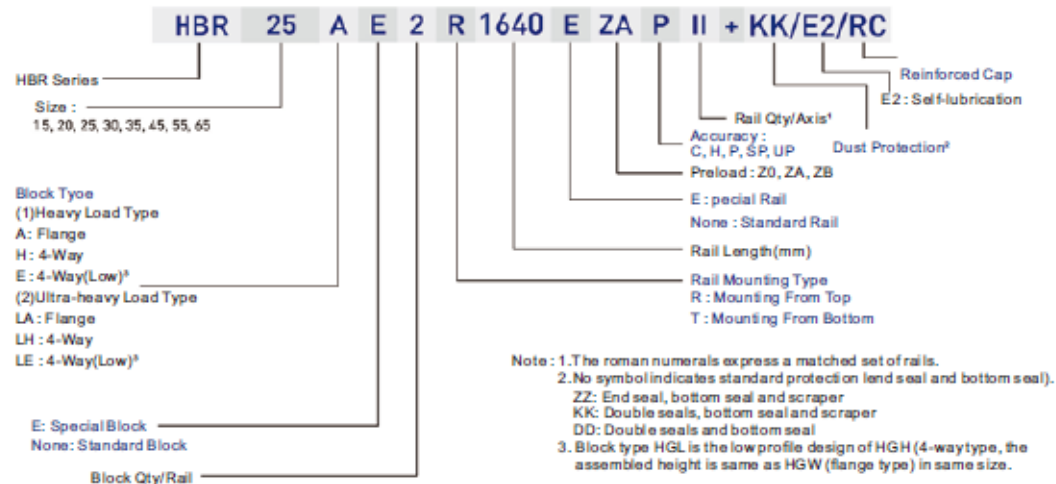
2-2-2 Construction of HBR Series

- 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

2-2-3 Product Descriptions

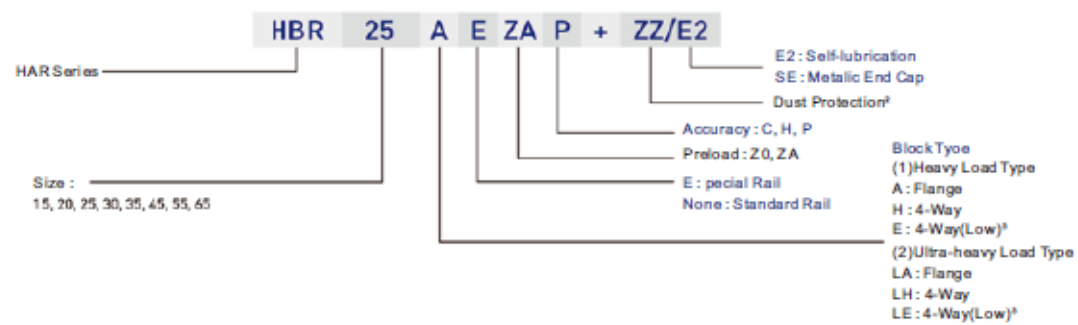
The HBR series is available in non-interchangeable and interchangeable types, with identical sizes. The primary distinction is that the interchangeable type allows for the free exchange of blocks and rails, achieving accuracy up to P class. The model number of the HBR series includes details such as size, type, accuracy class, and preload class.

(1) Non-interchangeable type



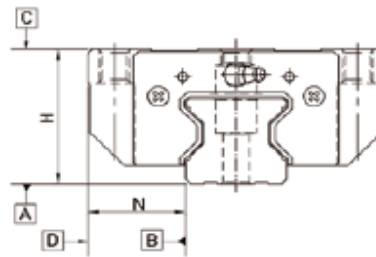
(2) Interchangeable type

Interchangeable type



2-2-4 Accuracy Grades

Accuracy Grades: normal (CI, high (H), precision (P), super precision (SP), ultra precision (UP).



(1) Non-interchangeable Type accuracy

Table 2-2-4 Assembly Accuracy

Unit: mm

Model	HBR-15,20			
Accuracy Grades	High (H)	Precision (P)	Super Precision (SP)	Ultra Precision (UP)
Dimensional tolerance of height H	± 0.03	0 - 0.03	0 - 0.015	0 - 0.008
Dimensional tolerance of width N	± 0.03	0 - 0.03	0 - 0.015	0 - 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 2-1-11			
Running parallelism of block surface D to surface B	See Table 2-1-11			

Table 2-2-5 Assembly Accuracy

Unit: mm

Model	HBR-25,30,35			
Accuracy Grades	High (H)	Precision (P)	Super Precision (SP)	Ultra Precision (UP)
Dimensional tolerance of height H	± 0.04	0 - 0.04	0 - 0.02	0 - 0.01
Dimensional tolerance of width N	± 0.04	0 - 0.04	0 - 0.02	0 - 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 2-1-11			
Running parallelism of block surface D to surface B	See Table 2-1-11			

Table 2-2-6 Assembly Accuracy

Unit: mm

Model	HBR-45,55			
Accuracy Grades	High (H)	Precision (P)	Super Precision (SP)	Ultra Precision (UP)
Dimensional tolerance of height H	± 0.05	0 - 0.05	0 - 0.03	0 - 0.02
Dimensional tolerance of width N	± 0.05	0 - 0.05	0 - 0.03	0 - 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 2-1-11			
Running parallelism of block surface D to surface B	See Table 2-1-11			

Table 2-2-7 Assembly Accuracy

Unit: mm

Model	HBR-65			
Accuracy Grades	High (H)	Precision (P)	Super Precision (SP)	Ultra Precision (UP)
Dimensional tolerance of height H	± 0.07	0 - 0.07	0 - 0.05	0 - 0.03
Dimensional tolerance of width N	± 0.07	0 - 0.07	0 - 0.05	0 - 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 2-1-11			
Running parallelism of block surface D to surface B	See Table 2-1-11			

(1) Interchangeable Type accuracy

Table 2-2-8 Individual Part Accuracy

Unit: mm

Model	HBR-15,20	
Accuracy Grades	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 2-1-11	
Running parallelism of block surface D to surface B	See Table 2-1-11	

Table 2-2-8 Individual Part Accuracy

Unit: mm

Model	HBR-25,30,35	
Accuracy Grades	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 2-1-11	
Running parallelism of block surface D to surface B	See Table 2-1-11	

Table 2-2-8 Individual Part Accuracy

Unit: mm

Model	HBR-45,55	
Accuracy Grades	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 2-1-11	
Running parallelism of block surface D to surface B	See Table 2-1-11	

Table 2-2-8 Individual Part Accuracy

Unit: mm

Model	HBR-65	
Accuracy Grades	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 2-1-11	
Running parallelism of block surface D to surface B	See Table 2-1-11	

(3) Travel Parallelism Accuracy

Table 2-2-12 Travel Parallelism Accuracy

Rail Length(mm)	Accuracy Grades (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	29	21	15	7

2-2-5 Preload

Preload can be applied to each guideway using oversized rollers. Typically, a linear motion guideway incorporates negative clearance between the raceway and rollers to enhance stiffness and maintain high precision. The HBR Series LM Guide offers three standard preloads to accommodate various applications and conditions.

Table 2-2-13 Preload

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

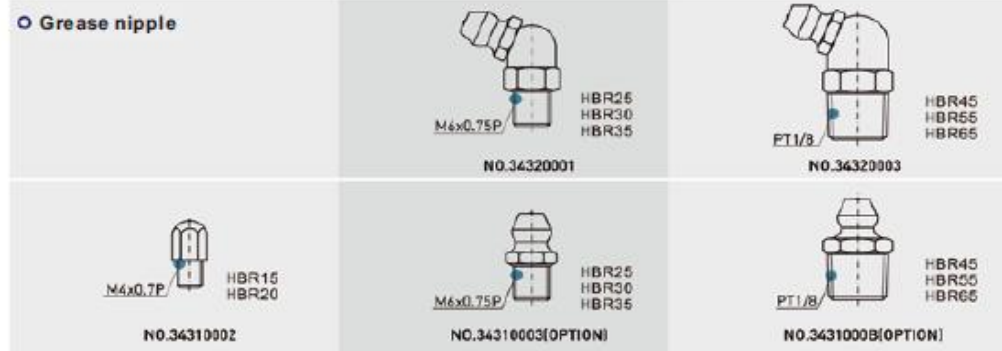
Note: The c in the preload column denotes basic dynamic load rating.

The right figure shows linear guide rigidity under different preload conditions and the relationship between friction and lifespan. Choose the appropriate preload based on equipment rigidity and lifespan needs. For smaller sizes, use medium or lower preload to avoid reducing lifespan.



2-2-6 Lubrication

(1) Grease



○ Mounting location

Mounting the nipple on the top of the block requires an adaptor or o-ring depending on different series. We will pre-drill the holes to accommodate the application's requirement. For non-standard location, please contact us. Oil piping joints may also be used at these locations for lubrication. For customers who need to lubricate from the top on a standard block, We will pre-tap the block and add a recessed o-ring.

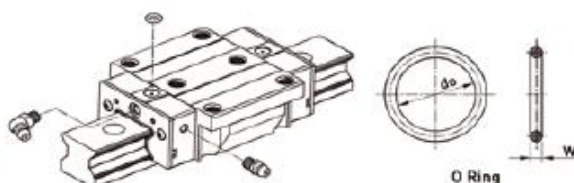
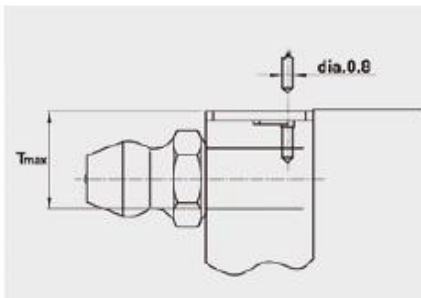


Table 2-2-14 O-Ring size and max. permissible depth for piercing

Type	O-ring Type		Lube hole at top: max. permissible depth for piercing T _{max} (mm)
	do (mm)	W (mm)	
HBR 15	2.5±0.15	1.5±0.15	3.45
HBR 20	2.5±0.15	1.5±0.15	4
HBR 25	7.5±0.15	1.5±0.15	5.8
HBR 30	7.5±0.15	1.5±0.15	6.2
HBR 35	7.5±0.15	1.5±0.15	8.65
HBR 45	7.5±0.15	1.5±0.15	9.5
HBR 55	7.5±0.15	1.5±0.15	11.6
HBR 65	7.5±0.15	1.5±0.15	14.5



○ The lubricant amount for a block filled with grease

Table 2-2-15 The lubricant amount for a block filled with grease

Type	Heavy Load(cm ³)	Ultra-heavy Load(cm ³)	Type	Heavy Load(cm ³)	Ultra-heavy Load(cm ³)
HBR15	3	-	HBR35	12	14
HBR20	5	6	HBR45	19	23
HBR25	7	8	HBR55	28	35
HBR30	9	10	HBR65	52	63

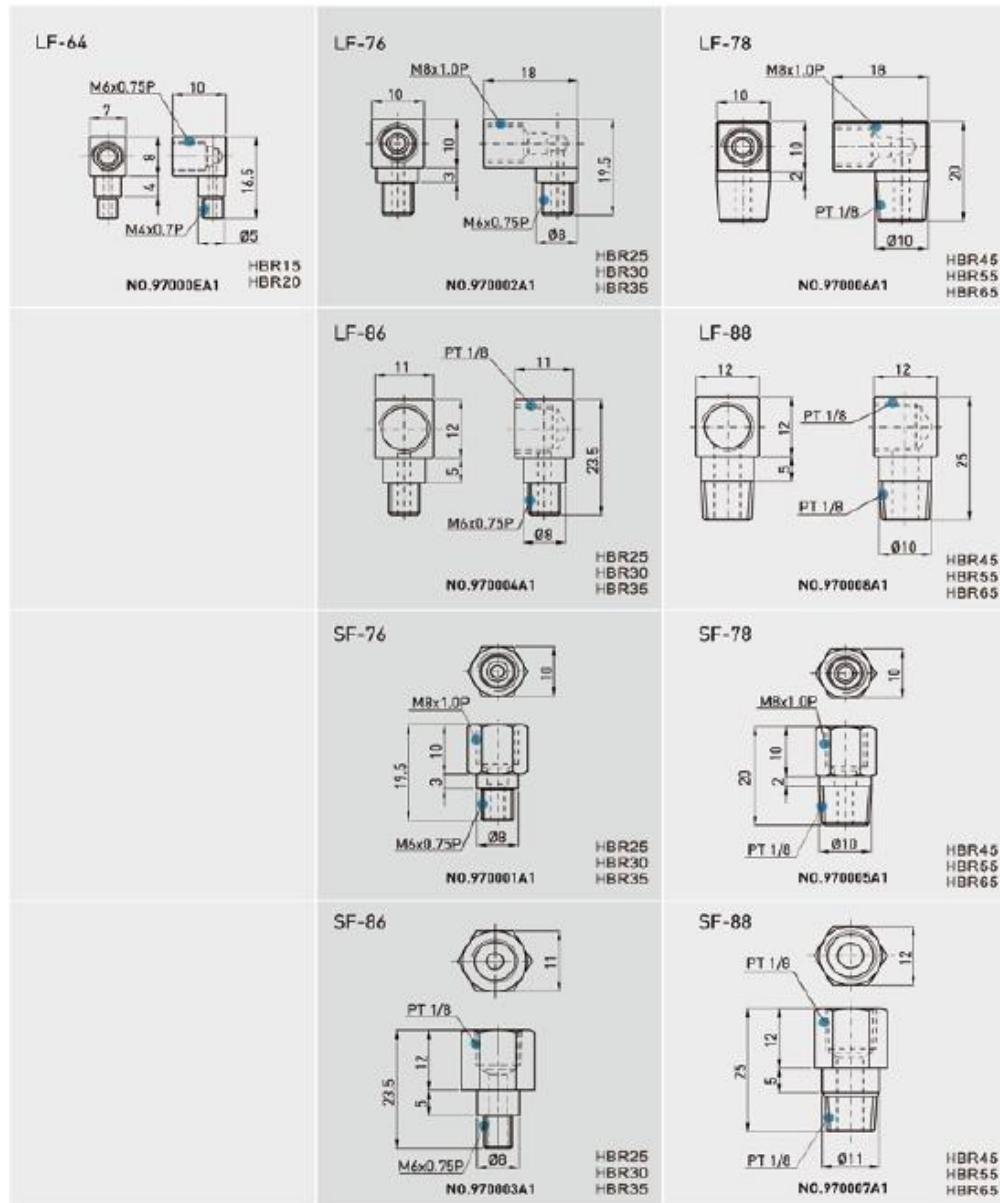
○ Frequency of replenishment

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

(2) Oil

The recommended viscosity of oil is about 30-150 cSt. If customer need to use oil-type lubrication, please inform us.

○ Types of oil piping joint



HBR Series

High Rigidity Roller Type LM Guide

Oil refilling rate

Table 2-2-16 Oil refilling rate

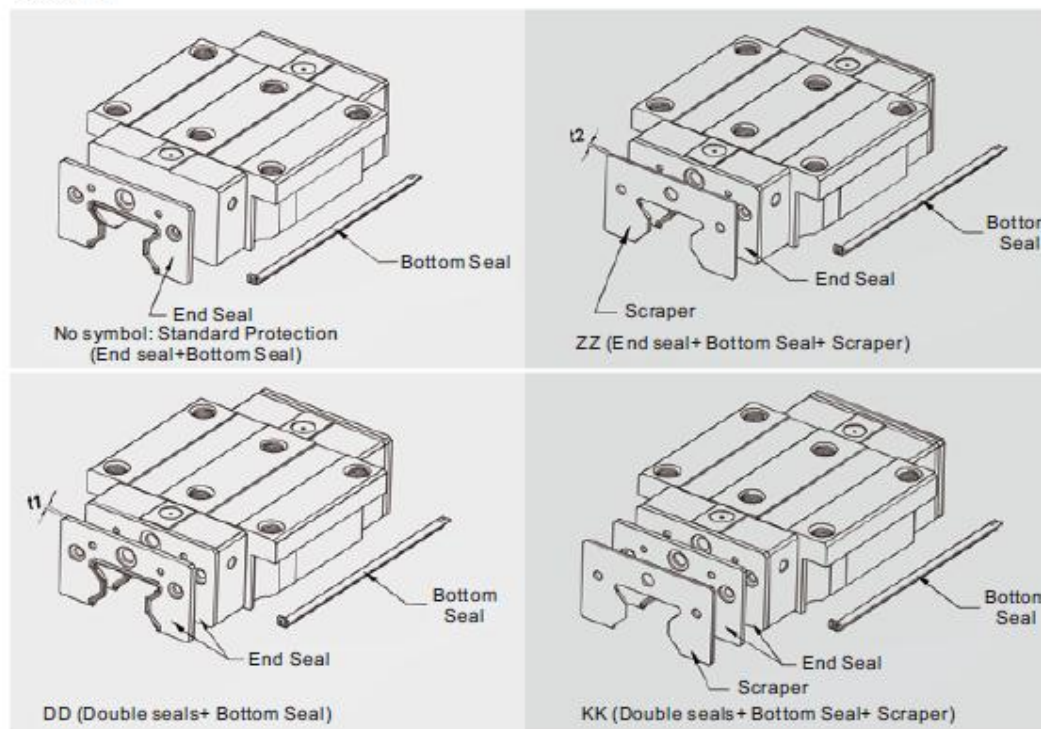
Type	Refilling rate (cm ³ /hr)
HBR 15	0.14
HBR 20	0.14
HBR 25	0.167
HBR 30	0.2
HBR 35	0.23
HBR 45	0.3
HBR 55	0.367
HBR 65	0.433

2-1-7 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.

Table 2-1-17



HBR Series

High Rigidity Roller Type LM Guide

(2)Function 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 2-1-18 Dimensions of end seal

Type	Thickness(t1) (mm)	Type	Thickness(t1) (mm)
HBR 15	2.2	HBR 35	2.5
HBR 20	2.2	HBR 45	3.6
HBR 25	2.2	HBR 55	3.6
HBR 30	2.4	HBR 65	4.4

● Scraper

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

Table 2-1-17 Dimensions of scraper

Type	Thickness(t2) (mm)	Type	Thickness(t2) (mm)
HBR 15	1.0	HBR 35	1.5
HBR 20	1.0	HBR 45	1.5
HBR 25	1.0	HBR 55	1.5
HBR 30	1.5	HBR 65	1.5

● 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.

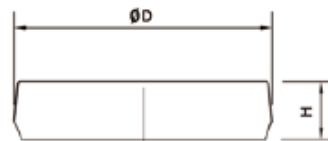
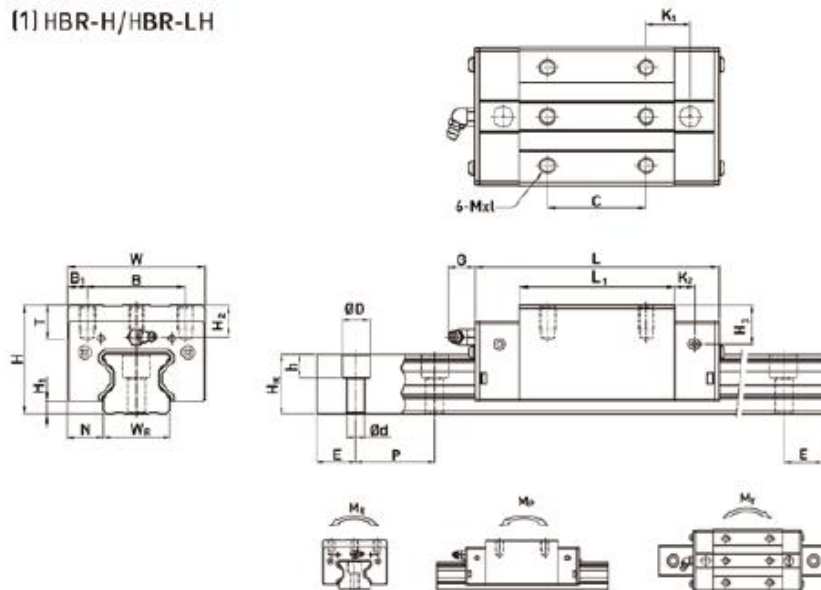


Table 2-2-20 Dimensions of Bolt Caps for Rail Mounting Holes

Type	Bolt	Diameter(D) (mm)	Thickness (H) (mm)	Type	Bolt	Diameter(D) (mm)	Thickness (H) (mm)
HBR 15	M4	7.65	1.1	HBR 35	M8	14.20	3.3
HBR 20	M5	9.65	2.2	HBR 45	M12	20.25	4.6
HBR 25	M6	11.15	2.5	HBR 55	M14	23.5	5.5
HBR 30	M8	14.20	3.3	HBR 65	M16	26.6	5.5

2-2-8 Dimensions of HBR Series

[1] HBR-H/HBR-LH



Model	Assembly Dimension (mm)		Block Dimension (mm)												Rail Dimension (mm)												Mounting Bolt for Rail	Basic Dynamic Load Rating	Basic Static Load Rating	Static Rated Moment			Weight	
																														M ₀	M ₁	N ₁	Rail	Block
	H	H ₁	N	W	B	R	C	L ₁	L	K ₁	K ₂	G	MxL	T	H ₁	H ₂	W _s	H _s	D	d	P	E	(mm)	C(kN)	C ₂ (kN)	kN·m	kN·m	kN·m	kg	kg/m				
HBR15H	20	4	9.5	34	26	4	25	45	60	13.4	4.7	5.3	M4x8	4	7.6	10.1	15	16.5	1.5	5.7	4.5	30	20	M4x16	11.3	24	0.311	0.170	0.173	0.23	1.6			
HBR20H	34	5	12	44	32	6		36	57.5	86	15.8		4	5.3	M5x8	8	8.3	8.3	20	21	5.5	8.5	4	30	20	M5x20	21.3	46.7	0.647	0.46	0.46	0.49	2.76	
HBR20LH								50	77.5	106	18.8														25.9	63	0.872	0.837	0.837	0.53				
HBR25H	40	5.5	12.5	48	35	6.5		35	64.5	97.9	20.75	12.25	12	M6x8	9.5	10.2	10	23	23.6	11	9	7	30	20	M6x20	27.7	57.1	0.758	0.605	0.605	0.61	3.08		
HBR25LH								50	81	114.4	21.5														33.9	73.4	0.975	0.991	0.991	0.75				
HBR30H	45	6	16	60	40	10		40	71	109.8	23.5	8	12	M8x10	9.5	9.5	10.1	23	28	14	12	1	40	20	M8x23	39.1	82.1	1.445	1.06	1.06	0.90	4.41		
HBR30LH								60	93	131.8	24.5														48.1	105	1.864	1.712	1.712	1.16				
HBR35H	55	6.5	18	70	50	10		50	79	124	22.5	10	12	M8x12	12	16	15.6	34	30.2	14	12	1	40	20	M8x23	57.9	135.2	2.17	1.66	1.66	1.57	5.06		
HBR35LH								72	106.5	151.5	25.25														73.1	142	2.93	2.6	2.6	2.06				
HBR45H	70	8	20.5	86	60	13		60	124	151.2	31	10	12.9	M10x17	16	20	24	43	38	20	17	14	52.5	22.5	M12x35	92.6	176.6	4.52	3.05	3.05	3.18	9.97		
HBR45LH								80	139.8	187	37.9														116	236.9	6.35	5.47	5.47	4.13				
HBR55H	80	10	23.5	100	75	12.5		75	125.5	183.7	39.75	12.5	12.5	M12x18	17.5	22	27.5	53	44	23	20	16	60	30	N16x45	136.5	252	8.01	5.4	5.4	4.89	13.98		
HBR55LH								95	173.8	232	51.9														167.8	348	11.15	10.25	10.25	6.68				
HBR65H	90	12	31.5	126	75	25		70	169	232	60.8	15.8	12.5	M16x20	25	15	15	43	53	26	22	18	75	35	M16x60	213	418.6	16.20	11.59	11.59	8.89	20.22		
HBR65LH								120	221	275	67.3														275.3	572.7	22.55	22.17	22.17	32.13				

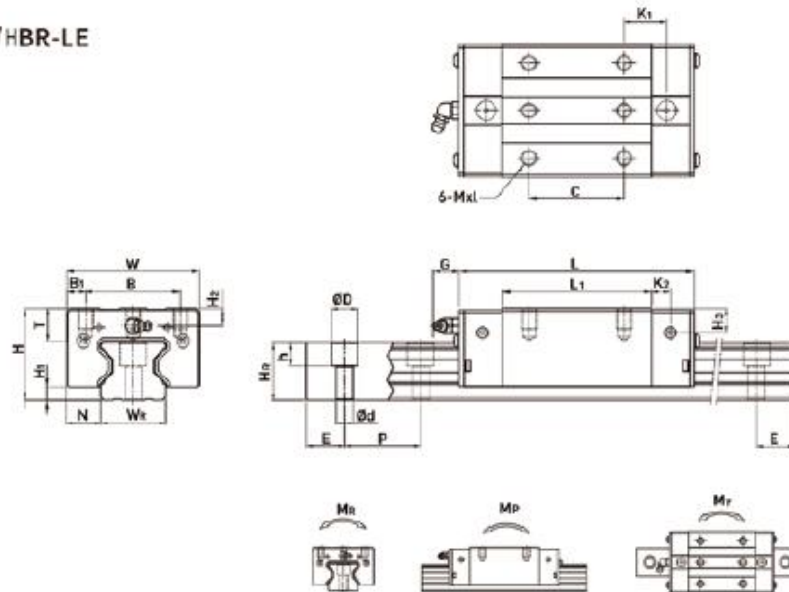
Note: 1. 1 kgf=9.81 N

2. This is the theoretical dynamic load rating for C_{min}. To convert for C_{max}, use the formula: C_{max} = 1.23 × C_{min}.

HBR Series

High Rigidity Roller Type LM Guide

[2] HBR-E/HBR-LE



Model	Assembly Dimension (mm)		Block Dimension (mm)														Rail Dimension (mm)										Mounting Bolt for Rail	Basic Dynamic Load Rating	Basic Static Load Rating	Static Rated Moment			Weight	
																														M _x	M _y	M _z		
	H	H ₁	N	W	B	B ₁	C	L ₁	L	K ₁	K ₂	G	M	T	H ₂	H ₃	W _B	H ₄	D	h	d	P	E	(mm)	C(kN)	C ₀ (kN)	kN-m	kN-m	kN-m	kg	kg/m			
HBR15E	24	4	9.5	34	24	4	24	45	48	12.4	4.7	5.3	M4x5.5	4	3.4	4.1	15	16.5	7.5	5.7	4.5	30	20	M6x14	11.3	24	0.311	0.173	0.173	0.15	1.8			
HBR20E	30	5	12	44	32	6	36	57.5	64	15.8	6	5.3	M5x8	8	4.3	4.3	20	21	9.5	8.5	6	30	20	M5x20	21.3	46.7	0.447	0.46	0.44	0.32	2.76			
HBR20LE																									26.9	63	0.872	0.837	0.637	0.42				
HBR25E	36	5.5	12.5	48	35	6.5	39	64.5	97.9	20.75	2.25	12	M6x8	9.5	6.2	6	23	23.6	11	9	7	30	20	M6x20	27.7	57.1	0.758	0.695	0.605	0.51	3.68			
HBR25LE																									33.9	73.4	0.975	0.911	0.991	0.43				
HBR30E	42	6	16	40	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	29.1	82.1	1.445	1.06	1.06	0.80	4.41			
HBR30LE																									48.1	105	1.846	1.712	1.712	1.03				
HBR35E	48	6.5	18	70	50	10	50	79	124	22.5	16	12	M8x12	12	7	12.6	34	30.2	14	12	9	40	20	M8x25	57.9	195.2	2.17	1.44	1.44	1.27	6.06			
HBR35LE																									73.1	142	2.93	2.6	2.6	1.65				
HBR45E	60	8	20.5	66	60	13	60	104	153.2	31	16	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			
HBR45LE																									116	236.9	6.33	5.47	5.47	3.28				
HBR55E	70	10	23.5	104	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	13.78			
HBR55LE																									167.8	348	11.15	10.25	10.25	5.32				

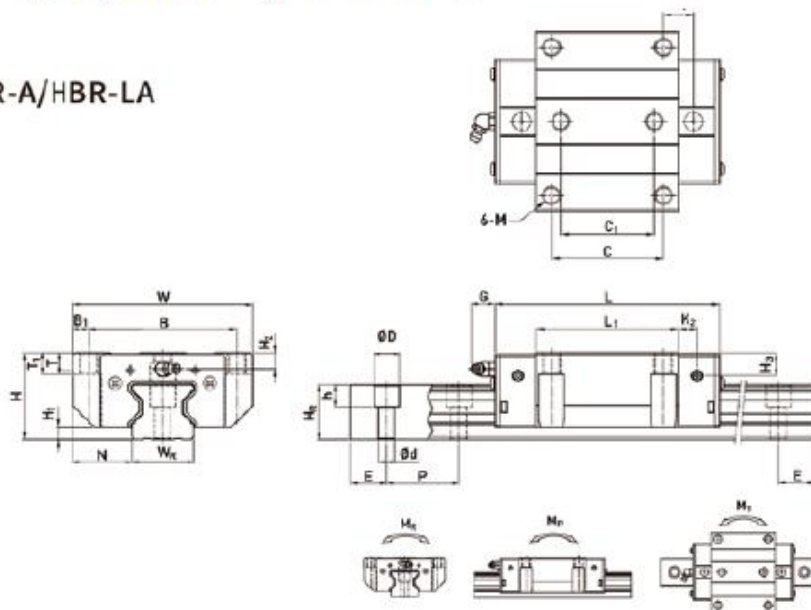
Note: 1.1 kgf=9.81 N

2. This is the theoretical dynamic load rating for C₁₀₀₀. To convert for C₁₀₀₀, use the formula: C₁₀₀₀ = 1.23 × C₁₀₀₀.

HBR Series

High Rigidity Roller Type LM Guide

(3)HBR-A/HBR-LA



Model	Assembly Dimension (mm)		Block Dimension (mm)														Rail Dimension (mm)										Mounting Bolt for Rail	Basic Dynamic Load Rating	Basic Static Load Rating	Static Rate of 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 _b	H _b	D	h	d	P				E	(mm)	C(kN)			C ₁ (kN)	kN·m	kN·m	kN·m																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
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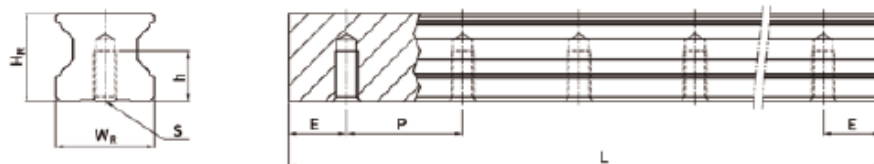
Note: 1.1 kgf=9.81 N

2. This is the theoretical dynamic load rating for C_{1000} . To convert for C_{1000} , use the formula: $C_{1000} = 1.23 \times C_{1000}$.

HBR Series

High Rigidity Roller Type LM Guide

(2) Locking Linear Guide Size



Model	Dimensions of Rail (mm)						Weight (kg/m)
	W _R	H _R	S	h	P	E	
HBRR15T	15	16.5	M5×0.8P	8	30	20	1.86
HBRR20T	20	21	M6×1P	10	30	20	2.76
HBRR25T	23	23.6	M6×1P	12	30	20	3.36
HBRR30T	28	28	M8×1.25P	15	40	20	4.82
HBRR35T	34	30.2	M8×1.25P	17	40	20	6.48
HBRR45T	45	38	M12×1.75P	24	52.5	22.5	10.63
HBRR55T	53	44	M14×2P	24	60	30	15.15
HBRR65T	63	53	M20×2.5P	30	75	35	21.24

HER Series

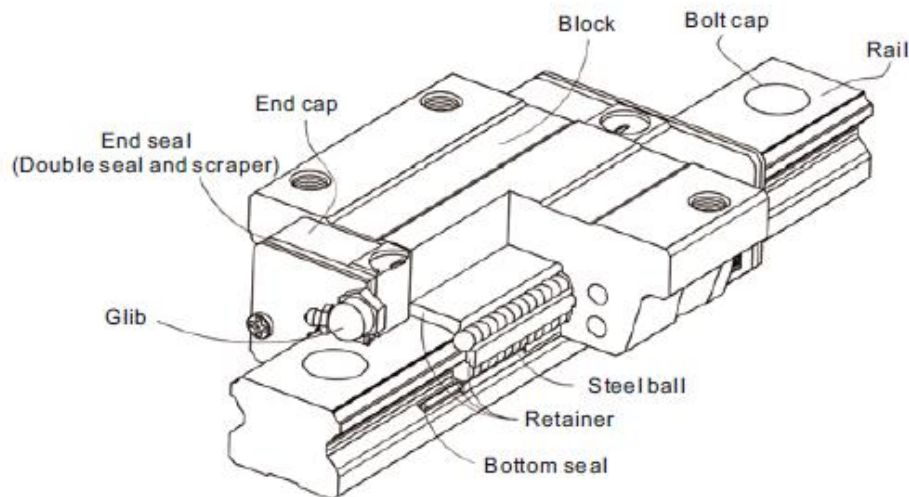
Low Profile Ball Type

2-3 HER Series-Low Profile Ball Type

2-3-1 Features of HER Series

The HER Series is designed with a low profile that offers high load capacity and rigidity. It provides equal load ratings in all four directions and features self-aligning capabilities to accommodate installation errors, which enhances accuracy. The reduced assembly height and shorter length make the HER Series ideal for high-speed, automated machines and applications with limited space. Additionally, the retainer is engineered to keep the balls in place within the block, even when it is removed from the rail.

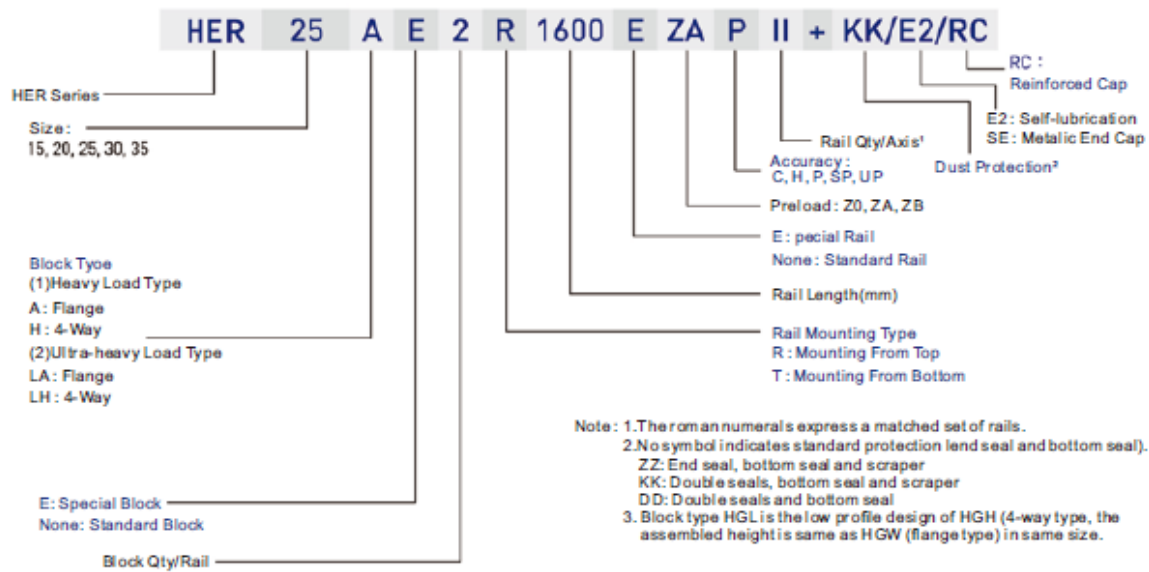
2-3-2 Construction of HER Series



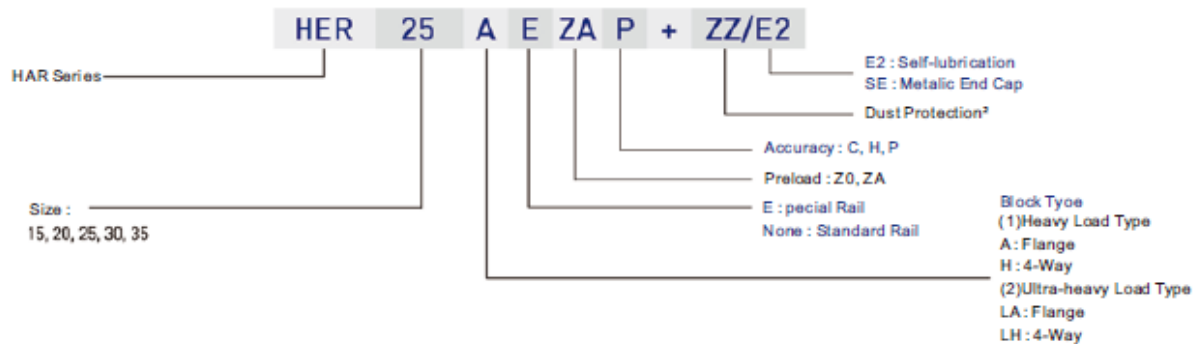
- Rolling circulation system: Block, Rail, End Cap and Retainer.
- Lubrication system: Grease Nipple and Piping Joint
- Dust protection system: End seal, Bottom Seal, Bolt Cap, Double Seals and Scraper

2-3-3 Product Descriptions

The HER Series LM Guide is available in both non-interchangeable and interchangeable types, with identical sizes for both. The key distinction is that the interchangeable type allows for free exchange of blocks and rails while maintaining P-class accuracy. Due to strict dimensional control, the interchangeable type is an optimal choice when matching rails is not required for an axis. The model number of the HER Series denotes the size, type, accuracy class, preload class, and other specifications.

(1) Non-interchangeable type**(2) Interchangeable type**

Interchangeable type

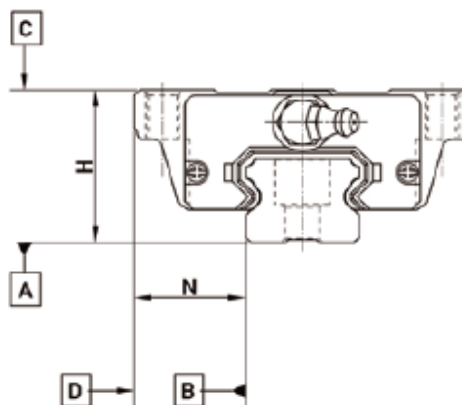


HER Series

Low Profile Ball Type

2-3-4 Accuracy Grades

Accuracy Grades: normal (C), high (H), precision (P), super precision (SP), ultra precision (UP).



(1) Non-interchangeable Type accuracy

Table 2-3-3 Assembly Accuracy

Unit: mm

Model	HER-15,20				
Accuracy Grades	Normal (C)	High (H)	Precision (P)	Super Precision (SP)	Ultra Precision (UP)
Dimensional tolerance of height H	± 0.1	± 0.03	0 -0.03	0 -0.015	0 -0.008
Dimensional tolerance of width N	± 0.1	± 0.03	0 -0.03	0 -0.015	0 -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 2-1-11				
Running parallelism of block surface D to surface B	See Table 2-1-11				

Table 2-3-4 Assembly Accuracy

Unit: mm

Model	HER-25,30,35				
Accuracy Grades	Normal (C)	High (H)	Precision (P)	Super Precision (SP)	Ultra Precision (UP)
Dimensional tolerance of height H	± 0.1	± 0.04	0 -0.04	0 -0.02	0 -0.01
Dimensional tolerance of width N	± 0.1	± 0.04	0 -0.04	0 -0.02	0 -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 2-1-11				
Running parallelism of block surface D to surface B	See Table 2-1-11				

HER Series

Low Profile Ball Type

(2) Non-interchangeable Type accuracy

Table 2-3-5 Individual Part Accuracy

Unit: mm

Model	HER-15,20		
Accuracy Grades	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 2-1-11		
Running parallelism of block surface D to surface B	See Table 2-1-11		

Table 2-3-5 Individual Part Accuracy

Unit: mm

Model	HER-25,30,35		
Accuracy Grades	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 2-1-11		
Running parallelism of block surface D to surface B	See Table 2-1-11		

(3) Travel Parallelism Accuracy

Table 2-3-7 Travel Parallelism Accuracy

Rail Length(mm)	Accuracy Grades (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

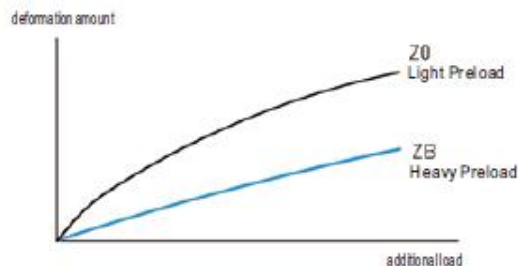
HER Series

Low Profile Ball Type

2-3-5 Preload

(1) Definition

Preload can be applied to each guideway using oversized balls. Typically, a linear motion guideway is designed with negative clearance between the groove and the balls to enhance stiffness and maintain high precision. As shown in the figure, applying preload increases the load capacity, doubles rigidity, and reduces deflection by half. For model sizes under HG20, a preload no greater than ZA is recommended to prevent excessive preload from negatively impacting the guideway's lifespan.



(2) Preload classes

Three classes of standard preload for various applications and conditions.

Table 2-3-8 Preload

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

Class	Interchangeable Guideway	Non-Interchangeable Guideway
Preload Level	Z0, ZA	Z0, ZA, ZB

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

2-3-6 Lubrication

(1) Grease



HER Series

Low Profile Ball Type

○ Mounting location

Mounting the nipple on the top of the block requires an adaptor or o-ring depending on different series. We will pre-drill the holes to accommodate the application's requirement. For non-standard location, please contact us.

Oil piping joints may also be used at these locations for lubrication. For customers who need to lubricate from the top on a standard block, We will pre-tap the block and add a recessed o-ring.

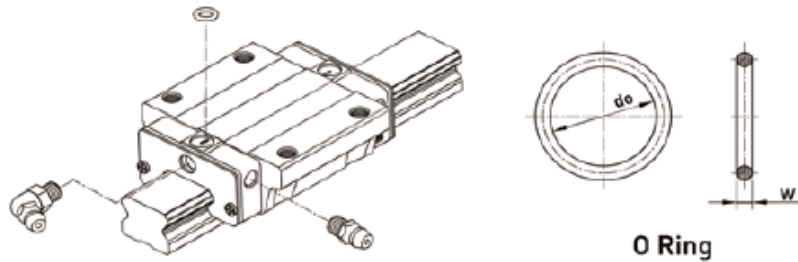
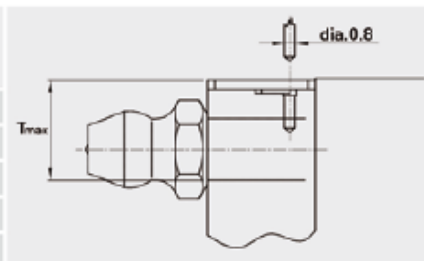


Table 2-2-14 O-Ring size and max. permissible depth for piercing

Type	O-ring Type		Lube hole at top: max. permissible depth for piercing T _{max} (mm)
	do (mm)	W (mm)	
HER 15	2.5 ± 0.15	1.5 ± 0.15	6.9
HER 20	4.5 ± 0.15	1.5 ± 0.15	8.4
HER 25	4.5 ± 0.15	1.5 ± 0.15	10.4
HER 30	4.5 ± 0.15	1.5 ± 0.15	10.4
HER 35	4.5 ± 0.15	1.5 ± 0.15	10.8



○ The lubricant amount for a block filled with grease

Table 2-2-15 The lubricant amount for a block filled with grease

Type	Medium Load(cm ³) [cm ³]	Heavy Load(cm ³) [cm ³]
HER 15	0.8	1.4
HER 20	1.5	2.4
HER 25	2.8	4.6
HER 30	3.7	6.3
HER 35	5.6	6.6

○ Frequency of replenishment

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

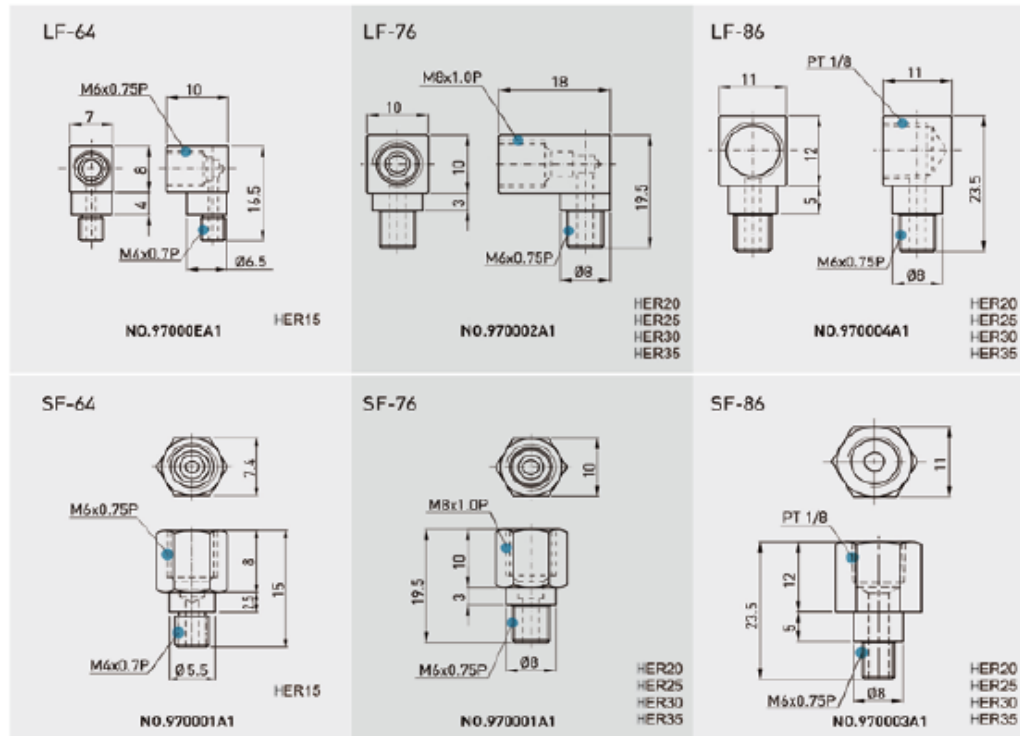
HER Series

Low Profile Ball Type

(2) Oil

The recommended viscosity of oil is about 30-150 cSt. If customer need to use oil-type lubrication, please inform us.

Types of oil piping joint



Oil refilling rate

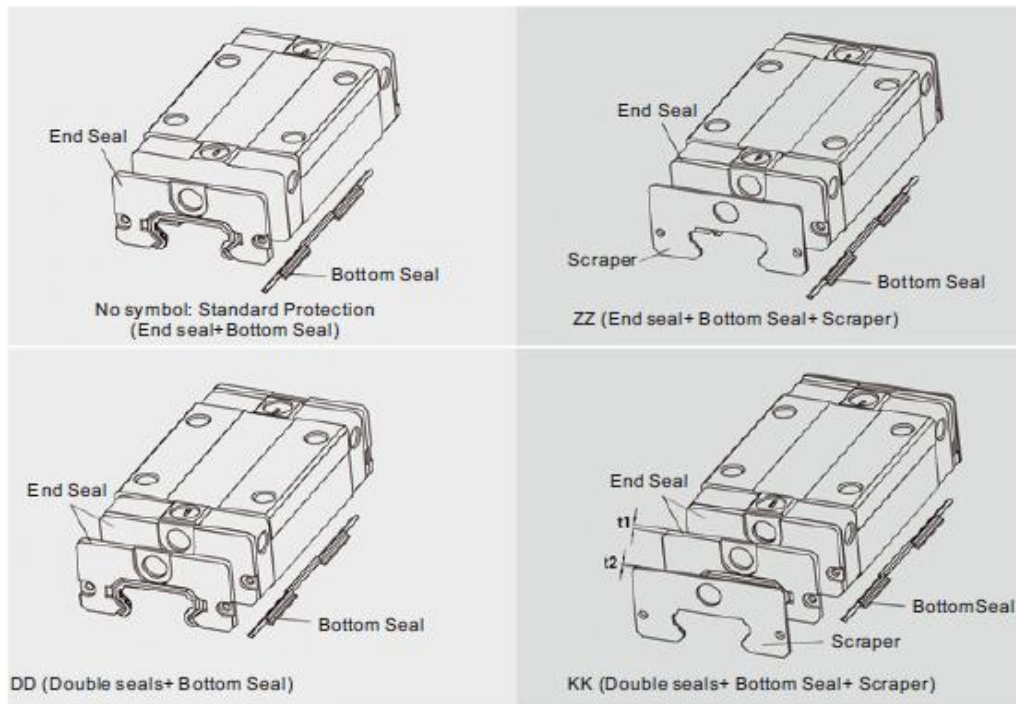
Table 2-2-16 Oil refilling rate

Type	Refilling rate (cm ³ /hr)
HER15	0.1
HER20	0.133
HER25	0.167
HER30	0.2
HER35	0.233

2-3-7 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.



(2) Function 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 2-1-18 Dimensions of end seal

Type	Thickness(t1) (mm)
HER15	2
HER20	2
HER25	2
HER30	2
HER35	2

HER Series

Low Profile Ball Type

● Scraper

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

Table 2-1-17 Dimensions of scraper

Type	Thickness(t2) (mm)
HER15	0.8
HER20	0.8
HER25	1
HER30	1
HER35	1.5

● 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.

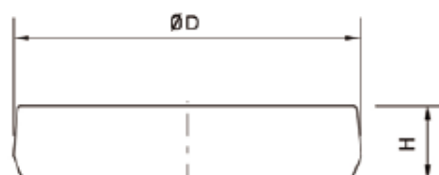


Table 2-2-20 Dimensions of Bolt Caps for Rail Mounting Holes

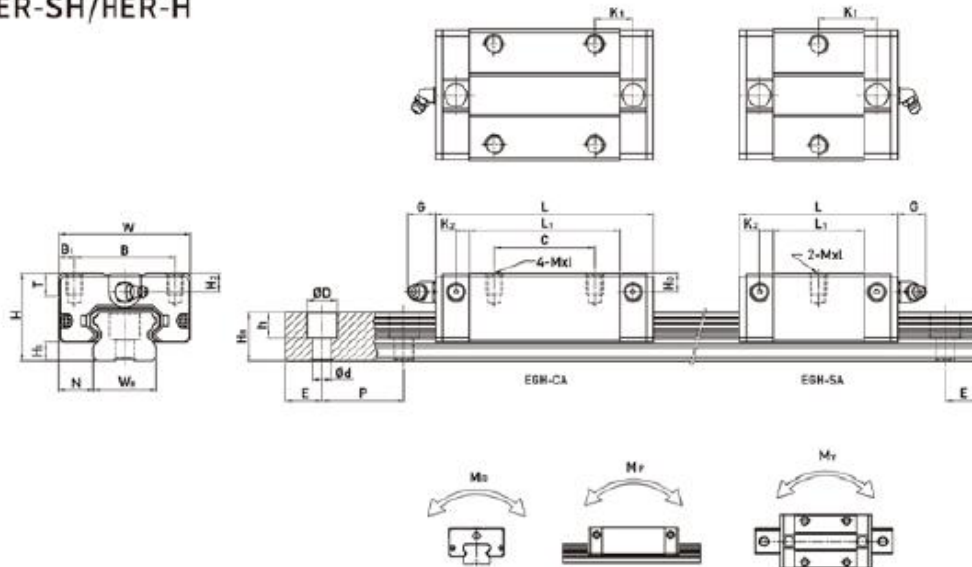
Type	Bolt	Diameter (D) (mm)	Thickness (H) (mm)
HERR15R	M3	6.15	1.2
HERR20R	M5	9.65	2.5
HERR25R	M6	11.15	2.5
HERR30R	M6	11.15	2.5
HERR35R	M8	14.20	3.5
HERR15U	M4	7.65	1.1
HERR30U	M8	14.20	3.5

HER Series

Low Profile Ball Type

2-3-8 Dimensions of HER Series

(1) HER-SH/HER-H



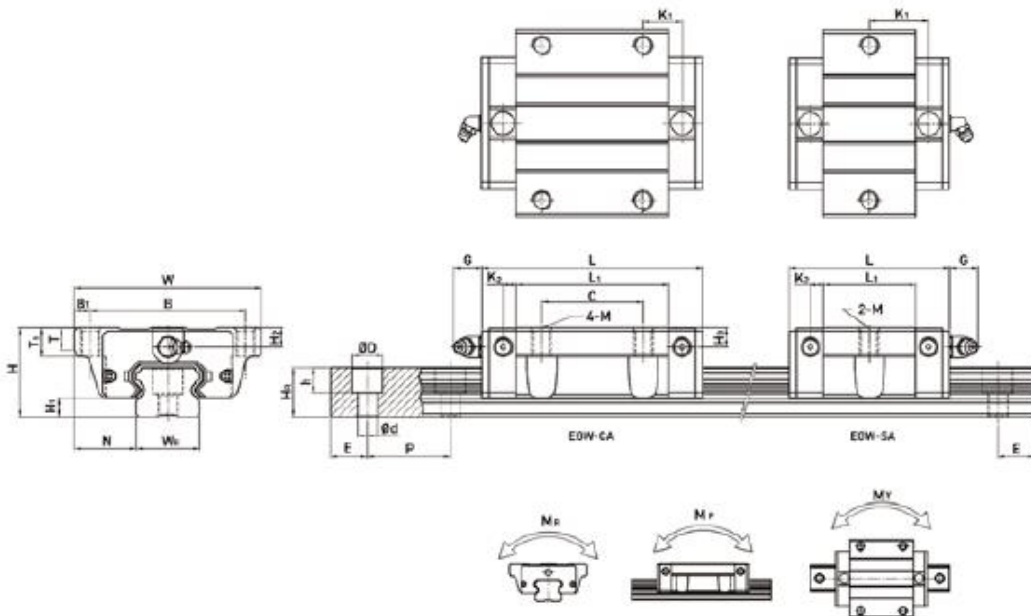
Model	Assembly Dimension (mm)		Block Dimension (mm)											Rail Dimension (mm)											Mounting Slot for Rail	Basic Dynamic Load Rating	Basic Static Load Rating	Static Rated Moment			Weight		
			H	H ₁	N	W	B	B ₁	C	L ₁	L	K ₁	K ₂	G	Mx1	T	H ₂	H ₃	W ₄	H ₄	D	h	d	P				E	(mm)	C (kN)	C ₀ (kN)	M _x kN-m	M _y kN-m
	HER10SH	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	7.5	5.3	4.5	60	20	M4x6	5.35	9.40	0.08	0.04	0.04	0.09	1.25
HER15H	24	4.5	9.5	34	26	4	-	24	39.8	56.8	10.15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	M4x6	7.83	16.19	0.13	0.10	0.10	0.15	-
HER20SH	28	4	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	M5x6	7.23	12.74	0.13	0.06	0.06	0.15	2.08	
HER20H	28	4	11	42	32	5	-	32	48.1	69.1	12.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	M5x6	10.31	21.13	0.22	0.15	0.15	0.24	-
HER25SH	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	
HER25H	33	7	12.5	48	35	6.5	-	35	59	82.6	14.15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	M6x20	14.27	32.48	0.38	0.32	0.32	0.41	-
HER30SH	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	4.30	
HER30H	42	10	16	60	40	10	-	40	70.1	93.1	21.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	M6x25	23.70	47.46	0.68	0.55	0.55	0.76	-
HER35SH	48	11	19	70	50	10	-	45	75	29.5	-	7	12	M8x12	10	9.5	8.5	34	27.5	14	12	9	90	20	M8x25	22.44	37.38	0.56	0.31	0.31	0.74	6.14	
HER35H	48	11	19	70	50	10	-	50	78	108	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	M8x25	53.35	64.84	0.98	0.69	0.69	1.10	-
Note: 1.1 kgf=9.81 N																																	

Note: 1.1 kgf=9.81 N

HER Series

Low Profile Ball Type

(2) HER-SA/HER-A



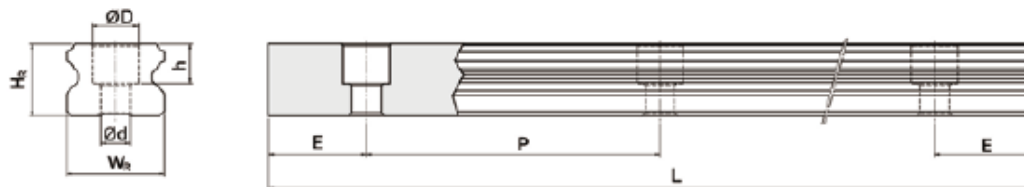
Model	Assembly Dimension (mm)		Block Dimension (mm)										Rail Dimension (mm)										Mounting Bolt for Rail	Basic Dynamic Load Rating	Basic Static Load Rating	Static Rated Moment			Weight				
																										M ₀	M ₁₀	M ₁₅			Rail	Block	
	H	H ₁	N	W	B	B ₁	C	L ₁	L	K ₁	K ₂	S	M	T	T ₁	H ₂	H ₃	W ₀	H ₄	D	h	d	P	E	(mm)	C(kN)	C ₀ (kN)	kN·m	kN·m	kN·m	kg	kg/m	
HER15SA	24	4.5	19.5	52	41	5.5	-	23.1	40.1	14.8	-	3.5	5.7	M5	5	7	5.5	6	15	12.5	7.5	5.0	4.5	40	20	M4x16	5.35	9.40	0.08	0.04	0.04	0.12	1.25
HER15A	24	4.5	19.5	52	41	5.5	-	23.1	40.1	14.8	-	3.5	5.7	M5	5	7	5.5	6	15	12.5	7.5	5.0	4.5	40	20	M4x16	7.80	16.99	0.10	0.10	0.10	0.21	-
HER20SA	28	6	19.5	59	45	5	-	29	50	18.75	-	4.15	12	M6	7	9	6	6	20	15.5	9.5	8.5	6	40	20	M5x16	7.23	12.76	0.11	0.06	0.06	0.19	2.08
HER20A	28	6	19.5	59	45	5	-	29	50	18.75	-	4.15	12	M6	7	9	6	6	20	15.5	9.5	8.5	6	40	20	M5x16	10.21	21.13	0.22	0.16	0.16	0.32	-
HER25SA	33	7	15	73	60	6.5	-	35.5	51.1	21.9	-	4.55	12	M6	7.5	10	8	8	23	18	11	9	7	40	20	M6x20	11.40	19.50	0.23	0.12	0.12	0.35	2.57
HER25A	33	7	15	73	60	6.5	-	35.5	51.1	21.9	-	4.55	12	M6	7.5	10	8	8	23	18	11	9	7	40	20	M6x20	14.17	32.40	0.39	0.32	0.32	0.59	-
HER30SA	42	10	31	93	72	9	-	41.5	69.5	28.75	-	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
HER30A	42	10	31	93	72	9	-	41.5	69.5	28.75	-	6	12	M10	7	10	8	9	28	23	11	9	7	80	20	M6x25	23.70	47.46	0.68	0.55	0.55	1.34	-
HER35SA	40	11	33	100	82	9	-	45	75	28.5	-	7	12	M10	10	13	9.5	9.5	34	27.5	14	12	9	80	20	M8x25	22.66	37.38	0.56	0.31	0.31	0.84	6.14
HER35A	40	11	33	100	82	9	-	45	75	28.5	-	7	12	M10	10	13	9.5	9.5	34	27.5	14	12	9	80	20	M8x25	33.35	64.84	0.98	0.69	0.69	1.45	-

Note: 1.1 kgf=9.81 N

HER Series

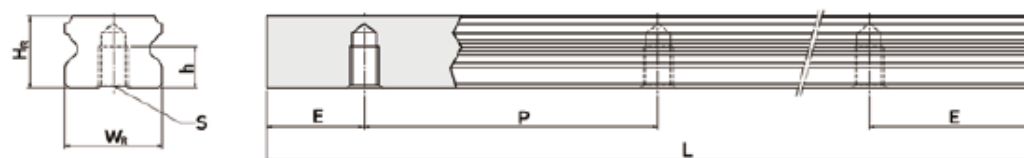
Low Profile Ball Type

(3) Locking Type (Enlarged Bolt Hole Diameter 1 Rail Size Chart)



Model	Rail Fixing Bolt Dimensions (mm)	Dimensions of Rail (mm)							Weight (kg/m)
		W _b	H _b	D	h	d	P	E	
HERR15U	M6x16	15	12.5	7.5	5.3	4.5	60	20	1.23
HERR30U	M8x25	28	23	14	12	9	80	20	4.23

(4) Rail Mounting from Bottom



Model	Dimensions of Rail (mm)						Weight (kg/m)
	W _b	H _b	S	h	P	E	
HERR15T	15	12.5	M5 x 0.8P	7	60	20	1.26
HERR20T	20	15.5	M6 x 1P	9	60	20	2.15
HERR25T	23	18	M6 x 1P	10	60	20	2.79
HERR30T	28	23	M8 x 1.25P	14	80	20	4.42
HERR35T	34	27.5	M8 x 1.25P	17	80	20	6.34

Product List

HIWIN	PMI	CSK		TBI	WON	THK
High Assembly Square Type without Flange						
HGH15CA	MSA15S	LMG15H	HAR15H	TRH15V	H15R/H15RL	HSR15R
HGH20CA	MSA20S	LMG20H	HAR20H	TRH20V	H20R	HSR20R
HGH20HA	MSA20LS	LMG20LH	HAR20LH	TRH20V	H20RL	HSR20LR
HGH25CA	MSA25S	LMG25H	HAR25H	TRH25V	H25R	HSR25R
HGH25CA	MSA25LS	LMG25LH	HAR25LH	TRH25V	H25RL	HSR25LR
HGH30CA	MSA30S	LMG30H	HAR30H	TRH30V	H30R	HSR30R
HGH30HA	MSA30LS	LMG30LH	HAR30LH	TRH30V	H30RL	HSR30LR
HGH35CA	MSA35S	LMG35H	HAR35H	TRH35V	H35R	HSR35R
HGH35HA	MSA35LS	LMG35LH	HAR35LH	TRH35V	H35RL	HSR35LR
HGH45CA	MSA45S	LMG45H	HAR45H	TRH45V	H45R	HSR45R
HGH45HA	MSA45LS	LMG45LH	HAR45LH	TRH45V	H45RL	HSR45LR
HGH55CA	MSA55S		HAR55H	TRH55V	H55R	HSR55R
HGH55HA	MSA55LS		HAR55LH	TRH55V	H55RL	HSR55LR
HGH65CA	MSA65S		HAR65H	TRH65V		HSR65R
HGH65HA	MSA65LS		HAR65LH	TRH65V		HSR65LR
High Assembly Flanged Type						
HGW15C	MSA15A	LMG15C	HAR15A	TRH15F	H15F/H15FL	HSR15A
HGW20C	MSA20A	LMG20C	HAR20A	TRH20F	H20F	HSR20A
HGW20H	MSA20LA	LMG20LC	HAR20LA	TRH20F	H20FL	HSR20LA
HGW25C	MSA25A	LMG25C	HAR25A	TRH25F	H25F	HSR25A
HGW25C	MSA25LA	LMG25LC	HAR25LA	TRH25F	H25FL	HSR25LA
HGW30C	MSA30A	LMG30C	HAR30A	TRH30F	H30F	HSR30A
HGW30H	MSA30LA	LMG30LC	HAR30LA	TRH30F	H30FL	HSR30LA
HGW35C	MSA35A	LMG35C	HAR35A	TRH35F	H35F	HSR35A
HGW35H	MSA35LA	LMG35LC	HAR35LA	TRH35F	H35FL	HSR35LA
HGW45C	MSA45A	LMG45C	HAR45A	TRH45F	H45F	HSR45A
HGW45H	MSA45LA	LMG45LC	HAR45LA	TRH45F	H45FL	HSR45LA
HGW55C	MSA55A		HAR55A	TRH55F	H55F	HSR55A
HGW55H	MSA55LA		HAR55LA	TRH55F	H55FL	HSR55LA
HGW65C	MSA65A		HAR65A	TRH65F		HSR65A
HGW65H	MSA65LA		HAR65LA	TRH65F		HSR65LA
Low Assembly Square Type without Flange						
EGH15SA	MSB15TS	LMG15ST	HER15SH	TRS15V	S15C	SR15V
EGH15CA	MSB15S	LMG15T	HER15H	TRS15V	S15R	SR15W
EGH20SA	MSB20TS	LMG20ST	HER20SH	TRS20V	S20C	SR20V
EGH20CA	MSB20S	LMG20T	HER20H	TRS20V	S20R	SR20W
EGH25SA	MSB25TS	LMG25ST	HER25SH	TRS25V	S25C	SR25V
EGH25CA	MSB25S	LMG25T	HER25H	TRS25V	S25R	SR25W
EGH30SA	MSB30TS	LMG30ST	HER30SH	TRS30V		SR30V
EGH30CA	MSB30S	LMG30T	HER30H	TRS30V		SR30W
Low Assembly Flanged Type						
EGW15SA	MSB15TE		HER15SA	TRS15FS		SR15SB
EGW15CA	MSB15E		HER15A	TRS15FN	S15CF	SR15TB
EGW20SA	MSB20TE		HER20SA	TRS20FS		SR20SB
EGW20CA	MSB20E		HER20A	TRS20FN	S20CF	SR20TB
EGW25SA	MSB25TE		HER25SA			SR25SB
EGW25CA	MSB25E		HER25A	TRS25FN	S25CF	SR25TB
EGW30SA	MSB30TE		HER30SA			SR30SB
EGW30CA	MSB30E		HER30A			SR30TB

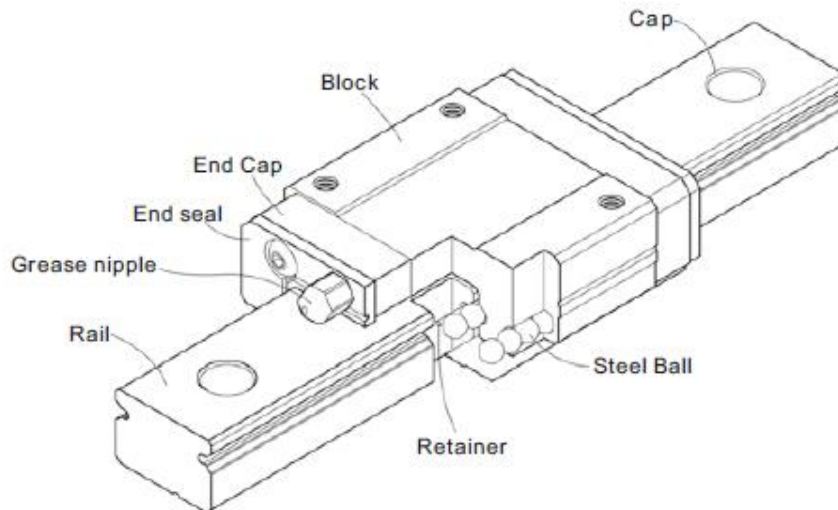
HVN Series Miniature Type

HVN Series Features

Compact and Lightweight

1. Compact and Lightweight: Designed for miniature equipment, offering a small footprint and low weight.
2. Gothic Arch Contact Design: Capable of supporting loads from all directions, providing high rigidity and accuracy.
3. Ball Retainers: Prevent balls from falling out when blocks are removed from the rails.
4. Interchangeable Types: Available in specific sizes and precision grades for flexibility in maintenance and replacement.

Structure



Rolling circulation system:

Block, rail, ball, end cap and retainer

Lubrication system:

Grease nipple is available for HVN15, lubricated by grease gun. 3,5,7,9,12 are lubricated by the hole at the side of the end cap.

Dust protection system:

End seal, cap(size 12, 15)

Application

The HVN Series is suitable for a wide range of applications, including semiconductor equipment, PCB/IC machinery, medical devices, robotics, measurement equipment, automation systems, and other miniature sliding machinery.

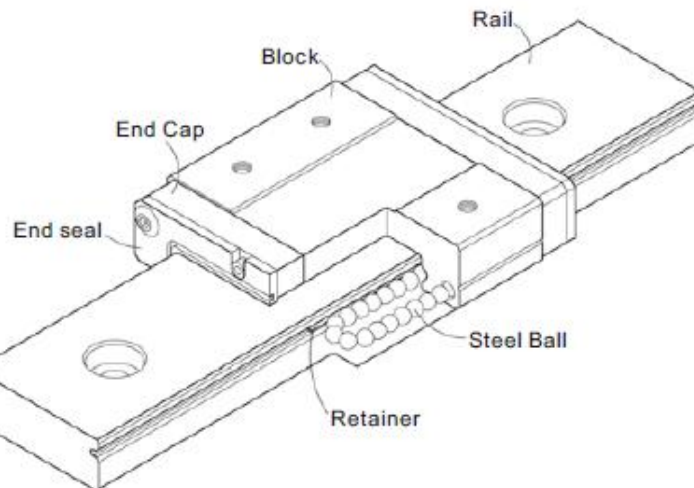
HVW Series Four-Row Wide Rail LM Guide

HVW Series Features

Significantly increase the track width

- 1.Enhanced Moment Loading Capacity: The increased width design improves the guide's ability to handle moment loads.
- 2.Gothic Arch Contact Design: Provides high rigidity in all directions.
- 3.Minature Retainer: Holds steel balls in place, preventing them from falling out even when blocks are removed from the rail.
- 4.Corrosion Resistance: Both the block and all metal components are made of stainless steel

Structure



Rolling circulation system:

Block, rail, ball, end cap and retainer

Lubrication system:

Grease nipple is available for HVW15, lubricated by grease gun. 3,5,7,9,12 are lubricated by the hole at the side of the end cap.

Dust protection system:

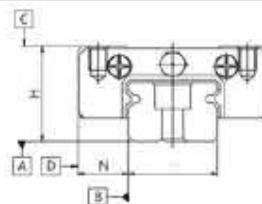
End seal, cap(size12, 15)

Description

The HVW Series LM Guide is available in both non-interchangeable and interchangeable types, with identical sizes for both. The primary difference is that the interchangeable type allows for the free exchange of blocks and rails while maintaining P-class accuracy. Due to precise dimensional control, the interchangeable type is ideal when rail matching is not required for an axis. The model number of the HVW Series specifies the size, type, accuracy class, preload class, and other details.

Accuracy Grade

Three classes: normal (C), high (H), precision (P).



► Non-interchangeable Type accuracy

Combination precision H is measured from the center of the upper reference surface on the slider, while combination width N is measured from the center of the side reference surface on the slider.

Accuracy table

Table 1

Model	Normal(N)	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
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 3		
Running parallelism of block surface D to surface B	See Table 3		

► Interchangeable type accuracy

The paired height and width accuracy of interchangeable linear guides is the same as non-interchangeable guides when assembled on a single rail. However, on different rails, the height and width accuracy is slightly lower due to rail height variations, while the running parallelism accuracy remains consistent with interchangeable guides.

Interchangeable type accuracy

Table 2

Model	Normal(N)	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
单支成对 Variation of height H	0.03	0.015	0.007
Variation of width N	0.03	0.02	0.01
複数支成对高度H的相互误差	0.07	0.04	0.02
Running parallelism of block surface C to surface A	See Table 3		
Running parallelism of block surface D to surface B	See Table 3		

► Travel Parallelism Accuracy

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

Travel Parallelism Accuracy

Table 3

Rail Length (mm)	Accuracy Grades (μm)			Rail Length (mm)	Accuracy Grades (μm)		
	(N)	(H)	(P)		(N)	(H)	(P)
50以下	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				

Preload

Three classes of standard preload for various applications and conditions.

Class

Table 4

Class	Code	Condition	适用精度
閑隙 preload	FZ	精密面数 4~10μm	N
Light Preload	FC	0	N~P
Medium Preload	FD	0.02C	N~P

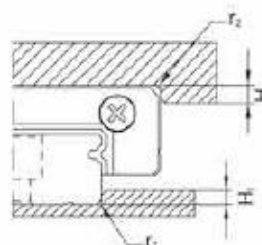
Installation considerations

► Shoulder heights and fillets

Shoulder heights and fillets

Table 5

Model	Max. radius Size of fillets		Shoulder height beside rail	Shoulder height beside the block
	r_1 (mm)	r_2 (mm)	H_1 (mm)	H_2 (mm)
HVN3	0.15	0.1	0.8	1.5
HVN5	0.2	0.2	0.8	2
HVN7	0.2	0.2	1.2	3
HVN9	0.2	0.3	1.7	3
HVN12	0.3	0.4	1.7	4
HVN15	0.5	0.5	2.5	5
HVW7	0.2	0.2	1.7	3
HVW9	0.3	0.3	2.5	3
HVW12	0.4	0.4	3	4
HVW15	0.4	0.6	3	5



► Tightening torque of bolts for installation

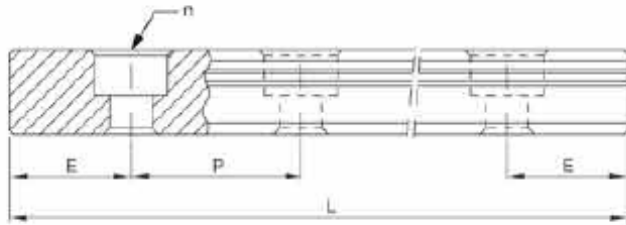
Improper tightening of rail mounting bolts will seriously affect the accuracy of the LM guide. The following table lists the recommended tightening torque for the specific bolt sizes.

Table 6

Model	Bolt	扭力值(kgf-cm)
HVN3	M1.6	1.5
HVN5	M2	5.9
HVN7	M2	5.9
HVN9	M3	19
HVN12	M3	19
HVN15	M3	19
HVW7	M3	19
HVW9	M3	19
HVW12	M4	40
HVW15	M4	40

Standard and Maximum Lengths of Rail

Haozhi offers standard lengths of rail for fast shipping. For non-standard rail lengths, it's recommended that the E value is no greater than 1/2 of the pitch (P) to prevent instability at the end of the rail, and the E value should be no less than E-min to avoid a broken mounting hole.



$$L = (n-1) \times P + 2 \times E$$

L: Total length of rail (mm)

n: Number of mounting holes

P: Distance between any two holes (mm)

E: Distance from the center of the last hole to the edge (mm)

Rail Length

Table 7

Model	Pitch (P)	Distance to End (E)	Standard Length (Max. Length) (L)
HVN	3	10	5
	5	15	7.5
	7	15	5
	9	20	7.5
	12	25	10
	15	40	15
HVW	7	30	10
	9	30	10
	12	40	15
	15	40	15

注: 若客户需要不同E值, 请咨询我司。

Product Description

All-steel Small-sized

► Non-Interchangeable type

	HV□	12	C	2	FC	R1600	-5.5/7.5	P	M	II
	Series	Model	Block	Block Qty	Preload Level	Rail Length	Distance	Accuracy Grade	Material	Block Qty
H: Haozhi V: Miniature Type										
□ N: Standard Type										
W: Wide Type										
Type: 7, 9, 12, 15										
Type C: Standard, H: Extended										
Block Qty. per rail										
FZ: very low preload FC: low preload										
F0: Medium preload										
R: Mounting from top, length:1600										
distance from the start / end to the center of the first fixed hole										
N: Normal H: High P: Precision										
M: stainless steel, None: alloy										
The number of rails used on the same plane										
* None:1pc, II: 2pcs, III:3pcs										

► Interchangeable Block

	HV□	12	C	FZ	P	M
	Series	Model	Block	Preload Level	Accuracy Grade	Material
H: Haozhi V: Miniature Type						
□ N: Standard Type W: Wide Type						
Type: 7, 9, 12, 15						
Type C: Standard, H: Extended						
FZ: very low preload FC: low preload						
F0: Medium preload						
N: Normal H: High P: Precision						
M: stainless steel, None: alloy						

► Interchangeable Rail

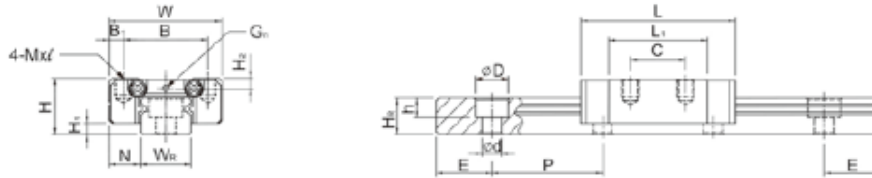
	HV□	12	R1200-5.5/7.5	N	M
	Series	Block	Distance	Accuracy Grade	Material
H: Haozhi V: Miniature Type					
□ N: Standard Type W: Wide Type					
Type: 7, 9, 12, 15					
R: Locking type, with the slider rail length being 1200mm from the starting end to the center of the first fixing hole / from the end to the center of the last fixing hole					
N: Normal H: High P: Precision					
M: stainless steel, None: alloy					

HVN Series Miniature Type

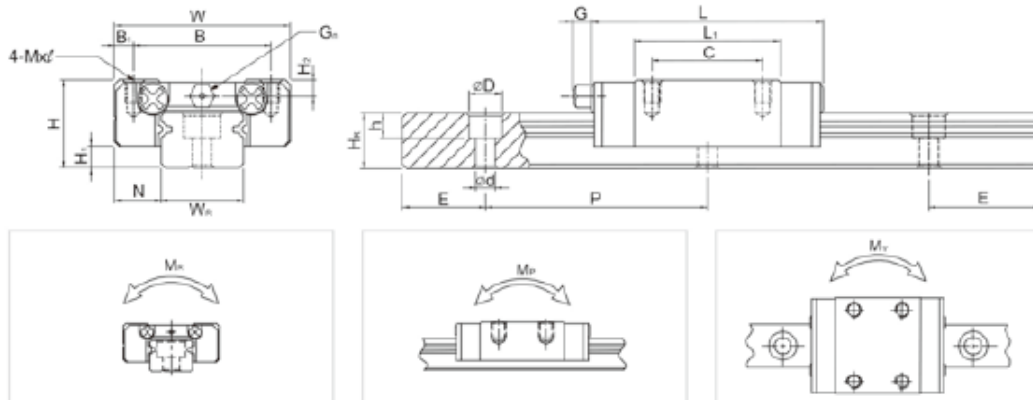
Dimensions of HVN Series

HVN-C / HVN-H 型

▶ HVN 3, HVN 5, HVN 7, HVN 9, HVN 12



▶ HVN 15



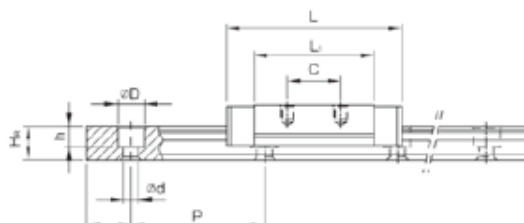
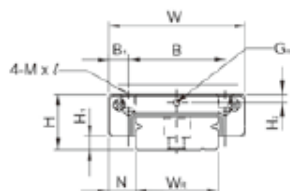
Model	Assembly Dimension (mm)		Block Dimension (mm)										Rail Dimension (mm)										Mounting Bolt for Rail	Basic Dynamic Load Rating	Basic Static Load Rating	Static Rated Moment					Weight	
																															Rail	Block
	H	H1	N	W	B	B1	C	L1	L	G	G1	MxL	H1	W1	H1	D	h	d	P	E	(mm)	C (kN)				C1 (kN)	Mx	My	Mz	kg	kg/m	
HVN 3C	4	1	25	8	-	4	3.5	6.7	11.5	-	-	M1.6	-	3	2.6	M1.5			10	5	M1.6x4	0.25	0.36	0.65	0.49	0.49	0.0010	-	-	-	0.053	
HVN 3H							M2.0																									
HVN 5C	6	1	35	12	6	4	-	9.6	15.8	-	Ø1	M2x1.5	1.15	5	3.7	3.6	0.6	2.4	15	5	M2x6	0.56	0.84	2.20	1.20	1.20	0.0034	-	-	-	0.12	
HVN 5H							M2x1.5																									
HVN 7C	8	1.5	5	17	12	2.5	-	9.6	18.6	-	Ø1.2	M2x1.5	1.5	7	4.8	4.2	2.3	2.4	15	5	M2x6	0.70	0.78	2.69	1.68	1.68	0.0057	-	-	-	0.22	
HVN 7H							M2x1.5																									
HVN 9C	10	2	55	20	15	2.5	-	11.9	21.5	-	Ø1.4	M3x3	1.8	9	6.5	6	3.5	3.5	20	7.5	M3x8	1.36	1.62	7.05	2.90	2.90	0.011	-	-	-	0.38	
HVN 9H							M3x3																									
HVN 12C	13	3	75	27	20	3.5	-	13.0	26.0	-	Ø2	M3x3.5	2.5	12	8	6	4.5	3.5	25	10	M3x8	2.55	4.02	19.60	18.62	18.62	0.026	-	-	-	0.65	
HVN 12H							M3x3.5																									
HVN 15C	16	4	85	32	25	3.5	-	20	26.7	42.1	4.5	M3	M3x4	3	15	10	6	4.5	3.5	40	15	M3x10	2.84	3.92	25.48	13.72	13.72	0.034	-	-	-	1.06
HVN 15H							M3x4																									

HVW Series Four-Row Wide Rail LM Guide

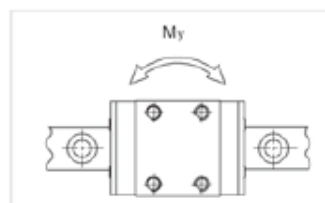
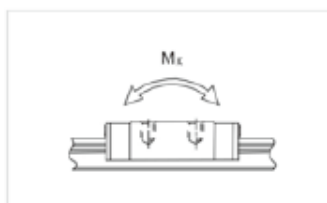
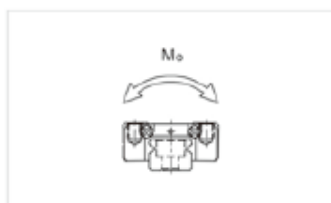
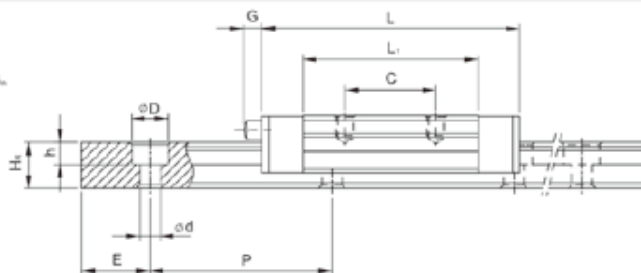
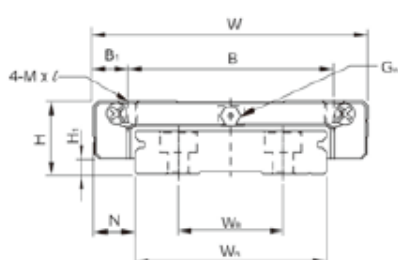
Dimensions of HVW Series

HVW-C / HVW-H 型

► HVW 7, HVW 9, HVW 12



► HVW 15



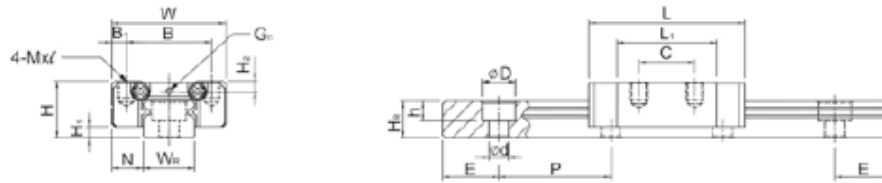
Model	Assembly Dimension (mm)			Block Dimension (mm)										Rail Dimension (mm)										Mounting Bolt for Rail	Basic Dynamic Load Rating	Basic Static Load Rating	Static Rated Moment			Weight	
																											M _x	M _y	M _z	Rail	Block
	H	H ₁	N	W	B	B ₁	C	L ₁	L	G	G ₁	Mx1	H ₁	W ₁	H ₁	D	h	d	P	E	(mm)	C(kN)	C ₀ (kN)				N-m	N-m	N-m	kg	kg/r
HMW 7C	9	19	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	2.66	15.70	7.14	7.14	0.020	0.51		
HMW 7H							19	30.8	41														1.77	3.14	23.45	15.53	15.53	0.029			
HMW 9C	12	29	6	30	23	3.5	24	38.5	50.7	-	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		
HMW 9H							23	35	44														3.43	5.89	54.54	34.00	34.00	0.057			
HMW 9T							21	35	24														38.5	50.7	3.43	5.89	54.54	34.00		34.00	0.057
HMW 12C	14	34	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	76.34	27.80	27.80	0.071	1.49		
HMW 12H							28	45.6	60.4														5.10	8.24	102.70	57.37	57.37	0.103			
HMW 15C							20	38	54.8														6.77	9.22	199.34	56.66	56.66	0.143			
HMW 15H	16	34	9	60	45	7.5	35	57	73.8	5.2	M3	M4x1.2	3.2	42	23	9.5	8	4.5	4.5	40	15	M4x10	8.93	13.38	299.01	122.60	122.60	0.215	2.86		

HVN Series Miniature Type

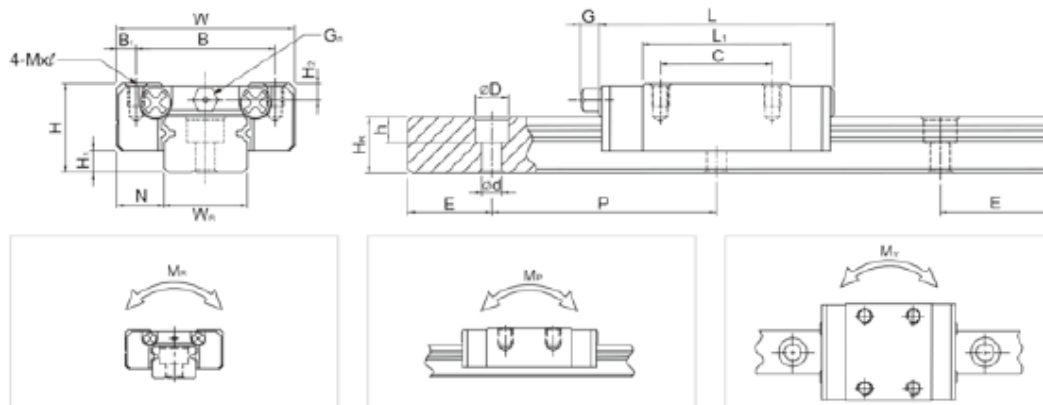
Dimensions of HVN Series

HVN-C / HVN-H 型

▶ HVN 3, HVN 5, HVN 7, HVN 9, HVN 12



▶ HVN 15



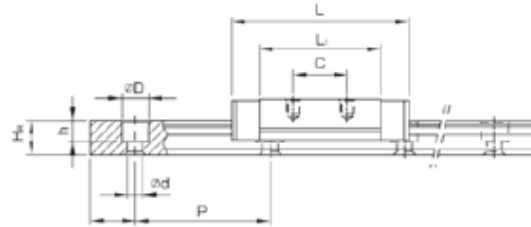
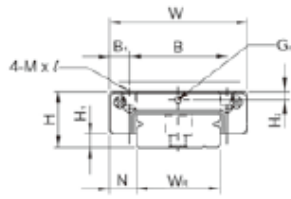
Model	Assembly Dimension (mm)		Block Dimension (mm)										Rail Dimension (mm)										Mounting Bolt for Rail	Basic Dynamic Load Rating	Basic Static Load Rating	Static Rated Moment					Weight	
			H	H1	N	W	B	B1	C	L1	L	G	G1	MxL	H1	W1	H1	D	h	d	P	E				(mm)	C (kN)	Cr (kN)	Mx	My	My	Rail
	N-m	N-m	N-m	kg	kg/m																											
HVN 3C	4	1	25	8	-	4	3.5	6.7	11.5	-	-	M1.6	-	3	2.6	M1.5				10	5	M1.5x4	0.25	0.36	0.65	0.49	0.49	0.0010	0.053			
HVN 3H							M2.0	M2.5	1.00			1.10											1.10	0.0010								
HVN 5C	6	1	35	12	8	4	-	9.6	15.8	-	Ø1	M2x1.5	1.15	5	3.7	0.6	0.6	2.4	15	5	M2x5	0.56	0.84	2.20	1.20	1.20	0.0034	0.12				
HVN 5H							M2x1.5	M2.5	2.90			1.90										1.90	0.0043									
HVN 75	8	1.5	5	17	12	2.5	-	9.6	18.6	-	Ø1.2	M2x2.5	1.5	7	4.8	4.2	2.3	2.4	15	5	M2x5	0.70	0.78	2.69	1.68	1.68	0.0067	0.22				
HVN 7C							8	13.5	22.5													4.70	2.84	2.84	0.010							
HVN 7H							13	21.8	30.8													7.64	4.80	4.80	0.015							
HVN 95							-	11.9	21.5													1.36	1.62	7.05	2.90	2.90	0.011					
HVN 9C	10	2	55	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				
HVN 9H							16	29.9	39.9													2.55	4.62	19.60	18.62	18.62	0.026					
HVN 125	13	3	75	27	20	3.5	-	13.0	26.0	-	Ø2	M3x3.5	2.5	12	8	6	4.5	3.5	25	10	M3x8	2.17	2.61	16.99	5.19	5.19	0.022	0.65				
HVN 12C							15	21.7	34.7													2.84	3.92	25.48	13.72	13.72	0.034					
HVN 12H							20	32.4	45.4													3.72	5.88	38.22	36.26	36.26	0.054					
HVN 15C	16	4	85	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				
HVN 15H							25	43.4	56.8													6.37	9.11	73.50	57.82	57.82	0.092					

HVW Series Four-Row Wide Rail LM Guide

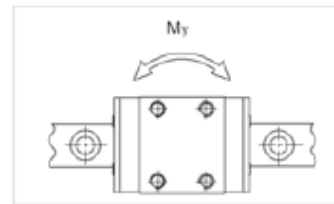
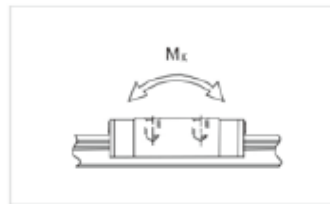
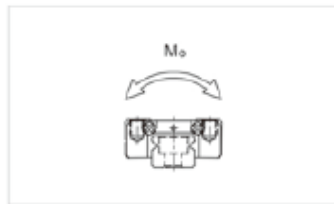
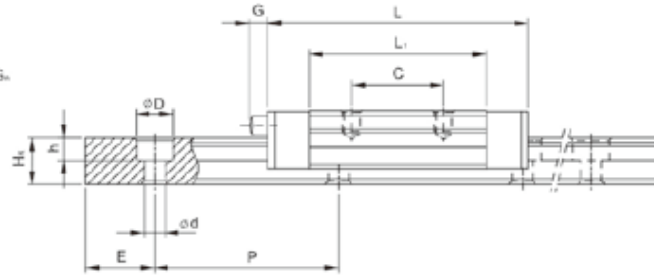
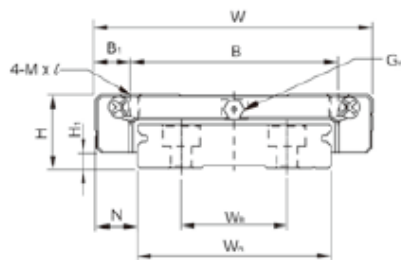
Dimensions of HVW Series

HVW-C / HVW-H 型

► HVW 7, HVW 9, HVW 12



► HVW 15



Model	Assembly Dimension (mm)			Block Dimension (mm)										Rail Dimension (mm)										Mounting Bolt for Rail	Basic Dynamic Load Rating	Basic Static Load Rating	Static Rated Moment					Weight	
	H	H1	N	W	B	B1	C	L1	L	G	G1	Mx1	H1	VH	WH	H1	D	h	d	P	E	(mm)	C (kN)				C0 (kN)	Mx	My	Nx	Ny	Rail	Block
HVW 7C	9	19	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	2.66	15.70	7.14	7.14	0.020	0.51				
HVW 7H							19	30.8	41														1.77	3.14	23.45	15.53	15.53	0.029					
HVW 9C							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		
HVW 9H	12	29	6	30	23	3.5	24	38.5	50.7	-	Ø1.2	M3x3	2.4	18	-	7	6	4.5	3.5	30	10		3.43		5.89	54.54	34.00	34.00	0.057				
HVW 9I							21	3.5	24	38.5	50.7													3.43	5.89	54.54	34.00	34.00	0.057				
HVW 12C							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	76.34	27.80	27.80	0.071	1.49		
HVW 12H	14	34	8	40	28	6	28	45.6	60.4	-	Ø1.2	M3x3.6	2.8	24	-	8.5	8	4.5	4.5	40	15		5.10		8.24	102.70	57.37	57.37	0.103				
HVW 15C							20	38	54.0				M3	M4x2	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		
HVW 15H	16	34	9	60	45	7.5	35	57	73.8	5.2	M3	M4x2	3.2	42	23	9.5	8	4.5	4.5	40	15		8.93		13.38	299.01	122.60	122.60	0.215				

Ball Screw Specification

HU R 025 05 T4 D G C5 -600 -P1 -B2 + N3N3

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬

①	②	⑤	⑦	⑩
Nominal Model	Thread Direction	Number of turns	Process	Preload level
H: S: single nut	R: right	Turns: T: 1	G: ground ball screw	P0,P1,P2,P3,P4
HD: double nut	L: left	A: 1.5(or 1.7/1.8)	F: turned ball screw	⑪
HS: integrated flange nut		B: 2.5/2.8		Nut
C: without flange and nut	③	C: 3.5	⑧	Number of nut: None: 1 pcs, 2: 2 pcs
	Screw Shaft Diameter	D: 4.8	lead accuracy grade	⑫ ⑬
I: I- Nut Type	Unit: mm	E: 5.8	C0, C1, C2, C3, C5, C7, C10	Nut surface treatment
U: U- Nut Type				S: Standard
H: H- Nut Type				B1: Black Oxide
A: A- Nut Type	④	⑥	⑨	N1: Chrome Plating
Y: Y- Nut Type	Lead	Flange Type	screw shaft length	P: Phosphate Coating
V: V- Nut Type	Unit: mm	N: full-face flange	Unit: mm	N3 Electro Nickel Plating
U: U- Nut Type		S: single-edged flange		N4: Cold Electroplating
K: K- Nut Type		D: double-edged flange		N5: Black Chrome Plating

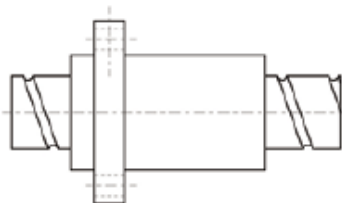
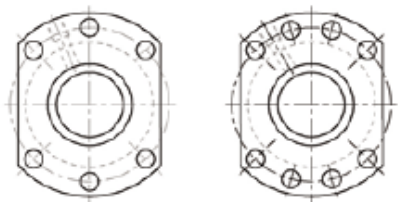
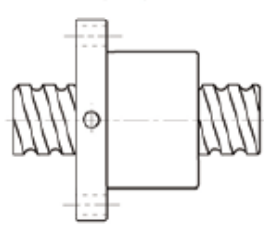
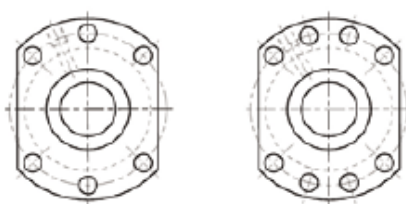
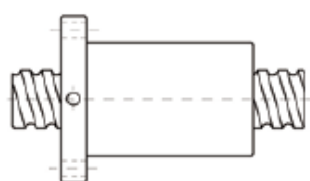
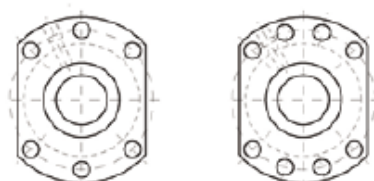
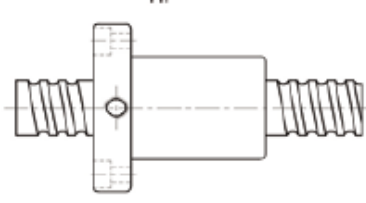
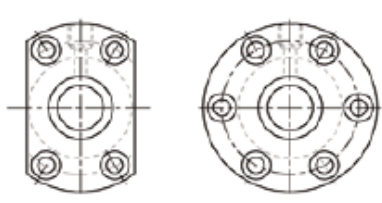
※ 當螺帽、螺桿均無表面處理時，則省略標示。
 ※ 研製級C5以上螺桿，HAOZ-K出貨檢附導引表。

Accuracy

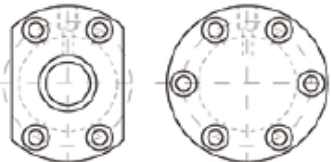
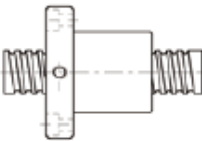
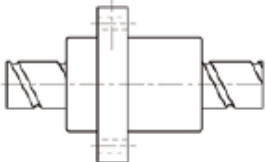
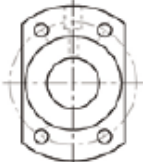
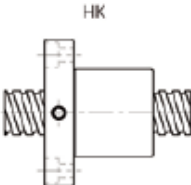
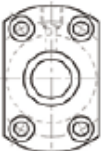
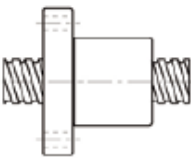
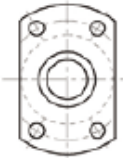
Cumulative Tolerance of Lead Screw Error ($\pm E$) and Variation (e) According to JIS B 1192Unit: μm

Model	C0	C1	C2	C3	C5	C7	C10
以上 以下	$\pm E$ e	$\pm E$ e	$\pm E$ e	$\pm E$ e	$\pm E$ e	e	e
100 200	3 3	3.5 5	5 7	8 8	18 18		
200 315	4 3.5	6 5	8 7	12 8	23 18		
315 400	5 3.5	7 5	9 7	13 10	25 20		
400 500	6 4	8 5	10 7	15 10	27 20		
500 630	6 4	9 6	11 8	16 12	30 23		
630 800	7 5	10 7	13 9	18 13	35 25		
800 1000	8 6	11 8	15 10	21 15	40 27		
1000 1250	9 6	13 9	18 11	24 16	46 30		
1250 1600	11 7	15 10	21 13	29 18	54 35	$\pm 50/300mm$	$\pm 210/300mm$
1600 2000		18 11	25 15	35 21	65 40		
2000 2500		22 13	30 18	41 24	77 46		
2500 3150		26 15	36 21	50 29	93 54		
3150 4000		30 18	44 25	60 35	115 65		
4000 5000			52 30	72 41	140 77		
5000 6300			65 36	90 50	170 93		
6300 8000				110 60	210 115		
8000 10000					260 140		
10000 12500					320 170		

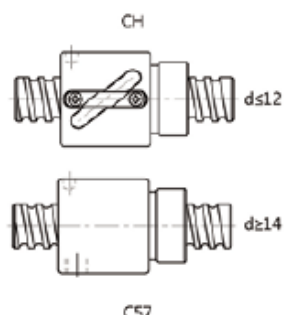
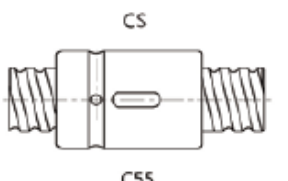
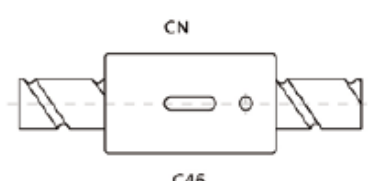
Precision Ground Ballscrews

	Nut Type	Flange Type
HH/HA (For Slide Tables/High Speed/Reinforced Dust-Proof)	HH/HA (DIN)  C44, 45	 $d \leq 32$ $d \geq 40$
HU (For Reinforced Dust-Proof)	HU (DIN)  C47	 $d \leq 32$ $d \geq 40$
HSU (Lightweight Integrated Double Nut)	HSU/HDU (DIN)  C48	
HI (For Reinforced Dust-Proof)	HI  C49	

Precision Ground Ballscrews

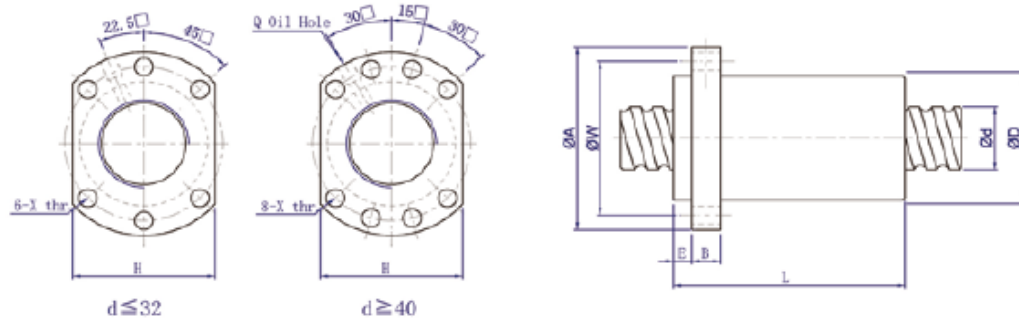
	Nut Type	Flange Type
HSI (Return tube design with high load)	HSI/GDI  C50	
HV (Return tube design with high load)	HV  C51	None
HV (High Drive-N)	HY  C53	
HK (Miniature)	HK  C56	 (GK 01004) (GK 02002) (GK 02502)
	HK  C56	

Precision Ground Ballscrews

	Nut Type	Flange Type
CH	 CH C57	None
(Standard) CS	 CS C55	None
(Dedicated for Slide Table) CN	 CN C46	None

※ The above are the standard specifications, please contact Haozhi for other requirements.

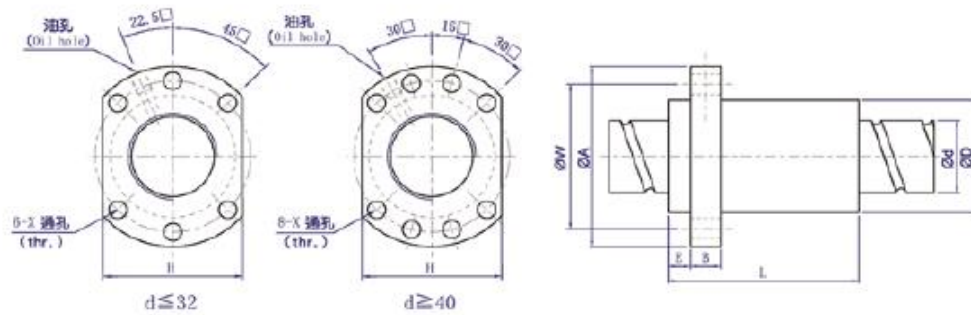
HA Precision grinding-grade series specification



Unit: mm

Model	Screw dial diameter d	Lead l	Ball diameter Da	Nut dimensions										Basic load rating		Stiffness kgf/ µm
				D	A	E	B	L	W	H	X	Q	n	Ca (kgf)	Coa(kgf)	
HA1205-2.8 *	12	5	2.5	24	40	5	10	30	32	30	4.5	-	2.8□1	661	1316	19
HA1210-2.8 *		10	2.5	24	40	5	10	42	32	30	4.5	-	2.8□1	642	1287	19
HA1605-3.8 *	15	5	2.778	28	48	5	10	31	38	40	5.5	M6	3.8□1	1112	2507	30
HA1610-2.8 *		10	2.778	28	48	5	10	42	38	40	5.5	M6	2.8□1	839	1821	23
HA1616-1.8 *		16	2.778	28	48	5	10	43	38	40	5.5	M6	1.8□1	552	1137	14
HA1616-2.8 *		16	2.778	28	48	5	10	59	38	40	5.5	M6	2.8□1	808	1769	22
HA1620-1.8 *		20	2.778	28	48	5	10	50	38	40	5.5	M6	1.8□1	554	1170	14
HA1630-1.8 *		30	2.778	28	48	7	10	70	38	40	5.5	M6	1.8□1	534	1195	14
HA2005-3.8 *	20	5	3.175	36	58	7	10	33	47	44	6.6	M6	3.8□1	1484	3681	37
HA2010-3.8 *		10	3.175	36	58	7	10	52	47	44	6.6	M6	3.8□1	1516	3833	40
HA2020-1.8 *		20	3.175	36	58	7	10	52	47	44	6.6	M6	1.8□1	764	1758	19
HA2020-2.8 *		20	3.175	36	58	7	10	72	47	44	6.6	M6	2.8□1	1118	2734	29
HA2505-3.8 *	25	5	3.175	40	62	7	10	33	51	48	6.6	M6	3.8□1	1650	4658	43
HA2510-3.8 *		10	3.175	40	62	7	12	52	51	48	6.6	M6	3.8□1	1638	4633	45
HA2525-1.8 *		25	3.175	40	62	7	12	60	51	48	6.6	M6	1.8□1	843	2199	22
HA2525-2.8 *		25	3.175	40	62	7	12	85	51	48	6.6	M6	2.8□1	1232	3421	34
HA3205-3.8	32	5	3.175	50	80	9	12	35	65	62	9	M6	3.8□1	1839	6026	51
HA3210-3.8		10	3.969	50	80	9	12	53	65	62	9	M6	3.8□1	2460	7255	55
HA3220-2.8		20	3.969	50	80	9	12	72	65	62	9	M6	2.8□1	1907	5482	43
HA3232-1.8		32	3.969	50	80	9	12	78	65	62	9	M6	1.8□1	1257	3426	27
HA3232-2.8	38	32	3.969	50	80	9	12	110	65	62	9	M6	2.8□1	1838	5329	42
HA4005-3.8		5	3.175	63	93	9	14	39	78	70	9	M8	3.8□1	2018	7589	60
HA4010-3.8		10	6.35	63	93	9	14	57	78	70	9	M8	3.8□1	5035	13943	67
HA4020-2.8		20	6.35	63	93	9	14	78	78	70	9	M8	2.8□1	3959	10715	54
HA4040-1.8	48	40	6.35	63	93	9	14	96	78	70	9	M8	1.8□1	2585	6648	34
HA4040-2.8		40	6.35	63	93	9	14	136	78	70	9	M8	2.8□1	3780	10341	52
HA5005-3.8	50	5	3.175	75	110	10.5	15	42	93	85	11	M8	3.8□1	2207	9542	68
HA5010-3.8		10	6.35	75	110	10.5	18	57	93	85	11	M8	3.8□1	5638	17852	79
HA5020-3.8		20	6.35	75	110	10.5	18	98	93	85	11	M8	3.8□1	5749	18485	87
HA5050-1.8		50	6.35	75	110	10.5	18	117	93	85	11	M8	1.8□1	2946	8749	42
HA5050-2.8	50	50	6.35	75	110	10.5	18	167	93	85	11	M8	2.8□1	4308	13610	65

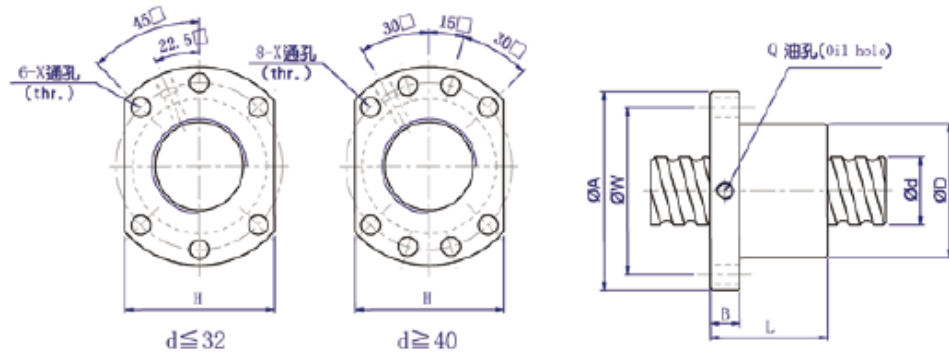
※ Labeled items ★ Specifications for manufacturing HH slidetables

HH (DIN 69051 FORM B) Precision grinding-grade series specification


Unit: mm

Model	Screw dia d	Lead l	Ball dia Da	Nut dimensions										Basic load rating		Stiffness kgf/ μ m
				D	A	E	B	L	W	H	X	Q	n	Ca (kgf)	Coa (kgf)	
HH01205-2.8*	12	5	2.5	24	40	5	10	30	32	30	4.5	-	2.8×1	661	1316	19
HH01210-2.8*		10	2.5	24	40	5	10	45	32	30	4.5	-	2.8×1	642	1287	19
HH01605-3.8*	15	5	2.778	28	48	5	10	37	38	40	5.5	M6	3.8×1	1112	2507	30
HH01610-2.8*		10	2.778	28	48	5	10	45	38	40	5.5	M6	2.8×1	839	1821	23
HH01616-1.8*	15	16	2.778	28	48	5	10	45	38	40	5.5	M6	1.8×1	552	1137	14
HH01616-2.8*		16	2.778	28	48	5	10	61	38	40	5.5	M6	2.8×1	808	1769	22
HH01620-1.8*	20	20	2.778	28	48	7	10	58	38	40	5.5	M6	1.8×1	554	1170	14
HH02005-3.8*		5	3.175	36	58	7	10	37	47	44	6.6	M6	3.8×1	1484	3681	37
HH02010-3.8*	20	10	3.175	36	58	7	10	55	47	44	6.6	M6	3.8×1	1516	3833	40
HH02020-1.8*		20	3.175	36	58	7	10	54	47	44	6.6	M6	1.8×1	764	1758	19
HH02020-2.8*	20	20	3.175	36	58	7	10	74	47	44	6.6	M6	2.8×1	1118	2734	29
HH02505-3.8*		5	3.175	40	62	7	10	37	51	48	6.6	M6	3.8×1	1650	4658	43
HH02510-3.8*	25	10	3.175	40	62	7	12	55	51	48	6.6	M6	3.8×1	1638	4633	45
HH02525-1.8*		25	3.175	40	62	7	12	64	51	48	6.6	M6	1.8×1	843	2199	22
HH02525-2.8*	25	25	3.175	40	62	7	12	89	51	48	6.6	M6	2.8×1	1232	3421	34
HH03205-3.8		5	3.175	50	80	9	12	37	65	62	9	M6	3.8×1	1839	6026	51
HH03210-3.8	31	10	3.969	50	80	9	12	57	65	62	9	M6	3.8×1	2460	7255	55
HH03220-2.8		20	3.969	50	80	9	12	76	65	62	9	M6	2.8×1	1907	5482	43
HH03232-1.8	32	32	3.969	50	80	9	12	80	65	62	9	M6	1.8×1	1257	3426	27
HH03232-2.8		32	3.969	50	80	9	12	112	65	62	9	M6	2.8×1	1838	5329	42
HH04005-3.8	40	5	3.175	63	93	9	15	42	78	70	9	M8	3.8×1	2018	7589	60
HH04010-3.8		10	6.35	63	93	9	14	60	78	70	9	M8	3.8×1	5035	13943	67
HH04020-2.8	38	20	6.35	63	93	9	14	80	78	70	9	M8	2.8×1	3959	10715	54
HH04040-1.8		40	6.35	63	93	9	14	98	78	70	9	M8	1.8×1	2585	6648	34
HH04040-2.8	40	40	6.35	63	93	9	14	138	78	70	9	M8	2.8×1	3780	10341	52
HH05005-3.8		5	3.175	75	110	10.5	15	42	93	85	11	M8	3.8×1	2207	9542	68
HH05010-3.8	48	10	6.35	75	110	10.5	18	60	93	85	11	M8	3.8×1	5638	17852	79
HH05020-3.8		20	6.35	75	110	10.5	18	100	93	85	11	M8	3.8×1	5749	18485	87
HH05050-1.8	50	50	6.35	75	110	10.5	18	120	93	85	11	M8	1.8×1	2946	8749	42
HH05050-2.8		50	6.35	75	110	10.5	18	170	93	85	11	M8	2.8×1	4308	13610	65

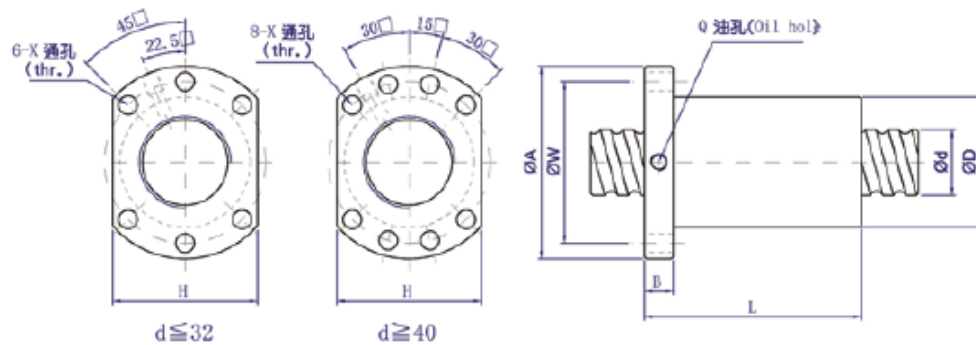
* labeled items★ Specifications for manufacturing HH slide tables

HU (DIN 69051 FORM B) Precision grinding-grade series specification


Unit: mm

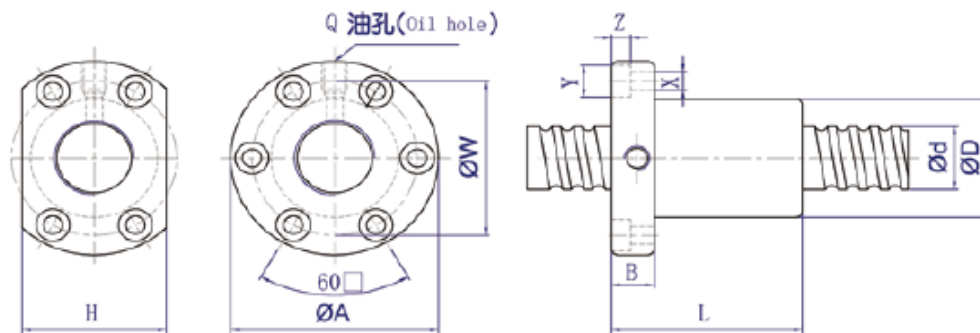
Model	Screw shaft diameter d	Lead l	Ball diameter Da	Nut dimensions									Dynamic rating Ca(kgf)	Static rating Coa(kgf)	Stiffness kgf/ µm
				D	A	B	L	W	H	X	Q	n			
HU01605-4 [☆]	16	5	3.175	28	48	10	45	38	40	5.5	M6	1x4	1380	3052	32
HU01610-3 [☆]		10	3.175	28	48	10	57	38	40	5.5	M6	1x3	1103	2401	26
HU02005-4 [☆]	20	5	3.175	36	58	10	51	47	44	6.6	M6	1x4	1551	3875	39
HU02505-4 [☆]		5	3.175	40	62	10	51	51	48	6.6	M6	1x4	1724	4904	45
HU02510-4 [☆]	25	10	4.762	40	62	12	80	51	48	6.6	M6	1x4	2954	7295	50
HU03205-4 [☆]		5	3.175	50	80	12	52	65	62	9	M6	1x4	1922	6343	54
HU03210-4 [☆]	32	10	6.35	50	80	12	85	65	62	9	M6	1x4	4805	12208	61
HU04005-4 [☆]		5	3.175	63	93	14	55	78	70	9	M8	1x4	2110	7988	63
HU04010-4 [☆]	40	10	6.35	63	93	14	88	78	70	9	M8	1x4	5399	15500	73
HU05010-4 [☆]		10	6.35	75	110	16	88	93	85	11	M8	1x4	6004	19614	85
HU06310-4	63	10	6.35	90	125	18	93	108	95	11	M8	1x4	6719	25358	99
HU08010-4	80	10	6.35	105	145	20	93	125	110	13.5	M8	1x4	7346	31953	109
HU01204-4	12	4	2.5	24	40	10	40	32	30	4.5	-	1x4	902	1884	26
HU01604-4	16	4	2.381	28	48	10	40	38	40	5.5	M6	1x4	973	2406	32
HU02004-4	20	4	2.381	36	58	10	42	47	44	6.6	M6	1x4	1066	2987	38
HU02504-4	25	4	2.381	40	62	10	42	51	48	6.6	M6	1x4	1180	3795	43
HU02506-4		6	3.969	40	62	10	54	51	48	6.6	M6	1x4	2318	6057	47
HU02508-4		8	4.762	40	62	10	63	51	48	6.6	M6	1x4	2963	7313	49
HU03204-4		4	2.381	50	80	12	44	65	62	9	M6	1x4	1296	4838	51
HU03206-4	32	6	3.969	50	80	12	57	65	62	9	M6	1x4	2632	7979	57
HU03208-4		8	4.762	50	80	12	65	65	62	9	M6	1x4	3387	9622	60
HU04006-4		6	3.969	63	93	14	60	78	70	9	M6	1x4	2873	9913	66
HU04008-4	40	8	4.762	63	93	14	67	78	70	9	M6	1x4	3712	11947	70
HU05020-4		20	7.144	75	110	16	138	93	85	11	M8	1x4	7142	22588	94
HU06320-4	63	20	9.525	95	135	20	149	115	100	13.5	M8	1x4	11444	36653	112
HU08020-4	80	20	9.525	125	165	25	154	145	130	13.5	M8	1x4	12911	47747	138
HU10020-4	100	20	9.525	150	202	30	180	170	155	17.5	M8	1x4	14303	60698	162

※ labeled items (HU01204-4: The standard nut does not come with a scraper.) ☆Capable of producing left-handed threads

HSU/HDU (DIN 69051 FORM B) Precision grinding-grade series specification


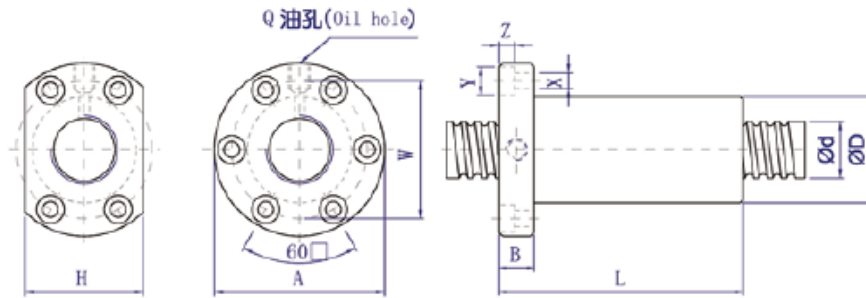
Unit: mm

Model	Screw shaft diameter d	Lead l	Ball diameter Da	Nut dimensions									Dynamic rating Ca(kgf)	Static rating Coa(kgf)	Stiffness kgf/ µm
				D	A	B	L	W	H	X	Q	n			
HSU01605-4	16	5	3.175	28	48	10	75	38	40	5.5	M6	1x4	1380	3052	44
HSU02005-4	20	5	3.175	36	58	10	85	47	44	6.6	M6	1x4	1551	3875	53
HSU02505-4	25	5	3.175	40	62	10	86	51	48	6.6	M6	1x4	1724	4904	62
HSU02510-4		10	4.762	40	62	12	130	51	48	6.6	M6	1x4	2954	7295	67
HSU03205-4	32	5	3.175	50	80	12	87	65	62	9	M6	1x4	1922	6343	74
HSU03210-4		10	6.35	50	80	12	145	65	62	9	M6	1x4	4805	12208	82
HSU04005-4	40	5	3.175	63	93	14	90	78	70	9	M8	1x4	2110	7988	87
HSU04010-4		10	6.35	63	93	14	148	78	70	9	M8	1x4	5399	15500	99
HSU05010-4	50	10	6.35	75	110	16	148	93	85	11	M8	1x4	6004	19614	117
HSU06310-4	63	10	6.35	90	125	18	153	108	95	11	M8	1x4	6719	25358	139
HSU08010-4	80	10	6.35	105	145	20	153	125	110	13.5	M8	1x4	7346	31953	156
HDU01604-4	16	4	2.381	28	48	10	80	38	40	5.5	M6	1x4	973	2406	43
HDU02004-4	20	4	2.381	36	58	10	80	47	44	6.6	M6	1x4	1066	2987	51
HDU02504-4	25	4	2.381	40	62	10	80	51	48	6.6	M6	1x4	1180	3795	60
HDU02506-4		6	3.969	40	62	10	105	51	48	6.6	M6	1x4	2318	6057	64
HDU02508-4		8	4.762	40	62	10	120	51	48	6.6	M6	1x4	2963	7313	67
HDU03204-4	32	4	2.381	50	80	12	80	65	62	9	M6	1x4	1296	4838	71
HDU03206-4		6	3.969	50	80	12	105	65	62	9	M6	1x4	2632	7979	78
HDU03208-4		8	4.762	50	80	12	122	65	62	9	M6	1x4	3387	9622	82
HDU04006-4	40	6	3.969	63	93	14	108	78	70	9	M6	1x4	2873	9913	91
HDU04008-4		8	4.762	63	93	14	132	78	70	9	M6	1x4	3712	11947	96
HDU05020-4	50	20	7.144	75	110	16	280	93	85	11	M8	1x4	7142	22588	126
HDU06320-4	63	20	9.525	95	135	20	290	115	100	13.5	M8	1x4	11444	36653	152
HDU08020-4	80	20	9.525	125	165	25	295	145	130	13.5	M8	1x4	12911	47747	187
HDU10020-4	100	20	9.525	150	202	30	340	170	155	17.5	M8	1x4	14303	60698	222

HI Precision grinding-grade series specification


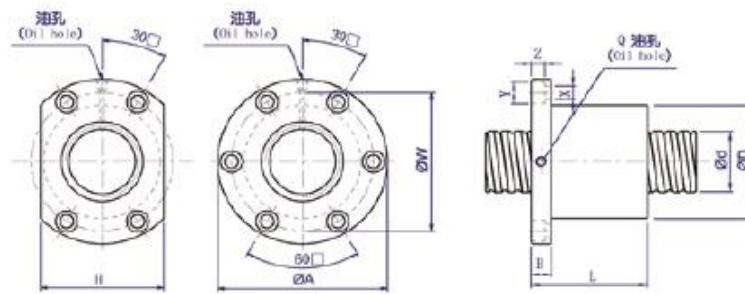
Unit: mm

Model	Screw thread diameter d	Lead l	Ball diameter Da	Nut dimensions											Dynamic rating Ca(kgf)	Static rating Coa(kgf)	Stiffness kgf/μm
				D	A	B	L	W	H	X	Y	Z	Q	n			
HI01605-4 [☆] ☆	16	5	3.175	30	49	10	45	39	34	4.5	8	4.5	M6	1x4	1380	3052	33
HI01610-3 [☆] ☆		10	3.175	34	58	10	57	45	34	5.5	9.5	5.5	M6	1x3	1103	2401	27
HI02005-4 [☆] ☆	20	5	3.175	34	57	11	51	45	40	5.5	9.5	5.5	M6	1x4	1551	3875	39
HI02505-4 [☆] ☆	25	5	3.175	40	63	11	51	51	46	5.5	9.5	5.5	M8	1x4	1724	4904	45
HI02510-4 [☆] ☆		10	4.762	46	72	12	80	58	52	6.5	11	6.5	M6	1x4	2954	7295	51
HI03205-4 [☆] ☆	32	5	3.175	46	72	12	52	58	52	6.5	11	6.5	M8	1x4	1922	6343	52
HI03210-4 [☆] ☆		10	6.35	54	88	15	85	70	62	9	14	8.5	M8	1x4	4805	12208	62
HI04005-4 [☆] ☆	40	5	3.175	56	90	15	55	72	64	9	14	8.5	M8	1x4	2110	7988	59
HI04010-4 [☆] ☆		10	6.35	62	104	18	88	82	70	11	17.5	11	M8	1x4	5399	15500	72
HI05010-4 [☆] ☆	50	10	6.35	72	114	18	88	92	82	11	17.5	11	M8	1x4	6004	19614	83
HI06310-4	63	10	6.35	85	131	22	93	107	95	14	20	13	M8	1x4	6719	25358	95
HI08010-4	80	10	6.35	105	150	22	93	127	115	14	20	13	M8	1x4	7346	31953	109
HI01604-4	16	4	2.381	30	49	10	45	39	34	4.5	8	4.5	M6	1x4	973	2406	32
HI02004-4		4	2.381	34	57	11	46	45	40	5.5	9.5	5.5	M6	1x4	1066	2987	37
HI0205T-4	20	5.08	3.175	34	57	11	51	45	40	5.5	9.5	5.5	M6	1x4	1550	3875	39
HI02504-4 [☆] ☆		4	2.381	40	63	11	46	51	46	5.5	9.5	5.5	M6	1x4	1180	3795	43
HI0255T-4	25	5.08	3.175	40	63	11	51	51	46	5.5	9.5	5.5	M8	1x4	1724	4903	45
HI03204-4		4	2.381	46	72	12	47	58	52	6.5	11	6.5	M6	1x4	1296	4838	49

HSI/HDI Precision grinding-grade series specification


Unit: mm

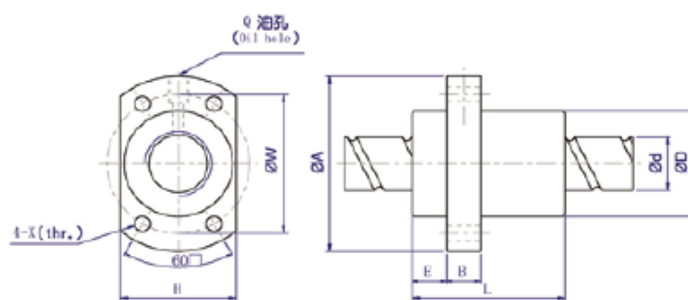
Model	Screw shaft dia meter	Lead	Ball diameter	Nut dimensions										Dynamic rating Ca(kgf)	Static rating Coa(kgf)	Stiffness kgf/ μm	
				D	A	B	L	W	H	X	Y	Z	Q				n
HSI01605-4	16	5	3.175	30	49	10	75	39	34	4.5	8	4.5	M6	1x4	1380	3052	44
HSI02005-4	20	5	3.175	34	57	11	85	45	40	5.5	9.5	5.5	M6	1x4	1551	3875	52
HSI02505-4	25	5	3.175	40	63	11	86	51	46	5.5	9.5	5.5	M8	1x4	1724	4904	62
HSI02510-4		10	4.762	46	72	12	130	58	52	6.5	11	6.5	M6	1x4	2954	7295	68
HSI03205-4	32	5	3.175	46	72	12	87	58	52	6.5	11	6.5	M8	1x4	1922	6343	72
HSI03210-4		10	6.35	54	88	15	145	70	62	9	14	8.5	M8	1x4	4805	12208	83
HSI04005-4	40	5	3.175	56	90	15	90	72	64	9	14	8.5	M8	1x4	2110	7988	84
HSI04010-4		10	6.35	62	104	18	148	82	70	11	17.5	11	M8	1x4	5399	15500	99
HSI05010-4	50	10	6.35	72	114	18	148	92	82	11	17.5	11	M8	1x4	6004	19614	115
HSI06310-4	63	10	6.35	85	131	22	153	107	95	14	20	13	M8	1x4	6719	25358	135
HSI08010-4	80	10	6.35	105	150	22	153	127	115	14	20	13	M8	1x4	7346	31953	156
HDI01604-4	16	4	2.381	30	49	10	80	39	34	4.5	8	4.5	M6	1x4	973	2406	44
HDI02004-4	20	4	2.381	34	57	11	80	45	40	5.5	9.5	5.5	M6	1x4	1066	2987	51
HDI02504-4	25	4	2.381	40	63	11	80	51	46	5.5	9.5	5.5	M6	1x4	1180	3795	60
HDI0255T-4		5.08	3.175	40	63	11	101	51	46	5.5	9.5	5.5	M8	1x4	1724	4903	62
HDI03204-4	32	4	2.381	46	72	12	80	58	52	6.5	11	6.5	M6	1x4	1296	4838	69
HDI0325T-4		5.08	3.175	46	72	12	102	58	52	6.5	11	6.5	M8	1x4	1922	6343	72

HV Precision grinding-grade series specification


Unit: mm

Model	Screw shaft diameter d	Lead l	Ball diameter Da	Nut dimensions											Dynamic rating Ca(kgf)	Static rating Coa(kgf)	Stiffness kgf/μm
				D	A	B	L	W	H	X	Y	Z	Q	n			
HV01205-2.8	12	5	2.5	30	50	10	42	40	32	4.5	8	4.5	M6	2.8x1	661	1316	19
HV01210-2.7		10	2.5	30	50	10	53	40	32	4.5	8	4.5	M6	2.7x1	623	1241	18
HV01510-2.7	15	10	3.175	34	58	10	57	45	34	5.5	9.5	5.5	M6	2.7x1	972	2020	23
HV01604-3.8	16	4	2.381	34	57	11	45	45	34	5.5	9.5	5.5	M6	3.8x1	931	2285	31
HV01605-4.8		5	3.175	40	63	11	58	51	42	5.5	9.5	5.5	M6	4.8x1	1614	3662	40
HV01610-2.7	20	10	3.175	40	63	11	56	51	42	5.5	9.5	5.5	M6	2.7x1	1008	2161	24
HV02004-4.8		4	2.381	40	60	10	50	50	40	4.5	8	4	M6	4.8x1	1247	3584	45
HV02005-4.8	20	5	3.175	44	67	11	57	55	52	5.5	9.5	5.5	M6	4.8x1	1814	4650	47
HV02010-2.7		10	3.969	46	74	13	57	59	46	6.6	11	6.5	M6	2.7x1	1518	3398	30
HV02020-1.8	25	20	3.175	46	74	13	70	59	46	6.6	11	6.5	M6	1.8x1	764	1758	19
HV02505-4.8		5	3.175	50	73	11	55	61	52	5.5	9.5	5.5	M8	4.8x1	2017	5884	56
HV02506-4.8	25	6	3.969	53	76	11	62	64	58	5.5	9.5	5.5	M6	4.8x1	2711	7268	58
HV02508-4.8		8	4.762	56	85	13	70	71	64	6.5	11	6.5	M6	4.8x1	3466	8776	61
HV02510-2.7	25	10	6.35	68	102	15	70	84	82	9	14	8.5	M8	2.7x1	3040	6547	37
HV02525-1.8		25	3.175	50	73	13	83	61	52	5.5	9.5	5.5	M8	1.8x1	843	2199	22
HV03204-4.8	32	4	2.381	54	81	12	50	67	64	6.6	11	6.5	M6	4.8x1	1517	5806	62
HV03205-4.8		5	3.175	58	85	12	56	71	64	6.6	11	6.5	M8	4.8x1	2249	7612	66
HV03206-4.8	32	6	3.969	62	89	12	60	75	68	6.6	11	6.5	M8	4.8x1	3079	9575	70
HV03208-4.8		8	4.762	66	100	15	75	82	76	9	14	8.5	M8	4.8x1	3962	11547	74
HV03210-4.8	40	10	6.35	74	108	15	96	90	82	9	14	9	M8	4.8x1	5620	14649	76
HV03220-2.7		20	6.35	74	108	16	100	90	82	9	14	8.5	M8	2.7x1	3509	8644	46
HV04005-4.8	40	5	3.175	67	101	15	59	83	72	9	14	8.5	M8	4.8x1	2468	9586	76
HV04010-4.8		10	6.35	82	124	18	100	102	94	11	17.5	11	M8	4.8x1	6316	18600	90
HV04020-2.7	50	20	6.35	82	124	18	100	102	90	11	17.5	11	M8	2.7x1	3935	10893	56
HV05005-4.8		5	3.175	80	114	15	60	96	82	9	14	8.5	M8	4.8x1	2698	12053	87
HV05010-4.8	50	10	6.35	93	135	16	93	113	98	11	17.5	11	M8	4.8x1	7023	23537	106
HV05020-2.7		20	9.525	105	152	28	121	128	110	14	20	13	M8	2.7x1	7336	19700	68
HV06310-4.8	63	10	6.35	108	154	22	105	130	110	14	20	13	M8	4.8x1	7860	30430	126
HV06320-2.7		20	9.525	122	180	28	120	150	130	18	26	17.5	M8	2.7x1	8162	24741	80
HV08010-4.8	80	10	6.35	130	176	22	105	152	132	14	20	13	M8	4.8x1	8593	38344	145
HV08020-4.8		20	9.525	143	204	28	180	172	148	18	26	18	M8	4.8x1	15103	57296	168
HV08020-7.6	80	20	9.525	143	204	28	240	172	148	18	26	18	M8	3.8x2	22423	90719	260

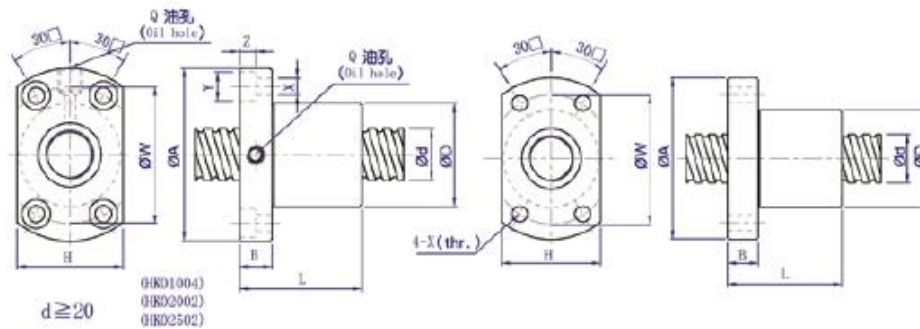
HY Precision grinding-grade series specification



Unit: mm

Single pitch nominal model	Screw shaft diameter d	Lead l	Ball diameter Da	Nut dimensions										Dynamic rating Ca(kgf)	Static rating Coa(kgf)	Stiffness kgf/μm
HY00606-3.6	6	6	1.2	14	27	4	4	21	21	16	3.4	-	1.8x2	217	407	9.8
HY00808-3.6	8	8	1.2	18	31	6	4	26	25	20	3.4	-	1.8x2	246	528	15
HY01616-3.6	16	16	2.778	32	53	10.1	10	45	42	34	4.5	M6	1.8x2	1073	2551	31
HY01616-5.6	16	16	2.778	32	53	10.1	10	61	42	34	4.5	M6	2.8x2	1568	3968	47
HY02020-3.6	20	20	3.175	39	62	13	10	52	50	41	5.5	M6	1.8x2	1387	3515	37
HY02020-5.6	20	20	3.175	39	62	13	10	72	50	41	5.5	M6	2.8x2	2029	5468	56
HY02525-3.6	25	25	3.969	47	74	15	12	64	60	49	6.6	M6	1.8x2	2074	5494	45
HY02525-5.6	25	25	3.969	47	74	15	12	89	60	49	6.6	M6	2.8x2	3032	8546	69
HY03232-3.6	32	32	4.762	58	92	17	12	78	74	60	9	M6	1.8x2	3021	8690	58
HY03232-5.6	32	32	4.762	58	92	17	12	110	74	60	9	M6	2.8x2	4417	13517	88
HY04040-3.6	40	40	6.35	73	114	19.5	15	99	93	75	11	M6	1.8x2	4831	14062	70
HY04040-5.6	40	40	6.35	73	114	19.5	15	139	93	75	11	M6	2.8x2	7065	21874	106
HY05050-3.6	50	50	7.938	90	135	21.5	20	117	112	92	14	M6	1.8x2	7220	21974	86
HY05050-5.6	50	50	7.938	90	135	21.5	20	167	112	92	14	M6	2.8x2	10558	34182	131
Double pitch nominal model	Screw shaft diameter d	Lead l	Ball diameter Da	Nut dimensions										Dynamic rating Ca(kgf)	Static rating Coa(kgf)	Stiffness kgf/μm
HY01632-1.6	16	32	2.778	32	53	10.1	10	42.5	42	34	4.5	M6	0.8x2	493	1116	11
HY01632-3.6	16	32	2.778	32	53	10.1	10	74.5	42	34	4.5	M6	1.8x2	989	2511	23
HY02040-1.6	20	40	3.175	39	62	13	10	48	50	41	5.5	M6	0.8x2	653	1597	15
HY02040-3.6	20	40	3.175	39	62	13	10	88	50	41	5.5	M6	1.8x2	1311	3592	30
HY02550-1.6	25	50	3.969	47	74	15	12	58	60	49	6.6	M6	0.8x2	976	2495	19
HY02550-3.6	25	50	3.969	47	74	15	12	108	60	49	6.6	M6	1.8x2	1960	5614	32
HY03264-1.6	32	64	4.762	58	92	17	12	71	74	60	9	M6	0.8x2	1374	3571	22
HY03264-3.6	32	64	4.762	58	92	17	12	135	74	60	9	M6	1.8x2	2759	8441	46
HY04080-1.6	40	80	6.35	73	114	19.5	15	90	93	75	11	M6	0.8x2	2273	6387	29
HY04080-3.6	40	80	6.35	73	114	19.5	15	170	93	75	11	M6	1.8x2	4566	14370	50
HY050100-1.6	50	100	7.938	90	135	21.5	20	111	112	92	14	M6	0.8x2	3398	9980	35
HY050100-3.6	50	100	7.938	90	135	21.5	20	211	112	92	14	M6	1.8x2	6824	22455	72

HK Precision grinding-grade series specification



Unit: mm

Model	Screw shaft diameter d	Lead l	Ball diameter Da	Nut dimensions											Dynamic rating Ca(kgf)	Static rating Coa(kgf)	Stiffness kgf/μm
				D	A	B	L	W	H	X	Y	Z	Q	n			
HK00401	4	1	0.8	10	20	3	12	15	14	2.9	-	-	-	1x2	64	97	5
HK00601	6	1	0.8	12	24	3.5	15	18	16	3.4	-	-	-	1x3	111	224	9
HK00801 [*]	8	1	0.8	14	27	4	16	21	18	3.4	-	-	-	1x4	161	403	14
HK00802 [*]		2	1.2	14	27	4	16	21	18	3.4	-	-	-	1x3	222	458	13
HK0082.5		2.5	1.2	16	29	4	26	23	20	3.4	-	-	-	1x3	221	457	13
HK01002 [*]	10	2	1.2	18	35	5	28	27	22	4.5	-	-	-	1x3	243	569	15
HK01004		4	2	26	46	10	34	36	28	4.5	8	4.5	M6	1x3	468	905	17
HK01202 [*]	12	2	1.2	20	37	5	28	29	24	4.5	-	-	-	1x4	334	906	22
HK01402 [*]	14	2	1.2	21	40	6	23	31	26	5.5	-	-	-	1x4	354	1053	24
HK01602 [*]	16	2	1.2	25	43	10	40	35	29	5.5	-	-	M6	1x4	373	1200	26
HK02002	20	2	1.2	50	80	15	55	65	68	6.5	10.5	6	M6	1x6	581	2284	48
HK02502	25	2	1.2	50	80	13	43	65	68	6.5	10.5	6	M6	1x5	540	2381	46

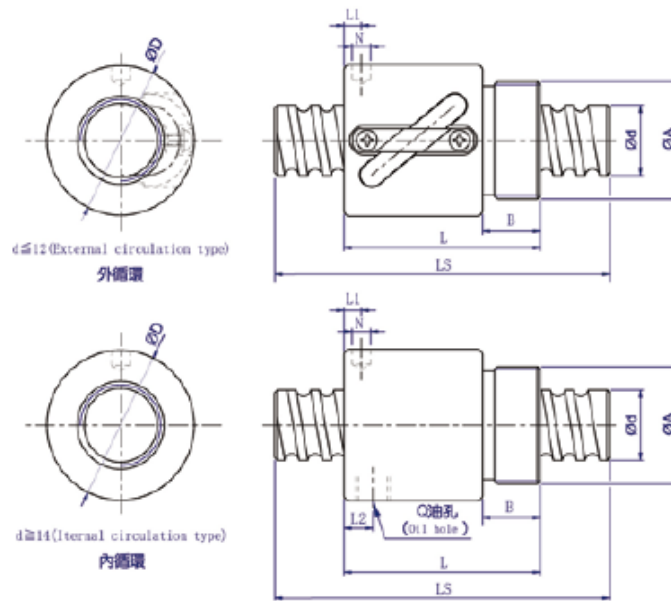
※ labeled items (HK00401 : The standard nut does not come with a scraper.)

※ Capable of producing left-handed threads.

Unit: mm

Model	Screw shaft diameter d	Lead l	Ball diameter Da	Nut dimensions											Dynamic rating Ca(kgf)	Static rating Coa(kgf)	Stiffness kgf/μm
				D	A	B	L	W	H	X	Y	Z	Q	n			
HK01204T3D-02	12	4	2.5	24	40	6	28	32	25	3.5	-	-	-	1x3	704	1413	-
HK01205T3D-00		5	2.5	22	37	8	39	29	24	4.5	-	-	-	1x3	702	1409	17

※ HK01204T3D-02 : The standard nut does not come with a scraper.

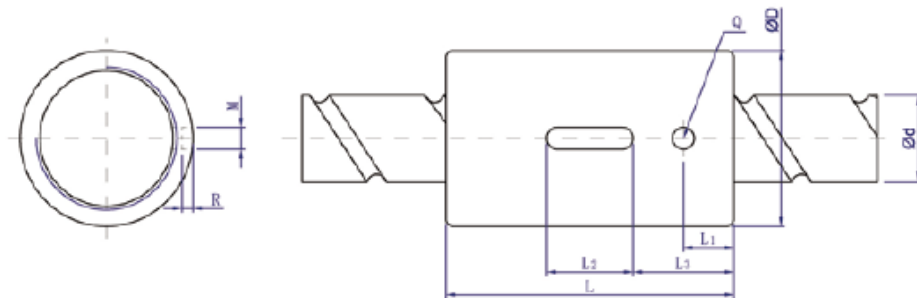
ZH Precision grinding-grade series specification


Unit: mm

Model	Screw shaft diameter d	Lead l	Ball diameter Da	Nut dimensions										Dynamic rating Ca(kgf)	Static rating Coa(kgf)	Stiffness kgf/ μm
				D	A	B	L	L1	N	L2	Q	n				
ZHR00825-2.5	8	2.5	1.2	17.5	M15x1P	7.5	23.5	10	3	-	-	2.5x1	189	381	11	
ZHR01002-3.5	10	2	1.2	19.5	M17x1P	7.5	22	3	3.2	-	-	3.5x1	277	664	17	
ZHR01004-2.5		4	2	25	M20x1P	10	34	3	3	-	-	2.5x1	400	754	14	
ZHR01204-3.5	12	4	2.5	25.5	M20x1P	10	34	13	3	-	-	3.5x1	804	1649	23	
ZHR01205-3.5		5	2.5	25.5	M20x1P	10	39	16.25	3	-	-	3.5x1	801	1644	24	
ZHR01404-3	14	4	2.5	32.1	M25x1.5P	10	35	11	3	-	-	1x3	748	1609	26	
ZHR01604-3	16	4	2.381	29	M22x1.5P	8	32	4	3.2	-	-	1x3	759	1804	24	
ZHR01605-3		5	3.175	32.5	M26x1.5P	12	42	19.25	3	-	-	1x3	1077	2289	25	
ZHR01610-2		10	3.175	32	M26x1.5P	12	50	3	4	3	M4	1x2	779	1601	14	
ZHR02005-3	20	5	3.175	38	M35x1.5P	15	45	20.3	3	-	-	1x3	1211	2906	30	
ZHR02505-4	25	5	3.175	43	M40x1.5P	19	69	32.11	3	8	M6	1x4	1724	4904	37	
ZHR02510-4		10	4.762	43	M40x1.5P	19	84	8	6	8	M6	1x4	2954	7295	41	

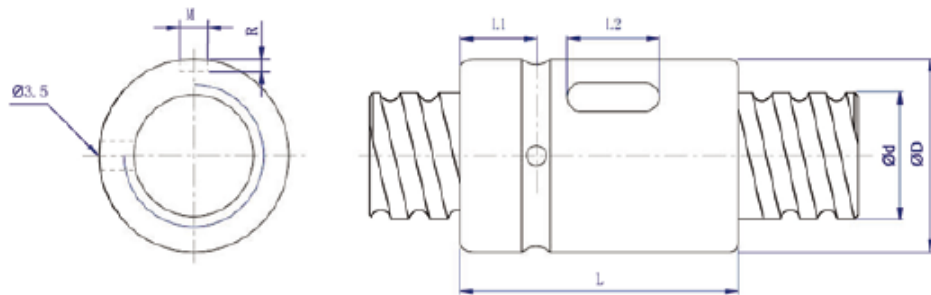
※ Φ8-Φ16: The standard nut does not come with a scraper.

ZN Precision grinding-grade series specification



Unit: mm

Model	Screw shaft diameter d	Lead l	Ball diameter Da	Nut dimensions										Basic load rating		Stiffness kgf/μm
				D	L	L1	L2	L3	M	R	Q	n	Ca (kgf)	Coa (kgf)		
ZN01205-4.8	12	5	2.5	24	40	7	12	14	3	1.5	3	4.8x1	1011	2105	34	
ZN01210-2.8		10	2.5	24	45	8	15	15	3	1.5	3	2.8x1	642	1287	19	
ZN01210-1.8		10	2.5	24	40	10.5	12	14	3	1.5	3	1.8x1	439	827	33	
ZN01605-5.8	15	5	2.778	28	45	7	20	12.5	5	3	3	5.8x1	1599	3827	49	
ZN01610-2.8		10	2.778	28	45	7	20	12.5	5	3	3	2.8x1	839	1821	23	
ZN01616-1.8		16	2.778	28	45	7	20	12.5	5	3	3	1.8x1	552	1137	18	
ZN01620-1.8		20	2.778	28	58	10	20	19	5	3	3	1.8x1	554	1170	14	
ZN02005-5.8	20	5	3.175	36	47	8	20	13.5	5	3	3	5.8x1	2134	5619	60	
ZN02010-3.8		10	3.175	36	55	8	20	17.5	5	3	3	3.8x1	1516	3833	40	
ZN02020-1.8		20	3.175	36	55	8	20	17.5	5	3	3	1.8x1	764	1758	19	

ZS Precision grinding-grade series specification


Unit: mm

Model	Screw shaft diameter d	Lead l	Ball diameter Da	Nut dimensions							Dynamic rating Ca(kgf)	Static rating Coa(kgf)	Stiffness kgf/μm
				D	L	L1	L2	M	R	n			
ZS 01605-4	16	5	3.175	30	45	9	20	5	3	1x4	1380	3052	33
ZS 02005-4	20	5	3.175	34	45	9	20	5	3	1x4	1551	3875	39
ZS 02505-4	25	5	3.175	40	45	9	20	5	3	1x4	1724	4904	45
ZS 02510-4		10	4.762	46	85	13	30	5	3	1x4	2954	7295	51
ZS 03205-4	32	5	3.175	46	45	9	20	5	3	1x4	1922	6343	52
ZS 03210-4		10	6.35	54	85	13	30	5	3	1x4	4805	12208	62
ZS 04005-4	40	5	3.175	56	45	9	20	5	3	1x4	2110	7988	59
ZS 04010-4		10	6.35	62	85	13	30	5	3	1x4	5399	15500	72
ZS 05010-4	50	10	6.35	72	85	13	30	5	3	1x4	6004	19614	83
ZS 06310-4	63	10	6.35	85	85	13	30	6	3.5	1x4	6719	25358	95
ZS 08010-4	80	10	6.35	105	85	13	30	8	4.5	1x4	7346	31953	109
ZS 01604-4	16	4	2.381	30	40	9	15	3	1.5	1x4	973	2406	32
ZS 02004-4	20	4	2.381	34	40	9	15	3	1.5	1x4	1066	2987	37
ZS 02504-4	25	4	2.381	40	40	9	15	3	1.5	1x4	1180	3795	43
ZS 03204-4	32	4	2.381	46	40	9	15	3	1.5	1x4	1296	4838	49