Technical Information Index

SHAC®

>>> Linear Guideways <<<

ABOUT SHAC LINEAR GUIDEWAYS

The rolling linear guide performs an infinite rolling cycle between the slider and the guide rail through a rolling element. The slider can perform high-precision linear motion on the guide rail with minimal frictional resistance, making it an efficient and high-precision rolling guide component. Compared with traditional slider guides,they greatly reduce the wear and noise of the raceway contact surface while improving accuracy, speed, and reliability. They are indispensable and important functional components in various CNC machine tools, optical machinery, precision instruments, and other automation equipment.

1.General Information

1-1 Features of Linear Guideways

Low frictional resistance

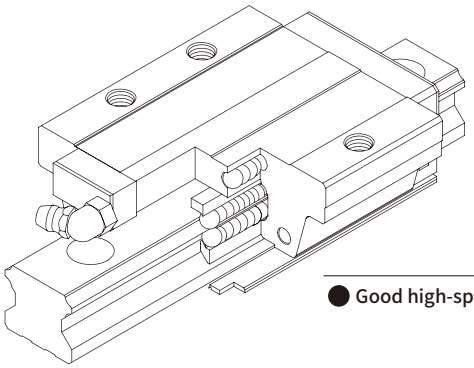
Due to the use of balls or rollers as the transmission medium,rolling friction resistance is much smaller than sliding friction resistance,lower running resistance leads to less contact surface wear,which can maintain running accuracy for a long time.Accuracy of running parallelism is one of the important performance indicators of linear guides, the running accuracy of the linear guide directly

High positioning accuracy

The friction force during the operation of linear guide belongs to rolling friction,the rolling friction coefficient is only 1/20-1/40 of the sliding friction coefficient.Due to the small difference between the dynamic friction coefficient and the static friction coefficient, even when feeding at low speeds, crawling phenomenon is not easy to occur, so the positioning accuracy is very high.

Reasonable mechanical structure

The optimized geometric and mechanical structural design can simultaneously withstand loads from all directions, suitable for various types of installation needs. By adjusting the gap between the slider and the guide rail by replacing different sizes of rolling elements, a simple replacement can achieve higher assembly preload and further improve rigidity.



Good high-speed performance

Thanks to the advantage of low frictional resistance during system operation, the requirement for driving force is also reduced, and even smaller motors can drive the machine to operate normally. Lower operating resistance can also effectively control the temperature rise of the system, reduce thermal deformation, and maintain high-speed operation

Easy installation and maintenance

By using a certain installation sequence and requirements for installation and debugging, the accuracy during processing can be reproduced. A simple and easy-to-use lubrication structure that can effectively maintain lubrication for a long time. Interchangeable design, simple replacement or repair of damaged components can restore normal operation of the machine.

1-2 Selecting Linear Guideways

Identify the conditio

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

Selection of series

- GH series-Grinding,Milling,and Drilling machine,Lathe,Electric discharge machine,Wire cutting machine,Wood cutting machine,Precision measure equipment,Machine center
- GE series-Automatic equipment,Semiconductor equipment,Laser engraving machine, High speed transfer machine,Packing machine,Medical equipment
- QE/QH-series-High precision measure equipment,Semiconductor equipment,Automatic equipment, can be widely applied in high-tech industry required high speed,low noise,low dust generation
- GR series-CNC machining centers,Heavy duty cutting machine,CNC grinding machine
- GC series-Wood cutting machine,Tool machine,Grinding machine,Transportation device
- GM Series-Miniature device,semiconductor equipment,3D printer

Selection of accurac

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

Determines the size & the number of bloc

- Dynamic load condition
- If accompanied with a balscrew, the size shoud be similar to the diameter of ballscrew.For example, f the diameter of the ballscrew is 32mm, then the model size of linear guideway should be GH35

Calculate the max. load of bloc

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

Choosing preloa

- Depends on the stiffness requirement and accuracy of mounting surface

Identify stiffnes

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

Calculating service lif

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

Selection of lubricatio

- According to equipment requirements,lubricating grease,oil,or special lubricants can be selected for lubrication,regularly inject lubricating grease or

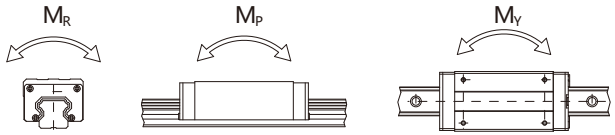
Completion of selectio

1-3 Basic Load Ratings of Linear Guideways

1-3-1 Basic Static Load

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

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



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

Table 1-1 Static Safety Factor

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

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

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

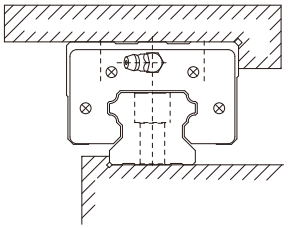
1-3-2 Basic Dynamic Load

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

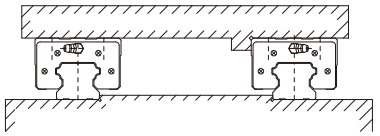
1-4 Mounting Conigurations

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

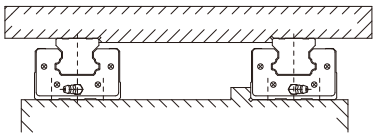
Use of one rail and mounting reference side



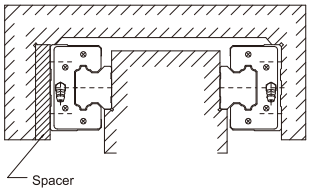
use of two rails(block movement)



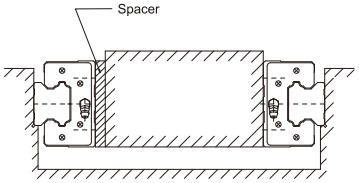
use of two rails(block fixed)



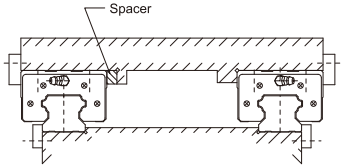
use of two external rails



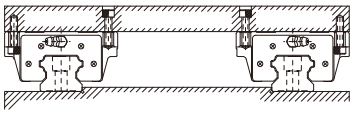
use of two internal rails



total surface fixed installation



GHW type block with mounting holes in different directions.

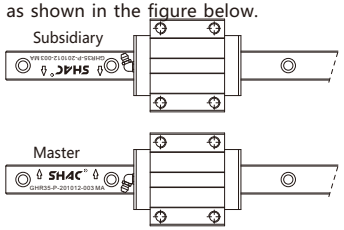


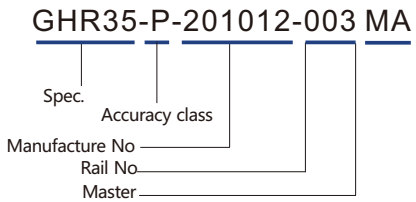
1-5 Mounting Procedures

Different installation methods are recommended based on the degree of vibration and impact force that the machine is subjected to during use, as well as the required walking accuracy and rigidity.

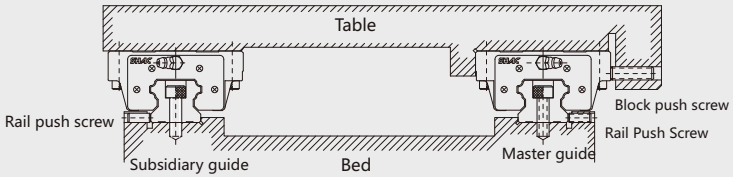
1-5-1 Master and Subsidiary Guide

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





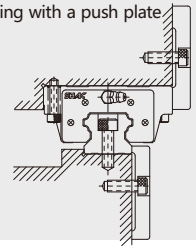
1-5-2 Installation to Achieve High Accuracy and Rigidity



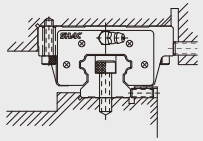
(1) Mounting methods

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

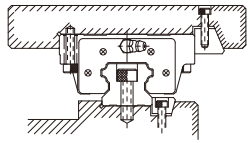
Mounting with a push plate



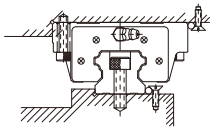
Mounting with push screws



Mounting with taper gib

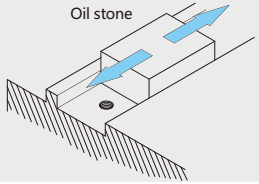


Mounting with needle roller

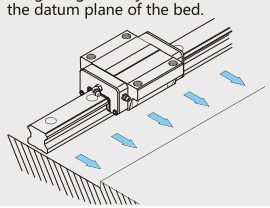


(2) Procedure of rail installation

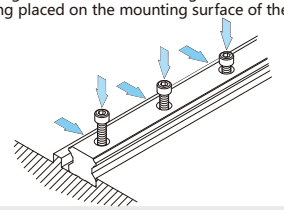
1 Before starting, remove all dirt from the mounting surface of the machine.



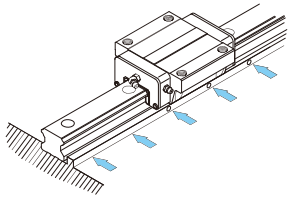
2 Place the linear guideway gently on the bed. Bring the guideway into close contact with the datum plane of the bed.



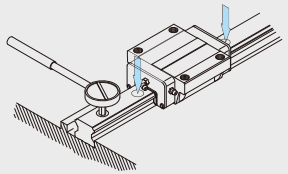
3 Check for correct thread engagement when inserting a bolt into the mounting hole while the rail is being placed on the mounting surface of the bed.



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

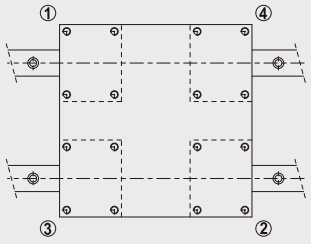


5 Tighten the mounting bolts with a torque wrench to the specified torque.



6 Install the remaining linear guideway in the same way.

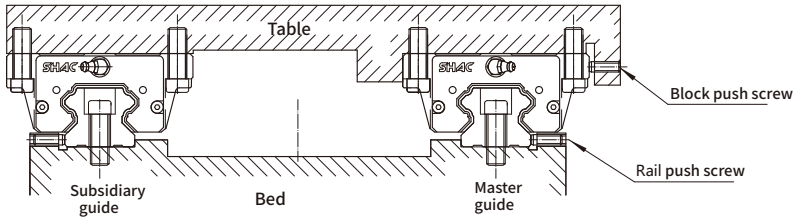
(3) Procedure of block installation



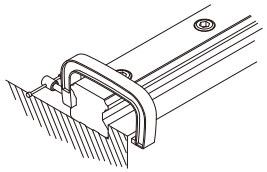
Place the table gently on the blocks. Next, tighten the block mounting bolts temporarily.
Push the blocks against the datum plane of the table and position the table by tightening the push screws.
The table can be fixed uniformly by tightening the mounting bolts on master guide side and subsidiary side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

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

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

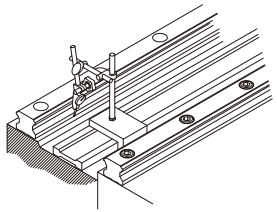


(1) Installation of the rail on the subsidiary guide side

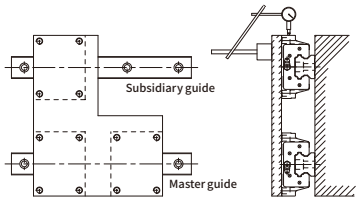


Using a vice
Place the rail into the mounting plane of the bed. Tighten the mounting bolts temporarily; then use a vice to push the rail against the side datum plane of the bed. Tighten the mounting bolts in sequence to the specified torque.

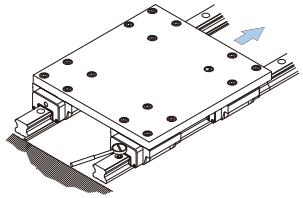
(2) Installation of the rail on the subsidiary guide side



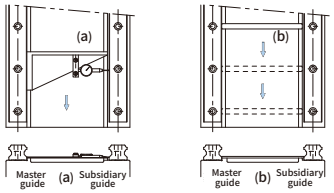
Method with use of a straight edge
Set a straight edge between the rails parallel to the side datum plane of the rail on the master guide side by using a dial gauge. Use the dial gauge to obtain the straight alignment of the rail on the subsidiary guide side. When the rail on the subsidiary guide side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



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



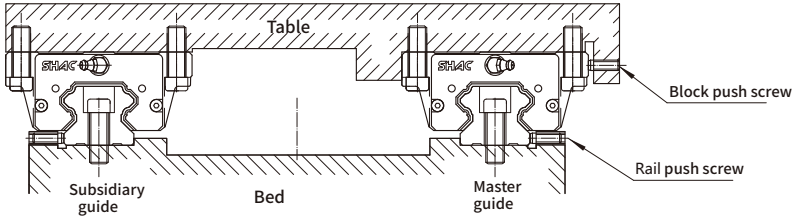
Method following the master guide side
When a rail on the master guide side is correctly tightened, fix both blocks on the master guide side and one of the two blocks on the subsidiary guide side completely to the table.
When moving the table from one end of the rail, tighten the mounting bolts on the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



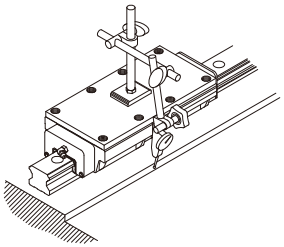
Method with use of a jig
Use a special jig to ensure the rail position on the subsidiary guide side. Tighten the mounting bolts to the specified torque in sequence.

1-5-4 When There Is No Side Surface of The Bed On The Master Guide Side

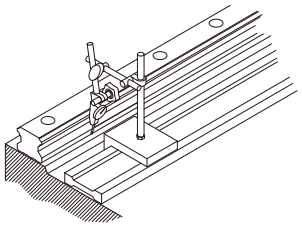
To ensure parallelism between the subsidiary guide and the master guide when there is no side surface, the following rail installation method is recommended. The installation of the blocks is the same as mentioned previously.



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



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



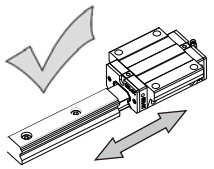
Method with use of a straight edge
Use a dial gauge and a straight edge to confirm the straightness of the side datum plane of the rail from one end to the other. Make sure the mounting bolts are tightened securely in sequence.

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

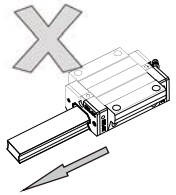
Linear Guideway Installation Precautions

1. Handling and using linear slide rails with care to prevent bumping. Otherwise, it may lead to scratches, bruises and so on, which will affect the accuracy of the product.
2. Tilting the linear slide rail during handling and use may cause the slide block to fall off from the slide rail due to its dead weight, resulting in collision and other damage to the slide block.
3. The surface of the linear slide rail is coated with anti-rust oil when it leaves the factory, and the inner seal of the slide block is equipped with lubricating oil. Please clean the anti-rust oil on the surface before installation.
4, during installation, debugging and use, do not knock the guide rail slider, which will cause indentation on the surface of the slide rail and slider, thus affecting the accuracy. When assembling, try not to remove the slide block from the slide rail. If you need to remove, please be sure to use the correct plastic track assistance. Otherwise, it may cause bad damage such as sliding block drop bead.
5. During installation and debugging, do not put your finger into the mounting hole of the guide rail. Moving the guide rail may cause finger pinch injury.
6. When two or more guide rails are used together on the same mounting surface, please confirm the reference rail and non-reference rail before assembly. The datum surface of the sliding block side of the reference rail has been grinded by the distribution rail, while the datum surface of the non-reference rail sliding block side has not been grinded. Please pay attention.
7. When the guide rail is used, it must be installed according to the stitching symbol on the upper surface of the guide rail to ensure installation accuracy.
8. During the assembly operation of the non-interchangeable linear slide rail, the slider must not be exchanged or reversed, so as not to affect the accuracy of the running product.
9. When the rigidity and accuracy of the installation component are insufficient, the stress concentration of the slider of the linear slide rail will be caused, resulting in a significant decline in the performance of the slider.

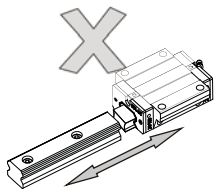
When installing the slider, the clamp rail and the guide rail are tightly fitted and then the slider is pushed into the guide rail



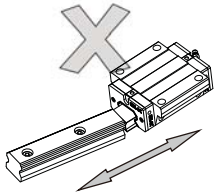
Do not remove the clamp rail from the slide block



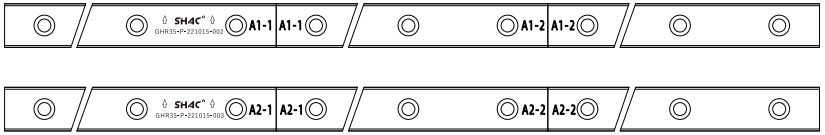
The clamping rail is not tightly attached to the guide rail, there is a gap



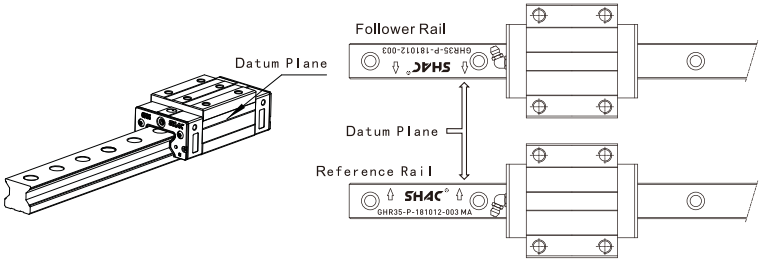
The clamp rail is not attached to the guide rail, and there is an Angle between them



When multiple guide rails are used together, the interfaces will be subjected to end grinding treatment, and the docking ports will correspond one by one. We will mark the end of the guide rail with marks. Please install them in sequence according to the marks.



The guide datum identification is beside the model LOGO on the front of the guide, and the arrow points to the guide datum. Linear guides used in pairs on the same plane are divided into reference rails and driven rails. The reference rails will be engraved with the word MA behind the model identifier. One side of the ball series slider is finely ground to a surface roughness of 0.4 as the datum surface. There will be a datum line on the side of the roller series slider for easy identification, as shown in the figure below. Please fix the datum close to the support surface of the workbench during installation.



Linear Guideway Use Precautions

1. Please prevent foreign bodies such as iron cutting and cutting fluid from entering the slider, which may lead to early damage.
2. Please work in the range of -20~+80 degrees Celsius, if the temperature exceeds the change of use, it may cause deformation or damage to plastic and rubber parts.
3. When working with a small stroke, the steel ball cannot form a complete cycle, resulting in that it cannot enter the inside of the slider after adding grease, and it is difficult to form lubricating oil film. Please note that effective lubrication cannot be performed.
4. If the linear slide rail is damaged due to an accident, the slide block may be removed from the slide rail and fall. For safe use, please add a safety mechanism to prevent falling.

Linear Guideway Lubrication Precautions

1. The first use of the guideway surface carefully wipe the anti-rust oil and inject lubricating oil to the slider before use.
2. Avoid mixed use of different lubricants, different lubricant formulations may cause adverse effects of mutual reactions.
3. If it is to be used in clean room, high and low temperature and other special occasions, please use lubricating grease that matches the environment.
4. The difference in consistency and adhesion of grease will cause the sliding resistance of guide rail slide block to change. Please select the appropriate grease according to the requirements of working conditions.
5. The lubrication performance of grease will decay during the use of grease. Choose the appropriate grease supplement interval according to the use frequency, running speed and load size. Please fill lubricating grease every 100KM or 3 months. For example, if there is pollution, vibration, high frequency, high load and other working conditions, the lubrication cycle will be shortened.

2. SHAC Linear Guideway Product Series

In an effort to meet customer's requirement and service needs SHAC offers several different types of guides. We supply the GH series which is suitable for CNC machineries, the GE series for automation industries, the GR series for high rigidity applications, and the miniature series GMN/GMW for medical devices and semiconductor equipment, also for high technology industries, SHAC has developed the QH and QE series with high speed and quiet characteristics.

(1) Types & series

Table 2-1 Types & Series

Series	Assembly Height	Load	Square	Flange		
			Tap hole	Tap hole	Drilled hole	Combination
GH	High	Heavy Load	GHH-CA	-	-	-
		Super Heavy Load	GHH-HA	-	-	-
	Low	Heavy Load	GHL-CA	GHW-CA	GHW-CB	GHW-CC
		Super Heavy Load	GHL-HA	GHW-HA	GHW-HB	GHW-HC
GE	Low	Medium Load	GEH -SA	GEW-SA	GEW-SB	GEW-SC
		Heavy Load	GEH -CA	GEW-CA	GEW-CB	GEW-CC
GMN	-	Standard	GMN-C	-	-	-
		Long	GMN-H	-	-	-
GMW	-	Standard	GMW-C	-	-	-
		Long	GMW-H	-	-	-
QH	High	Heavy Load	QHH-CA	-	-	-
		Super Heavy Load	QHH-HA	-	-	-
	Low	Heavy Load	-	QHW-CA	QHW-CB	QHW-CC
		Super Heavy Load	-	QHW-HA	QHW-HB	QHW-HC
QE	Low	Medium Load	QEH -SA	QEW-SA	QEW-SB	-
		Heavy Load	QEH -CA	QEW-CA	QEW-CB	-
GC	High	Heavy Load	GCH-CA	-	-	-
		Super Heavy Load	GCH-HA	-	-	-
	Low	Heavy Load	GCW-CA	-	-	
		Super Heavy Load	GCW-HA	-	-	
GR	High	Heavy Load	GRH-CA	-	-	-
		Super Heavy Load	GRH-HA	-	-	-
	Low	Heavy Load	GRL-CA	-	-	GRW-CC
		Super Heavy Load	GRL-HA	-	-	GRW-HC

GH Series

Heavy Load Ball Type

2-1 GH Series - Heavy Load Ball Type Linear Guideway

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

2-1-1 Features of GH Series

(1) Self-aligning capability

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

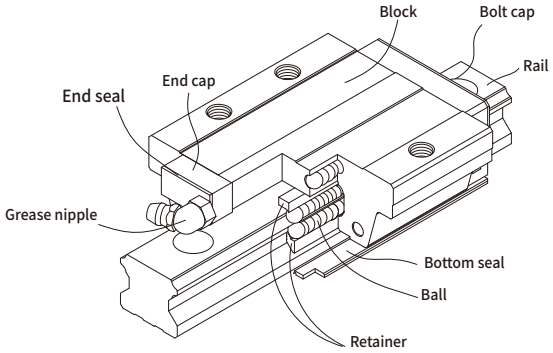
(2) Interchangeability

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

(3) High rigidity in all four directions

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

2-1-2 Construction of GH Series



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

2-1-3 Model Number of GH Series

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

(1) Non-interchangeable type

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

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

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

(2) Interchangeable type

Model Number of HG Block

GH W 25 C A E ZA P + ZZ/E2

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

Model Number of GH Rail

GH R 25 R 1200 E P + RC

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

GH Series

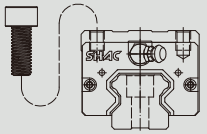
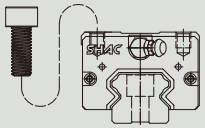
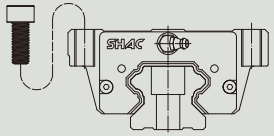
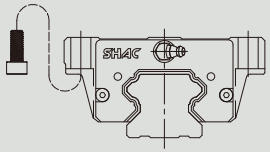
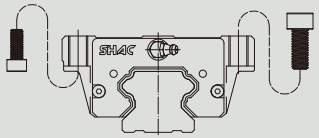
Heavy Load Ball Type

2-1-4 Types

(1) Block types

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

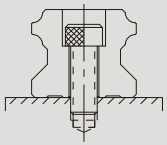
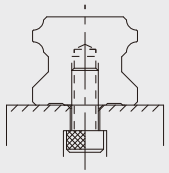
Table 2-1-1 Block Types

Type	Model	Shape	Height (mm)	Rail Length (mm)	Main Application
Square	GHH-CA GHH-HA		28 ↓ 90	100 ↓ 4000	Machine Centers CNC Lathes Grinding Machines Precision Machining Machines Heavy Cutting Machines Automation Devices Transportation Equipment Measuring Equipment Devices Requiring High Positional Accuracy
	GHL-CA GHL-HA		24 ↓ 70	100 ↓ 4000	
Flange	GHW-CA GHW-HA		24 ↓ 90	100 ↓ 4000	
	GHW-CB GHW-HB		24 ↓ 90	100 ↓ 4000	
	GHW-CC GHW-HC		24 ↓ 90	100 ↓ 4000	

(2) Rail types

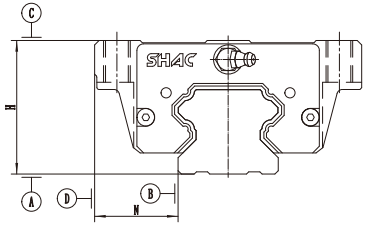
Besides the standard top mounting type, the bottom mounting type is also available.

Table 2-1-2 Rail Types

Mounting from Top	Mounting from bottom
	

2-1-5 Accuracy Classes

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



(1) Accuracy of non-interchangeable guideways

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

Item	GH - 15, 20				
Accuracy Classes	Normal (C)	High (H)	Precision (P)	Super Precision (SP)	Ultra Precision (UP)
Dimensional tolerance of height H	± 0.1	± 0.03	0 - 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 2-1-9				
Running parallelism of block surface D to surface B	See Table 2-1-9				

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

Item	GH - 25, 30, 35				
Accuracy Classes	Normal (C)	High (H)	Precision (P)	Super Precision (SP)	Ultra Precision (UP)
Dimensional tolerance of height H	± 0.1	± 0.04	0 - 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 2-1-9				
Running parallelism of block surface D to surface B	See Table 2-1-9				

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

Item	GH - 45, 55		
Accuracy Classes	Normal (C)	High (H)	Precision (P)
Dimensional tolerance of height H	± 0.1	± 0.05	± 0.025
Dimensional tolerance of width N	± 0.1	± 0.05	± 0.025
Variation of height H	0.03	0.015	0.007
Variation of width N	0.03	0.02	0.01
Running parallelism of block surface C to surface A	See Table 2-1-9		
Running parallelism of block surface D to surface B	See Table 2-1-9		

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

Item	GH - 65		
Accuracy Classes	Normal (C)	High (H)	Precision (P)
Dimensional tolerance of height H	± 0.1	± 0.07	± 0.035
Dimensional tolerance of width N	± 0.1	± 0.07	± 0.035
Variation of height H	0.03	0.02	0.01
Variation of width N	0.03	0.025	0.015
Running parallelism of block surface C to surface A	See Table 2-1-9		
Running parallelism of block surface D to surface B	See Table 2-1-9		

(2) Accuracy of interchangeable guideways

Table 2-1-7 Accuracy Standards — Unit: mm

Item	GH - 15, 20				
Accuracy Classes	Normal (C)	High (H)	Precision (P)	Super Precision (SP)	Ultra Precision (UP)
Dimensional tolerance of height H	± 0.1	± 0.03	± 0.015	0 - 0.015	0 - 0.008
Dimensional tolerance of width N	± 0.1	± 0.03	± 0.015	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 2-1-9				
Running parallelism of block surface D to surface B	See Table 2-1-9				

Table 2-1-8 Accuracy Standards — Unit: mm

Item	GH - 25, 30, 35				
Accuracy Classes	Normal (C)	High (H)	Precision (P)	Super Precision (SP)	Ultra Precision (UP)
Dimensional tolerance of height H	± 0.1	± 0.04	± 0.02	0 - 0.02	0 - 0.01
Dimensional tolerance of width N	± 0.1	± 0.04	± 0.02	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 2-1-9				
Running parallelism of block surface D to surface B	See Table 2-1-9				

(3) Accuracy of running parallelism

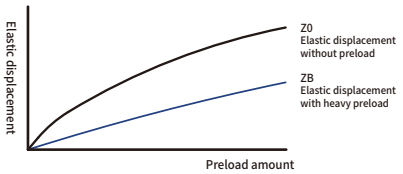
Table 2-1-9 Accuracy of Running Parallelism

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

2-1-6 Preload

(1) Definition

A preload can be applied to each guideway. Oversized balls are used. Generally, a linear motion guideway has a negative clearance between groove and balls in order to improve stiffness and maintain high precision. The figure shows the load is multiplied by the preload, the rigidity is doubled and the deflection is reduced by one half. The preload no larger than ZA would be recommended for the model size under GH20 to avoid an over-preload affecting the guideway' s life.



(2) Preload classes

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

Table 2-1-10 Preload Classes

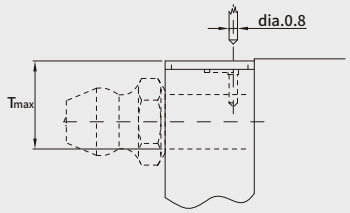
Class	Code	Preload	Condition	Examples of Application
NO Preload	Z0	0~ 0.02C	Certain load direction,low impact, low precision required	Transportationdevices,auto-packingmachines,X-Y axisforgeneralindustrialmachines,weldingmachines, welders
Light Preload	ZA	0.02C~0.04C	High precision required	Machining centers, Z axis for general industrial, machines, EDM, NC lathes, Precision X-Y tables, measuring equipment
Medium Preload	ZB	0.04C~ 008 C	High rigidity required, with vibration and impact	Machining centers, grinding machines, NC lathes, horizontal and vertical milling machines, Z axis of machine tools, Heavy cutting machines
Heavy Preload	ZC	0.08C~ 0.12C	Higher rigidity, and vibration, high impact environment	Machining centers, grinding machines, NC lathes, machine tools, Heavy cutting machines

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

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

Table 2-1-11 O-Ring size and max. permissible depth for piercing

Size	O-Ring		Lube hole at top: max. permissible depth for piercing
	do (mm)	W (mm)	T_{max} (mm)
GH15	2.5±0.15	1.5±0.15	3.75
GH20	4.5±0.15	1.5±0.15	5.7
GH25	4.5±0.15	1.5±0.15	5.8
GH30	4.5±0.15	1.5±0.15	6.3
GH35	4.5±0.15	1.5±0.15	8.8
GH45	4.5±0.15	1.5±0.15	8.2
GH55	4.5±0.15	1.5±0.15	11.8
GH65	4.5±0.15	1.5±0.15	10.8



The lubricant amount for a block filled with grease

Table 2-1-12 The lubricant Amount for a Block Filled with Grease

Size	Heavy load (cm^3)	Super heavy load (cm^3)	Size	Heavy load (cm^3)	Super heavy load (cm^3)
GH15	1	-	GH35	10	12
GH20	2	3	GH45	17	21
GH25	5	6	GH55	26	33
GH30	7	8	GH65	50	61

Frequency of replenishment

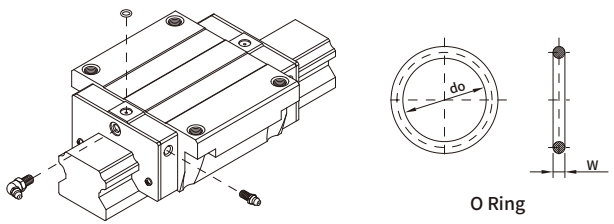
Check the grease every 100 km, or every 3-6 months.

2-1-7 Lubrication

(1) Grease

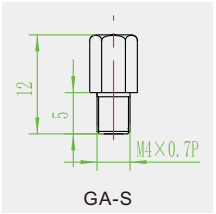
Mounting location

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

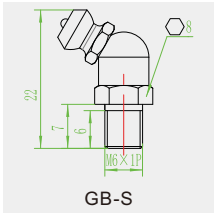


O Ring

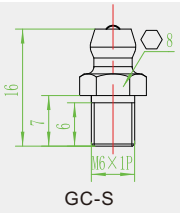
Grease nipple



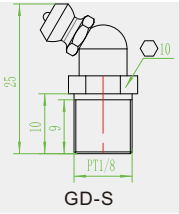
GA-S



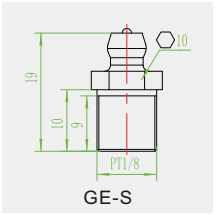
GB-S



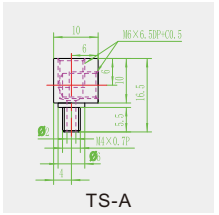
GC-S



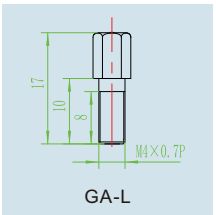
GD-S



GE-S



TS-A



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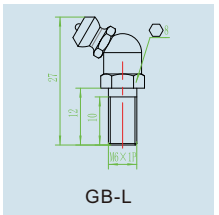

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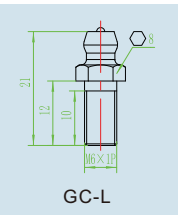
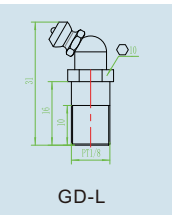
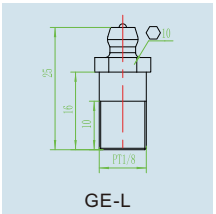


GC-L



GD-L



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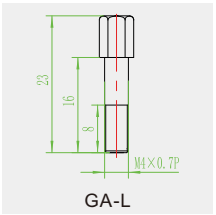

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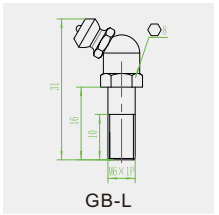
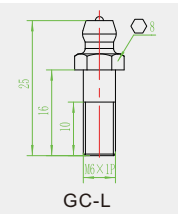
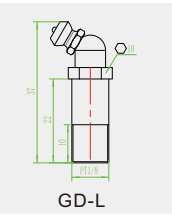


GB-L



GC-L



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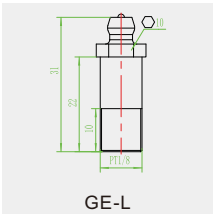

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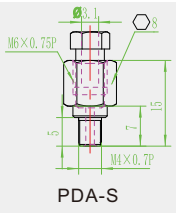
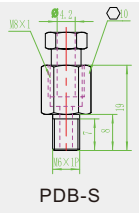
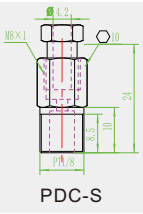


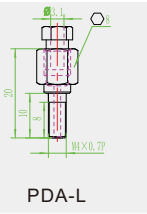
PDA-S



PDB-S



PDC-S



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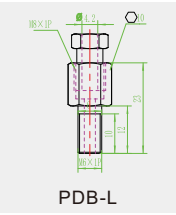

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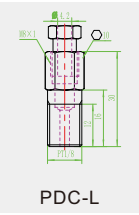
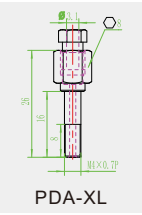
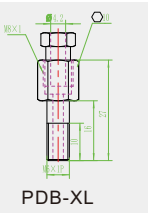


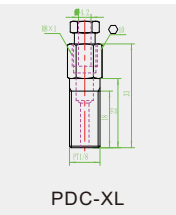
PDC-L



PDA-XL



PDB-XL



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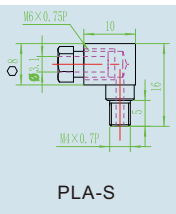

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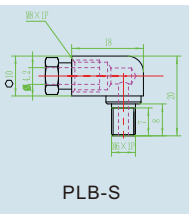

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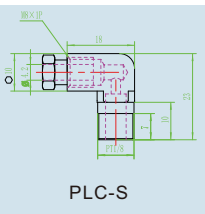
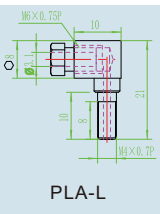


PLC-S



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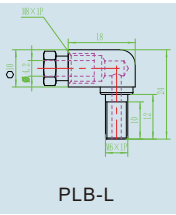

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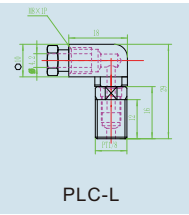
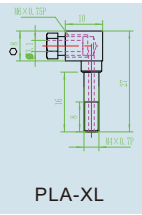
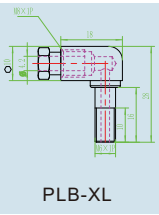


PLC-L



PLA-XL



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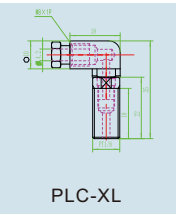


PLC-XL

Table 2-1-3

Model.NO	Lubrication	
	Standard Protection (End seal+Bottom Seal)	
	Grease	Oil
GEH15SA/GEH15CA/GEW15SA/GEW15CC GHH15CA/GHL15CA/GHW15CC	GA-S	PDA-S
		PLA-S
GEH2OSA/GEH20CA/GEW20SA/GEW20CC GEH25SA/GEH25CA/GEW25SA/GEW25CC GEH30SA/GEH30CA/GEW30SA/GEW30CC GHH20CA/GHH20HA/GHW20CC/GHW20HC GHH25CA/GHH25HA/GHL25CA/GHL25HC GHW25CC/GHW25HC/GHH30CA/GHH30HA GHL30CA/GHL30HA/GHW30CC/GHW30HC GHH35CA/GHH35HA/GHL35CA/GHL35HA GHW35CC/GHW35HC/GRH25CA/GRH25HA GRL25CA/GRL25HA/GRW25CC/GRW25HC GRH30CA/GRH30HA/GRL30CA/GRL30HA GRW30CC/GRW30HC/GRH35CA/GRH35HA GRL35CA/GRL35HA/GRW35CC/GRW35HC	GB-S	PDB-S
	GC-S	PLB-S
GHH45CA/GHH45HA/GHL45CA/GHL45HA GHW45CC/GHW45HC/GHH55CA/GHH55HA/ GHL55CA/GHL55HC/GHW55CC/GHW55HC GHH65CA/GHH65HA/GHW65CC/GHW65HC GRH45CA/GRH45HA/GRL45CA/GRL45HA GRW45CC/GRW45HC/GRH55CA/GRH55HA GRL55CA/GRL55HA/GRW55CC/GRW55HC GRH65CA/GRH65HA/GRW65CC/GRW65HC	GD-S	PDC-S
	GE-S	PLC-S

Lubrication					
DD (Double end seals+Bottom seal)		ZZ (End seal+Metal scraper+Bottom Seal)		KK (Double end seals+Metal scraper+Bottom seal)	
Grease	Oil	Grease	Oil	Grease	Oil
GA-L	PDA-L	GA-L	PDA-L	GA-XL	PDA-XL
	PLA-L		PLA-L		PLA-XL
GB-L	PDB-L	GB-L	PDB-L	GB-XL	PDB-XL
GC-L	PLB-L	GC-L	PLB-L	GC-XL	PLB-XL
GD-L	PDC-L	GD-L	PDC-L	GD-XL	PDC-XL
GE-L	PLC-L	GE-L	PLC-L	GE-XL	PLC-XL

GH Series

Heavy Load Ball Type

Oil refilling rate

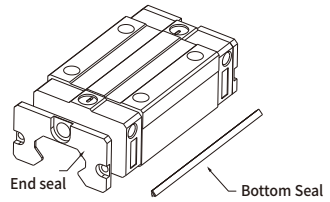
Table 2-1-14

Size	Refilling rate (cm³/hr)	Size	Refilling rate (cm³/hr)
GH15	0.2	GH35	0.3
GH20	0.2	GH45	0.4
GH25	0.3	GH55	0.5
GH30	0.3	GH65	0.6

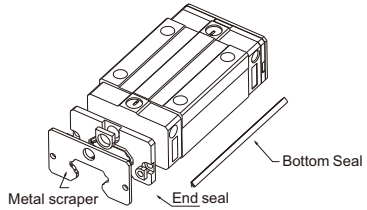
2-1-8 Dust Proof Accessories

(1) Codes of standard dust proof accessories

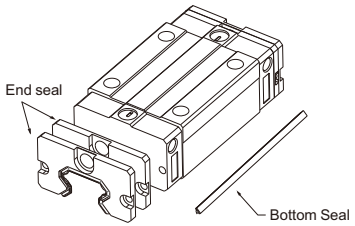
If the following accessories are needed, please add the code followed by the model number.



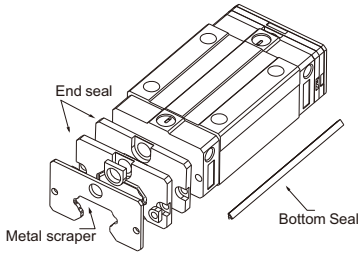
No symbol:Standard Protection(End seal+Bottom Seal)



ZZ(End seal+Metal scraper+Bottom Seal)



DD(Double end seals+Bottom seal)



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

Table 2-1-15

unit:mm

Size	Overall block length (L) SS	ZZ	DD	KK
GH15C	60.5	64.1	65.5	69.1
GH20C	76.7	80.3	82.5	86.1
GH20H	91.4	95	97.2	100.8
GH25C	84	87.6	90	93.6
GH25H	104.6	108.2	110.6	114.2
GH30C	98.4	102	104.6	108.2
GH30H	121.4	125	127.6	131.2
GH35C	112.4	116	118.8	122.4
GH35H	138.2	141.8	144.6	148.2
GH45C	137.4	141	145.4	149
GH45H	169.2	172.8	177.2	180.8

(4) Fuction of dust proof accessories

End seal and bottom seal

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

Double seals

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

Table 2-1-16 Dimensions of end seal

Size	Thickness (t1) (mm)	Size	Thickness (t1) (mm)
GH15 ES	3	GH35 ES	3.2
GH20 ES	3.5	GH45 ES	4.5
GH25 ES	3.5	GH55 ES	4.5
GH30 ES	3.2	GH65 ES	6

Scraper

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

Table 2-1-17 Dimensions of scraper

Size	Thickness (t2) (mm)	Size	Thickness (t2) (mm)
GH15 SC	1.5	GH35 SC	1.5
GH20 SC	1.5	GH45 SC	1.5
GH25 SC	1.5	GH55 SC	1.5
GH30 SC	1.5	GH65 SC	1.5

Top Seal

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

Bolt caps for rail mounting holes

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

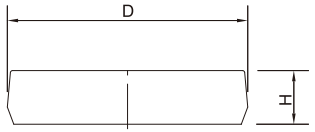
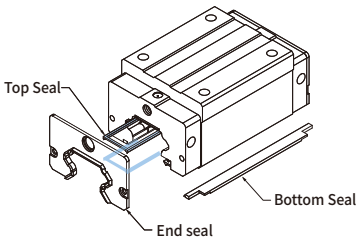


Table 2-1-18 Dimensions of Bolt Caps for Rail Mounting Holes

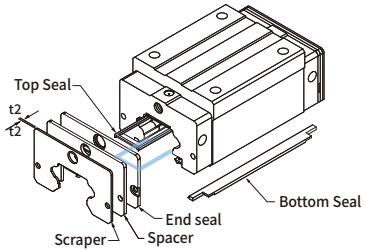
Rail size	Bolt size	Diameter(D) (mm)	Thickness(H) (mm)	Rail size	Bolt size	Diameter(D) (mm)	Thickness(H) (mm)
GHR15	M4	7.65	1.1	GHR35	M8	14.25	3.3
GHR20	M5	9.65	2.2	GHR45	M12	20.25	4.6
GHR25	M6	11.2	2.5	GHR55	M14	23.5	5.5
GHR30	M8	14.25	3.3	GHR65	M16	26.6	5.5

(2) Codes of high-dust proof accessories

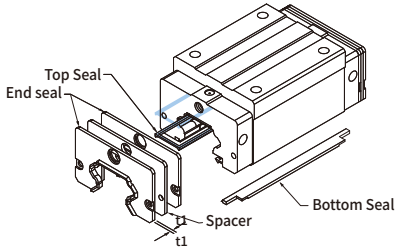
SHAC develops many kinds of dust proof accessories for different application and working environment to avoid dust or debris. If the following accessories are needed, please add the code followed by the model number.



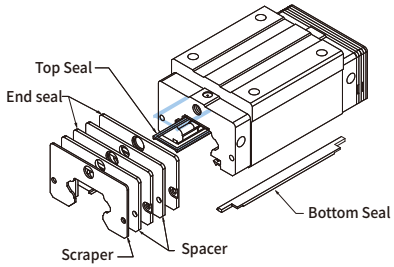
SH {End Seal (High-Dust Proof)
+ Bottom Seal (High Dust Proof) + Top Seal}



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



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



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

Note: 1. The available size for high dust proof accessories are GH20(C/H), 25(C/H), 30(C/H), 35(C/H) and 45C.
2. The value of fricton force will increase 0.6~1.2 kgf.

2-1-9 Friction

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

Table 2-1-19 Seal Resistance

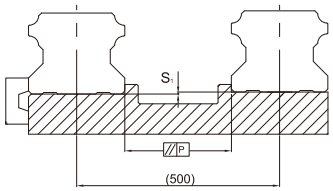
Size	Resistance N (kgf)	Size	Resistance N (kgf)
GH15	1. 50 (0.15)	GH35	4.5 (0.46)
GH20	2.55 (0.26)	GH45	6 (0. 61)
GH25	3.00 (0.3)	GH55	6.9 (0.7)
GH30	3.9 (0.4)	GH65	8.7(0.89)

Note:1kgf=9.81N

2-1-10 The Accuracy Tolerance of Mounting Surface

(1) The accuracy tolerance of rail-mounting surface

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



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

Table 2-1-20 Max. Parallelism Tolerance (P) unit: μm

Size	Preload classes		
	Z0	ZA	ZB
GH15	25	18	13
GH20	25	20	18
GH25	30	22	20
GH30	40	30	27
GH35	50	35	30
GH45	60	40	35
GH55	70	50	45
GH65	80	60	55

(3) The accuracy tolerance of reference surface height

Table 2-1-21 Max. Tolerance of Reference Surface Height (S_1) unit: μm

Size	Preload classes		
	Z0	ZA	ZB
GH15	130	85	35
GH20	130	85	50
GH25	130	85	70
GH30	170	110	90
GH35	210	150	120
GH45	250	170	140
GH55	300	210	170
GH65	350	250	200

2-1-11 Cautions for Installation

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

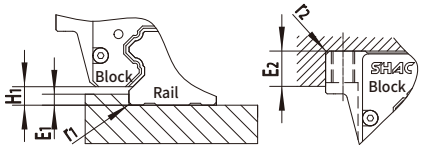


Table 2-1-**22** Shoulder Heights and Fillets

Size	Max. radius of fillets r_1 (mm)	Max. radius of fillets r_2 (mm)	Shoulder height of the rail E_1 (mm)	Shoulder height of the block E_2 (mm)	Clearance under block H_1 (mm)
GH15	0.5	0.5	3	4	4.3
GH20	0.5	0.5	3.5	5	4.6
GH25	1.0	1	5	5	5.5
GH30	1.0	1	5	5	6
GH35	1.0	1	6	6	7.5
GH45	1.0	1	8	8	9.5
GH55	1.5	1.5	10	10	13
GH65	1.5	1.5	10	10	15

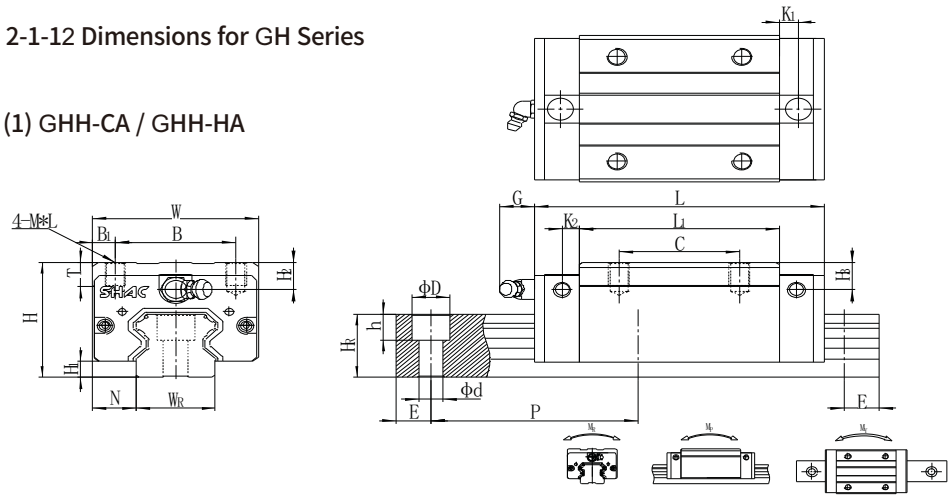
(2) Tightening Torque of Bolts for Installation
Improper tightening of bolts will seriously influence the accuracy of Linear Guideway installation. The following tightening torques for different sizes of bolts are recommended.

Table 2-1-23 Mounting Torque

Size	Bolt size	Torque N-cm (kgf-cm)		
		Iron	Casting	Aluminum
GH15	M4×0.7P×16L	392 (40)	274 (28)	206 (21)
GH20	M5×0.8P×16L	883 (90)	588 (60)	441 (45)
GH25	M6×1P×20L	1373 (140)	921 (94)	686 (70)
GH30	M8×1.25P×25L	3041 (310)	2010 (205)	1470 (150)
GH35	M8×1.25P×25L	3041 (310)	2010 (205)	1470 (150)
GH45	M12×1.75P×35L	11772 (1200)	7840 (800)	5880 (600)
GH55	M14×2P×45L	15696 (1600)	10500 (1100)	7840 (800)
GH65	M16×2P×50L	19620 (2000)	13100 (1350)	9800 (1000)

2-1-12 Dimensions for GH Series

(1) GHH-CA / GHH-HA



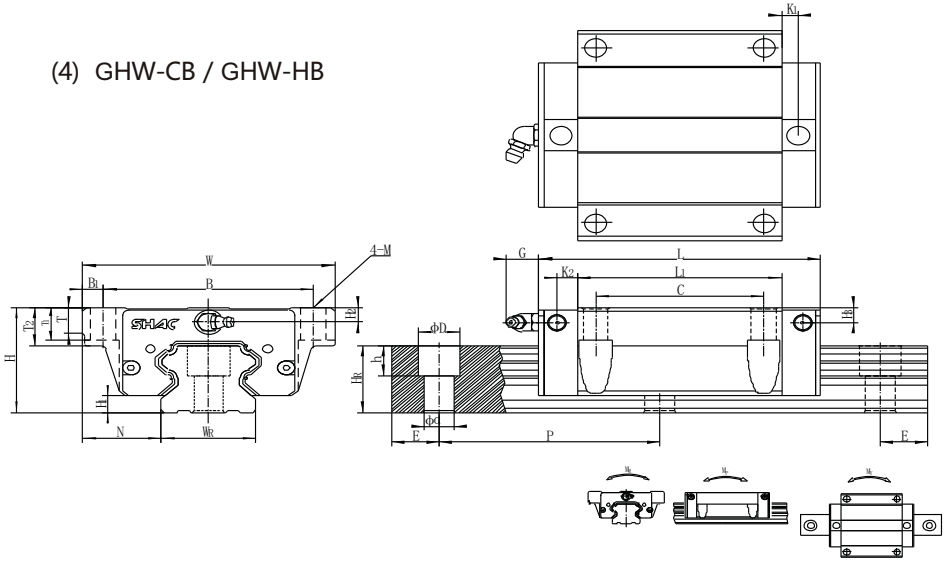
Model No.	Dimensions of Assembly (mm)			Dimensions of Block (mm)													Dimensions of Rail (mm)							Mounting Bolt for Rail (mm)	Basic Dynamic Load Rating Ca(KN)	Basic Static Load Rating Co(KN)	Static Rated Moment			Weight	
	H	H_1	N	W	B	B_1	C	L_1	L	K_1	K_2	G	M*I	T	H_2	H_3	W_R	H_R	D	h	d	P	E				M_R KN-m	M_P KN-m	M_Y KN-m	Block kg	Rail kg/m
GHH15CA	28	4.4	9.5	34	26	4	26	39.5	59.5	3.35	4.75	5.5	M4×5	6	8	8	15	15	7.5	5.3	4.5	60	20	M4×16	10.59	16.19	0.08	0.09	0.09	0.20	1.42
GHH20CA	30	4.3	12	44	32	6	36	50.5	74.5	5	6	12	M5×6	8	6	6	20	17.5	9.5	8.5	6	60	20	M5×16	17.05	25.3	0.24	0.18	0.18	0.33	2.2
GHH20HA							50	65.2	89.2																20.83	33.73	0.31	0.31	0.31	0.41	
GHH25CA	40	5.6	12.5	48	35	6.5	35	58	82	5	6	12	M6×8	8	10	9.5	23	22	11	9	7	60	20	M6×20	25.11	36.42	0.4	0.3	0.3	0.53	3.25
GHH25HA							50	78.6	102.6																30.73	48.56	0.53	0.53	0.53	0.71	
GHH30CA	45	6	16	60	40	10	40	70	96	6.5	5.5	12	M8×10	8.5	10	9	28	26	14	12	9	80	20	M8×25	34.95	49.58	0.51	0.49	0.49	0.90	4.49
GHH30HA							60	93	119																42.72	66.1	0.68	0.86	0.86	1.20	
GHH35CA	55	7.4	18	70	50	10	50	80	110.6	5.5	6.5	12	M8×12	10.2	16	15	34	29	14	12	9	80	20	M8×25	46.45	64.76	0.71	0.73	0.73	1.50	6.36
GHH35HA							72	105.8	136.4																56.8	86.35	0.95	1.28	1.28	1.96	
GHH45CA	70	9.5	20.5	86	60	13	60	97	135.4	4.8	8	13	M10×17	16	21	20	45	38	20	17	14	105	22.5	M12×35	74.71	101.2	1.56	1.37	1.37	2.75	10.45
GHH45HA							80	128.8	167.2																91.36	134.94	2.08	2.43	2.43	3.65	
GHH55CA	80	13	23.5	100	75	13	75	117.7	161.9	6	11	13	M12×18	17.5	22	29	53	44	23	20	16	120	30	M14×45	110.25	145.71	3.42	2.4	2.4	4.20	15.12
GHH55HA							95	155.8	200																134.81	194.29	4.56	4.24	4.24	5.55	
GHH65CA	90	15	31.5	126	76	25	70	144.2	194.2	6	14	13	M16×20	25	15	15	63	53	26	22	18	150	35	M16×50	153.43	198.33	6	4	4	9.25	21.25
GHH65HA							120	203.6	253.6																203.37	297.5	8.99	8.48	8.48	12.95	

Note : 1 kgf = 9.81 N

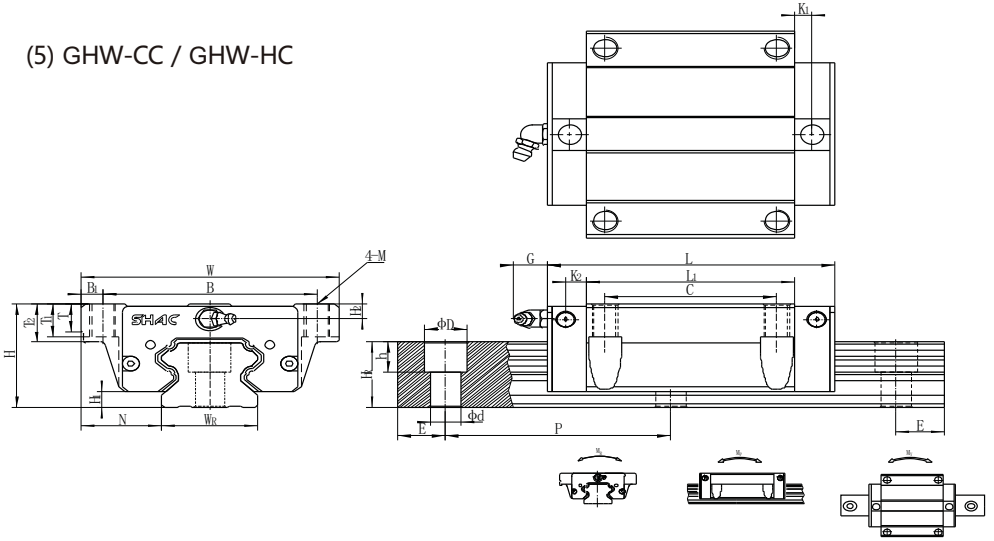
GH Series

Heavy Load Ball Type

(4) GHW-CB / GHW-HB



(5) GHW-CC / GHW-HC



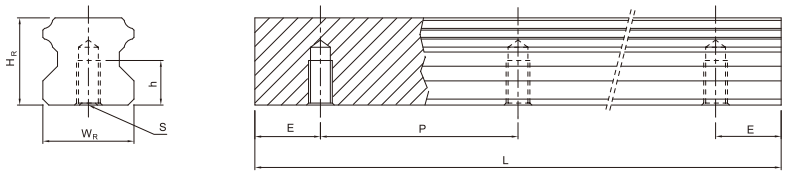
Model No.	Dimensions of Assembly (mm)			Dimensions of Block (mm)																		Dimensions of Rail (mm)						Mounting Bolt for Rail (mm)	Basic Dynamic Load Rating Ca(KN)	Basic Static Load Rating Co(KN)	Static Rated Moment			Weight	
	H	H_1	N	W	B	B_1	C	L_1	L	K_1	K_2	G	M	T	T_1	T_2	H_2	H_3	W_R	H_R	D	h	d	P	E				M_R KN-m	M_P KN-m	M_Y KN-m	Block kg	Rail kg/m
GHW15CB	24	4.4	16	47	38	4.5	30	39.5	59.5	3.35	4.75	5.5	φ4.5	6	7	8.9	4	4	15	15	7.5	5.3	4.5	60	20	M4×16	10.59	16.19	0.08	0.09	0.09	0.20	1.42
GHW20CB	30	4.3	21.5	63	53	5	40	50.5	74.5	5	6	12	φ6	8	9.5	10	6	6	20	17.5	9.5	8.5	6	60	20	M5×16	17.05	25.3	0.24	0.18	0.18	0.33	2.2
GHW20HB								65.2	89.2																		20.83	33.73	0.31	0.31	0.31	0.41	
GHW25CB	36	5.6	23.5	70	57	6.5	45	58	82	5	6	12	φ7	8	10	14	6	5.5	23	22	11	9	7	60	20	M6×20	25.11	36.42	0.4	0.3	0.3	0.53	3.25
GHW25HB								78.6	102.6																		30.73	48.56	0.53	0.53	0.53	0.71	
GHW30CB	42	6	31	90	72	9	52	70	96	6.5	5.5	12	φ9	8.5	10	16	7	6	28	26	14	12	9	80	20	M8×25	34.95	49.58	0.51	0.49	0.49	0.90	4.49
GHW30HB								93	119																		42.72	66.1	0.68	0.86	0.86	1.20	
GHW35CB	48	7.4	33	100	82	9	62	80	110.6	5.5	6.5	12	φ9	10	13	18	9	8	34	29	14	12	9	80	20	M8×25	46.45	64.76	0.71	0.73	0.73	1.50	6.36
GHW35HB								105.8	136.4																		56.8	86.35	0.95	1.28	1.28	1.96	
GHW45CB	60	9.5	37.5	120	100	10	80	97	135.4	4.8	8	13	φ11	15	15	22	11	10	45	38	20	17	14	105	22.5	M12×35	74.71	101.2	1.56	1.37	1.37	2.75	10.45
GHW45HB								128.8	167.2																		91.36	134.94	2.08	2.43	2.43	3.65	
GHW55CB	70	13	43.5	140	116	12	95	117.7	161.9	6	11	13	φ14	17.5	17	26.5	12	19	53	44	23	20	16	120	30	M14×45	110.25	145.71	3.42	2.4	2.4	4.20	15.12
GHW55HB								155.8	200																		134.81	194.29	4.56	4.24	4.24	5.55	
GHW65CB	90	15	53.5	170	142	14	110	144.2	194.2	6	14	13	φ16	25	23	37.5	15	15	63	53	26	22	18	150	35	M16×50	153.43	198.33	6	4	4	9.25	21.25
GHW65HB								203.6	253.6																		203.37	297.5	8.99	8.48	8.48	12.95	

Note : 1 kgf = 9.81 N

Model No.	Dimensions of Assembly (mm)			Dimensions of Block (mm)																		Dimensions of Rail (mm)						Mounting Bolt for Rail (mm)	Basic Dynamic Load Rating Ca(KN)	Basic Static Load Rating Co(KN)	Static Rated Moment			Weight	
	H	H_1	N	W	B	B_1	C	L_1	L	K_1	K_2	G	M	T	T_1	T_2	H_2	H_3	W_R	H_R	D	h	d	P	E				M_R KN-m	M_P KN-m	M_Y KN-m	Block kg	Rail kg/m
GHW15CC	24	4.4	16	47	38	4.5	30	39.5	59.5	3.35	4.75	5	M5	6	7	8.9	4	4	15	15	7.5	5.3	4.5	60	20	M4×16	10.59	16.19	0.08	0.09	0.09	0.20	1.42
GHW20CC	30	4.3	21.5	63	53	5	40	50.5	74.5	5	6	12	M6	8	9.5	10	6	6	20	17.5	9.5	8.5	6	60	20	M5×16	17.05	25.3	0.24	0.18	0.18	0.33	2.2
GHW20HC								65.2	89.2																		20.83	33.73	0.31	0.31	0.31	0.41	
GHW25CC	36	5.6	23.5	70	57	6.5	45	58	82	5	6	12	M8	8	10	14	6	5.5	23	22	11	9	7	60	20	M6×20	25.11	36.42	0.4	0.3	0.3	0.53	3.25
GHW25HC								78.6	102.6																		30.73	48.56	0.53	0.53	0.53	0.71	
GHW30CC	42	6	31	90	72	9	52	70	96	6.5	5.5	12	M10	8.5	10	16	7	6	28	26	14	12	9	80	20	M8×25	34.95	49.58	0.51	0.49	0.49	0.90	4.49
GHW30HC								93	119																		42.72	66.1	0.68	0.86	0.86	1.20	
GHW35CC	48	7.4	33	100	82	9	62	80	110.6	5.5	6.5	12	M10	10	13	18	9	8	34	29	14	12	9	80	20	M8×25	46.45	64.76	0.71	0.73	0.73	1.50	6.36
GHW35HC								105.8	136.4																		56.8	86.35	0.95	1.28	1.28	1.96	
GHW45CC	60	9.5	37.5	120	100	10	80	97	135.4	4.8	8	13	M12	15	15	22	11	10	45	38	20	17	14	105	22.5	M12×35	74.71	101.2	1.56	1.37	1.37	2.75	10.45
GHW45HC								128.8	167.2																		91.36	134.94	2.08	2.43	2.43	3.65	
GHW55CC	70	13	43.5	140	116	12	95	117.7	161.9	6	11	13	M14	17.5	17	26.5	12	19	53	44	23	20	16	120	30	M14×45	110.25	145.71	3.42	2.4	2.4	4.20	15.12
GHW55HC								155.8	200																		134.81	194.29	4.56	4.24	4.24	5.55	
GHW65CC	90	15	53.5	170	142	14	110	144.2	194.2	6	14	13	M16	25	23	37.5	15	15	63	53	26	22	18	150	35	M16×50	153.43	198.33	6	4	4	9.25	21.25
GHW65HC								203.6	253.6																		203.37	297.5	8.99	8.48	8.48	12.95	

Note : 1 kgf = 9.81 N

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



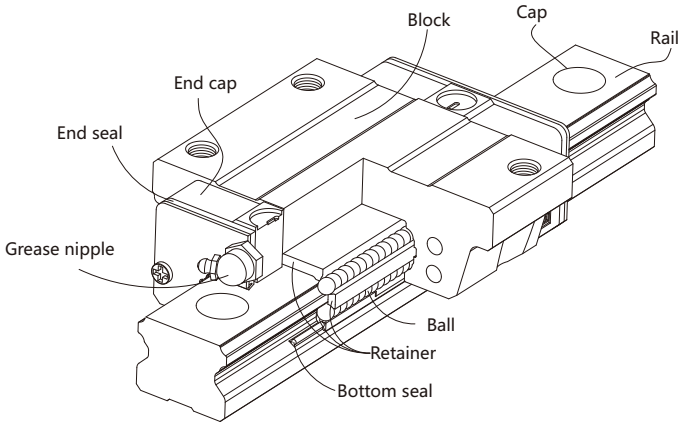
Model No.	Dimensions of Rail (mm)						Weight
	W_R	H_R	S	h	P	E	(kg/m)
GHR15T	15	15	M5 x 0.8P	8	60	20	1.48
GHR20T	20	17.5	M6 x 1P	10	60	20	2.29
GHR25T	23	22	M6 x 1P	12	60	20	3.35
GHR30T	28	26	M8 x 1.25P	15	80	20	4.67
GHR35T	34	29	M8x1.25P	17	80	20	6.51
GHR45T	45	38	M12 x 1.75P	24	105	22.5	10.87
GHR55T	53	44	M14 x 2P	24	120	30	15.67
GHR65T	63	53	M20 x 2.5P	30	150	35	21.73

2-2 GE Series – Low Profile Ball Type Linear Guideway

2-2-1 Features of the GE Series Linear Guideway

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

2-2-2 Construction of GE Series



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

2-2-3 Model Number of GE Series

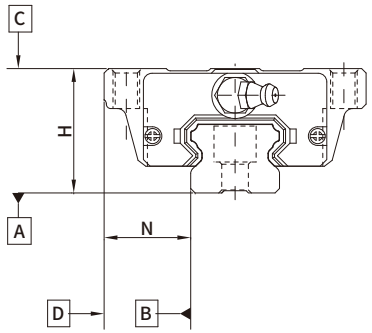
GE series linear guideways are classified into non-interchangeable and interchangeable types. The sizes of these two types are the same as one another. The main difference is that the interchangeable type of blocks and rails can be freely exchanged and they can maintain P-class accuracy. Because of strict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

GE Series

Low Profile Ball Type

2-2-5 Accuracy

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



(1) Accuracy of non-interchangeable guideways

Table 2-2-3 Accuracy Standards

Unit: mm

Item	GE - 15, 20				
Accuracy Classes	Normal (C)	High (H)	Precision (P)	Super Precision (SP)	Ultra Precision (UP)
Dimensional tolerance of height H	± 0.1	± 0.03	0 - 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 2-2-7				
Running parallelism of block surface D to surface B	See Table 2-2-7				

Table 2-2-4 Accuracy Standards

Unit: mm

Item	GE - 25, 30, 35				
Accuracy Classes	Normal (C)	High (H)	Precision (P)	Super Precision (SP)	Ultra Precision (UP)
Dimensional tolerance of height H	± 0.1	± 0.04	0 - 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 2-2-7				
Running parallelism of block surface D to surface B	See Table 2-2-7				

(2) Accuracy of interchangeable guideways

Table 2-2-5 Accuracy Standards

Unit: mm

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

Table 2-2-6 Accuracy Standards

Unit: mm

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

(3) Accuracy of running parallelism

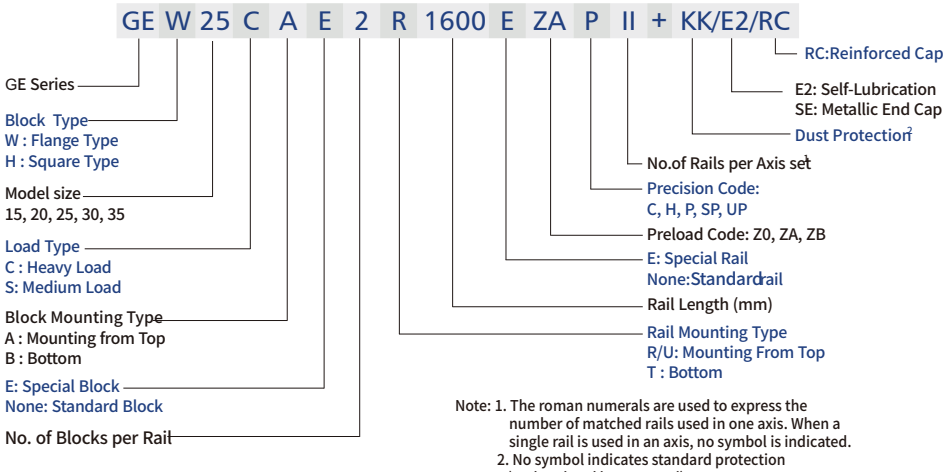
Table 2-2-7 Accuracy of Running Parallelism

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

GE Series

Low Profile Ball Type

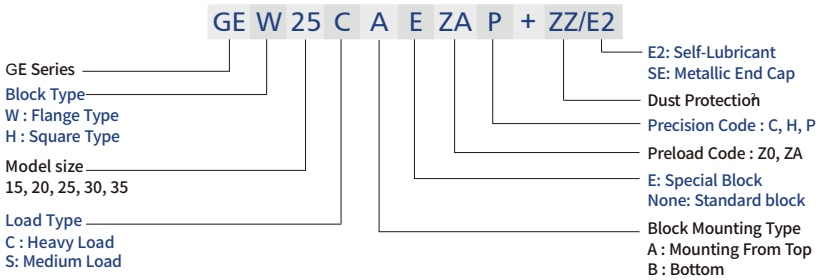
(1) Non-interchangeable type



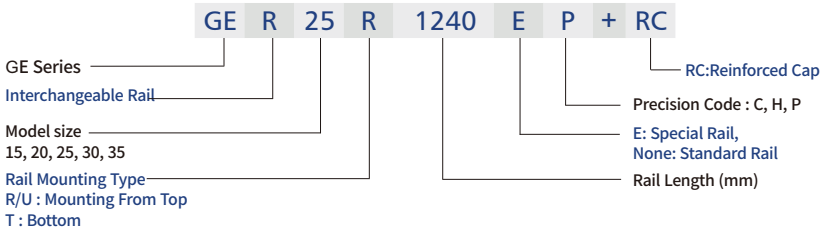
Note: 1. The roman numerals are used to express the number of matched rails used in one axis. When a single rail is used in an axis, no symbol is indicated.
2. No symbol indicates standard protection (end seal and bottom seal).
ZZ : End seal, bottom seal and scraper
KK: Double seals, bottom seal and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

(2) Interchangeable type

Model Number of GE Block



Model Number of GE Rail

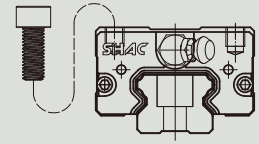
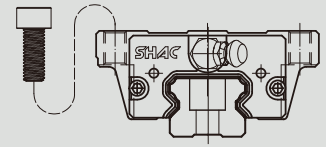
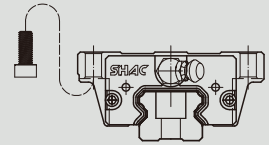
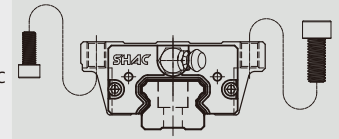


2-2-4 Types

(1) Block types

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

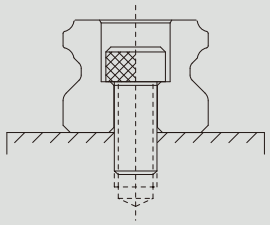
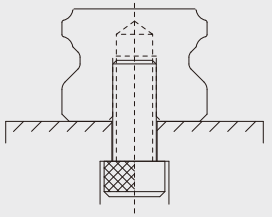
Table 2-2-1 Block Types

Type	Model	Shape	Height (mm)	Rail Length (mm)	Main Applications
Square	GEH-SA GEH-CA		24 48	100 6000	Automation devices High-speed transportation equipment Precision measuring equipment Semiconductor manufacturing equipment
Flange	GEW-SA GEW-CA		24 48	100 6000	
	GEW-SB GEW-CB		24 48	100 6000	
	GEW-SC GEW-CC		24 48	100 6000	

(2) Rail types

Besides the standard top mounting type, SHAC also offers bottom mounting type rails.

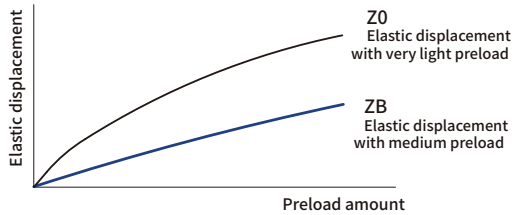
Table 2-2-2 Rail Types

Mounting from Top	Mounting from Bottom
	

2-2-6 Preload

(1) Definition

A preload can be applied to each guideway. Generally, a linear motion guideway has a negative clearance between the groove and balls in order to improve stiffness and maintain high precision. The figure shows that adding a preload can improve stiffness of the linear guideway. A preload no greater than ZA would be recommended for model sizes smaller than GE20. This will avoid an over-loaded condition that would affect guideway life.



(2) Preload classes

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

Table 2-1-8 Preload Classes

Class	Code	Preload	Condition	Examples of Application
NO Preload	Z0	0~ 0.02C	Certain load direction,low impact, low precision required	Transportationdevices,auto-packingmachines,X-Y axisforgeneralindustrialmachines,weldingmachines, welders
Light Preload	ZA	0.02C~0.04C	High precision required	Machining centers, Z axis for general industrial, machines, EDM, NC lathes, Precision X-Y tables, measuring equipment
Medium Preload	ZB	0.04C~ 008 C	High rigidity required, with vibration and impact	Machining centers, grinding machines, NC lathes, horizontal and vertical milling machines, Z axis of machine tools, Heavy cutting machines
Heavy Preload	ZC	0.08C~ 0.12C	Higher rigidity, and vibration, high impact environment	Machining centers, grinding machines, NC lathes, machine tools, Heavy cutting machines

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

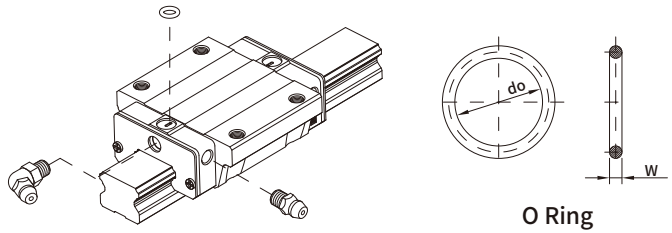
Note: The “C” in the preload column denotes basic dynamic load rating.

2-2-7 Lubrication

(1) Grease

Mounting location

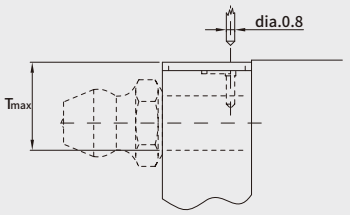
The standard location of the grease fitting is at both ends of the block, the nipple may be mounted in the side or top of the block. For lateral installation, we recommend that the nipple be mounted to the non-reference side, otherwise please contact us. When lubricating from above, in the recess for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



O Ring

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

Size	O-Ring		Lube hole at top: max. permissible depth for piercing
	do(mm)	W (mm)	T_{max}(mm)
GE15	2.5 ± 0.15	1.5 ± 0.15	6.9
GE20	4.5 ± 0.15	1.5 ± 0.15	8.4
GE25	4.5 ± 0.15	1.5 ± 0.15	10.4
GE30	4.5 ± 0.15	1.5 ± 0.15	10.4
GE35	4.5 ± 0.15	1.5 ± 0.15	10.8



The oil amount for a block filled with grease

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

Size	Medium Load (cm^3)	Heavy Load (cm^3)
GE15	0.8	1.4
GE20	1.5	2.4
GE25	2.8	4.6
GE30	3.7	6.3
GE35	5.6	6.6

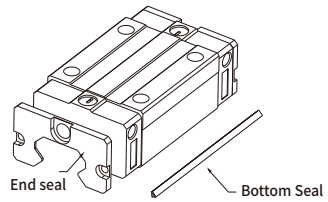
Frequency of replenishment

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

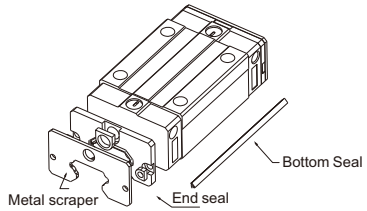
2-2-8 Dust Protection Equipment

(1) Codes of equipment

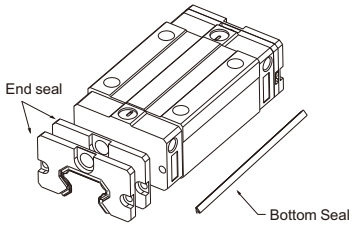
If the following equipment is needed, please indicate the code followed by the model number.



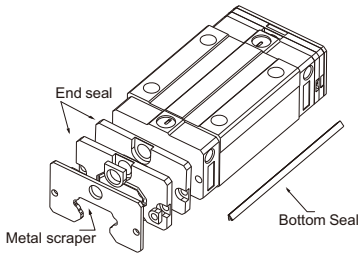
No symbol:Standard Protection(End seal+Bottom Seal)



ZZ(End seal+Metal scraper+Bottom Seal)



DD(Double end seals+Bottom seal)



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

(2) End seal and bottom seal

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

(3) Double seals

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

Table 2-2-11 Dimensions of end seal

Size	Thickness (t1) (mm)
GE15 ES	2.5
GE20 ES	2
GE25 ES	3
GE30 ES	3
GE35 ES	3

(4) Scraper

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

Table 2-2-12 Dimensions of Scraper

Size	Heavy Load (cm^3)	Super Heavy Load (cm^3)
GE15 SC	0.8	1.4
GE20 SC	1.5	2.4
GE25 SC	2.8	4.6
GE30 SC	3.7	6.3
GE35 SC	5.6	6.6

(5) Bolt caps for rail mounting holes

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

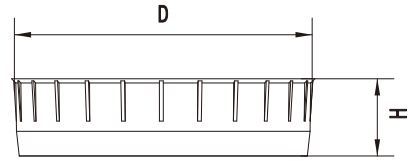


Table 2-2-13 Dimensions of Bolt Caps for Rail Mounting Holes

Rail size	Bolt size	Diameter(D) (mm)	Thickness(H) (mm)
GER15R	M4	7.65	1.0
GER20R	M5	9.75	3.2
GER25R	M6	11.15	2.7
GER30R	M8	14.15	3.7
GER35R	M8	14.15	3.7

(6) Dimensions of block equipped with the dustproof parts

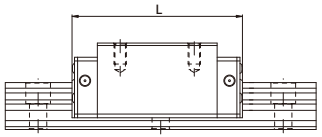


Table 2-2-14 Overall block length

unit: mm

Size	Overall block length (L)			
	SS	ZZ	DD	KK
GE15S	41.1	43.7	49.1	55.3
GE15C	57.8	64	65.8	72
GE20S	50	56	57	63
GE20C	69.1	75.1	76.1	82.1
GE25S	59.7	65.7	68.7	74.7
GE25C	85	91	94	100
GE30S	71.5	77.5	80.5	86.5
GE30C	100	106	109	115
GE35S	76	79	80	83
GE35C	108	111	112	115

2-2-9 Friction

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

Table 2-2-15 Seal Resistance

Size	Resistance N (kgf)
GE15	1.5 (0.15)
GE20	2.55 (0.26)
GE25	3.00 (0.31)
GE30	3.9 (0.4)
GE35	4.5 (0.46)

Note:1kgf=9.81N

2-2-10 Mounting Surface Accuracy Tolerance

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

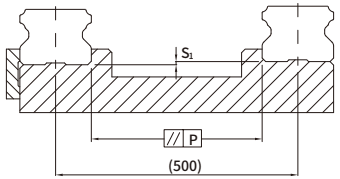


Table 2-2-16 Max. Parallelism Tolerance (P)

unit: μm

Size	Preload classes		
	Z0	ZA	ZB
GE15	25	18	-
GE20	25	20	18
GE25	30	22	20
GE30	40	30	27
GE35	50	35	30

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

unit: μm

Size	Preload classes		
	Z0	ZA	ZB
GE15	130	85	-
GE20	130	85	50
GE25	130	85	70
GE30	170	110	90
GE35	210	150	120

2-2-11 Cautions for Installation

(1) Shoulder heights and chamfers

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

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

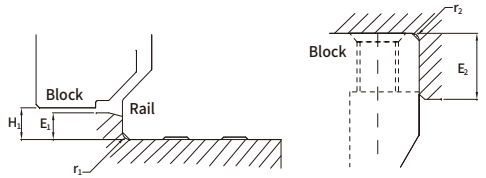


Table 2-2-18 Shoulder Heights and Chamfers

unit: mm

Size	Max. radius of fillets r_1 (mm)	Max. radius of fillets r_2 (mm)	Shoulder height of the rail E_1 (mm)	Shoulder height of the block E_2 (mm)	Clearance under block H_1 (mm)
GE15	0.5	0.5	2.7	5.0	4.5
GE20	0.5	0.5	5.0	7.0	6.0
GE25	1.0	1.0	5.0	7.5	7.0
GE30	1.0	1.0	7.0	7.0	10.0
GE35	1.0	1.0	7.5	9.5	11.0

(2) Tightening Torque of Bolts for Installation

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

Table 2-2-19 Tightening Torque

Size	Bolt size	Torque N-cm(kgf-cm)		
		Iron	Casting	Aluminum
GE 15	M3×0.5P×16L	186 (19)	127 (13)	98 (10)
GE 20	M5×0.8P×16L	883 (90)	588 (60)	441 (45)
GE 25	M6×1P×20L	1373 (140)	921 (94)	686 (70)
GE 30	M6×1P×25L	1373 (140)	921 (94)	686 (70)
GE 35	M8×1.25P×25L	3041 (310)	2010 (206)	1470 (150)

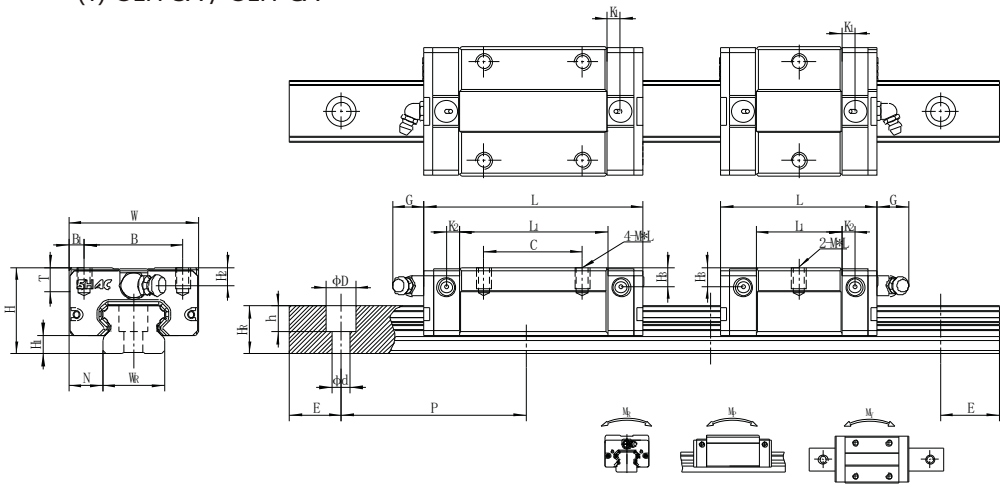
Note: 1 kgf = 9.81 N

GE Series

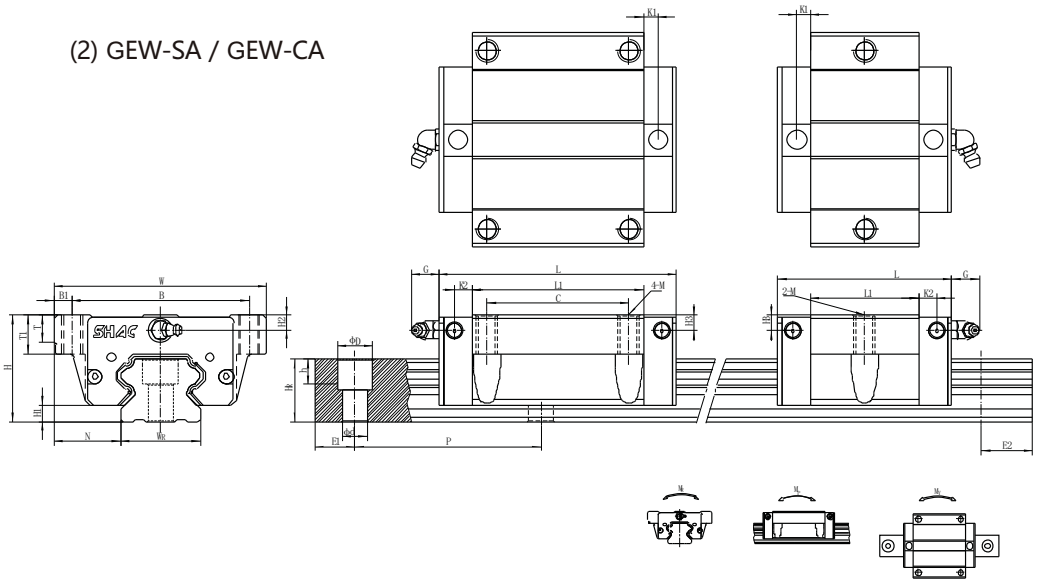
Low Profile Ball Type

2-2-12 Dimensions for GE Series

(1) GEH-SA / GEH-CA



(2) GEW-SA / GEW-CA



Model No.	Dimensions of Assembly (mm)			Dimensions of Block (mm)														Dimensions of Rail (mm)						Mounting Bolt for Rail	Basic Dynamic Load Rating	Basic Static Load Rating Co	Static Rated Moment			Weight	
	H	H_1	N	W	B	B_1	C	L_1	L	K_1	K_2	G	M*I	T	H_2	H_3	W_R	H_R	D	h	d	P	E				M_R KN-m	M_P KN-m	M_Y KN-m	Block kg	Rail kg/m
GEH15SA	24	4.4	9.5	34	26	4	-	23.1	39.7	3.4	3.4	5.5	M4×6	6	5.5	5.5	15	12.5	6	4.5	3.5	60	20	M3×16	5.99	8.26	0.06	0.03	0.03	0.12	1.26
★ GEH15CA							26	39.8	56.4																8.86	14.46	0.1	0.08	0.08	0.17	
GEH15SA	24	4.4	9.5	34	26	4	-	23.1	39.7	3.4	3.4	5.5	M4×6	6	5.5	5.5	15	12.5	7.5	5.3	4.5	60	20	M4×16	5.99	8.26	0.06	0.03	0.03	0.12	
GEH15CA							26	39.8	56.4																8.86	14.46	0.1	0.08	0.08	0.17	
GEH20SA	28	6	11	42	32	5	-	29	50.2	4.2	4.2	12	M5×7	7.5	5.8	6.3	20	15.5	9.5	8.5	6	60	20	M5×16	8.65	12.14	0.13	0.05	0.05	0.16	2.09
GEH20CA							32	48.1	69.3																12.36	20.24	0.21	0.14	0.14	0.28	
GEH25SA	33	6.2	12.5	48	35	6.5	-	35.5	59.5	5	5	12	M6×9	8	7.4	7.4	23	18	11	9	7	60	20	M6×20	12.86	16.87	0.19	0.08	0.08	0.26	2.69
GEH25CA		6.9					35	59	83.1																18.99	29.52	0.34	0.24	0.24	0.42	
★ GEH30SA	42	10	16	60	40	10	-	41.5	69.5	6	6	12	M8×12	9	9	9	28	23	11	9	7	80	20	M6×25	18.95	24.28	0.36	0.14	0.14	0.46	4.26
GEH30CA							40	70	98																28	42.49	0.63	0.42	0.42	0.77	
GEH30SA	42	10	16	60	40	10	-	41.5	69.5	6	6	12	M8×12	9	9	9	28	23	14	12	9	80	20	M8×25	18.95	24.28	0.36	0.14	0.14	0.46	
GEH30CA							40	70	98																28	42.49	0.63	0.42	0.42	0.77	
GEH35SA	48	11	18	70	50	10	-	45	75	7	7	12	M8×12	10	8.5	8.5	34	27.5	14	12	9	80	20	M8×25	26.27	33.05	0.46	0.2	0.2	0.75	6.11
GEH35CA							50	78	108																38.85	57.84	0.8	0.51	0.51	1.12	

Note : 1 kgf = 9.81 N

Note: above size model No. marked with * still on R&D,details requirements please confirm with our sales

Model No.	Dimensions of Assembly (mm)			Dimensions of Block (mm)														Dimensions of Rail (mm)						Mounting Bolt for Rail	Basic Dynamic Load Rating	Basic Static Load Rating Co	Static Rated Moment			Weight	
	H	H_1	N	W	B	B_1	C	L_1	L	K_1	K_2	G	M	T	T_1	H_2	H_3	W_R	H_R	D	h	d	P	E				M_R KN-m	M_P KN-m	M_Y KN-m	Block kg	Rail kg/m
GEW15SA	24	4.4	18.5	52	41	5.5	-	23.1	39.7	3.4	3.4	5.5	M5	5	7.8	5.5	5.5	15	12.5	6	4.5	3.5	60	20	M3×16	5.99	8.26	0.06	0.03	0.03	0.12	1.26
★ GEW15CA							26	39.8	56.4																	8.86	14.46	0.1	0.08	0.08	0.17	
GEW15SA	24	4.4	18.5	52	41	5.5	-	23.1	39.7	3.4	3.4	5.5	M5	5	7.8	5.5	5.5	15	12.5	7.5	5.3	4.5	60	20	M4×16	5.99	8.26	0.06	0.03	0.03	0.12	1.26
GEW15CA							26	39.8	56.4																	8.86	14.46	0.1	0.08	0.08	0.17	
GEW20SA	28	6	19.5	59	49	5	-	29	50.2	4.2	4.2	12	M6	7	9	5.8	6.3	20	15.5	9.5	8.5	6	60	20	M5×16	8.65	12.14	0.13	0.05	0.05	0.16	2.09
GEW20CA							32	48.1	69.3																	12.36	20.24	0.21	0.14	0.14	0.28	
GEW25SA	33	6.2	25	73	60	6.5	-	35.5	59.5	5	5	12	M8	7.5	10	7.4	7.4	23	18	11	9	7	60	20	M6×20	12.86	16.87	0.19	0.08	0.08	0.26	2.69
GEW25CA		6.9					35	59	83.1																	18.99	29.52	0.34	0.24	0.24	0.42	
GEW30SA	42	10	31	90	72	9	-	41.5	69.5	6	6	12	M10	7	10	9	9	28	23	11	9	7	80	20	M6×25	18.95	24.28	0.36	0.14	0.14	0.46	4.26
★ GEW30CA							40	70	98																	28	42.49	0.63	0.42	0.42	0.77	
GEW30SA	42	10	31	90	72	9	-	41.5	69.5	6	6	12	M10	7	10	9	9	28	23	14	12	9	80	20	M8×25	18.95	24.28	0.36	0.14	0.14	0.46	4.26
GEW30CA							40	70	98																	28	42.49	0.63	0.42	0.42	0.77	
GEW35SA	48	11	33	100	82	9	-	45	75	7	7	12	M10	10	13	8.5	8.5	34	27.5	14	12	9	80	20	M8×25	26.27	33.05	0.46	0.2	0.2	0.75	6.11
GEW35CA							50	78	108																	38.85	57.84	0.8	0.51	0.51	1.12	

Note : 1 kgf = 9.81 N

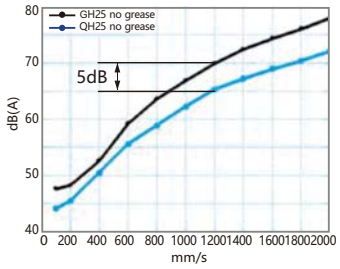
Note: above size model No. marked with * still on R&D,details requirements please confirm with our sales

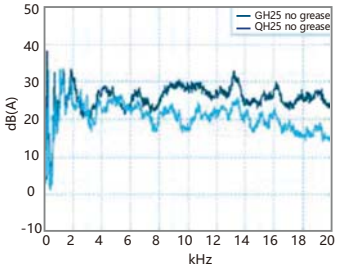
2–3 QH Series – Quiet Linear Guideway, with SynchMotion™ Technology

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

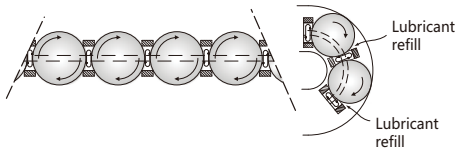
2-3-1 Features

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



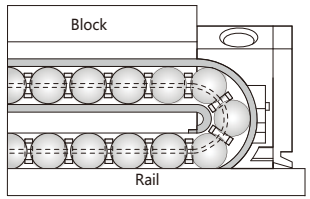


(2) Self-Lubricant Design
The partition is a grouping of hollow ring-like structures formed with a through hole to facilitate circulation of the lubricant. Because of the special lubrication path design, the lubricant of the partition storage space can be refilled. Therefore, the frequency of lubricant refilling can be decreased.
The QH-series linear guideway is pre-lubricated. Performance testing at a 0.2C (basic dynamic load) shows that after running 4,000km no damage was apparent to either the rolling elements or the raceway.

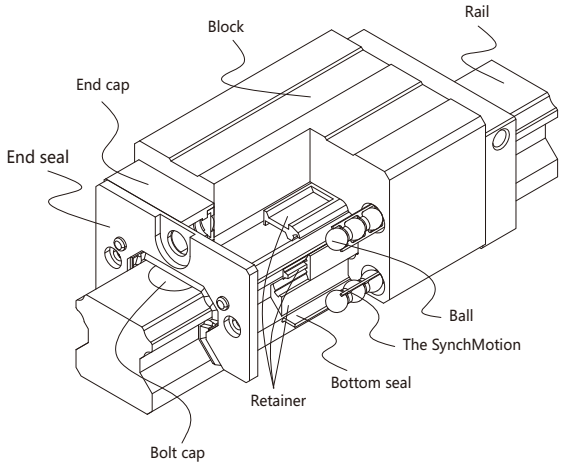


(3) Smooth Movement
In standard linear guideways, rolling elements on the load side of the guide block begin rolling and push their way through the raceway. When they contact other rolling elements they create counter-rotational friction. This results in a great variation of rolling resistance. The QH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

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



2-3-2 Construction



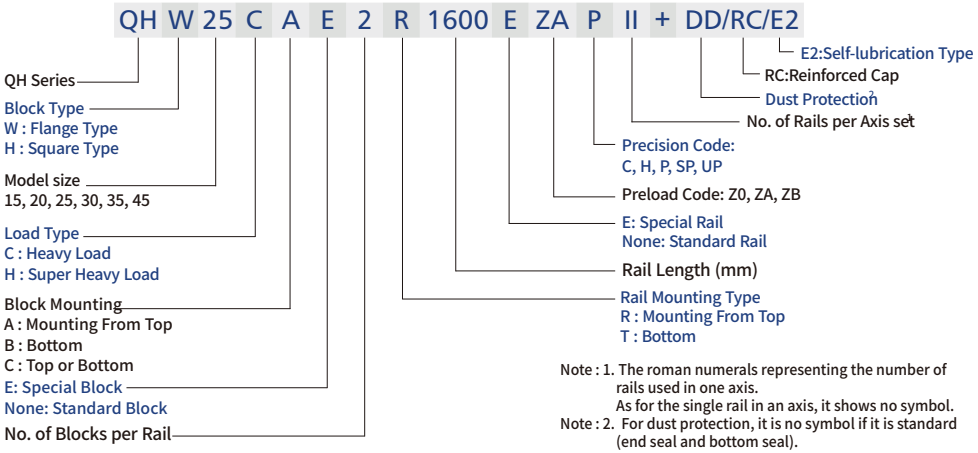
2-3-3 Model Number of QH Series

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

QH Series

Heavy Load Type

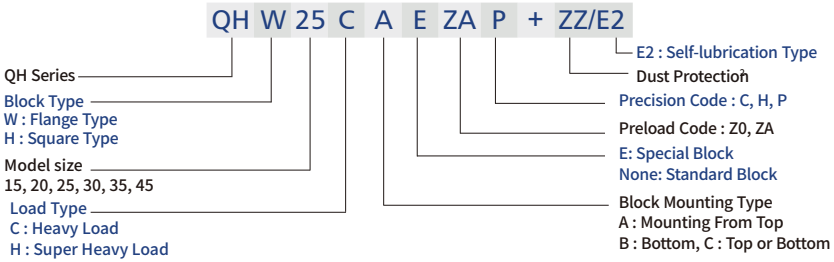
(1) Non-interchangeable type



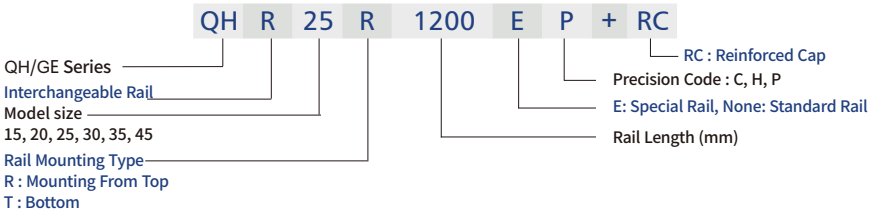
Note : 1. The roman numerals representing the number of rails used in one axis.
As for the single rail in an axis, it shows no symbol.
Note : 2. For dust protection, it is no symbol if it is standard (end seal and bottom seal).
ZZ : End seal, bottom seal and scraper.
KK : Double seals, bottom seal and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

(2) Interchangeable type

Model Number of QH Block



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

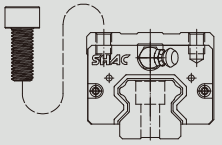
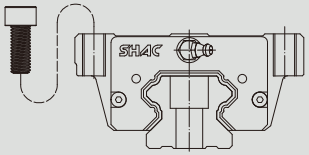
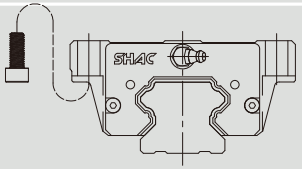
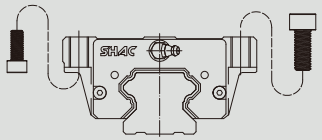


2-3-4 Types

(1) Block types

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

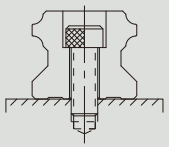
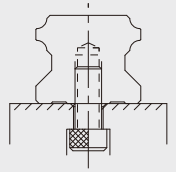
Table 2-3-1 Block Types

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

(2) Rail types

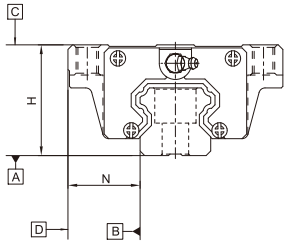
Besides the standard top mounting type, the bottom mounting type is also available.
QH and GE are on the same linear rail.

Table 2-3-2 Rail Types

Mounting from Top	Mounting from bottom
	

2-3-5 Accuracy Classes

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



(1) Accuracy of non-interchangeable

Table 2-3-3 Accuracy Standards Unit: mm

Item	QH - 15, 20				
Accuracy Classes	Normal (C)	High (H)	Precision (P)	Super Precision (SP)	Ultra Precision (UP)
Dimensional tolerance of height H	± 0.1	± 0.03	0 / - 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 2-3-7				
Running parallelism of block surface D to surface B	See Table 2-3-7				

Table 2-3-4 Accuracy Standards Unit: mm

Item	QH - 25, 30				
Accuracy Classes	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 2-3-7				
Running parallelism of block surface D to surface B	See Table 2-3-7				

(2) Accuracy of interchangeable

Table 2-3-5 Accuracy Standards Unit: mm

Item	QH - 15, 20		
Accuracy Classes	Normal (C)	High (H)	Precision (P)
Dimensional tolerance of height H	± 0.1	± 0.03	± 0.015
Dimensional tolerance of width N	± 0.1	± 0.03	± 0.015
Variation of height H	0.02	0.01	0.006
Variation of width N	0.02	0.01	0.006
Running parallelism of block surface C to surface A	See Table 2-3-7		
Running parallelism of block surface D to surface B	See Table 2-3-7		

Table 2-3-6 Accuracy Standards Unit: mm

Item	QH - 25, 30, 35		
Accuracy Classes	Normal (C)	High (H)	Precision (P)
Dimensional tolerance of height H	± 0.1	± 0.04	± 0.02
Dimensional tolerance of width N	± 0.1	± 0.04	± 0.02
Variation of height H	0.02	0.015	0.007
Variation of width N	0.03	0.015	0.007
Running parallelism of block surface C to surface A	See Table 2-3-7		
Running parallelism of block surface D to surface B	See Table 2-3-7		

(3) Accuracy of running parallelism

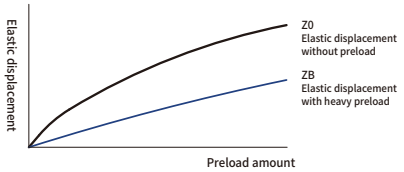
Table 2-3-7 Accuracy of Running Parallelism

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

2-3-6 Preload

(1) Definition

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



(2) Preload classes

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

Table 2-1-8 Preload Classes

Class	Code	Preload	Condition	Examples of Application
NO Preload	Z0	0~ 0.02C	Certain load direction,low impact, low precision required	Transportationdevices,auto-packingmachines,X-Y axisforgeneralindustrialmachines,weldingmachines, welders
Light Preload	ZA	0.02C~0.04C	High precision required	Machining centers, Z axis for general industrial, machines, EDM, NC lathes, Precision X-Y tables, measuring equipment
Medium Preload	ZB	0.04C~ 008 C	High rigidity required, with vibration and impact	Machining centers, grinding machines, NC lathes, horizontal and vertical milling machines, Z axis of machine tools, Heavy cutting machines
Heavy Preload	ZC	0.08C~ 0.12C	Higher rigidity, and vibration, high impact environment	Machining centers, grinding machines, NC lathes, machine tools, Heavy cutting machines

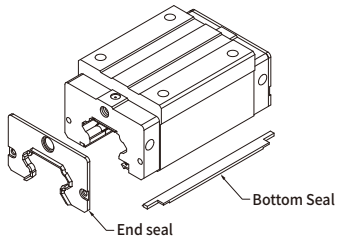
Class	Interchangeable Guideway	Non-Interchangeable Guideway
Preload classes	Z0, ZA	Z0, ZA, ZB, ZC

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

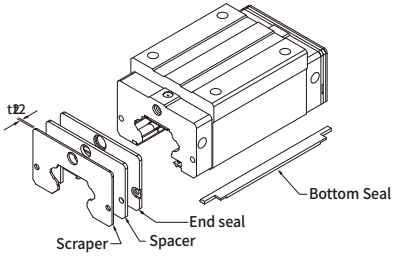
2-3-7 Dust Proof Accessories

(1) Codes of accessories

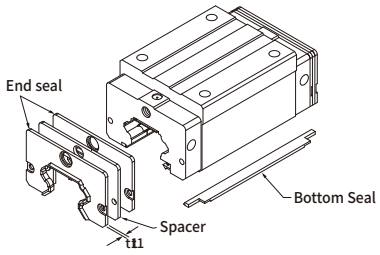
If the following accessories are needed, please add the code followed by the model number.



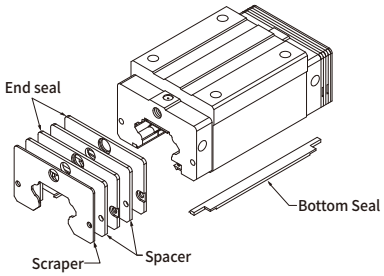
No symbol: Standard Protection (End seal + Bottom Seal)



ZZ (End seal + Bottom Seal + Scraper)



DD (Double seals + Bottom Seal)



KK (Double seals + Bottom Seal + Scraper)

(2) End seal and bottom seal

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

(3) Double seals

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

Table 2-3-11 Dimensions of end seal

Size	Thickness (t1) (mm)	Size	Thickness (t1) (mm)
QH15 ES	2	QH25 ES	2
QH20 ES	2	QH30 ES	2

(4) Scraper

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

Table 2-3-12 Dimensions of scraper

Size	Thickness (t2) (mm)	Size	Thickness (t2) (mm)
QH15 SC	1.5	QH25 SC	1.5
QH20 SC	1.5	QH30 SC	1.5

(5) Dimensions of block equipped with the dustproof parts

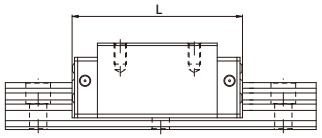


Table 2-3-13 Overall block length

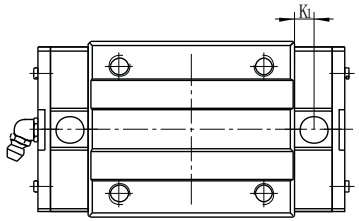
unit: mm

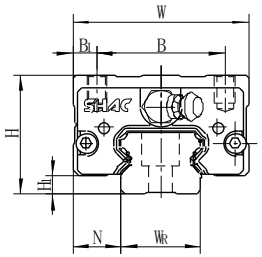
Size	Overall block length (L)			
	SS	ZZ	DD	KK
QH15C	62.2	65.8	67.2	70.8
QH20C	76.5	80.1	81.5	85.1
QH20H	94.5	98.1	99.5	103.1
QH25C	82.5	86.1	87.5	91.1
QH25H	104.5	108.1	109.5	113.1
QH30C	98	101.6	103	106.6
QH30H	121.5	125.1	126.5	130.1

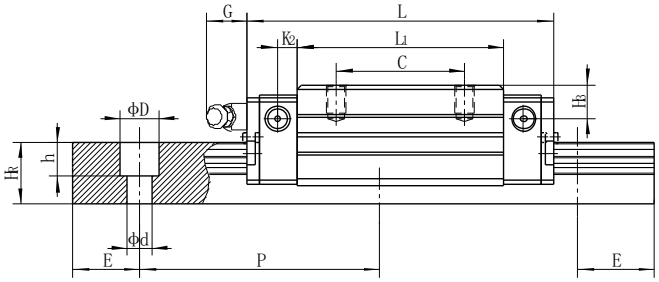
Note : The marking of "( )" denotes the maximum block length with screws, lips of end seals, etc.

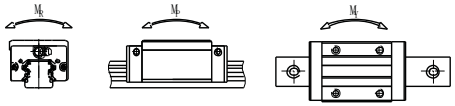
2-3-8 Dimensions for SHAC QH Series

(1) QHH-CA / QHH-HA









	Model No.	Dimensions of Assembly (mm)			Dimensions of Block (mm)												Dimensions of Rail (mm)							Mounting Bolt for Rail	Basic Dynamic Load Rating	Basic Static Load Rating Co	Static Rated Moment			Weight	
		H	H_1	N	W	B	B_1	C	L_1	L	K_1	K_2	G	M*l	T	H_2	H_3	W_R	H_R	D	h	d	P	E				M_R KN-m	M_P KN-m	M_Y KN-m	Block kg	Rail kg/m
★	QHH15CA	28	3.2	9.5	34	26	4	26	39.8	62.2	3.5	3.5	5.5	M4X7	6	9.5	9	15	12.5	6	4.5	3.5	60	20	M3×16	11.96	14.46	0.08	0.06	0.06	0.21	1.26
	QHH15CA	28	3.2	9.5	34	26	4	26	39.8	62.2	3.5	3.5	5.5	M4X7	6	9.5	9	15	12.5	7.5	5.3	4.5	60	20	M4×16	11.96	14.46	0.08	0.06	0.06	0.21	1.26
	QHH20CA	30	4.6	12	44	32	6	36	51.5	76.5	4.75	5	12	M5X7	8	8	8.5	20	15.5	9.5	8.5	6	60	20	M5×16	17.46	21.59	0.22	0.15	0.15	0.32	2.09
	QHH20HA							50	69.5	94.5																21.14	28.33	0.28	0.25	0.25	0.4	
	QHH25CA	40	4.5	12.5	48	35	6.5	35	59.5	82.5	4.75	5	12	M6X8	8	13	13	23	18	11	9	7	60	20	M6×20	25.65	29.52	0.35	0.25	0.25	0.55	2.69
	QHH25HA							50	81.5	104.5																32.88	42.17	0.48	0.42	0.42	0.72	
★	QHH30CA	45	7	16	60	40	10	40	70	98	6	5	12	M8X10	8.5	11	11	28	23	11	9	7	80	20	M6×25	42.17	45.22	0.52	0.45	0.45	0.9	4.26
	QHH30HA							60	93.5	121.5																52.09	62.13	0.8	0.85	0.85	1.18	
	QHH30CA	45	7	16	60	40	10	40	70	98	6	5	12	M8X10	8.5	11	11	28	23	14	12	9	80	20	M8×25	42.17	45.22	0.52	0.45	0.45	0.9	4.26
	QHH30HA							60	93.5	121.5																52.09	62.13	0.8	0.85	0.85	1.18	

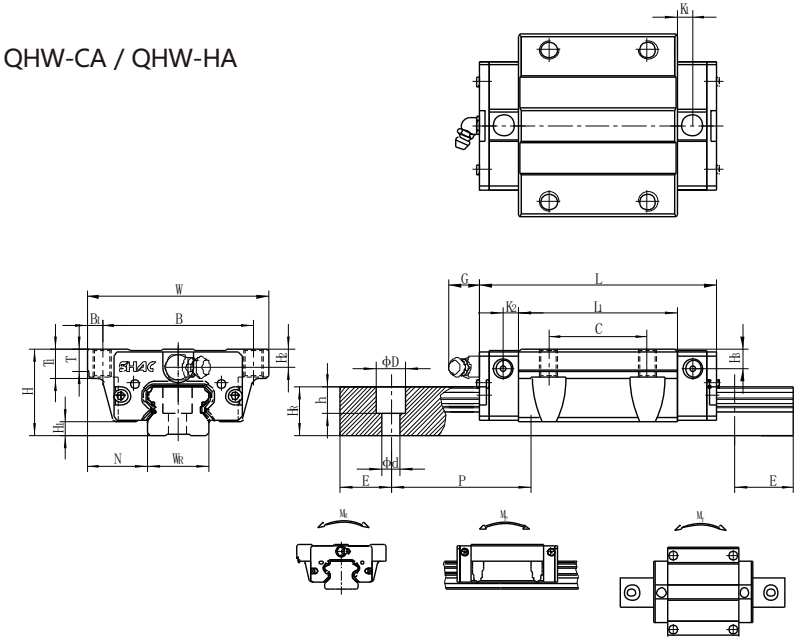
Note : 1 kgf = 9.81 N

Note: above size model No. marked with * still on R&D,details requirements please confirm with our sales

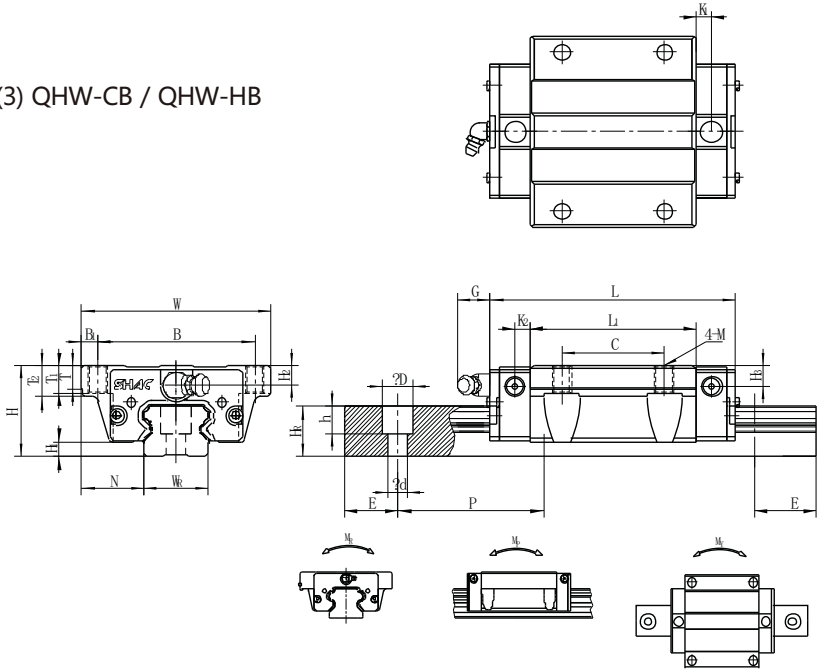
QH Series

Heavy Load Type

(2) QHW-CA / QHW-HA



(3) QHW-CB / QHW-HB



	Model No.	Dimensions of Assembly (mm)			Dimensions of Block (mm)															Dimensions of Rail (mm)						Mounting Bolt for Rail	Basic Dynamic Load Rating	Basic Static Load Rating Co	Static Rated Moment			Weight	
		H	H_1	N	W	B	B_1	C	L_1	L	K_1	K_2	G	M	T	T_1	H_2	H_3	W_R	H_R	D	h	d	P	E				M_R KN-m	M_P KN-m	M_Y KN-m	Block kg	Rail kg/m
★	QHW15CA	24	4	16	47	38	4.5	30	39.8	62.2	3.35	4.75	5.5	M5	6	7	5.5	5	15	12.5	6	4.5	3.5	60	20	M3×16	11.96	14.46	0.08	0.06	0.06	0.21	1.26
	QHW15CA	24	4	16	47	38	4.5	30	39.8	62.2	3.35	4.75	5.5	M5	6	7	5.5	5	15	12.5	7.5	5.3	4.5	60	20	M4×16	11.96	14.46	0.08	0.06	0.06	0.21	1.26
	QHW20CA	30	4.6	21.5	63	53	5	40	51.5	76.5	4.75	5	12	M6	8	9	8	8.5	20	15.5	9.5	8.5	6	60	20	M5×16	17.46	21.59	0.22	0.15	0.15	0.32	2.09
	QHW20HA								69.5	94.5																	21.14	28.33	0.28	0.25	0.25	0.4	
	QHW25CA	36	4.5	23.5	70	57	6.5	45	59.5	82.5	4.75	5	12	M8	8	10	9	9	23	18	11	9	7	60	20	M6×20	25.65	29.52	0.35	0.25	0.25	0.55	2.69
	QHW25HA								81.5	104.5																	32.88	42.17	0.48	0.42	0.42	0.72	
	QHW30CA	42	7	31	90	72	9	52	70	98	6	5	12	M10	8	10	8	8	28	23	11	9	7	80	20	M6×25	42.17	45.22	0.52	0.45	0.45	0.9	4.26
★	QHW30HA								93.5	121.5																	52.09	62.13	0.8	0.85	0.85	1.18	
	QHW30CA	42	7	31	90	72	9	52	70	98	6	5	12	M10	8	10	8	8	28	23	14	12	9	80	20	M8×25	42.17	45.22	0.52	0.45	0.45	0.9	4.26
	QHW30HA								93.5	121.5																	52.09	62.13	0.8	0.85	0.85	1.18	

Note : 1 kgf = 9.81 N

Note: above size model No. marked with * still on R&D,details requirements please confirm with our sales

	Model No.	Dimensions of Assembly (mm)			Dimensions of Block (mm)															Dimensions of Rail (mm)						Mounting Bolt for Rail	Basic Dynamic Load Rating	Basic Static Load Rating Co	Static Rated Moment			Weight	
		H	H_1	N	W	B	B_1	C	L_1	L	K_1	K_2	G	M	T	T_1	T_2	H_2	H_3	W_R	H_R	D	h	d	P	E				M_R KN-m	M_P KN-m	M_Y KN-m	Block kg	Rail kg/m
★	QHW15CB	24	4	16	47	38	4.5	30	39.8	62.2	3.35	4.75	5.5	φ4.5	6	7	8.9	5.5	5	15	12.5	6	4.5	3.5	60	20	M3×16	11.96	14.46	0.08	0.06	0.06	0.21	1.26
	QHW15CB	24	4	16	47	38	4.5	30	39.8	62.2	3.35	4.75	5.5	φ4.5	6	7	8.9	5.5	5	15	12.5	7.5	5.3	4.5	60	20	M4×16	11.96	14.46	0.08	0.06	0.06	0.21	1.26
	QHW20CB	30	4.6	21.5	63	53	5	40	51.5	76.5	4.75	5	12	φ6	8	9	10	8	8.5	20	15.5	9.5	8.5	6	60	20	M5×16	17.46	21.59	0.22	0.15	0.15	0.32	2.09
	QHW20HB								69.5	94.5																	21.14	28.33	0.28	0.25	0.25	0.4	
	QHW25CB	36	4.5	23.5	70	57	6.5	45	59.5	82.5	4.75	5	12	φ7	8	10	14	9	9	23	18	11	9	7	60	20	M6×20	25.65	29.52	0.35	0.25	0.25	0.55	2.69
	QHW25HB								81.5	104.5																	32.88	42.17	0.48	0.42	0.42	0.72	
	QHW30CB	42	7	31	90	72	9	52	70	98	6	5	12	φ9	8.5	10	16	8	8	28	23	11	9	7	80	20	M6×25	42.17	45.22	0.52	0.45	0.45	0.9	4.26
★	QHW30HB								93.5	121.5																	52.09	62.13	0.8	0.85	0.85	1.18	
	QHW30CB	42	7	31	90	72	9	52	70	98	6	5	12	φ9	8.5	10	16	8	8	28	23	14	12	9	80	20	M8×25	42.17	45.22	0.52	0.45	0.45	0.9	4.26
	QHW30HB								93.5	121.5																	52.09	62.13	0.8	0.85	0.85	1.18	

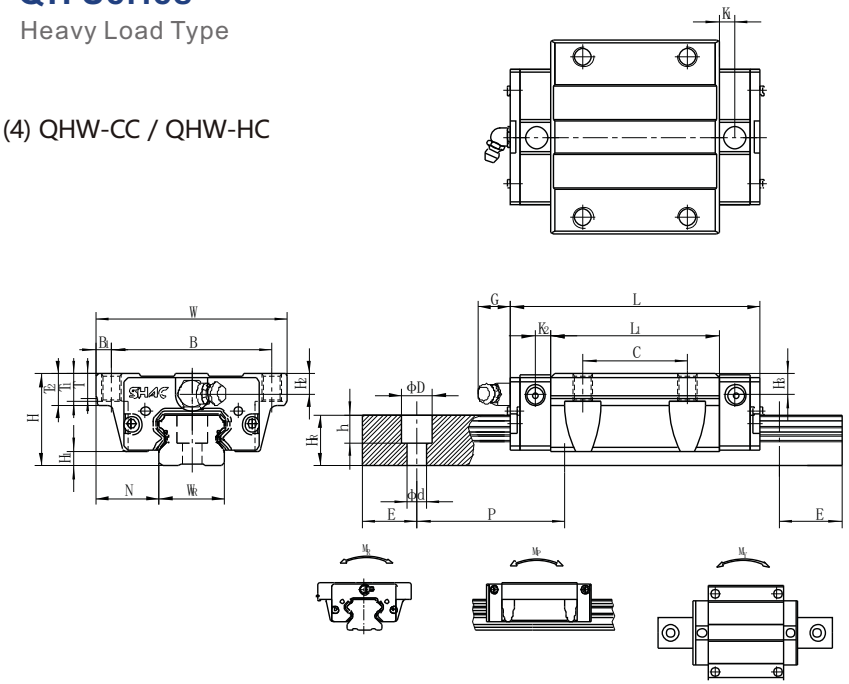
Note : 1 kgf = 9.81 N

Note: above size model No. marked with * still on R&D,details requirements please confirm with our sales

QH Series

Heavy Load Type

(4) QHW-CC / QHW-HC



Model No.	Dimensions of Assembly (mm)			Dimensions of Block (mm)														Dimensions of Rail (mm)							Mounting Bolt for Rail	Basic Dynamic Load Rating	Basic Static Load Rating Co	Static Rated Moment			Weight	
	H	H_1	N	W	B	B_1	C	L_1	L	K_1	K_2	G	M	T	T_1	T_2	H_2	H_3	W_R	H_R	D	h	d	P	E				M_R KN-m	M_P KN-m	M_Y KN-m	Block kg	Rail kg/m
★ QHW15CC	24	4	16	47	38	4.5	30	39.8	62.2	3.35	4.75	5.5	M5	6	6.95	8.9	5.5	5	15	12.5	6	4.5	3.5	60	20	M3×16	11.96	14.46	0.08	0.06	0.06	0.21	1.26
QHW15CC	24	4	16	47	38	4.5	30	39.8	62.2	3.35	4.75	5.5	M5	6	6.95	8.9	5.5	5	15	12.5	7.5	5.3	4.5	60	20	M4×16	11.96	14.46	0.08	0.06	0.06	0.21	1.26
QHW20CC	30	4.6	21.5	63	53	5	40	51.5	76.5	4.75	5	12	M6	8	9	10	8	8.5	20	15.5	9.5	8.5	6	60	20	M5×16	17.46	21.59	0.22	0.15	0.15	0.32	2.09
QHW20HC								69.5	94.5																		21.14	28.33	0.28	0.25	0.25	0.4	
QHW25CC	36	4.5	23.5	70	57	6.5	45	59.5	82.5	4.75	5	12	M8	8	10	14	9	9	23	18	11	9	7	60	20	M6×20	25.65	29.52	0.35	0.25	0.25	0.55	2.69
QHW25HC								81.5	104.5																		32.88	42.17	0.48	0.42	0.42	0.72	
QHW30CC	42	7	31	90	72	9	52	70	98	6	5	12	M10	8.5	10	16	8	8	28	23	11	9	7	80	20	M6×25	42.17	45.22	0.52	0.45	0.45	0.9	4.26
★ QHW30HC								93.5	121.5																		52.09	62.13	0.8	0.85	0.85	1.18	
QHW30CC	42	7	31	90	72	9	52	70	98	6	5	12	M10	8.5	10	16	8	8	28	23	14	12	9	80	20	M8×25	42.17	45.22	0.52	0.45	0.45	0.9	4.26
QHW30HC								93.5	121.5																		52.09	62.13	0.8	0.85	0.85	1.18	

Note : 1 kgf = 9.81 N

Note: above size model No. marked with * still on R&D,details requirements please confirm with our sales

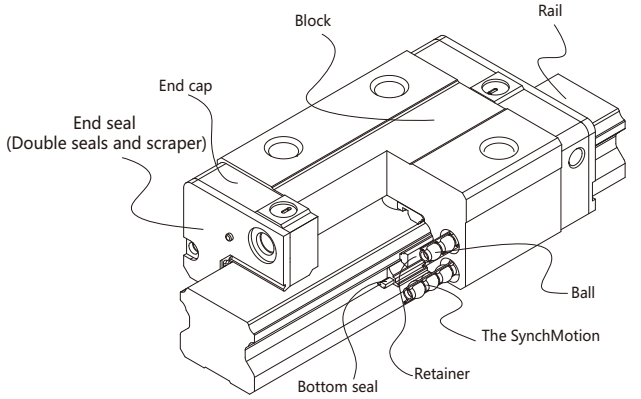
QE Series

Low Profile

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

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

2-4-1 Construction



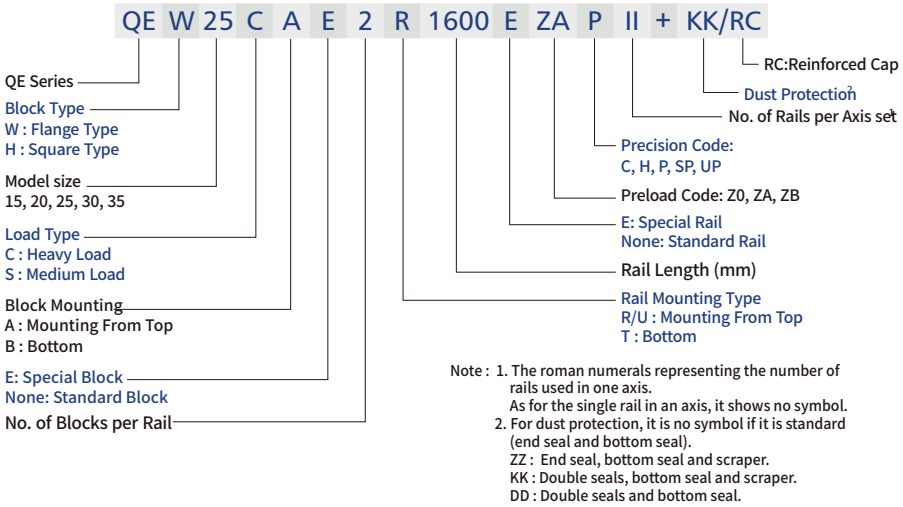
2-4-2 Model Number of QE Series

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

QE Series

Low Profile

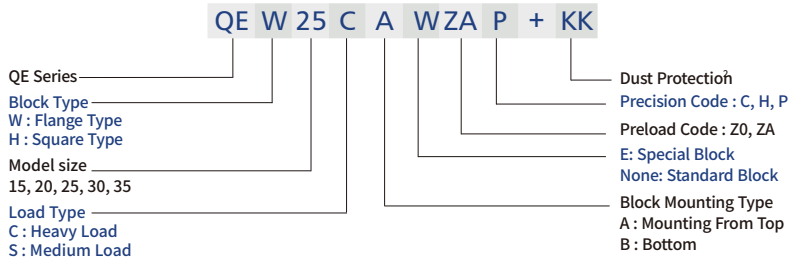
(1) Non-interchangeable type



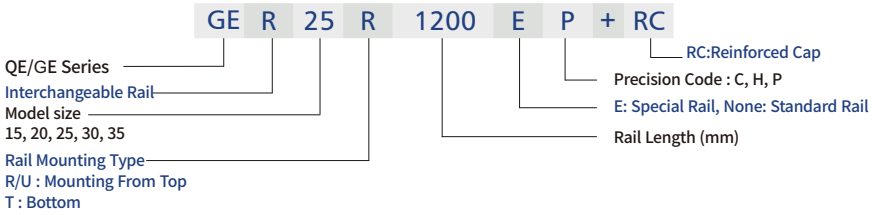
Note : 1. The roman numerals representing the number of rails used in one axis.
As for the single rail in an axis, it shows no symbol.
2. For dust protection, it is no symbol if it is standard (end seal and bottom seal).
ZZ : End seal, bottom seal and scraper.
KK : Double seals, bottom seal and scraper.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

(2) Interchangeable type

Model Number of QE Block



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

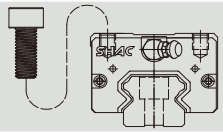
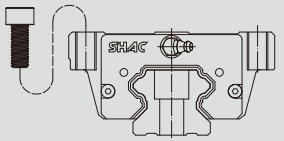
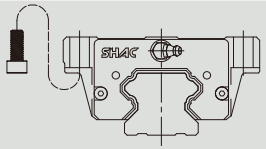
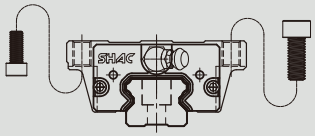


2-4-3 Types

(1) Block types

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

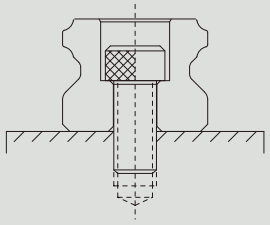
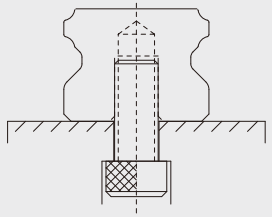
Table 2-4-1 Block Type

Type	Model	Shape	Height (mm)	Rail Length (mm)	Main Applications
Square	QEH-SA QEH-CA		24 ↓ 48	100 ↓ 6000	Automation devices High-speed transportation equipment Precision measuring equipment Semiconductor manufacturing equipment
Flange	QEW-SA QEW-CA		24 ↓ 48	100 ↓ 6000	
	QEW-SB QEW-CB		24 ↓ 48	100 ↓ 6000	
	QEW-SC QEW-CC		24 ↓ 48	100 ↓ 6000	

(2) Rail types

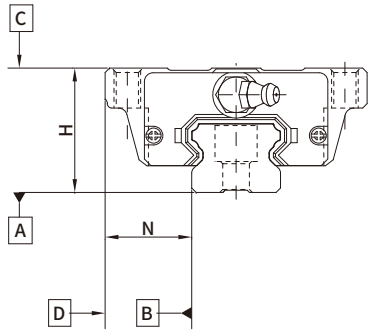
Besides the standard top mounting type, the bottom mounting type is also available.

Table 2-4-2 Rail Types

Mounting from Top	Mounting from bottom
	

2-4-4 Accuracy

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



(1) Accuracy of non-interchangeable guideways

Table 2-4-3 Accuracy Standards — Unit: mm

Item	QE - 15, 20				
Accuracy Classes	Normal (C)	High (H)	Precision (P)	Super Precision (SP)	Ultra Precision (UP)
Dimensional tolerance of height H	± 0.1	± 0.03	0 - 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 2-4-7				
Running parallelism of block surface D to surface B	See Table 2-4-7				

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

Item	QE - 25, 30, 35				
Accuracy Classes	Normal (C)	High (H)	Precision (P)	Super Precision (SP)	Ultra Precision (UP)
Dimensional tolerance of height H	± 0.1	± 0.04	0 - 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 2-4-7				
Running parallelism of block surface D to surface B	See Table 2-4-7				

(2) Accuracy of interchangeable guideways

Table 2-4-5 Accuracy Standards — Unit: mm

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

Table 2-4-6 Accuracy Standards — Unit: mm

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

(3) Accuracy of running parallelism

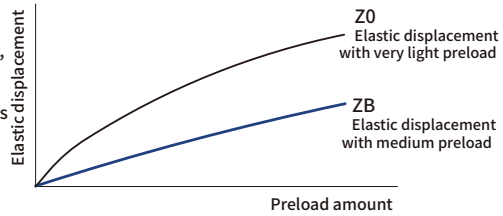
Table 2-4-7 Accuracy of Running Parallelism

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

2-4-5 Preload

(1) Definition

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



(2) Preload classes

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

Table 2-1-8 Preload Classes

Class	Code	Preload	Condition	Examples of Application
NO Preload	Z0	0~ 0.02C	Certain load direction,low impact low precision required	Transportationdevices,auto-packingmachines,X-Y axisforgeneralindustrialmachines,weldingmachines, welders
Light Preload	ZA	0.02C~0.04C	High precision required	Machining centers, Z axis for general industrial, machines, EDM, NC lathes, Precision X-Y tables, measuring equipment
Medium Preload	ZB	0.04C~ 008 C	High rigidity required, with vibration and impact	Machining centers, grinding machines, NC lathes, horizontal and vertical milling machines, Z axis of machine tools, Heavy cutting machines
Heavy Preload	ZC	0.08C~ 0.12C	Higher rigidity, and vibration, high impact environment	Machining centers, grinding machines, NC lathes, machine tools, Heavy cutting machines

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

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

2-4-6 Dust Protection Equipment

(1) End seal and bottom seal

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

(2) Double seals

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

Table2-4-9 Dimensions of end seal

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

(3) Scraper

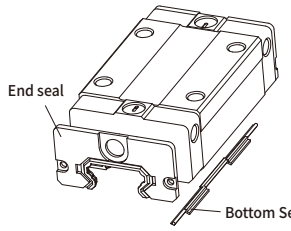
Clears larger contaminants, such as weld spatter and metal cuttings, from the rail. Metal scraper protects end seals from excessive damage.

Table2-4-10 Dimensions of Scraper

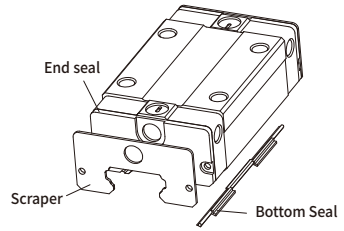
Size	Thickness (t2) (mm)
QE15 SC	1
QE20 SC	1
QE25 SC	1
QE30 SC	1.5

(4) Codes of equipment

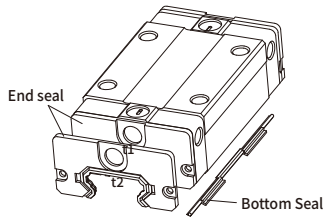
If the following equipment is needed, please indicate the code followed by the model number.



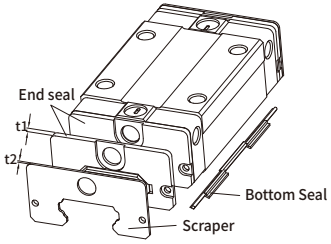
No symbol: Standard Protection (End seal + Bottom seal)



ZZ(End seal + Bottom seal + Scraper)



DD (Double seals + Bottom Seal)



KK (Double seals + Bottom Seal + Scraper)

(5) Dimensions of block equipped with the dustproof parts

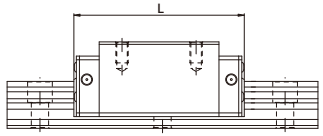


Table 2-4-11 Overall block length

unit: mm

Size	Overall block length (L)			
	SS	ZZ	DD	KK
QE15S	45.5	51.5	52.5	58.5
QE15C	62.2	68.2	69.2	75.2
QE20S	54	60	61	67
QE20C	76.5	82.5	83.5	89.5
QE25S	60.5	66.5	67.5	73.5
QE25C	82.5	88.5	89.5	95.5
QE30S	69.5	75.5	76.5	82.5
QE30C	98	104	105	111

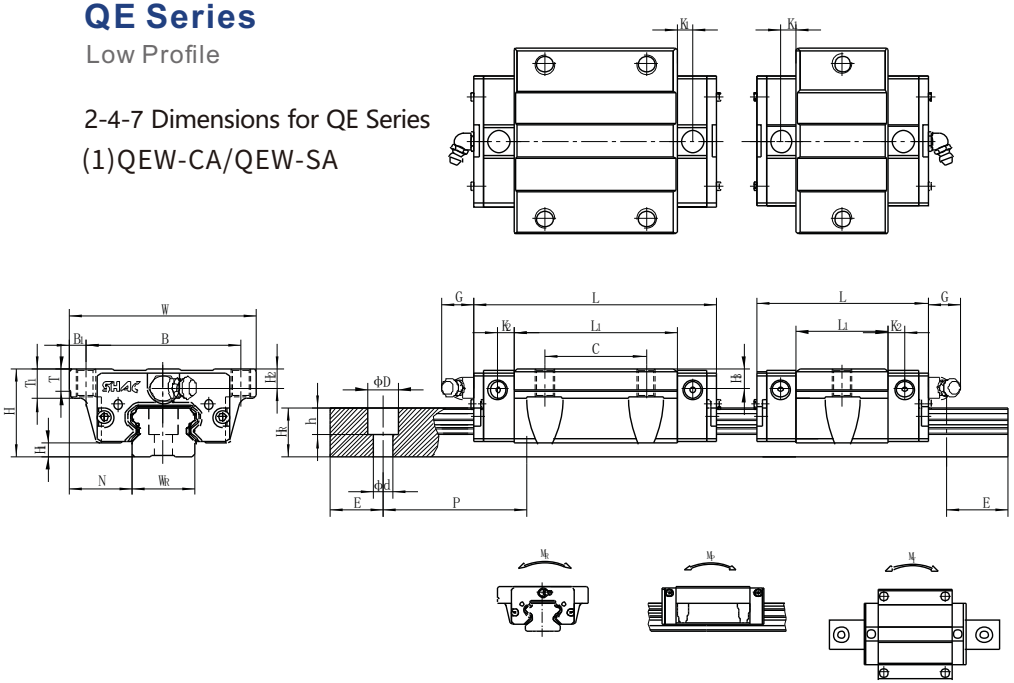
Note : The marking of "( )" denotes the maximum block length with screws, lips of end seals, etc.

QE Series

Low Profile

2-4-7 Dimensions for QE Series

(1)QEW-CA/QEW-SA

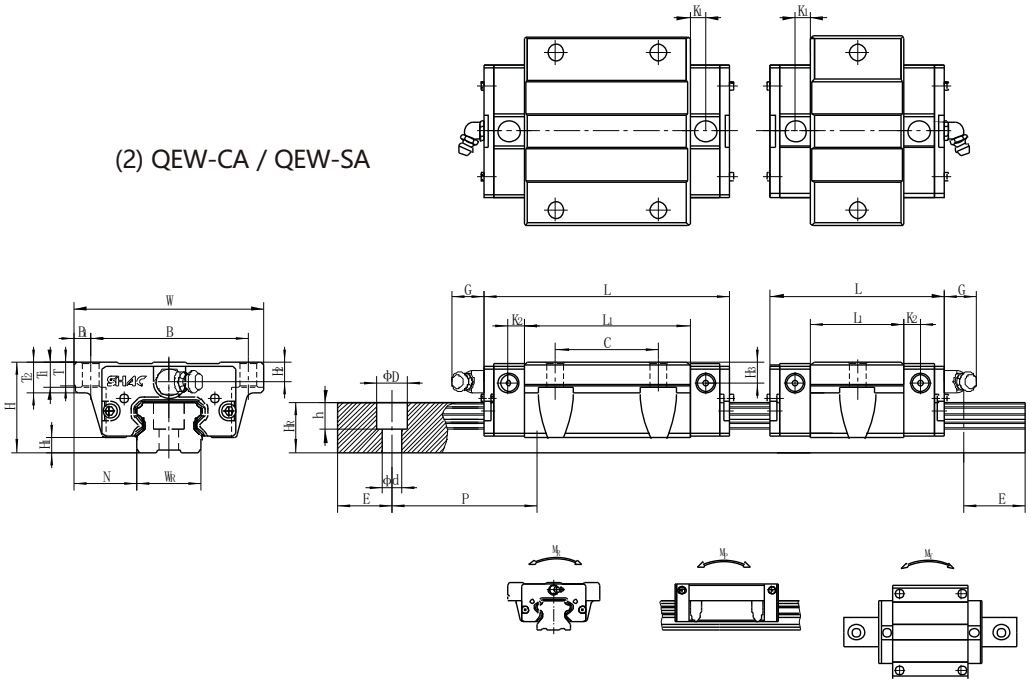


	Model No.	Dimensions of Assembly (mm)			Dimensions of Block (mm)														Dimensions of Rail (mm)						Mounting Bolt for Rail	Basic Dynamic Load Rating	Basic Static Load Rating	Static Rated Moment			Weight	
		H	H_1	N	W	B	B_1	C	L_1	L	K_1	K_2	G	M	T	T_1	H_2	H_3	W_R	H_R	D	h	d	P	E		Ca	Co	M_R KN-m	M_P KN-m	M_Y KN-m	Block kg	Rail kg/m
★	QEW15SA	24	3.2	18.5	52	41	5.5	-	23.1	45.5	3.5	3.5	5.5	M5	5	7	5.5	5	15	12.5	6	4.5	3.5	60	20	M3×16	8.09	8.26	0.06	0.02	0.02	0.14	1.26
	QEW15CA							26	39.8	62.2																11.96	14.46	0.11	0.08	0.08	0.25	
	QEW15SA	24	3.2	18.5	52	41	5.5	-	23.1	45.5	3.5	3.5	5.5	M5	5	7	5.5	5	15	12.5	7.5	5.3	4.5	60	20	M4×16	8.09	8.26	0.06	0.02	0.02	0.14	1.26
	QEW15CA							26	39.8	62.2																11.96	14.46	0.11	0.08	0.08	0.25	
	QEW20SA	28	4.6	19.5	59	49	5	-	29	54	4.75	5	12	M6	7	9	6	6.5	20	15.5	9.5	8.5	6	60	20	M5×16	11.46	12.14	0.11	0.04	0.04	0.21	2.09
	QEW20CA							32	51.5	76.5																17.46	21.59	0.19	0.13	0.13	0.35	
	QEW25SA	33	4.5	25	73	60	6.5	-	37.5	60.5	4.75	5	12	M8	7.5	10	6	6	23	18	11	9	7	60	20	M6×20	18.81	18.98	0.2	0.09	0.09	0.37	2.69
	QEW25CA							35	59.5	82.5																25.65	29.52	0.35	0.27	0.27	0.65	
	QEW30SA	42	7	31	90	72	9	-	41.5	69.5	6	5	12	M10	7	10	8	8	28	23	11	9	7	80	20	M6×25	24.88	25.96	0.36	0.15	0.15	0.64	4.26
★	QEW30CA							40	70	98																36.54	45.12	0.35	0.45	0.45	1.09	
	QEW30SA	42	7	31	90	72	9	-	41.5	69.5	6	5	12	M10	7	10	8	8	28	23	14	12	9	80	20	M8×25	24.88	25.96	0.36	0.15	0.15	0.64	4.26
	QEW30CA							40	70	98																36.54	45.12	0.35	0.45	0.45	1.09	

Note : 1 kgf = 9.81 N

Note: above size model No. marked with * still on R&D,details requirements please confirm with our sales

(2) QEW-CA / QEW-SA



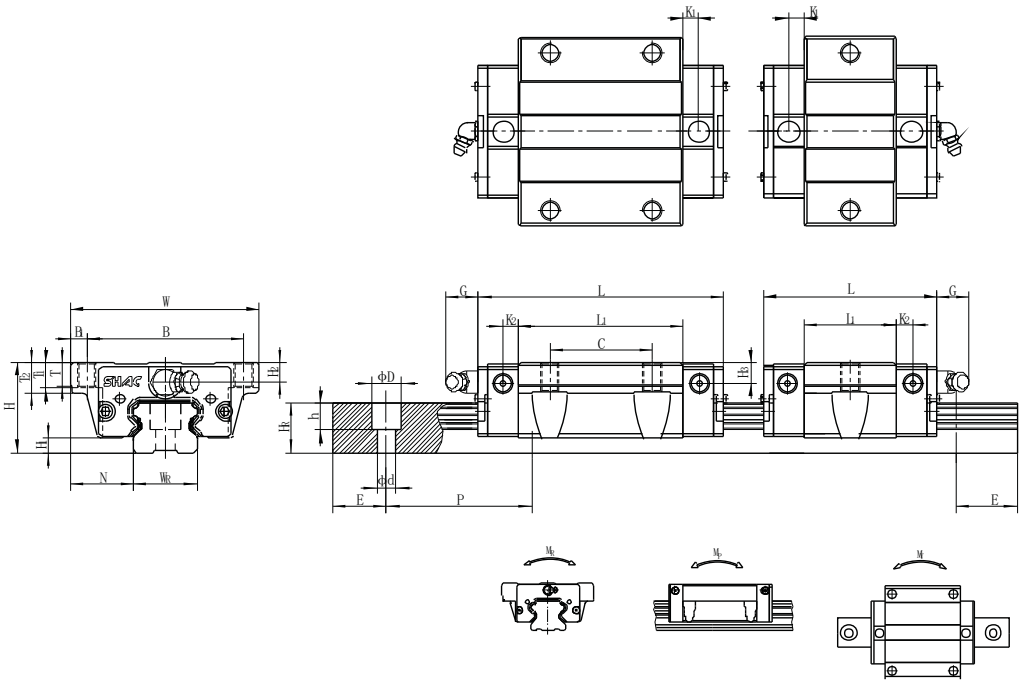
	Model No.	Dimensions of Assembly (mm)			Dimensions of Block (mm)															Dimensions of Rail (mm)							Mounting Bolt for Rail (mm)	Basic Dynamic Load Rating Ca(KN)	Basic Static Load Rating Co(KN)	Static Rated Moment			Weight	
		H	H_1	N	W	B	B_1	C	L_1	L	K_1	K_2	G	M	T	T_1	T_2	H_2	H_3	W_R	H_R	D	h	d	P	E				M_R KN-m	M_P KN-m	M_Y KN-m	Block kg	Rail kg/m
★	QEW15SB	24	3.2	18.5	52	41	5.5	-	23.1	45.5	3.5	3.5	5.5	φ4.5	5	7	7.8	5.5	5	15	12.5	6	4.5	3.5	60	20	M3×16	8.09	8.26	0.06	0.02	0.02	0.14	1.26
	QEW15CB							26	39.8	62.2																		11.96	14.46	0.11	0.08	0.08	0.25	
	QEW15SB	24	3.2	18.5	52	41	5.5	-	23.1	45.5	3.5	3.5	5.5	φ4.5	5	7	7.8	5.5	5	15	12.5	7.5	5.3	4.5	60	20	M4×16	8.09	8.26	0.06	0.02	0.02	0.14	1.26
	QEW15CB							26	39.8	62.2																		11.96	14.46	0.11	0.08	0.08	0.25	
	QEW20SB	28	4.6	19.5	59	49	5	-	29	54	4.75	5	12	φ5.5	7	7	9	6	6.5	20	15.5	9.5	8.5	6	60	20	M5×16	11.46	12.14	0.11	0.04	0.04	0.21	2.09
	QEW20CB							32	51.5	76.5																		17.46	21.59	0.19	0.13	0.13	0.35	
	QEW25SB	33	4.5	25	73	60	6.5	-	37.5	60.5	4.75	5	12	φ7	7.5	10	10	6	6	23	18	11	9	7	60	20	M6×20	18.81	18.98	0.2	0.09	0.09	0.37	2.69
	QEW25CB							35	59.5	82.5																		25.65	29.52	0.35	0.27	0.27	0.65	
★	QEW30SB	42	7	31	90	72	9	-	41.5	69.5	6	5	12	φ9	7	10	10	8	8	28	23	11	9	7	80	20	M6×25	24.88	25.96	0.36	0.15	0.15	0.64	4.26
	QEW30CB							40	70	98																		36.54	45.12	0.35	0.45	0.45	1.09	
	QEW30SB	42	7	31	90	72	9	-	41.5	69.5	6	5	12	φ9	7	10	10	8	8	28	23	14	12	9	80	20	M8×25	24.88	25.96	0.36	0.15	0.15	0.64	4.26
	QEW30CB							40	70	98																		36.54	45.12	0.35	0.45	0.45	1.09	

Note : 1 kgf = 9.81 N

Note: above size model No. marked with * still on R&D,details requirements please confirm with our sales

QE Series

Low Profile



Model No.	Dimensions of Assembly (mm)			Dimensions of Block (mm)															Dimensions of Rail (mm)							Mounting Bolt for Rail	Basic Dynamic Load Rating	Basic Static Load Rating Co	Static Rated Moment			Weight	
	H	H_1	N	W	B	B_1	C	L_1	L	K_1	K_2	G	M	T	T_1	T_2	H_2	H_3	W_R	H_R	D	h	d	P	E				M_R KN-m	M_P KN-m	M_Y KN-m	Block kg	Rail kg/m
QEW15SC	24	3.2	18.5	52	41	5.5	-	23.1	45.5	3.5	3.5	5.5	φ4.5	5	7	7.8	5.5	5	15	12.5	6	4.5	3.5	60	20	M3×16	8.09	8.26	0.06	0.02	0.02	0.14	1.26
★ QEW15CC							26	39.8	62.2																		11.96	14.46	0.11	0.08	0.08	0.25	
QEW15SC	24	3.2	18.5	52	41	5.5	-	23.1	45.5	3.5	3.5	5.5	φ4.5	5	7	7.8	5.5	5	15	12.5	7.5	5.3	4.5	60	20	M4×16	8.09	8.26	0.06	0.02	0.02	0.14	1.26
QEW15CC							26	39.8	62.2																		11.96	14.46	0.11	0.08	0.08	0.25	
QEW20SC	28	4.6	19.5	59	49	5	-	29	54	4.75	5	12	φ5.5	7	7	9	6	6.5	20	15.5	9.5	8.5	6	60	20	M5×16	11.46	12.14	0.11	0.04	0.04	0.21	2.09
QEW20CC							32	51.5	76.5																		17.46	21.59	0.19	0.13	0.13	0.35	
QEW25SC	33	4.5	25	73	60	6.5	-	37.5	60.5	4.75	5	12	φ7	7.5	10	10	6	6	23	18	11	9	7	60	20	M6×20	18.81	18.98	0.2	0.09	0.09	0.37	2.69
QEW25CC							35	59.5	82.5																		25.65	29.52	0.35	0.27	0.27	0.65	
QEW30SC	42	7	31	90	72	9	-	41.5	69.5	6	5	12	φ9	7	10	10	8	8	28	23	11	9	7	80	20	M6×25	24.88	25.96	0.36	0.15	0.15	0.64	4.26
★ QEW30CC							40	70	98																		36.54	45.12	0.35	0.45	0.45	1.09	
QEW30SC	42	7	31	90	72	9	-	41.5	69.5	6	5	12	φ9	7	10	10	8	8	28	23	14	12	9	80	20	M8×25	24.88	25.96	0.36	0.15	0.15	0.64	4.26
QEW30CC							40	70	98																		36.54	45.12	0.35	0.45	0.45	1.09	

Note : 1 kgf = 9.81 N
Note: above size model No. marked with * still on R&D,details requirements please confirm with our sales

GR Series

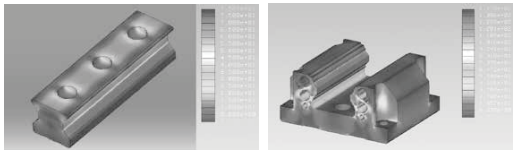
High Rigidity Roller Type

2-5 GR Series – High Rigidity Roller Type Linear Guideway

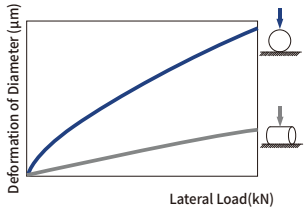
2-5-1 Advantages and features

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

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

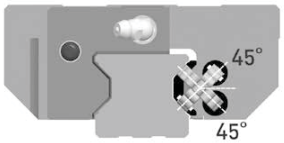


(2) Super high rigidity
The GR series is a type of linear guideway that uses rollers as the rolling elements. Rollers have a greater contact area than balls so that the roller guideway features higher load capacity and greater rigidity. The figure shows the rigidity of a roller and a ball with equal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

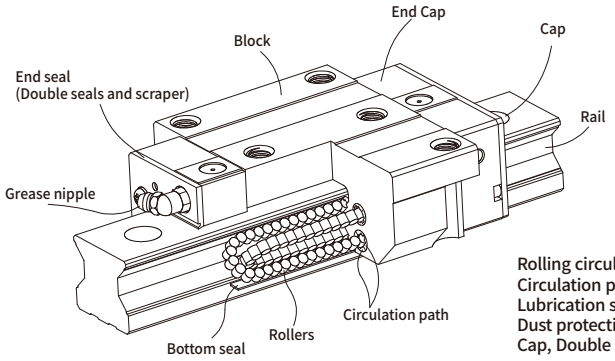


(3) Super high load capacity
With the four rows of rollers arranged at a contact angle of 45-degrees, the GR series linear guideway has equal load ratings in the radial, reverse radial and lateral directions. The GR series has a higher load capacity in a smaller size than conventional, ball-type linear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

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



2-5-2 Construction of GR Series



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

GR Series

High Rigidity Roller Type

2-5-3 Model Number of GR series

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

(1) Non-interchangeable type

GR W 35 C C W 2 R 1640 E ZA P II + KK/E2/RC

- GR Series
- Block Type — W : Flange Type; H : Square Type; L : Square Type (Low)
- Model size — 25, 30, 35, 45, 55, 65
- Load Type — C : Heavy Load; H : Super Heavy Load
- Block Mounting — A : Mounting From Top; C : Top or Bottom
- E: Special Block; None: Standard Block
- No. of Blocks per Rail
- Rail Mounting Type — R : Mounting From Top; T : Bottom
- Rail Length (mm)
- E: Special Rail; None: Standard Rail
- Preload Code: Z0, ZA, ZB
- Precision Code: H, P, SP, UP
- No. of Rails per matched set
- Dust Protection
- E2: Self-Lubricant
- RC: Reinforced Cap

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

(2) Interchangeable type

Model Number of RG Block

GR W 25C A E ZA P + ZZ/E2

- GR Series
- Block Type — W : Flange Type; H : Square Type; L : Square Type (Low)
- Model size — 25, 30, 35, 45, 55, 65
- Load Type — C : Heavy Load; H : Super Heavy Load
- Block Mounting Type — A : Mounting From Top; C : Top or Bottom
- E: Special Block; None: Standard block
- Preload Code : Z0, ZA
- Precision Code : H, P
- Dust Protection
- E2: Self-Lubricant

Model Number of RG Rail

GR R 25 R 1240 E P + RC

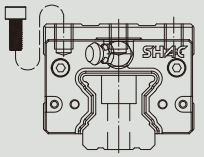
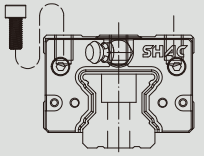
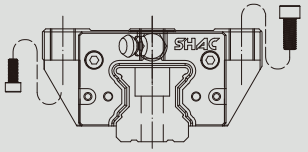
- GR Series
- Interchangeable Rail
- Model size — 25, 30, 35, 45, 55, 65
- Rail Mounting Type — R : Mounting From Top; T : Bottom
- Rail Length (mm)
- E: Special Rail, None: Standard Rail
- Precision Code : H, P
- RC:Reinforced Cap

2-5-4 Types

(1) Block types

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

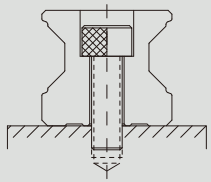
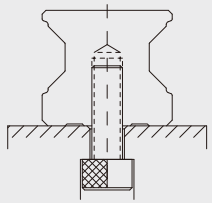
Table2-5-1 Block Types

Type	Model	Shape	Height (mm)	Rail Length (mm)	Main Applications
Square	GRH-CA GRH-HA		40 ↓ 90	100 ↓ 6000	Automation Systems Transportation equipment CNC machining centers Heavy duty cutting machines CNC grinding machines Injection molding machines Plano millers Devices requiring high rigidity Devices requiring high load capacity Electric discharge machines
Square	GRL-CA GRL-HA		36 ↓ 70	100 ↓ 6000	
Flange	GRW-CC GRW-HC		36 ↓ 90	100 ↓ 6000	

(2) Rail types

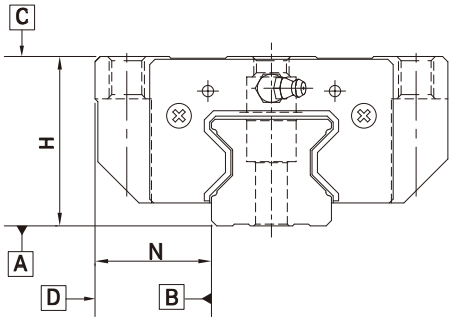
In addition to the standard top mounting type, SHAC also offers the bottom mounting type of rails.

Table 2-5-2Rail Types

Mounting from Top	Mounting from Bottom
	

2-5-5 Accuracy Classes

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



(1) Accuracy of non-interchangeable

Table 2-5-4 Accuracy Standards Unit: mm

Item	GR - 25, 30, 35			
Accuracy Classes	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 2-5-11			
Running parallelism of block surface D to surface B	See Table 2-5-11			

Table 2-5-5 Accuracy Standards Unit: mm

Item	GR - 45, 55			
Accuracy Classes	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 2-5-11			
Running parallelism of block surface D to surface B	See Table 2-5-11			

Table 2-5-6 Accuracy Standards Unit: mm

Item	GR - 65			
Accuracy Classes	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 2-5-11			
Running parallelism of block surface D to surface B	See Table 2-5-11			

(2) Accuracy of interchangeable

Table 2-5-8 Accuracy Standards Unit: mm

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

Table 2-5-9 Accuracy Standards Unit: mm

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

Table 2-5-10 Accuracy Standards Unit: mm

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

(3) Accuracy of running parallelism

Table 2-5-11 Accuracy of Running Parallelism

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

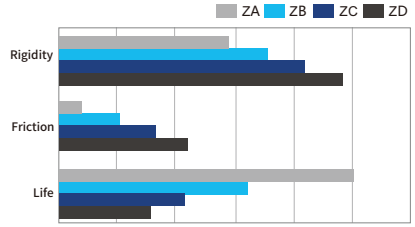
2-5-6 Preload

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

Table 2-5-12

Class	Code	Preload	Condition
No Preload	ZA	0.02C~ 0.04C	Certain load direction, low impact, low precision required
Light Preload	ZB	0.04C~0.08C	High rigidity required, high precision required
Medium Preload	ZC	0.08C~ 0.12C	High rigidity required, with vibration and impact
Heavy Preload	ZD	0. 12C~ 0.16C	Super high rigidity required, with vibration and impact

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



2-5-7 Lubrication

(1) Grease

Mounting location

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

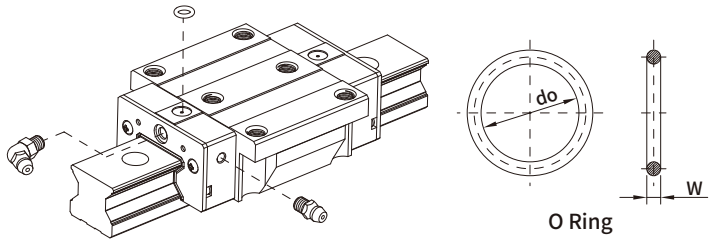
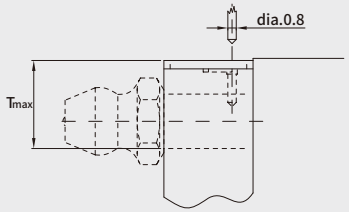


Table 2-5-13 O-Ring size and max. permissible depth for piercing

Size	O-Ring do (mm)	O-Ring W (mm)	Lube hole at top: max. permissible depth for piercing T_{max} (mm)
GR25	7.5±0.15	1.5±0.15	5.8
GR30	7.5±0.15	1.5±0.15	6.2
GR35	7.5±0.15	1.5±0.15	8.65
GR45	7.5±0.15	1.5±0.15	9.5
GR55	7.5±0.15	1.5±0.15	11.6
GR65	7.5±0.15	1.5±0.15	14.5



The oil amount for a block filled with grease

Table2-5-14 The oil amount for a block illed with grease

Size	Heavy Load(cm³)	Super Heavy Load(cm³)	Size	Heavy Load(cm³)	Super Heavy Load(cm³)
GR25	7	8	GR45	19	23
GR30	9	10	GR55	28	35
GR35	12	14	GR65	52	63

Frequency of replenishment

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

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

Oil feeding rate

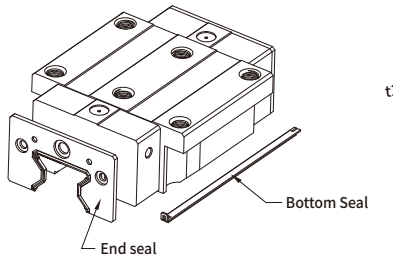
Table 2-5-15 oil feed rate

Size	Feed rate (cm^3/hr)
GR25	0.167
GR30	0.2
GR35	0.23
GR45	0.3
GR55	0.367
GR65	0.433

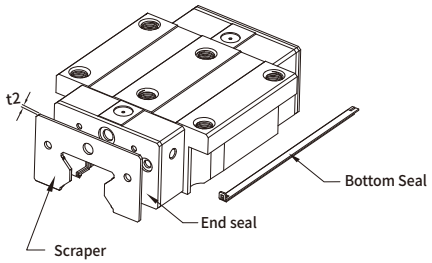
2-5-8 Dust Proof Accessories

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

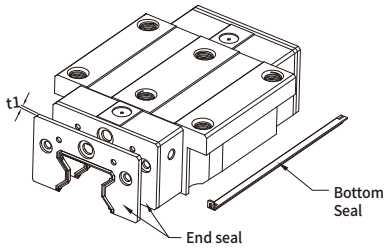
Table 2-5-16



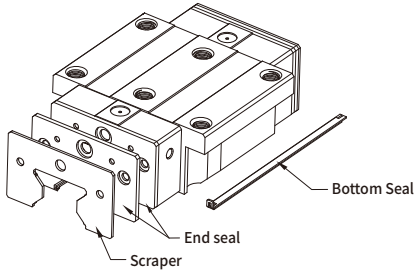
No symbol: Standard Protection (End seal + Bottom Seal)



ZZ (End seal + Bottom Seal + Scraper)



DD (Double seals + Bottom Seal)



KK (Double seals + Bottom Seal + Scraper)

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

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

Table 2-5-17 Dimensions of end seal

Size	Thickness (t1) (mm)	Size	Thickness (t1) (mm)
GR25 ES	2	GR45 ES	2.5
GR30 ES	2.1	GR55 ES	2.5
GR35 ES	2.5	GR65 ES	4

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

Table 2-5-18 Dimensions of scraper

Size	Thickness (t2) (mm)	Size	Thickness (t2) (mm)
GR25 SC	1.5	GR45 SC	1.5
GR30 SC	1.5	GR55 SC	1.5
GR35 SC	1.5	GR65 SC	1.5

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

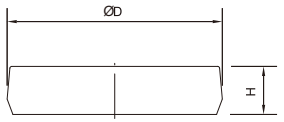


Table 2-5-19 Dimensions of Bolt Caps for Rail Mounting Holes

Rail size	Bolt size	Diameter(D) (mm)	Thickness(H) (mm)	Rail size	Bolt size	Diameter(D) (mm)	Thickness(H) (mm)
GRR25	M6	11.15	2.5	GRR45	M12	20.25	4.6
GRR30	M8	14.2	3.3	GRR55	M14	23.5	5.5
GRR35	M8	14.2	3.3	GRR65	M16	26.6	5.5

GR Series

High Rigidity Roller Type

(6) Dimensions of block equipped with the dustproof parts

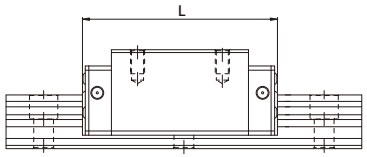


Table 2-5-20 Overall block length

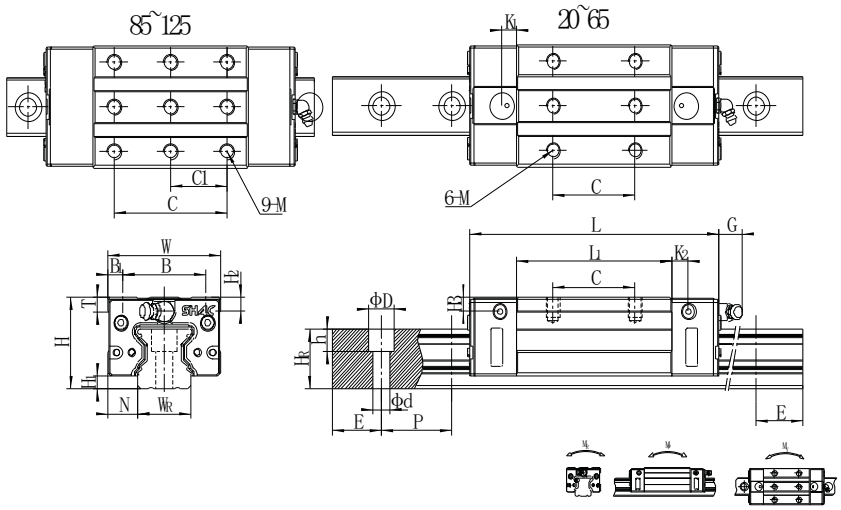
unit: mm

Size	Overall block length (L)			
	SS	ZZ	DD	KK
GR25C	96.3	102.3	103.3	109.3
GR25S	107.7	113.7	114.7	120.7
GR25H	124.2	130.2	131.2	137.2
GR30C	114	120	121.2	127.2
GR30H	136	142	143.2	149.2
GR35C	131	137	139	145
GR35H	159	165	167	173
GR45C	158	164	166	172
GR45H	194	200	202	208
GR55C	182.5	189.5	191.5	198.5
GR55H	233.5	240.5	242.5	249.5
GR65C	232	239	244	251
GR65H	295	302	307	314

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

2-5-10 Dimensions for GR series

(1) GRH-SA / GRH-CA / GRH-HA



Model No.	Dimensions of Assembly (mm)			Dimensions of Block (mm)														Dimensions of Rail (mm)							Mounting Bolt for Rail	Basic Dynamic Load Rating	Basic Static Load Rating Co	Static Rated Moment			Weight	
	H	H_1	N	W	B	B_1	C	L_1	L	K_1	K_2	G	M	T	T_1	H_2	H_3	W_R	H_R	D	h	d	P	E				M_R KN-m	M_P KN-m	M_Y KN-m	Block kg	Rail kg/m
GRH20CA	34	5	12	44	32	6	36	-	57.5	86.6	5	4.6	8	M5X8	8.3	8.5	8.5	20	21	9.5	8.5	6	30	20	M5X20	24.05	45.83	0.69	0.466	0.466	0.41	2.55
GRH20HA							50	-	77.5	106.6																30.34	61.77	0.93	0.846	0.846	0.55	
GRH25SA	40	5	12.5	48	35	6.5	35	-	55.1	96.3	6	7	12	M6X10	10	9.5	9.5	23	23.6	11	9	7	30	20	M6X25	28.54	50.21	0.78	0.65	0.65	0.53	3.12
GRH25CA								-	66.5	107.7																33.35	61.37	0.89	0.80	0.80	0.64	
GRH25HA							50	-	83	124.2																39.13	75.31	1.12	1.15	1.15	0.78	
GRH30CA	45	6	16	60	40	10	40	-	71	114	8	8	12	M8X10	9.5	9.5	10.3	28	28	14	12	9	40	20	M8X30	48.62	81.29	1.8	1.55	1.55	0.92	4.47
GRH30HA							60	-	93	136																61.45	109.98	2.05	1.92	1.92	1.21	
GRH35CA	55	6.5	18	70	50	10	50	-	82	131	8	12	12	M8X14	12	16	16	34	30.2	14	12	9	40	20	M8X30	55.14	95.64	2.01	1.22	1.22	1.6	6.13
GRH35HA							72	-	110	159																69.62	129.11	2.66	2.3	2.3	2.1	
GRH45CA	70	8	20.5	86	60	13	60	-	106	158	8	10	13	M10X20	16	20	20	45	38	20	17	14	52.5	22.5	M12X35	95.63	178.72	4.75	3.55	3.55	3.2	9.99
GRH45HA							80	-	142	194																120.6	240.89	6.55	5.8	5.8	4.19	
GRH55CA	80	10	23.5	100	75	12.5	75	-	125.5	182.5	8	12.5	13	M12X20	19	22	22	53	44	23	20	16	60	30	M14X45	147.64	255.03	8.2	5.6	5.6	4.92	14.14
GRH55HA							95	-	176.5	233.5																196.95	369.8	11.25	10.4	10.4	6.72	
GRH65CA	90	12	31.5	126	76	25	70	-	160	226	16	16	13	M16X20	25	15	15	63	53	26	22	18	75.0	35.0	M16X50	213	411.6	16.2	11.59	11.59	8.89	20.3
GRH65HA							120	-	226	292																275.3	572.7	22.55	22.17	22.17	12.13	
GRH85HA	110	15	35.5	156	100	28	140	70	254	349	-	21.5	14	M18X25	30	17	31	85	73	35	28	24	90	45	M20	460	945.2	51.42	45.6	45.6	14.7	35.2
GRH100HA	120	15	50	200	130	35	200	100	286	394	-	23	16	M20X27	33	23	37	100	80	39	32	26	105	52.5	M24	547	1330	73.14	61.2	61.2	24.5	46.8
GRH125HA	160	24.5	57.5	240	184	28	205	102.5	360	491	-	23	16	M24X30	40	30.5	47	125	115	45	45	33	120	60	M30	1040	1924	114.40	123.2	123.2	46	84.6

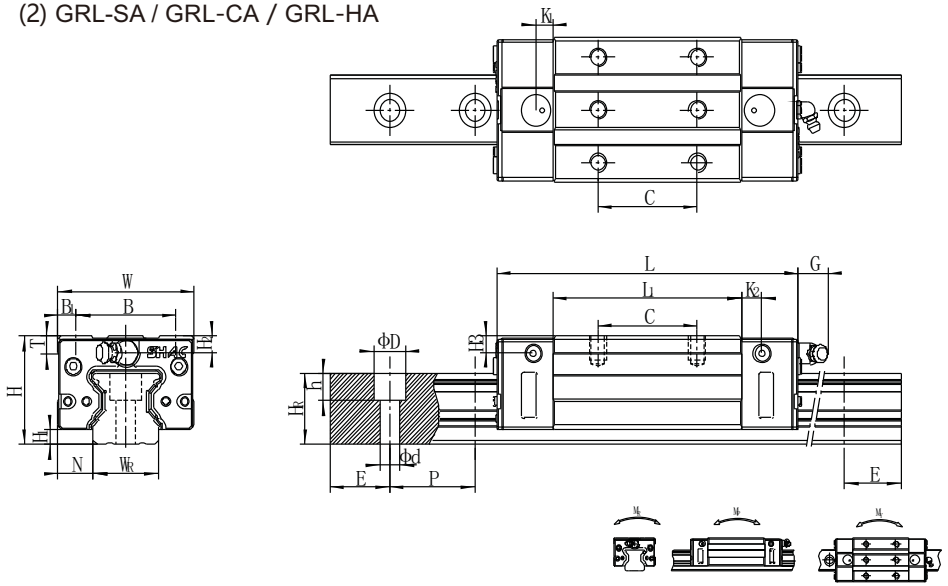
Note : 1 kgf = 9.81 N

Note:our currently GR blocks with caged rollers,details requirements please confirm with our sales

GR Series

High Rigidity Roller Type

(2) GRL-SA / GRL-CA / GRL-HA

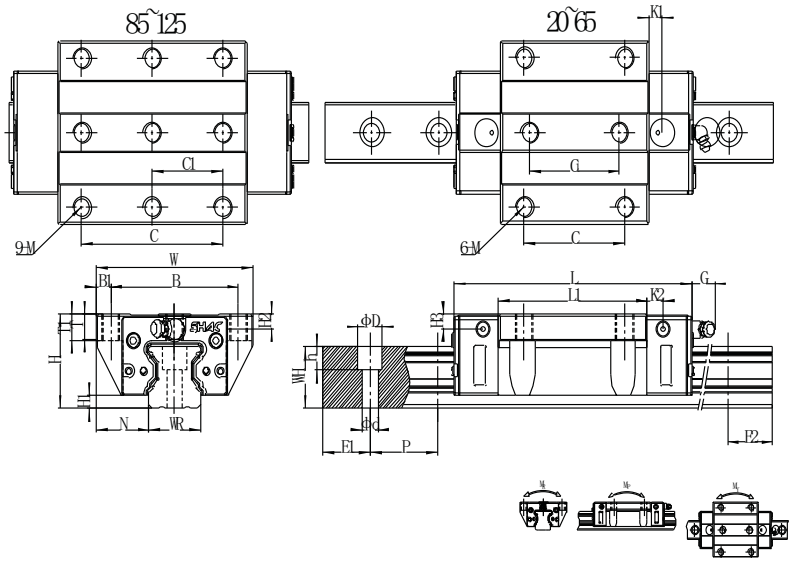


Model No.	Dimensions of Assembly (mm)			Dimensions of Block (mm)														Dimensions of Rail (mm)							Mounting Bolt for Rail (mm)	Basic Dynamic Load Rating Ca(KN)	Basic Static Load Rating Co(KN)	Static Rated Moment			Weight	
	H	H_1	N	W	B	B_1	C	L_1	L	K_1	K_2	G	M*I	T	H_2	H_3	W_R	H_R	D	h	d	P	E				M_R KN-m	M_P KN-m	M_Y KN-m	Block kg	Rail kg/m
GRL25SA	36	5	12.5	48	35	6.5	35	55.1	96.3	6	7	12	M6X10	10	5.5	5.5	23	23.6	11	9	7	30	20	M6X25	28.54	50.21	0.78	0.65	0.65	0.53	3.12
GRL25CA								66.5	107.7																33.35	61.37	0.89	0.80	0.80	0.64	
GRL25HA							50	83	124.2																39.13	75.31	1.12	1.15	1.15	0.78	
GRL30CA	42	6	16	60	40	10	40	71	114	8	8	12	M8X10	9.5	6.5	7.3	28	28	14	12	9	40	20	M8X30	48.62	81.29	1.8	1.55	1.55	0.92	4.47
GRL30HA							60	93	136																61.45	109.98	2.05	1.92	1.92	1.21	
GRL35CA	48	6.5	18	70	50	10	50	82	131	8	12	12	M8X14	12	9	9	34	30.2	14	12	9	40	20	M8X30	55.14	95.64	2.01	1.22	1.22	1.6	6.13
GRL35HA							72	110	159																69.62	129.11	2.66	2.3	2.3	2.1	
GRL45CA	60	8	20.5	86	60	13	60	106	158	8	10	13	M10X17	16	10	10	45	38	20	17	14	52.5	22.5	M12X35	95.63	178.72	4.75	3.55	3.55	3.2	9.99
GRL45HA							80	142	194																120.6	240.89	6.55	5.8	5.8	4.19	
GRL55CA	70	10	23.5	100	75	12.5	75	125.5	182.5	8	12.5	13	M12X20	19	12	12	53	44	23	20	16	60	30	M14X45	147.64	255.03	8.2	5.6	5.6	4.92	14.14
GRL55HA							95	176.5	233.5																196.95	369.8	11.25	10.4	10.4	6.72	

Note : 1 kgf = 9.81 N

Note:our currently GR blocks with caged rollers,details requirements please confirm with our sales

(3) GRW-SC / GRW-CC / GRW-HC



Model No.	Dimensions of Assembly (mm)			Dimensions of Block (mm)														Dimensions of Rail (mm)							Mounting Bolt for Rail	Basic Dynamic Load Rating	Basic Static Load Rating Co	Static Rated Moment			Weight	
	H	H_1	N	W	B	B_1	C	L_1	L	K_1	K_2	G	M	T	T_1	T_2	H_2	H_3	W_R	H_R	D	h	d	P	E				M_R KN-m	M_P KN-m	M_Y KN-m	Block kg	Rail kg/m
GRW20CC	30	5	21.5	63	53	5	40	35	57.5	86.6	5	4.6	8	M6	10	14	4.5	4.5	20	21	9.5	8.5	6	30	20	M5X20	24.05	45.83	0.69	0.466	0.466	0.48	2.55
GRW20HC									77.5	106.6																	30.34	61.77	0.93	0.846	0.846	0.65	
GRW25SC	36	5	23.5	70	57	6.5	45	40	55.1	96.3	6	7	12	M8	10	12.5	5.5	5.5	23	23.6	11	9	7	30	20	M6X25	28.54	50.21	0.78	0.65	0.65	0.53	3.12
GRW25CC									66.5	107.7																	33.35	61.37	0.89	0.80	0.80	0.64	
GRW25HC									83	124.2																	39.13	75.31	1.12	1.15	1.15	0.78	
GRW30CC	42	6	31	90	72	9	52	44	71	114	8	8	12	M10	10	14	6.5	7.3	28	28	14	12	9	40	20	M8X30	48.62	81.29	1.8	1.55	1.55	0.92	4.47
GRW30HC									93	136																	61.45	109.98	2.05	1.92	1.92	1.21	
GRW35CC	48	6.5	33	100	82	9	62	52	82	131	8	12	12	M10	13	13	9	9	34	30.2	14	12	9	40	20	M8X30	55.14	95.64	2.01	1.22	1.22	1.6	6.13
GRW35HC									110	159																	69.62	129.11	2.66	2.3	2.3	2.1	
GRW45CC	60	8	37.5	120	100	10	80	60	106	158	8	10	13	M12	18	18	10	10	45	38	20	17	14	52.5	22.5	M12X35	95.63	178.72	4.75	3.55	3.55	3.2	9.99
GRW45HC									142	194																	120.6	240.89	6.55	5.8	5.8	4.19	
GRW55CC	70	10	43.5	140	116	12	95	70	125.5	182.5	8	13	13	M14	18	18	12	12	53	44	23	20	16	60	30	M14X45	147.64	255.03	8.2	5.6	5.6	4.92	14.14
GRW55HC									176.5	233.5																	196.95	369.8	11.25	10.4	10.4	6.72	
GRW65CC	90	12	53.5	170	142	14	110	82	160	226	16	16	13	M16	23	23	15	15	63	53	26	22	18	75	35	M16X50	213	411.6	16.2	11.59	11.59	8.89	20.3
GRW65HC									226	292																	275.3	572.7	22.55	22.17	22.17	12.13	
GRW85HC	110	15	35.5	215	185	22.5	140	70	254	349	-	21.5	14	M20	24	26	17	31	85	73	35	28	24	90	45	M20	460	945.2	51.42	45.6	45.6	21.6	35.2
GRW100HC	120	15	50	200	220	10	200	100	286	394	-	23	16	M20	25	30	23	37	100	80	39	32	26	105	52.5	M24	547	1330	73.14	61.2	61.2	31.5	46.8
GRW125HC	160	24.5	57.5	240	270	32.5	205	103	360	491	-	23	16	M20	30	45	30.5	47	125	115	45	45	33	120	60	M30	1040	1924	114.40	123.2	123.2	65.5	84.6

Note : 1 kgf = 9.81 N

Note:our currently GR blocks with caged rollers,details requirements please confirm with our sales