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AKD®

Integrated service provider for  
automation core components

Shenzhen Jinwangda Electromechanical Co., Ltd  
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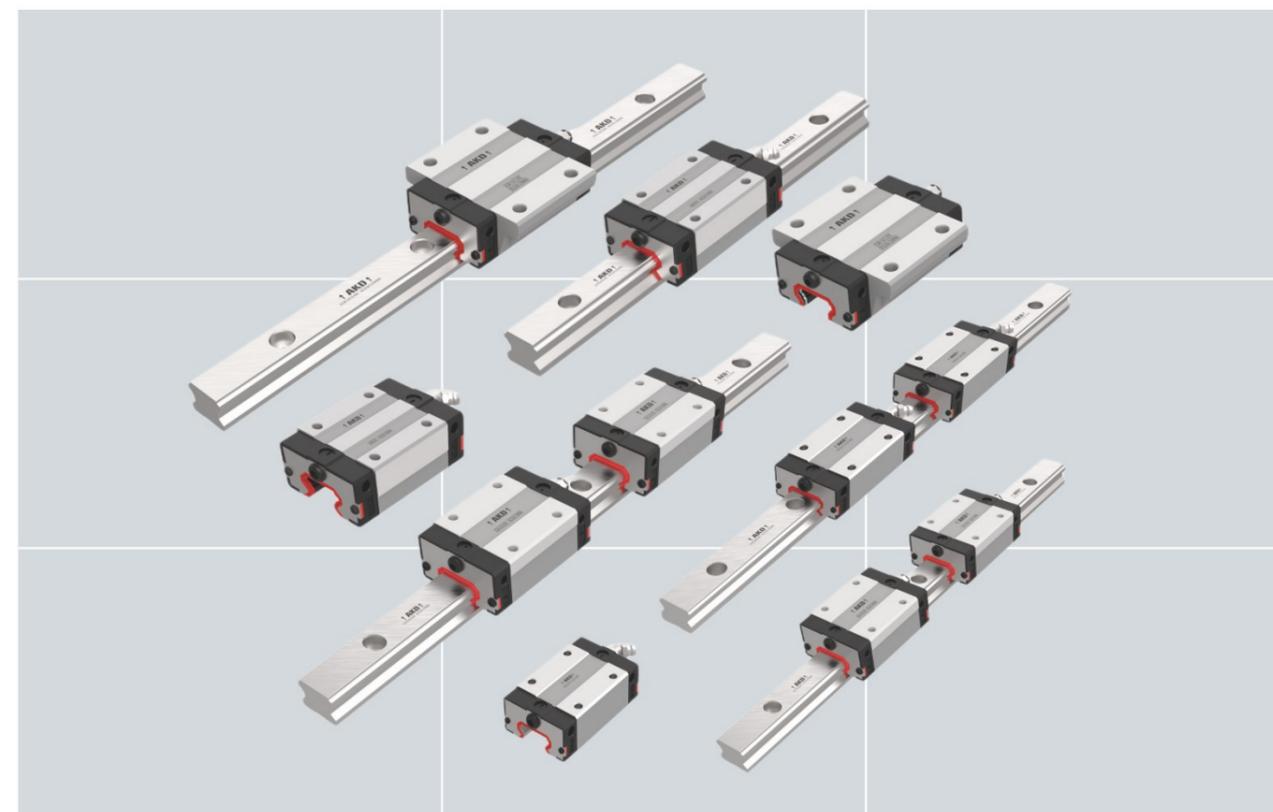
WeChat Official Account



Module Life Verification



3D Model Selection Website



# Company Profile

Shenzhen Jinwangda Electromechanical Co., Ltd. (brand AKD) was established in 2009. We are a national high-tech enterprise dedicated to the research and development, production, and sales of high-end automation core components, as well as a specialized and innovative technology enterprise in Guangdong Province.

Main products: Precision linear guides, precision ball screws, precision planetary roller screws, precision reducers, KKR steel-based modules, GTHA embedded aluminum-based modules, KTH/KTB/KCH/KCB series aluminum-based modules, KDG/KDA/KY series electric cylinders, linear motors, DD motors, hollow rotary tables, screws and support seats, etc.

Application fields: Semiconductor, 3C electronics, new energy, LCD/LED panels, medical, machine tools, humanoid robots, and other high-end automation industries.

Management System: ISO9001 Quality Management System.

Intellectual Property: The company has 8 invention patents, 33 utility model patents, 29 appearance patents, and 11 software copyrights.

Product certification: CE, ROHS.

AKD always adheres to the values of pragmatism and innovation, and the development concept of trust and persistence; Dedicated to building a well-known brand in the field of high-end automation core components, gradually achieving the internationalization of AKD brand. Through decades of continuous efforts and focus, AKD's revenue has always maintained a steady growth trend, with a wide range of market applications, creating a double good reputation for both brand and product, and winning unanimous recognition from peers and customers.



**Mission:**  
Make industrial design more precise and easy to operate.

**Vision:**  
Become a cost-effective and long-term reliable partner for customers!  
Become a leading brand in automation core components.

**Core values:**  
Pragmatic and innovative.

- National High-Tech Enterprise
- Shenzhen High-Tech Enterprise

- Guangdong SRDI Enterprise
- Partner Unit of Robotics Technology and the State Key Laboratory

**Accuracy**  
Precision, pursuit of precision

**Kind**  
Treat customers, employees, and shareholders with sincerity and friendliness

**Design**  
Design, originality, and innovation



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### Precise Linear Guide Series

With high positioning accuracy and high-speed movement, it can bear loads in different directions at the same time, and is advantaged by easy assembly and simple lubrication structure

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## Foreword

The linear guide system is a kind of rolling guide. By means of the steel balls rolling infinitely between the slider and guide, the load platform can easily perform linear motion along the guide with high accuracy. Compared with traditional sliding guides, the friction coefficient of rolling guides can be reduced to 1/50 of the original. Due to the greatly reduced starting friction, the relatively few ineffective movements occur, so micron-level feeding and positioning can be easily achieved. In addition, the design of restraint unit between the slider and guide enables the linear guide to bear loads in all directions, such as upper, lower, left and right. The above-mentioned characteristics cannot be compared with traditional sliding guides. Therefore, if the machine tool can cooperate with ball screws, and the linear guide is used for guiding, the equipment accuracy and mechanical efficiency will be greatly improved.

## 1. Basic Information

### 1-1 Advantages and Characteristics of AKD Linear Guide

#### 1-1-1 Advantages

##### [1] High positioning accuracy

When linear guides are used as the linear guide, since the friction mode of linear guides is rolling friction, not only the friction coefficient is reduced to 1/50 of that of sliding guides, but also the difference between dynamic friction and static friction gets very small. Therefore, when the machine tool is running, there will be no slippage, and the positioning accuracy of micron-level can be achieved.

##### [2] Less wear and tear, the accuracy can be maintained for a long time

Traditional sliding guides will inevitably cause poor platform movement accuracy due to oil film backflow, and the insufficient lubrication during movement will lead to wear of the contact surface of the running track, which will seriously affect the accuracy. The wear of the rolling guide is very small, so the machine tool can maintain accuracy for a long time.

##### [3] It is suitable for a high-speed motion and greatly reduces the driving horsepower required by the machine tool

Since the friction force of the linear guide is very small when it moves, only a small amount of power is needed to make the machine tool running. Especially when the machine tool is working in a reciprocating manner, the power loss of machine tool can be significantly reduced. Due to the smaller heat generated by its friction, it can be applied to high-speed operation.

##### [4] It can bear the load in up, down, left and right directions at the same time

Due to the special restraint structure design of linear guide, it can bear the loads in the up, down, left and right directions at the same time, unlike the sliding guide, which can bear a lighter lateral load in the parallel contact surface direction, easily causing the poor running accuracy of machine tool.

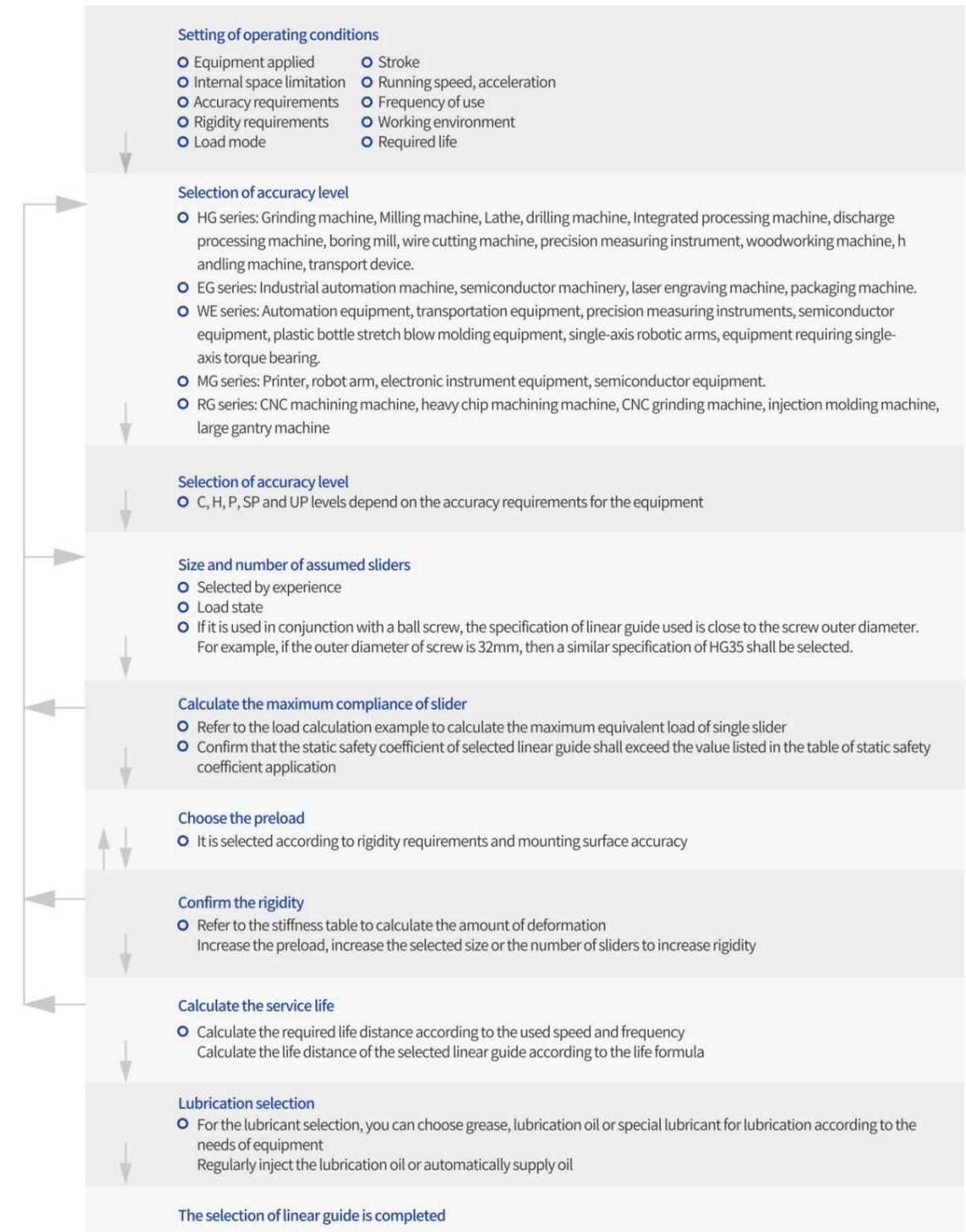
##### [5] It is easy to assemble and interchangeable

During assembly, as long as the assembly surface of guide on the machine tool is milled or grinded, and the guide and slider are fixed on machine tool with a specific torque according to the recommended steps, then the high precision during processing can be reproduced. The traditional sliding guide needs to shovel the running track, which is time-consuming and laborious. Once the machine tool has poor accuracy, it must be shoveled again. The linear guides are interchangeable, and the slider or guide or even the linear guide assembly can be replaced separately, and the machine tool can regain high-precision guidance.

##### [6] Simple lubrication structure

If the sliding guide is not sufficiently lubricated, it will cause the metal on contact surface to directly rub and wear the machine tool. It is not easy to fully lubricate the sliding guide, so holes need to be drilled in the appropriate position of machine tool for oil supply. The linear guide has an oil nozzle installed on slider, which can directly inject grease with a grease gun, or it can be replaced with a special oil pipe connector to connect the oil supply pipe for lubrication with an automatic oil supply machine.

### 1-2 Selection criteria



Precise Linear Guide

Precise Linear Guide

### 1-3 Rated Compliance

### 1-4 Life of Linear Guide

#### 1-3-1 Basic Static Rated Load

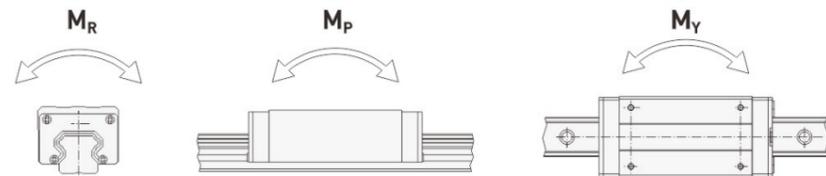
##### [1] Definition of Basic Static Rated Load [C<sub>0</sub>]

If the linear guide bears excessive load or large impact load when it is stationary or in moving, it will cause local permanent deformation of the contact surface of ball raceway and the steel ball. If the permanent deformation exceeds a certain limit, it will hinder the stability of linear guide movement. The basic static rated load is the limit load that allows this permanent deformation. According to the definition: it refers to the static load when the total permanent deformation of steel balls and the surface of ball raceway is just 0.01% of the steel ball diameter on the contact surface with the maximum stress under the condition of constant load direction and size.

The value of basic static rated load is listed in dimension table of each specification. Users can refer to the table to select a suitable linear guide, but it must be noted that the maximum static load on the selected linear guide during operation cannot exceed its basic static rated load.

##### [2] Definition of Allowable Static Torque [M<sub>0</sub>]

When the steel ball under the maximum stress in slider reaches the static rated load as defined above, the torque borne by the slider at this time is called the static rated torque. In linear guide motion, it is defined by these three directions: M<sub>R</sub>, M<sub>P</sub>, M<sub>Y</sub>:



##### [3] Static Safety Coefficient

When the linear guide is used in slow motion or the frequency of movement is not high, the static safety coefficient needs to be considered. According to different use conditions, different safety coefficients must be considered when calculating the static load, especially when the guide is subjected to impact load, a larger safety coefficient needs to be taken.

Table 1 Static Safety Coefficient Application

Load conditions	f <sub>SL</sub> 、f <sub>SM</sub> lower limit
General operating conditions	1.0~3.0
It is subject to shock and vibration during operation	3.0~5.0

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

- f<sub>SL</sub> : static safety coefficient
- f<sub>SM</sub> : static safety coefficient [torque load]
- C<sub>0</sub> : basic static rated load [kN]
- M<sub>0</sub> : allowable static torque [kN·m]
- P : work load [kN]
- M : static torque load [kN·m]

#### 1-3-2 Basic Dynamic Rated Load

##### [1] Definition of Basic Dynamic Rated Load [C]

The basic dynamic rated load is used for life calculation when the linear guide bears load and makes rolling motion. Definition: it refers to the maximum load when the rated life of linear guide is 50km (that of needle roller linear guide is 100km) under the condition of constant load direction and size. Such value is listed in the specification and size table, and users can estimate the rated life of the used linear guide based on such value in advance.

#### 1-4-1 Life

When the linear guide bears the load and moves, the surface of ball raceway and the steel ball are continuously subjected to cyclic stress. Once the critical value of rolling fatigue is reached, the contact surface will begin to fatigue and damage, and partial surface will appear fish scale-like flakes peel off, this phenomenon is called surface peeling. The definition of life is the total running distance until the surface of ball raceway and steel ball produce surface peeling due to material fatigue.

#### 1-4-2 Rated Life

The life of linear guide shows the high-degree dispersion. Even if the same batch of manufactured products is used under the same motion state, the life will be different. It is mostly due to the inherent changes in fatigue characteristics of material itself. Therefore, the rated life is generally used as a benchmark to define the life of linear guide. Its definition: it refers to the total operation distance that can be reached when 90% of the same batch of products, each running under the same conditions and rated load, did not experience the surface peeling.

#### 1-4-3 Life Calculation

The life of linear guide will vary with the actual work load, and the service life can be estimated according to the basic dynamic rated load and work load of the selected linear guide.

[1] The calculation of life without considering the influence of environmental factors is as follows

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

- L: rated life
- C: basic dynamic rated load
- P: work load

[2] If the environmental factors of using linear guide are considered, its life will vary as the state of motion, the hardness of ball raceway surface and system temperature.

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

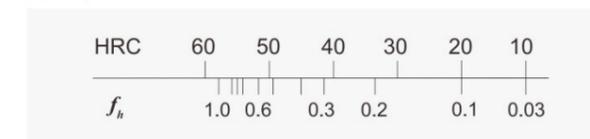
- L : life
- f<sub>h</sub> : hardness coefficient
- C : basic dynamic rated load
- f<sub>t</sub> : temperature coefficient
- P<sub>c</sub> : work load
- f<sub>w</sub> : load coefficient

#### 1-4-4 Life Coefficient

##### [1] Hardness coefficient [f<sub>h</sub>]

The contact surface hardness of ball raceway of linear guide requires that the hardness at a certain hardening depth is HRC 58~62. If the hardness value cannot reach the required level, the rated load and service life of linear guide will be reduced. At this time, the dynamic and static rated loads are the values listed in the dimension table multiplied by the corresponding hardness coefficient. The hardness requirement of AKD ex-factory linear guides is above HRC 58, so f<sub>h</sub> is 1.

##### Raceway hardness



Precise Linear Guide

[2] Temperature coefficient [f<sub>t</sub>]

The system temperature will affect the material of linear guide. When the temperature is higher than 100°C, the rated load and service life of linear guide will be reduced. At this time, the dynamic and static rated loads are the values listed in the dimension table multiplied by the corresponding temperature coefficient. As some accessories are made of plastic materials and not resistant against high temperature, it is recommended that the operating temperature shall be lower than 100 °C.

Temperature

°C	100	150	200	250	
f <sub>t</sub>	1.0	0.9	0.8	0.7	0.6

[3] Load coefficient [f<sub>w</sub>]

The load acting on linear guide, in addition to the self-weight of the device, the inertial load when starting and stopping, and the torque load generated due to suspension, there are also vibration and impact loads caused by the movement. This type of load is not easy to calculate. According to experience, load condition and used speed, it is recommended to multiply the calculated load value by the corresponding load coefficient.

Table 2 Load Coefficient

Load condition	Used speed	f <sub>w</sub>
Non-impact and smooth	V ≤ 15 m/min	1 - 1.2
Minor impact force	15 m/min < V ≤ 60 m/min	1.2 - 1.5
Normal load	60m/min < V ≤ 120 m/min	1.5 - 2.0
With impact and vibration	V > 120 m/min	2.0 - 3.5

1-4-5 Conversion of Life Time

1-4-5 Conversion of Life Time

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

- L<sub>h</sub> : Life time [hr]
- L : Life [km]
- V<sub>e</sub> : Operation speed [m/min]
- C/P : Load ratio

1-5 Work Load

1-5-1 Calculation of Work Load

The method of calculating work load varies with the actual distribution of forces, such as the position of gravity center of carrier's body, the point of applying force, and the inertial forces during acceleration and deceleration in operation. Therefore, when using linear guides, it is necessary to carefully consider various load conditions to calculate the most accurate load value.

Precise Linear Guide

[1] Single slider bearing load

Table 3 Load Calculation Example

Linear Guide Layout Diagram	Force Distribution Diagram	Single slider load
		$P_1 = \frac{W}{4} + \frac{F}{4} + \frac{F \cdot a}{2c} + \frac{F \cdot b}{2d}$ $P_2 = \frac{W}{4} + \frac{F}{4} + \frac{F \cdot a}{2c} - \frac{F \cdot b}{2d}$ $P_3 = \frac{W}{4} + \frac{F}{4} - \frac{F \cdot a}{2c} + \frac{F \cdot b}{2d}$ $P_4 = \frac{W}{4} + \frac{F}{4} - \frac{F \cdot a}{2c} - \frac{F \cdot b}{2d}$
		$P_1 = \frac{W}{4} + \frac{F}{4} + \frac{F \cdot a}{2c} + \frac{F \cdot b}{2d}$ $P_2 = \frac{W}{4} + \frac{F}{4} + \frac{F \cdot a}{2c} - \frac{F \cdot b}{2d}$ $P_3 = \frac{W}{4} + \frac{F}{4} - \frac{F \cdot a}{2c} + \frac{F \cdot b}{2d}$ $P_4 = \frac{W}{4} + \frac{F}{4} - \frac{F \cdot a}{2c} - \frac{F \cdot b}{2d}$
		$P_1 = P_3 = \frac{W}{4} - \frac{F \cdot l}{2d}$ $P_2 = P_4 = \frac{W}{4} + \frac{F \cdot l}{2d}$
		$P_1 - P_2 = -\frac{W \cdot h}{2d} + \frac{F \cdot l}{2d}$
		$P_1 - P_2 = -\frac{W \cdot h}{2c} - \frac{F \cdot l}{2c}$ $P_1 = P_3 = \frac{W}{4} + \frac{F}{4} + \frac{F \cdot k}{2d}$ $P_2 = P_4 = \frac{W}{4} + \frac{F}{4} - \frac{F \cdot k}{2d}$

Note: W: weight  
F: External Force  
P<sub>n</sub>: load [slider radial and anti-radial] n=1~4  
P<sub>tn</sub>: load [slider lateral] n=1~4  
a, b, k: distance from external force to geometric center of guide span  
l: distance from external force to drive source  
d: slider span  
h: distance from center of gravity to drive source

Precise Linear Guide

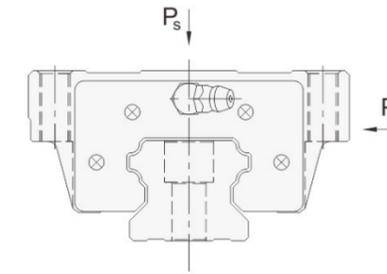
[2] Inertia load

Table 4 Example of Inertia Load Calculation

Example of considering acceleration and deceleration	Force on single slider
<p>                     F : Drive thrust [N]                      W : Device weight [N]                      g : Gravitational acceleration [9.8m/sec<sup>2</sup>]                      P<sub>n</sub> : Load [radial and anti-radial] n=1~4                      V<sub>c</sub> : Speed                      t<sub>n</sub> : Time constant n=1~3                      c · d · l : distance                 </p>	<ul style="list-style-type: none"> <li>Constant speed  <math>P_1 \sim P_4 = \frac{W}{4}</math> </li> <li>Acceleration  <math>P_1 = P_3 = \frac{W}{4} + \frac{1}{2} \cdot \frac{W}{g} \cdot \frac{V_c}{t_1} \cdot \frac{l}{d}</math>  <math>P_2 = P_4 = \frac{W}{4} - \frac{1}{2} \cdot \frac{W}{g} \cdot \frac{V_c}{t_1} \cdot \frac{l}{d}</math> </li> <li>Deceleration  <math>P_1 = P_3 = \frac{W}{4} - \frac{1}{2} \cdot \frac{W}{g} \cdot \frac{V_c}{t_3} \cdot \frac{l}{d}</math>  <math>P_2 = P_4 = \frac{W}{4} + \frac{1}{2} \cdot \frac{W}{g} \cdot \frac{V_c}{t_3} \cdot \frac{l}{d}</math> </li> </ul>

1-5-3 Equivalent Load Calculation in Two Directions

The linear guide can bear loads in four directions: up, down, left and right, so when using the linear guide, it may be subject to vertical load [P<sub>s</sub>] and lateral load [P<sub>l</sub>] at the same time. The equivalent load [P<sub>e</sub>] can be converted according to the following formula.



HG/EG/WE/RG Series

$$P_e = P_s + P_l \quad \text{Eq.1.5}$$

MG/QG Series

$$P_s > P_l \quad P_e = P_s + 0.5 \cdot P_l \quad \text{Eq.1.6}$$

$$P_l > P_s \quad P_e = P_l + 0.5 \cdot P_s \quad \text{Eq.1.7}$$

1-5-4 calculation Example of Linear Guide Service Life

Select the type and specification of linear guide based on experience, and then estimate the maximum work load of single slider according to the actual use situation, and calculate the load ratio between the dynamic rated load and work load to estimate its service life.

1-5-2 Average Load Calculation

The load borne by the slider during operation is sometimes not equal. For example, during the operation of the conveying device, it bears the weight of the goods additionally when moving forward, and only bears the weight of the device itself when returning, and the load shows a stepped change. Therefore, it is necessary to find out the average load during operation is used to calculate the life. The definition of average load is the equivalent load value with the same life under the condition of load change.

Table 5 Average Load Calculation Example

Load change type	Average load
<p>Stepped change</p>	$P_m = \sqrt[3]{1/L(P_1^3 \cdot L_1 + P_2^3 \cdot L_2 + \dots + P_n^3 \cdot L_n)}$ <p>                     P<sub>m</sub> : average load                      P<sub>n</sub> : variable load                      L : total operation distance                      L<sub>n</sub> : operation distance under P<sub>n</sub> load                 </p>
<p>Monotonic change</p>	$P_m = 1/3 (P_{min} + 2 \cdot P_{max})$ <p>                     P<sub>m</sub> : average load                      P<sub>min</sub> : minimum load                      P<sub>max</sub> : maximum load                 </p>
<p>Sinusoidal change</p>	$P_m = 0.65 \cdot P_{max}$ <p>                     P<sub>m</sub> : average load                      P<sub>max</sub> : maximum load                 </p>

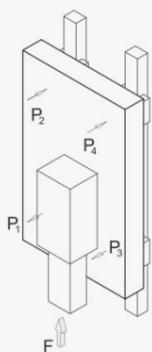
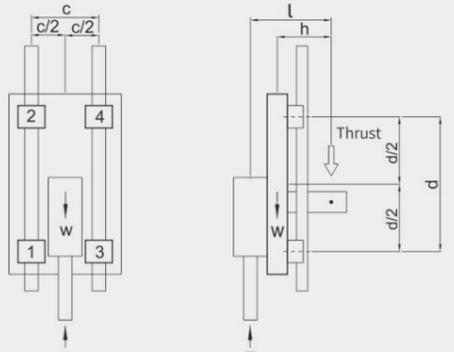
Precise Linear Guide

Precise Linear Guide

Table 6 Life Calculation Example

Applicable specifications of linear guides	Equipment Dimension	Processing condition
Type : HGH 30 CA C : 38.74 kN C <sub>0</sub> : 52.19 kN Preload: Z0	d : 600 mm c : 400 mm h : 200 mm l : 250 mm	Dead weight of device [W]: 15 kN Drilling force [F]: 1 kN System temperature: normal temperature Load state: normal load

- Slider load calculation
 
$$P_1 \sim P_4 = + \frac{W \times h}{2d} - \frac{F \times l}{2d} = + \frac{15 \times 200}{2 \times 600} - \frac{1 \times 250}{2 \times 600} = 2.29 \text{ (kN)}$$

$$P_{\max} = |P_1 - P_4| = 2.29 \text{ (kN)}$$
- Since Z0 preload is selected,  $P_c = P_{\max} = 2.29 \text{ (kN)}$   
Note: if you choose a heavier preload [ZA, ZB], although the rigidity will be improved, it will reduce its service life
- Life L calculation
 
$$L = \left( \frac{f_h \times f_t \times C}{f_w \times P_c} \right)^3 \times 50 = \left( \frac{1 \times 1 \times 38.74}{2 \times 2.29} \right)^3 \times 50 = 30,258 \text{ (km)}$$

1-6 Friction

The linear guide adopts steel balls for rolling guide, so its friction force can be reduced to 1/50 of the traditional sliding guide, especially the static friction is very small, and there is not much difference from the dynamic friction. There will be no idling and slipping so that the micron-level motion accuracy can be realized. Generally speaking, the friction coefficient of linear guides is about 0.004. The resistance of oil wiper varies with the specifications, and its value is listed in the friction section of each specification.

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

F: friction force [kN]  
S: oil wiper resistance [kN];  
 $\mu$ : friction coefficient  
W: vertical load in motion [kN]

1-7 Lubrication

If the linear guide is not properly lubricated, the friction of rolling parts will increase, and long-term use will become the main reason for shortening the life.

Lubricants provide the following functions:

- Reduce friction of rolling parts, prevent burns and reduce wear.
- Form an oil film between the rolling surfaces to extend the rolling fatigue life.
- Prevent rust.

1-7-1 Lubrication Grease (GREASE)

Each set of linear guides uses lubrication ball groove rails. Although lubrication grease is not easy to lose, to avoid insufficient lubrication due to lubrication loss, it is recommended that customers replenish the lubrication grease once when the use distance reaches 100km. At this time, the grease gun can be used to inject grease into the slider through the nozzle attached to the slider. Lubrication grease is suitable for occasions where the speed does not exceed 60m/min and there is no requirement for cooling effect.

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

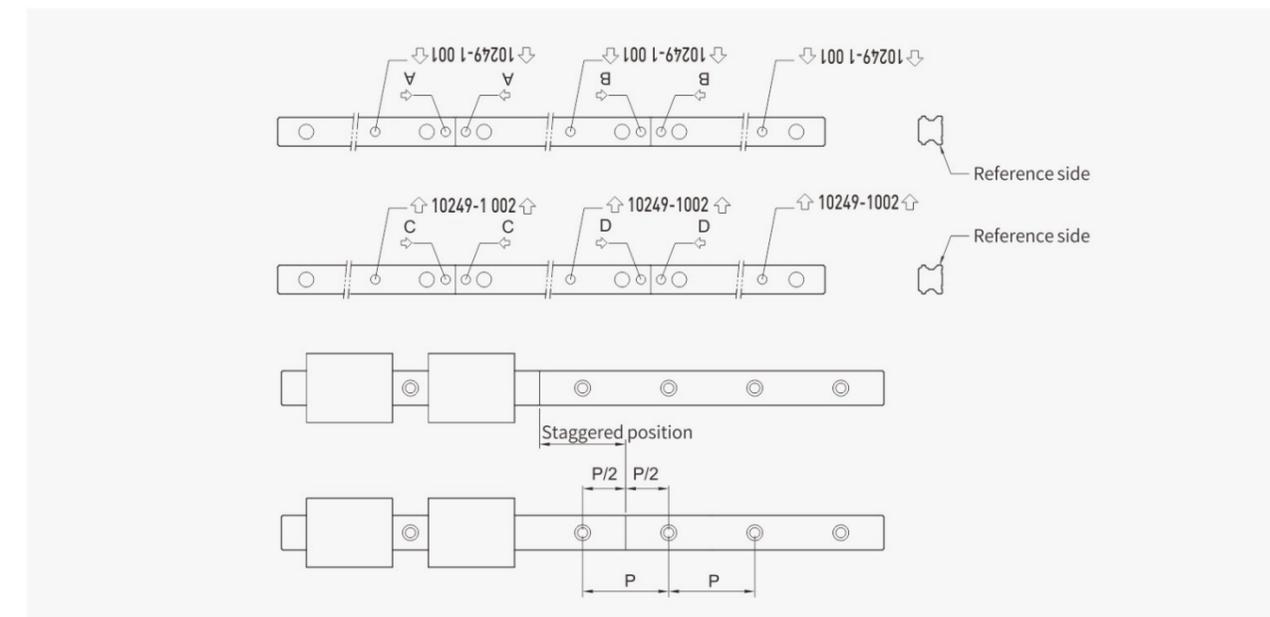
T : oil refilling frequency [hour]  
V<sub>e</sub> : Speed [m/min]

1-7-2 Lubrication Oil [OIL]

It is recommended that customers shall use lubrication oil with an oil viscosity of about 32~150cst to lubricate the linear guide. AKD can install oil pipe joints at the position of original oil nozzle according to customer needs, so customers only need to connect oil pipes preset for the machine to the oil pipe joints. The loss of lubrication oil is faster than that of lubrication grease. It is necessary to ensure sufficient oil supply during use. In case of insufficient lubrication, it can cause abnormal wear of linear guide and reduce its life. It is recommended to apply oil at a frequency of about 0.3cm<sup>3</sup>/hr, but customers can appropriately adjust it according to their usage conditions. Lubrication oil is suitable for occasions with various loads and speeds. However, the lubrication oil is easy to volatilize, it is not suitable for high-temperature lubrication.

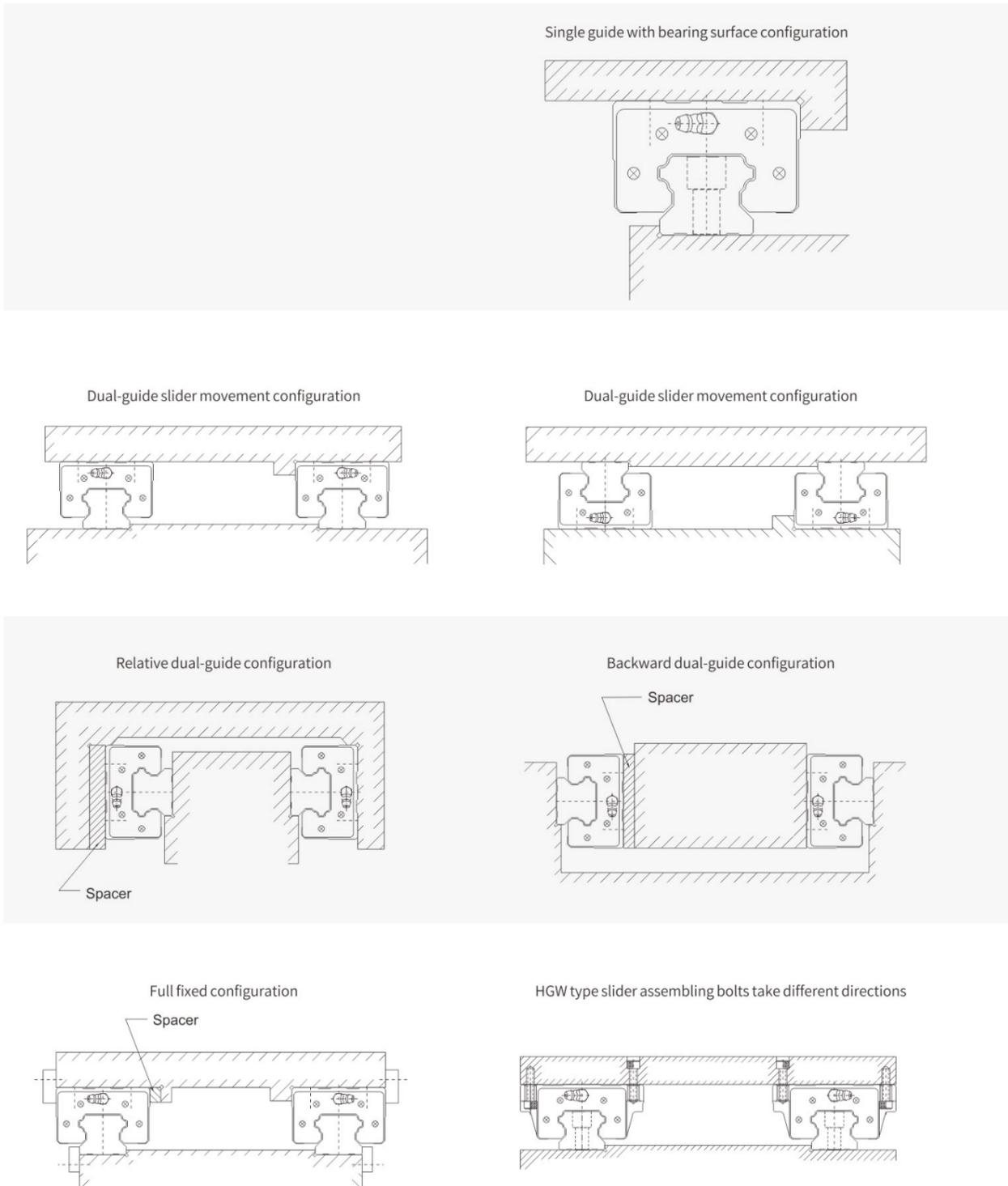
1-8 Guide Teeth Connector

When installing the guide teeth connector, it must be installed according to the sequence marked on guide to ensure the accuracy of linear guide. It is recommended that the position of paired guide teeth connector shall be staggered as much as possible to avoid that the part from machine tool to the connector causes poor accuracy due to the difference of guides.



### 1-9 Configuration of Linear Guide

The linear guide can bear loads in the up, down, left and right directions, so the linear guide group can be arranged according to the machine tool structure and the direction of work load.

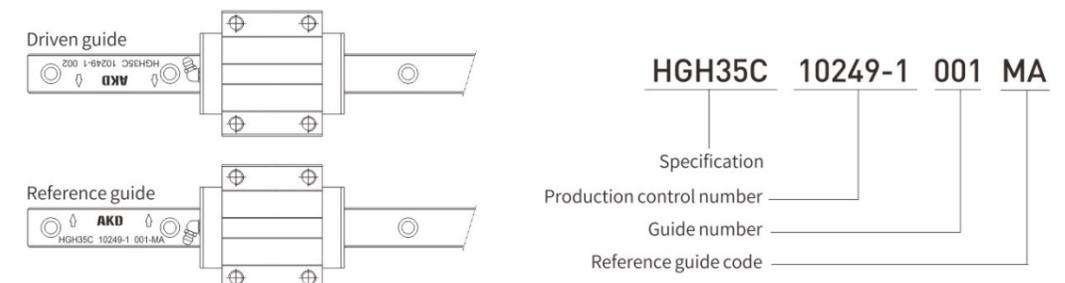


### 1-10 Installation of Linear Guide

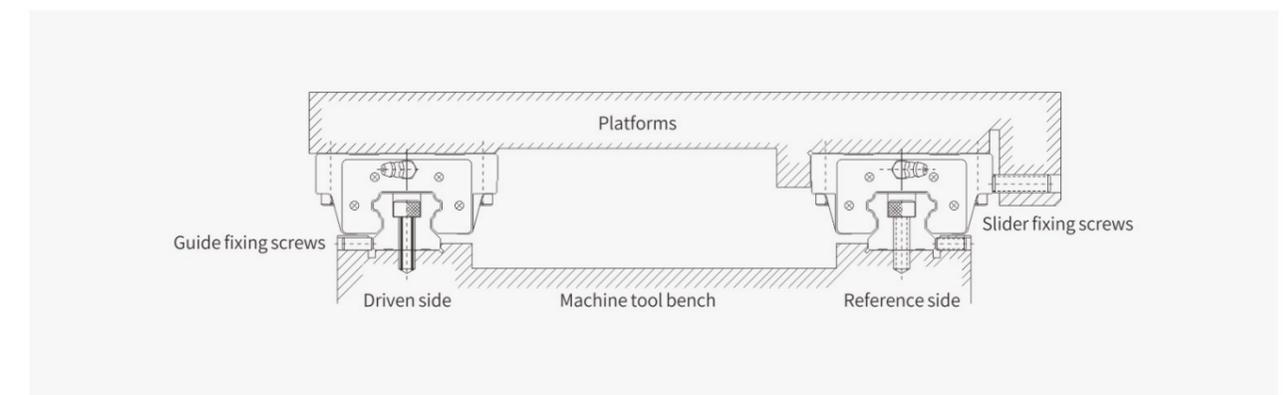
The installation method of linear guide must be determined according to the use condition of machine tool, such as the degree of vibration and impact force, the required walking accuracy and the limitation of the machine tool.

#### 1-10-1 Reference Guide and Driven Guide

When using the non-interchangeable linear guides in pairs, pay attention to the difference between the reference guide and the driven guide. The accuracy of reference surface on the side of reference guide is higher than that of driven guide, and it can be used as the bearing surface for installation of machine tool. There is an MA mark on reference guide, as shown in figure.

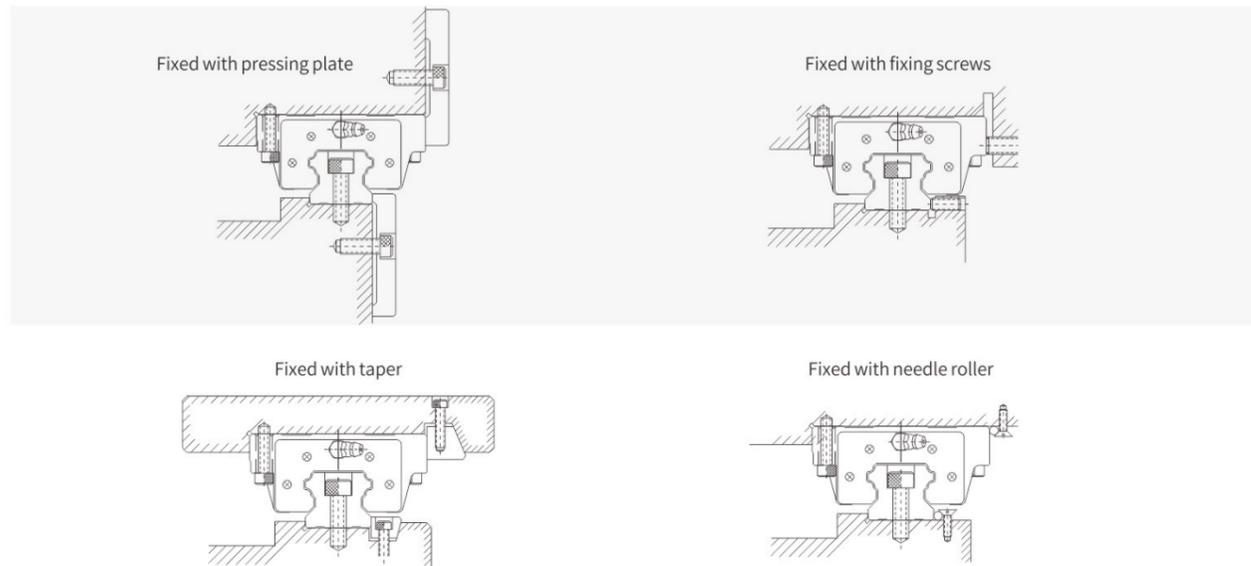


#### 1-10-2 The machine tool is subjected to vibration and impact force, and requires high-rigidity and high-precision installation



(1) Fixing method

When the machine tool is subjected to vibration and impact force, the guide and slider are likely to deviate from the original fixed position, which will affect the accuracy. To avoid similar situations, it is recommended to use four fixing methods listed in the figure below to fix the guides and sliders and ensure the operation accuracy of machine tool.



(2) Guide Installation

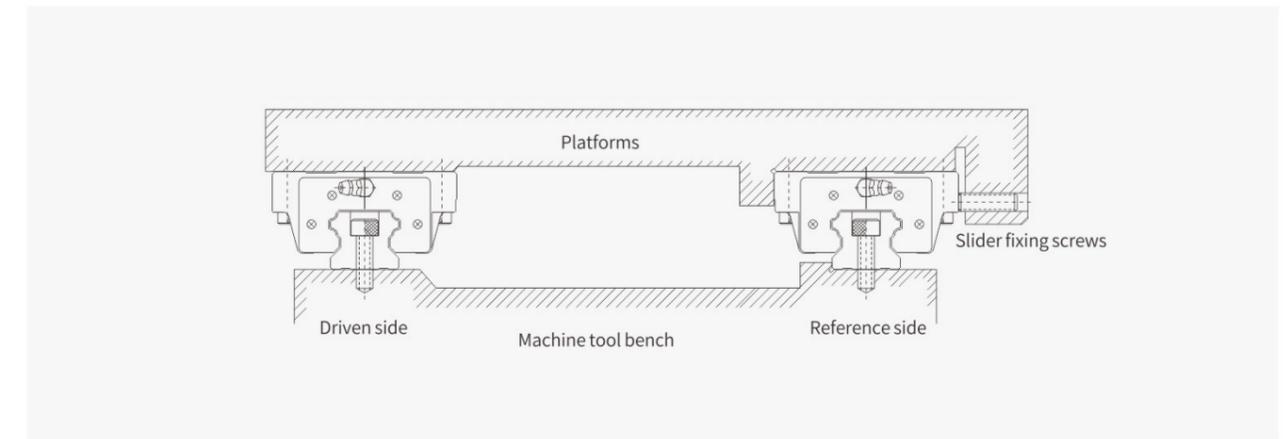
1. Clean the dirt on the assembly surface of the machine tool.
2. Place the linear guide stably on machine tool and let the side reference surface of guide lean against the assembly surface of machine tool.
3. Try to lock the assembly screws to confirm whether the bolt holes match, and roughly fix the bottom reference surface of guide to the bottom assembly surface of machine tool.
4. Use the side fixing screws to tighten the side reference surface of guide against the side assembly surface of machine tool to determine guide position.
5. Use a torque wrench to tighten assembly screws in order with a specific torque to press the bottom reference surface of guide against the bottom assembly surface of machine tool.
6. Install the remaining matching guides according to steps 1 to 5.

(3) Slider Installation

- Use assembly screws to roughly fix the bearing platform on slider.
- Use fixing screws to fasten the side reference surface of slider to the side assembly surface of platform to determine the slider position.
- Tighten the assembly screws to fasten the bearing platform to slider in the order of 1-4 diagonals.

1-10-3 Installation of Guide without Lateral Fixing Screws

In the installation example without fixing screws, the guides can be installed as shown below to ensure the parallelism between the driven side guide and the reference side guide, and the installation of slider is the same as the previous example.



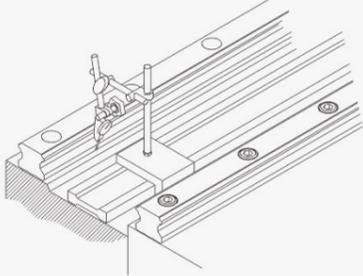
(1) Installation of Reference Side Guide

- Vise Clamping Method**  
 Firstly use assembly screws to roughly fix the bottom reference surface of guide to the bottom assembly surface of machine tool, and then use a vise to tighten the side reference surface of guide against the side assembly surface of machine tool to determine the guide position, and then use a torque wrench to tighten the fixing screws in order with a certain torque, and press the bottom reference surface of guide against the bottom assembly surface of machine tool.

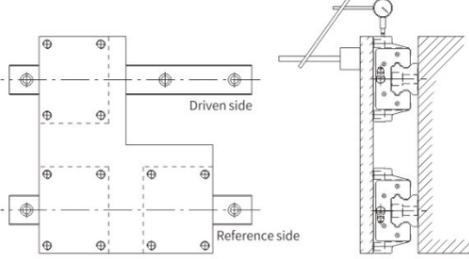
Precise Linear Guide

Precise Linear Guide

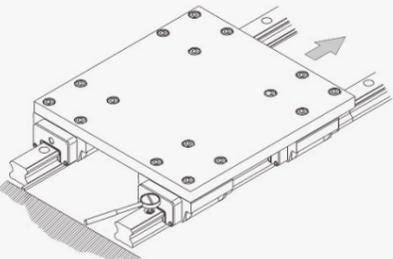
(2) Installation of Driven Side Guide



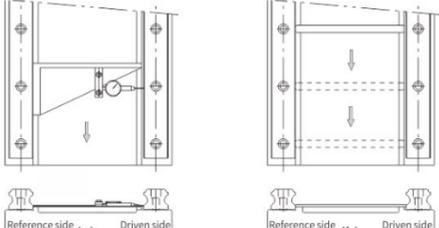
- Linear Block Gauge Method**  
 Place the linear block gauge between two guides, use a dial indicator to calibrate the linear block gauge so that it is parallel to the side reference surface of reference side guide, and then calibrate the driven side guide according to the linear block gauge, starting from one end of guide, calibrate and tighten the assembly screws in order with a specific torque.



- Moving Platform Method**  
 Fix the two sliders on the reference side on a measuring platform, and only install one slider on the driven side. The guide and slider are not yet fastened to the machine tool and platform. Use the dial indicator attached to the top of driven side slider, measure the side reference surface of driven side slider, start calibration from one end of guide, and tighten the assembly screws in order with a specific torque.



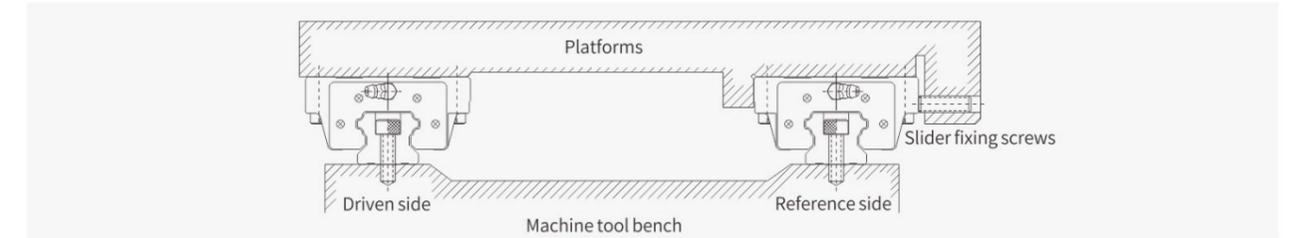
- Reference side guide simulative method**  
 Fix two sliders of reference side linear guide and one slider of the driven side guide to the platform, and then roughly fix the driven side guide and its other slider to the machine tool and platform respectively, and move the platform with the reference side guide as the reference, starting from one end of guide, while confirming the rolling resistance of driven side linear guide, tighten the assembly screws in order with a specific torque.



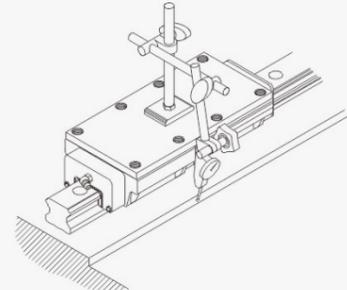
- Special Tool Method**  
 Use special tools to determine the position of driven side guide, and tighten assembly screws in order with a specific torque.

1-10-4 Installation of Guide without Lateral Positioning Assembly Surface

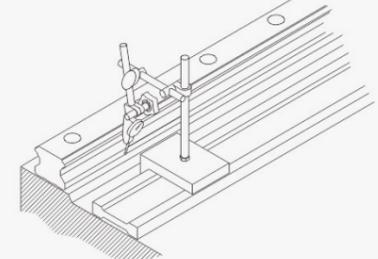
In the installation example without a lateral positioning assembly surface, the guides can be installed as shown below to ensure the parallelism between the driven side guide and reference side guide, and the installation of slider is the same as the previous example.



(1) Installation of Reference Side Guide



- False Reference Surface Method**  
 Use two sliders to tightly connect and fix them on the measuring plate and use the reference surface near assembly surface of machine tool guide as the reference. Use a dial indicator to calibrate the side reference surface of reference side guide, calibrate from one end of guide, and tighten the assembly screws in order with a specific torque.



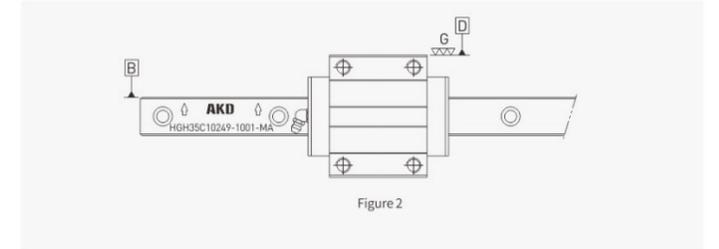
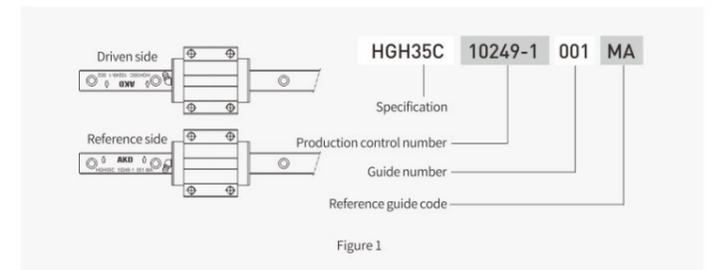
- Linear Block Gauge Method**  
 Relying on the linear block gauge, use a dial indicator to calibrate the side reference surface of reference side guide, calibrate from one end of guide, and tighten the assembly screws in order with a specific torque.

(2) Installation of Driven Side Guide

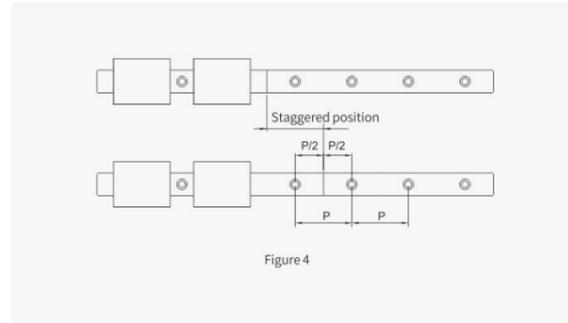
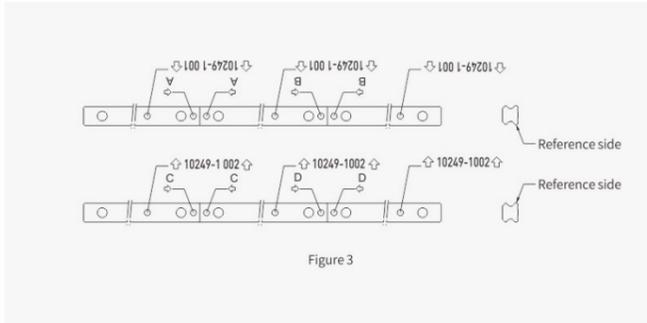
It is the same as the method listed in the installation example without lateral fixing screws.

1-10-5 Precautions for Linear Guide Installation

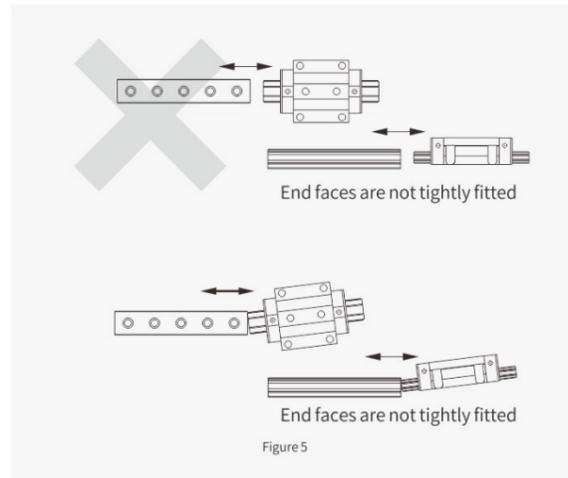
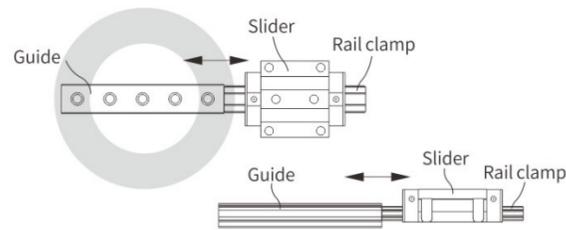
- All linear guide products are coated with an appropriate amount of anti-rust oil before delivery. Please wipe off the anti-rust oil on guide before installation and use so that the slider can move.
- Confirm the reference guide and driven guide: when using non-interchangeable linear guides in pairs, the attention must be paid to the differences between reference guide and driven guide. The accuracy of reference surface on the side of reference guide is higher than that of driven guide, and it can be used as the bearing surface for installation of machine tool. The reference guide is marked with the symbol MA. Furthermore, when using double guides in pairs, the reference guide numbers are odd, and the driven guide numbers are even. Please install them in order according to the indicated symbols [e.g., 001 paired with 002, 003 paired with 004...], as shown in Figure 1. For multi-guide installations, please follow this principle.
- Confirm the installation reference surface: the guide reference surface is side surface [B] indicated by arrow next to the AKD marking; the slider reference surface is the smooth surface [D] that has been ground. (See Figure 2)



4. Guide teeth connector: the guide teeth connector must be installed in the order marked on guide to ensure the accuracy of linear guide. The teeth connector marks are on the upper surface of connector end. Please align the ends with the same connector mark, as shown in Figure 3. It is recommended that the teeth connector positions of paired guides shall be staggered to avoid poor accuracy due to differences between the guides from the machine tool to the teeth connector position, as shown in Figure 4.



5. When installing the linear guide, please do not remove the slider unless necessary. If you need to remove or install the slider from the guide, please use the attached rail clamp (see Figure 5 for use method).



- 6. When installing linear guide rails, do not arbitrarily switch the sliders of non-interchangeable guide rails to avoid affecting the accuracy.
- 7. When installing the linear guide rail, please use the torque wrench, and use the torque value recommended by the company, and lock the screws in order to ensure the straightness of the guide rail.

## 2. AKD Product Series

To serve customers' diverse needs for products, in addition to HG series suitable for the general machine tool industry, we developed the EG series that is more suitable for the automation industry, and developed RG series that is suitable for high rigidity demand industries and the MGN/MGW series that is suitable for micro-machinery and semiconductor industries. For the high-tech industry, we also developed products with high speed, silence and low dust generation requirements.

### (1) Series Type

Table 7 General Table of Series Type

Series	Combined altitude	Load type	Square type	Flange type		
			Lock-up type	Lock-up type	Lock-down type	Lock-up and lock-down type
HG	High type	Heavy load	HGH-CA	-	-	-
		Super heavy load	HGH-HA	-	-	-
	Low type	Heavy load	HGL-CA	HGW-CA	HGW-CB	HGW-CC
		Super heavy load	HGL-HA	HGW-HA	HGW-HB	HGW-HC
EG	Low type	Medium load	EGH-SA	EGW-SA	EGW-SB	-
		Heavy load	EGH-CA	EGW-CA	EGW-CB	-
WE	Low type	Heavy load	WEH-CA	-	-	WEW-CC
MGN/QGN	-	Standard Type	MGN-C QGN-C	-	-	-
		Extended type	MGN-H QGN-H	-	-	-
MGW/QGW	-	Standard Type	MGW-C QGW-C	-	-	-
		Extended type	MGW-H QGW-H	-	-	-
RG	High type	Heavy load	RGH-CA	-	-	-
		Super heavy load	RGH-HA	-	-	-
	Low type	Heavy load	RGL-CA	-	-	RGW-CC
		Super heavy load	RGL-HA	-	-	RGW-HC

### 1-10-6 Precautions for Linear Guide Maintenance

1. The standard products of linear guides have been filled with high-quality lubricant [lubrication oil or lithium soap-based grease] into the slider before shipment. After installation and trial operation, please lubricate the slider again before formal operation. Please use the same lithium soap-based lubricant when lubrication.
2. The standard products of linear guides have been coated with anti-rust oil on the surface of guide before shipment. If there is any cleaning action of guide during installation, please apply a proper layer of lubrication oil on the surface of guide again after the machine equipment is fully installed (please use compatible lubricant).
3. As the slider of linear guide is composed of many plastic parts, please avoid contacting or soaking these parts with organic solvents during cleaning to avoid damage to product.
4. Foreign matter entering the slider is one of the reasons that cause slider failure and damage, which shall be avoided.
5. Arbitrarily disassembling the parts of linear guide may cause foreign matter to enter the slider or reduce the accuracy of linear guide. Please do not disassemble the linear guide arbitrarily.
6. Improperly tilting the linear guide may cause the slider to slide out of the guide due to its own weight. Please keep the linear guide horizontal when moving it.
7. Dropping or bumping the linear guide may damage its normal function. Please avoid the improper dropping or bumping the linear guide.
8. In special environments, please apply the appropriate surface treatment or contact with AKD.

The allowable ambient temperature range for self-lubricating linear guides [E2 type] is -10°C-60°C; the allowable ambient temperature range for silent linear guides [Q1 type] is -10°C-80°C; and the maximum allowable ambient temperature for linear guides with metal end cover [SE type] is 150°C. In addition, the maximum allowable ambient temperature for general linear guides is 100°C.

10. For other detailed descriptions, please refer to the technical catalog. If you have any other questions or problems in use, please contact with AKD.

(2)Series Accuracy Level

Table 8 General Table of Series Accuracy Level

Series	Non-interchangeable linear guide					Interchangeable linear guide		
	Ordinary (C)	High (H)	Precision (P)	Super precision (SP)	Ultra-high precision (UP)	Ordinary (C)	High (H)	Precision (P)
HG	●	●	●	●	●	●	●	●
EG	●	●	●	●	●	●	●	●
WE	●	●	●	●	●	●	●	●
MGN/QGN	●	●	●	-	-	●	●	●
MGW/QGW	●	●	●	-	-	●	●	●
RG	-	●	●	●	●	-	●	●

(3)Series Preload Level

Table 9 General Table of Series Preload Level

Series	Non-interchangeable linear guide			Interchangeable linear guide	
	Normal clearance (Z0)	Light preload (ZA)	Medium preload (ZB)	No preload (Z0)	Light preload (ZA)
HG	●	●	●	●	●
EG	●	●	●	●	●

Series	Non-interchangeable linear guide			Interchangeable linear guide	
	Normal clearance (Z0)	Light preload (ZA)	Medium preload (ZB)	No preload (Z0)	Light preload (ZA)
RG	●	●	●	●	●

Series	Non-interchangeable linear guide			Interchangeable linear guide		
	Normal clearance (Z0)	Light preload (ZA)	Medium preload (ZB)	No preload (Z0)	Light preload (ZA)	Light preload (ZA)
MGN/QGN	●	●	●	●	●	●
MGW/QGW	●	●	●	●	●	●

2-1 HG Series - Heavy Load Ball Linear Guide

HG series linear guide is a four-row single circular arc tooth contact linear guide, which integrates the optimal structural design of ultra heavy load precision linear guide, and improves the load and rigidity compared with other linear guides. With four-way equal load characteristics, and automatic center aligning function, it can absorb the assembly error of mounting surface, to achieve high-precision requirements. The concept of high speed, high load, high rigidity and high accuracy has become the trend of future development of industrial products all over the world. AKD four-row ultra heavy load linear guide is developed based on this concept.

2-1-1 Features of HG Series Linear Guide

(1)Automatic center aligning capability

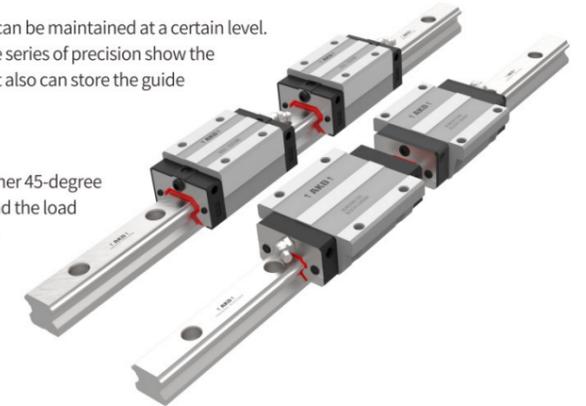
Under the effect of elastic deformation of steel balls and transfer of contact points in the installation process, even if the assembly surface is somewhat deviated, DF (45°-45° combination) from the circular arc groove still can be absorbed by the internal linear guide slider to produce the effect of automatic center aligning capability and obtain high-precision stable smooth movement.

(2)Interchangeability

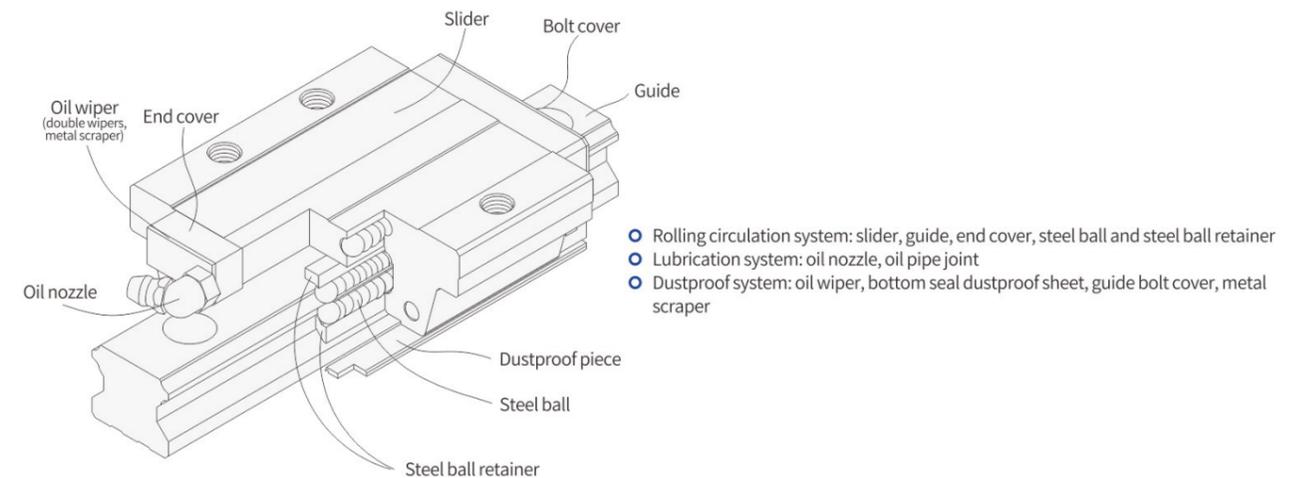
Due to strict control of production and manufacturing accuracy, the size of linear guide can be maintained at a certain level. The design of slider with retainer can prevent the steel balls from falling off so that some series of precision show the interchangeability. Customers can order the guide or slider according to their needs, but also can store the guide and slider separately to reduce storage space.

(3)High rigidity in all directions

Using a four-row circular arc groove and cooperating with four rows of steel balls and other 45-degree contact angle, the steel balls can achieve the ideal two-point contact structure, withstand the load from the upper, lower, left and right directions. When necessary, the preload can also be applied to improve rigidity.



2-1-2 HG body structure



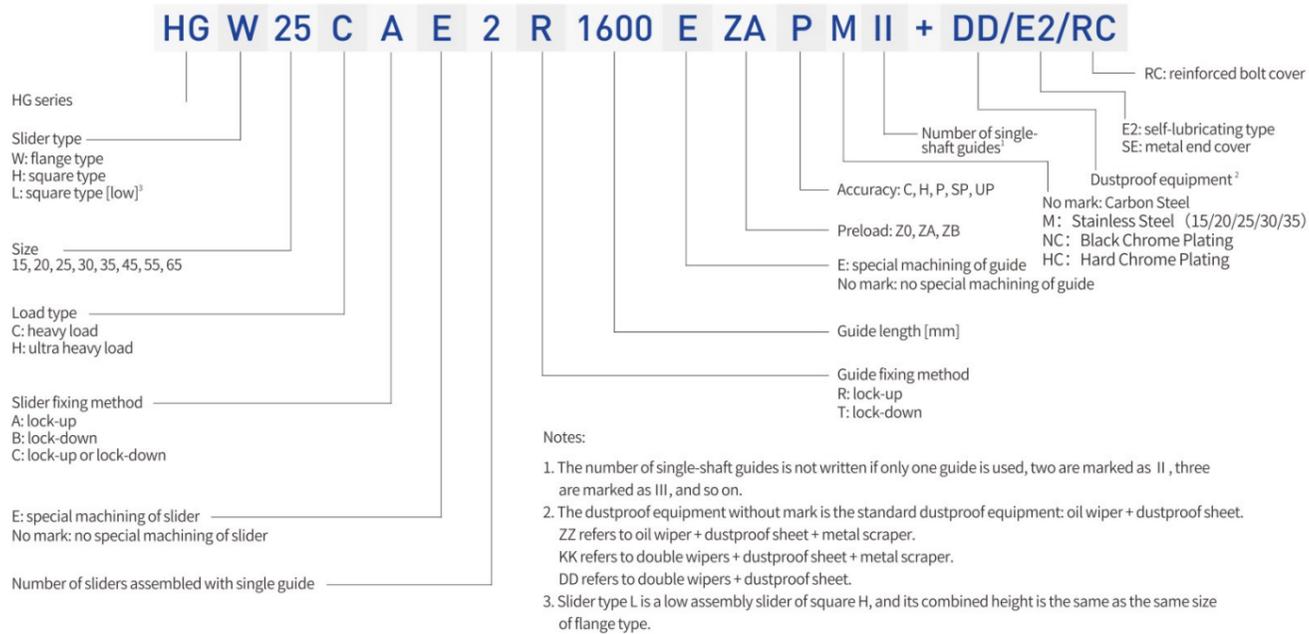
2-1-3 Description of Product Specification

HG series is divided into two types of linear guides: non-interchangeable and interchangeable. The specifications and dimensions of two types are the same while the main difference is that the actuator and guide of interchangeable type can be used separately or interchanged for use, more convenient. However, its combined accuracy can not reach the ultra-high accuracy of non-interchangeable type. As AKD has good dimensional control and strict quality requirements in manufacturing, the combined accuracy of interchangeable type has reached a certain level. It is a good choice for customers who do not need to pair and install the linear guides. The product specification and models of linear guides mainly indicate the linear guide size, model, accuracy level, preload and other requirements, facilitating the confirmation of products by both parties when ordering.

HG series Heavy load ball linear guide

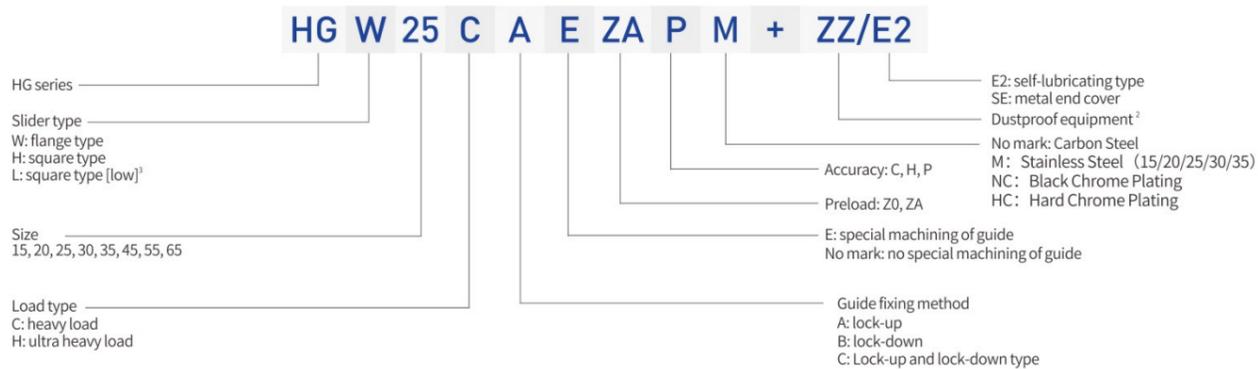
HG series Heavy load ball linear guide

(1) Product model of non-interchangeable linear guide

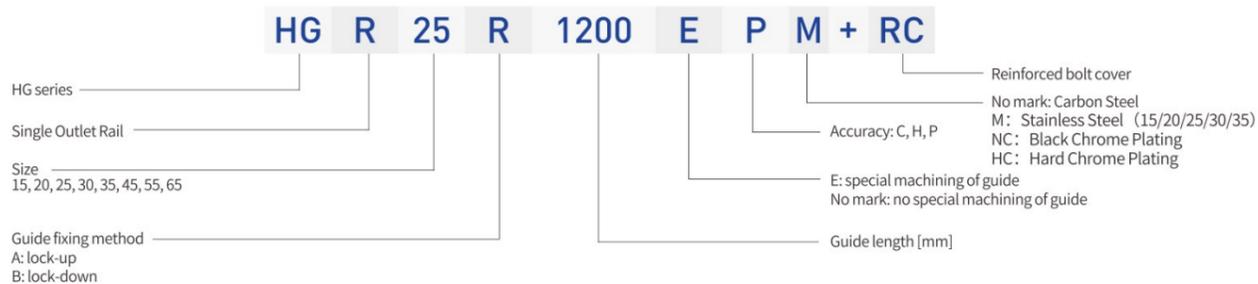


(2) Product model of interchangeable linear guide

○ Interchangeable Slide Product Model



○ Interchangeable Guideway Product Model



2-1-4 HG Series Types

(1) Slider type

AKD provides two types of linear guides, flange type and square type. The square linear guide is divided into H type and L type, in which L type is a low assembly linear guide based on H type, its combined height is the same as the flange type linear guide.

Table 2-1-1 Slider Type

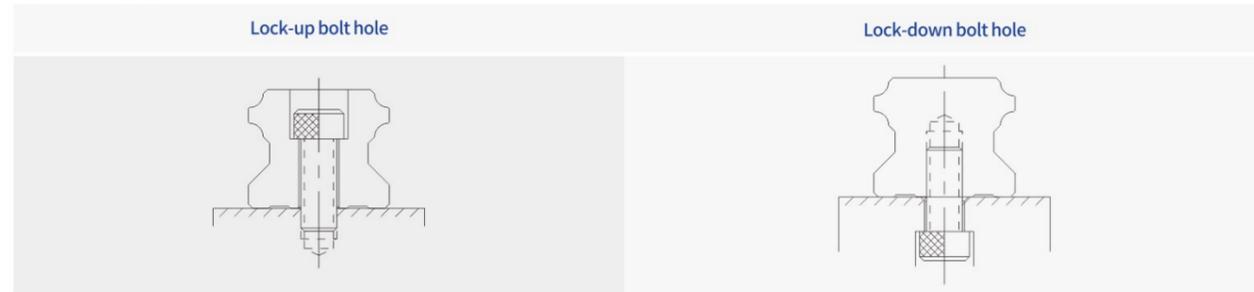
Type	Specification	Shape	Height size (mm)	Guide length (mm)	Application equipment
Square type	HGH-CA HGH-HA		28 ↓ 90	100 ↓ 4000	<ul style="list-style-type: none"> <li>Machining center</li> <li>Machine tools</li> <li>Precision machining machine</li> <li>Heavy-duty cutting machine</li> <li>Marble cutting machine</li> <li>Grinding machine</li> <li>Injection molding machine</li> <li>Punching machine</li> <li>Automation equipment</li> <li>Transportation equipment</li> <li>Measuring instrument</li> </ul>
	HGL-CA HGL-HA		24 ↓ 70	100 ↓ 4000	
Flange type	HGW-CA HGW-HA		24 ↓ 90	100 ↓ 4000	
	HGW-CB HGW-HB		24 ↓ 90	100 ↓ 4000	
	HGW-CC HGW-HC		24 ↓ 90	100 ↓ 4000	

HG series Heavy load ball linear guide

(2)Guide type

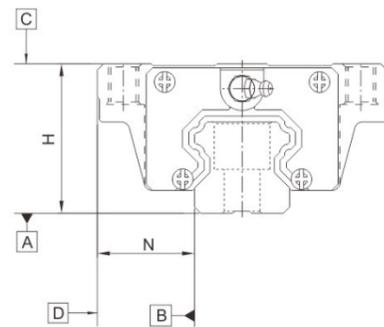
In addition to the general lock-up guide with bolt hole, AKD also provides lock-down guide with screw hole for easy installation and use by customers.

Table 2-1-2 Guide Type



2-1-5 Accuracy Level

The accuracy of HG series linear guide is divided into five levels: normal, high, precision, super precision and ultra-high precision. Customers can choose the accuracy according to accuracy requirements for equipment.



(1)Non-interchangeable linear guide accuracy

Table 2-1-3 Accuracy Table of Assembling Piece

Model	HG - 15, 20				
Accuracy Grade	Common level (C)	Advanced (H)	Precision-level (P)	Super precision (SP)	Ultra-high precision (UP)
Allowable dimensional error of height H	± 0.1	± 0.03	$\begin{matrix} 0 \\ -0.03 \end{matrix}$	$\begin{matrix} 0 \\ -0.015 \end{matrix}$	$\begin{matrix} 0 \\ -0.008 \end{matrix}$
Allowable dimensional error of width N	± 0.1	± 0.03	$\begin{matrix} 0 \\ -0.03 \end{matrix}$	$\begin{matrix} 0 \\ -0.015 \end{matrix}$	$\begin{matrix} 0 \\ -0.008 \end{matrix}$
Mutual error of paired height H	0.02	0.01	0.006	0.004	0.003
Mutual error of paired width N	0.02	0.01	0.006	0.004	0.003
Travel parallelism of slider C surface to guide A surface	Travel parallelism (see Table 2-1-11)				
Travel parallelism of slider D surface to guide B surface	Travel parallelism (see Table 2-1-11)				

Unit: mm

Table 2-1-4 Accuracy Table of Assembling Piece

Model	HG - 25, 30, 35				
Accuracy Grade	Common level (C)	Advanced (H)	Precision-level (P)	Super precision (SP)	Ultra-high precision (UP)
Allowable dimensional error of height H	± 0.1	± 0.04	$\begin{matrix} 0 \\ -0.04 \end{matrix}$	$\begin{matrix} 0 \\ -0.02 \end{matrix}$	$\begin{matrix} 0 \\ -0.01 \end{matrix}$
Allowable dimensional error of width N	± 0.1	± 0.04	$\begin{matrix} 0 \\ -0.04 \end{matrix}$	$\begin{matrix} 0 \\ -0.02 \end{matrix}$	$\begin{matrix} 0 \\ -0.01 \end{matrix}$
Mutual error of paired height H	0.02	0.015	0.007	0.005	0.003
Mutual error of paired width N	0.03	0.015	0.007	0.005	0.003
Travel parallelism of slider C surface to guide A surface	Travel parallelism (see Table 2-1-11)				
Travel parallelism of slider D surface to guide B surface	Travel parallelism (see Table 2-1-11)				

Unit: mm

HG series Heavy load ball linear guide

Table 2-1-5 Accuracy Table of Assembling Piece

Unit: mm

Model	HG - 45, 55				
Accuracy Grade	Common level (C)	Advanced (H)	Precision-level (P)	Super precision (SP)	Ultra-high precision (UP)
Allowable dimensional error of height H	± 0.1	± 0.05	$\begin{matrix} 0 \\ -0.05 \end{matrix}$	$\begin{matrix} 0 \\ -0.03 \end{matrix}$	$\begin{matrix} 0 \\ -0.02 \end{matrix}$
Allowable dimensional error of width N	± 0.1	± 0.05	$\begin{matrix} 0 \\ -0.05 \end{matrix}$	$\begin{matrix} 0 \\ -0.03 \end{matrix}$	$\begin{matrix} 0 \\ -0.02 \end{matrix}$
Mutual error of paired height H	0.03	0.015	0.007	0.005	0.003
Mutual error of paired width N	0.03	0.02	0.01	0.007	0.005
Travel parallelism of slider C surface to guide A surface	Travel parallelism (see Table 2-1-11)				
Travel parallelism of slider D surface to guide B surface	Travel parallelism (see Table 2-1-11)				

Table 2-1-6 Accuracy Table of Assembling Piece

Unit: mm

Model	HG - 65				
Accuracy Grade	Common level (C)	Advanced (H)	Precision-level (P)	Super precision (SP)	Ultra-high precision (UP)
Allowable dimensional error of height H	± 0.1	± 0.07	$\begin{matrix} 0 \\ -0.07 \end{matrix}$	$\begin{matrix} 0 \\ -0.05 \end{matrix}$	$\begin{matrix} 0 \\ -0.03 \end{matrix}$
Allowable dimensional error of width N	± 0.1	± 0.07	$\begin{matrix} 0 \\ -0.07 \end{matrix}$	$\begin{matrix} 0 \\ -0.05 \end{matrix}$	$\begin{matrix} 0 \\ -0.03 \end{matrix}$
Mutual error of paired height H	0.03	0.02	0.01	0.007	0.005
Mutual error of paired width N	0.03	0.025	0.015	0.01	0.007
Travel parallelism of slider C surface to guide A surface	Travel parallelism (see Table 2-1-11)				
Travel parallelism of slider D surface to guide B surface	Travel parallelism (see Table 2-1-11)				

(2)Accuracy of Interchangeable Linear Guide

Table 2-1-7 Accuracy Table of Single Piece

Unit: mm

Model	HG - 15, 20		
Accuracy Grade	Common level (C)	Advanced (H)	Precision-level (P)
Allowable dimensional error of height H	± 0.1	± 0.03	± 0.015
Allowable dimensional error of width N	± 0.1	± 0.03	± 0.015
Mutual error of paired height H	0.02	0.01	0.006
Mutual error of paired width N	0.02	0.01	0.006
Travel parallelism of slider C surface to guide A surface	Travel parallelism (see Table 2-1-11)		
Travel parallelism of slider D surface to guide B surface	Travel parallelism (see Table 2-1-11)		

Table 2-1-8 Accuracy Table of Single Piece

Unit: mm

Model	HG - 25, 30, 35		
Accuracy Grade	Common level (C)	Advanced (H)	Precision-level (P)
Allowable dimensional error of height H	± 0.1	± 0.04	± 0.02
Allowable dimensional error of width N	± 0.1	± 0.04	± 0.02
Mutual error of paired height H	0.02	0.015	0.007
Mutual error of paired width N	0.03	0.015	0.007
Travel parallelism of slider C surface to guide A surface	Travel parallelism (see Table 2-1-11)		
Travel parallelism of slider D surface to guide B surface	Travel parallelism (see Table 2-1-11)		

HG series Heavy load ball linear guide

HG series Heavy load ball linear guide

Table 2-1-9 Accuracy Table of Single Piece

Unit: mm

Model	HG - 45, 55		
	Common level (C)	Advanced (H)	Precision-level (P)
Allowable dimensional error of height H	± 0.1	± 0.05	± 0.025
Allowable dimensional error of width N	± 0.1	± 0.05	± 0.025
Mutual error of paired height H	0.03	0.015	0.007
Mutual error of paired width N	0.03	0.02	0.01
Travel parallelism of slider C surface to guide A surface	Travel parallelism (see Table 2-1-11)		
Travel parallelism of slider D surface to guide B surface	Travel parallelism (see Table 2-1-11)		

Table 2-1-10 Accuracy Table of Single Piece

Unit: mm

Model	HG - 65		
	Common level (C)	Advanced (H)	Precision-level (P)
Allowable dimensional error of height H	± 0.1	± 0.07	± 0.035
Allowable dimensional error of width N	± 0.1	± 0.07	± 0.035
Mutual error of paired height H	0.03	0.02	0.01
Mutual error of paired width N	0.03	0.025	0.015
Travel parallelism of slider C surface to guide A surface	Travel parallelism (see Table 2-1-11)		
Travel parallelism of slider D surface to guide B surface	Travel parallelism (see Table 2-1-11)		

(3) Travel parallelism accuracy

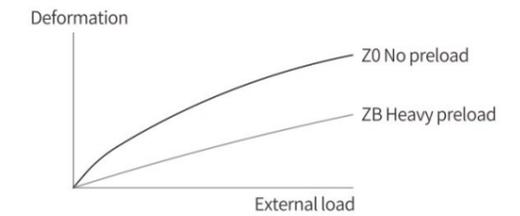
Table 2-1-11 Travel parallelism accuracy

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

2-1-6 Preload

(1) Preload Definition

Preload is the pre-applied load to steel balls, that is, by increasing the diameter of steel balls. The preload is given through the negative clearance between steel balls and raceway, which can improve the rigidity of linear guide and eliminate the clearance. As shown in figure on the right, increasing the preload can increase the rigidity of linear guide. However, it is recommended to choose a preload below light preload for small specifications to avoid reducing its service life due to excessive preload selection.



(2) Preload Level

HG series linear guides provide three standard preloads, and you can choose the appropriate preload according to the application.

Table 2-1-12 Preload level

Preload level	Mark	Preload	Service Conditions	Applicability
No preload	Z0	0~ 0.02C	The load direction is fixed, the impact is small, and the accuracy requirement is low	Handling device, automatic packaging machine, automation industry machinery, general industrial machinery XY shafts, welding machine, breaking machine, tool exchange device
Medium preload	ZA	0.05C~0.07C	Light load and high precision requirements	Z-shaft of general industrial machinery, electro-spark machining, NC lathe, precision XY platform, measuring instrument, machining center, vertical machining center, industrial robot, automatic painting machine, various high-speed materials supply device
Heavy preload	ZB	0.10C~ 0.12C	Rigidity requirements, and there is vibration and impact in work environment	Machining center, grinder, NC lathe, vertical or horizontal milling machine, machine tool Z-shaft, heavy cutting machine

Class	Interchangeable linear guide(single piece)	Non-interchangeable linear guide(assembling piece)
Preload level	Z0, ZA	Z0, ZA, ZB

Note: Preload C is the basic dynamic rated load

2-1-7 Lubrication Method

(1) Lubrication Grease

Oil nozzle type

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Oil nozzle position

According to customer requirements, the oil nozzle can be installed in the front or at rear end of the slider for manual oil injection. HG series specially reserves the side oil hole position on the side of end cover to install the oil nozzle [generally straight oil nozzle] for lateral oil injection. The position of lateral oil injection is recommended to be on the non-reference side, but if there are special needs, it can also be placed on the reference side. Please contact us if you have the above lateral oil injection needs. Linear guides that use connecting pipes to automatically supply grease can be installed with oil pipe joints according to the type of connecting pipe.

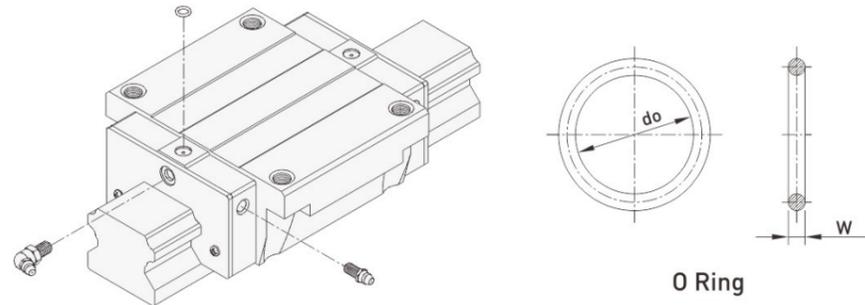
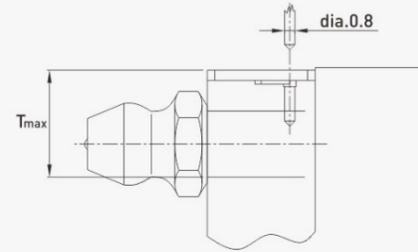


Table 2-1-13 O-ring Specification and Maximum Allowable Depth of Perforation

Specification	O-ring specification		Maximum allowable depth of perforation $T_{max}$ [mm]
	do (mm)	W (mm)	
HG 15	2.5±0.15	1.5±0.15	3.75
HG 20	4.5±0.15	1.5±0.15	5.7
HG 25	4.5±0.15	1.5±0.15	5.8
HG 30	4.5±0.15	1.5±0.15	6.3
HG 35	4.5±0.15	1.5±0.15	8.8
HG 45	4.5±0.15	1.5±0.15	8.2
HG 55	4.5±0.15	1.5±0.15	11.8
HG 65	4.5±0.15	1.5±0.15	10.8



Amount of lubrication grease and oil filling up single slider

2-1-14 Lubrication Grease Amount for Single Slider

Specification	Heavy load (cm <sup>3</sup> )	Super heavy load (cm <sup>3</sup> )	Specification	Heavy load (cm <sup>3</sup> )	Super heavy load (cm <sup>3</sup> )
HG 15	1	-	HG 35	10	12
HG 20	2	3	HG 45	17	21
HG 25	5	6	HG 55	26	33
HG 30	7	8	HG 65	50	61

Lubrication frequency

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

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(2) Lubrication Oil

It is recommended to use lubrication oil with an oil viscosity of about 30-150cSt to lubricate the linear guide. Customers can firstly explain to us the need of using oil lubrication, and the shipped linear guide will not be sealed with lubrication grease.

Oil pipe joint type

Oil supply rate

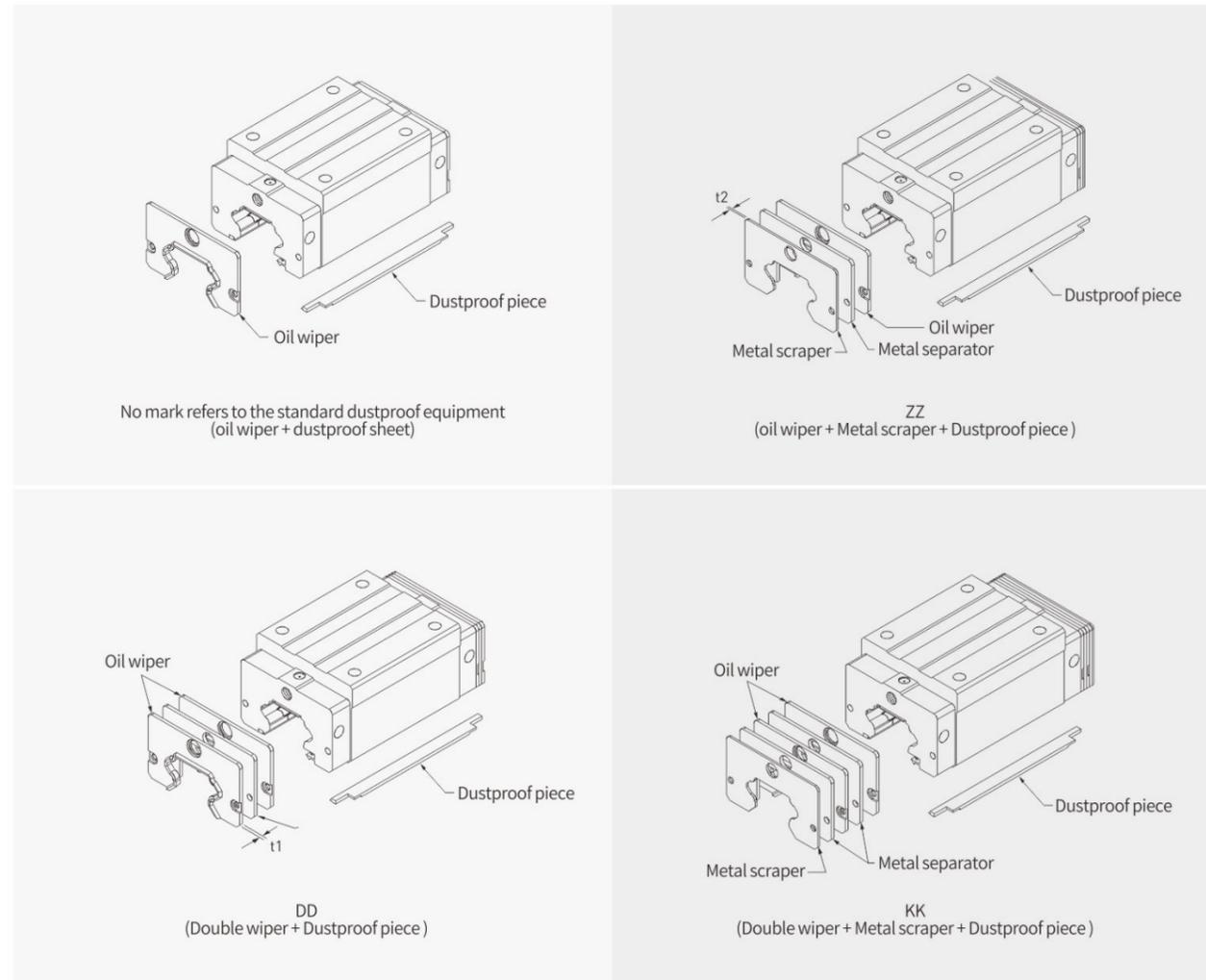
Table 2-1-15 Oil Supply Rate

Specification	Oil supply rate (cm <sup>3</sup> /hr)	Specification	Oil supply rate (cm <sup>3</sup> /hr)
HG 15	0.2	HG 35	0.3
HG 20	0.2	HG 45	0.4
HG 25	0.3	HG 55	0.5
HG 30	0.3	HG 65	0.6

2-1-8 Dustproof Equipment

(1) Standard Dustproof Equipment Code

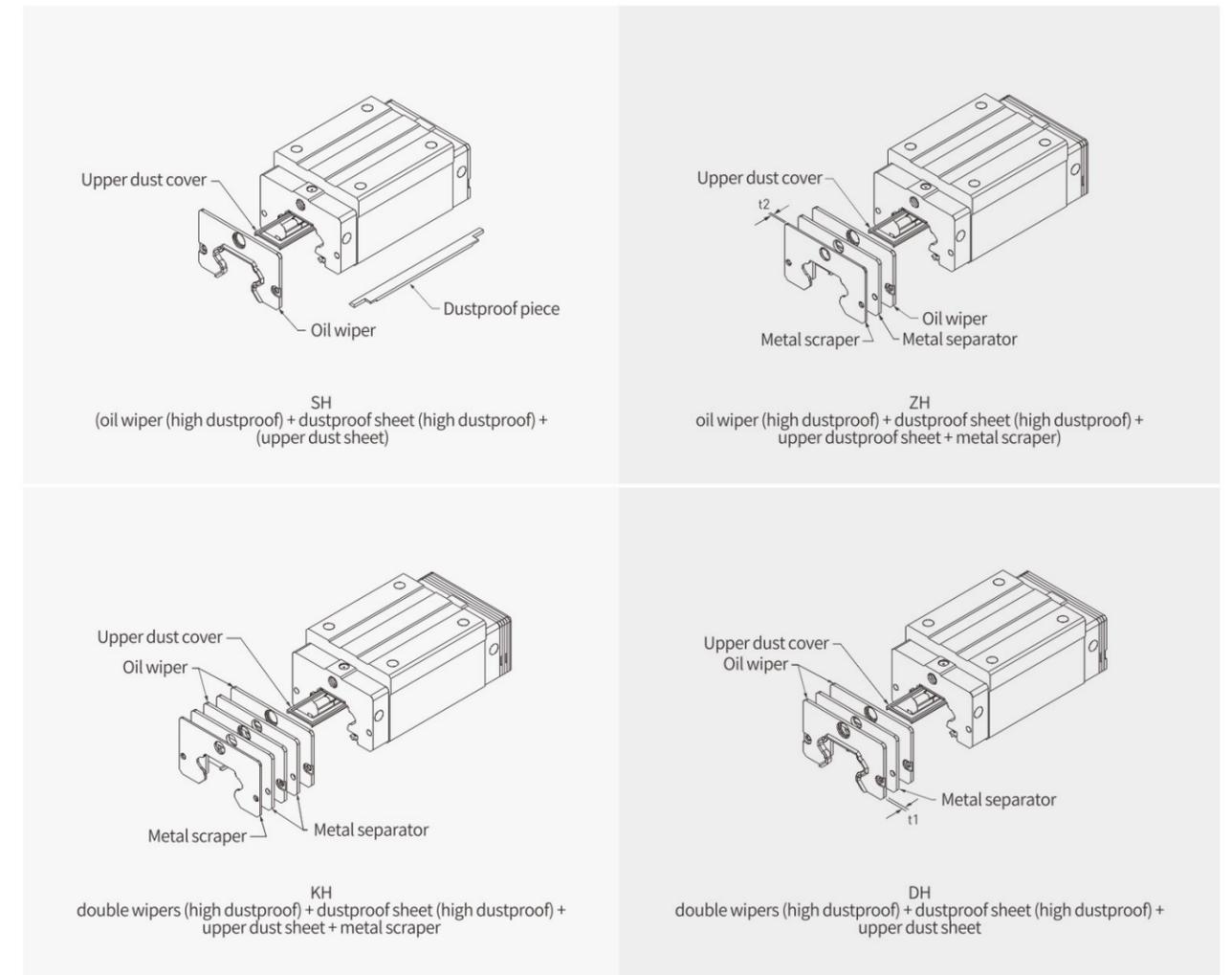
It is used in common operating environments without special requirements. If you need the following dustproof accessories, please add the code behind the product model.



Note: HG20/HG25/HG65 has no metal partition.

(2) High dust proof configuration code

AKD has developed dustproof accessories with enhanced high dustproof function for harsh working environment. If the following dustproof accessories are required, please add the code after the product model.

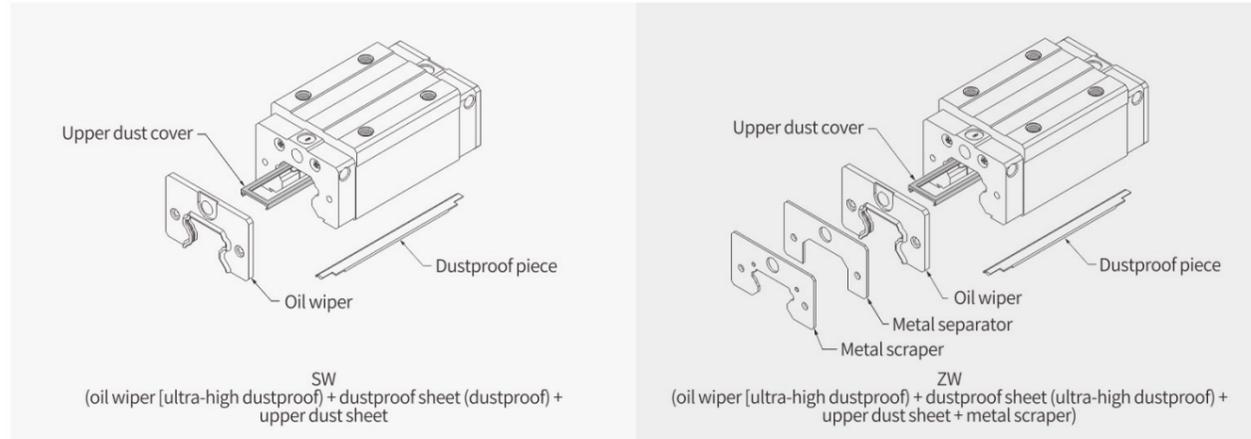


Notes: 1. The specifications currently available for high dustproof accessories are HG20(C/H), 25(C/H), 30(C/H), 35(C/H) and 45C.  
 2. The resistance is about 0.6~1.2 kgf higher than that of general parts.  
 3. If the customer has higher dustproof function requirements, please contact with AKD.

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(3) Ultra-high Dustproof Equipment Code

AKD has developed special accessories with ultra-high dustproof function to address the harsh operating environments with dust particles, such as woodworking machinery, glass/graphite processing equipment, etc., to achieve the ultra-high dustproof performance. If the following high dustproof accessories are required, please add the code behind the product model.



- Notes: 1. The specifications currently available for high dustproof accessories are HG15C, HG20(C/H), HG25(C/H), HG30(C/H), HG35(C/H) and HG45(C/H).  
 2. The resistance is about 1.5~4.0 kgf higher than that of the general parts.  
 3. HG15 only has oil wiper [ultra-high dustproof]

(4) Description of dustproof equipment

● Oil wiper and bottom dustproof sheet

It can prevent machining chips or dust particles from entering the slider, damaging the raceway surface and reducing the life of linear guide.

● Double wipers

Double the scraping effect, even in heavy cutting and machining environment, foreign matter is completely excluded from the slider.

Table 2-1-16 Oil Wiper Thickness

Specification	Increase thickness(t1) (mm)	Specification	Increase thickness(t1) (mm)
HG 15 ES	3	HG 35 ES	3.2
HG 20 ES	3.5	HG 45 ES	4.5
HG 25 ES	3.5	HG 55 ES	4.5
HG 30 ES	3.2	HG 65 ES	6

● Metal scraper

It can isolate high temperature chips or processing sparks and exclude large volume of impurities.

Table 2-1-17 Metal Scraper Thickness

Specification	Increase thickness(t1) (mm)	Specification	Increase thickness(t1) (mm)
HG 15 SC	1.5	HG 35 SC	1.5
HG 20 SC	1.5	HG 45 SC	1.5
HG 25 SC	1.5	HG 55 SC	1.5
HG 30 SC	1.5	HG 65 SC	1.5

● Upper dust sheet

It can effectively prevent dust from entering the slider from the upper surface of guide or bolt holes.

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● Guide bolt cover

To prevent cutting powder or foreign matter from entering the slider through the bolt hole and affecting the accuracy, the customer must drive the bolt cover into bolt hole when installing the guide. Each guide is equipped with a bolt cover when leaving the factory.

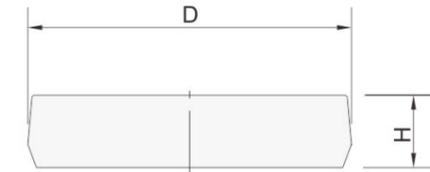


Table 2-1-18 Guide Bolt Cover

Guide specification	Mounting screws	Diameter (D) (mm)	Thickness (H) (mm)	Guide specification	Mounting screws	Diameter (D) (mm)	Thickness (H) (mm)
HGR15	M4	7.65	1.1	HGR35	M8	14.20	3.5
HGR20	M5	9.65	2.5	HGR45	M12	20.25	4.5
HGR25	M6	11.15	2.5	HGR55	M14	23.25	5.0
HGR30	M8	14.20	3.5	HGR65	M16	26.35	5.0

(5) Total length of slider with dustproof code

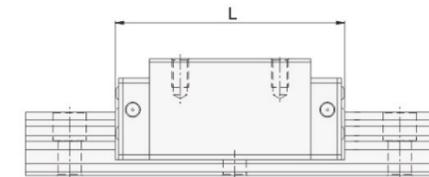


Table 2-1-19 Total length of slider

Unit: mm

Specification	Total length of slider(L)					
	SS/SH	ZZ/ZH	DD/DH	KK/KH	SW	ZW
*HG15C	61.4 (61.8)	69.0 (69.4)	68.0 (68.4)	75.6 (76.0)	63.2 (63.2)	71.0 (71.4)
*HG20C	77.5 (79.3)	82.5 (84.5)	82.5 (84.3)	87.5 (89.5)	78.5 (79.3)	86.3 (88.3)
*HG20H	92.2 (94.0)	97.2 (99.2)	97.5 (99.0)	102.2 (104.2)	93.2 (94.0)	101.0 (103.0)
*HG25C	84.0 (85.0)	89.0 (91.0)	89.0 (90.0)	94.0 (96.0)	85.0 (86.0)	92.8 (94.8)
*HG25H	104.6 (105.6)	109.6 (111.6)	109.6 (110.6)	114.6 (116.6)	105.6 (106.6)	113.4 (115.4)
*HG30C	97.4 (99.4)	105.4 (107.4)	104.8 (106.8)	112.8 (110.8)	99.0 (101.0)	107.2 (110.4)
*HG30H	120.4 (122.4)	128.4 (130.4)	127.8 (129.8)	135.8 (133.8)	122.0 (124.0)	130.2 (133.4)
*HG35C	112.4 (114.4)	120.4 (122.4)	119.8 (121.8)	127.8 (129.8)	115.2 (116.0)	123.4 (125.4)
*HG35H	138.2 (140.2)	146.2 (148.2)	145.6 (147.6)	153.6 (155.6)	141.0 (141.8)	149.2 (151.2)
*HG45C	139.4 (139.4)	150.0 (150.0)	149.4 (149.4)	160.0 (160.0)	140.0 (140.0)	148.8 (151.6)
*HG45H	171.2 (171.2)	181.8 (181.8)	181.2 (181.2)	191.8 (191.8)	171.8 (171.8)	180.6 (183.4)
*HG55C	166.7 (166.7)	177.1 (177.1)	177.1 (177.1)	187.5 (187.5)	-	-
*HG55H	204.8 (204.8)	215.2 (215.2)	215.2 (215.2)	225.5 (225.6)	-	-
*HG65C	200.2 (200.2)	208.2 (208.2)	209.2 (209.2)	217.2 (217.2)	-	-
*HG65H	259.6 (259.6)	267.6 (267.6)	268.6 (268.6)	276.6 (276.6)	-	-

1. Those marked with \* indicate that this specification is available with /SH, /ZH, /DH, /KH dustproof equipment  
 2. ( ) is the maximum length of the slider, including screws, oil wiper lips, etc.

HG series Heavy load ball linear guide

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2-1-9 摩擦力

This resistance is the maximum one of single wiper.

Table 2-1-20 HG Series Oil Wiper Resistance

Specification	Oil wiper resistance N (kgf)	Specification	Oil wiper resistance N (kgf)
HG15	1.18 [0.12]	HG35	3.04 [0.31]
HG20	1.57 [0.16]	HG45	3.83 [0.39]
HG25	1.96 [0.2]	HG55	4.61 [0.47]
HG30	2.65 [0.27]	HG65	5.79 [0.59]

Notes : 1 kgf = 9.81N

2-1-10 Mounting Surface Error

HG series is a circular arc two-point contact linear guide, and its automatic center aligning characteristics can absorb some errors of mounting surface without affecting the smoothness of linear motion. The following table shows the allowable error values of the mounting surface:

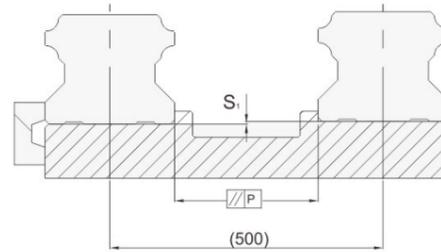


Table 2-1-21 Allowable Parallelism Error(P)

Unit:  $\mu\text{m}$

Specification	Preload		
	Z0 Preload	ZA Preload	ZB Preload
HG15	25	18	13
HG20	25	20	18
HG25	30	22	20
HG30	40	30	27
HG35	50	35	30
HG45	60	40	35
HG55	70	50	45
HG65	80	60	55

Table 2-1-22 Allowable upper and lower horizontal error(S<sub>i</sub>)

Unit:  $\mu\text{m}$

Specification	Preload		
	Z0 Preload	ZA Preload	ZB Preload
HG15	130	85	35
HG20	130	85	50
HG25	130	85	70
HG30	170	110	90
HG35	210	150	120
HG45	250	170	140
HG55	300	210	170
HG65	350	250	200

Note: allowable values are proportional to the distance between shafts

2-1-11 Precautions for Installation

(1) Shoulder Height and Chamfer of Mounting Surface

When installing the linear guide, it is necessary to pay attention to whether the shoulder condition of mounting surface is appropriate, such as whether the chamfer is too large, the protruding place is easy to cause poor accuracy of linear guide, and whether the height is too high, it will interfere with the slider. Therefore, if the mounting surface shoulder can be installed according to the recommended requirements, the poor installation accuracy can be eliminated.

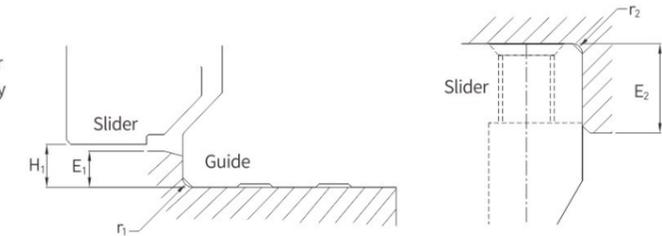


Table 2-1-23 Shoulder Height and Chamfer

Specification	Maximum fillet radius of guide end $r_1$ (mm)	Maximum fillet radius of slider end $r_2$ (mm)	Shoulder height of guide end $E_1$ (mm)	Shoulder height of slider end $E_2$ (mm)	operation height of slider $H_1$ (mm)
HG15	0.5	0.5	3.0	4.0	4.3
HG20	0.5	0.5	3.5	5.0	4.6
HG25	1.0	1.0	5.0	5.0	5.5
HG30	1.0	1.0	5.0	5.0	6.0
HG35	1.0	1.0	6.0	6.0	7.5
HG45	1.0	1.0	8.0	8.0	9.5
HG55	1.5	1.5	10.0	10.0	13.0
HG65	1.5	1.5	10.0	10.0	15.0

(2) Torque Value of Guide Assembly Screws

Whether the mounting guide is locked and flattened against the reference surface has a great impact on the accuracy of linear guide. Therefore, to achieve the purpose of locking each screw tightly, it is recommended to use the following torque values to lock the assembly screws.

Table 2-1-24 Torque Values

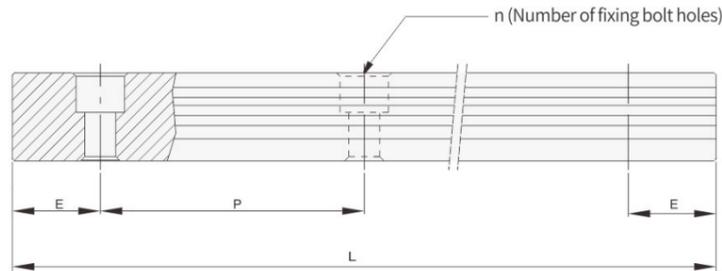
Specification	Screw Size	Torque N-cm (kgf-cm)		
		Iron material	Casting material	Aluminum alloy
HG 15	M4×0.7P×16L	392[40]	274[28]	206[21]
HG 20	M5×0.8P×16L	883[90]	588[60]	441[45]
HG 25	M6×1P×20L	1373[140]	921[94]	686[70]
HG 30	M8×1.25P×25L	3041[310]	2010[205]	1470[150]
HG 35	M8×1.25P×25L	3041[310]	2010[205]	1470[150]
HG 45	M12×1.75P×35L	11772[1200]	7840[800]	5880[600]
HG 55	M14×2P×45L	15696[1600]	10500[1100]	7840[800]
HG 65	M16×2P×50L	19620[2000]	13100[1350]	9800[1000]

HG series Heavy load ball linear guide

HG series Heavy load ball linear guide

2-1-12 Standard Length and Maximum Length of Single Guide

AKD has a standard length of guide inventory to supply customer needs. If the customer orders a guide with non-standard length, the size of end distance E shall not be greater than 1/2P to prevent the instability of guide assembly end due to the excessive size of E, and reduce the accuracy of linear guide.



$L = (n-1) \times P + 2 \times E$  Eq.2.1

L: total length of guide (mm)  
 n: number of bolt holes  
 P: distance between bolt holes (mm)  
 E: distance from bolt hole to end face (mm)

Table 2-1-25 Track Length

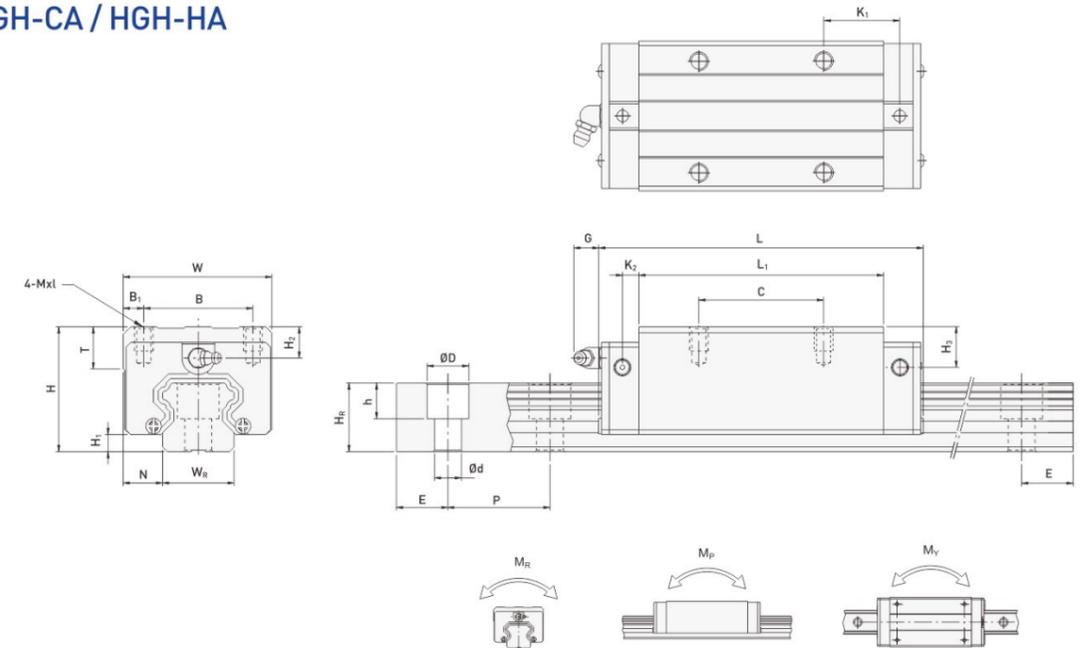
Unit: mm

Item	HG series							
	HG15	HG20	HG25	HG30	HG35	HG45	HG55	HG65
Standard length L (n)	160(3)	220(4)	220(4)	280(4)	280(4)	570(6)	780(7)	1,270(9)
	220(4)	280(5)	280(5)	440(6)	440(6)	885(9)	1,020(9)	1,570(11)
	280(5)	340(6)	340(6)	600(8)	600(8)	1,200(12)	1,260(11)	2,020(14)
	340(6)	460(8)	460(8)	760(10)	760(10)	1,620(16)	1,500(13)	2,620(18)
	460(8)	640(11)	640(11)	1,000(13)	1,000(13)	2,040(20)	1,980(17)	
	640(11)	820(14)	820(14)	1,640(21)	1,640(21)	2,460(24)	2,580(22)	
	820(14)	1,000(17)	1,000(17)	2,040(26)	2,040(26)	2,985(29)	2,940(25)	
		1,240(21)	1,240(21)	2,520(32)	2,520(32)			
Spacing (P)	60	60	60	80	80	105	120	150
Standard end distance (E)	20	20	20	20	20	22.5	30	35
Maximum length of standard end distance	4,000(67)	4,000(67)	4,000(67)	3,960(50)	3,960(50)	3,930(38)	3,900(33)	3,970(27)
Maximum length	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000

Notes: 1. The E size tolerance of general guide is 0.5~0.5 mm, and the E size tolerance of guide teeth connector end distance is stricter 0~0.3 mm.  
 2. The maximum length of standard end distance refers to the maximum length of the guide with left and right end distances as the standard end distance.  
 3. If the customer needs a different E size, please contact with AKD.

2-1-13 Table of HG Series Guide Sizes

(1) HGH-CA / HGH-HA



Model	Component size(mm)		Slider size (mm)													Guide size (mm)					Size of guide fixing bolt (mm)	Basic dynamic rated load C(kN)	Basic static rated load C <sub>0</sub> (kN)	Allowable static torque			Weight				
	H	H <sub>1</sub>	N	W	B	B <sub>1</sub>	C	L <sub>1</sub>	L	K <sub>1</sub>	K <sub>2</sub>	G	MxI	T	H <sub>2</sub>	H <sub>3</sub>	W <sub>R</sub>	H <sub>R</sub>	D	h				d	P	E	M <sub>R</sub> (kN-m)	M <sub>P</sub> (kN-m)	M <sub>Y</sub> (kN-m)	Slider (kg)	Guide (kg/m)
HGH 15CA	28	4.3	9.5	34	26	4	26	39.4	61.4	10	4.85	5.3	M4x5	6	7.95	7.7	15	15	7.5	5.3	4.5	60	20	M4x16	14.7	23.47	0.12	0.10	0.10	0.18	1.45
HGH 20CA	30	4.6	12	44	32	6	36	50.5	77.5	12.25	6	12	M5x6	8	6	6	20	17.5	9.5	8.5	6	60	20	M5x16	27.1	36.68	0.27	0.20	0.20	0.30	2.21
HGH 20HA							50	65.2	92.2	12.6															32.7	47.96	0.35	0.35	0.35	0.39	
HGH 25CA	40	5.5	12.5	48	35	6.5	35	58	84	15.7	6	12	M6x8	8	10	9	23	22	11	9	7	60	20	M6x20	34.9	52.82	0.42	0.33	0.33	0.51	3.21
HGH 25HA							50	78.6	104.6	18.5															42.2	69.07	0.56	0.57	0.57	0.69	
HGH 30CA	45	6	16	60	40	10	40	70	97.4	20.25	6	12	M8x10	8.5	9.5	13.8	28	26	14	12	9	80	20	M8x25	48.5	71.87	0.66	0.53	0.53	0.88	4.47
HGH 30HA							60	93	120.4	21.75															58.6	93.99	0.88	0.92	0.92	1.16	
HGH 35CA	55	7.5	18	70	50	10	50	80	112.4	20.6	7	12	M8x12	10.2	16	19.6	34	29	14	12	9	80	20	M8x25	64.6	93.88	1.16	0.81	0.81	1.45	6.30
HGH 35HA							72	105.8	138.2	22.5															77.9	122.77	1.54	1.40	1.40	1.92	
HGH 45CA	70	9.5	20.5	86	60	13	60	97	139.4	23	10	12.9	M10x17	16	18.5	30.5	45	38	20	17	14	105	22.5	M12x35	103.8	146.71	1.98	1.55	1.55	2.73	10.41
HGH 45HA							80	128.8	171.2	28.9															125.3	191.85	2.63	2.68	2.68	3.61	
HGH 55CA	80	13	23.5	100	75	12.5	75	117.7	166.7	27.35	11	12.9	M12x18	17.5	22	29	53	44	23	20	16	120	30	M14x45	153.2	211.23	3.69	2.64	2.64	4.17	15.08
HGH 55HA							95	155.8	204.8	36.4															184.9	276.23	4.88	4.57	4.57	5.49	
HGH 65CA	90	15	31.5	126	76	25	70	144.2	200.2	43.1	14	12.9	M16x20	25	15	15	63	53	26	22	18	150	35	M16x50	213.2	287.48	6.65	4.27	4.27	7.00	21.18
HGH 65HA							120	203.6	259.6	47.8															277.8	420.17	9.38	7.38	7.38	9.82	

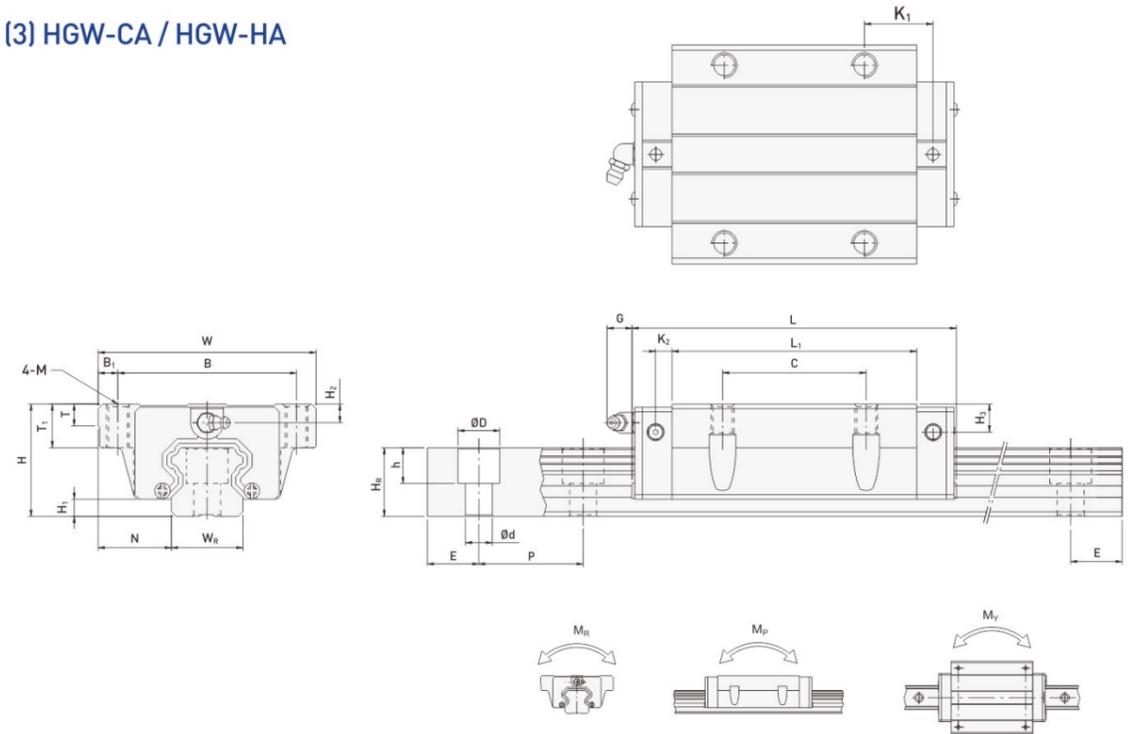
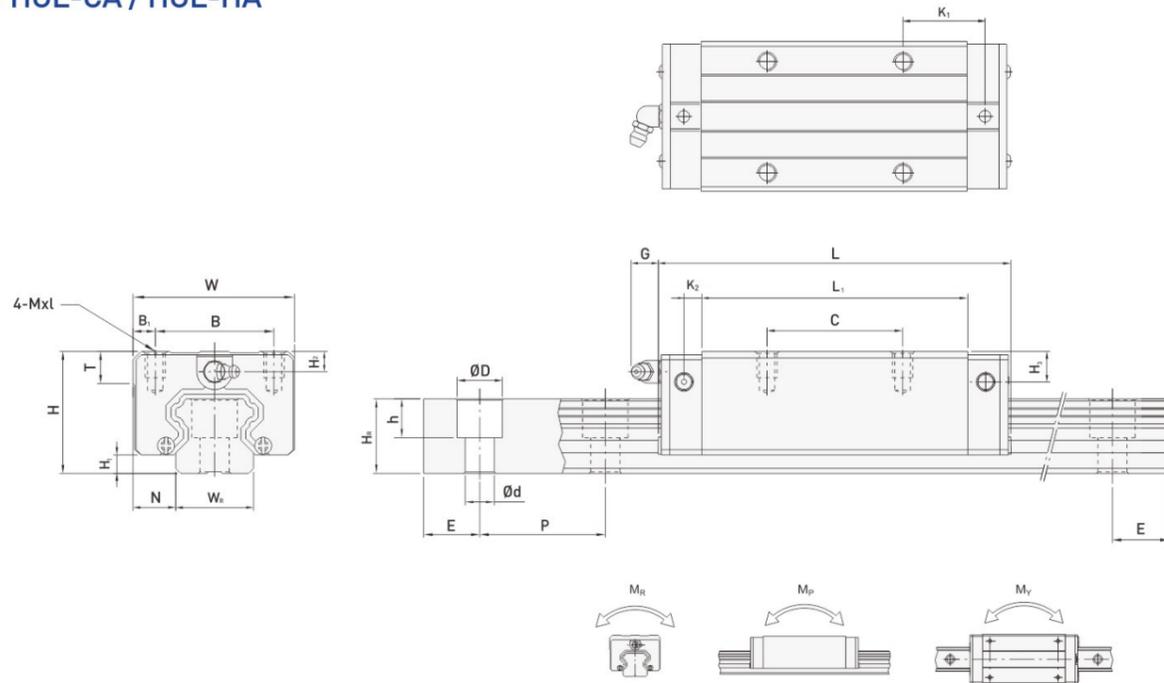
Notes: 1 kgf = 9.81 N

HG series Heavy load ball linear guide

HG series Heavy load ball linear guide

(2) HGL-CA / HGL-HA

(3) HGW-CA / HGW-HA



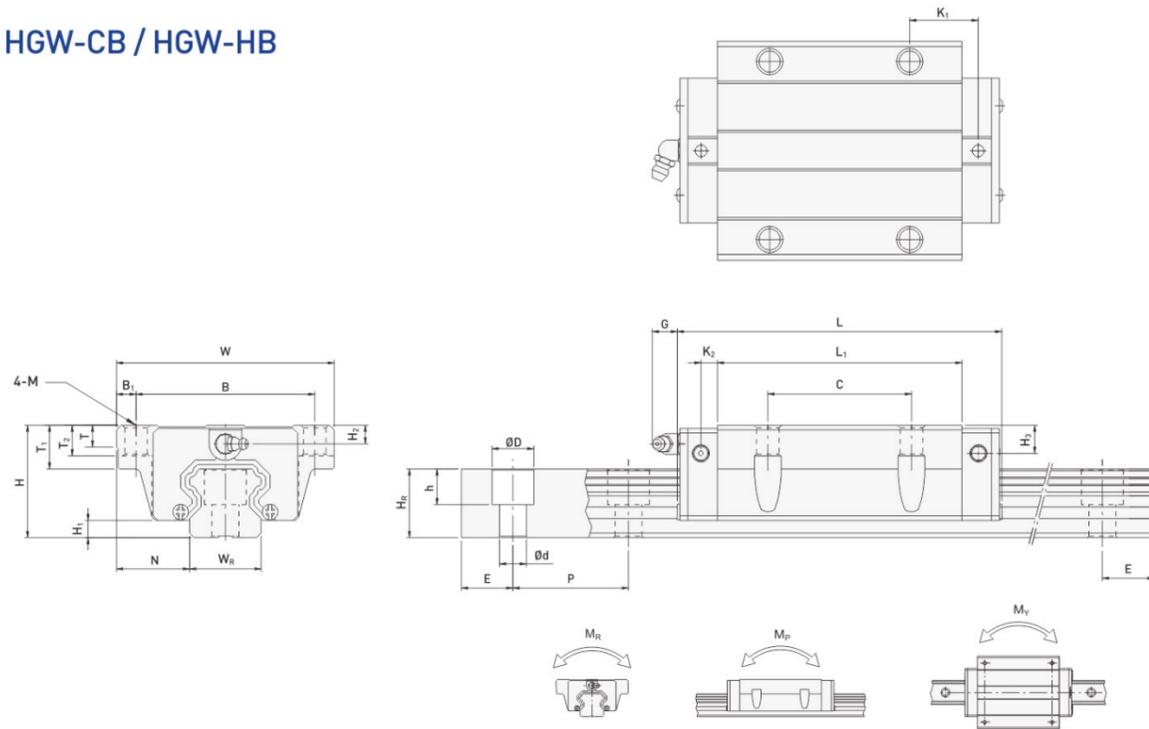
Model	Component size(mm)			Slider size (mm)										Guide size (mm)					Size of guide fixing bolt	Basic dynamic rated load	Basic static rated load	Allowable static torque			Weight						
	H	H <sub>1</sub>	N	W	B	B <sub>1</sub>	C	L <sub>1</sub>	L	K <sub>1</sub>	K <sub>2</sub>	G	Mxl	T	H <sub>2</sub>	H <sub>3</sub>	W <sub>R</sub>	H <sub>R</sub>				D	h	d	P	E	[mm]	C(kN)	C <sub>0</sub> (kN)	M <sub>R</sub> kN-m	M <sub>p</sub> kN-m
HGL 15CA	24	4.3	9.5	34	26	4	26	39.4	61.4	10	4.85	5.3	M4x4	6	3.95	3.7	15	15	7.5	5.3	4.5	60	20	M4x16	14.7	23.47	0.12	0.10	0.10	0.14	1.45
HGL 25CA	36	5.5	12.5	48	35	6.5	35	58	84	15.7	6	12	M6x6	8	6	5	23	22	11	9	7	60	20	M6x20	34.9	52.82	0.42	0.33	0.33	0.42	3.21
HGL 25HA							50	78.6	104.6	18.5															42.2	69.07	0.56	0.57	0.57	0.57	
HGL 30CA	42	6	16	60	40	10	40	70	97.4	20.25	6	12	M8x10	8.5	6.5	10.8	28	26	14	12	9	80	20	M8x25	48.5	71.87	0.66	0.53	0.53	0.78	4.47
HGL 30HA							60	93	120.4	21.75															58.6	93.99	0.88	0.92	0.92	1.03	
HGL 35CA	48	7.5	18	70	50	10	50	80	112.4	20.6	7	12	M8x12	10.2	9	12.6	34	29	14	12	9	80	20	M8x25	64.6	93.88	1.16	0.81	0.81	1.14	6.30
HGL 35HA							72	105.8	138.2	22.5															77.9	122.77	1.54	1.40	1.40	1.52	
HGL 45CA	60	9.5	20.5	86	60	13	60	97	139.4	23	10	12.9	M10x17	16	8.5	20.5	45	38	20	17	14	105	22.5	M12x35	103.8	146.71	1.98	1.55	1.55	2.08	10.41
HGL 45HA							80	128.8	171.2	28.9															125.3	191.85	2.63	2.68	2.68	2.75	
HGL 55CA	70	13	23.5	100	75	12.5	75	117.7	166.7	27.35	11	12.9	M12x18	17.5	12	19	53	44	23	20	16	120	30	M14x45	153.2	211.23	3.69	2.64	2.64	3.25	15.08
HGL 55HA							95	155.8	204.8	36.4															184.9	276.23	4.88	4.57	4.57	4.27	

Notes: 1 kgf = 9.81 N

Model	Component size(mm)			Slider size (mm)										Guide size (mm)					Size of guide fixing bolt	Basic dynamic rated load	Basic static rated load	Allowable static torque			Weight							
	H	H <sub>1</sub>	N	W	B	B <sub>1</sub>	C	L <sub>1</sub>	L	K <sub>1</sub>	K <sub>2</sub>	G	M	T	T <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	W <sub>R</sub>				H <sub>R</sub>	D	h	d	P	E	[mm]	C(kN)	C <sub>0</sub> (kN)	M <sub>R</sub> kN-m	M <sub>p</sub> kN-m
HGW 15CA	24	4.3	16	47	38	4.5	30	39.4	61.4	8	4.85	5.3	M5	6	8.9	3.95	3.7	15	15	7.5	5.3	4.5	60	20	M4x16	14.7	23.47	0.12	0.10	0.10	0.17	1.45
HGW 20CA	30	4.6	21.5	63	53	5	40	50.5	77.5	10.25	6	12	M6	8	10	6	6	20	17.5	9.5	8.5	6	60	20	M5x16	27.1	36.68	0.27	0.20	0.20	0.40	2.21
HGW 20HA							65.2	92.2	17.6	32.7																47.96	0.35	0.35	0.35	0.52		
HGW 25CA	36	5.5	23.5	70	57	6.5	45	58	84	10.7	6	12	M8	8	14	6	5	23	22	11	9	7	60	20	M6x20	34.9	52.82	0.42	0.33	0.33	0.59	3.21
HGW 25HA							78.6	104.6	21	42.2																69.07	0.56	0.57	0.57	0.80		
HGW 30CA	42	6	31	90	72	9	52	70	97.4	14.25	6	12	M10	8.5	16	6.5	10.8	28	26	14	12	9	80	20	M8x25	48.5	71.87	0.66	0.53	0.53	1.09	4.47
HGW 30HA							93	120.4	25.75	58.6																93.99	0.88	0.92	0.92	1.44		
HGW 35CA	48	7.5	33	100	82	9	62	80	112.4	14.6	7	12	M10	10.1	18	9	12.6	34	29	14	12	9	80	20	M8x25	64.6	93.88	1.16	0.81	0.81	1.56	6.30
HGW 35HA							105.8	138.2	27.5	77.9																122.77	1.54	1.40	1.40	2.06		
HGW 45CA	60	9.5	37.5	120	100	80	80	97	139.4	13	10	12.9	M12	15.1	22	8.5	20.5	45	38	20	17	14	105	22.5	M12x35	103.8	146.71	1.98	1.55	1.55	2.79	10.41
HGW 45HA							128.8	171.2	28.9	125.3																191.85	2.63	2.68	2.68	3.69		
HGW 55CA	70	13	43.5	140	116	12	95	117.7	166.7	17.35	11	12.9	M14	17.5	26.5	12	19	53	44	23	20	16	120	30	M14x45	153.2	211.23	3.69	2.64	2.64	4.52	15.08
HGW 55HA							155.8	204.8	36.4	184.9																276.23	4.88	4.57	4.57	5.96		
HGW 65CA	90	15	53.5	170	142	14	110	144.2	200.2	23.1	14	12.9	M16	25	37.5	15	15	63	53	26	22	18	150	35	M16x50	213.2	287.48	6.65	4.27	4.27	9.17	21.18
HGW 65HA							203.6	259.6	52.8	277.8																420.17	9.38	7.38	7.38	12.89		

Notes: 1 kgf = 9.81 N

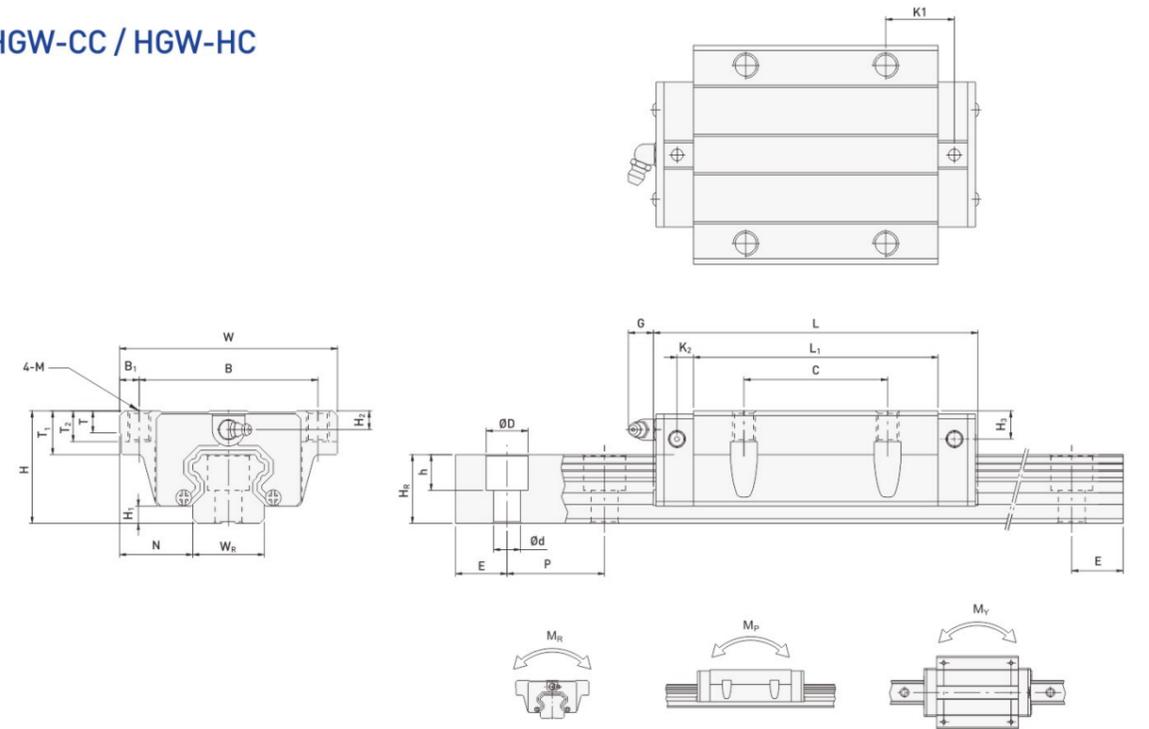
(4) HGW-CB / HGW-HB



Model	Component size(mm)		Slider size (mm)															Guide size (mm)					Size of guide fixing bolt (mm)	Basic dynamic rated load C(kN)	Basic static rated load Co (kN)	Allowable static torque			Weight				
	H	H1	N	W	B	B1	C	L1	L	K1	K2	G	M	T	T1	T2	H2	H3	WR	Hr	D	h				d	P	E	MR	MP	MY	Slider kg	Guide kg/m
HGW 15CB	24	4.3	16	47	38	4.5	30	39.4	61.4	8	4.85	5.3	Ø4.5	6	8.9	6.95	3.95	3.7	15	15	7.5	5.3	4.5	60	20	M4x16	14.7	23.47	0.12	0.10	0.10	0.17	1.45
HGW 20CB	30	4.6	21.5	63	53	5	40	50.5	77.5	10.25	6	12	Ø6	8	10	9.5	6	6	20	17.5	9.5	8.5	6	60	20	M5x16	27.1	36.68	0.27	0.20	0.20	0.40	2.21
HGW 20HB								65.2	92.2	17.6																	32.7	47.96	0.35	0.35	0.35	0.52	
HGW 25CB	36	5.5	23.5	70	57	6.5	45	58	84	10.7	6	12	Ø7	8	14	10	6	5	23	22	11	9	7	60	20	M6x20	34.9	52.82	0.42	0.33	0.33	0.59	3.21
HGW 25HB								78.6	104.6	21																	42.2	69.07	0.56	0.57	0.57	0.80	
HGW 30CB	42	6	31	90	72	9	52	70	97.4	14.25	6	12	Ø9	8.5	16	10	6.5	10.8	28	26	14	12	9	80	20	M8x25	48.5	71.87	0.66	0.53	0.53	1.09	4.47
HGW 30HB								93	120.4	25.75																	58.6	93.99	0.88	0.92	0.92	1.44	
HGW 35CB	48	7.5	33	100	82	9	62	80	112.4	14.6	7	12	Ø9	10.1	18	13	9	12.6	34	29	14	12	9	80	20	M8x25	64.6	93.88	1.16	0.81	0.81	1.56	6.30
HGW 35HB								105.8	138.2	27.5																	77.9	122.77	1.54	1.40	1.40	2.06	
HGW 45CB	60	9.5	37.5	120	100	10	80	97	139.4	13	10	12.9	Ø11	15.1	22	15	8.5	20.5	45	38	20	17	14	105	22.5	M12x35	103.8	146.71	1.98	1.55	1.55	2.79	10.41
HGW 45HB								128.8	171.2	28.9																	125.3	191.85	2.63	2.68	2.68	3.69	
HGW 55CB	70	13	43.5	140	116	12	95	117.7	166.7	17.35	11	12.9	Ø14	17.5	26.5	17	12	19	53	44	23	20	16	120	30	M14x45	153.2	211.23	3.69	2.64	2.64	4.52	15.08
HGW 55HB								155.8	204.8	36.4																	184.9	276.23	4.88	4.57	4.57	5.96	
HGW 65CB	90	15	53.5	170	142	14	110	144.2	200.2	23.1	14	12.9	Ø16	25	37.5	23	15	15	63	53	26	22	18	150	35	M16x50	213.2	287.48	6.65	4.27	4.27	9.17	21.18
HGW 65HB								203.6	259.6	52.8																	277.8	420.17	9.38	7.38	7.38	12.89	

Notes: 1 kgf = 9.81 N

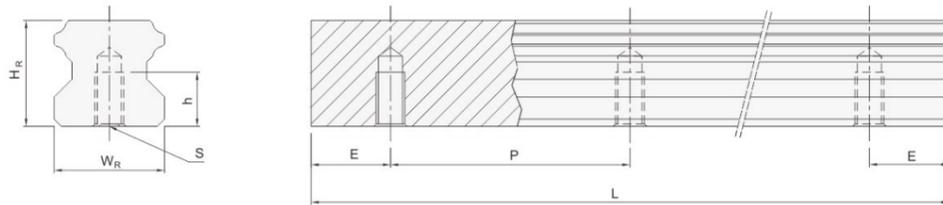
(5) HGW-CC / HGW-HC



Model	Component size(mm)		Slider size (mm)															Guide size (mm)					Size of guide fixing bolt (mm)	Basic dynamic rated load C(kN)	Basic static rated load Co (kN)	Allowable static torque			Weight				
	H	H1	N	W	B	B1	C	L1	L	K1	K2	G	M	T	T1	T2	H2	H3	WR	Hr	D	h				d	P	E	MR	MP	MY	Slider kg	Guide kg/m
HGW 15CC	24	4.3	16	47	38	4.5	30	39.4	61.4	8	4.85	5.3	M5	6	8.9	6.95	3.95	3.7	15	15	7.5	5.3	4.5	60	20	M4x16	14.7	23.47	0.12	0.10	0.10	0.17	1.45
HGW 20CC	30	4.6	21.5	63	53	5	40	50.5	77.5	10.25	6	12	M6	8	10	9.5	6	6	20	17.5	9.5	8.5	6	60	20	M5x16	27.1	36.68	0.27	0.20	0.20	0.40	2.21
HGW 20HC								65.2	92.2	17.6																	32.7	47.96	0.35	0.35	0.35	0.52	
HGW 25CC	36	5.5	23.5	70	57	6.5	45	58	84	10.7	6	12	M8	8	14	10	6	5	23	22	11	9	7	60	20	M6x20	34.9	52.82	0.42	0.33	0.33	0.59	3.21
HGW 25HC								78.6	104.6	21																	42.2	69.07	0.56	0.57	0.57	0.80	
HGW 30CC	42	6	31	90	72	9	52	70	97.4	14.25	6	12	M10	8.5	16	10	6.5	10.8	28	26	14	12	9	80	20	M8x25	48.5	71.87	0.66	0.53	0.53	1.09	4.47
HGW 30HC								93	120.4	25.75																	58.6	93.99	0.88	0.92	0.92	1.44	
HGW 35CC	48	7.5	33	100	82	9	62	80	112.4	14.6	7	12	M10	10.1	18	13	9	12.6	34	29	14	12	9	80	20	M8x25	64.6	93.88	1.16	0.81	0.81	1.56	6.30
HGW 35HC								105.8	138.2	27.5																	77.9	122.77	1.54	1.40	1.40	2.06	
HGW 45CC	60	9.5	37.5	120	100	10	80	97	139.4	13	10	12.9	M12	15.1	22	15	8.5	20.5	45	38	20	17	14	105	22.5	M12x35	103.8	146.71	1.98	1.55	1.55	2.79	10.41
HGW 45HC								128.8	171.2	28.9																	125.3	191.85	2.63	2.68	2.68	3.69	
HGW 55CC	70	13	43.5	140	116	12	95	117.7	166.7	17.35	11	12.9	M14	17.5	26.5	17	12	19	53	44	23	20	16	120	30	M14x45	153.2	211.23	3.69	2.64	2.64	4.52	15.08
HGW 55HC								155.8	204.8	36.4																	184.9	276.23	4.88	4.57	4.57	5.96	
HGW 65CC	90	15	53.5	170	142	14	110	144.2	200.2	23.1	14	12.9	M16	25	37.5	23	15	15	63	53	26	22	18	150	35	M16x50	213.2	287.48	6.65	4.27	4.27	9.17	21.18
HGW 65HC								203.6	259.6	52.8																	277.8	420.17	9.38	7.38	7.38	12.89	

Notes: 1 kgf = 9.81 N

(6) Table of Lock-down Guide Size



Model	Guide size (mm)						Weight (kg/m)
	W <sub>R</sub>	H <sub>R</sub>	S	h	P	E	
HGR15T	15	15	M5 x 0.8P	8	60	20	1.48
HGR20T	20	17.5	M6 x 1P	10	60	20	2.29
HGR25T	23	22	M6 x 1P	12	60	20	3.35
HGR30T	28	26	M8 x 1.25P	15	80	20	4.67
HGR35T	34	29	M8 x 1.25P	17	80	20	6.51
HGR45T	45	38	M12 x 1.75P	24	105	22.5	10.87
HGR55T	53	44	M14 x 2P	24	120	30	15.67
HGR65T	63	53	M20 x 2.5P	30	150	35	21.73

2-2 EG Series Low Assembly Ball Linear Guide

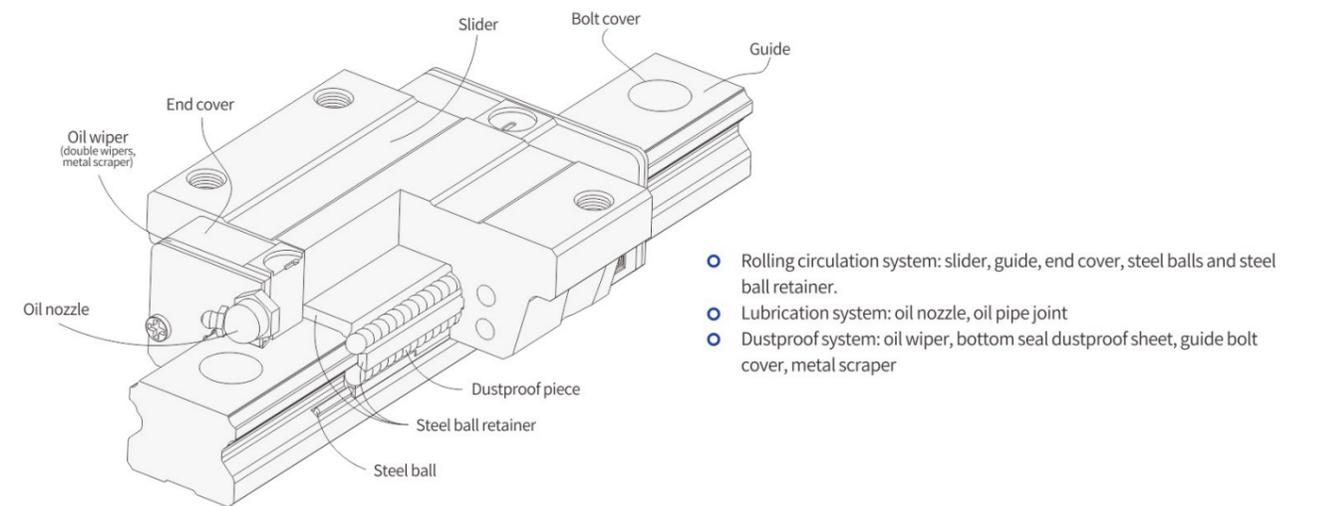
2-2-1 Features of EG Series Linear Guide

EG series applies the design of four-row steel balls to bear loads, enabling it with high rigidity and high load. Meanwhile, it has the four-way equal load characteristics and automatic center aligning function, and can absorb the assembly error of mounting surface, reaching the requirements for high accuracy. With the functions of reducing combination height and shortening the slider length, it is quite suitable for high-speed automated industrial machinery and small-sized equipment with space limit.

The slider is equipped with steel ball retainer to prevent steel balls from falling off. This design not only facilitates the installation of linear guides by customers, but also prevents steel balls from falling off when the slider is removed. It is also interchangeable within the allowable accuracy.



2-2-2 EG Body Structure



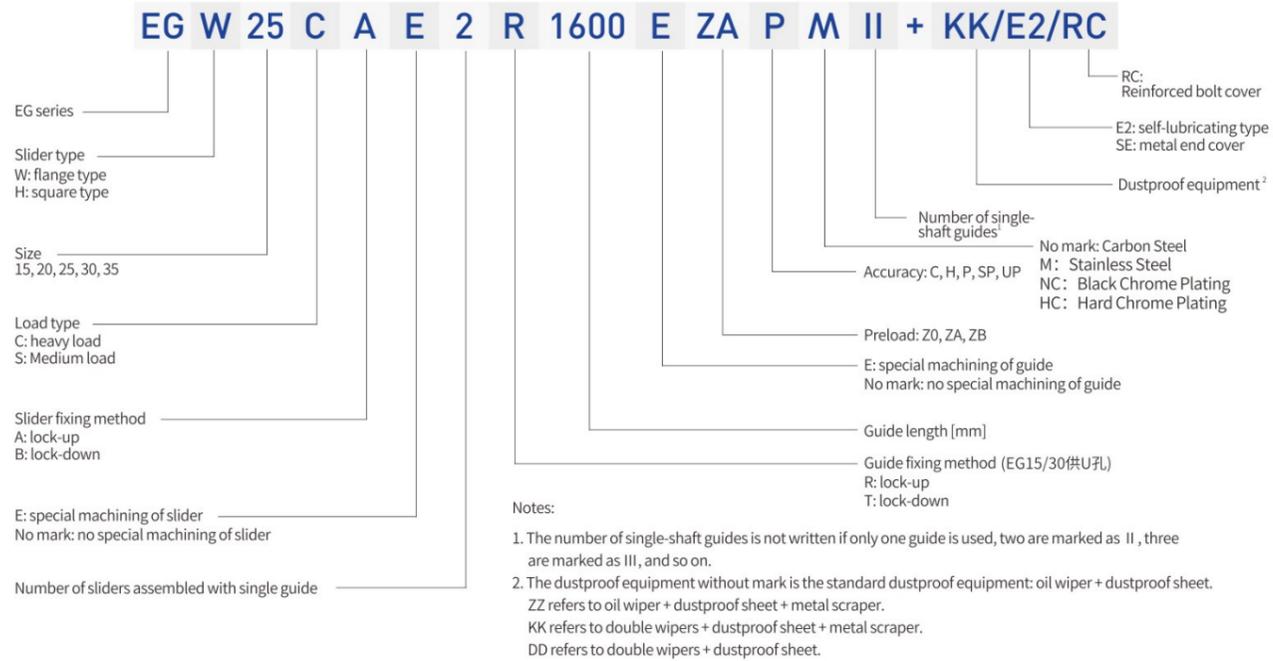
2-2-3 Description of Product Specification

EG series is divided into two types of linear guides: non-interchangeable and interchangeable. The specifications and dimensions of two types are the same while the main difference is that the actuator and guide of interchangeable type can be used separately or interchanged for use, more convenient. However, its combined accuracy can not reach the super precision and above of non-interchangeable type. At present, the combined accuracy of AKD interchangeable type has reached a certain level. It is an easy option for customers who do not need to pair and install the linear guide. The product specification and models of linear guides mainly indicate the linear guide size, model, accuracy level, preload and other requirements, facilitating the confirmation of products by both parties when ordering.

EG Series Low Assembly Ball Linear Guide

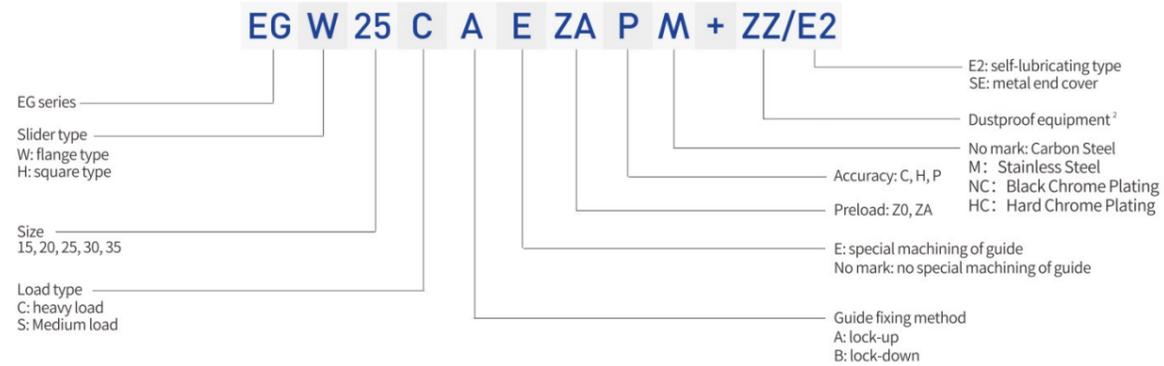
EG Series Low Assembly Ball Linear Guide

(1) Product model of non-interchangeable linear guide



(2) Product model of interchangeable linear guide

○ Interchangeable Slide Product Model



○ Interchangeable Guideway Product Model



2-2-4 EG Series Types

(1) Slider type

AKD offers two types of linear guides: flange type and square type.

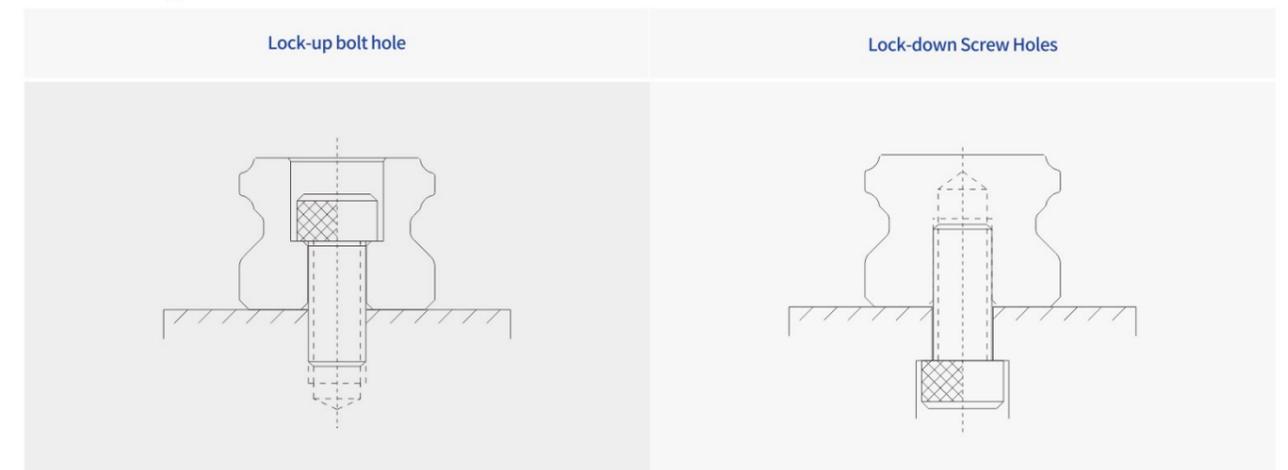
Table 2-2-1 Slider Type

Type	Specification	Shape	Height size (mm)	Guide length (mm)	Application equipment
Square type	EGH-SA EGH-CA		24	100	<ul style="list-style-type: none"> <li>Automation equipment</li> <li>High-speed transportation equipment</li> <li>Precision measuring instrument</li> <li>Semiconductor equipment</li> </ul>
			↓	↓	
Flange type	EGW-SA EGW-CA		48	4000	
			↓	↓	
Flange type	EGW-SB EGW-CB		24	100	
			↓	↓	
Flange type	EGW-SB EGW-CB		48	4000	
			↓	↓	

(2) Guide type

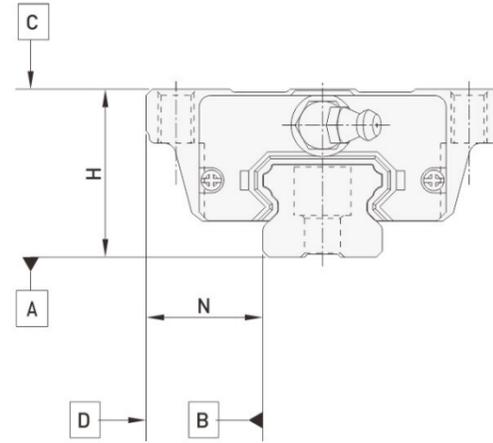
In addition to the general lock-up guide with bolt hole, AKD also provides lock-down guide with screw hole for easy installation and use by customers.

Table 2-2-2 Guide Type



2-2-5 Accuracy Level

The accuracy of EG series linear guide is divided into five levels: normal, high, precision, super precision and ultra-high precision. Customers can choose the accuracy according to accuracy requirements for equipment.



(1) Non-interchangeable linear guide accuracy

Table 2-2-3 Accuracy Table of Assembling Piece

Unit: mm

Model	EG - 15, 20				
	Common level (C)	Advanced (H)	Precision-level (P)	Super precision (SP)	Ultra-high precision (UP)
Allowable dimensional error of height H	± 0.1	± 0.03	$\begin{matrix} 0 \\ -0.03 \end{matrix}$	$\begin{matrix} 0 \\ -0.015 \end{matrix}$	$\begin{matrix} 0 \\ -0.008 \end{matrix}$
Allowable dimensional error of width N	± 0.1	± 0.03	$\begin{matrix} 0 \\ -0.03 \end{matrix}$	$\begin{matrix} 0 \\ -0.015 \end{matrix}$	$\begin{matrix} 0 \\ -0.008 \end{matrix}$
Mutual error of paired height H	0.02	0.01	0.006	0.004	0.003
Mutual error of paired width N	0.02	0.01	0.006	0.004	0.003
Travel parallelism of slider C surface to guide A surface	Travel parallelism (see Table 2-2-7)				
Travel parallelism of slider D surface to guide B surface	Travel parallelism (see Table 2-2-7)				

Table 2-2-4 Accuracy Table of Assembling Piece

Unit: mm

Model	EG - 25, 30, 35				
	Common level (C)	Advanced (H)	Precision-level (P)	Super precision (SP)	Ultra-high precision (UP)
Allowable dimensional error of height H	± 0.1	± 0.04	$\begin{matrix} 0 \\ -0.04 \end{matrix}$	$\begin{matrix} 0 \\ -0.02 \end{matrix}$	$\begin{matrix} 0 \\ -0.01 \end{matrix}$
Allowable dimensional error of width N	± 0.1	± 0.04	$\begin{matrix} 0 \\ -0.04 \end{matrix}$	$\begin{matrix} 0 \\ -0.02 \end{matrix}$	$\begin{matrix} 0 \\ -0.01 \end{matrix}$
Mutual error of paired height H	0.02	0.015	0.007	0.005	0.003
Mutual error of paired width N	0.03	0.015	0.007	0.005	0.003
Travel parallelism of slider C surface to guide A surface	Travel parallelism (see Table 2-2-7)				
Travel parallelism of slider D surface to guide B surface	Travel parallelism (see Table 2-2-7)				

(2) Accuracy of Interchangeable Linear Guide

Table 2-2-5 Accuracy Table of Assembling Piece

Unit: mm

Model	EG - 15, 20		
	Common level (C)	Advanced (H)	Precision-level (P)
Allowable dimensional error of height H	± 0.1	± 0.03	± 0.015
Allowable dimensional error of width N	± 0.1	± 0.03	± 0.015
Mutual error of paired height H	0.02	0.01	0.006
Mutual error of paired width N	0.02	0.01	0.006
Travel parallelism of slider C surface to guide A surface	Travel parallelism (see Table 2-2-7)		
Travel parallelism of slider D surface to guide B surface	Travel parallelism (see Table 2-2-7)		

Table 2-2-6 Accuracy Table of Assembling Piece

Unit: mm

Model	EG - 25, 30, 35		
	Common level (C)	Advanced (H)	Precision-level (P)
Allowable dimensional error of height H	± 0.1	± 0.04	± 0.02
Allowable dimensional error of width N	± 0.1	± 0.04	± 0.02
Mutual error of paired height H	0.02	0.015	0.007
Mutual error of paired width N	0.03	0.015	0.007
Travel parallelism of slider C surface to guide A surface	Travel parallelism (see Table 2-2-7)		
Travel parallelism of slider D surface to guide B surface	Travel parallelism (see Table 2-2-7)		

(3) Travel parallelism accuracy

Table 2-2-7 Travel parallelism accuracy

Guide length (mm)	Accuracy Grade (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

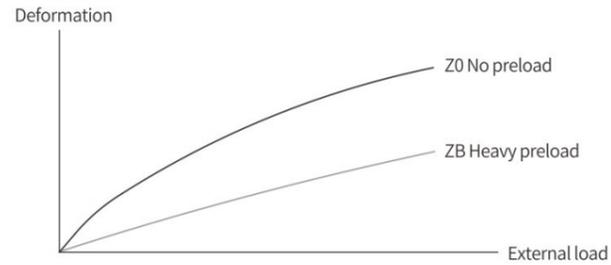
EG Series Low Assembly Ball Linear Guide

EG Series Low Assembly Ball Linear Guide

2-2-6 Preload

(1)Preload Definition

Preload is the pre-applied load to steel balls, that is, by increasing the diameter of steel balls. The preload is given through the negative clearance between steel balls and raceway, which can improve the rigidity of linear guide and eliminate the clearance. As shown in above figure, increasing the preload can increase the rigidity of linear guide. However, it is recommended to choose a preload below light preload for small specifications to avoid reducing its service life due to excessive preload selection.



(2)Preload Level

EG series linear guides provide three standard preloads, and you can choose the appropriate preload according to the application.

Table 2-2-8 Preload level

Preload level	Mark	Preload	Service Conditions
Normal clearance	Z0	0- 0.02C	The load direction is fixed, the impact is small, and the accuracy requirement is low
Light preload	ZA	0.03C-0.05C	Light load and high precision requirements
Medium preload	ZB	0.06C- 0.08C	High rigidity requirements, and there is vibration and impact in work environment

Class	Interchangeable linear guide(single piece)	Non-interchangeable linear guide(assembling piece)
Preload level	Z0, ZA	Z0, ZA, ZB

Note: Preload C is the basic dynamic rated load

Oil nozzle position

According to customer requirements, the oil nozzle can be installed in the front or at rear end of the slider for manual oil injection. EG series specially reserves the side oil hole position on the side of end cover to install the oil nozzle [generally straight oil nozzle] for lateral oil injection. The position of lateral oil injection is recommended to be on the non-reference side, but if there are special needs, it can also be placed on the reference side. Please contact us if you have the above lateral oil injection needs. EG series also reserves the upper oil hole position at the top of end cover. If the customer wants to supply oil from the top of end cover, the metal needle with the diameter of 0.8mm must be used to pierce upper oil hole at the designated position by preheating, and then the seal ring can be mounted in the recess to avoid using a drill bit to pierce the upper oil hole, where the debris has the risk of contaminating oil pipe. Linear guides that use connecting pipes to automatically supply grease can be installed with oil pipe joints according to the type of connecting pipe.

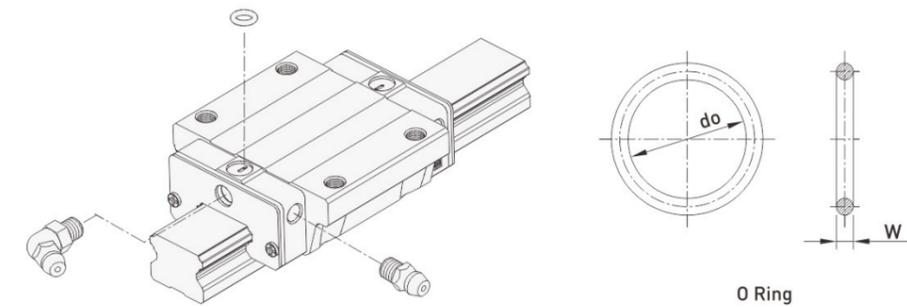
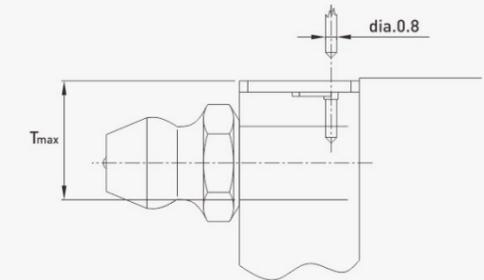


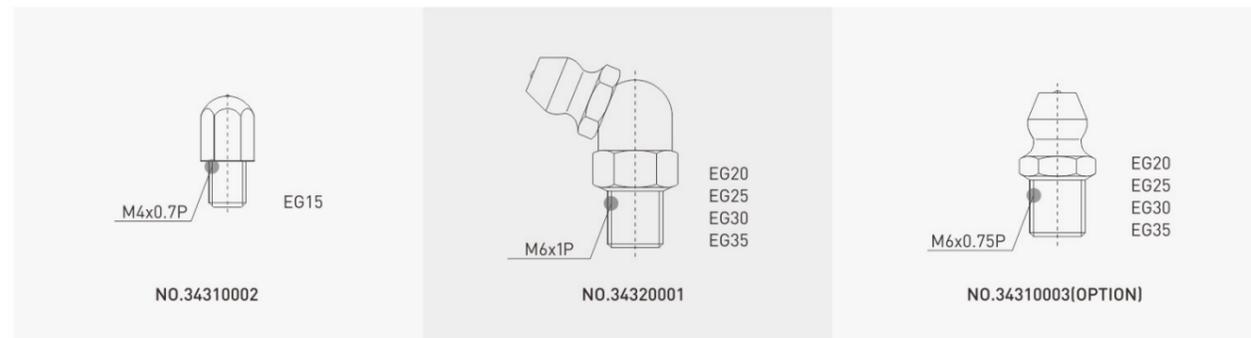
Table 2-1-9 O-Ring Specification and Maximum Allowable Depth of Perforation

Specification	O-ring specification		Maximum allowable depth of perforation T <sub>max</sub> (mm)
	do (mm)	W (mm)	
EG 15	2.5 ± 0.15	1.5 ± 0.15	6.9
EG 20	4.5 ± 0.15	1.5 ± 0.15	8.4
EG 25	4.5 ± 0.15	1.5 ± 0.15	10.4
EG 30	4.5 ± 0.15	1.5 ± 0.15	10.4
EG 35	4.5 ± 0.15	1.5 ± 0.15	10.8



2-2-7 Lubrication Method

(1) Lubrication Grease



Amount of lubrication grease and oil filling up single slider

Table 2-2-10 Lubrication Grease Amount for Single Slider

Specification	Medium load (cm <sup>2</sup> )	Heavy load (cm <sup>2</sup> )
EG 15	0.8	1.4
EG 20	1.5	2.4
EG 25	2.8	4.6
EG 30	3.7	6.3
EG 35	5.6	6.6

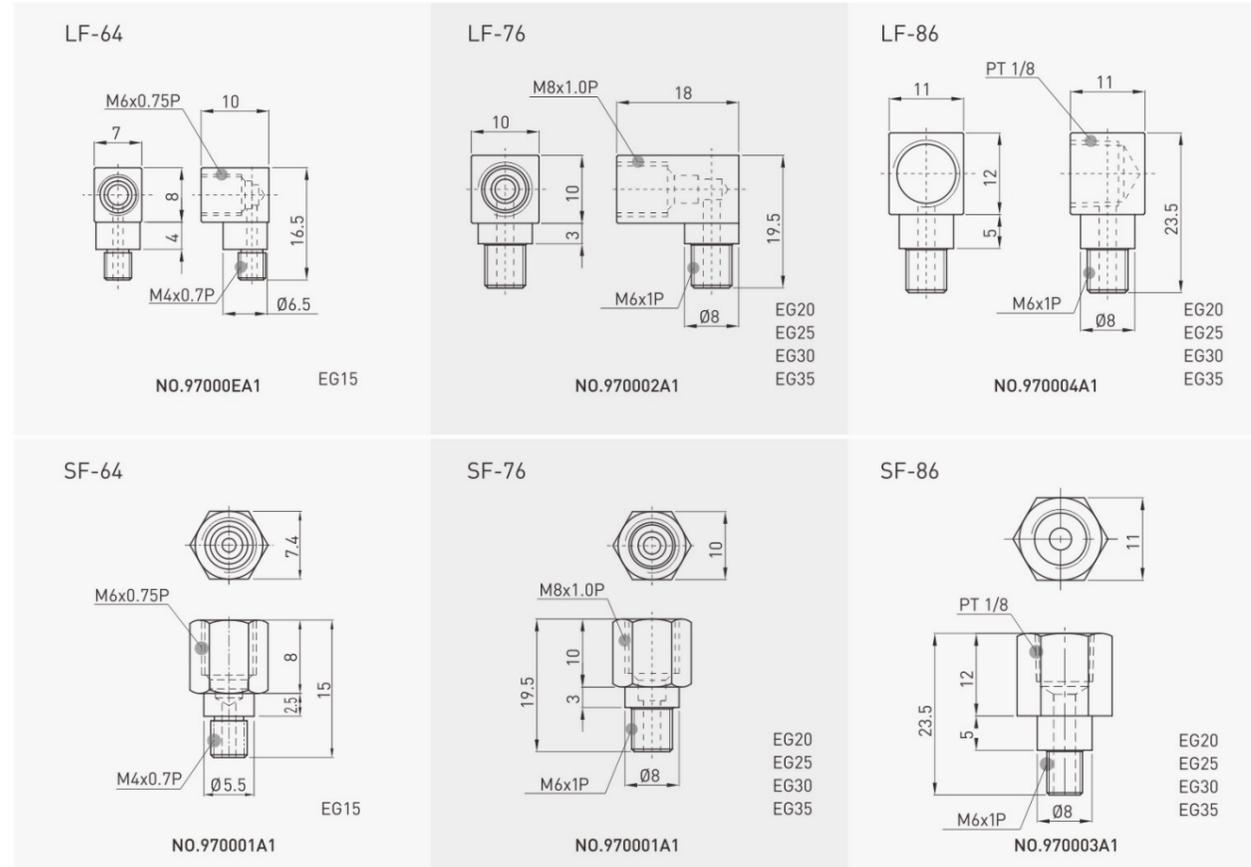
Lubrication frequency

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

(2)Lubrication Oil

It is recommended to use lubrication oil with an oil viscosity of about 32-150cSt to lubricate the linear guide. Customers can firstly explain to us the need of using oil lubrication, and the shipped linear guide will not be sealed with lubrication grease.

Oil pipe joint type



Oil supply rate

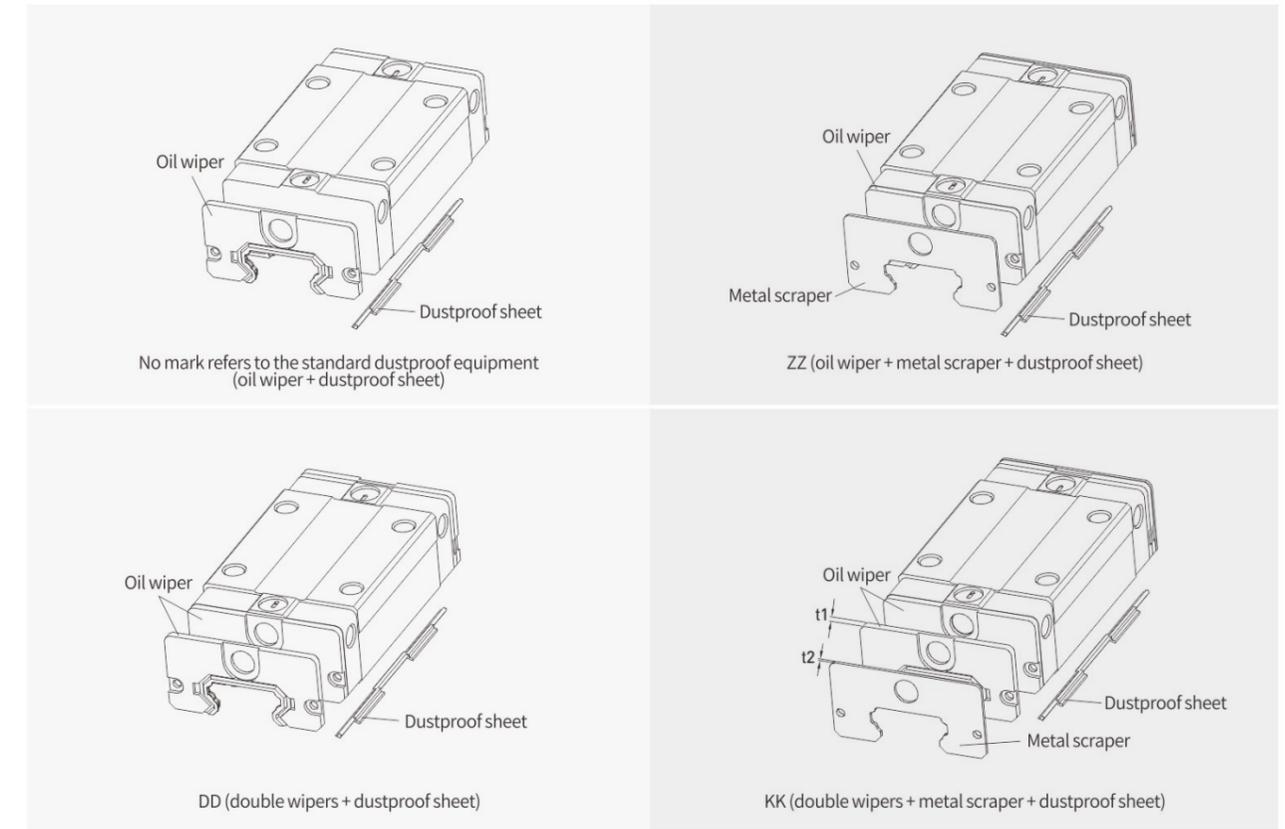
Table 2-2-11 Oil Supply Rate

Specification	Oil supply rate (cm <sup>3</sup> /hr)
EG 15	0.1
EG 20	0.133
EG 25	0.167
EG 30	0.2
EG 35	0.233

2-2-8 Dustproof Equipment

(1) Standard Dustproof Equipment Code

If the following dustproof equipment is required, please add the code behind the product model.



(2) Description of Dustproof Equipment

- Oil wiper and bottom dustproof sheet  
It can prevent machining chips or dust particles from entering the slider, damaging the raceway surface and reducing the life of linear guide.
- Double wipers  
Double the scraping effect, even in heavy cutting and machining environment, foreign matter is completely excluded from the slider.

Table 2-2-12 Oil Wiper

Specification	Thickness(t1) (mm)
EG 15 ES	2
EG 20 ES	2
EG 25 ES	2
EG 30 ES	2
EG 35 ES	2

EG Series Low Assembly Ball Linear Guide

● Metal scraper

It can isolate high temperature chips or processing sparks and exclude large volume of impurities.

Table 2-2-13 Metal Scraper

Specification	Thickness(t2) (mm)
EG 15 SC	0.8
EG 20 SC	0.8
EG 25 SC	1
EG 30 SC	1
EG 35 SC	1.5

● Guide bolt cover

To prevent cutting powder or foreign matter from entering the slider through the bolt hole and affecting the accuracy, the customer must drive the bolt cover into bolt hole when installing the guide. Each guide is equipped with a bolt cover when leaving the factory.

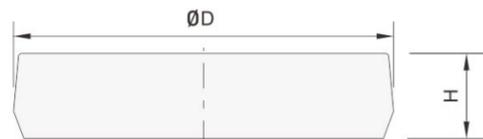


Table 2-2-14 Guide Dust Cover

Guide specification	Mounting screws	Diameter (D) (mm)	Thickness(H) (mm)
EGR15R	M3	6.15	1.2
EGR20R	M5	9.65	2.5
EGR25R	M6	11.15	2.5
EGR30R	M6	11.15	2.5
EGR35R	M8	14.20	3.5
EGR15U	M4	7.65	1.1
EGR30U	M8	14.20	3.5

(3) Total Length of Slider for Each Dustproof Code

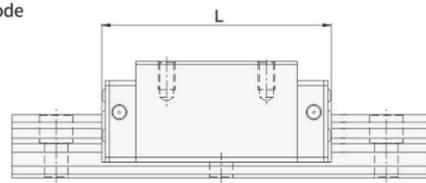


Table 2-2-15 Total Length of Slider

Unit: mm

Specification	Total length of slider (L)			
	SS	ZZ	DD	KK
EG15S	40.1 [42.5]	41.7 [46.1]	44.1 [46.5]	45.7 [50.1]
EG15C	56.8 [59.2]	58.4 [62.8]	60.8 [63.2]	62.4 [66.8]
EG20S	50.0 [54.0]	51.6 [57.6]	54.0 [58.0]	55.6 [61.6]
EG20C	69.1 [73.1]	70.7 [76.7]	73.1 [77.1]	74.7 [80.7]
EG25S	59.1 [63.1]	61.1 [67.1]	63.1 [67.1]	65.1 [71.1]
EG25C	82.6 [86.6]	84.6 [90.6]	86.6 [90.6]	88.6 [94.6]
EG30S	69.5 [73.5]	71.5 [77.5]	73.5 [77.5]	75.5 [81.5]
EG30C	98.1 [102.1]	100.1 [106.1]	102.1 [106.1]	104.1 [110.1]
EG35S	75.0 [79.0]	78.0 [84.0]	79.0 [83.0]	82.0 [88.0]
EG35C	108.0 [112.0]	111.0 [117.0]	112.0 [116.0]	115.0 [121.0]

Note: ( ) is the maximum length of the slider, including screws, oil wiper lips, etc.

EG Series Low Assembly Ball Linear Guide

2-2-9 Friction

This resistance is the maximum one of single wiper.

Table 2-2-16 EG Series Oil Wiper Resistance

Specification	Oil wiper resistance N (kgf)
EG15	0.98 (0.1)
EG20	0.98 (0.1)
EG25	0.98 (0.1)
EG30	1.47 (0.15)
EG35	1.96 (0.2)

Notes: 1 kgf = 9.81 N

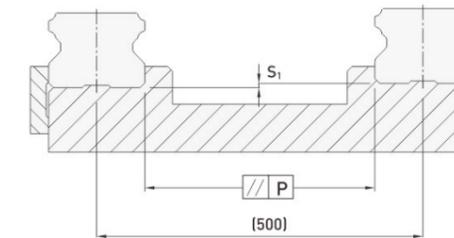


Table 2-2-17 Allowable parallelism error(P)

Unit: μm

Specification	Preload level		
	Z0	ZA	ZB
EG15	25	18	-
EG20	25	20	18
EG25	30	22	20
EG30	40	30	27
EG35	50	35	30

Table 2-2-18 Allowable upper and lower horizontal error(S<sub>1</sub>)

Unit: μm

Specification	Preload level		
	Z0	ZA	ZB
EG15	130	85	-
EG20	130	85	50
EG25	130	85	70
EG30	170	110	90
EG35	210	150	120

Note: allowable values are proportional to the distance between shafts

2-2-11 Precautions for Installation

(1) Shoulder Height and Chamfer of Mounting Surface

When installing the linear guide, it is necessary to pay attention to whether the shoulder condition of mounting surface is appropriate, such as whether the chamfer is too large, the protruding place is easy to cause poor accuracy of linear guide, and whether the height is too high, it will interfere with the slider. Therefore, if the mounting surface shoulder can be installed according to the recommended requirements, the poor installation accuracy can be eliminated.

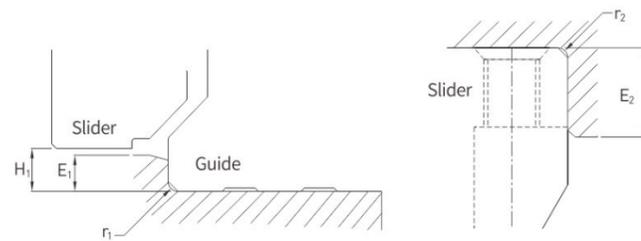


Table 2-2-19 Shoulder Height and Chamfer

Unit: mm

Specification	Maximum fillet radius of guide end r <sub>1</sub> (mm)	Maximum fillet radius of slider end r <sub>2</sub> (mm)	Shoulder height of guide end E <sub>1</sub> (mm)	Shoulder height of slider end E <sub>2</sub> (mm)	operation height of slider H <sub>1</sub> (mm)
EG15	0.5	0.5	2.7	5.0	4.5
EG20	0.5	0.5	5.0	7.0	6.0
EG25	1.0	1.0	5.0	7.5	7.0
EG30	1.0	1.0	7.0	7.0	10.0
EG35	1.0	1.0	7.5	9.5	11.0

(2) Torque Value of Guide Assembly Screws

Whether the mounting guide is locked and flattened against the reference surface has a great impact on the accuracy of linear guide. Therefore, to achieve the purpose of locking each screw tightly, it is recommended to use the following torque values to lock the assembly screws.

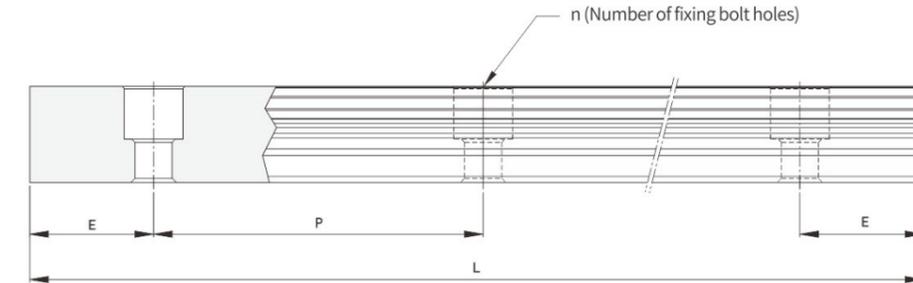
Table 2-2-20 Torque Values

Specification	Screw Size	Torque N-cm (kgf-cm)		
		Iron material	Casting material	Aluminum alloy
EG15	M3×0.5P×16L	186(19)	127(13)	98(10)
EG20	M5×0.8P×16L	883(90)	588(60)	441(45)
EG25	M6×1P×20L	1373(140)	921(94)	686(70)
EG30	M6×1P×25L	1373(140)	921(94)	686(70)
EG35	M8×1.25P×25L	3041(310)	2010(206)	1470(150)

Note: 1 kgf = 9.81 N

2-2-12 Standard Length and Maximum Length of Single Guide

AKD has a standard length of guide inventory to supply customer needs. If the customer orders a guide with non-standard length, the size of end distance E shall not be greater than 1/2P to prevent the instability of guide assembly end due to the excessive size of E, and reduce the accuracy of linear guide.



$$L = (n - 1) \times P + 2 \times E \quad \text{Eq.2.2}$$

L: total length of guide (mm)  
 n: number of bolt holes  
 P: distance between bolt holes (mm)  
 E: distance from bolt hole to end face (mm)

Table 2-2-21 Track Length

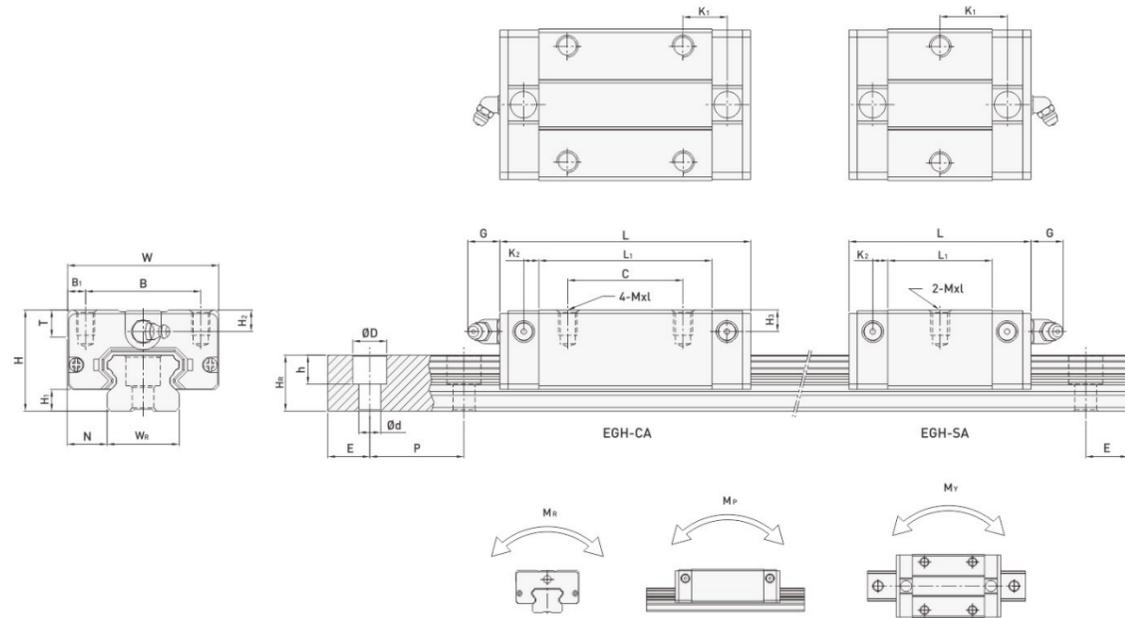
Unit: mm

Item	EGR15	EGR20	EGR25	EGR30	EGR35
Standard length L (n)	160(3)	220(4)	220(4)	280(4)	280(4)
	220(4)	280(5)	280(5)	440(6)	440(6)
	280(5)	340(6)	340(6)	600(8)	600(8)
	340(6)	460(8)	460(8)	760(10)	760(10)
	460(8)	640(11)	640(11)	1,000(13)	1,000(13)
	640(11)	820(14)	820(14)	1,640(21)	1,640(21)
	820(14)	1,000(17)	1,000(17)	2,040(26)	2,040(26)
		1,240(21)	1,240(21)	2,520(32)	2,520(32)
Spacing (P)	60	60	60	80	80
Standard end distance (ES)	20	20	20	20	20
Maximum length of standard end distance	4,000(67)	4,000(67)	4,000(67)	3,960(50)	3,960(50)
Maximum length	4,000	4,000	4,000	4,000	4,000

Notes: 1. The E size tolerance of general guide is 0.5~0.5 mm, and the E size tolerance of guide teeth connector end distance is stricter 0~-0.3 mm.  
 2. The maximum length of standard end distance refers to the maximum length of the guide with left and right end distances as the standard end distance.  
 3. If the customer needs a different E size, please contact with AKD.

2-2-13 Table of EG Series Guide Sizes

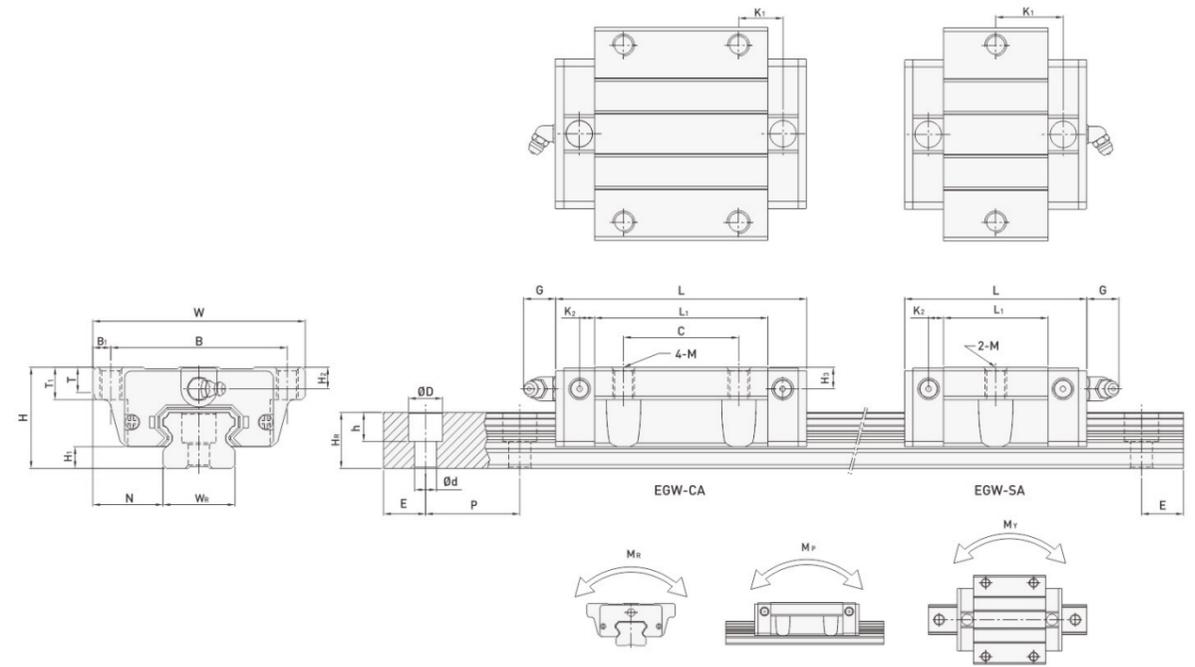
(1) EGH-SA / EGH-CA



Model	Component size(mm)				Slider size (mm)										Guide size (mm)					Size of guide fixing bolt (mm)	Basic dynamic rated load C(kN)	Basic static rated load C <sub>0</sub> (kN)	Allowable static torque			Weight					
	H	H <sub>1</sub>	N	W	B	B <sub>1</sub>	C	L <sub>1</sub>	L	K <sub>1</sub>	K <sub>2</sub>	G	MxL	T	H <sub>2</sub>	H <sub>3</sub>	W <sub>R</sub>	H <sub>R</sub>	D				h	d	P	E	M <sub>R</sub> (kN-m)	M <sub>P</sub> (kN-m)	M <sub>Y</sub> (kN-m)	Slider kg	Guide kg/m
EGH15SA	24	4.5	9.5	34	26	4	-	23.1	40.1	14.8	3.5	5.7	M4x6	6	5.5	6	15	12.5	7.5	5.3	4.5	60	20	M4x16	5.35	9.40	0.08	0.04	0.04	0.09	1.25
EGH15CA							26	39.8	56.8	10.15															7.83	16.19	0.13	0.10	0.10	0.15	
EGH20SA	28	6	11	42	32	5	-	29	50	18.75	4.15	12	M5x7	7.5	6	6	20	15.5	9.5	8.5	6	60	20	M5x16	7.23	12.74	0.13	0.06	0.06	0.15	2.08
EGH20CA							32	48.1	69.1	12.3															10.31	21.13	0.22	0.16	0.16	0.24	
EGH25SA	33	7	12.5	48	35	6.5	-	35.5	59.1	21.9	4.55	12	M6x9	8	8	8	23	18	11	9	7	60	20	M6x20	11.40	19.50	0.23	0.12	0.12	0.25	2.67
EGH25CA							35	59	82.6	16.15															16.27	32.40	0.38	0.32	0.32	0.41	
EGH30SA	42	10	16	60	40	10	-	41.5	69.5	26.75	6	12	M8x12	9	8	9	28	23	14	12	9	80	20	M8x25	16.42	28.10	0.40	0.21	0.21	0.45	4.35
EGH30CA							40	70.1	98.1	21.05															23.70	47.46	0.68	0.55	0.55	0.76	
EGH35SA	48	11	18	70	50	10	-	45	75	28.5	7	12	M8x12	10	8.5	8.5	34	27.5	14	12	9	80	20	M8x25	22.66	37.38	0.56	0.31	0.31	0.74	6.14
EGH35CA							50	78	108	20															33.35	64.84	0.98	0.69	0.69	1.10	

Notes: 1 kgf = 9.81 N

(2) EGW-SA / EGW-CA



Model	Component size(mm)				Slider size (mm)										Guide size (mm)					Size of guide fixing bolt (mm)	Basic dynamic rated load C(kN)	Basic static rated load C <sub>0</sub> (kN)	Allowable static torque			Weight						
	H	H <sub>1</sub>	N	W	B	B <sub>1</sub>	C	L <sub>1</sub>	L	K <sub>1</sub>	K <sub>2</sub>	G	M	T	H <sub>2</sub>	H <sub>3</sub>	W <sub>R</sub>	H <sub>R</sub>	D				h	d	P	E	M <sub>R</sub> (kN-m)	M <sub>P</sub> (kN-m)	M <sub>Y</sub> (kN-m)	Slider kg	Guide kg/m	
EGW 15SA	24	4.5	18.5	52	41	5.5	-	23.1	40.1	14.8	3.5	5.7	M5	5	7	5.5	6	15	12.5	7.5	5.3	4.5	60	20	M4x16	5.35	9.40	0.08	0.04	0.04	0.12	1.25
EGW 15CA							26	39.8	56.8	10.15																7.83	16.19	0.13	0.10	0.10	0.21	
EGW 20SA	28	6	19.5	59	49	5	-	29	50	18.75	4.15	12	M6	7	9	6	6	20	15.5	9.5	8.5	6	60	20	M5x16	7.23	12.74	0.13	0.06	0.06	0.19	2.08
EGW 20CA							32	48.1	69.1	12.3																10.31	21.13	0.22	0.16	0.16	0.32	
EGW 25SA	33	7	25	73	60	6.5	-	35.5	59.1	21.9	4.55	12	M8	7.5	10	8	8	23	18	11	9	7	60	20	M6x20	11.40	19.50	0.23	0.12	0.12	0.35	2.67
EGW 25CA							35	59	82.6	16.15																16.27	32.40	0.38	0.32	0.32	0.59	
EGW 30SA	42	10	31	90	72	9	-	41.5	69.5	26.75	6	12	M10	7	10	8	9	28	23	14	12	9	80	20	M8x25	16.42	28.10	0.40	0.21	0.21	0.62	4.35
EGW 30CA							40	70.1	98.1	21.05																23.70	47.46	0.68	0.55	0.55	1.04	
EGW35SA	48	11	33	100	82	9	-	45	75	28.5	7	12	M10	10	13	8.5	8.5	34	27.5	14	12	9	80	20	M8x25	22.66	37.38	0.56	0.31	0.31	0.84	6.14
EGW35CA							50	78	108	20																33.35	64.84	0.98	0.69	0.69	1.45	

Notes: 1 kgf = 9.81 N



WE Series Four Row Wide Rail Type Linear Guideway

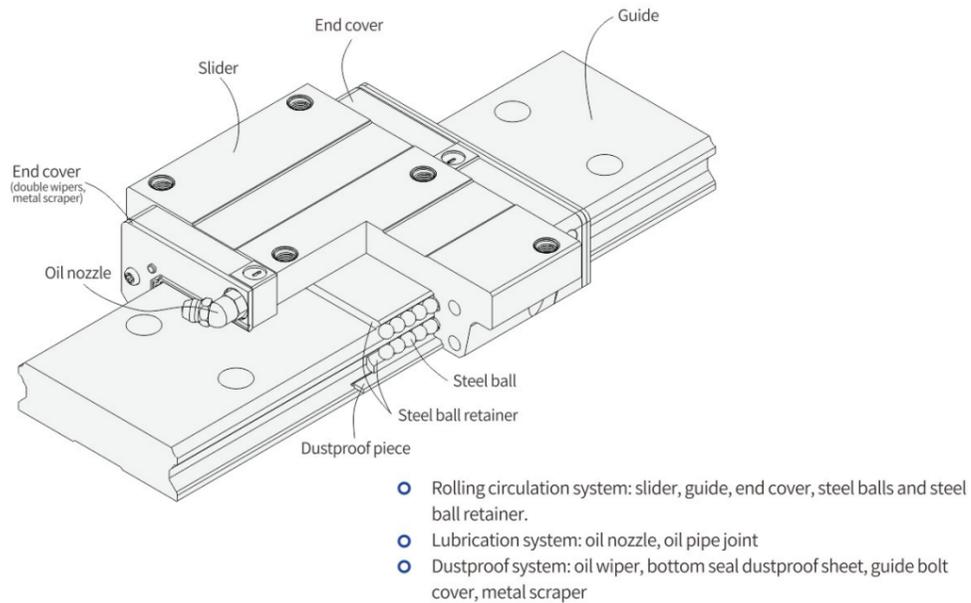
WE Series Four Row Wide Rail Type Linear Guideway

2-3-1 Features of WE Series Linear Guides

The WE Series employs a four-row ball load-bearing design, utilizing a 45-degree contact angle. This configuration provides equal load capacity in all four directions and features a self-aligning function that can accommodate mounting surface installation errors, ensuring high precision requirements are met. Furthermore, by increasing the rail width and reducing the overall height, ultra-high torsional resistance is achieved. When space constraints are a consideration in specific environments or when high torque loads are required, the system can be used as a single-axis solution.



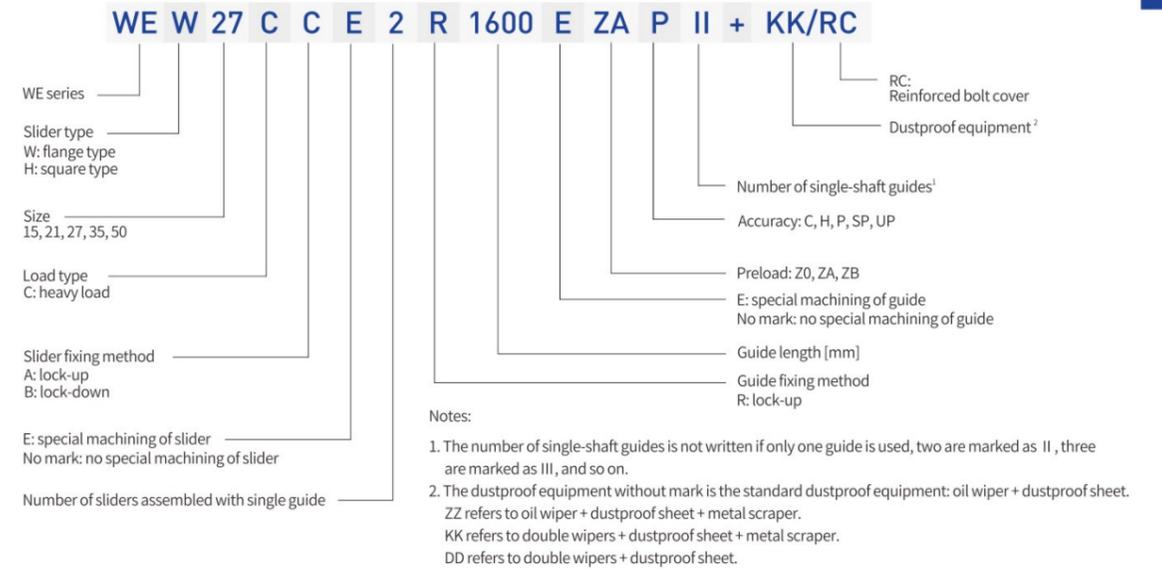
2-3-2 WE Series Body Structure



2-2-3 Description of Product Specification

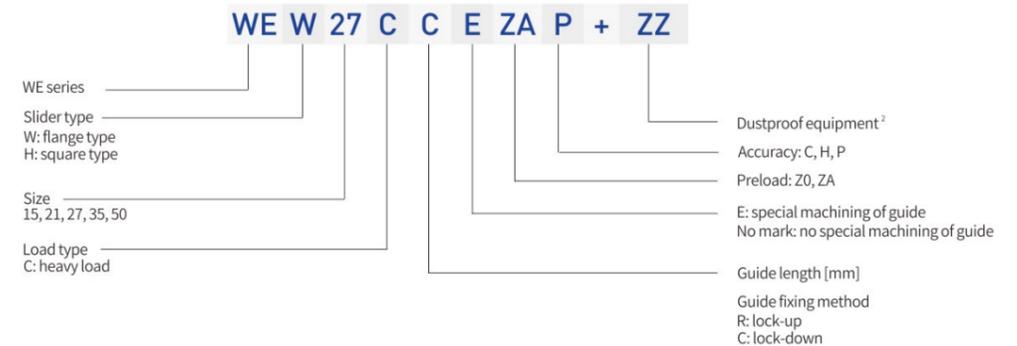
The WE Series is divided into two types of linear guides: non-interchangeable and interchangeable. Both share the same specifications and dimensions. The main difference lies in the fact that the interchangeable type allows for the separate interchangeability of the slide blocks and guide rails, offering greater convenience. However, its assembled accuracy cannot achieve the ultra-precision level or higher of the non-interchangeable type. Nevertheless, since the assembled accuracy of the AKD interchangeable type has now reached a certain standard, it serves as a convenient option for customers who do not require paired installation of linear guides. The product specification model of the linear guide primarily indicates requirements such as the linear guide's size, type, accuracy grade, and preload, facilitating product confirmation between both parties during ordering.

(1) Product model of non-interchangeable linear guide



(2) Product model of interchangeable linear guide

Interchangeable Slide Product Model



Interchangeable Guideway Product Model



WE Series Four Row Wide Rail Type Linear Guideway

WE Series Four Row Wide Rail Type Linear Guideway

2-3-4 WE Series Types

(1)Slider type

AKD offers two types of linear guides: flange type and square type.

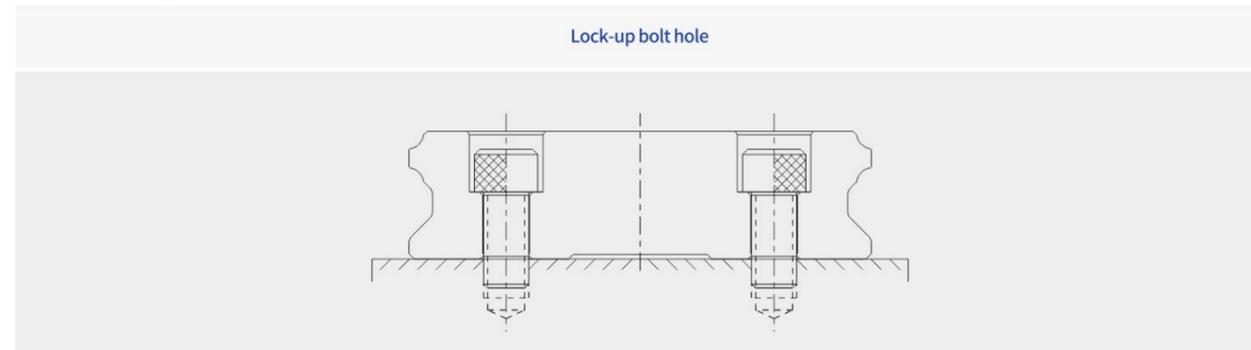
Table 2-2-1 Slider Type

Type	Specification	Shape	Height size (mm)	Guide length (mm)	Application equipment
Square type	WEH-CA 17, 21		17	100	<ul style="list-style-type: none"> <li>○ Automation equipment</li> <li>○ High-speed transportation equipment</li> <li>○ Precision measuring instrument</li> <li>○ Semiconductor equipment</li> <li>○ Plastic Bottle Stretch Blow Molding Equipment</li> <li>○ Single-Axis Robotic Arm</li> <li>○ Single-Axis Torque-Bearing Equipment</li> </ul>
			↓	↓	
Square type	WEH-CA 27, 35, 50		27	100	
			↓	↓	
Flange type	W EW-CC		17	100	
			↓	↓	
			50	4000	

(2)Guide type

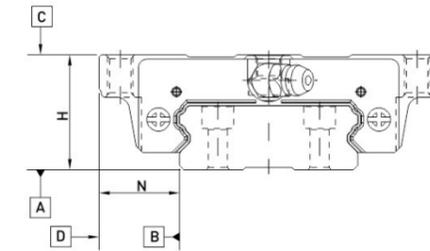
AKD provides standard locking-type guide rails.

Table 2-2-2 Guide Type



2-3-5 Accuracy Level

The accuracy of WE series linear guide is divided into five levels: normal, high, precision, super precision and ultra-high precision. Customers can choose the accuracy according to accuracy requirements for equipment.



(1)Non-interchangeable linear guide accuracy

Table 2-2-3 Accuracy Table of Assembling Piece

Unit: mm

Model	WE - 17, 21					WE - 27, 35				
	Common level (C)	Advanced (H)	Precision-level (P)	Super precision (SP)	Ultra-high precision (UP)	Common level (C)	Advanced (H)	Precision-level (P)	Super precision (SP)	Ultra-high precision (UP)
Allowable dimensional error of height H	±0.1	±0.03	0 -0.03	0 -0.015	0 -0.008	±0.1	±0.04	0 -0.04	0 -0.02	0 -0.01
Allowable dimensional error of width N	±0.1	±0.03	0 -0.03	0 -0.015	0 -0.008	±0.1	±0.04	0 -0.04	0 -0.02	0 -0.01
Mutual error of paired height H	0.02	0.01	0.006	0.004	0.003	0.02	0.015	0.007	0.005	0.003
Mutual error of paired width N	0.02	0.01	0.006	0.004	0.003	0.03	0.015	0.007	0.005	0.003
Travel parallelism of slider C surface to guide A surface	Travel parallelism (see Table 2-3-5)									
Travel parallelism of slider D surface to guide B surface	Travel parallelism (see Table 2-3-5)									

Model	WE - 50				
	Common level (C)	Advanced (H)	Precision-level (P)	Super precision (SP)	Ultra-high precision (UP)
Allowable dimensional error of height H	±0.1	±0.05	0 -0.05	0 -0.03	0 -0.02
Allowable dimensional error of width N	±0.1	±0.05	0 -0.05	0 -0.03	0 -0.02
Mutual error of paired height H	0.03	0.015	0.007	0.005	0.003
Mutual error of paired width N	0.03	0.02	0.010	0.007	0.005
Travel parallelism of slider C surface to guide A surface	Travel parallelism (see Table 2-3-5)				
Travel parallelism of slider D surface to guide B surface	Travel parallelism (see Table 2-3-5)				

WE Series Four Row Wide Rail Type Linear Guideway

WE Series Four Row Wide Rail Type Linear Guideway

2-3-5 Accuracy Level

(2)Accuracy of Interchangeable Linear Guide

Table 2-3-4 Accuracy Table of Assembling Piece

Unit: mm

Model	WE - 17, 21			WE - 27, 35			WE - 50		
	Common level (C)	Advanced (H)	Precision-level (P)	Common level (C)	Advanced (H)	Precision-level (P)	Common level (C)	Advanced (H)	Precision-level (P)
Accuracy Grade	± 0.1	± 0.03	± 0.015	± 0.1	± 0.04	± 0.02	± 0.1	± 0.05	± 0.025
Allowable dimensional error of height H	± 0.1	± 0.03	± 0.015	± 0.1	± 0.04	± 0.02	± 0.1	± 0.05	± 0.025
Allowable dimensional error of width N	± 0.1	± 0.03	± 0.015	± 0.1	± 0.04	± 0.02	± 0.1	± 0.05	± 0.025
Mutual error of paired height H	0.02	0.01	0.006	0.02	0.015	0.007	0.03	0.015	0.007
Mutual error of paired width N	0.02	0.01	0.006	0.03	0.015	0.007	0.03	0.02	0.01
Travel parallelism of slider C surface to guide A surface	Travel parallelism (see Table 2-3-5)								
Travel parallelism of slider D surface to guide B surface	Travel parallelism (see Table 2-3-5)								

(3)Travel parallelism accuracy

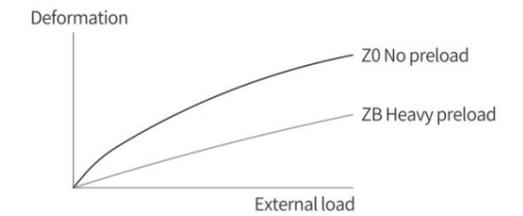
Table 2-3-5 Travel parallelism accuracy

Guide length(mm)	Accuracy Grade(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)Preload Definition

Preload is the pre-applied load to steel balls, that is, by increasing the diameter of steel balls. The preload is given through the negative clearance between steel balls and raceway, which can improve the rigidity of linear guide and eliminate the clearance. As shown in figure on the right, increasing the preload can increase the rigidity of linear guide. However, it is recommended to choose a preload below light preload for small specifications to avoid reducing its service life due to excessive preload selection.



(2)Preload Level

WE series linear guides provide three standard preloads, and you can choose the appropriate preload according to the application.

Table 2-3-6 Preload level

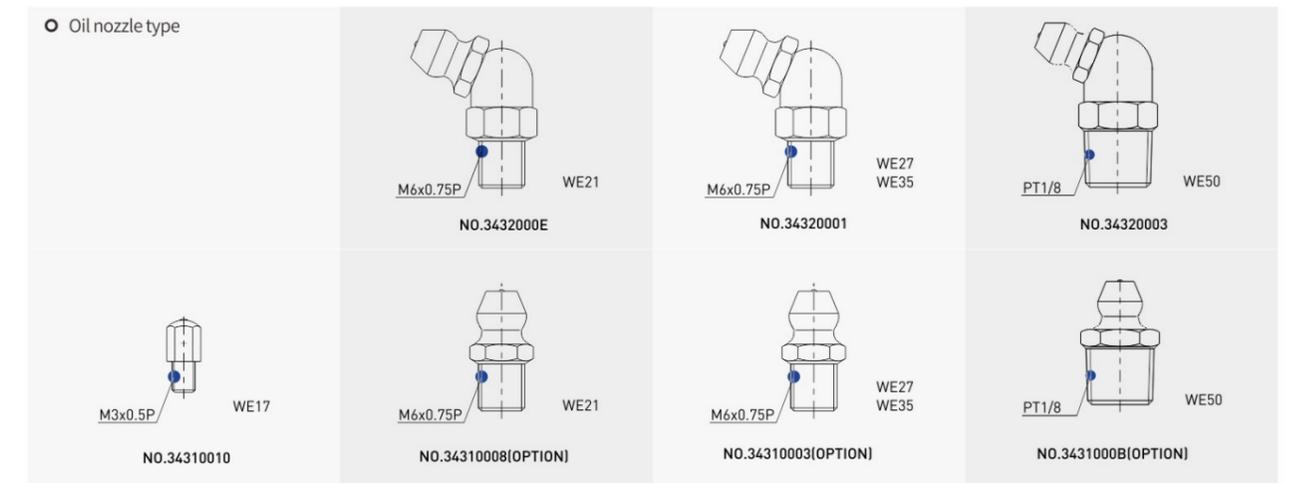
Preload level	Mark	Preload	Applicability
No preload	Z0	0~ 0.02C	The load direction is fixed, the impact is small, and the accuracy requirement is low
Medium preload	ZA	0.03C~0.05C	Light load and high precision requirements
Heavy preload	ZB	0.06C~ 0.08C	High rigidity requirements, and there is vibration and impact in work environment

Class	Interchangeable linear guide(single piece)	Non-interchangeable linear guide(assembling piece)
Preload level	Z0, ZA	Z0, ZA, ZB

Note: Preload C is the basic dynamic rated load

2-3-7 Lubrication Method

(1) Lubrication Grease



WE Series Four Row Wide Rail Type Linear Guideway

WE Series Four Row Wide Rail Type Linear Guideway

Oil nozzle position

According to customer requirements, the oil nozzle can be installed in the front or at rear end of the slider for manual oil injection. WE series specially reserves the side oil hole position on the side of end cover to install the oil nozzle [generally straight oil nozzle] for lateral oil injection. The position of lateral oil injection is recommended to be on the non-reference side, but if there are special needs, it can also be placed on the reference side. Please contact us if you have the above lateral oil injection needs. The WE series also reserves an oil hole position on the top of the end cover. If the customer intends to supply oil from the top of the end cover, it is necessary to use a metal pin with a diameter of 0.8 mm and preheating method to penetrate the oil hole at the designated location. After that, the sealing ring should be installed in the recess. Avoid using a drill to penetrate the oil hole, as the debris may risk contaminating the oil passage. Linear guides that use connecting pipes to automatically supply grease can be installed with oil pipe joints according to the type of connecting pipe.

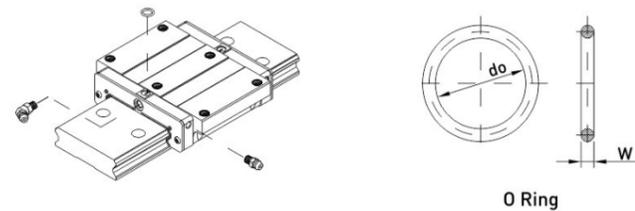
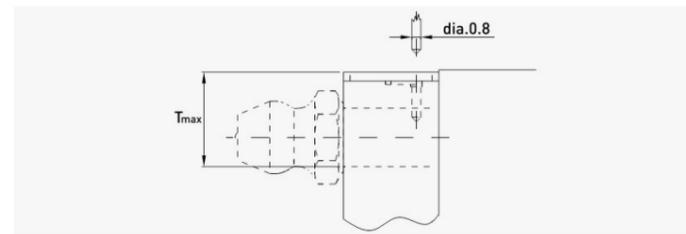


Table 2-3-7 O-ring Specification and Maximum Allowable Depth of Perforation

Specification	O-ring specification		Maximum allowable depth of perforation $T_{max}$ [mm]
	do (mm)	W (mm)	
WE 21	2.5 ± 0.15	1.5 ± 0.15	4.2
WE 27	4.5 ± 0.15	1.5 ± 0.15	5.8
WE 35	4.5 ± 0.15	1.5 ± 0.15	7.6
WE 50	4.5 ± 0.15	1.5 ± 0.15	11.8



Amount of lubrication grease and oil filling up single slider

2-3-8 Lubrication Grease Amount for Single Slider

Specification	Heavy load (cm <sup>3</sup> )	Specification	Heavy load (cm <sup>3</sup> )
WE 17	1.4	WE 35	9.5
WE 21	2.4	WE 50	20
WE 27	3.6		

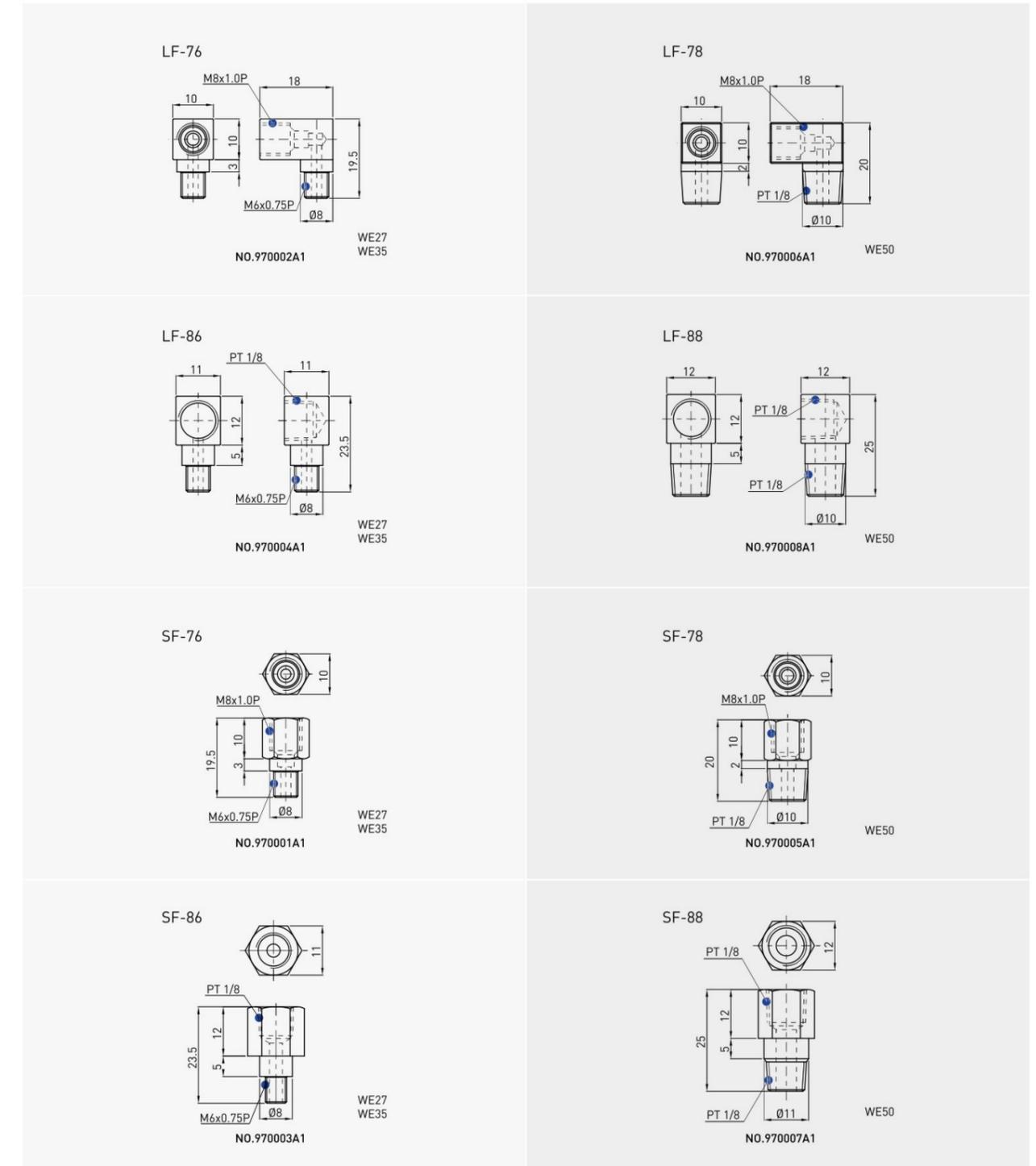
Lubrication frequency

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

Lubrication Oil

It is recommended to use lubrication oil with an oil viscosity of about 30-150cSt to lubricate the linear guide. Customers can firstly explain to us the need of using oil lubrication, and the shipped linear guide will not be sealed with lubrication grease.

Oil pipe joint type



WE Series Four Row Wide Rail Type Linear Guideway

Oil supply rate

Table 2-3-9 Oil Supply Rate

Specification	Oil supply rate(cm <sup>3</sup> /hr)
WE 17	0.15
WE 21	0.2
WE 27	0.2
WE 35	0.3
WE 50	0.4

WE Series Four Row Wide Rail Type Linear Guideway

(2) Description of dustproof equipment

● Oil wiper and bottom dustproof sheet  
It can prevent machining chips or dust particles from entering the slider, damaging the raceway surface and reducing the life of linear guide.

● Double wipers  
Double the scraping effect, even in heavy cutting and machining environment, foreign matter is completely excluded from the slider.

Table 2-1-10 Oil Wiper Thickness

Specification	Increase thickness(t1)(mm)	Specification	Increase thickness(t1)(mm)
WE 17 ES	1.6	WE 35 ES	2
WE 21 ES	2	WE 50 ES	2.5
WE 27 ES	2		

● Metal scraper  
It can isolate high temperature chips or processing sparks and exclude large volume of impurities.

Table 2-3-11 Metal Scraper Thickness

Specification	Increase thickness(t2)(mm)	Specification	Increase thickness(t2)(mm)
WE 17 SC	1	WE 35 SC	1.5
WE 21 SC	1	WE 50 SC	1
WE 27 SC	1		

● Guide bolt cover  
To prevent cutting powder or foreign matter from entering the slider through the bolt hole and affecting the accuracy, the customer must drive the bolt cover into bolt hole when installing the guide. Each guide is equipped with a bolt cover when leaving the factory.

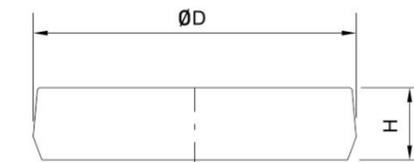


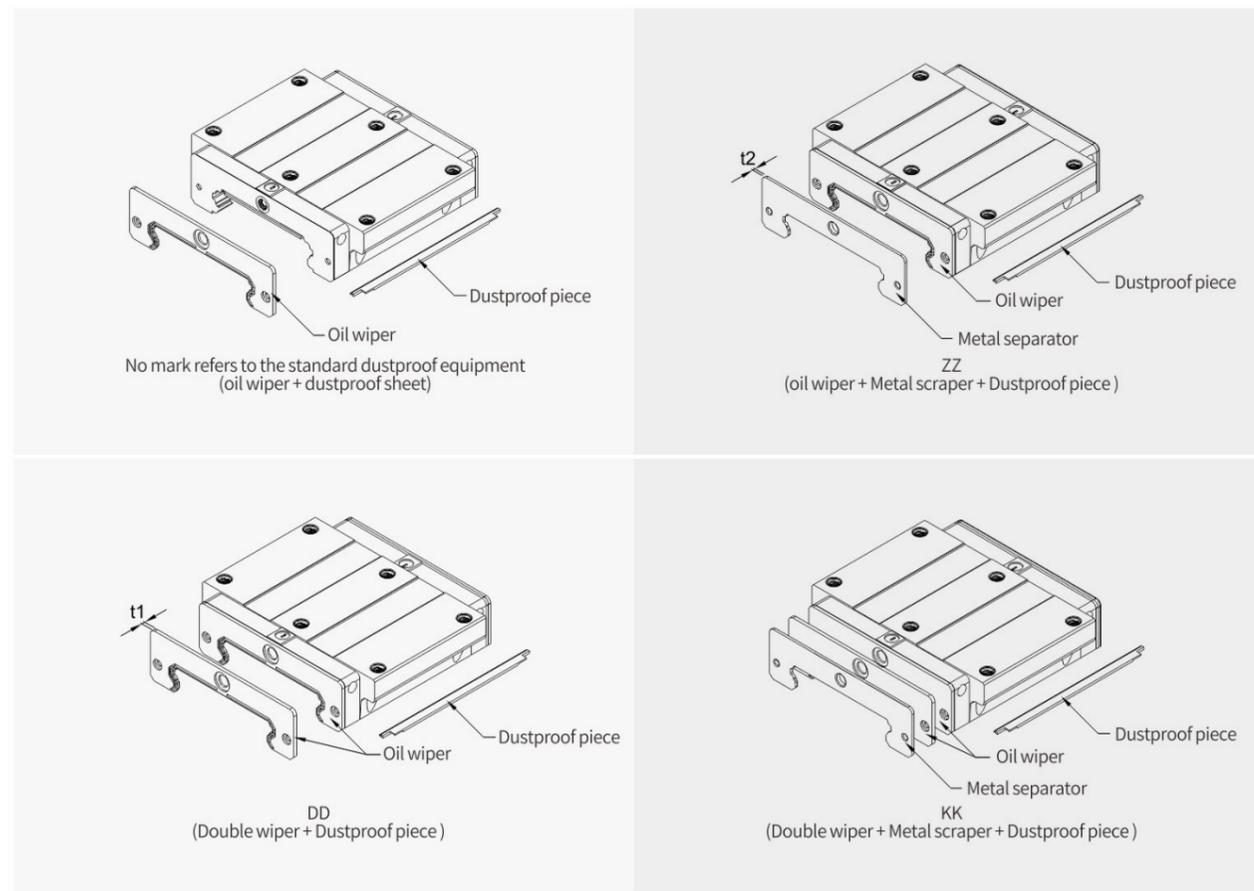
Table 2-3-12 Guide Bolt Cover

Guide specification	Mounting screws	Diameter (D)(mm)	Thickness (H)(mm)
WER17R	M4	7.65	1.1
WER21R	M4	7.65	1.1
WER27R	M4	7.65	1.1
WER35R	M6	11.20	2.5
WER50R	M8	14.25	3.3

2-3-8 Dustproof Equipment

(1) Standard Dustproof Equipment Code

If you need the following dustproof accessories, please add the code behind the product model.



WE Series Four Row Wide Rail Type Linear Guideway

WE Series Four Row Wide Rail Type Linear Guideway

(3) Total Length of Slider for Each Dustproof Code

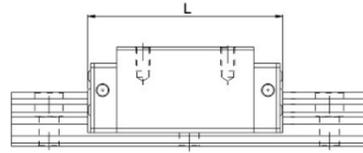


Table 2-3-13 Total Length of Slider

Specification	Total length of slider (L)			
	SS	ZZ	DD	KK
WE17C	50.6 [52.6]	52.6 [55.6]	53.8 [55.8]	55.8 [58.8]
WE21C	59.0 [63.0]	61.0 [67.0]	63.0 [67.0]	65.0 [71.0]
WE27C	72.8 [76.8]	74.8 [80.8]	76.8 [80.8]	78.8 [84.8]
WE35C	102.6 [106.6]	105.6 [111.6]	106.6 [110.6]	109.6 [115.6]
WE50C	140.0 [144.0]	142.0 [146.2]	145.0 [149.0]	147.0 [151.2]

Note: ( ) is the maximum length of the slider, including screws, oil wiper lips, etc.

2-2-9 Friction

This resistance is the maximum one of single wiper.

Table 2-3-14 WE Series Oil Wiper Resistance

Specification	Oil wiper resistance N (kgf)	Specification	Oil wiper resistance N (kgf)
WE 17	1.18 [0.12]	WE 35	3.92 [0.4]
WE 21	1.96 [0.2]	WE 50	3.92 [0.4]
WE 27	2.94 [0.3]		

Notes: 1 kgf = 9.81 N

2-3-10 Mounting Surface Error

WE series is a circular arc two-point contact linear guide, and its automatic center aligning characteristics can absorb some errors of mounting surface without affecting the smoothness of linear motion. The following table shows the allowable error values of the mounting surface:

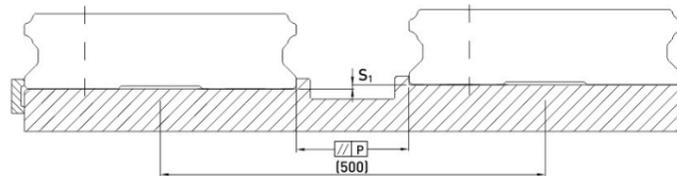


Table 2-3-15 Allowable parallelism error(P)

Specification	Preload level			Specification	Preload level		
	Z0	ZA	ZB		Z0	ZA	ZB
WE 17	20	15	9	WE 35	30	22	20
WE 21	25	18	9	WE 50	40	30	27
WE 27	25	20	13				

Table 2-3-16 Allowable upper and lower horizontal error(S<sub>i</sub>)

Specification	Preload level			Specification	Preload level		
	Z0	ZA	ZB		Z0	ZA	ZB
WE 17	65	20	-	WE 35	130	85	70
WE 21	130	85	45	WE 50	170	110	90
WE 27	130	85	45				

Note: allowable values are proportional to the distance between shafts

2-3-11 Precautions for Installation

(1) Shoulder Height and Chamfer of Mounting Surface

When installing the linear guide, it is necessary to pay attention to whether the shoulder condition of mounting surface is appropriate, such as whether the chamfer is too large, the protruding place is easy to cause poor accuracy of linear guide, and whether the height is too high, it will interfere with the slider. Therefore, if the mounting surface shoulder can be installed according to the recommended requirements, the poor installation accuracy can be eliminated.

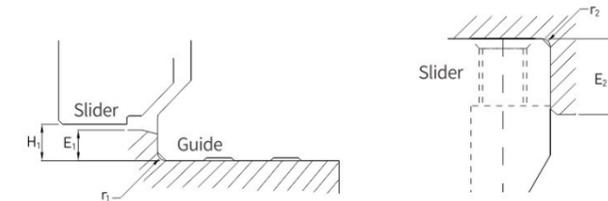


Table 2-3-17 Shoulder Height and Chamfer

Specification	Maximum fillet radius of guide end r <sub>1</sub> (mm)	Maximum fillet radius of slider end r <sub>2</sub> (mm)	Shoulder height of guide end E <sub>1</sub> (mm)	Shoulder height of slider end E <sub>2</sub> (mm)	operation height of slider H <sub>1</sub> (mm)
WE 17	0.4	0.4	2.0	4.0	2.5
WE 21	0.4	0.4	2.5	5.0	3.0
WE 27	0.5	0.4	3.0	7.0	4.0
WE 35	0.5	0.5	3.5	10.0	4.0
WE 50	0.8	0.8	6.0	10.0	7.5

(2) Torque Value of Guide Assembly Screws

Whether the mounting guide is locked and flattened against the reference surface has a great impact on the accuracy of linear guide. Therefore, to achieve the purpose of locking each screw tightly, it is recommended to use the following torque values to lock the assembly screws.

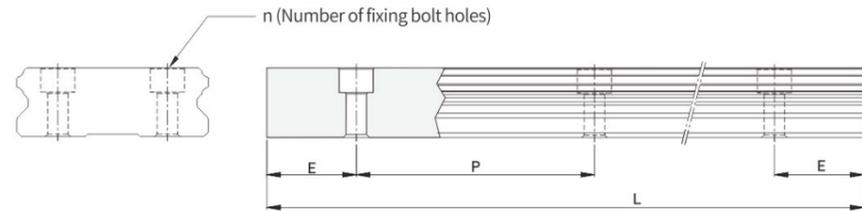
Table 2-3-18 Torque Values

Specification	Screw Size	Torque N-cm (kgf-cm)		
		Iron material	Casting material	Aluminum alloy
WE 17	M4×0.7P×12L	392(40)	274(28)	206(21)
WE 21	M4×0.7P×12L	392(40)	274(28)	206(21)
WE 27	M4×0.7P×16L	392(40)	274(28)	206(21)
WE 35	M6×1P×20L	1373(140)	921(94)	686(70)
WE 50	M8×1.25P×25L	3041(310)	2010(205)	1470(150)

Notes: 1 kgf = 9.81 N

2-3-12 Standard Length and Maximum Length of Single Guide

AKD has a standard length of guide inventory to supply customer needs. If the customer orders a guide with non-standard length, the size of end distance E shall not be greater than 1/2P to prevent the instability of guide assembly end due to the excessive size of E, and reduce the accuracy of linear guide.



$$L = (n-1) \times P + 2 \times E \quad \text{Eq.2.3}$$

L: total length of guide (mm)  
 n: number of bolt holes  
 P: distance between bolt holes (mm)  
 E: distance from bolt hole to end face (mm)

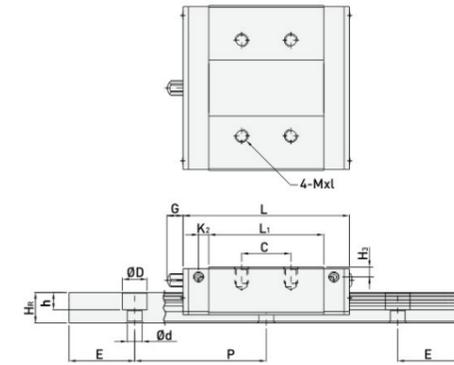
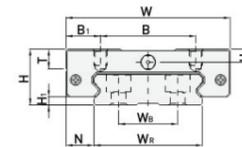
Table 2-3-19 Track Length

Item	WER17	WER21	WER27	WER35	WER50
Standard length L (n)	110 (3)	130 (3)	220 (4)	280 (4)	280 (4)
	190 (5)	230 (5)	280 (5)	440 (6)	440 (6)
	310 (8)	380 (8)	340 (6)	600 (8)	600 (8)
	390 (10)	480 (10)	460 (8)	760 (10)	760 (10)
	470 (12)	580 (12)	640 (11)	1000 (13)	1,000 (13)
	550 (14)	780 (16)	820 (14)	1,640 (21)	1,640 (21)
	-	-	1,000 (17)	2,040 (26)	2,040 (26)
	-	-	1,240 (21)	2,520 (32)	2,520 (32)
	-	-	1,600 (27)	3,000 (38)	3,000 (38)
Spacing (P)	40	50	60	80	80
Standard end distance (E <sub>s</sub> )	15	15	20	20	20
Maximum length of standard end distance	4,000 (100)	4,000 (80)	4,000 (67)	3,960 (50)	3,960 (50)
Maximum length	4,000	4,000	4,000	4,000	4,000

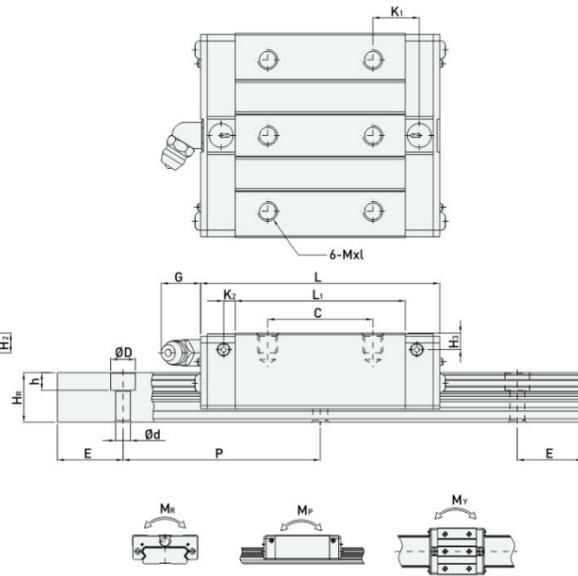
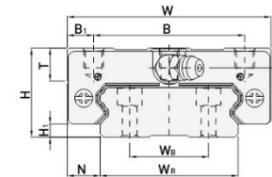
Notes: 1. The E size tolerance of general guide is 0.5~-0.5 mm, and the E size tolerance of guide teeth connector end distance is stricter 0~-0.3 mm.  
 2. The maximum length of standard end distance refers to the maximum length of the guide with left and right end distances as the standard end distance.  
 3. If the customer needs a different E size, please contact with AKD.

2-3-13 Table of WE Series Guide Sizes

(1) WEH-CA WEH17CA  
WEH21CA



WEH27CA  
WEH35CA\*  
WEH50CA\*

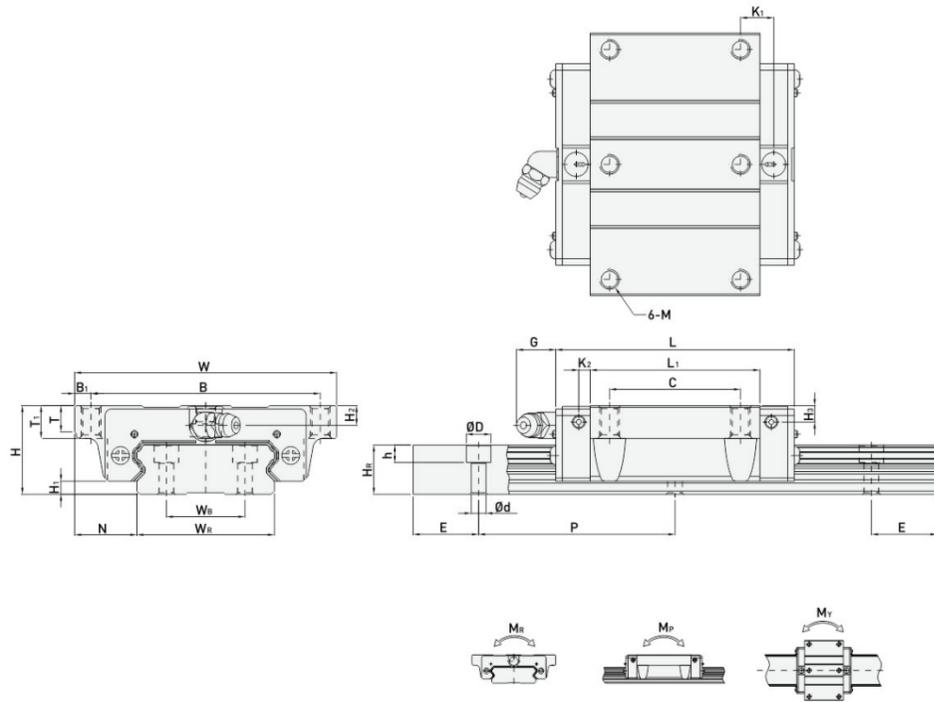


Model	Component size (mm)			Slider size (mm)										Guide size (mm)					Size of guide fixing bolt	Basic dynamic rated load	Basic static rated load	Allowable static torque			Weight							
	H	H <sub>1</sub>	N	W	B	B <sub>1</sub>	C	L <sub>1</sub>	L	K <sub>1</sub>	K <sub>2</sub>	G	Mxl	T	H <sub>2</sub>	H <sub>3</sub>	W <sub>R</sub>	W <sub>B</sub>				H <sub>R</sub>	D	h	d	P	E	(mm)	C (kN)	C <sub>0</sub> (kN)	M <sub>R</sub> (kN-m)	M <sub>P</sub> (kN-m)
WEH17CA	17	2.5	8.5	50	29	10.5	15	35	50.6	-	3.1	4.9	M4x5	6	4	3	33	18	9.3	7.5	5.3	4.5	40	15	M4x12	5.23	9.64	0.15	0.062	0.062	0.12	2.2
WEH21CA	21	3	8.5	54	31	11.5	19	41.7	59	14.68	3.65	12	M5x6	8	4.5	4.2	37	22	11	7.5	5.3	4.5	50	15	M4x12	7.21	13.7	0.23	0.10	0.10	0.20	3.0
WEH27CA	27	4	10	62	46	8	32	51.8	72.8	14.15	3.5	12	M6x6	10	6	5	42	24	15	7.5	5.3	4.5	60	20	M4x16	12.4	21.6	0.42	0.17	0.17	0.35	4.7
WEH35CA*	35	4	15.5	100	76	12	50	77.6	102.6	18.35	5.25	12	M8x8	13	8	6.5	69	40	19	11	9	7	80	20	M6x20	29.8	49.4	1.48	0.67	0.67	1.1	9.7
WEH50CA*	50	7.5	20	130	100	15	65	112	140	28.05	6	12.9	M10x15	19.5	12	10.5	90	60	24	14	12	9	80	20	M8x25	61.52	97.1	4.03	1.96	1.96	3.16	14.6

Notes: 1 kgf = 9.81 N

\* The WEH35CA and WEH50CA series need to be confirmed with AKD Engineering.

(2) WEW-CC



MEMO

Model	Component size(mm)			Slider size (mm)													Guide size (mm)										Size of guide fixing bolt	Basic dynamic rated load	Basic static rated load	Allowable static torque			Weight	
	H	H <sub>1</sub>	N	W	B	B <sub>1</sub>	C	L <sub>1</sub>	L	K <sub>1</sub>	K <sub>2</sub>	G	M	T	T <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	W <sub>R</sub>	W <sub>B</sub>	H <sub>R</sub>	D	h	d	P	E	(mm)				C(kN)	C <sub>0</sub> (kN)	M <sub>R</sub> (kN-m)	M <sub>P</sub> (kN-m)	M <sub>V</sub> (kN-m)
WEW17CC	17	2.5	13.5	60	53	3.5	26	35	50.6	-	3.1	4.9	M4	5.3	6	4	3	33	18	9.3	7.5	5.3	4.5	40	15	M4x12	5.23	9.64	0.15	0.062	0.062	0.13	2.2	
WEW21CC	21	3	15.5	68	60	4	29	41.7	59	9.68	3.65	12	M5	7.3	8	4.5	4.2	37	22	11	7.5	5.3	4.5	50	15	M4x12	7.21	13.7	0.23	0.10	0.10	0.23	3.0	
WEW27CC	27	4	19	80	70	5	40	51.8	72.8	10.15	3.5	12	M6	8	10	6	5	42	24	15	7.5	5.3	4.5	60	20	M4x16	12.4	21.6	0.42	0.17	0.17	0.43	4.7	
WEW35CC*	35	4	25.5	120	107	6.5	60	77.6	102.6	13.35	5.25	12	M8	11.2	14	8	6.5	69	40	19	11	9	7	80	20	M6x20	29.8	49.4	1.48	0.67	0.67	1.26	9.7	
WEW50CC*	50	7.5	36	162	144	9	80	112	140	20.55	6	12.9	M10	14	18	12	10.5	90	60	24	14	12	9	80	20	M8x25	61.52	97.1	4.03	1.96	1.96	3.71	14.6	

Notes: 1 kgf = 9.81 N

\* The WEH35CA and WEH50CA series need to be confirmed with AKD Engineering.

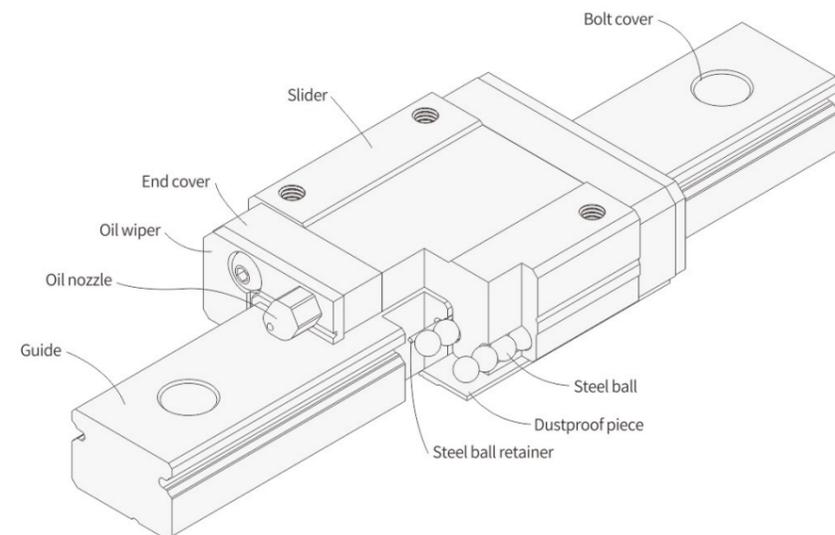
## 2-3 Rated Compliance

## 2-3-1 Features of MGN/QGN Series Miniature Linear Guide

1. Small size and light weight, it is especially suitable for miniaturized equipment.
2. Adopting Gothic four-point contact design, it is capable of bearing loads in all directions, with high rigidity and high accuracy.
3. Adopting the design of steel ball retainer, it is interchangeable within the allowable accuracy.



## 2-3-2 MGN/QGN Series Body Structure



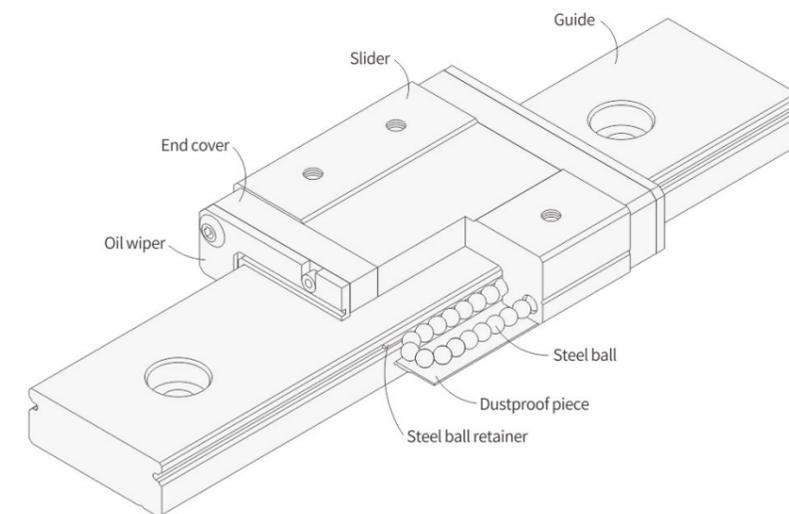
- Rolling circulation system: slider, guide, end cover, steel balls and retainer.
- Lubrication system: MGN15/QGN15 end cover is equipped with an oil nozzle for customer to inject oil, while MGN/QGN 7, 9, and 12 have reserved oil filling holes on the end cover side for injecting oil or grease into slider for lubrication.
- Dustproof system: oil wiper, dustproof sheet [9, 12, 15 specifications are optional], bolt cover [12, 15 specifications].

## 2-3-3 Features of MGW/QGW Miniature Wide-range Linear Guide

1. The widened guide design greatly enhances torque load capacity, allowing for single-shaft use.
2. Adopting Gothic four-point contact design, it is capable of bearing loads in all directions, with high rigidity.
3. The slider is equipped with miniature retaining wires to prevent steel balls from falling out even when the slider is removed.



## 2-3-4 MGW/QGW Series Body Structure

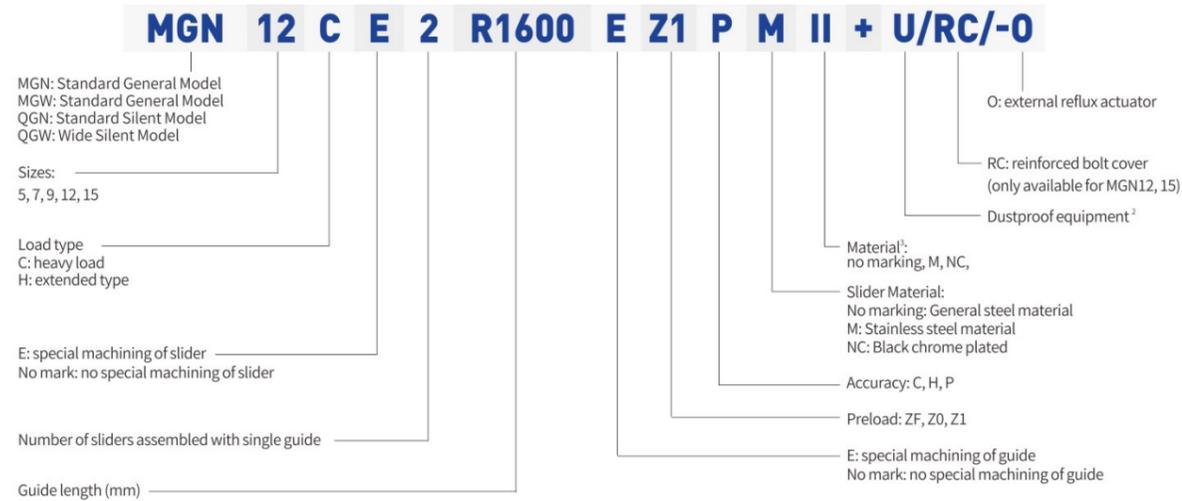


- Rolling circulation system: slider, guide, end cover, steel balls and retainer.
- Lubrication system: MGW15/QGW15 end cover is equipped with an oil nozzle for customer to inject oil, while MGW/QGW 7, 9, and 12 have reserved oil filling holes on the end cover side for injecting oil or grease into slider for lubrication.
- Dustproof system: oil wiper, dustproof sheet [9, 12, 15 specifications are optional], bolt cover [12, 15 specifications].

MG/QG Series - Miniature Ball Linear Guide

MG/QG Series - Miniature Ball Linear Guide

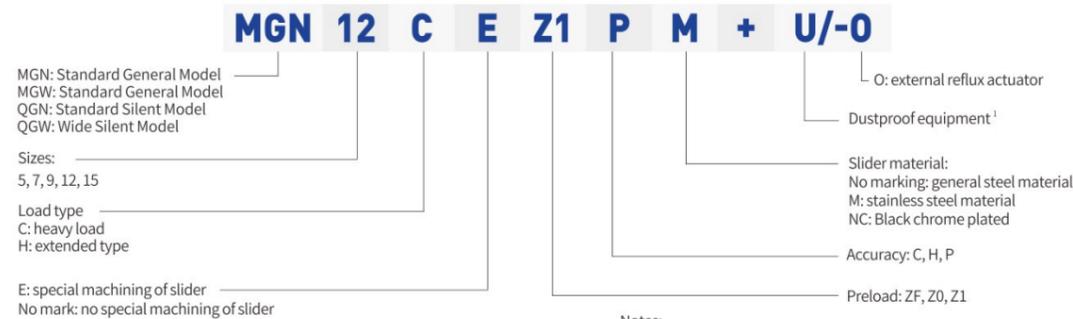
(1) Product model of non-interchangeable linear guide



Notes:  
 1. The number of single-shaft guides is not written if only one guide is used, two are marked as II, three are marked as III, and so on.  
 2. Dustproof sheets are optional for specifications 9, 12, and 15 of MGN and MGW.  
 3. No marking: general steel material + hard chrome plating

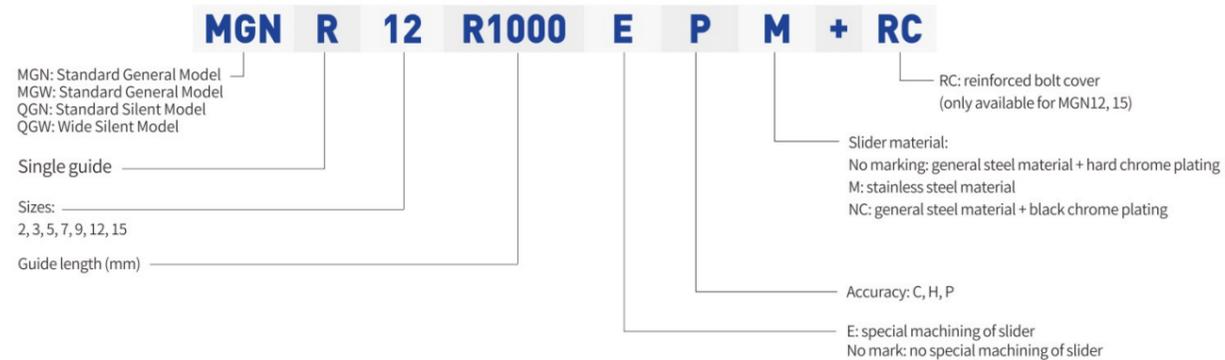
(2) Product model of interchangeable linear guide

○ Product model of single guide



Notes:  
 1. Dustproof sheets are optional for specifications 9, 12, and 15 of MGN and MGW.

○ Product model of single guide



2-3-11 MG Series Model

(1) Slider type

AKD provides two types of linear guides: standard type and wide-range type, facilitating the model selection and use of customer.

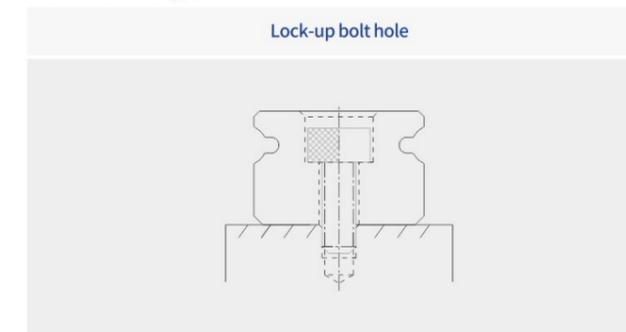
Table 2-3-1 Slider Type

Type	Specification	Shape	Height size (mm)	Guide length (mm)	Application equipment
Standard Type	MGN-C MGN-H QGN-C QGN-H		8	100	<ul style="list-style-type: none"> <li>○ Printer</li> <li>○ Mechanical arm</li> <li>○ Electronic instrument and equipment</li> <li>○ Semiconductor equipment</li> </ul>
			↓	↓	
Wide-range type	MGW-C MGW-H QGW-C QGW-H		9	100	
			↓	↓	
			16	2000	

(2) Guide type

AKD provides lock-up screw hole guide, facilitating the model selection and use of customer.

Table 2-3-2 Guide Type

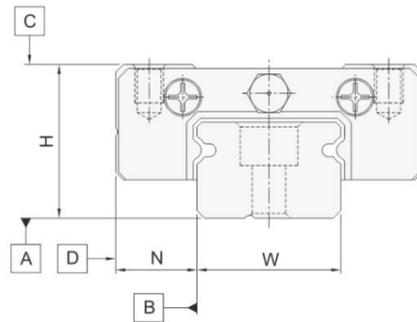


MG/QG Series - Miniature Ball Linear Guide

MG/QG Series - Miniature Ball Linear Guide

2-3-12 Accuracy Level

The accuracy of MGN/QGN and MGW/QGW series miniature guides is divided into three levels: normal, high and precision. Customers can choose the proper accuracy according to the requirements of their equipment.



(1) Non-interchangeable linear guide accuracy

The measurement of combined height H is based on the center position of the upper reference surface of slider, and the measurement of combined width N is based on the center position of the side reference surface of slider.

Table 2-3-3 Accuracy

Unit: mm

Accuracy Level	Common level (C)	Advanced (H)	Precision-level (P)
Allowable dimensional error of height H	± 0.04	± 0.02	± 0.01
Allowable dimensional error of width N	± 0.04	± 0.025	± 0.015
Mutual error of paired height H	0.03	0.015	0.007
Mutual error of paired width N	0.03	0.02	0.01
Travel parallelism of slider C surface to guide A surface	Travel parallelism (see Table 2-4-5)		
Travel parallelism of slider D surface to guide B surface	Travel parallelism (see Table 2-4-5)		

(2) Accuracy of Interchangeable Linear Guide

The accuracy of interchangeable linear guides refers to the paired height and width accuracy when the slider is assembled on a single guide, which is the same as the accuracy of non-interchangeable linear guides. However, if assembled on different guides, the paired height and width accuracy will be slightly inferior to non-interchangeable linear guides due to guide height errors, while the travel parallelism accuracy is the same as that of non-interchangeable linear guides.

Table 2-3-4 Accuracy of Interchangeable Linear Guide

Unit: mm

Accuracy Level	Common level (C)	Advanced (H)	Precision-level (P)
Allowable dimensional error of height H	± 0.04	± 0.02	± 0.01
Allowable dimensional error of width N	± 0.04	± 0.025	± 0.015
Single guide, paired sliders	Mutual error of paired height H	0.03	0.007
	Mutual error of paired width N	0.03	0.01
Multiple guides, paired sliders, variation of height H	0.07	0.04	0.02
Travel parallelism of slider C surface to guide A surface	Travel parallelism (see Table 2-4-5)		
Travel parallelism of slider D surface to guide B surface	Travel parallelism (see Table 2-4-5)		

(3) Travel Parallelism Accuracy

The travel parallelism of guide C to A, D and B is related to the guide accuracy and length, and the values are listed in table below.

Table 2-3-5 Travel Parallelism

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

2-3-13 Preload

MGN/QGN and MGW/QGW series provides three preload options: normal clearance, no preload, and light preload.

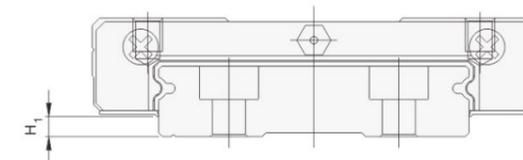
Table 2-3-6 Preload level

Preload level	Mark	Preload level	Applicable accuracy
Preload options	ZF	Precision gap 4~10μm	C
No preload	Z0	0	C-P
Light preload	Z1	0.02C	C-P

Note: Preload C is the basic dynamic rated load

2-3-14 Dustproof Equipment

The standard dustproof equipment includes oil wipers installed at both ends of slider to prevent dust or impurities from entering the slider and affecting the life and accuracy of linear guide. Dustproof sheets are installed at the bottom of slider to prevent dust or impurities from entering slider through the bottom clearance. If customers want to use dustproof sheets, they can add +U code behind the model number. The clearance [H1] from the slider with specification of 5 and 7 to the bottom bearing surface is very small, and dustproof sheets are not provided. However, dustproof sheets are available for specifications 9, 12, and 15. When choosing dustproof sheets, customers need to pay attention to reduced slider clearance [H1]. When using side bearing surfaces, the height of the side bearing surfaces shall not exceed the clearance value [H1] to avoid interference between the slider and side bearing surfaces in operation.



Model	Steel ball	H, mm	Model	Steel ball	H, mm
MGN7 / QGN7	-	-	MGW7 / QGW7	-	-
MGN9 / QGN9	●	1	MGW9 / QGW9	●	1.9
MGN12 / QGN12	●	2	MGW12 / QGW12	●	2.4
MGN15 / QGN15	●	3	MGW15 / QGW15	●	2.4

2-3-15 Mounting surface error

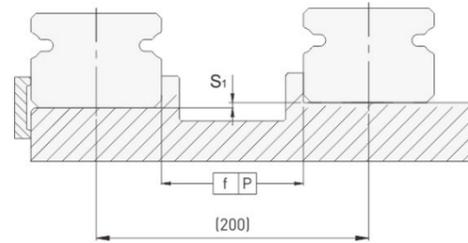


Table 2-3-8 Allowable parallelism error(P)

Unit:  $\mu\text{m}$

Specification	Preload		
	ZF Preload	Z0 Preload	Z1 Preload
MG2	2	2	2
MG3	2	2	2
MG5	2	2	2
MG7 / QG7	3	3	3
MG9 / QG9	4	4	3
MG12 / QG12	9	9	5
MG15 / QG15	10	10	6

Table 2-3-9 Allowable upper and lower horizontal error(S<sub>i</sub>)

Unit:  $\mu\text{m}$

Specification	Preload		
	ZF Preload	Z0 Preload	Z1 Preload
MG2	15	15	1.5
MG3	20	20	2
MG5	20	20	2
MG7 / QG7	25	25	3
MG9 / QG9	35	35	6
MG12 / QG12	50	50	12
MG15 / QG15	60	60	20

Note: allowable values are proportional to the distance between shafts

Table 2-3-10 Flatness of Mounting Surface

Unit: mm

Specification	Flatness Error
MG2	0.012/200
MG3	0.015/200
MG5	0.015/200
MG7 / QG7	0.025/200
MG9 / QG9	0.035/200
MG12 / QG12	0.050/200
MG15 / QG15	0.060/200

Note: the above values apply to preload levels ZF/Z0. If using Z1 level or two or more guides (including two), it is recommended to use 50% or less of above values.

2-3-16 Precautions for Installation

- Mounting shoulder height and chamfer

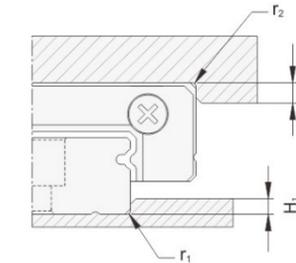


Table 2-3-11 Shoulder Height and Chamfer

Specification	Maximum chamfer radius of shoulder r <sub>1</sub> (mm)	Maximum chamfer radius of shoulder r <sub>2</sub> (mm)	Guide shoulder height H <sub>1</sub> (mm)	Slider shoulder height H <sub>2</sub> (mm)
MGN2	0.1	0.1	0.8	1.5
MGN3	0.1	0.1	0.8	2
MGN5	0.1	0.2	1.2	2
MGN7 / QGN7	0.2	0.2	1.2	3
MGN9 / QGN9	0.2	0.3	1.7	3
MGN12 / QGN12	0.3	0.4	1.7	4
MGN15 / QGN15	0.5	0.5	2.5	5
MGW2	0.1	0.1	0.8	1.5
MGW3	0.1	0.1	0.8	2
MGW5 / QGW5	0.1	0.2	1.2	2
MGW7 / QGW7	0.2	0.2	1.7	3
MGW9 / QGW9	0.3	0.3	2.5	3
MGW12 / QGW12	0.4	0.4	3	4
MGW15 / QGW15	0.4	0.8	3	5

- Torque value of guide assembly screws

Whether the mounting guide is locked and flattened against the reference surface has a great impact on the accuracy of linear guide. Therefore, to achieve the purpose of locking each screw tightly, it is recommended to use the following torque values to lock the assembly screws.

Table 2-3-12 Torque Values

Specification	Screw Size	Torque N-cm [kgf-cm]		
		Iron material	Casting material	Aluminum alloy
MGN2	M1	—	—	10 (1.02)
MGN3	M1.6	—	—	15 (1.53)
MGN5	M2×0.4P×6L	57(5.9)	39.2(4)	29.4(3)
MGN7 / QGN7	M2×0.4P×6L	57(5.9)	39.2(4)	29.4(3)
MGN9 / QGN9	M3×0.5P×8L	186(19)	127(13)	98(10)
MGN12 / QGN12	M3×0.5P×8L	186(19)	127(13)	98(10)
MGN15 / QGN15	M3×0.5P×10L	186(19)	127(13)	98(10)
MGW2	M1.6×5	—	—	15 (1.53)
MGW3	M2×4	—	—	29.4 (3)
MGW5 / QGW5	M2.5×0.45P×7L	118(12)	78.4(8)	58.8(6)
MGW7 / QGW7	M3×0.5P×6L	186(19)	127(13)	98(10)
MGW9 / QGW9	M3×0.5P×8L	186(19)	127(13)	98(10)
MGW12 / QGW12	M4×0.7P×8L	392(40)	274(28)	206(21)
MGW15 / QGW15	M4×0.7P×10L	392(40)	274(28)	206(21)

Note: 1 kgf = 9.81 N

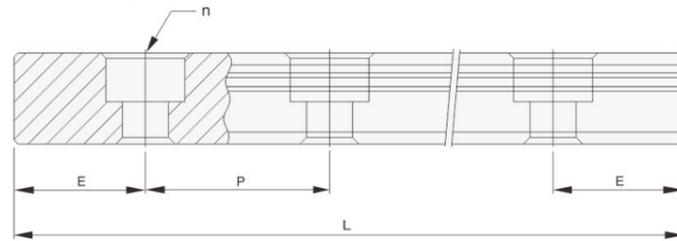
MG/QG Series - Miniature Ball Linear Guide

MG/QG Series - Miniature Ball Linear Guide

2-3-17 Standard Length and Maximum Length of Single Guide

Table 2-3-8 Allowable parallelism error(P)

The standard length of guide is stocked to supply customer needs. If customers order the non-standard length guides, it is better not to make the end distance E greater than 1/2P, to prevent instability at the end of guide after assembly due to excessive E value, which will reduce the accuracy of linear guide. Additionally, do not use too small E value (less than E<sub>min</sub>) to avoid bolt hole breakage.



$L = (n-1) \times P + 2 \times E$  Eq.2.4

L: total length of guide (mm)  
 n: number of bolt holes  
 P: distance between bolt holes (mm)  
 E: distance from bolt hole to end face (mm)

Table 2-3-13 Track Length

Model		Spacing (P)	Standard end distance (E)	Maximum length of standard end distance (L)
MGN QGN	2	8	4	300
	3	10	5	300
	5	15	7.5	500
	7	15	5	1000
	9	20	7.5	1000
	12	25	10	1000(2000)
	15	40	15	1000(2000)
	20	60	30	1000(2000)

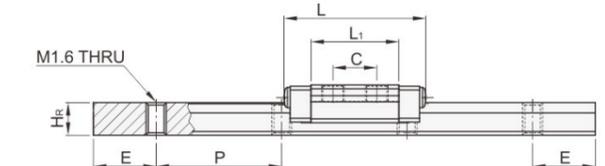
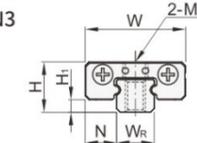
Model		Spacing (P)	Standard end distance (E)	Maximum length of standard end distance (L)
MGW QGW	2	10	5	500
	3	15	10	1000
	5	20	10	1000
	7	30	10	1000
	9	30	10	1000(2000)
	12	40	15	1000(2000)
	15	40	15	1000(2000)

Note: If customers require different E values, please consult our company.

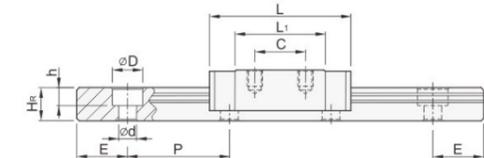
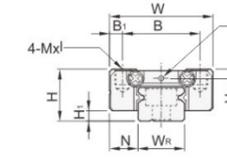
2-3-18 Table of MGN/QGN and MGW/QGW Series Guide Sizes

(1) MGN-C / MGN-H  
QGN-C / QGN-H

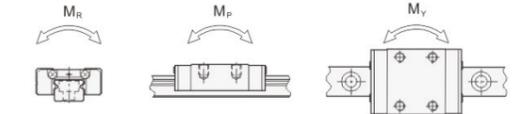
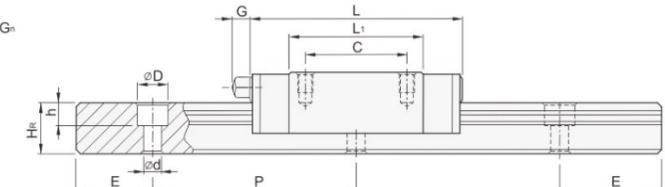
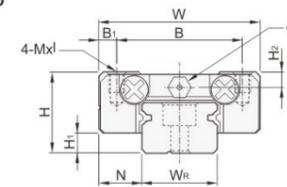
MGN2, MGN3



MGN5, MGN7, MGN9, MGN12  
QGN5, QGN7, QGN9, QGN12



MGN15  
QGN15



Model	Component size(mm)		Slider size (mm)										Guide size (mm)					Size of guide fixing bolt (mm)	Basic dynamic rated load C <sub>0</sub> (kN)	Basic static rated load C <sub>0</sub> (kN)	Allowable static torque			Weight														
	H	H <sub>1</sub>	N	W	B	B <sub>1</sub>	C	L <sub>1</sub>	L	G	G <sub>n</sub>	Mxl	H <sub>2</sub>	W <sub>R</sub>	H <sub>R</sub>	D	h				d	P	E	M <sub>R</sub> N-m	M <sub>P</sub> N-m	M <sub>V</sub> N-m	Slider kg	Guide kg/m										
MGN2	3.2	0.7	2.0	6	-	-	4.0	8.4	12.5	-	-	M1.4x1.1	-	2	2.0	M1 THRU	8.0	4.0	M1	0.21	0.38	0.42	0.54	0.64	0.0009	0.028												
MGN3C	4	1	2.5	8	-	-	3.5	6.7	11.5	-	-	M1.6x1.3	-	3	2.6	M1.6	10	5	M1.6	0.25	0.36	0.65	0.49	0.49	0.0010	0.053												
MGN3H							5.5	10.7	15.5			M2x1.3								0.35	0.58	1.00	1.10	1.10	0.0016													
MGN5C QGN5C	6	1	3.5	12	8	2	-	9.6	16	-	Ø0.8	M2x1.5	1.15	5	3.7	3.6	0.8	2.4	15	5	M2x6	0.56	0.84	2.20	1.20	1.20	0.0034	0.12										
MGN5H QGN5H							7	12.6	19			M2x1.5 M2.6x2dp									0.67	1.08	2.90	1.90	1.90	0.0043												
MGN7C QGN7C							8	14.3	23.5			-									Ø1.2	M2x2.5	1.5	7	4.8	4.2	2.3		2.4	15	5	M2x6	0.98	1.24	4.70	2.84	2.84	0.010
MGN7H QGN7H	13	21.6	31	-	Ø1.2	M2x2.5	1.5	7	4.8	4.2	2.3	2.4	15	5	M2x6	1.37	1.96	7.64	4.80	4.80	0.015																	
MGN9C QGN9C	10	2	5.5	20	15	2.5	10	18.9	28.9	-	Ø1.4	M3x3	1.8	9	6.5	6	3.5	3.5	20	7.5	M3x8	1.86	2.55	11.76	7.35	7.35	0.016	0.38										
MGN9H QGN9H							16	29.9	39.9			-									Ø1.4	M3x3	1.8	9	6.5	6	3.5		3.5	20	7.5	M3x8	2.55	4.02	19.60	18.62	18.62	0.026
MGN12C QGN12C							15	21.7	34.7			-									Ø2	M3x3.5	2.5	12	8	6	4.5		3.5	25	10	M3x8	2.84	3.92	25.48	13.72	13.72	0.034
MGN12H QGN12H	20	32.4	45.4	-	Ø2	M3x3.5	2.5	12	8	6	4.5	3.5	25	10	M3x8	3.72	5.88	38.22	36.26	36.26	0.054																	
MGN15C QGN15C	16	4	8.5	32	25	3.5	20	26.7	42.1	4.5	M3	M3x4	3	15	10	6	4.5	3.5	40	15	M3x10	4.61	5.59	45.08	21.56	21.56	0.059	1.06										
MGN15H QGN15H							25	43.4	58.8			-									M3	M3x4	3	15	10	6	4.5		3.5	40	15	M3x10	6.37	9.11	73.50	57.82	57.82	0.092

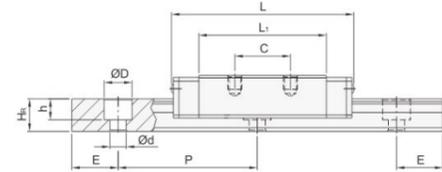
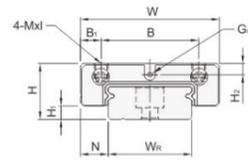
Notes: 1 kgf = 9.81 N

MG/QG Series - Miniature Ball Linear Guide

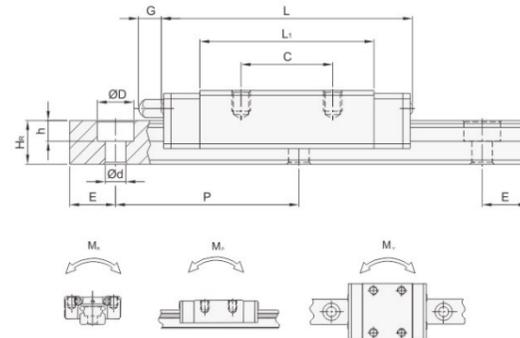
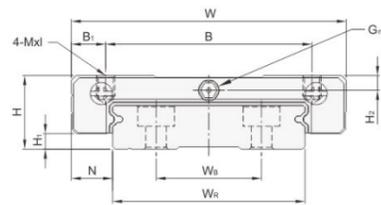
RG Series - Needle Roller Linear Guide

(1) MGW-C / MGW-H  
QGW-C / QGW-H

MGW2, MGW3, MGW5,  
MGW7, MGW9, MGW12  
QGW7, QGW9, QGW12



MGW15  
QGW15



Model	Component size(mm)			Slider size (mm)										Guide size (mm)										Size of guide fixing bolt (mm)	Basic dynamic rated load C(kN)	Basic static rated load C <sub>0</sub> (kN)	Allowable static torque			Weight	
	H	H <sub>1</sub>	N	W	B	B <sub>1</sub>	C	L <sub>1</sub>	L	G	G <sub>1</sub>	MxL	H <sub>2</sub>	W <sub>R</sub>	W <sub>B</sub>	H <sub>R</sub>	D	h	d	P	E	M <sub>R</sub> N-m	M <sub>P</sub> N-m				M <sub>V</sub> N-m	Slider kg	Guide kg/m		
MGW2	4.0	1	3	10	-	5	6.5	11.9	17.0	-	-	M2x1.3	-	4	-	2.6	2.8	1.0	1.8	10	5	M1.6x5	0.39	0.68	1.40	1.30	1.50	0.0021	0.068		
MGW3C	4.5	1	3	12	-	-	4.5	9.8	15.0	-	-	M2x1.6	-	6	-	2.8	4	1.5	2.4	15	10	M2x4	0.33	0.54	1.70	0.84	1.00	0.0025	0.12		
MGW3H							8	14.6	20.0														0.44	0.81	2.50	1.90	2.20			0.0037	
MGW5C QGW5C	6.5	1.5	3.5	17	13	2	-	13.6	20.6	-	Ø0.7	M3x2dp/ M2.5x1.5	1.3	10	-	4	4.8	1.6	2.9	20	10	M2.5x7	0.65	1.08	5.61	2.39	2.02	0.0064	0.28		
MGW5H QGW5H							-	17.6	24.6														0.80	1.42	7.31	3.94	3.28			0.0079	
MGW7C QGW7C	9	1.9	5.5	25	19	3	10	21	31.2	-	Ø1.2	M3x3	1.85	14	-	5.2	6	3.2	3.5	30	10	M3x6	1.37	2.06	15.70	7.14	7.14	0.020	0.51		
MGW7H QGW7H							19	30.8	41														1.77	3.14	23.45	15.53	15.53			0.029	
MGW9C QGW9C	12	2.9	6	30	21	4.5	12	27.5	39.3	-	Ø1.2	M3x3	2.4	18	-	7	6	4.5	3.5	30	10	M3x8	2.75	4.12	40.12	18.96	18.96	0.040	0.91		
MGW9H QGW9H							23	3.5	24														38.5	50.7	3.43	5.89	54.54			34.00	34.00
MGW12C QGW12C	14	3.4	8	40	28	6	15	31.3	46.1	-	Ø1.2	M3x3.6	2.8	24	-	8.5	8	4.5	4.5	40	15	M4x8	3.92	5.59	70.34	27.80	27.80	0.071	1.49		
MGW12H QGW12H							28	45.6	60.4														5.10	8.24	102.70	57.37	57.37			0.103	
MGW15C QGW15C	16	3.4	9	60	45	7.5	20	38	54.8	5.2	M3	M4x4.2	3.2	42	23	9.5	8	4.5	4.5	40	15	M4x10	6.77	9.22	199.34	56.66	56.66	0.143	2.86		
MGW15H QGW15H							35	57	73.8														8.93	13.38	299.01	122.60	122.60			0.215	

Notes: 1 kgf = 9.81 N

2-4 RG Series - Needle Roller Linear Guide

2-4-1 Features of RG Series Linear Guide

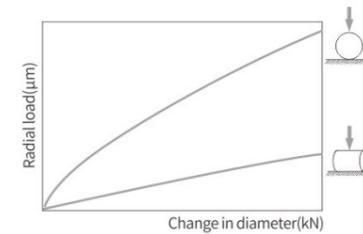
RG series linear guides are designed for ultra-high rigidity and ultra heavy load capacity by replacing steel balls with needle roller rolling elements. Through linear contact among rolling elements, guide and slider, the rolling elements only undergo slight elastic deformation under high loads. The design of 45-degree contact angle enables the entire linear guide to achieve high rigidity and high load capacity in four directions. The realization of ultra-high rigidity can greatly improve processing accuracy and reach requirements for high precision. Due to the characteristics of ultra heavy load, the service life of linear guide is extended. It is very suitable for high-speed automated industrial machinery and equipment with high rigidity requirements.

(1) Optimal Design

The reflux actuator of RG series linear guide has obtained patents in many countries, ensuring that needle roller rolling elements can smoothly carry out infinite circular rolling. The advanced finite element analysis is used for structural stress analysis to obtain the optimal design of slider and guide structure.

(2) Ultra-high Rigidity in Four Directions

RG series linear guide replaces steel balls with needle roller rolling elements. With the linear contact among needle rollers, guide and slider, the needle rollers only undergo slight elastic deformation under high loads, which can not only greatly improve the rigidity of linear guide but also maintain high-accuracy processing. The right figure shows the rigidity performance of equal-volume steel balls and need rollers.



(3) Ultra-heavy Load Capacity in Four Directions

RG series linear guide adopts a DB [45°-45°] combination, which can bear loads in four directions: upper, lower, left and right, offering the linear guide with ultra-high load capacity. Under the same work load requirements, RG linear guides can have a smaller size compared to steel ball linear guides, and can bear high loads evenly.

(4) Extended Life

The basic dynamic rated load of RG series linear guide is determined on the basis of ISO specification [ISO14728-1], and calculated as per 100km of rated life. The life of linear guide varies depending on the actual work load. The service life of needle roller linear guide can be calculated based on the basic dynamic rated load and work load of the selected linear guide.

Without considering environmental factors, the life calculation is as follows.

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

If environmental factors of linear guide are considered, its life will vary with the state of motion, the hardness of raceway surface, and the system temperature.

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

L : life  
P : work load  
C : basic dynamic rated load  
f<sub>h</sub> : hardness coefficient  
f<sub>t</sub> : temperature coefficient  
f<sub>w</sub> : load coefficient

Wherein, the hardness coefficient, temperature coefficient and load coefficient are the same as those of steel ball linear guides. Compared with steel ball linear guides, RG series has ultra-heavy load capacity, which can greatly extend the service life.

RG Series - Needle Roller Linear Guide

RG Series - Needle Roller Linear Guide

(5) Endurance test

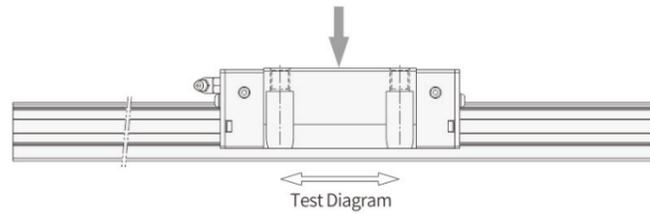
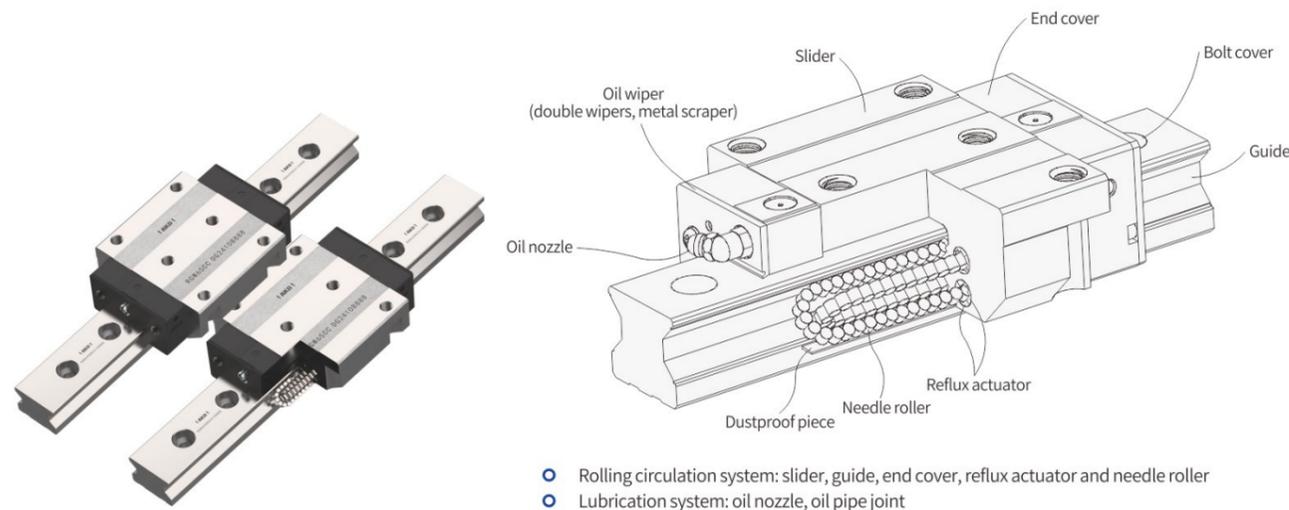


Table 2-4-1 Test Data

<p><b>Test sample 1: RGH35CA</b>                  Preload level: ZA                  Moving speed: 60 m/min                  Acceleration: 1G                  Stroke: 0.55 m                  Lubrication grease: it shall be refilled every 100 kilometers                  External load: 15 kN                  Operation distance: 1,135km</p>	<p><b>Test result:</b>                  Based on the basic dynamic rated load, preload and work load of RGH35CA, its calculated service life is 1,000 km. After operation for 1,135 km, the fish scale-like flakes peeling off do not occur to the raceway surface and needle roller surface of this test sample.</p>
<p><b>Test sample 2: RGW35CC</b>                  Preload level: ZA                  Moving speed: 120 m/min                  Acceleration: 1G                  Stroke: 2m                  Lubrication oil refilling frequency: 0.3 cm<sup>3</sup>/hr                  External load: none                  Operation distance: 15,000 km</p>	<p><b>Test result:</b>                  After operation for 15,000 km, the fish scale-like flakes peeling off do not occur to the raceway surface and needle roller surface of this test sample.</p>

Note: the above test data are sample data

2-4-2 RG Body Structure

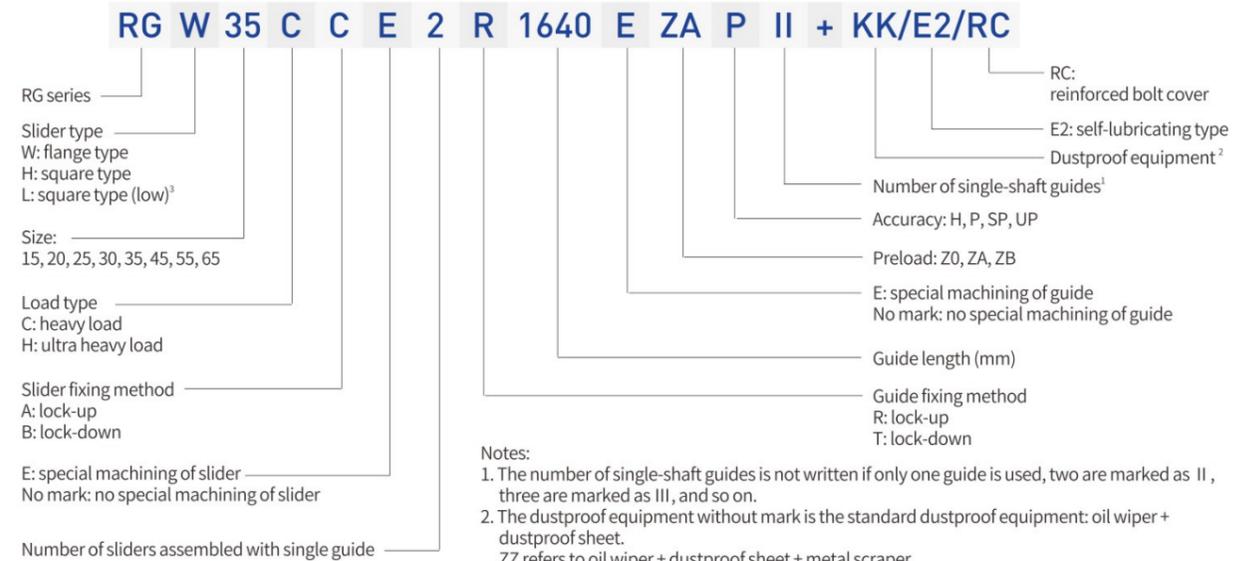


- Rolling circulation system: slider, guide, end cover, reflux actuator and needle roller
- Lubrication system: oil nozzle, oil pipe joint
- Dustproof system: oil wiper, bottom seal dustproof sheet, guide bolt cover, metal scraper

2-4-3 Description of Product Specification

RG series is divided into two types of linear guides: non-interchangeable and interchangeable. The specifications and dimensions of two types are the same while the main difference is that the actuator and guide of interchangeable type can be used separately or interchanged for use, more convenient. However, its combined accuracy can not reach the super precision and above of non-interchangeable type. At present, the combined accuracy of AKD interchangeable type has reached a certain level. It is an easy option for customers who do not need to pair and install the linear guide. The product specification and models of linear guides mainly indicate the linear guide size, model, accuracy level, preload and other requirements, facilitating the confirmation of products by both parties when ordering.

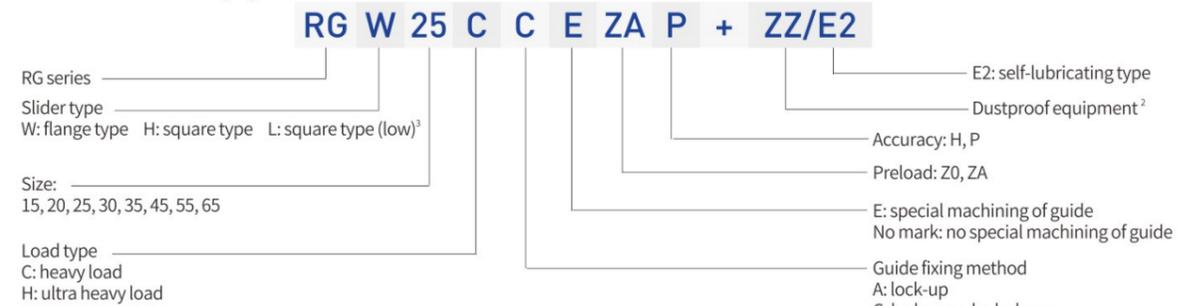
(1) Product model of non-interchangeable linear guide



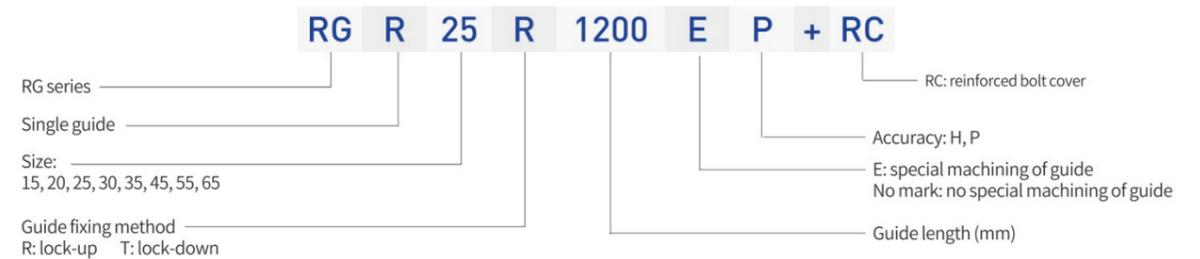
- Notes:
- The number of single-shaft guides is not written if only one guide is used, two are marked as II, three are marked as III, and so on.
  - The dustproof equipment without mark is the standard dustproof equipment: oil wiper + dustproof sheet. ZZ refers to oil wiper + dustproof sheet + metal scraper. KK refers to double wipers + dustproof sheet + metal scraper. DD refers to double wipers + dustproof sheet.
  - Slider type L is a low assembly slider of square H, and its combined height is the same as the same size of flange type.

(2) Product model of interchangeable linear guide

Product model of single guide



Product model of single guide



RG Series - Needle Roller Linear Guide

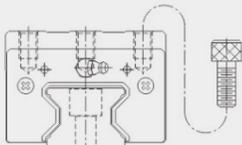
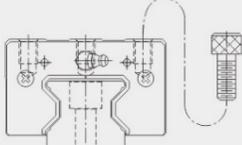
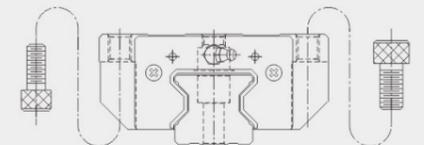
RG Series - Needle Roller Linear Guide

2-4-4 Series Type

(1) Slider type

RG series is divided into two types of linear guides: flange type and square type. The flanged slider has mounting screw holes on the flange for installation, and it is also suitable for lock-down installation. Its linear guide assembly is featured by small height and large bearing surface, and suitable for places where torque load is applied. The square slider has a smaller width, suitable for equipment with limited installation space. The mounting screw holes on the top of slider are available for installation.

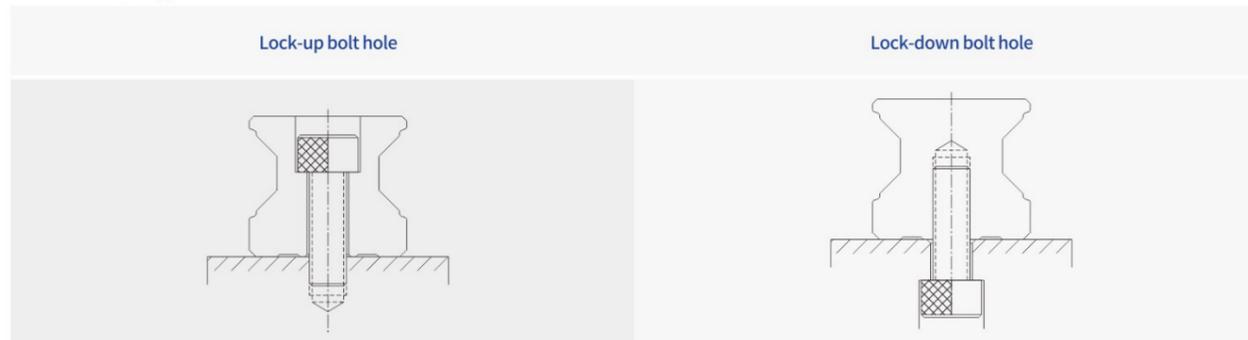
Table 2-4-2 Slider Type

Type	Specification	Shape	Height size (mm)	Guide length (mm)	Application equipment
Square type	RGH-CA RGH-HA		28	100	<ul style="list-style-type: none"> <li>Automation equipment</li> <li>Heavy-duty handling equipment</li> <li>CNC machining center</li> <li>Heavy-duty cutting machine</li> <li>CNC grinding machine</li> <li>Injection molding machine</li> <li>Electro-spark machining</li> <li>Large-sized gantry machine tool</li> <li>Working machinery with high rigidity and heavy load requirements</li> </ul>
			90	4000	
Square type	RGL-CA RGL-HA		24	100	
			70	4000	
Flange type	RGW-CC RGW-HC		24	100	
			90	4000	

(2) Guide type

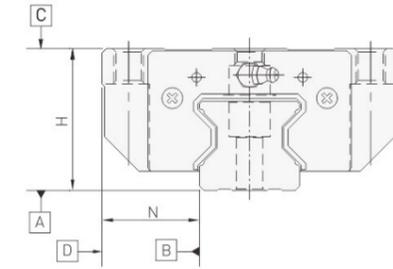
In addition to the general lock-up guide with screw hole, RG series also provides lock-down guide with screw hole for easy customer installation and use.

Table 2-4-3 Guide Type



2-4-5 Accuracy Level

The accuracy of RG series linear guide is divided into five levels: normal, high, precision, super precision and ultra-high precision. Customers can choose the accuracy according to accuracy requirements for equipment.



(1) Non-interchangeable linear guide accuracy

Table 2-4-4 Accuracy Table of Assembling Piece

Model	RG - 15, 20			
Accuracy Grade	Advanced (H)	Precision-level (P)	Super precision (SP)	Ultra-high precision (UP)
Allowable dimensional error of height H	± 0.03	0 - 0.03	0 - 0.015	0 - 0.008
Allowable dimensional error of width N	± 0.03	0 - 0.03	0 - 0.015	0 - 0.008
Mutual error of paired height H	0.01	0.006	0.004	0.003
Mutual error of paired width N	0.01	0.006	0.004	0.003
Travel parallelism of slider C surface to guide A surface	Travel parallelism (see Table 2-9-12)			
Travel parallelism of slider D surface to guide B surface	Travel parallelism (see Table 2-9-12)			

Unit: mm

Table 2-4-5 Accuracy Table of Assembling Piece

Model	RG - 25, 30, 35			
Accuracy Grade	Advanced (H)	Precision-level (P)	Super precision (SP)	Ultra-high precision (UP)
Allowable dimensional error of height H	± 0.04	0 - 0.04	0 - 0.02	0 - 0.01
Allowable dimensional error of width N	± 0.04	0 - 0.04	0 - 0.02	0 - 0.01
Mutual error of paired height H	0.015	0.007	0.005	0.003
Mutual error of paired width N	0.015	0.007	0.005	0.003
Travel parallelism of slider C surface to guide A surface	Travel parallelism (see Table 2-9-12)			
Travel parallelism of slider D surface to guide B surface	Travel parallelism (see Table 2-9-12)			

Unit: mm

Table 2-4-6 Accuracy Table of Assembling Piece

Model	RG - 45, 55			
Accuracy Grade	Advanced (H)	Precision-level (P)	Super precision (SP)	Ultra-high precision (UP)
Allowable dimensional error of height H	± 0.05	0 - 0.05	0 - 0.03	0 - 0.02
Allowable dimensional error of width N	± 0.05	0 - 0.05	0 - 0.03	0 - 0.02
Mutual error of paired height H	0.015	0.007	0.005	0.003
Mutual error of paired width N	0.02	0.01	0.007	0.005
Travel parallelism of slider C surface to guide A surface	Travel parallelism (see Table 2-9-12)			
Travel parallelism of slider D surface to guide B surface	Travel parallelism (see Table 2-9-12)			

Unit: mm

RG Series - Needle Roller Linear Guide

RG Series - Needle Roller Linear Guide

Table 2-4-7 Accuracy Table of Assembling Piece

Unit: mm

Model	RG - 65			
	Advanced (H)	Precision-level (P)	Super precision (SP)	Ultra-high precision (UP)
Allowable dimensional error of height H	± 0.07	0 - 0.07	0 - 0.05	0 - 0.03
Allowable dimensional error of width N	± 0.07	0 - 0.07	0 - 0.05	0 - 0.03
Mutual error of paired height H	0.02	0.01	0.007	0.005
Mutual error of paired width N	0.025	0.015	0.01	0.007
Travel parallelism of slider C surface to guide A surface	Travel parallelism (see Table 2-9-12)			
Travel parallelism of slider D surface to guide B surface	Travel parallelism (see Table 2-9-12)			

(2) Interchangeable linear guide accuracy

Table 2-4-8 Accuracy Table of Assembling Piece

Unit: mm

Model	RG - 15, 20	
	Advanced (H)	Precision-level (P)
Allowable dimensional error of height H	± 0.03	± 0.015
Allowable dimensional error of width N	± 0.03	± 0.015
Mutual error of paired height H	0.01	0.006
Mutual error of paired width N	0.01	0.006
Travel parallelism of slider C surface to guide A surface	Travel parallelism (see Table 2-9-12)	
Travel parallelism of slider D surface to guide B surface	Travel parallelism (see Table 2-9-12)	

Table 2-4-9 Accuracy Table of Assembling Piece

Unit: mm

Model	RG - 25, 30, 35	
	Advanced (H)	Precision-level (P)
Allowable dimensional error of height H	± 0.04	± 0.02
Allowable dimensional error of width N	± 0.04	± 0.02
Mutual error of paired height H	0.015	0.007
Mutual error of paired width N	0.015	0.007
Travel parallelism of slider C surface to guide A surface	Travel parallelism (see Table 2-9-12)	
Travel parallelism of slider D surface to guide B surface	Travel parallelism (see Table 2-9-12)	

Table 2-4-10 Accuracy Table of Assembling Piece

Unit: mm

Model	RG - 45, 55	
	Advanced (H)	Precision-level (P)
Allowable dimensional error of height H	± 0.05	± 0.025
Allowable dimensional error of width N	± 0.05	± 0.025
Mutual error of paired height H	0.015	0.007
Mutual error of paired width N	0.02	0.01
Travel parallelism of slider C surface to guide A surface	Travel parallelism (see Table 2-9-12)	
Travel parallelism of slider D surface to guide B surface	Travel parallelism (see Table 2-9-12)	

Table 2-4-11 Accuracy Table of Assembling Piece

Unit: mm

Model	RG - 65	
	Advanced (H)	Precision-level (P)
Allowable dimensional error of height H	± 0.07	± 0.035
Allowable dimensional error of width N	± 0.07	± 0.035
Mutual error of paired height H	0.02	0.01
Mutual error of paired width N	0.025	0.015
Travel parallelism of slider C surface to guide A surface	Travel parallelism (see Table 2-9-12)	
Travel parallelism of slider D surface to guide B surface	Travel parallelism (see Table 2-9-12)	

(3) Travel parallelism accuracy

Table 2-4-12 Travel parallelism accuracy

Guide length(mm)	Accuracy Grade(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

2-4-6 Preload

The preload is the preload force applied to the needle roller, that is, increasing the diameter of needle roller and using the negative clearance between needle roller and raceway to apply preload, which can improve the rigidity of linear guide and eliminate clearance. RG series linear guides provide three standard preloads

Table 2-1-13 Preload level

Preload level	Mark	Preload	Applicability
No preload	Z0	0.02C~ 0.04C	The load direction is fixed with small impact and low accuracy requirements.
Medium preload	ZA	0.07C~0.09C	Rigidity requirement and light load, high precision requirement.
Heavy preload	ZB	0.12C~ 0.14C	High rigidity requirements, and there is vibration and impact in work environment

Note: Preload C is the basic dynamic rated load

The right figure shows the relationship between the rigidity performance, friction resistance, and service life of the linear guide rail under different preloading conditions. Customers can choose an appropriate preloading level according to the equipment rigidity and service life requirements. But for small specifications, it is recommended to choose preloading below medium value to avoid excessive preloading and reducing its service life.



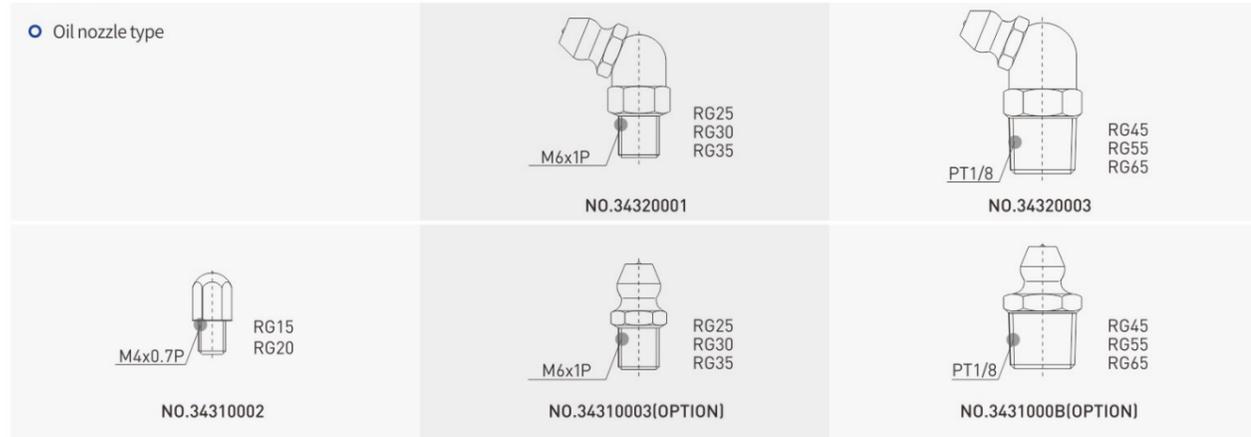
RG Series - Needle Roller Linear Guide

RG Series - Needle Roller Linear Guide

2-4-7 Lubrication Method

(1) Lubrication Grease

Oil nozzle type



Oil nozzle position

According to customer requirements, the oil nozzle can be installed in the front or at rear end of the slider for manual oil injection. EG series specially reserves the oil hole position on the side and top of end cover to install the oil nozzle [generally straight oil nozzle] for lateral and upper oil injection. The position of lateral oil injection is recommended to be on the non-reference side, but if there are special needs, it can also be placed on the reference side. Please contact us if you have the above lateral or upper oil injection needs. Linear guides that use connecting pipes to automatically supply grease can be installed with oil pipe joints according to the type of connecting pipe.

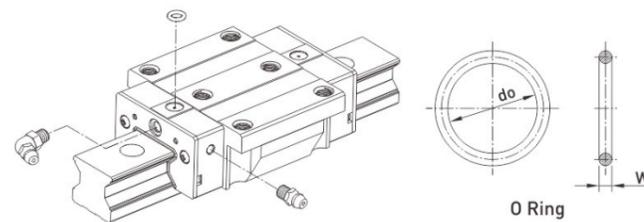
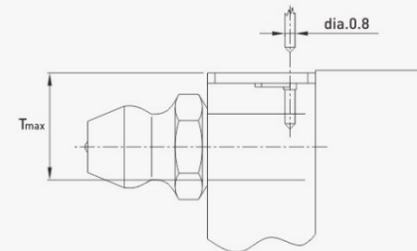


Table 2-4-14 O-Ring Specification and Maximum Allowable Depth of Perforation

Specification	O-ring specification		Maximum allowable depth of perforation $T_{max}$ [mm]
	do (mm)	W (mm)	
RG 15	2.5±0.15	1.5±0.15	3.45
RG 20	2.5±0.15	1.5±0.15	4
RG 25	7.5±0.15	1.5±0.15	5.8
RG 30	7.5±0.15	1.5±0.15	6.2
RG 35	7.5±0.15	1.5±0.15	8.65
RG 45	7.5±0.15	1.5±0.15	9.5
RG 55	7.5±0.15	1.5±0.15	11.6
RG 65	7.5±0.15	1.5±0.15	14.5



Amount of lubrication grease and oil filling up single slider

2-4-15 Lubrication Grease Amount for Single Slider

Specification	Heavy load(cm <sup>3</sup> )	Super heavy load(cm <sup>3</sup> )	Specification	Heavy load(cm <sup>3</sup> )	Super heavy load(cm <sup>3</sup> )
RG 15	3	-	RG 35	12	14
RG 20	5	6	RG 45	19	23
RG 25	7	8	RG 55	28	35
RG 30	9	10	RG 65	52	63

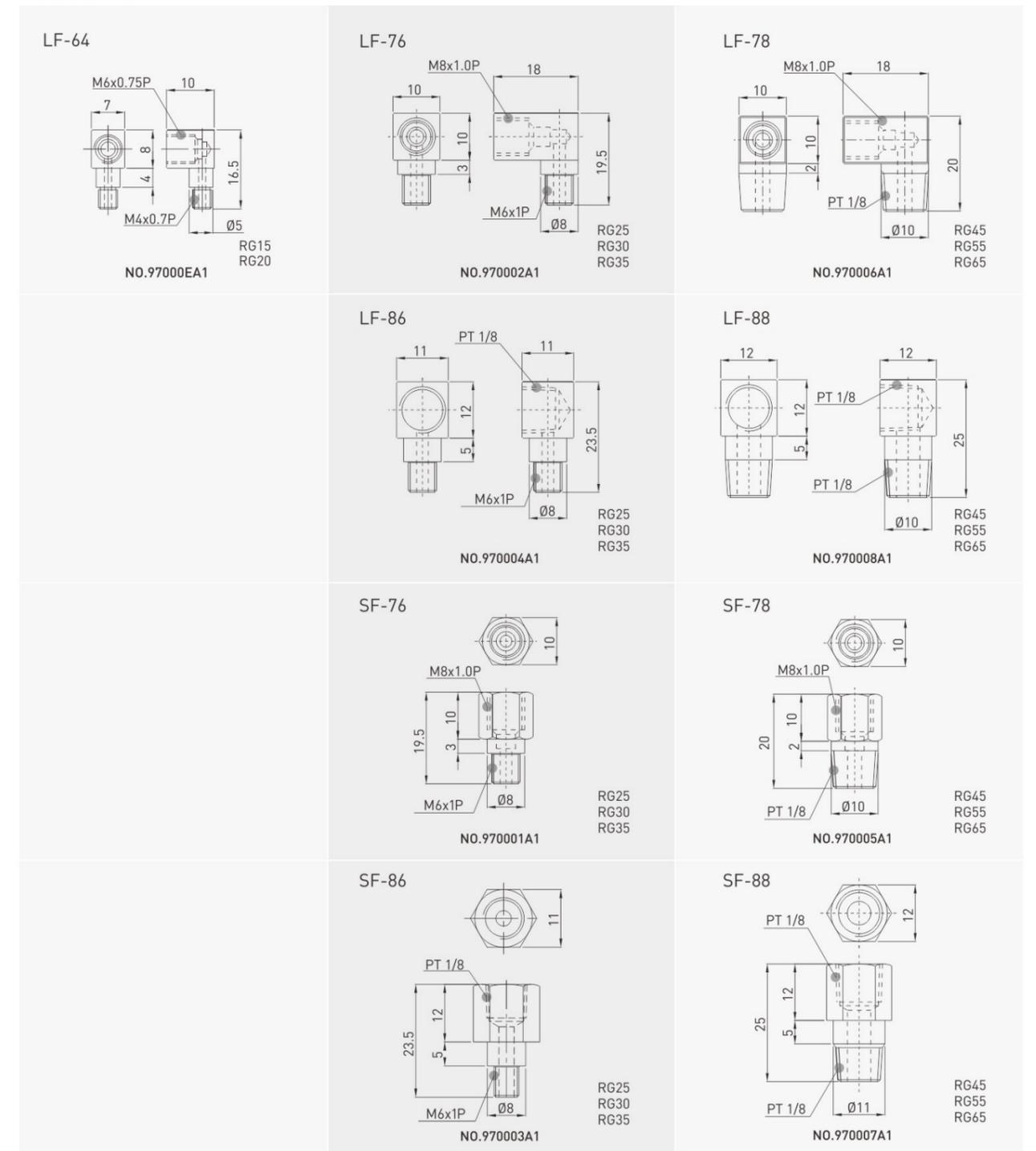
Lubrication frequency

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

(2) Lubrication Oil

It is recommended to use lubrication oil with an oil viscosity of about 30-150cSt to lubricate the linear guide. Customers can firstly explain to us the need of using oil lubrication, and the shipped linear guide will not be sealed with lubrication grease.

Oil pipe joint type



RG Series - Needle Roller Linear Guide

RG Series - Needle Roller Linear Guide

Oil supply rate

Table 2-4-16 Oil Supply Rate

Specification	Oil supply rate (cm <sup>3</sup> /hr)
RG 15	0.14
RG 20	0.14
RG 25	0.167
RG 30	0.2
RG 35	0.23
RG 45	0.3
RG 55	0.367
RG 65	0.433

(2) Description of dustproof equipment

● Oil wiper and bottom dustproof sheet  
It can prevent machining chips or dust particles from entering the slider, damaging the raceway surface and reducing the life of linear guide.

● Double wipers  
Double the scraping effect, even in heavy cutting and machining environment, foreign matter is completely excluded from the slider.

Table 2-4-18 Oil Wiper

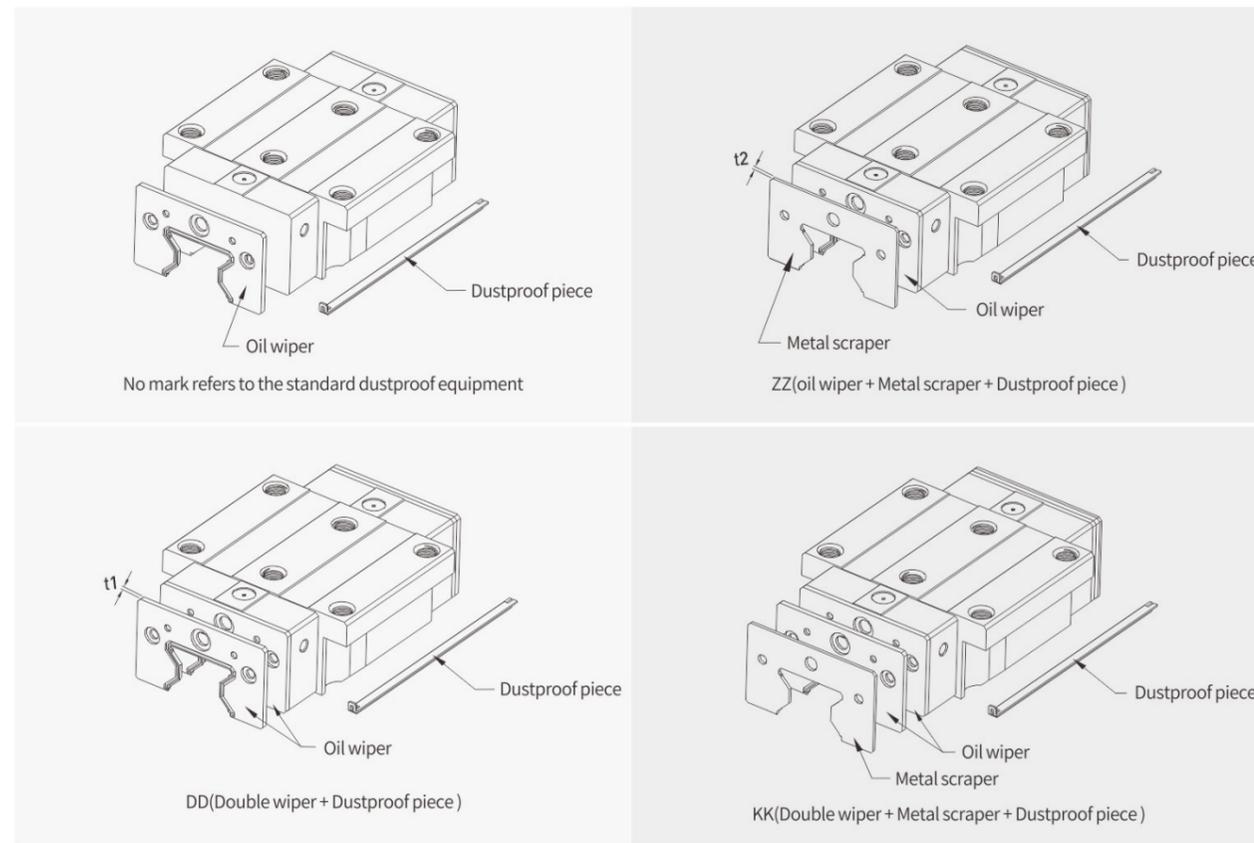
Specification	Increase thickness(t1) (mm)	Specification	Increase thickness(t1) (mm)
RG 15 ES	2.2	RG 35 ES	2.5
RG 20 ES	2.2	RG 45 ES	3.6
RG 25 ES	2.2	RG 55 ES	3.6
RG 30 ES	2.4	RG 65 ES	4.4

2-4-8 Dustproof Equipment

(1) Standard Dustproof Equipment Code

If you need the following dustproof accessories, please add the code behind the product model.

Table 2-4-17



● Metal scraper  
It can isolate high temperature chips or processing sparks and exclude large volume of impurities.

Table 2-4-19 Metal Scraper Thickness

Specification	Increase thickness(t1) (mm)	Specification	Increase thickness(t1) (mm)
RG 15 SC	1.0	RG 35 SC	1.5
RG 20 SC	1.0	RG 45 SC	1.5
RG 25 SC	1.0	RG 55 SC	1.5
RG 30 SC	1.5	RG 65 SC	1.5

● Guide bolt cover  
To prevent cutting powder or foreign matter from entering the slider through the bolt hole and affecting the accuracy, the customer must drive the bolt cover into bolt hole when installing the guide. Each guide is equipped with a bolt cover when leaving the factory.

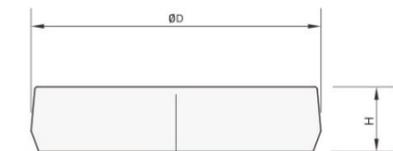


Table 2-4-20 Way cover

Guide specification	Mounting screws	Diameter (D) (mm)	Thickness (H) (mm)	Guide specification	Mounting screws	Diameter (D) (mm)	Thickness (H) (mm)
RGR15	M4	7.65	1.1	RGR35	M8	14.20	3.3
RGR20	M5	9.65	2.2	RGR45	M12	20.25	4.6
RGR25	M6	11.15	2.5	RGR55	M14	23.5	5.5
RGR30	M8	14.20	3.3	RGR65	M16	26.6	5.5

RG Series - Needle Roller Linear Guide

RG Series - Needle Roller Linear Guide

(3) Total length of slider with dustproof code

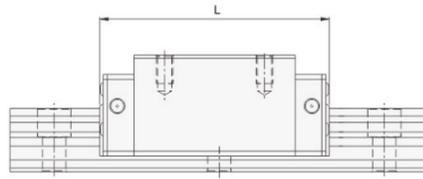


Table 2-4-21 Total length of slider

Unit: mm

Specification	Total length of slider(L)			
	SS	ZZ	DD	KK
RG15C	68.0 [70.4]	70.0 [74.4]	72.4 [74.8]	74.4 [78.8]
RG20C	86.0 [88.4]	88.0 [92.4]	90.4 [92.8]	92.4 [96.8]
RG20H	106.0 [108.4]	108.0 [112.4]	110.4 [112.8]	112.4 [116.8]
RG25C	97.9 [101.5]	99.9 [105.9]	102.3 [105.9]	104.3 [110.3]
RG25H	114.4 [118]	116.4 [122.4]	118.8 [122.4]	120.8 [126.8]
RG30C	109.8 [113.4]	112.8 [118.8]	114.6 [118.2]	117.6 [123.6]
RG30H	131.8 [135.4]	134.8 [140.8]	136.6 [140.2]	139.6 [145.6]
RG35C	124.0 [129.4]	127.0 [135.0]	129.0 [134.4]	132.0 [140.0]
RG35H	151.5 [156.9]	154.5 [162.5]	156.5 [161.9]	159.5 [167.5]
RG45C	153.2 [156.4]	156.2 [164.2]	160.4 [163.6]	163.4 [171.4]
RG45H	187.0 [190.2]	190.0 [198.0]	194.2 [197.4]	197.2 [205.2]
RG55C	183.7 [186.9]	186.7 [194.7]	190.9 [194.1]	193.9 [201.9]
RG55H	232.0 [235.2]	235.0 [243.0]	239.2 [242.4]	242.2 [250.2]
RG65C	232.0 [236.0]	235.0 [245.0]	240.8 [244.8]	243.8 [253.8]
RG65H	295.0 [299.0]	298.0 [308.0]	303.8 [307.8]	306.8 [316.8]

Notes: ( ) is the maximum length of the slider, including screws, oil wiper lips, etc.

2-4-9 Friction

This resistance is the maximum one of single wiper.

Table 2-4-22 RG Series Oil Wiper Resistance

Specification	Oil wiper resistance N (kgf)	Specification	Oil wiper resistance N (kgf)
RG15	1.96 [0.2]	RG35	3.53 [0.36]
RG20	2.45 [0.25]	RG45	4.21 [0.43]
RG25	2.74 [0.28]	RG55	5.09 [0.52]
RG30	3.31 [0.31]	RG65	6.66 [0.68]

2-4-10 Mounting Surface Error

(1) Accuracy of Guide Mounting Surface

RG series linear guide greatly improves the rigidity of linear guide through the linear contact among the needle roller rolling elements, guide and slider. Therefore, when the mounting surface accuracy error is too large, it will affect the installation quality of linear guide, not only increasing friction resistance but also reducing its service life. If customers can follow the following requirements for the mounting surface accuracy when installing the linear guide, the characteristics of RG series linear guide will show up, including high rigidity, high accuracy and long life.

○ Parallelism error of bearing surface (P)

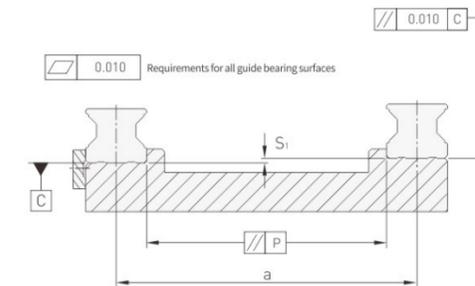


Table 2-4-23 Allowable Parallelism Error(P)

Unit: μm

Specification	Preload		
	Z0 Preload	ZA Preload	ZB Preload
RG15	5	3	3
RG20	8	6	4
RG25	9	7	5
RG30	11	8	6
RG35	14	10	7
RG45	17	13	9
RG55	21	14	11
RG65	27	18	14

○ Parallelism error of bearing surface (S<sub>1</sub>)

$$S_1 = a \times K$$

S<sub>1</sub> : maximum allowable height error  
 a : distance between paired guides  
 K : height error coefficient

Table 2-4-24 Height error coefficient

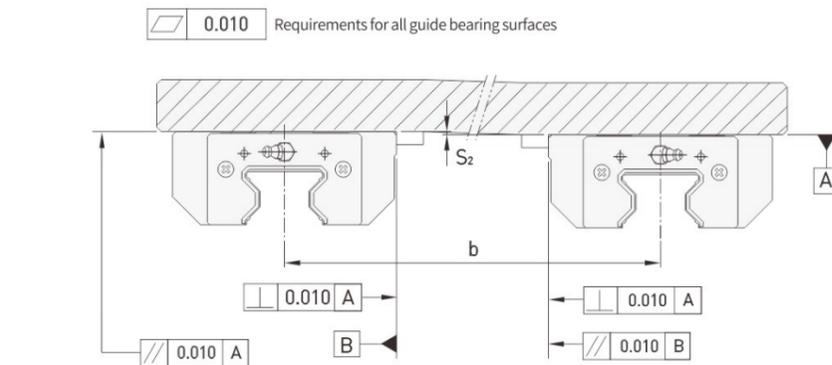
Specification	Preload		
	Z0 Preload	ZA Preload	ZB Preload
K	2.2 × 10 <sup>-4</sup>	1.7 × 10 <sup>-4</sup>	1.2 × 10 <sup>-4</sup>

RG Series - Needle Roller Linear Guide

RG Series - Needle Roller Linear Guide

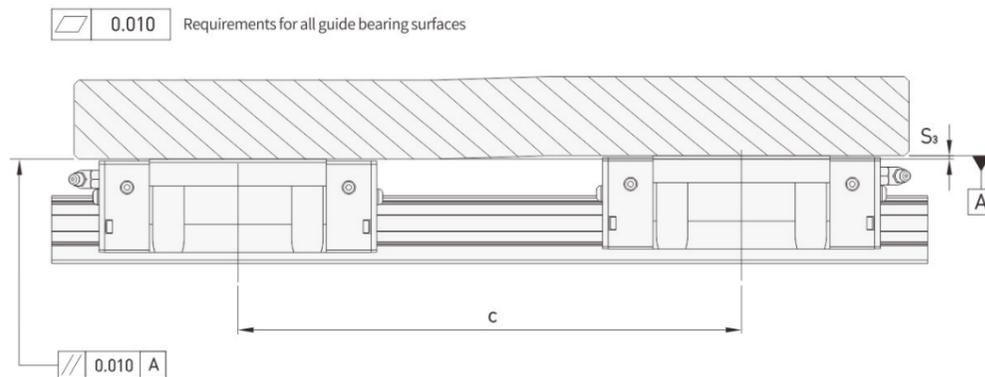
(2)Slider Assembly Surface Accuracy

- Height error between paired bearing surfaces of sliders on different guides ( $S_2$ )



$S_2 = b \times 4.2 \times 10^{-5}$   
 $S_2$  : maximum allowable height error  
 $b$  : distance between paired guides

- Height error between paired bearing surfaces of sliders on the same guide ( $S_3$ )



$S_3 = c \times 4.2 \times 10^{-5}$   
 $S_3$  : maximum allowable height error  
 $c$  : distance between paired guides

(1)Shoulder Height and Chamfer of Mounting Surface

When installing the linear guide, it is necessary to pay attention to whether the shoulder condition of mounting surface is appropriate, such as whether the chamfer is too large, the protruding place is easy to cause poor accuracy of linear guide, and whether the height is too high, it will interfere with the slider. Therefore, if the mounting surface shoulder can be installed according to the recommended requirements, the poor installation accuracy can be eliminated.

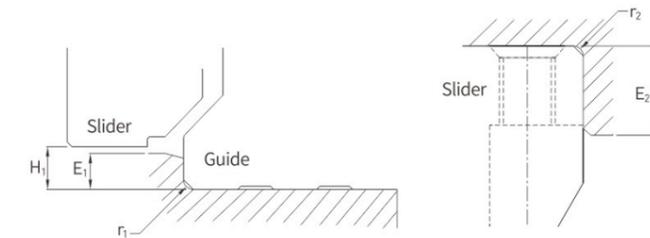


Table 2-4-25

Specification	Maximum fillet radius of guide end $r_1$ (mm)	Maximum fillet radius of slider end $r_2$ (mm)	Shoulder height of guide end $E_1$ (mm)	Shoulder height of slider end $E_2$ (mm)	operation height of slider $H_1$ (mm)
RG15	0.5	0.5	3	4	4
RG20	0.5	0.5	3.5	5	5
RG25	1.0	1.0	5	5	5.5
RG30	1.0	1.0	5	5	6
RG35	1.0	1.0	6	6	6.5
RG45	1.0	1.0	7	8	8
RG55	1.5	1.5	9	10	10
RG65	1.5	1.5	10	10	12

(2)Torque Value of Guide Assembly Screws

Whether the mounting guide is locked and flattened against the reference surface has a great impact on the accuracy of linear guide. Therefore, to achieve the purpose of locking each screw tightly, it is recommended to use the following torque values to lock the assembly screws.

Table 2-4-26

Specification	Screw Size	Torque N-cm (kgf-cm)		
		Iron material	Casting material	Aluminum alloy
RG15	M4×0.7P×16L	392(40)	274(28)	206(21)
RG20	M5×0.8P×20L	883(90)	588(60)	441(45)
RG25	M6×1P×20L	1373(140)	921(94)	686(70)
RG30	M8×1.25P×25L	3041(310)	2010(205)	1470(150)
RG35	M8×1.25P×25L	3041(310)	2010(205)	1470(150)
RG45	M12×1.75P×35L	11772(1200)	7840(800)	5880(600)
RG55	M14×2P×45L	15696(1600)	10500(1100)	7840(800)
RG65	M16×2P×50L	19620(2000)	13100(1350)	9800(1000)

2-4-12 Standard Length and Maximum Length of Single Guide

AKD has a standard length of guide inventory to supply customer needs. If the customer orders a guide with non-standard length, the size of end distance E shall not be greater than 1/2P to prevent the instability of guide assembly end due to the excessive size of E, and reduce the accuracy of linear guide.

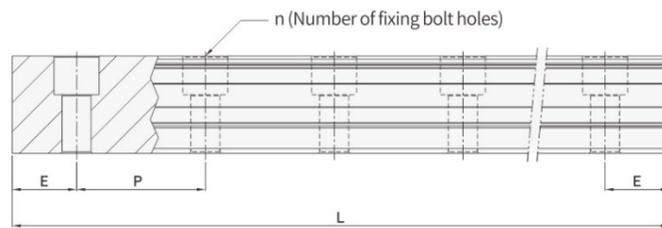


Table 2-4-27 Track Length

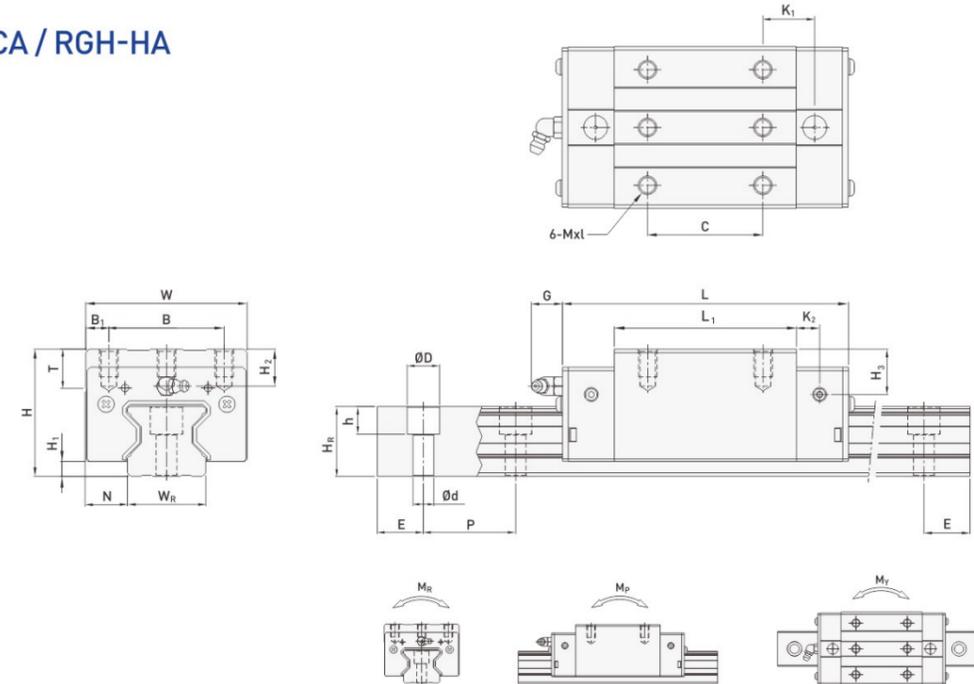
Unit: mm

Item	RGR15	RGR20	RGR25	RGR30	RGR35	RGR45	RGR55	RGR65
Standard length L (n)	160(5)	220(7)	220(7)	280(7)	280(7)	570(11)	780(13)	1,270(17)
	220(7)	280(9)	280(9)	440(11)	440(11)	885(17)	1020(17)	1,570(21)
	340(11)	340(11)	340(11)	600(15)	600(15)	1,200(23)	1,260(21)	2,020(27)
	460(15)	460(15)	460(15)	760(19)	760(19)	1,620(31)	1,500(25)	2,620(35)
	580(19)	640(21)	640(21)	1,000(25)	1,000(25)	2,040(39)	1,980(33)	-
	700(23)	820(27)	820(27)	1,640(41)	1,640(41)	2,460(47)	2,580(43)	-
	940(31)	1000(33)	1,000(33)	2,040(51)	2,040(51)	2,985(57)	2,940(49)	-
	1120(37)	1180(39)	1,240(41)	2,520(63)	2,520(63)	3,090(59)	3,060(51)	-
1360(45)	1360(45)	1,600(53)	3,000(75)	3,000(75)	-	-	-	
Spacing (P)	30	30	30	40	40	52.5	60	75
Standard end distance (E <sub>s</sub> )	20	20	20	20	20	22.5	30	35
Maximum length of standard end distance	4,000(133)	4,000(133)	4,000(133)	4,000(100)	4,000(100)	3,982.5(76)	3,960(66)	3,970(53)
Maximum length	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000

Notes: 1. The E size tolerance of general guide is 0.5~-0.5 mm, and the E size tolerance of guide teeth connector end distance is stricter 0~-0.3 mm.  
 2. The maximum length of standard end distance refers to the maximum length of the guide with left and right end distances as the standard end distance.  
 3. If customers need different E values, please contact with AKD.

2-4-13 Table of RG Series Guide Sizes

(1) RGH-CA / RGH-HA



Model	Component size(mm)		Slider size (mm)										Guide size (mm)						Size of guide fixing bolt	Basic dynamic rated load C <sub>0</sub> (kN)	Basic static rated load C <sub>0</sub> (kN)	Allowable static torque			Weight						
	H	H <sub>1</sub>	N	W	B	B <sub>1</sub>	C	L <sub>1</sub>	L	K <sub>1</sub>	K <sub>2</sub>	G	Mxl	T	H <sub>2</sub>	H <sub>3</sub>	W <sub>R</sub>	H <sub>R</sub>				D	h	d	P	E	M <sub>R</sub> (kN-m)	M <sub>P</sub> (kN-m)	M <sub>Y</sub> (kN-m)	Slider (kg)	Guide (kg/m)
RGH 15CA	28	4	9.5	34	26	4	26	45	68	13.4	4.7	5.3	M4 x 8	6	7.6	10.1	15	16.5	7.5	5.7	4.5	30	20	M4 x 16	11.3	24	0.311	0.173	0.173	0.20	1.8
RGH 20CA	34	5	12	44	32	6	36	57.5	86	15.8	6	5.3	M5 x 8	8	8.3	8.3	20	21	9.5	8.5	6	30	20	M5 x 20	21.3	46.7	0.647	0.46	0.46	0.40	2.76
RGH 20HA							50	77.5	106	18.8															26.9	63	0.872	0.837	0.837	0.53	
RGH 25CA	40	5.5	12.5	48	35	6.5	35	64.5	97.9	20.75	7.25	12	M6 x 8	9.5	10.2	10	23	23.6	11	9	7	30	20	M6 x 20	27.7	57.1	0.758	0.605	0.605	0.61	3.08
RGH 25HA							50	81	114.4	21.5															33.9	73.4	0.975	0.991	0.991	0.75	
RGH 30CA	45	6	16	60	40	10	40	71	109.8	23.5	8	12	M8 x 10	9.5	9.5	10.3	28	28	14	12	9	40	20	M8 x 25	39.1	82.1	1.445	1.06	1.06	0.90	4.41
RGH 30HA							60	93	131.8	24.5															48.1	105	1.846	1.712	1.712	1.16	
RGH 35CA	55	6.5	18	70	50	10	50	79	124	22.5	10	12	M8 x 12	12	16	19.6	34	30.2	14	12	9	40	20	M8 x 25	57.9	105.2	2.17	1.44	1.44	1.57	6.06
RGH 35HA							72	106.5	151.5	25.25															73.1	142	2.93	2.6	2.6	2.06	
RGH 45CA	70	8	20.5	86	60	13	60	106	153.2	31	10	12.9	M10 x 17	16	20	24	45	38	20	17	14	52.5	22.5	M12 x 35	92.6	178.8	4.52	3.05	3.05	3.18	9.97
RGH 45HA							80	139.8	187	37.9															116	230.9	6.33	5.47	5.47	4.13	
RGH 55CA	80	10	23.5	100	75	12.5	75	125.5	183.7	37.75	12.5	12.9	M12 x 18	17.5	22	27.5	53	44	23	20	16	60	30	M14 x 45	130.5	252	8.01	5.4	5.4	4.89	13.98
RGH 55HA							95	173.8	232	51.9															167.8	348	11.15	10.25	10.25	6.68	
RGH 65CA	90	12	31.5	126	76	25	70	160	232	60.8	15.8	12.9	M16 x 20	25	15	15	63	53	26	22	18	75	35	M16 x 50	213	411.6	16.20	11.59	11.59	8.89	20.22
RGH 65HA							120	223	295	67.3															275.3	572.7	22.55	22.17	22.17	12.13	

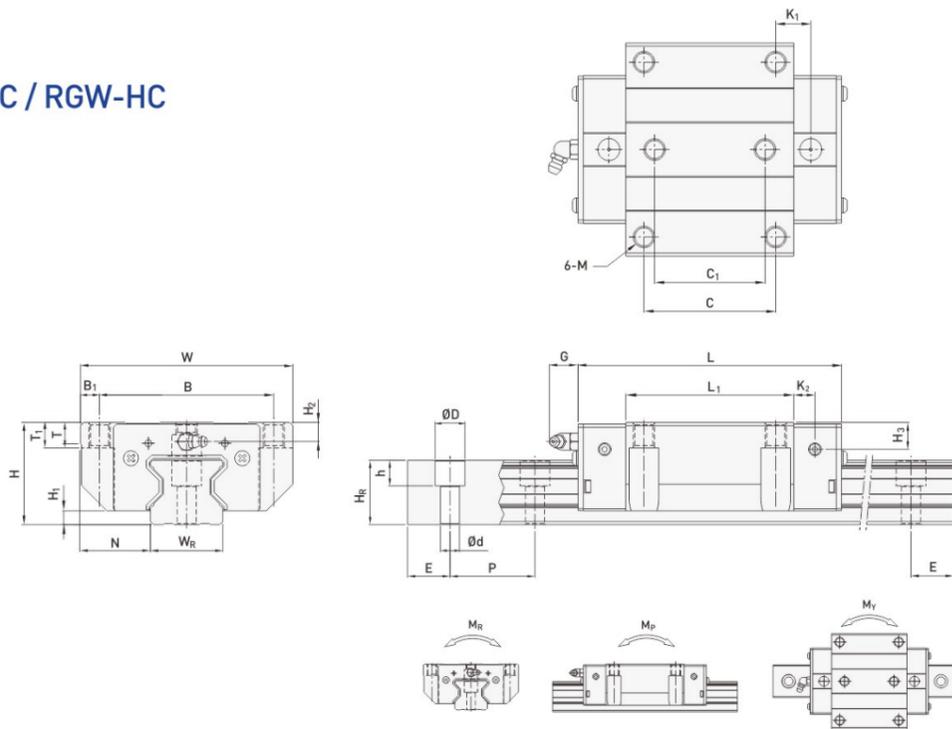
Notes: 1. 1kgf=9.81N

2. This is the theoretical dynamic rated load of C<sub>100R</sub>, When it needs to be converted into C<sub>50R</sub>, the conversion formula is: C<sub>50R</sub>=1.23 X C<sub>100R</sub>

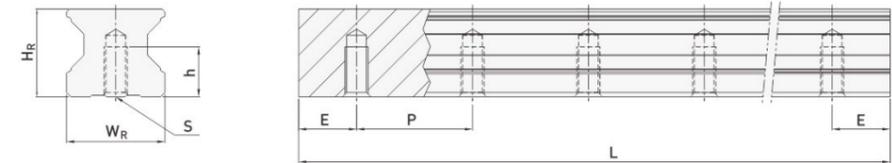
RG Series - Needle Roller Linear Guide

RG Series - Needle Roller Linear Guide

(3) RGW-CC / RGW-HC



(4) RGR-T Table of Lock-down Guide Size



Model	Component size(mm)		Slider size (mm)														Guide size (mm)						Size of guide fixing bolt (mm)	Basic dynamic rated load C <sub>0</sub> (kN)	Basic static rated load C <sub>0</sub> (kN)	Allowable static torque			Weight				
	H	H <sub>1</sub>	N	W	B	B <sub>1</sub>	C	C <sub>1</sub>	L <sub>1</sub>	L	K <sub>1</sub>	K <sub>2</sub>	G	M	T	T <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	W <sub>R</sub>	H <sub>R</sub>	D	h				d	P	E	M <sub>R</sub> (kN-m)	M <sub>P</sub> (kN-m)	M <sub>Y</sub> (kN-m)	Slider kg	Guide kg/m
RGW15CC	24	4	16	47	38	4.5	30	26	45	68	11.4	4.7	5.3	M5	6	6.95	3.6	6.1	15	16.5	7.5	5.7	4.5	30	20	M4x16	11.3	24	0.311	0.173	0.173	0.22	1.8
RGW20CC	30	5	21.5	63	53	5	40	35	57.5	86	13.8	6	5.3	M6	8	10	4.3	4.3	20	21	9.5	8.5	6	30	20	M5x20	21.3	46.7	0.647	0.46	0.46	0.47	2.76
RGW20HC									77.5	106	23.8															26.9	63	0.872	0.837	0.837	0.63		
RGW25CC	36	5.5	23.5	70	57	6.5	45	40	64.5	97.9	15.75	7.25	12	M8	9.5	10	6.2	6	23	23.6	11	9	7	30	20	M6x20	27.7	57.1	0.758	0.605	0.605	0.72	3.08
RGW25HC									81	114.4	24															33.9	73.4	0.975	0.991	0.991	0.91		
RGW30CC	42	6	31	90	72	9	52	44	71	109.8	17.5	8	12	M10	9.5	10	6.5	7.3	28	28	14	12	9	40	20	M8x25	39.1	82.1	1.445	1.06	1.06	1.16	4.41
RGW30HC									93	131.8	28.5															48.1	105	1.846	1.712	1.712	1.52		
RGW35CC	48	6.5	33	100	82	9	62	52	79	124	16.5	10	12	M10	12	13	9	12.6	34	30.2	14	12	9	40	20	M8x25	57.9	105.2	2.17	1.44	1.44	1.75	6.06
RGW35HC									106.5	151.5	30.25															73.1	142	2.93	2.6	2.6	2.40		
RGW45CC	60	8	37.5	120	100	10	80	60	106	153.2	21	10	12.9	M12	14	15	10	14	45	38	20	17	14	52.5	22.5	M12x35	92.6	178.8	4.52	3.05	3.05	3.43	9.97
RGW45HC									139.8	187	37.9															116	230.9	6.33	5.47	5.47	4.57		
RGW55CC	70	10	43.5	140	116	12	95	70	125.5	183.7	27.75	12.5	12.9	M14	16	17	12	17.5	53	44	23	20	16	60	30	M14x45	130.5	252	8.01	5.4	5.4	5.43	13.98
RGW55HC									173.8	232	51.9															167.8	348	11.15	10.25	10.25	7.61		
RGW 65CC	90	12	53.5	170	142	14	110	82	160	232	40.8	15.8	12.9	M16	22	23	15	15	63	53	26	22	18	75	35	M16x50	213	411.6	16.20	11.59	11.59	11.63	20.22
RGW 65HC									223	295	72.3															275.3	572.7	22.55	22.17	22.17	16.58		

Notes: 1. 1kgf=9.81N

2. This is the theoretical dynamic rated load of C<sub>100R</sub>, When it needs to be converted into C<sub>50R</sub>, the conversion formula is: C<sub>50R</sub>=1.23 X C<sub>100R</sub>

Model	Guide size (mm)						Weight (kg/m)
	W <sub>R</sub>	H <sub>R</sub>	S	h	P	E	
RGR15T	15	16.5	M5×0.8P	8	30	20	1.86
RGR20T	20	21	M6×1P	10	30	20	2.76
RGR25T	23	23.6	M6×1P	12	30	20	3.36
RGR30T	28	28	M8×1.25P	15	40	20	4.82
RGR35T	34	30.2	M8×1.25P	17	40	20	6.48
RGR45T	45	38	M12×1.75P	24	52.5	22.5	10.83
RGR55T	53	44	M14×2P	24	60	30	15.15
RGR65T	63	53	M20×2.5P	30	75	35	21.24

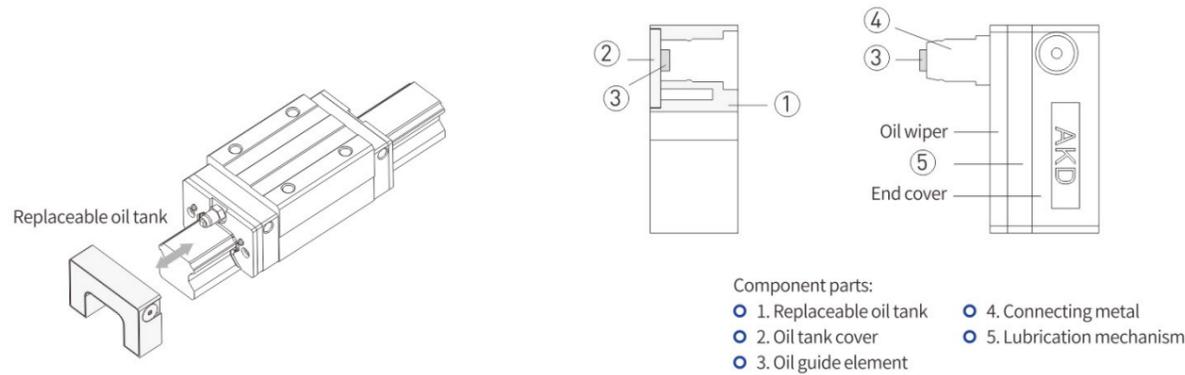
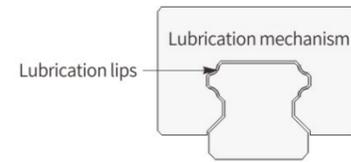
E2 Self-lubricating linear guide

E2 Self-lubricating linear guide

2-5-1 Self-lubricating Linear Guide Structure

E2 self-lubricating linear guide is equipped with lubrication mechanism between the end cover and oil wiper, and a replaceable oil tank is installed at the outermost end of slider, as shown in figure. The replaceable oil tank supplies lubrication oil to the lubrication mechanism, which lubricates the raceway of the guide.

The oil tank contains an oil guide element, whose specific three-dimensional shape allows the slider to contact the lubrication oil at any position or when the oil level is low, so as to completely extract and use the lubrication oil in oil tank.



2-5-2 Characteristics of Self-lubricating Linear Guide

(1) Cost saving: it does not need the lubrication pipe system and equipment, reducing oil cost.

Table 2-5-1 Specification HG25 is Exemplified

Item	Centralized lubricating	E2 Self-lubricating Slider
Lubrication pipe equipment	\$ XXX	None
Design and installation of lubrication pipe	\$ XXX	None
Lubrication oil cost	0.3 c.c./hour × 8 hours/day × 280 days/year × 5 years = 3360 cc × cost per cc = \$XXX	10 cc [10,000km in 5 years] × cost per cc = \$XX
Oil replacement cost	3-5 hours / time × 3-5 times / year × 5 years × unit cost = \$XXX	None
Waste oil treatment cost	3-5 times / year × 5 years × unit cost = \$XXX	None

(2) Clean and environmental-friendly: there is nothing to worry out oil leakage leading to pollution and oil splash during forced lubrication. It is suitable for environments with high cleanliness requirements.

(3) Easy maintenance and long service life: for normal users, almost no maintenance is required within the average service life.

(4) Flexible installation and use: the slider can be lubricated normally in any direction, without installation direction restrictions.

(5) Easy to assemble and disassemble: with the cassette-type oil tank design, it can be easily replaced on the machine, further extending the service life.

(6) Optional lubrication oil: the replaceable oil tank can be filled with appropriate lubrication oil according to the different operating environments of linear guide.

(7) Application in special environments: such as dusty environments, exposure to harsh weather and water environments, etc., using with grease sealed in slider can achieve the better lubrication effect.

2-5-3 Scope of Application

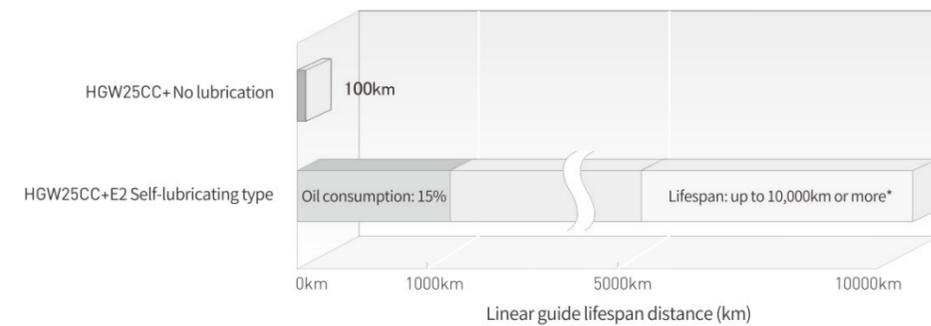
- (1) Automation equipment
- (2) Industrial machinery: plastics, printing, paper-making, textile, food, woodworking etc.
- (3) Electronic machinery: semiconductor machinery, mechanical arm, X-Y platforms, measuring equipment.
- (4) Others: Medical equipment, material handling machinery, construction equipment.

2-5-4 Selection Notes

(1) After selecting the specification, the self-lubricating linear guides are refilled with /E2  
For example: HGW25CC2R1600ZAPII+ZZ/E2

2-5-5 Performance Test

(1) Light Load Life Test



\* The lifespan mileage varies depending on the oil tank capacity applicable to each product specification.

Table 2-5-2 Test Conditions

Specification	HGW25CC
Speed ratio	60m / min
Stroke	1500mm
Load	500kgf

(2) Characteristics of Lubrication Oil

The replaceable oil tank is pre-filled with ISO VG680 lubrication oil when leaving the factory. Such lubrication oil is a fully synthetic lubrication oil based on synthetic hydrocarbon (PAO) with the following characteristics:

- It is compatible with grease based on mineral oil, PAO and ester oil.
- It can synthesize base oil and show the excellent high-temperature oxidation stability.
- With the high viscosity index, it shows the excellent performance in extremely high or low temperature operating environments.
- With low fluid traction coefficient, it can reduce power consumption.
- Anti-corrosion and rust prevention

※ Lubrication oil of the same viscosity level can also be refilled to replaceable oil tank, but the attention must be paid to the compatibility of lubrication oil.

2-5-6 Operating Temperature Range

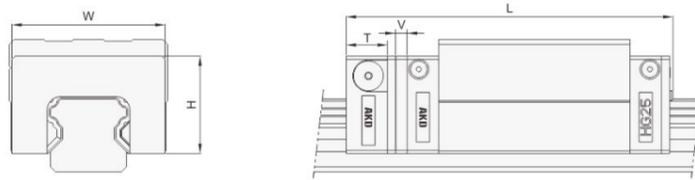
The operating temperature of this product is -10°C to 60°C. If it needs to exceed this range, please contact with AKD.

E2 Self-lubricating linear guide

E2 Self-lubricating linear guide

Size Table of E2 Self-lubricating Linear Guide

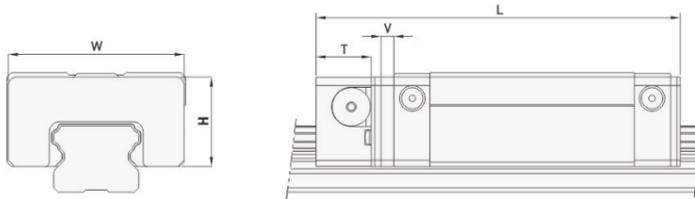
(1)HG Series



Model	E2 self-lubricating actuator size							
	W	H	T	V	L			
					SS	ZZ	DD	KK
HG15C	32.4	19.5	12.5	3.0	75.4 (75.6)	82.5 (82.7)	82.0 (82.2)	89.1 (89.3)
HG20C	43.0	24.4	13.5	3.5	93.5 (94.4)	97.5 (98.5)	98.5 (99.4)	102.5 (103.5)
HG20H					108.2 (109.1)	112.2 (113.2)	113.2 (114.1)	117.2 (118.2)
HG25C	46.4	29.5	13.5	3.5	100.0 (100.5)	104.0 (105.0)	105.0 (105.5)	109.0 (110.0)
HG25H					120.6 (121.1)	124.6 (125.6)	125.6 (126.1)	129.6 (130.6)
HG30C	58.0	35.0	13.5	3.5	112.9 (113.9)	120.4 (121.4)	120.3 (121.3)	127.8 (126.8)
HG30H					135.9 (136.9)	143.4 (144.4)	143.3 (144.3)	150.8 (149.8)
HG35C	68.0	38.5	13.5	3.5	127.9 (128.9)	135.4 (136.4)	135.3 (136.3)	142.8 (143.8)
HG35H					153.7 (154.7)	161.2 (162.2)	161.1 (162.1)	168.6 (169.6)
HG45C	82.0	49.0	16.0	4.5	157.2 (157.2)	166.5 (166.5)	167.2 (167.2)	176.5 (176.5)
HG45H					189.0 (189.0)	198.3 (198.3)	199.0 (199.0)	208.3 (208.3)
HG55C	97.0	55.5	16.0	4.5	183.9 (183.9)	193.6 (193.6)	194.3 (194.3)	204.0 (204.0)
HG55H					222.0 (222.0)	231.7 (231.7)	232.4 (232.4)	242.1 (242.1)
HG65C	121.0	69.0	16.0	4.5	219.2 (219.2)	224.7 (224.7)	228.2 (228.2)	233.7 (233.7)
HG65H					278.6 (278.6)	284.1 (284.1)	287.6 (287.6)	293.1 (293.1)

Note: ( ) is the maximum length of the slider, including screws, oil wiper lips, etc.

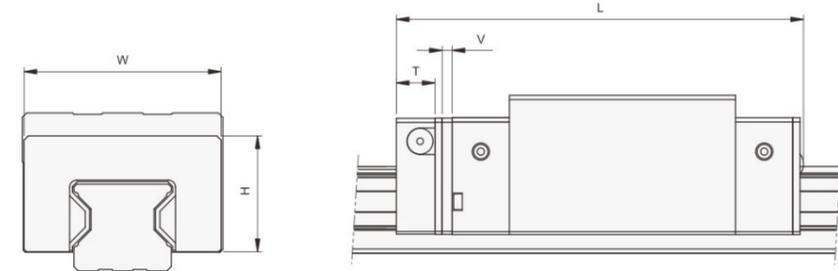
(2)EG Series



Model	E2 self-lubricating actuator size							
	W	H	T	V	L			
					SS	ZZ	DD	KK
EG15S	33.3	18.7	11.5	3.0	54.6 (55.8)	56.2 (58.4)	58.6 (59.8)	60.2 (62.4)
EG15C					71.3 (72.5)	72.9 (75.1)	75.3 (76.5)	76.9 (79.1)
EG20S	41.3	20.9	13.0	3.0	66.0 (68.0)	67.6 (70.6)	70.0 (72.0)	71.6 (74.6)
EG20C					85.1 (87.1)	86.7 (89.7)	89.1 (91.1)	90.7 (93.7)
EG25S	47.3	24.9	13.0	3.0	75.1 (77.1)	77.1 (80.1)	79.1 (81.1)	81.1 (84.1)
EG25C					98.6 (100.6)	100.6 (103.6)	102.6 (104.6)	104.6 (107.6)
EG30S	59.3	31.0	13.0	3.0	85.5 (87.5)	87.5 (90.5)	89.5 (91.5)	91.5 (94.5)
EG30C					114.1 (116.1)	116.1 (119.1)	118.1 (120.1)	120.1 (123.1)
EG35S	68.0	33.5	13.0	3.0	91.0 (93.0)	94.0 (97.0)	95.0 (97.0)	98.0 (101.0)
EG35C					124.0 (126.0)	127.0 (130.0)	128.0 (130.0)	131.0 (134.0)

Note: ( ) is the maximum length of the slider, including screws, oil wiper lips, etc.

(3)RG Series



Model	E2 self-lubricating actuator size							
	W	H	T	V	L			
					SS	ZZ	DD	KK
RG15C	33.0	19.2	12.5	3.5	84.0 (85.2)	86.0 (88.2)	88.4 (89.6)	90.4 (92.6)
RG20C	43.4	24.2	12.5	3.5	102 (103.2)	104.0 (106.2)	106.4 (107.6)	108.4 (110.6)
RG20H					122 (123.2)	124.0 (126.2)	126.4 (127.6)	128.4 (130.6)
RG25C	46.8	29.2	13.5	3.5	114.9 (116.7)	116.9 (119.9)	119.3 (121.1)	121.3 (124.3)
RG25H					131.4 (133.2)	133.4 (136.4)	135.8 (137.6)	137.8 (140.8)
RG30C	58.8	34.9	13.5	3.5	126.8 (128.6)	129.8 (132.8)	131.6 (133.4)	134.6 (137.6)
RG30H					148.8 (150.6)	151.8 (154.8)	153.6 (155.4)	156.6 (159.6)
RG35C	68.8	40.3	13.5	3.5	141 (143.7)	144.0 (148.0)	146.0 (148.7)	149.0 (153.0)
RG35H					168.5 (171.2)	171.5 (175.5)	173.5 (176.2)	176.5 (180.5)
RG45C	83.8	50.2	16.0	4.5	173.7 (175.3)	176.7 (180.7)	180.9 (182.5)	183.9 (187.9)
RG45H					207.5 (209.1)	210.5 (214.5)	214.7 (216.3)	217.7 (221.7)
RG55C	97.6	58.4	16.0	4.5	204.2 (205.8)	207.2 (211.2)	211.4 (213)	214.4 (218.4)
RG55H					252.5 (254.1)	255.5 (259.5)	259.7 (261.3)	262.7 (266.7)
RG65C	121.7	76.1	16.0	4.5	252.5 (254.5)	255.5 (260.5)	261.3 (263.3)	264.3 (269.3)
RG65H					315.5 (317.5)	318.5 (323.5)	324.3 (326.3)	327.3 (332.3)

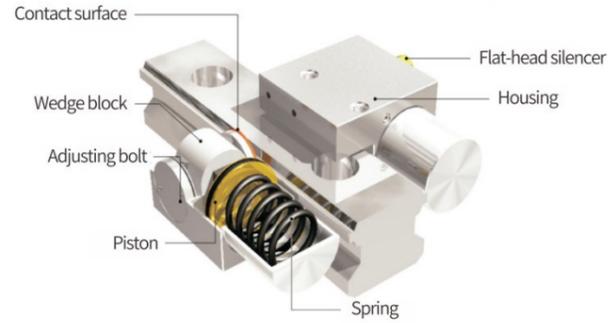
Note: ( ) is the maximum length of the slider, including screws, oil wiper lips, etc.

Linear guide clamp

Linear guide clamp

Structure and Function

Rolling linear guide clamps consist of the clamp body, actuating elements, clamping elements, contact elements, etc. They are high-performance functional components designed for use with rolling linear guides and linear optical axes. They provide functions such as fixing worktables, precise positioning, vibration prevention, and rigidity enhancement.



Explanation of Terms

Normally Open Clamp

A clamp that is in the released state when no air is supplied.

Normally Closed Clamp

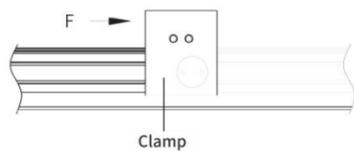
A clamp that is in the clamped state when no air is supplied.

Clamp with Brake

A clamp whose contact element is a brake pad.

Holding Force

The force that resists the axial movement of the sliding block. The holding force varies depending on the static friction coefficient between the guide rail and the clamping mechanism. (The rated holding force in the catalog is a calculated value based on a static friction coefficient of 0.1.)



Minimum Operating Pressure

The minimum pressure required for the normal operation of the clamp.

Maximum Operating Pressure

The maximum allowable pressure for the normal operation of the clamp.

Mounting Shim

A shim used to align the height of the clamp with the height of the linear guide.

Air Consumption

The amount of air required for the clamp to complete one operating cycle.

Reaction Time

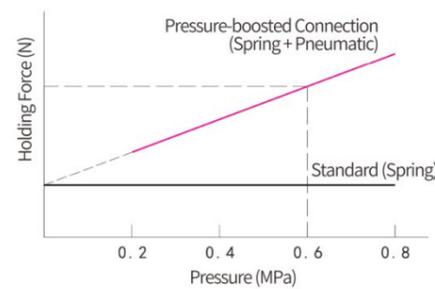
- Normally Open Clamp Reaction Time: The time elapsed from when the system issues the signal to start air supply until the air supply to the clamp actually begins.
- Normally Closed Clamp Reaction Time: The time elapsed from when the system issues the signal to stop air supply until the air supply to the clamp actually stops.

Response Time

- Normally Open Clamp Response Time: The time elapsed from when air supply to the clamp begins until the linear guide is clamped.
- Normally Closed Clamp Response Time: The time elapsed from when air supply to the clamp stops until the linear guide is clamped.

Pressure-Boosted Connection

A connection method that increases the holding force by superimposing additional holding force generated by air pressure on the existing holding force provided by the spring.



Ordering Method

Series Designation:  
EZ Pneumatic Normally Open  
EZS Normally Closed Pneumatic

Size Specification Code:  
20、25、30、35、45、55、65

**EZS 25 R H 04**

"04" indicates opening at 0.4 MPa.  
No label indicates opening at 0.55 MPa.

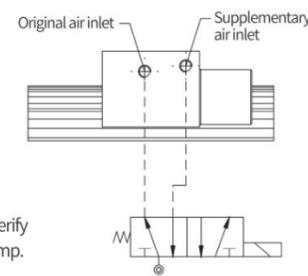
**Matching Guide Rail Brand:**  
H - Hiwin guide rail  
P - PMI guide rail

**Matching Guide Rail and Optical Axis Type:**  
R - Linear roller guide rail  
G - Linear optical axis guide rail  
Default: Linear ball guide rail

Pressure Boost Connection

Connection Method

1. Remove the silencer.
2. Install the pipe fitting, air tube, and solenoid valve.
3. Begin air supply.
4. Activate the solenoid valve and verify the open/closed status of the clamp.

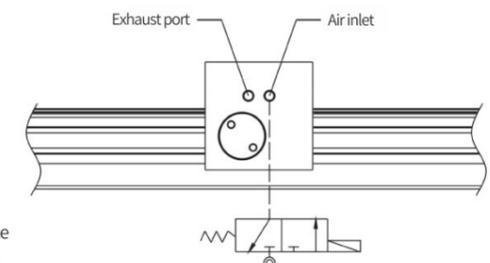


Installation Method

1. The clamp should be installed after the guide rail and sliding block are assembled, preferably between the two sliding blocks.
2. Install the clamp onto the linear guide rail in the released state, and ensure that the clamp can move freely without the clamping mechanism contacting the guide rail.
3. Hand-tighten the hex socket screws to temporarily pre-secure the clamp onto the sliding table.
4. Perform clamping actions on the guide rail, repeating the clamping and releasing processes at least 10 times.
5. With the clamp in the clamped state on the guide rail, use a torque wrench to tighten the bolts according to the specified torque. Release the clamp and verify that the clamping mechanism does not contact the guide rail (push the sliding table back and forth to compare friction before and after fixing the clamp; if friction increases, loosen the bolts and readjust the clamp).
6. Finally, check for air leakage at the tubing connections.

Attention Issues

1. Normally closed clamps are shipped with a spacer between the clamping mechanisms. Do not remove the spacer except during installation.
2. To avoid eccentric loading, clamps must be installed on all guide rails.
3. Install an air filter with a filtration level of 25 μm or finer.
4. It is recommended to use air tubing with an outer diameter of Φ6mm or larger. A smaller outer diameter will result in a longer reaction time.
5. Keep the tubing length as short as possible. Longer tubing leads to a longer reaction time.
6. The mounting through-holes connecting the clamp to the worktable should have a tolerance of +0.5mm, and the hole edges in contact with the clamp should have a chamfer of C0.3mm.
7. It is recommended to use a normally closed solenoid valve with a fast response time in conjunction with the clamp. Refer to the diagram on the right for the connection method.



Linear guide clamp

EZ Pneumatic Normally Open Series

Linear guide clamp

EZ Pneumatic Normally Open Series

Features

Utilizing the wedge block force amplification principle, clamping is achieved through pneumatic pressure.  
 Compact in structure yet powerful in holding force.  
 Innovatively designed to avoid rigid impact during clamping.  
 Easy to install, connects directly to the worktable without requiring modifications to the worktable dimensions.  
 Provides precise positioning, suitable for pneumatic clamping on motion axes.

	Response Time	Operating Pressure	Operating Temperature
Pneumatic Normally Open Type	≤0.06S	0.2~0.8MPa	0°C~70°C

Note: The holding force values in the table correspond to an air pressure of 0.6 MPa; the holding force is proportional to pressure within the operating pressure range.



EZ Series Clamps for Ball-type Linear Guides

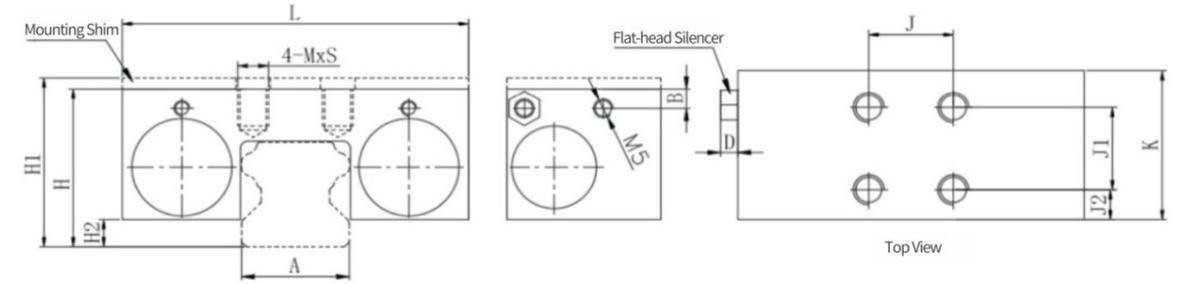
Model Code	Rated Holding Force (N)	Air Consumption (l/cycle)
EZ15	650	0.011
EZ20	1000	0.019
EZ25	1200	0.021
EZ30	1750	0.031
EZ35	2000	0.031
EZ45	2250	0.041
EZ55	2250	0.041



EZ Series Clamps for Roller-type Linear Guides

Model Code	Rated Holding Force (N)	Air Consumption (l/cycle)
EZ25R	1200	0.02
EZ30R	1750	0.028
EZ35R	2000	0.03
EZ45R	2250	0.04
EZ55R	2250	0.04
EZ65R	2250	0.07

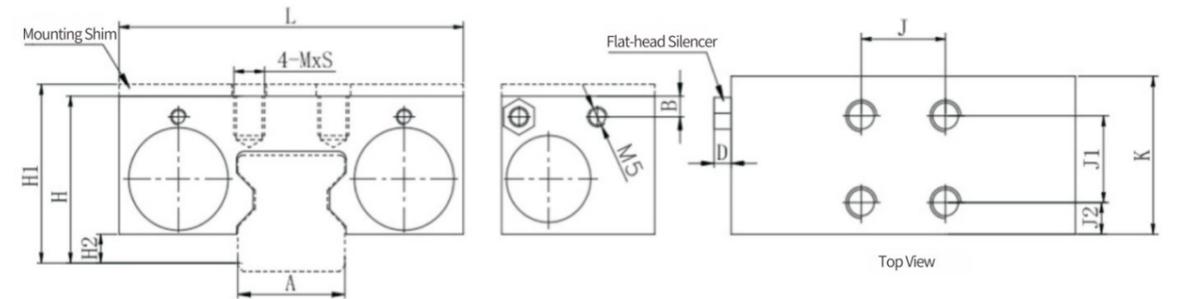
Dimensional Chart



Unit: mm

Model Code	H	H1	H2	L	M	S	A	B	D	J	J1	J2	K
EZ15	24	28	2.5	60	M4	5	15	4	4.5	15	15	16.5	42
EZ20	30	-	4	67	M5	5	20	4.55	4.5	20	20	8	39
EZ25	36	40	6	74	M6	7	23	4	4.5	20	20	10	37
EZ30	42	45	7	90	M8	10	28	5.5	4.5	22	22	8	41
EZ35	48	55	7	100	M8	12	34	7.5	4.5	24	24	8.5	41
EZ45	60	70	13	120	M8	12	45	12	4.5	26	26	11	49
EZ55	70	80	18.5	128	M10	15	53	15.5	4.5	30	30	9.5	49

H1 represents the height of the clamp after adding the mounting shim when used with a square sliding block.



Unit: mm

Model Code	H	H1	H2	L	M	S	A	B	D	J	J1	J2	K
EZ25R-H	36	40	4.5	74	M6	7	23	6.5	4.5	20	20	7	37
EZ30R-H	42	45	5	90	M8	9	28	7.25	4.5	22	22	10	41
EZ35R-H	48	55	5	100	M8	11	34	10	4.5	24	24	8.5	41
EZ45R-H	60	70	8	120	M8	12	45	16	4.5	26	26	11	49
EZ55R-H	70	80	10	128	M10	12	53	19	4.5	30	30	9.5	49
EZ65R-H	90	90	13	138	M10	15	63	25.5	4.5	30	30	9.5	49

H1 represents the height of the clamp after adding the mounting shim when used with a square sliding block.

Linear guide clamp

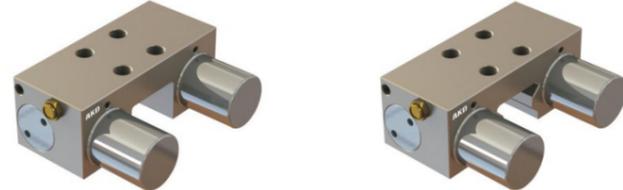
EZS Normally Closed Pneumatic Series

Linear guide clamp

EZS Normally Closed Pneumatic Series

Features

Clamping is achieved by spring energy storage acting on the wedge block.  
Clamping is released via pneumatic pressure (available in standard and low-pressure series based on different release pressures).  
Easy installation, connects directly to the worktable without requiring modifications to the worktable dimensions.  
High positioning accuracy, suitable for fixing machining center worktables.



EZS Series Clamps for Ball-type Linear Guides    EZS Series Clamps for Roller-type Linear Guides

Standard Series

	Release Pressure	Pressure-boosted Connection	Response Time	Operating Temperature
Pneumatic Normally Closed Type	0.55~0.8MPa	0.2~0.8MPa	≤0.06S	0°C~70°C

Model Code	Rated Holding Force (N)		Air Consumption (L/Cycle)	
	Standard Connection	Pressure-boosted Connection	Standard Connection	Pressure-boosted Connection
EZS15	400/1050		0.011/0.035	
EZS20	600/1300		0.019/0.063	
EZS25 EZS25R	750/1500		0.021/0.068	
EZS30 EZS30R	1050/2600		0.031/0.121	
EZS35 EZS35R	1250/2800		0.031/0.129	
EZS45 EZS45R	1450/3300		0.041/0.175	
EZS55 EZS55R	1450/3300		0.041/0.175	
EZS65R	1450/3300		0.041/0.175	

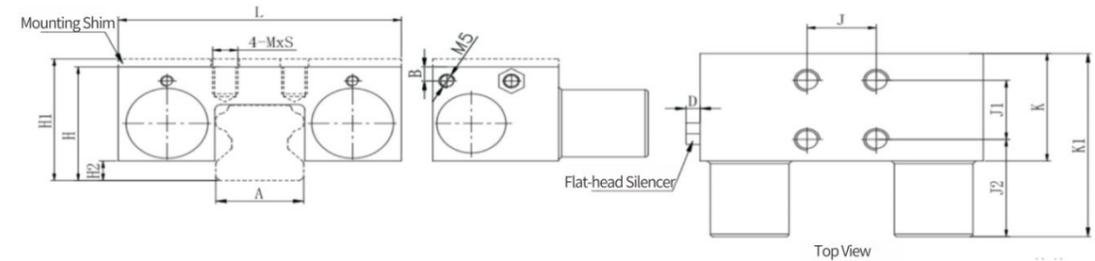
Use the low-pressure series when the operating pressure is below 0.55 MPa.

Low-Pressure Series

	Release Pressure	Pressure-boosted Connection	Response Time	Operating Temperature
Pneumatic Normally Closed Type	0.4~0.8MPa	0.2~0.8MPa	≤0.06S	0°C~70°C

Model Code	Rated Holding Force (N)		Air Consumption (L/Cycle)	
	Standard Connection	Pressure-boosted Connection	Standard Connection	Pressure-boosted Connection
EZS15-04	300/650		0.008/0.025	
EZS20-04	500/1200		0.014/0.045	
EZS25-04 EZS25R-04	650/1300		0.015/0.049	
EZS30-04 EZS30R-04	850/1700		0.022/0.086	
EZS35-04 EZS35R-04	1100/1900		0.022/0.092	
EZS45-04 EZS45R-04	1350/2000		0.029/0.125	
EZS55-04 EZS55R-04	1350/2000		0.029/0.125	
EZS65R-04	1350/2000		0.029/0.125	

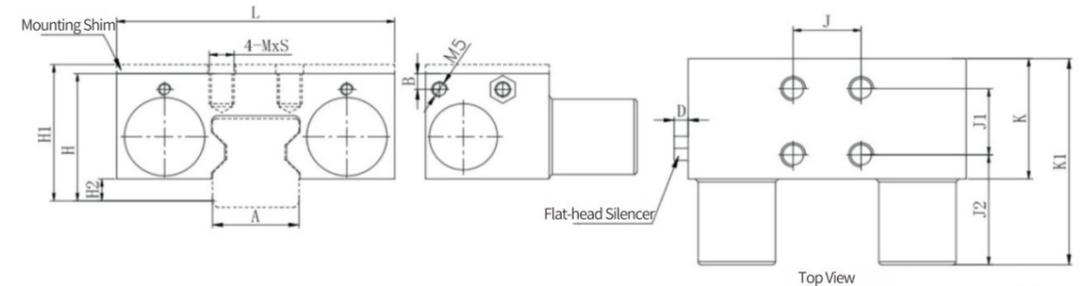
Dimensional Chart



Unit: mm

Model Code	H	H1	H2	L	M	S	A	B	D	J	J1	J2	K	K1
EZS15 EZS15-04	24	28	2.5	60	M4	5	15	12.5	4.5	15	15	37.5	42	63
EZS20 EZS20-04	30	-	4	67	M5	5	20	4.55	4.5	20	20	30	39	61
EZS25 EZS25-04	36	40	6	74	M6	7	23	7	4.5	20	20	32	37	59
EZS30 EZS30-04	42	45	7	90	M8	10	28	5.5	4.5	22	22	36	41	69
EZS35 EZS35-04	48	55	7	100	M8	12	34	9.5	4.5	24	24	36.5	41	69
EZS45 EZS45-04	60	70	13	120	M8	12	45	14.5	4.5	26	26	44	49	82
EZS55 EZS55-04	70	80	18.5	128	M10	15	53	18.5	4.5	30	30	42.5	49	82

H1 represents the height of the clamp after adding the mounting shim when used with a square sliding block.



Unit: mm

Model Code	H	H1	H2	L	M	S	A	B	D	J	J1	J2	K	K1
EZS25R-H EZS25R-H-04	36	40	4.5	74	M6	7	23	6	4.5	20	20	29	37	59
EZS30R-H EZS30R-H-04	42	45	5	90	M8	9	28	6	4.5	22	22	38	41	69
EZS35R-H EZS35R-H-04	48	55	5	100	M8	11	34	13.2	4.5	24	24	36.5	41	69
EZS45R-H EZS45R-H-04	60	70	8	120	M8	12	45	16	4.5	26	26	44	49	82
EZS55R-H EZS55R-H-04	70	80	10	128	M10	12	53	19	5.5	30	30	42.5	49	82
EZS65R-H EZS65R-H-04	90	90	13	138	M10	15	63	25.5	5.5	30	30	42.5	49	82

H1 represents the height of the clamp after adding the mounting shim when used with a square sliding block.

Linear Shaft Clamp

EZG Pneumatic Normally Open Series

Linear Shaft Clamp

EZG Pneumatic Normally Open Series

Features

- Leveraging the wedge block force amplification principle, clamping is achieved through pneumatic pressure.
- Compact in structure with powerful holding force.
- Innovatively designed to avoid rigid impact during clamping.
- Easy to install—connects directly to the worktable without requiring modifications to its dimensions.
- Offers precise positioning, ideal for pneumatic clamping on motion axes.

	Response Time	Operating Pressure	Operating Temperature
Pneumatic Normally Open Type	≤0.06S	0.2~0.8MPa	0°C~70°C

Note: The holding force values in the table correspond to an air pressure of 0.6 MPa; the holding force is proportional to pressure within the operating pressure range.



EZ-G Series Normally Open Clamps for Linear Optical Axes

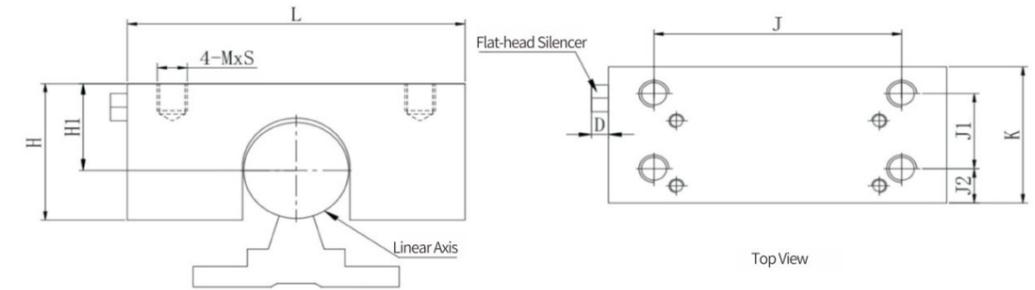
Model Code	Rated Holding Force (N)	Air Consumption (l/cycle)
EZ12G	650	0.019
EZ16G	650	0.021
EZ20G	1000	0.019
EZ25G	1200	0.021
EZ30G	1750	0.031
EZ32G	1850	0.031
EZ40G	1850	0.041



EZS-G Series Normally Closed Clamps for Linear Optical Axes

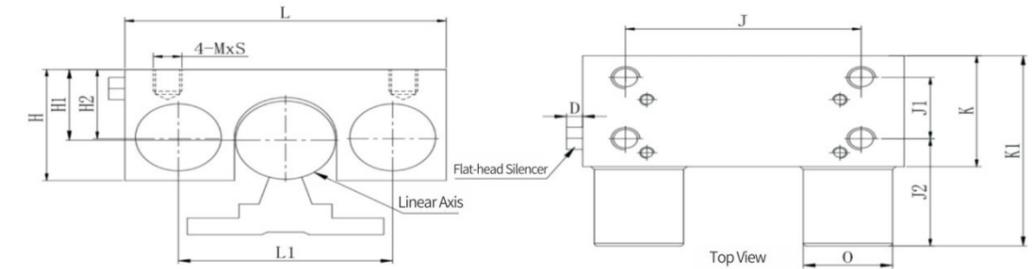
Model Code	Rated Holding Force (N)	Air Consumption (l/cycle)
EZS12G	350	0.019
EZS16G	400	0.021
EZS20G	600	0.019
EZS25G	750	0.021
EZS30G	1050	0.031
EZS32G	1650	0.031
EZS40G	1650	0.041

Dimensional Chart



Unit: mm

Model Code	H	H1	L	M	S	D	J	J1	J2	K
EZ12G	27.5	17.5	56	M5	6	4.5	15	15	11	37
EZ16G	32	20	60	M5	6	4.5	15	15	12.5	37
EZ20G	38	23	67	M8	10	4.5	45	18	13	39
EZ25G	43	27	77	M10	12	4.5	60	20	13.5	42
EZ30G	48.5	33	92	M10	12	4.5	68	25	14	48.5
EZ32G	62	44.5	120	M10	15	4.5	90	26	14	49
EZ40G	62	44.5	120	M10	15	4.5	90	26	14	49



Unit: mm

Model Code	H	H1	H2	L	L1	M	S	O	D	J	J1	J2	K	K1
EZS12G	27.5	17.5	18	56	34	M5	6	16	4.5	15	15	32	37	58
EZS16G	32	20	22	60	38	M8	6	16	4.5	15	15	33.5	37	58
EZS20G	38	23	25	67	44	M10	10	20	4.5	45	18	35	39	61
EZS25G	43	27	29	77	51	M10	12	22	4.5	60	20	35.5	42	64
EZS30G	48.5	33	34	92	61	M10	12	25	4.5	68	25	42	48.5	76.5
EZS32G	62	44.5	45	120	78	M10	15	30	4.5	90	26	47	49	82
EZS40G	62	44.5	45	120	78	M10	15	30	4.5	90	26	47	49	82

Manual Series Clamp

EZ-SD Series

Manual Series Clamp

EZ-SD Series

Features

- Low Cost
- Compact Design
- Easy Installation



EZ-SD Series Manual Clamps for Linear Guides

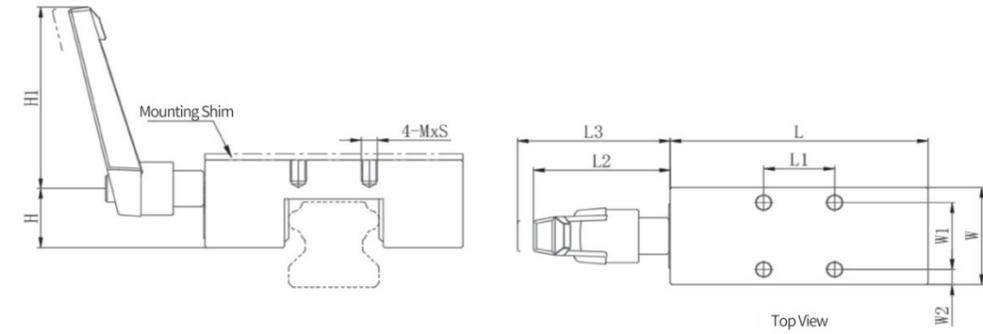
Model Code	Rated Holding Force (N)
EZ15-SD	1200
EZ20-SD	1200
EZ25-SD	1200
EZ30-SD	2000
EZ35-SD	2000
EZ45-SD	2000



EZG-SD Series Manual Clamps for Optical Axis Guides

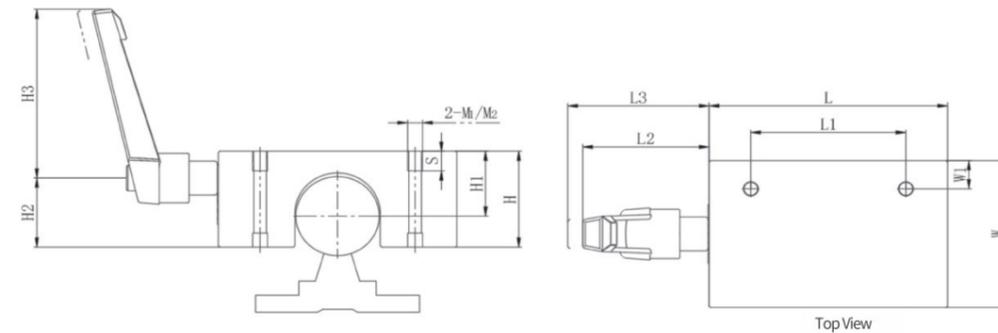
Model Code	Rated Holding Force (N)
EZ12G-SD	1200
EZ16G-SD	1200
EZ20G-SD	1200
EZ25G-SD	2000
EZ30G-SD	2000
EZ40G-SD	2000

Dimensional Chart



Unit: mm

Model Code	H	H1	M	S	L	L1	L2	L3	W	W1	W2
EZ15-SD	13	50	M4	5	47	17	33.5	35.5	24	17	3.5
EZ20-SD	14.25	50	M5	6	60	15	33.5	35.5	24	15	4.5
EZ25-SD	16.25	50	M6	7	70	20	33.5	35.5	30	20	5
EZ30-SD	20	63	M6	7	90	22	44.5	46.5	39	22	8.5
EZ35-SD	22	63	M8	10	100	24	44.5	46.5	39	24	7.5
EZ45-SD	30.5	63	M10	13	120	26	44.5	46.5	44	26	9



Unit: mm

Model Code	H	H1	H2	H3	M1	M2	S	L	L1	L2	L3	W	W1
EZ12G-SD	24	18	16	45	M5	M4	10	43	32	33.5	33.5	32	4.5
EZ16G-SD	29	22	19	45	M6	M5	12	53	40	33.5	33.5	38	5.5
EZ20G-SD	32	25	21.5	63	M6	M6	14	60	45	33.5	33.5	44	6.5
EZ25G-SD	38	30	25	63	M10	M8	16	78	60	44.5	46.5	52	9
EZ30G-SD	43	35	28.5	78	M10	M8	16	87	68	44.5	46.5	58	10
EZ40G-SD	53	45	24.5	92	M12	M10	20	108	86	44.5	46.5	68	11

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01	中国China
02	香港Hong Kong
03	台湾Taiwan
04	美国United States
05	新加坡Singapore
06	马来西亚Malaysia
07	越南Vietnam
08	印度India
09	印度尼西亚Indonesia
10	俄罗斯Russia
11	欧盟（德国、法国等）European Union (Germany, France, etc.)
12	韩国South Korea
13	墨西哥Mexico
14	泰国Thailand
15	巴西Brazil
16	埃及Egypt
17	日本Japan
18	中东Middle East

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