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LINEAR GUIDEWAY

Slider/ Guideway

HENGERDA NEW MATERIALS (FUJIAN) CO., LTD.

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DSAC_C：Standard /Low Assembly/Flange Slider

DSAC_V：Standard /Low Assembly/Square Slider

DSAH_C：Standard /High Assembly/Flange Slider

DSAH_V：Standard /High Assembly/Flange Slider

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Hengerda New Materials (Fujian) Co., Ltd. (Stock Code: 300946.SZ) was founded in 1995. On February 8, 2021, it was listed on the ChiNext of the Shenzhen Stock Exchange. Hengerda is a national high-tech enterprise focusing on the new metal materials. It mainly engages in the R&D, production, sales and service in terms of various high tenacity materials, multi-metal composite materials, die-cutting tools, sawing tools, intelligent equipment and functional components and other series of products. Hengerda is committed to providing product lines and integrated accessory equipment of cutting solutions to light, heavy and military industry, machinery, construction and building materials, intelligent manufacturing and other fundamental industries of the national economy.

Hengerda' s main suppliers and clients are well-known enterprises at home and abroad. Its overseas markets have been laid out in North and South America, Europe, Africa, Southeast Asia, the Middle East as well as other countries and regions along the Belt and Road.

In 2022, the company engaged in the core functional components of intelligent equipment, layout of linear Guideway, ball screws and other product lines. It is aimed at promoting the product series in Hengerda, and equipping it with a business layout featured by the integration and R&D, production and sales in the key functional components. Linear Guideway series products in Hengerda are characterized by "low noise and high smoothness". They are mainly applied in the linear reciprocating motion occasions of automation and high-end precision equipment. In the case of heavy load or high-speed movement, they can still ensure high precision reciprocating linear transmission, which is a fundamental support to improve intelligent manufacturing.

A Terminologies

01 Load and Life (L)

When choosing the linear guideway, it' s required to get the load of each slider in accordance with the structure of the equipment and the external force on the slider through calculations. By comparing the slider' s basic static load rating (C0) and the static permissible moment (Mx, My, Mz) as well as other parameters, the static safety factor (fs) can be acquired so as to determine the reliability of mechanism. As for the evaluation of the service life, the basic dynamic load rating (C) is applied to calculate the operating life (distance) of the linear guideway.

02 Basic Dynamic Load Rating (C)

Dynamic load rating refers to a radial load when a batch of linear guideways of same size goes through a 50 km operation (rolling parts for steel balls), and more than 90% of the bead groove track or steel ball surface does not produce fatigue damage (stripping flaking or pitting). Dynamic load rating values are recorded in the dimension tables. Valuesof reliability fr refer to the following table.

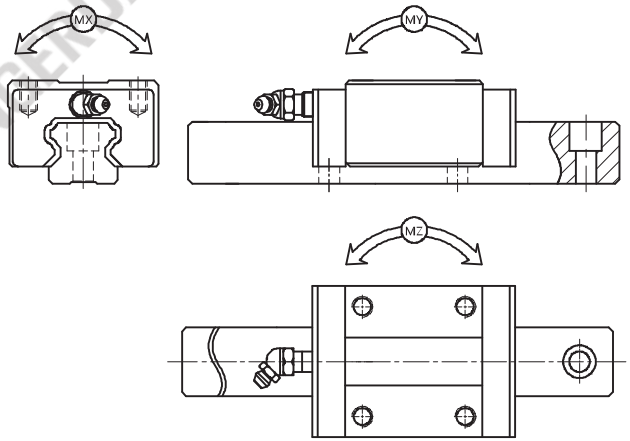
Reliability	90%	95%	96%	97%	98%	99%
fr	1	0.62	0.53	0.44	0.33	0.21

03 Basic Static Load Rating (C0)

When the linear guideways are subjected to excessive loads or shocks at rest or during operation, the track groove and steel ball shall lead to permanent deflection. When the deflection reaches a permanent volume of one ten thousandth of the diameter of the rolling element (steel ball), the linear guideway would not run as smoothly. The static load is the basic static load rating (C0).

04 Basic Allowable Load Rating-KN (Mx, My, Mz)

When the linear guideway is subjected to a force moment, the permanent deflection of the track groove and the steel ball reaches one ten thousandth of the steel ball. This force moment is called the static permissible moment of the slider. Mx, My and Mz are the values for the linear guideway in the three axes X, Y and Z, which are illustrated in the table below:



05 Static Safety Factor(fs)

Static safety factor refers to the ratio of the basic static load rating (C0) to the maximum equivalent load of the linear guideway. The value demonstrates the reliability of linear guideway at a standstill. Equivalent load is the stress on the arc groove of the linear guideway. The value is the vertical and horizontal load on the slider. In the case of the trains of balls are designed to a contact angle of 45°, the equivalent load is the sum of the absolute values of both the horizontal and the vertical force.

$$f_s = \frac{fc \cdot C0}{P} \qquad f_s = \frac{fc \cdot M0}{M}$$

f_s : Static Safety Factor
$C0$: Basic Static Load Rating
P : Equivalent Load
fc : Contact Factor
$M0$: Static Permissible Moment
M : Equivalent moment

The following are the reference values for the static safety factor (fs).

Operating Conditions	Loading Conditions	Fs Reference Value
General Industrial Machine	Light Impact/Torsion/Vibration	1.0 ~ 1.3
	Heavy Impact/Torsion/Vibration	2.0~ 3.0
Machine Tool	Light Impact/Torsion/Vibration	1.0 ~ 1.5
	Heavy Impact/Torsion/Vibration	2.5 ~ 5.0

06 Nominal Life (L)

Linear guideways are mass-produced products.. Despite the same process and raw materials, the guidewayss generate different service lives under similar operating circumstances. The nomial life (L) is defined as a total running distance where 90% of the linear guideways of same size can work without developing metal fatigue or flaking.

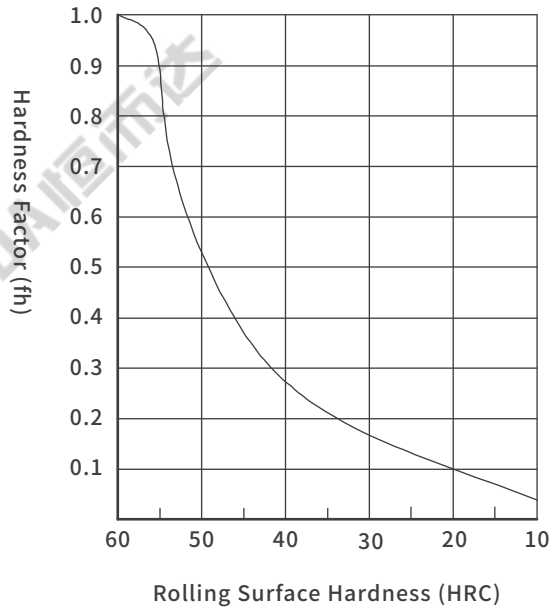
07 Contact Factor (fc)

When sliders are used closely together, it is usually not easy to obtain a uniform load distribution under the influence of moment and mounting precision. Therefore, when using 2 or more sliders in close proximity, the basic dynamic load rating (C) and the basic static load rating (C0) should be multiplied by the contact factor (fc).

Number of Sliders Used	Contact Factor fc
2	0.81
3	0.72
4	0.66
5	0.61
Normal Use	1

08 Hardness Factor (fh)

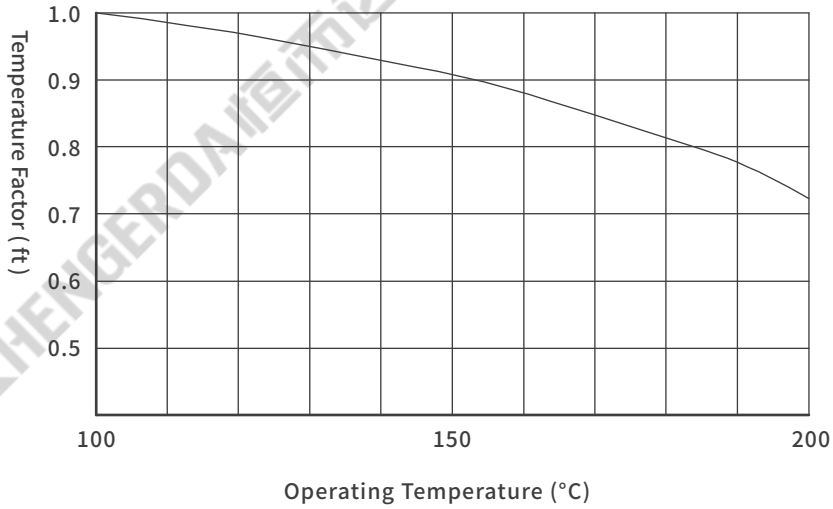
In order to achieve the optimum load bearing capacity of the linear guideway, the hardness of the rolling surface should preferably be in the range of HRC 58 to 62. If its hardness is lower than HRC 58, the nominal life and permissible load rating would decrease. Therefore, the hardness factor (fh) is required to be included in the calculation of basic dynamic load rating (C) and the basic static load rating (C0).



09 Temperature Factor (ft)

When linear guideways are used at temperatures above 100°C, the temperature factor must be taken into account in the calculation of basic dynamic and static load rating.

Note: Dust scrapers, retainers, spacers and end caps made of high temperature resistant materials must be used when the ambient temperature exceeds 80°C.



10 Load Factor (fw)

The operation of the reciprocal motonis prone to generate vibration and shock. Especially at high-speed operation and frequent start-stop movement, forces are apt to emerge, including vibration, inertia and shock. When the above factors have a large impact, it is suggested to refer to the load factor in the table below divided by the basic dynamic rated load (C).

Vibration, Shock	Velocity (V)	Vibration Values (G)	fw
Micro	Micro speed V ⩽ 15 m/min	G ⩽ 0.5	1.0 ~ 1.5
Low	Low speed 15 < V ⩽ 60 m/min	0.5 < G ⩽ 1.0	1.5 ~ 2.0
High	High speed V > 60 m/min	1.0 < G ⩽ 2.0	2.0 ~ 3.5

11 Serive Life Calculation Formula

Substituting the basic dynamic load rating C and the equivalent load P, the service life of the rail can be calculated as follows.

$$L = \left(\frac{fh \cdot ft \cdot fc}{fw} \cdot \frac{C}{P} \right)^3 \cdot 50km$$

12 Nominal Life (L: km)

It refers to a running distance that a batch of identical linear motion systems move under the same circumstances, 90% of which will run without surface flaking.

C : Basic Dynamic Load Rating
P : Equivalent Load
fh : Hardness Factor
ft : Temperature Factor
fc : Contact Factor
fw : Load Factor

After figuring out the nomial life (L), the service life can be deduced from the reciprocating length and number of movements.

$$Ln = \frac{L \cdot 10^6}{2 \cdot Ls \cdot N1 \cdot 60}$$

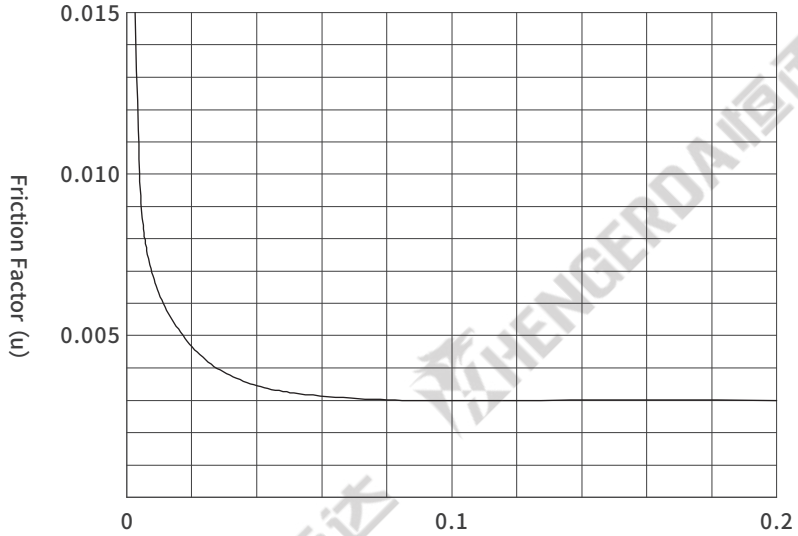
Ln = Service Life (hr)
$N1$ = Round Trips per minute
Ls = Stroke Length (mm)

13 Friction

A linear guideway is composed by the slider, guide rail and rollingelements. The rolling element is steel ball. The movement of linear guideway system is the rolling movement between the rail and slider through the rolling elements. Therefore, the friction resistance can be as small as 1/20 ~ 1/40 compared with the sliding movement of the guideway. The force of guideway is extremely small from a standstill state to start moving. Idle phenomenon barely emerges, so the linear guideway can be applied in various precision movement. The guideway friction resistance changes along with guideway design, preloadmagtitude, lubricant viscosity resistance and load on the rail. In particular, when the rail is affected by force moment or the preload imposed in order to improve the rigidity of the linear guideway system, its frictional resistance will increase. The performance of DAJU linear guideway frictional force is illustrated in the table.

Unit：Kgf

Specifications and Models	F: Friction Resistance-ZA
DSA 15	0.20
DSA 20	0.30
DSA 25	0.35
DSA 30	0.40
DSA 35	0.60
DSA 45	0.80
DSA 55	1.05
DSA 65	1.30



Load Ratio: (P/C)

P:Equivalent Load C:Basic Dynamic Load Rating

Friction Resistance can be calculated by the following formula:

$$F = u * W + f$$

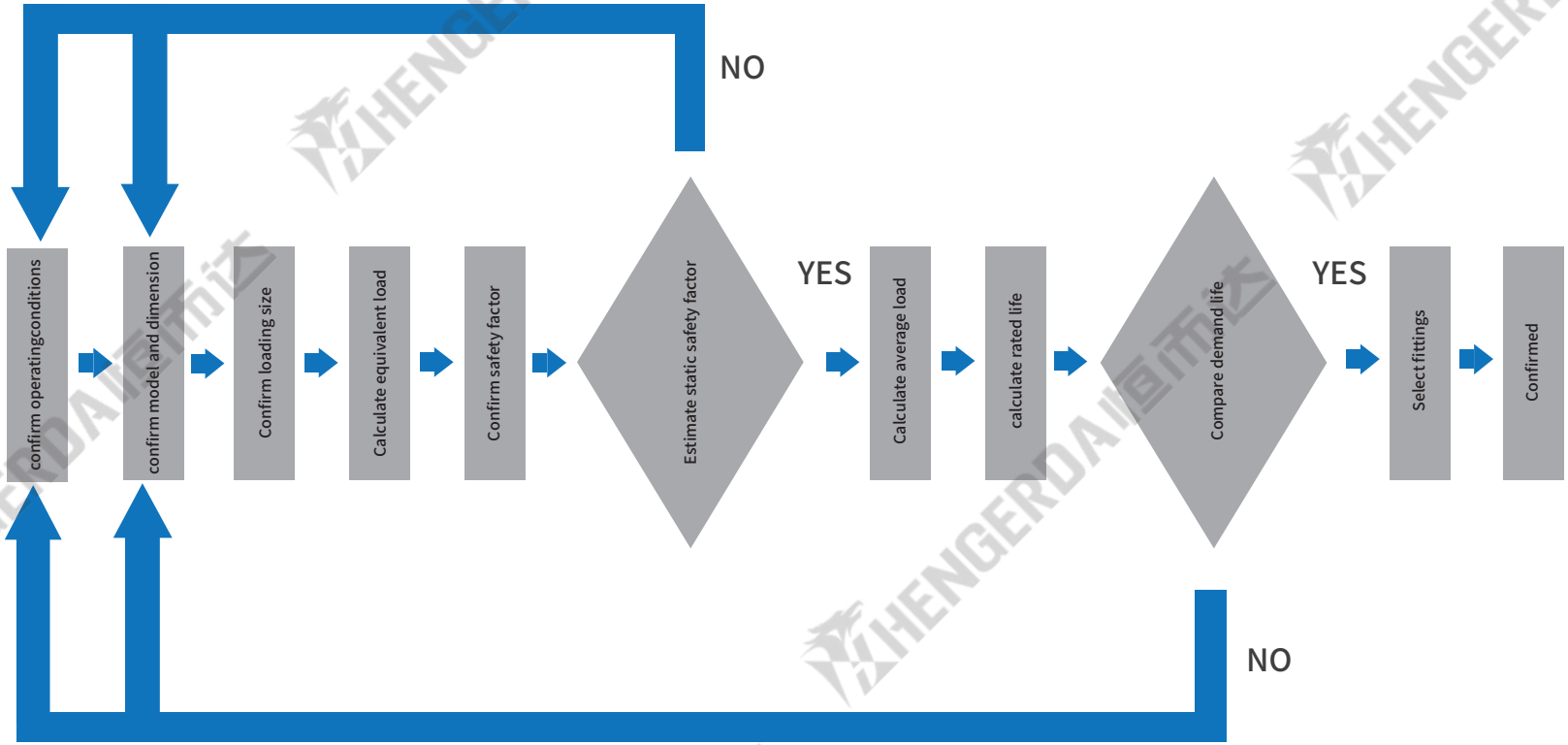
F ： Friction

W ： Weight

u ： Friction Factor

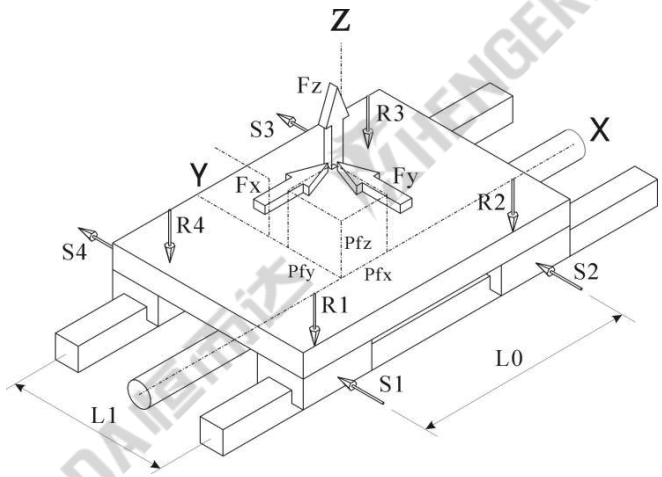
f ： Starting Resistance of sliders

B Selection Procedures of the Guideway



C Linear Guideway Calculation Examples

01 Load calculation formula



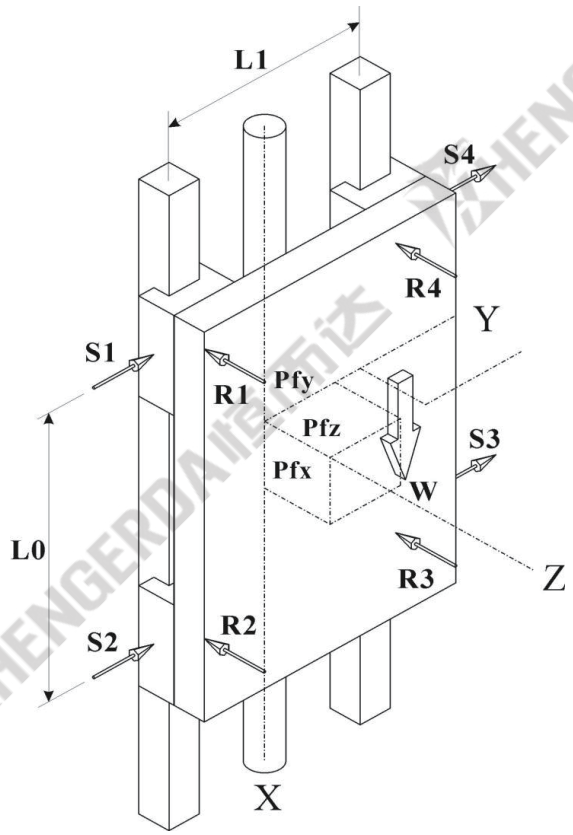
R1= -Fz/4+(Fz*Pfy-Fy*Pfz)/(2*L1)-(Fx*Pfz-Fz*Pfx)/(2*L0)
R2= -Fz/4+(Fz*Pfy-Fy*Pfz)/(2*L1)+(Fx*Pfz-Fz*Pfx)/(2*L0)
R3= -Fz/4-(Fz*Pfy-Fy*Pfz)/(2*L1)+(Fx*Pfz-Fz*Pfx)/(2*L0)
R4= -Fz/4-(Fz*Pfy-Fy*Pfz)/(2*L1)-(Fx*Pfz-Fz*Pfx)/(2*L0)
S1= Fy/4+(Fy*Pfx-Fx*Pfy)/(2*L0) S2= Fy/4-(Fy*Pfx-Fx*Pfy)/(2*L0)
S3= Fy/4-(Fy*Pfx-Fx*Pfy)/(2*L0) S4= Fy/4+(Fy*Pfx-Fx*Pfy)/(2*L0)
△ X= (R2-R1)*(Pfz)/(L0*Kr)-(S1-S2)*(Pfy)/(L0*Ks)
△ Y= (R2-R3)*(Pfz)/(L1*Kr)+(S2-S1)*(Pfx)/(L0*Ks)+(S2+S1)/(2*Ks)
△ Z= (R2+R4)/(2*Kr)+(R2-R1)*(Pfx)/(L0*Kr)-(R2-R3)*Pfy)/(L1*Kr)

Input user' s data:
Fx : Load – X Direction (- or +) kgf
Fy : Load – Y Direction (- or +) kgf
Fz : Load – Z Direction (- or +) kgf
Pfx : Location – X Direction (- or +) mm
Pfy : Location – Y Direction (- or +) mm
Pfz : Location – Z Direction (- or +) mm
L0 : Distance between sliders (mm)
L1 : Distance between Guideways (mm)

DAJU Linear Guideway Load (kgf):
R1 : Radial load of slider 1 (- or +)
R2 : Radial load of slider 2 (- or +)
R3 : Radial load of slider 3 (- or +)
R4 : Radial load of slider 4 (- or +)
S1 : Lateral load of slider 1 (- or +)
S2 : Lateral load of slider 2 (- or +)
S3 : Lateral load of slider 3 (- or +)
S4 : Lateral load of slider 4 (- or +)

Load Deflection (mm):
Kr : Rigidity value of radial slider (kgf/um)
Ks : Rigidity value of lateral slider (kgf/um)
△X : X direction deflection (- or +) mm
△Y : Y direction deflection (- or +) mm
△Z : Z direction deflection (- or +) mm

02 Life calculation paradigm



Operating speed of the calculation paradigm ca be divided into three stages:

Stage 1: Subject to

W (Weight) and ---------- Fx(W)

(W/g) * A (Acceleration) ---------- Fx(A)

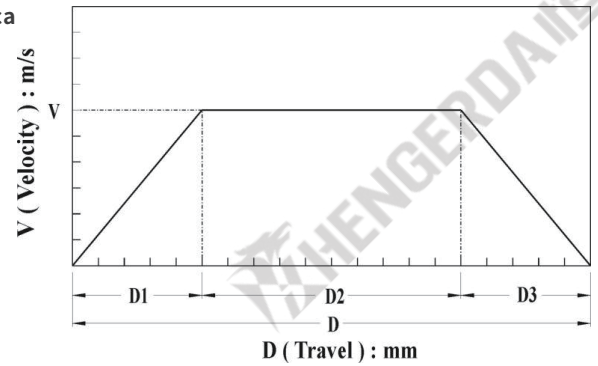
Stage 2: Subject to

W (Weight) ---------- Fx(W)

Stage 3: Subject to

W(Weight) and ---------- Fx(W)

(W/g)*(-A)(减速度) ---------- Fx(-A)



2-1 Input user's data:

V*V = V0*V0 + 2*A*D1 => A = (V*V – V0*V0)/(2*D1)

D1 = 1000 mm D2 = 2000 mm D3 = 1000 mm

V = 1 m/s V0 = 0 m/s => (A) = 0.5 m/s2 (acceleration)

V = 0 m/s V0 = 1 m/s => (-A) = -0.5 m/s2 (deceleration)

Fx(W) = 98 kgf Fy(W) = 0 Fz(W) = 0

Fx(A) = (98/9.8)*0.5 = 5kgf Fy(A) = 0 Fz(A) = 0

Fx(-A) = (98/9.8)*(-0.5) = -5kgf Fy(-A) = 0 Fz(-A) = 0

Pfx = 80 mm Pfy = 250 mm Pfz = 280 mm

L0 = 300 mm L1 = 500 mm fw = 1.5

2-2 Calculate the load of sliders :

R1(W) = -Fx(W)*Pfz/(2*L0) = -45.73 kgf
S1(W) = -Fx(W)*Pfy/(2*L0) = -40.83 kgf
R2(W) = Fx(W)*Pfz/(2*L0) = 45.73 kgf
S2(W) = Fx(W)*Pfy/(2*L0) = 40.83 kgf
R3(W) = Fx(W)*Pfz/(2*L0) = 45.73 kgf
S3(W) = Fx(W)*Pfy/(2*L0) = 40.83 kgf
R4(W) = -Fx(W)*Pfz/(2*L0) = -45.73 kgf
S4(W) = -Fx(W)*Pfy/(2*L0) = -40.83 kgf

R1(A) = -Fx(A)*Pfz/(2*L0)= -2.33 kgf
S1(A) = -Fx(A)*Pfy/(2*L0) = -2.08 kgf
R2(A) = Fx(A)*Pfz/(2*L0) = 2.33 kgf
S2(A) = Fx(A)*Pfy/(2*L0) = 2.08 kgf
R3(A) = Fx(A)*Pfz/(2*L0) = 2.33 kgf
S3(A) = Fx(A)*Pfy/(2*L0) = 2.08 kgf
R4(A) = -Fx(A)*Pfz/(2*L0) = -2.33 kgf
S4(A) = -Fx(A)*Pfy/(2*L0) = -2.08 kgf

R1(-A) = -Fx(-A)*Pfz/(2*L0) = 2.33 kgf
S1(-A) = -Fx(-A)*Pfy/(2*L0) = 2.08 kgf
R2(-A) = Fx(-A)*Pfz/(2*L0) = -2.33 kgf
S2(-A) = Fx(-A)*Pfy/(2*L0) = -2.08 kgf
R3(-A) = Fx(-A)*Pfz/(2*L0) = -2.33 kgf
S3(-A) = Fx(-A)*Pfy/(2*L0) = -2.08 kgf
R4(-A) = -Fx(-A)*Pfz/(2*L0) = 2.33 kgf
S4(-A) = -Fx(-A)*Pfy/(2*L0) = 2.08 kgf

Load of sliders – stage 1:

R1(1) = R1(W)+R1(A) = -48.06 kgf
S1(1) = S1(W)+S1(A) = -42.91 kgf
R2(1) = R2(W)+R2(A) = 48.06 kgf
S2(1) = S2(W)+S2(A) = 42.91 kgf
R3(1) = R3(W)+R3(A) = 48.06 kgf
S3(1) = S3(W)+S3(A) = 42.91 kgf
R4(1) = R4(W)+R1(A) = -48.06 kgf
S4(1) = S4(W)+S4(A) = -42.91 kgf

Load of sliders – stage 2:

R1(2) = R1(W) = -45.73 kgf
S1(2) = S1(W) = -40.83 kgf
R2(2) = R2(W) = 45.73 kgf
S2(2) = S2(W) = 40.83 kgf
R3(2) = R3(W) = 45.73 kgf
S3(2) = S3(W) = 40.83 kgf
R4(2) = R4(W) = -45.73 kgf
S4(2) = S4(W) = -40.83 kgf

Load of sliders – stage 3:

R1(3) = R1(W)+R1(-A) = -43.4 kgf
S1(3) = S1(W)+S1(-A) = -38.75 kgf
R2(3) = R2(W)+R2(-A) = 43.4 kgf
S2(3) = S2(W)+S2(-A) = 38.75 kgf
R3(3) = R3(W)+R3(-A) = 43.4 kgf
S3(3) = S3(W)+S3(-A) = 38.75 kgf
R4(3) = R4(W)+R1(-A) = -43.4 kgf
S4(3) = S4(W)+S4(-A) = -38.75 kgf

2-3 Calculate resultant load force of sliders :

DAJU Linear Guideway is designed with the equivalent load from all four trains of balls through the 45 degree contact angle; therefore, the resultant load force can be calculated as follows:

$$Re = Rn + Sn$$

Resultant load force of sliders – Stage1 : R11,R21,R31 & R41

R11 = | R1(1) | + | S1(1) | = 90.97 kgf

R21 = | R2(1) | + | S2(1) | = 90.97 kgf

R31 = | R3(1) | + | S3(1) | = 90.97 kgf

R41 = | R4(1) | + | S4(1) | = 90.97 kgf

Resultant load force of sliders – Stage2 : R12,R22,R32 & R42

R12 = | R1(2) | + | S1(2) | = 86.56 kgf

R22 = | R2(2) | + | S2(2) | = 86.56 kgf

R32 = | R3(2) | + | S3(2) | = 86.56 kgf

R42 = | R4(2) | + | S4(2) | = 86.56 kgf

Resultant load force of sliders – Stage3 : R13,R23,R33 & R43

R13 = | R1(3) | + | S1(3) | = 82.15 kgf

R23 = | R2(3) | + | S2(3) | = 82.15 kgf

R33 = | R3(3) | + | S3(3) | = 82.15 kgf

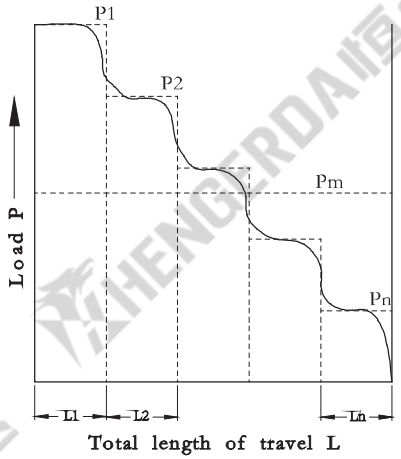
R43 = | R4(3) | + | S4(3) | = 82.15 kgf

2-4 Calculate equivalent load of sliders :

Stepped load

$$Pm = [(P1nxL1+P2nxL2..... +PnnxLn)/L] \ 1/n$$

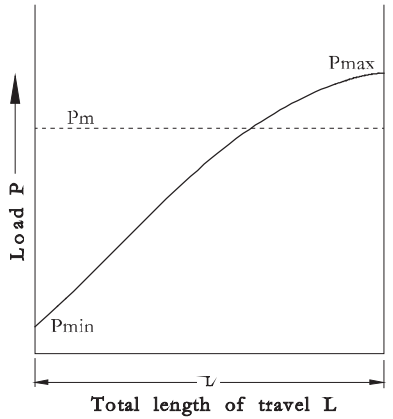
Pm : Equivalent load (kgf)
Pn : Section load (kgf)
L : Total distance (mm)
Ln : Partial distance Pn (mm)
n = 3 Steel balls as rolling elements



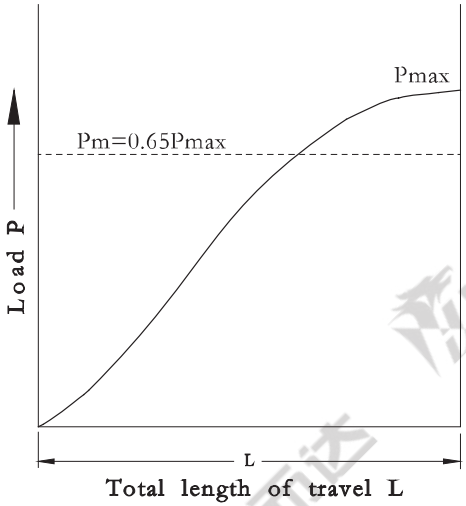
Leaner load

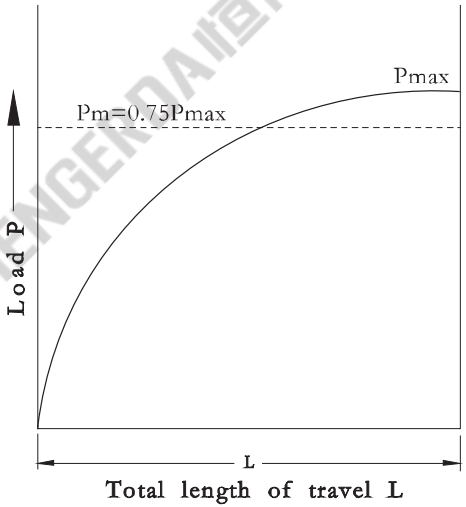
$$Pm = (Pmin+2xPmax)/3$$

Pmin : Minimum load (kgf)
Pmax : Maximum load (kgf)



Sinusoidal load





Paradigm: Equivalent load of sliders (Stepped load calculation) : R1,R2,R3 & R4

R1 = [(R113x1000+R123x2000+R133x1000)/4000] 1/3 = 86.7 kgf
R2 = [(R213x1000+R223x2000+R233x1000)/4000] 1/3 = 86.7 kgf
R3 = [(R313x1000+R323x2000+R333x1000)/4000] 1/3 = 86.7 kgf
R4 = [(R413x1000+R423x2000+R433x1000)/4000] 1/3 = 86.7 kgf

2-5 Calculate nominal life of sliders :

$$L = \left(\frac{fh \cdot ft \cdot fc}{fw} \cdot \frac{C}{P} \right)^3 \cdot 50km$$

DAJU leaner guide : DSAH20CN 2 L4000 NZ0 => C = 1481 kgf C0 = 3234 kgf
Known: (P: Equivalent load of sliders)

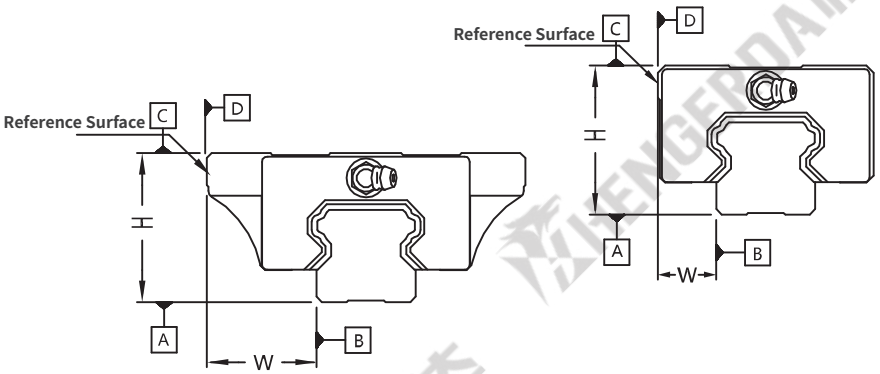
fh = 1 ft = 1 fc = 1 & fw = 1.5
L1 = [C/(R1xfw)] 3 x 50 = 73842.1 km L2 = [C/(R2xfw)] 3 x 50 = 73842.1 km
L3 = [C/(R3xfw)] 3 x 50 = 73842.1 km L4 = [C/(R4xfw)] 3 x 50 = 73842.1 km

2-6 Calculate safety factor :

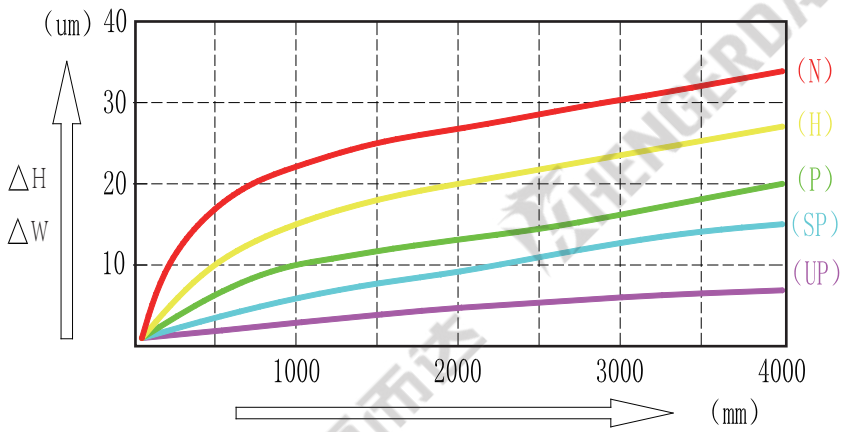
fs = (fc * C0) / P = 3234/R11 = 35.6

(P : Maximum load of sliders = R11 or R21 or R31 or R41)

A Precision standard – DSA series



Guideway length and running precision figure



Guideway length (mm)	Precision Level				
	N	H	P	SP	UP
	Running Parallelism Values for △H and △W values (μm)				
⩽500	17	11	7	4	2
>500～1000	22	15	10	6	3
>1000～1500	25	18	11	8	4
>1500～2000	27	20	13	9	5
>2000～2500	29	22	14	11	6
>2500～3000	30	24	16	12	7
>3000～3500	32	25	18	13	8
>3500～4000	34	27	20	15	9

Item \ Precision Level	Normal (N)	High (H)	Precision (P)	Super precision (SP)	Ultra precision (UP)
Height Tolerance (H)	±0.1	±0.04	0-0.04	0-0.02	0-0.01
Width Tolerance(W)	±0.1	±0.04	0-0.04	0-0.02	0-0.01
Paired Single Axis Combined Height Tolerance (△H)	0.03	0.02	0.01	0.005	0.003
Paired Single Axis Combined Width Tolerance (△W)	0.03	0.02	0.01	0.005	0.003
Running Parallelism of Plane C Relative to Plane A	△H See the figure above and left				
Running Parallelism of Plane D Relative to Plane B	△W See the figure above and left				

A Definition of Preload

C : Basic Dynamic Load Rating

Item / Preload Level	Code	Preload
Zero interspace	Z0	0-0.02 C
Medium Preload	ZA	0.03 C -0.06 C
Heavy Preload	ZB	0.07 C -0.10 C

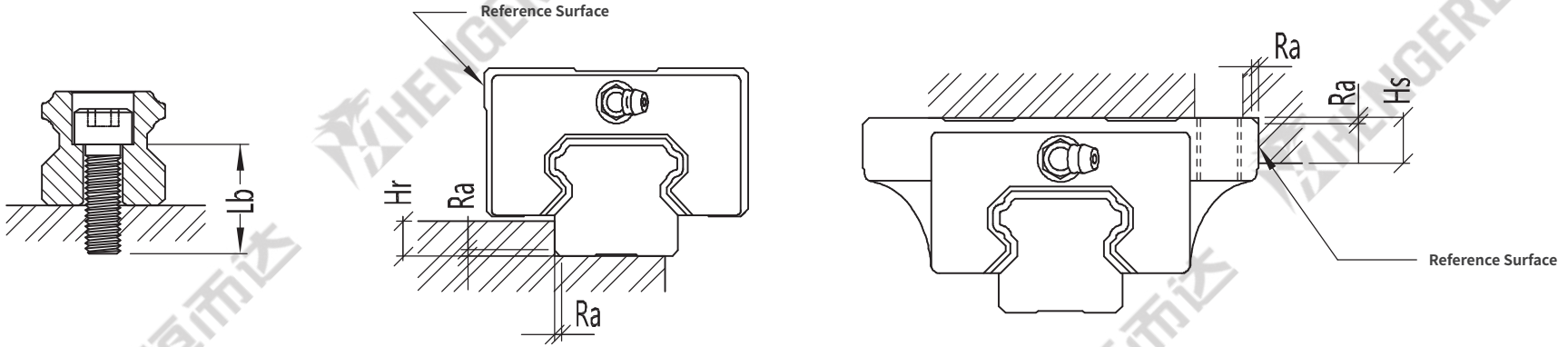
B Radial Clearance Magnitude of Preload

Unit : um

Model / Code	Z0	ZA	ZB
DSA15	-5～0	-12～-5	-
DSA20	-6～0	-12～-6	-18～-12
DSA25	-7～0	-13～-7	-19～-13
DSA30	-8～0	-14～-8	-20～-14
DSA35	-9～0	-17～-9	-24～-17
DSA45	-12～0	-21～-12	-30～-21
DSA55	-14～0	-24～-14	-34～-24
DSA65	-16～0	-27～-16	-39～-27

A Precautions on Guideway Installation

01 Shoulder Heights and Chamfers



Unit : mm

Specifications	Maximum shoulder chamfer(Ra)	Maximum shoulder height of rail(Hr)	Maximum shoulder height of sliders(Hs)	Recommended length of Rail bolts(Lb)
DSA15	0.5	2.8	5	M4*16
DSA20	0.5	4.3	6	M5*20
DSA25	1	5.6	7	M6*25
DSA30	1	6.8	8	M8*30
DSA35	1	7.3	9	M8*30
DSA45	1	8.0	9	M12*35
DSA55	1.5	10.0	10	M14*40
DSA65	1.5	10.0	10	M16*50

02 Threaded Hole Chamfer Dimension on the Surface

2-1 Dimension Tolerance of Datum Plane and Mounting Hole :

The rail or slider may not be in close contact with the datum plane if the dimension tolerance between the rail or slider and datum plane is too large. Normally, the tolerance should be controlled within 0.1 mm.

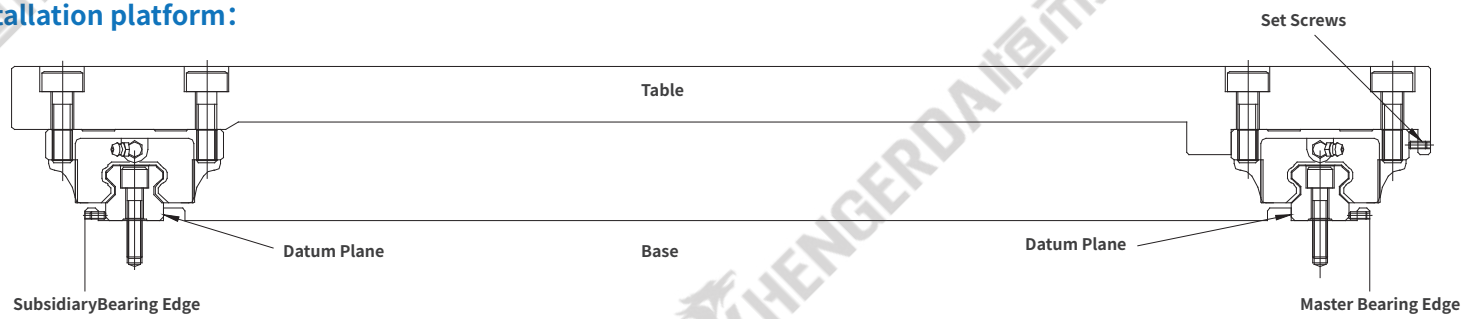
2-2 Threaded Mounting Hole Chamfer :

It is necessary to drill a threaded hole with chamfer on the mounting surface in order to install the rail.
And it will affect the precision if the chamfer is too large or too small.

Size reference for the chamfer: Diameter of the chamfer (D)= Nominal diameter of bolt + Pitch
For example: If the nominal diameter of bolt is M6 (Pitch= 1 mm), then :

03 Linear Guideway Installation Steps

3-1 Standard installation platform:

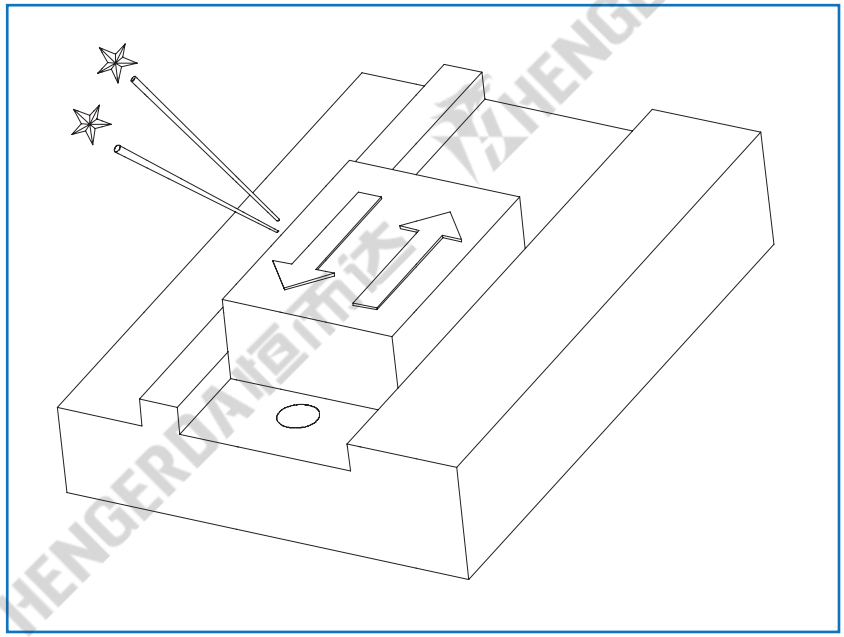


The figure above shows a standard example of parallel using and installation. The installation platform has the following features:

3-1-1: A base contains two datum planes for mounting rail.
3-1-2: A table contains a laterally positioned datum plane and compression screws.
3-1-3: The master side and the table compression screws are on the same side.

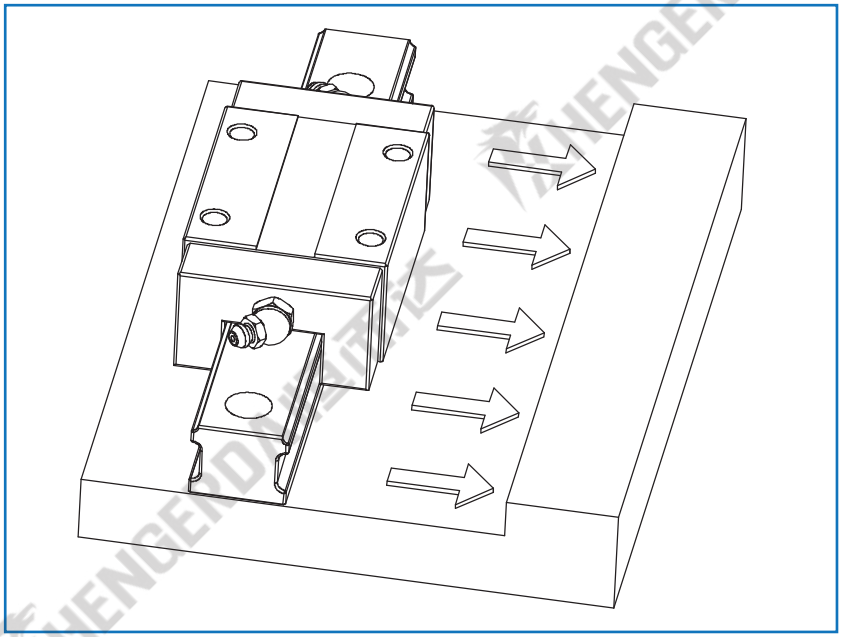
3-2 Installation Steps:

3-2-1: Deburr the mounting surface before installation.



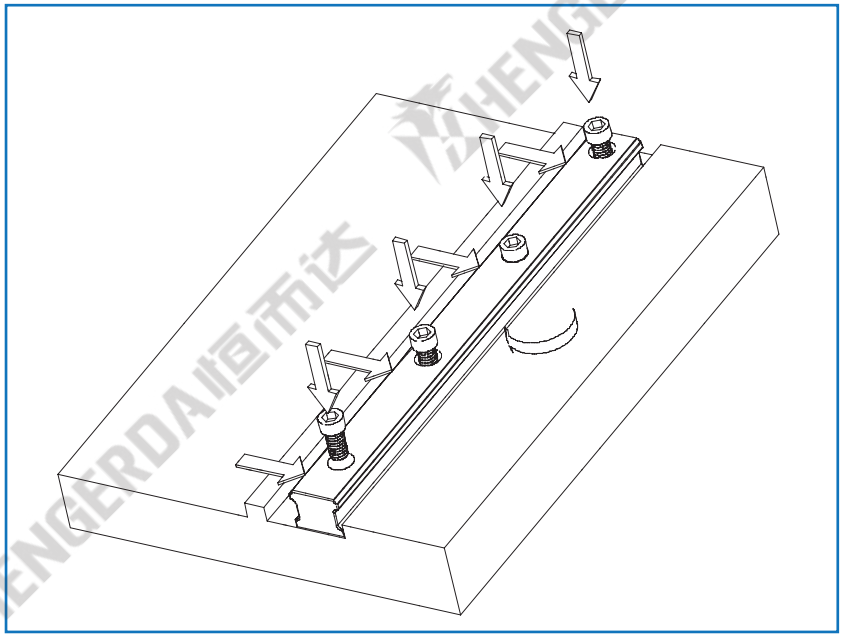
Note: Make sure to wash the anti-rust oil applied on the datum plane with cleaning oil before installation and spray low-viscosity spindle oil lubricant in case of rust.

3-2-2: Slightly put the master rail on the platform and use lateral fixed screws or other fixed fixtures to gently fit the linear guide way to the lateral mounting surface.

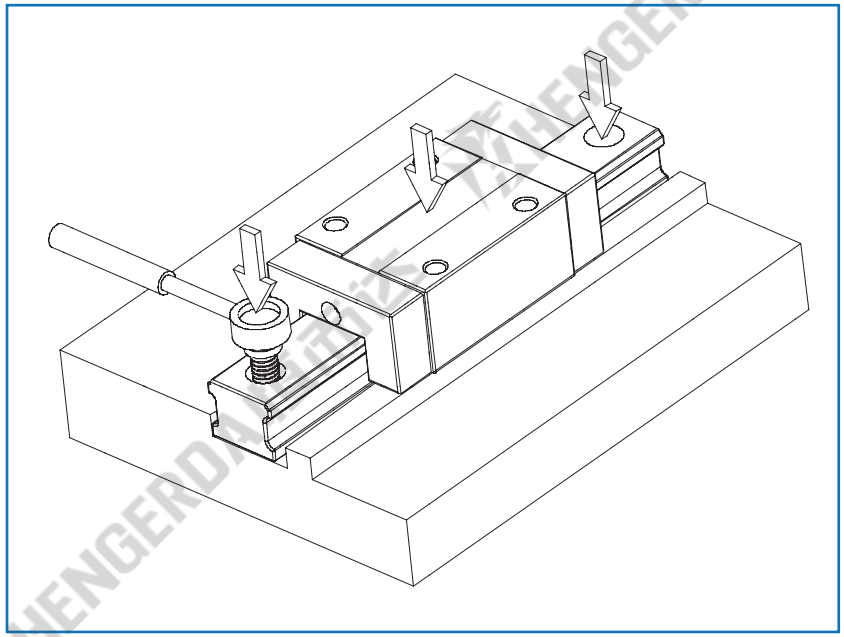


Note: Before installation and use, make sure the screw holes are in the right position. It will easily cause deflection and largely affect the guideway accuracy and operating quality if the platform screw holes are forcibly locked in the wrong position.

3-2-3：In order to obtain a stabler accuracy, slightly tighten the positioned screws of the rail from the center to both sides. Gently fit the rail to the mounting surface. Strengthen the lateral datum pressing force of the rail after therail datum is slightly tightened, so that the master rail can actually fit the lateral datum.

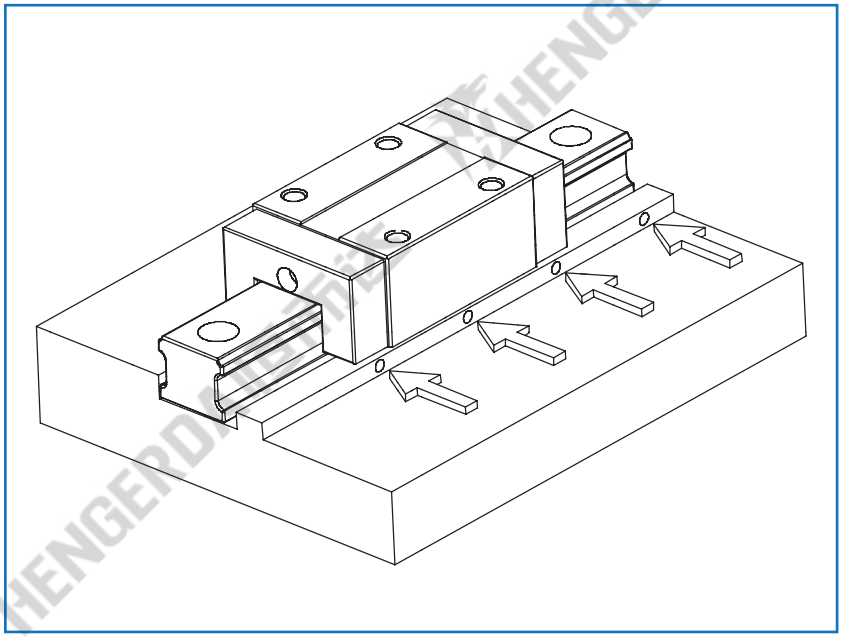


3-2-4：Use torque wrench and slowly tighten the set screws of the guide way with fastening torque according to the material of the platform.

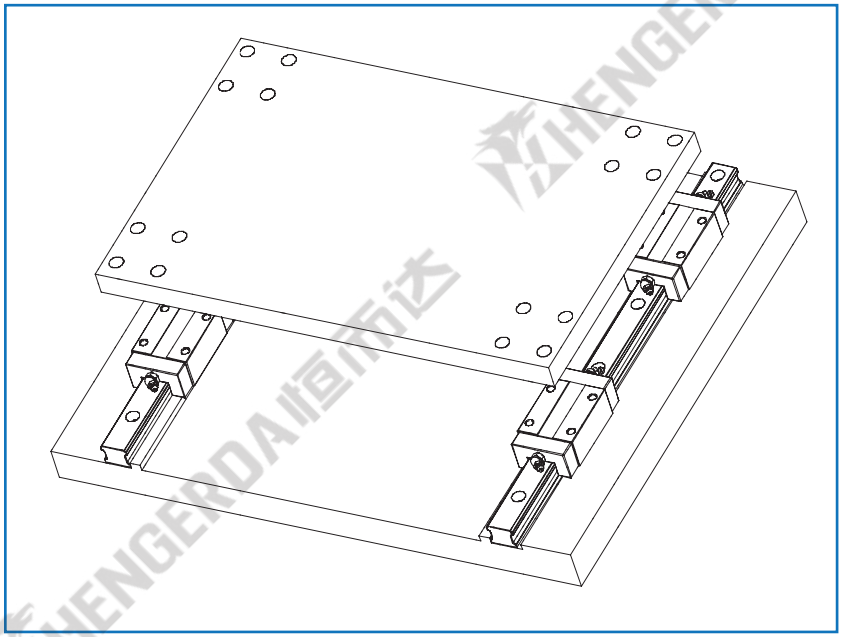


Please choose the fastening torque in accordance with the material of platform and the type of set screws. Slowly tighten the rail bolt with torque wrench.

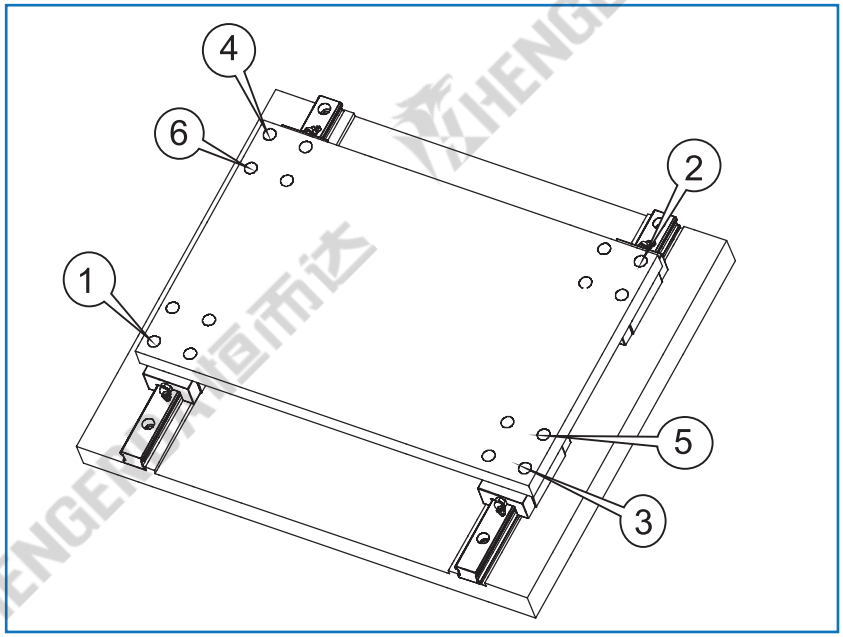
3-2-5: Install the subsidiary rail in the same way and install several sliders on the master rail and subsidiary rail. After installing the sliders, many attachments cannot be installed in the later stages because of limited installation space, therefore the required attachments must be installed together at this stage.(Attachments could be oil nozzles, oil tube joints or dustproof system.)



3-2-6: Gently place the table on the sliders on the master rail and subsidiary rail.



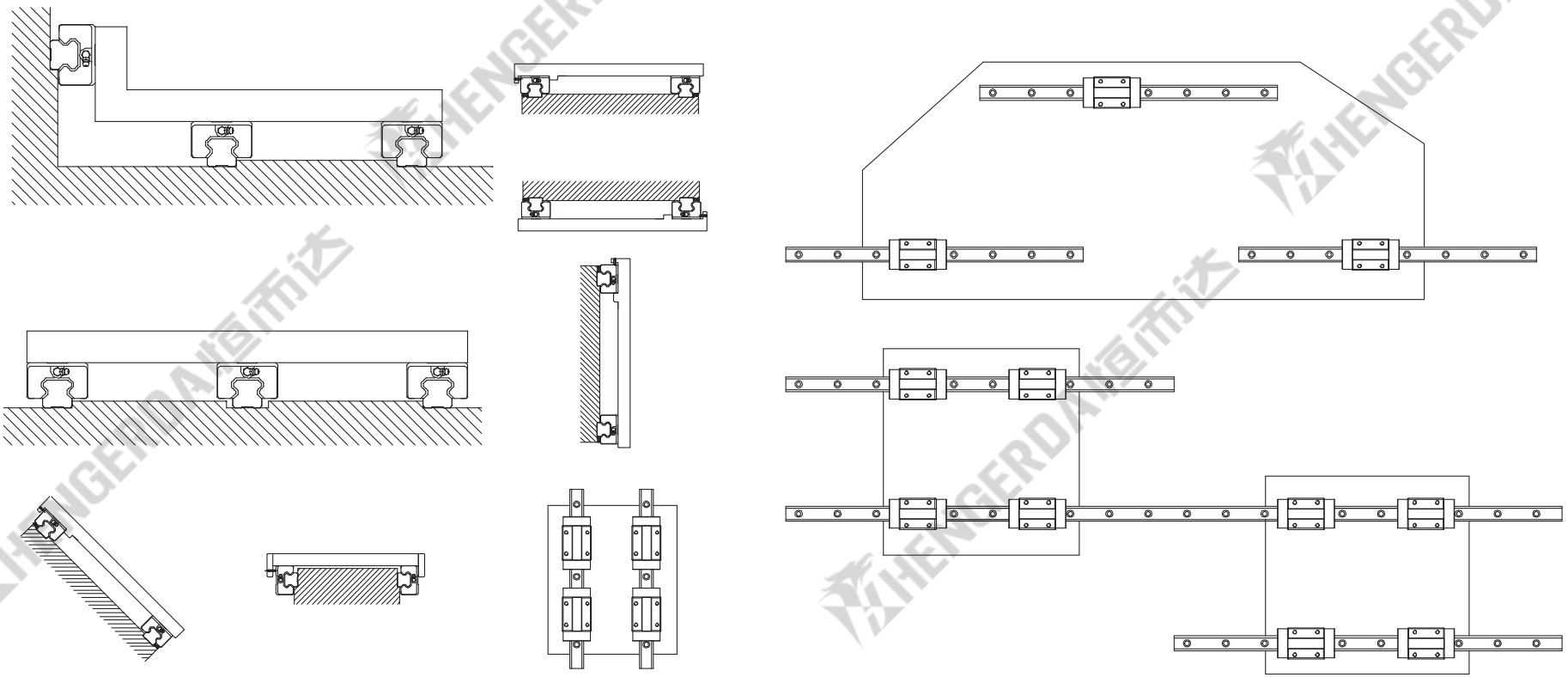
3-2-7: Lock and fix the lateral compression screws on the table following the order below after finishing installation and positioning.



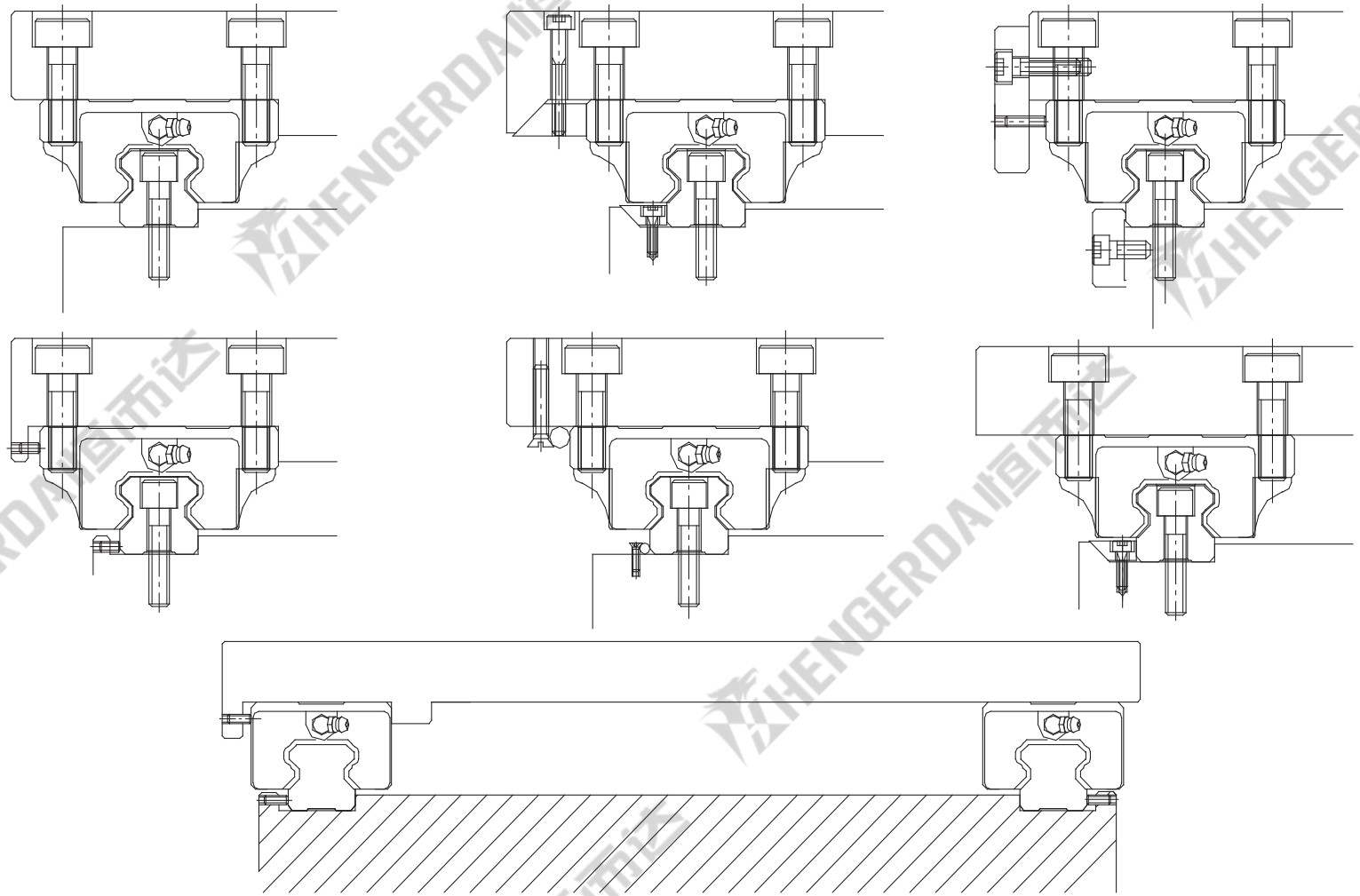
04 Bolt Locking Torque of Rail

Screw size	Fastening Torque (N*M)– hexagonal socket		
	Steel	Cast Iron	Aluminum
M2	0.63	0.42	0.31
M2.3	0.84	0.57	0.42
M2.6	1.26	0.84	0.63
M3	2.1	1.36	1.05
M4	4.41	2.93	2.2
M5	9.45	6.3	4.72
M6	14.67	9.86	7.35
M8	32.57	21.53	15.75
M10	72.42	48.32	35.67
M12	126.42	84.0	63.0
M14	168.21	112.5	84.0
M16	210	140.35	105.0

B Common Guideway application modes

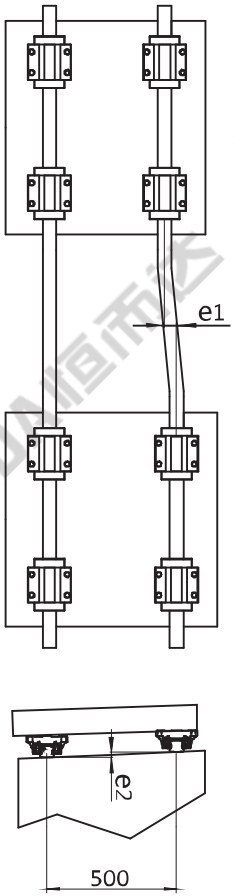


C Common Guideway Installation Modes



D Tolerance of the Mounting Surface Displacements

01 Tolerance of the Guideway Mounting Surface Displacements



DS series:

Unit : um

Model	Parallelism Displacement ToleranceValue of Two Axes Under Following Preload Conditions (e1)			Horizontal Displacement Tolerance Value of Two Axes Under Following Preload Conditions (e2)		
	ZB	ZA	Z0	ZB	ZA	Z0
DS15	17	18	25	60	85	130
DS20	19	20	25	68	85	130
DS25	21	22	30	78	85	130
DS30	29	30	40	100	110	170
DS35	33	35	50	135	150	210
DS45	38	40	60	155	170	250
DS55	48	50	70	190	210	300
DS65	58	60	80	225	250	350

02 Interchangeabilities

	Non-Interchangeable Type					Interchangeable Type	
Precision Grade	UP	SP	P	H	N	H	N
Preload Level	ZA ZB	ZA ZB	Z0 ZA ZB	Z0 ZA ZB	Z0 ZA ZB	Z0 ZA	Z0 ZA

03 Selection of Precision Grade

Here are the recommended precision grades according to the different type of machines:

Machine type		Machine tool																Industrial robot		Semiconductor manufacturing equipment				Other equipment									
		Machining Center	Lathe	Grinding Machine	Boring Machine	Coordinate Boring Machine	Drilling Machine	Electro Discharge Machining Center	Punch Press	Laser Machine	Woodworking Machine	CNC Drilling Machine	Tapping Machine	Interchangeable Worktable	Automatic Timing Corrector	Wire Cutting Machine	Straightening Machine	Cartesian coordinate system	Cylindrical coordinates	Seam welder	Detector	Plugin of electronic components	circuit board drill	Injection molding machine	Three-dimensional measuring instrument	Office machines	Water delivery system	XY Tables	Coating process	Welding machine	Medical device	Digital converter	Inspectio Equipme
Precision Grade	UP					√	√	√									√				√				√								√
	SP	√	√	√	√	√	√	√		√						√	√			√	√		√		√			√				√	√
	P	√	√	√	√			√	√	√	√	√	√			√		√		√		√	√					√				√	√
	H								√	√	√	√	√					√	√			√	√	√		√	√	√	√	√	√	√	√	
	N										√			√	√			√	√					√		√	√		√	√	√			

04 Selecting Preload Level

Radial clearance	Zero clearance	Light preload	Medium and Heavy preload
Conditions	1.Minimal impact 2.Double-axes are mounted in parallel 3.Low precision requirement 4.Low sliding resistance 5.Low reciprocating load	1.Mounted Overhung 2.Single axe mounted 3.Light load 4.Requirement of high precision	1.Great shock 2.High-frequency vibration 3.Heavy cutting
Examples of applications	1.Welding machine 2.Cutting machine 3.Material supply mechanism 4.Tool exchange mechanism 5.XY axes of general industrial machinery 6.Packaging machine	1.NC lathe 2.Electro discharge machines 3.Precision XY table 4.Z axe of general machines 5.Industrial robot arm 6.Circuit board drilling machine	1.Machining center 2.NC lathe、milling machine 3.Feed axis of grinding machine 4.Feed axis of tool

The insufficient rigidity and clearance may occur while using the linear guide way. To improve the overall rigidity and eliminate clearance in some part, the diameter of the rolling elements is increased, which caused internal load within linear guide way.

Increasing preload could lower shaking and reduce the inertial impact caused by reciprocating motion. However, increase in preload also brings load to rolling elements. The larger the preload, the bigger the internal load. Preload needs to be considered for calculation to select appropriate liner guide way. The rise and drop of preload affect the mounting of liner guide way in an integrated way. Therefore, when choosing preload, users need to consider the impact of driven load and preload on service life of linear guide way and make good trade-offs.

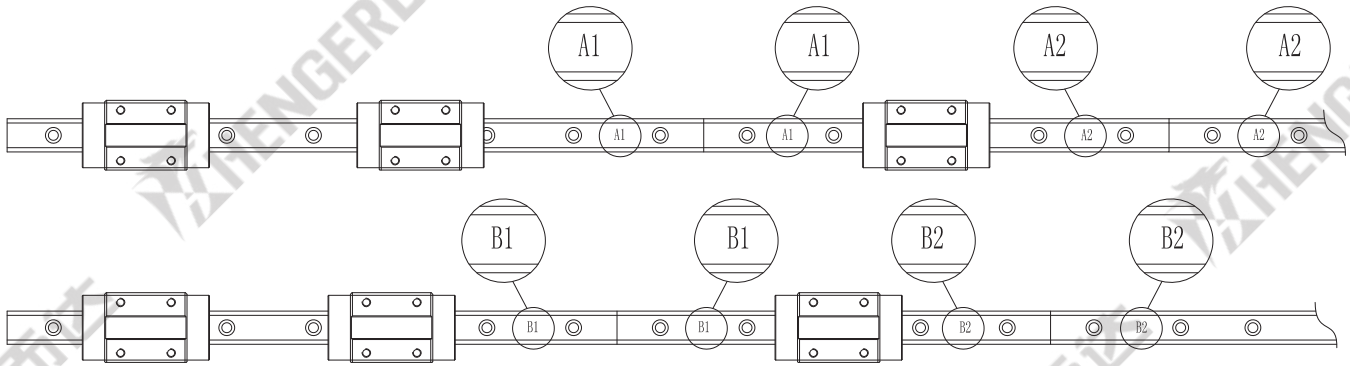
E Precautions on removing slider from the linear Guideway

If not necessary, please do not take the slider off the linear Guideway. When you must do so, please note:

1. Interchangeable type: Please remove the slider in parallel. While pushing the slider back, please be careful and make sure that the linear Guideway and the slider are lined up in parallel.

2. Non-interchangeable type: Please take the slider off in parallel and pay attention to the direction of removal. When reattaching the slider back, please align the slider and the profile of linear Guideway with the original direction. Please avoid reversing the direction, otherwise it may affect the operational precision.

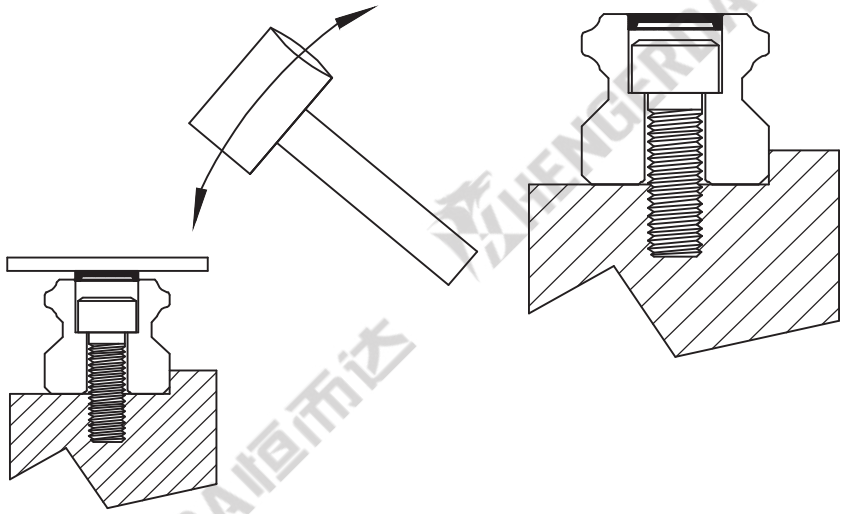
F Butt-Joints of Rails



When the length of linear Guideway needs to be higher than its standard length, two or more linear Guideways could be lined up in parallel to meet the length requirement. Please follow the aligning institution as illustrated (note: The clearance between linear Guideways should be near 0.05 mm).The coding patterns are shown in the table below:

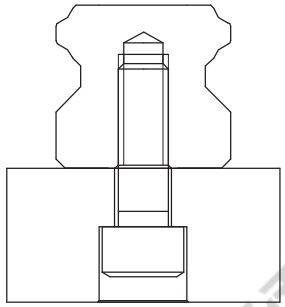
	Align the first linear Guideway	Align the second linear Guideway	Align the third linear Guideway	•••	Align the Nth linear Guideway
Axis 01 in parallel	No markings A1	A1 A2	A2 A3	A3 …	AN No markings
Axis 02 in parallel	No markings B1	B1 B2	B2 B3	B3 …	BN No markings
…	…	…	…	…	…
Axis 26 in parallel	No markings Z1	Z1 Z2	Z2 Z3	Z3 …	ZN No markings

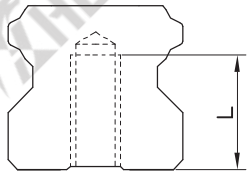
G Guideway Dust Prevention



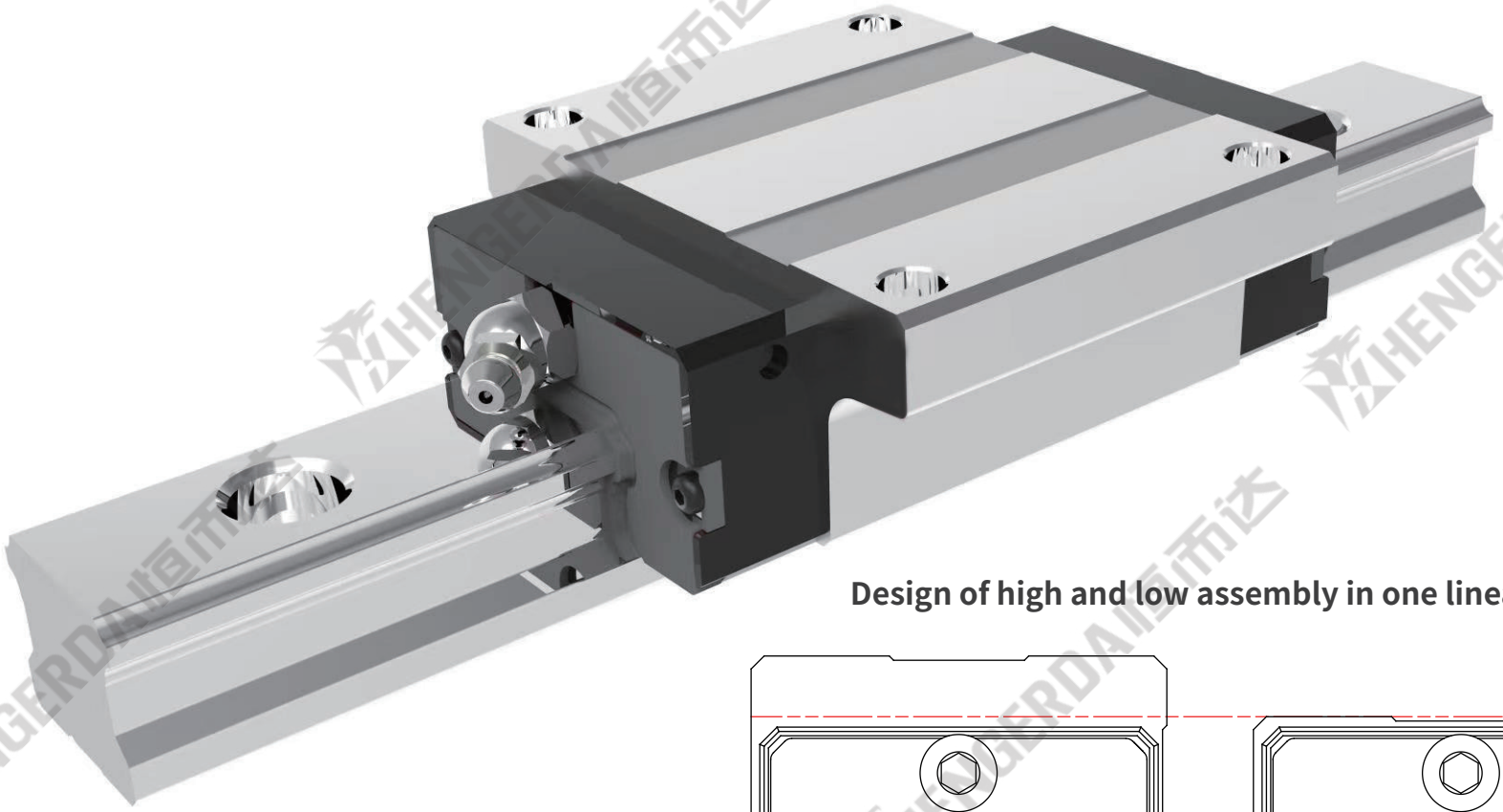
Mounting of dedicated caps: In the use of linear guide way, the cutting chips or foreign materials may emerge. Most of it could be removed due to the dust scraperof slider. A few chips or foreign materials may accumulate on the linear guide way or at the mounting hole. Dedicated caps of linear guide way are used to cover the mounting hole to prevent the entrance of foreign materials.

After mounting the linear guide way, set the cap on the mounting hole and then use the plastic hammer to gradually drive the cap covered with a pad until it is levelled with the upper surface of the rail.

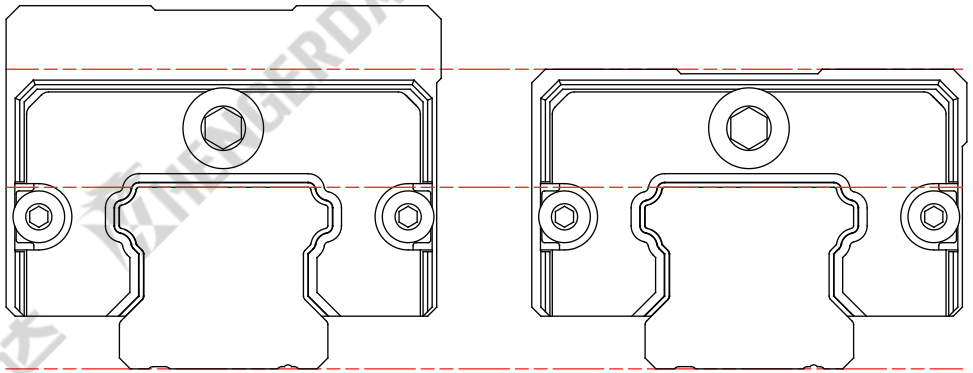




Size of Rail way	Dimension of tap	Maximum length of thread (L)
DS15	M5	8mm
DS20	M6	10mm
DS25	M6	12mm
DS30	M8	15mm
DS35	M8	17mm
DS45	M12	20mm
DS55	M14	24mm



Design of high and low assembly in one linear guideway



A Coding principle-DSA series

1	2	3	4	5	6	7	8	9	10	11
DSA	H	30	CN	Z0	P	UU	2	R2000	G1G2	II , III

1 Code of linear Guideway

- DSA: Standard Type

2 Assembly type

- H: High assembly
- C: ow assembly

3 Size

- 15、20、25、30、
- 35、45、55、65

4 Shape and load form

- VS: Rectangular/medium load
- CS: Flange/medium load
- VN: Rectangular/heavy load
- VL: Rectangular/super-heavy load
- CN: Flange/heavy load
- CE: Flange/super-heavy load

5 Preload form

- Z0: Zero clearance
- ZA: Medium preload
- ZB: Weighty preload

6 Precision level

- C: Normal
- H: High
- P: Precise
- SP: Super high
- UP: Ultra precision

7 Dust Scraper type

- NN: No dust proof
- UU: Side scraper
- DD: Side oil scraper+bottom
- SD: Side oil scraper+side dust
- Unmarked: Side scraper(UU)

8 The number of slider for a single rail

9 Bolting of the rail and its length

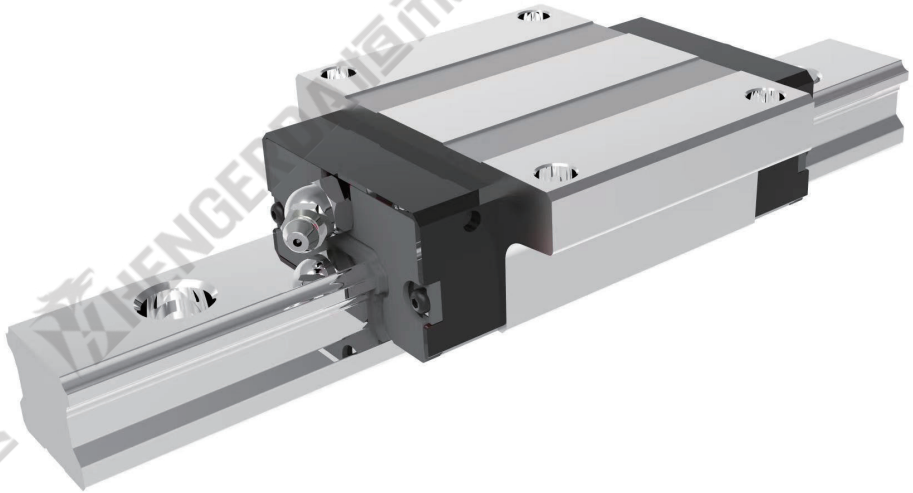
- R2000:Downward bolting+rail length in 2000mm
- T2000:Upward bolting+rail length in 2000mm

10 The side distance of linear Guideway

- Left side distance G1: the first hole center distance to the left edge of the rail
- Right side distance G1: the first hole center distance to the right edge of the rail

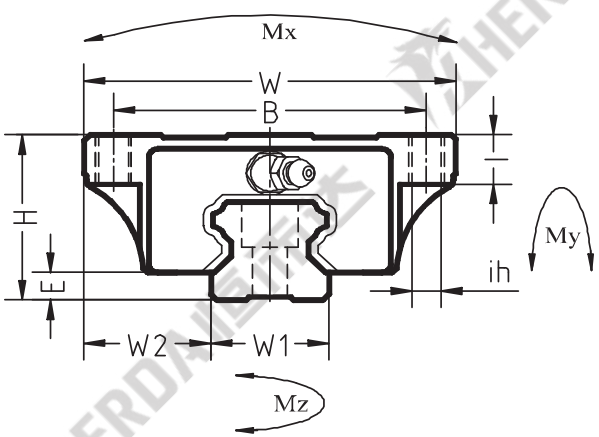
11 The number of rails on a single axis

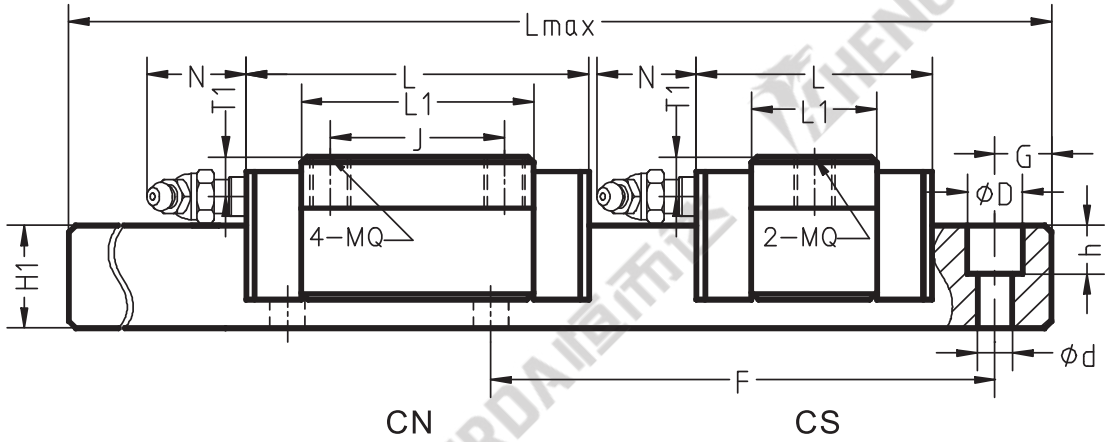
- rails marked as: II
- rails marked as:III, and so on in a similar manner



B Dimension table-DSA series

DSAC_ : Low assembly series
DSAC_C_ : Flange Slider

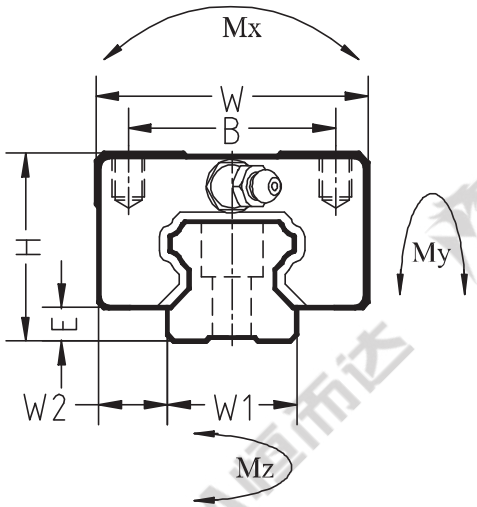


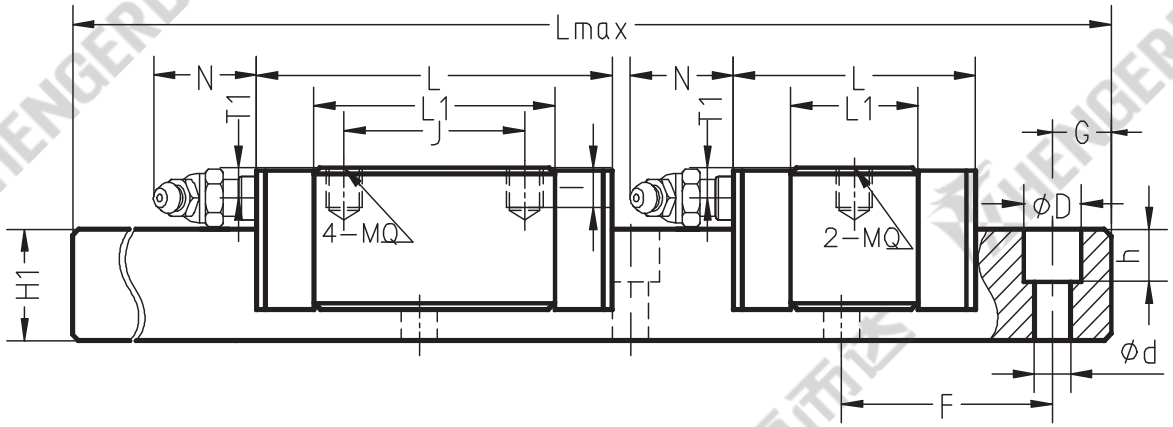


Type	Assembly specification-mm				Slider-mm										Guideway-mm						Load Rating-KN		Static torque-KN*M			Weight of Slider	Weight of rail
	H	W	W2	E	L	B	J	MQ	l	ih	L1	Oil H	T1	N	W1	H1	F	d	D	h	Dynamic load C	Static load C0	Mx	My	Mz	Kg	Kg/M
C15CS	24.0	52.0	18.5	3.0	49.8	41.0	-	M5	6.1	4.5	25.60	M4X0.75	5.5	5.5	15.0	13.0	60.0	4.5	7.5	6.0	6.61	9.3	0.08	0.04	0.04	0.11	1.26
C15CN	24.0	52.0	18.5	3.0	58.7	41.0	26.0	M5	6.1	4.5	34.45	M4X0.75	5.5	5.5	15.0	13.0	60.0	4.5	7.5	6.0	8.13	12.39	0.11	0.09	0.09	0.15	1.26
C20CS	28.0	59.0	19.5	4.6	58.1	49.0	-	M6	9.0	5.5	32.10	M6X0.75	6.0	11.5	20.0	16.5	60.0	6.0	9.5	8.5	10.78	14.76	0.16	0.07	0.07	0.20	2.19
C20CN	28.0	59.0	19.5	4.6	70.7	49.0	32.0	M6	9.0	5.5	44.70	M6X0.75	6.0	11.5	20.0	16.5	60.0	6.0	9.5	8.5	13.59	21.31	0.21	0.16	0.16	0.24	2.19
C25CN	33.0	73.0	25.0	5.8	83.8	60.0	35.0	M8	10.0	7.0	57.00	M6X0.75	6.5	11.5	23.0	20.0	60.0	7.0	11.0	9.0	19.29	29.51	0.39	0.31	0.31	0.44	3.04

DSAC_ : Low assembly series

DSAC_V_ : Rectangular Slider

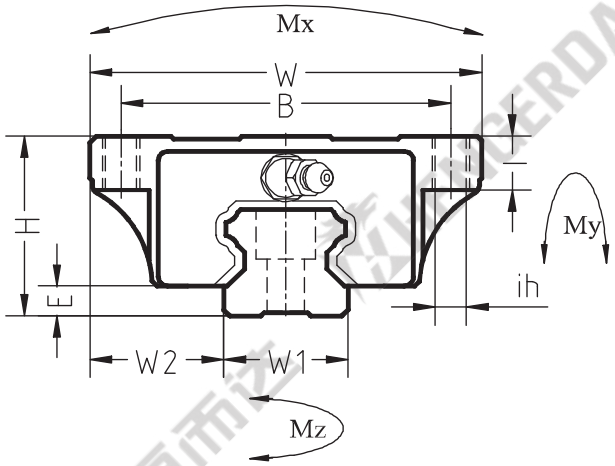


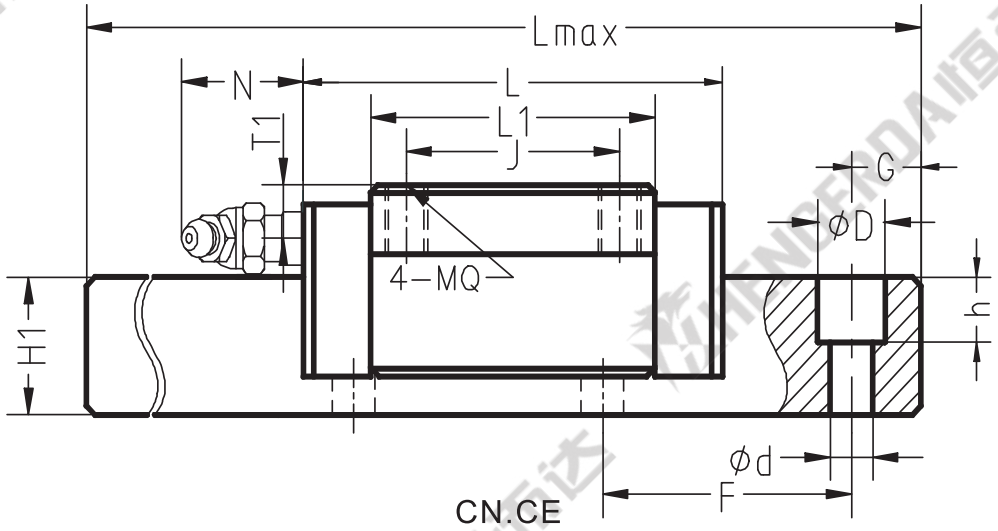


VN VS

Type	Assembly specification-mm				Slider-mm									Guideway-mm						Load Rating-KN		Static torque-KN*M			Weight of Slider	Weight of rail
	H	W	W2	E	L	B	J	MQ	l	L1	Oil H	T1	N	W1	H1	F	d	D	h	Dynamic load C	Static load C0	Mx	My	Mz	Kg	Kg/M
C15VS	24.0	34.0	9.5	3.0	49.8	26.0	-	M4	4.0	25.6	M4X0.75	5.5	5.5	15.0	13.0	60.0	4.5	7.5	6.0	6.61	9.3	0.08	0.04	0.04	0.08	1.26
C15VN	24.0	34.0	9.5	3.0	58.65	26.0	26.0	M4	4.0	34.45	M4X0.75	5.5	5.5	15.0	13.0	60.0	4.5	7.5	6.0	8.13	12.39	0.12	0.13	0.13	0.11	1.26
C20VS	28.0	42.0	11.0	4.6	58.1	32.0	-	M5	5.0	32.1	M6X0.75	6.0	11.5	20.0	16.5	60.0	6.0	9.5	8.5	10.78	14.76	0.16	0.07	0.07	0.13	2.19
C20VN	28.0	42.0	11.0	4.6	70.7	32.0	32.0	M5	5.0	44.7	M6X0.75	6.0	11.5	20.0	16.5	60.0	6.0	9.5	8.5	13.59	21.31	0.21	0.16	0.16	0.18	2.19
C25VN	33.0	48.0	12.5	5.8	83.8	35.0	35.0	M6	6.0	57	M6X0.75	6.5	11.5	23.0	20.0	60.0	7.0	11.0	9.0	19.29	29.51	0.39	0.32	0.32	0.31	3.04
C30VN	42.0	60.0	16.0	7.0	101.6	40.0	40.0	M8	9.0	67.4	M6X0.75	8.0	11.5	28.0	23.0	80.0	9.0	14.0	12.0	28.17	42.5	0.68	0.55	0.55	0.65	4.29
C35VN	48.0	70.0	18.0	7.5	115.2	50.0	50.0	M8	10.0	77	M6X0.75	8.0	11.5	34.0	26.0	80.0	9.0	14.0	12.0	38.62	57.92	1.05	0.77	0.77	1.31	5.97
C45VN	60.0	86.0	20.5	8.9	134.2	60.0	60.0	M10	12.0	96	M6X0.75	10.5	11.5	45.0	32.0	105.0	14.0	20.0	17.0	54.52	80.95	2.00	1.24	1.24	2.59	9.75

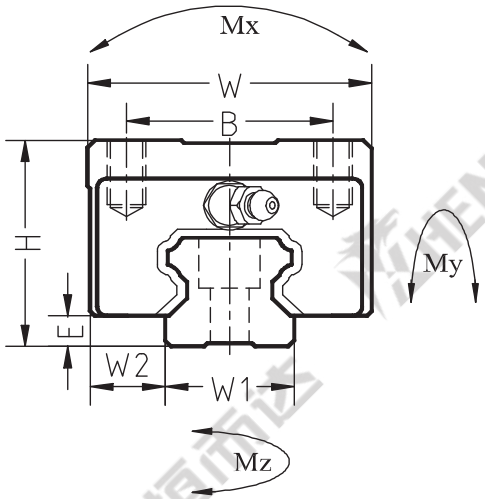
DSAH_ : High assembly series
DSAH_C_ : Flange Slider

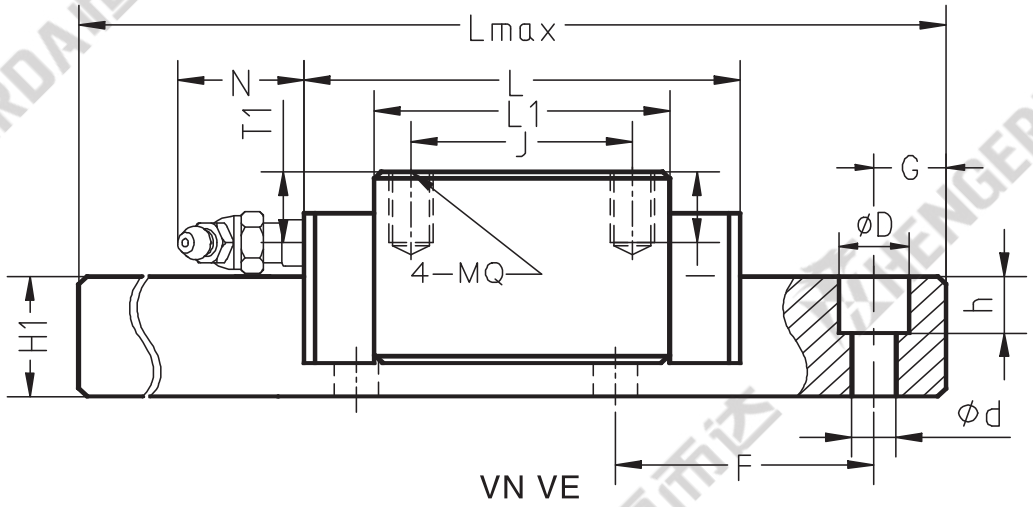




Type	Assembly specification-mm				Slider-mm										Guideway-mm						Load Rating-KN		Static torque-KN*M			Weight of Slider	Weight of rail
	H	W	W2	E	L	B	J	MQ	l	ih	L1	Oil H	T1	N	W1	H1	F	d	D	h	Dynamic load C	Static load C0	Mx	My	Mz	Kg	Kg/M
H15CN	24.0	47.0	16.0	3.0	64.2	38.0	30.0	M5	8.0	4.4	40.0	M4X0.75	5.5	5.5	15.0	13.0	60.0	4.5	7.5	6.0	9.03	14.46	0.13	0.15	0.15	0.16	1.26
H20CN	30.0	63.0	21.5	4.6	76.0	53.0	40.0	M6	9.0	5.4	50.0	M6X0.75	8.0	11.5	20.0	16.5	60.0	6.0	9.5	8.5	14.7	22.95	0.31	0.28	0.28	0.33	2.19
H25CN	36.0	70.0	23.5	5.8	83.8	57.0	45.0	M8	12.0	6.8	57.0	M6X0.75	9.5	11.5	23.0	20.0	60.0	7.0	11.0	9.0	19.29	29.51	0.45	0.45	0.45	0.49	3.04
H25CE	36.0	70.0	23.5	5.8	114.8	57.0	45.0	M8	12.0	6.8	88.0	M6X0.75	9.5	11.5	23.0	20.0	60.0	7.0	11.0	9.0	26.15	42.16	0.70	0.85	0.85	0.76	3.04
H30CN	42.0	90.0	31.0	7.0	101.6	72.0	52.0	M10	15.0	8.5	67.4	M6X0.75	8.0	11.5	28.0	23.0	80.0	9.0	14.0	12.0	28.17	42.5	0.73	0.66	0.66	0.90	4.29
H30CE	42.0	90.0	31.0	7.0	139.2	72.0	52.0	M10	15.0	8.5	105.0	M6X0.75	8.0	11.5	28.0	23.0	80.0	9.0	14.0	12.0	38.38	60.71	1.15	1.36	1.36	1.43	4.29
H35CN	48.0	100.0	33.0	7.5	115.2	82.0	62.0	M10	15.0	8.5	77.0	M6X0.75	8.0	11.5	34.0	26.0	80.0	9.0	14.0	12.0	38.62	57.92	1.27	1.14	1.14	1.35	5.97
H35CE	48.0	100.0	33.0	7.5	163.5	82.0	62.0	M10	15.0	8.5	125.3	M6X0.75	8.0	11.5	34.0	26.0	80.0	9.0	14.0	12.0	54.29	91.02	2.05	2.38	2.38	2.24	5.97
H45CN	60.0	120.0	37.5	8.9	134.2	100.0	80.0	M12	18.0	10.5	96.0	M6X0.75	10.5	11.5	45.0	32.0	105.0	14.0	20.0	17.0	54.52	80.95	2.43	1.86	1.86	2.52	9.75
H45CE	60.0	120.0	37.5	8.9	179.7	100.0	80.0	M12	18.0	10.5	141.5	M6X0.75	10.5	11.5	45.0	32.0	105.0	14.0	20.0	17.0	71.52	118.73	3.57	3.50	3.50	3.65	9.75

DSAH_ ：High assembly series
DSAH_V_：Rectangular Slider





Type	Assembly specification-mm				Slider-mm									Guideway-mm						Load Rating-KN		Static torque-KN*M			Weight of Slider	Weight of rail
	H	W	W2	E	L	B	J	MQ	l	L1	Oil H	T1	N	W1	H1	F	d	D	h	Dynamic load C	Static load C0	Mx	My	Mz	Kg	Kg/M
H15VN	28.0	34.0	9.5	3.0	64.2	26.0	26.0	M4	4.0	40.0	M4X0.75	9.5	5.5	15.0	13.0	60.0	4.5	7.5	6.0	9.03	14.46	0.13	0.15	0.15	0.17	1.26
H20VN	30.0	44.0	12.0	4.6	76.0	32.0	36.0	M5	5.0	50.0	M6X0.75	8.0	11.6	20.0	16.5	60.0	6.0	9.5	8.5	14.7	22.95	0.31	0.28	0.28	0.26	2.19
H25VN	40.0	48.0	12.5	5.8	83.8	35.0	35.0	M6	9.0	57.0	M6X0.75	13.5	11.5	23.0	20.0	60.0	7.0	11.0	9.0	19.29	29.51	0.45	0.45	0.45	0.46	3.04
H25VE	40.0	48.0	12.5	5.8	114.8	35.0	50.0	M6	9.0	88.0	M6X0.75	13.5	11.5	23.0	20.0	60.0	7.0	11.0	9.0	26.15	42.16	0.70	0.85	0.85	0.72	3.04
H30VN	45.0	60.0	16.0	7.0	101.6	40.0	40.0	M8	9.0	67.4	M6X0.75	11.0	11.5	28.0	23.0	80.0	9.0	14.0	12.0	28.17	42.5	0.73	0.66	0.66	0.75	4.29
H30VE	45.0	60.0	16.0	7.0	139.2	40.0	60.0	M8	9.0	105.0	M6X0.75	11.0	11.5	28.0	23.0	80.0	9.0	14.0	12.0	38.38	60.71	1.15	1.36	1.36	1.17	4.29
H35VN	55.0	70.0	18.0	7.5	115.2	50.0	50.0	M8	10.0	77.0	M6X0.75	15.0	11.5	34.0	26.0	80.0	9.0	14.0	12.0	38.62	57.92	1.27	1.14	1.14	1.13	5.97
H35VE	55.0	70.0	18.0	7.5	163.5	50.0	72.0	M8	10.0	125.3	M6X0.75	15.0	11.5	34.0	26.0	80.0	9.0	14.0	12.0	54.29	91.02	2.05	2.38	2.38	2.15	5.97
H45VN	70.0	86.0	20.5	8.9	134.2	60.0	60.0	M10	13.0	96.0	M6X0.75	20.5	11.5	45.0	32.0	105.0	14.0	20.0	17.0	54.52	80.95	2.43	1.86	1.86	2.59	9.75
H45VE	70.0	86.0	20.5	8.9	179.7	60.0	80.0	M10	13.0	141.5	M6X0.75	20.5	11.5	45.0	32.0	105.0	14.0	20.0	17.0	71.52	118.73	3.57	3.50	3.50	3.84	9.75

Employment

- Please do not dismantle all parts of DAJU linear Guideway. This may result in the entrance of foreign materials, which may affect precision and shorten service life.
- Please note to prevent foreign materials and cutting chips from entering. Otherwise, this may cause damage on circulation parts of steel ball or the function of the rail.
- Please do not use this product if the external temperature exceeds 80°C. If it is used over 80°C, please consult with technical staff of Hengerda New Materials (Fujian) Co., Ltd.
- Please do not make this product be knocked on or dropped out. Otherwise, this may lead to damage of the product function and quality.
- When this product works, the customers should maintain enough distance for safety and avoid touching parts of the rail.
- If this product is used in harsh environment, please get it protected with protective enclosure to prevent dust, chemicals and metal powder chips from entering. Otherwise, this may affect the precision and service life of this product.

Lubrication

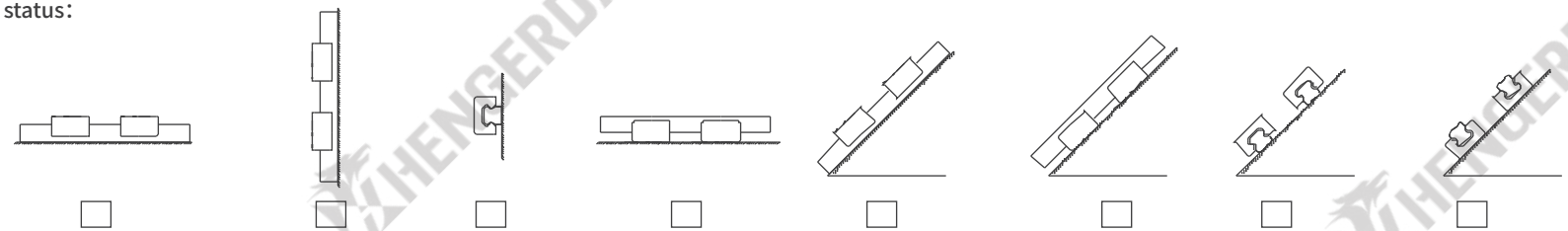
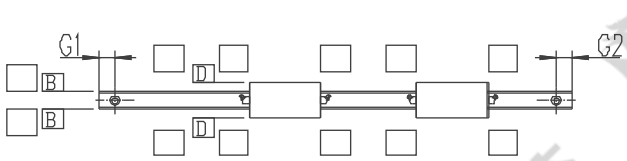
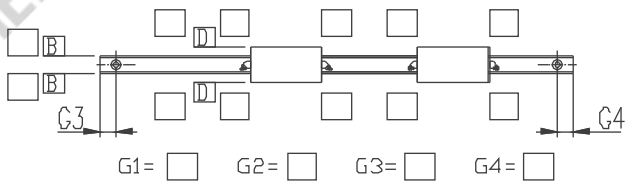
- Prior to the entrance into the market, DAJU linear Guideway is handled to prevent corrosion. Therefore, before using it, please thoroughly remove anti-rust oil and then feed oil lubricant immediately. This product would rust if the oil lubricant is not added.
- To fully utilize the functions of DAJU linear Guideway, complete lubrication must be done. Incomplete lubrication may bring damage and thus shorten life of this rail.

Oil lubricant of slider/Recommended volume of lubricant

Feeding amount of oil lubricant	Size/Model	15	20	25	30	35	45	55	65
	The volume of oil lubricant for first feeding (cm^3)	0.6	0.6	0.9	0.6	0.9	1.2	1.5	1.8
	Feeding rate of oil lubricant (cm^3/hr)	0.2	0.2	0.3	0.2	0.3	0.4	0.5	0.6
The amount of grease lubricant	The amount of each feeding (cm^3/次)	1		1 ~ 2		2 ~ 3			
Note:	1.When the slider uses grease lubricant, please note that as for non-interchangeable type of linear guideway, grease needs to be added mannually before assemblying the silder and rail together. It is suggested that customers should add grease shot every 100 km in travel distance.								
	2.When the slider uses grease lubricant, please note that for replenishment of grease through a second shot, the Slider needs to run back and forth after one shot due to to its viscosity, which could avoid overflow of grease as the steel balls slider it.								

Storage of the product

- When storing the DAJU linear guideway products, please enclose it in a package from Hengerda New Materials (Fujian) Co., Ltd.. DAJU linear guideway should be placed in a horizontal orientation while avoiding high temperature, high humidity, weighty load or irregular travel.

Name of customer:		Date:	
Phone number:	Email:	Signature:	
Name of the rail size:			
Axial direction for mounting:	☐ X ☐ Y ☐ Z Other ( )		
Mounting status:  ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐			
Model and size of the linear guideway product:			
Rail Specification:	☐ R(Downward bolting) ☐ T(Upward bolting) ☐ U(Downward bolting with larger pore diameter)		
Dust proof:	☐ DD: Side scraper+bottom dust proof ☐ SD: Side scraper+bottom dust proof+metal scraper ☐ UU:Side scraper ☐ NN:No dust proof ☐ Unmarked:Side scraper(UU)		
Lubrication:	☐ Oil nozzles ☐ Oil tube joints ☐ Special way to feed oil lubricant		
The number of rails on a single axis:	☐ I(1) ☐ II(2) ☐ III(3) ☐ Other ( )		
Special requirements:			
Datum plane and the direction of feeding oil lubricant: (Please tick the direction needed in the box)	 		

Model	Brand				
	DAJU	THK	HIWIN	PMI	TBI
DSAH_V_ High assembly rectangular	DSAH15VN	HSR15R,SHS15R	HGH15CA	MSA15S	TRH15VN
	DSAH20VN	HSR20R,SHS20V	HGH20CA	MAS20S	TRH20VN
	DSAH20VE	HSR20LR,SHS20LV	HGH20HA	MSA20LS	TRH20VE
	DSAH25VN	HSR25R,SHS25R	HGH25CA	MAS25S	TRH25VN
	DSAH25VE	HSR25LR,SHS25LR	HGH25HA	MSA25LS	TRH25VE
	DSAH30VN	HSR30R,SHS30R	HGH30CA	MAS30S	TRH30VN
	DSAH30VE	HSR30LR,SHS30LR	HGH30HA	MSA30LS	TRH30VE
	DSAH35VN	HSR35R,SHS35R	HGH35CA	MAS35S	TRH35VN
	DSAH35VE	HSR35LR,SHS35LR	HGH35HA	MSA35LS	TRH35VE
	DSAH45VN	HSR45R,SHS45R	HGH45CA	MAS45S	TRH45VN
	DSAH45VE	HSR45LR,SHS45LR	HGH45HA	MSA45LS	TRH45VE
	DSAH55VN	HSR55R,SHS55R	HGH55CA	MAS55S	TRH55VN
	DSAH55VE	HSR55LR,SHS55LR	HGH55HA	MSA55LS	TRH55VE
	DSAH65VN	HSR65R	HGH65CA	MAS65S	TRH65VN
	DSAH65VE	HSR65LR	HGH65HA	MSA65LS	TRH65VE
DSAH_C_ High assembly flange	DSAH15CN	HSR15A/B,SHS15C	HGW15CA/B/C	MAS15E/A	TRH15FN
	DSAH20CN	HSR20A/B,SHS20C	HGW20CA/B/C	MSA20E/A	TRH20FN
	DSAH20CE	HSR20LA/LB,SHS20LC	HGW20HA/B/C	MSA20LE/LA	TRH20FETRH20FN
	DSAH25CN	HSR25A/B,SHS25C	HGW25CA/B/C	MSA25E/A	TRH25N
	DSAH25CE	HSR25LA/LB,SHS25LC	HGW25HA/B/C	MSA25LE/LA	TRH25FE
	DSAH30CN	HSR30A/B,SHS30C	HGW30CA/B/C	MSA30E/A	TRH30N
	DSAH30CE	HSR30LA/LB,SHS30LC	HGW30HA/B/C	MSA30LE/LA	TRH30FE
	DSAH35CN	HSR35A/B,SHS35C	HGW35CA/B/C	MSA35E/A	TRH35N
	DSAH35CE	HSR35LA/LB,SHS35LC	HGW35HA/B/C	MSA35LE/LA	TRH35FE
	DSAH45CN	HSR45A/B,SHS45C	HGW45CA/B/C	MSA45E/A	TRH45N
	DSAH45CE	HSR45LA/LB,SHS45LC	HGW45HA/B/C	MSA45LE/LA	TRH45FE
	DSAH55CN	HSR55A/B,SHS55C	HGW55CA/B/C	MSA55E/A	TRH55N
	DSAH55CE	HSR55LA/LB,SHS55LC	HGW55HA/B/C	MSA55LE/LA	TRH55FE
	DSAH65CN	HSR65A/B,SHS65C	HGW65CA/B/C	MSA65E/A	TRH65N
	DSAH65CE	HSR65LA/LB,SHS65LC	HGW65HA/B/C	MSA65LE/LA	TRH65FE

Model	Brand				
	DAJU	THK	HIWIN	PMI	TBI
DSAC_V_ Low assembly rectangular	DSAC15VS	SSR15XVY/XVMY,SR15V	EGH15SA	MSB15TS	TRS15VS
	DSAC15VN	SSRR15XWY/XWMY,SHS15V,SR15W	EGH15CA	MSB15S	TRS15VN
	DSAC20VS	SSR20XVY,XVMY,SR20V	EGH20SA	MSB20TS	TRS20VS
	DSAC20VN	SSR15XWY/XWMY,SR20W	EGH20CA	MSB20S	TRS20VN
	DSAC25VS	SSR25XVY/XVMY,SR25V	EGH25SA	MSB25TS	TRS25VS
	DSAC25VN	SSR25XWY/XWMY,SR25W	EGH25CA	MSB25S	TRS25VN
	DSAC30VS	SR30V	EGH30SA	MSB30TS	TRS30VS
	DSAC30VN	SSR30XWY/XWMY,SHS30V,SR30W	EGH30CA	MSB30S	TRS30VN
DSAC_C_ Low assembly flange	DSAC15CS	SR15SB	EGW15SA/B	MSB15TE	TRS15FS
	DSAC15CN	SSR15XTBY,SR15TB	EGW15CA/B	MSB15E	TRS15FN
	DSAC20CS	SR20SB	EGW20SA/B	MSB20TE	TRS20FS
	DSAC20CN	SSR20XTBY,SR20TB	EGW20CA/B	MSB20E	TRS20FN
	DSAC25CS	SR25SB	EGW25SA/B	MSB25TE	TRS25FS
	DSAC25CN	SSR25XTBY,SR25TB	EGW25CA/B	MSB25E	TRS25FN
	DSAC30CS	SR30SB	EGW30SA/B	MSB30TE	TRS30FS
	DSAC30CN	SR30TB	EGW30CA/B	MSB30E	TRS30FN