



Solar panels drainage clips manual

We have all kinds of clips

Huizhou Laihui Cleaning Equipment Co., Ltd.



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1.1 What is solar panels drainage clips?

1.1.1 What is soiling bands ?

Due to the slightly higher positioned edge of the panels, when it rains, the accumulated water cannot flow out from the frame because of the blockage of the frame, resulting in accumulated water at the frame. The dust and debris will remain on the inside of the frame, after the accumulated water evaporated, and will form soiling bands. It blocks light and reduces power generation. The maximum power point (MPP) of the solar panels with soiling bands is lower than other panels. There are many panels under the same inverter, the algorithm of the inverter determines that it will reduce the total output power to match the panels with soiling bands, and it will form shading/hot spot effects, damaging and reducing the service life of panels. The power generation of the entire string of panels is reduced, and in severe cases, the power generation is reduced by more than 10%. The lower the tilt of the solar installation, the bigger becomes the problem.



Figure 1. Soiling bands on the lower edge of the solar panels



1.1.2 What is the Mold on the lower edge of photovoltaic glass?

In areas where water accumulates, at the surface of the photovoltaic glass, Hazy Appearance will be observed, and at the hazy appearance, slight rainbow pattern will be seen, that is the mold on the lower edge of the photovoltaic glass. It is not yet known exactly the cause of the mold, but it is certain that it is related to the stagnant water and, to the high temperature and high humidity environment when the accumulated water evaporates. This physical damage penetrates deep into the surface of the panels, and it was permanent, blocking more than 10% of light, and will deepen year by year, it will exacerbate the aging of glass, and it cannot be scrubbed and basically cannot be repaired.

The picture below shows the Mold of the panels, which ordinary occurs on the relatively flat solar panels installed. But, even if the solar panel is installed at an angle of 13 degrees, although there are few soiling bands, there are also moldy, as shown in Figure 3.



Figure 2 Moldy along the lower edge of the panels and accumulated water at the frame



Figure 3 Moldy along the lower edge of the panels installed at an angle of 13 degrees



1.1.3 What is a drainage clip



Fig. 4 Metal and plastic drainage clips

The solar panels water drainage clips (hereinafter referred to as the drainage clips) is to solve the above problems. It is a clip, made of plastic or metal. Buckle it on the solar panels, and the accumulated water can be drained away in time, so that soiling bands and moldy will not be formed. It is simple installation, no clogging, and maintenance-free.



Figure 5 Drainage clips was installed

1.2 How the drainage clips works,

The flow of stagnant water over the frame of the panels is based on the siphon effect. The drainage clips is mounted on the frame, between clips and the frame, forms a narrow cavity that allows water to flow, and this space is the siphon channel of drainage. This space should be the suitable size, if it is too small, drainage slowly. If it is too large, it cannot form a siphon effect.

Under the same size, the smaller the resistance of the inner walls of the channel to water,



the faster the drainage. And the ash in the water will be drained before it can settle, so there have no soiling bands, and without water accumulation, mold will not be generated.

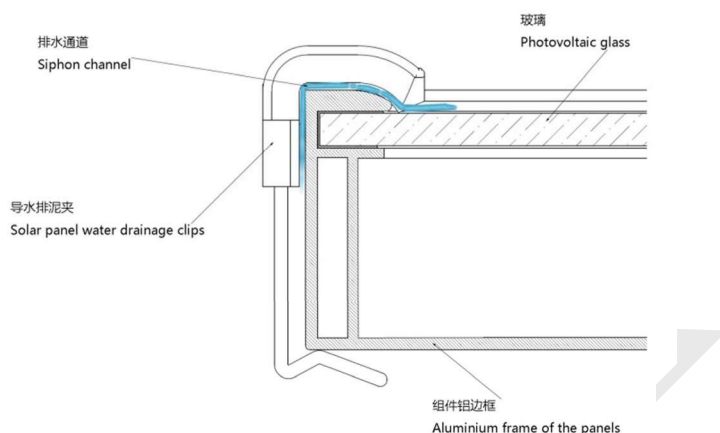


Figure 6 Schematic diagram of siphon effect

1.3 Why drainage clips need to be hydrophilic?

The so-called hydrophilicity refers to the fact that a drop of water droplets are gently dropped on the surface of the object, and the water droplets tend to spread out rather than gather together, or that the object is easily wetted by water, which is called hydrophilic. If the water droplets are completely diffused (the hydrophilic angle is close to 0 degrees), it is called a superhydrophilic material. For example, the inner walls of the capillary, used to transport water from the ground to the leaves at a height of tens of meters in large trees are super-hydrophilic. The more hydrophilic the inner surface of the pipe, the smaller the resistance of the fluid. Therefore, the inner surface of the drainage clips should be hydrophilic, preferably super-hydrophilic, so that it can drain faster. The fast or slow drainage is very important, because when the rain is over and the sky is sunny, the accumulated water needs to be drained away as soon as possible, otherwise, under the sun exposure, the accumulated water will quickly make the photovoltaic glass moldy. In addition, during the period when it is not raining, dust and other sundries may be deposited on the surface of the drainage clip, which is easy to clog after a long time. If its surface is hydrophilic, when rain comes, water can easily infiltrate its surface so that the soil cannot stick and will fall off, and the clips will not be blocked.

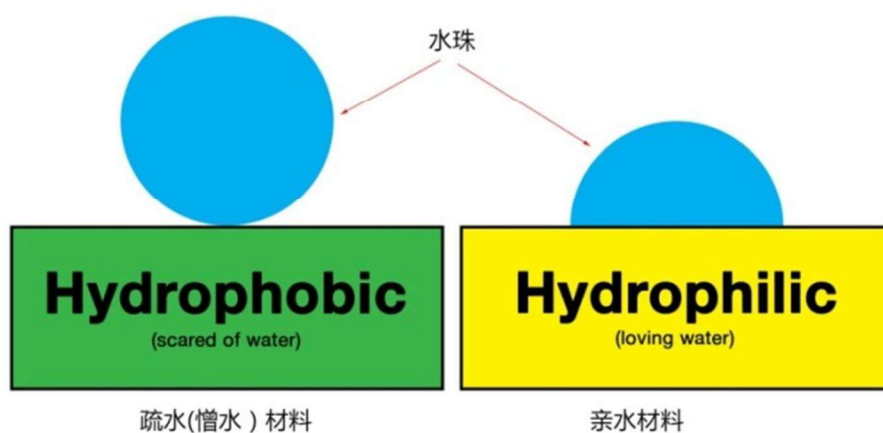


Figure7 Schematic diagram of hydrophilicity

1.4 Scope of Application

If there have accumulated water, whether new or already built photovoltaic power stations, can be used, that is, there is soiling bands under the panels can be used. Generally speaking, the lower edge of photovoltaic panels that are installed relatively flat (installation angle less than 15 degrees) have dust accumulation problems; Photovoltaic panels with an inclination angle of less than 8 degrees have a large water accumulation belt; Those panels with a large inclination angle, such as those with more than 20 degrees, will not accumulate water, and there will be no soiling bands; so this product is not needed; If it is not a soiling bands; such as dust on the entire photovoltaic panel, the drainage clips is useless.

1.5 Soiling bands formed by dew

In spring or autumn, some places in the evening dew more, will condense on the surface of photovoltaic panels, severe these dew will accumulate under the panels, this accumulated water is the most difficult to eliminate, according to our tests, the drainage clips, only with hydrophilic coating, can drain part of the stagnant water, the remaining stagnant water and soiling bands can only be drainage away when waiting for rain.

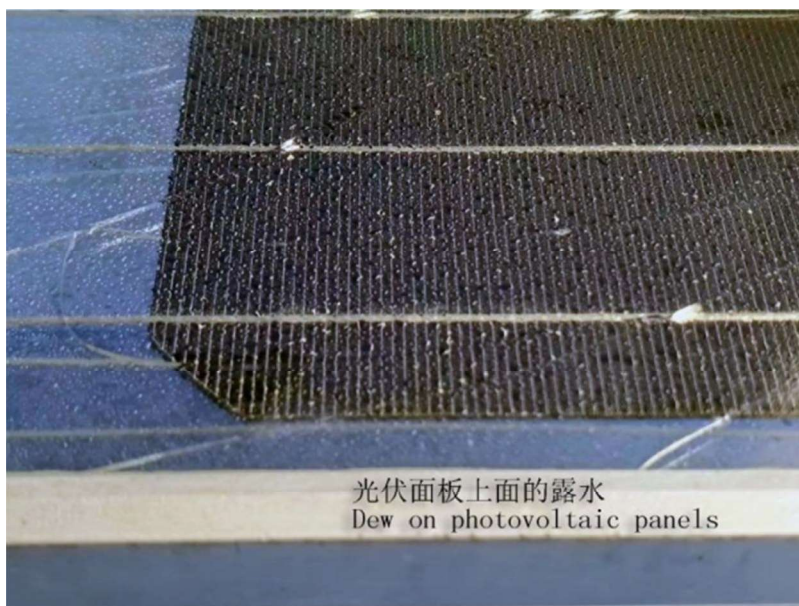


Figure 8 Dew on photovoltaic panels

1.6 Benefits of installing drainage clips.

The drainage clips can eliminate the soiling bands, inhibit the mold on the lower edge of the glass, increase the power generation, reduce the number of cleaning, after installing the drainage clips, the general situation is only once a year can be cleaned, the hot spots formed by the soiling bands also disappear, reduce the fire risk, will no longer mold, can extend the life of the solar panels.

1.6.1 How much power generation can be increased?

According to the actual test data, after installing the drainage clips, the power generation gain is from about 2% to 12%, and the average power generation increases by nearly 8%! After a few rains (probably a few months), it is possible to pay for itself! Actual measurement shows that the commonly used 540 panels, one board generates about 530 degrees of electricity per year, and two drainage clips are installed on one board, which generates about 25 degrees of electricity per year, which has good economic benefits.



1.7 Product Features and Specifications

1.7.1 Model Description

Product name and specifications: "Solar panels drainage clips", referred to as "drainage clips", specification model (see the following table):

LH -35T-Q, LH -35T-P, LH -35T-Q-J, LH -35T-XHJ-Q

Model Description:

LH, Rhenium (registered trademark)

T, universal

XHJ, zinc alloy (If there without XHJ, means made of plastic)

35, aluminum frame thickness 35 mm

Q, there is hydrophilic coating, P, without hydrophilic coating, J Japan special



Figure 9 Zinc alloy drainage clips

1.7.2 Product Code List

成品编码/Code	成品名称/Name	规格/型号? No	单位/Unit
LH -25T-XHJ-Q	25 锌合金导水排泥夹	T25XHJ	个
LH -28T-XHJ-Q	28 锌合金导水排泥夹	T28XHJ	个
LH -30T-XHJ-Q	30 锌合金导水排泥夹	T30XHJ	个
LH -32T-XHJ-Q	32 锌合金导水排泥夹	T32XHJ	个
LH -35T-XHJ-Q	35 锌合金导水排泥夹 35 Metal drainage clips	T35XHJ	个
LH -38T-XHJ-Q	38 锌合金导水排泥夹	T38XHJ	个
LH -40T-XHJ-Q	40 锌合金导水排泥夹	T40XHJ	个



LH -45T-XHJ-Q	45 锌合金导水排泥夹	T45XHJ	个
LH -50T-XHJ-Q	50 锌合金导水排泥夹	T50XHJ	个
LH -25T-XHJ-P	25 锌合金导水排泥夹不亲水	T25XHJBQS	个
LH -28T-XHJ-P	28 锌合金导水排泥夹不亲水	T28XHJBQS	个
LH -30T-XHJ-P	30 锌合金导水排泥夹不亲水	T30XHJBQS	个
LH -32T-XHJ-P	32 锌合金导水排泥夹不亲水	T32XHJBQS	个
LH -35T-XHJ-P	35 锌合金导水排泥夹不亲水	T35XHJBQS	个
LH -38T-XHJ-P	38 锌合金导水排泥夹不亲水	T38XHJBQS	个
LH -40T-XHJ-P	40 锌合金导水排泥夹不亲水	T40XHJBQS	个
LH -45T-XHJ-P	45 锌合金导水排泥夹不亲水	T45XHJBQS	个
LH -50T-XHJ-P	50 锌合金导水排泥夹不亲水	T50XHJBQS	个
LH -25T-XHJ-J	25 锌合金导水排泥夹日本款	T25XHJ-RB	个
LH -28T-XHJ-J	28 锌合金导水排泥夹日本款	T28XHJ-RB	个
LH -30T-XHJ-J	30 锌合金导水排泥夹日本款	T30XHJ-RB	个
LH -32T-XHJ-J	32 锌合金导水排泥夹日本款	T32XHJ-RB	个
LH -35T-XHJ-J	35 锌合金导水排泥夹日本款	T35XHJ-RB	个
LH -38T-XHJ-J	38 锌合金导水排泥夹日本款	T38XHJ-RB	个
LH -40T-XHJ-J	40 锌合金导水排泥夹日本款	T40XHJ-RB	个
LH -45T-XHJ-J	45 锌合金导水排泥夹日本款	T45XHJ-RB	个
LH -50T-XHJ-J	50 锌合金导水排泥夹日本款	T50XHJ-RB	个
LH -25T-Q	25 毫米亲水塑料排水夹	T25-Q	个
LH -30T-Q	30 毫米亲水塑料排水夹	T30-Q	个
LH -35T-Q	35 毫米亲水塑料排水夹 35 Plastic drainage clips	T35-Q	个
LH -40T-Q	40 毫米亲水塑料排水夹	T40-Q	个
LH -45T-Q	45 毫米亲水塑料排水夹	T45-Q	个
LH -50T-Q	50 毫米亲水塑料排水夹	T50-Q	个
LH -25T-P	25 毫米普通塑料排水夹	T25-P	个
LH -30T-P	30 毫米普通塑料排水夹	T30-P	个
LH -35T-P	35 毫米普通塑料排水夹	T35-P	个
LH -40T-P	40 毫米普通塑料排水夹	T40-P	个
LH -45T-P	45 毫米普通塑料排水夹	T45-P	个
LH -50T-P	50 毫米普通塑料排水夹	T50-P	个
LH -35T-J	35 规格日本排水夹	T35-Q-J	个
LH -35T-Q-老	35 毫米亲水塑料排水夹老款	T35-Q-LK	个
LH -40T-Q-老	40 毫米亲水塑料排水夹老款	T40-Q-LK	个
LH -35T-P-老	35 毫米普通塑料排水夹老款	T35-P-LK	个
LH -40T-P-老	40 毫米普通塑料排水夹老款	T40-P-LK	个

Plastic drainage clips are shipped with a face width (Fig 20) of 11 mm by default, it will be loose or too tight for other face width sizes, so please specify other face width sizes in advance.

Metal drainage clips are available in a variety of face width sizes.



1.7.3 Plastic drainage clips



Figure 10 Plastic drainage clips

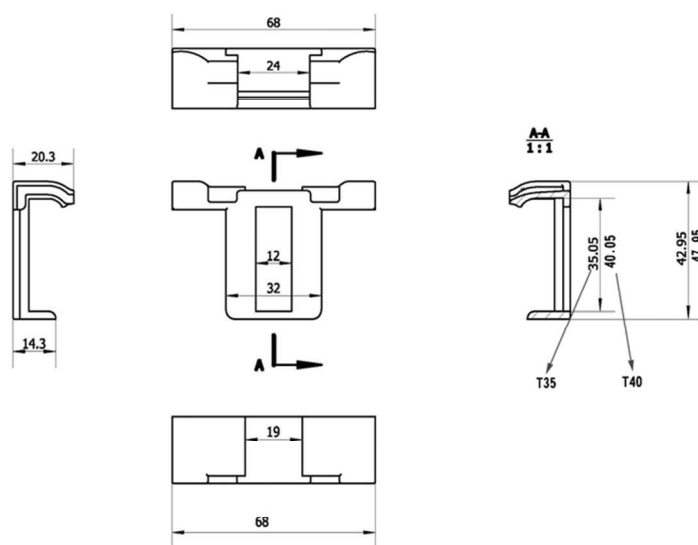
Plastic drainage clips are made of ABS (A kind of engineering plastics), with hydrophilic coating, UV resistance, aging resistance, high and low temperature resistance, and can be used outdoors for a long time. This material has good elasticity, high structural strength, and does not fall off in long-term use. Its service life is expected to be 5 years.

Product specifications: Customs HS CODE: 3926909090

导水排泥夹规格及参数 Technical Specification		
名称/Name	35 塑料导水排泥夹 35 Plastic drainage clips	40 塑料导水排泥夹 40 Plastic drainage clips
型号/Model Number	LH -35T-Q	LH -40T-Q
适用范围/Scope of application	铝边框厚度 35 毫米组件 Aluminum frame thickness 35 mm	铝边框厚度 40 毫米组件 Aluminum frame thickness 40 mm
尺寸/Dimensions (mm)	68*20*43	68*20*48
重量 (克) /Weight (g)	8	8
材料/Material	ABS 工程塑料	ABS 工程塑料
亲水涂层/Hydrophilic coating	有/Yes	有/Yes
产品寿命 (年)/Lifespan (Year)	5	5
使用温度范围/Working Temperature (° C)	-25° ~ 75°	-25° ~ 75°



Figure 11 Plastic drainage clips



T35, T40 导水排泥夹图纸

Figure 12 Drawing of plastic drainage clip

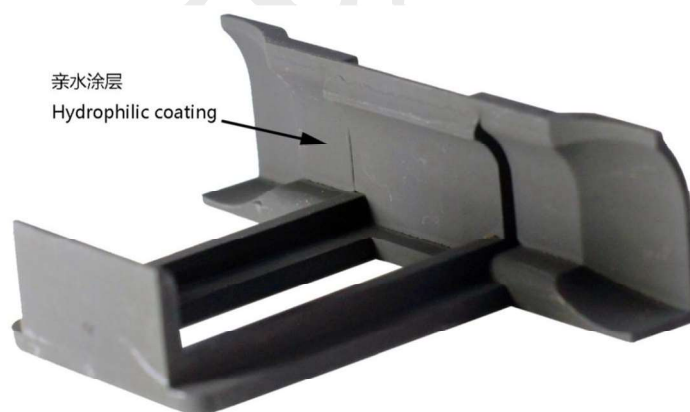


Figure 13 Plastic drainage clips with hydrophilic coating on the inside

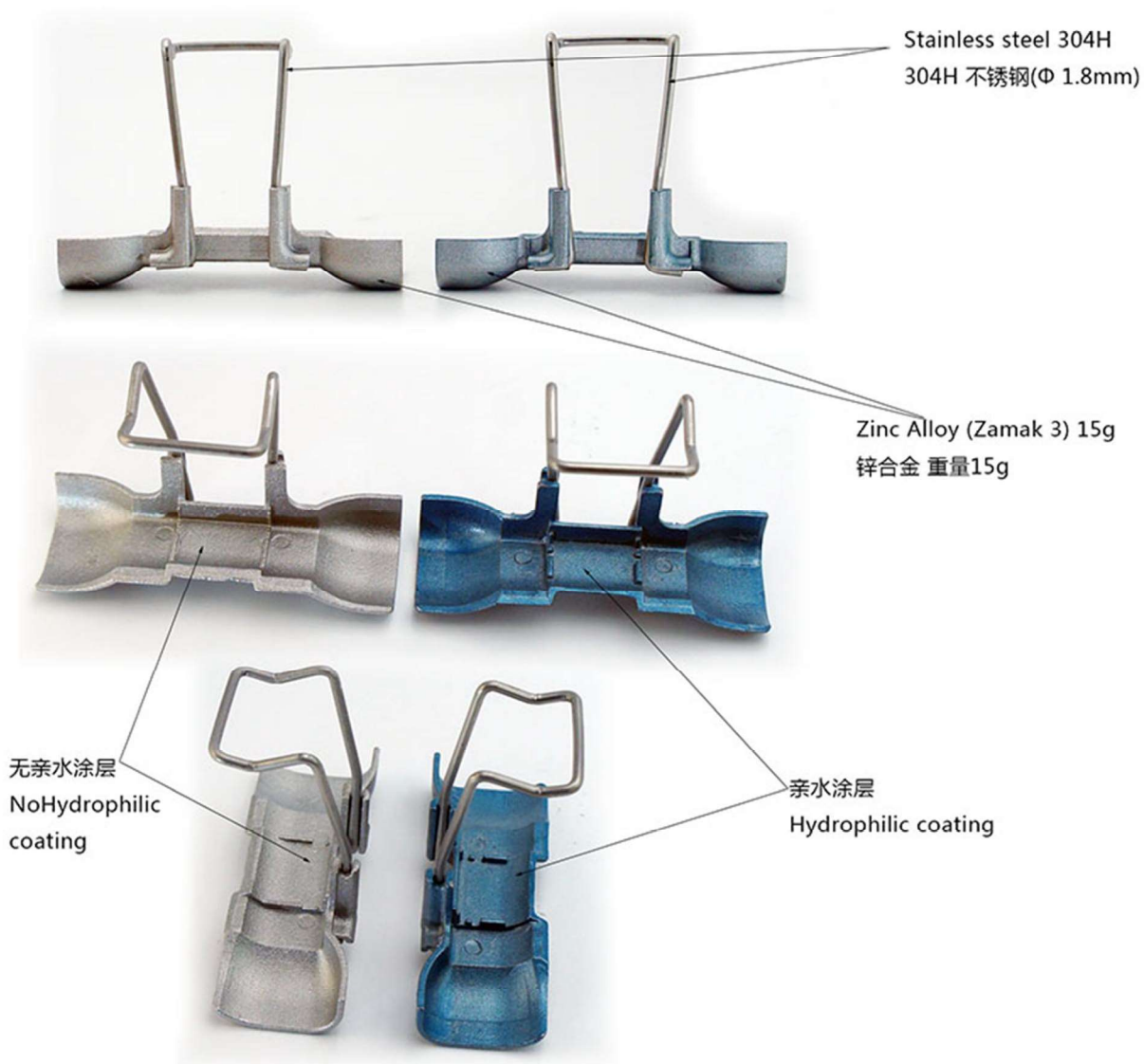


1.7.4 Metal drainage clip

Metal drainage clip is composed of zinc alloy drainage cap and stainless steel spring feet, zinc alloy cap inside has hydrophilic coating, hydrophilic coating is processed by baking paint process, hardness exceeds automotive paint, UV resistance, aging resistance, high and low temperature resistance, can be used outdoors for a long time, especially excellent corrosion resistance, can be used in marine environments. This material has good elasticity, high structural strength, long-term use does not fall off, and its service life is more than 20 years. Customs HS code 8302490000



Figure 14 Zinc alloy drainage clips of various sizes



Metal drainage clips

Figure 15 Zinc alloy drainage clips with or without hydrophilic coating



Technical Specification

名称/Name	35 金属导水排水夹 35 Metal drainage clips	40 金属导水排水夹 40 Metal drainage clips
型号/Model Number	LH -35T-Q-XHJ	LH -40T-Q-XHJ
适用范围/ Scope of application	铝边框厚度 35 毫米组件 Aluminum frame thickness 35 mm	铝边框厚度 40 毫米组件 Aluminum frame thickness 40 mm
尺寸/Dimensions (mm)	60*21*50	60*21*55
重量(克)/Weight (g)	16	16
材料/Material	锌合金+不锈钢 Zinc Alloy (Zamak 3)+304H stainless steel	锌合金+不锈钢 Zinc Alloy (Zamak 3)+304H stainless steel
亲水涂层/ Hydrophilic coating	有/Yes	有/Yes
产品寿命(年) /Lifespan (Year)	20	20
使用温度范围/Working Temperature (°C)	-45° ~ 105°	-45° ~ 105°



Figure 16 Zinc Alloy Solar panels drainage clips

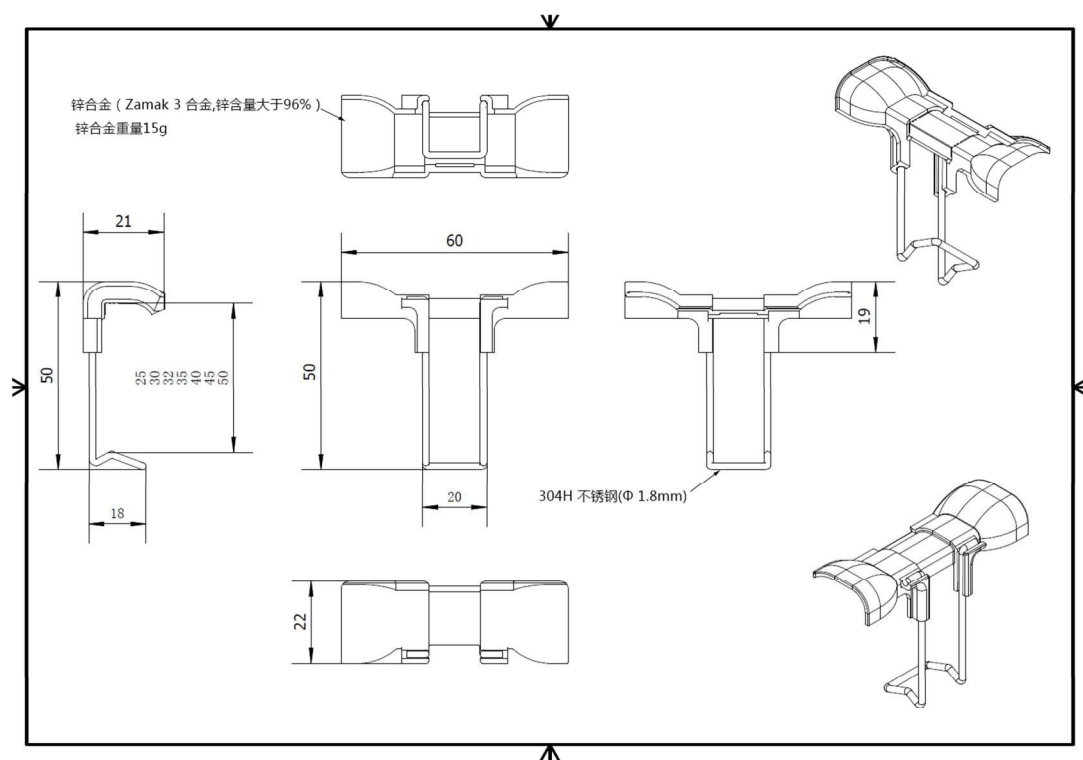


Figure 17 Drawing of Zinc Alloy

2 Selection guide for Solar panels drainage clips

The drainage clips need to be fastened in the panels aluminum frame to function, in order to fit different manufacturers of different sizes of panels, mainly the size of these two panels: (1) the thickness of the panels aluminum frame, (2) the panels aluminum frame surface width (Figure 16), see the figure below:



Figure 18 Plastic drainage clips of various sizes



2.1 PV modules thickness

The drainage clip should be buckled on the aluminum frame of the module, and the dimensions of the are different for photovoltaic modules manufactured by different manufacturers and in different periods.

The common aluminum frame thicknesses ① are (mm) : 25, 30, 35, 40, 45, 50, and the corresponding specifications of the drainage clips are T25, T30, T35, T40, T45, T50.

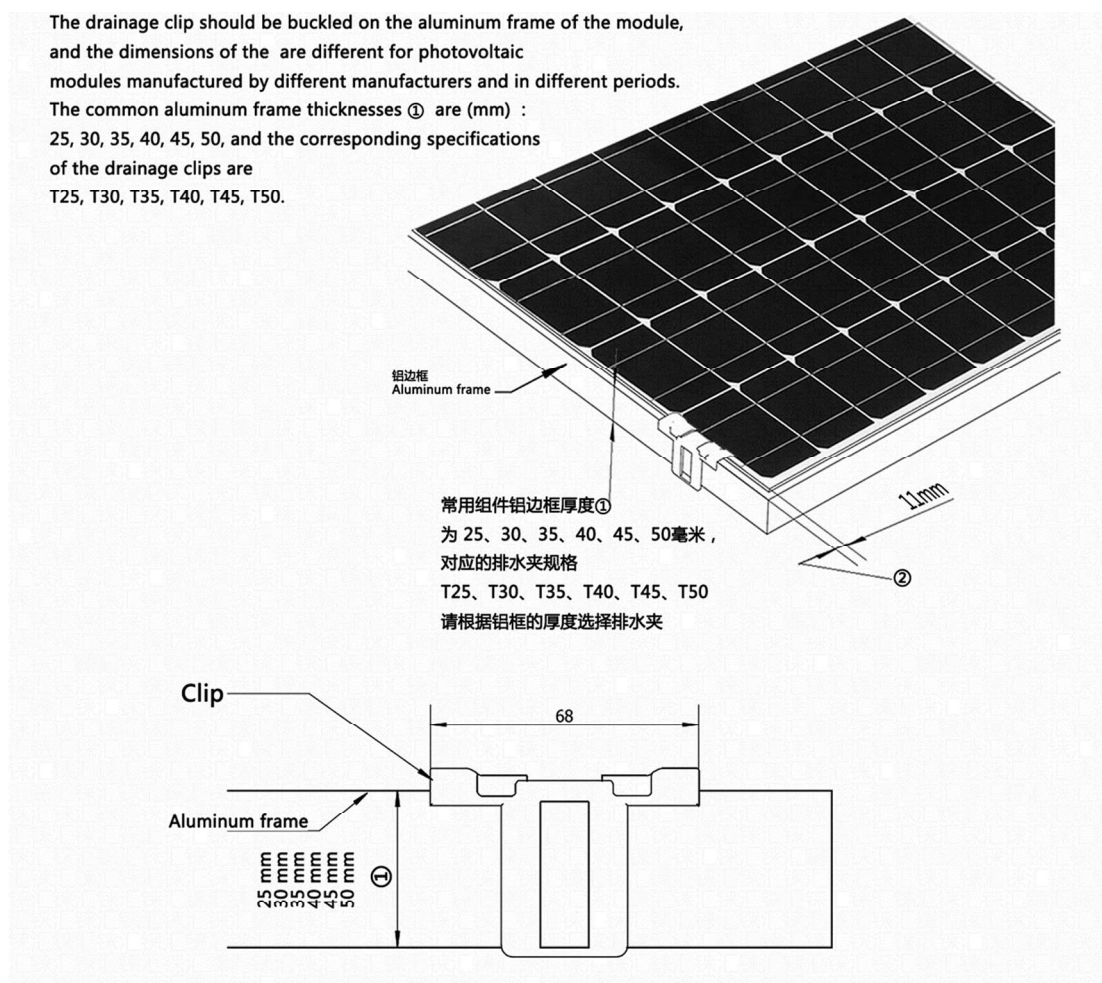


Figure 19 Plastic drainage clips of various sizes

The thickness dimensions of the aluminum frame can be viewed on the back of the PV modules:



Figure 20 Plastic drainage clips of various sizes



Figure 21 Measuring the thickness of the aluminum frame:

Commonly used panels are 35 or 40 mm thick, as well as 25, 30 or 45, 50 mm, and there are many sizes of drainage clips depending on the size of the panels.

2.2 Panels face width

The face width is usually 11 mm, but also 9, 10 or 12 or 14 mm (see figure below). When installing, if the drainage clips is too loose or cannot be buckled, the width of the aluminum frame surface may be 9mm or 12~14mm, we can supply various specifications of drainage clip, please contact us to provide a sample



We also offer more specifications

Sometimes, even if the thickness of the drain clip you purchased matches the thickness of the aluminum frame of the module, it still feels too tight or too loose after it is fastened. This is because, even in the case of the same thickness, due to different manufacturers, photovoltaic The width of the aluminum frame of the component is also different (as shown in the Fig. 7 ②).

Our drain clips

(T25, T30, T35, T40, T45, T50) are suitable for this size, if the face width (②) of your component frame is not 11 mm, but 9mm or 12mm or 14mm or other sizes, please contact We, we can supply products in these sizes.

常用组件铝边框面宽为11mm.如果排水夹过松或者扣不上, 铝边框面宽可能是9mm或者12~14mm, 我们可供应各种规格排水夹, 请联系我们提供样板。

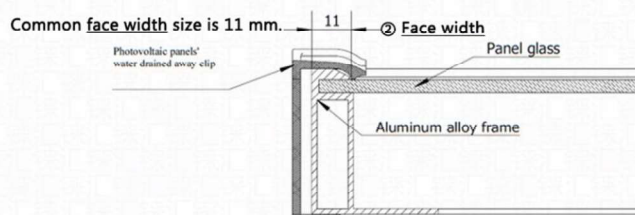
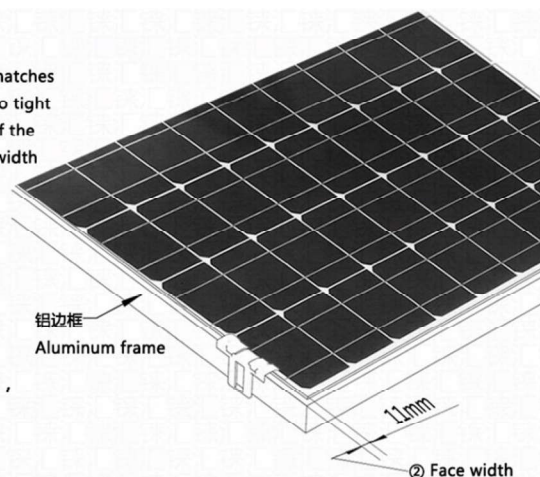


Figure 22 Measuring the width of the aluminum frame Face width

Plastic drainage clips are available for 25, 30, 35, 40, 45, 50 mm aluminum frame assemblies. Metal drainage clips are available for 25, 28, 30, 32, 33, 35, 38, 40, 45, 50 55mm aluminum frame assemblies. All in stock.

Special specifications can be customized.



3 How to install drainage clips

3.1 Where is it installed? How many pieces to install?

The installation position of the drainage clips is very important, deviation from the optimal position will cause poor drainage and reduce power generation, and when the deviation is serious, it is basically ineffective. The basic principle of location selection is to follow the soiling bands, and buckle it in the place where the water accumulates the widest (the soiling bands traces are the most obvious). One cm from the very edge. If the accumulation collects in one corner, install one piece. If evenly distributed along the lower edge of the panels, two pieces need to be installed, and if the evenly distributed soiling bands length exceeds one meter, install 3 pieces

安装在哪里？安几块

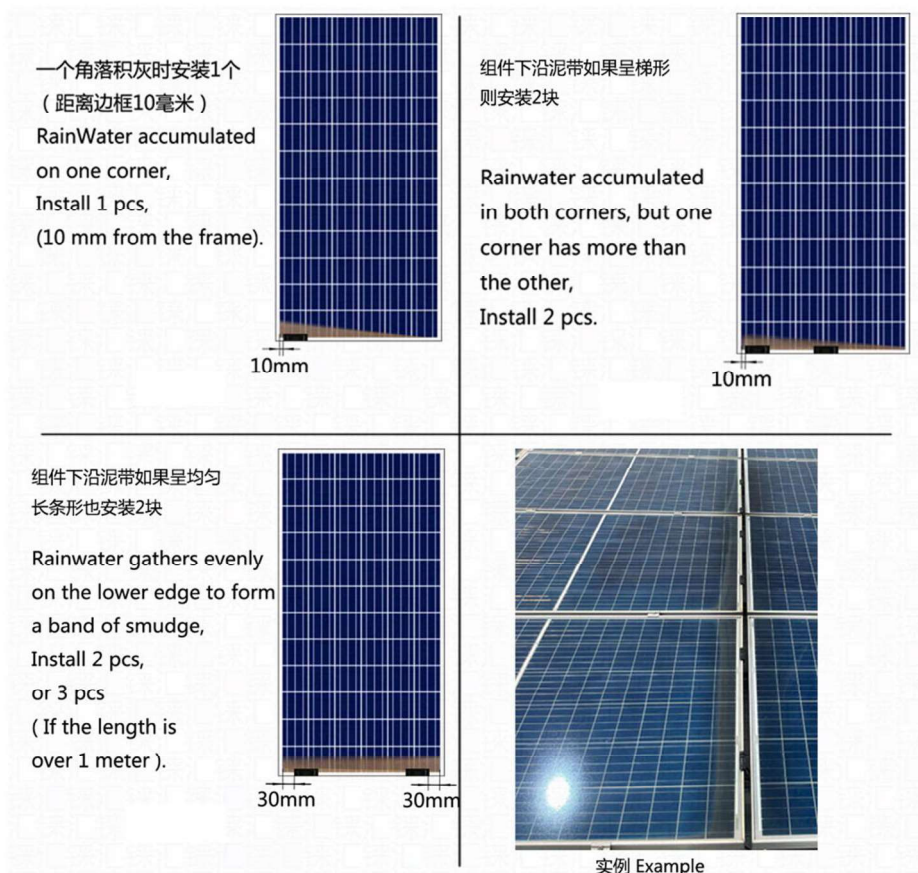


Figure 23 Larger than one meter may require the installation of three pieces



如果组件下沿的积灰带长度超过1米，最好安装3块，如下图所示

Rainwater gathers evenly on the lower edge to form a band of smudge, Install 2 pcs, or 3 pcs (If the length is over 1 meter).



Figure 24 Larger than one meter may require the installation of three pieces

新建的光伏电站怎么处理？

在铺设光伏板的同时，安装排水夹是好的方法。在这种情况下，建议在每块光伏板的下沿处距离两个角落10毫米的地方各安装一块。很明显它不一定是积水最多的位置，怎么处理呢？等待第1场雨下过以后，根据积水的痕迹再调整排水夹的位置（用手把它推到合适的位置）

How to install drainage clips in newly built photovoltaic power plants?

Install one at each corner at the lower edge of each panel.

After the first rain has passed, adjust the position of the clip according to the traces of the rainwater (push it to the proper position by hand)

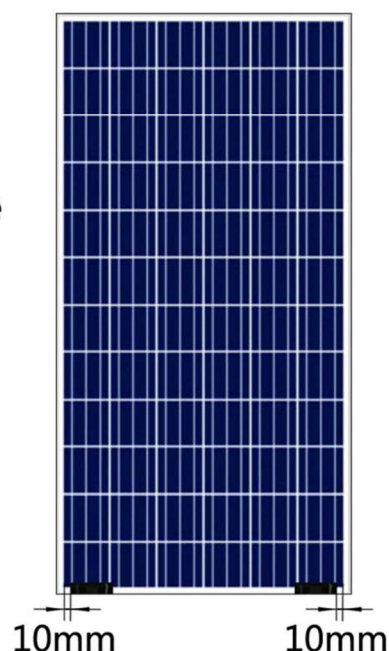


Figure 25 How to install the new power station



3.2 Installation examples: The following are installation examples

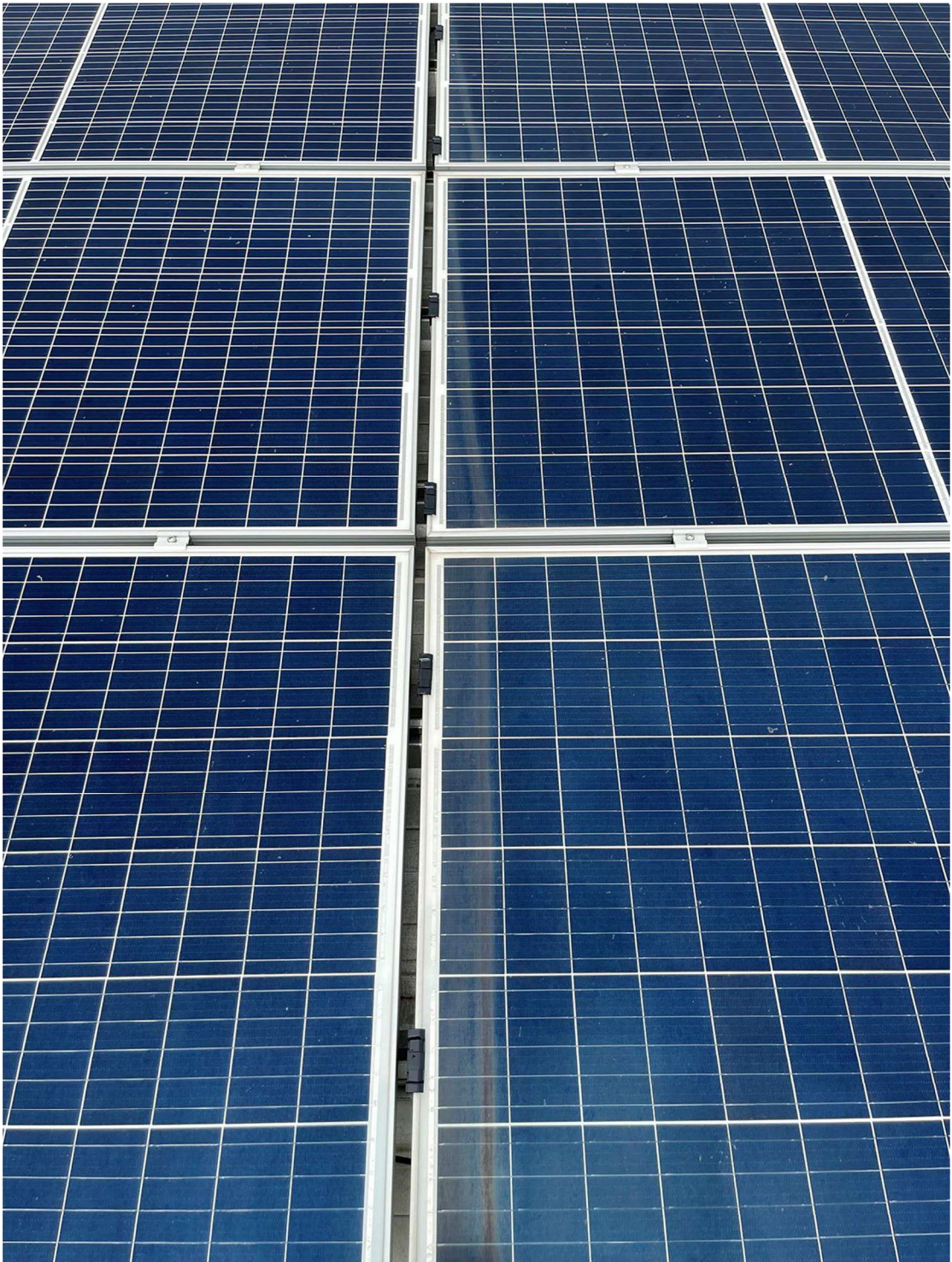


Figure 26 Installation example



Figure 27 Installation example



Figure 28 Installation example



3.3 How to install?

Before installation, the panels should be cleaned; especially the original soiling bands should be removed.

The soiling bands are fastened to the frame of the panels, and the buckle is in place, without skew or cocking feet. Pay special attention to installing two or three pieces, leaving a gap of 1 cm from the corner!

Intermediate installation of panels of large-area arrays: The distance between panels greater than 8 mm can be followed, first put the drainage clips between the frames, and then press with a small flat shovel.



Figure 29 How to install it

Precautions for construction: It is strictly forbidden to step directly on the panels for installation operation to avoid hidden cracking of the panel; In order to prevent stepping on the photovoltaic modules, you can use PV panels protection mat (We can provide) to install drainage clips.



Figure 30 Installing drainage clips using protection mat



4 Troubleshooting

4.1 Buckle, not tight (loose)

The size of the panels may vary, if it cannot be installed, buckled or loose, please contact us to provide the appropriate size drainage clips, be sure to perform a small number of trial installations before installing large areas.

4.2 Residual mud bands (unclean sludge drainage)

The first installation is completed, after the first rain, you should check all again, if you also find the soiling bands on the panels, may be the installation position is incorrect, please press the "follow the soiling bands, where the soiling bands is installed where" in time to change the installation position, you can push the drainage clip to the appropriate position.

4.3 Mud bands remain during light rain

In some cases, the installation angle of photovoltaic modules is small (close to the horizontal plane), even if the location is selected correctly, there are soiling bands residues, see the figure below, this is because, there is no rain for a long time, the module dust is more, when it rains lightly, the amount of rain is too small, when the rain stops, the saturated mud water flows away due to the siphon phenomenon, but the sediment settles down, if the rain can fall longer, or it rains heavily later, there will be no more of these residual soiling bands.



Figure 31 Soiling bands after light rain stops



5 Packaging specifications and precautions for transportation and storage

Plastic Drainage clips are packed in cartons:

T35, T40, T45, T50 1000 pcs per carton,

T25, T30 500pcs per carton. The specifications are as follows:

纸箱 (含有吸塑托盘) 包装尺寸 :

Package: Carton with plastic tray inside.

Size: Width*Depth*Heigh (cm): 51*38*47

Gross Weight (kgs): 10 Kg



Figure 32 Plastic Drainage clips packaging



金属排水夹包装
Metal drainage clips packaging

纸箱（内含塑料袋）包装尺寸：
每个纸箱内有10个塑料袋，每个塑料
袋装100个。总共1000个一箱。
每箱重量16.5公斤
Package: Carton with plastic bag.
Carton Size: Width*Depth*Heigh
(cm): 57*37*21
Gross Weight (kgs): 16.5 Kg
1000 PCS



Figure 33 Metal Drainage clips packaging



5.1 Transportation and storage:

Keep dry and do not soak in water for a long time. Do not press again, do not use if accidentally deformed by pressure. Do not scratch the inside with sharp objects. Storage temperature: -35 °C ~ 95 °C. Do not contact with strong acid, alkali and other corrosive objects.

5.2 Later maintenance and after-sales service.

If there is a problem with the product during the product warranty period, it will only be replaced but not repaired. This product has stable performance, basically no need for post-maintenance, if you find a problem, please contact us in time.

BENEFICIARY: Huizhou Laihui Cleaning Equipment Co., Ltd.

NAME OF BANK: BANK OF CHINA HUIZHOU BRANCH

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