浮能光伏科技

SUZHOU FONER SOLAR POWER CO., LTD

Most reliable Solar Mounting System Developer

Innovate

Suzhou Foner Solar Power Co., Ltd. is a high-tech enterprise dedicated to providing floating systems and rooftop solar mounting system. The main businesses are system design, system installation and solar power project development. The designed system annual capacity can reach over 200MW.

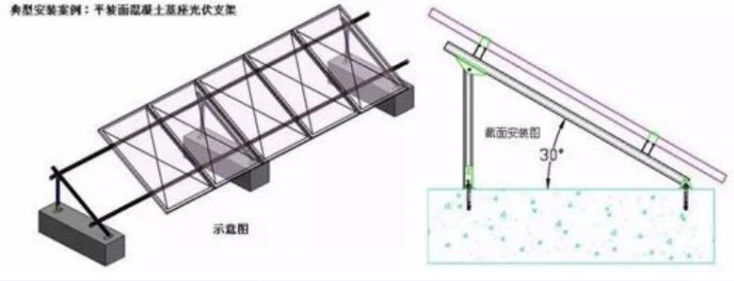
The founding team members of Foner have more than 10 years of experience in system R&D, design, production and marketing of solar mounting system development. Relying on continuous technological innovation and management changes, Foner cooperate closely with upstream and downstream enterprises in the solar industry chain to provide better product solutions and continuous innovation impetus for the development of the whole solar industry.

Foner has obtained a number of pioneering technology patents and has industry-leading technical advantages. She has established vast technical and business contacts with solar companies and EPC companies all over the world.

水平混凝土屋面HDPE光伏安装系统
Mobile HDPE mounting module for flat rooftop solar project

Traditional mounting system

The concrete material is usually used for counterweight for rooftop PV projects at flat concrete rooftop. The bottom of the counterweight is padded with waterproof material and fixed and leveled with cement mortar on the rooftop. The weight of the counterweights will balance the solar module arrays. As the counterweights are directly placed on the roof without drilling holes, they will not damage the original structure of the roof. In the installation , counterweights have various forms, such as strip counterweight, square counterweight, reinforced concrete counterweight ,engineering plastic, etc..



strip counterweight

square counterweight

reinforced concrete + engineering plastic

In the installation of PV systems on flat concrete rooftops, concrete counterweights are often used. However, the concrete counterweights have the following shortcomings in actual installation :

1.Complicated installation and inconvenient transportation: When making concrete counterweights, it is necessary to use machinery to mix cement, gravel, sand, water and other raw materials. The machinery and materials are relatively bulky and inconvenient for storage and transportation

2.Large site requirements: a relatively wide ground is required for equipment, material placement, storage and counterweight making.

3. Long installation duration: the concrete counterweights need to be made firstly and maintained for some time to become solidified and get sufficient strength before installation can be carried out. The installation period is long and need very careful maintenance

4.Not environment friendly: the operation of machinery will produce noise and wastewater pollution. Due to concrete mixing and the use of sand and gravel materials, a large amount of dust is easily generated during the installation period, which pollutes the environment and easily causes occupational hazards

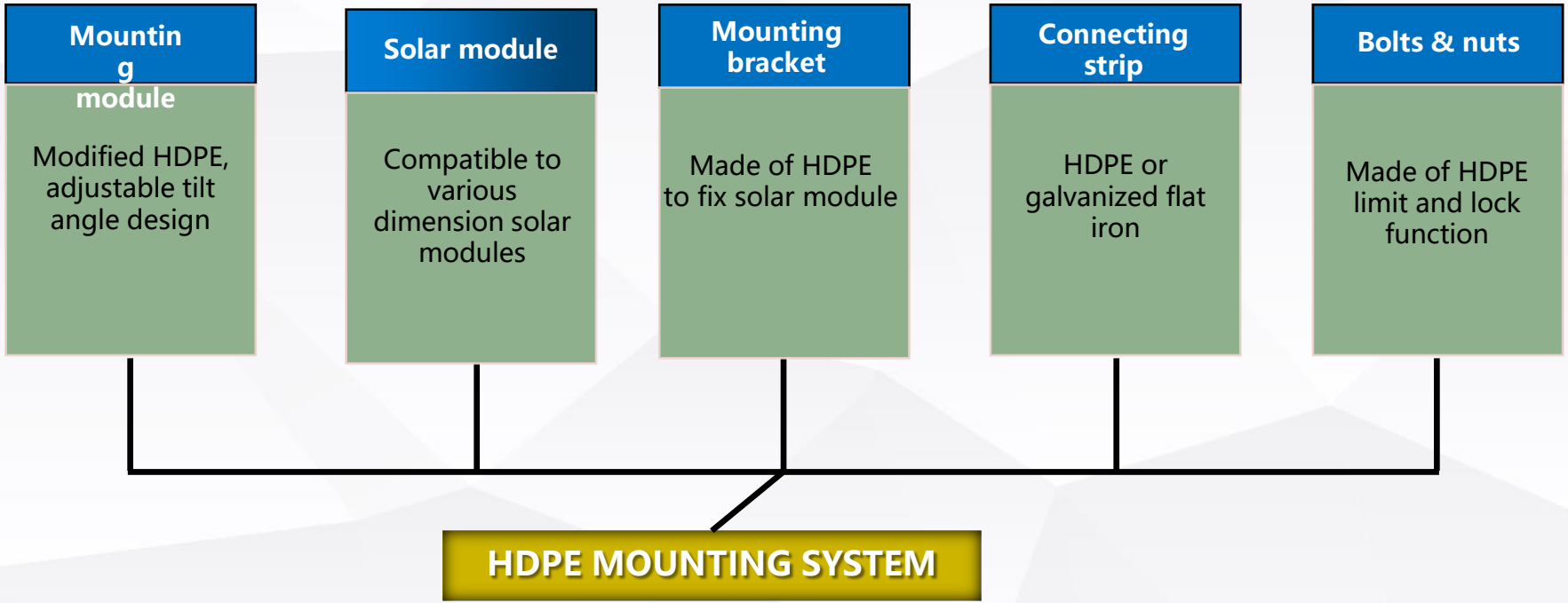
5.Higher labor cost: a lot of installation personnel need to be deployed on the installation site, and the salary is rising according to the larger amount of work and the longer installation period, thus the labor cost is higher

6. High layout requirements: Due to the inconvenient movement of the counterweight , the design accuracy of the layout of the counterweight is required to be higher

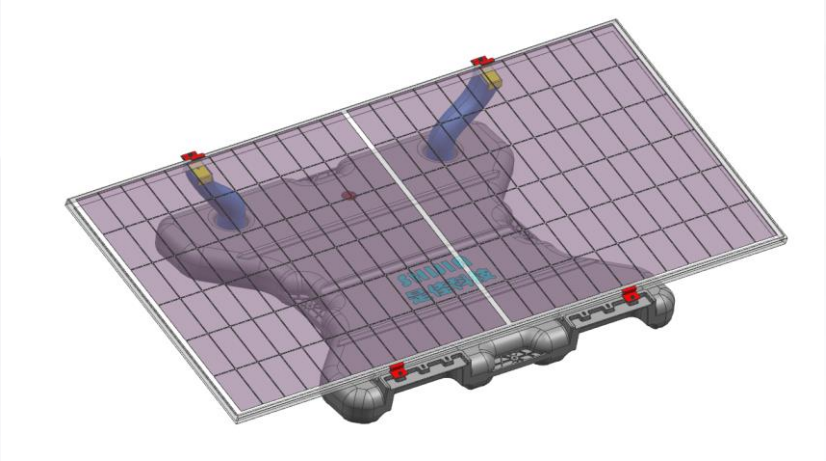
7.Remains pollution is large: after the installation and the life cycle of the rooftop PV project, the concrete materials has no recycling value, resulting in a lot of waste of resources and pollution.

8.Inconvenient disassembly and transportation: If the rooftop PV project needs to be adjusted or moved, the disassembly and transportation are extremely inconvenient, and the transportation of the counterweight is almost impossible.

New Mobile HDPE mounting system



Mobile HDPE mounting system



Raw material	Made of modified anti-aging HDPE material in line with Hunt water absorption test
Wall thickness	2～4mm(adjustable)
Dimension(cm)	1170 X 1214 X 150mm
Counterweight (water filled)	160kg min

The water filled mounting module is made of modified high quality HDPE material, which is same to the mounting modules used for floating solar system with same 25 years' design service life with stable operation

The water filled HDPE mounting module is made of integrated blow molding process with excellent performance, high wear resistance and pressure resistance

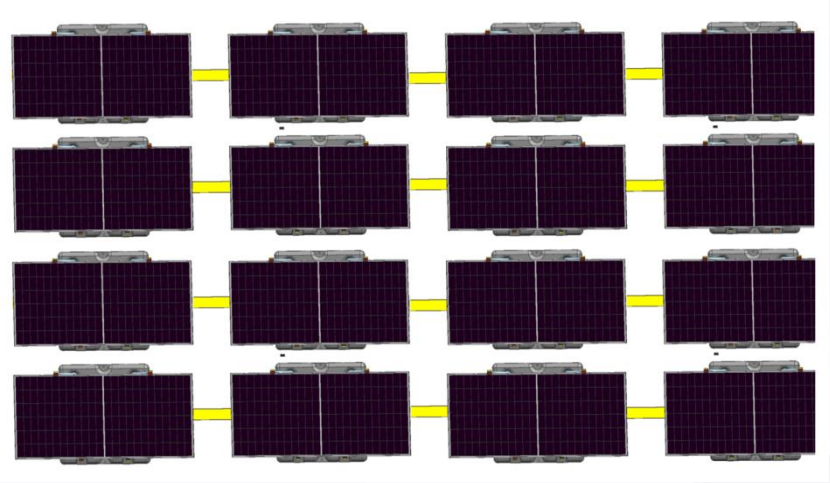
Portable structure design, easy to be transported and carried, easy to assemble, hoisting, and be installed

Plane slotted design, increase the friction between the bottom and ground to improve the stability of mounting system

After the water filling, the unit pressure of the mounting module on the rooftop is much lower than that of the concrete counterweight, this can obviously reduce the potential damage to the rooftop

The counterweight can be adjusted by changing the type and filling ratio of the medium filled into cavity of the module, thus the modules layout is more flexible

Mobile HDPE mounting system



This mobile distributed PV HDPE mounting system is inspired by the floating solar system. It uses the HDPE mounting modules cavity as a water filled module. After the modules is filled with water, its own weight is used as the counterweight, and the "chained connection" conception is used for this HDPE mounting system layout design. After the water filling, the mounting modules are interconnected with each other to form an integrated modules array on rooftop. With the same function of the concrete counterweights, this integrated overall modules array have many advantages such as higher stability, convenient installation, low cost and easy storage and transportation.

The anchoring concept is adopted to stabilize the array if needed, which will bring good system stability and wind resistance.

Comparative advantages

1. **Long system life** : The modified HDPE material has many advantages such as a wide working temperature range, corrosion resistance, and excellent performance, which can meet the 25-year service life requirement of the PV industry
2. **Fast production**: The integrated filling molding process is fast and the delivery is timely
3. Convenient transportation: The module adopts lightweight design, which is convenient for storage and transportation
4. Lower cost: Thanks to the improvement and optimization of system design, this HDPE system cost and installation cost are s lower than traditional system
5. **Easier and faster installation**: only water filling is required to complete the installation of a single counterweight module, so the installation time is at least **30% less** than that of the traditional concrete counterweight mounting system
6. **Saving manpower cost**: the installation process is much easier and faster the manpower cost is much lower
7. **Environmental protection** and energy saving: only water, sand or other media are required to be filled into module during the installation process, and no extra pollution and noise are generated during installation, little power consumption
8. **Easier adjustment**: the system layout adjustment is more flexible and convenient
9. **Low pressure:** the flat wider bottom surface design is used to avoid possible potential damage to rooftop.
10. **Mobile and reusable**: If the finished PV project needs to be relocated , it can be disassembled and discharged quickly, and it can be quickly assembled and reused in a new project site
11. Recyclable: HDPE materials can **be recycled** after a 25-year life cycle to reduce environmental pollution.

Tests

TUV,CPVT,REACH certificate
Pass wind tunnel test with maximum 60m/s wind speed
Modified raw HDPE materials with over 25 years lifetime design

风洞试验

表 6-2　工况二测试结果

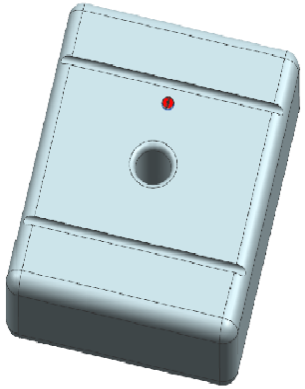
迎风方向		侧面迎风
风速（m/s）	持续时间	现象
0	/	样品各部位安装牢固
10	3min	未出现明显晃动或部件损坏
20	3min	未出现明显晃动或部件损坏
30	3min	未出现明显晃动或部件损坏
40	3min	未出现明显晃动或部件损坏
50	3min	光伏板出现轻微振动，但未发生连接破坏或部件损坏
60	10min	光伏板振动幅度加大，但未发生连接破坏或部件损坏
停机	/	经检查，样品无明显变形，也未出现部件的松脱或破坏

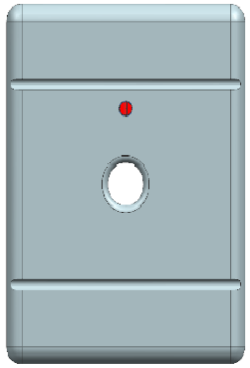
（a）试验前照片　　（b）试验后照片

C	**荷载计算**		
C-1	组件自重GK=	P*a*n*Lx=	0.244kN
C-2	水平风荷载(Ek)Wx=	Wk*a*n*Lx*sinθ=	0.618kN
C-3	竖向风荷载Wy=	Wk*a*n*Lx*cosθ=	1.070kN
C-4	竖向拔力Tk=	Wy-Gk=	0.826kN
C-5	单个基础Gb=	w*d*h*tt=	2.132kN
D	**验算结果**		
D-1	抗拔稳定性验算		
	抗拔验比★=	Gb/Tk=	2.58
	验算结果:	★>1.6	验算通过！
D-2	抗倾覆稳定性验算（基础承受的竖向力为拔力）		
	倾覆弯矩M1=	Wx*H+Tk*d/2=	0.63 kN·m
	抗倾覆弯矩M2=	Gb*d/2=	1.07 kN·m
	抗倾覆验比▲=	M2/M1=	1.69
	验算结果:	▲>1.6	验算通过！
D-3	抗滑移稳定性验算		
	摩擦系数取值μ：	0.65	
	抗滑移验比▼=	(Gb-Tk)*μ/Ek=	1.37
	验算结果:	▼>1.3	验算通过！

Conceptional HDPE Counterweight

Water filling counterweight
Dimension:1500*800*280mm
Weight after water filled: 320KG

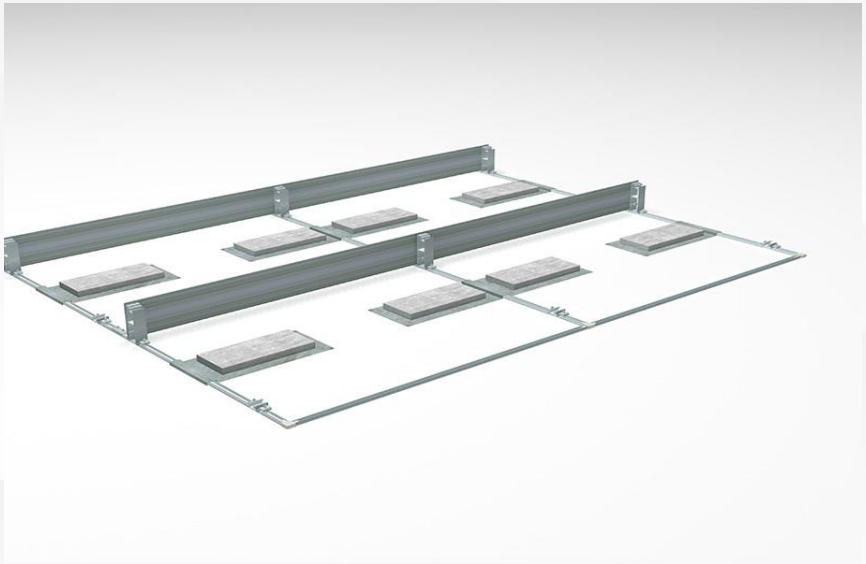




Sand filling counterweight
Dimension:1000*800*280mm
Weight after sand filled: 320KG

This HDPE counterweight modules design is inspired by the floating solar system. It uses the HDPE modules cavity as a water filled module. After it is filled with water, its own weight is used as the counterweight with the same function of the concrete counterweights, this design has many advantages such as higher stability, easier mobility , convenient installation, low cost and easy storage and transportation.
It can use water or sands as filling materials, the cost varies basing on the fill materials.

Target Application



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Technical partners

Changjiang Institute of Survey, Planning, Design and Research (CISPDR) rendering its services covering survey, planning, design, scientific research, consultancy, installation supervision and EPC. With a complete quality management system, CISPDR remains committed to provide high-quality products, advanced technology and sincerity service by scientific management and continuous improvement, in a way that exceeds the needs of customers.

CISPDR has prepared master plans for large rivers and lakes, and has performed survey and design for hundreds of projects in 45 countries and regions, represented by the Master Plan of the Yangtze River Basin, , Three Gorges Project and the Middle Route of South-to-North Water Transfer Project. CISPDR also design and EPC for over hundreds MW floating solar project. CISPDR possesses 330 national patents and has been awarded more than 400 national awards and has been successively granted international awards from FIDIC, ICOLD and other world-renowned organizations in the past several years

Relying on CISPDR abundant experience in floating solar projects and structural design, we have developed B series, Stacka series floating solar sys

Fuzhou ONESUN Power Consulting Co., Ltd. was founded in 2006. It is a subsidiary of Jiangsu Hengtong Optoelectronics Co., Ltd. (stock code: 600487) dedicated to the whole process of energy engineering planning, design, investment and installation. It is recognized as a national high-tech enterprise, a leading enterprise of small science and technology giants in Fujian Province, and an intellectual property advantage enterprise in Fujian Province.

The company has the power industry (power transmission engineering, substation engineering) professional level A, power industry (new energy power generation, wind power generation) professional level B, engineering survey (engineering survey, geotechnical engineering) professional level B, installation industry (installation engineering)) Professional C-level qualifications. The main business content mainly includes: grid system planning, power engineering design (transmission and transformation design, distribution network design), new energy business development (charging piles, photovoltaic, hydropower, wind power), power user engineering general contracting, etc.

ONE SUN

万山电力

One Sun Power

HDPE material enterprises

We use HDPE base materials and modified materials from Saudi Basic Industries Corporation (SABIC), Yanshan Petrochemical, Thai Petroleum, Hangzhou Hefu New Material Co., Ltd., Hefei Yuanran New Material Co., Ltd. and other HDPE material production and R&D units and have established close cooperation with them. The HDPE raw materials and modified materials used in our rooftop solar module mounting systems have passed REACH, RoHS and other certifications with stable performance and strong consistency. The HDPE mounting modules and solar module mounting structures made of the above materials have stable performance, wide working range and good weather resistance.

Mold manufacturer

Anhui Seagul Technology Co., Ltd. is also a technology-orientated enterprise specializing in the design and manufacture of plastic molds and HDPE solar system development. Its main business scope is the design and manufacture of plastic molds, precision parts, research and development of the floating solar system. Seagul has rich experience in floating solar system mold design, processing and assembly team. The technical team and mold team sincerely cooperated to develop blow molding mold for HDPE rooftop solar module mounting system and injection molding molds for floating solar system , which has many advantages such as uniform wall thickness, fast production cycle, stable performance and so on.

Third party testing agency

According to the floating solar system relevant tests of professional PV testing, the test results are fed back to product design and process control, which effectively guarantees the continuous improvement of our products.

Partial projects

Partial projects

Partial projects

Partial projects

携手合作,共创未来!

Win-Win Cooperation Sharing the Future!

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