

DAH Solar Full-Screen PV Module Outdoor Field Test Report Published by TÜV Nord

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TÜV Nord published the outdoor field test report for the Full-Screen PV Module. This product is innovated by DAH Solar, and it has a global patent in 18 countries and regions. The report indicated the power generation for the Full-Screen PV Module is increased by 11.5%.

The rooftops with small-angle installation conditions would form the bottom soiling due to the nature rain wash and the altitude intercept between the regular PV module frame and glass. This problem is the primary reason that causes the shade and hotspots on commercial and household PV stations. This bottom soiling could form a “shading belt” with different widths. At some extreme conditions, the “shading belt” could completely cover the PV module, which will decrease the power generation, harm the PV module generation capacity, and shorten the life span of the PV module. The Full-Screen PV Module with frameless front A-side design could let the natural rainfalls wash away the dust. This innovation would avoid the bottom soiling and eliminate the power loss by dust covering.

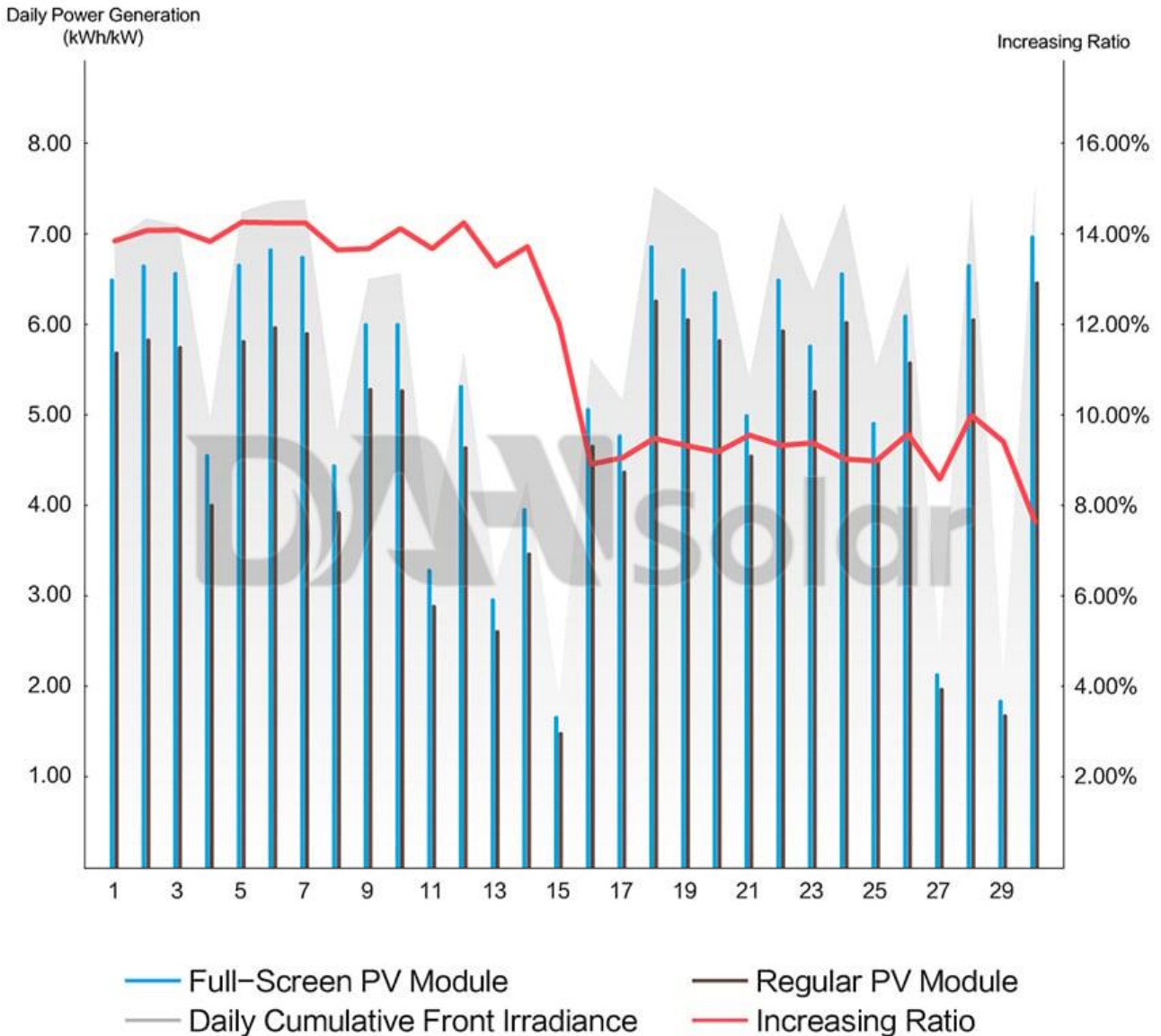


TÜV Nord Outdoor Field Test PV Power Station in Ningxia Province

The Full-Screen PV Module outdoor field test PV power station is located in Xixia District, Ningxia Province (38°36'56.77" N, 106°0'52.27" E). The demonstrative test was implemented by TÜV Nord, which relies on its testing and demonstration platform. This comparison test applied 182mm Cells Full-Screen PV Module(DHT-M60X10/FS-460W) with frameless front A-side design, which

was independently innovated by DAH Solar and the 182mm Cells regular PV module(DHT-M60X10-460W). To control variables, each module contains 6X30 pieces of cell, and the power generation efficiency are both 460W. All the PV modules are 182mm Cells PERC mono-crystal PV modules. The fixed installation angles for both types of modules are 5° (simulate the installation angles of color steel tile rooftop). The comparison groups used the same micro-inverters to achieve the MPPT tracking. These 2 groups could showcase the different power generation performances for 2 types of modules under natural conditions. Before the field test, the 2 groups were exposed to the sunlight 60Wh/m² and tested the initial power. Then the lab controlled the installation method, ground condition (soil, sand, rock, and grass), and the length of the PV cable.

The front irradiance is 170.28 kWh/m² in April. DAH Solar produced the Full-Screen PV Module generated 73.21 kWh, and the cumulative power generation per watt is 161.17 Kwh/kW. The regular PV module generated 65.06kWh, and the cumulative power generation per watt is 144.54kWh/kW. Compared to the regular PV module, the Full-Screen PV Module increased the power generation by 11.5%. This field test illustrated the Full-Screen PV Module has advantages in avoiding bottom soiling and reducing dust covering.



Analysis of Power Response Characteristics of PV Modules in Different Temperature Ranges

The power responsiveness data of the 2 modules in each temperature range indicated that in each operating temperature range, the performance of the Full-Screen PV module per watt (performance per watt = average power ÷ measured power) is better than the regular PV Module. As the height increases, the difference in power response characteristics between the Full-Screen PV Module and the regular PV module is proportionally increasing.

Analysis of Power Response Characteristics of PV Modules in Different Temperature Ranges Data				
Model	Minimum Power (W)	Maximum Power (W)	Average Power (W)	Performance per Watt
Temperature Range : 0~10°C				
Full-Screen PV Module	19.77	131.01	51.38	11.31%
Regular PV Module	17.55	114.95	45.99	10.22%
Temperature Range : 10~20°C				
Full-Screen PV Module	8.04	509.59	96.3	21.20%
Regular PV Module	7.53	464.42	89.26	19.83%
Temperature Range : 20~30°C				
Full-Screen PV Module	7.08	515.13	196.2	43.19%
Regular PV Module	6.5	467.52	177.07	39.34%
Temperature Range : 30~40°C				
Full-Screen PV Module	59.17	468.32	315.01	69.34%
Regular PV Module	53.14	425.14	284.63	63.23%
Temperature Range : > 40°C				
Full-Screen PV Module	100.23	456.63	365.34	80.42%
Regular PV Module	90.88	416.27	325.22	72.25%

Analysis of PV Modules Strong and Weak Light Response Characteristics

In order to research the power generation performance of the 2 types of module under various irradiation values. TÜV NORD compared the power response characteristics of the 2 types of module in each irradiation range. The result showcase that the Full-Screen PV Modules' performance is better than the regular PV modules in each irradiation range. As the irradiation value increases, the difference in power response characteristics between the Full-Screen PV Modules and the regular PV modules also increases proportionally.

Analysis of PV Modules Strong and Weak Light Response Characteristics Data				
Model	Minimum Power (W)	Maximum Power	Average Power (W)	Performance per Watt
Irradiance : ≤ 200 W/m²				
Full-Screen PV Module	7.08	93.35	54.43	11.98%
Regular PV Module	6.5	82.2	48.57	10.79%
Irradiance : 200~400 W/m²				
Full-Screen PV Module	79.61	191.25	128.09	28.20%
Regular PV Module	70.99	165.74	113.22	25.15%
Irradiance : 400~600 W/m²				
Full-Screen PV Module	161.28	279.87	220.8	48.60%
Regular PV Module	146.17	249.32	194.7	43.25%
Irradiance : 600~800 W/m²				
Full-Screen PV Module	241	363.35	304.54	67.04%
Regular PV Module	218.12	327.57	269.91	59.96%
Irradiance : 800~1000 W/m²				
Full-Screen PV Module	323.09	451.27	382.65	84.23%
Regular PV Module	291.62	409.52	341	75.76%
Irradiance : > 1000 W/m²				
Full-Screen PV Module	399.32	515.13	434.12	95.56%
Regular PV Module	363.87	467.52	397.41	88.29%

The Full-Screen PV Module is innovated by DAH Solar. This product holds a global patent in China, Brazil, Germany, Spain, The United States, Australia, Japan, and other 18 countries and regions. The Full-Screen PV Module obtained high recognition and reputation all over the world, because of its power generation increasing and product reliability. The Full-Screen PV Modules are used in a wide variety of commercial and household roof PV power stations and BIPV projects. The Full-Screen PV Module won the TÜV Nord Outdoor Field Performance Award.