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Feature Introduction to MS-HCPV120W HCPV System

1. HCPV Profile

HCPV (High Concentration Photovoltaic System) refer in particular to a system whose concentration multiple is greater than 300 (ratio of the lens areas to battery area).

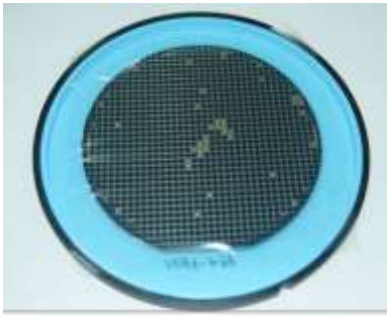
Concentration photovoltaic focuses a large area of sunlight on a tiny area heat resisting photovoltaic battery chip of high conversion efficiency, using photovoltaic element such as the optical lens and the like, and converts the light energy directly into electricity through the photovoltaic principle.

Due to the requirements of light-gathering optics system, it is very strict in the direction of the incident light for the module, and it requires the solar tracking system to ensure that the surface of the module will be always perpendicular to the sunlight during work.

2. The main features of MACSUN SOLAR HCPV

MACSUN SOLAR HCPV, using multi section gallium arsenide compound semiconductor battery chip applied in aviation as the core and adopting Fresnel lens as the condenser, realizes an efficient concentration and uniform distributions of the luminous power on the chip through micro-prism; it ensures the accuracy of the solar tracking in different conditions with a high accurate solar tracking system and achieves high reliability, high efficiency, high power generation capacity, low energy consumption during production process, low environmental load for installation, and low electricity cost in large-scale deployment.

The conversion efficiency of the battery chip is over 40%, the static conversion efficiency of the module (CSTC) exceeding 32%, the maximum efficiency up to 36%, and the dynamic conversion efficiency (CSOC) more than 28%.



Characteristic data of the chip (500 times concentrated):

Size of the chip: 2.7X2.7X0.2mm;

Isc=0.43A

Voc=3.15V

FF=89%

Pm=1.2W

Characteristic data of the module (850DNI, AM1.5D):

Size of the module: 830X630X104mm

Effective lighted area: 0.48m2;

Isc=4.5A

Voc=37.3V

Pm=133W

3. Technical highlights of MACSUN SOLAR HCPV

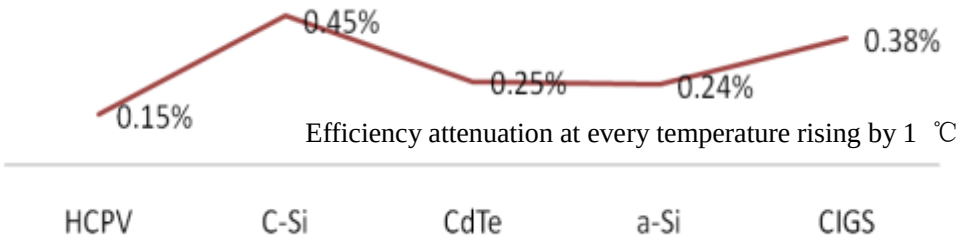
Based on the independent development of the whole industry chain solutions, MACSUN SOLAR HCPV achieves a significant breakthrough in the following areas:

3.1 The chips:

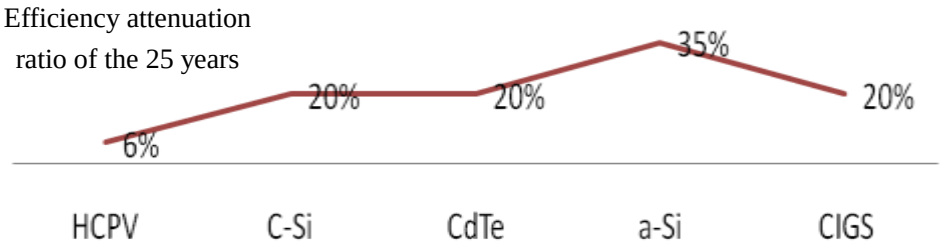
MACSUN SOLAR HCPV realizes a large scale production in applying HCPV on the ground, on the basis of the design and production capacity of multi section gallium arsenide compound semiconductor battery chip applied in aviation.

A) High conversion efficiency of the chip: the conversion efficiency of the chip is at present more than 40% and the maximum production efficiency up to 44%, which is far higher than the production ability of current photovoltaic products such as crystalline silicon, thin-film, and the like. Moreover, the production efficiency is now going beyond 44% with the development of chips of more sections;

B) Strong heat adaptability of the chip: decline in the conversion efficiency of the chip is slow as the temperature rises, whose temperature coefficient takes only about half of that of crystalline silicon;



C) Low efficiency attenuation of the chip: owning to the advanced nanometer film-forming technique, the efficiency attenuation of the chip declines less than 8% upon being used for 25 years of aging, far less than other batteries does.



3.2 The module

MACSUN SOLAR HCPV achieves a high efficiency of solar radiation energy harvesting and conversion and improves the adaptability of the module to the environment through the unique design of Fresnel lens and delicate design of secondary optical device.

A) Light concentration efficiency: relying on the self-designed lens, the average light concentration efficiency of the Fresnel lens has exceeded 85% and even up to 89% maximally, which is far more than that of the products of the similar kinds;

B) Radiation distributing performance: by introducing secondary optical elements, the unevenness of radiation energy distributed on the chip surface has been greatly reduced, burden on partial of the chip been reduced, the overall conversion efficiency of the chip been enhanced, and working life of the chip been effectively extended;

C) Temperature adaptability: the impact on the laser efficiency of optical system from low and high temperature has been reduced due to the combinational optimization of Fresnel lens and secondary optical device, and the conversion efficiency of the module has been improved either at high or low

temperature;

D) Thickness of the module: the thickness of the module has been reduced to only about 100mm through optimization of the optical design, which has lowered the transportation cost and installation difficulty;

E) Light transmittance performance: because the front and back of the module are both made of glass, the scattered light can penetrate the module, which enhances the light at the shade of the module and does good to the plant growth inside the environment.

3.3 The solar tracking system

MACSUN SOLAR HCPV realizes a high accuracy in solar tracking and a good productivity of power generation through an independently developed tracking system.

A) High accuracy of solar tracking: a high accuracy of solar tracking of 0.1 is guaranteed by high precise bracket machining process control, optimized installation technologies for bracket and module, and combined solar tracking strategies;

B) High survival wind speed of the system: the system survival wind speed can achieve 40m/s and more, based on the high strength bracket and status control mode optimized according to the field condition;

C) Easy installation: viewing from the point of field installation, the module installation process can be simplified and the system installation efficiency can be improved through a combination optimization of the module and bracket;

D) Large power generation capacity: in sunny days, daily generation capacity of HCPV can be 30% more than that of crystalline silicon in power stations near the electricity load center;

E) Small actual floor area: MACSUN SOLAR HCPV modules are over 0.5m above ground, which can be further elevated according to requirements of the customer to reduce the impact on crops on the ground, so that the comprehensive utilization and benefit of the land can be improved.