A WORLD-CLASS SOLAR PRODUCT MANUFACTURER
Since its foundation in 2011, Seraphim has accomplished significant achievements and has been continuously pushing the boundaries of our industry in terms of production R&D and technology innovation. By far, Seraphim has reached a 12GW global production capacity. We have earned the Tier 1 distinction from BNEF for 10 consecutive years, and the Top Performer distinction from PVEL for 5 times. By the end of 2023, nearly 30GW of Seraphim modules were installed in over 100 countries, the excellent performance of these products has been widely verified under various natural conditions.

ABOUT US

Stringent quality control is the cornerstone of Seraph’s manufacturing. We have developed a thorough understanding of all of our customers’ requirements, ensuring that our products can perfectly fit the requirements and applications. And these high-quality products have won us increased loyalty from our long-term partners and newest customers. From an industry follower, Seraphim has now become a leader in every aspect of the business. Today Seraphim has more than 25 sales offices around the world, employs more than 1000 people worldwide, and is dedicated to being a leader in product innovation and service upgrades.
Seraphim has established itself as a technology leader in the solar industry. Focusing on the unique needs and installation conditions of customers in various countries, we’ve launched a variety of products including customized services, project types from large-scale power stations to commercial and residential rooftops. The company has been awarded a number of advanced solar patented technologies. Our emphasis on R&D enables us to stay at the forefront of the solar industry, assisting customers in achieving higher returns.

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As one of the world’s leading manufacturers of photovoltaic products, Seraphim established an in-house R&D center in 2013. The center specializes in R&D and product testing for further development, new material testing, client customization and periodic sample testing, etc., to provide technical support, thereby guaranteeing the product development and quality control. The laboratory has been recognized as a CSA, TÜV Rheinland, and DEKRA witness laboratory, meanwhile obtaining accreditations and certifications from CMAS, CTC, TÜV SÜD, CCC, and other globally renowned institutions. This allows Seraphim to shorten the certification period and accelerate the speed of new product releases under our strict reliability control procedures.

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SMARTER MANUFACTURING, MORE GUARANTEED QUALITY

Seraphim has steadfastly worked with its partners to overcome any technical issues encountered. For the plant layout, a complete set of highly automated manufacturing architectures has been developed. In addition, Seraphim also uses statistical engineering, equipment control, and a variety of management systems to achieve lean production. While ensuring the consistency of product quality, we also strive to shorten the yield learning curve and new product mass production cycle, reduce production costs, and improve customer profitability.

To achieve a high utilization rate and efficiency, Seraphim has divided the entire production chain into separate closely united automatic production sectors, achieving 90%+ overall automation coverage. This results in the high-efficiency output of products and improves overall reliability, quality, and guarantees an easy configuration and modification to the production lines.

The upgraded new production line is fully compatible with 162mm, 210mm, TOPCon, HJT, and other specifications. Equipped with a fully digital management system and production equipment, and integrating AI intelligent detection, it enables precise inspection and intelligent positioning of risk points in key processes of the production line. This promotes the elevation of production data visualization and the network management of the workshop. Over 40 patents are applied to the production process optimization, which effectively avoids manual errors and makes sure all the production processes from raw material inspection to packing are all monitored online and saved for later use.

At the same time, the production department collects data from various key monitoring points in the production process to achieve further improvement in equipment, manufacturing process and yield.

AI-empowered Highly Flexible Modular Fully Automatic Production Line

<table>
<thead>
<tr>
<th>Feature</th>
<th>Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower production cost</td>
<td>15%</td>
</tr>
<tr>
<td>Higher equipment effectiveness</td>
<td>15%</td>
</tr>
<tr>
<td>Real-time online monitoring</td>
<td>24*7</td>
</tr>
<tr>
<td>Patents on products and</td>
<td>100+</td>
</tr>
<tr>
<td>production process optimization</td>
<td>99.9%</td>
</tr>
<tr>
<td>Higher production efficiency</td>
<td>35%</td>
</tr>
</tbody>
</table>
Seraphim implements fully transparent manufacturing management and quality control. Through the self-developed ERP system, we track all procedures for manufacturing each PV module, achieving complete traceability from raw material to processing, testing, and delivery. Starting from the first step of production, the ERP system assigns a unique barcode to each module. Information such as raw material suppliers, operators of each process, each online inspection result, and production date can be all viewed online through the ERP system. The data is stored on our servers for retraceing all details, and it is available to clients as well. Thanks to this, Seraphim realized full-cycle monitoring of products. This huge database provides data support for us to further standardize product manufacturing and process improvements, also significantly improving the yield rate.
Quality is Seraphim’s core competitiveness. Starting from the initial stages of production, we rigorously control every step and hold ourselves and our products to strict standards. We take pride in the quality and reliable performance of our products, even in the most extreme conditions.

With over a decade of dedication, Seraphim has always insisted on the highest standards of product quality and performance. In the tide of advancing times, Seraphim values and seizes each opportunity to accelerate our path toward a greener future.

Quality Management System

Quality Assurance

Supplier Quality Engineering (SQE)

Incoming-material Quality Assurance

Open Box Audit (OBA) Test

After Production Inspection

Production Control

300+ Quality Check Points

3 * ELT Tests

HALM Inside Production Lines

Supply Chain Control

Stringent Supplier Management

Automatic Material Filtration and Sorting

Spot Check Every Feedstock Batch

Proper Storage at Fixed Temperature and Humidity

Supplier Quality Engineering (SQE)
Seraphim passed the strictest accelerated stress testing and characterization under PV Evolution Labs Product Qualification Program (PQP) and earned 2017, 2019, 2020, 2021 and 2022 Top Performance. The PQP is a comprehensive evaluation of environmental sensitivities and degradation mechanisms of PV module designs. In addition, Seraphim’s module products have received the China Quality Certification Center’s (“CQC”) Top Runner Program Level One energy efficiency certification.

Seraphim Has Been Recognized as a Top Performer in the PVEL PV Module Reliability Scorecard for the Fifth Time.

Proven High Module Efficiency and Output
**Diversified Solar Modules Meet Various Needs**

Seraphim redefines a variety of products by integrating large silicon wafers with bifacial-cell, multi-busbar, high-density encapsulation and other related technologies. With years of R&D investment, Seraphim innovates and continues to deliver highly competitive products and value to customers.

<table>
<thead>
<tr>
<th><strong>Sable</strong></th>
<th><strong>Seco</strong></th>
<th><strong>Hydra</strong></th>
<th><strong>Nebula</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TOPCon series</strong></td>
<td><strong>PERC series</strong></td>
<td><strong>HJT series</strong></td>
<td><strong>Lightweight dual-glass series</strong></td>
</tr>
<tr>
<td>Module efficiency up to 22.45%</td>
<td>Power output up to 670W</td>
<td>Higher efficiency up to 23.18%</td>
<td>Module efficiency up to 20.5%</td>
</tr>
<tr>
<td>Higher temperature coefficient (-0.29%/℃)</td>
<td>Module efficiency up to 21.8%</td>
<td>Higher efficiency up to 22.45%</td>
<td>Excellent temperature coefficient (-0.25%/℃)</td>
</tr>
</tbody>
</table>
| Lower attenuation, Longer warranty (30 years) | Lower internal consumption, parallel circuit design reduces shading impact | Lower internal consumption, parallel circuit design reduces shading impact | Higher bifaciality (90%±5%)
| Lower BoS costs, Better ROI | Lower risk of hot spot effects | Lower risk of hot spot effects | Extremely low LID & PID degradation |

### Product Advantages

<table>
<thead>
<tr>
<th><strong>Product</strong></th>
<th><strong>Advantage</strong></th>
</tr>
</thead>
</table>
| Sable | Module efficiency up to 22.45%
Higher temperature coefficient (-0.29%/℃)
Lower attenuation, Longer warranty (30 years)
Lower BoS costs, Better ROI |
| Seco | Power output up to 670W
Module efficiency up to 21.8%
Lower internal consumption, parallel circuit design reduces shading impact
Lower risk of hot spot effects
Significantly reducing LCOE, savings BoS costs |
| Hydra | Module efficiency up to 20.5%
Excellent temperature coefficient (-0.25%/℃)
Thinner, lighter, with greater efficiency
Significantly reducing LCOE, savings BoS costs
Longer warranty (30 years) |
| Nebula Lightweight dual-glass series | Module efficiency up to 20.5%
Excellent temperature coefficient (-0.25%/℃)
Higher bifaciality (90%±5%)
Extremely low LID & PID degradation
Reduced hot spot effect
Reducing the module hot spot risk
First year attenuation > 1%, annual attenuation < 0.4%
Excellent low-light performance
Multi-busbar Technology
Effectively increasing the efficiency and output power
Superior load capacity: Able to withstand 5400 Pa pressure at front side and 2400 Pa at back side
Harsh environmental adaptability: Suitable for harsh and cloudy days
Multi-busbar Technology
Effectively increasing the efficiency and output power |
| Nebula Lightweight dual-glass series | Module efficiency up to 20.5%
Excellent temperature coefficient (-0.25%/℃)
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Reducing the module hot spot risk
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Multi-busbar Technology
Effectively increasing the efficiency and output power |

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**TOPCon series**

- Module efficiency up to 21.3%
- Thinner, lighter, with greater efficiency
- Significantly reducing LCOE, savings BOS costs
- Longer warranty (30 years)

**Lightweight dual-glass series**

- Module efficiency up to 21.8%
- Lower internal consumption, parallel circuit design reduces shading impact
- Lower risk of hot spot effects
- Significantly reducing LCOE, savings BOS costs
- Extremely low LID & PID degradation
- Output more power in low light conditions such as haze and cloudy days
- Excellent low-light performance
- Multi-busbar Technology
- Effectively increasing the efficiency and output power

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Seraphim continues to innovate and deliver highly competitive products and value to customers.
## Seraphim Product Roadmap

<table>
<thead>
<tr>
<th>Year</th>
<th>PERC</th>
<th>TOPCon</th>
<th>HJT</th>
</tr>
</thead>
<tbody>
<tr>
<td>2023</td>
<td>560-680W</td>
<td>182*182mm</td>
<td>182*210mm</td>
</tr>
<tr>
<td>2024</td>
<td>560-730W</td>
<td>182*182mm</td>
<td>182*188mm</td>
</tr>
<tr>
<td>2025</td>
<td>615-740W</td>
<td>TOPCon</td>
<td>HJT</td>
</tr>
<tr>
<td>2026</td>
<td>640-750W</td>
<td>TOPCon</td>
<td>HJT</td>
</tr>
</tbody>
</table>
Seraphim is committed to becoming an enterprise that pays attention to social responsibility and sustainable development, adhering to the "community with a shared future for mankind" as its core and promoting the integration of sustainable development concepts into the company’s decision-making, operations and management processes.

**HIGH STANDARD ESG CONSTRUCTION LEADING SUSTAINABLE DEVELOPMENT**

**Sustainable Development Path**

- **Environmental Management**
  Adhere to the carbon peaking and carbon neutrality goals and reduce the carbon footprint in the entire project process.

- **Strategic Development**
  Adhere to the promotion of sustainable development through scientific and technological innovation. Seize key strategic opportunities in the renewable energy sector, such as the "Belt and Road" initiative, and more.

- **Talent-oriented Management**
  Talent is the key to the competition and development of modern enterprises. We pay attention to talents and aim to build a core team with international vision and responsibility.

- **Sustainable Supply Chain**
  Standardize partners and work together to promote sustainable development.

- **Social Responsibilities**
  The progress of enterprises is intricately linked with that of society. We proactively shoulder our social responsibilities and contribute positively to the community.
Low-Carbon Product

In March 2023, Seraphim received the "low-carbon" certificate from CERTISOLIS for its PV modules. This adds advantages to Seraphim’s European market development and injects vigorous momentum into our global strategic layout.

Social Responsibilities

Adhering to the vision of "Shifting the Future", we leverage our advantages to support public welfare undertakings, seamlessly integrating environmental protection, humanitarian care, and economic benefits, thus contributing Seraphim’s strength to global sustainable development.

Seraphim is devoted to promoting global sustainable development.

In December 2023, Seraphim was awarded another silver medal in the EcoVadis corporate social responsibility (CSR) rating, and will continue to make positive contributions to promoting energy reform, sustainable energy development, and creating a more beautiful social environment.

In May 2018, driven by our mission, Seraphim joined PV CYCLE, an international PV waste recycling organization. In this way, Seraphim’s products can be recycled, and reused in the areas covered by the association, thereby contributing to the sustainable development of the economy and the environment.

In November 2021, Seraphim announced that it has officially joined the UN Global Compact, and will work with like-minded leading enterprises in various industries around the world to jointly promote global sustainable development and create a beautiful new world that meets human aspirations.

In October 2013, Seraphim donated a 5kW PV system to Heni Village Primary School in Litang, Sichuan, and Pajiang Village Primary School in Zhongba, Tibet.

In January 2018, the 10kW PV system jointly donated by Seraphim and China Energy Yunnan Power Technology Co., Ltd. was put into operation on the roof of Myanmar Ministry of Energy.

In November 2020, a 60kW rooftop PV system was donated to Hubei Xiangyang No. 12 Middle School. The project was connected to the grid in February 2021, generating 60,000 kWh of clean power.

In February 2018, Seraphim and iHEARu Charity Fund reached a long-term partnership on the "Cognitive Center" project for hearing-impaired children.

In February 2021, Seraphim joined the international "Light It Up Blue" campaign in Changzhou, donated ¥100,000 for autistic children’s rehabilitation and was awarded “Caring Enterprise” by the Changzhou government.

In September 2022, Seraphim provided material assistance to Fenghang Children’s Learning Ability Training and Rehabilitation Center in Tianning District, Changzhou to help the healthy growth of autistic children and contribute to the realization of global sustainable development.

Delivering Green Hope to the World

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On April 1, 2021, the World Autism Day, Seraphim joined the international "Light It Up Blue" campaign in Changzhou, donated ¥50,000 to autistic children’s rehabilitation and was awarded "Caring Enterprise" by the Changzhou government.

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Convey Warmth to the Society
SEAMLESS SERVICES
LET YOU ENJOY
THE SUNSHINE

Seraphim provides all aspects of services prior to an order being placed. Meticulous and professional technology consultation is available, fully transparent ERP, including local offices and an online instant response system. This seamless service structure delivers all the benefits to guarantee your cozy life.

24 * 7 REAL-TIME MONITORING
ERP system allows you to observe production process online

48-HOUR RESPONSE
Timely response warranty calls

LOCAL OFFICES
Global network insures rapid on-site support

TECHNOLOGY SUPPORT
Professional technical team helps maximize the benefits of your projects

FINANCING SERVICE
Professional bankability support and assistance

TAILOR-MADE EVALUATIONS AND RECOMMENDATIONS
Experienced sales and technical staff provide professional consultation

MARKETING SUPPORT
Co-marketing to enhance your brand awareness

CUSTOMIZED SERVICE
Customized service to meet your unique needs

PV POLICY CONSULTATION
Experienced team of analysts provides up-to-date analysis and forecast

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