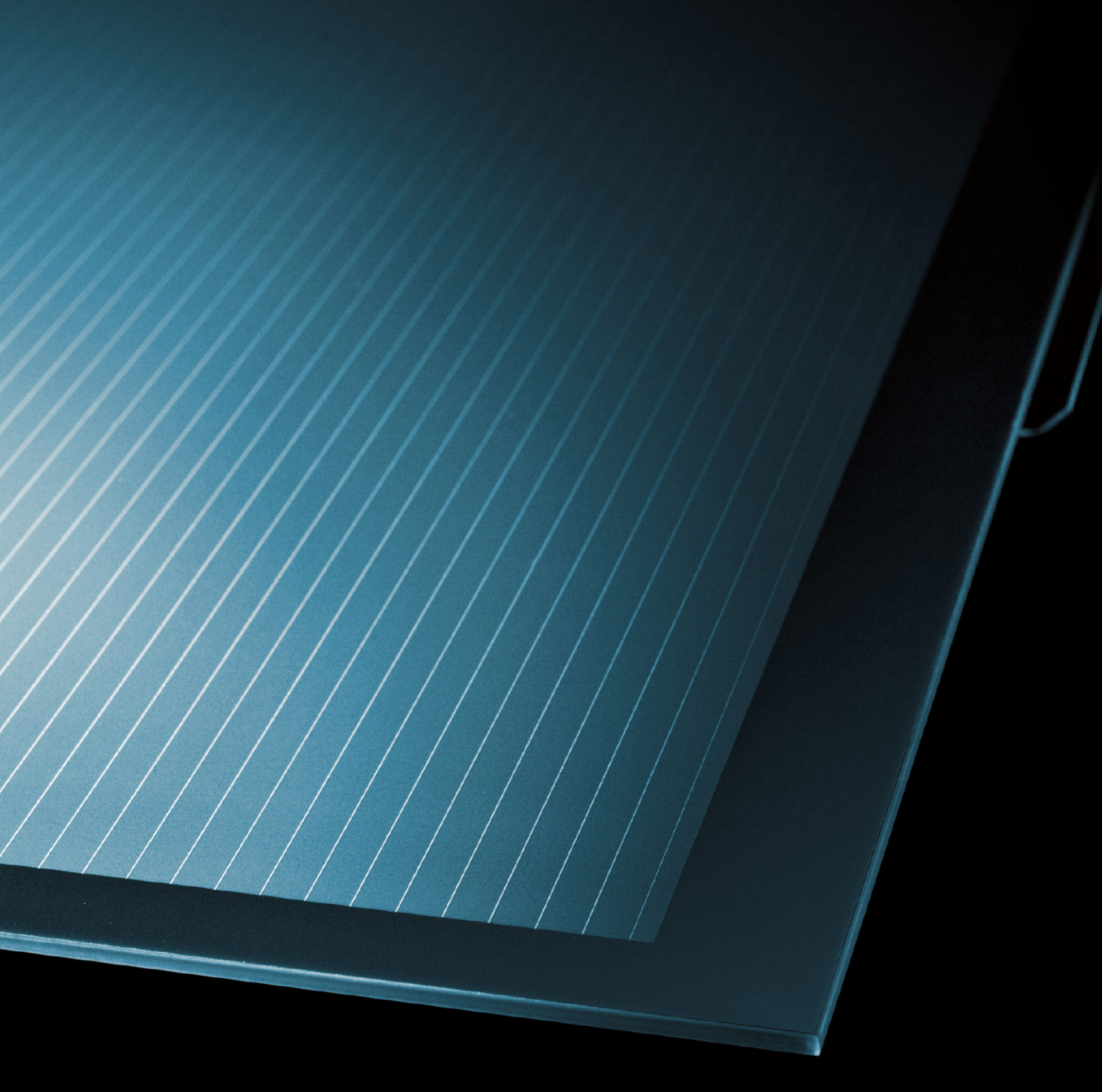


PowerMax[®] SMART

The intelligent rail line.



ENGLISH

**AVANCIS**
ADVANCED SOLAR POWER

AVANCIS – THE AVANT-GARDE OF PHOTOVOLTAICS.

Since the early 1980s we have been pioneering research into high-performance solar modules with our scientists. As pioneers of CIS technology we are extremely proud of what we have achieved so far, especially that our technology was the first to be successfully used for the mass-production of CIS modules. With our innovative history and our multiple world efficiency records, we are extremely proud of a track record that is clear for all to see. AVANCIS stands for advancement in technology, performance and aesthetics. Or simply put, AVANCIS = advanced solar power.

The successful AVANCIS brand is well known on the market under the name PowerMax®. Beneath this umbrella brand all of our product lines are brought together and have one very important thing in common: An extremely high energy yield (kWh per kWp) possible due to spectral sensitivity, excellent low light performance and a low temperature coefficient. All PowerMax® modules not only meet the highest technological and aesthetic requirements, they are also among the most economical on the market. The basis for this success is our fully integrated industrial production process.

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SIMPLY SMART: POWERMAX® FOR LARGE SYSTEMS AND OPEN SPACES.

The PowerMax® SMART modules were specifically developed for use in large, commercial rooftop systems and open spaces. However, due to their unique mounting profile and their aesthetically attractive design, they are also suitable for smaller rooftop systems.

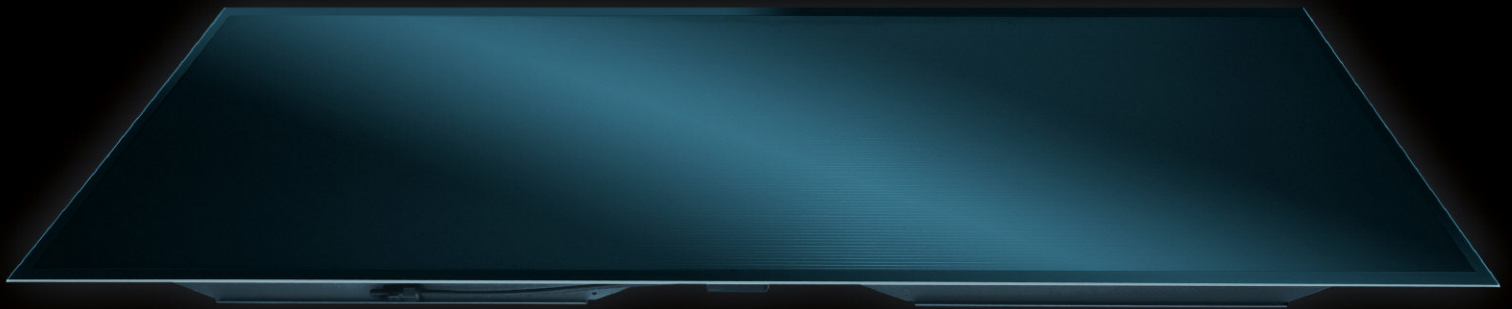
WHY POWERMAX® SMART MODULES ARE SO INTELLIGENT.

PowerMax® SMART are frameless CIS solar modules that use an intelligent mounting profile of two steel backrails allowing a mounting clamp that is not attached to the front of the glass modules. This allows the glass to be mounted almost seamlessly creating an aesthetically pleasing look.

The backrails on the extremely thin and light PowerMax® SMART modules allow maximum mechanical loads, making these modules not only ideal for maximum snow load zones but equally suitable for use with extremely steep inclinations. Angles of less than 5 percent are no problem, snow simply slides off and a self-cleaning effect is assured.

We think that is pretty SMART.





POWERMAX® SMART – 4 TIMES SMARTER.

HIGHEST YIELD

- The broadest spectral sensitivity, the very good performance in low light conditions and the low temperature coefficient ensure a high energy yield (kWh/kWp).
- The back ventilation and cooling of the frameless modules continually optimises the original high energy yield.
- The plus sorting of the nominal power guarantees the paid for power, and more.

EXTREME DURABILITY

- The module adheres to DIN 1055, maximum snow load zones and is able to withstand loads of up to 551 kg/m².
- An edge isolation between the glass provides long-term protection against power loss for the solar cells.
- A permanent lamination between the glass layers utilizes a foil that has proven its worth in the automotive industry. The tempered and overlaying front glass offers additional stability.
- Through a special coating we ensure long-life corrosion protection of the back rail.

UNIQUE AESTHETICS

- Excellent design through cells in an elegant pinstripe look and a uniform black surface of the module creates a uniquely attractive look.
- The mounting clamps are hidden from view behind the module edge, ensuring an attractive appearance for the entire system.

SIMPLE INSTALLATION

- Secure and simple front-side mounting of the modules using an intelligent backrail system (two steel backrails attached to the back).
- Easy handling of the frameless modules due to reduced weight.
- The mechanical and electrical construction of each module has been optimised for low system costs.



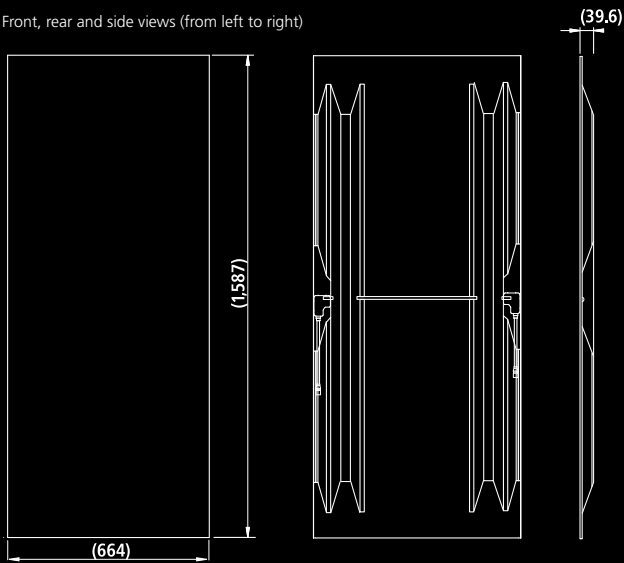
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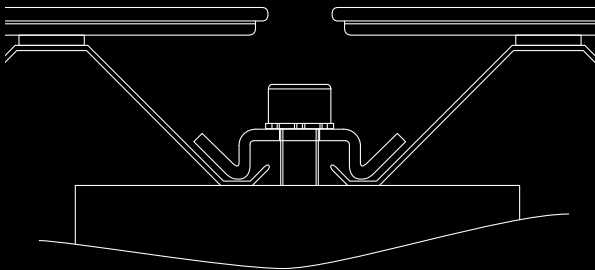


DIMENSIONS

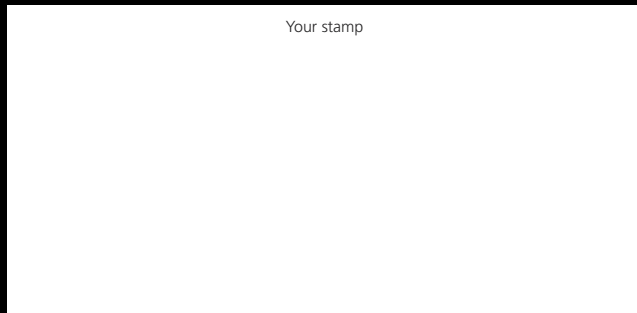
Front, rear and side views (from left to right)



Cross section through glass, rail and clamp



Dimensions in mm



MECHANICAL SPECIFICATIONS

PowerMax [®] SMART	Value
External dimensions	1,587 x 664 mm ²
Thickness	39.6 mm
Weight	16 kg
Junction box protection class	IP65
Dimensions of the junction boxes	70 x 64 x 13 mm ³
Cable lengths (⊖ plug ⊕ socket)	170 300 mm
Cable cross section	2.5 mm ²
Connector type	LC4

ELECTRICAL SPECIFICATIONS

Data measured under standard test conditions (STC)*:

PowerMax [®] SMART	110	115	120	125	130	135
Nominal power P_{nom}	110 W	115 W	120 W	125 W	130 W	135 W
Tolerance of nominal power ΔP_{nom}	-0/+5 %	-0/+5 %	-0/+5 %	-0/+4 %	-0/+4 %	-0/+4 %
Module efficiency η^{**}	10.4 %	10.9 %	11.4 %	11.9 %	12.3 %	12.8 %
Aperture efficiency η	11.5 %	12.1 %	12.6 %	13.1 %	13.6 %	14.2 %
Open-circuit voltage V_{oc}	56.6 V	57.5 V	58.5 V	59.5 V	60.5 V	61.5 V
Short-circuit current I_{sc}	3.10 A	3.10 A	3.11 A	3.12 A	3.13 A	3.14 A
Voltage at mpp V_{mpp}	41.4 V	42.7 V	43.9 V	45.1 V	46.3 V	47.4 V
Current at mpp I_{mpp}	2.65 A	2.69 A	2.73 A	2.77 A	2.81 A	2.84 A
Limiting reverse current I_r	5.0 A	5.0 A	5.0 A	5.0 A	5.0 A	5.0 A
Max. system voltage V_{sys} (IEC)	1,000 V	1,000 V	1,000 V	1,000 V	1,000 V	1,000 V
Max. system voltage V_{sys} (UL)	600 V	600 V	600 V	600 V	600 V	600 V

* Insolation intensity 1,000 W/m² in the plane of the module, module temperature 25 °C and a spectral distribution of the sunlight according to the atmospheric mass (AM) 1.5.

Data measured at nominal operating cell temperature (NOCT)* and AM 1.5:

PowerMax [®] SMART	110	115	120	125	130	135
NOCT	40.0 °C	40.0 °C	40.0 °C	40.0 °C	40.0 °C	40.0 °C
Nominal power P_{nom}	82.0 W	85.8 W	89.5 W	93.2 W	96.9 W	100.7 W
Open-circuit voltage V_{oc}	53.0 V	53.9 V	54.8 V	55.8 V	56.8 V	57.8 V
Short-circuit current I_{sc}	2.48 A	2.48 A	2.48 A	2.48 A	2.48 A	2.48 A
Voltage at mpp V_{mpp}	38.5 V	39.8 V	41.0 V	42.1 V	43.3 V	44.4 V

* Module operating temperature at 800 W/m² insolation intensity in the plane of the module, air temperature 20 °C, wind speed 1 m/s and open-circuit condition.

Temperature coefficients:

PowerMax [®] SMART	Value
Temperature coefficient P_{nom}	-0.39 %/°C
Temperature coefficient V_{oc}	-170 mV/°C
Temperature coefficient I_{sc}	0.1 mA/°C
Temperature coefficient V_{mpp}	-140 mV/°C

Data measured at low light intensity:

The relative reduction in the module-efficiency at a light intensity of 200 W/m² relative to 1,000 W/m² at 25 °C module temperature and spectrum AM 1.5 is 6 %.
At 500 W/m² the relative improvement in module-efficiency is +1 %.

For more information about handling, installation and operation of PowerMax[®] modules, refer to the installation, operating and safety manual for AVANCIS PowerMax[®] photovoltaic modules.

As a result of ongoing research and product improvements, the specifications in this product data sheet are subject to changes without prior publication. This data sheet is not allowed to be used for deriving any rights, and AVANCIS does not accept any liability with regard to and resulting from the use of information contained herein. Installation equipment is not supplied with the product.

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- Qualified, IEC 61646
- Safety tested, IEC 61730
- Periodic inspection
- Salt mist corrosion proofed



TUEVPAM-1110
(Resistance to Ammonia Test)

Certification per IEC 61646, IEC 61730, UL 1703, MCS and Ammonia Test pending.