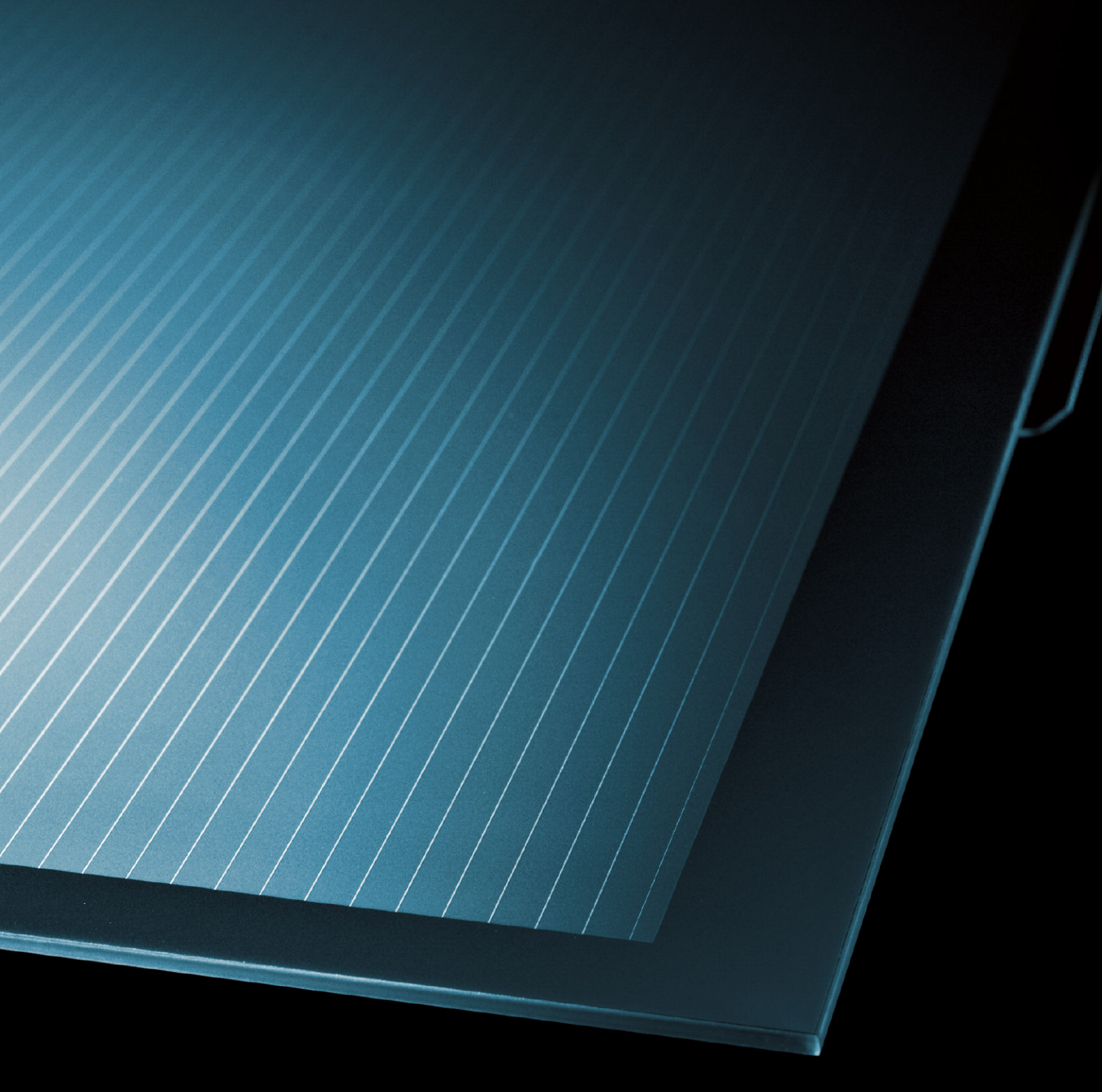


# PowerMax<sup>®</sup> SMART

*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, a low nominal operating cell temperature (NOCT) and a low temperature coefficient. All PowerMax® modules not only meet the highest technological requirements, they are also among the most economical on the market. The basis for this success is our fully integrated industrial production process.

# PowerMax<sup>®</sup> SMART

## *The intelligent rail line.*



### SIMPLY SMART: POWERMAX<sup>®</sup> FOR LARGE SYSTEMS AND OPEN SPACES.

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

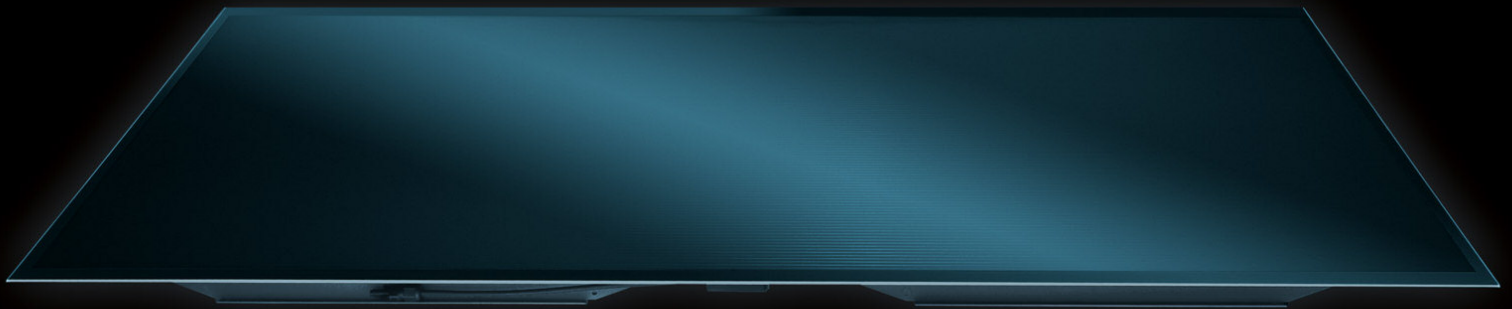
### WHY POWERMAX<sup>®</sup> SMART MODULES ARE SO INTELLIGENT.

PowerMax<sup>®</sup> 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 a pleasing look.

The backrails on the extremely thin and light PowerMax<sup>®</sup> 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. Installation of the frameless modules below angles of 10 percent is even allowed.

We think that is pretty SMART.





## POWERMAX<sup>®</sup> SMART – 4 TIMES SMART.

### HIGHEST YIELD

- The broadest spectral sensitivity, the very good performance in low light conditions, the low nominal operating cell temperature (NOCT) 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/m<sup>2</sup>.
- An edge isolation between the glass provides long-term protection against power loss for the solar cells.
- The tempered and overlaying front glass offers a very good stability.
- Through a special coating we ensure long-life corrosion protection of the back rail.

### ELEGANT DESIGN

- Excellent design through cells in an elegant pinstripe look.
- The mounting clamps are largely hidden from view behind the module edge, ensuring an attractive appearance for the entire system.

### EASY INSTALLATION

- Secure and easy 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.



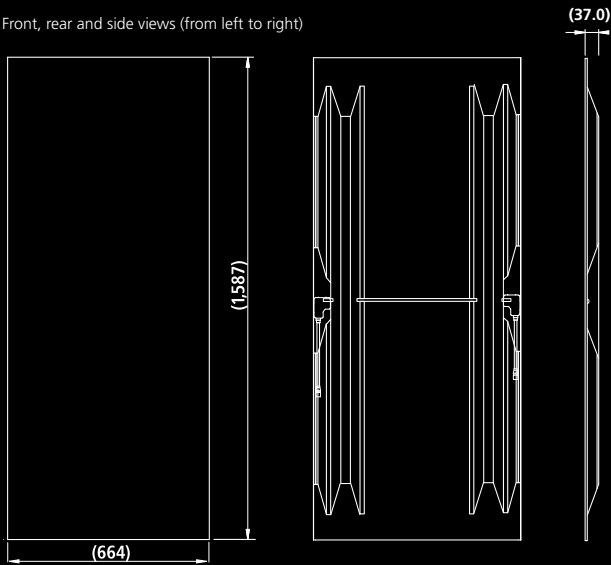
# PowerMax<sup>®</sup> SMART

The intelligent rail line.

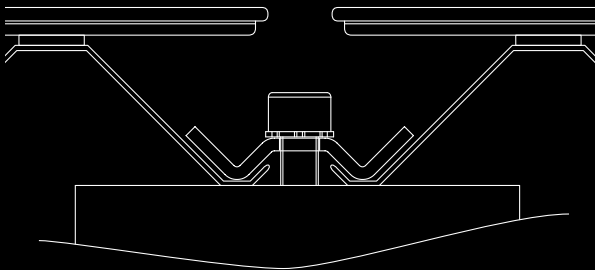


## DIMENSIONS

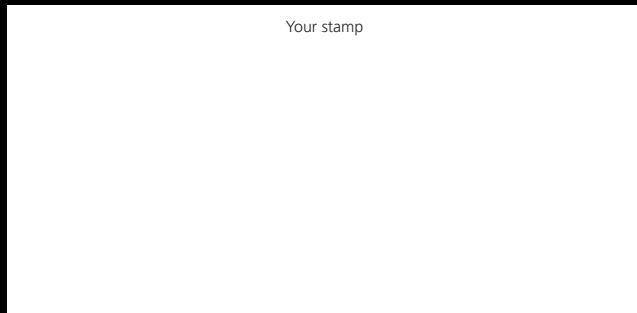
Front, rear and side views (from left to right)



Cross section through glass, rail and clamp



Dimensions in mm



## MECHANICAL SPECIFICATIONS

PowerMax <sup>®</sup> SMART	Value
External dimensions	1,587 x 664 mm <sup>2</sup>
Thickness	37.0 mm
Weight	16 kg
Junction box protection class	IP65
Dimensions of the junction boxes	70 x 64 x 13 mm <sup>3</sup>
Cable lengths (⊖ plug   ⊕ socket)	170   300 mm
Cable cross section	2.5 mm <sup>2</sup>
Connector type	LC4

## ELECTRICAL SPECIFICATIONS

Data measured under standard test conditions (STC)\*:

PowerMax <sup>®</sup> SMART	105	110	115	120	125	130
Nominal power $P_{nom}$	105 W	110 W	115 W	120 W	125 W	130 W
Tolerance of nominal power $\Delta P_{nom}$	-0/+5 %	-0/+5 %	-0/+5 %	-0/+5 %	-0/+4 %	-0/+4 %
Module efficiency $\eta^*$	10.0 %	10.4 %	10.9 %	11.4 %	11.9 %	12.3 %
Aperture efficiency $\eta$	11.0 %	11.5 %	12.1 %	12.6 %	13.1 %	13.6 %
Open-circuit voltage $V_{oc}$	56.0 V	56.7 V	57.4 V	58.1 V	58.8 V	59.5 V
Short-circuit current $I_{sc}$	3.22 A	3.23 A	3.25 A	3.26 A	3.27 A	3.28 A
Voltage at mpp $V_{mpp}$	39.0 V	40.2 V	41.4 V	42.5 V	43.7 V	44.9 V
Current at mpp $I_{mpp}$	2.70 A	2.74 A	2.78 A	2.82 A	2.86 A	2.90 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/m<sup>2</sup> 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 <sup>®</sup> SMART	105	110	115	120	125	130
NOCT	40.0 °C	40.0 °C	40.0 °C	40.0 °C	40.0 °C	40.0 °C
Nominal power $P_{nom}$	78.3 W	82.0 W	85.8 W	89.5 W	93.2 W	96.9 W
Open-circuit voltage $V_{oc}$	52.4 V	53.1 V	53.8 V	54.4 V	55.1 V	55.8 V
Short-circuit current $I_{sc}$	2.60 A	2.60 A	2.60 A	2.60 A	2.60 A	2.60 A
Voltage at mpp $V_{mpp}$	36.2 V	37.3 V	38.5 V	39.6 V	40.8 V	41.9 V

\* Module operating temperature at 800 W/m<sup>2</sup> insolation intensity in the plane of the module, air temperature 20 °C, wind speed 1 m/s and open-circuit condition.

Temperature coefficients:

PowerMax <sup>®</sup> 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/m<sup>2</sup> relative to 1,000 W/m<sup>2</sup> at 25 °C module temperature and spectrum AM 1.5 is 6 %.  
At 500 W/m<sup>2</sup> the relative improvement in module-efficiency is +1 %.

For more information about handling, installation and operation of PowerMax<sup>®</sup> modules, refer to the installation, operating and safety manual for AVANCIS PowerMax<sup>®</sup> photovoltaic modules.

The measurement accuracy of  $P_{nom}$  is  $\pm 3.5$  %. 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
- UL 1703
- Ammonia resistance tested
- Periodic inspection

APPROVED PRODUCT

