



PHOTOVOLTAIC MODULE

e.Giant M HC black

120 MONO PERC HALF-CUT CELLS



17
WARRANTY
25



**96.3 PERCENT
REAL-LIFE
PERFORMANCE**



**SHADOW AND
TEMPERATURE
MANAGEMENT**



**CLIMATE NEUTRAL
MANUFACTURED IN
EUROPE / AUSTRIA**



www.energetica-pv.com



#BePartOfTheChange

energetica
PHOTOVOLTAIC INDUSTRIES



e.Giant M HC

Powerful. Elegant. Esthetic.

Innovation. Power. Sustainability. And that for 25 years.

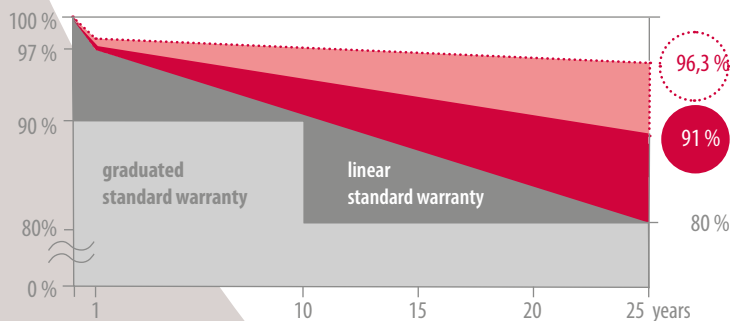
Energetica Photovoltaic Industries GmbH is an independent, Austrian photovoltaic technology company with headquarters and production facility in Liebenfels.

The sustainable supply of renewable energy has been our goal for 25 years. The focus is on our high-tech product portfolio, which is developed, tested and produced in one of the world's most modern climate-neutral 4.0 production facilities.

As giant among photovoltaic modules, e.Giant M HC black is ideal for quick and inexpensive installation in large systems, such as solar parks and commercial applications with aesthetic claim. 144 monocrystalline half-cut cells and 12-busbar technology elicit up to 440 Wp from the high-performer.

The high-quality modules equipped with e.ISP guarantee the highest power output of the Energetica portfolio. The robust stacking and packaging system e.STAK from Energetica also guarantees that the modules arrive at their destination stably and without micro-cracks. In addition, packaging material is saved massively and the environment is protected.

Up to 16.3% more performance



- 96,3 % 96.3% real-life performance after 25 years, tested by AIT - Austrian Institute of Technology
- 91 % 91% Energetica performance guarantee after 25 years
- 80 % Industry standard guarantee

Guarantees more performance.

What makes a top-class PV module? Top performance? Longest lifespan? Sure, but we offer more:

- e **Avoiding hot spots** through highly efficient control electronics,
- e **more power** through 12-busbar technology,
- e **higher yield** through anti-reflective glass technology.

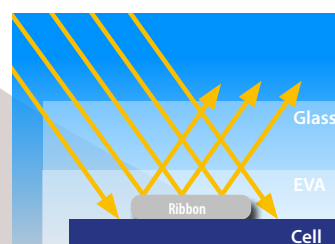
Our patented e.ISP® technology increases the energy yield compared to conventional modules and protects the cell strings by more precise shutdown in the event of shading. That is why we offer a linear added value guarantee¹⁾ of 91 percent of the initial performance even after 25 years without hesitation. 17 years extendable to 20/25.

1) For details of the performance guarantee (added value guarantee), see Energetica Approved Warranty in the first year 97 percent of the nominal output and min. 91 percent of the nominal power in the 25th year.

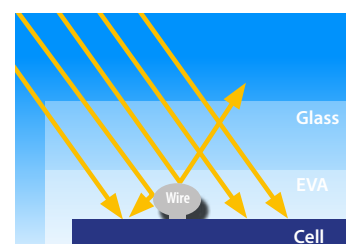
Pioneering technologies.

Our 12-busbar technology is used in the new e.Giant series. The energy generated is dissipated over 12 wafer-thin wires, instead of wide collecting bars as before. This enables optimized shading management and the efficient use of resources in cell production. Result: the cell surface is used more efficiently and the energy yield increases while keeping the same module size. Furthermore, the e.ISP® technology ensures higher efficiency and an optimised energy yield in the sun as well as in case of shading.

Standard busbar technology



12 busbar technology



WE PAY ATTENTION TO DETAIL



e.ISP TECHNOLOGY®

Integrated Shadow Protection (e.ISP) for improved efficiency and optimized energy yield in sun and shade.

12 BB TECHNOLOGY

For optimized shading, maximum efficiency and improved reliability due to shorter electron paths.

HALF CUT TECHNOLOGY

The cell arrangement increases the energy yield and improves the module's behaviour in case of low solar radiation.

120 MONO PERC HALF-CUT CELLS

e.Giant M HC black



TOP QUALITY FROM THE HEART OF EUROPE

Energetica modules are engineered and produced exclusively in Austria – Europe. Modules are produced using the patented method of manufacturing and subsequently tested by independent institutes.



17 YEAR WARRANTY ON OUR PRODUCTS

Energetica provides a 17-year warranty on products and 25 year warranty of 91% on performance, extendable to 20/25 and 25/25 years.



REDUCED WEAR

Energetica products are tested beyond IEC and UL standards. From 2 - 25 years the degradation is 0,25 percent p.a.



MAXIMUM PERFORMANCE ON SUNNY DAYS

Thanks to the improved temperature coefficient, Energetica modules can produce more energy on hot, sunny days.



HIGHER YIELDS WHEN SHADED

In the event of shading intelligent module design provides up to 83% more energy than conventional modules.



INTEGRATED TEMPERATURE- AND SHADOW MANAGEMENT

(e.ISP® TECHNOLOGY) The integrated deactivation of the cell strings in the event of shading is only available in Energetica modules. The active electronics integrated in the laminate guarantee a higher output than conventional modules in both sun and shade.



CLIMATE NEUTRAL PRODUCTION

Sustainability is the main corporate goal of Energetica. We therefore avoid CO₂ emissions in all areas. This includes the use of 100% clean energy in our production facilities as well as a fully electric car fleet for sales and technical service.



USER-FRIENDLY PERFORMANCE RECORDS

A weather-proof QR and barcode provides quick access to data on the measured performance class, serial number and module type. Available as of 2021.



RAPID INSTALLATION IN LARGE APPLICATIONS

e.Giant m hc black is ideal for quick and cost-efficient installation in large systems such as solar parks and commercial applications.

Note: This data sheet is a legally binding document and, in addition to the installation manual, it is part of the required documentation in accordance with OVE EN 50380. Due to constant technical innovations, R&D and improvements, technical data given in data sheets are subject to change. Energetica reserves the right to perform these changes at any time without prior notice. Product depictions are symbolic images and may deviate from the original in appearance and data provided herein.

Electrical data (STC)

Type	440	445	450	455	460
Maximum power (P_{Max})	440 Wp	445 Wp	450 Wp	455 Wp	460 Wp
Open circuit voltage (V_{OC})	49,60 V	49,70 V	49,63 V	49,85 V	49,96 V
MPP voltage (V_{MPP})	41,00 V	41,40 V	41,60 V	41,80 V	42,10 V
MPP current (I_{MPP})	10,74 A	10,82 A	10,90 A	10,93 A	10,96 A
Short circuit Current (I_{SC})	11,33 A	11,37 A	11,59 A	11,69 A	11,72 A
Module efficiency (η_{Modul})	20,05 %	20,30 %	20,66 %	20,83 %	20,90 %
Performance sorting	-0/+5 Wp	-0/+5 Wp	-0/+5 Wp	-0/+5 Wp	-0/+5 Wp

These measurements are valid under standard test conditions STC. All electrical data $\pm 10\%$. Measurement uncertainty P_{MPP} (P_{Max}): +/- 3%, (Airmass AM 1,5; radiation of 1000W/m2; cell temperature 25°C)

Electrical data (NMOT)

Type	440	445	450	455	460
Maximum power (P_{Max})	352 Wp	335,4 Wp	339,5 Wp	342,1 Wp	345,5 Wp
MPP voltage (V_{MPP})	37,90 V	38,09 V	38,28 V	38,46 V	38,74 V
MPP current (I_{MPP})	8,61 A	8,80 A	8,87 A	8,89 A	8,92 A
Open circuit voltage (V_{OC})	46,30 V	45,68 V	45,83 V	46,03 V	46,14 V
Short circuit current (I_{SC})	9,13 A	9,17 A	9,35 A	9,43 A	9,46 A

NMOT (Nominal Module Operating Temperature): Irradiance 800 W/m2, ambient temperature 20 °C, wind speed 1 m/s

Permissible operating conditions

Temperature range	-40°C bis +90°C
Maximum system voltage	1.050 V, 1.500 V auf Anfrage
Test load I_{max}	tested according to IEC up to 5.4 kPa snow/2.4 kPa wind
Breaking load	>6.0 kPa
Hail resistance	hailstone up to 25 mm Ø at 165,6 km/h v hailstone up to 55 mm Ø at 120,6 km/h v
Reverse current strength	16 A*

*In any case, due to the integrated active electronics, it must be ensured that there are no reverse currents greater than 16 A.

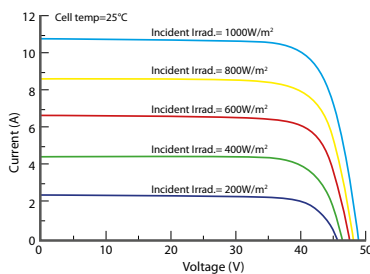
Temperature coefficient (Tc)

Tc short circuit current	0,057 %/K
Tc open circuit voltage	-0,27 %/K
Tc maximum power	-0,34 %/K
NOCT	44°C +/- 2

Paletts / Truck load

Pieces per pallet	30
Pieces per truck	720

Current-Voltage-Curve



Certifications and warranties

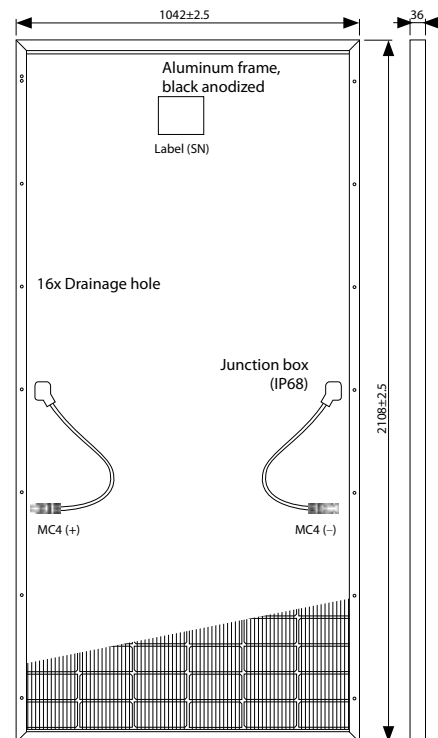
Certifications	IEC 61215, IEC 61730 IEC 62716 (Ammonia corrosion test) IEC 61701 (Salt mist corrosion test) ISO 9001, ISO 14001, ISO 45001 Safety class II
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Product warranty	17 years extendable to 20/25
Output warranty of P_{MAX} (Measurement tolerance +/- 3%)	25 years linear acc. warranty conditions

Mechanical data

Dimensions HxWxD	2108 x 1042 x 36 mm
Weight	23 kg
Front glass	highly transparent tempered glass 3,2 mm
Backsheet	coextruded Polypropylen (PP)
Frame	black anodized aluminum
Cells	24 x 6 High efficiency solar half-cut cells (166 x 83 mm)
Cell type	mono PERC halfcut, 12 busbars
Bypass control	active electronics at string level
Modul connector	4/6mm ² solar cable, (+,-) 1.150 mm
Connectors	multi-contact MC4, IP68
Origin	Made in Austria

All indicated dimensions in mm



Energetica is certified according to the valid standards of ISO 9001, ISO 14001 and ISO 45001. Energetica is cooperation partner of the AIT (Austrian Institute of Technology).

Dokument: 20210415_e-Giant_M_HC_black