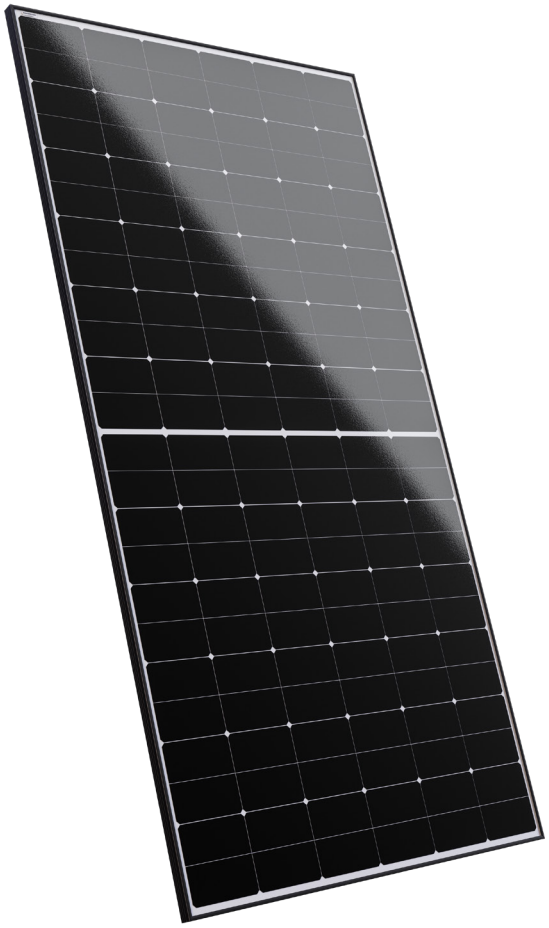


ASTORIOS

per aspera ad astra

BLACK FRAME HIGH EFFICIENCY PHOTOVOLTAIC MODULE

ASTR **IBC-144M** Series **460-470 Wp**

N-TYPE
INTERDIGITATED BACK CONTACT CELLS

470 Wp
MAXIMUM POWER OUTPUT

22.0 %
MAXIMUM MODULE EFFICIENCY

IBC TECHNOLOGY

Interdigitated Back Contact cells technology is the most advanced technology in the market available for the serial manufacturing with the highest efficiency

MORE POWER GAIN

7% more accumulated power gain in 25 years, proved by TUV NORD test

PROVEN RELIABILITY

PV module top performer technology according to PVEL 2021 / 2022 reliability scorecard

HIGH DENSITY

19.88% more power generation from the same area compared to conventional panels

HIGH TEMPERATURE RESISTANCE

30-50% less losses in power generation in high temperature conditions operation due to optimized temperature coefficient -0.29% / C

MINIMIZING THE SHADING IMPACT

Outstanding performance in partial shaded conditions comparing to other technologies

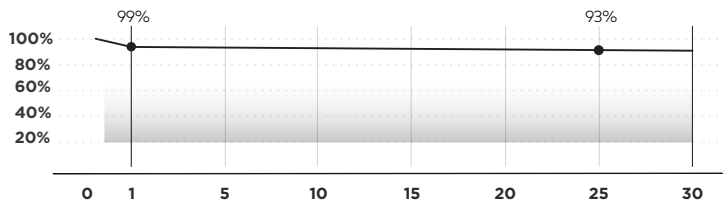
HOT SPOTS REDUCTION

Distributed junction design makes IBC control operating temperature and avoid hot spots

NO LID

N-Type cells have no Light Induced Degradation

PERFORMANCE



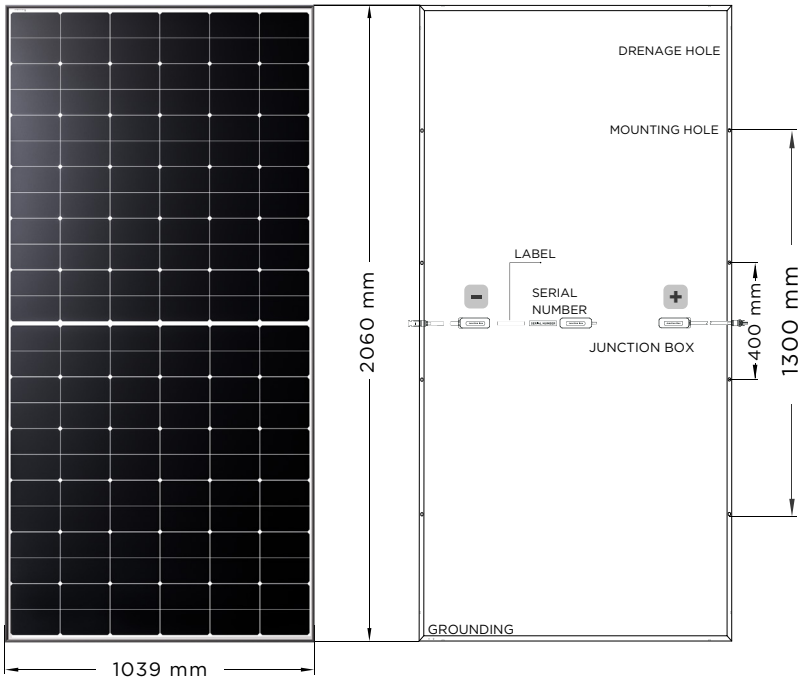
30 YEARS
Performance Guarantee

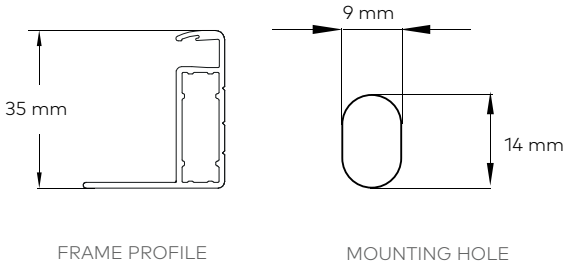
25 YEARS
Product Warranty

info@astorios.com
www.astorios.com

ASTORIOS

per aspera ad astra





FRAME PROFILE

MOUNTING HOLE

MATERIAL CHARACTERISTICS

Dimensions	2060x1039x35 mm
Weight	22.5 kg
Glass	3.2 mm, coated tempered glass, low iron
Number of cells	144 pcs (6x24)
Cell layout	Mono-crystalline, Half Cut N-Type IBC 166x83 mm
Frame	Black color, Anodized aluminum alloy
Junction box	IP 68 rated, 3 bypass diodes
Output cable	4 mm², 1600 mm, customizable
Connector type	Staubli MC4-Evo 2 / MC4 (Original)

PACKAGING INFORMATION

One pallet quantity	31 pcs
40 ft HC/HQ container	704 pcs

TEMPERATURE PARAMETERS

Temperature Coefficient of Pmax	-0.29 % / °C
Temperature Coefficient of Voc	-0.246 % / °C
Temperature Coefficient of Isc	+0.046 % / °C
Operating Temperature	-40°C to +85 °C

MAXIMUM RATINGS

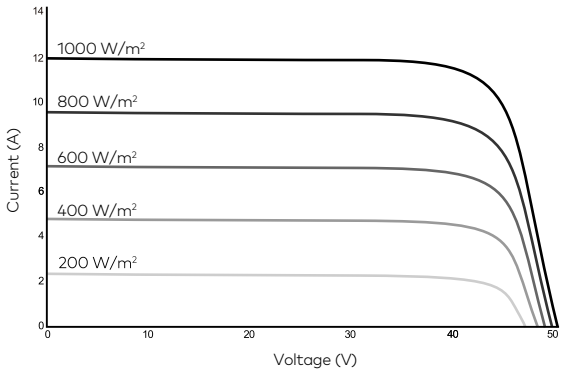
Max. System Voltage	1500V DC (IEC)
Max. Series Fuse Rating	20A
Uplift load (wind)	2400 Pa*
Downforce load (snow)	5400 Pa*
Hail Resistance	Max. diameter 25mm, impact speed 23m/s

*For more information please refer to Instruction Manual

MODULE TYPE IBC-144M	460 Wp		465 Wp		470 Wp	
ELECTRICAL CHARACTERISTICS	**STC**	**NOCT**	**STC**	**NOCT**	**STC**	**NOCT**
Maximum power (Pmax / Wp)	**460**	**346**	**465**	**350**	**470**	**354**
Open circuit voltage (Voc / V)	**50.1**	**48.0**	**50.2**	**48.1**	**50.3**	**48.2**
Short circuit current (Isc / A)	**11.69**	**9.45**	**11.79**	**9.53**	**11.88**	**9.59**
Maximum power voltage (Vmp / V)	**42.4**	**39.5**	**42.6**	**39.7**	**42.8**	**39.9**
Maximum power current (Imp / A)	**10.85**	**8.76**	**10.92**	**8.82**	**10.98**	**8.88**
Module efficiency at STC (ηm / %)	**21.5**		**21.7**		**22.0**	
Power tolerance (Pmax)	**(0,+5) Wp**					

STC: Irradiance of 1000 W/m² with spectrum AM 1.5 and a module temperature of 25°C
NOCT: Irradiance 800 W/m², ambient temperature 20°C and wind speed 1 m/s

I-V Curves (470 W)



CERTIFICATES

IEC61215/61730, IEC62804 (PID), IEC61701 (Salt)

IEC62716 (Ammonia), IEC60068-2-68 (Sand)

IC TS 62941 -2016 PV industry quality management system

ASTORIOS Holding Inc.
16192 Coastal Highway, Lewes,
Delaware 19958, USA
info@astorios.com