



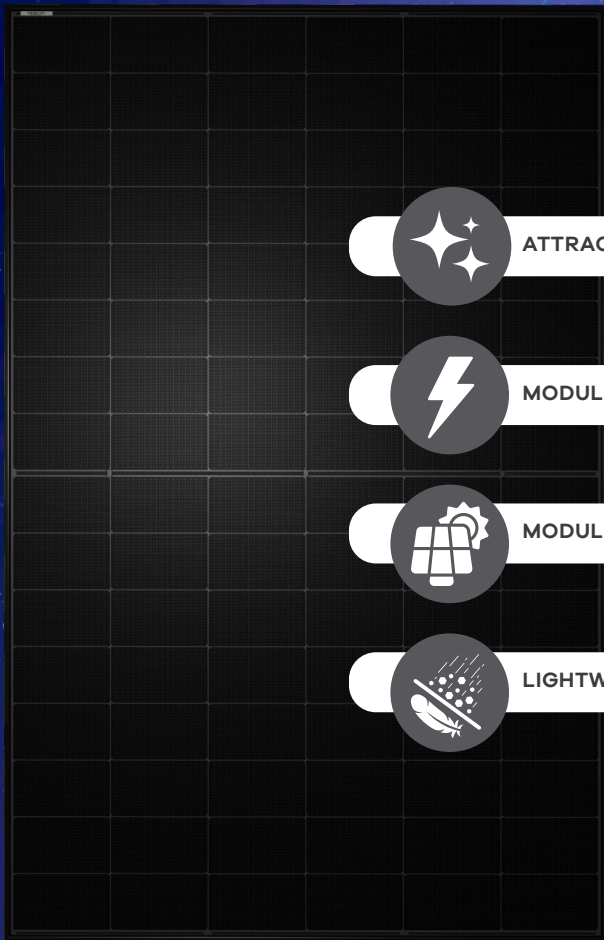
# Heckert Solar

FUTURE STARTS IN GERMANY

# ZEUS 1.1

N-Type Bifacial glass-glass-module

# 445-450WP BLACK FRAME



ATTRACTIVE DESIGN



MODULE POWER UP TO 445WP



MODULE EFFICIENCY UP TO 22.3%



LIGHTWEIGHT & RESILIENT

**DE**

GERMAN  
WARRANTOR



DIRECT  
SERVICE

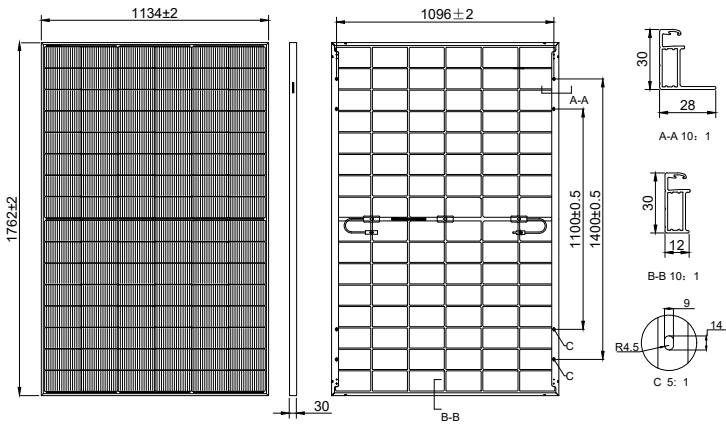
**30**  
YEARS

PRODUCT  
WARRANTY

**30**  
YEARS

PERFORMAN  
CE

## DIMENSIONS IN MM



## MODULE SPECIFICATIONS

Cell Technology	G12R n-type monocrystalline, TOPCon
Cells	96 half cut cells
Dimensions	1762±2 x 1134±2 x 30mm
Weight	20,9kg
Front Glass	2,0mm partially heat strengthened AR-glass
Rear Glass	2,0mm partially heat strengthened AR-glass
Frame	30mm black anodized aluminium frame
Junction Box	3 diodes, IP68, according to IEC 62790
Connecting Cable	4mm <sup>2</sup> Stäubli MC4-EVO 2A connector +/- (1500V)
Cable Length	2 x 1280mm
Max. Test-Load, push/pull	8100Pa / 2400Pa
Max. Design-Load, push/pull	5400Pa / 1600Pa

## ELECTRICAL SPECIFICATIONS<sup>1</sup> (STC<sup>2</sup>)

Rated Power $P_{MPP}$ (Wp)	445	450
Max. Power Current $I_{MPP}$ (A)	14.87	14.91
Max. Power Voltage $V_{MPP}$ (V)	29.93	30.19
Short-circuit Current $I_{SC}$ (A)	15.92	15.95
Open-circuit Voltage $V_{OC}$ (V)	35.55	35.75
Module Efficiency (%)	22.3	22.5

## ELECTRICAL SPECIFICATIONS<sup>1</sup> (NMOT<sup>3</sup>)

Rated Power $P_{MPP}$ (Wp)	336	340
Max. Power Current $I_{MPP}$ (A)	12.01	12.04
Max. Power Voltage $V_{MPP}$ (V)	27.98	28.24
Short-circuit Current $I_{SC}$ (A)	12.85	12.88
Open-circuit Voltage $V_{OC}$ (V)	34.84	34.03

## BIFACIAL OUTPUT (STC)

5% $P_{max}$ (Wp)	467	472
15% $P_{max}$ (Wp)	511	517
25% $P_{max}$ (Wp)	556	562

## TEMPERATURE CHARACTERISTICS

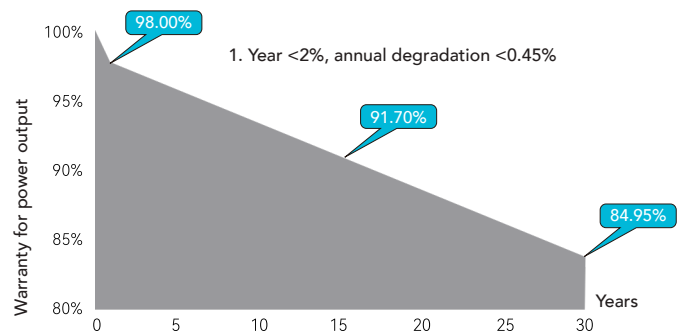
Nominal Module Operating Temperature <sup>3</sup>	42 ± 2°C
Temperature Coefficient $P_{MAX}$ (%/°C)	- 0.28
Temperature Coefficient $V_{OC}$ (%/°C)	- 0.24
Temperature Coefficient $I_{SC}$ (%/°C)	+ 0.046

## OPERATING CONDITIONS

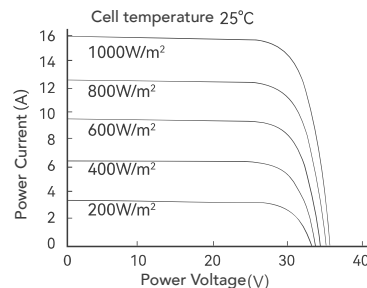
Operation Temperature Range	-40 ~ +85°C
Max. System Voltage (VDC)	1500
Reverse Current Feed $I_R$ (A)	30
Power Performance Tolerance (Wp)	0 / +4.99
Max. Bifaciality (%)	80 ± 5

Measurements according to IEC 60904-3, measurements tolerance:  $I_{SC}$  ±5%,  $V_{OC}$  ±5%,  $P_{MPP}$  ±4%, bifaciality: 80% ± 5%, <sup>2</sup>Standard Test Conditions STC: irradiation 1.000 W/m<sup>2</sup> with a spectrum of AM 1.5 at a cell temperature of 25°C. Maximum reduction in efficiency at 200W/m<sup>2</sup>: 2%; <sup>3</sup>NMOT-Data: Nominal Module Operating Temperature at irradiation of 800W/m<sup>2</sup> and an ambient temperature of 20 °C. Operation temperature range between -40°C and +85°C. All dimensions +/-3mm. Technical specifications subject to changes. No liability is assumed for particulars. Please follow our installations instructions.

## LINEAR POWER OUTPUT WARRANTY



## I-V CURVE



## CERTIFICATES & WARRANTIES

- IEC 61215, IEC 61730
- IEC 62716: Ammonia Corrosion
- IEC 61701: Salt Mist Corrosion
- IEC 62804: PID
- IEC 60068-2-68: Dust & Sand
- Fire Protection Class: A (acc. to UL 790)
- Hail Resistance Class: HW4
- Product Warranty: 30 years
- Performance Warranty: 30 years
- WEEE-Reg.-No.: DE42676826

