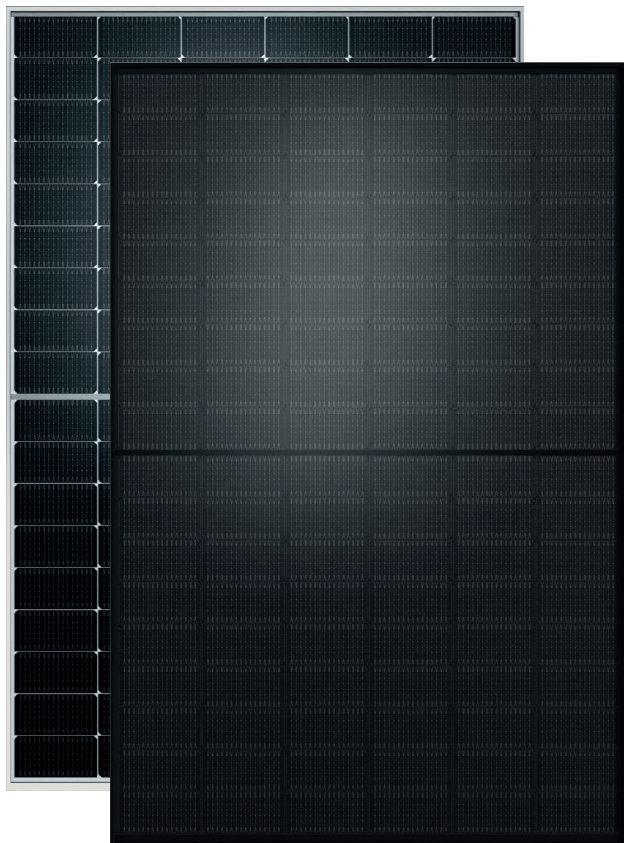


PRODUCT



SOLARWATT Panel vision M 5.0 black vision M 5.0 pure

Glass-Glass-Module

Solid quality with high performance

Thanks to their design Solarwatt glass-glass modules deliver the highest long-term yields. They are robust and resilient. Bifacial TOPCon half-cut-cells enable modules that are optimized for maximum performance.

The solar cells are embedded almost indestructibly in the glass-glass composite and thus optimally protected against all weather effects and mechanical stress. Solarwatt can therefore offer a 30-year warranty on performance and product quality.



SUSTAINABILITY



low CO₂ footprint

< 220 kg eq CO₂ / Modul*, 50 % less CO₂ than standard modules and certified according to PPE2 criteria



fair production conditions

no forced or child labour, fair pay and regular audits by independent auditors



high recycling rate in raw materials

aluminum: 75 %, cell silicium: 45 %
sustainable use through maximum durability and recycling at the end of the product life cycle

* Specification without frame, with frame: < 240 kg eq CO₂/module

PRODUCT QUALITY

- performance: 440 Wp to 455 Wp
- 100 % plus-sorting
- bifacial TOPCon half-cut-cells
- LeTID tested and PID protected
- ammonia resistant
- salt mist resistant
- intensive hailstorm resistant

SERVICE

30 year product warranty

as per „Warranty conditions for SOLARWATT Panel vision“

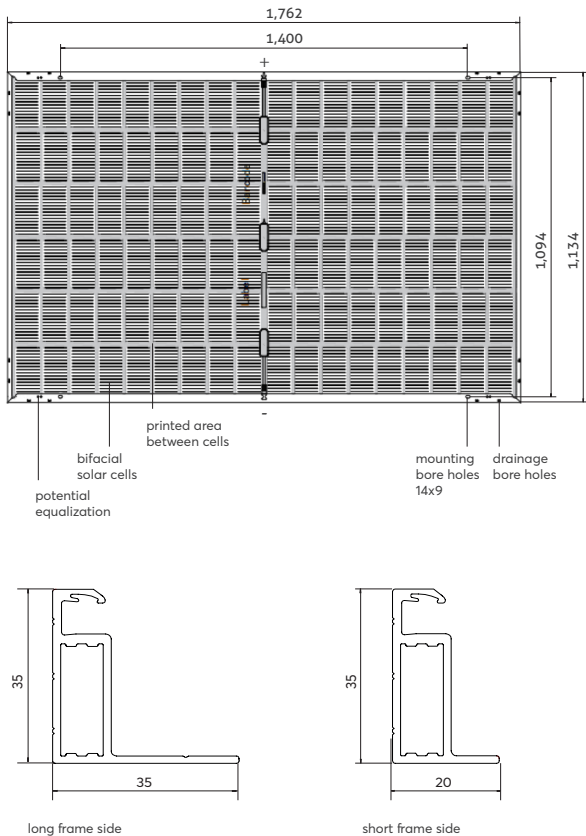
30 year performance warranty

on 90 % of nominal power as per „Warranty conditions for SOLARWATT Panel vision“

simple returns policy

as per „Delivery terms for Solarwatt solar modules“

DIMENSIONS



GENERAL DATA

Module technology	Glass-glass laminate; aluminum frame black (style, black) or silver (pure)
Covering material	Tempered solar glass with anti-reflective finish, 2 mm
Encapsulation	Solar cells in POE encapsulation
Backing material	Tempered glass partially printed (spaces between the cells) in black (black) or white (pure), 2 mm
Solar cells	108 monocrystalline, bifacial, high power TOPCon-solar cells
Cell dimensions	182 x 94 mm
L x W x H / Weight	1,762 ^{±2} x 1,134 ^{±2} x 35 ^{±0.3} mm / 24.8 kg
Connection technology	Cables 2x 1.2 m / 4 mm ² Stäubli Electrical MC4-Evo 2 connectors
Bypass diodes	3
Max. system voltage	1,500 V
IP rating	IP68
Protection class	II (acc. to IEC 61140)
Fire class	A (IEC 61730/UL 790), B-s1, d0 (EN 13501-1), B _{ROOF} (t1), B _{ROOF} (t2) (EN 13501-5)
Certified mechanical ratings as per IEC 61215	Pressure load up to 8,100 Pa (test load 12,150 Pa) Suction load up to 2,800 Pa (test load 4,200 Pa)
Qualifications	IEC 61215 (incl. LeTID) IEC 61730 PID IEC TS 62804 IEC 61701 IEC 62716 hail resistance class HW 3

THERMAL FEATURES

Operating temperature range	-40 ... +85 °C
Ambient temperature range	-40 ... +45 °C
Temperature coefficient P _{max}	-0.29 %/K
Temperature coefficient V _{oc}	-0.25 %/K
Temperature coefficient I _{sc}	0.05 %/K
NMOT	42 °C

TRANSPORT AND PACKAGING

Modules per pallet	31
Pallets per container	26
Stacked pallets/pallets per truck	14 / 28
Gross weight per pallet	809 kg
Gross weight per stacked pallet (max. 2)	1,618 kg
Pallet dimensions (packing size)	1,800 x 1,140 x 1,250

ELECTRICAL DATA (STC)

STC (Standard Test Conditions): Irradiation intensity 1,000 W/m², spectral distribution AM 1.5 | Temperature 25 ±2 °C, in accordance to EN 60904-3

Please check the performance class availability!

Nominal power P _{max}	445 Wp	450 Wp	455 Wp
Nominal voltage V _{mp}	33.0 V	33.2 V	33.4 V
Nominal current I _{mp}	13.5 A	13.5 A	13.6 A
Open circuit voltage V _{oc}	39.6 V	39.8 V	40.0 V
Short circuit current I _{sc}	14.0 A	14.0 A	14.1 A
Module efficiency	22.3 %	22.5 %	22.8 %

ELECTRICAL DATA (WEAK LIGHT AND BNPI)

Weak light conditions: Irradiation intensity 200 W/m², Temperature 25 °C, Wind speed 1 m/s, load operation

BNPI: Bifacial Nameplate Irradiance $G = 1000 \text{ W/m}^2 + \varphi \cdot 135 \text{ W/m}^2$
 $\varphi = \text{MIN}(\varphi_{\text{ISC}}, \varphi_{\text{Pmax}})$, $\varphi_{\text{ISC}} = 80 \%$, $\varphi_{\text{VOC}} = 100 \%$, $\varphi_{\text{Pmax}} = 80 \%$

Nominal power P _{max@STC}	445 W	450 W	455 W
Nominal power P _{max@200 W/m²}	87.2 W	88.2 W	89.2 W
Nominal power P _{max@BNPI}	490 W	496 W	501 W
Open circuit voltage V _{oc@BNPI}	39.7 V	39.9 V	40.1 V
Short circuit current I _{sc@BNPI}	15.4 A	15.4 A	15.5 A

P_{max} Nominal power: -0/+3%
All measured values are within the normal measurement tolerances of P_{max} ±5 %; V_{oc} ±3 %; I_{sc} ±3 %, I_{mp} ±10 %.
Reverse-current power rating IR: 30 A, operating modules with an external power source is only permissible if using a phase fuse with a tripping current of ≤ 30 A.