

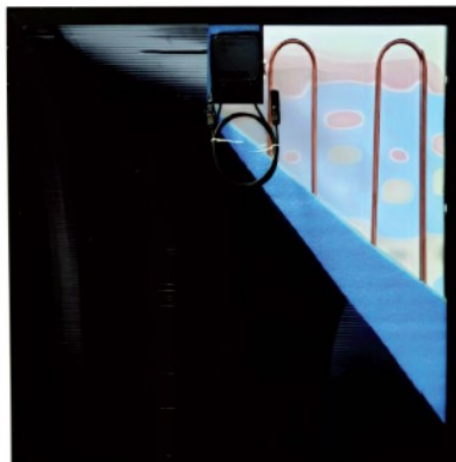


ART
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R ENEWABLE
E NERGY
T ECHNOLOGY



310W Mono Si 60Cells

THERMAL PHOTOVOLTAIC MODULE
TWINPOWER[®]



Thermal photovoltaic module for the production of electricity, sanitary water and heating all in one.

TWINPOWER NEW ERA



OF PHOTOVOLTAIC

Premium Cells, Premium Modules



TWINPOWER Total Energy Production +300% in combination Power and Thermal



TWINPOWER module 295Wp VS Conventional module 295Wp in same weather conditions

TWINPOWER Benefit: 30% More Power



TWINPOWER module 295Wp VS Conventional module 295Wp in same weather conditions

Benefit: Save System Costs Per Watt



Cost saving estimation made by comparison between 295W and TWINPOWER 295W modules

High Reliability

- Long-term reliability tests
- Harsh climate environment endurance tests
- PID-resistance tests in accordance to IEC62804
- Certified by TÜV SÜD and ETL
- Industry-leading cell technology
- High quality components from best suppliers
- Manufacturing inspected and certified by PI-Berlin and Solar-IF
- 100% in-house automatic manufacturing

Comprehensive Certificates

- IEC 61215, IEC 61730, UL1703, CEC Listed, MCS and CE
- ISO 9001: 2008: Quality management systems
- ISO 14001: 2004: Environmental management systems
- BS OHSAS 18001: 2007: Occupational health and safety management systems

Other Features

- Positive power tolerance: 0~+5W
- Modules binned by current to improve system performance
- Excellent mechanical load resistance: Certified to withstand high wind loads (2400Pa) and heavy snow loads (5400Pa)

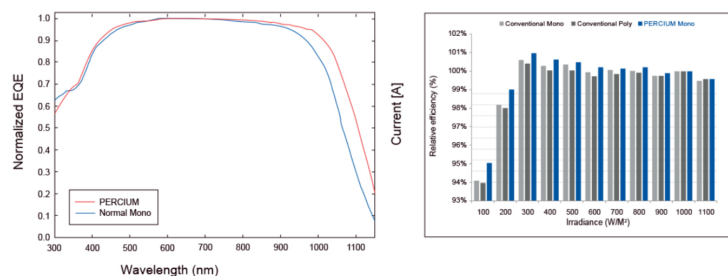
Excellent Low-light Performance

Enhanced spectral response at longer wavelength boosts low-light performance, which can produce more than 3% additional power compared with conventional module at system side.

Product Warranty

- 12-year product warranty
- 25-year linear power warranty

Benefit: Excellent Low-light Performance

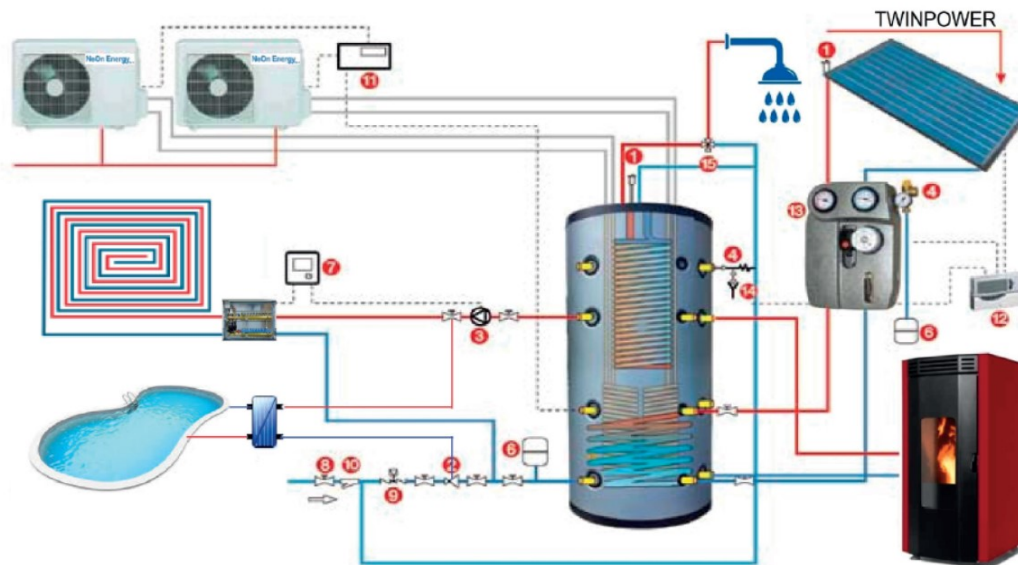


EQE—External quantum efficiency

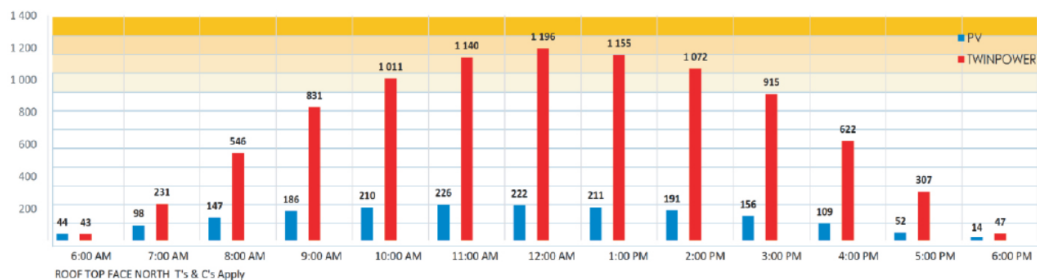
Relative module efficiency comparison under different irradiance

TWINPOWER Thermal Functional Parameter

Instant efficiency absorber area	η_0	0,580
Coefficient of linear thermal dispersion	a_1	7,500W/(m ² °K)
Thermal coefficient	a_2	0,012W/(m ² °K ²)
Angle of incidence 50°, reduced optical efficiency	$k\Theta(50^\circ)$	94%
Thermal peak power		890 W
Load loss		50 mbar
Maximum operating temperature		80°C
Maximum working pressure		6 bar
Minimum recommended flow		7 lt/m
Weight empty module		21 Kg
Module fluid volume		1 lt
Total Area		1,66 m ²
Open area		1,60 m ²
Absorption area		1,60 m ²
Tubing diameter for connection		Ø 10x 0,1 mm
Reference standard	UNI EN 12975-2:2006	

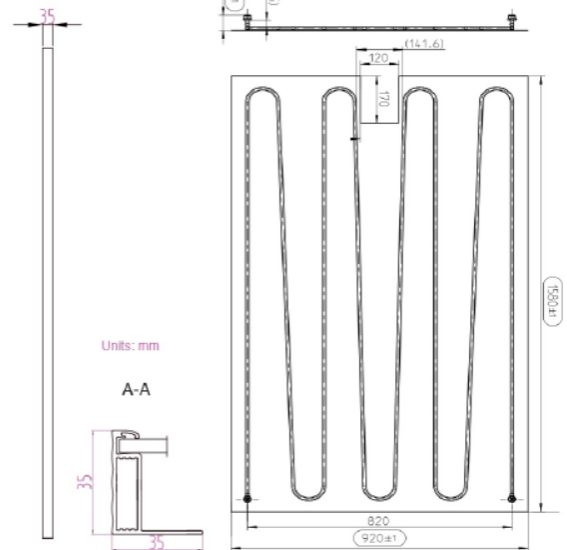
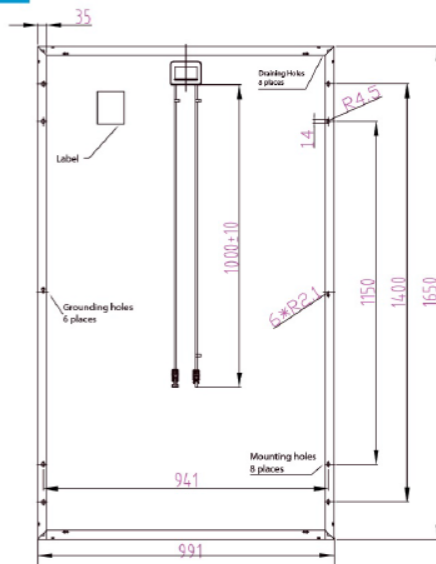
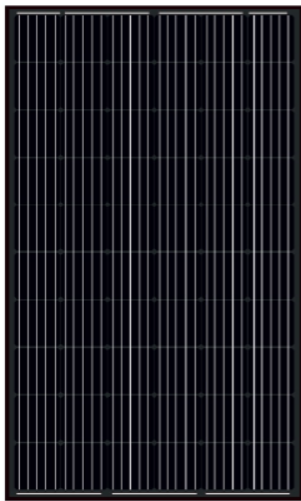


Benefit: Excellent Performance per m²





MECHANICAL DIAGRAMS



Units: mm

A-A

TWP60S02 310/TP

SPECIFICATIONS

Cell	Mono 156.75x156.75mm
Weight	18.2kg±3%
Dimensions	1665×1002×35mm
Cable Cross Section Size	4mm ²
No. of cells	60 (6×10)
Junction Box	IP67, 3 diodes
Connector	MC4 Compatible
Packaging Configuration	28 Per Pallet

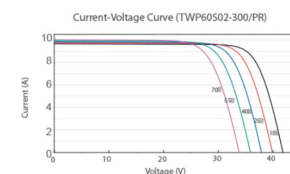
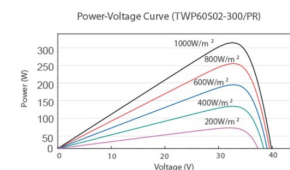
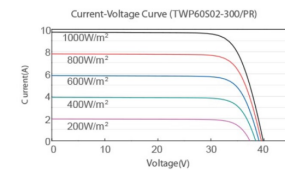
OPERATING CONDITIONS

Maximum System Voltage	1000/1500V _{DC} (IEC)
Operating Temperature	-40~+85
Maximum Series Fuse	15A
Maximum Static Load, Front	5400Pa
Maximum Static Load, Back	2400Pa
NOCT	46±2
Application Class	Class A

ELECTRICAL PARAMETERS AT STC

TYPE	TWP60S02-310/PR
Rated Maximum Power (P _{max}) [W]	310
Open Circuit Voltage (V _{oc}) [V]	40.43
Maximum Power Voltage (V _{mp}) [V]	33.41
Short Circuit Current (I _{sc}) [A]	9.84
Maximum Power Current (I _{mp}) [A]	9.28
Module Efficiency [%]	19.10
Power Tolerance	-0~+5W
Temperature Coefficient of I _{sc} (α _{Isc})	+0.042%
Temperature Coefficient of V _{oc} (β _{Voc})	-0.0284%
Temperature Coefficient of P _{max} (γ _{Pmp})	-0.380%
STC	Irradiance 1000W/m ² , cell temperature 25° ± AM 1.5G

CHARACTERISTICS



ELECTRICAL PARAMETERS AT NOCT

TYPE	TWP60S02-310/PR
Max Power (P _{max}) [W]	227.9
Open Circuit Voltage (V _{oc}) [V]	37.42
Max Power Voltage (V _{mp}) [V]	30.07
Short Circuit Current (I _{sc}) [A]	8.07
Max Power Current (I _{mp}) [A]	7.58
NOCT	Irradiance 800 W/m ² , ambient temperature 20° ± wind speed 1 m/s, AM 1.5G