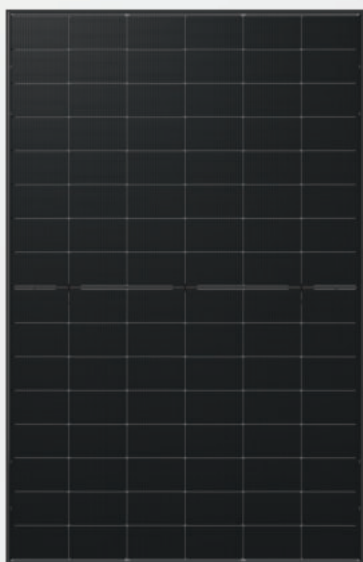


TNC 2.0

**N-type Half-cell Bifacial Dual glass
Black Frame and Transparent Module (48)**
TWMNH-48HD



High light transmittance, suitable for carports and balcony scenarios



Compact size and lightweight, hassle-free operation and low maintenance



Increased power, lower transportation cost



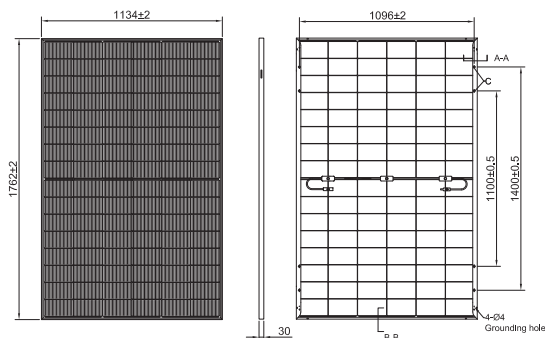
Integrated design, perfectly blending with architectural aesthetics

440-465W



TWMNH N-type Half-cell Bifacial Dual glass Black Frame and Transparent Module (48)

Drawings (Unit: mm)



Electrical Characteristics (STC)

Module type:	TWMNH-48 HD440	TWMNH-48 HD445	TWMNH-48 HD450	TWMNH-48 HD455	TWMNH-48 HD460	TWMNH-48 HD465
Maximum Power: Pmax [W]	440	445	450	455	460	465
Open Circuit Voltage: Voc [V]	35.35	35.55	35.75	35.95	36.15	36.35
Short Circuit Current: Isc [A]	15.89	15.92	15.95	15.98	16.05	16.12
Voltage at Maximum Power: Vmp [V]	29.67	29.93	30.19	30.44	30.69	30.94
Current at Maximum Power: Imp [A]	14.83	14.87	14.91	14.95	14.99	15.03
Module Efficiency: η [%]	22.02	22.27	22.52	22.77	23.02	23.27

* STC: Irradiance 1000W/m², Cell temperature 25°C, AM=1.5, Power measurement tolerance: ±3%, Voc measurement tolerance: ±5%, Isc measurement tolerance: ±5%

Electrical Characteristics (BNPI)

Maximum Power: Pmax [W]	485.7	491.5	496.9	502.3	507.9	513.3
Open Circuit Voltage: Voc [V]	35.35	35.55	35.75	35.95	36.15	36.35
Short Circuit Current: Isc [A]	17.54	17.57	17.61	17.64	17.72	17.80
Voltage at Maximum Power: Vmp [V]	29.67	29.93	30.19	30.44	30.69	30.94
Current at Maximum Power: Imp [A]	16.37	16.42	16.46	16.50	16.55	16.59

* BNPI: Front side irradiance 1000W/m², Rear side irradiance 135W/m², Cell Temperature=25°C, AM=1.5
Power measurement tolerance: ±3%, Voc measurement tolerance: ±5%, Isc measurement tolerance: ±5%

Electrical Characteristics (BSI)

Short Circuit Current: Isc [A]	19.56	19.60	19.63	19.67	19.76	19.84
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* BSI: Front side irradiance 1000W/m², Rear side irradiance 300W/m², Cell Temperature=25°C, AM=1.5
Isc measurement tolerance: ±5%

Electrical characteristics with different rear side power gain

5%	Maximum Power: Pmax[W]	462	467	472	477	483	488
	Module Efficiency: η [%]	23.12	23.37	23.62	23.87	24.17	24.42
15%	Maximum Power: Pmax[W]	506	511	517	523	529	534
	Module Efficiency: η [%]	25.32	25.57	25.87	26.17	26.48	26.73
25%	Maximum Power: Pmax[W]	550	556	562	568	575	581
	Module Efficiency: η [%]	27.53	27.83	28.13	28.43	28.78	29.08

Temperature Rating

Temperature Coefficient of Pmax	-0.28%/°C
Temperature Coefficient of Voc	-0.24%/°C
Temperature Coefficient of Isc	+0.046%/°C

Operating Parameters

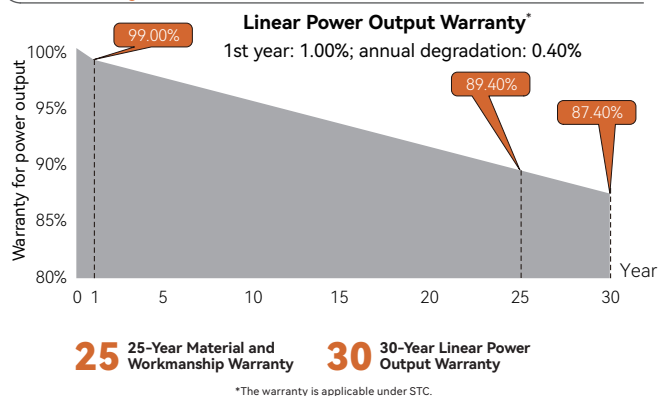
Operating Temperature*	[T _g] ≤70°C
Maximum System Voltage	1500V DC
Maximum Series Fuse Rating	30A
Power Output Tolerance	0~+3%
Bifaciality coefficient of Pmax	80±10%
Bifaciality coefficient of Voc	98±5%
Bifaciality coefficient of Isc	80±10%
Fire Class Rating	Class C

*The module operating temperature can reach up to 85°C for short term.

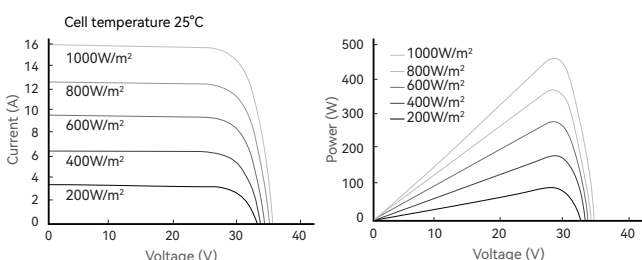
Mechanical Parameters

Cell Type	TNC
Cell Orientation	96[6×16]
Dimension	1762±2×1134±2×30mm
Weight	22.8 kg
Front Glass	2.0 mm AR coating semi tempered glass
Rear Glass	2.0 mm semi tempered glass
Frame	Anodized aluminum alloy black frame
Junction Box	IP68, 3 diodes
Cable	4.0 mm ²
Cable Length	+1200mm,-1200mm,length can be customized
Connector	TW-PVCON-01,TW-PVCON-02(Tongwei Solar) PV-KST4-EVO2/xy_UR, PV-KBT4-EVO2/xy_UR(Staubli) PV-KST4-EVO2A/xy, PV-KBT4-EVO2A/xy(Staubli) PV-ZH202B(Zhejiang Zhonghuan Sunter)
Maximum Static Test Load	5400Pa (positive) / 2400Pa (negative)
Packaging (Per pallet)	36 pcs
Packaging	936 pcs per 40'HC

Warranty



Curve



Certifications

Quality Management System and Product Certification

ISO 9001: 2015 / Quality Management System
ISO 14001: 2015 / Environmental Management System
ISO 45001: 2018 / Occupational Health and Safety Management System
ISO 50001: 2018 / Energy Management System
IEC 62941: 2019 / Quality System for PV Module Manufacturing
IEC 61215 (2021) / IEC 61730 (2023), IEC TS 62804,
IEC 61701, IEC 62716, IEC 60068-2-68



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Made in china

Statement: With technological process and product update, there maybe deviation between the technical parameters of Tongwei's module products and the technical parameters contained in the specification, and Tongwei Solar has the right to adjust the technical parameters at any time without notifying the customer, the final interpretation of the technical specification is vested in Tongwei Solar. (AUS-Ver.20260501)
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