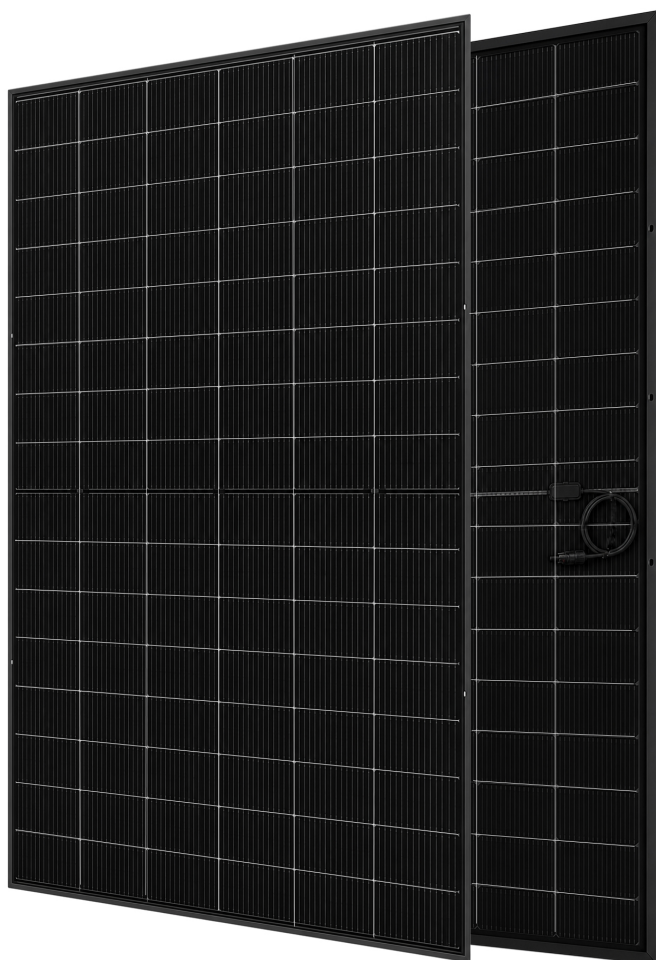


Twisun Pro N-Topcon Full Black Bifacial 440-460W

MS(440-460)MDG - 48H - FBBG
Mono N-Type 96Cells

Specifically customized for
household rooftop PV systems



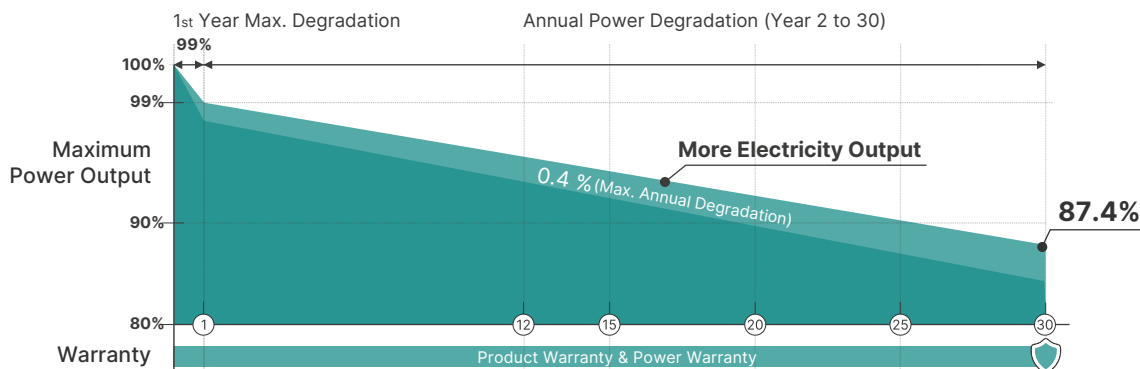
- LECO N-TYPE Cell Technology
- Bifacial Cell Module Technologies
- Less Hot Spot Shading Effects
- SMBB Half Cut Cell Technology
- Excellent Anti-PID Low LID Performance
- Higher Power Output Lower BOS & LCOE

23.02%
Maximum Efficiency

0 ~ +5W
Positive Power Tolerance

30 Years
Product Warranty

30 Years
Power Warranty



Electrical Data(STC / NOCT)

Test Conditions	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Peak Power Watts- P_{MAX} (Wp)*	440	330	445	334	450	338	455	342	460	346
Power Tolerance- P_{MAX} (W)	0 ~ +5									
Maximum Power Voltage- V_{MPP} (V)	29.72	27.80	29.97	28.02	30.22	28.24	30.47	28.46	30.72	28.68
Maximum Power Current- I_{MPP} (A)	14.81	11.87	14.85	11.92	14.89	11.97	14.93	12.02	14.98	12.07
Open Circuit Voltage- V_{OC} (V)	35.33	32.58	35.54	32.82	35.75	33.07	35.96	35.68	36.17	38.29
Short Circuit Current- I_{SC} (A)	15.80	12.72	15.86	12.77	15.92	12.82	15.98	12.86	16.04	12.90
Module Efficiency η m (%)	22.02	22.02	22.27	22.27	22.52	22.52	22.77	22.77	23.02	23.02

* STC: Air Mass AM1.5, Irradiance at 1000W/m², Cell Temperature 25°C / Measuring tolerance: ±3%.
 * NOCT: Irradiance at 800W/m², Cell Temperature 20°C, Wind Speed 1m/s / Measuring tolerance: ±3%.

Bifacial Output-Rearside Power Gain

5% Maximum Power- P_{MAX}	462	467	473	478	483
5% Module Efficiency η m (%)	23.12	23.38	23.65	23.91	24.17
15% Maximum Power- P_{MAX}	506	512	518	523	528
15% Module Efficiency η m (%)	25.32	25.61	25.90	26.19	26.48
25% Maximum Power- P_{MAX}	550	556	563	569	575
25% Module Efficiency η m (%)	27.53	27.84	28.15	28.46	28.77

* Power Bifaciality: 80±5%

Mechanical Data

Solar Cells	N-type Mono
Cell Orientation	96cells (6 x 16)
Module Dimensions	1762mm × 1134mm × 30mm
Weight	25.00kg
Front Glass	2.0mm coated semi-tempered glass
Encapsulant material	POE / EVA
Back Glass	2.0mm coated semi-tempered glass
Frame	Anodized aluminium alloy/Galvanized Steel
J-Box	Ip68 rated (3 by pass diodes)
Cables	Photovoltaic Technology Cable 4.0mm ² Portrait: N 1000mm / P 1000mm Length Can be Customized
Connector	MC4 Compatible

* Please refer to regional datasheet for specific connector.

Temperature Ratings

NOCT(Nominal Operating Cell Temperature)	45°C (±2°C)
Temperature Coefficient of P_{MAX}	-0.29% / °C
Temperature Coefficient of V_{OC}	-0.25% / °C
Temperature Coefficient of I_{SC}	0.045% / °C

* Do not connect fuse in combiner box with two or more strings in parallel connection.

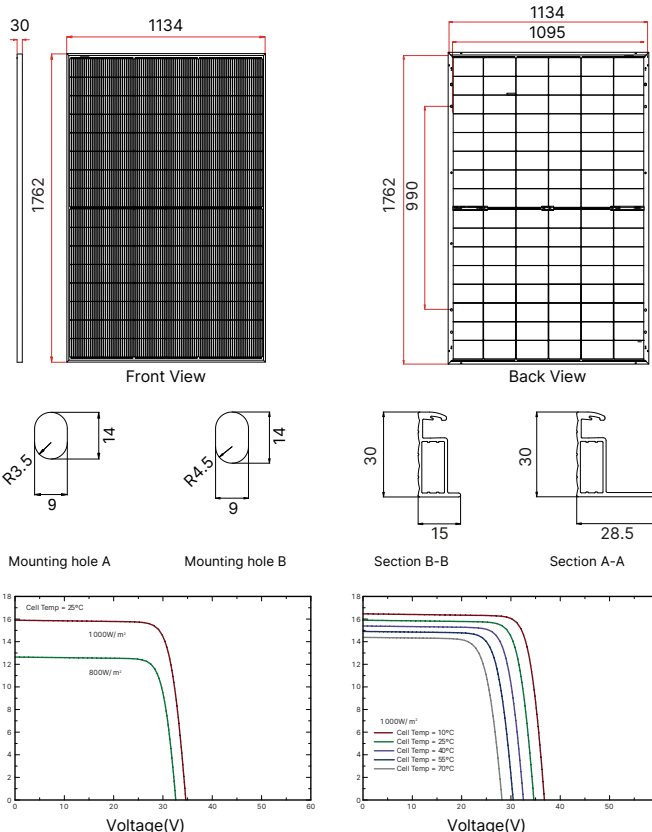
Application Environment

Operational Temperature	-40 ~ +85°C
Maximum System Voltage	1500VDC
Max Series Fuse Rating	30A
Mechanical Performance	P 5400Pa / N 4000Pa

Packaging Configuration

Modules Per Pallet: 36 Pieces
Modules Per 40' Container: 936 Pieces (26 Pallets)

Dimensions of PV Module (mm)



Warranty

30 Years Product Warranty

30 Years Power Warranty

1% First Year Degradation

0.4% Annual Power Degradation

* Please refer to product warranty for details.