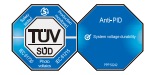




# M6 HIEFF TWIN MONO by SUNPRO

SPxxx-144M  
(xxx=435~460)

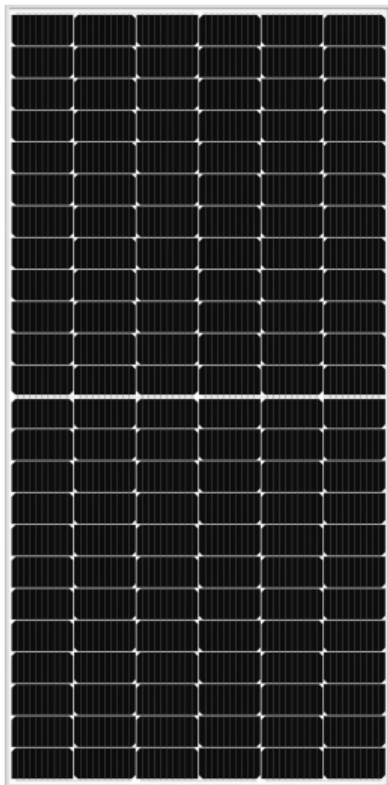
HIGH EFFICIENCY



ISO 14001

ISO 9001

ISO 45001



### POWER TOLERANCE

0~+3%



### WITHSTAND STRONG SNOW LOAD 5400 Pa/ WIND LOAD 2400 Pa



### NEW TECHNOLOGY: HIEFF UP TO 21,17%

Higher yield per surface area,  
lower BOS costs, higher power classes,  
and an efficiency rate of up to 21.17%.

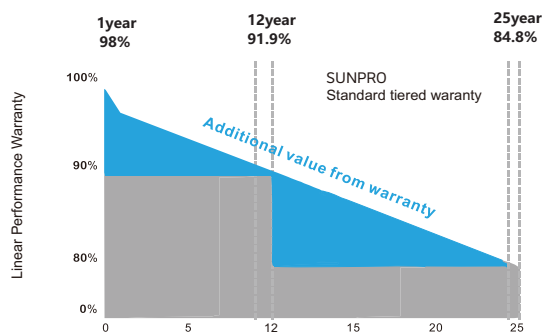


### PRODUCT WITH HIEFF BY SUNPRO TECHNOLOGY

SUNPRO combines cutting edge cell  
separation and innovative 9-busbar design  
with SUNPRO Technology.

## Reliability & Certification

Product Guarantee: **12-year**  
Linear Performance Warranty  
**12-year: 91.9%** power output  
**25-year: 84.8%** power output



## Product Specification

Electrical parameters at standard test conditions  
(STC:AM=1.5, 1000W/m<sup>2</sup>, Cells Temperature 25°C)

| Typical type                | 435W                          | 440W  | 450W  | 455W  | 460W  |
|-----------------------------|-------------------------------|-------|-------|-------|-------|
| Max power(Pmax)             | 435                           | 440   | 450   | 455   | 460   |
| Open circuit voltage (Voc)  | 49.5                          | 49.6  | 49.8  | 49.9  | 50.0  |
| Short circuit current (Isc) | 11.23                         | 11.34 | 11.56 | 11.65 | 11.69 |
| Max power voltage(Vmp)      | 40.7                          | 40.8  | 41.0  | 41.1  | 41.2  |
| Max power current(Imp)      | 10.69                         | 10.79 | 10.98 | 11.08 | 11.17 |
| Module Efficiency(%)        | 20.01                         | 20.24 | 20.70 | 20.93 | 21.16 |
| Max system voltage          | DC 1500V(TUV) / DC 1000V(TUV) |       |       |       |       |
| Maximum Series Fuse Rating  | 25A                           |       |       |       |       |

## Electrical parameters at NMOT test conditions

(NMOT:Irradiance 800W/m<sup>2</sup>, Ambient Temperature 20°C, AM 1.5, Wind Speed 1m/s)

| Item                        | 435W  | 440W | 450W | 455W  | 460W  |
|-----------------------------|-------|------|------|-------|-------|
| Max power(Pmax)             | 353.9 | 358  | 366  | 370.2 | 374.3 |
| Open circuit voltage (Voc)  | 49.7  | 49.8 | 50.0 | 50.1  | 50.2  |
| Short circuit current (Isc) | 8.96  | 9.05 | 9.23 | 9.30  | 9.33  |
| Max power voltage(Vmp)      | 41.7  | 41.8 | 42.0 | 42.1  | 42.3  |
| Max power current(Imp)      | 8.49  | 8.56 | 8.72 | 10.69 | 10.69 |

## Mechanical Data

| Item          | Specification        |
|---------------|----------------------|
| Dimensions    | 2094x1038x35mm       |
| Weight        | 24.2kgs              |
| Front glass   | 3.2mm tempered glass |
|               | 4mm <sup>2</sup>     |
| Output cables | symmetrical lengths  |
|               | 1300mm               |

|                 |                                 |
|-----------------|---------------------------------|
| Connectors      | MC4 compatible IP68             |
| Cell type       | Mono-Crystalline PERC Half-Cell |
|                 | 9BB 83x166mm                    |
| Number of cells | 144 cells                       |

## Temperature Characteristics

| Item                              | Specification |
|-----------------------------------|---------------|
| Temp.Coeff.of Isc(TK Isc)         | 0.05%/°C      |
| Temp.Coeff.of Voc(TK Voc)         | -0.29%/°C     |
| Temp.Coeff.of Pmax(TK Pmax)       | -0.34%/°C     |
| Operating temperature             | -40~+85°C     |
| Normal operating cell temperature | 44±2°C        |

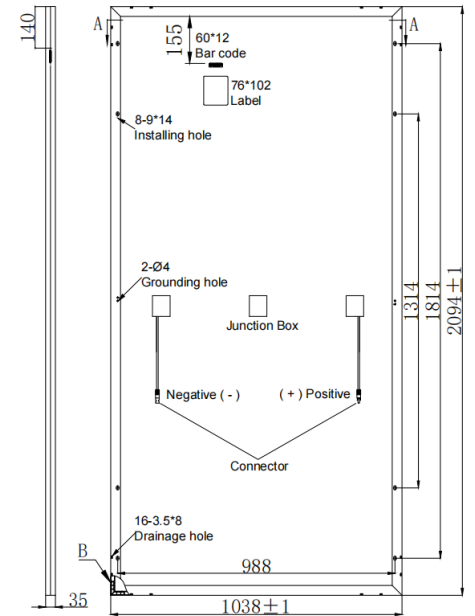
## Packing Configuration

| Item                  | Specification |
|-----------------------|---------------|
| Container             | 40'HQ         |
| Pieces per pallet     | 66            |
| Pallets per container | 11            |
| Pieces per container  | 726           |

## Test, Certifications and Warranties

| Item                                | Specification  |
|-------------------------------------|--|
| Standard tests                      | IEC 61215, IEC 61730, IEC 61701, IEC 62716, PPP 58042B             |
| System certs                        | ISO 9001, ISO14001, ISO45001                                       |
| Certifications                      | TUV, AMMONIA AND SALT MIST CORROSION, ANTI-PID, CE, WEEE, INMERTRO |
| Extreme wind and snow loads testing | Withstand extreme wind(2400 Pascal) and snow loads(5400 Pascal)    |
| Power tolerance                     | 0~+3%  |
| Junction box                        | IP68   |
| Warranties                          | 12 years product warranty and 25 years 84.8% of power              |

## Dimensions and Structure



## I-V Curve

I-V characteristics at different irradiation

