

Mono

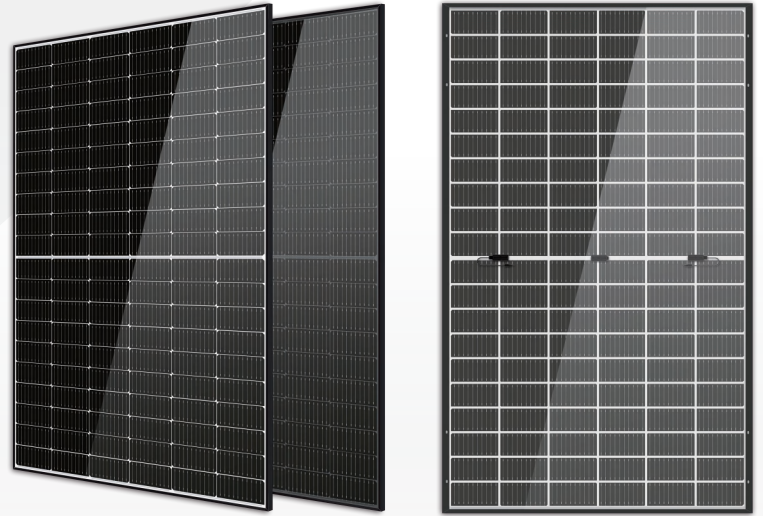
Bifacial

HORAY

Solar Ocean

450-470 Watt MONO-BIFACIAL MODULE

- IEC61215: 2021
- IEC61730: 2016
- TUV Rheinland Standard
- Lloyd'S Ariel Re
- Solar Performance Insurance
- ISO9001: 2015
- Quality Management System
- ISO14001:
- Environmental Management System
- CE: Europe Standard
- Inmetro Certificate
- Japan JP-AC



KEY FEATURES



MBB Cell

More uniform current collection capability, reducing the current heat loss of the internal cells.



Low Light Features

Higher performance under low light environment.



Higher Output Power

The output power of 120 half-cells Monocrystalline modules is up to 470W.



PID Protection

Ensure the attenuation probability caused by PID phenomenon is minimized.



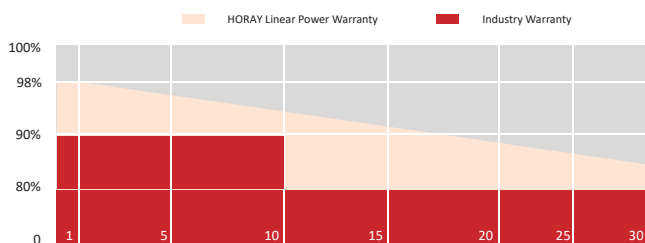
Harsh Environmental Adaptability

Strict salt spray and ammonia corrosion test by the third party.



Load Capacity

Mechanical load tests including wind load 2400 Pa and snow load 5400 Pa.



HEADQUARTER: HORAY SOLAR CO., LTD.

GLOBAL MARKETING AND SERVICE: HORAY SOLAR GMBH

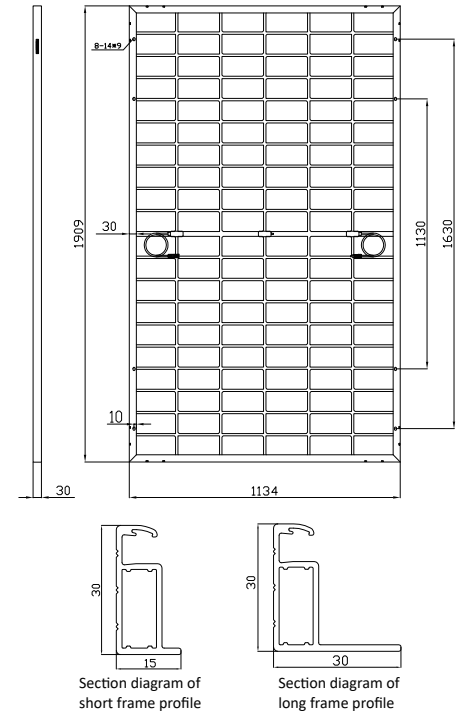
✉ sales@horaysolar.com 🌐 www.horaysolar.com ☎ +86-510 83580688
 📍 NO.30-5, East Yanxin Road, Huishan District, Wuxi 214177 Jiangsu P.R China

✉ info@horaysolar.com 🌐 www.horaysolar.com
 📍 Robert-Bosch-Str. 29,Langen, Frankfurt am Main, Germany

❖ SPECIFICATIONS

Weight	25.5kg
Dimension	1909mm*1134mm*30mm
Cell Dimension	182*91mm
Cell Amount	60*2 pcs
Maximum System Voltage	1500V
Junction Box	IP68
Type of the front glass	2.0mm Coated ultra clear glass
Type of the back glass	2.0mm Heat-strengthened glass
Frame	Aluminum Alloy
Cable	4mm ² ,+300,-300mm/±1100mm Length can be customized
Connector	MC4 compatible
Application Level	Class A

❖ MECHANICAL DIAGRAMS



❖ ELECTRICAL PARAMETERS AT STC

Module Type	HS450-MHO-D	HS455-MHO-D	HS460-MHO-D	HS465-MHO-D	HS470-MHO-D
Power	450W	455W	460W	465W	470W
Open Circuit Voltage	41.40V	41.60V	41.80V	42.00V	42.20V
Short Circuit Current	13.68A	13.73A	13.78A	13.84A	13.90A
Maximum Power Voltage	34.60V	34.80V	35.00V	35.20V	35.40V
Maximum Power Current	13.01A	13.08A	13.15A	13.21A	13.28A
Module Efficiency	20.79%	21.02%	21.25%	21.48%	21.71%

* Under Standard Test Conditions (STC) of irradiance of 1000 W/m², spectrum AM 1.5 and cell temperature of 25°C.

❖ ELECTRICAL PARAMETERS AT BNPI

Power	493W	498W	504W	509W	515W
Open Circuit Voltage	41.40V	41.60V	41.80V	42.00V	42.20V
Short Circuit Current	14.88A	14.97A	15.06A	15.15A	15.24A
Maximum Power Voltage	34.60V	34.80V	35.00V	35.20V	35.40V
Maximum Power Current	14.24A	14.32A	14.39A	14.47A	14.54A

*Rear side power gain: The additional gain from the rear side compared to the power of the front side at the standard test condition. It depends on mounting (structure,height,tilt angle etc.)and albedo of the ground.

❖ ELECTRICAL PARAMETERS AT NMOT

Power	340W	344W	348W	352W	356W
Open Circuit Voltage	39.20V	39.45V	39.70V	39.97V	40.21V
Short Circuit Current	10.94A	10.98A	11.02A	11.06A	11.10A
Maximum Power Voltage	32.67V	32.87V	33.08V	33.31V	33.51V
Maximum Power Current	10.41A	10.46A	10.52A	10.57A	10.62A

* Under Nominal Module Operating Temperature (NMOT), irradiance of 800 W/m², spectrum AM 1.5, ambient temperature 20°C, wind speed 1 m/s.

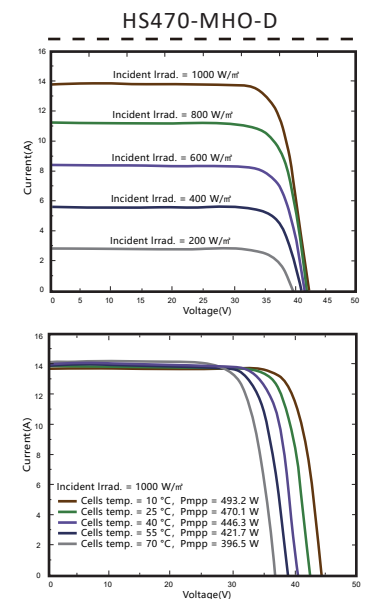
❖ TEMPERATURE CHARACTERISTICS

NMOT	45±2°C
Temp Coefficient of ISC	+0.05%/°C
Temp Coefficient of VOC	-0.28%/°C
Temp Coefficient of Pmax	-0.34%/°C

❖ PACKING CONFIGURATION

Modules/Pallet	37 Pieces
Packaging Description	24 Pallets, Total=(37+37)x12=888 Pieces
Modules/40' Container	888 Pieces

❖ IV CHARACTERISTICS



❖ MAXIMUM RATING

Power selection	0~+5W
Measuring uncertainty of Pm	0~±3%
Operating Temperature	-40°C~+85°C
Wind Load/Snow Load	2400pa/5400pa
Fuse Current	25A

15
YEARS

Quality
Warranty

30
YEARS

Power
Warranty

CAUTION: READ SAFETY AND INSTALLATION INSTRUCTIONS BEFORE USING THE PRODUCT.

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