

# 445~465 Watt

# HORAY

**TIER1**  
BloombergNEF

## HL **210R-96** TC 1.1 *Lite* N-type Mono-facial Modules



5.5kg/m<sup>2</sup>, 50% lighter than conventional glass module.



Ideal for rooftops with limited load capacity



### SMBB Half-Cell Technology

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



### Higher Output Power

The output power of 96 half-cells monocrystalline modules is up to 465W.



### Mechanical Load Enhanced

Heavy snow load up to 3600 Pa, wind load up to 2400 Pa.



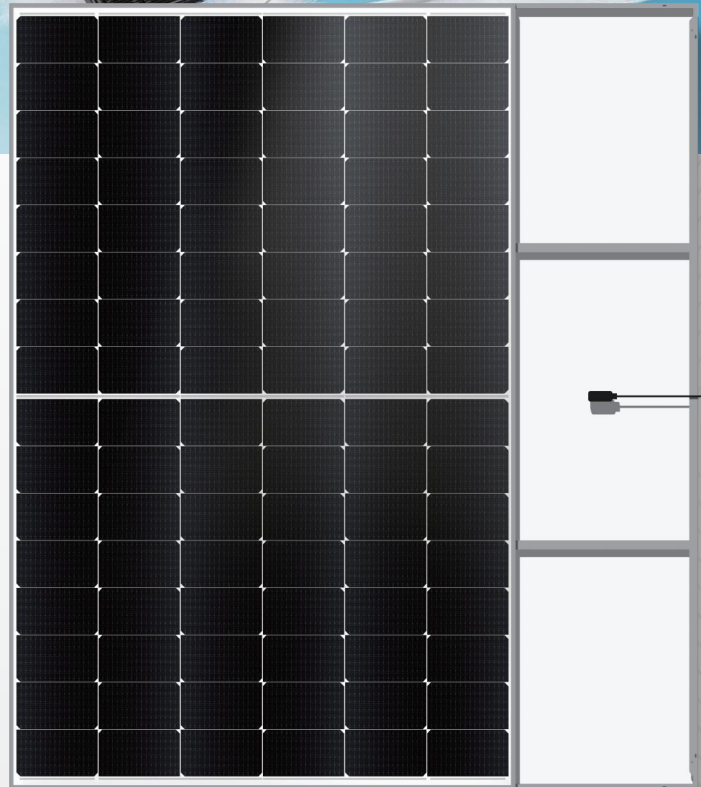
### Better Weather Adaptability

Excellent low light performance, lower temperature coefficients and power loss under high temperature.



### Lower Power Attenuation

Anti PID and negligible LID/LeTID attenuation, which can reduce power loss.



IEC61215:2021

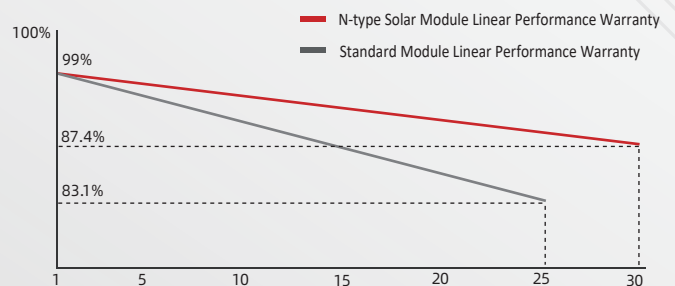
IEC61730:2023

ISO9001:2015 Quality Management System

ISO14001:2015 Environmental Management System

ISO45001:2018 Occupational Health and Safety Management System

CE: Europe Standard



12-year product warranty



25-year linear power output warranty

HEADQUARTER: HORAY SOLAR CO., LTD.

GLOBAL MARKETING AND SERVICE: HORAY SOLAR GMBH

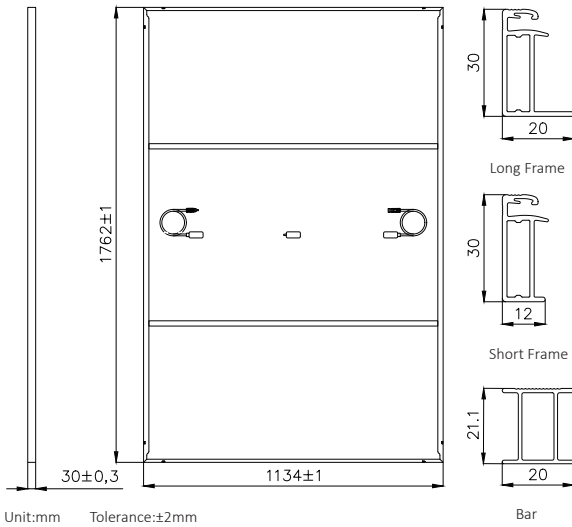
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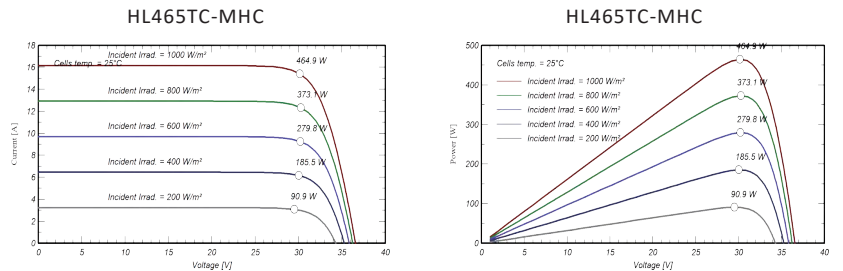
## MECHANICAL DIAGRAMS



## MECHANICAL PARAMETERS

Weight	11.0kg
Dimension	1762×1134×30mm
Cell Orientation	96 (6×16)
Junction Box	IP68, three diodes
Output Cable	4mm <sup>2</sup> ,±300mm (length can be customized)
Connector	MC4 compatible
Glass	1.1mm high transmittance tempered glass
Frame	Anodized aluminum alloy frame
Packaging	36pcs per pallet/936pcs per 40'HC

## MECHANICAL PARAMETERS



## ELECTRICAL CHARACTERISTICS AT STC

Module Type	HL445TC-MHC	HL450TC-MHC	HL455TC-MHC	HL460TC-MHC	HL465TC-MHC
Testing Condition	STC	STC	STC	STC	STC
Maximum Power(Pmax/W)	445	450	455	460	465
Open Circuit Voltage(Voc/V)	35.87	36.04	36.21	36.39	36.56
Short Circuit Current(Isc/A)	15.77	15.87	15.97	16.07	16.16
Maximum Power Voltage(Vmp/V)	29.81	29.95	30.10	30.24	30.38
Maximum Power Current(Imp/A)	14.93	15.02	15.12	15.21	15.30
Module Efficiency(%)	22.3	22.5	22.8	23.0	23.3

\* Under Standard Test Conditions (STC) of irradiance of 1000 W/m<sup>2</sup>, spectrum AM 1.5 and cell temperature of 25°C.

## ELECTRICAL CHARACTERISTICS AT NMOT

Module Type	HL445TC-MHC	HL450TC-MHC	HL455TC-MHC	HL460TC-MHC	HL465TC-MHC
Testing Condition	NMOT	NMOT	NMOT	NMOT	NMOT
Maximum Power(Pmax/W)	347	351	355	359	363
Open Circuit Voltage(Voc/V)	35.62	35.79	35.96	36.13	36.30
Short Circuit Current(Isc/A)	12.30	12.38	12.45	12.53	12.61
Maximum Power Voltage(Vmp/V)	30.14	30.28	30.43	30.57	30.72
Maximum Power Current(Imp/A)	11.52	11.59	11.66	11.74	11.81

\* Under Nominal Module Operating Temperature (NMOT), irradiance of 800 W/m<sup>2</sup>, spectrum AM 1.5, ambient temperature 20°C, wind speed 1 m/23.3

## OPERATING PARAMETERS

Operational Temperature	-40°C~+85°C
Power Output Tolerance	0~5%
Maximum System Voltage	1500V
Maximum Series Fuse Rating	30A
Nominal Operating Cell Temperature	45±2°C
Protection Class	Class II
Fire Rating	IEC Class C

\*The actual test value may be slightly deviated from the technical parameters due to the difference in test methods.

## MECHANICAL LOADING

Front Side Maximum Static Loading	3600Pa
Rear Side Maximum Static Loading	2400Pa
Hailstone Test	25mm Hailstone at the speed of 23m/s

## TEMPERATURE RATINGS (STC)

Temperature Coefficient of Isc	+0.048%/°C
Temperature Coefficient of Voc	-0.26%/°C
Temperature Coefficient of Pmax	-0.35%/°C

