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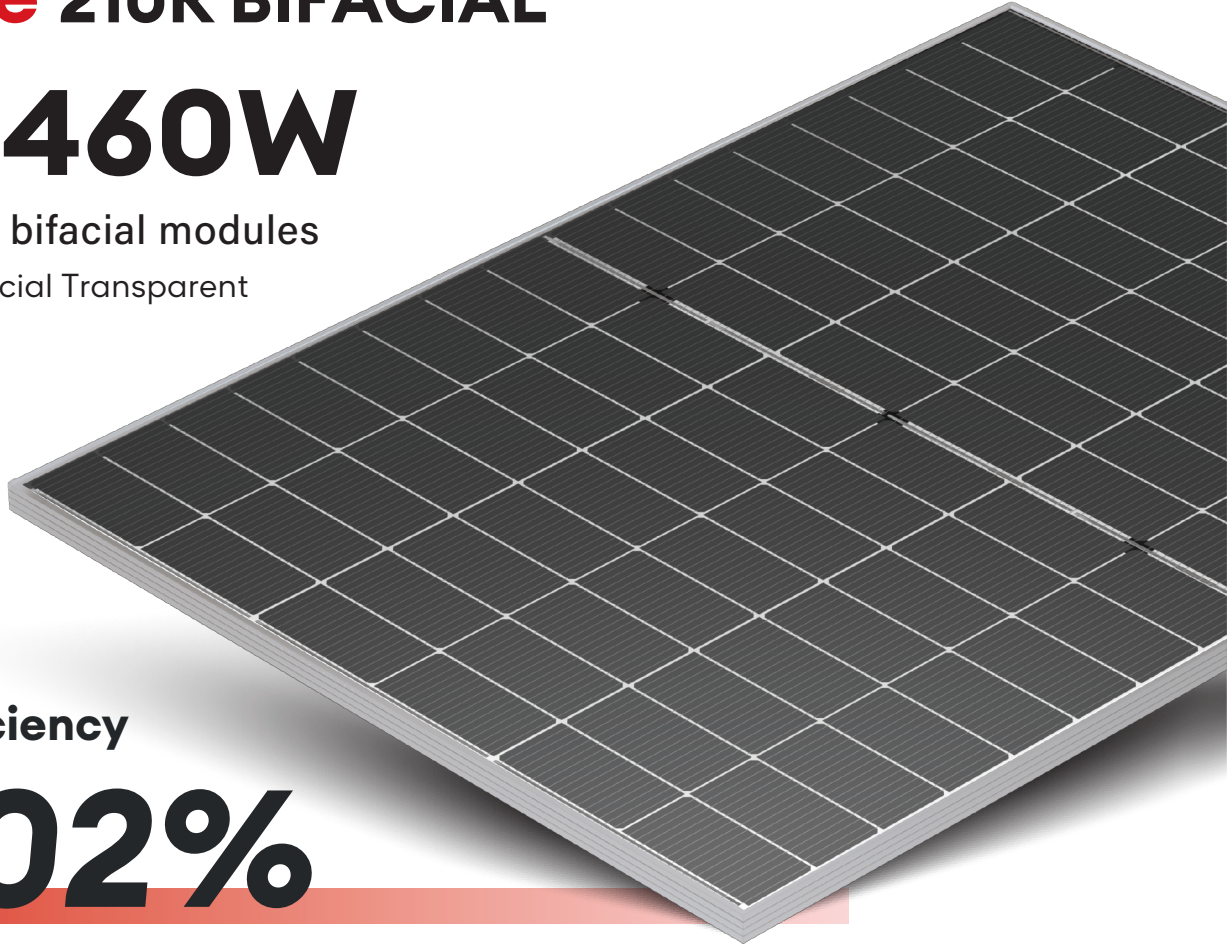
Power the future

# N-Type 210R BIFACIAL

# 445-460W

High efficiency bifacial modules

· Silver frame , Bifacial Transparent



Module efficiency

# 23.02%



Better leveled cost of energy



Better high temperature stability

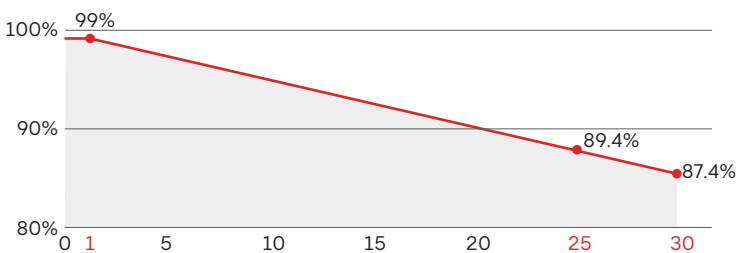


Improved low-light performance



Excellent bifacial performance

Linear performance guarantee for 30 years



## WARRANTY

Extended warranty is available at additional cost

Quality Guarantee **15** years

Power Warranty **30** years

## CERTIFICATE



## ELECTRIC CHARACTERISTICS

## SPDG (445/460W)-N96R12

Model of modules	SPDG445-N96R12		SPDG450-N96R12		SPDG455-N96R12		SPDG460-N96R12	
	STC	NMOT	STC	NMOT	STC	NMOT	STC	NMOT
Power ( Pmax/W )	445.00	336.50	450.00	340.70	455.00	344.80	460.00	348.90
Maximum power current ( Vmp )	29.69	27.90	29.93	28.10	30.16	28.40	30.39	28.60
Maximum power current ( Imp )	14.99	12.06	15.04	12.11	15.09	12.14	15.14	12.18
Open circuit voltage ( Voc )	35.54	33.70	35.80	33.90	36.06	34.20	36.30	34.50
Short circuit current ( Isc )	15.86	12.77	15.90	12.80	15.94	12.84	15.99	12.88
Module efficiency	22.27%		22.52%		22.77%		23.02%	

STC ( Electrical parameters at standard test conditions (STC:AM=1.5, 1000W/m<sup>2</sup>, Cells Temperature25°C )

NMOT ( Irradiance 800W/m<sup>2</sup>, Ambient Temperature 20°C , AM1.5, Wind Speed 1m/s )

## ELECTRICAL CHARACTERISTICS WITH 15% REAR SIDE POWER GAIN

Front power Pmax/W	511.75	517.50	523.25	529.00
Maximum power voltage ( Vmp )	29.69	29.93	30.16	30.39
Maximum power current ( Imp )	17.24	17.29	17.35	17.41
Open circuit voltage ( Voc )	35.54	35.80	36.06	36.30
Short circuit current ( Isc )	18.24	18.29	18.33	18.39

## STRUCTURAL CHARACTERISTICS

Module size (L*W*H)	1762x1134x30mm
Weight	23.8kg
Cell	96 cells , N type Mono-Crystalline , 182.2mm×105 mm
Front glass	2.0mm , Anti-Reflection Coating
Back glass	2.0mm , Heat Strengthened Glass
Frame	Anodized aluminum alloy
Junction box	IP68 , 3 bypass diodes
Output wire	4mm <sup>2</sup>
Wire length	Line length 1100mm/customized
Connector	Staubli MC4
Packing Specification	37 pcs/Pallet ; 936 pcs/40' HQ

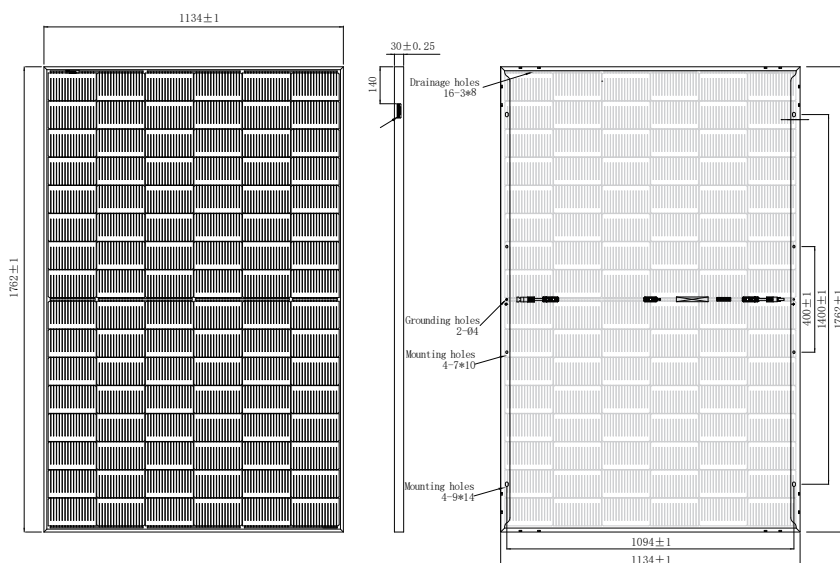
## OPERATING PARAMETERS

Power tolerance (W)	(0~+5W)
Maximum system voltage (V)	1500V
Maximum rated fuse current (A)	30A
Current operating temperature (C)	-40~+85°C
Mechanical load	+8000Pa/-5400Pa

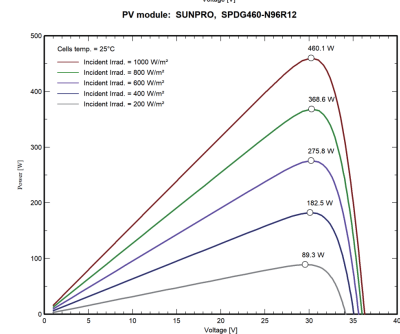
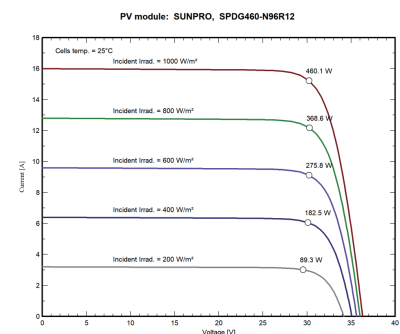
## TEMPERATURE CHARACTERISTICS

Temp. Coeff. of Isc (TK Isc)	0.045% / °C
Temp. Coeff. of Voc (TK Voc)	-0.25% / °C
Temp. Coeff. of Pmax (TK Pmax)	-0.30% / °C
Normal Operating Cell Temperature	45±2°C

## MODULE DIMENSIONS(MM)



## I-V CHARACTERISTICS AT DIFFERENT IRRADIATION



**SUNPRO POWER NORTH AMERICA INC.**

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\*All data may have a lag, for reference only. Sunpro has the final right of interpretation.