HD HYUNDAI ENERGY SOLUTIONS

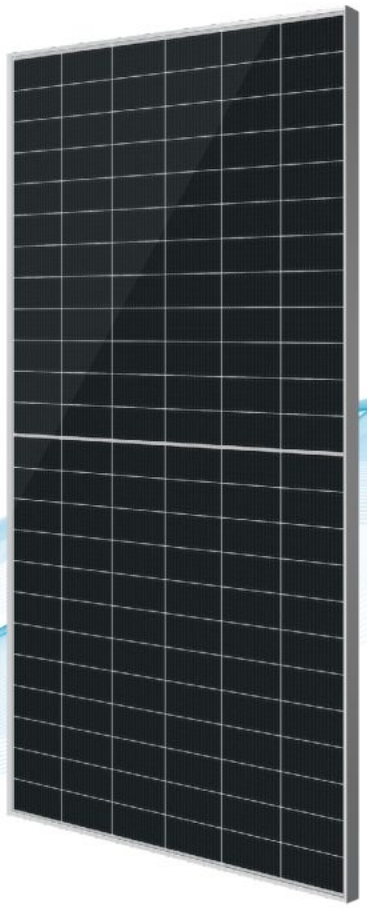
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HD HYUNDAI SOLAR MODULE

NI Series

Premium N-Type TOPCon Module

HiN-T590NI | HiN-T595NI | HiN-T600NI



23.23% High Efficiency

High-End TOPCon Technology

Higher Bifaciality

Long-Term Reliability

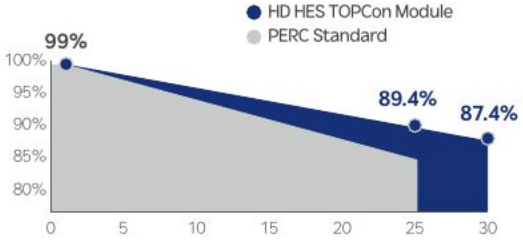
Rooftop Applications

For Commercial & Utility Applications

HD Hyundai's Warranty Provisions

12 YEARS
- 12-Year Product Warranty
  - Materials and workmanship

30 YEARS
- 30-Year Performance Warranty
  - First year degradation: 1%
  - Linear warranty after initial year: with 0.4%p annual degradation, 87.4% is guaranteed up to 30years



*Refer to HD HES standard warranty for details.

Certification

- ISO 9001:2015: Quality Management System
- ISO 14001:2015: Environmental Management System
- ISO 45001:2018: Occupational Health and Safety Management System
- UL 61730: Photovoltaic (PV) module safety qualification (CSA)
- IEC 61701: Salt mist corrosion testing
- IEC 62716: Ammonia corrosion testing
- IEC 62804: Potential Induced Degradation (PID) testing
- IEC 60068-2-68: Sand and dust testing for environmental durability

Electrical Characteristics

HiN-TxxxNI		HiN-T590NI		HiN-T595NI		HiN-T600NI	
Item	Unit		BNPI		BNPI		BNPI
Nominal output (Pmax)	W	590	654	595	659	600	665
Open circuit voltage (Voc)	V	51.9	51.9	52.1	52.1	52.3	52.3
Short circuit current (Isc)	A	14.47	16.03	14.53	16.10	14.59	16.17
Voltage at Pmax (Vmpp)	V	43.2	43.2	43.4	43.4	43.6	43.6
Current at Pmax (Impp)	A	13.66	15.14	13.72	15.20	13.77	15.26
Module efficiency	%	22.84		23.03		23.23	
Power Class Sorting	W	0 ~ +5					
Temperature coefficient of Pmax	%/℃	-0.30					
Temperature coefficient of Voc	%/℃	-0.25					
Temperature coefficient of Isc	%/℃	0.046					
Bifaciality	%	80±10					

*STC : Irradiance 1,000 W/m², cell temperature 25℃, AM=1.5 / Test uncertainty for Pmax ±3%; Voc ±3%; Isc ±3%
**The electrical properties of BNPI are measured under the irradiance corresponding to 1000 W/m² on the module front and 135 W/m² on the module rear.

Additional Power Gain from rear side					
Pmpp gain	Pmpp [W]	Vmpp [V]	Impp [A]	Voc [V]	Isc [A]
5%	625	43.4	14.41	52.1	15.26
15%	684	43.4	15.78	52.1	16.71
25%	744	43.4	17.15	52.1	18.16

*Electrical characteristics with different rear power gain (reference to 585W)

Mechanical Characteristics

Dimensions	2,278mm (L) x 1,134mm (W) x 30mm (H) (89.7in x 44.7in x 1.2in)
Weight	31.5 kg (69.5lbs)
Solar Cells	N-Type TOPCon, 144 (6x24) monocrystalline 16BB half-cut bifacial cells
Output Cables	Cable : (+)1,200mm(47.2in), (-)1,200mm(47.2in) Connector : MC4 Genuine, IP68
Junction Box	3-part, 3 bypass diodes, IP68 rated
Construction	Front : 2.0mm(0.08in) semi-tempered solar glass with high transmittance and anti-reflective coating Rear : 2.0mm(0.08in) semi-tempered solar glass
Frame	Anodized aluminum alloy

Shipping Configurations

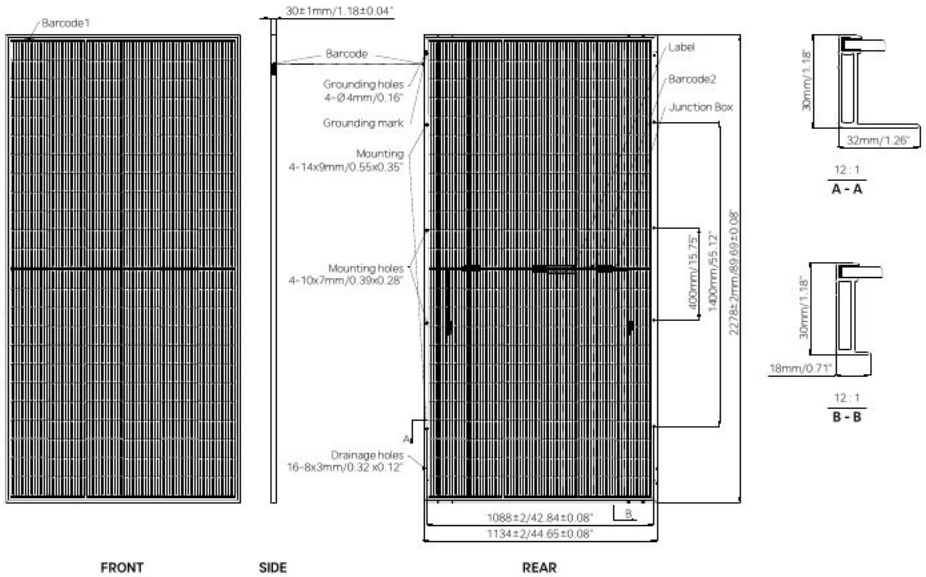
Container Size (HC)	40'	Modules Per Pallet (pcs)	36
Pallets Per Container	16	Modules Per Container (pcs)	576

Installation Safety Guide

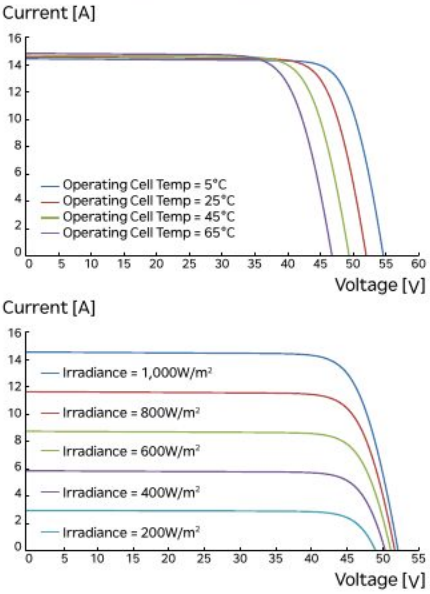
- Only qualified personnel should install or perform maintenance.
- Be aware of dangerous high DC voltage.
- Do not handle or install modules when they are wet.

Nominal Module Operation Temperature	44℃ ± 2℃
Operating Temperature	-40℃~+85℃
Maximum System Voltage	DC 1,500 V
Maximum Reverse Current	30A
Maximum Test Load	Front 5,400Pa Rear 2,400Pa
Fire Performance	Type 29

Module Diagram (unit : mm)



I-V Curves (HiN-T595NI)



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HD Hyundai Energy Solutions reserves the right to update or modify the specifications and features listed in this datasheet without prior notice. Always check the latest version of the datasheet for accurate information. Before using the product, please refer to the Installation and Operation Manual and Warranty. We retain the right of final interpretation.

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