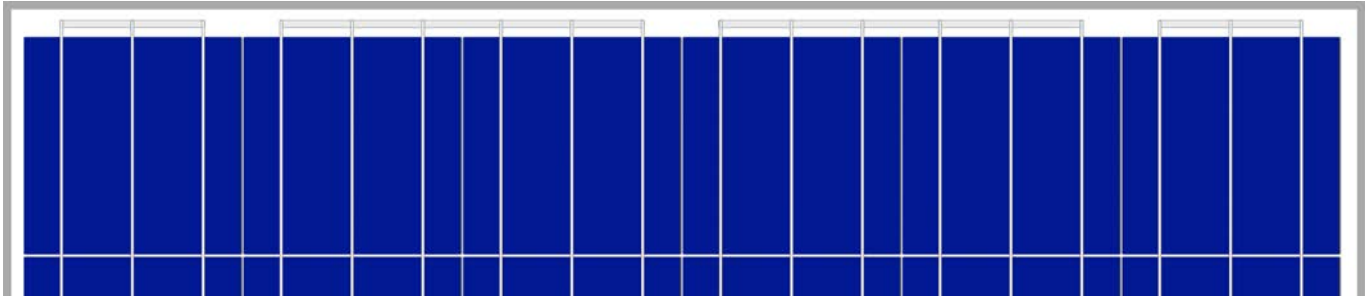




PHOTOVOLTAIC SOLAR ENERGY

POLYCRYSTALLINE MODULES - SI-ESF-M-P156-48



ABOUT SOLAR INNOVA

Solar Innova uses the latest materials to manufacture photovoltaic modules. This ensures that we can control our quality strictly in raw materials and production processes, offering our customers a durable and sustainable performance products backed by our 25 year limited power warranty.

PERFORMANCE

These PV modules use squared, high-efficiency, polycrystalline silicon cells (the cells are made of several crystals of high purity silicon) to transform the energy of sunlight into electric energy. Each cell is electrically rated to optimize the behavior of the module.

RESISTANCE

The compact, anodized aluminum frame provides an optimal relationship-weight moment of inertia, to obtain greater rigidity and resistance to twisting and bending. It has several holes to attach the module to the support structure and ground if necessary.

QUALITY

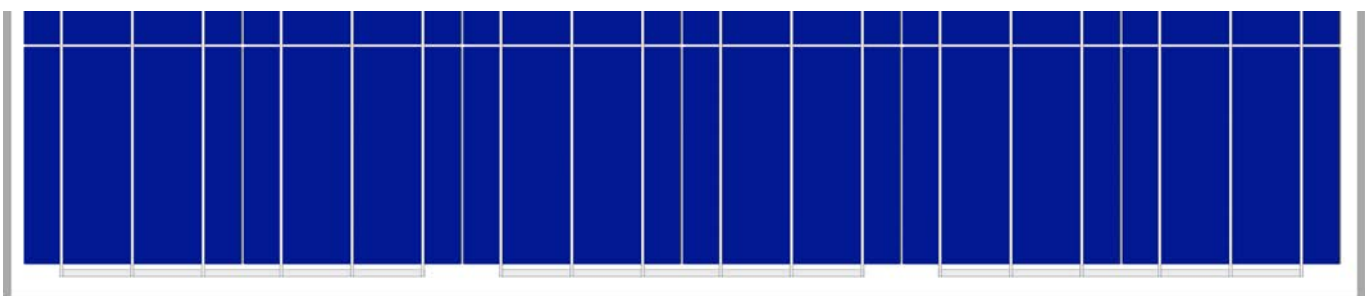
The photovoltaic modules from Solar Innova have passed several international certification requirements and continue to even improve on an already superior quality and performance of products of proven technologies. Quality is one of our core principles and the pursuit of quality is the engine of the company's future, in our desire to continually offer better products.

CERTIFICATES

Our manufacturing plants have been prepared in accordance with:

- ✓ ISO 9001:2008, in terms of Quality Systems and Business.
- ✓ ISO 14001:2004, in terms of Environmental Management Systems.
- ✓ OHSAS 18001:2007, in terms of Management Systems Health and Safety.

Our PV modules are certified by internationally recognized laboratories and are proof of our strict adherence to international safety standards, long term performance and overall quality of products.

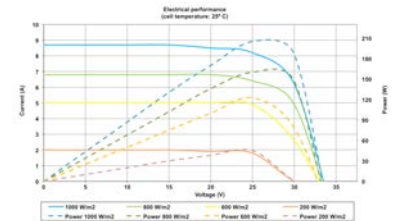




PHOTOVOLTAIC SOLAR ENERGY POLYCRYSTALLINE MODULES - SI-ESF-M-P156-48

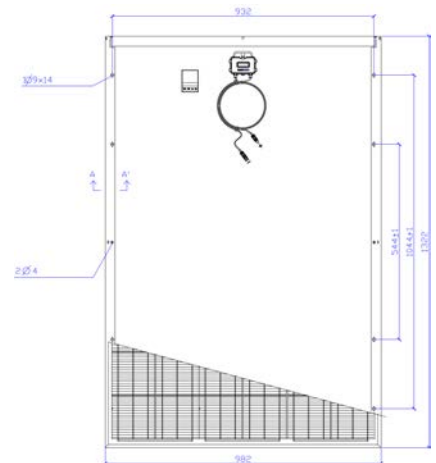
ELECTRICAL CHARACTERISTICS (STC)

Maximum power (P_{mpp})	[Wp]	210	215	220	225
Tolerance	[Wp]	0 ~ + 5			
Voltage at maximum power (V_{mpp})	[V]	24.2	24.4	24.6	24.8
Current at maximum power (I_{mpp})	[A]	8.69	8.81	8.94	9.06
Open circuit voltage (V_{oc})	[V]	30.7	30.9	31.1	31.4
Short circuit current (I_{sc})	[A]	9.34	9.41	9.48	9.55
Maximum system Voltage (V_{sys})	[V]	600 (UL) / 1,000 (IEC)			
Maximum series fuse	[A]	15			
Form Factor	[%]	≥ 73			



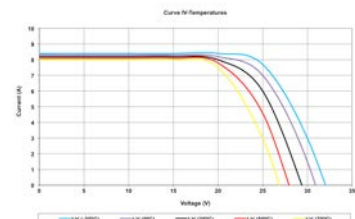
MECHANICAL CHARACTERISTICS

Height	mm	1,322
Width	mm	982
Thickness	mm	40
Weight	kg	15
Frame	Material	Anodized aluminum AL6063-T5
Front	Material	High transmissivity toughened glass
Front-Thickness	mm	3.2 ± 0.2
Cells	Type	Polycrystalline
Cells-Units	Quantity	6 x 8
Cells-Size	mm	156 x 156
Cells-Serial connection	Quantity	48
Cells-Parallel connection	Quantity	1
Encapsulation	Materials	Glass/EVA/Cells/EVA/TPT
Junction box	Type	IP67
Junction box	Isolation	Versus humidity and inclement weather
Cables	Type	Polarized and symmetric in length
Cables-Length	mm	900
Cables-Section of copper	mm ²	4
Cables	Features	Low contact resistance Minimal losses for voltage drop
Connectors	Type	MC4



THERMAL CHARACTERISTICS

Temperature coefficient of short circuit current α (I_{sc})	%/°C	+ 0.0825
Temperature coefficient of open circuit voltage β (V_{oc})	%/°C	- 0.4049
Temperature coefficient of maximum power γ (P_{mpp})	%/°C	- 0.4336
Temperature coefficient of current at maximum power (I_{mpp})	%/°C	+ 0.10
Temperature coefficient of voltage at maximum power (V_{mpp})	%/°C	- 0.38
NOCT (Nominal Operating Cell Temperature)	°C	+ 47 ± 2



WARRANTIES

Manufacturing defects	Years	12
Performance	Minimal Rated Power	90 % at 10 years,
	%/Years	80 % at 25 years.

