

# Renewable Energy: Photovoltaic Modules



## 135 Watts

### Excellent designed Single (Mono) - crystalline PV module

High consistency and reliability of Ekarat Engineering's 135 Watts PV modules versatility for users and solar system designer to suit a needed application. A village solar systems, residential roof, solar home unit, telecommunication station, and battery-charge station as well as stand-alone and grid connected systems are recommended and commonly used with these 135 Watts modules.

High efficiency module, more than 13%, is a result of solar cell's superior power output, which has been developed by our solar cell partnership. Moreover, other component materials are also selected to comply with international standards such as IEC 61215 and Safety Standard IEC 61730. These create a customer's confidence ensured with a manufacturing based 25 years limited warranty\*.

- Low iron tempered glass allows a high light transmission rate with a great robustness.
- EVA encapsulate sheet, back-sheet, and clear anodized aluminum frame are technically equipped to protect the module against all weather condition.
- Junction box with IP65 to ensure water proof and prolong lifetime operation.
- Special cable with connectors is offered as option for easy interconnection in grid-connected systems as well as stand-alone systems.
- Bypass diode included in promptly provided junction box is to prevent the power dropped by partial shading.



#### \*Warranty

- 25 year transferrable power output warranty: 10 years / 90%, 25 years / 80%
- Linear performance warranty
- 12 year material and workmanship warranty

#### Electrical Characteristics

Model No.	EE1135
Maximum power (Pmax)	135 W
Power tolerance	± 5%
No. of connected cells	36
Voltage of Pmax (Vmp)	17.68 V
Current at Pmax (Imp)	7.65 A
Short - Circuit current (Isc)	8 A
Open - Circuit voltage (Voc)	22.5 V
Temperature Coefficient of Voc	-0.0968 V / °C
Temperature Coefficient of Isc	+ 2.4 mA / °C
Temperature Coefficient of power	-0.4507 % / °C
Maximum series fuse rating	15 A
Maximum voltage system	1000 V

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Specifications subject to technical changes  
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## Mechanical Characteristics

<b>Dimension</b>	1481 x 661 x 38 mm.
<b>Weight</b>	11.2 kg.
<b>Dimension tolerance</b>	± 1 mm.
<b>Junction Box</b>	Degree of protection: IP65 and compatibility with 2.5 - 4.0 mm cross section cable size.
<b>Diode</b>	Silicon or Schottky By - pass diode for every 18 cells connection.
<b>Frame</b>	Anodized Aluminum.
<b>Construction structure</b>	Front: High light transmission tempered glass with 3.20 mm thickness. Back: Weather proof back sheet material. Laminated Material: EVA.

## Qualification and testing

ISO 9001 for quality management system.

IEC 61215 : Crystalline silicon terrestrial PV modules— Design qualification and type approval.

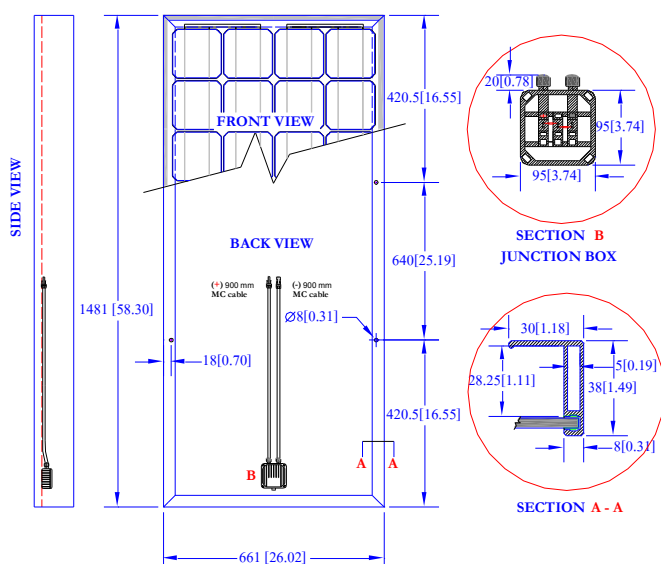
IEC 61730 : PV module safety qualification. To ensure a safety for users and installing operator of our products.

TIS 1843 : Thailand Industrial Standard equivalents to IEC 61215.

CE mark : European Conformity.



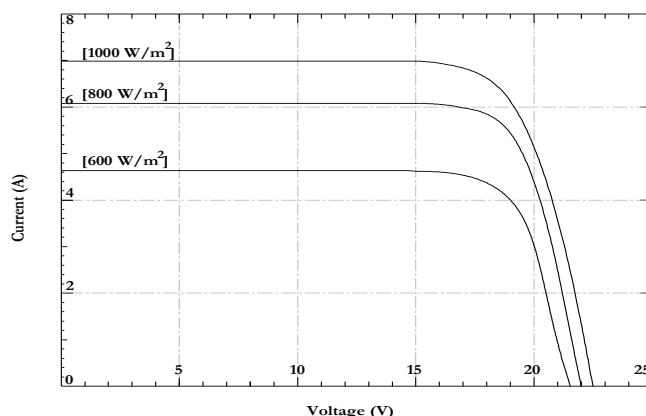
Module drawing diagram



## IV - curves

### Irradiance

1,000 W/m<sup>2</sup>, 800 W/m<sup>2</sup>, and 600 W/m<sup>2</sup>



Model: 135W

These data represent the performance of typical modules as measured at their out put terminals, and do not include the effect of such additional equipment as diodes or cables. The data are based on measurements made in accordance with ASTM E1036-85 corrected to SRC (Standard Reporting Conditions, also known as STC or Standard Test Conditions), which are:

- Illumination of 1kW/m<sup>2</sup> (1sun) at spectral distribution of AM1.5 (ASTME892-87 global spectral irradiance);
- Cell temperature of 25°C.

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