

FIRST SOLAR – FS-270 / FS-272 / FS-275 / FS-277

Solar modules are the key element of every solar power system as they convert sunlight into electricity. Their quality and the optimum use of the respective technology are therefore decisive for the yield and profit of your system. Solar modules based on thin-film technology absorb a particularly wide spectrum of sunlight. This enables the effective use of solar power – even under less than ideal sunlight conditions.

Phoenix Solar selects the best solar modules from leading international manufacturers based on strict quality criteria. They are tested by our own technical experts as well as independent institutes. This provides you with investment security whilst optimising your return at the same time.



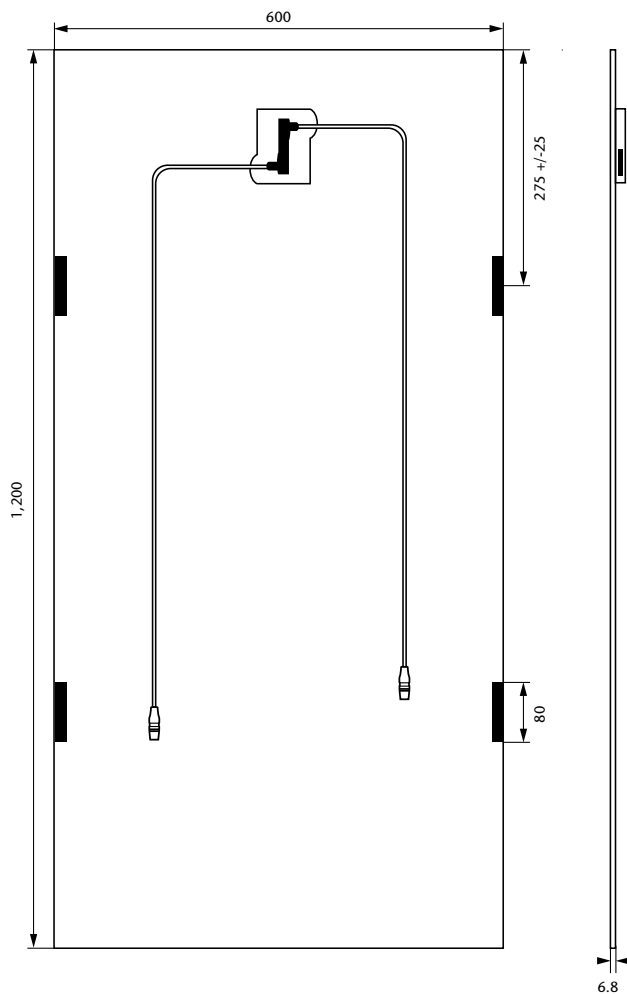
The advantages at a glance:

- ▶ 70, 72.5, 75 and 77.5 Wp power output available
- ▶ Tested in a RAL certificated process, independent of the manufacturer
- ▶ Reliable power generation through high temperature tolerance and high performance, even in diffuse sunlight
- ▶ High efficiency and stable output power provide reliably high performance over a period of many years
- ▶ Performance guarantee*: 25 years at 80 %, 10 years at 90 % of the minimal rated power output
- ▶ Frameless solar module
- ▶ Pre-funded end-of-life take back and recycling

*The manufacturer's terms and conditions of guarantee apply

Experience that pays

Phoenix Solar or your local Phoenix Solar partner individually match the solar modules and all additional system components to ensure that you get the ideal system to meet your requirements. All of our sales partners have a considerable amount of expertise and many years of experience in solar technology and have been personally chosen by us according to the strictest quality criteria.



Mechanical parameters

| | |
|--|-------------------------------------|
| Length [mm] | 1,200 |
| Width [mm] | 600 |
| Depth [mm] | 6.8 |
| Depth with connection socket [mm] | 19.9 |
| Weight [kg] | 12 |
| Connection socket (manufacturer) | First Solar |
| Positive cable (manufacturer/length [mm]/cable cross-section [mm ²]) | General Cable/610/3.2 |
| Negative cable (manufacturer/length [mm]/cable cross-section [mm ²]) | General Cable/610/3.2 |
| Plug connector (manufacturer/type) | Multicontact/MC3 or Yamaichi/Y-sol3 |
| Front cover (material/thickness [mm]) | Tempered glass/3.2 |
| Cell type (quantity/technology) | 116/CdS/CdTe |
| Cell embedding (material) | Ethylene vinyl acetate (EVA) |
| Rear cover (material/thickness [mm]) | Tempered glass/3.2 |
| Frame (profile type) | Frameless |

Manufacturer's guarantee

| | |
|-------------------|---------------------------|
| Product guarantee | 5-year product guarantee* |
|-------------------|---------------------------|

Performance guarantee 10 years at 90% of the minimal rated power output*
 25 years at 80% the minimal rated power output*

*The manufacturer's terms and conditions of guarantee apply

Qualifications and Certificates

IEC 61215

IEC 61730 Class A



First Solar has consistently focused on thin-film technology and is one of the international leading manufacturers of solar modules, primarily in the larger solar power plant sector. The company manufactures solar modules using a highly-developed semi-conductor coating process that reduces module manufacturing costs whilst ensuring high performance yields in the field.



Electrical parameters

Electrical parameters for STC (1,000 W/m², T_{Module} = 25 (+/- 2) °C, AM 1.5, according to EN/IEC 60904-1 to 60904-3)

| Article number | 100288 | 100270 | 100271 | 100272 |
|---|--------|--------|--------|--------|
| Power output [P _{mpp}] | 70.00 | 72.50 | 75.00 | 77.50 |
| Power output tolerances [%] | +/- 5 | +/- 5 | +/- 5 | +/- 5 |
| Efficiency [%] | 9.22 | 10.07 | 10.42 | 10.69 |
| Max. voltage V _{mpp} [V] | 65.50 | 66.60 | 68.20 | 69.90 |
| Max. current I _{mpp} [A] | 1.07 | 1.09 | 1.10 | 1.11 |
| Open circuit voltage V _{oc} [V] | 88.00 | 88.70 | 89.60 | 90.50 |
| Short circuit current I _{sc} [A] | 1.23 | 1.23 | 1.23 | 1.22 |

Electrical parameters for 800 W/m², T_{Module} = NOCT, AM 1.5, according to EN/IEC 60904-1 to 60904-3
NOCT = Nominal Operating Cell Temperature, cell temperature under nominal operating conditions

| | | | | |
|---|-------|-------|-------|-------|
| Max. power output P _{mpp} [Wp] | 52.60 | 54.40 | 56.30 | 58.10 |
| Max. voltage V _{mpp} [V] | 61.40 | 62.50 | 63.90 | 65.40 |
| Max. current I _{mpp} [A] | 0.86 | 0.87 | 0.88 | 0.89 |
| Open circuit voltage V _{oc} [V] | 81.80 | 82.50 | 83.30 | 84.20 |
| Short circuit current I _{sc} [A] | 1.01 | 1.01 | 1.01 | 1.00 |

Performance at low irradiance:

Efficiency at 200 W/m²: First Solar Series 2 PV Modules experience an increase in efficiency of 2 % at 200 W/m² when compared to the efficiency at 1000 W/m².

| | |
|---|-------|
| Reverse current loading capability I _R [A] | 2 |
| Max. permissible system voltage V _{sys} [V] | 1,000 |

Parameters of the thermal characteristics

| | |
|--|-------------------------------------|
| NOCT [° C] | 45 |
| Temperature coefficient of the short circuit current I _{sc} [%/K] | + 0.04 |
| Temperature coefficient of the open circuit voltage V _{oc} [%/K] | -0,25 (>25°C), -0,20 (-40°C - 25°C) |
| Temperature coefficient of the MPP power P _{mpp} [%/K] | - 0.25 |

Operating conditions

| | |
|----------------------------------|--------------|
| Max. operating temperature [° C] | - 40 to + 85 |
| Max. snow load [Pa] | 2,400 |
| Max. wind load [Pa] | 2,400 |

PLANNING GUIDE

The module array displayed below applies specifically to First Solar modules, including the distances for connecting them together (using the Tecto-Sun mounting system, scale: 1:100).

Notes on use: Draw a scale diagram of the roof (1:100) with all the details (windows, dormer windows, chimneys, etc.) on transparent paper and place it over this module

array. Copy the intersecting points of the grid on the roof diagram and connect them with a line. If the roof diagram is larger than the grid, it can be moved as required. Doing this allows you to determine the maximum allocation of modules while taking shading and objects on the roof into account.

| Number of modules | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
|-------------------------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|-------------------------------------|
| Module array dimensions | 1.21 | 2.42 | 3.63 | 4.84 | 6.05 | 7.26 | 8.47 | 9.68 | 10.89 | 12.10 | 13.31 | 14.52 | Width (m) |
| 1 | | | | | | | | | | | | | |
| 0.62 | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | |
| 1.24 | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | |
| 1.86 | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | |
| 2.48 | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | |
| 3.10 | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | |
| 3.72 | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | |
| 4.34 | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | |
| 4.96 | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | |
| 5.58 | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | |
| 6.20 | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | |
| 6.82 | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | |
| 7.44 | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | |
| 8.06 | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | |
| 8.68 | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | |
| 9.30 | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | |
| 9.92 | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | | |
| 10.54 | | | | | | | | | | | | | |
| Length (m) | | | | | | | | | | | | | Subject to modifications and errors |