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SOLAR PANEL POWER PRODUCTION

Amperage & Voltage:

1. Solar panel current (amps) output increases nearly linearly with increases in light intensity.
2. Solar panel voltage, however, is not linear with light intensity. At 10% of full sun intensity, panel operating voltage is about 95% of its rated capacity. Example- if the panel has a Typical Power Voltage of 17.0V, at 10% lighting it will read about 16V.

Panel Specifications

Photowatt solar panels will have the following specifications:

Typical Power – The average (advertised) wattage rating of the panel.

Minimum Power – The minimum wattage allowed for the panels in that series.

Nominal Battery Voltage – The nominal voltage of the battery & system the panel is designed to operate with – i.e. 12VDC, 24VDC, 36VDC, or 48VDC.

Open Circuit Voltage – The full light voltage of the panel with no loads connected and no circuit between the positive and negative terminals.

Solar panels have a “maximum power point” (MPP). For the Photowatt panels, the MPP is called the Typical Power point. For all solar panels, this is the combination of voltage and amperage (current) that produce the maximum amount of power (watt). The MPP voltage is roughly 75% of the Open Circuit Voltage and is designated in the Photowatt Specifications as the Voltage at Typical Power. The Typical Power rating divided by the Voltage at Typical Power gives the Current at Typical Power specification. Hence, the panels have both a maximum wattage specification (Typical Power) and a maximum amperage specification (Current at Typical Power). Restricting the panel to a voltage lower than the Voltage at Typical Power results in a correspondingly lowered maximum amperage and less efficient panel operation.

Solar Panel Energy Available at Various Light Conditions Relative to Full Sun

Condition	Intensity (% of full sun)
Full sun – panel square to the sun	100%
Light Overcast	60-80%
Heavy Overcast	20-30%
Inside window, single pane, double strength glass, window and module square to the sun	91%
Inside window, double pane, double strength glass, window and module square to the sun	84%
Inside window, single pane, double strength glass, window and module at 45° angle to the sun	64%
Indoor office light – at desk top	0.4%
Indoor light – store lighting	1.3%
Indoor light – home	0.2%

Panel Loss Due to Deflection

(These losses will apply to all “square to sun” percentages.)

Deflection in Degrees	Loss
9	1.2%
18	4.9%
40	19.0%
45	29.0%