



INTRODUCTION

Photovoltaic solar cells based on CIGS technology, compared with commercial (polycrystalline or amorphous) silicon cells, have several major advantages: They can be embedded as a thin layer into a flexible plastic compound and due to this, they are extremely light, flexible and practically unbreakable. They operate under a clear blue sky as well as in extremely weak or diffused light, with incandescent lamp or halogen lamp lighting, and even if part of the cells are covered by items or external shadows (so-called "partial shadows"). Therefore, CIGS cells are ideal for mobile use.

PRODUCT DESCRIPTION

Sunload solar folding modules are superb for non-stationary generation of electrical power from solar energy. In combination with specially developed charging connections (MPP tracking) in Sunload-Powerbanks or Sunload watt meters, a maximum of available power is utilised. Solar energy can be used either directly for charging a 12V-lead battery or, when temporarily stored in a Sunload-Powerbank, for charging and operating miniature electronic devices.

GENERAL NOTICES

The achievable power output of Sunload folding modules depends on various factors:

• Position of the sun

The lower the sun, the longer is the path of the solar radiation through the atmosphere – the lower its intensity. Therefore, the power output of the module at lunchtime is clearly higher than during the morning or evening hours, during the summer months, it will be stronger than during the winter months, and closer to the equator, it will be much better than in the northern or the southern hemisphere.

The maximum potential power output of solar modules is given in Wp (Watt peak) and applies in the case of very high light radiation (1,000 W/m² and/or Standard Testing Conditions STC).

There is little point in stating charging times for varying devices, because the system always consists of a folding module + charging controller + device. In many devices, special circuits limit the charging current in order to protect the storage batteries against overloading. In this case, also the use of a more efficient module will not result in shorter charging times.

• Alignment towards the sun

The so-called effective area is largest, when the folding module is always aligned exactly vertically to the angle of incidence of the sun. Also with strong sunlight, the module output power is more reduced, the less the module is aligned with the sun.

• Weather

The output power of the module decreases as the cloudiness increases, i.e., even slight mist results in a reduction in yield. This reduction in power, however, is not anywhere near as serious as, for example, with crystalline solar cells, which, even with the slightest cloudiness clearly produce less electricity.

• Partial shading

With partial shading of individual cells or part of the solar module, CIGS modules do not lose their capability to generate electricity. For a general assessment of the power reduction to be expected on average, even shading, the following approximate values may serve:

- No shading, full sun 100 %
- Shading approx. 2 % of the panel approx. 85 – 90 %
- Shading approx. 5 % of the panel approx. 80 %
- Shading approx. 10 % of the panel approx. 50 %
- Shading approx. 25 % of the panel approx. 25 %

HANDLING

- ▶ Fold the module only at the provided points.
- ▶ Do not buckle or bend the solar panels in tight radii and/or over edges.
- ▶ Protect the modules from sharp corners, points and edges.
- ▶ Please do not wash the modules in the machine, do not have them chemically cleaned and do not place them in laundry dryers.
- ▶ The folding modules are water and rain resistant in the plastic laminate area. Protect the electric plug-and-socket connectors from wetness – for instance, use the Sunload protective bag.
- ▶ Sunload folding modules are not designed for permanent exposure to the elements.
- ▶ Please observe the manufacturer's instructions for the devices or batteries with which you operate the Sunload folding modules or with which you want to charge the modules, and if you are uncertain, contact Sunload GmbH's customer service.

USE

• Miniature electronic devices

In order to charge or operate electronic devices, such as the MP3-Player, organizer, mobile telephone or notebook, preferably use the specially developed Sunload Powerbanks. These provide suitable voltages.

If you want to connect the miniature electronic devices directly to the solar module or to a solar charging controller, please observe especially the increased open-circuit voltage of the module. The high open-circuit voltage of the module could result in the device's destruction. The voltage input of your connected device must be able to process the open-circuit voltage. In any case, read the technical instruction for your device.

• Charging the motor vehicle or lead batteries

The electrical data of the folding module enables the charging of the 12V vehicle and/or lead-acid batteries directly via the battery terminals or the charging plug available as an accessory. As there are various battery types with specific charging requirements, ask the battery manufacturer in the first place, whether charging with a solar module is permissible. In any case, always use a solar charge controller suitable for your battery type.

HELP

Flexible CIGS cells represent a new technology. In order to be able to react fast to continuous developments, current product-related information is published regularly on our website www.sunload.de. It will provide you with answers on frequently asked questions, provide suggestions and application examples. Our customer service also is available at any time. You can reach us by telephone, e-mail or via the contact form on the website.

SCOPE OF DELIVERY

Sunload folding module (6,5W, 12W, 25W, 30W, 48W or 62W)
Adaptor set

TECHNICAL DATA

Nominal voltage	12V
Open-circuit voltage	15.6V
Nominal current	433 mA
Max. Power	6.5Wp
Dimensions folded	225 × 127 × 13 mm
Dimensions open	740 × 264 × 1.2 mm
Weight (scope of delivery)	0.2 kg

6,5 W
Article no. 301.110

Nominal voltage	12V
Open-circuit voltage	15.6V
Nominal current	800mA
Max. Power	12Wp
Dimensions folded	225 × 127 × 18 mm
Dimensions open	740 × 445 × 1.2 mm
Weight (scope of delivery)	0.32 kg

12 W
Article no. 301.120

Nominal voltage	12V
Open-circuit voltage	25V
Nominal current	1.5A
Max. Power	25Wp
Dimensions folded	280 × 210 × 22 mm
Dimensions open	1050 × 545 × 1.5 mm
Weight	0.85 kg

25 W
Article No. 301.100

Nominal voltage	12V
Open-circuit voltage	28V
Nominal current	1.5A
Max. Power	30Wp
Dimensions folded	270 × 225 × 31 mm
Dimensions open	1130 × 546 × 1.5 mm
Weight (scope of delivery)	0.92 kg

30 W
Article No. 301.140

Nominal voltage	12V
Open-circuit voltage	28V
Nominal current	2.5A
Max. Power	48Wp
Dimensions folded	380 × 225 × 40 mm
Dimensions open	1333 × 762 × 1.5 mm
Weight	1.45 kg

48 W
Article No. 301.150

Nominal voltage	12V
Open-circuit voltage	28V
Nominal current	3.1A
Max. Power	62Wp
Dimensions folded	375 × 215 × 36 mm
Dimensions open	1330 × 760 × 0.8 mm
Weight	1.4 kg

62 W
Article No. 301.170