



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 mobil 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 12 V 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 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	ca. 85 – 90 %
- Shading approx. 5% of the panel	ca. 80 %
- Shading approx. 10% of the panel	ca. 50 %
- Shading approx. 25% of the panel	ca. 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 mashine, 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 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 instructions for your device.

• Charging the motor vehicle or lead batteries

The electrical data of the folding module enables the charging of the 12 V 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 our website.

SCOPE OF Delivery

Sunload folding module (6 Wp, 12 Wp, 25 Wp, 30 Wp or 62 Wp)
Adaptor set

TECHNICAL DATA*

Nominal voltage	12 V	6 Wp
Open circuit voltage	14,6 V	Art.-Nr.: 301.110
Nominal current	433 mA	
Max. power	6 Wp	
Dimensions folded	225 × 127 × 13 mm	
Dimensions unfolded	740 × 264 × 1,2 mm	
Weight	0,2 kg	

Nominal voltage	12 V	12 Wp
Open circuit voltage	14,6 V	Art.-Nr.: 301.120
Nominal current	800 mA	
Max. power	12 Wp	
Dimensions folded	225 × 127 × 18 mm	
Dimensions unfolded	740 × 445 × 1,2 mm	
Weight	0,32 kg	

Nominal voltage	12 V	25 Wp
Open circuit voltage	25 V	Art.-Nr.: 301.100
Nominal current	1,5 A	
Max. power	25 Wp	
Dimensions folded	280 × 210 × 22 mm	
Dimensions unfolded	1050 × 545 × 1,5 mm	
Weight	0,85 kg	

Nominal voltage	12 V	30 Wp
Open circuit voltage	28 V	Art.-Nr.: 301.140
Nominal current	1,5 A	
Max. power	30 Wp	
Dimensions folded	270 × 225 × 31 mm	
Dimensions unfolded	1130 × 546 × 1,5 mm	
Weight	0,92 kg	

Nominal voltage	12 V	62 Wp
Open circuit voltage	28 V	Art.-Nr.: 301.170
Nominal current	3,1 A	
Max. power	62 Wp	
Dimensions folded	375 × 215 × 36 mm	
Dimensions unfolded	1330 × 760 × 1,5 mm	
Weight	1,4 kg	

*Measured under standard test conditions (STC) consisting of irradiance of 1000 W/m², AM 1.5 and 25°C cell temperature. More about STC you find under www.sunload.de