

sunload

MODULAR 5 Solar Power Bank



Operating manual and limited warranty
Sunload Mobile Solutions GmbH

Technology by German developers *made in Germany*,
Maximum product quality and safety.

That's what SUNLOAD-products stand out for.



The CE sign stands for *Communauté Européenne*, i.e. the European Community, meaning that all products coming with that sign comply with all EU health and safety directives applicable to the corresponding product category. This is the condition for marketing a product in the European Union. The CE sign is the manufacturer's declaration that the product meets the applicable EU directives and thus may be safely operated. In addition, SUNLOAD has the compliance with CE regulations confirmed by an independent institute.



The GS sign stands for *tested safety (Geprüfte Sicherheit)*. This voluntary quality certificate confirms that a product meets the requirements of the German device and product safety act (GPSG).

The GS sign may only be issued by an independent test institute after the product has passed a range of comprehensive tests proving that it is safe to use. In order to ensure maximum safety, this product was tested by TÜV Rheinland, an internationally renowned test institute.

Dear Customer,

With your new MODULAR 5 solar power bank you will experience a new dimension of independence. MODULAR 5 conveniently and safely stores the power you need away from home or office. Wherever you are, you will always have enough standby power for your mobile phone, MP3 player, GPS device, digital camera etc. MODULAR 5 may charge almost every small mobile electronic device with a USB based power supply system.

Moreover, MODULAR 5 will take you to the age of solar power generation. In combination with a SUNLOAD solar module, you will soon generate your own solar power.

Enjoy you new MODULAR 5 solar power bank.

Your SUNLOAD Team

Table of Contents

About this manual	5
Safety Advice	6
The Built-in Battery	8
Scope of Supply and Optional Accessories	9
Which Solar Module fits best?	10
How to put the Device into Operation	11
Controls.....	11
Electrical Connections	12
Display	13
Usage	14
How to charge your MODULAR 5 from mains	14
How to charge your MODULAR 5 with solar power	14
How to charge mobile devices with your MODULAR 5.....	15
How to use your MODULAR 5 as a universal power supply.....	16
SUNLOAD Power Management	17
Technical Data	18
Trouble Shooting	20
Cleaning	21
Disposal	21
Declaration of Conformity	22
Limited Warranty	23
How to replace the Battery	23
SUNLOAD Customer Service	23

About this manual

This MODULAR 5 device comes with a multilevel safety system. Nevertheless we recommend you to read this manual carefully. In order to avoid any risks or injuries, make sure to operate MODULAR 5 only as described in this manual. Please keep this manual for reading it from time to time. When passing on the device, make sure to hand over this manual as well.

Symbols used in this manual:



This sign warns you of the risks of injury.



This sign warns you of the risk of explosion.



This sign warns you of potential damage.

Safety Advice

If the device does not work properly, please read the trouble-shooting section before calling customer service.

Do not use accessories other than recommended by SUNLOAD!



Do not expose to open fire, water, rain, snow or wet environment. Risk of explosion or short circuit!
Protect the device from getting wet (e.g. in case of rain) and direct sunlight!



Do not keep the device or its accessories within the reach of children or animals!

Keep away from children any small parts which might be swallowed! If any such object has been swallowed, immediately call a doctor!

Do not operate the device, if the casing or a cable has been damaged. Touching live parts may cause electric shock!

Do not use the device for operating life support or other medical equipment!

For charging on a mains power supply system, only use the Sunny SYS1196-0612-W2E power adapter supplied with the device.



When transporting your solar power bank in a bag, keep out any beverages or other liquids, to prevent the electronic components from being damaged.



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When transporting the solar power bank in a bag, keep out any beverages or other liquids, to prevent the electronic components of the device from being damaged.

The temperature of the device may rise up to 50 °C, approximately, when in use. Keep away any materials which are not suitable for that temperature!

Air transport

MODULAR 5 is subject to the applicable air transport legislation and the regulations of each airline with regard to electronic equipment and must be switched off in aircraft.

The Built-in Battery

Your solar power bank stores the energy in a latest-generation high-quality lithium ion battery. This battery is rechargeable. The energy storage capacity of the battery is indicated in Wh (watt hours).

Due to natural wear the battery loses capacity over time. In order to delay this process as much as possible, the battery is electronically monitored and protected from excessive strain. In many cases this may extend the life of the battery even beyond the time indicated by the manufacturer. It cannot be excluded, however, that the battery may wear much faster in cases.

Several electronic safety stages in your solar power bank protect the battery against overload and overcurrent and as far as possible against excessive discharge. However, since lithium ion batteries are self-discharging, complete over-discharge protection is not possible. If the battery is damaged due to excessive discharge, the safety system will switch off the power bank permanently, until the battery has been replaced. Please note that the battery may only be replaced by Sunload Mobile Solution GmbH's customer service! Otherwise your limited warranty will become void!

The following recommendations will ensure a longer life of your battery:

- Discharge and recharge the battery regularly (about once a week).
- Do not expose the battery to temperatures above 20°C during a longer period.
- When storing the solar power bank for a longer time, make sure it has been switched off and that the battery has the appropriate charging level. Risk of over-discharge! Please find more about recommended storage conditions in the Technical Data section.

Scope of Supply and Optional Accessories

Scope of Supply

- solar power bank MODULAR 5
- type Sunny SYS1196-0612-W2E 12V / 500 mA power adapter,
- USB charging cable with adapters for several mobile phones
- operating instructions

Recommended optional accessories

(see www.sunload-shop.de)

- SUNLOAD foldable module 6 Wp or 12 Wp
- SUNLOAD Solar Claw
- SUNLOAD solar bags and backpacks
- 12 V CLA adapter
- USB charging adapter for rechargeable AA and AAA batteries
- Other adapter cables and plugs
- external display unit
- MODULAR 5 protective bag

For more information about connectable mobile equipment and the required adapter plugs, please go to our Web site or contact our customer service (kundenservice@sunload.de). You may also download the list from the support section of our homepage (www.sunload.de).

Which Solar Module fits best?

This MODULAR 5 device was especially designed to work highly efficiently with different solar modules.

The connector must be a DC jack (round hollow type, 5.5 x 2.1).



Be careful when using modular adapter jacks from other manufacturers! They may have the inverse polarity!

The acceptable DC input voltage of the solar power bank is limited to 30 V. Higher voltage will damage the device!



Please note that the open-circuit voltage of the solar module must be lower than 30 V; otherwise the solar power bank will be damaged!

As regards the size of the module, please note that the maximum power the device may process amounts to 6 W. Above an input power of 6 W the charge current will automatically be limited. Depending on the weather conditions, we recommend to use solar modules with a peak power from 6 to 12 Watt. Higher module power will not accelerate the charging process.

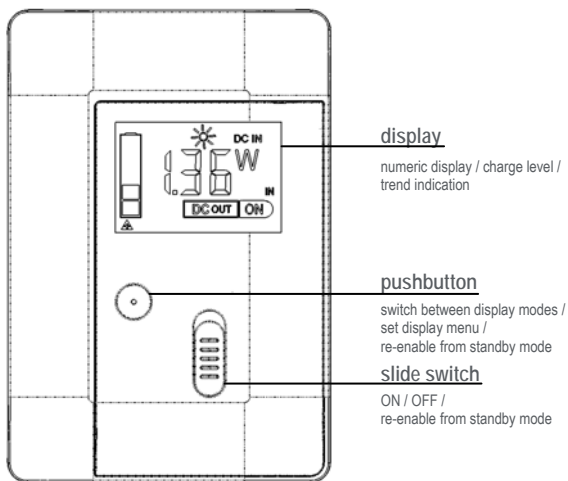
Please note that even a minor shadow on the solar module surface considerably reduces its power. When using a 6 Wp solar module – perfectly oriented towards the sun – in Berlin, you will need the following times, approximately, to charge an empty battery.

full sunlight:	2 to 3 hrs, approx.
partly clouded:	3 to 6 hrs, approx.
overcast sky:	6 to 12 hrs, approx.

How to put the Device into Operation

Controls

You may control the device with a slide switch and a pushbutton.



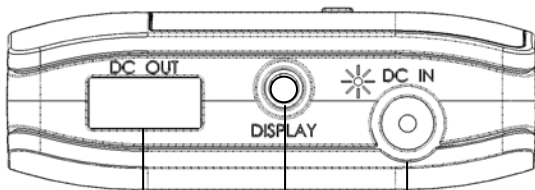
Slide Switch Options

ON	DC input DC IN and USB output DC OUT ready / in energy-saving (standby) mode
OFF	DC In and DC OUT switched off

Pushbutton Functions

push and release	In standby mode (display off or showing SLEEP). Re-enable input, output and display. Otherwise: Switch between display modes
press & hold for 2 secs.	Only if display is in Wh_{IN} mode: Reset Wh_{IN} to 0.0 Wh (see Display section)
press & hold for 5 secs.	Switch between extended (ext.) and reduced (red.) display menu (see Display section)

Electrical Connections



**USB output
DC OUT**
to connect
external devices

**Display
input**
to connect
an external
Display

**Input
DC-IN**
to connect
power adapter / solar module* /
charging cable with car adapter*
(round hollow jack 5.5 x 2.1)
*optionally available

Display

Use the display to actively watch and monitor all electrical processes around solar power generation and storage as well as the current consumption of your small mobile devices. You may, for instance, assess the charging behaviour, position the solar module perfectly with regard to sunlight or estimate the relationship between the incoming solar energy and the power consumption of a connected device.

Two menus with display modes are available. By default you see the reduced (red.) menu with the most important functions. By pressing and holding the key (for approx. 5 secs.) you switch between the reduced and the extended (ext.) menu, where all functions of the MODULAR 5 device are available. Within a menu you may switch rotatively between display modes by pressing and releasing the key.

Display modes and Menu			
mode	menu	unit	information displayed
W_{IN}	red./ext.	W	input power at DC IN
Wh_{IN}	red./ext.	Wh	cumulated power at DC IN
V_{IN}	ext.	V	voltage at DC IN
A_{IN}	ext.	A	current at DC IN
W_{OUT}	red./ext.	W	power at DC OUT
A_{OUT}	ext.	A	current at DC OUT
Additional Information Displayed			
sun symbol	Connected solar module detected		
battery symbol	battery charge level (0 to 5 squares)		
+ / -	Energy flows to battery (+) / is being drained from battery (-)		
DC OUT ON	USB output ready		
DC OUT SLEEP	USB output in standby mode		
DC OUT OFF	USB output switched off because of low battery		
ERROR	see detailed error list in trouble-shooting section		

Usage

How to charge your MODULAR 5 from mains

You may use the included mains adapter to charge the MODULAR 5 device on the American (110 V) or European (220 V) mains.

! For charging on a mains power supply system, only use the included Sunny SYS1196-0612-W2E power adapter. Otherwise there may be safety risks or the MODULAR 5 device may be damaged.

- (1) Switch on your MODULAR 5 device (slide switch to ON).
- (2) Connect the included mains adapter to a mains outlet.
- (3) Plug the DC jack of the adapter into the DC IN port of the solar power bank. After a moment the plus sign appears below the battery symbol. It indicates the power flowing into the battery.
- (4) You may see the incoming electric power on the W_{IN} value displayed. The value should rise slowly and finally remain between 5 and 6 Watts.
- (5) The current state of battery charge is indicated by the filled segments in the battery symbol. If the battery is empty at the beginning, the maximum charge level (5 filled segments) will be indicated after 2 to 3 hours, approximately. As soon as the MODULAR 5 device is fully charged, the plus sign below the battery symbol will disappear.

How to charge your MODULAR 5 with solar power

In order to obtain as much solar energy as possible, the MODULAR 5 device uses the MPP tracking method. MPP (maximum power point) means that the power characteristic of the solar cells are constantly monitored and kept within the maximum capacity range. This results in an average additional solar yield of up to 20 percent as compared with systems without MPP tracking.

How to connect the solar module

- (1) Plug the DC jack of the solar module into the DC IN port of the solar power bank. When connecting the solar module, make sure to avoid any short circuit at the module jack, because this could damage the solar module.
- (2) As soon as enough light is cast on the solar module, the sun symbol will appear on the display.
- (3) Position your solar module perfectly in the sunlight. Observe the indicated solar power W_{IN} , while changing the position of the solar module. The optimum position is reached, when the display shows the maximum value. Please observe that the input current of the charger is limited to 500 mA. If the W_{IN} value remains at the same high level in spite of varying the module position, it is possible that the solar module produces more power than the MODULAR 5 device may use.

How to charge mobile devices with your MODULAR 5

This MODULAR 5 device may charge and operate almost all small mobile electronic devices (e.g. mobile phones, MP3 players, GPS devices, PDAs, digital cameras etc.) with a USB based power supply system. Please use the appropriate USB charging cable for your device. The included USB charging cable along with the set of adapters should suit the most common mobile phones.



Before starting the charging process, make sure whether your mobile device is suitable for a charging voltage of 5 V. Overvoltage may damage your mobile device.

- (1) Switch on your MODULAR 5 unit (slide switch to ON).
- (2) Connect the USB plug of the USB charging cable with the USB output "DC OUT" of your MODULAR 5 unit. Normally MODULAR 5 detects the plugged-in USB device and enables the output automatically (DC OUT ON). If in

- (3) Make sure the MODULAR 5 device is sufficiently charged. For charging a mobile phone the MODULAR 5 battery should be at least half charged (battery symbol showing 2 to 3 segments).
- (4) Connect your small device (using an appropriate adapter, if required) to the USB charging cable. The charging process will start.
- (5) By pressing the pushbutton several times you may switch to W_{OUT} display mode and observe directly, how much electric power is being transferred to your mobile device.

How to use your MODULAR 5 as a universal power supply

When travelling you may comfortably use the solar power bank as a universal power supply unit. To charge your mobile device, simply connect it to the USB port of your MODULAR 5 unit while charging the power bank itself from mains. Power is then transferred directly to your mobile device. See also the SUNLOAD Power Management section.

SUNLOAD Power Management

SUNLOAD power management technology offers maximum user comfort with minimum energy consumption. For example, you may easily feed the MODULAR 5 battery while charging a mobile device connected to the USB output. The plus or minus sign below the battery symbol in each case indicates the trend, i.e. whether you are rather feeding (plus sign) or draining (minus sign) the internal battery.

Two built-in energy-saving (standby) modes make sure that the MODULAR 5 unit uses as little power as possible from the internal battery for its internal processes. In standby mode I the DC IN input and the USB output are switched off, when not required for some time. The word "SLEEP" shown in the display indicates that the USB output is switched off. In standby mode II the display is additionally switched off completely.

The DC IN input is enabled automatically, as soon as a voltage within the acceptable range is applied (see section Technical Data). In standby mode I the USB output is re-enabled automatically, as soon as MODULAR 5 detects a power consuming mobile device. Attention: For technical reasons some mobile devices may not be detected. Please enable the USB output manually in these cases, by shortly pressing the pushbutton. In standby mode II you always have to enable the USB output by pressing the pushbutton or by switching the device off and on.

In order to effectively prevent the battery from being over-discharged, make sure the MODULAR 5 device is always switched off (slide switch to "OFF"), when not in use.

Technical Data

I/O connections

I/O	typical values	description
DC IN	6...30 V (DC)	suitable for solar modules with an open-circuit voltage of up to 30 V or for 12 V power adapters
	max. 0.5 A (DC)	
DC OUT	5 V (DC)	USB port for connecting the mobile device
	max. 0.5 A (DC)	
DISPLAY	Socket (4 poles) to connect an external display unit*	

*available as optional accessory.

Plug-in power adapter

model	Sunny SYS1196-0612-W2E
Technical Data	input: 100..240 V / 0.3 A max. / 50-60 Hz DC output: 12 V / 0.5 A / 6 W max.

Casing dimensions and weight

weight	120 g
dimensions	64 mm x 94 mm x 21.4 mm

Battery

type	Li-Ion (3.7 V / 1.8 Ah)
capacity	6 Wh when new
life	At least 500 charging cycles are possible, until the battery capacity has reduced to 60% of its initial value.
charging time	When charging on the power mains (charging current 500 mA), the battery at room temperature reaches a charge level of 80% after 2 to 3 hours, approximately. Below 0°C the charging current is considerably reduced, in order to prevent the battery from being damaged. Above 40 °C the battery is not fully charged for safety reasons.

Operating conditions

acceptable ambient temperature	-10...40°C
ambient conditions	< 92% relative air humidity, no condensation, no corrosive atmosphere

Storage conditions

short-term storage temperature	-20...+50°C
long-term storage temperature	-20...+20°C
ambient conditions	< 92% relative air humidity, no condensation, no corrosive atmosphere
required minimum charge level for storage of up to 3 months when switched off	battery charge level approx. 30% (battery symbol showing at least two segments)

Trouble Shooting

Problem	Solution
Display shows "SLEEP"	The USB output is in standby mode I. It will be enabled automatically, when a mobile device connected to the USB output is detected. For technical reasons, some devices may not be detected. Please enable the MODULAR 5 device manually in these cases, by shortly pressing the pushbutton.
mobile device connected to the USB output is not charged. Display shows "DC OUT OFF"	The battery charge level is too low. In case of further discharge the battery may be over-discharged. Therefore the USB output has been disabled automatically. Connect the input of your MODULAR 5 device to a power source (plug-in mains adapter or solar module).
The charger seems to have switched off and does not respond, although the slide switch is put to "ON".	The charger is in standby mode II. It is enabled automatically, when electric current is fed into the battery. Alternatively, you may enable the MODULAR 5 device manually by pressing the pushbutton or switching the device off and on.
ERROR and the empty battery symbol are flashing alternately.	Battery failure. Please contact customer service.
ERROR and °C are flashing alternately.	The temperature is below or has exceeded acceptable temperature limits (see Technical Data section). The error should disappear automatically, as soon as the temperature of your MODULAR 5 device has returned to the acceptable range.
ERROR and OFF/DC OUT/SLEEP are flashing alternately.	The device connected to the USB output is draining more current than acceptable (see Technical Data section). Remove the device from the USB port. Press and release pushbutton to re-enable your MODULAR 5 device.

Cleaning

Since your MODULAR 5 device must not get in touch with moisture, please wipe it with a dry soft cloth, when required.

Disposal

Please dispose of the package properly after separating the materials.



The symbol of the crossed-out waste bin indicates that the product is subject to the European directive 2002/96/EC. Accordingly, all electrical and electronic equipment must be disposed of separately from general household waste at the appropriate official waste disposal points. The proper disposal and separate collection of used devices shall avoid potential damage to health and environment. They are a prerequisite for re-using and recycling used electrical and electronic devices.

You may get detailed information about how to dispose of your electronic devices from your municipal authorities, your waste disposal centre or the dealer where you bought the equipment.

Declaration of Conformity

CE Konformitätserklärung Declaration of Conformity Déclaration de conformité

Wir / We / Nous

**Sunload Mobile Solutions GmbH,
Ullsteinstraße 108,
12109 Berlin, Germany,**

erklären hiermit in alleiniger Verantwortung, dass das Produkt
herewith declare under our sole responsibility that the product
déclarons sous notre seule responsabilité que le produit

MODULAR 5,

auf das sich diese Erklärung bezieht, mit den folgenden Normen übereinstimmt
to which this declaration relates is in accordance with the following standards
auquel se réfère cette déclaration est conforme aux normes

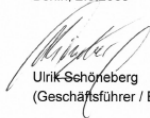
**EN 60950-1 (2006), EN 61000-6.3 (2007),
EN 61000-6.1 (2007)**

gemäß den Bestimmungen der Richtlinien
following the provisions of Directives
conformément aux dispositions des Directives

2006/95/EG, 2002/96/EG, 2002/95/EG, 2004/108/EG,

und dass die Serie entsprechend gefertigt wird.
and that built production will be manufactured accordingly.
et que la série est fabriqué en conséquence.

Berlin, 2.6.2009



Ulrik Schöneberg
(Geschäftsführer / Executive Director / Gérant d'Affaires)

sunload 
mobile solar solutions

Limited Warranty

This MODULAR 5 device was made in Germany, using the latest state-of-the-art manufacturing methods. We guarantee its perfect condition.

Statutory warranty regulations shall apply. Within the warranty period of 2 years from the date of purchase we repair all material or manufacturing failures free of charge. In case of any claim, please contact our customer service first by phone or email, indicating the purchase date and serial number of the device.

Being a wearing part, the built-in battery is excluded from warranty, unless the failure existed right from the beginning. You may have replaced a defective battery by our customer service.

The manufacturer is not liable for damages caused by improper use of the MODULAR 5 device.

How to replace the Battery

When the built-in battery of your MODULAR 5 device clearly loses capacity after some time, we recommend you to have it replaced. Our customer service will inform you about the current conditions for battery replacement. **Please note that the battery may only be replaced by SUNLOAD GmbH's customer service!** Otherwise your limited warranty will become void!

SUNLOAD Customer Service

Please read our frequently asked questions (FAQ) in the support section of our homepage (www.sunload.de). In the download section you may find lists of connectable devices.

For further questions please email us to kundenservice@sunload.de or call the customer service phone +49 30 743 04 87-14.

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