Solar UPS Module V3

SolarUPS V3 SLA

SolarUPS V3 Li

The device can serve constant uninterruptible power supply (UPS) in low or medium consumption equipment where mains power supply could not be or is difficult to be solved. Power may come from a 20W (or 30W) solar panel, but it is also possible to charge from the AC adapter. The device stores the energy in a 9000mAh SLA Gel (SLA version) or a 9000mAh Li-ion (Li version) battery pack. The battery type can be chosen according to your needs. Charging of the battery pack is performed intelligently with a Maximum Power Point Tracking function, using the power fed from the solar panel very efficiently.

Maximum Power Point Tracking: the charger circuit regulates charging - and at the same time current of DC input – automatically, so that the solar panel would work always at the maximum performance. So the most energy could be gained from the solar panel with the lowest losses of charging. The value of nominal voltage belonging to the maximum performance of the solar panel can be adjusted with a trimmer potentiometer in the device, thus the maximum charging efficiency can be reached with any type of solar panels.

Power Supply

The device includes an integrated DCDC Buck Boost system supply unit, producing optionally 5V or 12V supply voltage, with a maximum loadability of 2A (in case of 5V - max. 2.5 A). Irrespective of the battery level and voltage the supply unit can always produce these output parameters.

Protection

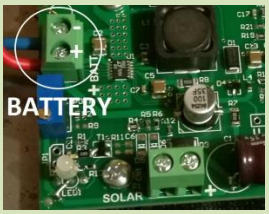
The device has battery protection functions, e.g. the built-in power supply unit is deep discharge protected: it does not let the battery pack to discharge below 9.0-10.5 V (depending on the type of the battery). When the lower limit is reached it switches off and back on is only performed when the terminal voltage of the battery is 10.5-11.5 V again (depending on the type of the battery). The charge protection function permits battery charging (built-in thermal protection, it is activated by closing of JP2 jumper) only in the ambient temperature range of 0...45 degrees (increasing the battery life time). The output of the power supply unit is short circuit protected and the Solar DC input is polarity protected.

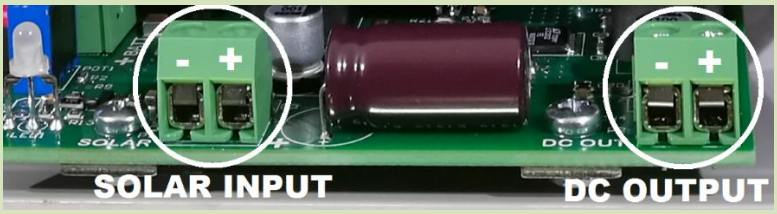
Functions

The device includes an output current monitoring circuit, for measuring consumption at the output. Its voltage output releases maximum 2.5V and output current can be measured by 1V/1A exchange (CN3 connector). The battery voltage can also be measured at the CN3 connector. There is also a LED next to the connectors, showing charging with green colour and charging error with red colour. An optional pre-heater circuit can be connected to the CN5 connector (SolarUPS HM1), when it is needed. The pre-heater circuit heats the device (in case of activating of the temperature protection, JP2) from the energy of the solar panel in freezing. Heating is stopped when reaching the required temperature above freeze and charging of the battery starts.

Formation

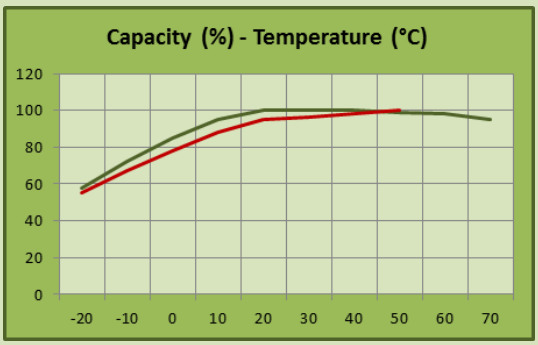
SolarUPS V3 device is available as an Add-On panel without battery (dimensions 80x50x15mm, type PCB) or with the optional battery (types SLA and Li) in a housing of IP66 or IP65 protection. External dimensions, depending on the type of the selected battery: 192x164x87mm (type SLA) or 160x80x85mm (type Li). The cable of the solar panel and of the powered device (max. 6 mm) let out from the housing through two simple cable gland. Connection of the cables to the panel is illustrated on the next figure:





Battery pack

The device is available with two kinds of battery packs. One of them is a Li-ion battery pack of capacity 9000mAh and nominal voltage of 11.1V, with an automatic balancing circuit. This battery has a wide range of operating temperature and a full charge cycle value (life time) higher than the usual: it wears at least 1000 charge cycle (50% DOD) without larger capacity loss. Device equipped with this kind of battery is more favourable both in its dimensions and weight, however it is more expensive. Comparison of the operating temperature range - Li-ion (green line) and SLA (red line) battery:



The other possibility is the SLA Gel working battery with 12V of nominal voltage and 9000mAh of capacity. This version is larger and heavier, and it does not work in such a wide range of temperature, as compared to the Li-ion battery version. The lifetime of the battery is lower (600 charge cycle, 50% DOD), however its price is more favourable and at the end of the lifetime of the battery its replacement is simple and cheap, anyone can do it.

SLA 12V / 5-12Ah capacity battery can be connected to the PCB version SolarUPS device. The connected battery must bear 1.8A of charge current! The optional charge temperature protection must be activated in compliance with the temperature specifications of the selected battery.

Charging characteristics

The full charge time of the device from full discharged condition with 20W solar panel, in sunny weather is about 6-7 hours (with 9Ah battery). This time is same in case of devices selected with both optional battery types. If the battery is not completely discharged then the charge time will be shorter in proportion with the remained battery capacity. However, the load at the output will proportionally increase the charge time.

Device availability

Almost full capacity of the battery can be utilized for supplying the powered device, due to the efficiency of the device's power supply unit. Utilizable capacity is at least 100Wh in case of devices equipped with both kinds of the optional batteries. As an example, the operating time of a connected 12V device which working with an average 500mA current, will be about 16 hours (at 20 – 50 °C temperature) from full battery level to power switching off (deep discharge protection).

Specification

Recommended solar cell capacity	20 - 30 W
DC power input voltage	0 … 34 V
DC power input max current	1,2 A
Battery pack max charging current	2 A
Power supply output voltage	5 V or 12 V
Power supply output max current	2500 mA (5V), 2000 mA (12V)
Battery pack type	Li-ion or SLA Gel
Battery type and capacity (PCB device type)	SLA 5000 – 12000 mAh
Battery type and capacity (SLA and Li device type)	9000 mAh (SLA Gel), 9000mAh (Li-ion)
Environmental temperature (PCB)	-40 … +70 °C
Charging environmental temperature (Li)	-10 … +50 °C
Charging environmental temperature (SLA)	-10 … +50 °C
Discharging / Storage environmental temp. (Li)	-20 … +70 °C
Discharging / Storage environmental temp. (SLA)	-20 … +50 °C
Device size (PCB device type)	80 (w) * 50 (h) * 15 (d) mm
Device size (Li device type)	160 (w) * 80 (h) * 85 (d) mm
Device size (SLA device type)	192 (w) * 164 (h) * 87 (d) mm
Device weight	200 g (PCB) / 1100 g (Li) / 3100 g (SLA)

Ordering Information

SolarUPS device type	DC output	Battery type	Device Size	Weight
SolarUPS V3 PCB 5V	5V / 2500mA	-	80x50x15mm	200g
SolarUPS V3 PCB 12V	12V / 2000mA	-	80x50x15mm	200g
SolarUPS V3 Li 5V	5V / 2500mA	Li-ion 9000mAh	160x80x85mm	1100g
SolarUPS V3 Li 12V	12V / 2000mA	Li-ion 9000mAh	160x80x85mm	1100g
SolarUPS V3 SLA 5V	5V / 2500mA	SLA Gel 9000mAh	192x164x87mm	3100g
SolarUPS V3 SLA 12V	12V / 2000mA	SLA Gel 9000mAh	192x164x87mm	3100g

Conformity with directive 2014/30/EU for electromagnetic compatibility (EMC).