



MS 2012

v.1.0

MS 13,8V/2A

Buffer, switch mode power supply module.

EN**

Edition: 2 from 21.11.2016

Supersedes the edition: 1 from 18.09.2014



Features:

- DC 13,8V/2A uninterruptible power supply
- high efficiency 83%
- low voltage ripple
- battery charging and maintenance control
- battery output full protection against short-circuit and reverse polarity connection
- jumper selectable battery charge current
0,2A/0,5A
- LED indication
- protections:
 - SCP short-circuit protection
 - OLP overload protection
 - OHP overheat protection
 - overvoltage protection
- warranty – 5 year from the production date

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1. Technical description.

1.1 General description.

A buffer PSU module is intended for an uninterrupted supply to devices requiring stabilised voltage of **12V DC (+/-15%)**. The PSU module provides voltage of **13,8V DC** with current capacity:



1. Output current 2A + 0,2A battery charge
 2. Output current 1,7A + 0,5A battery charge
- Total device current + battery: 2,2A max.

In case of power failure, a battery back-up is activated immediately.

1.2. Block diagram (fig.1)

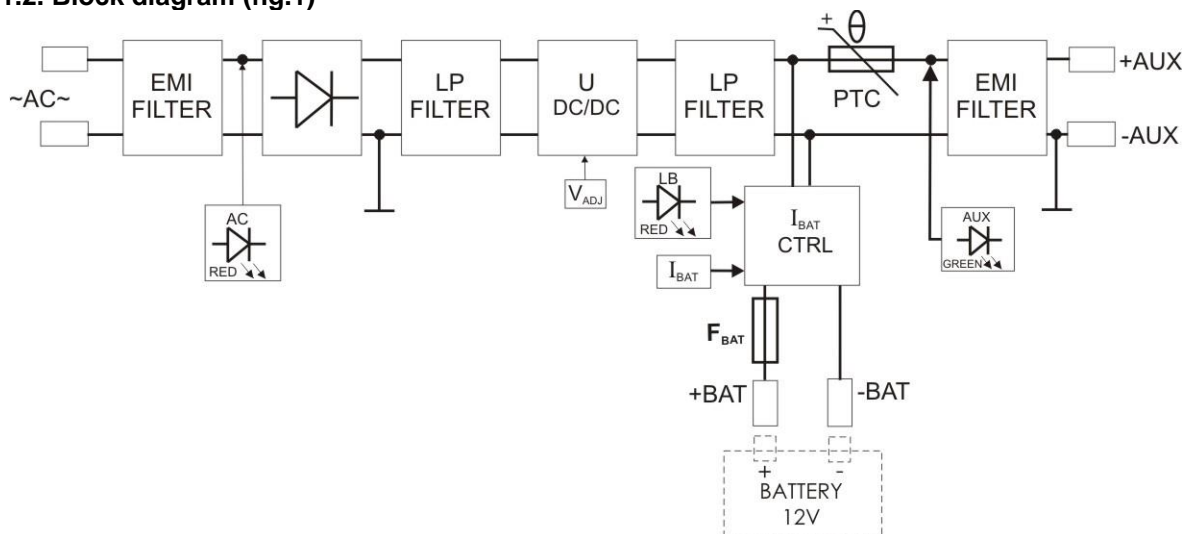


Fig.1. Block diagram of the PSU module.

1.3. Description of components and connectors PSU module.

Table 1. Elements of the PSU module pcb (fig. 2).

Element no.	Description
[1]	V_{ADJ} potentiometer, DC adjustment
[2]	F_{BAT} fuse in the battery circuit
[3]	Connectors: +BAT- DC supply output of the battery +AUX- DC supply output (+AUX= +U, -AUX=GND)
[4]	LEDs – optical indication: AC - AC voltage LB - battery charge AUX - output voltage DC
[5]	Connector to the external LED indicators.
[6]	I_{BAT} jumper– battery charging current selection <ul style="list-style-type: none"> $I_{BAT} = \blacksquare$ $I_{bat} = 0,2A$ $I_{BAT} = \square$ $I_{bat} = 0,5A$ Legend: \blacksquare jumper installed \square jumper removed

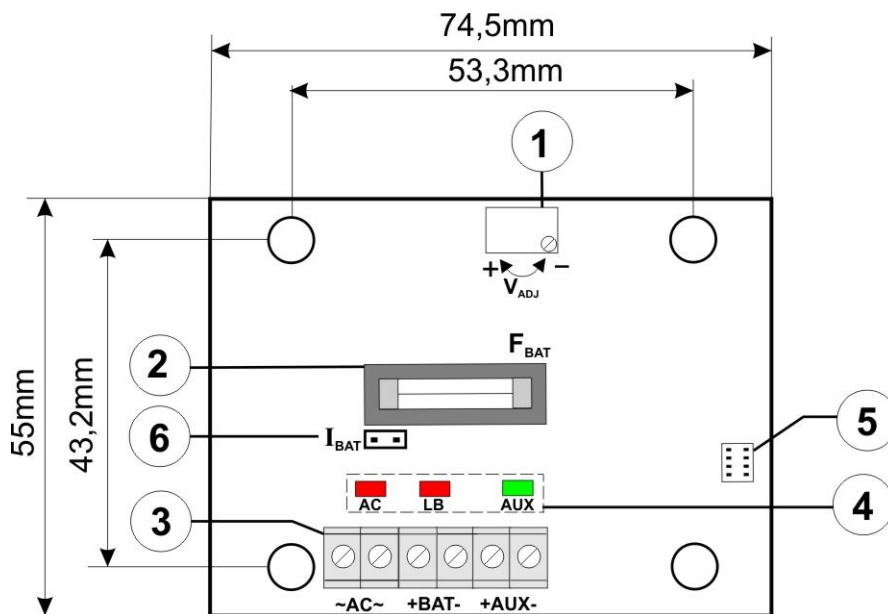


Fig.2. View of the PSU module.

1.4 Specifications:

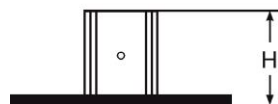
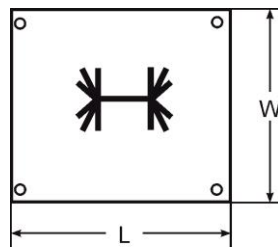
- electrical parameters (tab.2)
- mechanical parameters (tab.3)
- operating parameters (tab.4)

Electrical parameters (tab. 2).

Mains supply	20V±22V AC 50VA min. (e.g. AWT5161820, AWT037)
Current up to	2,5A max.
Power frequency	50Hz
Power	34 W
Efficiency	83%
Output voltage	11V± 13,8V DC – buffer operation 10V± 13,8V DC – battery-assisted operation
Output current	2A + 0,2A battery charge 1,7A + 0,5A battery charge
Voltage adjustment range	12V± 14,5V DC
Ripple	40 mV p-p max.
Current consumption by PSU module systems	16 mA – battery operation
Battery charging current	0,2A / 0,5A - jumper selectable I_{BAT}
Short-circuit protection SCP	Electronic - current limitation and/or activation of the F_{BAT} melting fuse in the battery circuit (failure requires fuse replacement). Automatic return.
Overload protection OLP	110% ± 150% (@25°C) of power supply, manual restart (the fault requires disconnection of the DC output circuit)
Battery circuit SCP and reverse polarity protections	3,15A - current limitation, F_{BAT} fuse (in case of a failure, fuse-element replacement required)
F_{BAT} fuse	F3,15A / 250V

Mechanical parameters (tab. 3).

Dimensions	L=75, W=55, H=40 [+/- 2mm]
Fixation	Dowel pins x4 (PCB fi=4,2 mm)
Net/gross weight	0,08kg/0,13kg
Connectors	Outputs: $\Phi 0,41 \pm 1,63$ (AWG 26-14) Battery output BAT: 6,3F-2,5, 30cm

**Operating parameters (tab. 4).**

Environmental class	II
Operating temperature	-10°C...+40°C
Storage temperature	-20°C...+60°C
Relative humidity	20%...90%, without condensation
Vibrations during operation	unacceptable
Impulse waves during operation	unacceptable
Direct insulation	unacceptable
Vibrations and impulse waves during transport	According to PN-83/T-42106

2. Installation.

2.1. Requirements.

The buffer PSU module is to be mounted by a qualified installer, holding relevant permits and licenses (applicable and required for a given country) for 230V/AC and low-voltage installations. The unit should be mounted in confined spaces, in accordance with the II-nd environmental class, with normal relative humidity (RH=90% maximum, without condensing) and temperature from -10°C to +40°C.

The unit should be mounted in a metal enclosure (cabinet) in a vertical position so as to ensure free, convection air flow through the vents.

In order to meet the EU requirements, follow the guidelines on: power supply, enclosures and shielding:

- according to application. The module requires 20÷22V AC power supply with galvanic (transformer) isolation.



1. Output current 2A + 0,2A battery charge
2. Output current 1,7A + 0,5A battery charge

Total device current + battery: 2,2A max.

As the PSU module is designed for a continuous operation and is not equipped with a power-switch, therefore an appropriate overload protection shall be guaranteed in the power supply circuit. Moreover, the user shall be informed about the method of unplugging (most frequently through separating and assigning an appropriate fuse in the fuse-box). The electrical system shall follow valid standards and regulations.

2.2. Installation procedure.

1. Before installation, cut off the voltage in the 230V power-supply circuit.
2. Install the enclosure or cabinet and lead the cables through the cable ducts.
3. Install the PSU module on mounting pins (the mounting pins should be installed before the assembly of the enclosure/cabinet).
4. Deliver the AC voltage to the ~AC~ terminals.
5. Connect the receivers' cables to the +AUX, -AUX terminals of the terminal box on the PSU board.
6. Using the I_{BAT} pins, determine the maximum battery charging current the should be determine, in accordance with battery parameters.
7. Make the connections between the battery and the power supply panel paying special attention to the correct polarity.
8. Connect the ~ 230V AC power to the transformer (the AC diode and the AUX diode should be permanently illuminated).
9. Check the output voltage (the PSU voltage without load should amount to 13,6V÷ 13,9V, during battery charging 11V÷ 13,8V). If the value of the voltage requires adjustment, it should be set by the V_{ADJ} potentiometer, monitoring the voltage at the AUX output of the PSU module.
10. Check the current consumption of the receivers, taking into account the battery charging current, so as not to exceed the total current efficiency of the PSU (section 1.1).
11. Once the tests and control operation have been completed, close the enclosure/cabinet.

3. Operating status indication.

3.1 LED indication.

The PSU module is equipped with three diodes indicating operating status: AC, LB, AUX.

- **AC- red diode:** under normal status (AC supply) the diode is permanently illuminated. The absence of AC supply is indicated by the AC diode going off.
- **LB - yellow diode:** indicates the battery charging process; the intensity of illumination is dependent on the charging current.
- **AUX- green diode:** indicates the DC supply status in the output of the PSU module. Under normal status, the diode is permanently illuminated and in case of a short-circuit or overload, the diode goes off.

4. Operation and use.

4.1 Overload or short circuit of the PSU module output.

The AUX output of the PSU module is equipped with the PTC polymer fuse assisted protection. If the load of the PSU module exceeds I_{\max} (load 110% ÷ 150% @25°C of the PSU module power), the output voltage is automatically cut off and indicated by the green diode going off. To restore the output power, cut off the output load for approximately 1 minute.

In case of of the short-circuit to the AUX, BAT output, or incorrect connection of the battery, the fuse F_{BAT} in the battery circuit becomes permanently damaged and the restoration of the voltage at the BAT output requires the replacement of the fuse.

4.2 Battery-assisted operation

In case of a main power outage, the device is immediately switched into a battery-assisted operation.

The PSU module is not equipped with a discharged battery disconnection system.

4.3 Maintenance.

Any and all maintenance operations may be performed following the disconnection of the PSU module from the power supply network. The PSU module does not require performing any specific maintenance measures, however, in the case of significant dust rate, its interior is recommended to be cleaned with compressed air. In case of fuse replacement, use a replacement of the same parameters.



WEEE MARK

According to the EU WEE Directive – It is required not to dispose of electric or electronic waste as unsorted municipal waste and to collect such WEEE separately.

CAUTION! The power supply module unit is adapted for a sealed lead-acid battery (SLA). After the operation period it must not be disposed of but recycled according to the applicable law.

Pulsar

Siedlec 150, 32-744 Łapczyca, Poland
Tel. (+48) 14-610-19-40, Fax. (+48) 14-610-19-50
e-mail: biuro@pulsar.pl, sales@pulsar.pl
http:// www.pulsar.pl, www.zasilacze.pl