



MSRD 2012

v.1.0

MSRD 13,8V/2A

Buffer switch mode power supply module

EN*

Edition: 3 from 06.08.2018

Supersedes the edition: 2 from 28.06.2012

Features:

- uninterrupted supply of 13,8VDC/2A
- supply voltage 18±22VAC(external transformer required e.g.AWT150, AWT468)
- high efficiency 84%
- battery charging and maintenance control
- deep discharge battery protection (UVP)
- battery output protection against short-circuit and reverse polarity connection
- jumper selectable battery charging current 0,2A/0,5A
- battery fuse status control
- LED indication
- START facility for manual battery connection
- STOP button for battery disconnection during battery-assisted operation
- FAC technical output indicating AC power collapse - relay and OC type
- FPS technical output indicating PSU failure
- protections:
 - SCP short-circuit protection
 - OLP overload protection
 - surge 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 alarm systems devices requiring stabilised voltage of **12V DC (+/-15%)**. The PSU module provides voltage of **13,8V DC** with current capacity:



1. Output current **2A (without a battery)**
 2. Output current **1,8A + 0,2A battery charge**
 3. Output current **1,5A + 0,5A battery charge**
- Total current of the receivers + battery: 2A max.**

In case of power failure, a battery back-up is activated immediately. The battery charging current is preset to 0,2A.

1.2. Block diagram.

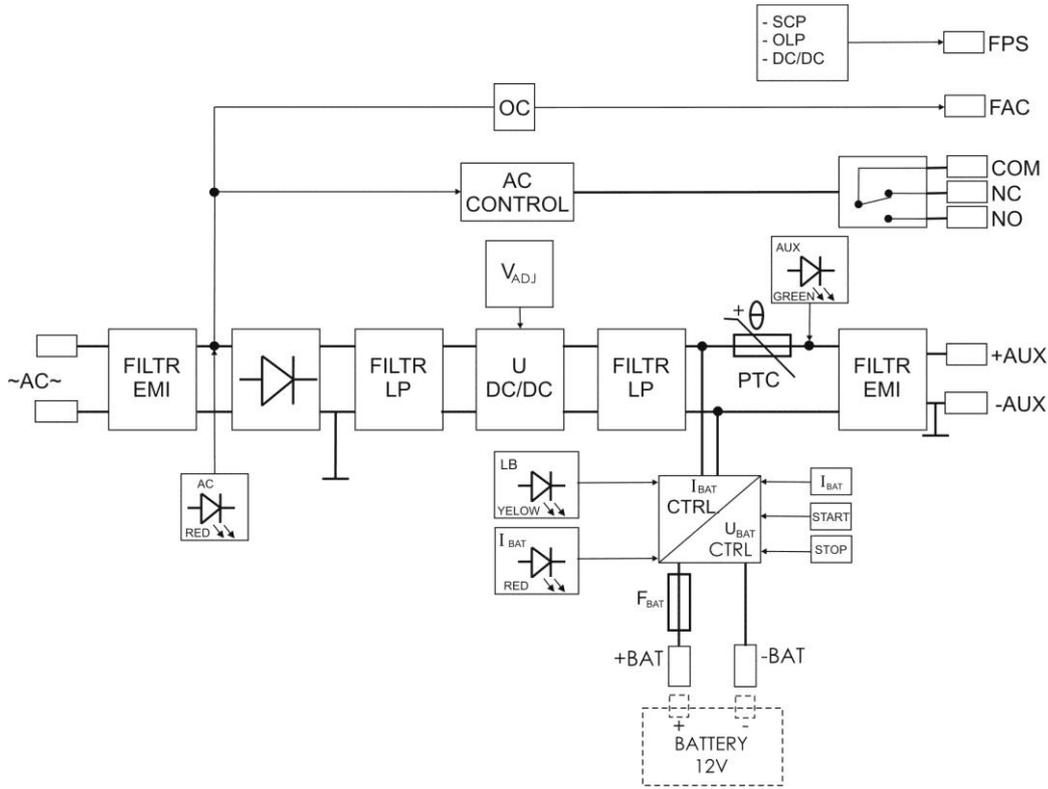


Fig.1. Block diagram of the PSU module

1.3. Description of components and connectors (Fig.2, tab.1)

Table 1. Description of components and connectors (see Fig. 1).

Element no.	Description
[1]	AC, AUX, LB, F _{BAT} LED indication for PSU module operating status
[2]	FAC - technical output for no AC network - relay type Caution! In Fig.2. the set of contacts indicates potential-free status which corresponds to AC power outage (AC power failure).
[3]	Technical outputs, open collector type: FAC - AC absence technical output: normal status - L level (0V), failure status: hi-Z level indication time lag: approx. 10 sec. GND – joint terminal (-) FPS – technical output of the PSU failure – OC type, normal status - L level (0V), failure status: hi-Z level
[4]	I _{BAT} ; pin – battery charging current adjustment <ul style="list-style-type: none"> I_{BAT} = , Ibat =0,2A I_{BAT} = , Ibat =0,5A Caption: jumper on, jumper off
[5]	V _{ADJ} potentiometer, DC voltage adjustment 12V÷14,5V
[6]	F _{BAT} fuse in the battery circuit F 3,15A
[7]	STOP button (PSU module disconnection from the battery)
[8]	START button (launching the PSU module from a battery)
[9]	Connectors: +BAT- DC supply output (+BAT= red, -BAT = black) +AUX- DC power output (+AUX= +U, -AUX=GND) ~AC~ – AC power input (18÷22VAC min. 40VA, AWT150, AWT468)

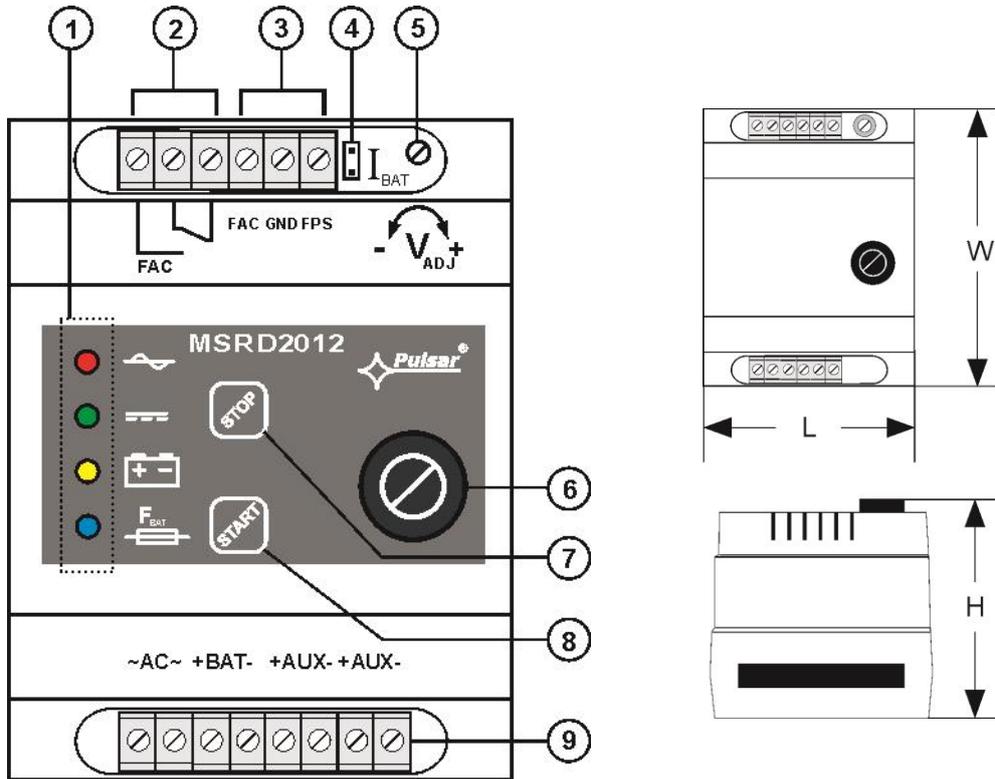


Fig. 2. The view of the PSU module

1.4. Specifications:

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

Electrical specifications (tab. 2).

Supply voltage	18V±22V/AC (transformer min.40VA e.g.AWT150, AWT468)
Current consumption	2,4 A max.
Power frequency	50Hz
PSU power	28W
Efficiency	84%
Output voltage	11V÷13,8VDC – buffer operation 10V÷13,8VDC – battery-assisted operation
Output current	2A without a battery 1,8A + 0,2A battery charge 1,5A + 0,5A battery charge
Output voltage escalation, decrease, and keeping time	20ms/40ms/12ms @ I _{zn.} , U _{ac} =min.
Voltage adjustment range	12V÷ 14,5V
Ripple voltage	30mV p-p max.
Current drawn by the PSU module systems	25 mA max.
Battery charging current	0,2A / 0,5A – I _{BAT} jumper selectable
Short-circuit protection SCP	200% ÷ 250% of PSU module power - current limitation and/or fuse damage in the battery circuit (fuse-element replacement required)
Overload protection OLP	110% ÷ 150% (@25°C±55°C) of PSU module power - current limitation with the PTC resettable fuse, manual restart (failure requires disconnection of the DC output circuit)
Battery circuit SCP and reverse polarity protections	F3,15A- current limitation, F _{BAT} fuse (failure requires fuse-element replacement)
Deep discharge battery protection UVP	U<10V (± 5%) – disconnection (-BAT) of the battery
Technical outputs: - FAC; output indicating failure of AC power supply	- R – relay type, 1A@ 30VDC/50VAC max. CAUTION! In Fig.2. the set of contacts indicates potential-free

- FPS; technical output of the PSU operation status	status which corresponds to AC power outage (AC power failure) - OC type, 50mA max., normal status: L (0V) level, failure: hi-Z level, time lag: 10s. - OC type, 50mA max. normal status: L (0V) level, failure: hi-Z level (automatic return after restoration of correct operation)
LED indication - AC diode indicating AC power - AUX diode indicating DC at the PSU output - LB diode indicating battery charging process - F _{BAT} diode indicating battery fuse status	- red, normal status: permanently illuminated - green, normal status: permanently illuminated - yellow, the light intensity depends on battery charging current - blue, normal status: off, fuse failure: permanently illuminated
F _{BAT} fuse	F 3,15A

Mechanical specifications (tab. 3).

Dimensions	L=67, W=87, H=69 [+/- 2mm]
Fixing	on DIN TH35 rail
Net/gross weight	0,19kg/0,25kg
Enclosure	plastic, RAL9003, white
Connectors	Φ0,63÷2,50 (AWG 22-10)

Operating specifications (tab.4).

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 insolation	unacceptable
Vibrations and impulse waves during transport	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 interference and low-voltage installations. The unit should be mounted in confined spaces, in accordance with the 2nd environmental class, with normal relative humidity (RH=90% maximum, without condensation) and temperature from -10°C to +40°C. The PSU module shall work in a vertical position that guarantees sufficient convectional air-flow through ventilating holes of the enclosure. The PSU module provides voltage of **13,8V DC** with current capacity:

1. Output current **2A (without a battery)**
2. Output current **1,8A + 0,2A battery charge**
3. Output current **1,5A + 0,5A battery charge**



Total current of the receivers + battery: 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.

The device should be installed in the metallic enclosure, distribution board (ICT cabinet) equipped with a DIN TH35 rail (35 mm wide). In order to meet the UE requirements, the rules concerning: supply, development and shielding ought to be followed- accordingly to the application. The module requires 18-22V AC power supply with galvanic separation (transformer insulation). The minimum power of the transformer: 40VA. For mounting the transformer and the battery, additional grips are to be used. They are shown in the picture below.

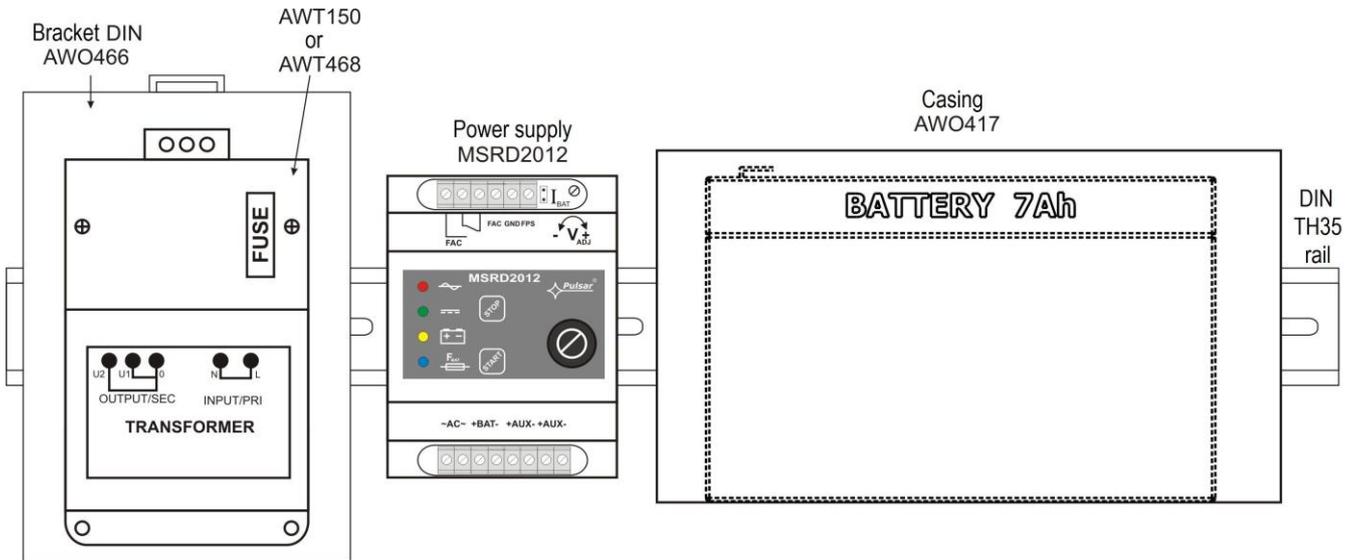


Fig.3. Additional accessories.

2.2 Installation procedure

1. Install an enclosure, a distribution board or a cabinet and lead the cables through the cable ducts.
2. Install the PSU module on the DIN rail: Mount the module onto the rail and block with a clip (Fig. 3)
3. Deliver the output voltage from the AC transformer to the ~AC~ terminals.
4. Connect the receivers' cables to the +AUX, -AUX terminals of the terminal block on the PSU module's board.
5. If necessary, connect the device conductors to the technical output, two pairs of contacts Cx-NCx-NOx (alarm panel, controller, indicator, LED, etc.)
6. Activate the ~230V/AC supply (the AC red diode and AUX green diode should be permanently illuminated)
7. Check the output voltage (the PSU module 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.
8. Connect the battery in accordance with the signs: +BAT red to 'plus', -BAT black to 'minus', (the LB red diode will be lit and the light should fade throughout the time of charging).
9. Once the tests and operation control have been completed, the enclosure/cabinet can be locked.

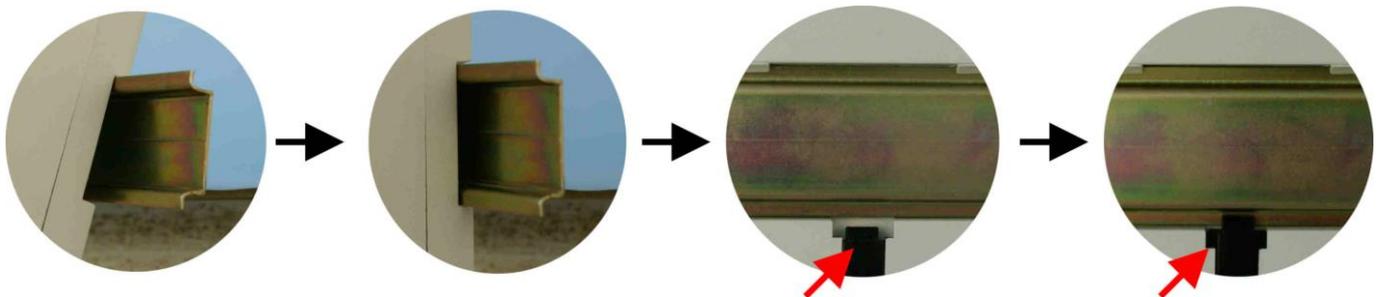


Fig.4. Mounting on a DIN rail.

3. Operating status indication.

3.1 LED indication

The PSU module is equipped with four diodes indicating operating status: AC, LB, AUX, F_{BAT}.

- **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 out.
- **AUX- green diode:** indicates the DC supply status in the output of the PSU module. Under normal status, the diode is permanently illuminated. In case of a short circuit or overload the diode goes out.
- **LB- yellow diode:** indicates battery charging process, the light intensity depends on the battery charging current: 0,5A=100%.....0,0A=0%.
- **F_{BAT}- blue diode:** under normal status, it is off. In case of fuse damage (burnt fuse-) the diode is lit.

3.2 Technical outputs

The PSU module is equipped with indication outputs:

- **FAC - absence of AC supply output:** - OC type output indicating AC power loss. In normal status, with 230V AC supply, the output is connected to ground (L level – 0V). In case of power loss, the PSU will switch the output into a high impedance state, hi-Z, after 10 seconds.
- **FAC - absence of AC supply output:** - relay output indicating the absence of AC supply. In case of power loss, the PSU module will switch the relay contacts after approx. 10 seconds.



CAUTION! In Fig.2. the contact set in the potential-free status corresponds to a state with no AC power (AC power failure).

- **FPS - technical output of the PSU operation status:** OC type output indicating the PSU failure. In normal state (during correct operation) the output is connected to ground (L level – 0V). In case of incorrect operating parameters (voltage, current, temperature), the output is switched into a high impedance state – hi-Z.

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 2A (load 110% ÷ 150% @25°C of the PSU module power), the output voltage is automatically cut off and indicated by the green diode going out. To restore the output power, cut off the output load for approximately 1 minute.

In case of a short-circuit in the AUX, BAT output, or reverse battery connection, the F_{BAT} fuse 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 the main power outage, the device is immediately switched into a battery-assisted operation.

In order to run the PSU module from the battery only, connect the BAT connectors in accordance with the signs: + BAT red to 'plus' and, - BAT black to 'minus' then press the START button on the main board and hold it for 5 seconds.



The PSU module is equipped with the discharged battery disconnection system (UVP).

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 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 paramet



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.

The power supply 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.

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