Pulsar®

USER MANUAL

EN

Edition: 2 from 24.02.2023

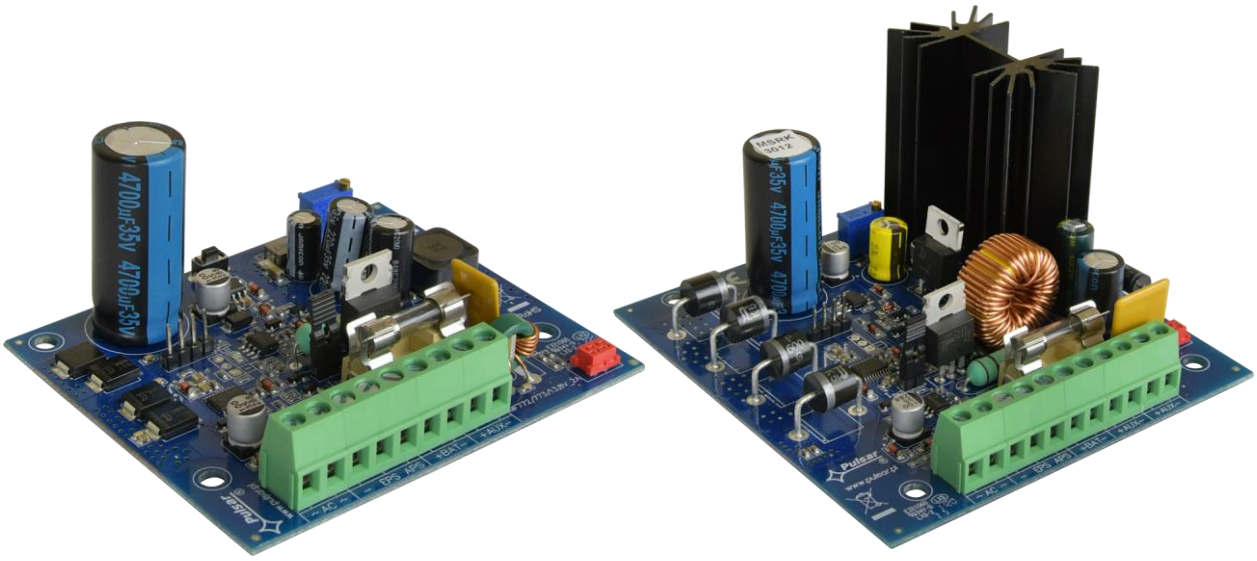
Supersedes edition: 1 from 05.01.2021

Modules of the series

MSRK

v.2.0

The module of buffer power supply Grade 2.



Features:

- built-in power supply module
- compliance with norm EN50131-6:2017 in grade 1, 2 and II environment class
- compliance with norm (KD) EN60839-11-2:2015+AC:2015 standard and I environment class
- DC 13,8 V uninterruptible power supply
- available versions with current efficiencies:
  - **13,8 V: 2 A/3 A**
- microprocessor-based automation system
- dynamic battery test
- battery circuit continuity control
- battery voltage control
- battery fuse status control
- battery charging and maintenance control
- deep discharge battery protection (UVP)
- battery output protection against short circuit and reverse connection
- battery charging current jumper selectable
- START function of manual switch to battery power
- LED optical indication
- EPS technical output of network loss - OC type
- APS technical output indicating battery failure – OC type
- optional module AWZ639 changing OC outputs into relay outputs
- additional accessories: set of LED optical indication PKAZ168
- protections:
  - SCP short-circuit protection
  - OLP overload protection
- warranty – 5 years from production date

Table of contents:

1. Technical description.

Power supply modules are intended for installation in an additional enclosure. In order to meet the requirements of IDS and AC standards, enclosure must be designed in accordance to security level with which compliance is established.

1.1. General description.

The buffer power supply modules is designed in accordance with the requirements of the (I&HAS) EN50131-6:2017 grade 1,2, II environmental class and EN60839-11-2:2015+AC:2015, I environmental class. The power supplies units are intended for for an uninterrupted supply of I&HAS and (KD) requiring stabilized voltage of 12 V DC (±15%).

Displaying parameters of the modules:

Name	Output voltage	Charging current	Total output current with charging
MSRK2012	**13,8 V**	**0,2 / 0,5 A**	**2 A**
MSRK3012	**13,8 V**	**0,5 / 1 A**	**3 A**

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

Depending on a required protection level of the alarm system in the installation place, the PSU efficiency and the battery charging current should be set as follows:

Grade 1, 2 - standby time 12h:
The 12h standby output current can be calculated from the formula:

$$I=Q_{AKU}/12 - I_Z$$

where:
Q_{AKU} – minimum battery capacity [Ah]
Iz – PSU current consumption (including optional modules) [A] (Table 4)

The power supply module should be configured to work in intruder alarm systems or access control, depending on application. For this purpose, appropriate charging current should be selected (taking into account battery capacity and required charging time).

1.2. Block diagram (fig.1).

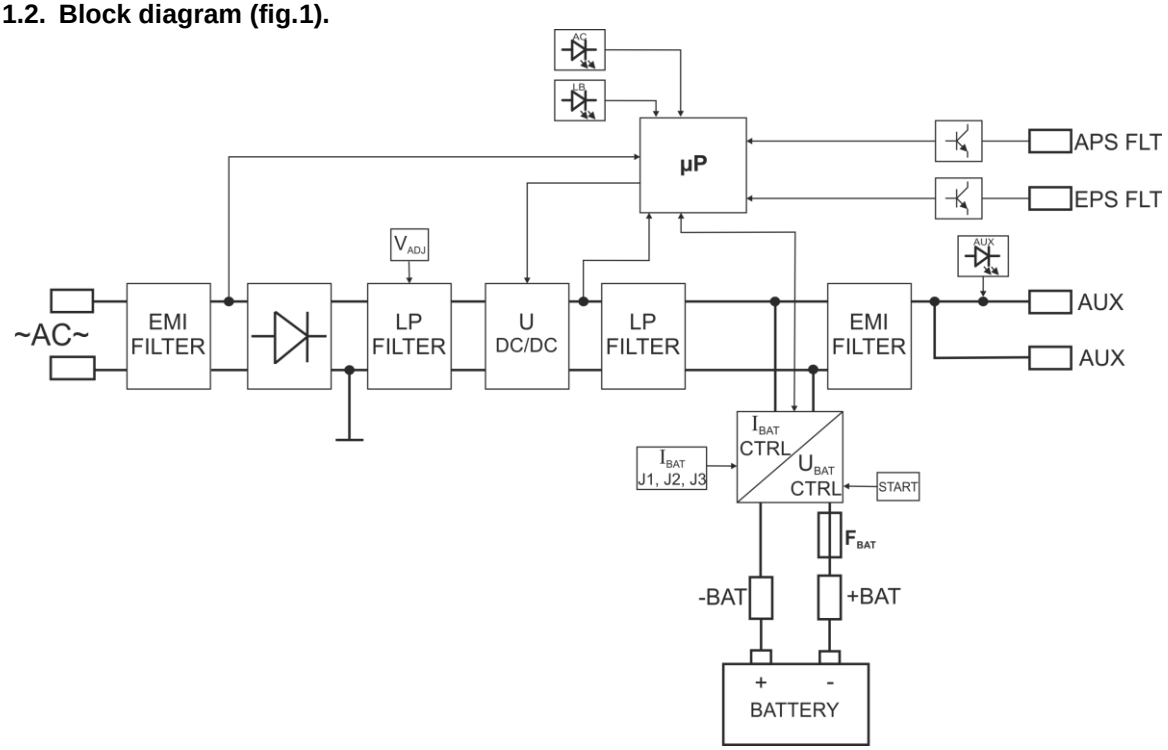


Fig.1. Block diagram of PSU.

1.3. Description of components and connectors.

Table 1. Elements of the PSU pcb (see: tab. 2a,b,c).

Element no.	Description
1	**START** button (launching from battery)
2	**V_{ADJ}** potentiometer, adjustable output voltage
3	**F_{BAT}** fuse in the battery circuit
4	**Terminals:** **~AC~** – AC power input **EPS** – technical output of AC power loss indication hi-Z state = AC power failure 0V state = AC power - O.K. **APS** – technical output of battery failure hi-Z state = failure 0V state = PSU status O.K. **+BAT-** – terminals for battery connection **+AUX-** – DC power supply output, (+AUX= +U, -AUX=GND) Description: hi-Z – high impedance, 0V – connection to the ground GND
5	**LEDs** – **AC** – indication of presence of main power
6	**LEDs** – **AUX** – power supply output voltage indication

7	**LEDs – LB** – battery charging indication
8	Connector to the external LED indicators
9	**Jumper I_{BAT};** – battery charging current configuration Power supply unit 12V2A (see Fig 2a) • **I_{BAT}** = ▬, I_{BAT} =0,2 A • **I_{BAT}** = ▭, I_{BAT} =0,5 A Power supply unit 12V3A (see Fig 2b) • **I_{BAT}** = ▬, I_{BAT} =0,5 A • **I_{BAT}** = ▭, I_{BAT} =1,0 A Description: ▬ jumper installed, ▭ jumper removed

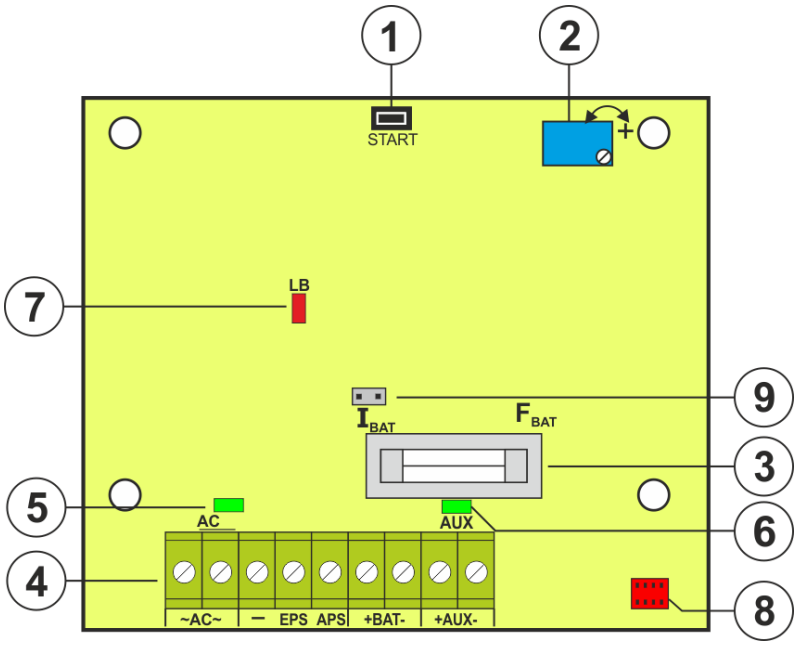


Fig. 2a. View of PCB board of 12V2A model

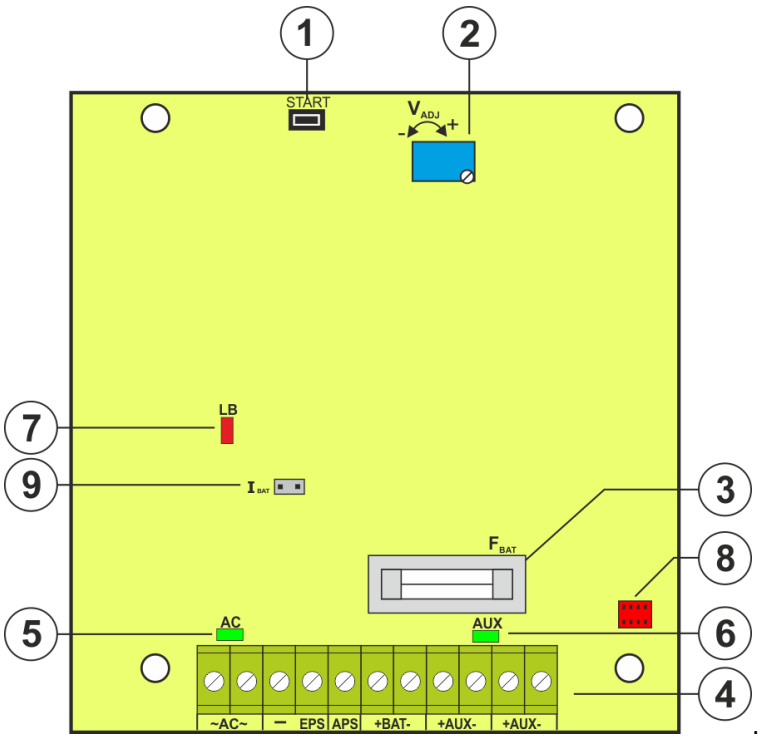


Fig. 2b. View of PCB board of 12V3A model

1.4. Specifications:

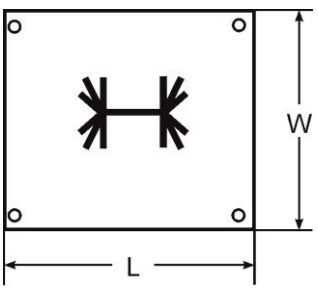
- electrical specifications (tab. 2)
- mechanical specifications (tab. 3)
- operating specifications (tab. 4)

Table 2. Electrical parameters.

Models	**MSRK2012**	**MSRK3012**
PSU type EN50131-6	A, Grade 1,2, II environmental class	
Supply voltage	~ 20-22 V; min. 50 VA	~ 20-22 V; min. 80 VA
Current consumption	2,3 A	3,55 A
Power frequency	50 Hz	
PSU power	27 W	41 W
Total output current with charging	2 A	3 A
Efficiency	81%	81%
Output voltage	11 - 13,8 V – buffer operation 10 - 13,8 V – battery-assisted operation	
Voltage adjustment range	13 - 14 V	
Ripple voltage (max.)	10 mV p-p	45 mV p-p
Current consumption by the PSU systems during battery-assisted operation	11 mA	10 mA
Low battery voltage indication	Ubat < 11,5 V, during battery operation	
Charging current (jumper selectable)	0,2/0,5A	0,5/1A
Battery circuit protection SCP and reverse polarity connection	- F_{BAT} fuse (in case of a failure, fuse-element replacement required)	
Deep discharge battery protection UVP	U<10 V (± 0,5V) – disconnection of battery terminal	
Optical indication	- LEDs on PCB of power supply unit - optionally additional LED optical indication (see section 3.1)	
Technical outputs: **- EPS; output indicating AC power failure** **- APS; output indicating battery failure**	- OC type: 50mA max. normal status: L (0V) level, failure: hi-Z level	
	- OC type: 50mA max. normal status: L (0V) level, failure: hi-Z level	
Fuses: - F_{BAT}	F 3,15A/250V	F 5A/250V
Optional equipment	set of LED optical indication PKAZ168	
Notes	Convectional cooling	

Table 3. Mechanical parameters

Dimensions	L=86, W=73, H=42 [+/- 2mm]	L=94, W=98, H=57 [+/- 2mm]
Fixing	Mounting pins x 4 (PCB fi=4,2 mm)	
Net/gross weight	0,05 / 0,1 [kg]	0,14 / 0,2 [kg]
Connectors	Outputs: Φ0,41÷1,63 (AWG 26-14) Battery output BAT: 6,3F-2,5, 30cm	



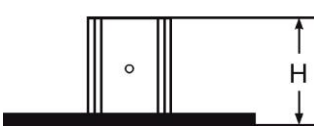


Table 4. Operating parameters.

Environment class EN 50131-6	II
Environment class EN 60839-11-2	I (first)
Operating temperature	-10ºC...+40ºC
Storage temperature	-20ºC...+60ºC
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.

Power supply modules are intended for installation in an additional enclosure. In order to meet the requirements of IDS and AC standards, enclosure must be designed in accordance to security level with which compliance is established.

2.1. Requirements.

The PSU module is to be mounted by a qualified installer, holding relevant permits and licenses (required in installation country) to connect (interfere) with 230 V mains supply. 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.

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.

CAUTION!
Before installation, make sure that the voltage in the 230 V power-supply circuit is cut off.
To switch off power use an external switch in which the distance between the contacts of all poles in the disconnection state is not less than 3mm.

It is required to install an installation switch with a nominal current of min. 6 A in the power supply circuits outside the power supply unit.

1. Install the enclosure or cabinet and lead the cables through the cable ducts.
2. Install the PSU module on mounting pins (the mounting pins should be installed before the assembly of the enclosure/cabinet).
3. Deliver the AC voltage to the ~AC~ terminals.
4. Connect the receivers' cables to the +AUX, -AUX terminals of the terminal box on the PSU board.
5. If needed, connect the device cables to the technical outputs:
   - EPS; technical output indicating AC power failure
   - APS; technical output indicating battery failure
   - optional installation of the AWZ639 relay module changing technical outputs of the OC type to relay type (page. 8, section. 3.3)
6. Use the I_{BAT} jumper to set the battery charging current, taking into account the battery parameters and required charging time.
7. Mount the battery in the battery compartment of the enclosure. Connect the batteries with the PSU paying special attention to the correct polarity.
8. Connect the ~ 230 V power to the transformer. The corresponding LEDs on the PCB of the power supply module should be ON: green AC and AUX and red LB. The yellow LB LED should be ON during battery charging.. Optionally, you can install additional PKAZ168 signaling module (page 7, chapter 3.1).

Output voltage of the PSU, without load U = 13,8 V DC.
During battery charge, voltage can amount to U = 11 - 13,8 V DC.

9. Run the PSU test: check the LED and acoustic indication (Tab. 7), technical output; through:
   - **cutting off the 230 V current**: LED AC (Fig. 2 level 5), EPS technical output after time 30s
   - **battery disconnection**: optical indication, APS technical output – after a battery test have been completed (~5min).
10. After installing and checking proper working, the enclosure/cabinet can be closed.

3. Operating status indication.

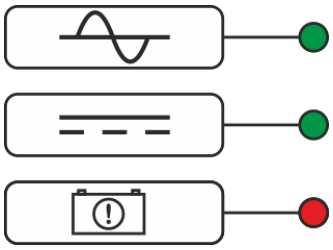
The power supply unit features LED and acoustic status indication. PSU status can be remote-controlled by two technical outputs.

3.1. Optical indication.

Additionally, PSU is fitted with 3 LED lights indicating operating status: AC, LB and AUX at the PCB of PSU:

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

Moreover, signalling can be extended with optional PKAZ168 module:



Green LED AC:
- **on – the PSU is supplied with 230 V AC**
- **off – no 230 V power, battery-assisted operation**

Green LED DC:
- **on – presence of DC voltage in the output of the PSU**
- **off – no voltage in the output of the PSU**

Red LED APS:
- **off – no failure**
- **on – indicates battery failure status**

3.2. Technical outputs.

The PSU is equipped with indication outputs:

- **EPS FLT - technical output indicating 230 V power failure**.
  Output indicates 230 V power failure. Under normal status – with the 230 V supply on, output is shorted to ground GND. In case of power failure, PSU will switch output into hi-Z high impedance state after a time about 30s.

- **APS FLT - output indicating battery failure.**
  The output indicates the PSU failure. The output indicates failure PSU module. Under normal status (correct operation) the output is shorted to ground GND. If there is failure, the output is switched into hi-Z high impedance state.
  PSU failure can be caused by the following events:
  - defective or low battery
  - battery fuse failure
  - no continuity in the battery circuit
  - battery voltage below 11,5 V during battery-assisted operation

  A battery failure is detected within a maximum of 5 minutes - after each battery test

After switching from battery operation to electrical network operation, battery failure indication is inactive until full recharge battery, or for 24 hours after power returns.

The power supply technical outputs are open collector (OC) type, as shown schematically below.

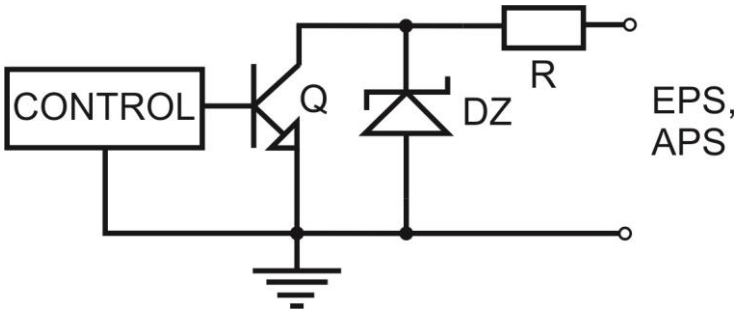


Fig. 4. Electrical diagram of OC outputs.

3.3. Technical outputs – relay.

If the OC type outputs are not sufficient to control the unit, it is possible to use the AWZ639 relay module changing technical outputs of the OC type to relay type.

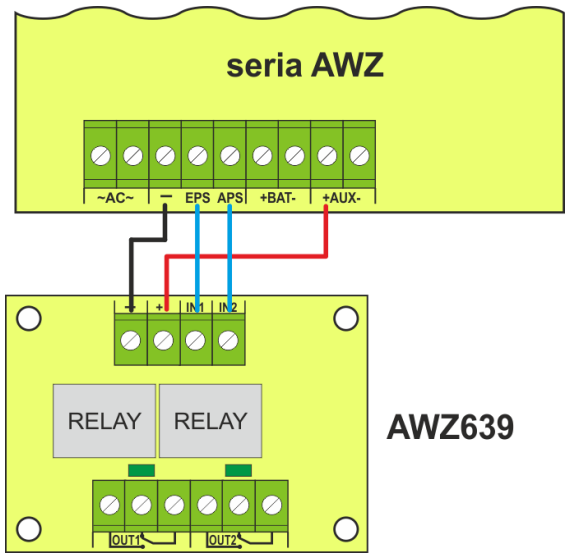


Fig. 5. The diagram of connecting the AWZ639 module.

3.4. Standby time.

Battery-assisted operating depends on battery capacity, charging level and load current. To maintain an appropriate standby time, current drawn from the PSU in battery mode should be limited:

Total current of the receivers + battery charging current mustn't cross maximum current of power supply

3.5. Battery charging time.

The PSU has a battery circuit charged with direct current. The current selection is done with use of the I_{BAT} jumpers. The table below shows how long does it take to charge a (fully discharged) battery up to min. 80% of its nominal capacity.

Table 9. Battery charging time up to the capacity of 0,8.

Battery	Charging current		
	0,2A	0,5A	1A
7Ah - 9Ah	32h – 36h	13h - 15h	-
17Ah - 20Ah	-	28h - 32h	14h - 16h
28Ah	-	-	23h
40Ah	-	-	36h

3.6. Running PSU on battery backup.

Power supply allows you to run on battery backup when necessary. To do this, press the START button on PCB.

4. Operation and use.

4.1. Overload or short circuit of the PSU output (SCP on).

The AUX output is equipped with an electronic protection. If power supply is loaded with current exceeding IMAX. (load 110% ÷ 150% of PSU power), current and voltage are automatically limited. Voltage at output is restored automatically after overload is removed.

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. Dynamic battery test.

The PSU runs a battery test every 5 minutes. It is done by a momentary output voltage reduction and voltage measurement at the battery terminals. A failure is indicated when voltage drops below approx.12,2 V.

4.3 Maintenance.

Any and all maintenance operations may be performed following the disconnection of the PSU from the power supply network. The PSU 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 the case of a fuse replacement, use a replacement of the same parameters.

WEEE LABEL
Waste electrical and electronic equipment must not be disposed of with normal household waste.
According to European Union WEEE Directive, waste electrical and electronic equipment should be disposed of separately from normal household waste.

CAUTION! *The power supply unit is adapted for cooperation with the sealed lead-acid batteries (SLA). After the operation period they must not be thrown but recycled according to the applicable law.*

Pulsar sp. j.
Siedlec 150,
32-744 Łapczyca, Poland
Tel. (+48) 14-610-19-45
e-mail: sales@pulsar.pl
http:// www.pulsar.pl

Facebook Linkedin YouTube Pulsar.pl