USER MANUAL

EN

Edition: 2 from 21.02.2023

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Power supplies
HPSDCG2 series

Buffer power supply units, multi-output

Grade 2

Features:

- compliance with norm EN50131-6:2017 in grade 1, 2 and II environmental class
- compliance with norm (KD) EN60839-11-2:2015+AC:2015 standard and I environment class
- supply voltage **~200 – 240 V**
- **DC 13,8 V** uninterruptible power supply
- available versions with **4x1A, 8x1A** current efficiencies
- high efficiency (up to 86%)
- battery charging current jumper selectable
- deep discharge battery protection (UVP)
- function START allows running PSU from battery power
- LED optical indication
- dynamic battery test
- battery circuit continuity control
- battery voltage control
- **EPS technical** output indicating power loss – relay type
- **APS technical output** indicating battery failure – relay type
- **FPS technical output** of fuse activation indication – relay type
- battery charging and maintenance control
- battery output protection against short circuit and reverse connection
- protections:
  - SCP short circuit protection
  - OLP overload protection
  - OVP overvoltage protection
  - surge protection
- warranty – 2 years from production date

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1. Technical description.

1.1. General description.

HPSDCG2 series the buffer power supply 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. Power supplies units are intended for an uninterrupted supply of I&HAS and KD devices requiring stabilized voltage of 12 V DC (±15%). They are mounted inside a metal enclosure equipped with a signalling panel and a microswitch indicating opening of door (lid).

Parameters of power supplies:

PSU's name	Output voltage	Charging current	Output current		Total output current with charge
			in standby mode for grade 1, 2 EN50131-6	for general purpose application	
HPSDCG2-12V4x1A-B	**13,8 V**	**0,5 / 1 A**	**Σ=0,58 A**	**4x1 A**	**5 A**
HPSDCG2-12V8x1A-C		**1 / 2 A**	**Σ=1,41 A**	**8x1 A**	**10 A**
HPSDCG2-12V8x1A-D		**1 / 2 A**	**Σ=3,33 A**	**8x1 A**	**10 A**

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

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

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

$$I_{WY}=Q_{AKU}/12 - I_Z$$

where:
Q_{AKU} – minimum battery capacity [Ah]
Iz – PSU current consumption (including optional modules) [A] (table 3)

PSU module should be configured properly, depending on application, to work in burglary and assault signalling systems or access control. For this purpose, appropriate charging current should be selected (taking into account battery capacity and required charging time).

1.2. Block diagram.

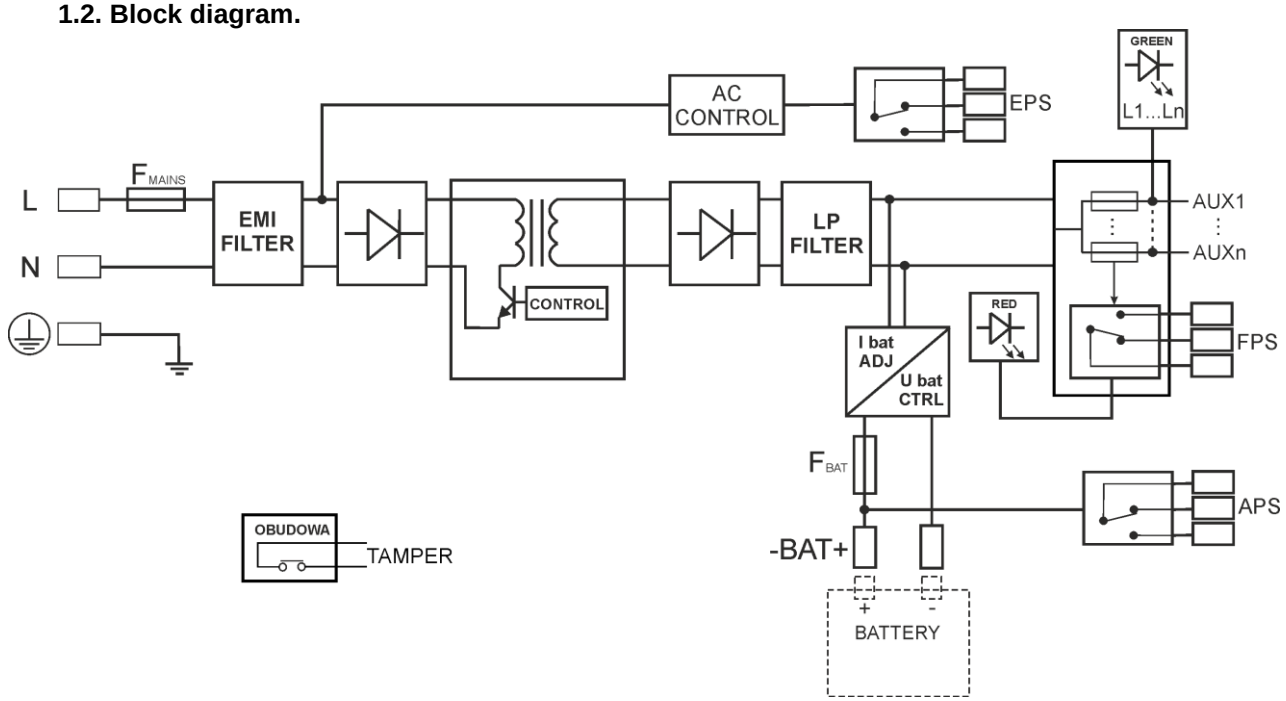


Fig. 1 Block diagram

1.3 Description of PSU components and connectors.

Table 1. Elements and connector of PSU (see Fig. 2a, 2b).

Element no.	Description
[1]	LED indicating presence of DC voltage at outputs
[2]	Connector for LED indicators
[3]	Selection jumper for charging current: • I_{BAT} = ▬, I_{BAT} = I1 • I_{BAT} = ▪▪, I_{BAT} = I2
[4]	**START** - button (launching from battery)
[5]	PSU output: Outputs **AUX1… AUXn** Battery terminals (**-BAT+)**
[6]	Technical outputs: **APS** – technical output of battery failure, relay type **EPS** – technical output of AC power loss indication, relay type **FPS** output indicating failure of one of outputs, relay type
[7]	**L-N** power supply connector ~ 230 V, ⏚ – connector for connection of a protective conductor
[8]	Main fuse $\mathbf{F_{MAINS}}$
[9]	**F1..Fn** output fuses
[10]	Battery fuse $\mathbf{F_{BAT}}$
[11]	**LED (red)** indicating failure of one of the outputs (fuse activation) **AUX1 ÷ AUXn**

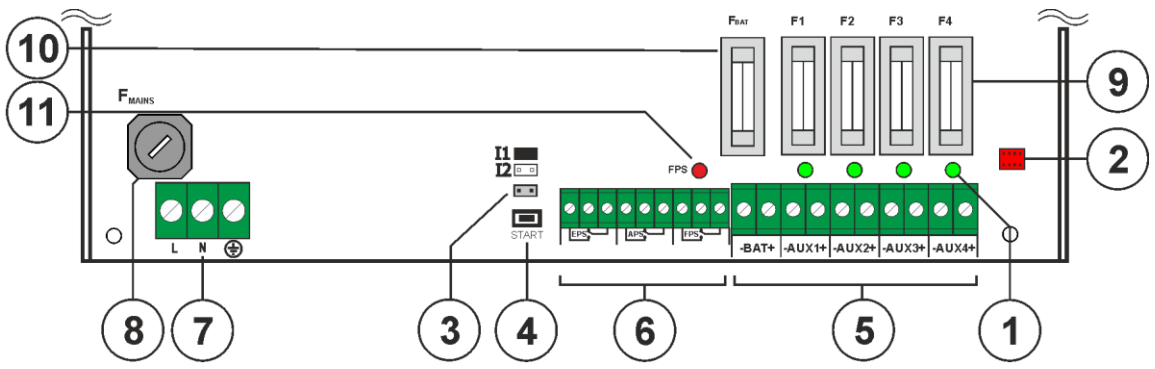


Fig. 2a. View of power supply module HPSDCG2-12V4x1A

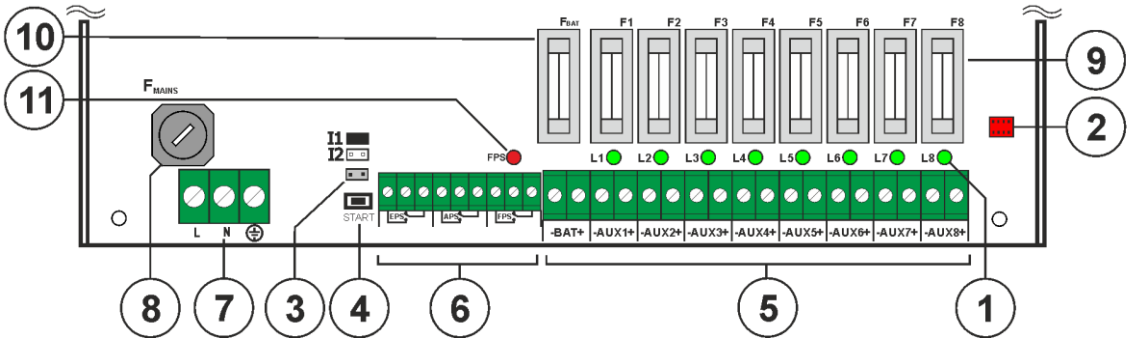


Fig. 2b. View of power supply module HPSDCG2-12V8x1A

Table 2. View of PSU (see Fig. 3).

Element no.	Description
[1]	PSU module
[2]	Cable grommet
[3]	**TAMPER;** microswitch of antisabotage protection (NC)
[4]	Battery connectors : +BAT = red, - BAT = black

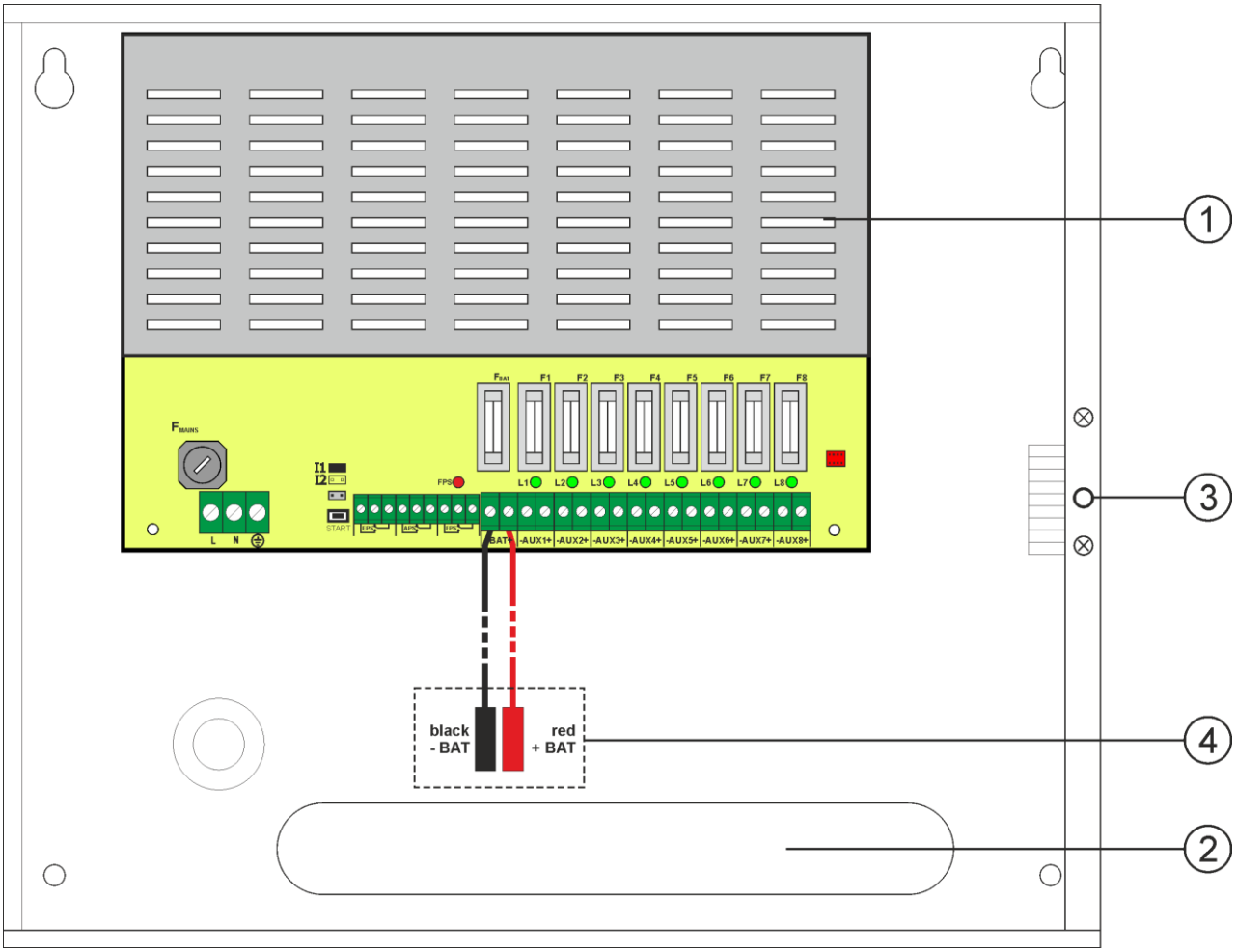


Fig. 3. View of enclosure

1.3. Specifications:

- **electrical parameters (Tab. 3)**
- **mechanical parameters (Tab. 4)**
- **operation safety (Tab. 5)**
- **operating parameters (Tab. 6)**

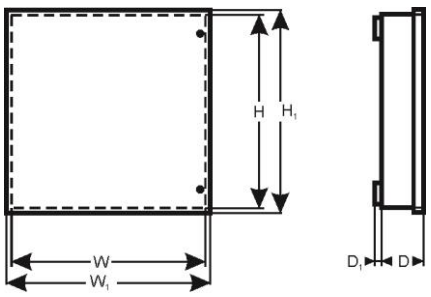


Table 3. electrical parameters.

Model	HPSDCG2-12V4x1A-B	HPSDCG2-12V8x1A-C	HPSDCG2-12V8x1A-D
PSU type EN50131-6	A, Grade 1,2, II environmental class		
Power supply	~ 200 – 240 V		
Current consumption	0,7 A	1,3 A	
Power frequency	50/60 Hz		
Inrush current	40 A		
Output power PSU	69 W	138 W	
Output current	4 x 1 A	8 x 1 A	
Total output current with charging	5 A	10 A	
Efficiency	85%	86%	
Output voltage	11 - 13,8 V – buffer operation 10 - 13,8 V – battery-assisted operation		
Ripple voltage (max.)	100 mV p-p		
Current consumption by PSU systems during battery-assisted operation	50 mA		
Fitting battery	7 – 9 Ah	17 – 20 Ah	40 – 45 Ah
Charging current (jumper selectable)	I1: 0,5 A I2: 1 A	I1: 1 A I2: 2 A	
Battery circuit protection SCP and reverse polarity connection	- F_{BAT} fuse (in case of a failure, fuse-element replacement required)		
Overload protection (OLP)	105 – 150% power, automatically recovered		
Over voltage protection (OVP)	>19 V automatic recovery		
Deep discharge battery protection UVP	U<9,5 V (± 5%) – disconnection of battery circuit		
Optical indication	- LEDs on PCB of power supply unit - LED indicators on power supply's cover (see section3.1)		
Fuses: - F_{BAT}	T6,3A/250V	T10A/250V	
- $F_{1....n}$	F1A/250V (permissible up to F2A/250V)		
Terminals: **Mains supply:** **Outputs AUX1-AUXn:**	0,5 – 2,5 mm^2 (AWG 26 – 12)		
Technical outputs	0,5 – 1 mm^2 (AWG 26 – 18)		
Battery outputs	Battery wires 6,3F – 45cm, angle muffs ML062		

Table 4. Mechanical parameters.

	HPSDCG2-12V4x1A-B	HPSDCG2-12V8x1A-C	HPSDCG2-12V8x1A-D
Enclosure dimensions (WxH) [±2mm]	300x258	300x300	330x380
Enclosure dimensions: (W_1xH_1xD_1+D) [±2mm]	305x263x77+8	305x305x105+8	335x385x173+14
Fixing (WxH):	267x226	274x265	298x310
Space for battery (WxHxD)	200x120x70	240x170x76	325x178x168
Net/gross weight	2,2 / 2,3 [kg]	2,8 / 3,0 [kg]	5,2 / 5,8 [kg]
Enclosure	Steel sheet DC01 0,7 mm		Steel sheet DC01 1 mm
Closing	Cheese head screw (at front), (lock assembly possible)		
Notes	Enclosure does not adjoin assembly surface so that cables can be led.		

Table 5. Operation safety.

Protection class EN 62368-1	I (first)
Protection grade EN 60529	IP20
Electrical strength of insulation: **- between input and output circuits of PSU** **- between input circuit and protection circuit** **- between output circuit and protection circuit**	 4000 V DC min. 2500 V DC min. 500 V DC min.
Insulation resistance: **- between input circuit and output or protection circuit**	 100 MΩ, 500 V DC

Table 6. 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 insolation	unacceptable
Vibrations and impulse waves during transport	According to PN-83/T-42106

2. Installation.

2.1 Requirements.

Buffer power supply is designed to be installed only by qualified installer with necessary permits and authorisations (required in installation country) to connect (interfere) with 230 V mains supply. Unit should be mounted in confined spaces with normal relative humidity (RH=90% maximum, without condensing) and temperature from -10°C to +40°C. PSU shall work in a vertical position that guarantees sufficient convectional air-flow through ventilating holes of enclosure.

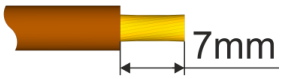
Because power supply is designed for the continuous operation and is not equipped with ON/OFF switch, power supply circuit should have appropriate overload protection. Moreover, user shall be informed about method of unplugging (most frequently through separating and assigning an appropriate fuse in fuse-box). Electrical system shall follow valid standards and regulations.

2.2 Installation procedure.

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

It is required to install in the supply circuits, in addition to power supply, circuit breaker with 6 A nominal current.

1. Mount the PSU in a selected location and connect the wires.
2. Connect power cables (~230 V) to L-N clips of PSU. Connect ground wire to clip marked by earth symbol PE ⏚. Use a three-core cable (with a yellow and green protection wire ⏚) to make connection). Lead power cables to relevant terminals of power supply via an isolation conduit. Wires should be deisolated to a length of 7mm.



Shock protection circuit shall be done with a particular care: yellow and green wire coat of power cable should be connected to terminal marked with the grounding symbol on PSU enclosure. Operation of PSU without the properly made and fully operational shock protection circuit is UNACCEPTABLE! It can cause damage to equipment or an electric shock.

3. If needed, connect the device cables to the technical outputs:
   - EPS; technical output of AC network absence indication
   - APS; technical output indicating battery failure
   - FPS; technical output indicating
4. Connect equipment to the appropriate output terminals of power supply (positive connector +AUX, negative connector -AUX).
5. Use the I_{BAT} jumper to set the maximum battery charging current, taking into account charging capacity and required charging time.
6. Mount battery in the battery compartment of enclosure. Connect the batteries with the PSU paying special attention to the correct polarity.
7. Switch on 230 V supply. LEDs on the PCB of power supply should light. After installing and checking proper working, enclosure can be closed.
   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.
8. Run PSU test: check LED and acoustic indication (see section 3.1) and technical output; through:
   - **cutting off 230 V current:** LED AC go out, EPS technical outputs will change status into opposite after about 30 s
   - **battery disconnection:** APS technical output will change status after a battery test have been completed (~5 min) and red APS LED lights up.
   - **dismantling of one of AUX fuses:** red FPS LED lights up, FPS technical output will change status.

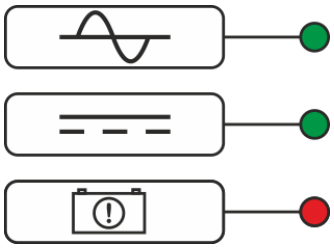
3. Operating status indication.

The power supply unit features LED status indication.

3.1 Optical indication.

The power supply unit features LED status indication. Presence of voltage at output of the PSU is indicated by the green LED L1 ÷ Ln. Failure (fuse damage) is indicated by shutting illuminating the red LED FPS. Status of the PSU (fuse damage **AUX1 ÷ AUXn**) can be remotely controlled via FPS technical output.

In addition, there is an additional indication on the lid of the power supply:



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

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

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

3.2 Technical outputs.

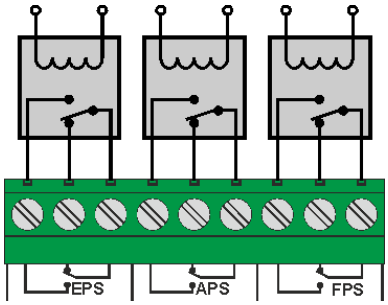
The PSU is equipped with indication outputs:

- **FPS – indicating fuse failure**
  Output indicates failure of at least one of AUX1-AUXn output fuses. In case of fuse failure, relay is switched immediately.

- **EPS – output indicating 230 V power loss**.
  The output indicates 230 V power failure. In case of power failure, contacts of relay change over after about 30 seconds.

- **APS – output indicating battery failure.**
  The output indicates the PSU failure. In case of failure, contacts of relay change over. 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.



CAUTION! The figure set of contacts shows a potential-free status of relay, which corresponds to power supply failure.

3.3 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. Required battery capacity can be calculated using following formula:

$$Q_{AKU}=\text{standby time}*(I_{WY} + Iz)$$

where:
Q_{AKU} – minimum battery capacity [Ah]
I_{WY} – power supplies output current (drawing by load
Iz – PSU current consumption (including optional modules) [A] (Table 3)

3.4 Battery charging time.

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

Table 6. Approximate battery charging time up to the capacity of 0,8.

Battery	Charging current		
	0,5 A	1 A	2 A
7 Ah	13 h	7 h	–
17 Ah	31 h	16 h	8 h
28 Ah	–	26 h	13 h
40 Ah	–	36 h	18 h

3.5 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 module output.

The AUX1÷AUXn PSU outputs are protected against short circuit by glass fuses. Activation of the protection (glass fuse blowing) is indicated by shutting down green LED nearby appropriate outputs fuse on the PSU module and illuminating the red LED FPS. In case of damage, replace the fuse (compatible with the original). As a precaution, it is possible to use fuses with a higher current (up to 2 A) and a fast blow characteristic (F), which will increase the current-carrying capacity of the given output. However, this does not affect the overall current capacity of the power supply.

Total current of the receivers + battery charging current mustn't exceed maximum current of power supply output current.

4.2. Operation of the PSU OVP system.

If the OVP system is activated, the output voltage is automatically cut off. Operation can be resumed after disconnecting the PSU from 230 V after approx. 1 minute.

5. 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