



USER MANUAL

PL

Edition: 3 from 06.02.2023

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Power supplies PSG2 series

v1.0

**Enclosed buffer switch mode
power supply unit Grade 2**



Features:

- 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
- supply voltage ~200 - 240 V
- DC 13,8 V or 27,6 V uninterruptible power supply
- available versions with current efficiencies:
13,8 V: 2A/3A/5A/7A/10A/20A
27,6 V: 2A/3A/5A/10A
- high efficiency (up to 89%)
- battery charging current jumper selectable
- deep discharge battery protection (UVP)
- optional equipment: set of external LED indicators: PKAZ168, mounting plate DIN1-4
- START function of manual switch to battery power
- LED optical indication
- dynamic battery test
- battery circuit continuity control
- battery voltage control
- battery charging and maintenance control
- EPS technical output indicating AC power loss – relay
- APS technical output indicating battery failure – relay
- 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.**

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.

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 or 24 V DC ($\pm 15\%$).

Displaying parameters of the power supply:

PSU's name	Output voltage	Charging current	Total output current with charging
PSG2-12V1A	13,8 V	0,2 A	1,2 A
PSG2-12V2A	13,8 V	0,5 / 1 A	2,5 A
PSG2-12V3A	13,8 V	0,5 / 1 A	3,5 A
PSG2-12V5A	13,8 V	1 / 2 A	5 A
PSG2-12V7A	13,8 V	1 / 2 A	7 A
PSG2-12V10A	13,8 V	1 / 4 A	10 A
PSG2-12V20A	13,8 V	2 / 4 / 8 A	20 A
PSG2-24V2A	27,6 V	0,5 / 1 A	2,5 A
PSG2-24V3A	27,6 V	0,5 / 1 A	3,5 A
PSG2-24V5A	27,6 V	1 / 2 A	5 A
PSG2-24V10A	27,6 V	1 / 2 / 4 A	10 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:

$$I = QAKU / 12 - I_Z$$

where:

QAKU – minimum battery capacity [Ah]

I_Z – 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).

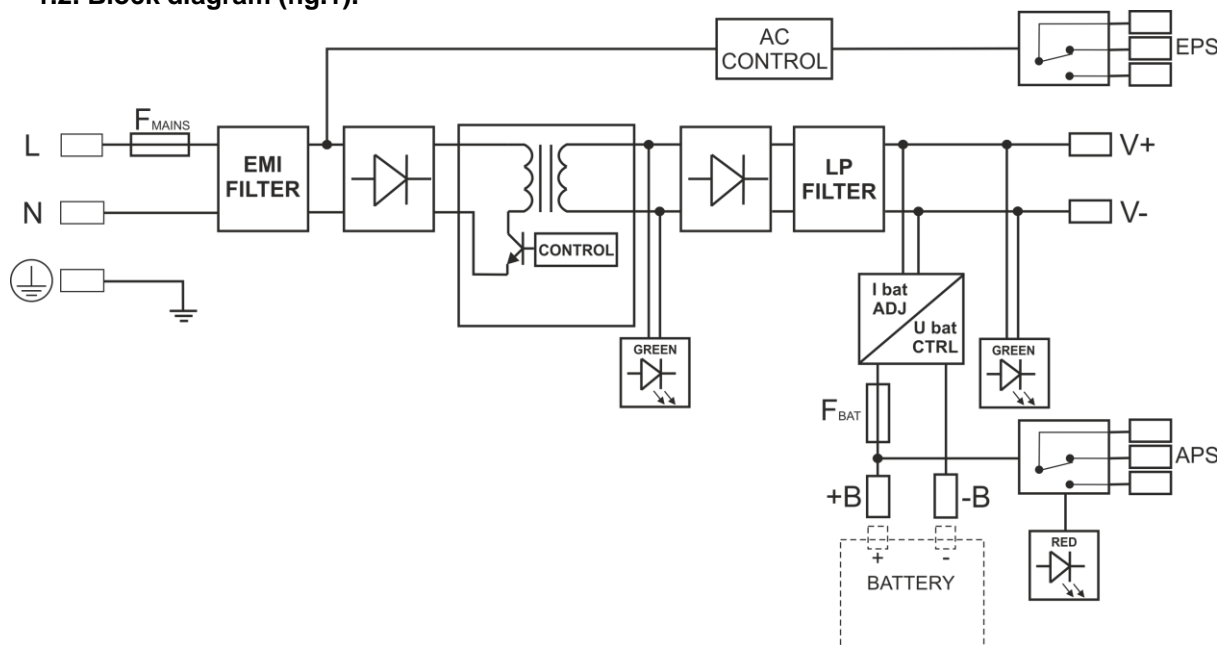


Fig.1. Block diagram of PSU.

1.3. Description of PSU components and connectors.

Table 1. Elements and connectors PSU (see Fig. 2a, 2b, 2c).

Element no.	Description
[1]	LED for DC output voltage
[2]	connector to external LED indicators
[3]	Selection jumper for charging current: Power supply units 12V2A; 12V3A; 12V5A; 12V7A; 12V10A; 24V2A; 24V3A; 24V5A: <ul style="list-style-type: none"> • I_{BAT} = , I_{BAT} = I1 • I_{BAT} = , I_{BAT} = I2 Power supply units 12V20A; 24V10A: <ul style="list-style-type: none"> • I1= I2= I3= I_{BAT} = I1 • I1= I2= I3= I_{BAT} = I2 • I1= I2= I3= I_{BAT} = I3
[4]	START - START button (launching from battery)
[5]	The output of the PSU (V+, V-)
[6]	Battery terminals (B+, B-)
[7]	APS – technical output of battery failure
[8]	EPS – technical output of AC power loss indication
[9]	L-N Power supply connector 230 V AC, – connector for connection of a protective conductor
[10]	Battery fuse

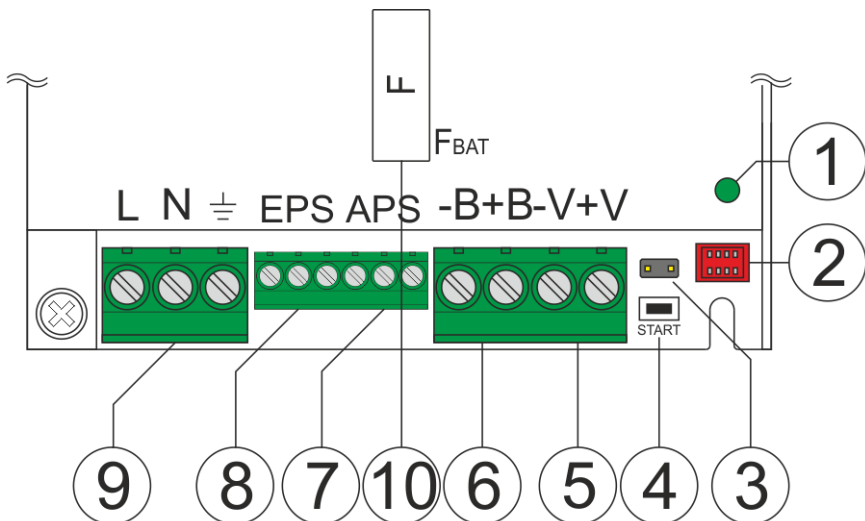


Fig. 2a. View of power supply module (12V2A, 12V3A, 12V5A, 12V7A, 24V2A, 24V3A models)

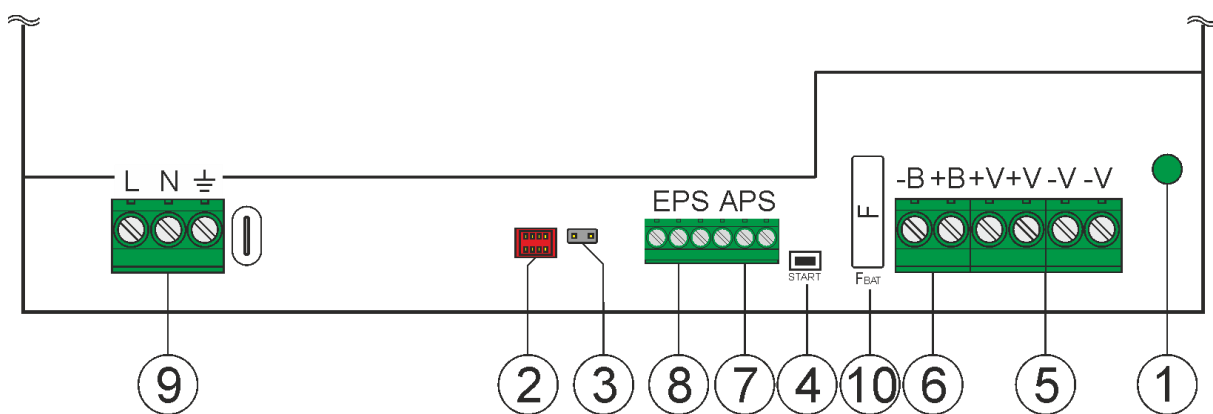


Fig. 2b. View of power supply module (12V10A, 24V5A models)

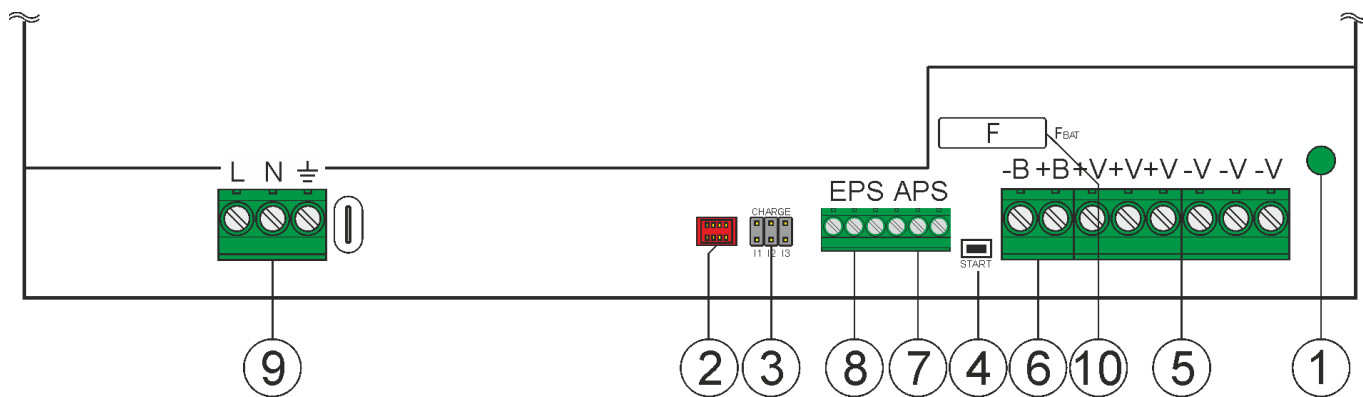


Fig. 2c. View of power supply module (12V20A, 24V10A models)

1.4. Specifications:

- electrical parameters (tab. 3)
- operation safety (tab. 4)
- operating parameters (tab. 5)

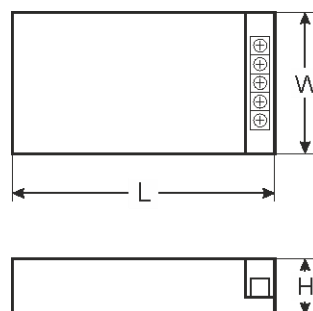


Table 3. Electrical parameters.

Models	PSG2-12V1A	PSG2-12V2A	PSG2-12V3A	PSG2-12V5A	PSG2-12V7A	PSG2-12V10A	PSG2-12V20A
PSU type EN50131-6	A, Grade 1,2, II environmental class						
Supply voltage	~ 200 - 240 V						
Current consumption	0,2 A	0,4 A	0,5 A	0,8 A	1 A	1,3 A	1,5 A
Power frequency	50/60 Hz						
Inrush current	40 A						60 A
Output power PSU	17 W	35 W	48 W	69 W	96 W	138 W	276 W
Total output current with charging	1,2 A	2,5 A	3,5 A	5 A	7 A	10 A	20 A
Efficiency	82 %	86%	86%	87%	87%	88%	87%
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 the PSU systems during battery-assisted operation	30 mA	30 mA	30 mA	30 mA	30 mA	50 mA	40 mA
Fitting battery	1,2 – 7 Ah	7 – 17 Ah	7 – 17 Ah	7 – 40 Ah	7 – 40 Ah	7 – 65Ah	17 – 65Ah
Charging current (jumper selectable)	I1: 0,2 A	I1: 0,5 A I2: 1 A	I1: 0,5 A I2: 1 A	I1: 1 A I2: 2 A	I1: 1 A I2: 2 A	I1: 1 A I2: 4 A	I1: 2 A I2: 4 A I3: 8 A
Net/gross weight	0,18 / 0,2 [kg]	0,28 / 0,33 [kg]	0,28 / 0,33 [kg]	0,35 / 0,41 [kg]	0,39 / 0,45 [kg]	0,83 / 0,88 [kg]	1,22 / 1,30 [kg]
Battery circuit protection SCP and reverse polarity connection	- polymer fuse (returnable)	- glass fuse F _{BAT} (in case of a failure, fuse-element replacement required – under power supply cover)				- glass fuse F _{BAT} (in case of a failure, fuse-element replacement required)	
Overload protection OLP	105-150% PSU power, automatically recovered						
Overvoltage protection OVP	>19 V (activation requires disconnecting the load or supply for about approx. 1 min)						
Deep discharge battery protection UVP	U<9,5 V (± 5%) – disconnection of battery terminal						
Optical indication	- LEDs on PCB of power supply unit						
LED optical indication output (intended for optional indication set PKAZ168)	LED AC – presence of AC voltage LED DC – presence of DC voltage in the output of the PSU APS FLT – battery failure						
Fuses: - F _{BAT}	-	F 3,15A/250V	F 4A/250V	T 6,3A/250V	F 8A/250V	T 10A/250V	T 20A
Enclosure dimensions (LxWxH) [±2mm]	110x78x36	129x98x40	129x98x40	159x98x42	159x98x42	204x141x52	237x168x54
Terminals: Mains supply: Outputs: Battery outputs:	0,5 – 2,5 mm ² (AWG 26 – 12)					Battery wires Φ6 (M6-2,5), 45cm	
Optional equipment:	A set for optical indication LED PKAZ168, mounting plate DIN1-4						
Notes:	Convectonal cooling						Forced cooling

Models	PSG2-24V2A	PSG2-24V3A	PSG2-24V5A	PSG2-24V10A
PSU type EN50131-6	A, Grade 1,2, II environmental class			
Supply voltage	~ 200 - 240 V			
Current consumption	0,8 A	1 A	1,3 A	1,5 A
Power frequency	50/60 Hz			
Inrush current	40 A			60 A
Output power PSU	69 W	96 W	138 W	276 W
Total output current with charging	2,5 A	3,5 A	5 A	10 A
Efficiency	89%	89%	89%	87%
Output voltage	22 – 27,6 V – buffer operation 20 – 27,6 V – battery-assisted operation			
Ripple voltage (max.)	100 mV p-p			
Current consumption by the PSU systems during battery-assisted operation	20 mA	30 mA	40 mA	40 mA
Fitting battery	7 – 17 Ah	7 – 40 Ah	7 – 40 Ah	7 – 65Ah
Charging current (jumper selectable)	I1: 0,5 A I2: 1 A	I1: 0,5 A I2: 1 A	I1: 1 A I2: 2 A	I1: 1 A I2: 2 A I3: 4 A
Net/gross weight	0,38 / 0,42 [kg]	0,39 / 0,45 [kg]	0,81 / 0,86 [kg]	1,23 / 1,30 [kg]
Battery circuit protection SCP and reverse polarity connection	- glass fuse F _{BAT} (in case of a failure, fuse-element replacement required - under power supply cover)		- glass fuse F _{BAT} (in case of a failure, fuse-element replacement required)	
Overload protection OLP	105-150% PSU power, automatically recovered			
Overvoltage protection OVP	>37 V (activation requires disconnecting the load or supply for about approx. 1 min)			
Deep discharge battery protection UVP	U<19 V (± 5%) – disconnection of battery terminal			
Optical indication	- LEDs on PCB of power supply unit			
LED optical indication output (intended for optional indication set PKAZ168)	LED AC – presence of AC voltage LED DC – presence of DC voltage in the output of the PSU APS FLT – battery failure			
Fuses: - F_{BAT}	F 3,15A/250V	T 6,3A/250V	F 8A/250V	T 10A/250V
Enclosure dimensions (LxWxH) [±2mm]	159x98x42	159x98x42	204x141x52	237x168x54
Terminals:	0,5 – 2,5 mm ² (AWG 26 – 12)			
Mains supply:				
Outputs:	Battery wires 6,3F – 45cm, angle muffs ML062			Battery wires Φ6 (M6-2,5), 45cm
Battery outputs:				
Optional equipment:	a set for optical indication LED PKAZ168, mounting plate DIN3-4			
Notes:	Convectonal cooling			Forced cooling

Table 4. Operation safety.

Protection class EN 62368-1	I (first)
Protection grade EN 60529	IP20
Electrical strength of insulation: - between input and output circuits of the PSU - between input circuit and PE protection circuit - between output circuit and PE 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 5. Operating parameters.

Environment class EN 50131-6	II
Environment class EN 60839-11-2	I (first)
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
Environmental Class	unacceptable
Operating temperature	According to PN-83/T-42106

2. Installation.

2.1 Requirements.



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.

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 the 230 V mains supply. The PSU shall work in a vertical position that guarantees sufficient convectional air-flow through ventilating holes of the enclosure. The device 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 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 (usually through assigning an appropriate fuse in the fuse-box). The electrical system shall follow valid standards and regulations.



2.2 Installation procedure.

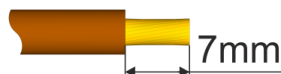


CAUTION!

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 6 A in the power supply circuits outside the power supply unit.

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 . Use a three-core cable (with a yellow and green protection wire  to make connection). Wires should be deisolated to a length of 7mm.



The shock protection circuit shall be performed with a particular care, i.e. the yellow and green wire coat of the power cable shall stick to one side of the '⊕' terminal - in the PSU enclosure. Operation of the PSU without a properly made and fully operational shock protection circuit is UNACCEPTABLE! It can cause a device failure or an electric shock.

3. If needed, connect the device cables to the technical outputs:
 - EPS; technical output indicating AC power failure
 - APS; technical output indicating battery failure
4. Connect equipment to the appropriate output terminals of power supply (positive connector +V, negative connector -V)
5. Use the I_{BAT} jumper to set the maximum battery charging current, taking into account the battery parameters and required charging time.
6. Mount the battery in the battery compartment of the enclosure. Connect the batteries with the PSU paying special attention to the correct polarity and type of connections (Fig.4):

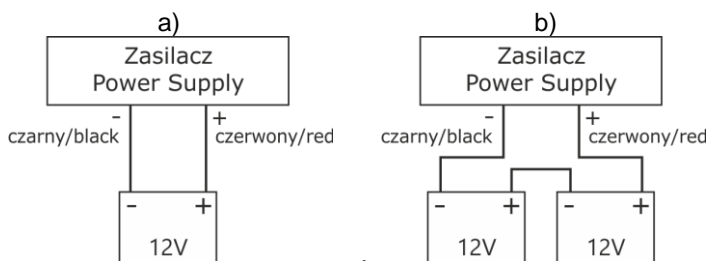


Fig. 4 Connecting batteries depending on voltage version of power supply:
a) version 12V, b) version 24V,

7. Switch on the 230 V supply. LEDs on the PCB of power supply should light. Optionally, you can install additional PKAZ168 signal module (chapter 3.1). After installing and checking proper working, the enclosure can be closed.

Output voltage of the PSU, without load $U = 13,8 (27,6) V DC$.

During battery charge, voltage can amount to $U = 11 - 13,8 (22 - 27,6) V DC$.

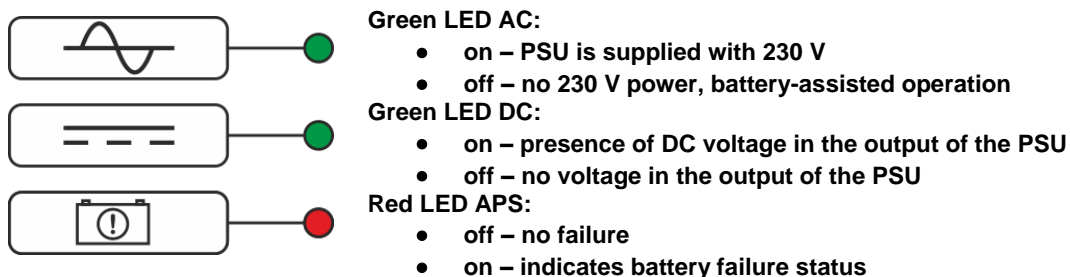
8. Run the PSU test: check the LED and acoustic indication (Tab. 7), technical output; through:
 - **cutting off the 230 V current:** LED AC (Fig. 2 level 5), EPS technical output after time 30s
 - **battery disconnection:** optical indication, APS technical output – after a battery test have been

3. Operating status indication.

The power supply unit features LED and acoustic status indication

3.1 Optical indication.

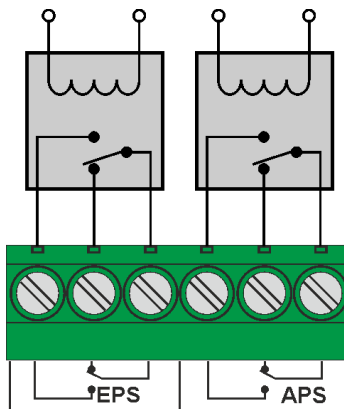
Moreover, PSU is equipped with LED indicating presence of voltage at PSU output, located on PCB of PSU module. Moreover, signalling can be extended with optional PKAZ168 module:



3.2 Technical outputs.

The PSU is equipped with indication outputs:

- **EPS FLT - technical output indicating 230 V power failure.**
The output indicates 230 V power failure. In case of power failure, contacts of relay change over after about 30 seconds.
- **APS FLT - 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 (23) V during battery-assisted operation
 A battery failure is detected within a maximum of 5 minutes - after each battery test



CAUTION! In 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, Required battery capacity can be calculated using following formula:

$$Q_{AKU} = \text{Standby Period} * (I_{WY} + I_z)$$

where:

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

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

Battery	Charging current					
	0,2 A	0,5 A	1 A	2 A	4 A	8 A
1,2Ah	6h	-	-	-	-	-
2,3Ah	12h	-	-	-	-	-
3,6Ah	18h	-	-	-	-	-
5Ah	25h	-	-	-	-	-
7Ah	36h	13h	7h	-	-	-
17Ah	-	31h	16h	8h	4h	-
28Ah	-	-	26h	13h	7h	-
40Ah	-	-	36h	18h	9h	5h
65Ah	-	-	-	30h	15h	8h

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. 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.

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