Power supplies of following series RSG2

v1.0

Switch mode buffer power supply in RACK 19” 2U enclosure

Edition: 1 from 17.11.2025
Supersedes edition: ----------

Features:

- supply voltage ~200 – 240 V
- DC 13,8 V or 27,6 V uninterruptible power supply
- available versions with the following current efficiencies:
  13,8 V: 10A/20A
  27,6 V: 5A/10A
- high efficiency (up to 89%)
- battery charging current jumper selectable
- deep discharge battery protection (UVP)
- **EPS** technical output for power failure - relay
- **APS** technical output indicating battery failure - relay type
- battery test lock jumper
- possibility to mount ARAS…N rails
- LED optical indication
- dynamic battery test
- battery circuit continuity control
- battery voltage control
- 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

TABLE OF CONTENTS:

1. Technical description.

1.1. General description.

RSG2 buffer power supplies are designed for the uninterrupted supply of devices requiring stabilized voltage of 12 V or 24 V DC (±15%).

In the event of a mains power failure, the unit automatically switches to battery operation without interruption. The devices are designed based on high-efficiency switch mode power supply modules housed in metal enclosures (RAL 9005 – black) intended for installation in 19” RACK cabinets. The enclosures are equipped with a microswitch indicating the opening of the cover.

Table 1. Parameters of power supplies:

PSU’s name	Output voltage	Charging current	Total output current with charging
RSG2-12V10A	**13,8 V**	**1 / 4 A**	**10 A**
RSG2-12V20A	**13,8 V**	**2 / 4 / 8 A**	**20 A**
RSG2-24V5A	**27,6 V**	**1 / 2 A**	**5 A**
RSG2-24V10A	**27,6 V**	**1 / 2 / 4 A**	**10 A**

1.2. Block diagram (Fig. 1).

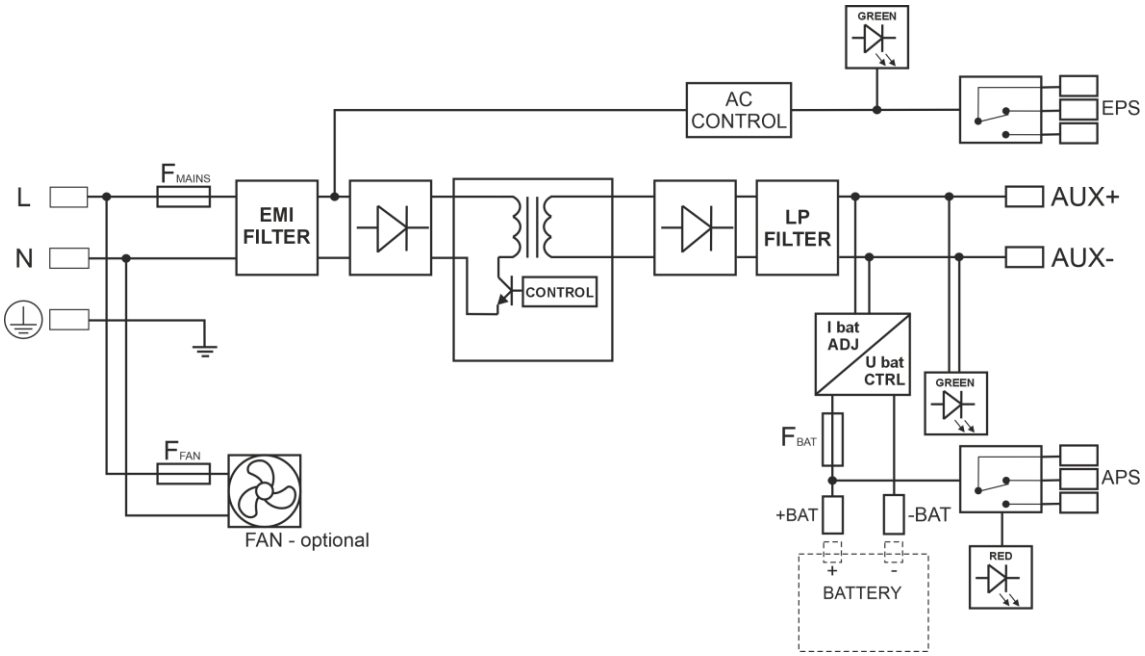


Fig. 1. Block diagram of PSU.

1.3. Description of components and connectors.

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

Element no.	Description
[1]	Output of PSU **(- AUX +)**
[2]	LED indicating the presence of **AUX** voltage
[3]	Battery connectors **(- BAT +)**
[4]	**APS** – technical output of battery failure
[5]	**APS** failure indication LED
[6]	**EPS** – technical output of AC network absence indication
[7]	**AC** presence indication LED
[8]	Power supply connector **~230 V** (IEC C14)
[9]	Selection jumper for charging current: Power supply: **12V10A; 24V5A**: • I_{BAT} = ▬, I_{BAT} = I1 • I_{BAT} = ▪▪, I_{BAT} = I2 Power supply: **12V20A; 24V10A:** • I1= ▬ I2= ▪▪ I3= ▪▪ I_{BAT} = I1 • I1= ▪▪ I2= ▬ I3= ▪▪ I_{BAT} = I2 • I1= ▪▪ I2= ▪▪ I3= ▬ I_{BAT} = I3
[10]	Battery test lock jumper • BAT_TEST ▬ - battery test active (default) • BAT_TEST ▪▪ - battery test disabled
[11]	Battery fuse
[12]	Fan (only models >200 W)

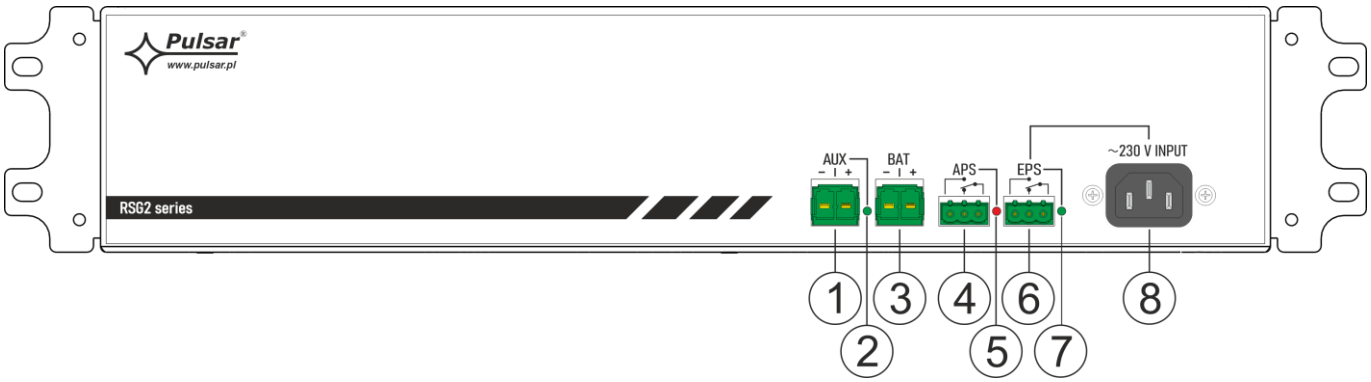


Fig. 2a. Front panel view

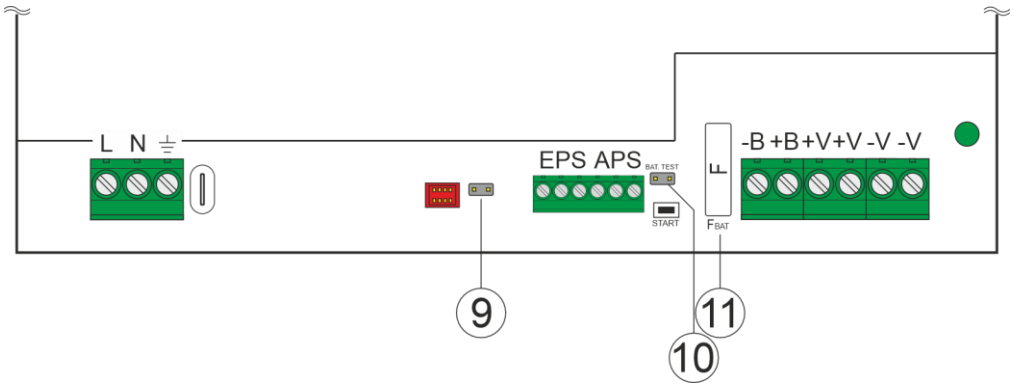


Fig. 2b. View of power supply module (12V10A, 24V5A models)

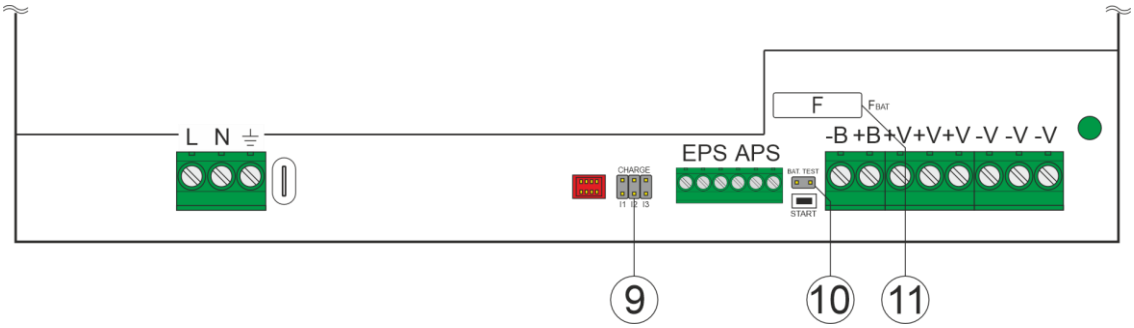


Fig. 2c. View of power supply module (12V20A, 24V10A models)

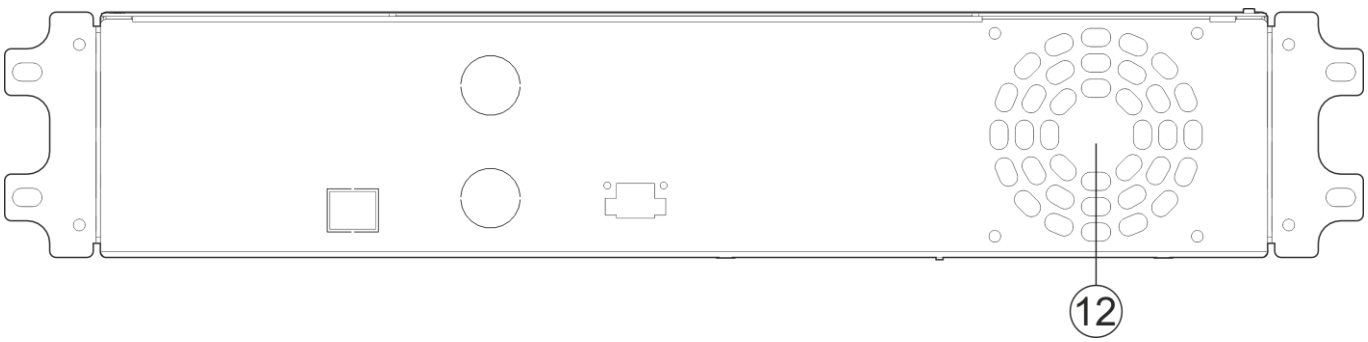


Fig. 2d. Rear panel view

1.4. Specifications:

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

Table 3. Electrical parameters.

Model	RSG2-12V10A	RSG2-12V20A	RSG2-24V5A	RSG2-24V10A
Supply voltage	~ 200 – 240 V			
Current consumption	1,3 A	1,5 A	1,3 A	1,5 A
Power frequency	50/60 Hz			
Inrush current	60 A			
Output power PSU	138 W	276 W	138 W	276 W
Total output current with charging	10 A	20 A	5 A	10 A
Efficiency	88%	87%	89%	87%
Output voltage	11 – 13,8 V - buffer operation 10 – 13,8 V - battery-assisted operation		22 – 27,6 V - buffer operation 20 – 27,6 V - battery-assisted operation	
Ripple voltage (max.)	100 mV p-p			
Current consumption by PSU systems during battery-assisted operation	50 mA	40 mA	40 mA	40 mA
Battery capacity (recommended)	7 – 65Ah	17 – 65Ah	7 – 40 Ah	7 – 65Ah
Charging current (jumper selectable)	I1: 1 A I2: 4 A	I1: 2 A I2: 4 A I3: 8 A	I1: 1 A I2: 2 A	I1: 1 A I2: 2 A I3: 4 A
Net/gross weight	4,3 / 4,7 [kg]	4,9 / 5,4 [kg]	4,3 / 4,7 [kg]	4,9 / 5,4 [kg]
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% of power supply, automatic recovery			
Over voltage protection (OVP)	>19 V (after running, disconnect PSU for about 1 minute)		>37 V (after running, disconnect PSU for about 1 minute)	
Deep discharge battery protection (UVP)	U<9,5 V (± 5%) – disconnection of battery circuit		U<19 V (± 5%) – disconnection of battery circuit	
Optical indication	- LEDs on the front panel			
Technical outputs: - EPS (AC power failure) - APS (battery failure)	relay type: 1A@ 30VDC/50VAC			
Fuse: - F_{BAT}	T 10A	T 20A	T 5A	T 10A
Enclosure dimensions (LxWxH) [±2mm]	W=19”, H=2U; 481 x 88 x 274 (WxHxD)			
Enclosure colour:	RAL 9005 (black)			
Terminals: Mains supply: Outputs: Technical outputs:	IEC C14 power inlet Φ0,5÷3,2 (AWG 24-8) 0,5-4mm^2 Φ0,5-2,1 (AWG 24-12) 0,5-1,5mm^2			
Equipment:	1.8 m power cable, set of connectors (2x PC 5/2-2P, 2x 2EDGK-3P), mounting kit (4x M6 screws + cage nuts + plastic washers)			
Notes:	Convectional cooling	Forced cooling	Convectional cooling	Forced cooling

Table 4. Operation safety.

Protection class EN 62368-1	I (first)
Degree of Protection EN 60529	IP20
Electrical strength of insulation: - between the input (mains) circuit and the power supply output circuits - between input circuit and protection circuit - between output circuit and protection circuit	 4000 V DC min. 2500 V DC min. 500 V DC min.
Isolation resistance: - between input circuit and output or protection circuit	 100 MΩ, 500 V DC

Table 5. Operating parameters.

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 the 230 V mains supply. The device should be installed in a metal enclosure (cabinet) in a horizontal position to ensure free airflow through the ventilation openings.
In order to meet the EU requirements, follow the guidelines on: power supply, enclosures and shielding: - according to application.

As power supply is designed for a continuous operation and is not equipped with a power-switch, therefore, an appropriate overload protection in power supply circuit should be provided. 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, 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 3mm.

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

1. Configure the power supply. To do this, open the enclosure cover. On the power supply module, set the battery charging current using the I_{BAT} jumper, taking into account the battery parameters and the required charging time. Depending on requirements, the battery test can also be disabled (see section 3.3).
2. Install the power supply in the RACK cabinet and route the connection cables.
3. Connect the ~230 V AC power cable with IEC C13 plug (included) to the ~230 V input socket of the power supply.

The device is designed to protection class I, therefore it must be connected only to an installation with an effective shock protection (earthing) circuit. Operation of the PSU without the properly made and fully operational shock protection circuit is UNACCEPTABLE! It can cause a device failure or an electric shock.

4. If necessary, connect device cables to the technical outputs (using the included 2EDGK-2P connectors):
   - EPS; technical output of AC network absence indication
   - APS; technical output indicating battery failure
5. Connect the load(s) to the AUX output connector using the included PC5/2-2P plug. Maintain correct polarity (positive pole marked “+”, negative pole marked “–”).
6. Connect the battery/batteries to the BAT output connector using included PC5/2-2P plug. Maintain correct polarity (positive pole marked “+”, negative pole marked “–”) and appropriate connection configuration (Fig. 4):

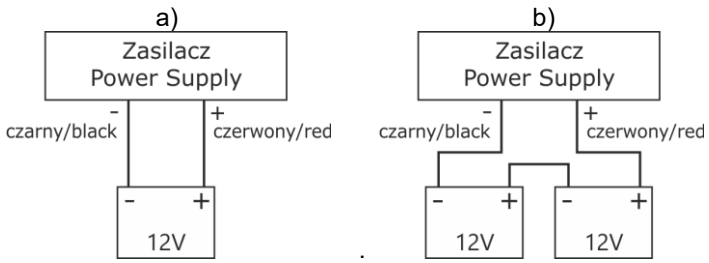


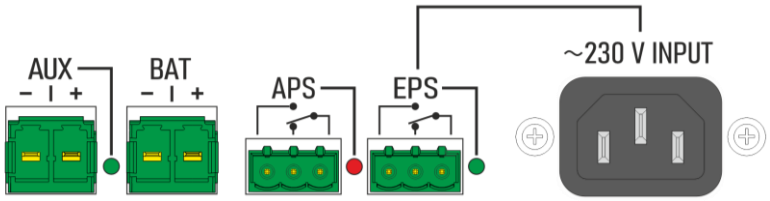
Fig. 4 Connecting batteries depending on voltage version of power supply:
a) version 2V, b) version 24V,

7. Switch on 230 V supply. The LEDs indicating the presence of AUX voltage and ~230 V on the front panel should light up.
8. 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.
9. Perform power supply tests: check optical indication (section 3.1), technical outputs by:
   a) cutting off the 230 V current: the AC LED (Fig. 2a, item 7) will turn off, and the EPS technical output will change its state after approximately 30 s.
   b) battery disconnection: the APS LED (Fig. 2a, item 5) will light up, and the APS technical output will change its state after performing the battery test (~5 min).

3. Operating status indication.

3.1 Optical indication.

The power supply is equipped with optical status indication located on the front panel.



Green EPS LED:
- ON - the PSU is supplied with 230 V
- OFF - no 230 V power, battery-assisted operation

Green AUX LED:
- ON - presence voltage in output of PSU
- OFF - no voltage in the output of the PSU

Red APS LED:
- OFF - no failure
- ON - indicates battery failure status

3.2 Technical output.

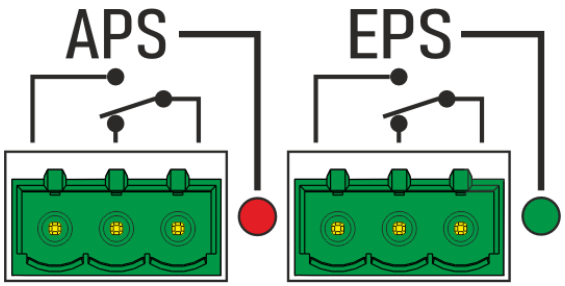
The PSU is equipped with indication outputs:

- **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 (23) V during battery-assisted operation

A battery failure is detected within a maximum of 5 minutes - after each battery test. Detection is based on a temporary reduction of the output voltage in order to measure the voltage at the battery terminals.
The function can be disabled by removing the battery test lock jumper (see section 1.3).

CAUTION! If the battery test lock jumper is removed, the APS output will indicate only low battery voltage during battery operation.



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

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 the load
Iz – 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.

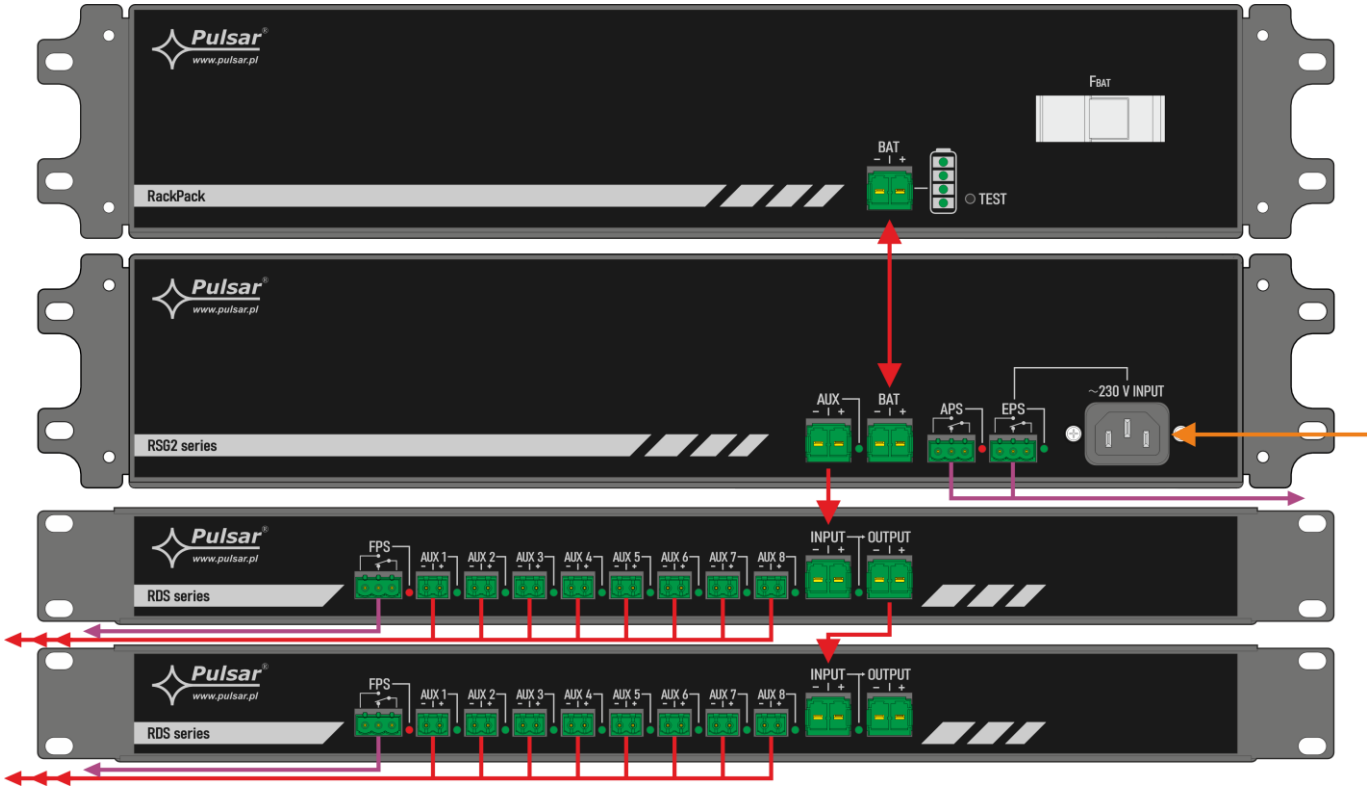
Battery	Charging current			
	1 A	2 A	4 A	8 A
7Ah	7h	-	-	-
17Ah	16h	8h	4h	-
28Ah	26h	13h	7h	-
40Ah	36h	18h	9h	5h
65Ah	-	30h	15h	8h

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 the power supply module (removal of the device cover is required).

4. Integration of RACK series devices.

RSG2 series buffer power supplies are part of the Pulsar RACK system, which includes: the RDS fuse module, the RackPack battery enclosure, and RWB series power supplies (dedicated to IP monitoring systems). The devices are visually matched and feature a standardized connection method, which simplifies installation and allows the system to be adapted to individual requirements. An example configuration is shown below:



5. Maintenance.

The figure set of contacts shows a potential-free status of relay, which corresponds to power supply failur. PSU does not require any specific maintenance, however, its interior should be cleaned with compressed air if it is used in dusty conditions. In case of fuse replacement, use only compatible replacement parts.

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.

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