Pulsar®

CNBOP-PIB

CE 17
1438

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Power supply unit for fire systems used in building industry.
Declared performance: Fire safety.
Certificate of constancy of performance: 1438-CPR-0504
Certificate of admittance: 4421/2021
Conformity: EN 54-4:2001 + A1:2004 + A2:2007
EN 12101-10:2007 + AC:2007

DSOS24V

v.1.1

FIREMAN'S MICROPHONE POWER SUPPLY FOR

THE VOICE ALARM SYSTEMS 24V

EN*

Edition: 6 from 16.11.2021

Supercedes edition: 5 from 10.09.2021

REACH compliance

RoHS

PSU features.

- Compliant with the requirements of the EN 54-4:1997+AC:1999+A1:2002+A2:2006 and EN 12101-10:2005+AC:2007standards and pt. 12.2 of the Regulation of the Minister of Interior and Administration of the Republic of Poland of 20.06.2007
- Power supply for the call station of the DSO system, e.g. the PVA-15CST and two PVA-20CSE extensions by BOSCH
- 24V DC Uninterruptible Power Supply
- Single battery power supply (7Ah /12V)
- Wide supply voltage range (176-264 V AC)
- Low ripple voltage
- Microprocessor-based automation system
- Measurement of the resistance of the battery circuit
- Automatic temperature compensation of the battery charging
- Battery test
- Two-phase battery charging
- The accelerated battery charging
- Battery electrical continuity control
- Battery voltage control
- Battery fuse status control
- Battery charge and maintenance control
- Deep discharge battery protection (UVP)
- Battery overload protection.
- Battery output protection against short-circuit and reverse polarity connection
- Output voltage control
- Acoustic indication of failure
- Technical inputs/outputs with galvanic isolation
- Technical outputs - relay type.
- ALARM – technical output of collective failure
- EPS – technical output of 230 V AC power failure indication
- PSU – technical output of power supply failure indication
- APS – technical output of battery failure indication
- LED Optical indication.
- Protection types:
  - SCP short-circuit protection
  - OLP overload protection
- Convection cooling.
- Warranty - 3 years from production date

TABLE OF CONTENTS:

1. Technical description.

1.1 General description.

The DSOS24V is designed for uninterruptible power supply of call stations (firefighter's microphone) used in VAS (Voice Alarm Systems) requiring stabilized voltage of 24 V DC (-5%/+5%).

In the case of mains power loss, the PSU immediately switches to battery power. The power supply unit is housed in a metal enclosure (color red RAL 3001) with space for a 7Ah / 12V battery. The power supply unit uses maintenance free, AGM or gel batteries (7Ah/12V).

1.2. Block diagram.

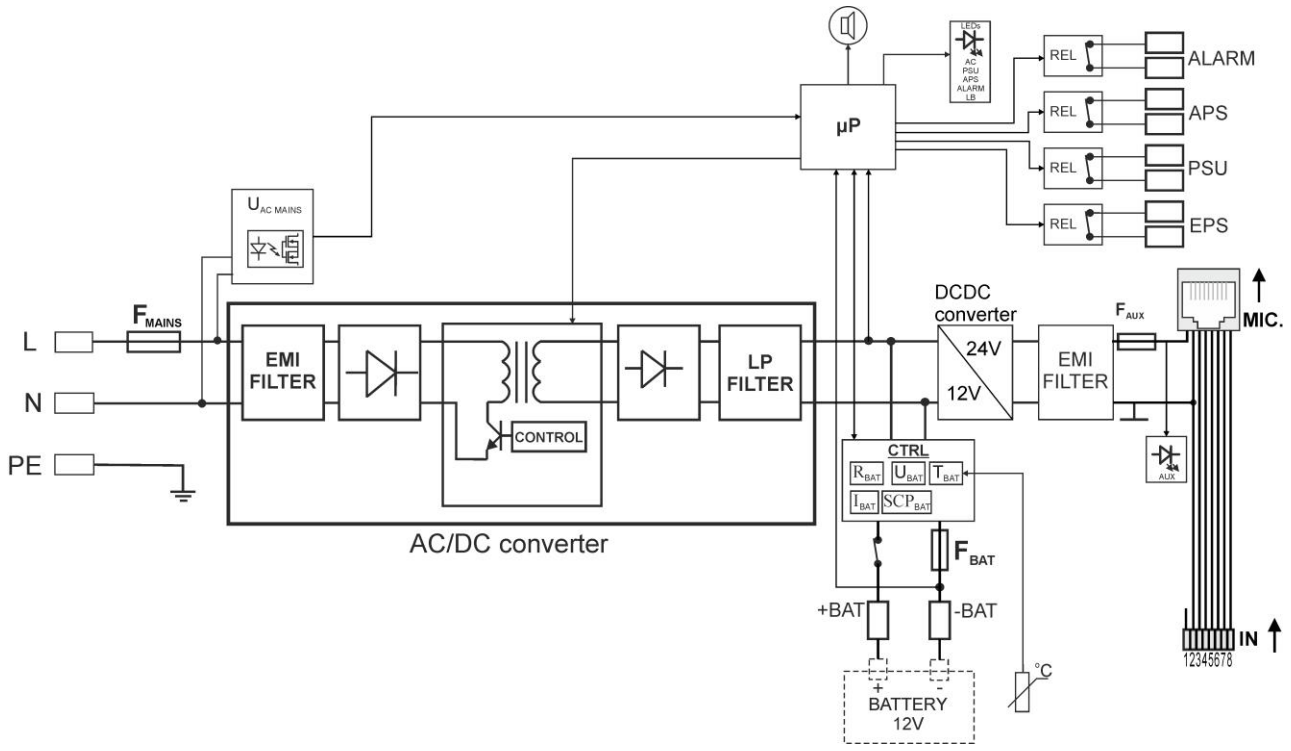

Fig. 1.Block diagram of the power supply unit.

1.3 Description of components and power supply connectors.

Table 1. Components of the PCB of the power supply (see Fig. 2).

Component No.	Description
1	**F_{BAT}** fuse in the battery circuit, T2A / 250V
2	**BUZZER** – acoustic indicator
3	**PANEL** – Output terminal of the external optical indication
4	**TEMP** – battery temperature sensor jack
5	**LED lights** - optical indication: **AC** – AC voltage **AUX** – 24V DC output voltage **PSU** – PSU failure **APS** – battery failure **ALARM** – collective failure **LB** – battery charging
6	**F_{AUX}** fuse in the battery circuit, 24 V DC, F500mA / 250V
7	**jumper**; switching on acoustic indication ▬ - indication ON ▪▪ - indication OFF Description: ▬ jumper on, ▪▪ jumper off
8	**Jumper** for configuring the relay contacts: NC or NO. NO / NC - contact closed in case of failure NO / NC - contact open in case of failure (factory setting)
9	**Terminals of technical outputs** **EPS** – technical output of AC power failure indication **PSU** – technical output of power supply failure indication **APS** – technical output of battery failure indication **ALARM** – technical output of collective failure indication
10	**The 1..8 Connector** for connecting the CST BUS
11	**The RJ45 connector** for connecting the call station (microphone)

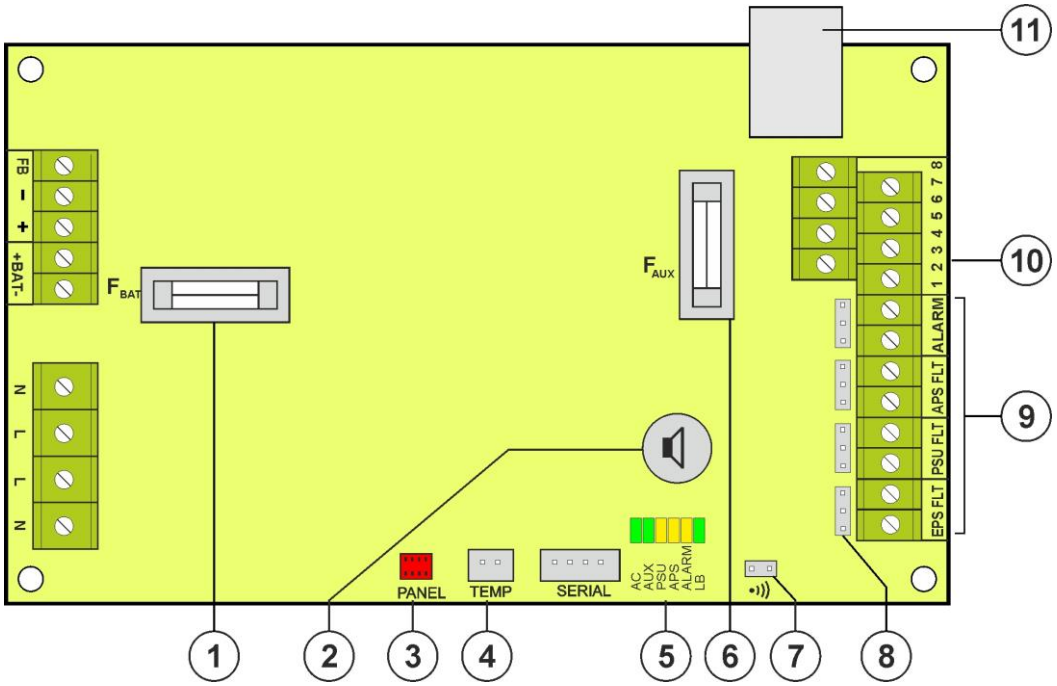

Fig. 2. The view of the printed circuit board of the power supply unit.

Table 2. Components of the power supply (see Fig. 3).

Component No.	Description
1	**Mounting shelf** with dimensions of 540 x 190 [mm] for the call station PVA-15CST and two PVA-20CSE extensions by BOSCH
2	**LED lights** - optical indication: **AC** – AC voltage **DC** – 24 V DC output voltage **FAILURE** – collective failure
3	**Battery space** for a 7Ah/12V battery
4	**Battery connectors;** positive: +BAT = red, negative: - BAT = black
5	**PE-N-L** power connector 230V AC, $\mathbf{F_{MAIN}}$=T3,15A / 250V

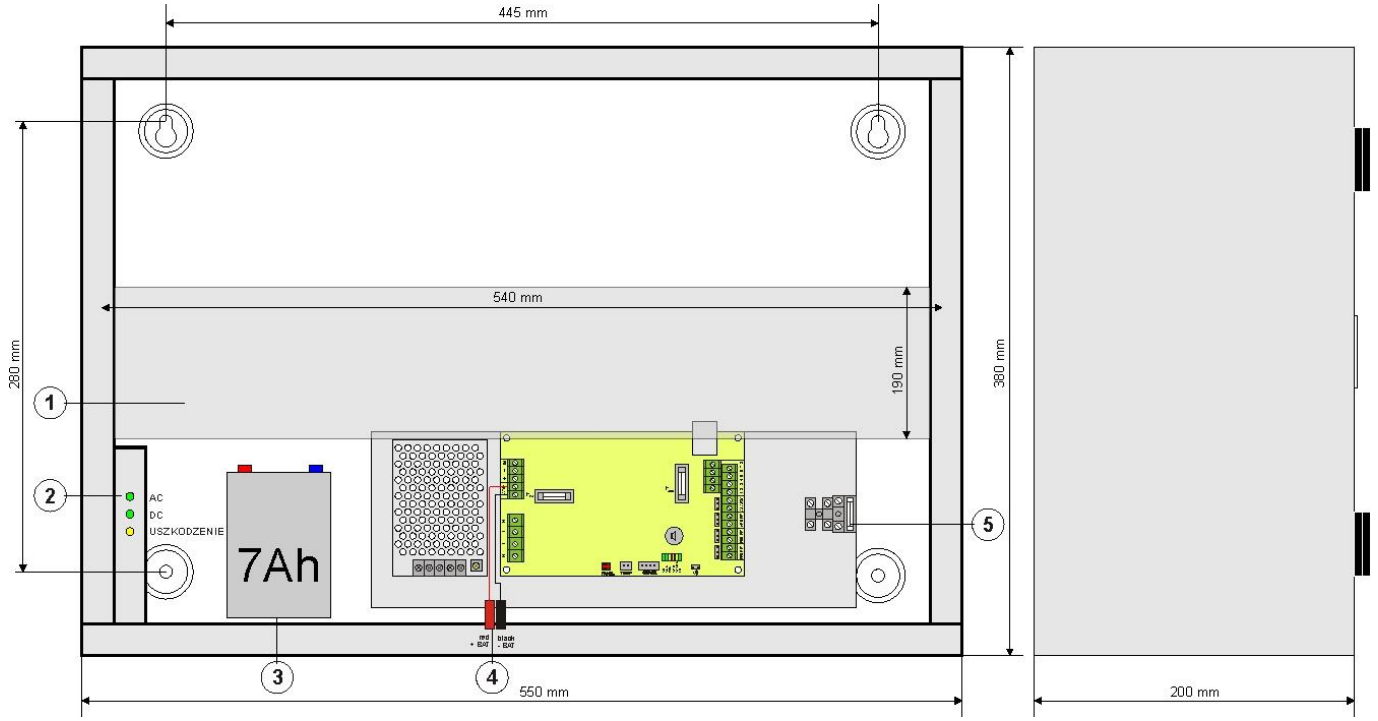

Fig.3. The view of the power supply unit.

1.4 Technical parameters:
- **Electrical parameters (Table 2)**
- **Mechanical parameters Table 3)**
- **Safety of Use (Table 4)**
- **Operation parameters (Table 5)**

Table 2. Mechanical parameters.

Power supply type:	A (EPS - External Power Source)
Supply voltage:	176 ÷ 264 V AC
Current consumption	0,15A @230 V AC
Power supply frequency	50Hz
PSU power	10W
Rated voltage	24 V DC (-5%/+5%)
Output current	200mA
The maximum resistance of the battery circuit	300mΩ
Ripple voltage	45mV p-p max.
Current consumption by PSU systems during battery operation	I = 115mA
Battery charging current	0,4A
The coefficient of temperature compensation of the battery voltage	-20mV/ ºC (-5ºC ÷ 40ºC)
Low battery voltage indication	Ubat < 11,5V, during battery operation
Short-circuit protection SCP and overload protection OLP	F500mA melting fuse at the 24 V DC output (requires fuse replacement)
Battery circuit protection SCP and reverse polarity connection	T2A- F_{BAT} melting fuse (failure requires fuse replacement)
Deep discharge battery protection (UVP)	U<10V (± 1V) – disconnecting (+BAT) the battery
Technical outputs: **- EPS FLT; output indicating AC power failure** **- APS FLT; output indicating battery failure** **- PSU FLT; output indicating PSU failure** **- ALARM; output indicating collective failure**	- relay type: 0.5A@ 30 V DC/50 V AC
Optical indication. **- AC; LED indicating AC power status** **- DC; LED indicating 24V DC power status at the PSU output** **- FAILURE; LED indicating failure**	- green, normal status: permanently illuminated, failure: not lit - green, normal status: permanently illuminated, failure: not lit - yellow, normal status: not lit, failure: permanently illuminated
Acoustic indication:	- Piezoelectric indicator ~75dB /0.3m
Fuses: **- F_{AUX}** **- F_{BAT}** **- F_{MAIN}**	 F500mA / 250V T2A / 250V T3,15A / 250V

Table 3. Mechanical parameters.

Enclosure dimensions	550 x 380 x 200 (WxHxD) [mm] (+/- 2)
Mounting	445 x 280 [mm]
Net/gross weight:	9,8 / 10,5 [kg]
Enclosure	DC01 steel plate 1 mm, color red (RAL 3001)
Terminals	Mains supply: Φ0,51÷2 (AWG 24-12) Outputs: Φ0,51÷2 (AWG 24-12) The BAT battery output: Φ6 (M6-0-2,5)
Notes:	Convection cooling.

Table 4. Safety of Use.

Protection class EN 62368-1	I (first)
Protection grade EN 60529	IP30
Insulation electrical strength: - between the input (network) circuit and the output circuits of the PSU (I/P-O/P) - between the input circuit and PE protection circuit (I/P-FG) - between the output circuit and PE protection circuit (O/P-FG)	 3000 V AC min. 1500 V AC min. 500 V AC min.
Insulation resistance: - between input, output, and protective circuit	 100 MΩ, 500V/DC

Table 5. Operation parameters.

Environmental class PN-EN 12101-10:2007	1
Operation temperature	-5ºC...+40ºC
Storage temperature	-25ºC...+60ºC
Relative humidity	20%...90%, no condensation
Sinusoidal vibrations during operation: 10 ÷ 50Hz 50 ÷ 150Hz	 0,1g 0,5g
Surges during operation	0,5J
Direct insolation	unacceptable
Vibrations and surges during transport	According to the PN-83/T-42106 standard

2. Installation.

2.1. Requirements.

The power supply unit should be mounted by a qualified installer, holding relevant permits and licenses (applicable and required for a given country) for 230 V AC and low-voltage installations.

The device is designed for a continuous operation and is not equipped with a power-switch. Therefore, an appropriate overload protection in the power supply circuit should be provided. Moreover, the user shall be informed about the method of disconnecting the mains voltage (usually through assigning an appropriate fuse in the fuse-box. The electrical system shall follow valid standards and regulations. The PSU shall work in a vertical position to ensure free, convection air flow around the enclosure.

The rules for power supply, enclosures, shielding, and cable routing- according to application - must be observed in order to meet the requirements of LVD and EMC directives.

As the PSU cyclically runs a periodic battery test, during which the connection resistance is measured, pay attention to the proper installation of the battery cables.

Connecting cables should be securely connected to battery side terminals and to the power supply connector.

2.2. Installation procedure.

CAUTION!

Before installation, make sure that the voltage in the 230V power-supply circuit is cut off. To turn off the power, use an external switch where the distance between the contacts of all poles in a disconnected state is at least 3mm.

Selection of installation cables should take account §187 of the Regulation of the Minister of Infrastructure on technical conditions to be met by buildings and their location, as amended on 12 March 2009.

1. Mount the power supply to the wall in the selected location using special metal expansion plugs. Do not use PVC plugs.
2. Connect the power cables (~230V) to the L-N terminals of the power supply. Connect the ground wire to the terminal marked by the earth symbol PE. Use a three-core cable (with a yellow and green PE protection wire) to make the connection.

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 marked with the PE symbol on the PSU enclosure. 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.

3. Connect the RJ45-RJ45 cable from the call station of the "CST BUS" to the "MIC" jack on the power supply board.

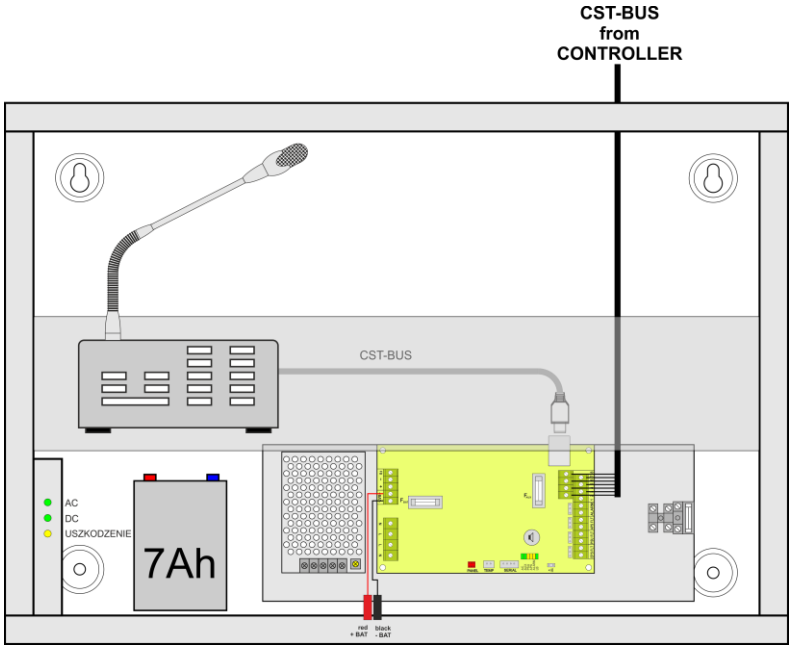

Fig. 4. Connecting the call station to the power supply.

4. Mount the mounting brackets to the call station paying attention to their correct position in relation to the right "P" and left "L" sides.
5. Connect the transmission cable (from the DSO „CST-BUS" control panel) to the "IN" connector on the power supply board (mark 1..8).
6. If needed, connect the device cables to the technical outputs:
   - EPS FLT; technical output of 230V AC power failure indication
   - PSU FLT; technical output of power supply failure indication.
   - APS FLT; technical output of battery failure indication
   - ALARM; technical output of collective failure of the PSU
   When technical outputs require reverse operation – move the configuration jumpers (Table 1, point 8).
7. Insert the battery in the designated compartment of the enclosure (Fig. 3 [3]). Connect the battery with the power supply board paying special attention to the correct polarity.
8. Mount the temperature sensor near or directly on the battery.
9. Switch on the 230 V AC supply. The corresponding LEDs on the front panel of the power supply should be lit: green AC and green DC.
10. Once the tests and operation control have been completed, the enclosure can be locked

2.3. The procedure for checking the power supply.

1. Check the indication displayed on the front panel of the power supply unit:
   a) The AC LED should remain lit to indicate the presence of the supply voltage.
   b) The DC LED should remain lit to indicate the presence of the output voltage.
   c) LED light DAMAGE off.
2. Check the output voltage after 230V AC power failure.
   a) Simulate the lack of 230 V AC mains voltage by disconnecting the appropriate switch in the electrical installation.
      I. The AC LED should go out
      II. The DC LED should remain lit to indicate the presence of the output voltage.
      III. After approximately 10s the EPS and ALARM technical outputs will change status into opposite.
      IV. Acoustic indication will be activated.
   b) Turn on the 230 V AC mains voltage again. Indication should return to the initial status within a few seconds.
3. Check whether the lack of continuity in the battery circuit is properly indicated.
   a) Disconnect the battery cable (230 V AC mains supply) during normal operation of the power supply unit.

I. Within 5 minutes the PSU will start signaling a failure in the battery circuit.
II. The ALARM LED will start blinking.
III. The APS and ALARM technical outputs will change status into opposite.
IV. Acoustic indication will be activated.

b) Reconnect the wires in the battery circuit.
c) The power supply should return to normal operation, indicating the initial status, within 5 minutes after the battery test is completed.

3. PSU operation indication.

3.1 Optical indication.
The PSU is fitted with three LED lights at the front panel

AC	**AC voltage** • ON - PSU supplied with 230 V AC voltage • OFF - no 230 V AC supply
DC	**24V DC output voltage** • ON – 24 V DC voltage at the MIC output of the power supply • OFF - no 24 V DC voltage at the MIC output of the power supply
FAILURE	**Collective failure** • blinking - failure • OFF – normal operation

3.2 Technical outputs.
The power supply is fitted with relay indication outputs changing state upon the occurrence of a specific event:

- **EPS FLT – output of 230V AC power failure indication**.
  Output indicating 230V AC power failure. Under normal status – with the 230 V AC supply on - the output is closed (open *); in the case of power failure the output is switched to an open state (shorted *) after 10 seconds.

- **APS FLT– output of battery failure indication.**
  Output indicating failure in the battery circuit. Under normal status – with the 230V AC supply on - the output is closed (open *); in the case of failure the output is switched to an open state (shorted *). Failure can be triggered by the following events:
  - Faulty battery
  - Undercharged battery
  - Disconnected battery
  - High resistance of the battery circuit
  - Battery voltage below 11,5V during battery-assisted operation
  - Battery fuse failure
  - No continuity in the battery circuit

- **PSU FLT** – output of power supply failure indication
  Output indicating PSU failure. Under normal status – with the 230 V AC supply on - the output is closed (open *); in the case of failure the output is switched to an open state (shorted *). Failure can be triggered by the following events:
  - Battery voltage below 13V
  - Battery voltage higher than 14,6V
  - Failure of the battery charging circuit
  - F_{AUX} fuse failure
  - Too high battery temperature
  - Temperature sensor failure
  - Internal damage of the power supply

- **ALARM – technical output of collective failure indication.**
  Output indicating collective failure. Under normal status – with the 230 V AC supply on - the output is closed (open *); in the case of failure at any EPS, APS, or PSU output, the output is switched to an open state (shorted *).

** Depending on the position of the jumper for configuring the relay contacts, see Table 1, item 8*

4. Maintenance and operation.

4.1. Overload or short circuit of the power supply output (SCP activation)

In the case of short circuit or overload of the power supply, the F_{AUX} fuse becomes permanently damaged. Restoration of the voltage at the output requires fuse replacement

4.2. Protection against reverse battery connection.

The power supply unit is protected against reverse battery connection. In the case of incorrect connection the FBAT fuse becomes damaged. The return to normal operation is possible only after replacing the fuse and correct connection of the batteries.

4.3. Deep discharge battery protection (UVP).

The PSU is equipped with the discharged battery disconnection system. During the battery-assisted operation, reducing voltage below 10V±1V at the battery terminals will disconnect the battery within 15 seconds. Re-connecting the battery to the power supply occurs automatically once the 230V mains voltage is restored.

4.4. Battery test

The PSU performs the battery test every 5 minutes. During the test the power supply controller measures the electrical parameters in accordance with the implemented measurement procedure.

A negative result occurs when the continuity of the battery circuit is interrupted, the resistance in the battery circuit is above 300 mΩ, or when the terminal voltage drops below 12V.

The battery test is automatically locked when the power supply is in the mode in which performing the battery test is not possible. Such a state occurs, e.g. during battery-assisted operation or in the case of power supply overload.

4.5. The measurement of the resistance of the battery circuit

The power supply unit is fitted with a function that checks the resistance in the battery circuit. During the measurement, the power supply controller takes into account the key parameters in the circuit and in the case of exceeding the limit value of 300m Ohm it indicates failure.

A failure may indicate significant battery consumption or loosening of the connection cables.

4.6. Measurement of the battery temperature

The power supply unit is fitted with a temperature sensor to monitor the temperature parameters of the installed battery.

The measurement of the battery temperature and the charging voltage compensation extend the battery life.

4.7. Maintenance.

Technical inspections and maintenance can be performed after disconnecting the power supply from the power network

In the case of fuse replacement, use a replacement of the same parameters

Re-tighten all screw connections after 4 weeks from installation of the power supply. 2 [9.10].

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