DSO-PRA

v.1.0

19" RACK CABINET FOR PRAESENSA DSO SYSTEM

EN

Edition: 5 from 21.06.2023

Supersedes the edition: 4 from 19.09.2022

TABLE OF CONTENTS

1. System features

- dimensions of RACK cabinets: 24U(600x600), 36U(600x600), 42U(600x600, 600x800), 45U(600x600, 600x800), 50U (600x800)
- CONFI-DSO PRAESENSA is a program for designers that has been designed with BOSCH to support the DSO configuration
- PSG3LA LED panel for optical and acoustic indication compliant with the PN-EN54-16 standard for evaluating DSO system operation
- LZxx-PRA safety strip with overcurrent fuses, surge arresters and a dummy connector
- single-phase or 3-phase power supply
- 230 V AC LDxxxx voltage distribution terminal
- grounding terminals
- protection Class: IP30
- batteries included
- mounting bracket for batteries
- mounting shelves for each cluster
- enclosure of DSOS24VPU firefighter's microphone – available as an option
- AWO506 End of Line (EOL) Supervision Board – available as an option
- forced cooling - fan unit with a thermostat; optional accessory for 24U, standard for 36U, 42U, 45U, 50U
- warranty for DSO-PRA cabin – 2 years from production date
- warranty for batteries – 1 year from installation date

2. Technical description.

2.1. General description.

19" DSO-PRA RACK cabinet is designed for installation of PRAESENSA voice alarm system devices by Bosch.

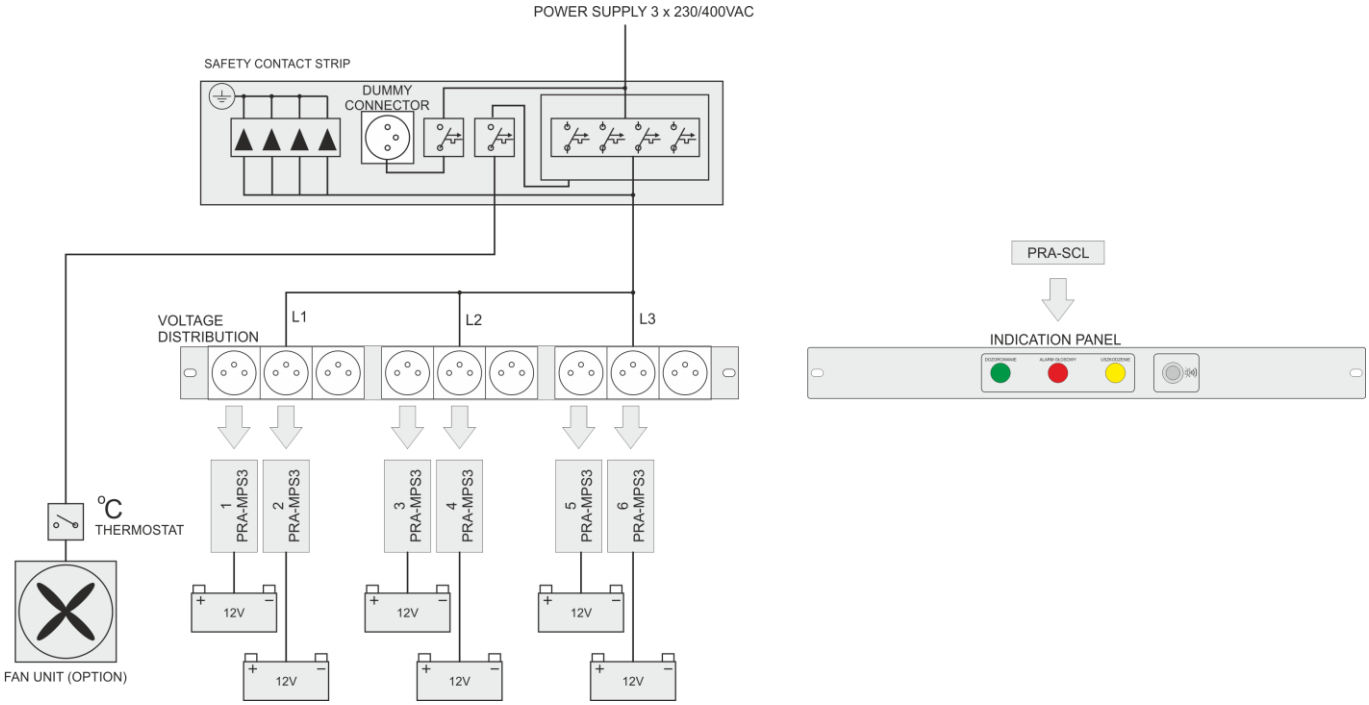
Devices of DSO system are placed in 19" RACK cabinet together with appropriate battery banks.

Power supply from power grid can be supplied to cabinet in form of 1-phase or 3-phase connection, which depends on total power consumed by DSOdevices.

CONFI DSO PRAESENSA program is designed for proper and fast configuration of DSO cabinet; based on implemented design parameters, program selects a complete power supply system taking into account required backup time.

2.2. Electrical scheme.

Figure 1 shows an exemplary wiring diagram inside a DSO cabinet for a 3-phase 230 V / 400 V AC connection.



PRA-MPS3 – multi-functional power supply
PRA-SCL – system driver

Fig.1. Block diagram of the DSO power supply system.

3. Design of Voice Alarm System.

The design and all components of the DSO are based on the RACK 19" cabinet (Protection Class: IP30), containing all components of the system. Depending on the system and the number of devices, the height of the cabinet is adjusted individually. The available dimensions are 24U(600x600) to 50U(600x800).

In order to facilitate the installation of devices, especially those of greater weight such as audio amplifiers, mounting brackets are fitted inside. If a call station (firefighter's microphone) is to be mounted in the rack, a dedicated pull out shelf will be added to facilitate the use of the microphone.

The equipment installed inside the cabinet can be accessed via the glass front doors, removable side walls, and rear doors. In addition, the use of two types of locks, separate for the front and rear doors, restricts unauthorized access. The cabinet can be mounted on a metal base with a height of 100 mm or wheels allowing it to move freely.

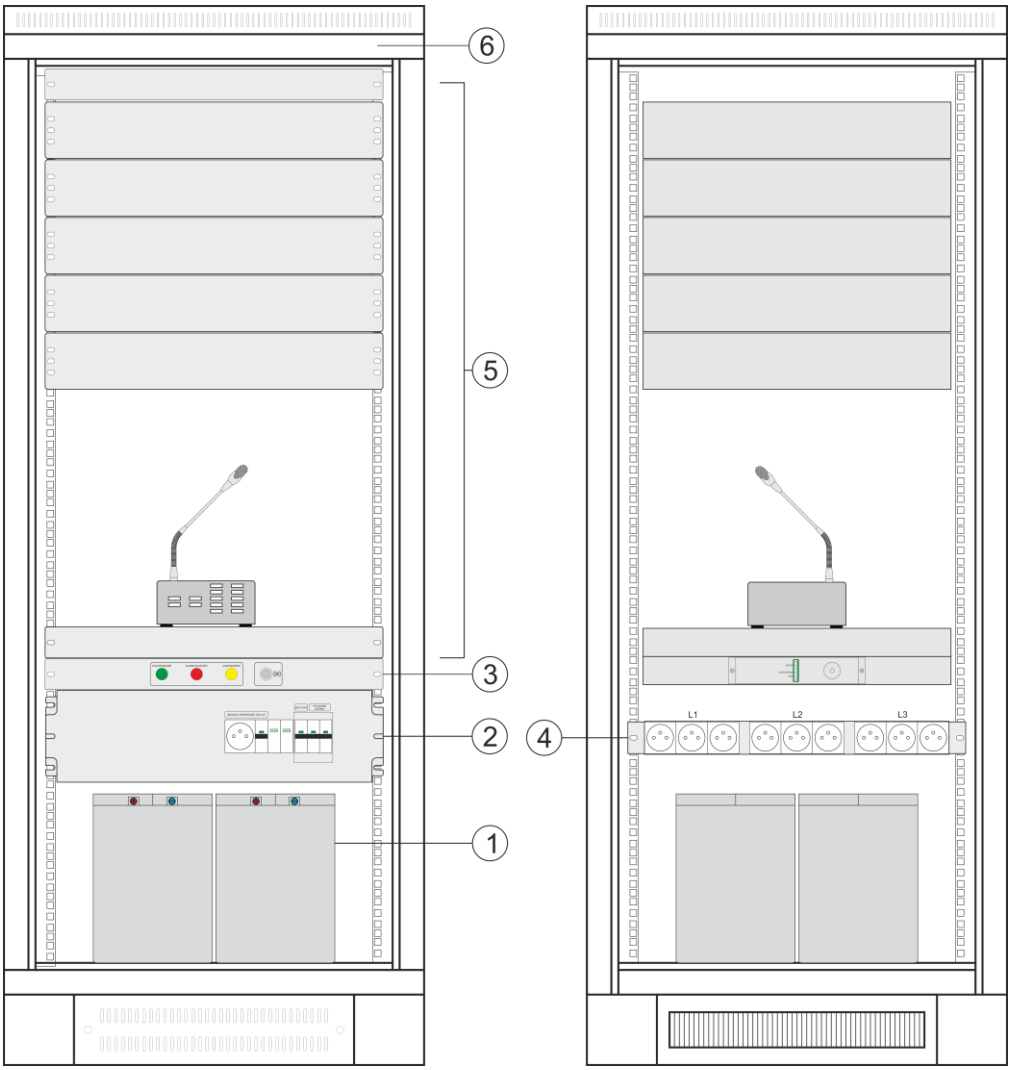


Fig. 2. Sample configuration of a DSO cabinet.

Table 1. Components of RACK cabinet.

Element no.	Description
1	Batteries
2	LZxx-PRA safety strip
3	PSG3LA LED panel for optical and acoustic indication.
4	230 V AC LDxxxx voltage distribution terminal.
5	Compartment for DSO equipment: power supply units, system driver, amplifiers, firefighter's microphone.
6	RAWP600RZ fan panel with a thermostat (optional).

Table 2. Technical parameters of RACK cabinets.

Mounting dimensions	**W=19" H=24U**	**W=19" H=36U**	**W=19" H=42U**	**W=19" H=45U**	**W=19" H=50U**
External dimensions	600x600x1303 [mm]	600x600x1837 [mm]	600x600x2103 or 600x800x2103 [mm]	600x600x2236 or 600x800x2236 [mm]	600x800x2459 [mm]
Weight	66kg	76kg	- 89kg (600x600mm) - 104kg (600x800mm)	- 91kg (600x600mm) - 106kg (600x800mm)	152kg
Static load	1000kg				
Protection class	IP30				
Notes	– set includes a base with a height of 100mm (optional - set of wheels) – glass front door – two types of locks, separately for front and rear doors				

4. Components of the DSO cabinet.

Equipment of each DSO cabinet includes elements necessary for proper operation of system.
These components, depending on their intended use, protect electrical system against overvoltage or short circuit, supply power to receivers, and ensure proper signaling or cooling of installed equipment in RACK cabinet.

If device comes in several models, they are selected automatically by CONFI-DSO PRAESENSA program supporting DSO configuration.

4.1. The LZxx-PRA safety strip.

Safety strip is fitted with circuit breakers, surge arresters, and a dummy connector. In right part, there is a connector for connecting 230V / 400V mains supply from power grid.

Main overcurrent circuit breaker disconnects 230 V / 400 V mains from all system devices.
In addition to the main switch, it is fitted with „type 3" surge arresters compliant with the EN 61643-11 standard.

Dummy connector includes overcurrent circuit breaker which can be switched on regardless of status of main switch.

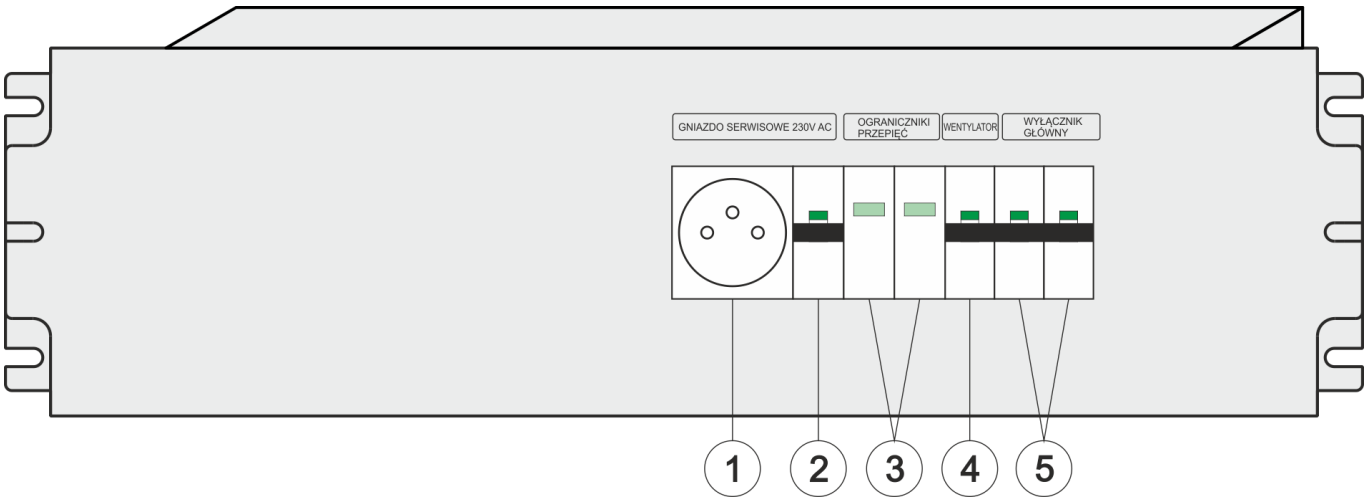


Fig.3. The LZ1F-PRA safety strip.

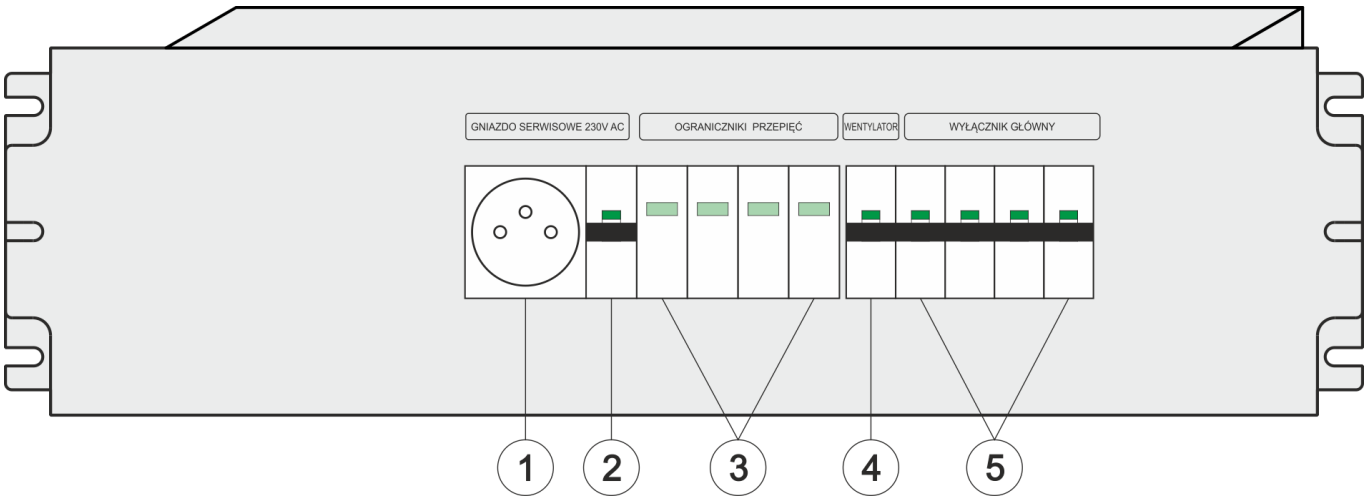


Fig.4. The LZ3F-PRA safety strip.

Table 3. Components of the safety strip.

Element no.	Description
1	A 230 V maintenance socket
2	Overcurrent circuit breaker of 230 V maintenance socket
3	Surge arresters
4	Overcurrent circuit breaker of fan
5	Main overcurrent circuit breaker

Safety contact strip is connected to mains. Access is obtained by removing front cover. Connection to power system is shown below.

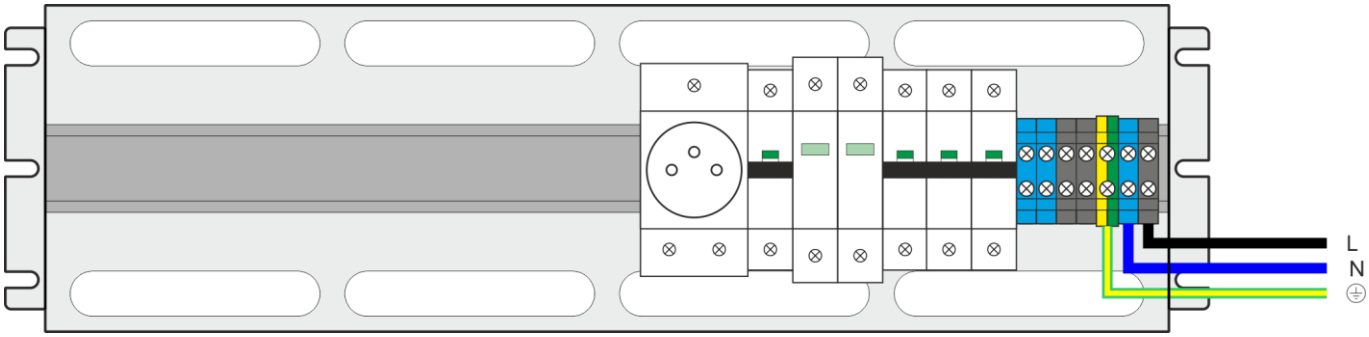


Fig.5. Connection to the power system – a single-phase 230 V AC connection.

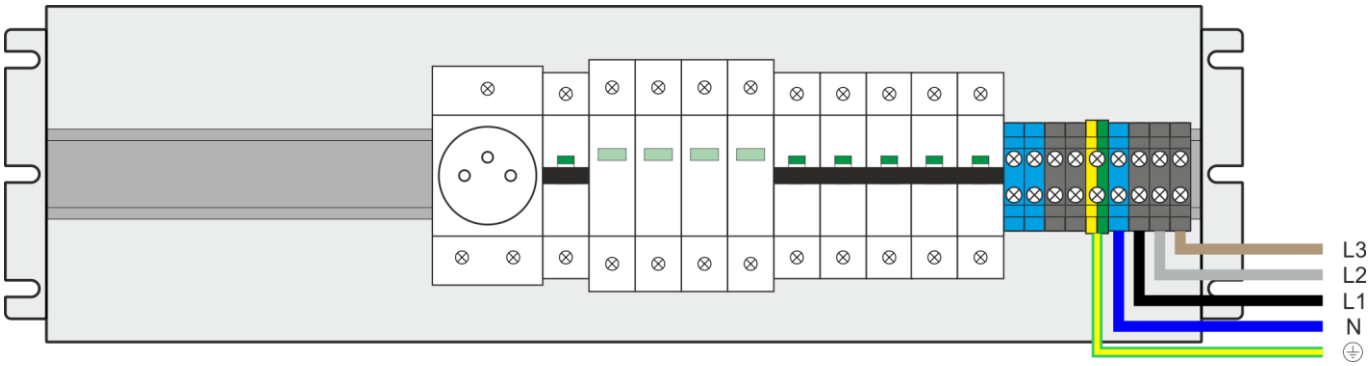


Fig.6. Connection to the power system – 3-phase 400 V AC connection.

Table 4. Technical parameters of safety strips.

Model	LZ1F-PRA	LZ3F-PRA
Connection to mains	Single-phase 230 V	3-phase 3x230 V / 400 V
Main overcurrent circuit breaker	1+N-pole C20 Rated short-circuit breaking capacity 6kA	3+N-pole C20 Rated short-circuit breaking capacity 6kA
Surge protection	L, N type 3 (D) according to EN 61643-11 standard	L1, L2, L3, N type 3 (D) according to EN 61643-11 standard
Overcurrent circuit breaker of fan	1 - pole, C10	
Recommended cable parameters	3 x 1,5 mm^2…4 mm^2	5 x 1,5 mm^2…4 mm^2
Dimensions	Standard RACK 19” H= 3U	

4.2. 230 V AC LDxxxx voltage distribution terminal.

Voltage distribution terminal is equipped with 230 V connection sockets and it is used to supply components of DSO. Depending on number of devices and amount of power consumption, terminal can have 1-phase or 3-phase connection. 3-phase version enables more uniform load per phase of power grid. Terminal is placed in back of cabinet.

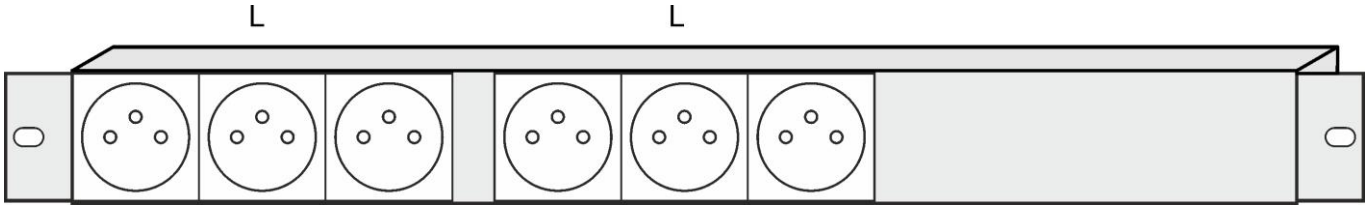


Fig. 7. A LD1F6G voltage distribution terminal.

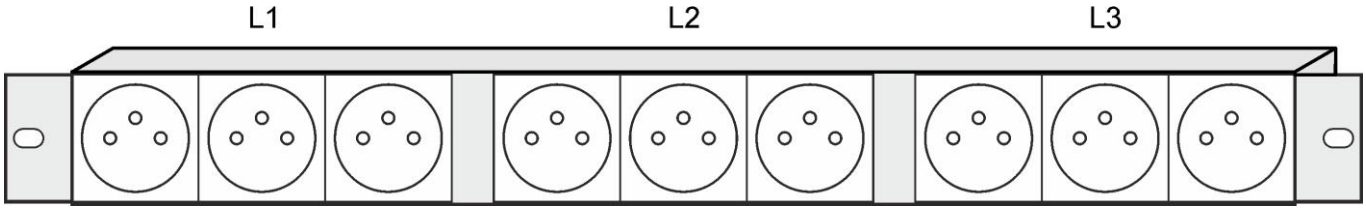


Fig. 8. LD3F9G voltage distribution terminal.

Table 5. Technical parameters of distribution terminals.

Model	LD1F6G	LD3F9G
Number of outlets	6	9
Protection	C20	3xC20
Dimensions	Standard RACK 19” H= 1U	

4.3. PSG3LA panel for optical and acoustic indication.

The optional panel for optical and acoustic indication compliant with the PN-EN54-16 standard indicates the status of the entire DSO system. It is equipped with three LEDs, a sounder, and a reset button of acoustic indication.

The panel can indicate three different operating states

CONTROL – Normal state, indicating the presence of mains power.
ACOUSTIC INDICATION – Fire alarm status, acoustic indication ON
FAILURE – Fire alarm status, acoustic indication ON

The indication panel is fitted with two alarm signal inputs:
- ACOUSTIC INDICATION
- FAILURE

Inputs should be connected to the control panel or other signaling device. For proper signalization, the terminals must be normally (without failure) opened; in the case of failure, they must be closed. A voice alarm signal or failure indication triggers the appropriate optical and acoustic indication. The button on the front panel allows muting the acoustic signal, while the optical signal remains unchanged. Once the failure is cleared, the optical and acoustic indication will automatically be stopped and the green indicator will light up to indicate that the system is operating properly.

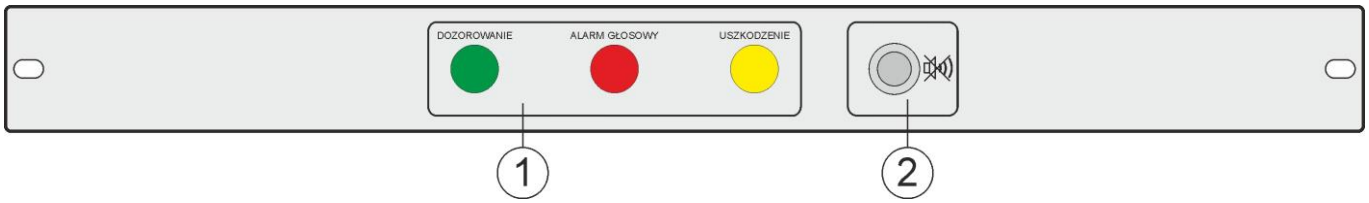


Fig.9. Indication panel – front view.

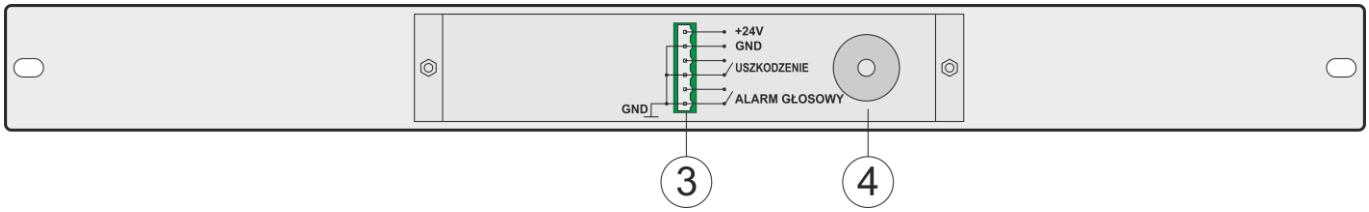


Fig.10. Indication panel – rear view.

Table 6. Components of the PSG3LA panel for optical and acoustic indication.

Element no.	Description
1	LED lights for optical indication.
2	Acoustic indication reset button.
3	Connector: ACOUSTIC INDICATION; normal status – terminals are opened Indication – terminals are closed FAILURE; normal status – terminals are opened Indication – terminals are closed + 24V / GND power supply terminals
4	Acoustic indicator.

Table 7. Technical parameters of indication panel.

Supply voltage	10÷30 V DC
Current consumption	30mA
Optical indication	LED lights: Green – „CONTROL” Red – „ACOUSTIC INDICATION” Yellow – „FAILURE”
Acoustic indication	- Piezoelectric indicator ~60dB /1m
Technical outputs: **- „ACOUSTIC INDICATION”** **- „FAILURE”**	 Normal operation (no failure) – terminals are opened Alarm – terminals closed Normal operation (no failure) – terminals are opened Failure indication – electrical contacts are closed
Terminals	Φ0,51÷2mm (AWG 24-12)
Dimensions	Standard RACK 19” H= 1U

Example of connection of optical-acoustic indication panel to MPS3-PRA DSO controller is presented below. Control output connector has SPDT type relay outputs, which can be configured for fault indication and voice alarm.

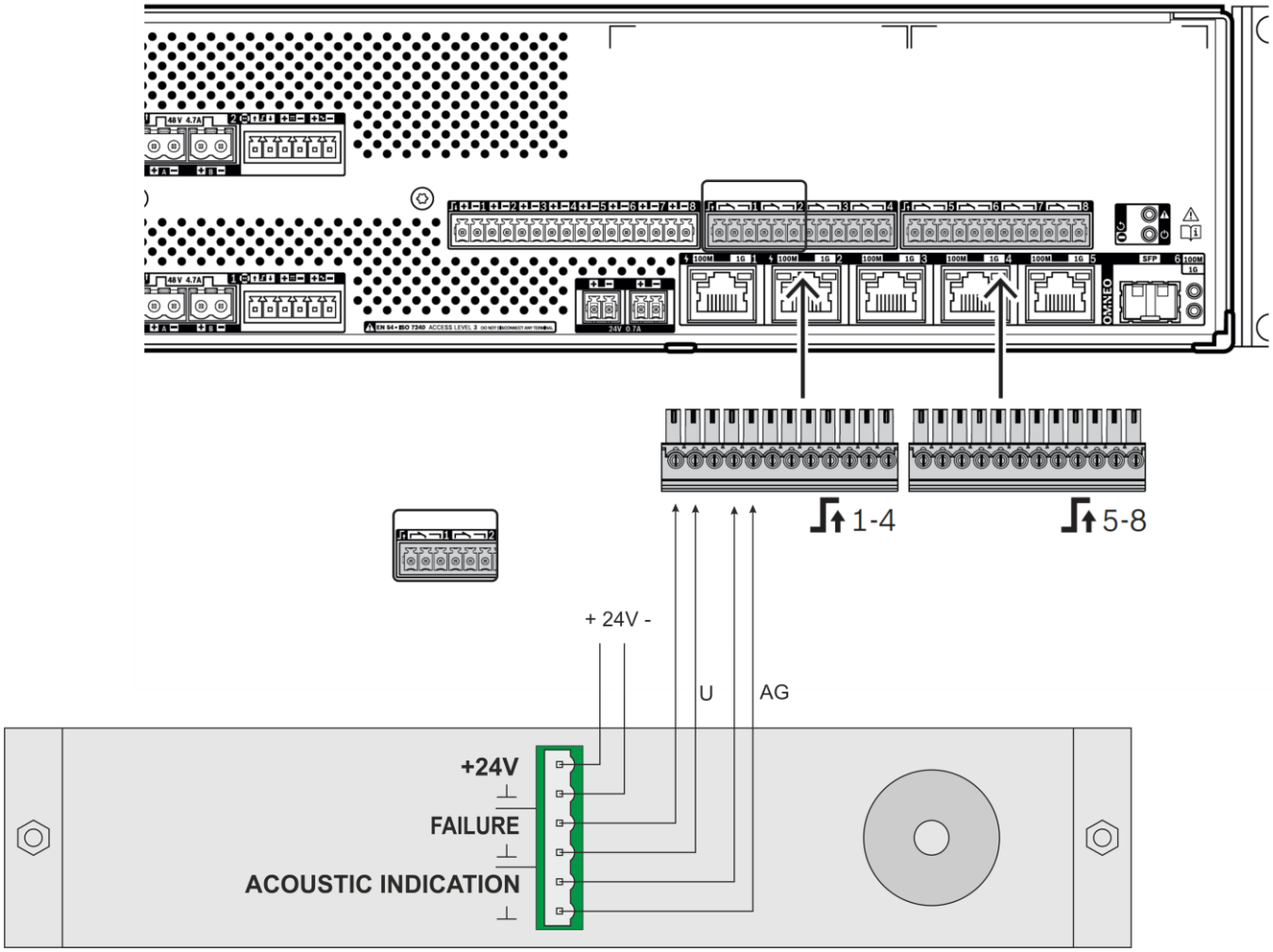


Fig.11. Indication panel – example of connection to MPS3-PRA power supply.

4.4. RAWP600RZ fan panel.

DSO cabinet is equipped with a ventilation panel located in upper part of housing to force air flow to heat emitting devices. Normally, ventilation panel is mounted in a 36U, 42U, 45U, 50U, and (optionally) 24U cabinet.

Fans are controlled by a nearby bimetallic thermostat that allows setting activation temperature in range 0-60ºC with adjustment knob. Fans are powered from 230 V mains; in case of power loss, they are switched off.

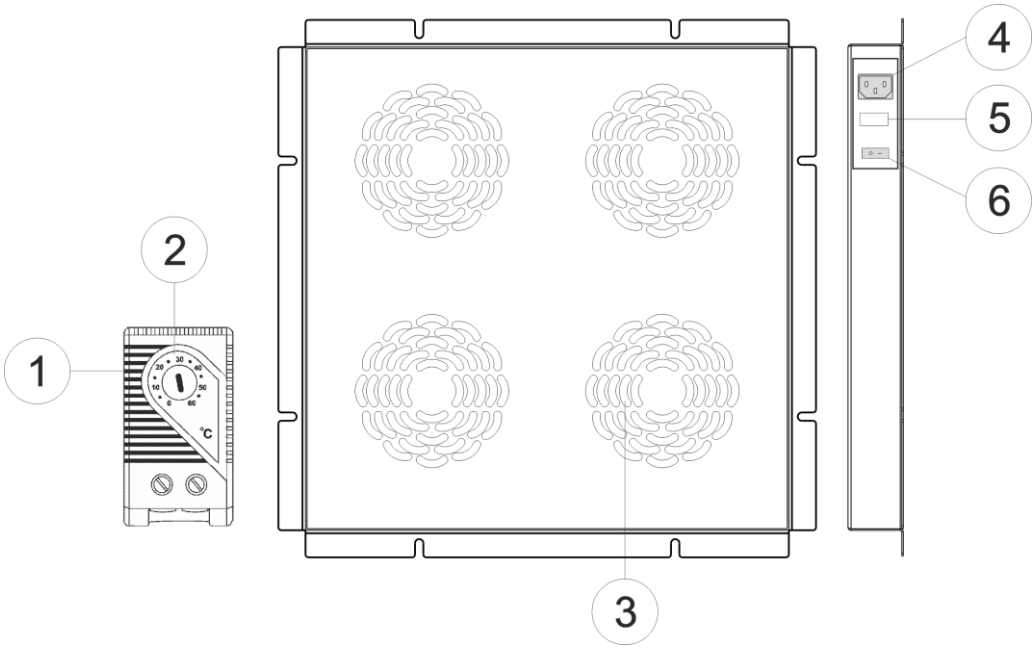


Fig. 12. Fan unit with a thermostat.

Table 8. Components of fan panel.

Element no.	Description
①	Bimetallic thermostat
②	On-off temperature control knob (in range 0-60ºC).
③	Airflow openings of fan panel
④	230 V AC power outlet
⑤	T 315mA fuse socket
⑥	Fan power switch

Table 9. Technical parameters of fan panel.

Supply voltage	230 V AC / 50Hz
Current consumption	Max. 0,3 A
Efficiency	Max. 732m^3/h
Adjustment of activation temperature	0÷60ºC
Thermostat type	Bimetallic
Mounting in RACK cabinet	Mounted as standard – 36U, 42U, 45U, 50U Mounted optionally – 24U

5. CONFI-DSO program for designers.

CONFI-DSO software is a tool supporting design of power supplies for voice alarm systems. Configuration tool is designed for BOSCH PRAESENSA systems.

Based on implemented design parameters, program selects a complete power supply system taking into account the required backup time.

Figure below shows appearance of CONFI-DSO main panel.

Fig. 1. Main panel of program.

You should start working with software by entering in input data tab required system backup time and additional space in RACK cabinet.

In next step, indicate devices of DSO system that will be powered from system power supply. During data input, CONFI-DSO makes ongoing calculations based on which minimum configuration of power supply system is automatically selected. These effects can be observed both in graphic part and in output data area where technical parameters are additionally displayed.

After completing the system configuration, user is able to print prepared documentation, which they can use later as an appendix to documentation of designed DSO system.

In upper part of programme window there is a configuration number, which by means of an automatically generated sequence of digits identifies designed DSO system unambiguously.

6. **Technical parameters**.

Parameters of DSO system (tab. 9).
Operation safety (tab. 10).
Operation parameters (tab. 11).

Table 9. Parameters of DSO system.

Functional class PN-EN 12101-10:2007	A
230 V / 400 V mains connection	Single-phase 230 V or 3-phase 3x230 V / 400 V 1)
Surge protection	type 3 (D) according to EN 61643-11 standard
Dimensions of RACK cabibnets	24U(600x600), 36U(600x600), 42U(600x600, 600x800), 45U (600x600, 600x800), 50U (600x800)[1)]
Battery capacity	100..230Ah max [1)]
Battery type	Sealed Lead-Acid (SLA) batteries (AGM, gel)
Status indication	panel for optical and acoustic indication., 60dB/1m; compliant with EN54 16 standard [1)]
Cooling	convection or forced cooling [1)]

[1)] Depending on DSO configuration.

Table 10. Operation safety.

Protection class EN 62368-1	I (first)
Protection grade EN 60529	IP30
Electrical strength of insulation: - between input (network) circuit and output circuits of PSU (I/P-O/P) - between input circuit and protection circuit (I/P-FG) - between output circuit and 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, 500 V DC

Table 11. Operating 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	Wg PN-83/T-42106

7. INSTALLATION.

7.1. Requirements.

DSO should be mounted by a qualified installer, holding relevant permits and licenses (applicable and required for a given country) for 230 / 400V AC and low-voltage installations. Installer should be trained in commissioning and operation of power supply system of DSO by Pulsar Company.

Electrical system shall follow valid standards and regulations. DSO cabinet should be mounted in such a way to provide both front and rear access for service personnel. Always ensure a free, convection air flow around cabinet.

As power supply unit of DSO cyclically runs a periodic battery test, during which connection resistance is measured, special attention should be paid to proper installation of battery cables.

7.2. Installation procedure.

CAUTION!
Before installation, make sure that the voltage in the 230 V / 400 V power-supply circuit is cut off.
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.

1. Equipment should be installed in appropriate compartments of cabinet.
2. Make additional protective conductor connections between housings of devices and earthing plate (set in a zip lock bag).
3. Equipment should be installed in appropriate compartments of cabinet.
4. Connect power cables (230 / 400 V AC) to L1-L2-L3-N contacts of power supply (or L-N in case of a single-phase connection).
5. Connect ground wire to clip marked by earth symbol ⏚. Use a five-core cable (or three-core cable for a single-phase connection) with a yellow and green PE protection wire to make connection.

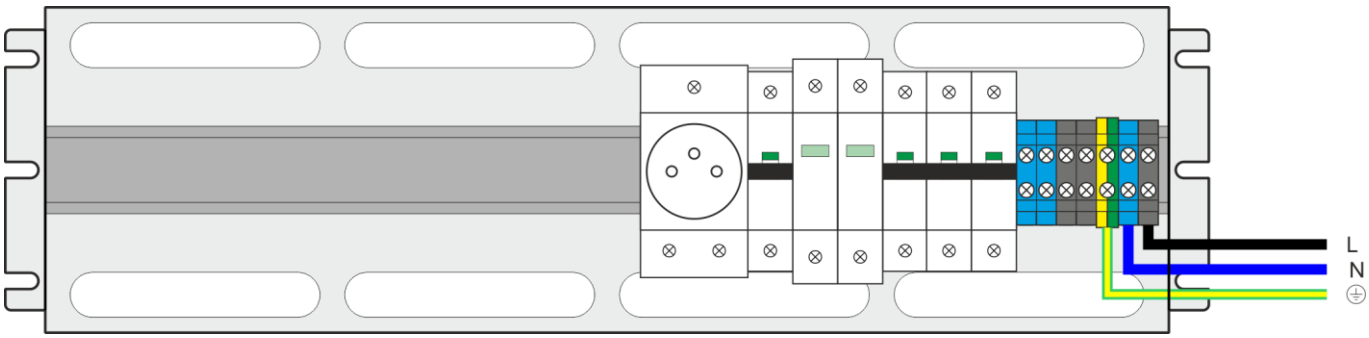


Fig. 13. Connection to the power system – a single-phase 230 V AC connection.

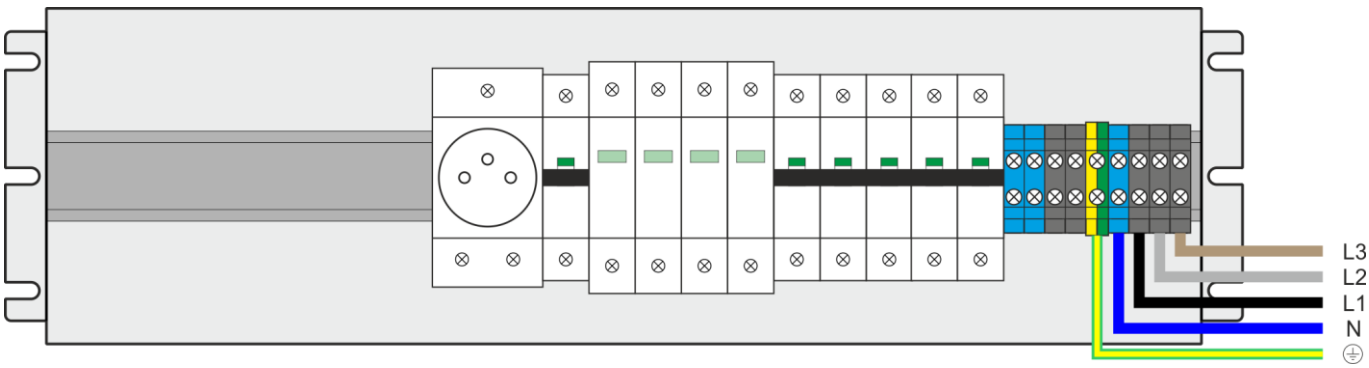


Fig.14. Connection to the power system – 3-phase 400 V AC connection.

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

6. After connections are correctly made, perform system checking procedure according to instructions of control panel manufacturer.

WEEE LABEL

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

In Poland, according to the European Union WEEE Directive, waste electrical and electronic equipment, marked with a crossed out wheeled bin symbol, should be disposed of separately from normal household waste. The user is obliged to throw the end-of-life equipment in a WEEE collection point. WEEE collection points are run by wholesale and retail sellers of this equipment, and municipal organizational units operating in the field of collecting municipal waste.

The proper implementation of these obligations is particularly important when the waste equipment contains hazardous components which have a negative impact on the environment and human health.

CAUTION! The DSO uses sealed lead acid batteries (SLA). Used batteries must be disposed of in accordance with the applicable regulations.

The warranty conditions

The warranty conditions can be found at: www.pulsar.pl

SEE

THE WARRANTY CONDITIONS FOR SLA BATTERIES
- Additional arrangements

The presented warranty conditions for SLA batteries are valid in conjunction with General Warranty Terms of the PULSAR company.

1. The battery will not be considered defective if its capacity during the warranty period has not dropped to **80 [%]** of the rated capacity.
2. The periodic maintenance of all batteries, including performing the appropriate measurements, shall be performed every **12** months from the installation. The measurement report, prepared in accordance with the guidelines contained in the "Installation" section, should be sent within two weeks to the company's e-mail address serwis@pulsar.pl. Presentation of the measurement results from all of required periodic maintenances is a **condition for warranty claim**.
3. The warranty applies only to batteries designed for **buffer operation. Cyclic batteries are not covered by this warranty.**
4. The warranty period will be reduced by 50 [%] for each sustained temperature rise of 8 [°C] above nominal operating temperature of the battery of 25 [°C].
5. The PULSAR company **is not responsible for:**
   - Batteries with unreadable serial number;
   - Damages resulting from improper charging or installation;
   - Mechanical damages to the enclosure and polarity terminals (clamp caps) caused by the installation, commissioning, and operation of the batteries;
   - Damages caused by fire, high temperature (overheating), explosion, or freezing;
   - Damages caused by misuse or negligence;
   - Damages caused by force majeure.
6. The PULSAR company reserves the right to verify battery operating conditions by reading the operating history of the DSO power supply system. The data can be read remotely or locally by employees of the PULSAR company
7. In the case of unjustified claim, the claimant may be charged with the travel and manhour costs of a PULSAR employee incurred by the PULSAR company.
8. The warranty is valid only upon presentation of the invoice and delivering the battery subjected to complaint along with a description of the defect at the expense of the claimant.

Pulsar sp. j.
Siedlec 150, 32-744 Łapczyca, Poland
Tel. (+48) 14-610-19-40, Fax. (+48) 14-610-19-50
e-mail: biuro@pulsar.pl, sales@pulsar.pl
http:// www.pulsar.pl, www.zasilacze.pl