POLON-ALFA

POWER SUPPLY UNIT

PZB 6000

Installation and Maintenance Manual

ID-E357-001-GB

Edition II

The PZB 6000 Power Supply, which is the subject of this documentation, meets the essential requirements of the following regulations of the European Parliament and of the Council (EU) and European Union directives:

CPR CPR/305/2011 Regulation (EU) of the European Parliament and of the Council of 9 March 2011 laying down harmonised conditions for the marketing of construction products repealing Council Directive 89/106/EEC;
LVD Directive 2014/35/EU on electrical equipment intended for use within certain voltage limits;
EMC Directive 2014/30/EU on electromagnetic compatibility.

The PZB 6000 Power Supply was issued a certificate of constancy of performance by CNBOP-PIB in Józefów, notified body No. 1438, confirming the possession of technical features/parameters required by PN-EN 1210110:2007, PN-EN 54-4:2001 + A1:2004 + A2:2007, PN-EN 54-18:2005 + AC:2007 and PN-EN 54-17:2005 + AC:2007.
The Manufacturer's technical features/parameters exceeding the requirements of the listed standards and other features/parameters of the product specified in this manual - not specified in the listed standards - are confirmed by the Manufacturer.
The product has an approval certificate issued by CNBOP-PIB.
The manufacturer has issued a declaration of performance for the product.
The certificate, certificate of approval and the declaration of performance are available on the website **www.polon-alfa.com.**
Read the contents of this manual before starting installation and operation.

Failure to follow the recommendations in this manual may prove dangerous or result in a violation of applicable regulations.

The manufacturer POLON-ALFA is not responsible for damage caused as a result of use inconsistent with these instructions.

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NOTE! POLON-ALFA reserves the right to make changes to this document

Worn-out products unsuitable for further use should be handed over to one of the collection points for waste electrical and electronic equipment.

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1. Introduction

The following section includes essential details regarding the PZB 6000 Power Supply.

1.1. Content

The following Installation and Maintenance Manual lets you get acquainted with the purpose, construction and operation of the PZB 6000 Power Supply. The documentation contains necessary information's for designers, installers and maintenance of the PZB 6000 Power Supplies.

1.2. Power Supply unit application

The main purpose of the PZB 6000 is to power devices used in fire protection systems. The MZZ-60 Main Power Management Module provides an uninterrupted power supply with a 24 V (+/- 25 %) voltage current capacity depending on variant. The MZZ-60 module is powered from the MZ-61-XXX Power Supply Module with power depending on variant. The power is supplied from the mains during normal operation and automatically switched to batteries in the event of a power outage. In the highest power variant (PZB-6000-4-600), device can provide 24 V output +/- 25 % with a maximum continuous current of 14 A and a maximum short-term current overload of 20 A. PZB-6000 is compatible with maximum capacity batteries of 134 Ah. The MZZ-60 module provides two-stage battery charging. It includes: two monitoring lines, configurable relay output, fault relay output, and a temperature probe allowing the ambient temperature monitoring. Communication via the Modbus RTU protocol or the possibility of communication between two devices is also provided. Device is programmable with a PC software.

PZB-6000 can be supplied with additional modules, including:

- MZS-60 (Signal Management Module), which allows to connect of four signal lines,
- MRZ-60 (Power Redundancy Module), which enables the power redundancy when using two PZB 6000 power supplies,
- MKA-62 (Addressable Communication Module), which allows to connect the power supply to detection line of the POLON 3000/4000/6000 system.

Power supply is designed to operate in a temperature range from -5 °C to +40 °C (environmental class A) and relative humidity of up to 80 % at + 40 °C.

1.3. Safety conditions

The following section presents safety requirements when using the PZB 6000 fire buffer power supply.

1.3.1. Electric shock protection

PZB 6000 are ranked as class I protection devices and only can be used with additional electric shock protection in the form of zeroing or PE protective wire.

The insulation of the circuits supplying the 230 V / 50 Hz power grid is reinforced and withstands the test voltage of 2800 V, while the low-voltage circuits (below 42 V) insulation withstands the test voltage of 700 V AC. After connecting the power grid wires, the mains connection should be protected with a factory cover.

1.3.2. Installation and equipment safety

Cabling should be made with proper fireproof cables and ensured with proper sealings on fireproof zone pass-throughs.

It is required to keep required separation distance of low voltage installation from power and lightning protection installations to prevent unwanted effects.

The batteries should be placed inside the unit at the final stage of assembly.

Components of this device are heat sensitive. The maximum ambient temperature should not exceed 40 °C. The space left around the power supply case should be large enough for air to flow freely around it. The air humidity in the rooms where the device operates should not exceed 95 %.

1.3.3. Repairs and maintenance

Maintenance work and periodic inspections must be carried out by authorized personnel of companies trained or approved by POLON-ALFA. All repairs must be carried out by the manufacturer. POLON-ALFA is not responsible for the operation of equipment maintained and repaired by unauthorized personnel.

2. Design and completion

The equipment supplied with the power supply unit is listed in Table 2.1.

Table 2.2 includes additional equipment which may be ordered separately.

Table 2.1. Completing the PZB 6000 power supply

Lp.		Specification	Number of pcs.
1		PZB 6000 Power Supply (MZZ-60 + MZ-61-XXX)	1
2		Technical Documentation ID-E357-001	1
3		Single unit package	1

Table 2.2. Additional equipment cooperating with the PZB 6000 power supply

Lp.	Module name	Abbreviation
1	Signal Management Module	MZS-60
2	Power Redundancy Module	MRZ-60
3	Addressable Communication Module	MKA-62
4	LED Signaling Module	MDS-60

For proper operation of the power supply, a 24 V lead-acid battery with appropriate capacity must be connected The battery is not included with the unit.

2.1. Modules arrangement inside the PZB 6000

The figure below shows the arrangement of modules inside the Power Supply.

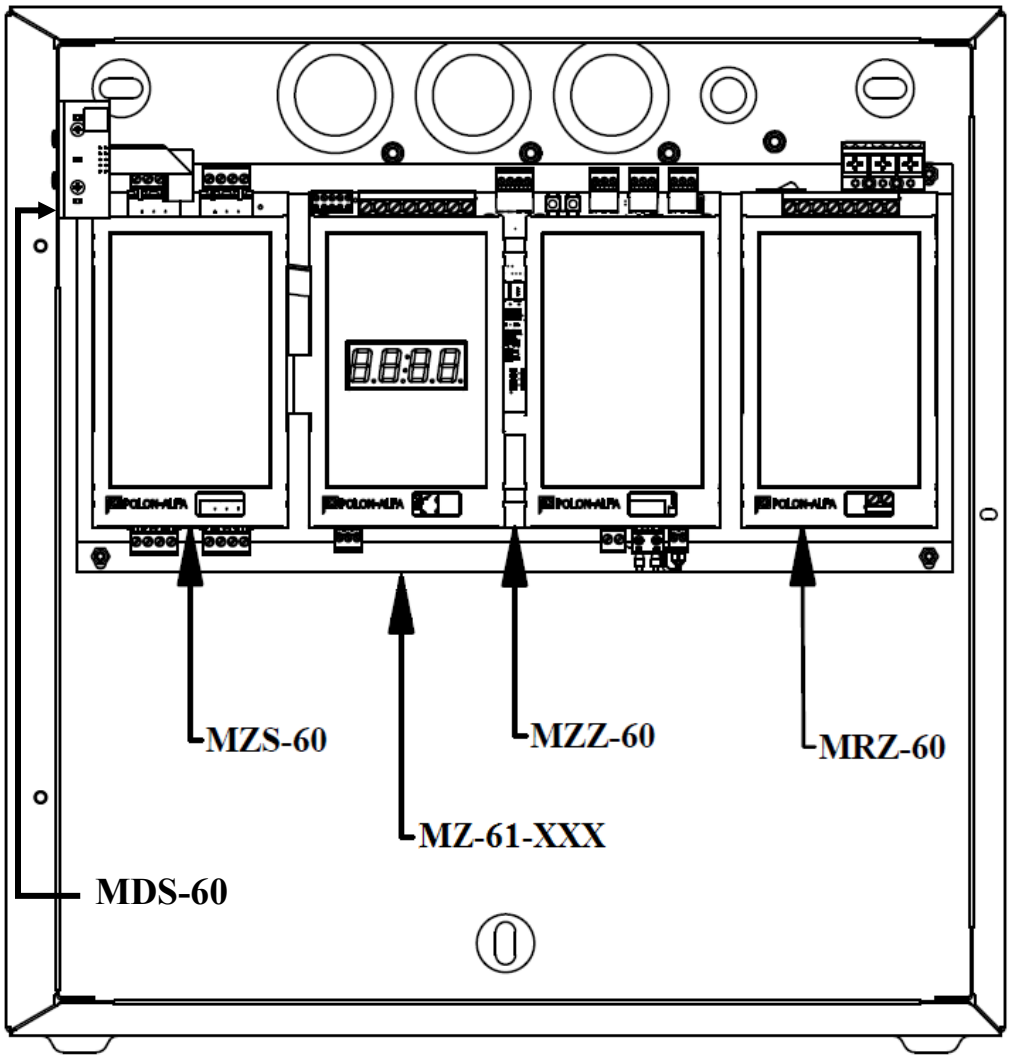


Figure 2.1.1. Arrangement of modules inside the PZB-6000

3. Technical specifications

The following are the specifications of the fire power supply.

Power Supply Input Parameters	
Primary power supply voltage	230 V AC + 10 % - 15 %
Frequency of the primary power supply voltage	47 ... 63 Hz
Maximum power consumption depending on the power of the MZ-61-XXX Power Supply Module used: 75 W (MZ-61-75): 150 W (MZ-61-150): 300 W (MZ-61-300): 600 W (MZ-61-600):	 0.85 A/230 VAC 1.6 A/230 VAC, 2 A/230 VAC, 4.1 A/230 VAC
Battery current consumption (no load)	< 100 mA

Power Supply Output Parameters					
The output current depends on the specific version of the power supply:					
Variant	Housing	Batteries provided (max.)	Power Module	Maximum short-term load current	Maximum continuous load current
PZB-6000-1-75	M70	2 x 12 V 18 Ah	MZ-61-75 (75 W)	2,5 A	1,5 A
PZB-6000-1-150			MZ-61-150 (150 W)	5 A	4,0 A
PZB-6000-2-150	M71	2 x 12 V 40 Ah	MZ-61-150 (150 W)	5 A	3,0 A
PZB-6000-2-300			MZ-61-300 (300 W)	10 A	8,0 A
PZB-6000-3-150	M72	2 x 12 V 80 Ah	MZ-61-150 (150 W)	5 A	1,2 A
PZB-6000-3-300			MZ-61-300 (300 W)	10 A	6,0 A
PZB-6000-4-300	M72 + M73	2 x 12 V 134 Ah	MZ-61-300 (300 W)	10 A	4,0 A
PZB-6000-4-600			MZ-61-600 (600 W)	20 A	14,0 A
Output Voltage:					
The output voltage of the power supply is 24 V DC +/- 25 %					

Configurable Relay / Fault Relay	
Current and voltage capacity of the NO/NC contact: Continuity check (for configurable relay only):	1 A / 24 V DC YES

RS232 connector (Modbus RTU protocol)	
Standard: Maximum Bit Rate:	RS232 (EIA/TIA-232 and V.28) 110 kbps

MZS-60 Signal Management Module	
Four outputs with parameters:	
Output Voltage:	24 V DC +/- 25 %
Output:	2 A
Termination Resistors:	6.2 kΩ
Maximum Wire Resistance:	50 ohms
Continuity Check (Programmable):	YES

MRZ-60 Power Redundancy Module	
Two outputs with the following parameters:	
Output Voltage:	24 V DC +/- 25%
Current carrying capacity (each of A and B outputs):	14 A

4. Unit enclosures

The dimensions of all type of the power supply housings are shown below.

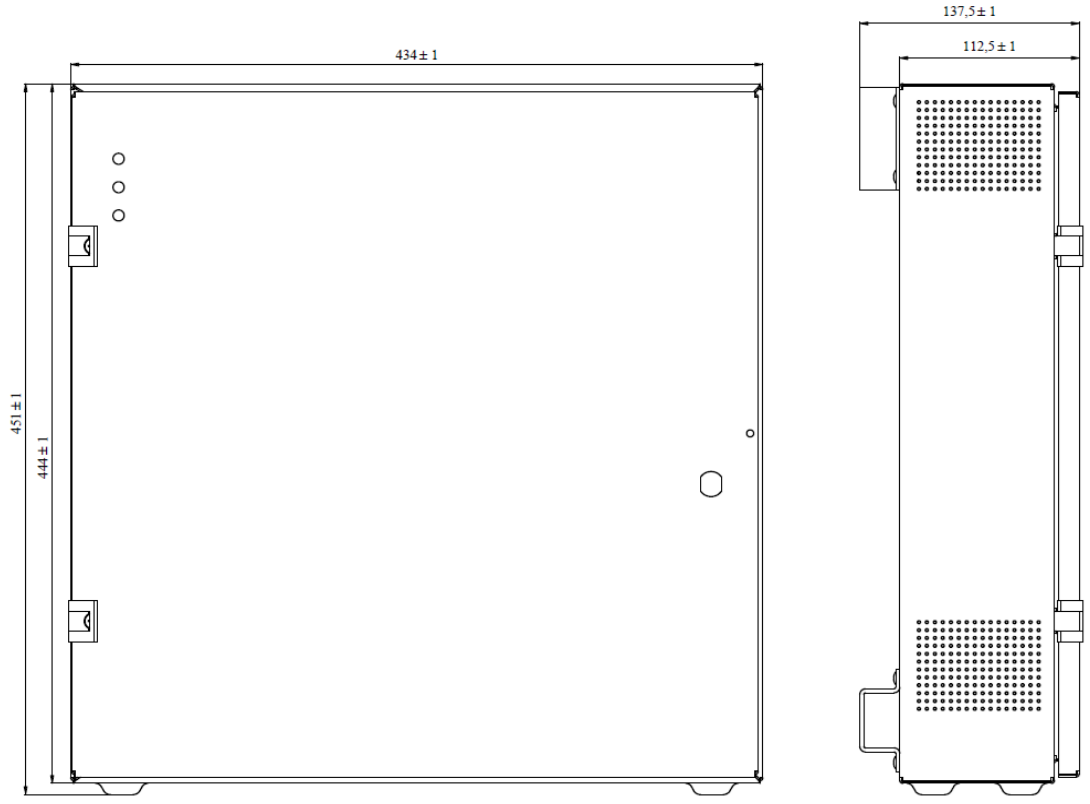


Figure 4.1. M70 enclosure

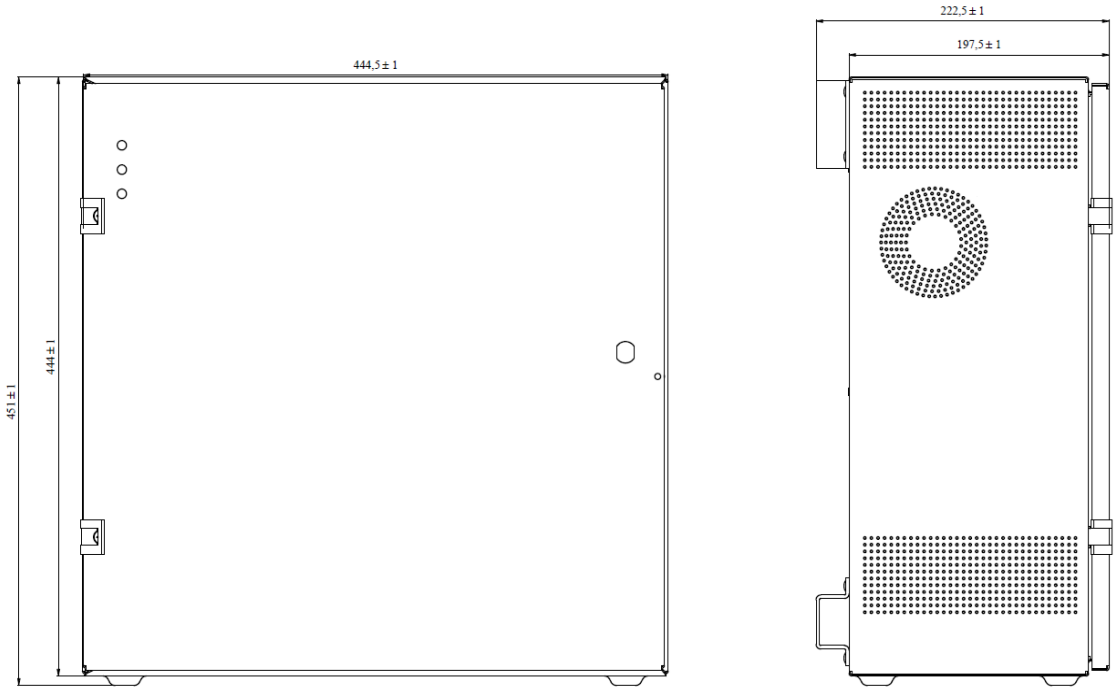


Figure 4.2. M71 enclosure

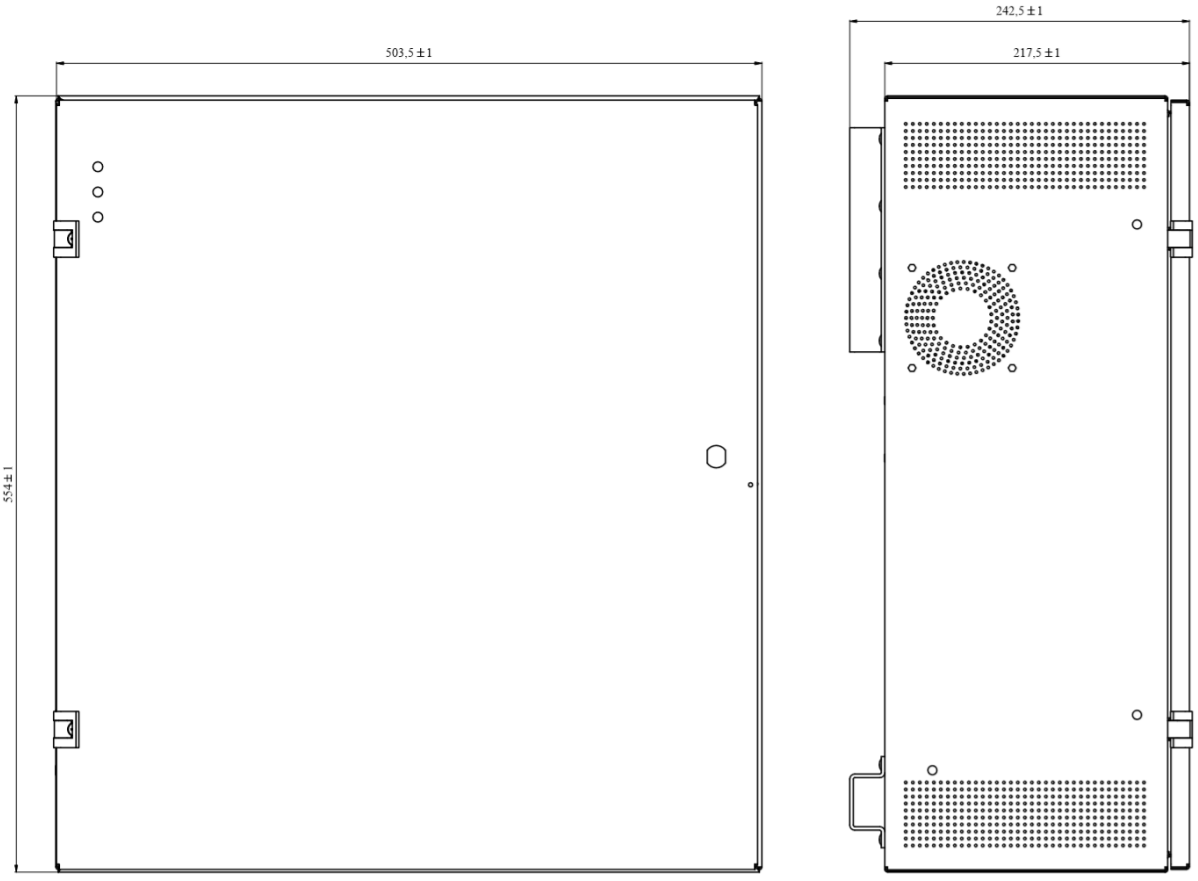


Figure 4.3. M72 enclosure

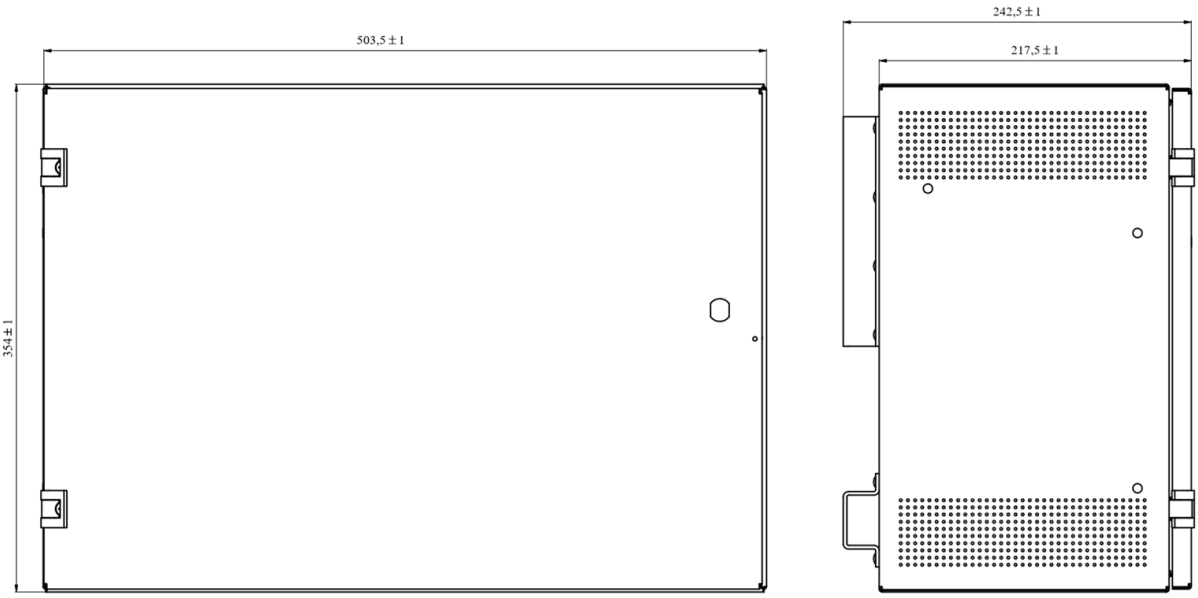


Figure 4.4. M73 enclosure

5. PZB-6000 Variants

The PZB 6000 Power Supply is available in eight versions described in table below. Depending on the battery capacity and the power of the MZ-61-XXX module, it is possible to obtain the appropriate load current (from the output). The I_{maxa} is the maximum continuous load current, and I_{maxb} is the maximum short-time load current.

Table 5.1. Power Supply variants

Variant	Housing	Maximum capacity	Battery charging current	Power Module	I_{maxb}	I_{maxa}
PZB-6000-1-75	M70	18 Ah	0,8 A	MZ-61-75 (75 W)	2,5 A	1,5 A
PZB-6000-1-150				MZ-61-150 (150 W)	5,0 A	4,0 A
PZB-6000-2-150	M71	40 Ah	1,8 A	MZ-61-150 (150 W)	5,0 A	3,0 A
PZB-6000-2-300				MZ-61-300 (300 W)	10 A	8,0 A
PZB-6000-3-150	M72	80 Ah	3,6 A	MZ-61-150 (150 W)	5,0 A	1,2 A
PZB-6000-3-300				MZ-61-300 (300 W)	10 A	6,0 A
PZB-6000-4-300	M72 + M73	134 Ah	6,0 A	MZ-61-300 (300 W)	10 A	4,0 A
PZB-6000-4-600				MZ-61-600 (600 W)	20 A	14 A

Power supply is available in four housing versions:

- M70 housing –up to 18 Ah batteries capacity,
- M71 housing – up to 40 Ah batteries capacity,
- M72 housing –up to 80 Ah batteries capacity,
- M72 + M73 housing –up to 134 Ah batteries capacity.

With a battery capacity of 134 Ah, the main housing M72 and the additional housing M73 are used. In such case one battery is located in the upper housing and the other in the additional housing (two 12 V batteries connected in series).

6. Functionality description

The following section includes design description of the PZB 6000 Power Supply.

Implemented functions / Power supply equipment:

- Constant (uninterruptible) 24 V +/- 25 % power supply,
- 24 V +/- 25 % four voltage outputs (with separate fuses) total maximum short-term load capacity of 20 A and a maximum continuous load capacity of up to 14 A, with 134 Ah batteries capacity (PZB-6000-4-600 version),
- status monitoring of the four 24 V output fuses,
- microprocessor controller based supervision,
- space for up to 18, 40, 80, 134 Ah batteries depending on the housing type,

- two-stage battery charging,
- batteries internal resistance measurement,
- automatic temperature compensation when charging batteries,
- battery circuit continuity monitoring ,
- battery voltage control against overcharging and over-discharge,
- proper operation of battery charging supervision,
- protection of batteries against short circuit and reverse polarity,
- no impact of short-circuiting of battery terminals on the power supply operation,
- communication via the Modbus RTU protocol or prospect of communication between two PZB power supplies,
- two programmable control lines (POLON 3000/4000/6000 synergy),
- configurable PK relay output (POLON 3000/4000/6000 synergy),
- PU fault relay output (POLON 3000/4000/6000 synergy),
- real-time clock with battery backup,
- synergy with the MZS-60 Signalling Management Module providing four signal lines,
- synergy with the MRZ-60 Power Redundancy Module ensuring the supply voltage redundancy,
- synergy with the MKA-62 Addressable Communication Module enabling the POLON 3000/4000/6000 systems with the PZB power supply connection,
- Free software used for configuration of the power supply, enabling: configuration reading and saving, event log reading, faults read-out, software version display, time and date saving and read-out,
- Protections: short-circuit, overload, thermal, overvoltage and undervoltage.

6.1. MZ-61-XXX Power Supply Module

The power supply module converts the mains voltage to a direct voltage of 24 V +/-25 % and supplies the MZZ-60 module. It is available in four power variants listed in Table 5.1.

6.2. MZZ-60 Power Management Module

MZZ-60 module is the main module of the power supply. The remaining modules: MZS-60 (Signal Management Module), MRZ-60 (Power Redundancy Module) and MKA-62 (Addressable Communication Module) are additional modules ordered separately. Figure 6 provides description of the inputs and outputs of the MZZ-60 module .

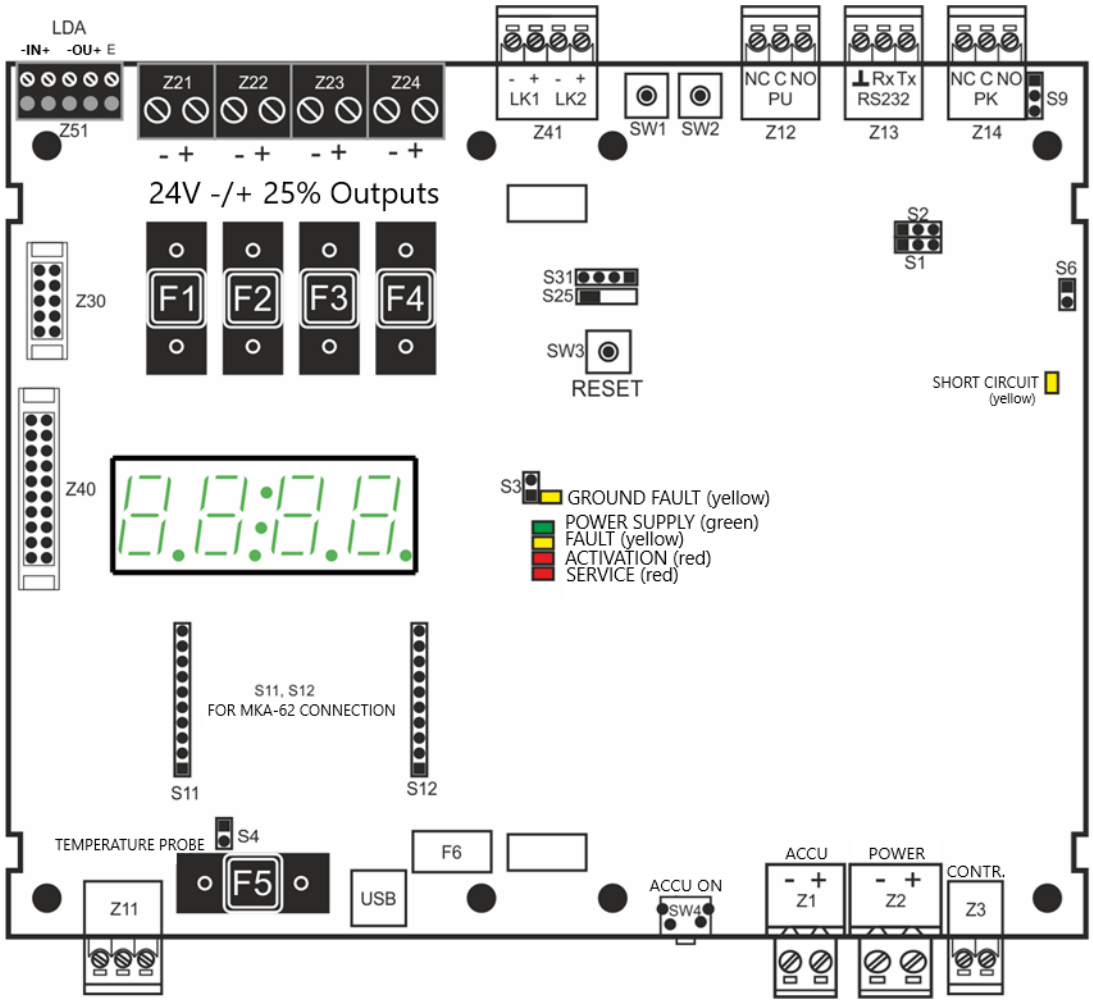


Figure 6.2.1. PZB 6000 input and output description of the MZZ-60 module connectors

Connectors Description:

- Z1 – 24 V battery input,
- Z2 – input from the MZ-61-XXX power module,
- Z3 – output regulating the voltage supplied by the MZ-61-XXX module,
- Z11 – temperature probe connector,
- Z12 – fault relay outputs,
- Z13 – RS232 connector (Modbus RTU protocol),
- Z14 – configurable relay outputs,
- Z21, Z22, Z23, Z24 – 24 V +/- 25% power supply voltage outputs,
- Z30 – signalling diodes connector: power supply, fault and actuation,
- Z40 – the MZS-60 module connection joint,

- Z41 –LK1 and LK2 control line inputs,
- Z51 – detection line connector.

DIP-switch (1-4) description:

- SW1 – display view change button,
- SW2 – scrolling through button for displayed faults, voltage and current values read-out,
- SW3 – microprocessor system reset,
- SW4 – switching on the power supply from the battery during a mains power outage.

Description of the pins on the board:

- S1 – reserved,
- S2 – reserved,
- S3 –ground fault control (enabled when jumper in place),
- S4 – reserved,
- S6 – reserved,
- S9 – activation of the circuit continuity control of the configurable relay,
- S11, S12 –MKA-62 module connector clamp,
- S25 –when programming externally, switch towards the heatsink,
- S31 – external programming connector.

Fuses:

- F1 , F2, F3, F4 – 24 V +/- 25 % output fuses,
- F5 – temperature probe powering fuse,
- F6 – USB connector fuse.

6.2.1. Fuses

Table 4 provides a list of F1, F2, F3, F4 fuses protecting the circuit outputs of the MZZ-60 module and the fuse in the battery circuit. The temperature probe circuits and the USB connector are protected by F5 & F6 fuses of 630 mA rated values.

Table 6.2.1.1. Fuse ratings.

Variant	F1, F2, F3, F4 Fuse ratings	Battery fuse ratings
Fuse Type	5x20 mm, Time Delay T	Car 19 mm
PZB-6000-1-75	3.15 A	4 A
PZB-6000-1-150	6.3 A	7.5 A
PZB-6000-2-150	6.3 A	7.5 A
PZB-6000-2-300	12 A	15 A
PZB-6000-3-150	6,3 A	7,5 A
PZB-6000-3-300	12 A	15 A
PZB-6000-4-300	12 A	15 A
PZB-6000-4-600	16 A	25 A

The F1 – F4 fuse values can be selected depending on the output load. A change of value is possible within the maximum power supply value of a given version, e.g. from a T 6,3 A for the 'PZB-6000-2-150" can be switched to T 3, 15 A or T 7, 5 A, however, **protection rated higher than the values in Table 6.2.1.2 shall not be used**.

Table 6.2.1.2. Maximum fuse values.

Variant	Maximum values of F1, F2, F3, F4 fuses
Fuse Type	5x20 mm, Time Delay T
PZB-6000-1-75	3,15 A
PZB-6000-1-150	7,5 A
PZB-6000-2-150	7,5 A
PZB-6000-2-300	15 A
PZB-6000-3-150	7,5 A
PZB-6000-3-300	15 A
PZB-6000-4-300	15 A
PZB-6000-4-600	25 A

6.2.2. Preparing the module for operation

Do not connect the batteries to the Z1 connector before configuring the MZZ-60 module using the configuration program. If the MZZ-60 module was previously configured and a larger battery capacity was selected (than the battery capacity to be used), a much higher charging current will than flow.

PC must be connected with the PZB 6000 via USB connector (type B) in order to access the configuration program. The PZB 6000 will be visible as a COM port when connected to the PC. First, the capacity of the batteries that work with the power supply must be selected. Choosing the appropriate capacity automatically adjust the battery charging current in PZB 6000. After selecting battery capacity in the configuration program and subsequently sending configuration to the power supply, the batteries can be connected (Z1 socket). Depending on the requirements, the MZZ-60 module allows the use of: LK1 and LK2 control lines, PK configurable relay, RS232 connector (communication via Modbus RTU protocol or communication between two PZB power supplies). These layouts are freely configurable with a computer program. In order to accustom the principle of operation and configuration possibilities, please read the following chapters.

6.2.3. Current carrying capacity

Depending on the battery capacity used, the corresponding capacity must be declared in the configuration program. The battery charging current is selected automatically after declaring the appropriate battery capacity and sending the configuration to the power supply. Table below shows the output current which can be drawn from the 24 V outputs +/- 25 % depending on the variant, where I_{maxa} is the maximum continuous load current and I_{maxb} is the maximum short-term load current.

Table 6.2.3.1. Power supply current capacity

Variant	Housing	Maximum capacity	Charging Battery	Power Module	I_{maxb}	I_{maxa}
PZB-6000-1-75	M70	18 Ah	0,8 A	MZ-61-75 (75 W)	2,5 A	1,5 A
PZB-6000-1-150				MZ-61-150 (150 W)	5,0 A	4,0 A
PZB-6000-2-150	M71	40 Ah	1,8 A	MZ-61-150 (150 W)	5,0 A	3,0 A
PZB-6000-2-300				MZ-61-300 (300 W)	10 A	8,0 A
PZB-6000-3-150	M72	80 Ah	3,6 A	MZ-61-150 (150 W)	5,0 A	1,2 A
PZB-6000-3-300				MZ-61-300 (300 W)	10 A	6,0 A
PZB-6000-4-300	M72 + M73	134 Ah	6,0 A	MZ-61-300 (300 W)	10 A	4,0 A
PZB-6000-4-600				MZ-61-600 (600 W)	20 A	14 A

With a total current consumption of devices loading the power supply, it is possible to calculate how long these devices will be properly powered (in the event of a mains power fault) using the following formula:

$$t_{power\ supply} = \frac{C_{BATTERY}}{I_{load\ current}}\text{r}$$

where, $C_{battery}$ states the capacity of batteries used and $I_{load\ current}$ equals the maximum continuous load current.

In a similar way, the maximum continuous load current that can be supplied continuously for 72 h can be calculated:

$$I_{72h} = \frac{C_{BATTERY}}{72}$$

where, $C_{BATTERY}$ is the capacity of batteries used.

When calculating the current that may be supplied for a different amount of time, other than 72 h value must be substituted.

NOTE! The capacity of batteries decreases with time hence the capacity of batteries should be chosen with plenty of reserve. In order to select the appropriate reserve of battery capacity, please refer to the documentation of the batteries used.

Attention should be paid when using the MZS-60 and MRZ-60 compatible modules, as shown in table below. These modules are powered from the voltage outputs of the MZZ-60 module.

Modules applied:	Instruction:
MZZ-60 + MZS-60	The MZS-60 module should be treat as an additional load on the outputs of the MZZ-60 module. Remember as not to exceed the maximum continuous load current I_{maxa} drawn from the MZZ-60 module.
MZZ-60 + MRZ-60	The sum of the currents drawn from outputs A and B of the MRZ-60 module cannot exceed the maximum continuous load current of the PZB 6000 used. This module should be used as an additional load on the MZZ-60 module outputs. Remember not to exceed the maximum continuous load currentI_{maxa} drawn from the MZZ-60 module. **NOTE! The maximum continuous load current drawn from the MRZ-60 module output <u>is NOT</u> the sum of two PZB 6000 power supply currents! (during redundant operation of these two power supplies)**

6.2.4. Event log

The MZZ-60 module is equipped with an event able to store of up to 1000 events in memory. Events can be read using the configuration program. Each event includes the date of recording, description of the case and name of the module it comes from. Recorded log events can be divided into faults or other actions e.g. actuation of the fault relay. If the fault is withdraw, description "REMOVED" is added to the fault name. Table 6.2.4.1 lists all events that can be saved to the event log of the PZB 6000 power supply.

Table 6.2.4.1. List of the all events recorded in the event log memory

Type of events:	Event designation:
Faults	No mains voltage 230 V
	Low battery voltage (below 22 V)
	Battery has been disconnected (battery voltage below 19 V)
	No batteries connected
	High battery path resistance (damaged batteries)
	Ground Fault Control Operation
	Damage to the battery charger
	High temperature inside the PZB 6000 (above 40 degrees Celsius)
	No temperature probe connected
	Open configurable PK relay circuit
	Microcontroller flash memory fault
	Fuse 1 Fault
	Fuse 2 Fault
	Fuse 3 Fault
	Fuse 4 Fault
	PZB power supply No. 2 (slave)[1] fault
	No communication with PZB power supply no. 2 (slave)[1]
	No communication via Modbus1 protocol
	Short circuit of monitoring line input number 1 (LK1)1
	Short circuit of monitoring line input number 2 (LK2)[1]
	Actuation of monitoring line input number 1 (LK1)[1]
	Actuation of monitoring line input number 2 (LK2)[1]
	POLON 3000/4000/6000 system general fault
	Short circuit of signal line output number 1 (LS1)[3]
	Short circuit of signal line output number 2 (LS2)[3]
	Short circuit of signal line output number 3 (LS3)[3]
	Short circuit of signal line output number 4 (LS4)[3]

Type of events:	Event designation:
	Signal line output interruption number 1 (LS1)[3]
	Disruption on signal line output number 2 (LS2)[3]
	Disruption on signal line output number 3 (LS3)[3]
	Disruption on signal line output number 4 (LS4)[3]
	Output overload on signal line number 1 (LS1)[3]
	Output overload on signal line number 2 (LS2)[3]
	Output overload on signal line number 3 (LS3)[3]
	Output overload on signal line number 4 (LS4)[3]
	No communication with MKA2 module
Other events	System Boot / Reset
	Erase event log content
	Save new configuration
	New date and time record
	Event log reading
	Fault reading
	Actuation of the PU fault relay
	Actuation of the PK1 configurable relay
	Actuation of signal line 1 (LS1)[3]
	Actuation of signal line 2 (LS2)[3]
	Actuation of signal line 3 (LS3)[3]
	Actuation of signal line 4 (LS4)[3]

1event occurs if the source configured in the MZZ-60 module

2event occurs if source configured in the MKA-62 module

3events occurs if the source configured in the MZS-60 module

6.2.5. Faults

The Power Management Module can signal 22 faults. Faults can be read using the configuration software or display used in this module. Table 6.2.5.1 shows all faults reported by the MZZ-60 module.

Table 6.2.5.1. List of faults reported by the MZZ-60 module with descriptions

Fault number Displayed on the screen	Fault name:
0	No mains voltage 230 V
1	Low battery voltage (below 22 V)
2	Battery disconnected (battery voltage below 19 V)
3	No batteries connected
4	High battery path resistance (Defective batteries)
5	Activation of the ground floor control
6	Battery charger fault
7	High temperature inside PZB 6000 (above 40 degrees Celsius)
8	No temperature probe connected
9	Actuation of the PK relay circuit
10	Microcontroller flash memory fault
11	Fuse 1 Fault
12	Fuse 2 Fault
13	Fuse 3 Fault
14	Fuse 4 Fault
15	PZB power supply No. 2 (slave)[1] general fault
16	No communication with PZB power supply no. 2 (slave)[1]
17	No communication via Modbus1 protocol
18	Short circuit on monitoring line input 1 (LK1)[1]
19	Short circuit on monitoring line input 2 (LK2)[1]
20	Actuation of monitoring line input 1 (LK1)[1]
21	Actuation of monitoring line input 2 (LK2)[1]
22	POLON 3000/4000/6000 system general fault
23	No communication with the MKA2 module
24	Short circuit of signal line output number 1 (LS1)[3]
25	Short circuit of signal line output number 2 (LS2)[3]
26	Short circuit of signal line output number 3 (LS3)[3]
27	Short circuit of signal line output number 4 (LS4)[3]
28	Signal line output interruption number 1 (LS1)[3]
29	Signal line output interruption number 2 (LS2)[3]

Fault number Displayed on the screen	Fault name:
30	Signal line output interruption number 3 (LS3)[3]
31	Signal line output interruption number 4 (LS4)[3]
32	Output overload on signal line 1 (LS1)[3]
33	Output overload on signal line 2 (LS2)[3]
34	Output overload on signal line 3 (LS3)[3]
35	Output overload on signal line 4 (LS4)[3]

1event occurs if source configured in the MZZ-60 module

2event occurs if sources configured in the MKA-62 module

3event occurs if source configured in the MZS-60 module

Please note some faults e.g. lack of 230 V mains voltage, no batteries connected, battery path high resistance (defective batteries), lack of communication via Modbus protocol, etc., are not immediately detected.

6.2.6. Ground Fault Control

The MZZ-60 module enables the ground fault control. In order to engage the ground fault control an S3 jumper is located in place. Otherwise, the jumper should be removed.

6.2.7. Control Lines

The MZZ-60 module is equipped with two, freely configurable control lines. Table 6.2.7.1 includes the states recognized by the monitoring line and the corresponding resistances connected to the monitoring input.

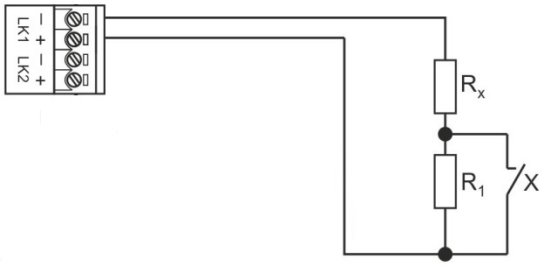
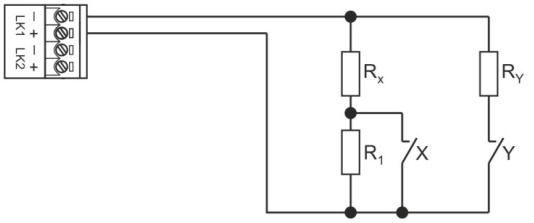
In addition to two operating states in two-state mode and the three operating states in three-state mode, the monitoring line recognizes such conditions as: short-circuit and open circuit state connected to the input of the control line.

Table 6.2.7.1. Statuses recognized by the monitoring line and their corresponding resistances

	Resistance Characteristic Value [Ω] ±10 %
Fault (Break)	>27 K
Detection	6.3 K
Active X	2.0 K
Active Y	680
Fault (short circuit)	<240

Control lines can operate in two configurations: 2-state and 3-state layout, as shown in Table 6.2.7.2 below.

Table 6.2.7.2. 2-state and 3-state monitoring line connecting method.

Method of connecting the monitoring line in a 2-state layout: - normal condition, - active state X - shorted contact X (with open and short circuit detection)	
Method of connecting the monitoring line in a 3-state layout: - normal condition, - active state X - shorted contact X, - active state Y - shorted contact Y, (with open and short circuit detection)	

Particular configuration can be performed by selecting the appropriate argument in the configuration program of the monitoring line mode parameter:

Inactive

- mode 2 – state,
- mode 3 – state,

In the monitoring state the resistors Rx + R1 are connected to the monitoring line in both cases. Active state X occurs when the contact X is shorted. At this point only Rx resistor is connected to the monitoring line input. The Y state occurs only in the 3-state mode. Such condition occurs when the Y pin is shorted.

Detection of the active state is possible after configuration (in a two-state configuration, the active state means state X, and in a three-state configuration, the active state means state X and Y):

- Actuation of the configurable relay PK,
- Actuation of a particular signal line,
- Operating as an elevated monitoring line of the POLON 3000/4000/6000 system when PZB 6000 connected to the detection line via the MKA-62 module.

6.2.8. Fault relay PU and configurable relay PK

Figure 7 shows the configurable relay (PK) and the fault relay (PU) contacts arrangement. Configurable relay PK is equipped with a continuity control system. This circuit is used to recognize an open and short circuit connected to a configurable relay. With the continuity check enabled jumper S9 must be

properly set (position 1-2 as shown on figure 6.2.8.1). Attention towards polarization should be paid when using the continuity control as not to damage the continuity control system. Otherwise, turn off the continuity control and set the jumper to position 2-3.

Table 6.2.8.1 includes fault relay and configurable relay technical parameters.

Table 6.2.8.1. Technical parameters of the fault relay and the configurable relay.

Configurable Relay PK / Fault Relay PU Technical parameters	
Current and voltage capacity of the NO/NC contact: Continuity control (for configurable relay only):	1 A / 24 V DC YES

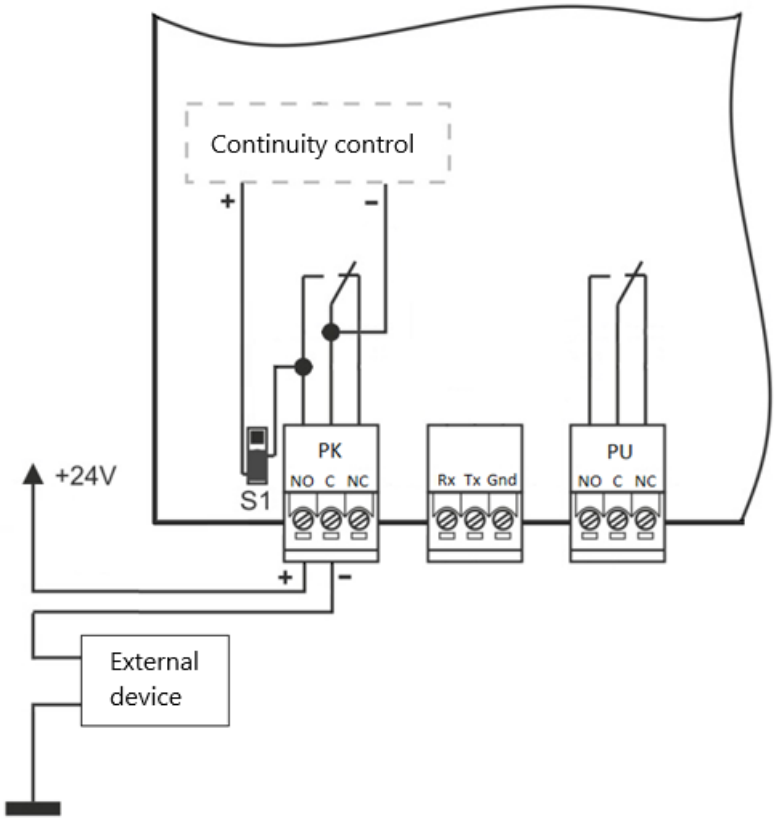


Figure 6.2.8.1. Configurable relay and fault relay contacts arrangement

The continuity control of the configurable relay is adapted with a dedicated software using parameter of the same name. When the continuity monitoring is actuated, fault is being signaled (if the continuity monitoring has been configured). When the relay is actuated, the relay contact is in the NO position.

The control criterion of the configurable PK relay can be configured as:

- Inactive output,
- LK1 monitoring line external input,

- LK2 monitoring line external input,
- POLON 3000/4000/6000 system.

The actuation criterion from the external input of the monitoring line LK1 and LK2 is implemented from the active state. The relay can be switched on via the POLON 3000/4000/6000 system with the last actuation.

The operating modes of the configurable relay can be configured as:

- Inactive,
- permanent actuation,
- temporary actuation,
- impulse-cyclic actuation,
- impulse-quantitative actuation.

For each of the configurations mentioned above, the relay actuation delay time should be determined (applies to each configuration). The indicated time determines how long the actuation source must take for the relay to be actuated. If the actuation source disappears on the meantime, the relay will not be actuated.

In timed actuation, the time after which the relay will be switched on must be determined. At pulse-cyclic actuation, the relay is switched on and off alternately. The switch-on time is determined by the actuation time, and the switch-off time is determined by the actuation pause time. In pulse-quantity configuration the parameter number of pulses - which determines the number of times the relay will be switched on and off - should additionally be specified.

The active state of the PU fault relay occurs (fault occurrence) when the relay contact is in the NC position, as shown in Figure 6.2.8.1. During proper operation (without fault), the relay contact is in the NO position. When no power supply (no mains voltage and no battery), the fault relay is in the NC position, which suggests a fault. It is possible to turn on the fault relay by the POLON 3000/4000/6000 system after configuring the relay output in the POLON 3000/4000/6000 control panel. In such a case, the fault relay will be actuated when a fault in PZB 6000 occurs or when the actuation will come from the POLON 3000/4000/6000 system. In case of actuation from the POLON 3000/4000/6000 control panel, a general fault from the POLON 3000/4000/6000 system occurs).

6.2.9. RS232 connector

RS232 (Z13) connector enables communication via Modbus RTU protocol or communication with the second PZB 6000 power supply. Choice between communication via Modbus RTU protocol, and communication with the second PZB power supply is made using the configuration software. The

technical parameters of the RS232 connector are shown in Table 6.2.9.1.

Table 6.2.9.1. Technical parameters of the RS232 connector

Technical parameters of the RS232 connector	
Standard:	RS232 (EIA/TIA-232 and V.28)
Maximum Bit Rate:	110 kbps

When Modbus RTU protocol is selected, necessary is to determine the transmission speed, address of the slave device (which is the power supply in this case) and the time out. From the moment of interruption in transmission, the time out is counted, after which a failure will appear informing about the lack of communication via the Modbus protocol. It is possible to read all faults and controls (e.g. information about the control of the signal line or configurable relay) during communication via Modbus. The above information can be read through the code of the 0x04 function, i.e. reading the input registers (Read Input Register).

To read input register, refer through the frame below (each column is one byte):

Slave adress – e.g. 0x01	Function code – 0x04 in this case	Starting address of the register we are requesting – part of HI	Starting address of the register we are requesting – part of LO	Number of registers we request – part of HI	Number of registers we request – part of LO	CRC checksum – part of HI	CRC checksum – part of LO
0x01	0x04	0x00	0x01	0x00	0x01	0x60	0x0A

In response, you will receive an example of the box presented below

Slave adress – e.g. 0x01	Function code – 0x04 in this case,	Amount of bytes transferred	Register value – part of HI	Register value – part of LO	CRC checksum – part of HI	CRC checksum – part of LO
0x01	0x04	0x02	0x04	0x00	0xBB	0xF0

For the above query for two-byte register with address 0x01, its value was obtained, which is 0x0400. Referring to Table 6.2.9.2, this indicates a short circuit on signal line 3 (LS3) output. Table 6.2.9.2 shows description of registers that can be queried using the Modbus protocol. It also shows the meaning of the individual bits.

Table 6.2.9.2. Description of Modbus protocol registers with individual addresses

Registry address	Bit Number	Description
0	0	No mains voltage 230 V
	1	Reserved
	2	Low voltage at the battery terminals (below 22 V)
	3	The battery has been disconnected due to undervoltage (below 20.5V)
	4	No batteries connected
	5	High battery path resistance (Damaged batteries)
	6	Activation of the ground fault control
	7	Battery charger fault

<table>
<tr><th>Registry address</th><th>Bit Number</th><th>Description</th></tr>
<tr><td></td><td>8</td><td>High ambient temperature (above 40 degrees Celsius)</td></tr>
<tr><td></td><td>9</td><td>No temperature probe connected</td></tr>
<tr><td></td><td>10</td><td>Microcontroller flash memory fault</td></tr>
<tr><td></td><td>11</td><td>Fuse number 1 Fault</td></tr>
<tr><td></td><td>12</td><td>Fuse number 2 fault</td></tr>
<tr><td></td><td>13</td><td>Fuse number 3 fault</td></tr>
<tr><td></td><td>14</td><td>Fuse number 4 fault</td></tr>
<tr><td></td><td>15</td><td>Open configurable relay circuit PK1</td></tr>
<tr><td>1</td><td>0</td><td>PZB power supply No. 2 (slave)[1] general fault</td></tr>
<tr><td></td><td>1</td><td>No communication with PZB power supply no. 2 (slave)[1]</td></tr>
<tr><td></td><td>2</td><td>No communication via Modbus1 protocol</td></tr>
<tr><td></td><td>3</td><td>No communication with the MKA-62[1] module</td></tr>
<tr><td></td><td>4</td><td>Short circuit of the monitoring line number 1 input (LK1)[1]</td></tr>
<tr><td></td><td>5</td><td>Short circuit of the monitoring line number 2 input (LK2)</td></tr>
<tr><td></td><td>6</td><td>Actuation of the monitoring line number 1 input (LK1)[1]</td></tr>
<tr><td></td><td>7</td><td>Actuation of the monitoring line number 2 input (LK2)[1]</td></tr>
<tr><td></td><td>8</td><td>Short Circuit of the signal line number 1 input (LS1)[2]</td></tr>
<tr><td></td><td>9</td><td>Short circuit of the signal line number number 2 output (LS2)[2]</td></tr>
<tr><td></td><td>10</td><td>Short circuit of the signal line number number 3 output (LS3)[2]</td></tr>
<tr><td></td><td>11</td><td>Short circuit of the signal line number 4 output (LS4)[2]</td></tr>
<tr><td></td><td>12</td><td>Signal line number 1 output actuation(LS1)[2]</td></tr>
<tr><td></td><td>13</td><td>Signal line number 2 output actuation (LS2)[2]</td></tr>
<tr><td></td><td>14</td><td>Signal line number 3 output actuation (LS3)[2]</td></tr>
<tr><td></td><td>15</td><td>Signal line number 4 output actuation (LS4)[2]</td></tr>
<tr><td>2</td><td>0</td><td>Signal line number 1 output overload (LS1)[2]</td></tr>
<tr><td></td><td>1</td><td>Signal line number 2 output overload (LS2)[2]</td></tr>
<tr><td></td><td>2</td><td>Signal line number 3 output overload (LS3)[2]</td></tr>
<tr><td></td><td>3</td><td>Signal line number 3 output overload (LS4)[2]</td></tr>
<tr><td></td><td>4 - 15</td><td>Reserved</td></tr>
<tr><td>3</td><td>0</td><td>Fault relay actuation</td></tr>
<tr><td></td><td>1</td><td>Configurable relay actuation[1]</td></tr>
<tr><td></td><td>2</td><td>Signal line number 1 actuation (LS1)[2]</td></tr>
<tr><td></td><td>3</td><td>Signal line number 2 actuation (LS2)[2]</td></tr>
<tr><td></td><td>4</td><td>Signal line numer 3 actuation (LS3)[2]</td></tr>
<tr><td></td><td>5</td><td>Signal line numer 4 actuation (LS4)[2]</td></tr>
<tr><td></td><td>6
7
8</td><td>Control Line 1 (LK1) Status
<table>
<tr><th>Bit No.</th><th>Short circuit</th><th>Status Y</th><th>Status X</th><th>Detection</th><th>Break</th></tr>
<tr><td>6</td><td>0</td><td>1</td><td>0</td><td>1</td><td>0</td></tr>
<tr><td>7</td><td>0</td><td>0</td><td>1</td><td>1</td><td>0</td></tr>
<tr><td>8</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td></tr>
</table></td></tr>
<tr><td></td><td>9
10</td><td>Control Line 2 (LK2) Status
<table>
<tr><th>Bit No.</th><th>Short circuit</th><th>Stan Y</th><th>Stan X</th><th>Detection</th><th>Break</th></tr>
<tr><td>9</td><td>0</td><td>1</td><td>0</td><td>1</td><td>0</td></tr>
</table></td></tr>
</table>

Registry address	Bit Number	Description					
	11	10	0	0	1	1	0
		11	0	0	0	0	1
	12 - 15	Reserved					

1Bit can be set provided that the source of fault is configured in the MZZ-60 module

2Bit can be set up provided that the source of fault is configured in the MZS-60 module

PZB 6000 can be connected to each other via the RS232 connector if two power supplies are used. In this case additional fault may occur informing about the lack of communication with the second PZB power supply. One of the power supplies should be configured as a master and the other as a slave. Power supply configured as a master receives information about general fault of the PZB 6000 slave device. Master configured power supply will also send information to the POLON 3000/4000/6000 system about the general fault of the slave device – provided that the MKA-62 module is configured. The correct RS232 connectors joint in two power supplies operation is shown in Figure 12 (Redundancy module with two fire power supplies - connection diagram). Pay attention to the wire connection between the RS232 connectors. Connections must be cross-over, i.e. Rx-Tx and Tx-Rx connections.

6.3. MZS-60 Signal Management Module

Figure 6.3.1 provides inputs and outputs description of the MZS-60 module. Module is equipped with four signal lines: LS1, LS2, LS3 and LS4. Each signal line should be supplied separately (WE1, WE2, WE3, WE4) from the 24 V +/- 25 % MZZ-60 module output. The Z40 connector is used to link the MZS-60 signal management module with the MZZ-60 power management module. This module should considered as an additional load on the MZZ-60 module outputs. Remember not to exceed the maximum continuous load current I_{maxa} drawn from the MZZ-60 module.

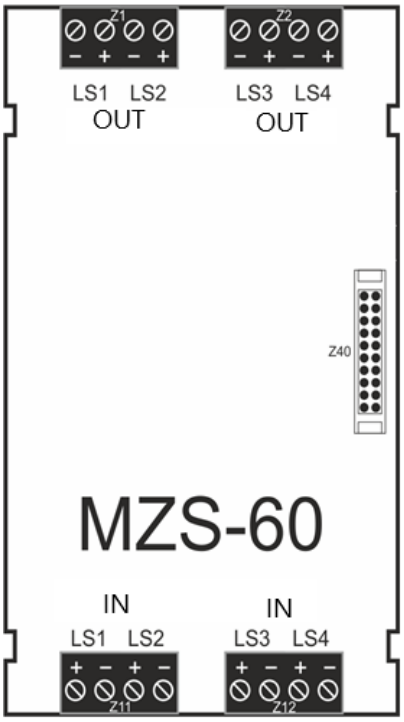


Figure 6.3.1. Description of inputs and outputs of the MZS-60 Signal management module connectors

Figure 6.3.2 shows method of connecting the MZS-60 module with the MZZ-60 module described above. In figure 6.3.2 below only two signal lines - LS3 and LS4 - are powered.

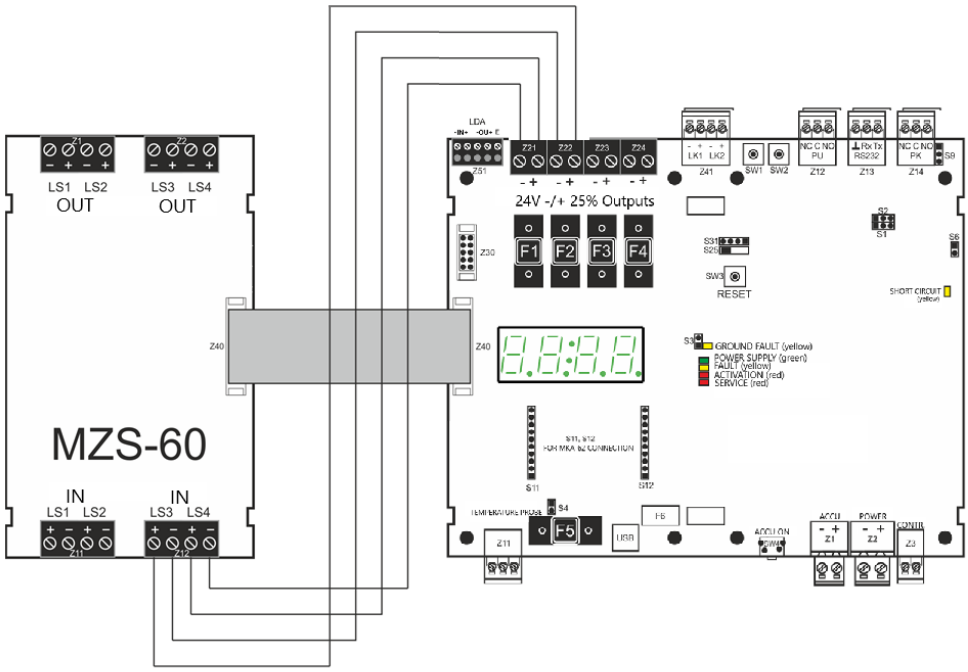


Figure 6.3.2. MZS-60 signal management module with the MZZ-60 power management module - connections diagram

The MZS-60 module enables to link four signal lines to which acoustic sirens or other alarm devices can be connected. Detection state occurs when the signal line is not actuated. The system then verifies whether a short circuit or actuation on the line occured. During the signal line actuation the system verifies if overload or short circuit took place.

Table 6.3.1 shows electrical parameters of the signal lines.

Table 6.3.1. Electrical parameters of signal lines

Electrical parameters of signal lines	
Four outputs with parameters: Output Voltage: Output Current: Termination Resistors: [1] Maximum Wire Resistance: Continuity control (programmable) :	 24 V DC +/- 25 % 2 A 6.2 kΩ 50 ohms YES

[1] *Depending on the load current in the drive mode, the resistance of the conductors should be limited accordingly due to the permissible voltage drop.*

The connection system of the LS1 signal line controlling an acoustic siren or other alarm device is shown in Figure 6.3.3. To prevent the reverse polarity connect the rectifier diode in series with the sounder in the direction shown in Figure 6.3.3. When connecting alarm device branches in parallel, only one termination resistor R_K should be connected (with the furthest device at the end of the line) .

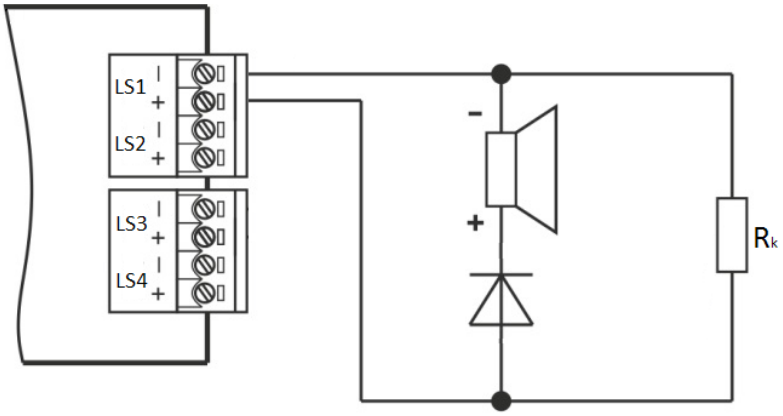


Figure 6.3.3. Acoustic siren with a signal line connection example

Additional faults which may occur after declaring the MZS-60 module and enabling the signal line continuity control parameter are listed in Table 6.3.2.

Table 6.3.2. Faults occuring after configuring signal line continuity control

Fault no. Displayed on the LED screen	Fault description
24	Short circuit of the signal line number 1 output (LS1)
25	Short circuit of the signal line number 2 output (LS2)
26	Short circuit of the signal line number 3 output (LS3)
27	Short circuit of the signal line number 4 output (LS4)
28	Signal line number 1 output break (LS1)
29	Signal line number 2 output break (LS2)
30	Signal line number 3 output break (LS3)
31	Signal line number 1 output break (LS1)
32	Signal line number 1 output overload (LS1)
33	Signal line number 2 output overload (LS2)
34	Signal line number 3 output overload (LS3)
35	Signal line number 4 output overload (LS4)

Source actuation of each of the four signal lines can be selected using the configuration software. The source of signal line actuation can be determined by selecting the parameter of the signal line actuation critetion:

- inactive output,
- external input of the LK1 monitoring line,
- external input of the LK2 monitoring line,
- POLON 3000/4000/6000 system.

Actuation criterion from the external input of the monitoring line LK1 and LK2 is implemented from the active state. With the criterion of controlling the signal line from POLON 3000/4000/6000, system decides whether to switch on or off a particular signal line.

By setting the signal line operating mode parameter, the output operation can be configured as:

- Inactive,
- Permanently active,
- time switching,
- pulse-cyclic switching,
- pulse-quantitative switching.

Delay time of the signal line actuation must be determined for each of the above-mentioned configurations (applies to each configuration). Delay time determines how long the actuation source remain for the signal line to be actuated. If the actuation source withdraws on the meantime, the signal line will not be actuated.

In timed switching, the control time for which the signal line will be switched on must be determined. With pulse-cyclic switch-on, the signal line is switched on and off alternately.

The switch-on time is determined by the actuation time, and the switch-off time is determined by the actuation pause time. In pulse-quantity configuration the number of pulses parameter - which determines how many times signal line will be switched on and off - should additionally be specified.

6.4. MKA-62 Addressable communication module

The MKA-62 module must be added in order to work with the POLON 3000/4000/6000 system. It enables to connect the power supply to the POLON 3000/4000/6000 system detection line.

The MKA-62 addressable communication module should be connected to the S11 and S12 connectors in MZZ-60 power management module. This module must also be declared in the configuration software. Detection line connection is made using the LDA connector.

Table 6.4.1 includes the LDA connector description .

Table 6.4.1. LDA connector pins description

Name	Function
WE+ IN-	Detection line input
YOU+ YOU-	Detection line output
E	Screen input

When the power supply is connected to the POLON 3000/4000/6000 system via the MKA-62 module, the control panel is in position to manage four LS signal lines switching with the configurable PK relay and the PU fault relay. Table 6.4.2 shows how the individual output is identified in the POLON 6000 system.

Table 6.4.2. Description of outputs in the POLON 6000 system

POLON 6000 – Output description
PU Fault Relay
PK Configurable Relay
LS1 Signal Line
LS2 Signal Line
LS3 Signal Line

LS4 Signal Line

The control line states are sent to the POLON 3000/4000/6000 system and the control lines are displayed as monitoring line LK1 and monitoring line LK2. In addition to the monitoring lines the following inputs are exclusive for POLON 6000 only: monitoring state of the configurable PK relay and LS signal lines.

Fault notification shown in Table 6.4.3 may occur when the MKA-62 module declared.

Table 6.4.3. Fault occurring after declaring the MKA-62 module

Fault no. Displayed on the screen	Fault description
23	No communication with the MKA module

6.5. MRZ-60 Power Redundancy Module

This module is used to provide power redundancy and requires the use of two power supplies for this purpose. The Power Redundancy Module is equipped with two redundant outputs (A and B). The electrical parameters of the power redundancy module are shown in Table 6.5.1. The sum of the currents drawn from A and B outputs of the MRZ-60 module cannot exceed the maximum continuous load current of the PZB 6000 power supply used. Module should be considered as an additional load on the MRZ-60 module outputs. Remember not to exceed the maximum continuous load current $I_{maxa,}$ drawn from the MRZ-60 module.

NOTE! The maximum continuous load current drawn from the MRZ-60 module output <u>is NOT</u> the sum of two PZB 6000 fire power supply currents!

Table 6.5.1. Electrical parameters of the power redundancy module

Electrical parameters of the redundancy module	
Two outputs with the following parameters: Output Voltage: Current carrying capacity (each of the A and B outputs):	 24 V DC +/- 25 % 14 A

To obtain power supply redundancy, a 24 V output from the first and second power supply should be connected to each of the A and B inputs, as shown below.

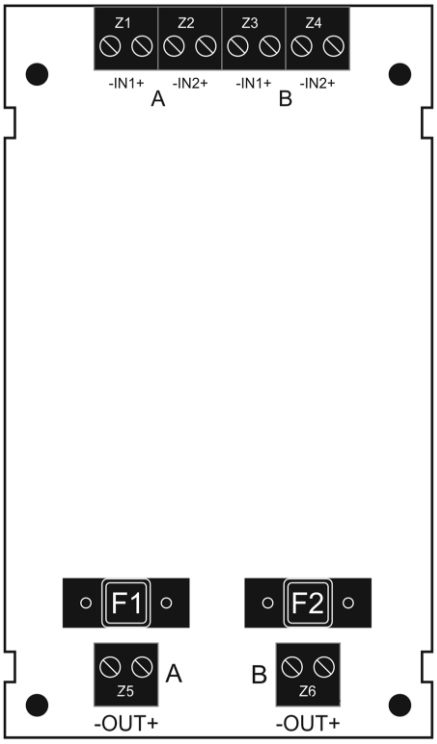


Figure 6.5.1. Description of the MRZ-60 Power Redundancy Module input and output connectors

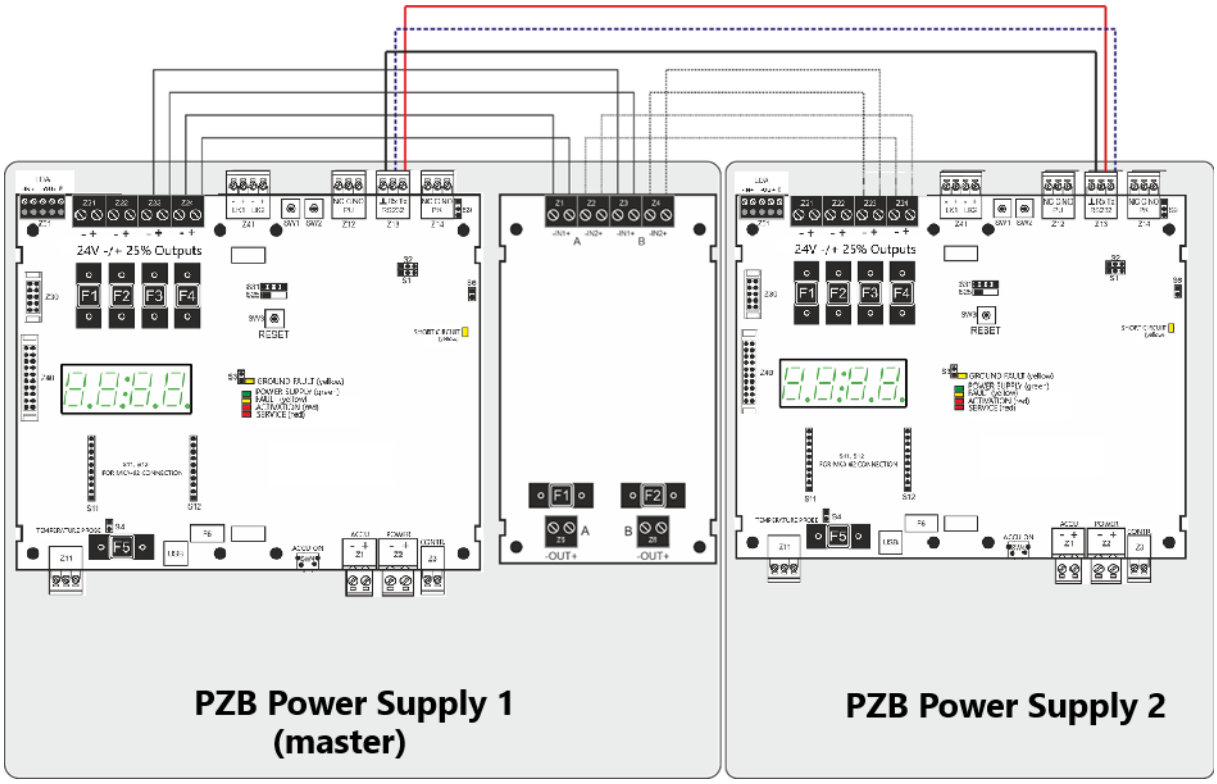


Figure 6.5.2. Redundancy module with two power supplies - connections diagram)

The connections should be made as shown in Figure 6.5.2. One output 24 V +/- 25 % from the first power supply should be connected to input A. The second output from the same power supply should be connected to input B. The same should be done with two 24 V +/- 25 % outputs of the second power supply. One output should be connected to the remaining input A and the other output should be connected to the remaining input B.

7. Power supply operating states

During normal operation of the power supply the following states may be listed :

- Normal operating state – main supply and battery charging,
- No mains voltage – battery power,
- No battery – mains power.

7.1. Regular operating condition

The mains voltage is present during regular operating condition. At the time the battery is charged and electricity is obtained from the mains. The output is supplied with 24 V +/- 25 % voltage. Two-stage charging is used to charge the battery. If the battery is discharged the microprocessor control system charges the battery with a constant current dependent on the battery capacity. Constant current charging continues until: voltage reaches 29 V and the charging current will drop by 50 %. When these conditions are met, the power supply charges the batteries with a constant buffer voltage of 27.3 V.

The values of these voltages may vary depending on the temperature inside the PZB 6000 enclosure (temperature compensation).

7.2. No mains voltage state

The electricity is obtained from the battery when there is no mains voltage. When the mains voltage fails, the device automatically switches to the power supply from batteries.In this condition the voltage at the battery terminals is monitored. When the low voltage of batteries occurs, (below 22 V) low battery voltage fault is indicated. If the battery voltage drops below 19.7 V, the batteries are disconnected from the powered devices. The power supply works with lead-acid batteries made using AGM or gel technology, which are maintenance-free.

7.3. No battery state

No battery state happens when the battery is not connected to the power supply.

Then the voltage of 27.3 V is supplied to the output.

8. User Interface

By pressing the SW1 button you can scroll through the menu. The menu consists of three items:

- By default, when the power supply is turned on, the current time is displayed as shown in Figure 8.1. If the fault occurs, the number of recent fault is displayed. Figure 8.2 shows the occurrence of fault no. 3, which means that there are no batteries connected. If there are more faults, they can be scrolled by pressing the SW2 button.

Figure 8.1. Example of the time displayed on the LED screen when no fault occurred.

Figure 8.2. Example of fault number 3 displaying

- By pressing the SW1 button the voltage supplied from the MZ-61-XXX module is displayed – Figure 8.3. Pressing the SW2 button shows the battery voltage – Figure 8.4, and SW2 pressed again indicates the battery charging current – Figure 8.5. Approximately every 2 seconds the display provides measured value or the name of the measured value as in Figures 8.3, 8.4, 8.5.

Figure 8.3. Designation shown on the mains voltage display (DC)

Figure 8.4. Designation shown on the battery voltage display

Figure 8.5. Designation shown on the charging current display

- Pressing the SW1 button again provides the current software version. Figure 8.7 shows the current software version 2.3.1.

Figure 8.6. Designation shown on the software version display

Figure 8.7. Example of displaying the current software version

The power supply is additionally equipped with three diodes shown in Table 8.1. LED's are placed on both the MZZ-60 module and the power supply housing.

Table 8.1. Power, fault and actuation indicating LED's – description of operation

No	Name / Colour	Signaling method	Description
1	**POWER** /green	Off	No batteries
		Intermittent	No mains power

2	**FAULT** /yellow	Continuous	Collective signaling of fault of at least one circuit or function - fault status
3	**ACTUATION** /red	Continuous	The LED lights up signals the occurrence of signal line drive or configurable relay

9. Power Supply Configuration

The following chapter presents description of computer software used to configure the PZB Power Supply will all described functions it enables.

Software functions:

- Configuration of all power supply modules,
- Reading of up to 1000 events stored in the power supply memory,
- Power supply recent faults reading,
- Current software version reading,
- Setting and reading the time and date programmed in the power supply with the ability to set automatic summer/winter time change,
- Erase the event log content.

The configuration software must be downloaded from the website and installed on the PC. In order to connect with the power supply, USB must be connected to a computer. Subsequently the virtual COM port number under which device is identified must be verified in the Device Manager window. Press “Connect” once the configuration software is switched on. After this operation, a window as in Figure 9.1 should appear. Select the com port number, e.g."COM22" and press OK. At this point connection with the power supply should be established.

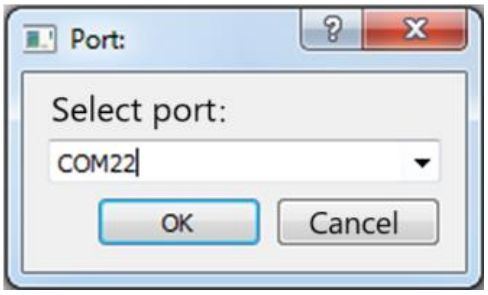


Figure 9.1. Port selection window (e.g. "COM22")

9.1. Configuration

The configuration is carried out in the "Configuration" tab and is divided into three modules: MZZ-60, MKA-60 and MZS-60. Table 9.1.1 includes all Power Supply configuration options.

Table 9.1.1. Overview of all Power Supply possible configurations

1. MZZ-60 Power Management Module			
Element	Parameter type	Configuration options	Description
Battery charger	Batteries capacity	Enter the battery capacity value	The charging current depends on the battery capacity and is selected automatically by PZB depending on the declared battery capacity
Configurable relay	Operating Mode	Inactive	Detailed description of each configuration is listed in Chapter 6.2.8.
		Permanently active	
		Timed actuation	
		Impulse-cyclic actuation	
		Pulse-quantity actuation	
	Actuation critetion	N/A	
		External input LK1	
		External input LK1	
		POLON 3000/4000/6000 system	
	T1 – actuation delay time	Enter time	
	T2 – actuation time	Enter time	
	T3 – actuation pause time	Enter time	
	Number of pulses	Enter the number of pulses	
	Continuity Check	Yes/No	
Control Line No. 1 and No. 2	Operating Mode	Inactive	Detailed description of each configuration is provided in Chapter 6.2.7.
		2 – state	
		3 – state	
RS232 connector	Operating Mode	Modbus protocol	
		Communication with PZB No. 2	
	Modbus protocol – baud rate	No speed configuration	First choose between the Modbus RTU protocol or communication between two PZB's. If the Modbus protocol is used, the address of the Slave device, i.e. PZB, time out time and transmission speed must be set. If communication between two PZB's is used, the master and slave power supplies must be declared. Detailed description is provided in chapter 6.2.9.
		1200 kbps	
		2400 kbps	
		4800 kbps	
		9600 kbps	
		19200 kbps	
		38400 kbps	
		57600 kbps	
		115200 kbps	
	Modbus protocol - address	Enter slave address	
	Modbus protocol - Time out	Enter time	
	Communication between two PZB's	Master	
		Slave	
2. MKA-60 Addressable Communication Module			
MKA-60	Module declaration	Yes / No	Only MKA module to be declared.
3. MZS-60 Signal Management Module			

MZS-60	Module declaration	Yes / No	The MZS-60 module must be declared in order for the system to work properly.
Signal Line No. 1, 2, 3, 4.	Operating Mode	Inactive	Each of the four available signal lines can be configured separately. Each configuration is described in Chapter 6.3.
		Permanently active	
		Timed Switching	
		Impulse-cyclic switching	
	Actuation criterion	Output inactive	
		External input LK1	
		External input LK1	
		POLON 3000/4000/6000 System	
	T1 – actuation delay time	Enter time	
	T2 – actuation time	Enter time	
	T3 – actuation pause time	Enter time	
	Number of pulses	Enter the number of pulses	
	Continuity Check	Yes/No	

Click “Add” in order to create a new configuration. In the following window type the new configuration name. Once accepted, the recently created configuration appears. Subsequently choose the right configuration and save it by clicking the "SAVE" button in bottom right corner of the screen.
To send the configuration to the PZB power supply, click the "Send" icon. The table below presents description of individual icons appearing in this tab.

Table 9.1.2. Description of individual icons from the configuration tab

	Reading the current configuration from the power supply
	Sending the configuration to the power supply
	Adding a new configuration
	Delete selected configuration
	Edit selected configuration
	Rename selected configuration
	Print the configuration

	Save the selected configuration to a PDF file
	Loading from a configuration file
	Saving configuration to a file

9.2. Event log

Event log content is available by entering the "Events" tab. Interface description and available possibilities are presented in table 9.2.1. Events are listed from the oldest to the newest. Erasing the event log in PZB 6000 is possible by entering the "Service" tab.

Table 9.2.1. Description of the interface when reading events

	Events reading – when pressed, all events from the power supply log will be downloaded and displayed in a list. The list includes the exact date of the event, its description and the name of the module. It is possible to read up to 1000 of the latest events.
	Erasing read events – pressing this button deletes the downloaded event list.
	Printing the selected event list.
	Save selected event list to a PDF file.

9.3. Faults

Current faults can be read after entering the "Faults" tab. Description of interface provided in this tab is shown in Table 9.3.1 below. Faults are arranged into modules in which they occur. (MZZ-60, MZS-60, MKA-60).

Table 9.3.1. Description of interface when fault reading

	Faults reading – when pressed - the current power supply faults appear.
	Erasing read faults – pressing this button deletes downloaded faults list.
	Printing selected events list.
	Save selected event list to a PDF file.

9.4. Software version

Obtaining the current software version of the PZB power supply is possible by entering the “Software versions” tab.

9.5. Time and date

In the "Date and time" tab it is possible to set and read date and time in the PZB power supply. It is also possible to set automatic summer/winter time change, as shown in Figure 9.5.1.

Figure 9.5.1. Interface provided by date and time tab

9.6. Service

“Service” tab enables to erase the event log content.

10. Installation

The following chapter describes power supply unit installation.

10.1. Mounting the power supply

The power supply should be mounted on the wall using three expansion plugs of at least 8 mm in diameter. The power supply mounting openings arrangement is shown in figures 10.1.1 - 10.1.4 below. Mounting is only possible with batteries removed.

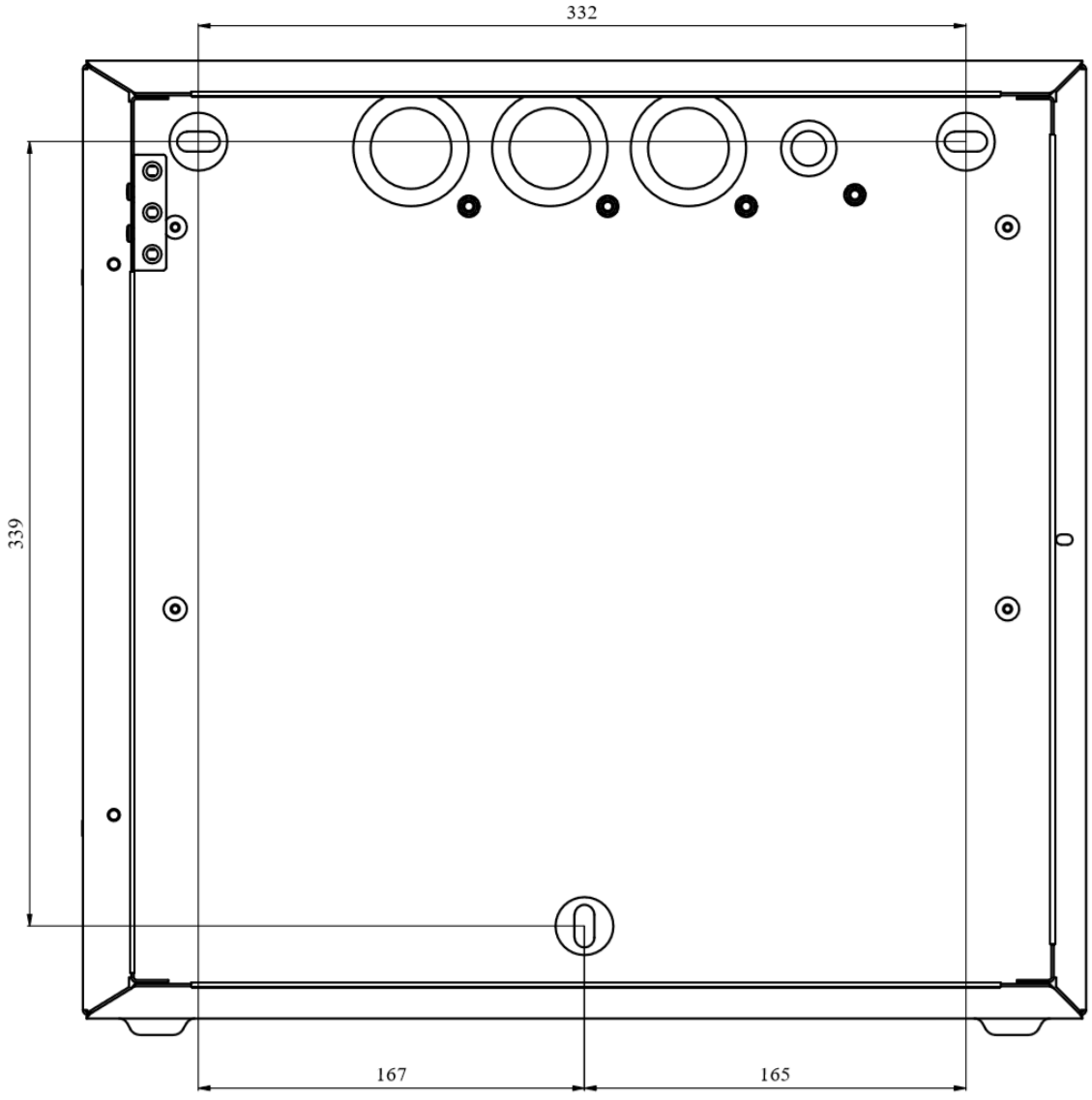


Figure 10.1.1. Mounting dimensions of the M70 housing

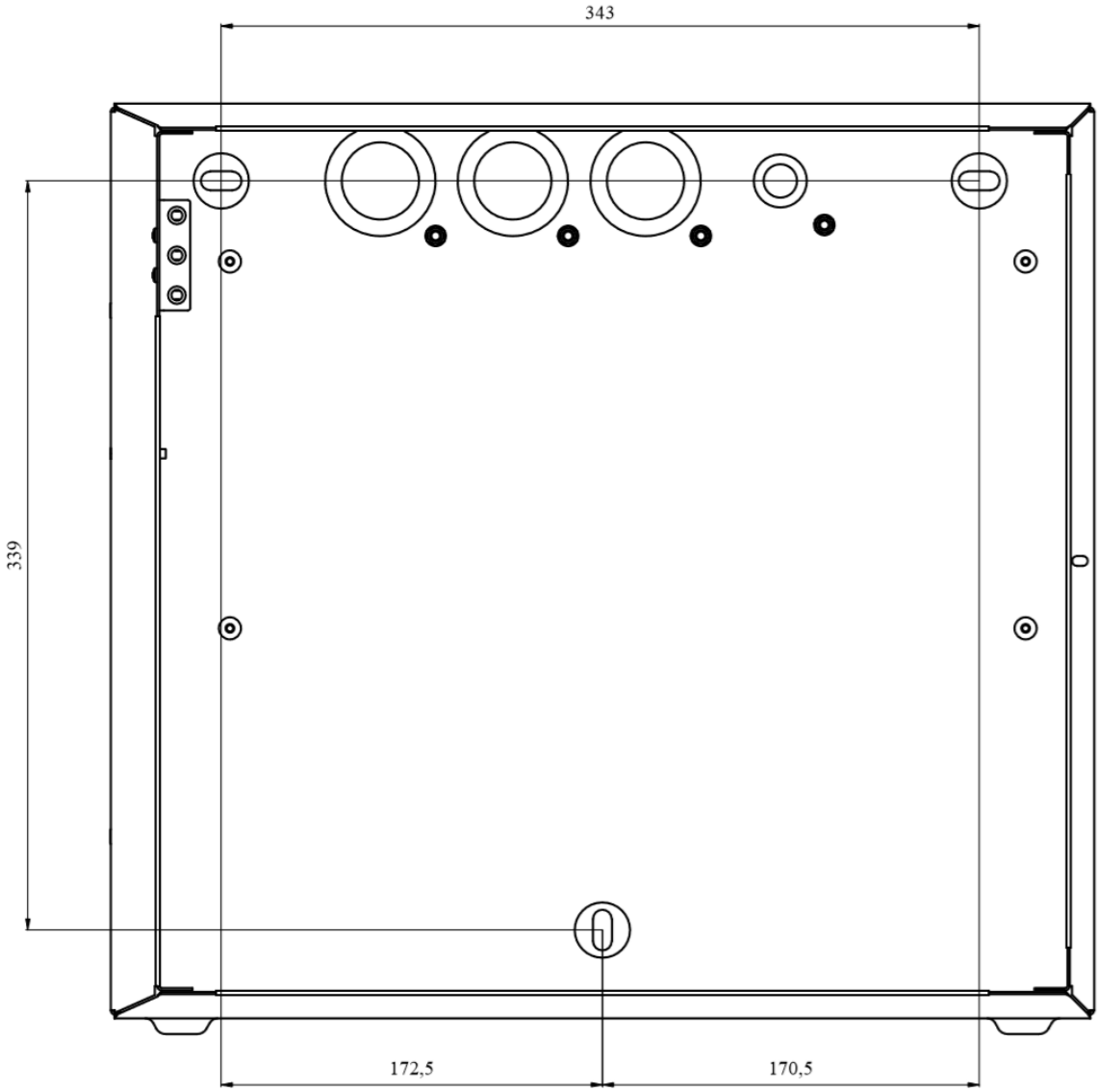


Figure 10.1.2. Mounting dimensions of the M71 housing

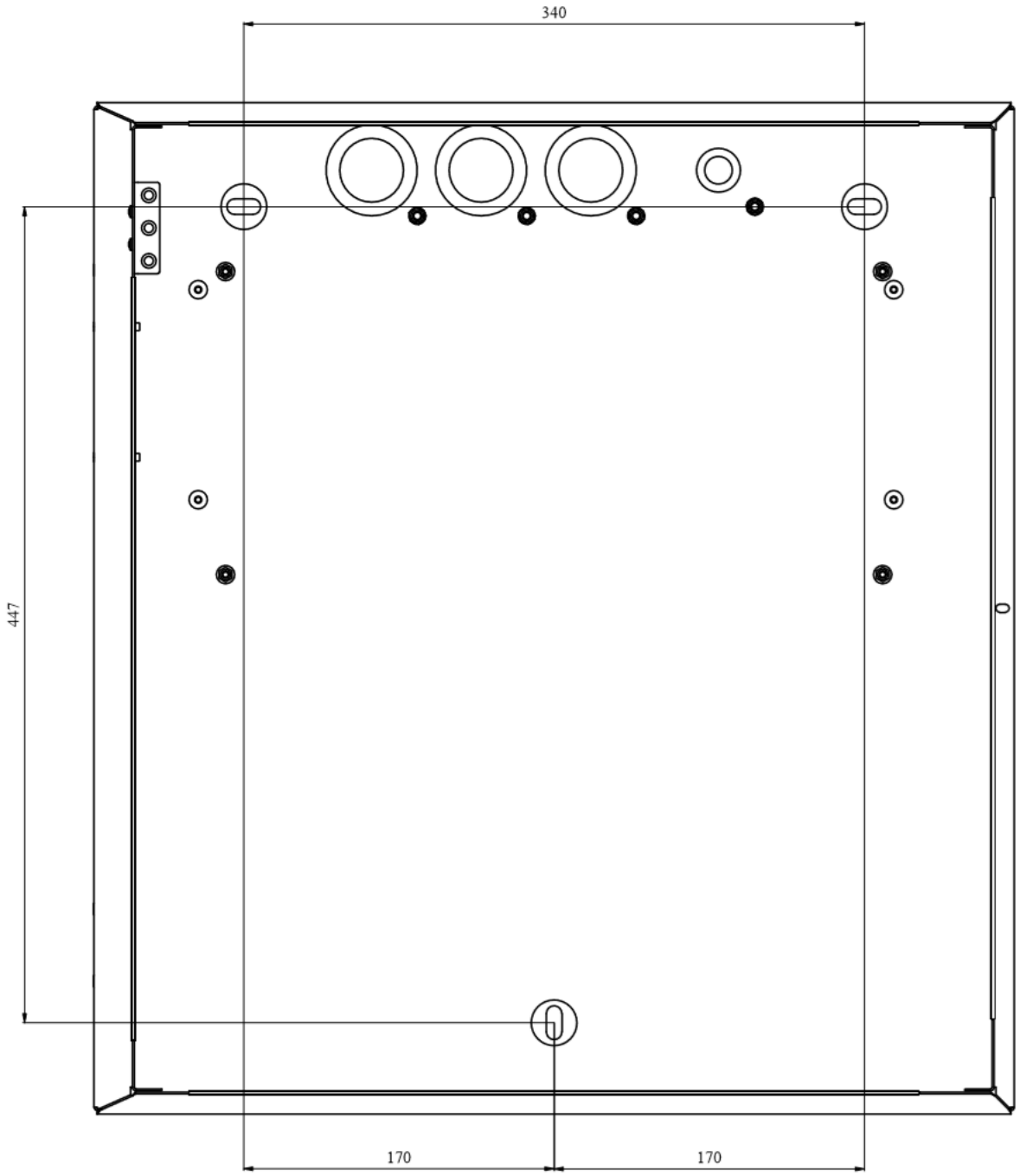


Figure 10.1.3. Mounting dimensions of the M72 housing

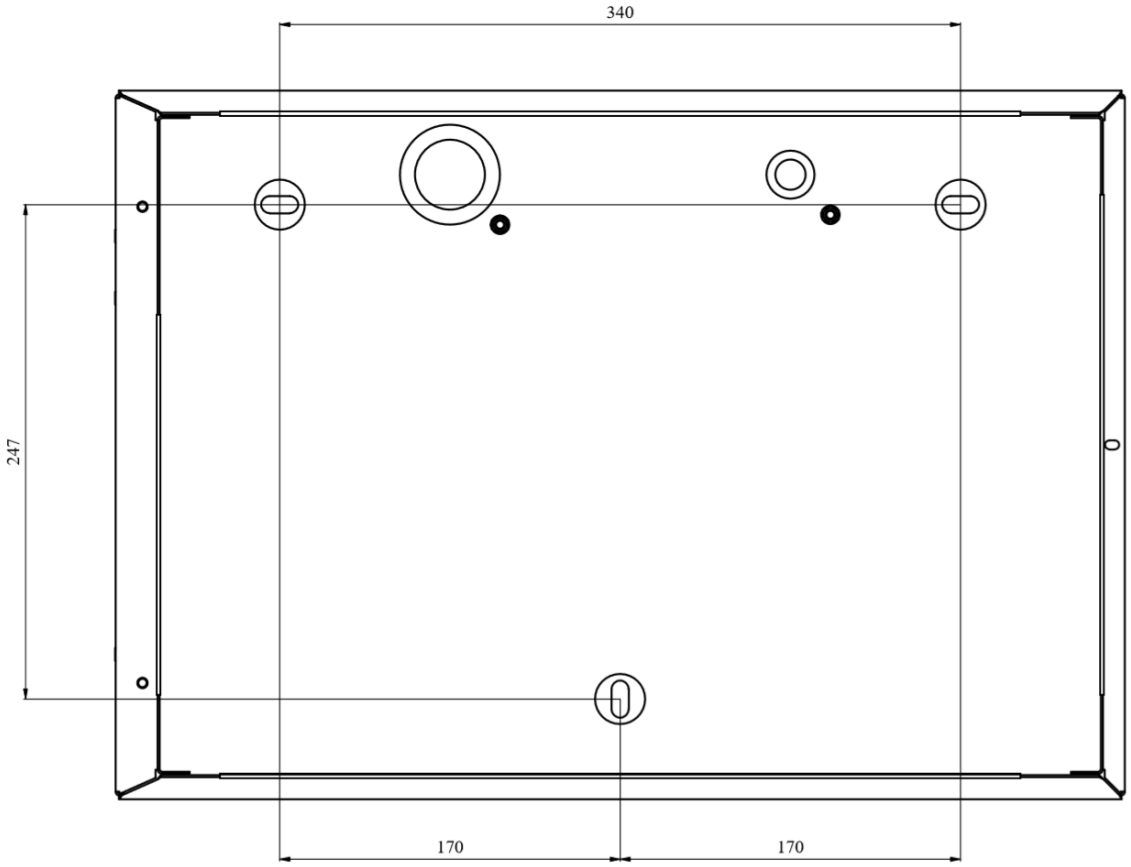


Figure 10.1.4. Mounting dimensions of the M73 housing

10.2. Connection terminals for input and output circuits and wiring

The power supply is equipped with a set of connection terminals designed for connecting wires to a configurable relay, fault relay, RS232 connector, installation of control lines, installation of signalling lines, connection of the POLON 3000/4000/6000 system detection line, connection of batteries and mains power supply. These terminals enable the wires connection with a maximum cross-section of 1.5 mm^2 or 2.5 mm^2.

Connection terminals layout is shown in the module description.

Lines connected to the power supply connectors should be routed in accordance with the rules adopted in telecommunications. Cables can be routed on the wall, under plaster, in the ground or as an overhead line. Supervised lines must be continuous, terminated by end resistors. Lines must be not installed along high-power cables.

Flush- or surface- mounted installation cables can be placed inside the power supply. They are introduced by the shortest route (without reserves), through round grommets on the back wall of the power supply, **separately mains, separately low-voltage cables**. The ends of the unused cables should not be placed in the power supply.

Mains power. There are L, N and PE mains terminals in the PZB power supply for the 230 V / 50 Hz mains supply and the protective conductor connection. Cross-section of 2.5 mm^2 is recommended for the conductor.

Detection lines. To connect the detection line, the LDA connector with marked polarity is used. It is recommended for detection lines to be routed with a CNBOP-certified shielded cable.

Control and signalling lines. Should be made with unshielded cable. Correct connection in accordance with the polarity of the terminals is essential during the assembly process.

11. Instructions for commissioning and checking the proper operation of the power supply after installation.

Work to be performed before commissioning

- Implementation of the installation of low-voltage lines: detection, control, signalling and 24 V power supplying together with 230 V mains power supply in accordance with the design,
- installation of devices in control and signalling lines, etc.,
- power supply installation,
- setting the power supply mains switch to 'off' position,
- connection to the low-voltage line connectors entering the power supply,
- connecting the mains power supply to the L, N, PE terminals in the power supply module - **ATTENTION! Dangerous voltage!**

Checking the celectrical connections

- checking the correct position of configuration jumpers in the power supply modules,
- checking the correct connection of the line wires to the connectors of the power supply, with attention to the polarity + , -,
- checking the connection of the end resistors in the last sockets of the signalling lines,
- checking the correctness of the connection of diodes in the signalling lines,
- **NOTE! The batteries should only be connected to the power supply after they have been properly configured using the provided configuration !!**

Commisioning

- for the time of initial start-up of the control panel, disconnect sounders devices, alarm transmission devices, and other external devices that should not be accidentally switched on during configuration and initial testing of the system, e.g. by sliding (disconnecting) the connectors,
- **NOTE! Do not connect batteries until the battery capacity has been correctly set in the configuration program and the configuration has been correctly sent to the power supply,**
- switch on the power supply using the mains switch,
- carry out software configuration of the power supply: declare modules, program types of inputs, outputs, their operating modes, control variants, time parameters and set the real-time clock in the PZB,
- read the faults detected by the power supply and remove any installation errors,
- perform a test of optical indicators of the front plate,
- perform a preliminary check of the correct operation of the control and signalling lines, the configurable relay and the fault relay.

After starting the system, it is recommended to verify and – if required - set the current date and time along with the event memory erasing.
Work can be considered completed if the above-mentioned activities have been performed and all functions of the fire power supply have been found to be functioning properly while the power supply does not indicate any faults - the system can be handed over to the end user.

Notes:

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