

FIRE ALARM CONTROL PANEL

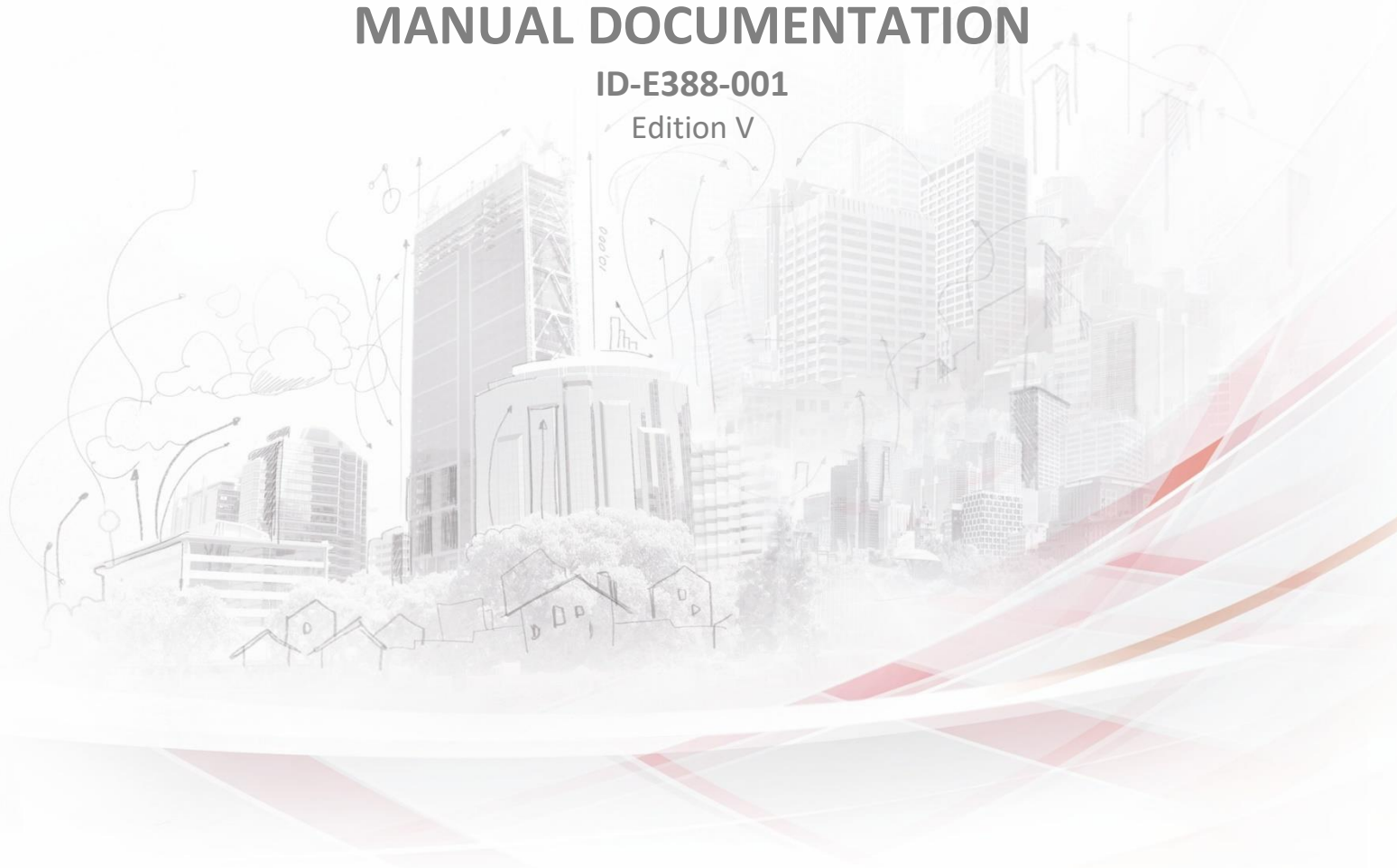
POLON 3000

POLON 3064, POLON 3128 and POLON 3256 variants

OPERATION AND MAINTENANCE MANUAL DOCUMENTATION

ID-E388-001

Edition V



The POLON 3000 fire alarm control panel, which is the subject of this OMM, 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 March 9, 2011 on establishing harmonized conditions for the marketing of construction products and repealing Council Directive 89/106 / EEC;
- LVD** Directive 2014 / 35 / EU relating to electrical equipment designed for use within certain voltage limits;
- EMC** Directive (EU) 2014 / 30 / EU on electromagnetic compatibility.

The POLON 3000 fire alarm control panel was issued a certificate of constancy of performance by JC CNBOP-PIB in Józefów, a notified body No. 1438 in the EU, confirming the compliance of the characteristics/technical parameters of the control panel with the requirements of PN-EN 54-2:2002+A1:2007 and EN 54-4:1997+ A1:2002+A2:2006.

The product has a certificate of approval issued by CNBOP-PIB.

The possessed features/technical parameters exceeding the requirements of the above-mentioned standards and other features/parameters of the product specified in this manual, not specified by the above-mentioned standards, are confirmed by the Manufacturer.

The certificate , certificate of approval and declaration of performance are available on the website www.polon-alfa.pl

Please read this manual carefully before starting the assembly and operation.

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

The POLON-ALFA manufacturer shall not be liable for damages resulting from use that does not comply with this manual.



PLEASE NOTE! POLON-ALFA reserves the right to introduce changes.

The worn-out product, unfit for further use, should be handed over to one of the points engaged in the collection of waste electrical and electronic equipment.



Table of contents

Table of contents	3
1 Introduction.....	7
1.1 Documentation content.....	7
1.2 Purpose of the control panel	7
1.3 Safety conditions	7
1.3.1 Protection against electric shock.....	7
1.3.2 Safety of installations and equipment.....	8
1.3.3 Operation of ionization smoke detectors	8
1.3.4 Repairs and maintenance.....	8
1.3.5 Fuse replacement	8
1.4 Terms and definitions	9
2 Completing the device.....	11
3 Technical parameters	12
4 Construction of the control panel	14
4.1 Housing.....	14
5 PSO-30 panel	16
5.1 User interface.....	16
5.2 Display - menu description	19
5.3 Access levels	24
5.4 Internal modules of the control panel	25
5.5 MSO-30 central controller module	27
5.6 MLD-30 Detection Line Module	31
5.7 MK-30 communication module.....	34
6 Power supply.....	36
6.1 MZ-30 power supply module	36
6.1.1 Backup power supply	37
7 Addressable detection lines.....	40
7.1 Operating mode	40
7.1.1 Detection line 6000.....	40
7.1.2 Detection line 4000.....	40
8 Alerting.....	41
8.1 Single-stage alarming	41
8.2 Two-stage alarming.....	41

8.3	Types of alarms.....	41
8.3.1	Pre-alarm	41
8.3.2	1 st Stage alarm.....	42
8.3.3	2nd Stage alarm.....	42
8.4	Signalling the alarm state.....	44
8.5	Delay inactive mode (staff absent)	44
8.6	Times T1, T2, T3, T4.....	44
9	Detection zone	45
9.1	Alarming variants.....	45
9.2	Method of alarming	45
9.2.1	MCP manual call point alarming.....	45
9.3	Pre-reset.....	46
9.4	Coincidence.....	46
9.4.1	Two-detector coincidence - mode of operation.....	46
9.5	Factory default alarming variants	47
10	Disablements	52
10.1	Indicating disablement status.....	52
10.2	Disabling and re-enabling detection lines, elements and zones.....	52
11	Testing.....	54
11.1	Enabling and signalling the testing status	54
11.2	Testing of alarming line elements in the zone	54
12	Service functions	55
12.1	Software versions and configurations.....	55
12.2	Service status of detectors.....	55
12.3	Tasks.....	55
12.4	Readout of measured parameters.....	55
12.5	Location of items	55
13	Faults.....	57
13.1	Fault status indication.....	57
13.2	Types of faults.....	57
14	Line elements.....	58
14.1	Types of elements of the 6000 series.....	58
14.2	Types of elements of the 4000 series.....	59
14.3	Declaration of elements.....	60
14.4	Parameter configuration.....	60

15	Control outputs	61
15.1	Output operation mode	61
15.2	Output line continuity monitoring.....	62
15.3	Relay fail-safe state.....	62
16	Output groups.....	63
16.1	Parameters.....	63
16.1.1	Group description.....	63
16.1.2	Activation criterion.....	63
16.1.3	Group activation delay time	64
16.1.4	Device type	64
16.2	Factory predefined output groups	66
16.3	Programmable output groups.....	66
17	Input lines	67
17.1	Input line status	67
17.2	Operating mode	67
17.2.1	Mode 0 - Input inactive	68
17.2.2	Mode 1 - Device operation monitoring.....	68
17.2.3	Mode 2 - Device status monitoring	69
17.2.4	Mode 3 - Fire alarm.....	70
17.2.5	Configuration.....	71
17.3	EKS-4001 inputs.....	71
17.4	EWK-4001 inputs.....	71
18	System configuration and programming.....	72
18.1	Hardware configuration.....	72
18.2	Configuration of the detection lines	72
18.3	Configuration of linear elements	73
18.4	Configuration of control outputs, groups of outputs, activation criteria.....	73
18.5	Configuration of input lines	73
18.6	Configuration of zones and alarm variants	73
18.7	Configuration of zone groups.....	74
18.7.1	Programming zone groups	75
18.8	Programming user buttons F1, F2, F3	76
19	Event memory and alarm memory	78
20	Installing the system	78
20.1	General.....	78

20.2	Installing the control panel on the wall	78
20.3	Connecting the power cables and batteries	80
20.4	Design recommendations.....	80
21	Operation and maintenance.....	81
21.1	Regulations for proper use.....	81
21.2	Periodic inspections and maintenance regulations.....	81
22	Packaging, storage, transportation.....	82
22.1	Packaging.....	82
22.2	Storage regulations.....	82
22.3	Transport regulations	82
23	INSTRUCTIONS FOR COMMISSIONING AND CHECKING THE CORRECT OPERATION OF THE CONTROL PANEL AFTER INSTALLATION	83
24	Appendix A - line elements of the POLON 4000/6000 system.....	85

1 Introduction

1.1 Documentation content

This Operation and Maintenance Manual (OMM) allows to familiarize oneself with the intended use, construction and operation of the POLON 3000 fire alarm control panel. It contains the necessary information for the proper installation, operation and use of control panels, and can also provide assistance in the design of fire alarm systems.

The Operation and Maintenance Manual does not cover other elements of the POLON 3000 system, for which there are separate descriptive documentation available.

Line elements that can cooperate with the POLON 3000 control panel are listed in the tables *Table 14-1*, *Table 14-2*.

1.2 Purpose of the control panel

The POLON 3000 modular fire alarm control panel is designed to protect life and property against fire hazards. This protection is implemented through:

- signalling of a fire source detected by cooperating fire call points (automatic and manual),
- indication of a place at risk of fire,
- activation of alarm devices,
- transmission of information about the fire to the relevant services, such as the Fire Brigade through alarm transmission devices,
- activation of fire protection devices.

1.3 Safety conditions

Failure to comply with the safety requirements contained in the instructions for use of the device risks irreparable damage to the device and may cause property damage, injury and/or death.

1.3.1 Protection against electric shock

POLON 3000 fire alarm control panels are classified as Class I equipment and may be used only in the case of application of additional anti-shock protection, in the form of protective earthing.

The insulation of the 230 V/50 Hz mains supply circuits is reinforced and withstands the test voltage of 2800 V, and the insulation of the low-voltage circuits (below 42 V) resists the test voltage of 700 V DC.

1.3.2 Safety of installations and equipment

The wiring system should be made with cables with the required fire resistance and properly protected, with crossings through the boundaries of fire zones. In order to avoid unwanted impact, the required distances of the low-voltage installation from the electrical power and lightning protection system must be maintained. From the point of view of the system resistance to interference, it is recommended to use a protective earthing system. Backup batteries should be placed in the control panel at the final stage of installation. The components of the described device are sensitive to heat. The maximum ambient temperature should not exceed 40 °C. Do not cover the ventilation openings of the control panel. The space left around it should be large enough for air to flow freely. Air humidity in rooms where the device is operated should not exceed 95 %.

1.3.3 Operation of ionization smoke detectors

In the case of cooperation of the control panel with ionization (isotope) detectors, their installation, removal and storage may be performed only by an "authorized installer", i.e. an organizational unit that, in accordance with Article 4 of the Atomic Law Act, has a permit from applicable Agency for such activity.

1.3.4 Repairs and maintenance

Maintenance work and periodic inspections must be performed by authorized personnel of companies authorized or trained 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.

1.3.5 Fuse replacement

The control panel construction is mainly based on automatic, electronic short-circuit protection systems or protection devices, intended to be replaced only under the manufacturer's service conditions. The exception is the protection of the batteries in the form of a safety fuse. When replacing a fuse link, use a replacement of the correct type and nominal value.

1.4 Terms and definitions

Addressable detection line - a detection line that enables addressable elements to be installed.

Side detection line - a detection line for non-addressable (conventional) two-state fire warning devices, created by the ADC-4001 adapter.

Addressable element - an element operating in an addressable detection line, with a unique and unchangeable identifier in the form of a serial number and the element number assigned during configuration. The addressable element enables two-way exchange of digital data with the control panel (transmission and reception).

Line/loop element - element installed on addressable detection lines/loops (addressable element) and side lines (non-addressable element).

Serial number (factory address) - an unique 12-character code assigned to each addressable element during the production process. The serial number includes the type of addressable element identified by the control panel.

Element number - consecutive number assigned to an addressable element when configuring a detection line. During normal operation, the control panel communicates using the element number (short number).

Detection zone – a separated part or location of a protected facility to which specific line elements are assigned.

Group of outputs - a set of assigned outputs, the actuation of which depends on the same actuation criterion.

Faulted device - a fault condition reported by the control inputs, in case of negative verification of tripping of the controlled device. The state can be used to implement scenarios of controlling the control outputs.

Device on - status reported by control inputs, in case of positive verification of actuation of the supervised device. The state can be used to implement scenarios of controlling the control outputs.

Quiescent (stand-by) status - operating mode in which the control panel is powered by an electric power source meeting the specified requirements and in which no other operating status is signalled.

Alarm (fire) state - the operating mode the control panel enters after receiving information on fire detection from fire warning devices (it can be signalled as a 1st stage or 2nd stage alarm).

Pre-alarm state (initial alarm state) - the operating mode the control panel enters after receiving the first alarm signal from fire warning devices, from the detection zone.

Disablement state - operating state in which any control panel functionality has been intentionally disabled in the control panel.

Testing state - the operating mode in which the control panel signals the function checking.

Fault state - a condition in which the control panel indicates damage to its circuits or any component of the alarm system.

Service state - the operating state in which the control panel signals the service state of any component of the alarm system.

2 Completing the device

In *Table 2-1* a complete set of equipment was provided, which is included in the POLON 3000 control panel as standard. In *Table 2-2* a list of additional equipment that can be installed in POLON 3000 control panels is summarized. Accessories must be ordered separately.

Table 2-1

No.	Specification	Number of items
1	POLON 3000 fire alarm control panel (in variants: POLON 3064, POLON 3128, POLON 3256)*	1
2	Operation and Maintenance Manual (OMM) ID-E388-001 **	1
3	User Manual IO-E388-001	1
4	Warranty book	1
5	Unit pack for the control panel	1

*) possible expansion of the control panel with an optional MK digital communication module-30 (according to table 2.2),

**) OMM together with the control panel or in the form of a file downloadable from the POLON-ALFA website.

Table 2-2

No.	Specification	Comments
1	MK-30 digital communication module	1 item
2	Battery 12 V / 7 ÷ 9 Ah inside the control panel or 17 ÷ 18 Ah outside the control panel	2 items
3	Line elements of the system - fire detectors, manual call points, control elements, signalling devices, etc.	According to the tables: Table 14-1, Table 14-2
4	Detector bases	According to the instructions of the individual detectors

3 Technical parameters

General parameters	Overall dimensions L x H x G Weight (without batteries) Housing tightness Operating temperature range Permissible relative humidity of operation Transport temperature range Max. Number of line elements supported by the control panel: ¹⁾ Variant: POLON 3064 POLON 3128 POLON 3256	339 x 402 x 90 mm < 6 kg IP 30 -5 °C ÷ +40 °C 95 % at +40 °C -25 °C ÷ +55 °C 64 128 256
Power supply	<p>Primary power supply (230 V mains) Voltage Current Power MZ-30 power supply module</p> <p>Backup power supply 2 batteries</p> <p>Voltage Charging current Exceeded internal resistance of the batteries indication Final discharge voltage Operating time on backup supply Control panel current consumption from backup power supply in detection: – with optional module MK-30</p> <p>Power output for external devices Voltage Available current max.</p>	<p>88 ÷ 264 V AC – 50/60 Hz < 1.0 A (for 230 V) 50 VA max. 24 V/ 2.2 A</p> <p>2 x 12 V, 7 ÷ 18 Ah 7 ÷ 9 Ah internal F1 (4,7 17÷18 Ah external 24 V 0.7 A</p> <p>> 1.0 Ω 21 V ±5 % 72 h</p> <p>approx. 48 mA (without output loads) approx. 68 mA (without output loads)</p> <p>24 V -15 % +20 % 0.5 A</p>
M50-30 module (Control panel main board)	<p>Alarm outputs (powered), monitored or alternatively as input lines: – number – output voltage – load current, max. Terminal resistor Rk</p> <p>Relay outputs (dry-contact) with circuit continuity monitoring system – number – voltage max. – load current, max.</p> <p>Computer connection Interface</p>	<p>2 24 V ±20 % 0.5 A 6.2 kΩ (or 4.3 kΩ +2 kΩ = 6.3 kΩ)</p> <p>3 30 V 1.0 A</p> <p>USB</p>
MLD-30 module (Detection line module)	Addressable detection lines – number	2

	Max. Number of elements per one line ¹⁾ : <ul style="list-style-type: none"> – type A (loop) line – type B (radial) line – line resistance, max. – line capacity, max. – max. line load current 	64 (ref. POLON 3064), 128 (regarding. POLON 3128 and POLON 3256) 32 2 x 100 Ω 300 nF 20 mA
MK-30 module (Communication Module) - optional	Digital communication outputs <ul style="list-style-type: none"> – RS485 type – ETHERNET type (Modbus) 	1 1
Zones	Number of zones to which line elements are assigned by software, max. Zone groups, max.	254 16
Output groups	Number of output groups, max.	64
Event memory	Number of events	≥ 4000
Resources of monitoring inputs and control outputs on detection lines (which are present in elements such as: EKS, SAW, SAL, SAB, UCS, IGNIS, PZB, CDG, mCDG, for all variants of control panels POLON 3064, POLON 3128, POLON 3256)		
Control inputs	Number of inputs, max. <ul style="list-style-type: none"> – detection line 1 – detection line 2 	64 64
Control outputs	Number of outputs, max. Detection line 1 <ul style="list-style-type: none"> – POLON 4000 protocol – POLON 6000 protocol Detection line 2 <ul style="list-style-type: none"> – POLON 4000 protocol – POLON 6000 protocol 	160 256 160 256
Recommended²⁾ or maximum²⁾ numbers of inspection, control and signalling line elements on detection lines with POLON 6000 and POLON 4000 communication protocol		
Number of EKS-6000 elements, up to 4 inputs / 4 outputs, POLON 6000 protocol, max.		64 32
Number of elements EKS-6080/6008, POLON 6000 protocol, max.		64
Number of SAW-6001/6006 sirens, POLON 6000 protocol, max.		51
Number of SAB-6001/6006 sirens, POLON 6000 protocol, max.		4
Number of UCS 6000 panels, POLON 6000/4000 protocol, max.		32
Number of elements EKS-4001, POLON 4000 protocol, max.		20
Number of elements EWS-4001, POLON 4000 protocol, max.		20
Number of elements EWK-4001, POLON 4000 protocol, max.		20
Number of UCS 4000 panels, POLON 4000 protocol, max.		2
Number of IGNIS 2500 panels, POLON 6000 protocol, max.		5
Number of CDG panels, POLON 6000 protocol, max.		8
Number of mCDG panels, POLON 6000 protocol, max.		it results only from the current consumption and the number of inputs / outputs on the detection line ¹⁾
Number of remaining elements		

¹⁾ The maximum number of elements on one detection line is additionally limited by the line load current limit (20 mA) and the number of active inputs / outputs in the monitoring and controlling elements. The load on the line depends on the type and number of elements used.

²⁾ For detailed information, please contact the Technical Support Department of POLON-ALFA.

4 Construction of the control panel

4.1 Housing

The POLON 3000 control panel housing consists of a metal housing in which the control panel components are mounted, and a removable front cover. The cover can be removed after unscrewing the screws in the upper part of the housing with a screwdriver and sliding it upwards in order to disconnect the side hooks - *Fig. 4-2*. The view of the housing with overall dimensions is shown in

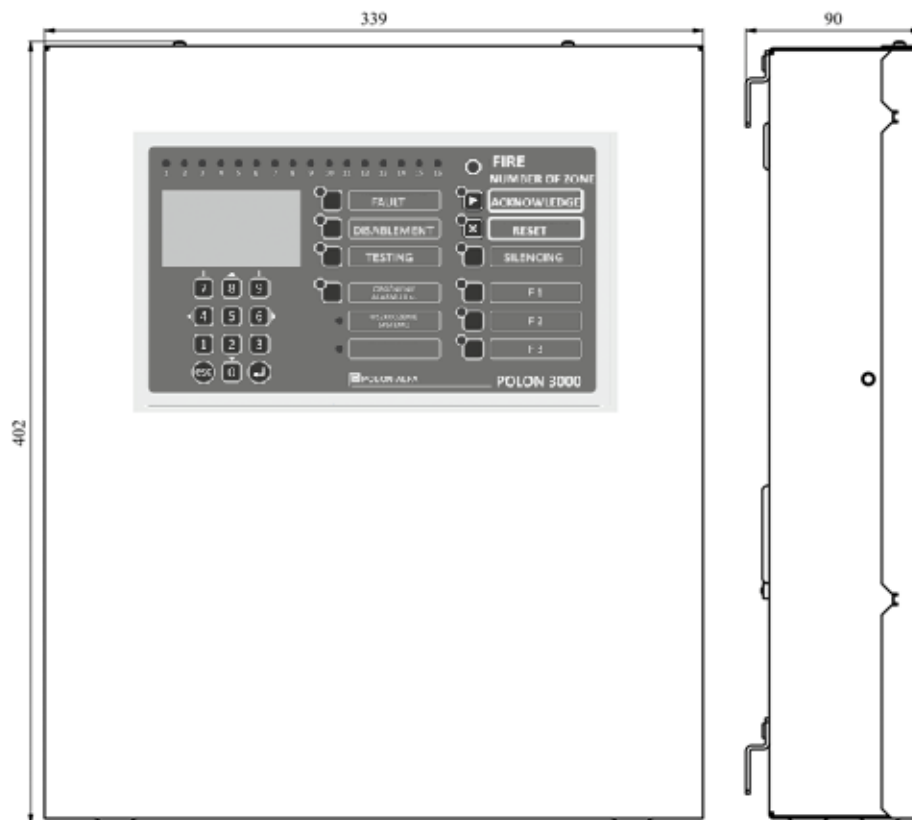


Fig. 4-1 View of the housing.

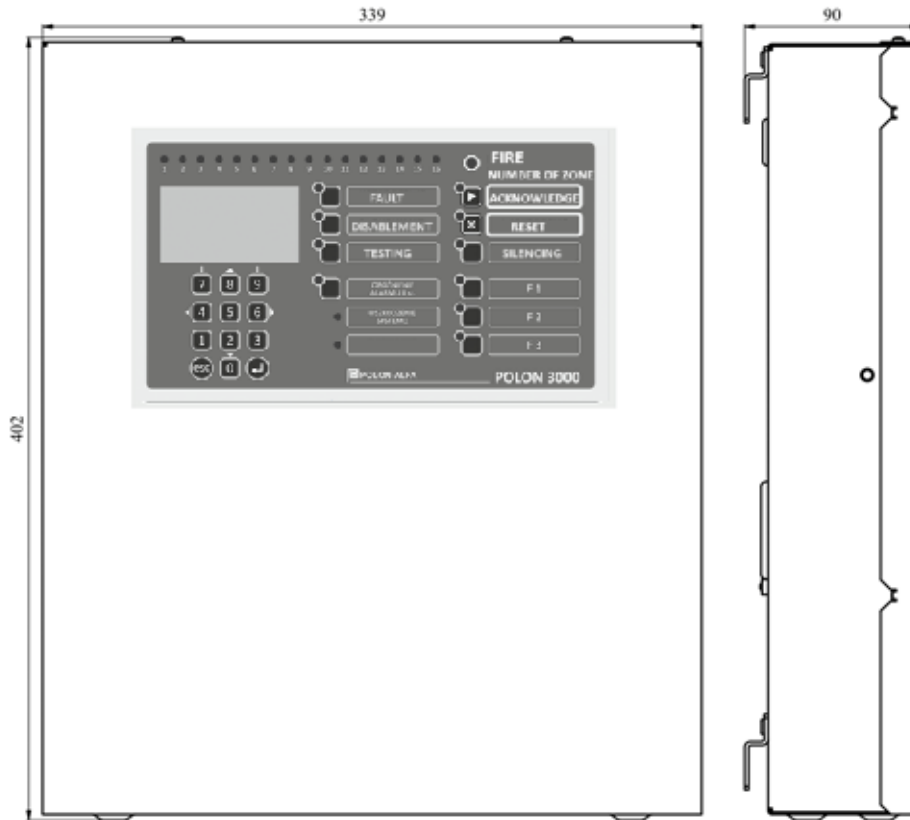


Fig. 4-1 View of the housing

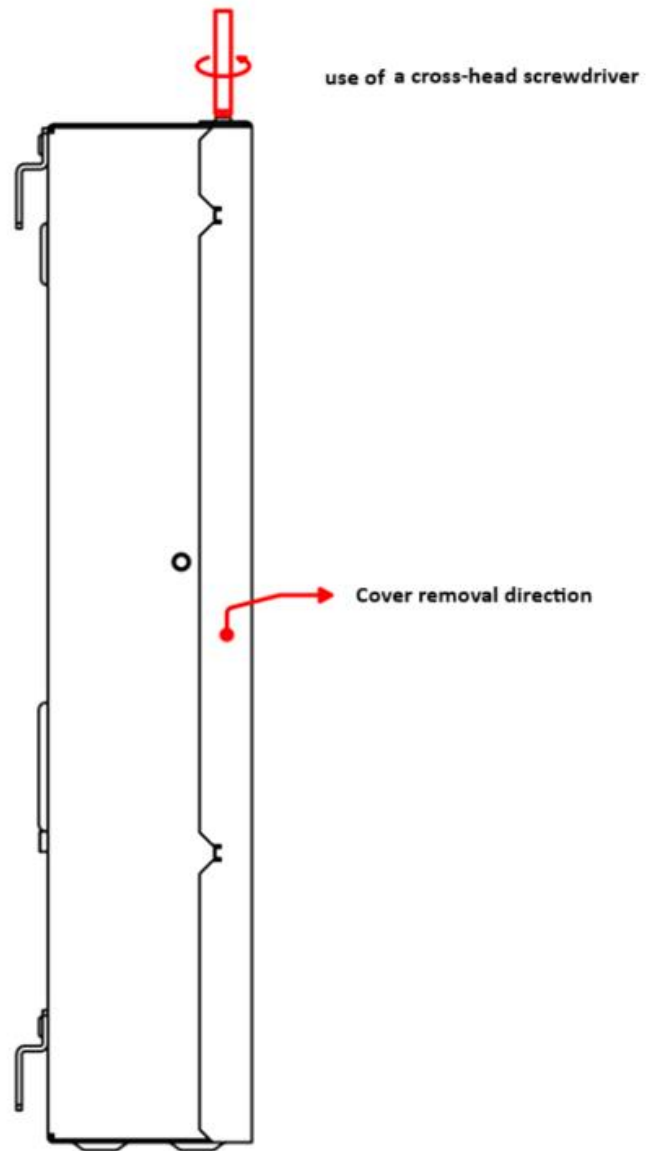


Fig. 4-2 Front cover removal

5 PSO-30 panel

5.1 User interface

The user interface is the front part of the PSO-30 panel, equipped with a set of buttons, optical indicators and LCD display. Indications of optical signalling devices, together with messages appearing on the LCD display, allow for a quick assessment of the fire hazard of the monitored facility and the operating status of the installed system. A view of the keypad of the PSO-30 panel is shown at *Fig. 5-1*. The description of the operation of individual buttons and optical indicators (lamps) is presented in the table *Table 5-1*.

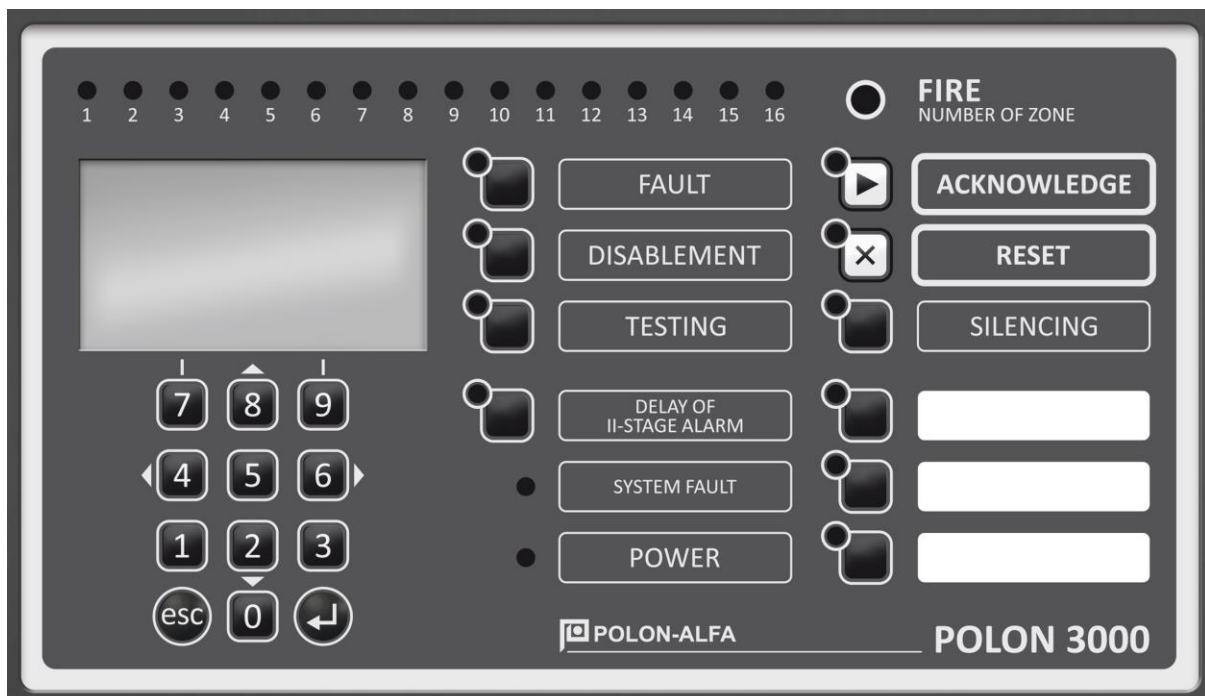


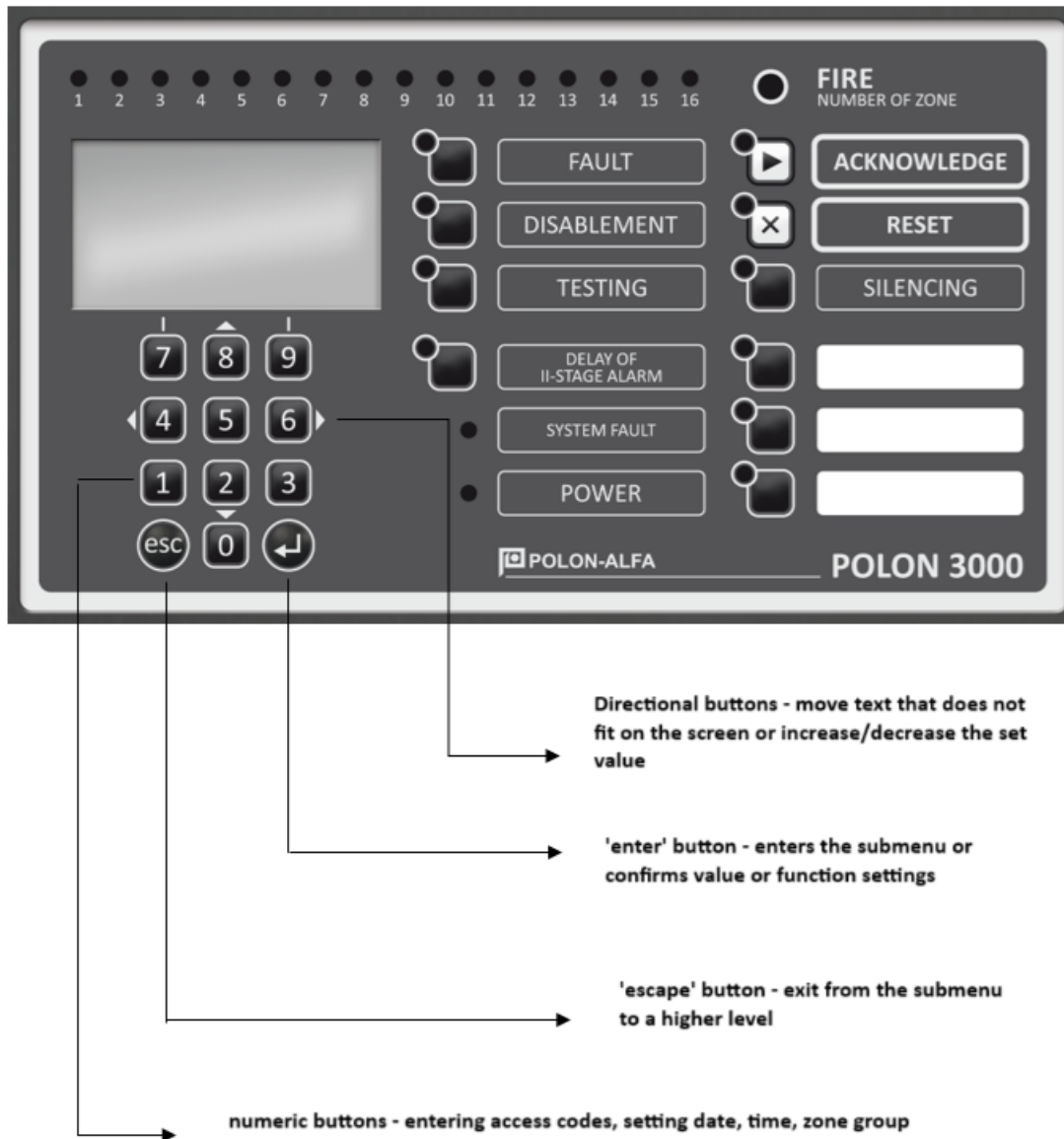
Fig. 5-1 PSO-30 panel keypad and indicators - user interface

Table 5-1

No.	Name / colour	Signalling method	Description of the signalled state or function of the button
1	FIRE - main indicator of fire alarm status Zone No. - 16 zone indicators ○ /red	Flashing	Fire detection - unconfirmed alarm condition The flashing light indicates the zone in which the test alarm was triggered. In the case of more than one zone, zones can be grouped, in which case one indicator will show a group of zones (the information on the display specifies the location of the detected threat).
		Continuous	The main indicator switches to the continuous signalling mode after pressing the CONFIRMATION button. Zone indicators indicate with a continuous light the numbers of the zones where the fire alarm occurred. In the case of more than one zone, zones can be grouped, in which case one indicator will show a group of zones (the information on the display specifies the location of the detected threat).
2	FAULT ○ / yellow	Continuous	Collective fault indication of at least one circuit or function - fault status.
	Button		Press to display a list of faults on the LCD display; button active from access level 1.
3	DISABLEMENT ○ / yellow	Continuous	Collective indication of disablement, at least one input/output or function - blocking status.
	Button		Display of disablement menu on LCD display; button active from level 1 access to read locking.
4	TESTING ○ / yellow	Continuous	Collective signalling of testing, at least one circuit or function - testing status.
	Button		Display the testing menu on the LCD display; button active from access level 2.
5	SECOND STAGE ALARM DELAY ○ / yellow	Continuous	Indicates the 2nd level alarm delay enabled,
	Button		off / on switches over to the alarm variant in PN mode (staff-absent mode, default one-stage variant) button active from the 2nd access level.
6	SILENCE ○ / yellow	Continuous	Blocking (disabled) all alarm sounders (outputs assigned to the alarm device group).

		Flashing	Partial blocking (off) - for more than one output assigned to a group of alarm devices (at least one blocked output and at least one unblocked output).
	Button		Quick access to DISABLEMENT menu for outputs configured as sounders control
7	ACKNOWLEDGE ○ / yellow	Continuous	No acknowledgement of the alarm - timer T1 counts until the ACKNOWLEDGE button is pressed.
	Button		Pressing the ACKNOWLEDGE button - acceptance of the fire alarm by the staff, switches the 2 stage alarm delay timer from T1 to T2 and (depending on the configuration) can cause silencing of the sounders; active from access level 1.
8	RESET ○ / yellow	Continuous	Indicates that the alarm can be cleared
	Button		Clear alarm status; button active from access level 2 onwards
9	SYSTEM FAILURE ○ / yellow		Failure of microprocessor chip operation or configuration data
10	POWER SUPPLY ○ / green	Continuous	Signalling of efficient primary and backup power supply.
		Flashing	Failure or absence of mains or backup power.
11	LCD DISPLAY		Display of messages related to the control panel status and configuration settings
12	NUMERIC KEYPAD, DIRECTION BUTTONS, esc., ↵ enter F1, F2, F3		Intended for entering the access code and operating the control panel menu. User buttons - programmable. Selected functions can be assigned to them in order to facilitate operation.

5.2 Display - menu description



The description of the control panel menu is shown in the table Table 5-2 *Control panel menu*. The table illustrates the structure of the main menu, sub-menus and provides a brief description of the available functions.

Table 5-2 Control panel menu

Main menu	Sub-menu 1	Sub-menu 2 (if available)	Sub-menu 3 (if available)	Functional description
FAULTS	<i>Readout - displaying a list of all detected faults.</i>			
DISABLEMENTS	DISABLEMENT LIST	<i>Readout - display a list of all blockades.</i>		
	LINE ELEMENTS	Detection line 1	<i>On/off blocking of LINE 1 elements.</i>	
		Detection line 2	<i>On/off blocking of LINE 2 elements.</i>	
	ZONES	<i>On/off zones disablements.</i>		
	OUTPUT GROUPS	<i>On / off output group disablements.</i>		
	INPUTS	<i>On/off inputs disablement.</i>		
	DETECTION LINES	<i>Enable/disable disablement of the detection lines.</i>		
TESTING	ZONES	<i>On / off for testing the elements within selected detection zones (detectors, MCPs, inputs operating in the "fire alarm" mode).</i>		
	INDICATORS	<i>On / off for test of optical indicators (lamps) and the control panel internal buzzer.</i>		
STATUS OF EQUIPMENT	ALARM DEVICES	ON	<i>Readout of activated alarm devices.</i>	
		FAULTY	<i>Readout for faulty alarm devices.</i>	
		DISABLED	<i>Readout for disabled alarm devices.</i>	
	AL. TRANSMISSION DEV.	ON	<i>Readout of the activated alarm transmission devices</i>	
		FAULTY	<i>Readout for faulty alarm transmission devices.</i>	
		DISABLED	<i>Readout for disabled alarm transmission devices.</i>	
	FIRE PROTECTION DEVICES	ON	<i>Readout for activated alarm devices.</i>	
		FAULTY	<i>Readout for faulty fire protection devices.</i>	

		DISABLED	<i>Readout for disabled fire protection devices.</i>	
	DEVICE STATE MONITORING	ON	<i>Readout for activated devices supervised by input lines operating in the "device status monitoring" mode.</i>	
		FAULTY	<i>Readout for faulty devices supervised by input lines operating in the "device status monitoring" mode.</i>	
		DISABLED	<i>Readout for disabled devices supervised by input lines operating in "device status monitoring" mode.</i>	
	DEV.TRIP CONTROL	ON	<i>Readout of activated alarm devices supervised by input lines operating in "device tripping control" mode.</i>	
		FAULTY	<i>Readout for faulty devices supervised by input lines operating in "device tripping control" mode.</i>	
		DISABLED	<i>Readout for disabled devices supervised by detection lines operating in "device tripping control" mode.</i>	
CONFIGURATION	TIMERS T1, T2, T3, T4	<i>Readout for timers delay values (T1, T2, T3, T4)</i>		
	DETECTION LINES	Detection line 1	LINE TYPE	<i>Possibility to change line type: loop/open.</i>
			AUTO-CONFIGURATION	<i>Readout of elements installed on Line1</i>
		Detection line 2	LINE TYPE	<i>Possibility to change line type: loop/open</i>

			AUTO-CONFIGURATION	<i>Readout of elements installed on Line2</i>
LINE ELEMENTS	Detection line 1	<i>Readout for elements assigned to the detection line 1.</i>		
	Detection line 2	<i>Readout for elements assigned to the detection line 2.</i>		
ZONES	<i>Readout for zone configuration (displaying the list of zones).</i>			
ZONE- AL. VARIANTS	<i>Readout for alarm variants configuration</i>			
ZONE GROUPS	<i>The window for reading and configuring (programming) zone groups 1-16, which involves assigning the selected fire zone to a zone group.</i>			
OUTPUTS	Detection line 1	<i>Readout for Outputs configured within Detection Line 1</i>		
	Detection line 2	<i>Readout for Outputs configured within Detection Line 2</i>		
	CSP	<i>Readout for configuration of outputs located on MSO-30 module in the control panel</i>		
OUTPUT GROUPS	<i>Readout for output groups configuration</i>			
INPUTS	Detection line 1	<i>Readout for Inputs configured within Detection Line 1</i>		
	Detection line 2	<i>Readout for Inputs configured within Detection Line 2</i>		
	CSP	<i>Reading the configuration of the inputs located in the control panel on the MSO-30 module</i>		
CRITERIA - OUTPUTS ACTIVATION	<i>Configuration readout for output groups activation criterions</i>			
MK-30	<i>Configuration readout for MK-30 module parameters</i>			

	USER BUTTONS	F1- programmable	List of functions to program F1 button	Button programming window
		F2- programmable	List of functions to program F2 button	Button programming window
		F3- programmable	List of functions to program F3 button	Button programming window
SETTINGS	DATE, TIME	Date and time setting window		
	CLOCK CALIBRATION	Clock daily correction in the range of $\pm 0... 9.9$ s with an accuracy of 0.1 s.		
	VOLTAGE CALIBRATION	Buffering voltage adjustment (27.3 V factory default)		
	LCD CONTRAST	LCD display contrast adjustment		
	LANGUAGE	Language selection - depending on the version of the program, Polish, English...		
EVENT LOG	Event log memory readout.			
ALARM COUNTER	Alarm log memory readout.			
DELETION OF EVENTS	CLEAR ALARM LOG	User window that allows you to erase stored alarm log memory (from the alarm counter)		
	CLEAR ALARM EVENTS	User window that allows you to erase stored events log memory (without deleting the alarm counter)		
SERVICE	VER. PROGR. CONFIG.	Readout for Software version and configuration ID		
	SERVICE STATUS	Detection line 1	Readout for contamination level of optical detectors on detection line 1	
		Detection line 2	Readout for contamination level of optical detectors on detection line 2	
	TASKS	DOP-6001 TUNING	Start of DOP-6001 automatic adjustment (tuning)	

		RESERVE	<i>Sub-menu reserved for new functions</i>
		RESERVE	<i>Sub-menu reserved for new functions</i>
	PARAM. MEASURED	Detection line 1	<i>Readout for sensed value by detectors on line 1</i>
		Detection line 2	<i>Readout for sensed media value by detectors on line 2</i>
		CSP	<i>Voltage readout at characteristic points of the MSO-30 controller</i>
	EL. LOCATION	Detection line 1	<i>Optical indication activation for selected element on detection line 1</i>
		Detection line 2	<i>Optical indication activation for selected element on detection line 2</i>
	ACCESS LEVEL	CHANGE OF ACCESS	<i>Window that allows you to enter an access code and grant access to functions of level 2, 3 or 4. Return to level 1 is after entering the wrong code.</i>
CODE CHANGE - LEVEL 2		<i>A window to change the default level 2 access code to user code.</i>	
CODE CHANGE - LEVEL 3		<i>A window to change the default level 3 access code to user code.</i>	
CODE CHANGE - LEVEL 4		<i>A window to change the default level 3 access code to user code.</i>	

5.3 Access levels

The range of user accessible actions is divided into 4 levels of access.

Access to a given level (except for level 1) is obtained by entering an access code. A higher level of access increases the range of possible operations.

Factory default access codes:

2222 - Level 2 access,
3333 - Level 3 access,
4444 - Level 4 access.

Default factory access codes can be changed by the user. The new access codes may contain from 1 to 6 digits. The change can be made after selecting the ACCESS CODES and CHANGE CODE LEVEL 2 (or 3, 4) from the menu, following the information displayed on the screen. After entering the new code

from the keypad, press "enter". To save new codes in the memory, press "esc" and confirm, in the automatically appearing window, SAVE, CANCEL.

The return to the factory access codes takes place after closing the S4 jumper on the MSO-30 module, according to Fig. "MSO-30 - back side" and entering the CHANGE ACCESS sub-menu and pressing "enter". Save default codes to memory by pressing "esc" and confirming in the automatically appearing SAVE, CANCEL window. After restoring the default access codes, the jumper should be moved back to its initial position (working position).

5.4 Internal modules of the control panel

The control panel has a compact design. Most of the control panel components, except for the power supply, have been integrated in one main PSO-30 unit, consisting of several modules. The PSO-30 unit includes:

- the main controller of the control panel - module MSO-30,
- user interface - in the form of a front panel with a keyboard and LCD display,
- MLD-30 module for detection loops,
- MK-30 digital communication module (optional).

Functional modules MLD-30 and MK-30 are built-in directly on the PCB of the main MSO 30 controller-. Communication of the MLD-30 line module and MK-30 communication module with the MSO-30 main controller is carried out with digital serial transmission. The modules have independent controllers that manage data exchange and the tasks they are designed for. The arrangement of the modules inside the control panel is shown on *Fig. 5-2* and *Fig. 5-3*.

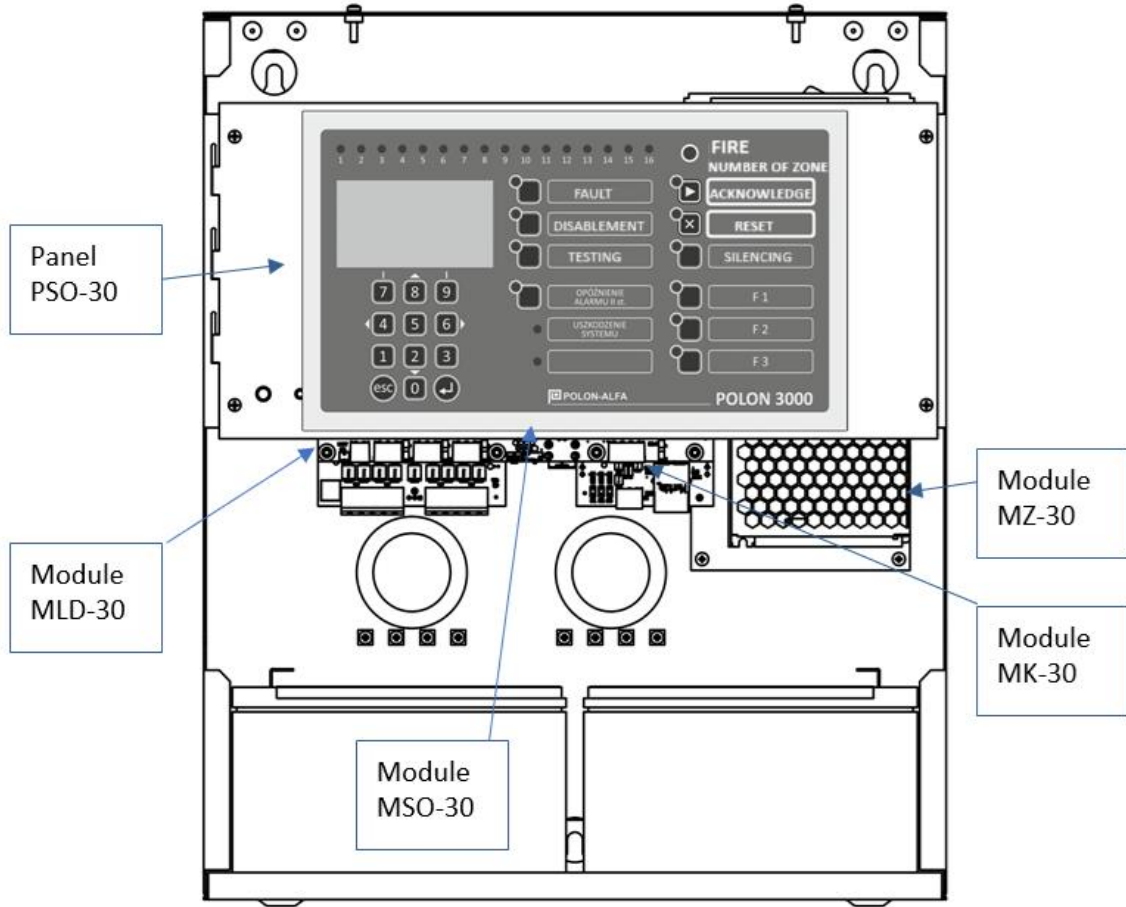


Fig. 5-2 Control panel modules

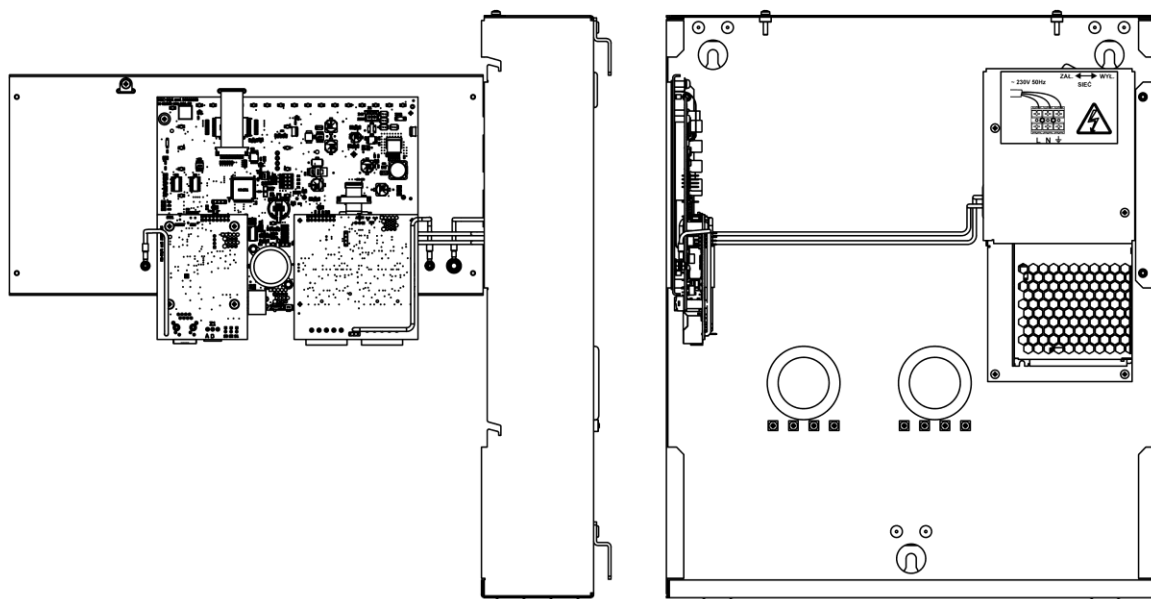


Fig. 5-3 Control panel with tilted panel PSO-30

5.5 MSO-30 central controller module

The MSO-30 module is the main, managing module of the control panel. It includes configuration memory, RAM and program memory. It provides data exchange between modules, supervises the efficiency of all circuits, analyses and processes received signals. It also controls the outputs and user interface. It also enables connection and communication with the POLON Studio application installed on a PC. The application is primarily designed to carry out the configuration settings of the control panel. It enables the automatic reading of elements installed on a detection line, visualization of detection lines with the read elements on the screen and their convenient configuration. It is also possible to "manually" add elements to detection lines or create a line design from scratch. In addition, the application allows you to download an existing configuration from the control panel to make changes or archive it, and perform other functions such as reading events. Without using the configuration application, the control panel enables automatic reading of the installed line elements in order to, for example, check the correctness of communication with the line elements and the correctness of the installation. In this case, the list of detected elements is displayed on the panel's display. For connection to a PC, a USB connector is provided on the edge of the MSO-30 module, accessible by removing the panel cover. On the module board, in addition to the USB connector, the following outputs with connectors for connecting to external installation lines have been placed:

- 3 relay outputs (connector ZL 11, 12, 13), potential-free with a set of changeover contacts (30 V / 1 A), equipped with a contact circuit continuity monitoring system,
 - PKU general fault relay,

- PK1 relay with programmable activation criterion,
- PK2 relay with programmable activation criterion,
- 2 universal outputs (ZL 15 connector):
 - alarm (powered), supervised, dedicated for alarming devices like sounder (24 V / 0.5 A)
 - or alternatively as monitoring lines, independently configurable, enabling device status control, device actuation control or work as a fire alarm input;
- 1 power supply output for external devices (24 V/0.5 A, Z1 connector).

All voltage-feeding outputs are protected against short-circuit effects. For internal connections, the MSO-30 module board has outputs for connection with the power supply, batteries and connectors with places for module installation - MLD-30 line and MK-30 communication modules.

Fig. 5-4 and

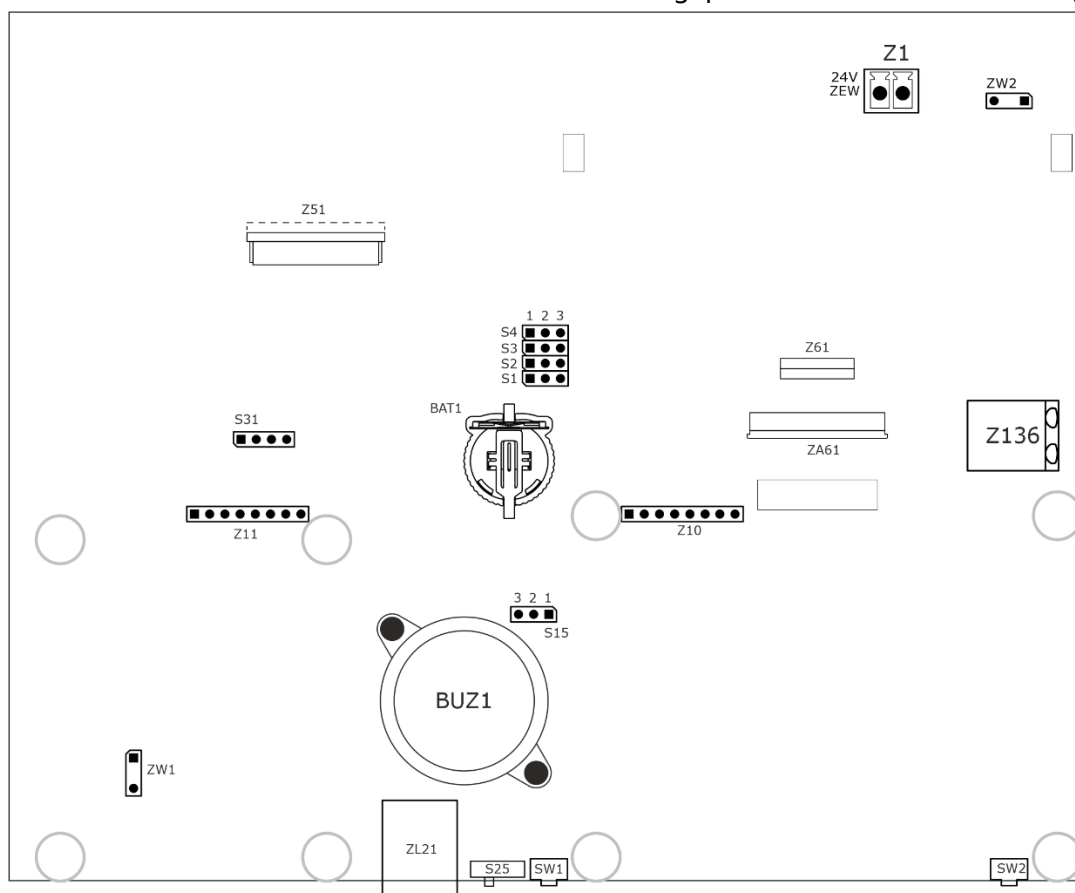


Fig. 5-5 show the arrangement of the main components on the PCB of the MSO-30 module. Fig. 5-6 - the way of connecting the alarm devices and marking the relay outputs.

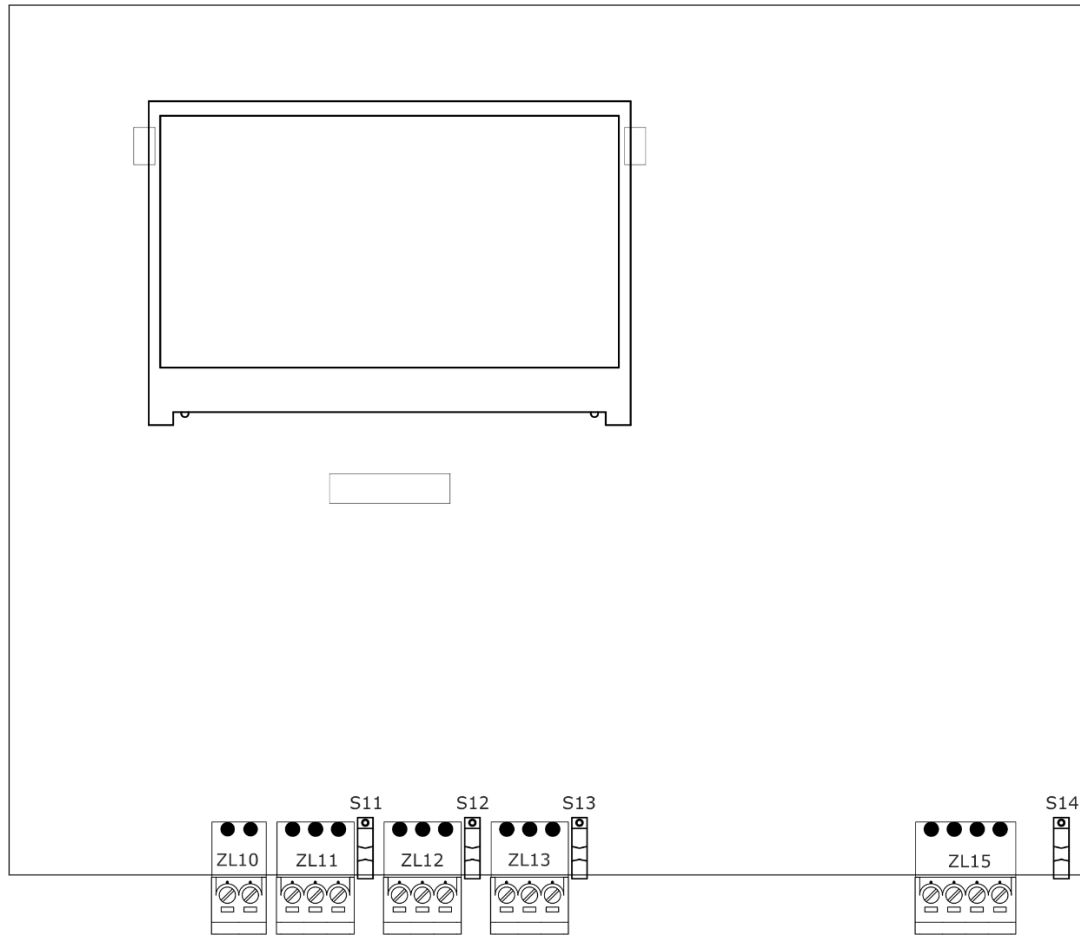


Fig. 5-4 MSO-30 - front side

- ZL 10 - connector for connecting 24 V batteries (2 x 12 V),
- ZL 11 – PK 1 general failure relay output, 1 A/30 V,
- ZL 12 - PK2 programmable relay output, 30 V/1 A,
- ZL 13 - PK3 programmable relay output, 30 V/1 A,
- ZL 15 - 2 potential outputs for connection of alarm devices 2 x 24 V/0.5 A,
or control (status control, equipment tripping control, fire alarm input)
- S11, S12, S13 - switches of the relay continuity monitoring circuit,
- S14 - circuit breaker of the grounding control system.

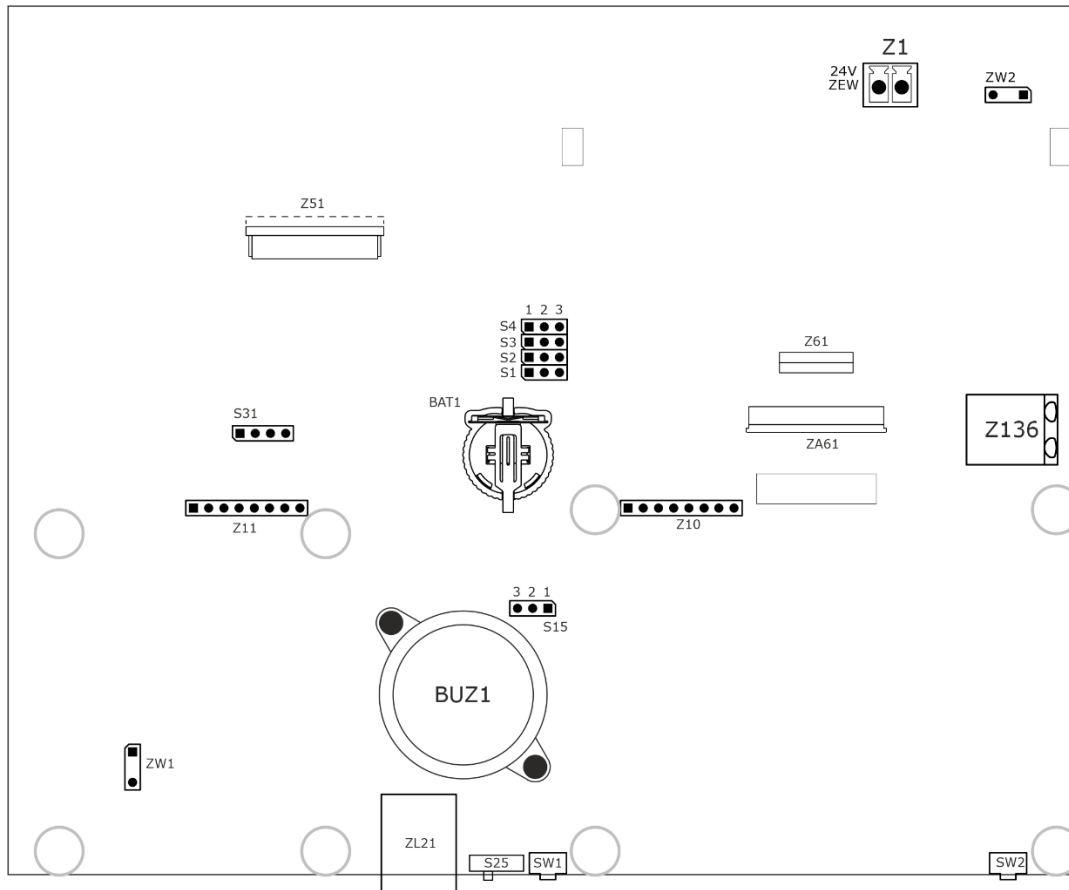


Fig. 5-5 MSO-30 - back side

Z1 - power connector for external devices,

ZL 21 - USB connector,

ZW2 - jumper for the earthing fault monitoring disconnecting,

S25 - "flash memory programming" mode switch - used only when changing the firmware,

SW1 - restart button,

SW2 – start button for control panel backup power supply (batteries) in the absence of mains power,

Z136 - module power supply connector from 24 V power supply,

Z10 - MLD-30 module connector,

Z11 - connector for the optional MK-30 digital communication module,

Z51 – front keypad connector,

S1, S2 - unused,

S3 - the jumper position sets the initial contrast of the LCD display (factory set position depending on the type of LCD display)

S4 - jumper to restore default access codes:

- closed contacts 1-2 - working position,
- closed contacts 2-3 - position of restoring default access codes,

S31 - micro-controller program memory programming connector,

Z61, ZA61- LCD display connectors.

Rk - EOL resistor, D - rectifying diode 1A such as 1N4004..7

The universal outputs (ZL15 connector) can be switched to operate as input lines.

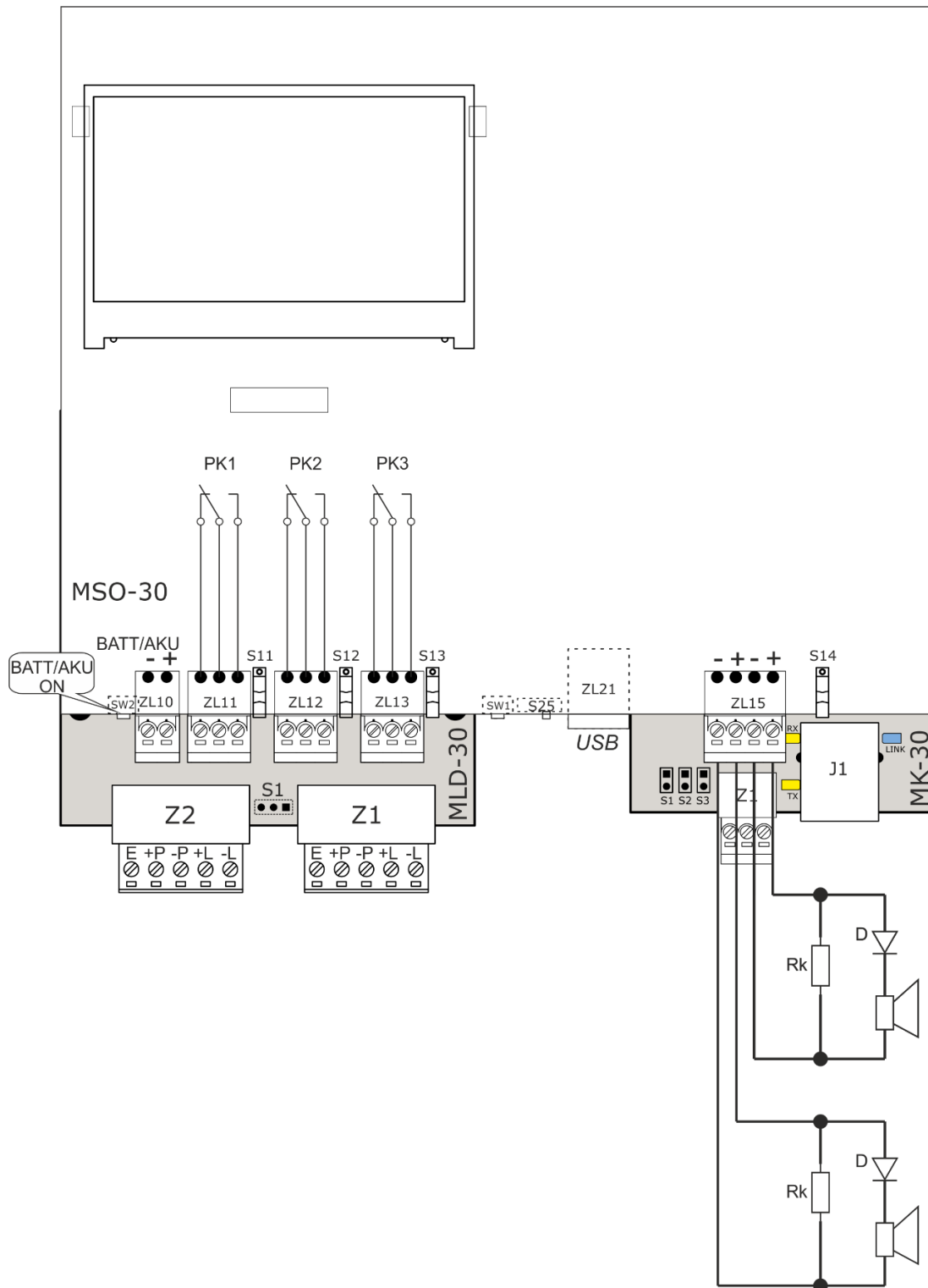


Fig. 5-6 Outputs connection for alarm devices i.e. sounders; designations of potential-free relay outputs

5.6 MLD-30 Detection Line Module

The detection lines module is a communication interface between the control panel and detection line elements. The detection lines are supplied with the voltage of 24 V. Communication with the main module of the MSO-30 control panel is carried out with the use of serial digital transmission.

The module enables 2 detection lines (loops) connection and handles the attached detection lines, both in the loop system - type A, and in the radial system - type B. According to the applicable guidelines, the number of line elements in a radial line should not exceed 32. The connection methods for detection lines with MLD-30 module are shown in Fig. 5-8 and Fig. 5-9. Connecting the second line connector to the module is analogic.

The maximum number of elements for single detection line in MLD-30 module is:

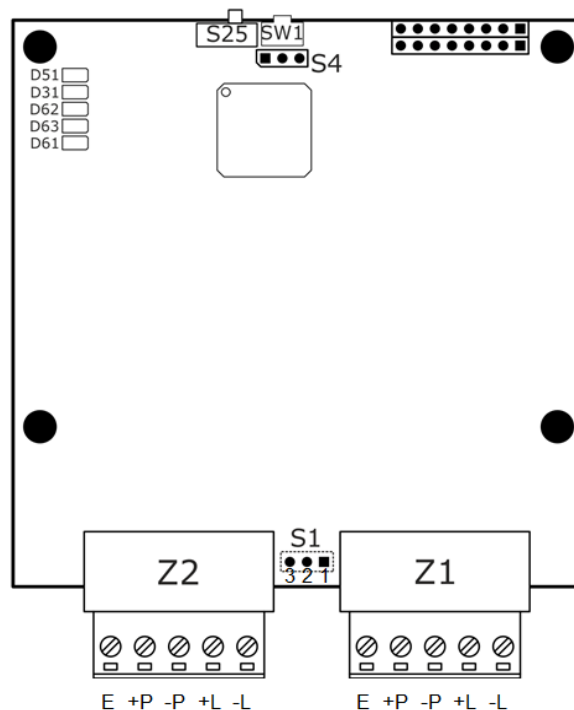
- 64 line elements for POLON 3064 control panel,
- 128 line elements for POLON 3128 control panel,
- 128 line elements for POLON 3256 control panel (max. 128 elements per line).

The number of line elements supported by the entire module (2 lines) depends on the type of control panel:

- up to 64 for POLON 3064 control panel (free elements allocation within the lines),
- up to 128 for the POLON 3128 control panel (free elements allocation within the lines),
- up to 256 line elements for the POLON 3256 control panel (2 x 128 elements).

The total current consumed by all line elements on one line should not exceed 20 mA.

When using elements with higher power consumption, it may be necessary to reduce the number of elements on the detection line (according to the calculator in the POLON Studio application).



Z1, Z2 – detection lines connectors -L, + L - line start, -P, + P - line (loop) return

S1 - not used in cooperation with POLON 3000 control panel

SW1 - restart button,

S25 - "flash memory programming" mode switch - used only when changing the program (firmware) version,

Fig. 5-7 MLD-30 module board

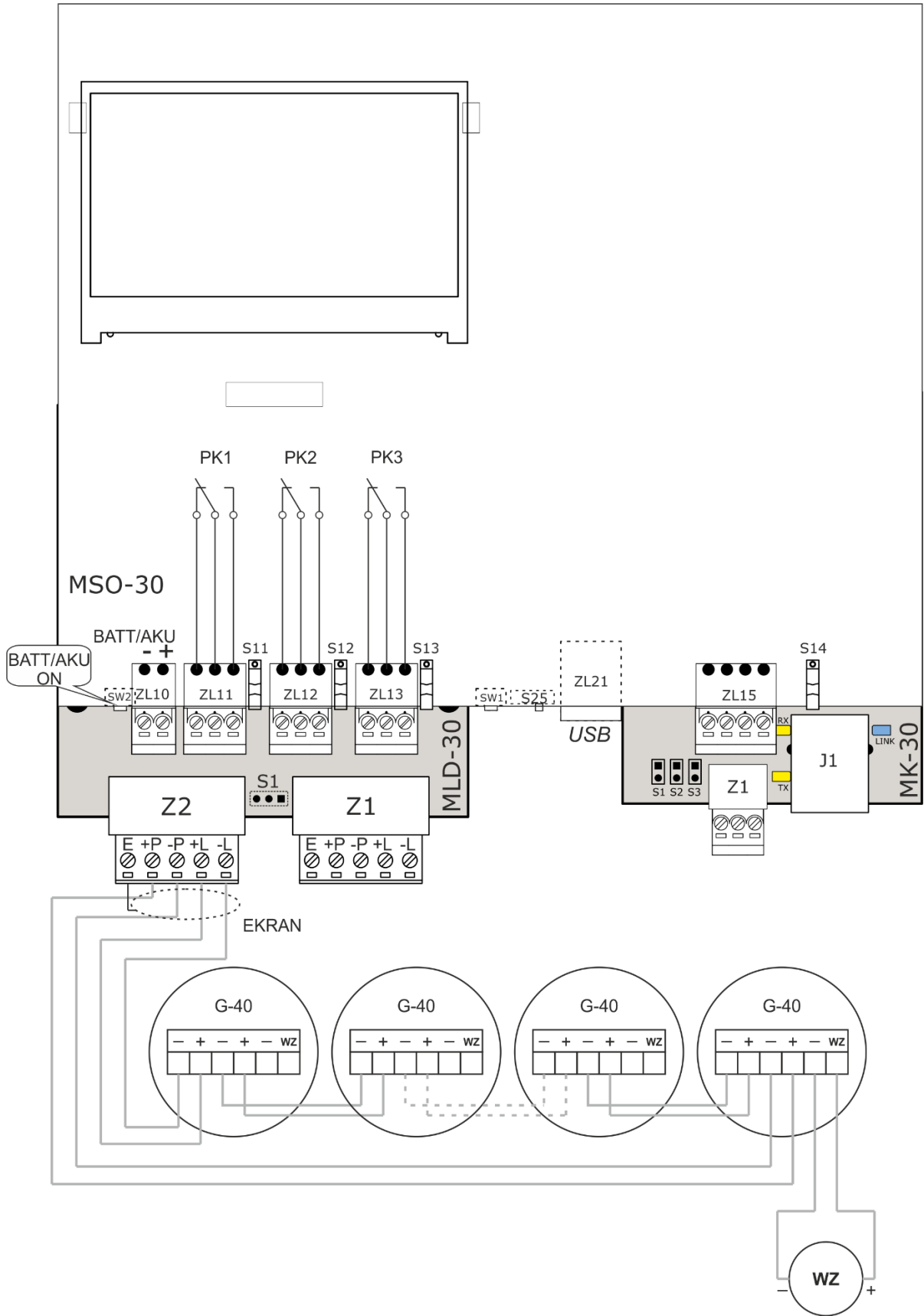


Fig. 5-8 Schematic diagram for connecting a loop detection line to MLD-30 module

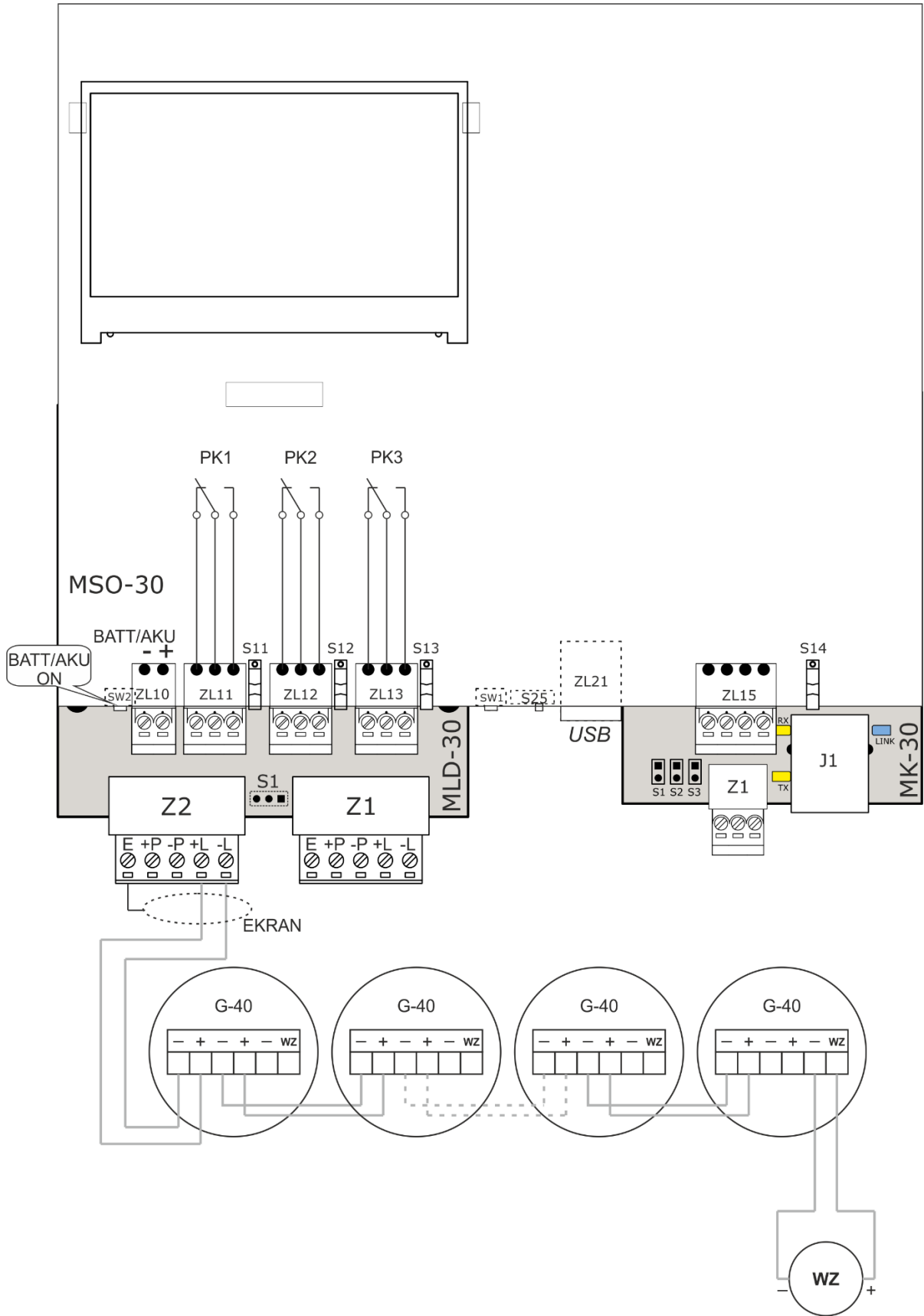


Fig. 5-9 Connection diagram of radial (open) detection line to MLD-30 module

5.7 MK-30 communication module

MK-30 module is used for monitoring digital integration with control panel. It allows monitoring via Modbus TCP and Modbus RTU. System status information available via Modbus TCP or Modbus RTU protocol. In order to connect to the control panel with Modbus TCP or Modbus RTU protocol, you need to configure the MK-30 module using POLON Studio application.

The combination of an Ethernet-based monitoring system and the standard Modbus TCP protocol, offers wide opportunities to use existing LAN infrastructures, media-converters and telecommunications equipment. A large selection of ready-made protocol libraries will enable quick implementation of monitoring on any hardware or programming platform. Module parameters include *Table 5-3*. The view of the module board is shown in *Fig. 5-10*.

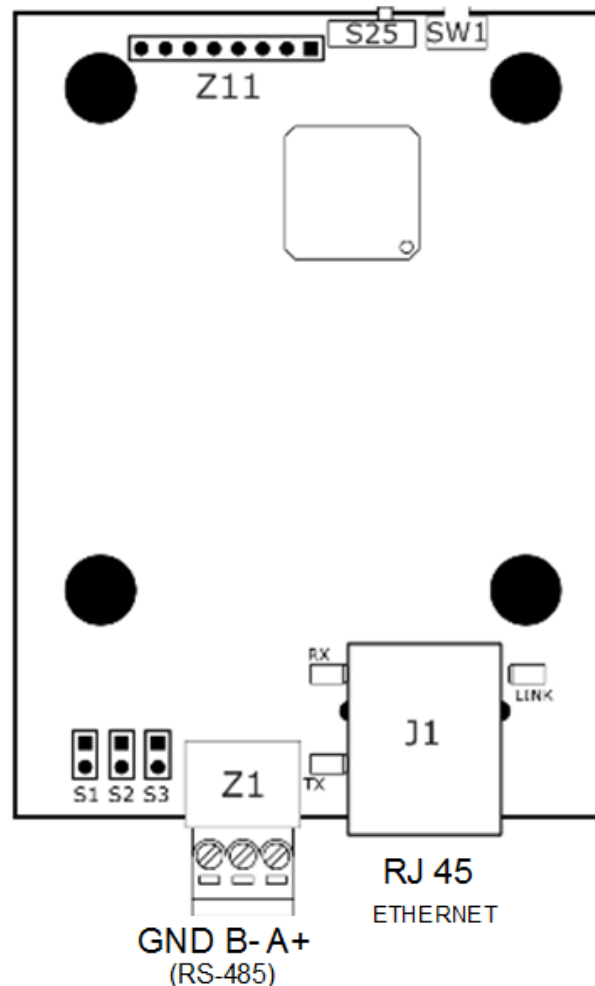


Fig. 5-10 MK-30 module board

SW1 - restart button,

S25 - "flash memory programming" mode switch - used only when changing the program version (firmware).

Table 5-3

Ethernet interface	
Protocols:	IP, TCP, UDP, ARP, ICMP (ping),
Speed:	10/100 Mbps, AUTO MDI/MDIX
Insulation:	1.5 kV for 1 min.
LED indicator lights:	2, built into RJ45 socket. Green - indicates network connection, yellow indicates data transmission
RS-485 serial interface	
Transmission speed:	2.4 kbps to 115.2 kbps, built-in serial line EOL
Line terminator:	internal, switch-activated
LED indicator lights:	TxD - indicates sending data via RS485 port, RxD - indicates receiving data via RS485 port
Insulation:	5 kV for 1 min.
Maximum line length:	1200 m

6 Power supply

6.1 MZ-30 power supply module

The power supply module includes a 50 W - 24 V / 2.2 A mains power supply and an anti-interference filter circuit with a main power switch and a terminals designed to connect 230 V mains cables. Access to the mains terminals is shown on Fig. 6-1.

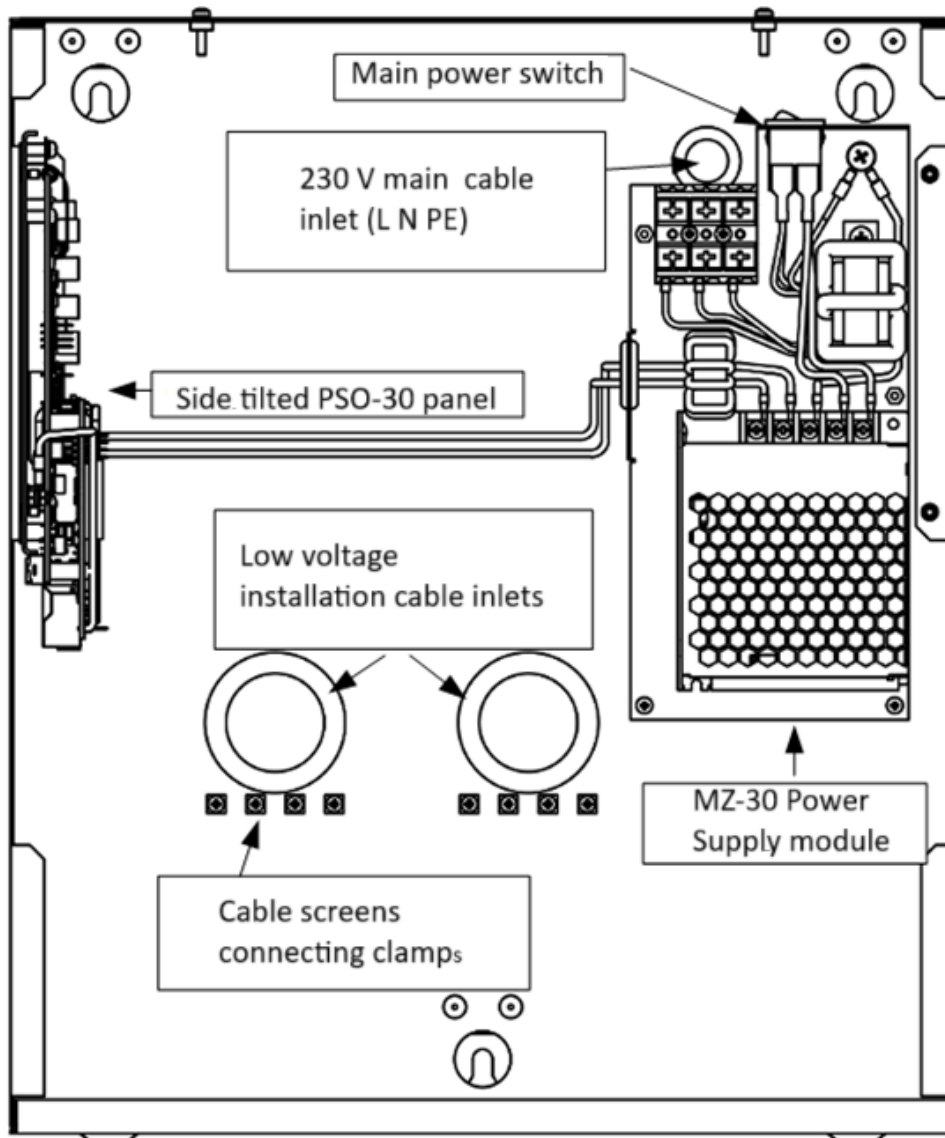


Fig. 6-1 View after tilting the PSO-30 panel and removing the 230 V connector cover

6.1.1 Backup power supply

Backup power is provided by 2 x 12 V batteries with a capacity of 7 ÷ 9 Ah inside the control panel. If more capacity is required, it is possible to connect external batteries up to 18 Ah. Capacity is limited by charging device power efficiency.

The location of the batteries inside the control panel is shown at

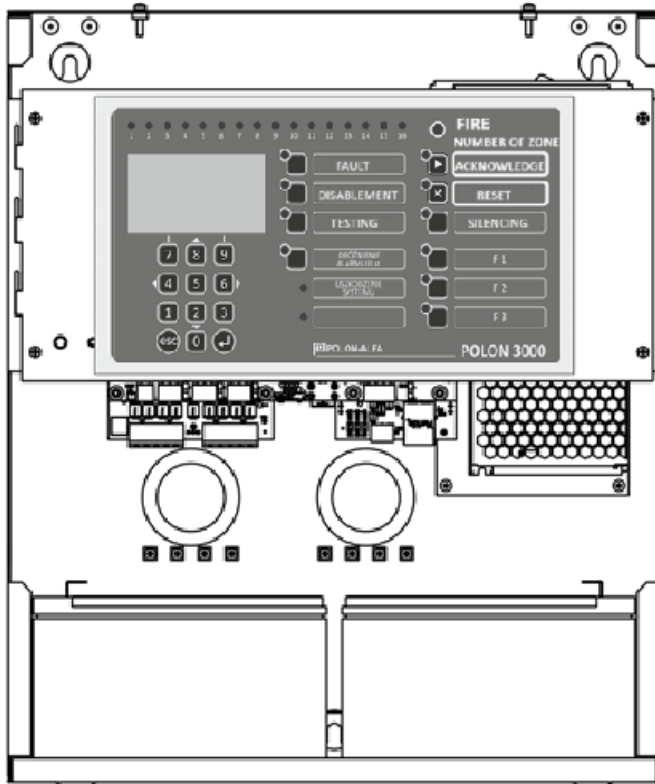


Fig. 6-2.

BATTERIES 2 x 12 V 9 Ah

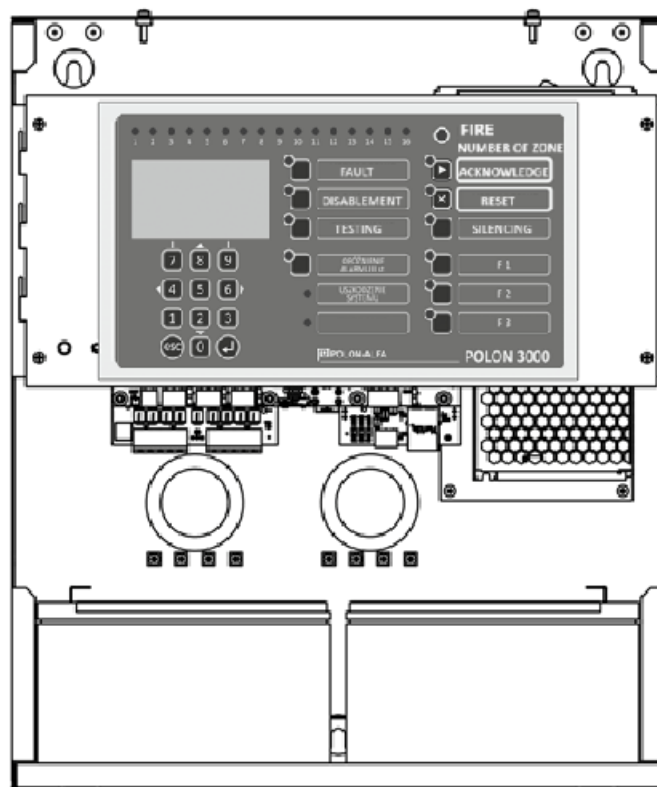


Fig. 6-2 View of the position of the batteries in the housing

The batteries should be connected in series using a ready-made wiring harness according to the diagram shown at Fig. 6-3 with the correct polarity of the poles \pm .

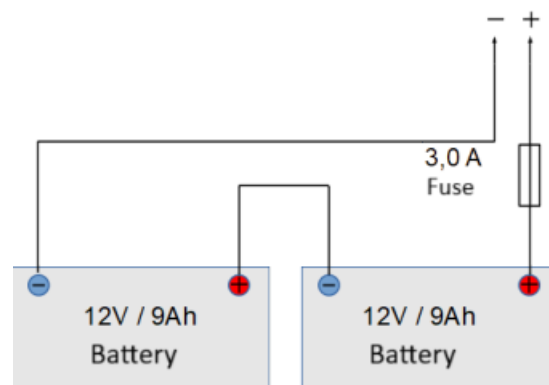


Fig. 6-3 Battery connection diagram

Switching over from the main supply source to the backup power supply is automatic, without causing a power interruption. The operating time of a battery-powered panel, with no main power supply, can reach 72 hours in the supervision state and an additional 0.5 hours in the alarm state, depending on the hardware configuration and connected loads. The power consumption of the control panel, for a given configuration, should be estimated in order to calculate the battery capacity and the required time of operation on the backup power supply. The batteries are charged automatically, by a charging circuit integrated into the MSO-30 module. The charging current is limited to c.a. 0.65 - 0.7 A.

When battery is fully charged, the charging current value is close to zero, and the buffering voltage should be about 27.3 V at < 25 °C. (The value is automatically set after switching to the buffering state). In order to extend the efficiency of the batteries, automatic tuning of the buffer voltage was used, depending on the temperature inside the control panel. The overall performance of the battery, as well as the charging device, is constantly monitored, and malfunction is indicated. The battery is considered inoperative (by the panel's internal control system) when the battery's internal resistance increases and exceeds 1.0 Ω.

Installation, operation and disposal of batteries should be carried out in accordance with the instructions of the battery manufacturer. Used batteries must be recycled in accordance with applicable regulations.

Automatic Power Shut-down. There is natural decrease of supply voltage during batteries powered control panel operation. Reduction of the backup power voltage to about 22 V is indicated with sound. Further batteries voltage lowering and reaching the final discharge voltage below about 21 V will automatically shut down the control panel. The return of the main power supply causes the control panel to switch on automatically. If the 230 V power supply is lost and fully charged batteries are connected, the control panel is started by pressing the SW2 button located on the MSO-30 module, shown in *Fig. 5-6*.

Table 6-1

Current consumption by the control panel from batteries during a failure of the primary power supply			
POLON 3000 control panel (3064, 3128, 3256)	Outputs state	Stand-by	Alarm state
Basic Control panel (PSO-30 + MLD-30)	– outputs without load,	48 mA	52 mA
Control panel with MK-30 module (PSO-30 + MLD-30+ MK-30)	– outputs without load, – MK-30 no transmission.	68 mA	72 mA
	– outputs without load, – MK-30 with ETHERNET transmission in progress.	78 mA	82 mA
For required battery capacity calculation, add:			
– load on detection lines (2 detection lines depending on the load with line elements, max. 2 x 20 mA),			
– load value of powered outputs in the alarm state depending on the current consumption of the installed alarm devices)			
– other loads (if any), such as current drawn from the power output of external devices.			

Example of calculation for control panel's battery capacity without the MK-30 optional module with the base conditions:

- stand-by operation time 72 h,
- 0.5 h alarm state operation,
- 2 x 10 mA detection lines load,
- load on potential outputs 2 x 0.5 A by device alarm.

The required capacity of the battery bank in Ah determined by the formula:

$$Q_{\min} = k \times [(D_1 \times I_1 \times t_1) + (D_2 \times I_2 \times t_2)]$$

where:

k – factors for taking into account, incl. battery aging ,

t1 - working time in detection mode,

t2 - working time in alarm mode,

D1 = 1 for t1 > 20 h,

D2 = 1 for small values of discharge current,

Equates to:

$$Q_{\min} = 1.25 \times [(1 \times 0.068 \times 72) + (1 \times 1.072 \times 0.5)] = 1.25 (4.896 + 0.536) = 6.79 \text{ Ah}$$

7 Addressable detection lines

The detection lines connect the fire alarm control panel with fire warning devices (detector, MCP), which are able to transmit alarm information about the state of the monitored room or facility. They also enable the transmission of control signals to line located actuators (control and control element, acoustic, voice, optical signalling device).

Types of detection lines:

- loop (type A), resistant to line break or short circuit,
- radial/open (type B), where break or short circuit cuts the elements from the point of damage to the end of the line.

Resistance for line damage is ensured by short circuit insulators in line addressable elements.

Loop lines allow to create branches (radial lines attached to a loop line), but each branch must be separated, with at least one addressable element. Radial lines must not have branches. Meeting these conditions enables automatic reading of elements on the detection line (auto-configuration).

Note: the use of radio components (with the ACR-4001 adapter) creates a branch on the loop line.

7.1 Operating mode

Addressable detection line enables connection for 4000 series and 6000 series addressable elements. Depending on the type of elements installed in the line, you need to set the appropriate operation mode for detection line - protocol type 4000 or 6000. Compatibility list of components with the detection line operation mode has been included in the chapter 14 *Line elements*.

7.1.1 Detection line 6000

- Transmission protocol compatible with the protocol used in the POLON 6000 system,
- Possibility of simultaneous control of a group of outputs located in different control elements on a detection line,
- Possibility to create simple branches in looped detection lines,
- Fast auto-configuration, detecting line hardware changes in configuration and elements swapped places.

7.1.2 Detection line 4000

The detection line is compatible with the POLON 4000 system (see OMM ID-270-011). Some 6000 series line elements may be operated with limited functionality.

8 Alerting

If the processed alarm signals received by the control panel are interpreted as a fire alarm, the control panel enters the fire alarm state. The alarm procedure can be one or two-stage.

8.1 Single-stage alarming

Single-stage alarm procedure, this is alarming procedure without delaying the 2 stage of alarm. During single-stage alarming, the panel, upon detecting a fire alarm, immediately switches to signalling a stage 2 alarm.

8.2 Two-stage alarming

In two-stage alarming, the delay of level 2 alarm signalling is enabled. During two-stage alarming, the control panel, upon detecting a fire alarm, enters the first stage alarm state. If, during T1, the 1st stage alarm is not acknowledged, the control panel will switch to the 2nd stage alarm state. Otherwise, the T2 timer is activated. If during T2 time, the 1st stage alarm is not cleared, the control panel will go into the 2nd degree alarm state. Conditions necessary for two-stage alarming:

- the zone reporting the alarm has the two-stage alarm mode set,
- enabled permission to delay the 2nd level alarm (status signalling at the button (DELAY OFF),
- the alarm signal cannot be received from a manual call point (it is possible to program, in special cases, a mode allowing an alarm signal from a manual call point MCP).

8.3 Types of alarms

After receiving an alarm signal from a fire call point, the control panel, depending on the programmed variants and alarm modes of the zone where the fire call point is located, can signal one of three types of alarms:

- Pre-alarm,
- 1st Stage alarm,
- 2nd Stage alarm.

8.3.1 Pre-alarm

The pre-alarm is a panel's internal condition that is not considered as a regular fire alarm condition. The pre-alarm is signalled by an internal sounder and a zone's red indicator (without signalling the main "fire" indicator).

Please note:

The pre-alarm can be transformed into a fire alarm or be automatically resetted by the control panel, according to the appropriate algorithms, resulting from the variants of alarming zones.

Confirmation of pre-alarm:

When the ACKNOWLEDGE button is pressed , the internal sounder is silenced and the ability to reset the pre-alarm is unlocked.

Resetting the pre-alarm:

When the RESET button is pressed , the panel's pre-alarm is cleared, which means the panel enters the detection state. The operation for pre-alarm reset is available for access level 2 minimum.

8.3.2 1st Stage alarm

During the 1st stage alarm, the sirens are turned on and additional outputs are activated, the activation of which is conditioned by the occurrence of the 1st stage alarm. (e.g. **ALARM DEVICES** external signalling, **ALARM TRANSMISSION DEVICES** or **FIRE PROTECTION DEVICES**, controlled by relay outputs, potential of the control panel or outputs located in the monitoring and controlling elements of the detection line.

1st Stage alarm signalling in the control panel:

- **continuous acoustic signal** (internal sounder),
- **illumination of the zone's red light**
- **illumination of the main *FIRE* light** on the front panel of the control panel,
 - **impulse** - unacknowledged alarm,
 - **permanently** - alarm acknowledged,
- **1st level alarm information on the LCD display** automatically displays the main alarm window, which will show messages assigned to alarming zones, the number of all alarms, information on enabled devices.

Confirmation of level 1 alarm:

When the CONFIRM button is pressed , the internal sounder is silenced and the ability to cancel the alarm is unlocked.

Level 1 alarm cancellation:

When the CLEAR button is pressed , the panel's Level 1 alarm is cleared, which means the panel enters the detection state. Resetting the fire alarm is possible after gaining access to at least level 2.

8.3.3 2nd Stage alarm

2nd Stage alarm is an internal condition of the control panel, recognized as a fire alarm condition. During a 2nd stage alarm, the fire signal is transmitted to the outside and additional outputs are activated, the activation of which depends on the occurrence of a 2nd stage alarm (e.g. **ALARM DEVICES** external signalling, **ALARM TRANSMISSION DEVICES** or **FIRE PROTECTION DEVICES** controlled by relay outputs, potential of the control panel or outputs located in the monitoring and controlling elements of the detection line. The occurrence of a 2nd Stage of alarm is equivalent to meeting the criterion for a level 1 alarm. This means that all devices conditioned by the occurrence of the 1st stage alarm will be activated during the signalling of the 2nd stage alarm.

Level 2 alarm signalling in the control panel:

- **continuous acoustic signal** (internal sounder),
- **illumination of the zone's red light** on the front panel of the control panel,
- **illumination of the main *FIRE* light** on the front panel of the control panel,
 - **impulse** - unacknowledged alarm,
 - **permanently** - alarm acknowledged,
- **1st level alarm information on the LCD display** automatically displays the main alarm window, which will show messages assigned to alarming zones, the number of all alarms, information on enabled devices.

Confirmation of a 2nd stage of alarm:

When the ***ACKNOWLEDGE*** button is pressed, the internal sounder is silenced and the ability to reset the alarm is unlocked.

Level 2 alarm cancellation:

When the ***RESET*** button is pressed, the control panel's level 2 alarm is cleared, which means the control panel enters the detection state. Resetting the fire alarm is possible after gaining access to at least level 2.

8.4 Signalling the alarm state

When control panel is in alarm state, the main optical FIRE indicator and zone indicators are on. An alarm window with information is displayed on the screen:

- type of alarm,
- 2nd stage alarm delay,
- states of groups of devices (alarm, alarm transmission, security) with the number of on, and damaged devices,
- number of alarms,
- a list of all alarms with detailed information - the full message may not fit on the screen - reading may require moving the screen to the left using the directional keys.

An example of the window displayed on the LCD screen in the alarm state:

```

ALARM 1 st.           18s
ALARM DEVICE:      ON 2, FAULT 1
AL.TRANSM.DEV:    ON 2, FAULT 1
FIRE PROTEC.DEV:  ON 2, FAULT 1
NUMBER OF ALARMS: 3
01 ZONE 1 GR. 1, MESSAGE
02 ZONE 3 GR. 1, MESSAGE
03 ZONE 6 GR. 3, MESSAGE
  
```

8.5 Delay inactive mode (staff absent)

Variants lose their sense during the staff on duty absence at the control panel. Then, any delay in notifying the relevant services about the fire is inadvisable. For this purpose, it is possible to switch control panel to operation mode without delays, resulting the two-stage alarming variants (see point *Alarm variants*) of all zones will automatically change to single-stage alarm.

Switching the mode of operation is possible using the button on the front panel of the panel DELAY OFF after at least level 2 access.

Switching the operating mode to PERSONNEL PRESENT is done by pressing the button again **DELAY SETTINGS / CHANGING THE PERSONNEL MODE**. All zones are then restored to their programmed alarm variants.

8.6 Times T1, T2, T3, T4

In order to realize a two-stage alarm, appropriate T1 and T2 times can be programmed in the system.

- **T1** - waiting time for confirmation of the 1st stage alarm,
- **T2** - time to recognize the situation after confirming the 1st stage alarm, which is also the delay time of the outputs actuation to **ALARM TRANSMISSION DEVICES**. Additional T3 and T4 timers have also been introduced, related to delays in activating outputs to groups of devices defined in the PN-EN 54 standard.-2:
- **T3** - delay time of outputs activation to **SOUNDERS (ALARM DEVICES)**,
- **T4** - delay time of outputs activation to **FIRE PROTECTION DEVICES**.

The delay timers T1, T2, T3 and T4 can be programmed within the range of 0... 10 min. (according to EN 54-2).

9 Detection zone

In the POLON 3000 system, the organization of alarms is based on detection zones. The zones describe the detection areas with a specific set of addressable elements, in a way that allows for the identification of event location.

Alarm messages displayed on the screen include zone number and zone group number. Zones can be grouped to assign zones to optical indicators (16 lights) on the control panel. The maximum number of zones is 254.

Each addressable element must be assigned to a detection zone. According to the recommendations, no more than 32 line elements should be assigned to one zone. The zone allows you to program the appropriate alarm variant to eliminate false alarms.

The fire alarm can be reported by the zone in one-stage or two-stage mode -see the section "Alarming Variants" for details.

9.1 Alarming variants

Alarming variants are described by the following parameters:

- Method of alarming:
 - **Mode** - one-stage or two-stage alarm operation,
 - **Pre-alarm** - YES/NO pre-alarm signalling,
 - **MCP mode** - one- or two-stage,
- Pre-reset - whether alarming with pre-reset - YES/NO,
 - **Pre-reset time T_{wk}** - timer after which the alarm reporting element will be pre-resetted (up to 60 s),
- Coincidence - whether alarming with dependencies between elements YES / NO:
 - **2-device coincidence**;
 - **T_{ko} coincidence time** - if the coincidence is selected, it is the waiting time for the alarm confirmation by another element in the zone (0 to 30 min), for the variant with initial reset. There is also timer without coincidence **T_{pa}** for alarm repeat by the same or another element in zone which is alarm - type A correlation according to EN 54-2, for coincidence modes, actuation of two or more detectors accelerates the 2nd stage alarm.

9.2 Method of alarming

A fire alarm can be reported by a zone which is in one- or two-stage mode.

9.2.1 MCP manual call point alarming

If a zone is operating with an MCP manual call point, its actuation switches zone to the one-stage alarm mode (parameter **MCP mode** - single-stage - *default mode*). You can program the operation mode of this zone to two-stage (despite the alarm from the MCP, parameter **MCP mode** - two-stage).

9.3 Pre-reset

In order to eliminate false alarms, pre-reset of the alarming element is introduced in the alarming variants. Parameter ***pre-reset time*** – it is the time after which the element (depending on the variant) reporting the alarm will be resetted.

9.4 Coincidence

In order to eliminate false alarms, coincidence between alarming elements in zones is introduced in alarming variants.

9.4.1 Two-detector coincidence - mode of operation

When a fire alarm in a zone is activated, the fire alarm is pre-cleared (immediately – if ***pre-reset*** is inactive; or after a selected ***pre-reset time*** - active ***pre-reset***). There will be ***pre-alarm*** indication if this option is declared and control panel signals this state (described earlier). If within the programmed ***coincidence time*** a previously resetted warning device is activated again and at least one more device in the same zone is activated, then the control panel signals 1st or 2nd stage alarm (described earlier) in accordance with the set ***alarm mode***. Otherwise, the control panel, treating the warning device actuation as false, will return to the detection mode, resetting the ***pre-alarm*** (if programmed).

9.5 Factory default alarming variants

POLON 3000 provides a choice of alarming method (variant) for individual zones. Alarming variants should be selected for detection zones so that they provide reliable, as well as early detection of fire danger. Alarming variants options are summarized in the table *Table 9-1*.

Variant 1: Single-stage basic alarming

Triggering of the fire warning device immediately triggers a 2nd stage of 2 alarm. This option is particularly applicable to zones considered to be at high risk of fire. Some national regulations may require this option as mandatory.

Variant 2: Two-stage basic alarming

Triggering of the fire alarm device triggers the 1st stage of alarm, which is signalled acoustically and optically for the T1 timer duration (this timer is intended for the operating personnel to report and confirm the alarm with the ACKNOWLEDGE button). If the operator fails to report during T1, then the 2nd stage alarm is activated. Operating personnel acknowledges the status, extends the duration of the 1st level alarm with T2 timer, measured from the confirmation moment of the 1st level alarm, which is intended to make a recognition of the fire danger that has occurred.

After T2 timer, if the operator will not perform the reset, by gaining II access level II and pressing the illuminated **RESET** button then the 2nd stage alarm will be activated. The T1, T2 timers should be programmed taking into account the individual characteristics of the protected facility (see T1, T2, T3, T4 times).

Two-stage alarming switches to single-stage alarming (immediate level 2 alarm) when the system is operated in **PERSONNEL ABSENT** mode.

Table 9-1

No.	Alarm Procedure			Pre-reset		Coincidence or re-alarm		Interact.	Accelerating the alarm 2nd Stage	Description
	Mode	Pre-alarm	Mode MCP	Mode	Time Twk	Mode	Time Tko Tpa			
1	1 st.	NO	X	NO	0	NO	0	NO	NO	VARIANT 1 Single-stage basic alarming
2	2 st.	NO	1 st.	NO	0	NO	0	NO	NO	VARIANT 2 Two-stage basic alarming
3	1 st.	NO	X	YES	40 s	NO	60 s	NO	NO	VARIANT 3 Single-stage alarming with one-time resetting of the warning device
4	2 st.	NO	1 st.	YES	40 s	NO	60 s	NO	NO	VARIANT 4 Two-stage alarming with one-time resetting of the warning device
5	1 st.	YES	x	YES	0 s	2-warning	8 min.	NO	NO	VARIANT 5 Single-stage alarming with coincidence 2-Warning
6	2 st.	YES	1 st.	YES	0 s	2-warning	8 min.	NO	NO	VARIANT 6 Two-stage alarming with 2-detector coincidence

No.	Alarm Procedure			Pre-reset		Coincidence or re-alarm		Interact.	Accelerating the alarm 2 nd Stage	Description
	Mode	Pre-alarm	Mode MCP	Mode	Time Twk	Mode	Time Tko Tpa			
7	1 st.	YES	X	YES	0 s	group	8 min.	NO	NO	VARIANT 7 Single-stage alarming with group A and B coincidence
8	2 st.	YES	1 st.	YES	0 s	group	8 min.	NO	NO	VARIANT 8 Two-stage alarming with Group A and B coincidence
11	2 st.	NO	1 st.	YES	40 s	2-warning	8 min.	NO	YES	VARIANT 11 Two-stage alarming with zone pre-reset and 2-detector coincidence to accelerate the alarm 2 nd degree
12	2 st.	NO	1 st.	YES	40 s	group	8 min.	NO	YES	VARIANT 12 Two-stage alarming with zone pre-reset and group A and B coincidence to accelerate the 2 nd Stage alarm
14	2 st.	NO	2 st.	NO	0	NO	0	NO	YES	VARIANT 14 Two-stage alarming with alarm 2 nd Stage acceleration from any alarm device in the system
15	2 st.	NO	1 st.	NO	0	2-warning	0	NO	YES	VARIANT 15 Two-stage alarming with acceleration of alarm 2nd Stage within the zone
16	2 st.									VARIANT 16 Zone dependence with acceleration of the 2nd Stage alarm in the zone

X - irrelevant,

Variant 3: Single-stage alarming with one-time resetting of the warning device

After a fire alarm is tripped, the system waits for 40 s for another fire alarm in the same zone to be tripped. If this happens - the control panel signals a level 2 alarm. Otherwise, the control panel resets the warning device, treating its actuation as false, and waits for further signals from the facility. If, within the next 60 seconds, the same or a different element is actuated in the same zone, the control panel evokes the 2nd stage alarm. If the same or another element in the same zone is not actuated again within 60 seconds, the control panel will recognize the previous actuation as false.

The above-described variant should be used in cases of a temporary appearance of a fire factor not related to the fire.

Variant 4: Two-stage alarming with one-time resetting of the warning device

After a fire alarm is tripped, the system waits for 40 s for another fire alarm in the same zone to be tripped. If this happens - the control panel signals a level 2 alarm. Otherwise, the control panel resets the warning device, treating its actuation as false, and waits for further signals from the facility. If the same or another element tripped again in the same zone within the next 60 seconds, the control panel triggers a level 1 alarm, and then alarming proceeds as in variant 2. If the same or another element in the same zone is not actuated again within 60 seconds, the control panel will recognize the previous actuation as false.

The above-described variant should be used in cases of a temporary appearance of a fire factor not related to the fire.

Variant 5: Single-stage alarming with 2-detector alarm coincidence

When the fire alarm is triggered, the fire alarm is pre-cleared and the control panel signals the pre-alarm condition. If, within 8 minutes, the reset device is actuated again and at least one more device in the same zone, the control panel signals the 2nd stage alarm. Otherwise, after 8 minutes, the control panel deletes the pre-alarm condition, treating the warning device action as false, and will return to the detection state.

Variant 6: Two-stage alarming with 2-alarm coincidence

When the fire alarm is triggered, the fire alarm is pre-cleared and the control panel signals the pre-alarm condition. If within 8 minutes the cancelled warning device tripped again and at least one more warning device in the same zone, then the control panel signals a level I alarm, and then alarming proceeds as in variant 2. Otherwise, after 8 minutes, the control panel deletes the pre-alarm condition, treating the warning device action as false, and will return to the detection state.

Variant 7: Single-stage alarming with A and B group coincidence

After an actuation of warning devices belonging to one of the A or B groups, the warning devices from this group are initially reset and the control panel signals the preliminary alarm mode. After the initial reset, if the warning devices belonging to groups A and B report actuation within 8 minutes (at least one device from each group), the control panel generates a 2nd stage alarm.

Otherwise, after 8 minutes, the control panel deletes the pre-alarm condition, treating the operation of the warnings as false, and will return to the detection state.

Please note: Correct operation of the variant requires declaring at least one warning device for group A and group B (2 warning devices for each group are recommended). The groups so formed cannot be separated by any physical obstacles. Failure to meet the above conditions can lead to the continuous deletion of the alarming warning device.

Variant 8: Two-stage alarming with A and B group coincidence

After an actuation of warning devices belonging to one of the A or B groups, the warning devices from this group are initially reset and the control panel signals the preliminary alarm mode. After the initial

deletion, if within 8 minutes, they report the tripping of warning devices belonging to groups A and B (at least one warning device from each group), the control panel triggers the 1st level alarm, and then the alarming proceeds as in variant 2.

Otherwise, after 8 minutes, the control panel deletes the pre-alarm condition, treating the operation of the warnings as false, and will return to the detection state.

Please note: Correct operation of the variant requires declaring at least one warning device for group A and group B (2 warning devices for each group are recommended). The groups so formed cannot be separated by any physical obstacles. Failure to meet the above conditions can lead to the continuous deletion of the alarming warning device.

Variant 11: Two-stage alarming with zone pre-reset and 2-detector coincidence for 2nd stage alarm acceleration

After a fire warning device belonging to a zone is actuated, the control panel measures the time of 40 s and then automatically resets the zone.

If within 8 minutes, from the moment of deleting the zone, any warning device is triggered again – the control panel triggers a level 1 alarm, and then alarming proceeds as in variant 2. Otherwise – failure to reactivate the fire alarms in the zone within 8 minutes causes the control panel to consider the previous tripping as false and return to the supervision state.

Triggering of two or more fire alarms in the zone results in an accelerated triggering of a level 2 alarm.

Please note: Correct operation of the variant requires the declaration of at least two warning devices (more recommended) in the zone.

Variant 12: Two-stage alarming with zone pre-reset and group coincidence to accelerate the second stage alarm

After a fire warning device belonging to a zone is actuated, the control panel measures the time of 40 s and then automatically resets the zone.

If within 8 minutes, from the moment of deleting the zone, any warning device is triggered again – the control panel triggers a level 1 alarm, and then alarming proceeds as in variant 2. Otherwise – failure to reactivate the fire alarms in the zone within 8 minutes causes the control panel to consider the previous tripping as false and return to the supervision state.

Simultaneous actuation of fire warning devices from two groups A and B (coincidence) results in an immediate 2nd stage alarm triggering.

Please note: Correct operation of the variant requires declaring at least one warning device for group A and group B (2 warning devices for each group are recommended). The groups so formed cannot be separated by any physical obstacles.

Variant 14: Two-stage alarming with acceleration of the level 2 alarm from any warning device in the system

Triggering of the fire warning device triggers a 1st Stage alarm, and then alarming proceeds as in variant 2. If any warning device in the system is actuated during a 1st stage alarm, it will trigger the 2nd stage alarm.

Two-stage alarming switches to single-stage alarming (immediate level 2 alarm) when the system is operated in **PERSONNEL ABSENT** mode.

Please note: The MCP in this variant operates in two stages.

Variant 15: Two-stage alarming with acceleration of level 2 alarm in the zone

Triggering of a fire alarm device in the zone triggers a level 1 alarm, and then alarming proceeds as in variant 2. Triggering of another warning device in the zone triggers a level 2 alarm.

Two-stage alarming switches to single-stage alarming (immediate level 2 alarm) when the system is operated in **PERSONNEL ABSENT** mode.

Variant 16: Alarming with zone dependence and acceleration of the level 2 alarm in the zone

Triggering of the fire warning device triggers a 1st Stage alarm, and then alarming proceeds as in variant 2. If any warning device, belonging to the dependent zone(s) is triggered during the 1st level alarm, it will accelerate the 2nd level alarm. The assigned interdependent zones can have any alarm variant.

Please note!

Disabling an element belonging to a zone (partial disablement of a zone), which had a declared variant different than 1 or 2, will automatically switch to the immediate variant – variant 1.

Alarming variants with pre-reset are not recommended for input lines which are operating as fire alarm mode.

10 Disablements

The POLON 3000 control panel allows to disable the following items:

- detection lines,
- detection zones,
- groups of detection zones,
- loop/line elements,
- output groups,
- inputs.

10.1 Indicating disablement status

The control panel signals the disablements by a continuous lighting of the collective yellow indicator **DISABLEMENT**, located on the front keypad (see: User Interface). Additionally, by pressing the button next to the optical indicator (lamp), you can display the number of disabled items together with the list of disabled system elements, which can be viewed using the menu navigation buttons.

DISABLEMENT LIST displays all entries and it is read only. Disabling and Re-enabling an element is possible after grant the 2nd access level and selecting an appropriate disablement area:

- LINE ELEMENTS
- ZONES
- OUTPUT GROUPS
- INPUTS
- DETECTION LINES

View of the blocking window

DISABLEMENTS
DISABLEMENT LIST
LINE ELEMENTS
ZONES
OUTPUT GROUPS
INPUTS
DETECTION LINES

10.2 Disabling and re-enabling detection lines, elements and zones

In case of line elements malfunction, e.g. manual call points, or carrying out repair/construction works in the protected facility, which could cause false alarms, the control panel allows to exclude part of the facility from control, by disabling the entire detection line, detection zone or part of it. Inputs and output groups can also be disabled.

Disabling fire warning devices, an entire zone or a detection line causes the control panel will not receive alarm or fault information from disabled devices.

Partial disabling of lines or zones may result in the inability to implement the set alarm variant, then the alarming method will be automatically changed to the single-stage, immediate variant no.1. After the zone is fully re-enabled, the alarm variant for a given zone returns to the originally programmed one.

Disabling is performed using the control panel menu. Engaging the disablement of the selected zone, item, input, etc. is achieved by pressing the numeric key "9" associated with the displayed function "ON.", while re-enabling by pressing the number button "7" associated with the displayed function "OFF."

ZONE DISABLEMENT	
01. DETECTION ZONE	
02. DETECTION ZONE	
03. DETECTION ZONE	
04. DETECTION ZONE	
	WŁ.

It should be noted that **disabling all elements (detectors) belonging to the zone results in the state of disabling of the entire zone**, which is shown on the display additionally as disabling the zone. Re-enabling the disabled zone must be done by enabling the elements that were disabled within the zone.

ZONE DISABLEMENT	
01. DETECTION ZONE	X
02. DETECTION ZONE	
03. DETECTION ZONE	
04. DETECTION ZONE	
OFF	

Screen of disabled zone or **all** elements within the zone.

ZONE DISABLEMENT	
01. DETECTION ZONE	XX
02. DETECTION ZONE	
03. DETECTION ZONE	
04. DETECTION ZONE	
OFF	

Screen for disabled zone and the elements belonging to the zone is highlighted by a double XX.

Note:

Blockings are retained after turning the control panel off and on again. If a new configuration is sent from the POLON Studio application, blocking is removed automatically, except for zone blocking.

11 Testing

The POLON 3000 control panel allows testing to determine efficiency of:

- signalling elements on the front door of the control panel,
- line elements installed in the facility.

11.1 Enabling and signalling the testing status

The testing status of the control panel is indicated by continuous illumination of the collective yellow **TESTING** indicator located on the front keypad (see: User Interface). Turning testing on and off is available after granting at least 2nd access level and selecting TESTING from the display menu. After entering the testing option, it is possible to select the type of test:

- zones,
- signalling devices (visual and audible control panel).

If zone testing is selected, the zone testing status is activated by selecting zone from the displayed list (using the menu navigation buttons) and pressing the ON/OFF button. (Number button "9". Zone testing is disabled when the OFF button is pressed. (number button "7")

TESTING		01
01. DETECTION ZONE		X
02. DETECTION ZONE		
03. DETECTION ZONE		
04. DETECTION ZONE		
OFF		

LCD screen view with 1 zone testing on.

11.2 Testing of alarming line elements in the zone

The POLON 3000 control panel allows to test the line elements within addressable loop/line. It is possible to test each zone individually. Enabling zone testing allows you to check the operation of detectors and inputs assigned to zone without triggering a fire alarm condition. The signals activating the alarm and the outputs related to the zone which is under test are blocked. The test alarm is signalled by the intermittent lighting of the red zone lamp, the number corresponding to the number of the zone (or the group of zones to which the given zone was assigned) on the control panel control panel. Test alarms are cleared automatically, after a time of about 60 s, from the moment the detector enters the alarm state. If more detectors are entered into the alarm state successively, the test alarm duration is extended - automatic reset takes place 60 seconds after the last alarm was triggered. There is a possibility to manually reset the test alarm before the 60 seconds have elapsed.

Test alarms of line elements are saved in the event memory.

12 Service functions

The service functions of the control panel are helpful when starting up and servicing the system. The use of service functions requires entering the 4th access level.

12.1 Software versions and configurations

This option allows you to read the panel internal modules current firmware versions and configuration ID (containing specific object data). ID – this is configuration unique code that is modified after each change in the configuration settings stored in the control panel's memory.

12.2 Service status of detectors

Optical smoke detectors, depending on conditions, become dirty after some time. Despite the high adaptability, so that the sensitivity remains unchanged, after exceeding a certain level of contamination, they report the service status, which is signalled by the control panel. The approximate dirt percentage is displayed on the screen, after selecting "Service status" from the menu. The contamination values may differ significantly between the different types of detectors and control panels on which the contamination is read, due to the different calculation algorithms used.

12.3 Tasks

DOP-6001 detector fine tuning

Use the directional buttons to highlight the DOP-6001 TUNE line. Press "enter", select an element that requires tuning from the list. Start the tuning process by pressing the "enter" button.

12.4 Readout of measured parameters

The control panel enables reading of parameters measured or calculated by the control panel and line elements, e.g. the size of the fire factor (temperature, parameters related to smoke) and voltage values at characteristic points of the control panel controller.

Readout of measured parameters

Select MEASURED PARAMETERS in the SERVICE menu. After pressing the "enter" button, you will be presented with options to choose from:

- Detection line 1,
- Detection line 2,
- PANEL.

If you select a detection line, a list of elements will be displayed, after which you can select the element from which the data to be displayed will be taken. Selecting PANEL will display voltages at characteristic points of the panel controller. Moving to subsequent windows requires pressing the "enter" button.

12.5 Location of items

When commissioning and servicing a system, the need often arises to verify where the line element is installed and to identify the number and type of the element.

1. Location of the selected element on the detection line:

- select EL LOCATION in the SERVICE menu,
- select the detection line number,
- after displaying the window with the list of elements, switch the element to the location (mark with "X") using the numeric button "9".

The element location activated in the above manner will be signalled by flashes of its LED diodes, alternately yellow and red, until the location is turned off, using the numeric button "7". Elements without a red LED (eg SAW, SAB) will only signal with the yellow LED.

2. Display on the panel screen of the selected item on the detection line.

The detectors of the 6000 series, equipped with a magnetic field sensor, allow identification and localization in the facility, using a service kit. The detector, after approaching the tester head, starts flashing a yellow LED and the control panel displays the element number and type. This information is displayed automatically on the LCD screen and does not require any operation in the control panel menu. Other elements, e.g. EKS, are equipped with a TEST button (microswitch on the circuit board marked TEST). Pressing the TEST button also invokes a function that displays the item number and type on the control panel screen.

13 Faults

The POLON 3000 system, thanks to its internal self-monitoring systems, detects and signals the following failures:

- on detection lines,
- in line elements,
- alarm device lines,
- in the control panel internal circuits,

in accordance with the requirements of EN 54-2 and EN 54-4.

13.1 Fault status indication

Any malfunction in the system is signalled by the lighting of the collective yellow indicator **FAULT** located on the control panel front panel and an intermittent acoustic signal with a constant frequency (internal acoustic signalling device).

Deletion of the visual and acoustic indications of **FAULT** occurs automatically when the damage is corrected. Deactivation of acoustic signalling is possible by pressing the highlighted **ACKNOWLEDGE** button located on the front panel of the control panel.

In addition, the LCD display automatically displays a window with the current list and number of faults. If there are more defects which do not fit on the screen, the number of hidden defects is displayed, which can be read by "scrolling" through the list using the menu navigation buttons.

13.2 Types of faults

- System faults:
 - program memory fault, RAM memory or the control panel configuration and object data,
 - interference to microprocessor operation,
- module failures,
- faults of detection lines,
- faults of line elements,
- faults of control outputs,
- faults of inputs,
- power-related faults.

Please note: A system fault is not reset automatically - in the event of a fault it must be reset manually. The inability to remove it indicates permanent malfunction to the system and the control panel entering the safe state. Such a state is signalled on the front panel by the FAULT and SYSTEM FAULT LEDs and continuous signalling of the internal acoustic signalling device.

14 Line elements

Line elements are all available devices, e.g. detectors, manual call points, sirens, etc., operating on any detection line of the POLON 3000 control panel. Detection lines of the POLON 3000 control panel have been adapted to support line elements of the 4000 and 6000 series produced by POLON-ALFA.

14.1 Types of elements of the 6000 series

Table 14-1

No.	Element type	Working on the detection line		Description
		4000	6000	
1.	DUT-6046	+	+	fire warning device
2.	DOP-6001	+	+	fire warning device
3.	TUN-6046 TUN-6043	+	+	fire warning device
4.	DTC-6046	+	+	fire warning device
5.	EKS-6000	-	+	input/output element
6.	SAW-6001	+	+	tone sounder
7.	SAW-6006	+	+	tone-voice sounder
8.	SAB-6001	+	+	optical, tone sounder
9.	SAB-6006	+	+	optical beacon, tone-to-voice
10.	DUT-6046AD	+	+	fire warning device with acoustic sounder device
11.	DUO-6046AD	+	+	fire warning device with acoustic sounder device
12.	DOT-6046 DOT-6043	+	+	fire warning device
13.	DUO-6046 DUO-6043	+	+	fire warning device
14.	UCS 6000	+	+	universal control panel
15.	AKC-6000	-	+	Input/output device for addressable communication
16.	Devices containing the MKA module: IGNIS 2500, PZB 6000 and CDG 6000, mCDG 6000 indirectly through AKC-6000	-	+	MKA - module for communication via the addressable line, compatible with 6000 protocol

14.2 Types of elements of the 4000 series

Linear elements designed for the POLON 4000 system.

Table 14-2

No.	Element type	Working on the detection line		Description
		4000	6000	
1.	DOR-4046	+	+ *	fire warning device
2.	DIO-4046	+	+ *	fire warning device
3.	TUN-4046	+	+ *	fire warning device
4.	DPR-4046	+	+ *	fire warning device
5.	DOT-4046	+	+ *	fire warning device
6.	DUR-4046	+	+ *	fire warning device
7.	DUR-4047	+	+ *	fire warning device
8.	DUR-4043	+	+ *	fire warning device
9.	DUO-6043	+	+ *	fire warning device
10.	DIO-4043	+	+ *	fire warning device
11.	DOR-4043	+	+ *	fire warning device
12.	TUN-4043	+	+ *	fire warning device
13.	ACR-4001	+	+	radio detector adapter
14.	ADC-4001M	+	+	conventional line adapter
15.	EKS-4001	+	-	Input/output element
16.	EWS-4001	+	-	control element
17.	EWK-4001	+	-	control element
18.	SAL-4001	+	+	sounder
19.	ROP-4001M	+	+	manual call point
20.	ROP-4001MH	+	+	manual call point
21.	ROP-4007M	+	+	manual call point
23.	UCS 4000	+**	-	universal control panel

*) required element software version V6.0 or V7.0 or later

***) special version of POLON 3000 control panel software required

During the configuration of the control panel, a list of elements belonging to the system is created, the so-called list of declared elements. Elements can be declared manually or automatically by reading elements from the line (auto-configuration) using the POLON Studio application. Elements attached to a line without a declaration are detected and reported as undeclared.

Common parameters for all elements:

- serial number,
- operation mode (internal configuration settings, e.g. sensitivity of detectors, operation mode of inputs, outputs, output group number...),
- user label.

Additional parameters for the detector:

- the number of the zone to which the detector is assigned.

14.3 Declaration of elements

The zone and user label is assigned to the long (serial) number of the device. Short numbers are assigned dynamically, during each declaration of elements in the system. In order to declare an element in the system, you need to make a configuration (declaration) of elements. The readout of installed elements and target declaration and configuration of elements must be performed using the POLON Studio application, which allows you to perform a "manual" declaration of elements or run auto-configuration and download data to the computer. The application allows you to make detailed settings and send the entire configuration to the control panel.

Default settings:

- **User label** – empty field,
- **mode of operation** – value depending on the type of element,
- **zone number** - by default, the item is not assigned to a zone,
- **serial number**,
- **outputs, inputs - inactive** by default,
- **consecutive number of the element on the detection line** - (1, 2, 3...) assigned after execution auto-configuration.

14.4 Parameter configuration

After auto-configuration is finished, the configurable parameters should be adapted to the requirements of the installation design. The parameters of the elements can be set or modified in the POLON Studio application from the beginning of creating the project or after sending the configuration from the control panel to the computer. The configuration of detectors (or fire alarm receiving zones) is related to a place (partition) in the protected facility. Therefore, it is necessary to create detection zones and assign detectors to proper zones (and zones working in the *fire alarm*). **The control panel does not signal a fire alarm from an element (entrance) without an assigned fire zone.** The outputs of the elements (used) should be assigned to groups of outputs and the groups must have defined control criteria.

15 Control outputs

Control outputs allow the connection to the system of external fire protection devices, the operation of which is to be controlled by the control panel. The device control method is defined by the group of outputs to which the output is assigned. Each output must be assigned to one specific output group.

Control outputs in the POLON 3000 system are available:

- in the MSO-30 module,
- in line elements.

Types of control outputs in the system:

- potential-free (relays),
- potential (signal lines),
- sound, voice, and optical signalling devices (e.g., SAL, SAW, SAB).

The parameters of the control outputs are determined by:

- operation mode,
- electrical parameters.

Detailed information on the electrical parameters of the outputs can be found in the documentation of the addressable line elements.

15.1 Output operation mode

The output operation mode determines the way in which the output will be activated after meeting the control criterion, and also determines the time values of the output switching phases. The available output operation modes are listed in the table below.

Table 15-1

No.	Output activation mode	Activation delay timer		Deactivation delay timer		Active duration		Pause duration		Number of pulses	
		Toz		Tow		Tz		Tw		Nimp	
		EKS-6x	MSO-3x	EKS-6x	MSO-3x	EKS-6x	MSO-3x	EKS-6x	MSO-3x	EKS-6x	MSO-3x
		0..2 min [every 2 s] 2..10 min [every 10 s]	0..10 min [every 1 s]	0..2 min [every 2 s] 2..10 min [every 10 s]	0..10 min [every 1 s]	0..2 min [every 2 s] 2..10 min [every 10 s]	0..10 min [every 1 s]	0..2 min [every 2 s] 2..10 min [every 10 s]	0..10 min [every 1 s]	0..256	0..999
1	Continuous	0		0		-		-		-	
2	1 impulse	0		-		0		-		-	
3	Cyclic	0		-		0		0		-	
4	Cyclic-completed	0		-		0		0		0	

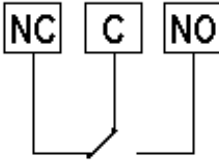
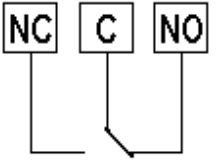
15.2 Output line continuity monitoring

The control outputs are equipped with output line continuity monitoring systems. Detection for lack of continuity is signalled by the control panel as a fault. For each output, it is possible to turn off the signalling of this fault by software.

15.3 Relay fail-safe state

Safe state (Fail Safe) determines what position the relay contacts position when the power supply fails. The safe state of the control output is maintained (after applying the supply voltage and establishing communication with the control panel) until the status update, in accordance with the mask or command sent from the control panel.

Table 15-2

Relay safe state mode			
Mode	Description	Scheme	Comments
1 - PK not active	Contacts in home position - as described NO, NC at the connector		
2- PK activated	Contacts in the opposite position to the description at the connector.		Only available in continuous activation mode
3 - PK no change	The contacts remain in the same state as they were in before the voltage failure.	—	Only available in continuous activation mode

Please note:

The relay safe state function is only implemented in the EKS 6000 series.

16 Output groups

The output group determines the parameters on the basis of which the decision to activate the control output is made. Each control output in the system must be assigned to an output group. Four groups of outputs are fixed and factory pre-defined in the control panel. It is possible to create your own output groups. Up to 64 output groups can be created. The number of outputs assigned to one group is limited only by the number of outputs available in the system. The activation of all outputs belonging to one group is carried out simultaneously.

16.1 Parameters

The group of outputs is defined by the following parameters:

- **group description** – user friendly name of the output group,
- **activation criterion** which defines:
 - **event table** (max. 3 inputs (system events), 1 logic state with criterion logic - true or false),
 - **logic gate of event inputs** (*OR, AND*),
 - **criterion logic** (true or false criterion),
- **delay timer** for **group control**,
- **device type**.

16.1.1 Group description

The description of the group is set individually by the user, in such a way that it facilitates the identification of devices that will be controlled by the outputs assigned to the group

16.1.2 Activation criterion

Triggering criterion is defined by the events that must be met in order to activate outputs within a selected group. The available criteria represent *Table 16-1*.

There is option to create a separate criterion for each of the 64 output groups. Each criterion can be assigned with 1 ÷ 3 events (event types such as level I alarm, level II alarm, fault, acknowledgement...) that can be assigned logic (normal/reverse) and coincidence (sum/product). For event signals (1 ÷ 3), depending on the type, it is possible to determine the range of operation by assigning a specific number of input signals from selected control zones or inputs.

For event signalling of below type:

- I stage alarm,
- II stage alarm.

It is possible to select the signal range:

- 'general' scope; activates the criterion of an alarm detected in any zone of the system,
- 'surveillance zones' scope; activates the criterion only from the alarm detected in selected zones, where 1÷32 surveillance zones can be assigned to every 1÷3 event signals.

For event signalling of below type:

- damaged equipment,
- devices turned on.

It is possible to select the signal range:

- general' scope; activates the criterion when a specified condition is detected by each control input configured in the "status check" or "trip check" mode,
- the range of 'control inputs'; activates the criterion when a specific condition is detected by the selected control input, where 1÷3 control inputs can be assigned to each 13 event signals.

16.1.3 Group activation delay time

Group activation delay time - the common delay for all outputs assigned to a group, with respect to the occurrence of an event (the actual time for outputs activation can be additionally delayed by the individual delay resulting from the output operation driving mode).

16.1.4 Device type

The parameter specifies whether the system should identify devices controlled by outputs assigned to an output group as a specific type of device.

Device types defined in the system:

- SOUNDERS (ALARM DEVICES),
- ALARM TRANSMISSION DEVICES,
- FIRE PROTECTION DEVICES.

Table 16-1 Output activation criterions

NO.	TYPE OF EVENT	CRITERIA (EVENT RANGE)	LOGIC GATE	LOGIC
1	1ST STAGE FIRE ALARM	GENERAL	-	TRUE/FALSE
		IN ASSIGNED ZONES	OR / AND	TRUE/FALSE
2	2ND STAGE FIRE ALARM	GENERAL	-	TRUE/FALSE
		IN ASSIGNED ZONES	OR / AND	TRUE/FALSE
3	FAULT	GENERAL	-	TRUE/FALSE
4	ACKNOWLEDGE	GENERAL	-	TRUE/FALSE
5	RESET	GENERAL	-	TRUE/FALSE

NO.	TYPE OF EVENT	CRITERIA (EVENT RANGE)	LOGIC GATE	LOGIC
6	FAULTY DEVICES	GENERAL -	-	TRUE/FALSE
		CONTROL INPUTS	OR / AND	
7	DEVICES ACTIVATED	GENERAL		TRUE/FALSE
		CONTROL INPUTS	OR / AND	

16.2 Factory predefined output groups

Groups of outputs, so-called factory outputs, are permanently declared in the control panel. It is not possible to modify their parameters.

Table 16-2

GROUP NO.	CONTROL CRITERION				LOGIC OUTPUTS	GROUP DESCRIPTION (NAME)
	EVENT INPUT TABLE			COINCIDENCE		
	NO	EVENT TYPE	CRITERIA			
0	0	NONE	-	-	-	INACTIVE OUTPUTS
1	1	FIRE ALARM 1 STAGE	ALARM GENERAL	SUM	TRUE	ALARM DEVICES - GENERAL ALARM
2	2	FIRE ALARM 2ND DEGREE	GENERAL ALARM	SUM	TRUE	ALARM TRANSMISSION DEVICES - GENERAL ALARM
3	2	FIRE ALARM 2ND DEGREE	GENERAL ALARM	SUM	TRUE	FIRE PROTECTION DEVICE - GENERAL ALARM
4	3	FAULT	GENERAL FAULT	SUM	TRUE	SIGNALLING GENERAL DAMAGE

16.3 Programmable output groups

In addition to the factory-set groups of outputs 1 ÷ 4 (Table 16-2), it is possible to program additional groups to which you can assign other activation criterions listed in the table *Table 16-1* Output activation criterions. E.g., you can create more groups of outputs that can only be controlled from an alarm in the assigned zone(s).

Each new created group can be assigned the type of controlled devices that correspond to the 1st, 2nd and 3rd factory output groups:

- sounders (alarm devices),
- alarm transmission devices,
- fire protection devices.

Devices status signalling in the control panel is related to the above types of devices. Separate groups can be created in which the triggering criterion will include only the failure of sounders (alarm devices), alarm transmission devices or security devices.

Output's groups programming is possible with POLON Studio application. The created groups with assigned activation criterions are part of the system configuration.

17 Input lines

Input lines are used to supervise devices connected to the system by analysing the status of input lines. The way the system responds to a change in the state of the input line, depends on input's mode of operation.

Input lines in the POLON 3000 system are found in elements of the EKS and EWK types, which can be installed on addressable monitoring lines and in the control panel - outputs LA1, LA2 can be independently reconfigured into fully functional control inputs. All inputs can be assigned with user message. The maximum number of active (declared) inputs on each detection loop/line is 64.

17.1 Input line status

The inputs base on its resistance measurements and report to the system the status of the input line connected to them.

Depending on the type and mode of operation of the input, it is possible to analyse 2-state or 3-state:

The states reported by the input in the 2 - state analysis:

- normal state (R-Normal),
- alarm state (R-Active).

The states reported by the input in the 3 state analysis: -:

- normal state (R-Normal),
- alarm state 1 (R-Active X),
- alarm state 2 (R-Active Y).

Table 17-1

Type of analysis	Input operation mode	Characteristic resistance				
		R-Normal	R-ActiveX	R - ActiveY	Break in the input line	Input line short circuit
2 -state	NO	6.3 kΩ	2.0 kΩ	- (not applicable)	>27 kΩ	<240 Ω
	NC	2.0 kΩ	6.3 kΩ	- (not applicable)		
3-state	NO	6.3 kΩ	2.0 kΩ	750 Ω		
	NC	Prohibited mode				

Detailed information, regarding the resistance ranges characteristic of each state, can be found in the documentation of functional modules and linear elements equipped with inputs.

Resistance that exceeds the ranges, is reported by the input, as a failure of the input line (short circuit or break).

17.2 Operating mode

The mode of operation determines how the control panel will respond to a change in state detected by a input.

It is possible to select one of four modes of operation:

- Mode 0 - Input inactive,
- Mode 1 - Device operation monitoring,
- Mode 2 - Device status monitoring,
- Mode 3 - Fire alarm.

17.2.1 Mode 0 - Input inactive

Signals from input operating in mode 0 (inactive) are not analysed.

17.2.2 Mode 1 - Device operation monitoring

The analysis of the state of the input operating in mode 1 depends on the activation of the output assigned to it and is divided into two phases: before activation and after activation of the output. During the analysis, the control panel takes into account the delay times that determine when to treat an output as activated and not-active. Parameters set for mode 1:

- **number of the supervised input**,
- **delay time** supervision after output activation,
- **analysis type** - the number of analysed states (applies only to inputs with 3-state analysis),
- **monitoring delay after deactivating the output** (applies only to inputs with 3-state analysis),
- **user messages** for the states *Device Active*, *Device faulty*.

Table 17-2

TYPE OF ANALYSIS	CONTROL PANEL SIGNALING DEPENDING ON THE STATUS OF THE INPUT LINE IN ALERT STATE					
	BEFORE ACTIVATING AN OUTPUT			AFTER ACTIVATING AN OUTPUT		
	R-Normal (6.3 k Ω)	R-Active X (2.0 k Ω)	R-Active Y (750 Ω)	R-Normal (6.3 k Ω)	R-Active X (2.0 k Ω)	R-Active Y (750 Ω)
2 -state	DEVICE SWITCHED OFF	DEVICE FAULTY		DEVICE FAULTY	DEVICE ON	
3-state	DEVICE SWITCHED OFF	DEVICE FAULTY	DEVICE FAULTY	DEVICE FAULTY	DEVICE ON	DEVICE ON
View of the message on the LCD display of the control panel (for one output)	ON 0	FAULT 1	FAULT 1	FAULT 1	ON 1	ON 1

During a fire alarm, the status of devices grouped by type:

- sounders (alarm devices),
- alarm transmission devices,
- fire protection devices,

is displayed in the alarm window on the LCD display. The number of enabled and failed outputs is displayed next to the status messages of a group of devices.

Example:

ALARM 2 St.	
SOUNDERS:	ON. 2, FAULT 1
AL.TRANS.DEV.:	ON. 0, FAULT 1
FIRE PROT.DEV.:	ON. 1, FAULT 3
ALARM COUNT: 3	
01 ZONE 1	GR.1, MESSAGE
02 ZONE 1	GR.1, MESSAGE
03 ZONE 1	GR.2, MESSAGE

Information about device activation can be indicated on the basis:

- to drive the output by the control panel without monitoring the tripping of the device,
- receiving a feedback signal confirming the operation of the device.

For the configuration with device operation control, the lack of a feedback signal for turning on the device (after a set delay time) is signalled as a fault.

In the case of configurations without device trip control, the failure is signalled only when a break or short circuit is detected in the transmission path to an external device.

Abnormal states of devices (both in activated and supervised states) are displayed on the general list of faults after selecting the FAULTS option from the main menu of the control panel.

The states of the supervised devices (devices active, faulty) are displayed when the DEVICE STATUS option is selected from the main menu.

17.2.3 Mode 2 - Device status monitoring

Status monitoring of the device in control input mode 2 is based on continuous measurement of the resistance of the line connected to the input.

The response of the control panel to a change in the state of an input operating in mode 2, depends on the configuration. Configuration involves assigning input line states to the control panel states. Parameters set for mode 2:

- **type of analysis** - number of analysed states (applies only to inputs with 3-state analysis)
- **control panel status** for R-Normal,
- **control panel status** for R-Active X,
- **control panel status** for R-Active Y (applies only to inputs with 3-state analysis),
- **user messages** for the states *Device active*, *Device faulty*.

Table 17-3

TYPE OF ANALYSIS	STATUS OF THE CONTROL PANEL DEPENDING ON THE STATUS OF THE INPUT LINE		
	R-Normal (6.3 k Ω)	R-Active X (2.0 k Ω)	R-Active Y (750 Ω)
2-state	DETECTION STATUS (NO SIGNALLING)	DEVICE ACTIVE	
	DETECTION STATUS (NO SIGNALLING)	DEFECTIVE FAULTY	
	DEVICE ACTIVE	DETECTION STATUS (NO SIGNALLING)	
	DEVICE FAULTY	DETECTION STATUS (NO SIGNALLING)	
3-state	DETECTION STATUS (NO SIGNALLING)	DEVICE ACTIVE	DEVICE FAULTY
	DETECTION STATUS (NO SIGNALLING)	DEVICE FAULTY	DEVICE ACTIVE
	DEVICE FAULTY	DETECTION STATUS (NO SIGNALLING)	DEVICE ACTIVE
	DEVICE FAULTY	DEVICE ACTIVE	DETECTION STATUS (NO SIGNALLING)
	DEVICE ACTIVE	DETECTION STATUS (NO SIGNALLING)	DEVICE FAULTY
	DEVICE ACTIVE	DEVICE FAULTY	DETECTION STATUS (NO SIGNALLING)

17.2.4 Mode 3 - Fire alarm

The control panel reports the R-Active state (both X and Y) of the input operating in mode 3 as a fire alarm signal. The state of the line is determined, based on the measurement of line resistance, by the control panel. It is necessary to assign an input to the surveillance zone.

Parameters set for mode 3:

- **detection zone number**

In mode 3, the input always operates as 2 - state. The states of the R-Active X and R-Active Y control lines are interpreted equally as a fire alarm signal.

Table 17-4

STATUS OF THE CONTROL PANEL DEPENDING ON THE STATUS OF THE INPUT LINE		
R-Normal (6.3 k Ω)	R-Active X (2.0 k Ω)	R-Active Y (750 Ω)
STAND-BY	FIRE ALARM IN ASSIGNED ZONE (with fulfilled zone criteria)	

17.2.5 Configuration

Table 17-5

INPUT OPERATION MODE	ZONE NUMBER	OUTPUT NUMBER	MONITORING DELAY 0s..10min [every 1 s]		Type of analysis	STATUS OF THE CONTROL PANEL DEPENDING ON THE STATUS OF THE INPUT LINE			OPERATION (NO/NC)
			After Output activation Tokz	After output deactivation Tokw		R-Normal	R-ActiveX	R-ActiveY	
0 - INACTIVE	-	-	-	-	-	-	-	-	-
1 - DEVICE OPERATION MONITORING	-	0	0	0	0	-	-	-	0
2 - DEVICE STATUS MONITORING	-	-	-	-	0	0	0	0	0
3 - FIRE ALARM	0	-	-	-	-	-	-	-	-

"0" - parameter relevant to the given mode of operation

"-" - parameter irrelevant in the given mode of operation

17.3 EKS-4001 inputs

The functionality of the EKS-4001 inputs operating with POLON 3000 control panel is limited, due to the way the element works (row 4000). Functional limitations:

- possible input modes: ACTIVATION CONTROL or STATUS MONITORING,
- for DEVICE OPERATION MONITORING, the number of the monitored output is limited to its own output,
- monitoring delay time of 40 s, 70 s or 130 s.

17.4 EWK-4001 inputs

The functionality of the inputs of the EWK-4001 element operating with POLON 3000 control panel is limited, due to its mode of operation. Functional limitations:

- possible input modes: STATUS MONITORING or FIRE ALARM.

18 System configuration and programming

To configure the POLON 3000 system, it is necessary to download the POLON Studio application from the manufacturer's website and install it on the computer. The application enables convenient system design, configuration settings prepare and project archiving. In particular, it allows:

- hardware configuration of the control panel,
- configuration of addressable detection lines,
- selecting from the list and attaching line elements to detection lines with on-screen visualization,
- configuration of line elements (detectors, MCPs, control elements, etc.),
- configuration of detection zones, alarm variants, criteria for activating outputs, groups of outputs, monitoring inputs, and control outputs,
- downloading and uploading configurations to/from control panel,
- starting auto-configuration - automatic readout of installed line elements on detection loops/lines,
- reading events and performing other auxiliary functions.

18.1 Hardware configuration

The POLON Studio application allows you to download the configuration from a connected control panel or make a new project of configuration settings. For a new project, select the project type (P3064, P3128, P3256) that is associated with the POLON 3000 control panel variation:

- POLON 3064,
- POLON 3124,
- POLON 3256.

and specify the name of the file to save the configuration. The program will automatically display the basic hardware configuration: housing and modules. For a control panel with optional communication module installed, it is advised to add the MK-30 module. Line elements can be added "manually" from the list, after selecting (highlighting) the detection line of the MLD-30 line module, by dragging and dropping on the displayed module terminals. Another practical method is to perform an automatic reading of elements from the panel's real operating detection loop. In this case, the control panel must be installed and a connection made to the computer via USB. After starting the POLON Studio application, connecting the computer to the panel, select "send/receive" and "connect" . Connection to the control panel will require selecting the proper USB port. When the port is opened, the ability to run auto-configuration is activated. Starting auto-configuration of the selected number and line type, will result in real-time display of messages on detected elements. In case of installation errors are present, proper messages are displayed to help fix the fault. Successful auto-configuration allows you to save the readings. Elements which were read they have factory default settings (if not configured).

18.2 Configuration of the detection lines

In the project window of the POLON Studio application, double-click on the MLD-30 line module will bring up the configuration window for the detection lines. The window displays line parameters with the possibility of setting them. The most important are:

- transmission protocol (Polon 6000 or Polon 4000 - depends on the line elements used),
- type of line (loop, radial/open),

- topology verification (the function of checking whether the elements on the detection line have not been swapped) - the function is available only for the Polon 6000 protocol.

Other parameters (e.g. cable type) are not sent to the control panel as configuration data.

18.3 Configuration of linear elements

In the project window of the POLON Studio application, after expanding a detection line, double-clicking on a line element pops up the configuration window. The window displays the parameters appropriate for the device type:

- logical number - the number of an element on the detection line: 1,2,3...,
- serial number - the unique number of the device assigned during production,
- user label - displayed in the control panel, e.g. when element is in alarm,
- other parameters depending on the type of element, e.g. zone no., operation mode, etc.

Once the parameters are set, you can save the changes and move on to configure the next element.

18.4 Configuration of control outputs, groups of outputs, activation criteria

The configuration window of control panel outputs, located on the MSO-30 module, is displayed after double-clicking on the MSO-30 module in the project window.

The configuration window of outputs located in line elements is displayed after double-clicking on an element connected to a detection line.

Outputs operation is organized in a group manner. An output must be assigned to an output group. Without assignment to an output group, the output will not function. The group must be created and have a defined activation criterion. Standard output groups related to the type of controlled devices are created in the program, as described in the section "Factory output groups".

In POLON Studio, the configuration of control outputs, output groups and activation criteria is enabled by tabs:

- criteria,
- output groups,
- control outputs.

For helpful information and a description of the output parameters, see the section "Control Outputs."

18.5 Configuration of input lines

Configuration of input lines is made similarly to the configuration of outputs. In the POLON Studio application, select the module or element having the input. After double-clicking, a window of all parameters of the element appears - select "inputs". Description of parameters, configuration options are included in the section "Input lines".

18.6 Configuration of zones and alarm variants

A zone can contain one or more fire detectors or manual call points (MCPs) installed in the protected area. In order to identify the site of an incident in detail, the system must have information about the number of zones and which linear elements belong to which zone. In the POLON Studio application, using the "Detection zones" tab, create detection zones, add appropriate elements from available in the system to a given zone, select the alarm variant and complete the zone description - a message that will be displayed on the control panel in the alarm state. A detector not assigned to a zone will not trigger an alarm condition on the control panel.

Helpful information on configuration of zones and alarm variants can be found in the section "Detection zone"

18.7 Configuration of zone groups

In the POLON 3000 control panel, apart from the main fire indicator, there are 16 zone indicators (lamps) intended to indicate the number of the zone in alarm mode. If there are more zones, it is necessary to assign more than 1 zone to one indicator, then several zones (group) can be assigned to 1 indicator. Configuration of zone groups can be performed using the POLON Studio application or directly from the control panel desktop by selecting ZONE GROUPS from the menu. In the configuration window, you just need to assign a group number to the displayed list of zones (corresponding to the lamp number on the control panel). Configuration, using the POLON Studio application, requires the activation (addition) of 1...16 zone groups. After creating groups of zones and opening the "Group of detection zones" window, it is available to add the selected zones to the proper group.

Note:

Each time a new configuration is sent from POLON Studio to the control panel the following occurs:

- all previously enabled blocking of elements, zones, zones, etc. are deleted,
- automatic blocking of the Detection Lines 1 & 2 (manual unblocking of the detection lines is required after verifying the set blockings and before changing the configuration)

18.7.1 Programming zone groups

Zone group programming is designed to assign optical zone indicators (16 red lights on the control panel) to zones or zone groups.

For up to 16 zones, the zone indicators on the control panel can be programmed so that each light corresponds to one fire zone.

In case of zones number higher than 16, the number of zone indicators on the control panel will be insufficient. It is advisable then to assign several zones to one group so that all detection zones have proper optical indication on the control panel. This operation can be performed directly from the control panel menu or after connecting to a computer via the POLON Studio application.

Programming of zone groups using the control panel menu

14:21	ACCESS LEVEL: 3
FAULTS DISABLEMENTS TESTS DEVICE STATUS CONFIGURATION SETTINGS	

In the main menu, select the CONFIGURATION line and press "enter" (access level 3 required).

CONFIGURATION
TIME T1, T2, T3, T4 DETECTION LINES LINE ELEMENTS ZONES ZONES - VARIANTS OF AL. ZONE GROUPS

In the "CONFIGURATION" sub-menu, select the ZONE GROUPS row and press "enter".

ZONES GROUP OF ZONES	
01 - DETECTION ZONE	01
02 - DETECTION ZONE	01
03 - DETECTION ZONE	02
04 - DETECTION ZONE	02
05 - DETECTION ZONE	03
06 - DETECTION ZONE	03

Use the cursor buttons to select a zone. Press "enter" - you will be able to edit the numbers in the ZONE GROUPS column. Use the numeric buttons to enter the group number to which the selected zone is to belong. Press "enter" again. Exit the sub-menu by pressing "esc".

CONFIGURATION	
CONFIGURATION CHANGE !	
SAVE	CANCEL

The system detects the configuration change. Saving to memory is done by pressing the numeric button "7". Pressing the "9" button will cancel the change made (restores the previous zone assignment to the zone group).

18.8 Programming user buttons F1, F2, F3

Programming user buttons using the control panel menu.

14:21	ACCESS LEVEL: 3
FAULTS DISABLEMENTS TESTS DEVICE STATUS CONFIGURATION SETTINGS	

In the main menu, select the CONFIGURATION line and press "enter" (access level 3 required).

CONFIGURATION
OUTPUTS OUTPUT GROUPS INPUTS CRITERIA - ON OF OUTPUTS MK-30 USER BUTTONS

In the sub-menu "CONFIGURATION" select the row USER BUTTONS and press "enter".

USER BUTTONS
F1 - INACTIVE F2 - INACTIVE F3 - INACTIVE

Select the F1 button (similarly, F2, or F3) to program the function and press "enter".

F1 - FUNCTION SELECTION
INACTIVE ZONE DISABLEMENT DISABLE GROUP OF OUTPUTS DISABLE LD1 INPUT DISABLE LD2 INPUT DISABLE CSP INPUT

From the list of available functions, select the function that will be assigned to the function F1 button and press "enter".

DISABLE GROUP OF OUTPUTS
01. Sounders 02. Transmission devices 03. Fire fighting 04. Signaling outputs
ON

From the list of available groups, select one group to be blocked after pressing the F1 button and press the number button "9" acting as ON.

DISABLE GROUP OF OUTPUTS	
01. Sounders	X
02. Transmission devices	
03. Fire fighting	
04. Signalling outputs	
OFF	

An "X" will appear next to the selected group of devices. The function of the button has been preset. Press "esc".
The system detects the configuration change. Save to memory is done by pressing the numeric button "7". Pressing the "9" button will cancel the change made to the function of the F1 button (restores the previous function of the F1 button).

USER BUTTONS
F1 - DISABLE A GROUP OF
F1 - INACTIVE
F1 - INACTIVE

The F1 button has been assigned the function DISABLE OUTPUT GROUP - gr. 1 Alarm devices Press "esc" to exit the sub-menu.

19 Event memory and alarm memory

The POLON 3000 control panel records events related to the system operation at a given facility in a log (event log). Each event is notified with a description in words as well as the date and time of its occurrence (with an accuracy of 1 second). The event memory stores, in chronological order, the following events, among others:

- alarm events,
- faults,
- service states,
- changing configuration data,
- testing,
- disablements,
- output activations for external devices,
- staff operations of the type; acknowledge, reset, activation of delays, etc.

The event log content can be viewed via PSO-30 panel display by selecting EVENT MEMORY from the list or on a computer after connecting to the control panel and downloading data via POLON Studio application. The available event memory provides the ability to save at least 4000 recent events. When the memory is full, oldest events are overwritten with the newest ones. Erasing the event log (events erasing) is possible after obtaining the 3rd access level and selecting the LOG ERASE menu from the list.

20 Installing the system

20.1 General

Before installing the control panel, remove the transport protection. Keep the securing components in case of the need to return the control panel for a warranty.

20.2 Installing the control panel on the wall

Install the control panel on the wall using three M5 screws and wall plugs with a diameter of at least 8 mm. Fig. 20-1 presents the necessary data to perform assembly operations.

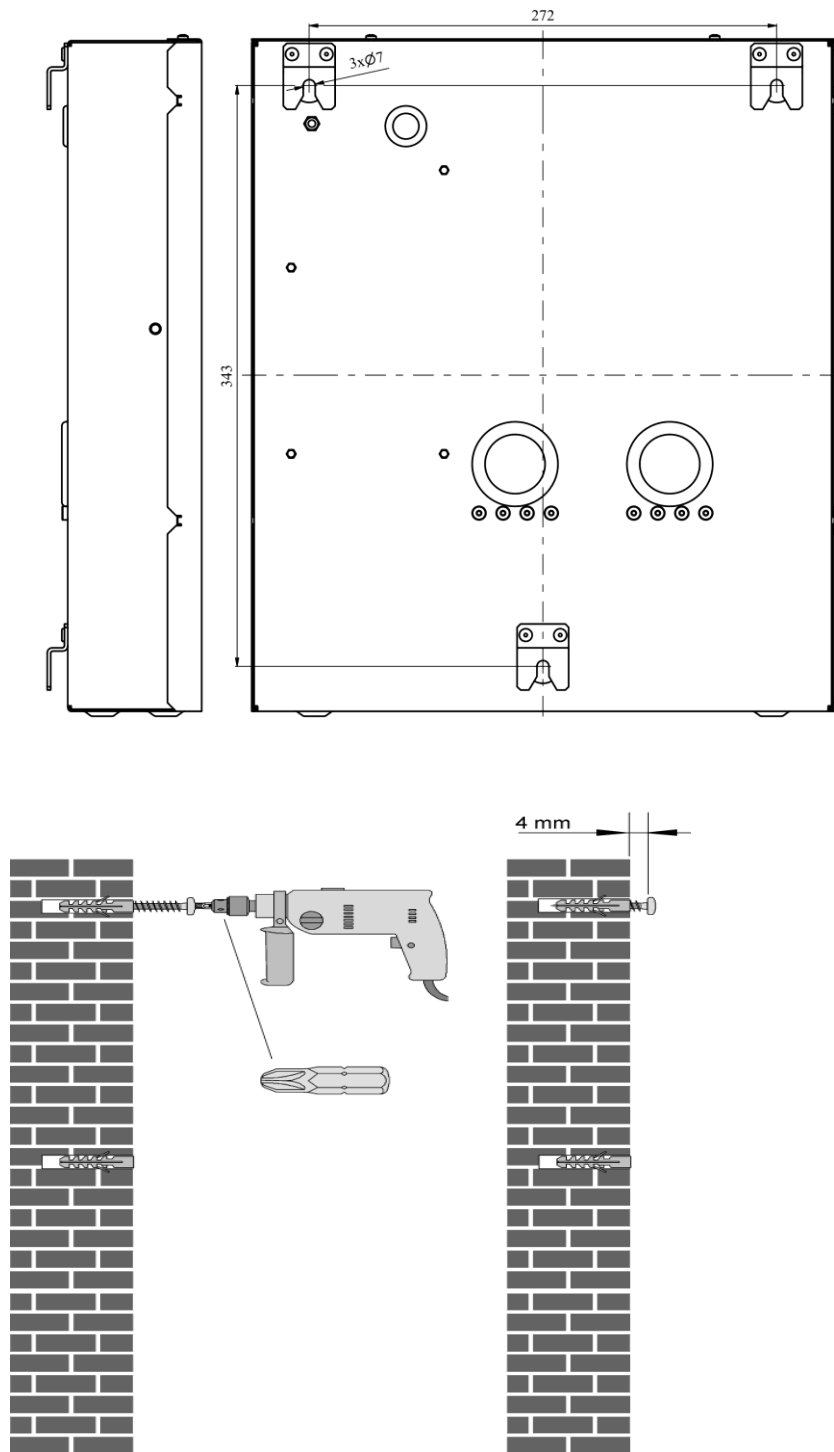


Fig. 20-1 View of the elements of fixing the housing on the wall

20.3 Connecting the power cables and batteries

The control panel has L, N PE (Fig. 6-1) terminals for connecting the mains supply. On the main board (MSO-30 module) there is a pair of terminals marked as ZL10 for connecting the battery harness "- AKU + ". Additionally, on the red (+) wire there is a socket with a 3 A fuse (car type). When connecting the wiring harness, pay special attention to the compliance of the polarity of the module terminals with the markings of poles (+) and (-) of the batteries.

20.4 Design recommendations

Considering reliability of installation operation, a loop system of routing for detection lines should be used. Radial lines should be used in exceptional circumstances (e.g. when a small number of detectors is to be moved to a considerable distance).

When designing an addressable detection line, you should assign each addressable line element with an address (element number) under which it will be identified by the control panel. Due to the good readability of the installation design and service facilities, it is recommended that the successively installed addressable line elements have successively increasing addresses - preferably assigned in accordance with the numbering algorithm by the control panel during automatic configuration (auto-configuration). It is recommended to use shielded cables in the POLON 3000 system. When designing the installation, it is necessary to meet all the requirements of the technical data, especially pay attention to the capacity of the addressable supervision line. The appropriate resistance of the detection line and the line resistance between adjacent short-circuit insulators should also be ensured.

21 Operation and maintenance

21.1 Regulations for proper use

The reliability of the operation of the control panel depends on the maintenance of proper operating conditions, power supply voltage, the condition of the batteries and the performance of periodic tests. Periodic inspections should be carried out by an authorized maintenance technician, who is commissioned by the user to maintain the installation. Any malfunction should be immediately reported to the maintenance technician. When replacing fuses, pay attention to their nominal values. Do not insert a spare fuse with higher nominal value in place of a blown fuse, due to the possibility of damage to the device.

21.2 Periodic inspections and maintenance regulations

Periodic tests of the POLON 3000 system should be carried out at least once a year, in accordance with CEN/TS 54-14. Every six months, check the condition of the protective, earthing or neutral connection with the control panel housing and clean the battery terminals.

At least once a year, check the charge state of the batteries. To do this, switch off the mains voltage for about 2 hours with the mains switch and after switching it on again, check that the battery will be recharged within 5 hours and after that the system will automatically switch to buffering.

An efficiently operating system, subject to regular periodic inspections, does not require special maintenance. It is recommended to vacuum the external surface of the control panel from time to time.

22 Packaging, storage, transportation

22.1 Packaging

All components of the control panel are placed in individual packaging, limiting the possibility of free movement and excluding damage during handling and transportation.

The packaging includes the following information:

- the manufacturer's name or mark,
- item name and type,
- item weight.

The packaging should also bear the following inscriptions: "CAUTION FRAGILE", "UP, DO NOT TURN", "PROTECT FROM WET" or corresponding signs according to proper regulations.

22.2 Storage regulations

The control panel modular components should be stored in closed rooms with a temperature of $+5\text{ °C} \div +40\text{ °C}$ and relative humidity not exceeding 80 %, free from corrosive vapours and gases.

During storage, components of the POLON 3000 control panel should not be exposed to heat, sunlight and heating devices.

22.3 Transport regulations

All elements of the POLON system in the package should be transported in covered means of transport, taking into account the transport indications given on the packages and with protection against sudden shocks and ambient temperatures exceeding the range from -25 °C up to $+55\text{ °C}$.

23 INSTRUCTIONS FOR COMMISSIONING AND CHECKING THE CORRECT OPERATION OF THE CONTROL PANEL AFTER INSTALLATION

Work to be performed before commissioning:

- implementation of the installation of low-voltage lines: detection, inspection, control and 24 V power supply, as well as the supply of 230 V mains in accordance with the design,
- installation of equipment in detection, inspection and control lines, etc...,
- installation of the control panel,
- setting the control panel power switch on the power module to the "off" position,
- connection to the connectors of low-voltage lines entering the control panel,
- connecting the mains power to the L, N, PE terminals in the power module - **ATTENTION! Dangerous voltage!**
- making paper slides with a description for the F1, F2, F3 user buttons on the control panel front panel (if they have been assigned user functions),
- preparation of a list of linear elements with a description of the location.

Checking the electrical connections

- checking the correct position of jumpers, configuration switches on the control panel printed circuit boards using the information contained in the Operation and Maintenance Manual;
- checking the correct connection of the line wires to the connectors of the control panel, paying attention to the polarity of +, -;
- checking the correctness of connection of termination resistors in sockets of supervised lines (control and alarm)
- checking the correctness of connection of separating diodes in alarm (potential) lines,
- checking continuity of screens - connections with the housing and through all sockets of addressable lines elements and ground continuity from (-L) to (-P).
- location in the control panel housing and serial connection of 2 12 V batteries, paying attention to the conformity of the polarity markings +, - on the battery connector and terminals,
- Check the voltage value at the battery terminals (batteries charged, in buffering mode the voltage should be $27.3 \text{ V} \pm 0.3 \text{ V}$, at temperature $<25 \text{ }^\circ \text{C}$).

Start-up

- 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,
- turn on the control panel using the mains switch on the power supply module,
- configure the control panel and line elements in accordance with the description of the Operation and Maintenance Manual,
- read the faults detected by the control panel and remove any installation errors,
- perform a test of the optical indicators of the user interface on the PSO-30 panel,
- perform a preliminary check for operation: of detection lines - by triggering the alarm status of elements and input lines - by triggering or simulating possible states of supervised devices,
- check the correct activation of potential and potential-free outputs,
- perform on/off test of groups of alarm, alarm transmission, fire protection devices,
- perform a test for disablement function of the outputs,
- perform a test of all line elements (detectors, MCP buttons, sirens and other devices connected to the system), paying attention to the compatibility of the location of the elements with the messages on the display and optical indication on the front panel,
- after removing all faults and achieving the detection condition, connect the connectors of disconnected outputs for the duration of initial commissioning,
- check the operation of alarm and fault signal transmission to monitoring devices.

After the system is started, it is recommended to check and set the current date and time if necessary, next step is to clear the event log.

The work can be considered as completed if the all above-mentioned activities have been carried out and the proper functioning of all system devices and the operation of the control panel in the stand-by (detection) state (with no indication of faults and disablements) has been established - the system can be handed over to the end user.

24 Appendix A - line elements of the POLON 4000/6000 system

Item name	Detection current
DIO-4046 addressable ionization smoke detector	150 μ A
DOR-4046 optical addressable smoke detector	150 μ A
DUR-4046 universal addressable optical smoke detector	150 μ A
TUN-4046 universal addressable heat detector	150 μ A
DOT-4046 multi-detector addressable smoke and heat detector	150 μ A
DPR-4046 multi-detector addressable smoke detector	170 μ A
TUN-6046 point heat detector addressable	150 μ A
DUT-6046 multi-detector addressable smoke and heat detector	150 μ A
DUT-6046AD universal smoke and heat detector with sounder	1 mA
DUO-6046, 6646, 6046K universal addressable smoke detector	150 μ A
DUO-6046AD universal smoke detector with sounder	1 mA
DTC-6046 universal smoke, heat and carbon monoxide detector	150 μ A
DOT-6046 universal addressable smoke and heat detector	150 μ A
DOP-6001 optical linear smoke detector	300 μ A
ROP-4001M, ROP-4001MH manual call points	140 μ A
ADC-4001 adapter (loaded with sideline): <ul style="list-style-type: none"> - programmed in operating mode 1 - programmed in operating mode 2 - programmed in operating mode 3 - programmed in operating mode 4 - programmed in operating mode 5 - programmed in operating mode 6 	6.8 mA 16.0 mA 2.5 mA 0.5 mA 2.2 mA 1.33 mA
ACR-4001 radio detector adapter	6.0 mA
ROP-4007, ROP-4007H Radio Manual Call Points	-
DUR-4047 optical radio smoke detector	-
EKS-4001 control and steering element	165 μ A
EKS-4001W control and steering element	250 μ A
EKS-6040, 6004, 6022, 6044, 6202, 6400 control and steering elements	< 250 μ A
EKS-6222P control and steering element	610 μ A
EKS-6080 control and steering element	210 μ A
EKS-6008 control and steering element	400 μ A
EWS-4001 multi-output control element	150 μ A
EWK-4001 multi-input control element	150 μ A
SAL-4001 addressable sounder: <ul style="list-style-type: none"> - powered by batteries or an external source - powered only from line ¹⁾ 	150 μ A 600 μ A
SAW-6001/SAW-6006 addressable sounder	150 μ A
SAB-6001/SAB-6006 addressable acoustic-optical siren	150 μ A
UCS 4000/ UCS 6000 universal control panel	600 μ A
PZB 6000 power supply of fire protection equipment	600 μ A

IGNIS 2500 automatic fire extinguishing control panel	600 μ A
CDG 6000, mCDG 6000 gas detection control panel	150 μ A

¹⁾ the signalling device without additional power supply must have a guaranteed current from the line/loop for alarming



POLON-ALFA S.A.

POLAND 85-861 Bydgoszcz, ul. Glinki 155 | www.polon-alfa.pl
EXPORT DEP. phone no. +48 52 36 39 278, email: export@polon-alfa.pl
SERVICE DEP. phone no. +48 52 36 39 390, email: serwis@polon-alfa.pl