POLON-ALFA NAJNOWSZA TECHNOLOGIA. NAJWYŻSZA JAKOŚĆ

DISTRIBUTED FIRE ALARM SYSTEM POLON 6000

FIRE ALARM CONTROL PANEL

POLON 6000

Operation and Maintenance Documentation

ID-E332-001

IF Edition

CE

CNBOP-PIB

Polon-Alfa Spółka z ograniczoną odpowiedzialnością Sp. k.

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The POLON 6000 Fire Alarm Control Panel described in this OMD fulfils all substantial requirements of the following European Parliament and the Council regulations:

CPR CPR/305/2011 The European Parliament and the Council (EU) regulation of March 9, 2011 establishing harmonized conditions for introducing construction products to the market and overruling the Council Directive 89/106/EEC;
LVD Directive 2006/95/EC concerning electrical equipment, designed for use within certain voltage limits;
EMC Directive (EU) 2004/108/EC concerning electromagnetic compatibility.

POLON 6000 Fire Alarm Control Panel received Declaration of Performance No. 1/E332/2015/PL.

JC CNBOP-PIB in Józefów, the notified body no 1438 in the EU, issued Certificate of Constancy of Performance No 438/CPR/0374 for the POLON 6000 fire alarm control panel, certifying the conformity of the panel to the requirements of the standard PN-EN 54-2:2002+A1:2007

CNBOP-PIB issued an acceptance certificate no 2109/2014 for POLON 6000 fire alarm control panel.

The certificate, acceptance certificate and Declaration of Performance can be downloaded from the website **www.polon-alfa.pl**

FIRE ALARM CONTROL PANEL

POLON 6000

The manufacturer Polon-Alfa accepts no liability for any fault resulting from usage inconsistent with the manual.

Worn out product, not suitable for further use must be handed over to an electrical and electronic equipment waste collection point.

Note - The manufacturer reserves the right to introduce changes.

CE

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Polon-Alfa Spółka z ograniczoną odpowiedzialnością Sp.k.

85-861 Bydgoszcz, ul. Glinki 155

1438

1438/CPR/0374

POLON 6000 Fire Alarm Control Panel

EN 54-2, EN 54-4

Declaration of Performance No. 1/E332/2013/PL

Product essential features	Features	Harmonized standard EN 54-2:1997 A1:2006 Chapter
Effectiveness in fire conditions		
General requirements	Fulfilled	4
General requirements for signalling	Fulfilled	5
Fire alarming status	Fulfilled	7
Reaction delay (fire response time)		
Alarm signals reception and processing	Fulfilled	7.1
Output for alarming status	Fulfilled	7.7
Delay for exits	Fulfilled	7.11
Dependences on more than one alarm signal	Fulfilled	7.12
Operation reliability		
General requirements	Fulfilled	4
General requirements for signalling	Fulfilled	5
Supervising status	Fulfilled	6
Fire alarming status	Fulfilled	7
Failure status	Fulfilled	8
Disablement status	Fulfilled	9
Testing status	Fulfilled	10
Standard input - output interface	N/A	11
Design requirements	Fulfilled	12
Additional design requirements for programmable control panels	Fulfilled	13
Marking	Fulfilled	14

Product essential features	Features	Harmonized standard EN 54-2:1997 A1:2006 Chapter
Reliability durability; resistance to heat		
Resistance to cold	Fulfilled	15.4
Reliability durability: vibration resistance		
Resistance to impacts	Fulfilled	15.6
Resistance to sinusoidal vibration	Fulfilled	15.7
Sinusoidal vibration endurance	Fulfilled	15.15
Reliability durability: electric stability		
Electromagnetic compatibility (EMC)	Fulfilled	15.8
Resistance to supply voltage changes	Fulfilled	15.13
Reliability durability: moisture resistance		
Resistance to constant humid hot	Fulfilled	5.5
Constant humid hot endurance	Fulfilled	5.14
Optional features		
Signalling		
Failure signals from points	Fulfilled	8.3
Total supply voltage loss	Fulfilled	8.4
Saving the number of fire alarming status introductions	Fulfilled	7.13
Controls		
Interdependent alarming	Fulfilled	7.12
Output signals delay	Fulfilled	7.11
Disabling each addressable point	Fulfilled	9.5
Testing status	Fulfilled	10
Outputs		
Fire alarming devices	Fulfilled	7.8
Fire alarms transmission devices	Fulfilled	7.9
Automatic fire protection security device	Fulfilled	7.10
Failure signals transmission device	Fulfilled	8.9
Standard input/output interface	Fulfilled	11

Product essential features	Features	Harmonized standard EN 54-4:1997+ A1:2002+A2:2006 Chapter
Power supply effectiveness		
General requirements	Fulfilled	4
Functionality	Fulfilled	5
Materials, design and implementation	Fulfilled	6
Operation reliability		
General requirements	Fulfilled	4
Functionality	Fulfilled	5
Materials, design and implementation	Fulfilled	6
Documentation	Fulfilled	7
Marking	Fulfilled	8
Reliability durability: resistance to temperature		
Cold (resistance)		9.5
Reliability durability: vibration resistance		
Impact (resistance)	Fulfilled	9.7
Sinusoidal Vibration (resistance)	Fulfilled	9.8
Sinusoidal Vibration (endurance)	Fulfilled	9.15
Reliability durability: electric stability		
Electromagnetic compatibility (resistance)	Fulfilled	9.9
Reliability durability: moisture resistance		
Constant humid hot (resistance)	Fulfilled	9.6
Constant humid hot (endurance)*)*	Fulfilled	9.14
Intended use: Fire safety – signalling detected fire by cooperating detectors and manual fire alarm call points.		
Technical data - see documentation: ID-E332-001		

Table of Contents

1 Introduction

1.1 Documentation Contents

This Operation and Maintenance Documentation (OMD) provides information on the purpose, construction and operation of components of POLON 6000 modular fire alarm control panel, representing an essential part of the POLON 6000 system. The OMD contains necessary information for proper control panels installation, handling and operation and it may also facilitate the process of designing fire alarm installations.
The OMD does not provide information on other POLON 6000 system elements which are described in separate technical documents.
Interoperating line elements which may be installed in the POLON 6000 control panel detection lines are listed in section 15.

1.2 Control Panel Purpose

POLON 6000 Modular Fire Alarm Control Panel is designed to save life and property from the risk of fire. Methods of protection:

- Signalling sources of fire detected by automatic and manual interoperating fire warning devices
- Indicating areas at risk of fire
- Actuating alarm devices
- Passing fire information to appropriate services, e.g. National Fire Service units.
- Activating fire protection devices

1.3 Safety Conditions

Failure to observe the instructions contained in the device user manual may irreparably fault the equipment and may also result in property fault, personal injuries and/or death.

1.3.1 Electric Shock Protection

The POLON 6000 system fire control panels are ranked as first class protection devices and can be used only in the case of application of additional protection against electric shocks using protective earthing.

The insulation of the circuits supplying electrical power 230V/50Hz is reinforced and can withstand test voltage of 2800V whereas low voltage circuits insulation (below 42V) can withstand test voltage of 700 V DC.

1.3.2 Installation and Equipment Safety

The wiring should be made with wires adequately resistant to fire and properly protected at where passing through fire zone borders.

The distance between the low-voltage installation and the power and lightning protection systems should be compliant with requirements to prevent unwelcome interactions. Protective grounding is recommended to assure system resistance to electromagnetic interference. Standby rechargeable batteries cluster should be placed in the control panel at the end of installation. Components of this unit are sensitive to heat.

The maximum ambient temperature must not exceed 40 °C. Do not block ventilation holes at the sides of the unit. Leave sufficient space around the unit to maintain free flow of air. The air humidity in the rooms where the unit operates must not exceed 95 %.

1.3.3 Support for Ion Smoke Detectors

If the control panel will be connected with (isotopic) ion detectors they shall be installed, removed and stored only by "authorized installer", i.e. organizational unit which is authorised by the National Atomic Energy Agency for such activity in accordance with Article 4 of the Nuclear Law Act.

1.3.4 Repairs and Maintenance

The maintenance works and periodical inspections should be conducted by authorised employees of companies which have been authorised or trained by Polon-Alfa personnel.

All repair works must be done exclusively by the manufacturer.
Polon-Alfa accepts no responsibility for the operation of devices maintained and repaired by unauthorised personnel.

1.3.5 Fuse Replacement

When replacing fuses use only spare ones of the appropriate type and nominal value.

1.4 Definitions

Addressable detection line – A detection line that enables connection of addressable elements.
Side detection line – A detection line for two-state non-addressable fire warning devices, established with ADC-4001 adapter.
Addressable element – An element operating in addressable detection line with a unique and fixed identifier in the form of a serial number and configured element number. An addressable element enables two-way exchange of digital data with the control panel (transmission and reception).
Element number – A sequential number assigned to an addressable element during detection line configuration. Normally, the control panel communicates using the element number (so-called "short number").
Supervising zone – A separated section of the protected premises with assigned line elements.
Line element – An element installed in addressable detection lines (addressable element) and side lines (non-addressable element).
Serial number (factory address) – A unique 12-digit number assigned to each addressable element during the production process. Serial number contains the addressable element type that can be identified by the control panel.
Line logical number – successive number assigned to the open or closed loop detection lines at the time of MLD-6x line modules declaration.
Output group – A collection of assigned outputs acting based on the same criterion.
Control panel node – Consecutive logical number given to the modules supplied with the module MZP-60, designating the node number 1 to 99. Node number 1 is the main node of the control panel. Other nodes 2 ÷ 99 are called remote nodes.

Faulty device – Fault condition reported by the control inputs due to negative verification of controlled device activity. The status may be used to implement scenarios for controlling outputs operation.

Active device – Condition reported by the control inputs after positive verification of controlled device activity. The status may be used to implement scenarios for controlling outputs operation.

The standard configuration – A collection of data identifying the hardware of the control panel and its working principle (e.g. a declaration of addressable devices, zones allocation, alarming types), determined and entered into the memory by the manufacturer.

Supervising mode – Operating status when the control panel is supplied with electrical energy source meeting certain requirements and when no other operation status is signalled.

Alarm (fire) state – Operating status of the control panel enters after receiving fire detection signal from warning devices.

Preliminary alarm state (first alarm mode) – Operating status of the control panel after warning devices transmits the first fire alarm signal.

Disabling state – Operating status of the control panel with intentionally blocked functionalities.

Testing state – Operating status in which the control panel signals that applicable functions are being checked.

Fault state – The condition in which the control panel indicates fault to its systems or any element of the alarm system.

Servicing state – Operation status in which control panel signals the servicing status of any alarm system component.

2 Polon 6000 Distributed Fire Alarming System Architecture

- **Addressable distributed system (with up to 99 thousand components).**
- **New range of 6000 series line elements.**
- **Compatibility with 4000 series components.**
- **The common space for control outputs (up to 64 thousand).**
- **The common space for control inputs (up to 64 thousand).**
- **Distributed systems may be connected in a wide-area network.**

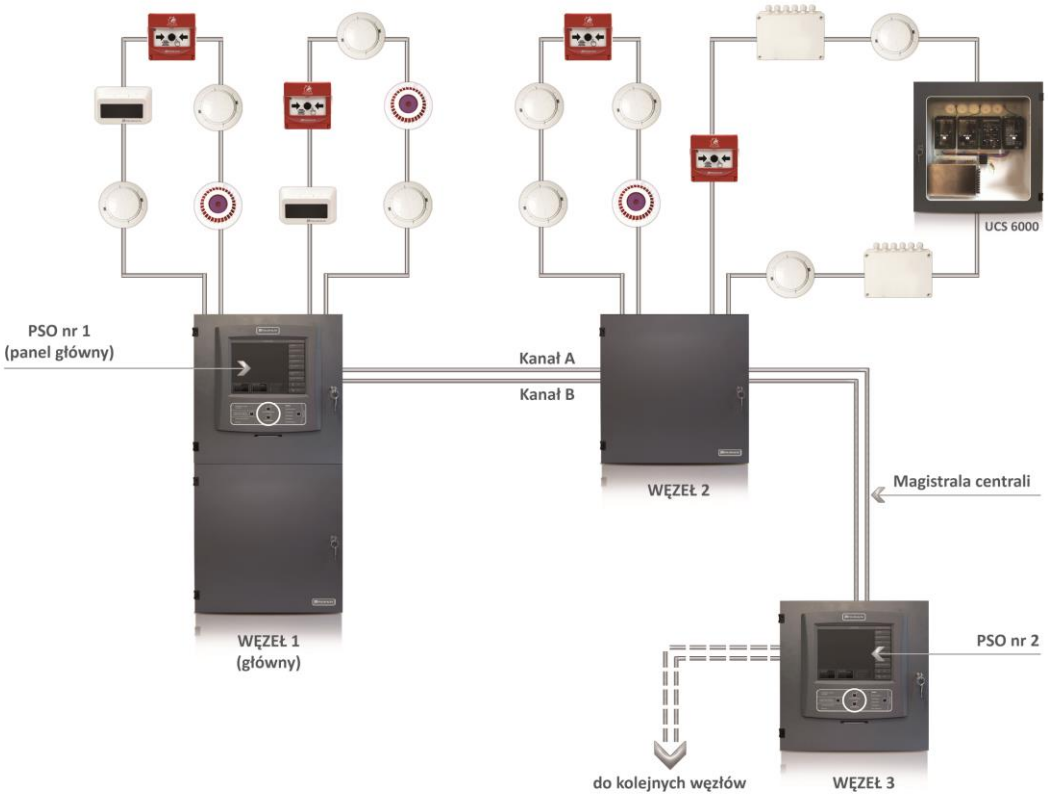


Figure 2/1 Distributed fire alarm system POLON 6000

2.1 Introduction

POLON6000 modular control panel is the main component of the distributed fire alarm system POLON 6000.

Polon 6000 control panel consists of operator panels PSO-60 (minimum 1, up to 99), functional modules (up to 99 of each type), power modules (up to 99) and transmission modules. Control panels and modules are installed in the OM-61, OM-62 enclosures with standardized dimensions that can be combined with each other mechanically. Mechanically connected housings form control panel node. Each node must be equipped with a power supply module. The control panel must have at least one node with operator panel PSO-60 number 1 (main control panel). Such node is called the primary node of the control panel. The control panel may have only one master node. Nodes connected to the main node are called control panel remote nodes with numbers in accordance with the numbering of the MZP-60 power modules. Communication between nodes is performed using double cable connection (RS-485) or double fibre optics.
At each node in the control panel may be line modules to which you can connect the detection lines that are running in 6000 mode or POLON 4000 mode.
Each control panel node may consist of control modules to directly operate fire-protection equipment.
Each remote node may consist of PSO-60 operator panel acting as remote terminal. PSO-60 panel may be placed in OM-62 standard housing or in a dedicated small enclosure. In such case the panel is marked as WPO-60 (remote operating panel).
Depending on the number of nodes the POLON 6000 system architecture is non-distributed (traditional) or distributed.

2.2 Non-distributed (Traditional) Architecture

The architecture is called non-distributed (traditional) if the control panel is composed of one node only (the primary node).

Non-distributed (traditional) architecture should be used to protect objects of compact architecture fulfilling the following conditions:

- The distance to the furthest monitored places should not exceed the detection lines range (see line modules specifications).
- The distance to the furthest fire protection devices should not exceed the control lines range (see control modules specification).

POLON 6000 control panel configuration for non-distributed (traditional) architecture:

- 1 control panel node (main node):
  - 1 control panel PSO-60 (main control panel),
  - 1 power supply module MZ-60-XXX with MZP-60,
  - Functional modules (their number is limited by the power supply module wattage),
  - Mechanically connected OM-61, OM-62 enclosures (their number depends on the number of functional modules).

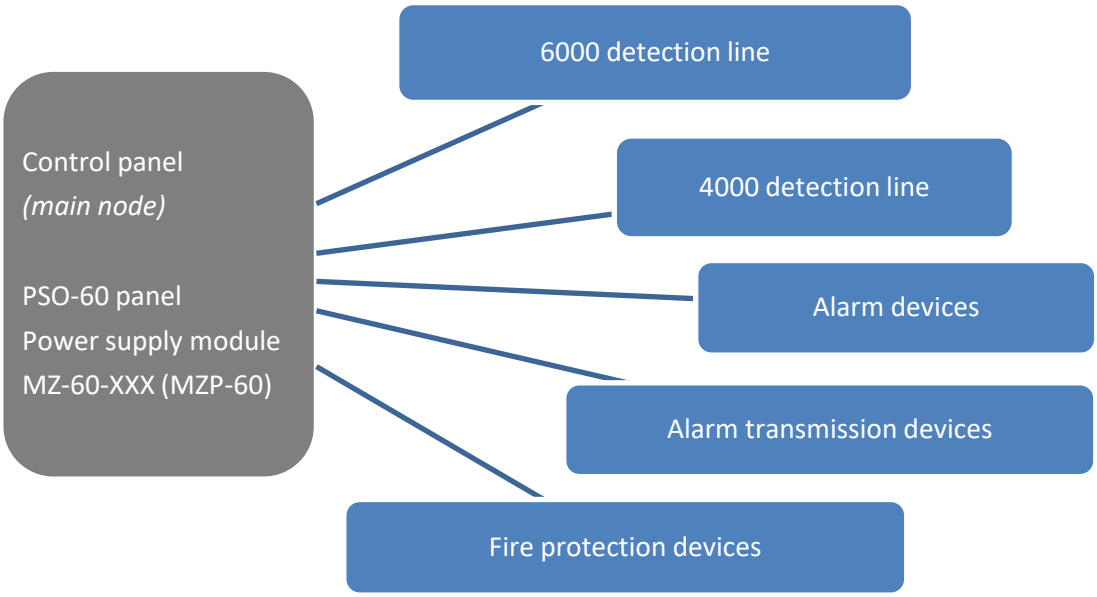


*Figure 2.2/1 Example configuration of POLON 6000 with **non-distributed (traditional) architecture***

2.3 Distributed Architecture

The architecture is distributed if the panel has more than one node.

- Distributed architecture should be used to protect objects of widespread architecture fulfilling the following conditions:
- The distance to the furthest monitored places exceeds the detection lines range (see line modules specifications).
- The distance to the furthest fire protection devices exceeds the control lines range (see control modules specification).
- The cost of the installation for inter-node communication is lower than the cost of several detection lines to remote parts of the protected facility.
- It is possible / justified to use fibre optic connection between distant parts of the protected facility.

POLON 6000 control panel configuration for distributed architecture:

- 1 main control panel node.
- Remote nodes (the maximum number of nodes is limited by the maximum number of MZP-60 power supply modules).
- 1 main operator panel PSO-60.
- Several operator panels PSO-60, working as remote terminals.
- Power supply modules MZ-60-XXX (number based on the number of nodes).
- The functional modules (their maximum number is limited by the maximum number of the given type modules and the maximum number of all modules).
- Mechanically connected OM-61, OM-62 enclosures (their number depends on the number of functional modules).

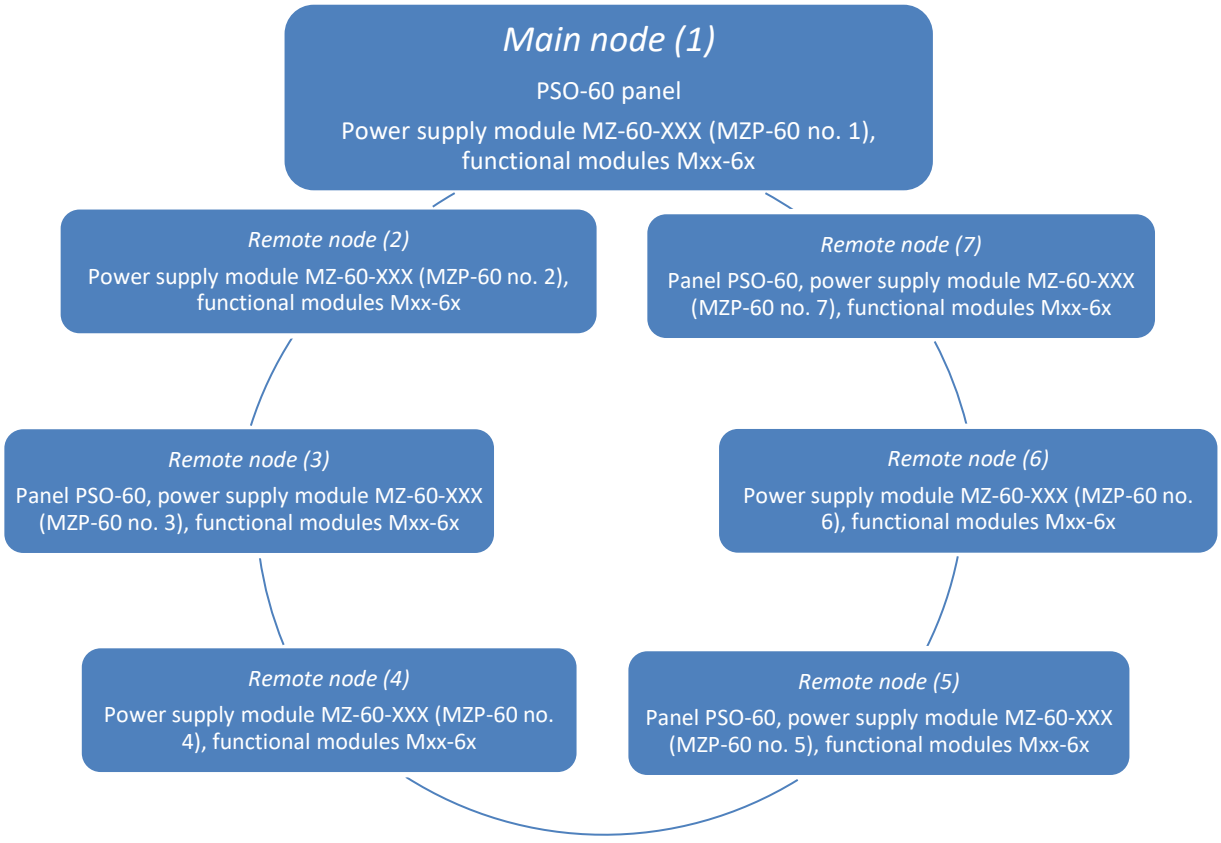


Figure 2.3/1 Example configuration of POLON 6000 with distributed architecture

3 Technical Specifications

3.1 Input Parameters

Table 3.1/1 Input parameters

Main supply voltage	230 V AC +10% -15%
The frequency of the main supply voltage	47 ... 63 Hz
Maximum supply current	< 7A at 115 V AC < 3.5A at 230 V AC
Operating temperature	- 5°C ... + 40°C
Backup power supply source	2 x 12V / 17 - 134Ah
Current drawn from the batteries during the stand-by depends on the control panel equipment	
PSO-60	450mA
MLD-61	173mA
MLD-62	153mA
MZP-60	45mA
MKS-60 MPK-60 MWS-60 MWK-60 MPW-61	15mA
MD-60 MTI-62	35mA
MTI-63	70mA

3.2 Output Parameters

Table 3.2/1 Output parameters

Control panel operating voltage	24V DC ± 25%
Continuous current available from the AC adapter:	
Power supply 150W	5A
Power supply 300W	10A

4 Resources

Table 4/1 POLON 6000 system resources

System	Distributed control panel	Networked
Control and functional modules		
The maximum number of all modules[1]	**900**	x 255 **(229,500)**
Maximum number of each type modules[1,2]	**99**	x 255 **(25245)**
The maximum number of line modules[1,2,3]	**198**	x 255 **(50490)**
Detection lines / Line components		
The maximum number of addressable detection lines in the system	**396**	x 255 **(100980)**
The maximum number of line components in detection line	**250** (POLON 6000 line) **127** (POLON 4000 line) **32** (conventional line - via ADC)	
The maximum number of line elements in the system[4]	**99000**	(x 255) **(25245000)**
Control outputs		
The maximum number of all control outputs supported in the system	**64000**	(x 255) **(16320000)**
The maximum number of potential free control outputs (PK) in detection line	**256** (POLON 6000 line) **160** (POLON 4000 line)	
The maximum number of potential free control outputs (PK) in functional modules[1]	**1000**	(x 255) **(255,000)**
The maximum number of potential control outputs in functional modules[1,5]	**600**	(x 255) **(153000)**
Control inputs		
The maximum number of all control inputs supported in the system	**64000**	(x 255) **(16320000)**
The maximum number of control inputs in detection line	**256** (POLON 6000 line) **160** (POLON 4000 line)	
The maximum number of control inputs in functional modules[1]	**1200**	(x 255) **(306,000)**
The recommended or maximum number of monitoring and control line components and signalling devices in detection lines of POLON 6000 and POLON 4000		
Max. recommended number of monitoring and control components EKS-6000 in POLON 6000 detection line	**64**	
Max. recommended number of SAW-6001/6006 signalling devices in POLON 6000 detection line	**64**	
Max. number of universal UCS 6000 control panels in POLON 6000/4000 detection line	**20**	

The maximum number of monitoring and control components EKS-4001 in POLON 4000 detection line	**32**
The maximum number of EWS-4001 multi-output components in POLON 4000 detection line	**20**
The maximum number of EWK-4001 multi-input components in POLON 4000 detection line	**20**
The maximum number of universal UCS 4000 control panels in POLON 4000 detection line	**20**

1) The number of modules in a given node is limited by power adapter wattage.
2) The number of modules of a given type is limited by the number of all modules.
3) 198 because there are two types of line modules: MLD-61 and MLD-62.
4) When only 127 components are used in the given line the maximum number of components for a single distributed control panel is 50292.
5) The number of potential outputs in a node is limited by the power supply wattage.

4.1 POLON 6000 System Components

Table 4.1/1 Components

Panel housing	Point 5
Power supply	MZ-60-300 MZ-60-150
Operator panel	PSO-60
Functional modules	MLD-61 - Module for 2 detection lines with converter MLD-62 - Module for 2 detection lines without converter MKS-60 - Input-output module (2 PK, 2 LS, 2 LK) MPK-60 - Relay inputs module (4 PK) MWS-60 - Signal inputs module (4 LS) MWK-60 - Control inputs module (8 LK) MPW-61 - Relay outputs module 230 V (2 PK, 2 LK) MTI-61 - Transmit module without separation MTI-62 - Transmission module with separation MTI-63 - Fibre optic transmission module MTS-60 - Network transmission module MD-60 - Printer module
6000 series line components	DUT-6046 - Universal smoke and heat detector DOP-6001 - Optical smoke detector EKS-6000 – Input-output element DTC-6046 - Universal smoke, heat and carbon monoxide detector TUN-6046 - Universal heat detector SAW-6000 - Voice or tone signalling device

Mounting accessories	SM-60 - Complete mounting rail for 4 MXX-6x modules: MM-60 - Support plate WP-61 and WL-62 - Upper rail brackets WP-63 and WL-64 - Lower rail brackets MGR-64 - Bus module LK-61-xxx - Connection wires of different lengths LK-62-035 -050 – Bus splitter wire

5 Control Panel Architecture

The control panel is hardware-configured by connecting and configuring housing elements and completing functional modules and connection wires.

Control panel configuration can be determined by index as follows:

P-6000-VWXYZ-ABCD-EFGH-IJKLM, where

P-6000 – System determinant;

VWXYZ – Enclosure, doors and power supply unit hardware configuration determinant;

ABCD– Configuration determinant of Mxx-6x functional modules for SM-60 upper mounting rail;

EFGH - Configuration determinant of Mxx-6x functional modules for SM-60 lower mounting rail;

IJKLM – Determinant of Mxx-6x additional functional modules (transmission and printer).

Table 5/1 Hardware configuration

Index	Housing component	Component type	CODE
V	Main enclosure body	KM-60	1
	Remote enclosure body	KS-61	2
	Batteries container body up to 134Ah	KA-61	3
	Batteries container body up to 90Ah	KA-62	4
W	Solid door	DM-61	1
	Door with hole	DO-61	2
	Remote enclosure door	DS-61	3
	Batteries container door up to 134Ah	DA-61	4
	Batteries container door up to 90Ah	DA-62	5
X	Upper rail	NO	0
		YES	1
Y	Lower rail	NO	0
		YES	1
Z	Power Supply	Lack	0
	Power supply MZ-60-300	300W	1
	Power supply MZ-60-150	150W	2
Index	**Functional module**	**Module type**	**CODE**
A B C D		Lack	0
	Detection lines module with 27V converter	MLD-61	1
	Detection lines module without converter	MLD-62	2
	Input-oputput element	MKS-60	3
E F G H	Relay outputs module	MPK-60	4
	Potential outputs module	MWS-60	5
	Control inputs module	MWK-60	6
	230V relay outputs module	MPW-61	7
Index	**Functional module**	**Module type**	**Number (pieces)**
And	Transmission module without separation	MTI-61	0
J	Transmission module with separation	MTI-62	0
K	Fibre optic transmission module	MTI-63	0-4
L	Printer module	MD-60	0-1
M	Network transmission module	MTS-60	0-1

5.1 Basic Enclosures OM-61 and OM-62 - VW Indices

There are two basic enclosure designs for POLON 6000 control panel: OM-61 and OM-62. Each of them contains KM-60 housing basic body. The second component is DM-61 (full) door for OM-61 enclosure and DO-61 (with hole for operator panel and printer) for OM-62 enclosure. The enclosure doors are equipped with safety locks protecting against unauthorised access. KM-60 body is the item in which functional modules and power supply module mounting rails may be fitted. In the body rechargeable batteries may also be fitted (max. 2 x 28Ah).

Basic bodies may be combined with each other to create double, triple and multiple enclosures.

The dimensions of the OM-61 and OM-62:

- 445 x 450 x 160 mm (w x h x d)
- 445 x 455,5 x 177,5 mm (w x h x d) overall dimensions with mounting hardware and lock.

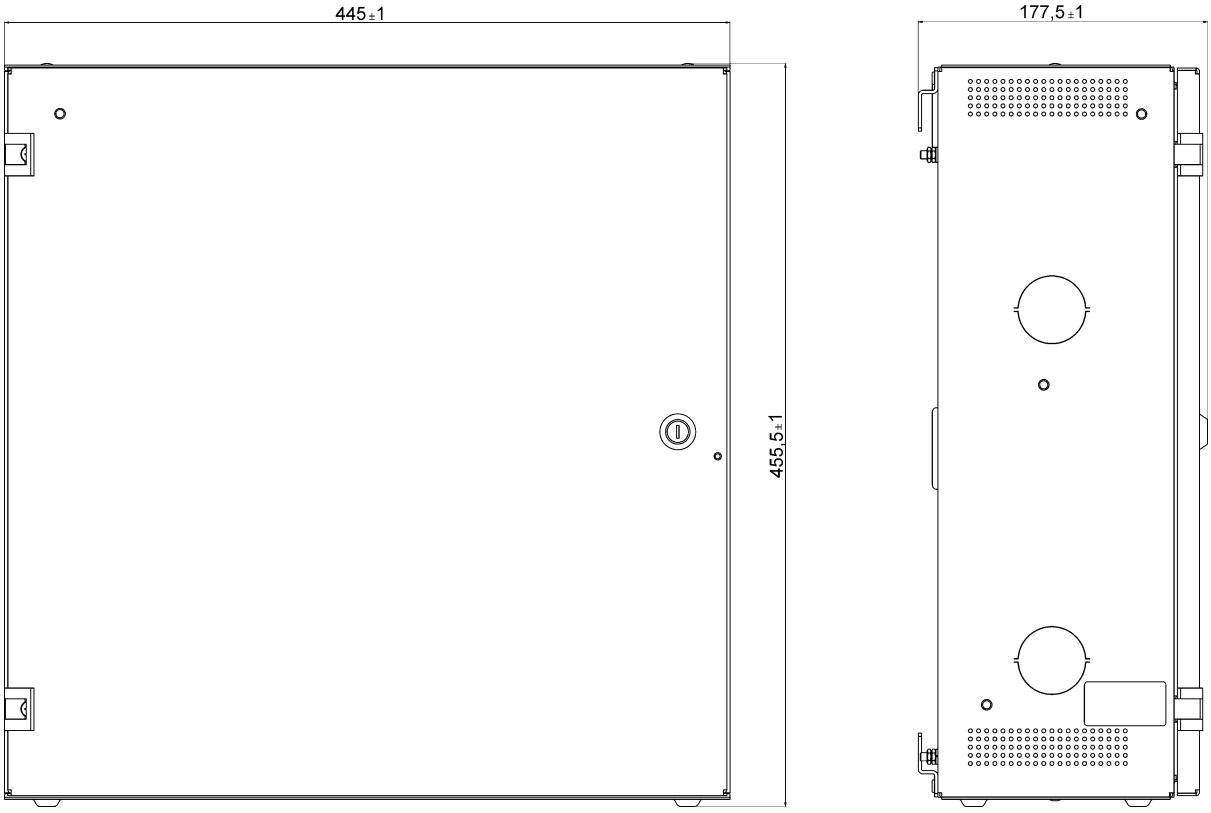


Figure 5.1/1 OM-61 housing - view and dimensions

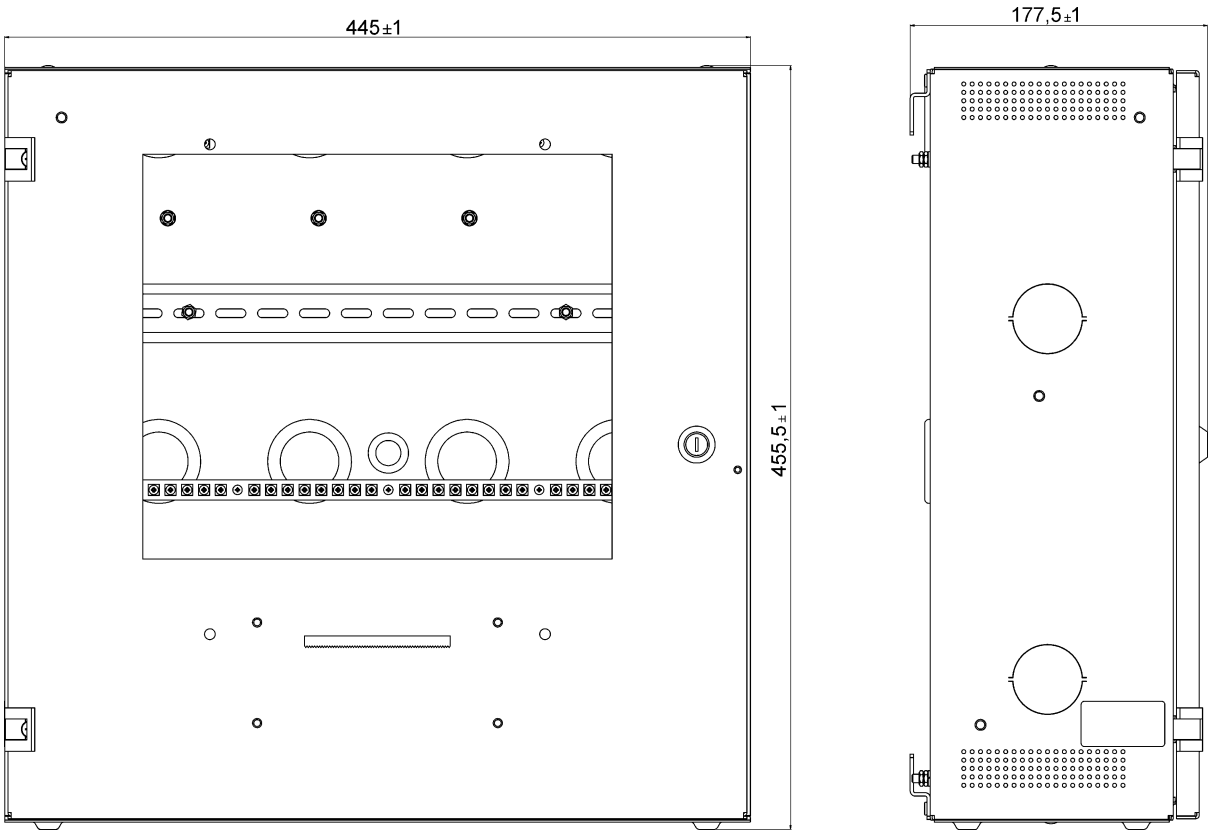


Figure 5.1/2 OM-62 housing - view and dimensions

5.2 Backup Batteries Container Enclosures OA-61 and OA-62

If the capacity of the backup rechargeable batteries exceeds 28Ah then larger batteries must be placed in additional housing OA-61 or OA-62. The bodies of KA-61 and KA-62 for OA-61 and OA-62 enclosures have the same width as KM-60 basic body. A connection wires harness is supplied with each OA-6x housing to connect rechargeable batteries. The positive wire has 19mm car type fuse socket installed.

Implementations:

- OA-61 for capacities up to 134Ah
  445 x 660 x 196 mm (w x h x d)
  445 x 682 x 199 mm (w x h x d) overall dimensions with feet and bracing
  (PA-6000-34000-0000-0000-00000)
- OA-62 for capacities up to 90Ah
  445 x 504 x 196 mm (w x h x d)
  445 x 522 x 199 mm (w x h x d) overall dimensions with feet and bracing
  (PA-6000-45000-0000-0000-00000)

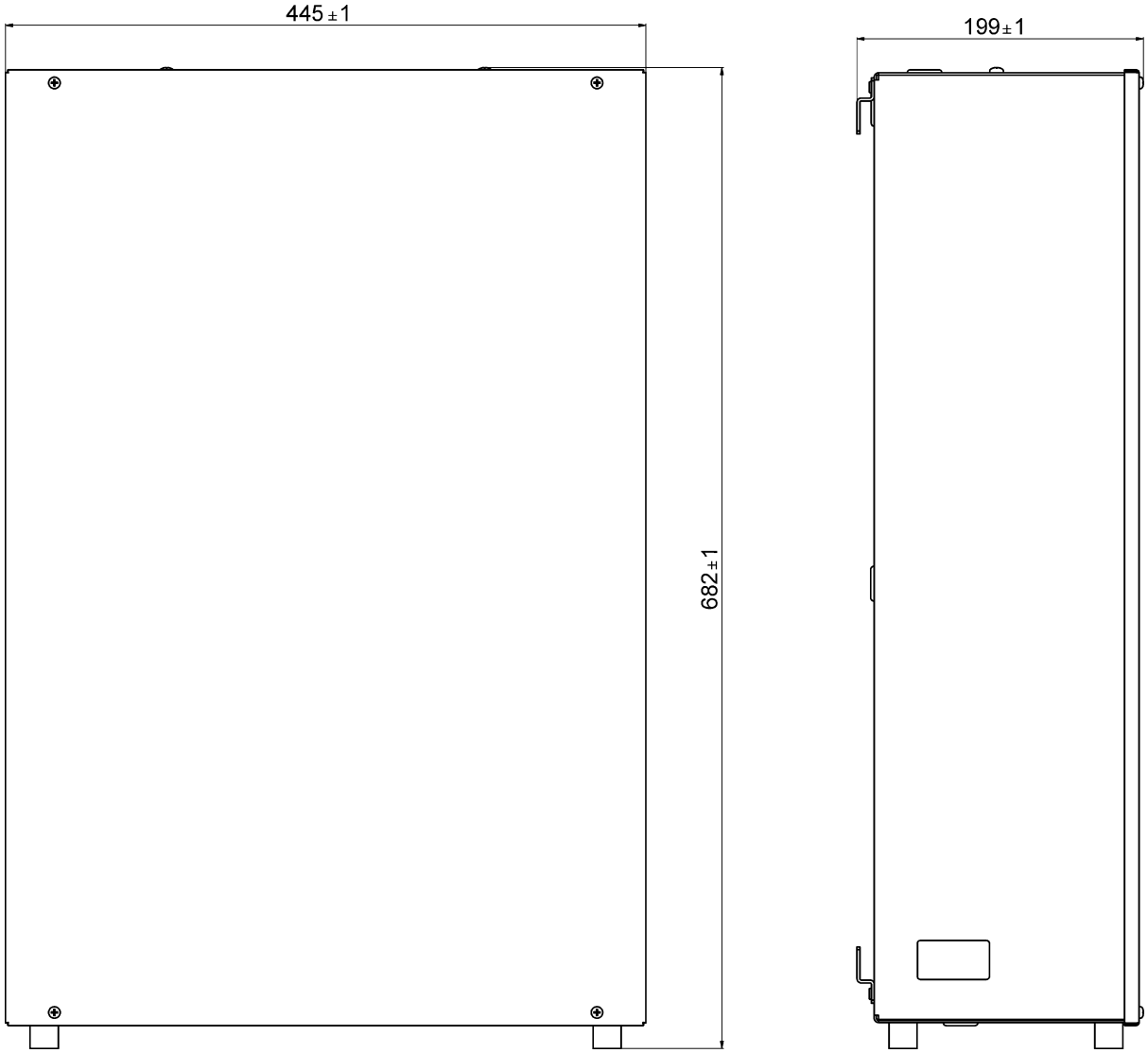


Figure 5.2/1 Housing OA-61 - view and dimensions

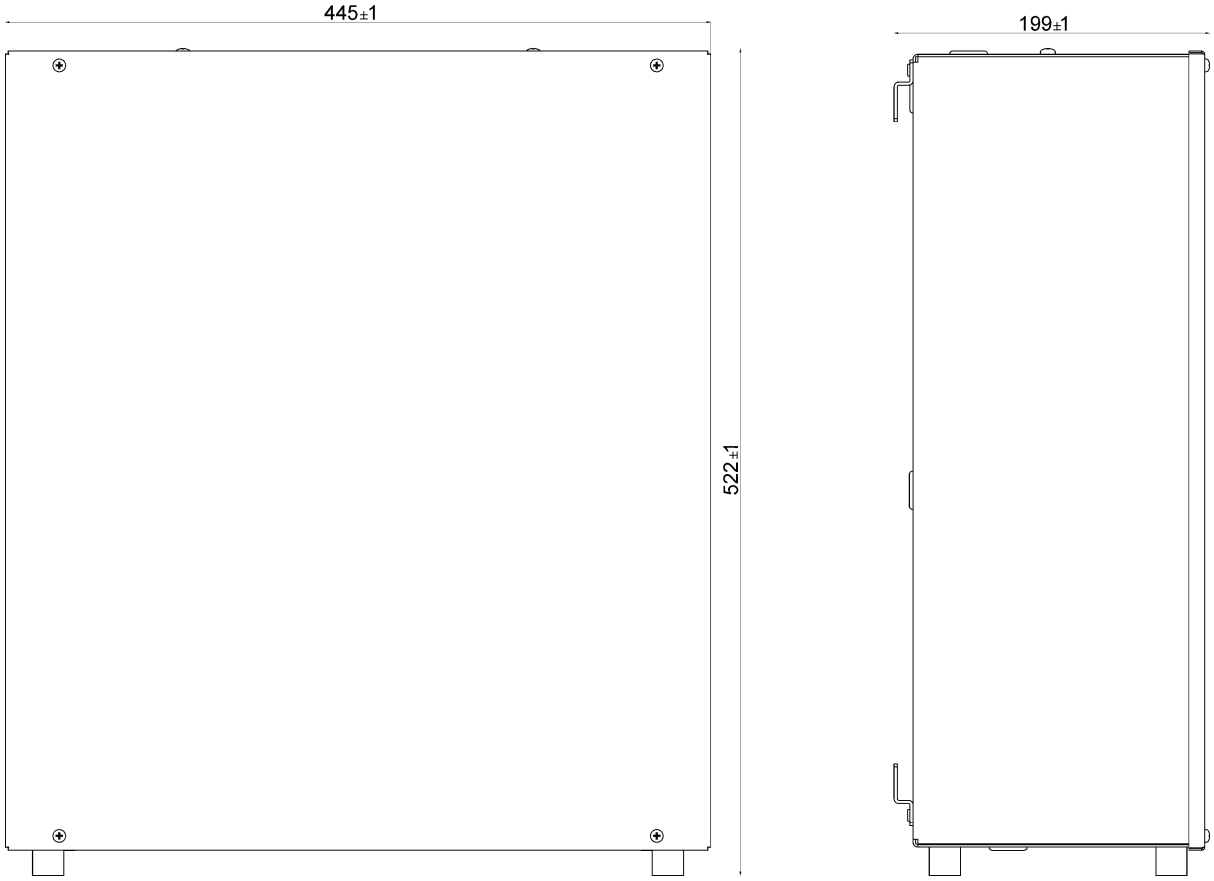


Figure 5.2/2 Housing OA-62 - view and dimensions

5.3 Special Enclosure OS-61 for PSF-60 Remote Operation Panel

If the main POLON 6000 node will need to be duplicated then it shall be possible to install the remote operator panel PSO-60 self-powered or without power supply in a dedicated housing OS-61 (PA-6000-23000-0000-0000-IJ000) consisting of KS-61 body and DS-61 door. Dedicated remote operating panel without power is designated as WPO-60. Depending its connection with 6000 system the remote panel in dedicated enclosure is equipped with transmission modules MTI-61 (1 piece) and MTI-62 (1 piece) (remote terminal as a final element on transmission bus or as an indirect element). WPO-60 remote operating panel may be placed 3m away from the node.

The dimensions of the OS-61:

- 350 x 336 x 89.5 (w x h x d)
- 350 x 336 x 96.5 (w x h x d) overall dimensions with bracing

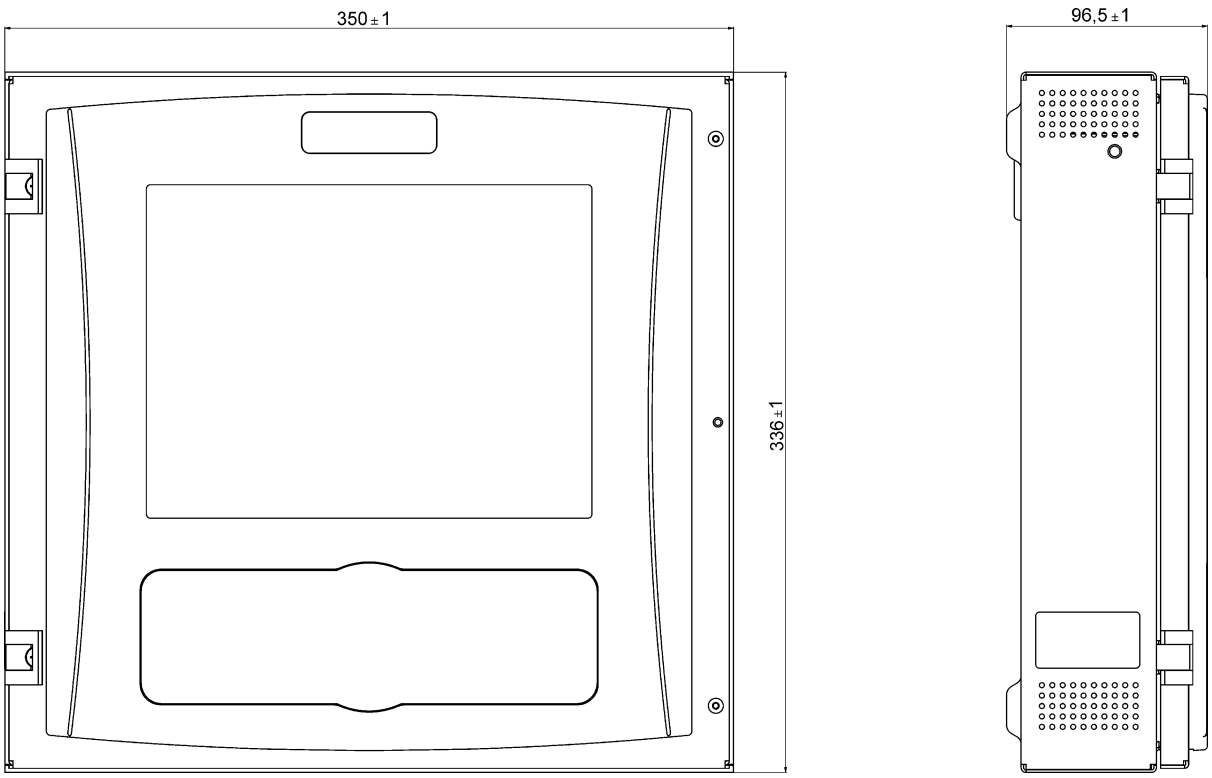


Figure 5.3/1 OS-61 housing for PSF-60 panel - view and dimensions

5.4 Mounting Rail SM 60 - XY Index

SM-60 mounting rail (400 x 150 mm) consisting of MM-60 support plate, MGR-64 bus module is used to install control panel functional modules. It may be installed in the upper section (index X) or the lower section (index Y) of KM-60 body for OM-61 or OM-62 housing. The design of the mounting rail allows to tilt it for easier access to installation wiring. To install the SM-60 rail at the top of the enclosure brackets WP-61 and WL-62 should be fitted, and to install it at the bottom of the enclosure brackets WP-63 and WL-64 should be used.

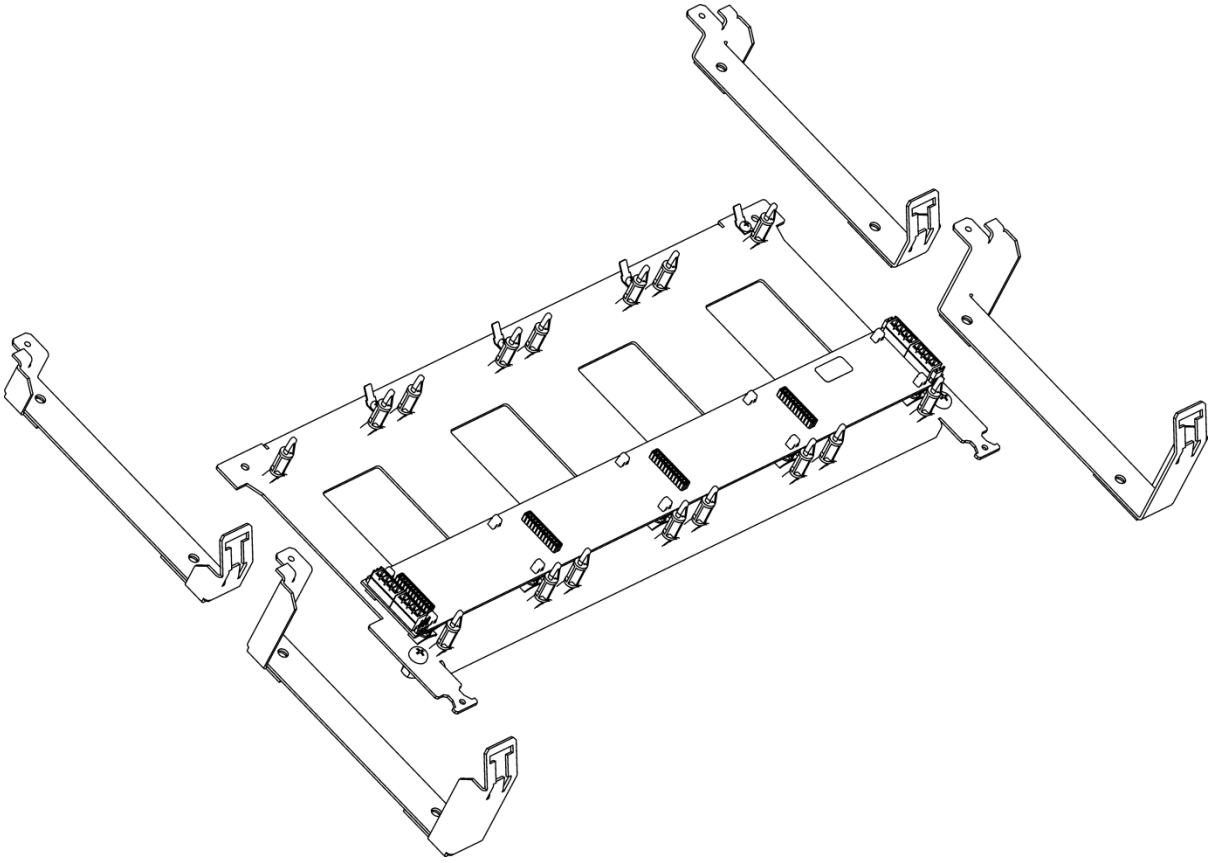


Figure 5.4/1 SM-60 mounting rail

(support plate MM-60, upper brackets WP-61 and WL-62, lower braces WP-63 and WL-64, MGR-64 bus)

5.4.1 Modules on a Mounting Rail SM-60 – Indices ABCD - EFGH

Modules on a top mounting rail SM-60 - determinant ABCD of the index:

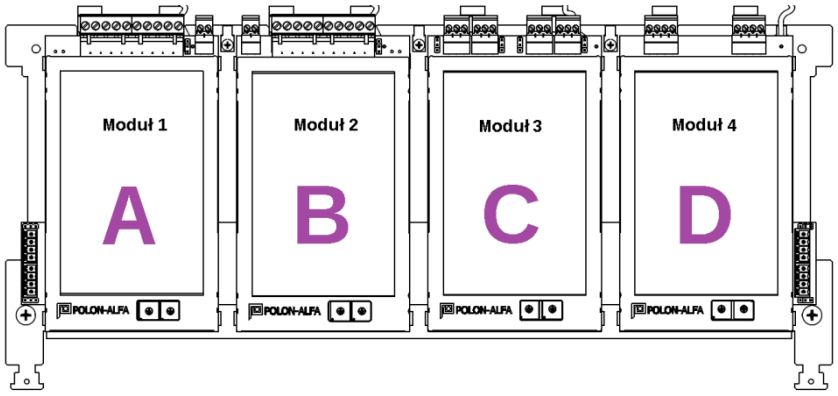


Fig. 5.4.1/1 SM-60 top mounting rail with modules - indices ABCD

Modules on a bottom mounting rail SM-60 - determinant EFGH of the index:

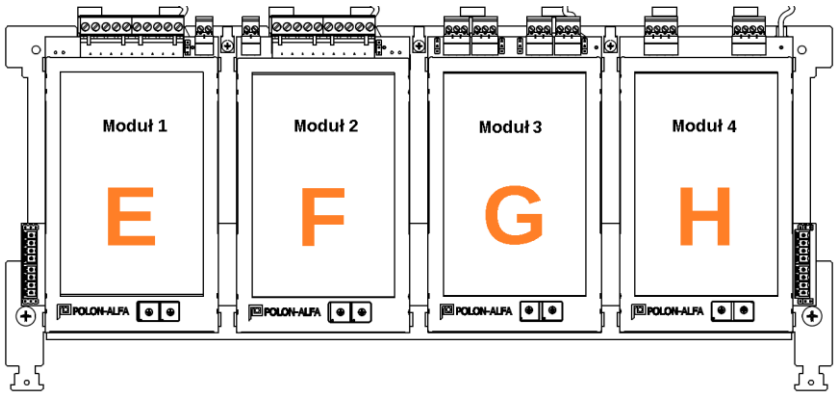


Fig. 5.4.1/2 SM-60 lower mounting rail with modules - indices EFGH

5.5 Power Supply MZ-60-xxx - index from

POLON 6000 control panel may be fitted with 150W (MZ-60-150) or 300W (MZ-60-300) power supplies.

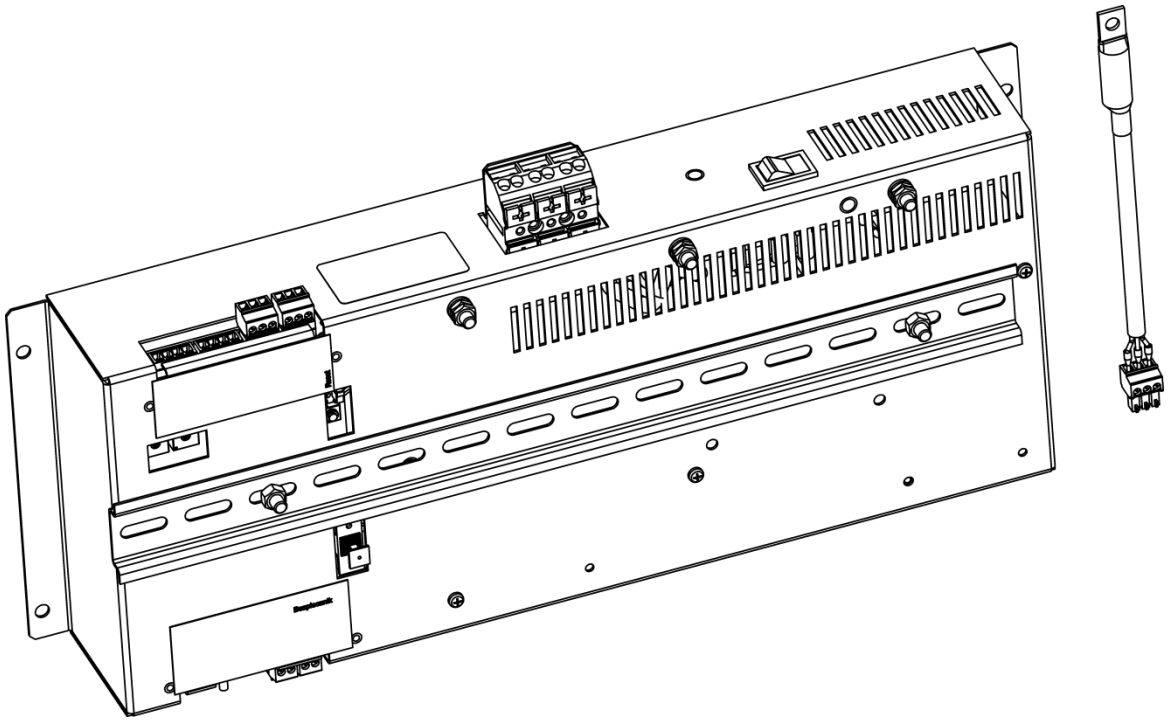


Figure 5.5/1 MZ-60-xxx power supply - index Z

5.6 Enclosure – Architecture, Equipment and Connections

OM-61 enclosure may be fitted with the following components:

- mounting rail SM-60 top (+ brackets WP-61, WL-62) and lower (+ brackets WP-63, WL-64);

- power supply MZ-60-xxx;

- up to eight functional modules MXX-6x;

- transmission modules MTI-61, MTI-62 or MTI-63;

- connection wires LK-61-xxx.

OM-62 enclosure may be fitted with the following components:

- operator panel PSO-60;

- printer MD-60;

- mounting rail SM-60 top (+ brackets WP-61, WL-62) and lower (+ brackets WP-63, WL-64);

- power supply MZ-60-xxx;

- up to eight functional modules MXX-6x;

- transmission modules MTI-61, MTI-62 or MTI-63;

- connection wires LK-61-xxx.

If there will be a printer module installed in OM-62 enclosure it will not be possible to install mounting rail SM-60 (with brackets WP-63, WL-64) and the power supply at the bottom of the enclosure.

In the OS-61 enclosure (remote operating panel for WPO-60) the following elements and components are installed:

- Operator panel PSO-60, 1 piece;

- Transmission modules MTI-61, 1 piece, MTI-62, 1 piece.

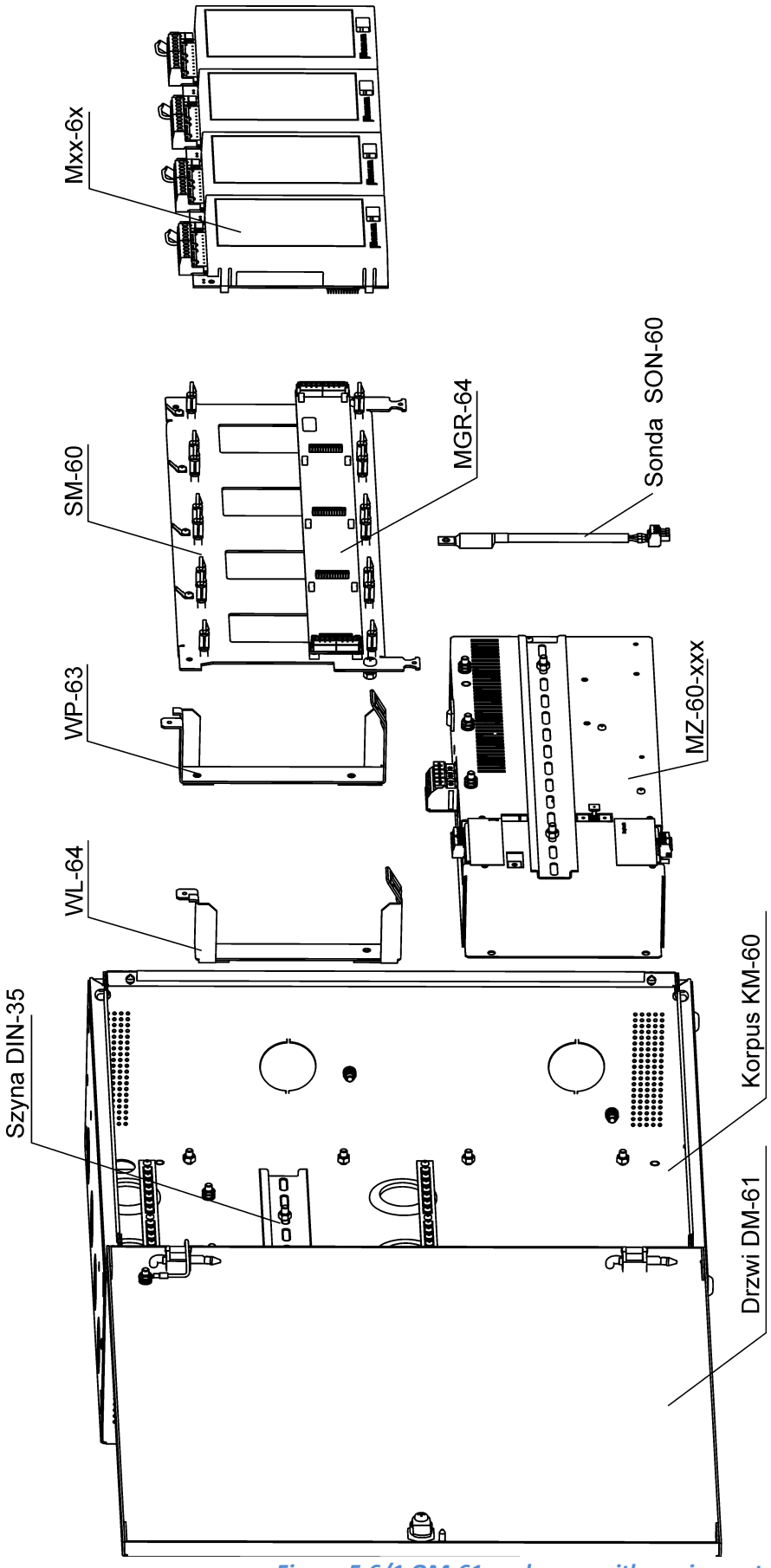


Figure 5.6/1 OM-61 enclosure with equipment

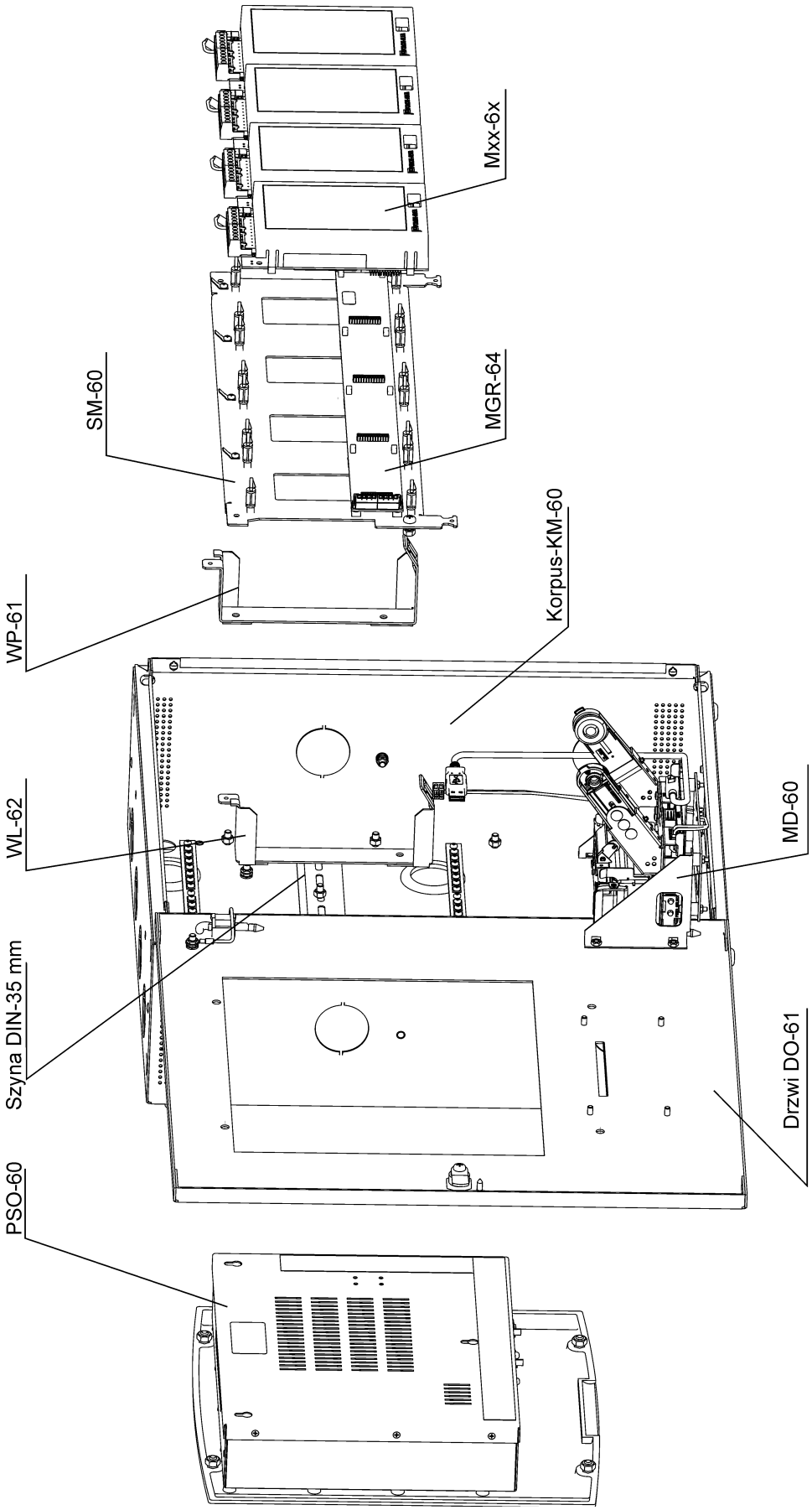


Figure 5.6/2 OM-62 enclosure with equipment

5.6.1 Typical Equipment Configurations

There are several possible combinations of enclosures equipment depending on the needs and the configuration of the site. The most typical are described below.

1. Index VWXYX - 12100

   Mounting rail SM-60 top + 4 modules Mxx-6x + operator panel PSO-60 + printer MD-60.

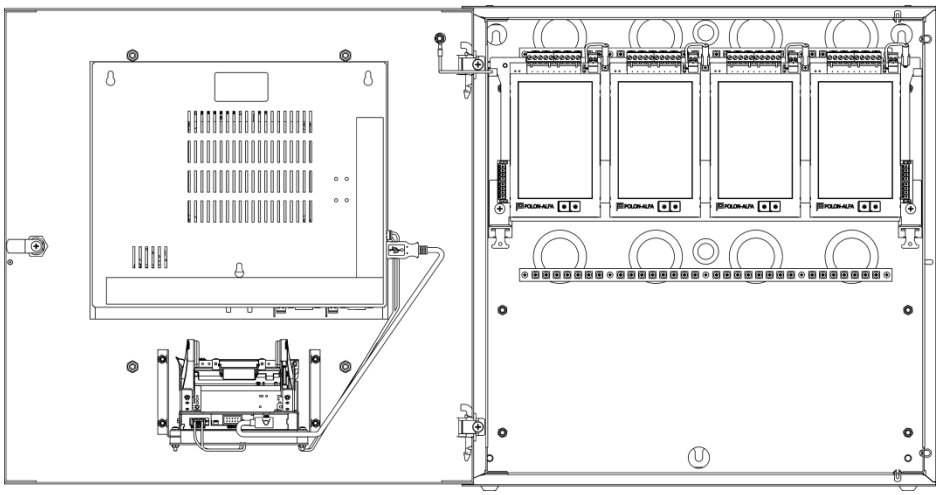


Fig. 5.6.1/1 Control panel P6000-12100-xxxx-0000-xxx1x

2. Index VWXYX - 12101, 12102

   Mounting rail SM-60 top + 4 modules Mxx-6x + operator panel PSO-60 + power supply MZ-60-150 or MZ-60-300.

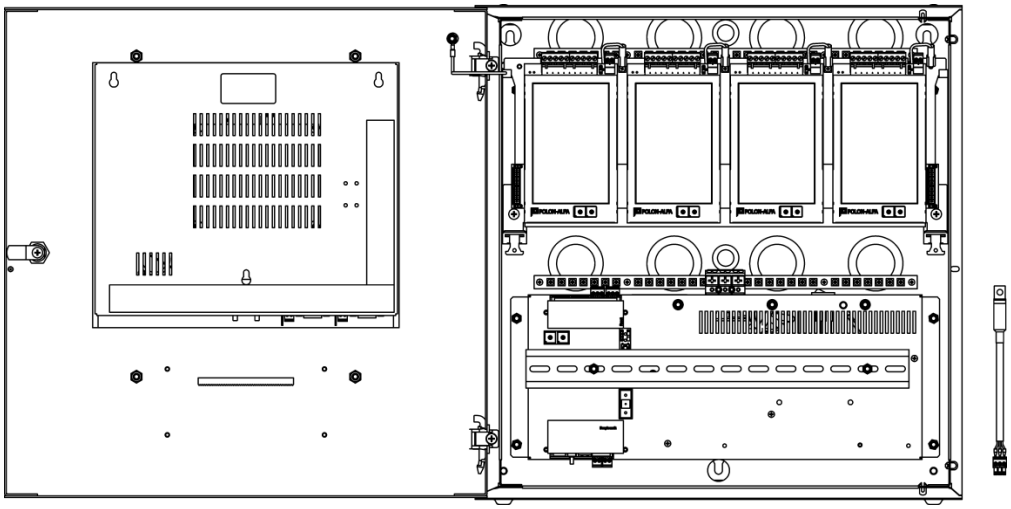


Fig. 5.6.1/2 Control panel P6000-12101-xxxx-0000-xxx0x or P6000-12102-xxxx-0000-xxx0x

3. Index VWXYX - 11101, 11102

   Mounting rail SM-60 top + 4 modules Mxx-6x + power supply MZ-60-150 or MZ-60-300 + batteries 17Ah (22Ah).

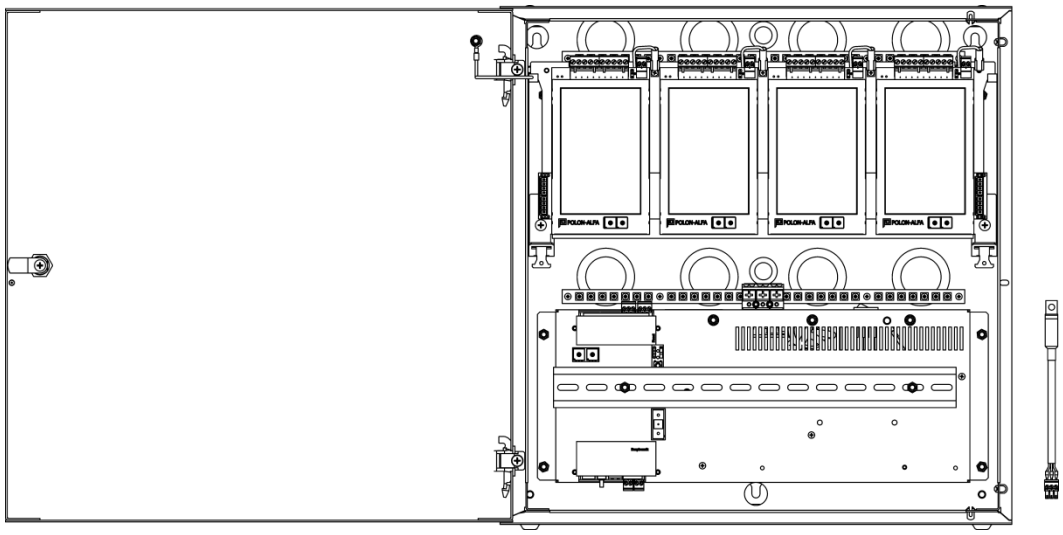


Fig. 5.6.1/3 Control panel P6000-11101-xxxx-0000-xxx0x or P6000-11102-xxxx-0000-xxx0x

4. Index VWXYX - 11110

   Mounting rail SM-60 top + SM-60 lower + 8 modules Mxx-6x.

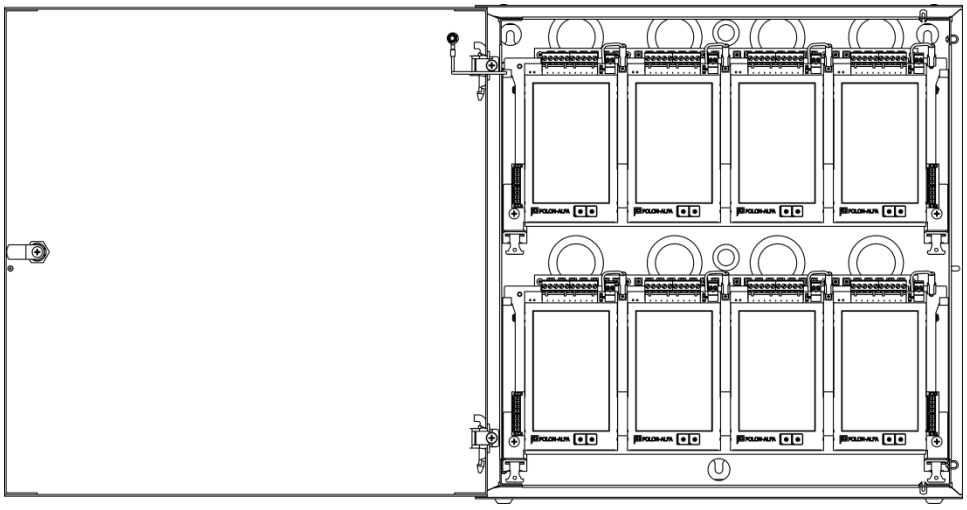


Fig. 5.6.1/4 Panel P6000-11110-XXXX-XXXX-XXX0x

5. Index VWXYX - 11001, 11002

   Power supply MZ-60-150 or MZ-60-300 + batteries 28Ah.

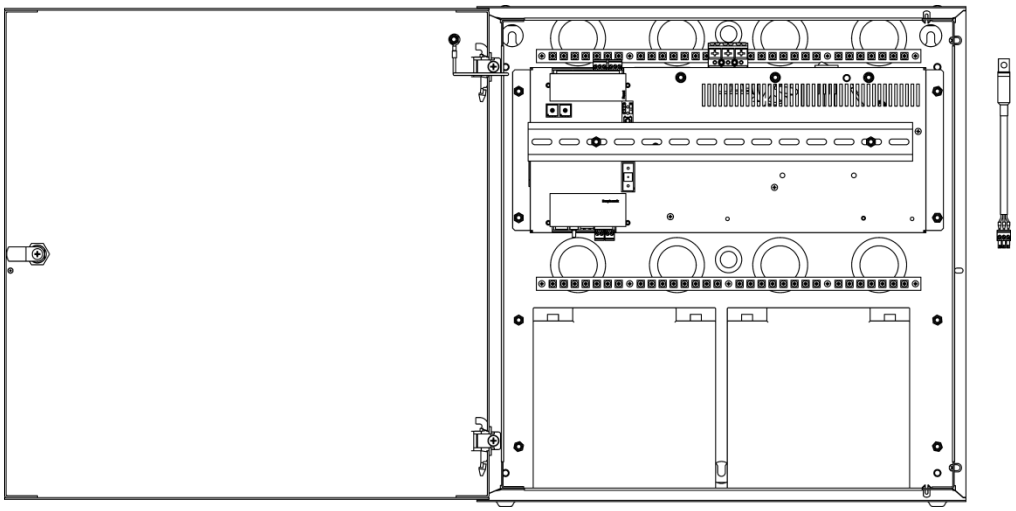


Fig. 5.6.1/5 Control panel P6000-11001-0000-0000-xxx0x or P6000-11002-0000-0000-xxx0x

6. Index VWXYX - 23000

   Remote operating panel WPO-60 (PSO-60 + MTI-61 + MTI-62).

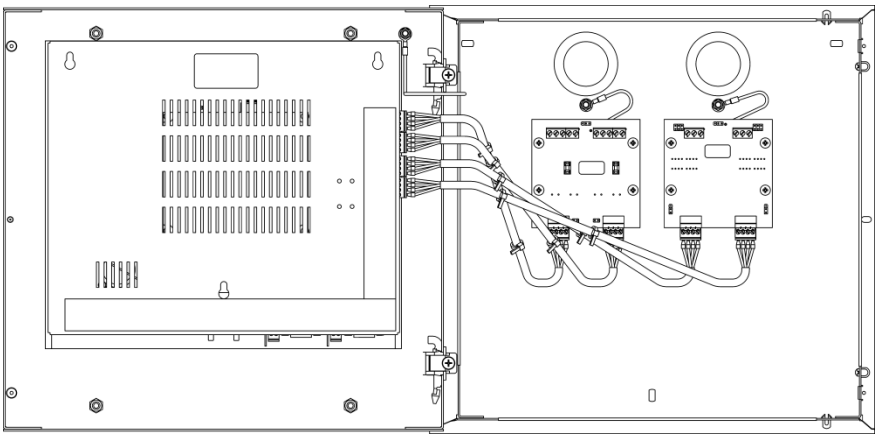
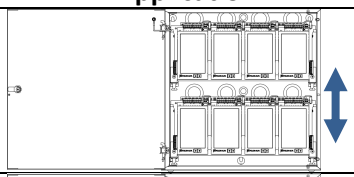
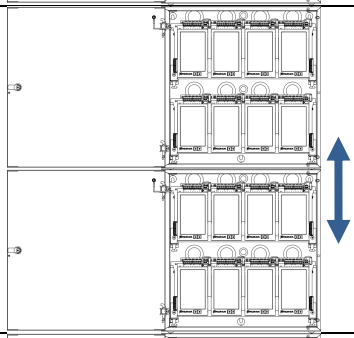
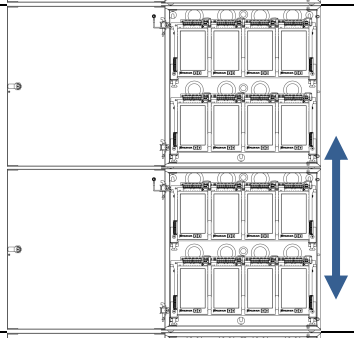
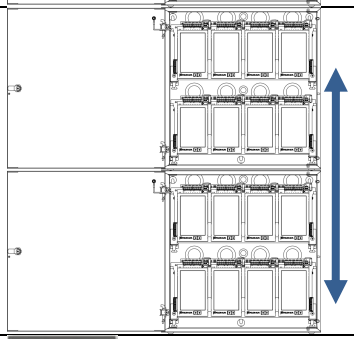
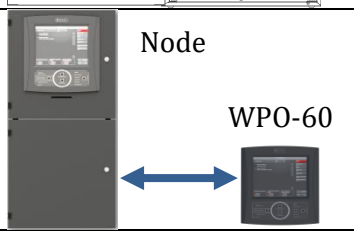


Fig. 5.6.1/6 Control panel P6000-23000-0000-0000-11000 (PSF-60)

5.6.2 Connection Wires LK-61-xxx and LK-62-xxx-xxx

The applied connecting wires (LK-61-xxx or LK-62-xxx-xxx) depend on the equipment of the enclosures and enclosure connections in POLON 6000 control panel nodes.

Table 5.6.2/1 Bus wires

Wire	Description	Application
LK-61-035 (2 pieces)	4-wire cable 35 cm long connecting: - Buses MGR-64 of mounting rails SM-60.	
LK-61-050 (2 pieces)	4-wire cable 50 cm long connecting: - Buses MGR-64 of mounting rails SM-60. - Operator panel PSO-60 with MGR-64 bus for mounting rail SM-60; - Bus MGR-64 for mounting rail SM-60 with power supply MZ-60-xxx.	
LK-61-070 (2 pieces)	4-wire cable 70 cm long connecting: - Buses MGR-64 of mounting rails SM-60.	
LK-61-090 (2 pieces)	4-wire cable 90 cm long connecting: - Buses MGR-64 of mounting rails SM-60.	
LK-61-320 (2 pieces)	5-wire cable 320 cm long connecting: - Remote operating panel WPO-60 with control panel node.	
LK-62-035-050 (2 pieces)	4-wire splitter 35/50 cm long connection: - Bus MGR-64 for mounting rail SM-60 with the MTI-61, MTI-62 or MTI-63 module and the power supply MZ-60-xxx.	

5.6.3 Combining Enclosure Bodies

Fig. 5.6.3/1 Combining Body Variants

6 Operator Panel PSO-60

The operator panel PSO-60 is a central element of the system and it is equipped with a friendly user interface (TouchPanel + LCD 10' 800x600). The central controller as a redundant system manages the entire fire protection system.

Figure 6/1 PSO-60 operator panel

PSO-60 operator panel consists of a display with touch panel, membrane keypad with buttons and indicators and two controllers:

- MCS-60 - the central controller module that manages and supervises the whole POLON 6000 control panel operation,
- MSR-60 – redundant controller module.

6.1 Central Controller Module MCS-60 (PSO-60)

The MCS-60 is the main, managing control panel module with configuration memory, RAM operating memory and program memory. It enables data exchange modules, controls operation of all circuits and collects all fault signals from lines.

Main controller communicates with modules via doubled communication bus using PBP-6000 protocol (Polon Bus Protocol). The bus may connect up to 99 modules of each type.
In the case of large facilities and wide area networks it is possible to create a ring by

connecting two bus ends in the main node module MCS-60 (PSO-60). The MCS-60 is supplied by two independent control panel power supply lines distributed by the transmission bus.

Current consumption of the PSO-60 is 450mA when supervising and 600mA in active mode (display on).

6.2 Redundant Controller Module MSR-60 (PSO-60)

The MSR-60 module acts as a spare controller in the event of fault to the central controller module MCS-60. In such case the MSR-60 takes over control and supervision of the system in accordance with EN 54-2.

6.3 User Interface

Most of the information is shown on the large 10" (600x800) colour display. The necessary (due to the requirements of EN 54-2 standard) and functional information is indicated by signal LEDs placed in the membrane keypad.

The control panel is operated by touch panel integrated with the display (Touch Panel).

Figure 6.3/1 User interface - keyboard + signalling devices

Buttons:

- ACKNOWLEDGE
- RESET
- SYSTEM STATUS READOUT
- DELAYS SETTING/
  PERSONEL MODE CHANGE

Signalling devices (LEDs):

- ACKNOWLEDGE
- RESET

- FIRE
- PRE-ALARM
- FAULT
- DISABLEMENT
- TESTING
- SERVICE

- II STAGE ALARM DELAY

- SYSTEM FAULT
- POWER

7 Functional Modules

Functional modules communicate with the main controller (MCS-60 in the main node) via doubled communication bus. Buses are distributed using transmission rail (MGR-64 module). Each module is designed to fit it onto transmission rail. All modules consist of hardware, independent for both buses, transmission direction controllers to prevent bus from being stuck in the event of faultfault to the unit. The modules are supplied by two independent supply lines, distributed via transmission rail.

All functional modules have identical dimensions and are adapted for installation on SM-60 mounting rail.

7.1 MLD-61 Detection Lines Module with 27V Line Voltage Converter

The detection lines module with 27V converter is a communication interface between the control panel and line components. The detection lines are supplied with isolated +27V voltage source. The module allows for 2 detection lines (loops) connection. It is equipped with connecting blocks with 27V to supply 1 additional line module MLD-62 (without converter) to extend the system to 4 detection lines (loops). Each line may be configured using the S1 (S2) jumper to work with higher or lower current efficiency and to provide higher or lower maximum permissible line resistance (length).

The module supports attached detection lines both in aloop layout - type A and in the radial layout - type B. In accordance with the applicable guidelines, the number of line elements in the radial layout should not exceed 32. Methods for connecting detection lines to MLD-61 module are shown in the figure below.

The control panel communicates via the system bus after setting appropriate module number (address) which must be set using 2 10-position switches- "x10" and "x1" before system commissioning.

Name	Purpose
1 -L1 2 + L1	Detection line 1 start input
3 -P1 4 +P1	Detection line 1 (loop) end input
5 E	Detection line 1 shield wire input
6 -L2 7 +L2	Detection line 2 start input
8 -P2 9 +P2	Detection line 2 (loop) end input
10 E	Detection line 2 shield wire input
11 -27V 12 +27V	Isolated 27V voltage output
S1, S2	Detection line 1 and 2 configuration jumpers setting load current value
S3	On/off jumper for grounding control system
x10 x1	Rotary switches fixing two digit module number: X10 - tens, x1 - units.

Figure 7.1/1 MLD-61 module

Table 7.1/1 Technical data - *MLD-61 module*

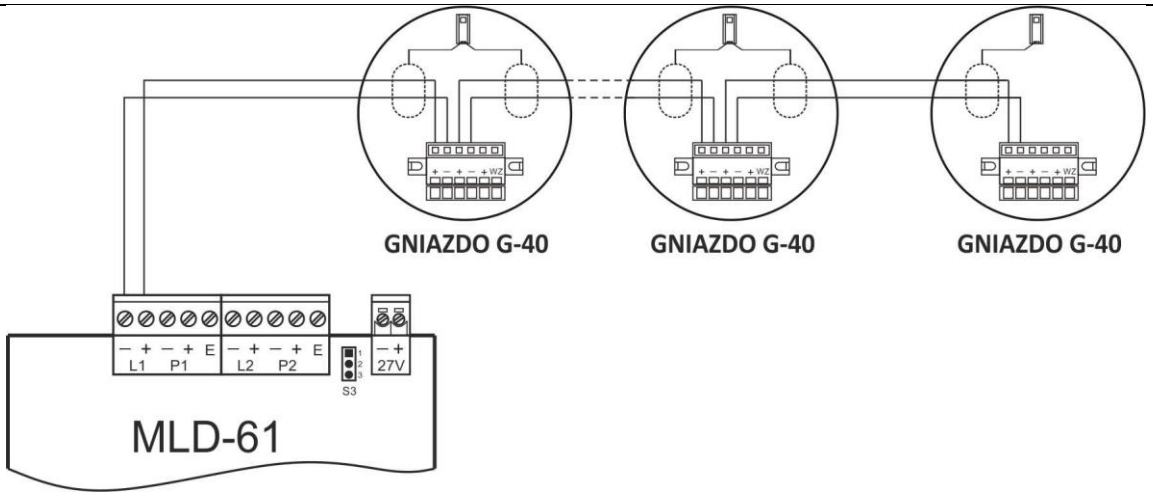
Mechanical and environmental specifications	
Dimensions	85 x 145 x 20 mm
Weight	Approx. 180 g
Operating temperature	-5 °C ÷ 40 °C

Storage temperature	-20 °C ÷ 70 °C
Permissible relative humidity	95 % non-condensing
Electrical specifications and values	
Operating voltage (module power supply)	24V DC ± 25 %
Maximum module current consumption Maximum current consumption with fully loaded lines	73mA (without line components) 173mA (lines 2 x 45Ω)
Maximum connecting wires cross section	2.5mm^2
Module addressing numbers setting range	1 ÷ 99
Maximum load current for detection line / Maximum resistance of the line wires depending on jumper settings: - jumper S1 (S2) in position 1-2 - jumper S1 (S2) in position 2-3 - jumper S1 (S2) in position 2-3	 50mA / 2 x 45Ω 20mA / 2 x 100Ω 22mA / 2 x 75Ω
The maximum line wires resistance between elements with shortcut isolators	40Ω
The maximum allowable line wires capacity	300nF
Minimum insulation resistance of installation wiring	100kΩ
The maximum number of addressable components in line: [1] - loop type - radial type	 250 32
The possibility of branches in the detection line: [2] - loop type - radial type	 Yes NO
Number of detection lines	2

[1] The maximum number of elements should be verified so as not to exceed the allowed load current of the line depending of the types of line components.

[2] Loop lines may have a single branches but two neighbouring branches should be separated by at least one addressable component. Branches are not recommended due to the one-direction power supply causing side line vulnerability to break or short circuit.

Detection line connection method in loop layout.



Detection line connection method in radial layout.

Figure 7.1/2 MLD-61 module - connections

7.2 MLD-62 Detection Lines Module without Line Voltage Converter

MLD-62 module provides a communication interface between the control panel and the line components, similar to MLD-61. This module extends number of detection lines. It can operate only with MLD-61 module with converter that generates isolates 27V voltage. Both modules are fitted with special connection blocks: 27V output in MLD-61 module and 27V input in MLD-62 module allowing for easy connection as shown in the figure below.

The module allows for 2 detection lines (loops) connection. Each line may be configured using the S1 (S2) jumper to work with higher or lower current capacity and to provide higher or lower maximum allowed line resistance (length). The module supports attached detection lines both in a closed loop layout - type A and in the radial layout - type B. In accordance with the applicable guidelines, the number of line components in the radial layout should not exceed 32.

The control panel communicates via the system bus after setting appropriate module number (address) which must be set using 2 10-position switches- "x10" and "x1" before system commissioning.

Name	Purpose
1 -L1 2 +L1	Detection line 1 start input
3 -P1 4 +P1	Detection line 1 (loop) end input
5 E	Detection line 1 shield wire input
6 -L2 7 +L2	Detection line 2 start input
8 -P2 9 +P2	Detection line 2 (loop) end input
10 E	Detection line 2 shield wire input
11 -27V 12 +27V	Isolated 27V voltage input (from MLD-61)
S1, S2	Detection line 1 and 2 configuration jumpers setting load current value
S3	On/off jumper for grounding control system
x10 x1	Rotary switches fixing two digit module number: X10 - tens, x1 - units.

Table 7.2/1 Technical data - *MLD-62 module*

Figure 7.2/1 MLD-62 module

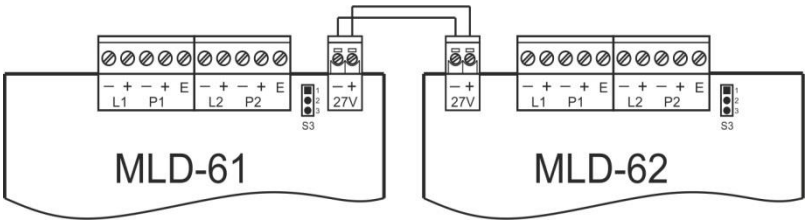
Mechanical and environmental specifications	
Dimensions	85 x 145 x 20 mm
Weight	Approx. 110 g
Operating temperature	-5 °C ÷ 40 °C
Storage temperature	-20 °C ÷ 70 °C
Permissible relative humidity	95 % non-condensing

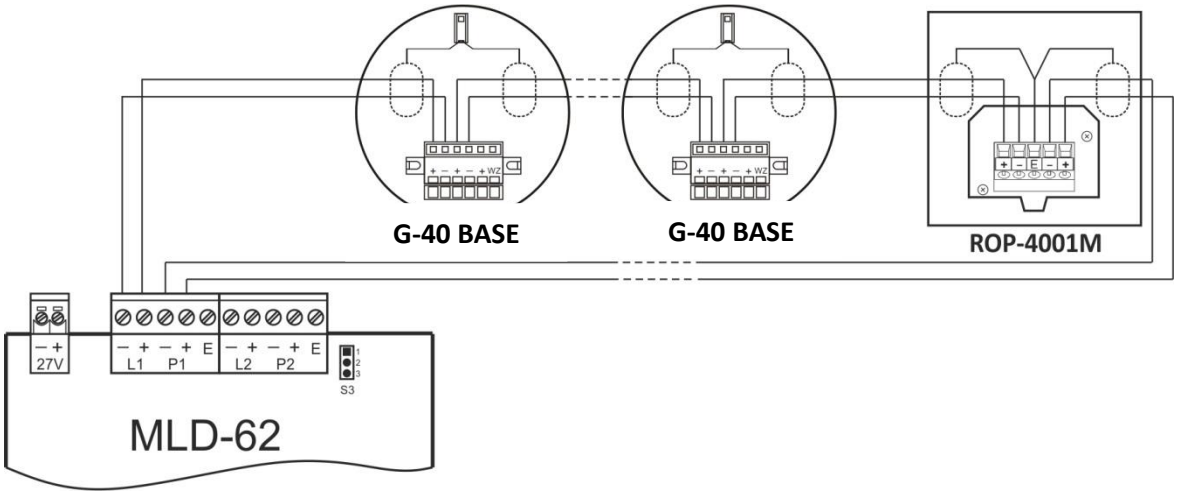
Electrical specifications and values	
Operating voltage (module power supply)	24V DC ± 25 %
Maximum module current consumption Maximum current consumption with fully loaded lines	53 mA (without line components) 153 mA (lines 2 x 45Ω)
Max. connecting wires cross section	2.5mm^2
Module addressing numbers setting range	1 ÷ 99
Maximum load current for detection line / Maximum resistance of the line wires depending on jumper settings: - jumper S1 (S2) in position 1-2 - jumper S1 (S2) in position 2-3 - jumper S1 (S2) in position 2-3	 50mA / 2 x 45Ω 20mA / 2 x 100Ω 22mA / 2 x 75Ω
The maximum line wires resistance between consecutive elements with shortcut isolators	 40Ω
The maximum allowable line wires capacity	300nF
Minimum insulation resistance of installation wiring	100kΩ
The maximum number of addressable elements in line: [1] - closed loop layout - radial layout	 250 32
The possibility of branches in the detection line: [2] - closed loop layout - radial layout	 Yes NO
Number of detection lines	2

[1] The maximum number of elements should be verified so as not to exceed the permissible load current of the line depending of the types of line components.

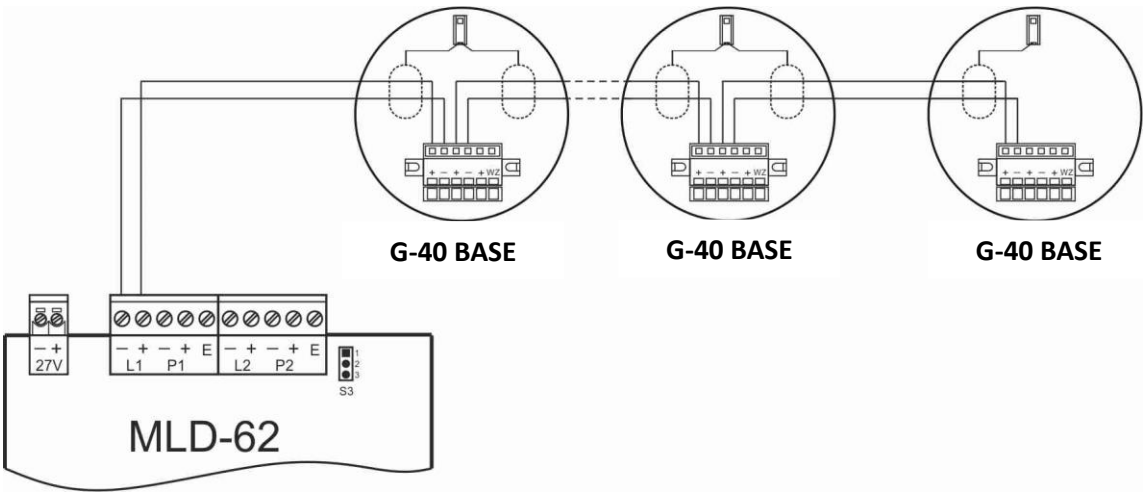
[2] Loop lines may have a single branches but two neighbouring branches should be separated by at least one addressable component. Branches are not recommended due to the one-direction power supply causing lack of branch immunity to open or short circuit

Method for 27V line voltage connection to MLD-61 module from MLD-61 module





Detection line connection method in loop layout.



Detection line connection method in radial layout.

Figure 7.2/2 MLD-62 module - connections

7.3 MKS-60 Input-output Module

Purpose of the MKS-60 module: optical signalling, acoustic signalling, diagnostics, control panel status visualization. Module equipment:

- 2 bistable potential-free relay outputs,
- 2 potential outputs,
- 2 input lines.

The relay control system is able to program safe contacts position for lack of power supply, i.e. safe state (fail-safe). Each relay output contains continuity control system that can be set on/off with jumpers S1, S2. Potential outputs consist of supervising system that detects open circuitry, shortcut and overloaded connected lines. The module number (address) is set using 2 10-position switches "x10" and "x1".

Name		Purpose
1	PK1-NC	Potential-free relay outputs
2	PK1-C	
3	PK1-NO	
4	PK2-NC	
5	PK2-C	
6	PK2-NO	
7	-LK1	Control lines inputs
8	+LK1	
9	-LK2	
10	+LK2	
11	-LS1	Potential outputs, supervised (signal lines)
12	+LS1	
13	-LS2	
14	+LS2	
S1, S2		On/off jumpers for PK output circuitry continuity control system
x10 x1		Rotary switches fixing two digit module number: X10 - tens, x1 - units.

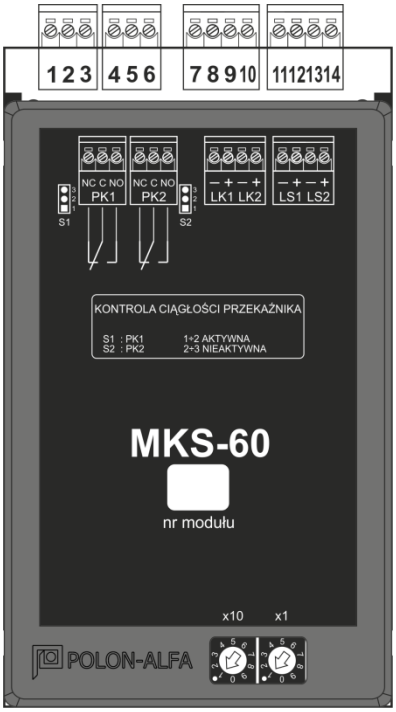


Figure 7.3/1 MKS-60 module

Table 7.3/1 Technical data - *MKS-60 module*

Mechanical and environmental specifications	
Dimensions	85 x 145 x 20 mm
Weight	Approx. 120 g
Operating temperature	-5 °C ÷ 40 °C
Storage temperature	-20 °C ÷ 70 °C

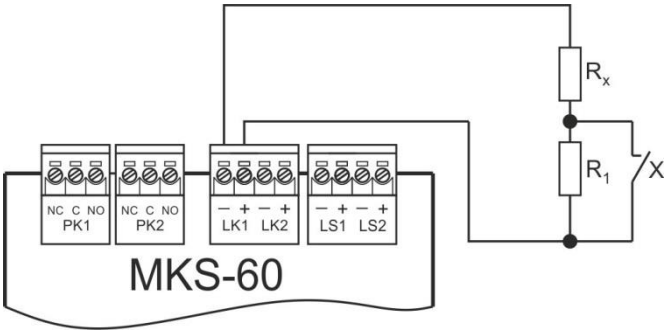
Permissible relative humidity	95 % non-condensing
Electrical specifications	
Operating voltage (module power supply)	24V DC ± 25 %
Maximum current consumption of the module - supervising / alarming	15mA / 35mA (outputs without load)
Maximum connecting wires cross section	1.5 mm^2
Module addressing numbers setting range	1 ÷ 99
Potential-free output relay PK1, PK2	
Maximum relay contacts current / voltage	1A / 30V
Circuit continuity system control current [1)]	typical 0.5mA
Potential outputs, supervised LS1, LS2	
Output voltage	24V DC ± 25 %
Maximum current load (when activated)	0.5 A (per output)
Control current value (supervision mode)	typical 0.3mA
Maximum wire resistance [2)]	50Ω
Termination resistor R value $_k$	6.2k Ω
Control lines inputs LK1, LK2	
Control current value	typical 0.3mA
Maximum wiring resistance	100Ω
Characteristic resistors values: [3)] - normal status (R_1 + R_X) - active state X (R_X) - active state Y (R_Y)	 4.3kΩ +2kΩ = 6.3kΩ ±10 % 2kΩ ±10 % 750Ω ±10 %
Control line failure signalling resistance (open, short)	R_{line}>27kΩ R_{line}<240Ω

[1)] Circuit continuity control PK1/PK2 is activated when the jumper S1/S2 is in pos. 1-2. Continuity control current is drawn from external controlled circuit.

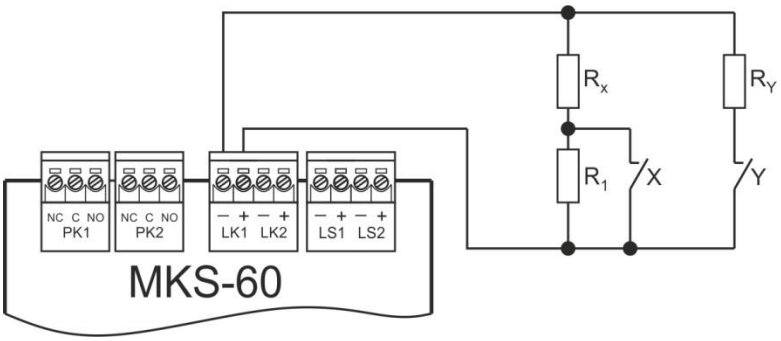
[2)] Depending on the load current when activated, the wire resistance should be accordingly limited due to permissible voltage drop.

[3)] For the given resistor values the normal condition and the X active status may be swapped depending on the NO or NC input configuration. The R_Y resistor is available only with 2-state input operating mode.

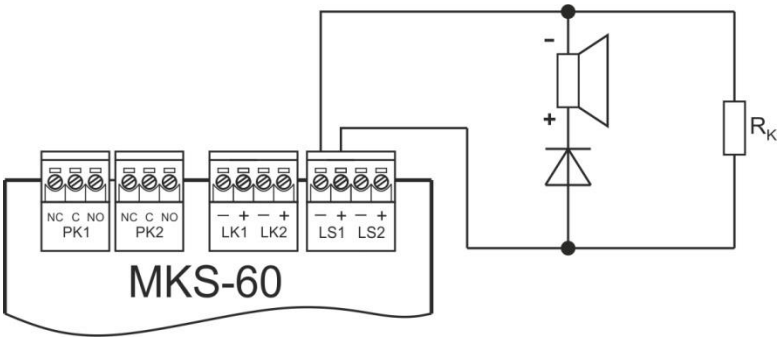
The input line connection method for 2-state system:
- normal status,
- X active status - shortcut X contact
(with line opens and shorts detection)



The input line connection method for 3-state system:
- normal status,
- X active state - X contact shortcut,
- Y active state - Y contact shortcut,
(with line opens and shorts detection)



LS1 signalling line connection layout to control beeper or other alarm device realizing circuit health check feature. In the case of parallel connections for alarm devices branches, only one terminating resistor R_K should be connected to the furthest device at the end of the line.



Example of the relay output connections layout with circuit continuity control system connected to PK 1 contacts (jumper S1 in position 1-2).

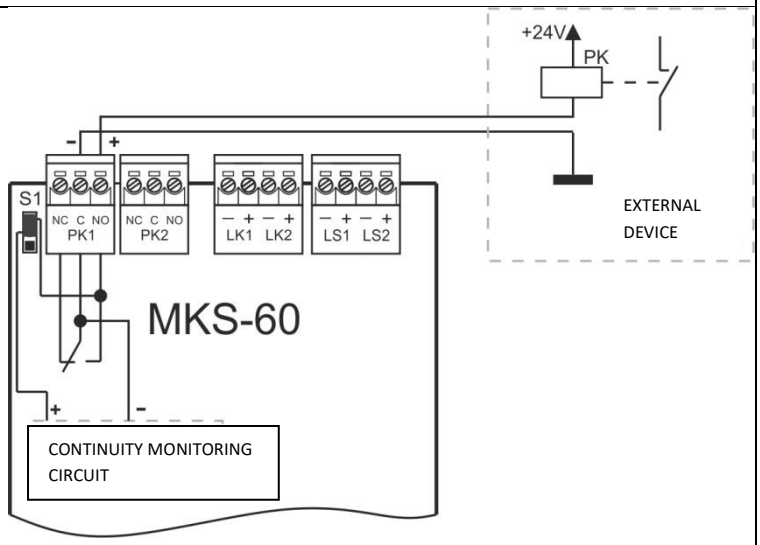


Figure 7.3/2 MKS-60 module - connections

7.4 MPK-60 Relay Outputs Module (4 Outputs)

The MPK-60 module is equipped with 4 programmable, universal relay outputs to control external devices. It is fitted with bistable relays allowing to program safe contacts position in the case of power loss, i.e. safe state (fail-safe). Each relay output contains continuity control system that can be set on/off with jumpers S1, S2.

The module number (address) is set using 2 10-position switches "x10" and "x1".

Name	Purpose
1 PK1-NC 2 PK1-C 3 PK1-NO 4 PK2-NC 5 PK2-C 6 PK2-NO 7 PK3-NC 8 PK3-C 9 PK3-NO 10 PK4-NC 11 PK4-C 12 PK4-NO	Relay potential-free outputs with ability to enable control feature for continuity of the circuit attached to relay contacts
S1, S2, S3, S4	On/off jumpers for PK output circuitry continuity control circuit
x10 x1	Rotary switches fixing two digit module number: X10 - tens, x1 - units.

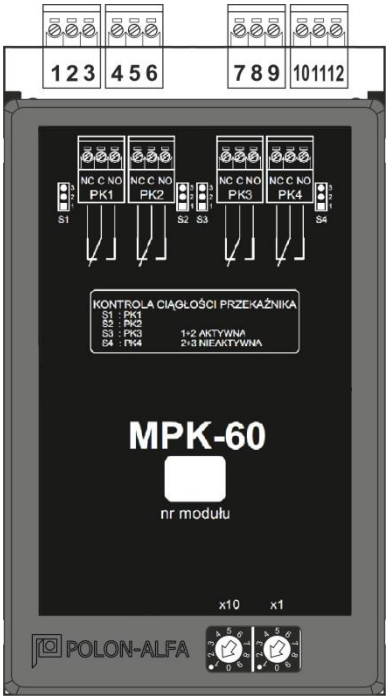


Figure 7.4/1 MKS-60 module

Table 7.4/1 Technical data - *MPK-60 module*

Mechanical and environmental specifications	
Dimensions	85 x 145 x 20 mm
Weight	Approx. 120 g
Operating temperature	-5 °C ÷40 °C
Storage temperature	-20 °C ÷ 70°C
Permissible relative humidity	95 % non-condensing
Electrical specifications	
Operating voltage (module power supply)	24V DC ± 25 %

Maximum current consumption of the module - supervising / alarming	15 mA / 15 mA
Maximum connecting wires cross section	1.5 mm^2
Number of module address numbers	1 ÷ 99
Number of relay outputs	4
Maximum relay contacts current / voltage	1A / 30V
Circuit continuity system control current [1)]	typical 0.5 mA

[1)] Circuit continuity control PK1/PK2/PK3/PK4 is activated when the jumper S1/S2/S3/S4 is in pos. 1-2. Continuity control current is drawn from external controlled circuit.

Example of the PK1 relay output connections layout with circuit continuity control system (jumper S1 in position 1-2).

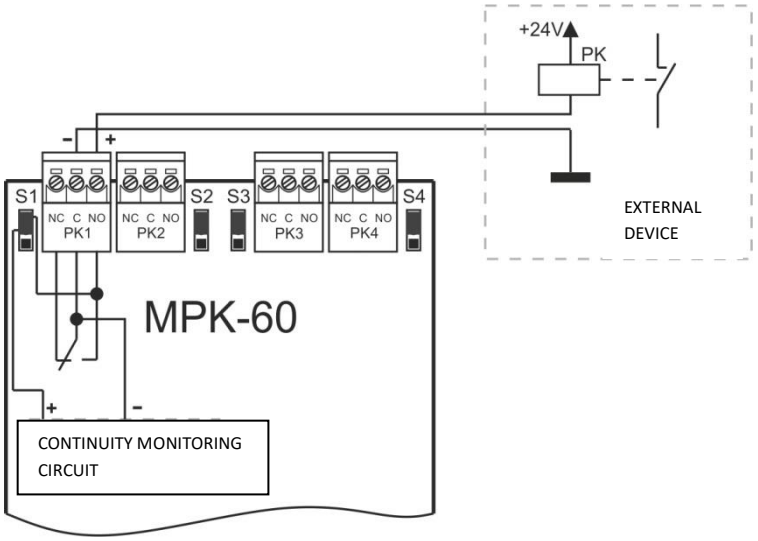


Figure 7.4/2 MPK-60 module - connections

7.5 MWS-60 Signal Outputs Module (4 Outputs)

The MWS-60 allows to control the signalling devices. It is equipped with 4 potential outputs containing the supervision circuit that allows to detect an open circuit, shortcut or overloaded connected lines.

The module number (address) is set using 2 10-position switches "x10" and "x1".

Name	Purpose
1 -LS1 2 +LS1 3 -LS2 4 +LS2 5 -LS3 6 +LS3 7 -LS4 8 +LS4	Supervised potential outputs (signal lines)
x10 x1	Rotary switches fixing two digit module number: X10 - tens, x1 - units.

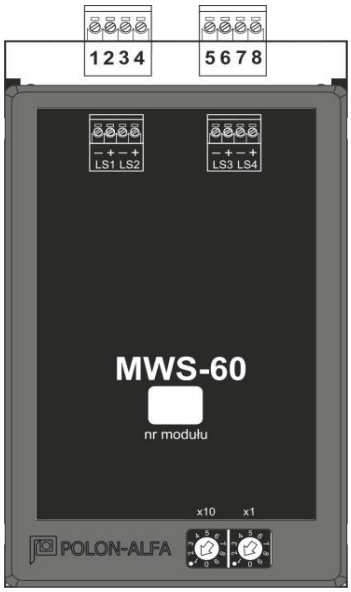


Figure 7.5/1 MWS-60 module

Table 7.5/1 Technical data - *MWS-60 module*

Mechanical and environmental specifications	
Dimensions	85 x 145 x 20 mm
Weight	Approx. 120 g
Operating temperature	-5 °C ÷ 40 °C
Storage temperature	-20 °C ÷ 70 °C
Permissible relative humidity	95 % non-condensing
Electrical specifications	
Operating voltage (module power supply)	24V DC ± 25 %
Maximum current consumption of the module - supervising / alarming	15mA / 54 mA (outputs without load)
Maximum connecting wires cross section	1.5 mm^2

Module addressing numbers setting range	1 ÷ 99
Number of potential exits	4
Output voltage	24V ±25 % DC
Maximum current load (when activated)	0.5A (per output)
Control current value (supervision mode)	typical 0.3 mA
Maximum wire resistance [1)]	50Ω
Termination resistor value R_K	6.2k Ω

1) Depending on the load current when activated, the wire resistance should be accordingly limited due to permissible voltage drop.

Signalling line connection layout to control sounder or other alarm device realizing circuit continuity check feature. In the case of parallel connections for alarm devices, only one terminating resistor R_K should be connected at the end of the line.

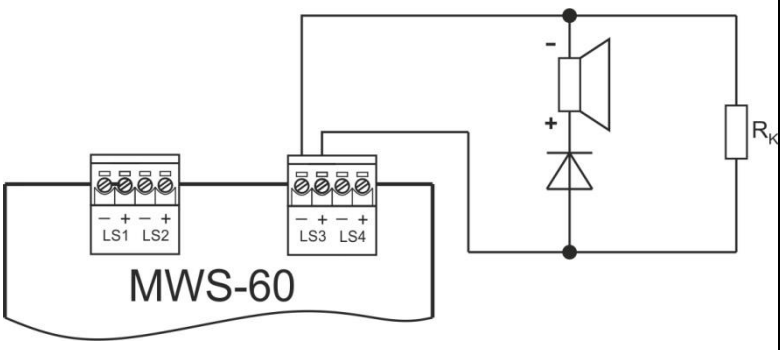


Figure 7.5/2 MWS-60 module - connections

7.6 MWK-60 Control Inputs Module (8 Inputs)

The MWK-60 allows supervision of devices connected to the system using input lines state analysis. It is equipped with 8 control lines inputs which may be operated in 2 states (normal state and active state) or 3 states (normal state and 2 active states) analysis mode. The status of the control line is determined by the resistance value of the line connected to the input terminals. The module number (address) is set using 2 10-position switches "x10" and "x1".

Name	Purpose
1 -LK1 2 +LK1 3 -LK2 4 +LK2 5 -LK3 6 +LK3 7 -LK4 8 +LK4 9 -LK5 10 +LK5 11 -LK6 12 +LK6 13 -LK7 14 +LK7 15 -LK8 16 +LK8	Input lines
x10 x1	Rotary switches fixing two digit module number: X10 - tens, x1 - units.

Figure 7.6/1 MWK-60 module

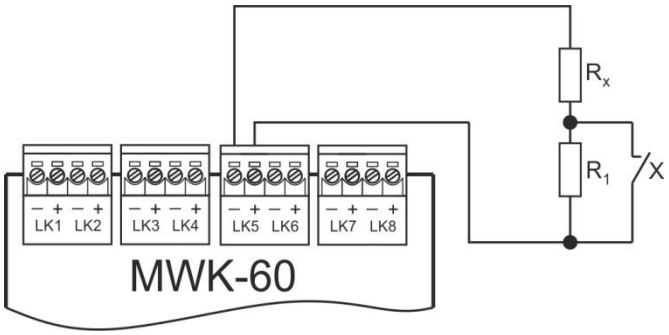
Table 7.6/1 Technical data - *MWK-60 module*

Mechanical and environmental specifications	
Dimensions	85 x 145 x 20 mm
Weight	Approx. 120 g
Operating temperature	-5 °C ÷ 40 °C
Storage temperature	-20 °C ÷ 70 °C
Permissible relative humidity	95 % non-condensing
Electrical specifications	
Operating voltage (module power supply)	24V DC ± 25 %

Maximum current consumption of the module - supervising / alarming	15 mA / 15mA
Maximum connecting wires cross section	1.5 mm^2
Module addressing numbers setting range	1 ÷ 99
Control current value	typical 0.3 mA
Maximum wiring resistance	100Ω
Characteristic resistors values: [1)] - normal status ($R_1 + R_X$) - active state X (R_X) - active state Y (R_Y)	 4.3kΩ +2kΩ = 6.3kΩ ±10 % 2kΩ ±10 % 750Ω ±10 %
Control line failure signalling resistance (open, short)	R_{line}>27kΩ R_{line}<240Ω

[1)] For the given resistor values the normal condition and the X active status may be swapped depending on the NO or NC input configuration. The R_Y resistor is available only with 3-state analysis of input operation.

The control line connection method for 2-state system:
- normal status,
- X active status - shortcut X contact
(with line opens and shorts detection)



The control line connection method for 3-state system:
- normal status,
- X active state - X contact shortcut,
- Y active state - Y contact shortcut,
(with line opens and shorts detection)

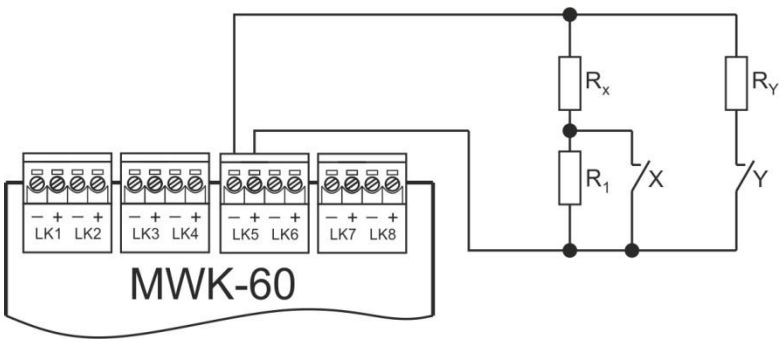


Figure 7.6/2 MWK-60 module - connections

7.7 NOW-61 Module with 230V Relay Outputs

The high-voltage relays module MPW-61 allows to control fire protection devices operated using 230V AC mains voltage, e.g. air supply or exhaust fans, smoke curtains and blinds, fire separations. Module equipment:

- 2 potential-free relay outputs rated at 230V/5A (PK1 and PK2),
- 2 control line inputs (LK1 and LK2).

PK1 and PK2 relay output lines are additionally protected by 6.3 A / 250 V fuse.

The module number (address) is set using 2 10-position switches "x10" and "x1".

Jumper S23 for POLON 6000 should be set to position 2 ÷ 3.

Name		Purpose
1 2 9 10	-LK1 +LK1 -LK2 +LK2	Control lines inputs
3 4 5 6 7 8	PK1-NC PK1-C PK1-NO PK2-NC PK2-C PK2-NO	Relay outputs 230V/5A
S23		Jumper
x10 x1		Rotary switches fixing two digit module number: X10 - tens, x1 - units.

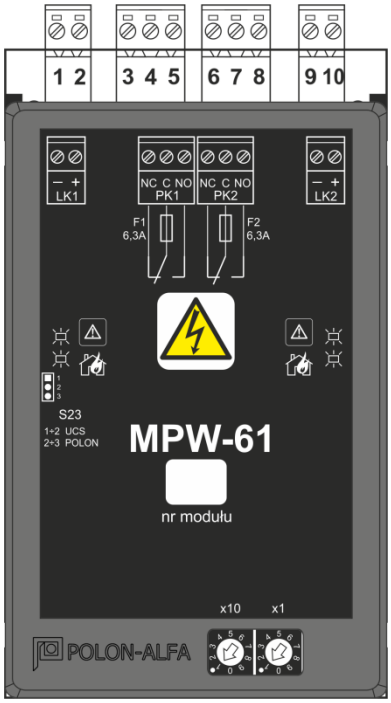


Figure 7.7/1 MPW-61 module

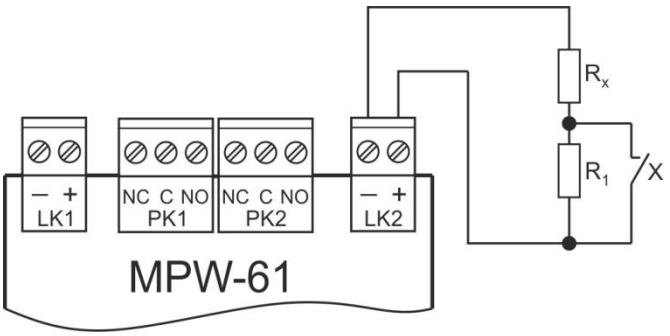
Table 7.7/1 Technical data - *MPW-61 module*

Mechanical and environmental specifications	
Dimensions	85 x 145 x 20 mm
Weight	Approx. 120 g
Operating temperature	-10 °C ÷ 55 °C
Storage temperature	-20 °C ÷ 70 °C
Permissible relative humidity	95 % non-condensing
Electrical specifications	

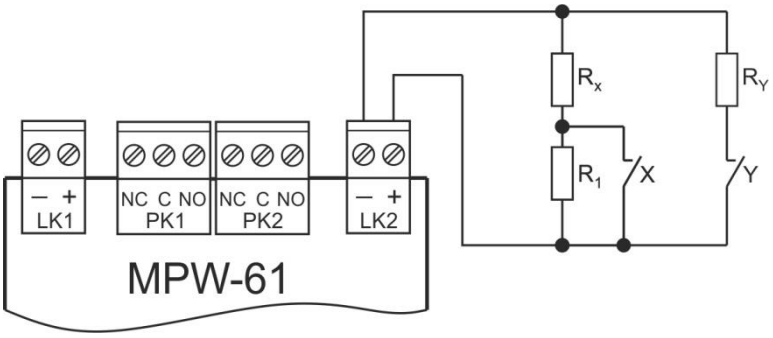
Operating voltage (module power supply)	24V DC ± 25 %
Maximum current consumption of the module - supervising / alarming	15 mA / 70 mA (PK1 and PK2 on, mode 1)
Maximum connecting wires cross section	2.5mm^2
Module addressing numbers setting range	1 ÷ 99
Relay outputs PK1, PK2	
Maximum relay contacts current / voltage	5 A / 230 V (fuse 6,3A / 250V)
Control lines inputs LK1, LK2	
Control current value	typical 0.3 mA
Max. wiring resistance	100Ω
Characteristic resistors values: [1)] - normal status ($R_1 + R_X$) - active state X (R_X) - active state Y (R_Y)	 4.3kΩ +2kΩ = 6.3kΩ ±10 % 2kΩ ±10 % 750Ω ±10 %
Control line failure signalling resistance (open, short)	R_{line}>27kΩ R_{line}>240Ω

[1)] For the given resistor values the normal condition and the X active status may be swapped depending on the NO or NC input configuration. The R_Y resistor is available only with 2-state input operating mode.

The control line connection method for 2-state operation:
- normal status,
- X active status - shortcut X contact
(with line opens and shorts detection)



The control line connection method for 3-state operation:
- normal status,
- X active state - X contact shortcut,
- Y active state - Y contact shortcut,
(with line opens and shorts detection)



Example of relay output connections layout to control fume vent system fan.

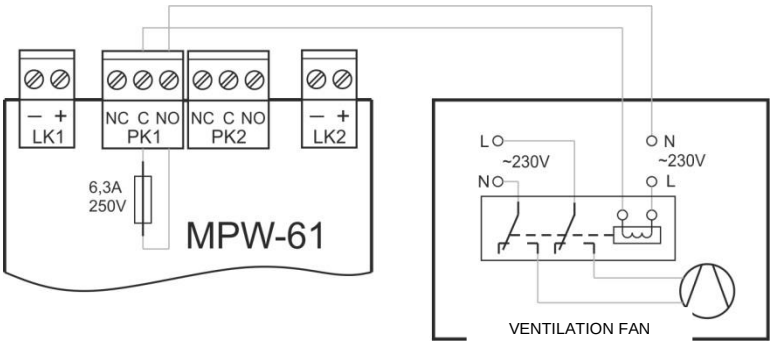


Figure 7.7/2 MPW-61 module

7.8 MD-60 Printer Module

The printer module MD-60 is equipped with a thermal printer that prints current system events and the event log. Detects and indicates the absence of paper and no connection with the printer.

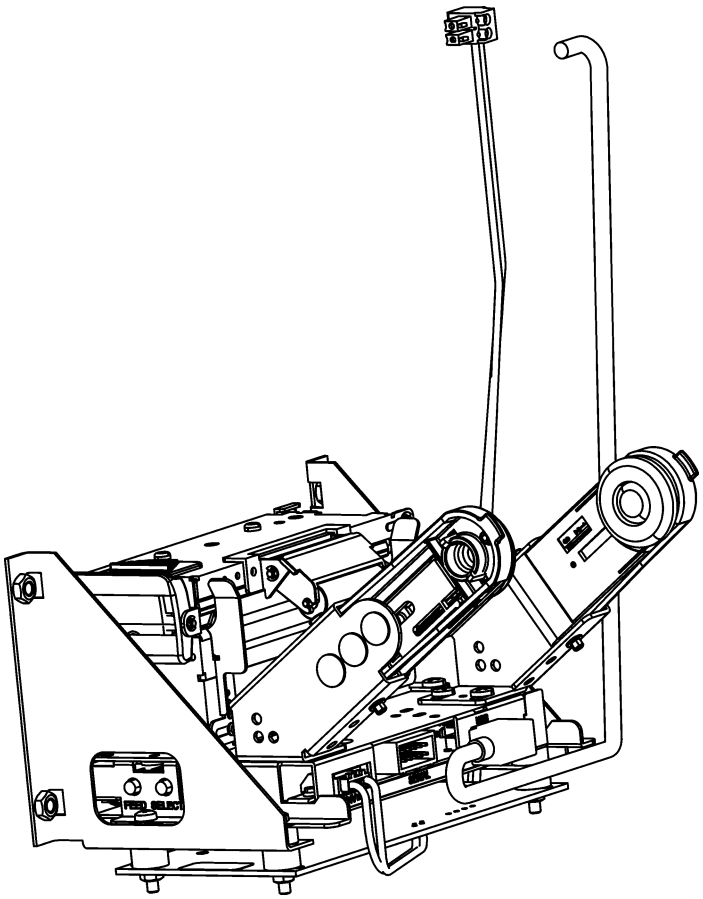


Figure 7.8/1 MD-60 module

7.9 MTI-61 Transmission Module without Galvanic Separation

The transmission module MTI-61 without separation is used for transmission channels connections between distributed system enclosures. It is used for connections up to ***3 m***. It additionally consists of 2 power supply lines.

Name		Purpose
1	A_TRX-	Transmission channel A
2	A_TRX+	
3	Ground	Power supply line 1
4	+24V_IN1	
5	2B_TRX-	Transmission channel B
6	B_TRX+	
7	Ground	Power supply line 2
8	+24_V_IN	
9	A_TRX-	Transmission channel A
10	A_TRX+	
11	-24V	Power supply line
12	+24V	
13	E	Shield
14	B_TRX-	Transmission channel B
15	B_TRX+	
16	-24V	Power supply line
17	+24V	
18	E	Shield
	S1, S2	Jumpers terminating on/off
	S6	Jumper connecting shield: Pos. 1-2 via high-voltage capacitor to the housing Pos. 2-3 directly to the housing

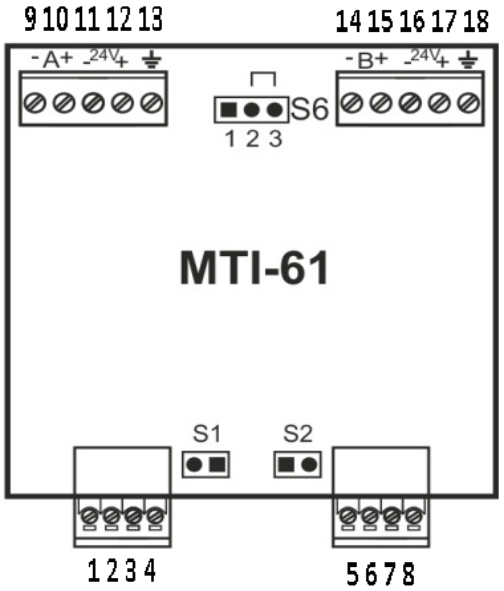


Figure 7.9/1 MTI-61 module

Table 7.9/1 Technical data - *MTI-61 module*

Mechanical and environmental specifications	
Dimensions	85 x 85 mm
Weight	Approx. 30 g
Operating temperature	-5 °C ÷ 40 °C
Storage temperature	-20 °C ÷ 70 °C
Permissible relative humidity	95 % non-condensing
Electrical specifications	
Operating voltage (module power supply)	24V DC ± 25 %
Maximum connecting wires cross section	1.5 mm^2

7.10 The MTI-62 Transmission Module with Galvanic Separation

The transmission module MTI-62 with galvanic separation is used for transmission channels connections between distributed system enclosures. It is used for connections up to ***1200 m***.

Name		Purpose
1	A_TRX-	Transmission channel A
2	A_TRX+	
3	Ground	Power supply line 1
4	+24V_IN1	
5	2B_TRX-	Transmission channel B
6	B_TRX+	
7	Ground	Power supply line 2
8	+24_V_IN	
9	A_TRX-	Transmission channel A
10	A_TRX+	Shield
11	E	
12	B_TRX-	Transmission channel B
13	B_TRX+	Shield
14	E	
	S4, S5	Jumpers terminating on/off
	S6	Jumper connecting shield: Pos. 1-2 via high-voltage capacitor to the housing Pos. 2-3 directly to the housing

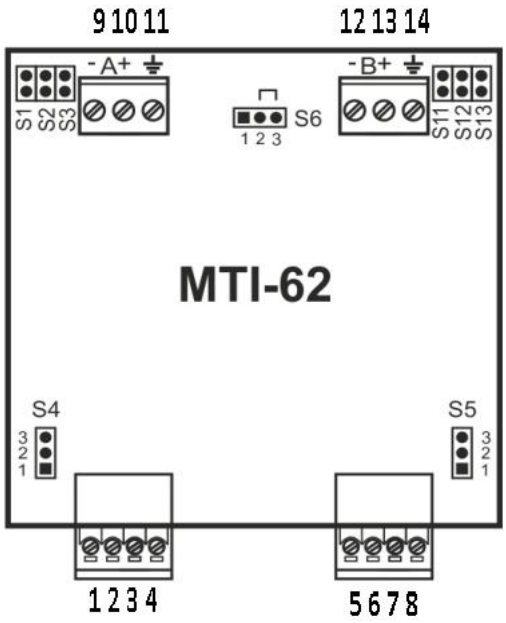


Figure 7.10/1 MTI-62 module

Table 7.10/1 Technical data - *MTI-62 module*

Mechanical and environmental specifications	
Dimensions	85 x 85 mm
Ground	Approx. 30 g
Operating temperature	-5 °C ÷ 40 °C
Storage temperature	-20 °C ÷ 70 °C
Permissible relative humidity	95 % non-condensing
Electrical specifications	
Operating voltage (module power supply)	24V DC ± 25 %
Maximum current consumption of the module - supervising / alarming	35 mA / 35 mA
Max. connecting wires cross section	1.5 mm^2

7.11 MTI-63 Fibre Optic Transmission Module

Fibre optic transmission module MTI-63 is used for nodes connection in the POLON 6000 system using fibre optics.

The MTI-63 module may be installed as functional modules on mounting rail (MGR-64 bus) or on a dedicated DIN 35mm rail located on the power supply MZ-60-xxx. It is also possible to install the DIN 35mm rail located on the back wall behind the upper mounting rail SM-60. In such case it is necessary to remove the black module cover.

Jumpers S1 and S2 are used to determine which transmission channel should be connected using fibre optics (1 ÷ 2: channel A; 2 to 3: channel B).

Figure 7.11/1 MTI-63 module

Table 7.11/1 Technical data - *MTI-63 module*

Mechanical and environmental specifications	
Dimensions	85 x 145 x 20 mm
Ground	Approx. 230 g
Operating temperature	-5 °C ÷ 40 °C
Storage temperature	-20 °C ÷ 70 °C
Permissible relative humidity	95 % non-condensing
Electrical specifications	
Operating voltage (module power supply)	24V DC ± 25 %
Maximum module current consumption	70 mA @ 24 VDC
The type of fibre optics connectors	SC (SC/PC)
Transmission range: [1)] Single-mode fibre Multi-mode fibre	 15 km 4 km

1) In the case of larger distances please contact Polon-Alfa Technical Support Section.

8 Power Supply

Main power supply voltage: 230 V +10% - 15% / 50Hz mains. When designing take into account the sum of all currents drawn simultaneously from control panel terminals, including the supply current of the control panel. Attention should also be paid to allowable current limits for individual outputs.

8.1 MZ-60-xxx Power Supply Module

The power supply module is built with power adapter (power module) and the power control module MZP-60.
The MZ-60-xxx module may be installed in the control panel enclosure interchangeably with mounting rails SM-60.

There are two power modules, based on the output power:

- **MZ-60-150**: 150W (5A for 30V)
- **MZ-60-300**: 300W (10 A for 30V)

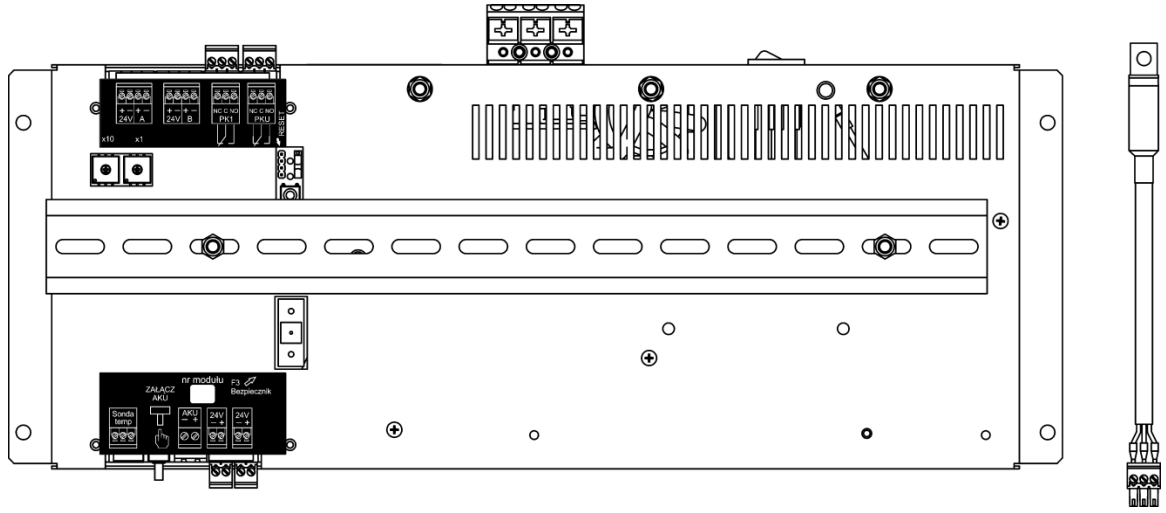


Figure 8.1/1 MZ-60-xxx module with probe SON-60

The power supply module MZP-60 communicates with the central controller MCS-60 by doubled communication bus using the PBP-6000 protocol (Polon Bus Protocol). Up to 99 power supply modules MZ-60-xxx (containing MZP-60) may be connected to one central controller. Each MZ-60-xxx (MZP-60) module must have a unique, individual logical number which designates its number. When declaring control panel functional modules Mxx-6x a node number should be declared for each one in which it is located. In other words, based on the power supply module it is fed from.
The module number (address) is set using 2 10-position switches "x10" and "x1".

When declaring MZP-60 module the capacity of connected stand-by rechargeable batteries should be declared:

- range 1: batteries 17 - 40Ah - current charge up to 2.1A;
- range 2: batteries 41 - 65Ah - current charge up to 3.5A;
- range 3: batteries 66 - 134Ah - current charge up to 7.0A.

The functions of the MZP-60:

- Control panel voltage generation,
- Main power supply control,
- Rechargeable batteries control and charging,
- Mandatory PKU fault output according to EN 54-2 (general fault)
- PK1 fire alarm output (general alarm);

Inputs / Outputs:

- 2 x bus connector (control panel power supply + transmission),
- 2 x PK (general fault, general alarm),
- 2 x auxilary voltage 24V/0.5A (for user),
- Rechargeable battery,
- Temperature probe SON-60 (buffering voltage temperature compensation).

1 - +24V_IN1 2 - Masa 3 - A_TRX+ 4 - A_TRX-	Transmission lines
5 - +24V_IN2 6 - Ground 7 - B_TRX+ 8 - B_TRX-	Transmission lines
9 - PK1_NC 10 - PK1_C 11 - PK1_NO	Alarm relay
12 - PKU_NC 13 - PKU_C 14 - PKU_NO	FaultFault relay
15 - S1 16 - S2 17 - S3	The temperature probe SON-60
18 - Ground 19 - +24V	Battery
20 - 24 V - 21 - 24 V +	Auxilary power supply
22 - 24 V - 23 - 24 V+	Auxilary power output
x10 x1	Rotary switches fixing two digit module number: X10 - tens, x1 - units.

Figure 8.1/2 MZP-60 module

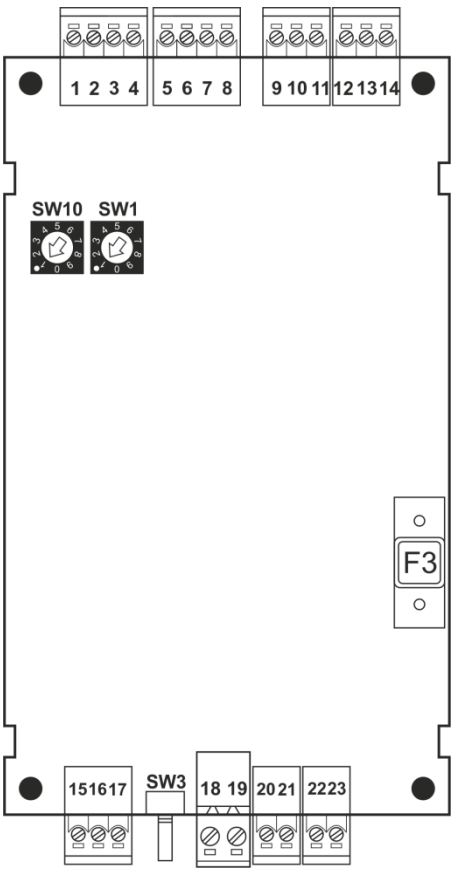
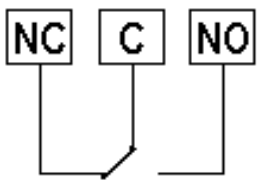


Table 8.1/1 Technical data - *MZP-60 module*

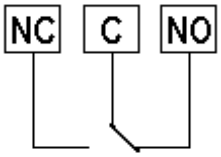
Mechanical and environmental specifications	
Dimensions	85 x 145 x 20 mm
Weight	Approx. 200g
Operating temperature	-5 °C ÷ 40 °C
Storage temperature	-20 °C ÷ 70 °C
Allowed relative humidity	95 % non-condensing
Electrical specifications	
Operating voltage (module power supply)	24V DC ± 25 %
Maximum current consumption of the module - supervising / alarming	45 mA / 60 mA (outputs without load)
Maximum connecting wires cross section Relays PKU and PKA, 24 V ext. Rechargeable batteries	 1.5 mm^2 2.5 mm^2
Module addressing numbers setting range	1 ÷ 99

8.1.1 Outputs

PKU relay - faultfault signalling relay located in the power supply module is permanently assigned to the factory outputs group for general fault. This means that it will indicate any failure in the system.
The contact state in PKU relay after power loss (FailSafe) is set as constant.



FAULT CONDITION = NO VOLTAGE STATUS (FAIL SAFE)



OPERATING CONDITION

Fig. 8.1.1/1 PKU Relay

transmission devices. This means that it will signal stage 2 alarm

in the system and it will be seen as alarm transmission devices output.

PK1 relay - alarm relay is by default assigned to the factory output group of alarm

The contact state in PK1 relay after power loss (FailSafe) is set as constant.

SUPERVISING CONDITION = NO VOLTAGE STATUS (FAIL SAFE)

ALARM CONDITION

Fig. 8.1.1/2 PK1 relay

+ 24 V - - dual power supply output to external devices with a total load capacity of 0.5 A (thermal fuse F3 630 mA).

8.1.2 Back-up Power Supply

Rechargeable batteries 2 x 12V, maximum capacity is limited by power supply wattage and control panel configuration. In the basic OM-61 or OM-62 enclosure there are 28Ah batteries.

If higher capacity batteries are required dedicated enclosures for backup batteries container OA-61 (up to 134 Ah) or OA-62 (up to 90 Ah) should be used.

Table 8.1.2/1 Summary of currents drawn by individual modules

Module	Description	Current consumption supervising status	Current consumption alarming status[1)]	Remarks
PSO-60 (MCS-60)	Operator panel	450 mA	600 mA	-
MZP-60	Power supply module	45 mA	60 mA	Select current for external devices max. 0.5 A
MLD-61	Detection module	73 mA	73 mA	Add the selected line current: 50 or 22 or 20 mA; there are 2 lines per module
MLD-62	Detection module	53 mA	53 mA	Add the selected line current: 50 or 22 or 20 mA; there are 2 lines per module

MKS-60	Input-output module	15 mA	35 mA	Add line load current LS 0.5A Max 2 x LS = 1 A
MPK-60	Relay outputs module	15 mA	15 mA	-
MWS-60	Potential outputs module	15 mA	54 mA	Add line load current LS 0.5A Max 4 x LS = 2 A
MWK-60	Control inputs module	15 mA	15 mA	-
MPW-61	Relay outputs module	15 mA	70 mA	PK1 and PK2 on Mode of operation: 1
MD-60	Printer module	35 mA	35 mA	When printing the current may be 3A (momentarily)
MTI-61	Transmission module without isolation	-	-	-
MTI-62	Transmission module insulated	35 mA	35 mA	-
MTI-63	Fibre optics transmission module	70 mA	70 mA	

1) At alarming status the module current is provided assuming all module outputs are driven in mode 1 - continuous, given outputs load current should always be added.

9 Addressable Detection Lines

Detection lines connect fire alarm control panel with fire detectors (detector, MFD) which may provide alarm information on supervised room or facility state or other line actuator element (input-output element, acoustic, voice, optical signalling device).

Detection lines connect the panel with line components and allow to connect these addressable components as follows:
Loop lines - resistant to line wires faults (opened, shorted) thanks to shortcut separator built in the line components, **type A**;
Radial lines – (with no resistance to line wires fault), the number of components in this line may not exceed 32, **type B**.

9.1 Operating Mode

Addressable detection line allows to activate addressable components of 4000 series or 6000 series. Depending on the type of components included in the line appropriate detection line operating de should be set. Information on components compatibility with detection line operating mode is provided in section Line components.

9.1.1 6000 Detection Line

- Own transmission protocol,
- A large number of line components,
- Ability to create simple branches in loop detection lines,
- Fast auto configuration, detection of changed and exchanged line components.

9.1.2 4000 Detecting Line

Detection line compatible with POLON 4000 (see DTR ID-270-011).

10 Alarming

If alarm signals received by the control panel after processing will be interpreted as fire alarm the control panel enables fire alarm status. Alarm process may be realised in one or two stages.

10.1 One Stage Alarming

One stage alarming is an alarming process without delay of 2nd degree alarm. In one-stage alarming mode the control panel enables 2nd degree alarm instantly after detecting fire alarm.

10.2 Two Stage Alarming

In two-stage alarming mode the control panel uses delay for 2nd degree alarm. In two-stage alarming mode the control panel enables 1st degree alarm after detecting fire alarm. If during T1 time the 1st degree alarm will not be confirmed the control panel will enable 2nd degree alarm. Otherwise, T2 time will be enabled. If during T2 time the 1st degree alarm will not be cleared the control panel will enable 2nd degree alarm. The conditions necessary for two-stage alarming:

- The zone submitting alarm must have two-stage alarming mode set,
- Enabled permission for 2nd stage alarm delay,
- The control panel operation in ***STAFF PRESENT*** mode (in certain cases it is also possible in ***STAFF ABSENT*** mode),
- The alarm signal cannot be received from the manual fire detector (special cases for permission of alarm signal from MFD may be programmed-).

10.3 Alarm Types

After receiving alarm signal from fire detector, the control panel, depending on the programmed variants and modes for the given fire detector zone alarming, may signal one of three alarm types:

- ***Prealarm***,
- ***Stage 1*** alarm,
- ***Stage 2*** Alarm.

10.3.1 Prealarm

The pre-alarm is the internal status of the panel that is not treated as a condition of a fire alarm. The pre-alarm is signalled by using the internal acoustic signalling and red light with ***PRE-ALARM*** message (pulsed - alarm unacknowledged, permanently - confirmed alarm).

Note:

The pre-alarm may be converted into a fire alarm or be automatically cleared by the control panel in accordance with the relevant algorithms arising from zones alarming variants.

Pre-alarm confirmation:
After pressing the *CONFIRMATION* button the internal acoustic signaling device is muted and the possibility to clear pre-alarm is unlocked.
Pre-alarm clearing:
After pressing the *CLEAR* button, the control panel pre-alarm is cleared which means that the control panel enables supervising status. Pre-alarm clearing operation is possible after receiving access at least at level 2.

10.3.2 Stage 1 alarm

During 1st degree alarm the signalling devices are enabled as well as additional inputs driven by 1st stage alarm occurrence. (e.g. ***ALARM DEVICES*** for external signalling, ***ALARM TRANSMISSION DEVICES*** or ***FIRE FIGHTING SAFETY DEVICES***, controlled by relay outputs of executive modules or input-output line components and potential outputs of executive modules).
Stage 1 alarm signalling in the control panel:

- **continuous acoustic signal** (internal acoustic signalling device),
- **voice message** (internal speaker) - option,
- ***FIRE*** signalling lamp lit in fly-leaf,
- to red ***FIRE*** beam colour changed to red at the display:
  - **pulsed** - alarm not acknowledged,
  - **continuous** - confirmed alarm,
- ***FIRE*** on the beam with displayed information on the time left till the control panel will move on to 2nd degree alarm,
- **automatically**, a main window is displayed with messages assigned to alarming zones, number of all alarms.

Acknowledging 1st stage alarm:
After pressing the *CONFIRMATION* button the internal acoustic signaling device is muted and the possibility to clear pre-alarm is cleared.
Clearing 1st stage alarm:
After pressing the *CLEARING* button, the 1st stage control panel alarm is deleted, which means the transition of the control panel to supervising status. Fire alarm clearing operation is possible after receiving access at least at level 2.

10.3.3 Stage 2 Alarm

The 2nd stage alarm is the internal status of the panel that is treated as a condition of a fire alarm. During the 2nd stage alarm a fire signal is transmitted to outside and the control panel enables additional inputs driven based on 2nd stage alarm (e.g. external signalling ***ALARM DEVICES***, ***ALARM TRANSMISSION DEVICES*** or ***FIRE SAFETY DEVICES***, controlled by executive modules relay outputs or input-output line components and potential outputs of executive modules). 2nd stage alarm occurrence is equivalent to 1st stage alarm criterion fulfilment. This means that all devices subject to 1st stage alarm occurrence will be driven.

Stage 2 alarm signalling in the control panel:

- **continuous acoustic signal** (internal acoustic signalling device),
- **voice message** (internal speaker) - option,
- ***FIRE*** signalling lamp lit in fly-leaf,
- to red ***FIRE*** beam colour changed to red at the display:
  - **pulsed** - alarm unacknowledged,
  - **continuous** - confirmed,
- ***Stage 2 alarm*** message on the ***FIRE*** beam on the display,
- **automatically**, a main window is displayed with messages assigned to alarming zones, number of all alarms and hidden alarms.

Acknowledging 2nd stage alarm:
After pressing the ***CONFIRMATION*** button the internal acoustic signaling device is muted and the possibility to clear pre-alarm is cleared.
Clearing 2nd stage alarm:
After pressing the ***CLEARING*** button, the 2nd stage control panel alarm is deleted, which means the transition of the control panel to supervising status. Fire alarm clearing operation is possible after receiving access at least at level 2.

10.4 Staff Absent Mode

The variants lose their meaning when there is no person at the control panel. In such case a delay before relevant services are informed on fire is not advisable. For this purpose it is possible to switch the operating mode of the panel to ***STAFF ABSENT***, resulting in variants of the two-stage alarming (see section Alarming variants) of all zones will automatically be changed to single stage alarming or if such need arises due to facility specificity a given zone may be assigned with a different alarming variant.

Operation mode switching is possible using ***SETTING DELAY/CHANGING STAFF MODE*** button. The control panel operation mode change is possible after obtaining at least level 2 access.

Switching the operating mode to ***STAFF ABSENT*** may be performed automatically when a schedule is the programed for automatic switching the operating mode to ***STAFF ABSENT***. The schedule comprises 5 time intervals (per day) to automatically change to ***STAFF ABSENT*** mode in daily, weekly or special (holidays) mode.

Switching operating mode to STAFF ABSENT is done by pressing the ***DELAY SETTINGS/CHANGE STAFF MODE*** button again. All zones are then restored to the programmed alarming variants.

10.5 T1, T2, T3, T4 Times

In order to realize two-stages alarming the system may be programmed with appropriate T1 and T2 times.

- ***T1*** - waiting time for 1st stage alarm confirmation,

-***T2*** - time to recognize the situation confirming the 1st stage alarm which is also the delay time for driving outputs of ***ALARM TRANSMISSION DEVICES***. Additional times T3 and T4 were also introduced in relation with output driving delays for device groups defined in standard PN-EN 54-2:

- ***T3*** - delay time for driving outputs to ***ALARMING DEVICES***,

- ***T4*** - delay time for driving outputs to ***FIRE FIGHTING PROTECTION DEVICES***.

T1, T2, T3 and T4 times may be programmed within the range of 0 ... 10 mins (in accordance with EN 54-2).

Note:

It is possible to program times longer than 10 minutes. In such case a warning will be generated by the system, informing on settings incompliance with the standard.

11 Supervising Zone

The POLON 6000 system alarming organization is based on supervising zones. Zones describe any supervising area with a specific set of addressable components in a way that allows for event location identification. Zones may be grouped for disabling or testing.

Each addressable component must be software-assigned to supervising zone. In accordance with the recommendations, each zone may be allocated with no more than 32 line components. Zones allow for programming appropriate alarming variant to eliminate false alarms. Each zone may be divided into two detector groups conventionally named group A and group B. The detector groups enable creation of coincidences within zones.
Fire alarm may be reported by the zone in one or two stages mode.
The maximum number of zones depends on the resources of the control panel (not lower than the maximum number of components or 99,000).

11.1 Alarming Variants

Alarming variants are described with the following parameters:

- ***Alarming method:***
  - **Mode** - **one** or **two-stage** alarming,
  - **Pre-alarm -** pre-alarm signalling YES/NO
  - **MFD mode** - **one** or **two-stage**,
- - alarming with preliminary clearing - YES/NO
  - **Pre-clearing time Twk**- time after which the component raising alarm will be initially cleared (up to 60 s),
- ***Coincidence*** - alarming with relationships between the components YES/NO:
  - **2-signalling devices coincidence**;
  - **Group coincidence**;
  - **Coincidence time Tko** - if coincidence is selected then this is the waiting time for alarm confirmation from another component in the same zone (0 to 30 min), *in the case of variant with preliminary clearing without coincidence this is also* ***Tpa*** *time for re-entering alarm from the same or other component in the zone into alarm - type A interdependence according to EN 54-2,*
- ***Stage 2 Alarm Acceleration*** - for modes with coincidence activation of two or more signalling devices shortens time to 2nd stage alarm,
- ***Interactivity*** - whether the system should react to pre-alarms (elevated fire factor) from components - at least 2,
- ***Switching to instant mode when locked*** - see box at the end of the chapter Factory alarming variants,
- ***Description*** - verbal comment, e.g. to the given variant operation.

11.2 Alarming Method

Fire alarm may be reported by the zone in one or two stages mode.

11.2.1 MFD Manual Fire Signalling Device Alarming

If there is MFD manual fire signalling device in the given zone then when it is activated the zone enters one-stage alarming mode (***MFD mode*** parameter - single stage - *default mode*). You can program operation mode for the zone as two-stage (despite MFD alarm, parameter ***MFD mode*** - two-stage).

11.3 Preliminary Clearing

In order to eliminate false alarms preliminary clearing of alarming component is introduced in alarming variants. Set parameter ***preliminary clearing time*** - clearing delay for components from the given A or B group (or zone, depending on variant) that raised alarm.

11.4 Coincidence

In order to eliminate false alarms coincidence between alarming components in groups is introduced in alarming variants. Coincidence may be 2-warning or group.

11.4.1 Two Detector Coincidence – Principle of Operation:

After fire signalling device operation in the zone the signalling device is initially cleared (immediately - inactive ***preliminary clearing***; or after a set ***preliminary clearing time*** - active ***preliminary clearing***). If in addition ***pre-alarm*** signalling is declared then the control panel signals this state (described earlier). If within a programmed ***coincidence time*** the cleared signalling device will be operated again and at least one more signalling device in the same zone then the control panel signalizes according to the ***alarming mode*** 1st or 2nd stage alarm (described earlier). Otherwise the control panel will treat the signalling device operation as false and will return to supervising state while clearing the state of ***pre-alarm*** (if programmed).

11.4.2 Group Coincidence – Principle of Operation:

After fire signalling devices operation belonging to one of groups A or B the signalling devices from this group are initially cleared (immediately - inactive ***preliminary clearing***; or after a set ***preliminary clearing time*** - active ***preliminary clearing***). If in addition ***pre-alarm*** signalling is declared then the control panel signals this state (described earlier). If within a programed ***coincidence time*** signalling devices belonging to groups A and B will be triggered (at least one signalling device from each group) then the control panel will signal according to set ***alarming mode*** 1st or 2nd stage alarm (described earlier). Otherwise the control panel will treat the signalling device operation as false and will return to supervising state while clearing the state of ***pre-alarm*** (if programmed).

Note:

Correct operation of group coincidence requires declaration of at least one signalling device in group A and group B (2 signalling devices in each group are recommended). The created groups may not be separated by any physical obstacles. Failure to observe these conditions may lead to continuous clearing of alarming signalling device.

11.5 Stage 2 Alarm Acceleration

For alarming variants with programmed coincidence it is possible to accelerate 2nd stage alarm activation. If the parameter - ***alarm acceleration*** for stage 2 - is active then triggering two or more signalling devices in the zone will raise 2nd stage alarm in the

control panel despite declared coincidence alarming variants for each zone.

11.6 Interactivity

A change in a fire factor in the supervised zone are registered by fire detectors that have factory defined so called prealarm level based on the given detector sensitivity. Prealarm state, i.e. elevated level of fire factor reported by detectors, may be used to create interactive alarm variants. ***Interactivity*** - if the parameter is set by the user then if one of the detectors in the zone reports prealarm and a different detector will confirm such changes (also reports prealarm) then the control panel signalizes according to ***alarming mode*** an alarm of stage 1 or 2 (described earlier). It may also report ***pre-alarm*** condition if such condition is set at the moment of prealarm reporting by one of the detectors. In the case of redundant activation of a single detector in the given zone alarm for the given zone is also raised and accordingly stage 1 or 2 alarm in the control panel.

The fire, in the case of interactive variants application, may be much faster detected in the case of waiting for alarm criterion fulfilment by single detector. Depending on the expected fire types it is possible to use different combinations of detectors for smoke (ionization, optical), heat or chemical (CO detector). At the same time by adequate detector distribution and selecting their types the system sensitivity to interfering factors (false alarms) will not be increased.

11.7 Description

Description – 128 characters, user word comment for the given created alarming variant, e.g. alarming operation method for the given zone.

11.8 Factory Default Alarming Variants

The list of 15 factory alarming variants defined in the system is provided in Table 11.8.

Variant 1: Normal Single Stage Alarming

Fire signalling device operation immediately triggers stage 2 alarm. This variant is specially applicable to zones recognized as being particularly at risk from fire.

Variant 2: Normal Two Stage Alarming

Fire detector operation triggers stage 1 alarm which is signalled acoustically and optically for T1 time to allow the operating staff to acknowledge the alarm (with CONFIRMATION button). If the staff will not take action during T1 time stage 2 alarm will be triggered. An action of the operating staff will extend stage 1 alarm T2 time, running from the moment of stage 1 alarm acknowledgment, which is designed to identify the occurred fire risk.
After T2 time, if the operating staff will not clear the alarm by obtaining level 2 access and pressing the highlighted the ***CLEARING*** button the stage 2 alarm will be enabled. T1, T2 times may be programmed with individual features of the protected facility (section T1, T2, T3, T4 times).
Two-stage alarming changes to one-stage alarming (immediate stage 2 alarm) in the case of system operation in ***STAFF ABSENT*** mode (unless the STAFF ABSENT is set with a variant other than 1).

Table 11.8 Factory alarming variants

No.	Alarming method			Preliminary clearing		Coincidence or re-alarm		Interact.	Stage 2 alarm acceleration	Description
	Mode	Pre-alarm	Mode MFD	Mode	Time Twk	Mode	Time Tko Tpa			
1	1 st.	NO	X	NO	0	NO	0	NO	NO	*VARIANT 1 Normal single stage alarming*
2	2 st.	NO	1 st.	NO	0	NO	0	NO	NO	*VARIANT 2 Normal two stage alarming*
3	1 st.	NO	X	YES	40 s	NO	60 s	NO	NO	*VARIANT 3 Single stage alarming with one time fire detector clearing*
4	2 st.	NO	1 st.	YES	40 s	NO	60 s	NO	NO	*VARIANT 4 Two-stage alarming with one-time fire detector clearing*
5	1 st.	YES	X	YES	0 s	2 detector	8 min	NO	NO	*VARIANT 5 One-stage alarming with coincidence 2 detector*

No.	Alarming method			Preliminary clearing		Coincidence or re-alarm		Interact.	Stage 2 alarm acceleration	Description
	Mode	Pre-alarm	Mode MFD	Mode	Time Twk	Mode	Time Tko Tpa			
6	2 st.	YES	1 st.	YES	0 s	2 detector	8 min	NO	NO	*VARIANT 6* *Two-stage alarming with coincidence* *2 detector*
7	1 st.	YES	X	YES	0 s	group	8 min	NO	NO	*VARIANT 7* *One-stage alarming with coincidence* *A and B group*
8	2 st.	YES	1 st.	YES	0 s	group	8 min	NO	NO	*VARIANT 8* *Two-stage alarming with coincidence* *A and B group*
9	1 st.	NO	X	NO	0	NO	0	YES	NO	*VARIANT 9* *One-stage interactive alarming*
10	2 st.	NO	1 st.	NO	0	NO	0	YES	NO	*VARIANT 10* *Two-stage interactive alarming*
11	2 st.	NO	1 st.	YES	40 s	2 detector	8 min	NO	YES	*VARIANT 11* *Two-stage alarming with preliminary zone clearing and coincidence* *2 detector to accelerate the alarm* *II stage*
12	2 st.	NO	1 st.	YES	40 s	group	8 min	NO	YES	*VARIANT 12* *Two-stage alarming with preliminary zone clearing and coincidence* *A and B group to accelerate the alarm* *II stage*
13	2 st.	NO	2 st.	NO	0	NO	0	NO	YES	*VARIANT 13* *Two-stage alarming with alarm acceleration* *Stage 2 from any system MFD*
14	2 st.	NO	2 st.	NO	0	NO	0	NO	YES	*VARIANT 14* *Two-stage alarming with alarm acceleration* *Stage 2 from any system detector*

No.	Alarming method			Preliminary clearing		Coincidence or re-alarm		Interact.	Stage 2 alarm acceleration	Description
	Mode	Pre-alarm	Mode MFD	Mode	Time Twk	Mode	Time Tko Tpa			
15	2 st.	NO	1 st.	NO	0	2 detector	0	NO	YES	*VARIANT 15* *Two-stage alarming with acceleration of stage 2 alarm in the zone*

X - irrelevant,

Variant 3: Single Stage Alarming with One-Time Fire Detector Clearing

After fire detector operation the system waits 40 s for any other fire detector operation in the same zone. When this occurs the control panel signals stage 2 alarm. Otherwise the control panel clears the detector, treating its operation as false and awaits further signals from facility. If the same or other component will be operated in the same zone within the next 60s the control panel triggers stage 2 alarm. Lack of the same or other element in the same zone re-triggering within 60s results in control panel considering previous operation as false.

The variant described above shall apply in cases of instantaneous fire factor appearance with no relation to fire.

Variant 4: Two-Stage Alarming with One-Time Fire Detector Clearing

After fire detector operation the system waits 40 s for any other fire detector operation in the same zone. When this occurs the control panel signals stage 2 alarm. Otherwise the control panel clears the detector, treating its operation as false and awaits further signals from facility. If the same or other component will be operated in the same zone within the next 60s the control panel triggers stage 2 alarm, and then the alarming is continued as in variant 2. Lack of the same or other element in the same zone re-triggering within 60s results in control panel considering previous operation as false.

The variant described above shall apply in cases of instantaneous fire factor appearance with no relation to fire.

Variant 5: One-Stage Alarming with 2-Detector Coincidence

After one fire detector operation this detector is initially cleared and the control panel signalizes pre-alarm status. If within 8 minutes the cleared detector will be operated again the control panel signalizes stage 2 alarm. Otherwise, after 8 minutes the control panel clears the pre-alarm status treating the detector operation as false and returns to the supervision state.

Variant 6: Two-Stage Alarming with 2-Detector Coincidence

After one fire detector operation this detector is initially cleared and the control panel signalizes pre-alarm status. If within 8 minutes the cleared detector will be operated again the control panel signalizes stage 2 alarm, and then alarming is continued as in variant 2.

Otherwise, after 8 minutes the control panel clears the pre-alarm status treating the detector operation as false and returns to the supervision state.

Variant 7: One-Stage Alarming with A and B Group Coincidence

After operation of fire detectors belonging to the same A or B group, this group detectors are initially cleared and the control panel signalizes pre-alarm. After the initial clearing, if within 8 minutes detectors from A and B group will be operated (at least one detector from each group) the control panel triggers stage 2 alarm.

Otherwise, after 8 minutes the control panel clears the pre-alarm status treating the detector operation as false and returns to the supervision state.

Note: Correct variant operation requires declaration of at least one signalling device in group A and group B (2 signalling devices in each group are recommended). The created groups may not be separated by any physical obstacles. Failure to observe these conditions may lead to continuous clearing of alarming signalling device.

Variant 8: Two-Stage Alarming with A and B Group Coincidence

After operation of fire detectors belonging to the same A or B group, this group detectors are initially cleared and the control panel signalizes pre-alarm. After the initial clearing, if within 8 minutes detectors from A and B group will be operated (at least one detector from each group) the control panel triggers stage 2 alarm, and then the alarming is continued as in variant 2.

Otherwise, after 8 minutes the control panel clears the pre-alarm status treating the detector operation as false and returns to the supervision state.

Note: Correct variant operation requires declaration of at least one signalling device in group A and group B (2 signalling devices in each group are recommended). The created groups may not be separated by any physical obstacles. Failure to observe these conditions may lead to continuous clearing of alarming signalling device.

Variant 9: One-Stage Interactive Alarming

After detection of a change in fire factor by detector (reaching the so called pre-alarm level), the control panel is notified and it monitors the remaining detectors in the same zone. Confirmation of changes by other detectors in the zone triggers the alarm for that zone and control panel stage 2 alarm.

In this variant the fire, in many cases, may be detected much faster than in the case of waiting for alarm criterion fulfilment by single detector. At the same time by adequate detector distribution and selecting their types the system sensitivity to interfering factors (false alarms) will not be increased.

Depending on the expected fire types it is possible to use different combinations of detectors for smoke (ionization, optical) and heat. Redundant operation of a single detector in the zone triggers alarm for this zone and control panel stage 2 alarm.

Variant 10: Two-Stage Interactive Alarming

After detection of a change in fire factor by detector (reaching the so called pre-alarm level), the control panel is notified and it monitors the remaining detectors in the same zone. Confirmation of changes by other detectors in the zone triggers the alarm for that zone and control panel stage 2 alarm, and then the alarming is continued as in variant 2.
In this variant the fire, in many cases, may be detected much faster than in the case of waiting for alarm criterion fulfilment by single detector. At the same time by adequate detector distribution and selecting their types the system sensitivity to interfering factors (false alarms) will not be increased.
Depending on the expected fire types it is possible to use different combinations of detectors for smoke (ionization, optical) and heat. Redundant operation of a single detector in the zone triggers alarm for this zone and control panel stage 2 alarm.

Variant 11: Two-Stage Alarming with Initial Zone Clearing and 2-Detector Coincidence to Accelerate Stage 2 Alarm

After operation of fire detector belonging to the zone, the control panel waits 40s and then automatically clears the zone.
If within 8 minutes from the clearing time any other detector operates then the control panel raises stage 1 alarm and then the alarming is continued as in variant 2. Otherwise - no fire detector re-triggered in the zone within 8 minutes will result in the control panel considering the previous operation as false and returning to the supervising state.
Two or more fire detectors operation in the zone will accelerate triggering of the stage 2 alarm.

Note: The correct variant operation requires declaration of at least two (preferably more) detectors in the zone.

Variant 12: Two-Stage Alarming with Initial Zone Clearing and Group Coincidence to Accelerate Stage 2 Alarm

After operation of fire detector belonging to the zone, the control panel waits 40s and then automatically clears the zone.
If within 8 minutes from the clearing time any other detector operates then the control panel raises stage 1 alarm and then the alarming is continued as in variant 2. Otherwise - no fire detector re-triggered in the zone within 8 minutes will result in the control panel considering the previous operation as false and returning to the supervising state.
Operation of fire detectors from two groups A and B at same time (coincidence) results in immediate triggering of the stage 2 alarm.

Note: Correct variant operation requires declaration of at least one signalling device in group A and group B (2 signalling devices in each group are recommended). The created groups may not be separated by any physical obstacles.

Variant 13: Two-Stage Alarming with Acceleration of Stage 2 Alarm from any System MFD

Fire detector operation results in stage 1 alarm and then the alarming is continued as in variant 2. If at the time of the stage 1 alarm any other system MFD component will be operated the stage 2 alarm will be triggered.
Two-stage alarming shall become one-stage alarming (immediate stage 2 alarm) in the

case of system operation in ***STAFF ABSENT*** mode.

Note: The MFD in this variant operates based on two stages principle.

Variant 14: Two-Stage Alarming with Acceleration of Stage 2 Alarm from any System Detector

Fire detector operation results in stage 1 alarm and then the alarming is continued as in variant 2. If at the time of the stage 1 alarm any other system detector will be operated the stage 2 alarm will be triggered.
Two-stage alarming shall become one-stage alarming (immediate stage 2 alarm) in the case of system operation in ***STAFF ABSENT*** mode.

Note: The MFD in this variant operates based on two stages principle.

Variant 15: Two-Stage Alarming with Acceleration of Stage 2 Alarm in the Zone

Zone fire detector operation results in stage 1 alarm and then the alarming is continued as in variant 2. Operation of another detector in the zone triggers stage 2 alarm.
Two-stage alarming shall become one-stage alarming (immediate stage 2 alarm) in the case of system operation in ***STAFF ABSENT*** mode.

Variant xx: User Variant

The user can create their own alarming variant by copying one of the 15 variants and modifying the timing parameters in the variant (time of coincidence and initial clearing) and MFD mode as well as the message - user description. Other parameters are constant.

Note:

In the POLON 6000 system also control inputs of functional control panel modules as well as line input-output modules may operate in mode 3, i.e. fire alarm (see section 19). When declaring alarming variant for each zone bear in mind that zones with coincidence (i.e. variants 7, 8, 11 and 12 and their derivatives - user variants) should not be linked to any inputs. This is due to the specific nature of these variants.

If the zone contains the components in the disabled state, i.e. the zone is partially blocked with programmed factory alarming variant higher than 2, such variant for this zone will be automatically switched to instant (variant 1 - factory variant). If the zone is given its own user variant which is a derivative of a variants higher than 2, it will also be switched to the instant factory variant 1. It is possible to leave the programmed variant despite locked components in the zone. To do this, for such a zone create a new alarming variant by copying one of the basic variants and disable Switch to instant mode when locked option. Disabling this option will display warnings for the zone with programmed variant.

After full zone unlocking that zone variant returs to the initially programmed one. See section - Locking.

The manufacturer Polon-Alfa does not recommend using alarming variants with disabled Switch to instant mode when locked option. The manufacturer Polon-Alfa accepts no liability for any unforeseen or incorrect alarming variant operation with disabled Switch to instant mode when locked option.

12 Disablement

POLON 6000 system allows disabling of the following components:

- **Detection lines,**
- **Supervising zones,**
- **Supervising zones groups,**
- **Line components,**
- **Output groups,**
- **Outputs,**
- **Inputs.**

There are two methods for disabling various system components:

- ***Manual ,***
- ***Automatic Disablement – Schedule*.**

Manual disabling has higher priority than disabling schedule deliberately set by system user.

12.1 Indicating Disablement Status

The control panel signals disabling with continuous illumination of the collective, yellow indicator ***DISABLEMENT*** located on the membrane keypad (see: The operator panel). In addition to that, on the right side of the user interface a ***DISABLEMENT*** indicator is displayed with current number of active lockouts.
If disabling relates to outputs assigned to dedicated device groups, additional disabling indicators are indicators in boxes for supported device types (see: The operator panel):

-***ALARM DEVICES*** - DISABLEMENT;
- ***ALARM TRANSMISSION DEVICES*** - DISABLEMENT;
- ***FIRE FIGHTING PROTECTINVE DEVICES*** - DISABLEMENT.

The DISABLING indicator colour will be changed to yellow to designate active disabling:
- pulsed illumination - at least one output assigned to dedicated device group,
- constant illumination - all outputs assigned to dedicated group of devices.

12.2 Manual Disablement

Manual disablement / enable requires at least level 2 access. A detailed description is provided in User Guide.

12.3 Automatic Disablement – Schedule

In the case when there is a need for disabling system components at certain times of the day it is possible to program individual disablement schedule for each system component (detection line, zone, line component, output group, output, input). Schedule programming requires at least level 3 access

Types of schedules:

- daily - programmed 4 disabling time periods,
- weekly - programmed 4 disabling time periods for each day of the week,
- special - holidays - programmed 4 disabling time periods for each date specified by the user in the given year (holidays).

When determining the schedule for various system components it is possible to select events that should be locked:

- alarms (if components can report such status),
- faults,
- all (alarms + faults).

A detailed description for schedule programming is provided in User Guide.

12.4 Disabling/Enabling Detection Lines, Components and Zones

In the event of line component failure, e.g. fire detectors or renovation works in the protected premises which could cause false alarms, the control panel allows to disable parts of the facility by disabling the whole detection line, whole zone or part of relevant zone.

Disabling fire detectors or the whole zone or detection line will prevent the control panel from receiving alarm or fault information from locked line components.

If the zone contains the components in the disabled state, i.e. the zone is partially blocked with programmed factory alarming variant higher than 2, such variant for this zone will be automatically switched to instant (variant 1 - factory variant). If the zone is given its own user variant which is a derivative of a variants higher than 2, it will also be switched to the instant factory variant 1. It is possible to leave the programmed variant despite locked components in the zone. To do this, for such a zone create a new alarming variant by copying one of the basic variants and disable **Switch to instant mode when locked** option. Disabling this option will display warnings for the zone with programmed variant.

After full zone unlocking that zone variant returns to the initially programmed one. See Disabling section.

The manufacturer Polon-Alfa does not recommend using alarming variants with disabled **Switch to instant mode when locked** option. The manufacturer Polon-Alfa accepts no liability for any unforeseen or incorrect alarming variant operation with disabled **Switch to instant mode when locked** option.

13 Testing

POLON 6000 system allows conducting tests to determine efficiency of:

- **Operator panel signalling components,**
- **Facility line components,**
- **Executive devices driven and controlled with system inputs and outputs (executive modules, input-output line components).**

Testing requires at least level 2 access. Testing shall be carried out as described in the User Guide.

13.1 Indicating the Testing Status

The control panel signals testing with continuous illumination of the collective, yellow indicator ***TESTING*** located on the membrane keypad (see: The operator panel).

In addition to that, on the right side of the user interface a ***TESTING*** indicator is displayed with current number of active tests.

13.2 Testing Operator Panel Signalling Components

During testing of signalling components all optical and acoustic signals are consecutively enabled. Upon test completion the system automatically returns to normal operation.
Testing is automatically terminated when fire alarm is received by the system. It is also impossible to switch to testing during fire alarm signalling.
Signalling components testing may be interrupted at any time with ***Stop*** button on the display touch panel on the ***operator panel.***

13.3 Testing of Line Fire Components in Zone

POLON 6000 system allows for testing line components in addressable line belonging to any zone.
Switching component testing on / off in the zone or zone group is performed according to description in the User Manual.
Upon test alarm signal reception from line component the information on the test alarm is displayed on LCD and printed on the printer (if assigned). The alarming component is cleared after approximately 60 s.
Fire Alarm from a zone that is under test results in automatic testing switching off and transition to fire alarm indication in the control panel according to the programmed variant.
Within the test area any number of line components may be simultaneously in alarm state, however for the purposes of checking it is recommended to trigger line components one by one.
Switching to TESTING is impossible during fire alarm signalling and for faultd or disabled (locked) zones.

13.4 Testing the Outputs and Inputs

13.4.1 Outputs

POLON 6000 system allows output (also output groups) testing both in functional modules (MKS-60, MPK-60, MWS-60, MPW-61) and in the input-output components of the 6000 system, i.e. EKS-6000.
Switching to testing mode is done according to description in the User Guide.

When switching to testing the tested output is driven by the system and operates according to programmed mode (see: Control outputs).
It is also possible to test input-output components of the 4000 system, namely EKS-4001 and EWS-4001 control components.

13.4.2 Inputs

POLON 6000 system allows testing outputs, both in functional modules (MKS-60, MWK-60, MPW-61) and in input-output components of the 6000 system, namely EKS-6000.
Switching to testing mode is done according to description in the User Guide.

When switching to testing, the status of the tested output is analysed by the system which reports appropriate states according to programmed output operation mode (see: Control inputs).
It is also possible to test the 4000 system control components, namely EWK-4001.

13.4.3 Testing EKS-4001 Input-output Components

Testing EKS-4001 components is based on switching component to testing state which should trigger the output relay. In response the element should indicate appropriate relay output state. A detailed description of the procedure is provided in the User Guide.

13.4.4 Testing EWS-4001 Control Components

Testing the EWS-4001 components is based on switching each component relay outputs to a testing state, which should trigger the tested relay. In response the element should indicate appropriate tested relay output state. A detailed description of the procedure is provided in the User Guide.

13.4.5 Testing EWK-4001 Monitoring Components

Testing EWK-4001 components is based on forcing a characteristic state on each output using resistor. The control panel should indicate the status of these inputs. A detailed description of the procedure is provided in the User Guide.

13.5 Testing Sounder Devices SAL, SAW

Testing acoustic signalling devices SAL-4001 and acoustic voice signalling devices SAW-6001, SAW-6006 is based on switching component to testing state which should start the acoustic or voice signal (wording message).

13.6 Line Components Location

The system allows the physical check of line component location by enabling in turns red and yellow component LEDs. The testing procedure is described in the User Manual and relates to both 4000 and 6000 series components.
In addition, only for 6000 series components it is possible to trigger component using a magnet (for detectors with built-in hallotron) or using built-in button (EKS-6000, DOP-6001). Such triggered component sends information to the system which displays it in the form of a message with triggered component location. A detailed description is provided in User Guide.

14 Fault

POLON 6000 system thanks to internal self-control features is able to detect and signal faultsfault occurring in:

- **Supervised lines,**
- **Line components,**
- **All functional modules connected to the system:**
  - ***MCS-60*** **(+ MSR-60),**
  - ***MZP-60*****,**
  - ***MLD-6x*****,**
  - ***MKS-60*****,**
  - ***MPK-60*****,**
  - ***MWS-60*****,**
  - ***MWK-60*****,**
  - ***MPW-61*****.**

14.1 Signalling the FaultFault Status

Any fault is signalled with illumination of the collective, yellow indicator ***FAULTFAULT*** located on the membrane keypad (see: ***The operator panel***):

- **pulsed** – unacknowledged fault,
- **continuous** - confirmed fault;

and intermittent acoustic signal with fixed frequency (internal acoustic signalling device). Once the fault is fixed the optical and acoustic signal for ***FAULTFAULT*** is cleared automatically. The acoustic signal may be disabled using highlighted ***CONFIRMATION*** button located on the membrane keypad (see: ***The operator panel***).

In addition to that, on the right side of the user interface a ***FAULTFAULT*** indicator is displayed with current number of faults.
If faultfault relates to outputs assigned to dedicated device groups, additional fault indicators are indicators in boxes for supported device types (see: ***The operator panel***):
- ***ALARM DEVICES*** - ***FAULTY***FAULT;
- ***ALARM TRANSMISSION DEVICES*** - FAULTFAULTY;
- ***FIRE FIGHTING PROTECTINVE DEVICES*** - FAULTFAULTY.

The FAULTFAULTY indicator colour change to yellow indicates fault of at least one output from dedicated device group.

14.2 FaultFault Types

- System faultfaults:
  - Program, RAM or configuration memory fault,
  - Microprocessor operation interruption,
- Execution modules faultsfault,
- Supervised line faultfaults,
- Line components faultfaults,
- System control outputs faultfaults,
- System control inputs faultfaults,
- Power supply faultfaults,
- Other faultfaults:
  - e.g. printer.

Note:

FaultFault to the system is not cleared automatically. If any such faultfault occurs it is necessary to clear it manually according to procedure described in the User Manual.

15 Line Components

Line components are all available working components in any detection line of the Polon 6000 system.

15.1 6000 Series Component Types

Table 15.1/1 6000 series

No.	Component type	Detection line operation		Description
		4000	6000	
1.	DUT-6046	+	+	Fire detector
2.	DOP-6001	+	+	Fire detector
3.	TUN-6046	+	+	Fire detector
4.	DTC-6046	+	+	Fire detector
5.	EKS-6000	-	+	Input-output component
6.	SAW-6001	+	+	acoustic-voice signalling device
7.	SAW-6006	+	+	acoustic-voice signalling device

15.2 4000 Series Component Types

Line components designed for Polon 4000.

Table 15.2/1 4000 series

No.	Component type	Detection line operation		Description
		4000	6000	
1.	DOR-4046	+	+	Fire detector
2.	DIO-4046	+	+	Fire detector
3.	TUN-4046	+	+	Fire detector
4.	DPR-4046	+	+	Fire detector
5.	DOT-4046	+	+	Fire detector
6.	DUR-4046	+	+	Fire detector
7.	DUR-4047	+	+	Fire detector
8.	ACR-4001	+	+	Radio detectors adapter
9.	ADC-4001M	+	+	Conventional line adapter
10.	EKS-4001	+	-	Input-outputInput-Output unit
11.	EWS-4001	+	-	Output Unit
12.	EWK-4001	+	-	Input component
13.	SAL-4001	+	+	Alarm signalling device
14.	ROP-4001M	+	+	Manual fire detector
15.	ROP-4001MH	+	+	Manual fire detector
16.	ROP-4007M	+	+	Manual fire detector
17.	UCS 4000	+	-	Universal control panel
18.	UCS 6000	+	+	Universal control panel

To declare a component an automatic component declaration must be performed in the system.

Common parameters for all components:
- Serial number
- Operating mode,
- Unit description.

Detector additional parameters:
- zone number for which the detector is assigned,
- zone group (A or B).

Additional parameters for input-output components:
- logical output number + individual output description,
- output logical number + individual output description.

Additional parameters for signalling devices:
- logical output number + individual output description,

Depending on the selected option settings from previous declaration will be assigned or default parameters will be set.

15.3 Declaration in the System

The zone and component description are assigned to long (factory) number of the given component. Short numbers are dynamically assigned during each components declaration in the system. To declare a component an automatic component declaration must be performed in the system.
Depending on the selected option settings from previous declaration will be assigned or default parameters will be set.

The default settings:

- **Description of** - *Line component: TYPE-XXXX,*
- **Operating mode** - Default depending on component type,
- **Zone number** - corresponds to the zone logical number,
- **Group**: A,
- **Serial number**.

Component parameters may be modified manually.

15.4 Parameter Configuration

Component parameters may be modified manually. A detailed description is provided in User Guide.

16 Control Outputs

Control outputs allow system connection with external firefighting devices to be controlled by the control panel. The device control method is defined by output group to which the given output is assigned. Each output must be assigned to one specific output group.

The location of the control outputs in the system:

- Functional modules,
- Line components.

Control output types in the system:

- Potential-free (relays),
- Potential (signal lines),
- Acoustic, voice and optical signalling devices (np. SAL, SAW).

The control outputs parameters:

- ***Control mode***
- ***Control line continuity checking***
- ***Relay safe state***
- *Electrical specifications*

Detailed information on the electrical characteristics of outputs are provided in the documentation of functional modules and line components.

16.1 Control Mode

Control mode determines the way in which the output will be controlled based on fulfilled control criterion and sets time values for output switching phases. The following table contains possible control modes.

Table 16.1/1 Output control modes

No.	Output control mode	Switching on delay time		Switching off delay time		Activating time		Pause time		Number of pulses	
		Toz[1)]		Tow[1)]		Tz[1)]		Tw[1)]		Nimp[1)]	
		EKS-6x	Mxx-6x	EKS-6x	Mxx-6x	EKS-6x	Mxx-6x	EKS-6x	Mxx-6x	EKS-6x	Mxx-6x
		0..2min [every 2 s] 2..10min [every 10s)	0..10min [every 1 s]	0..2min [every 2 s] 2..10min [every 10s)	0..10min [every 1 s]	0..2min [every 2 s] 2..10min [every 10s)	0..10min [every 1 s]	0..2min [every 2s] 2..10min [every 10s)	0..10min [every 1 s]	0..256	0..999
1	Continuous	o		o		-		-		-	
2	Pulsed	o		-		o		-		-	
3	Cyclic	o		-		o		o		-	
4	Cyclic-finite	o		-		o		o		o	

O - time available in the given mode, [1)] for modules Mxx-6x it is possible to set longer times, the control panel will generate warning on exceeded times based on EN54-2 standard.

16.2 Control-Line Continuity Supervision

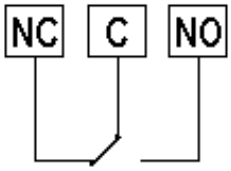
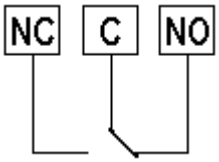
Control outputs are equipped with control line continuity circuit. Lack of continuity

detection is signalled by the control panel as output faultfault. For each output it is possible to disable faultfault signalling.

16.3 Relay Fail Safe State

Safe state (Fail Safe) indicates in which position relay contacts should be upon supply voltage failure. Control output safe state is maintained (with provided supply voltage and established communication with the control panel) until updated according to the mask sent from the control panel.

Table 16.3/1 Programmable relay safe state modes

Relay safe state mode			
Mode	Description	Diagram	Notes
1 - PK not driven	Contacts in the starting position - in accordance with the description of the NO, NC at the connection block		
2- PK driven	Contacts in reverse position in relation to the description at the connection block.		Available only in continuous activation mode
3 - PK without changes	The contacts remain in the same state in which they were before the power failure.	—	Available only in continuous activation mode

Note:
Relay safe state feature is implemented only in the 6000 system components (excluding relays in the MPW-61 module).

17 Output Groups

Output group sets the parameters for activating control output. Each control output in the system must be assigned to output group. In the control panel four factory output groups are defined that may not be deleted or modified. You can create your own output groups.

17.1 Parameters

Output group is determined by the following parameters:

- ***The group description*** - facilitates identification of output group,
- ***Activation criterion***, with defined:
  - **Event table** (max. 16 event inputs, 1 output with criterion logic - true or false),
  - **Event inputs coincidence logic** (*sum*, *product of k with n*),
  - **Event logic** (true or false),
  - **Criterion logic** (criterion true or false),
- ***Delay time* for group activation,**
- ***Activation for confirmation***,
- ***Device type***.

17.1.1 Group Description

A description of the group shall be determined individually by the user, in such a way as to facilitate the identification of devices that will be controlled by the output assigned to the group. By default the group description corresponds to the parameter **Device Type.**

17.1.2 Activation Criterion

Activation criterion shall be determined by event scenario (in the form of the event table) which must be fulfilled to activate group outputs to which the criterion is assigned. Additional parameter is criterion logic, i.e. true / false criterion.

Event table contains up to 16 system event inputs and one logic output (true/false).
System events that can be used to implement the criterion are contained in ***Events for activation criterion implementation section.***

Note:
Other activation criterion must be also assigned to the event table input.

17.1.3 Activation Criterion Logic

Activation criterion logic - a parameter that determines group triggering method, the criterion is fulfilled (true) or unfulfilled - negation (false).

17.1.4 Activation Delay Time

The activation delay time - common delay for activation of all outputs assigned to group based on the event occurrence (actual output activation time may be additionally delayed by individual setting related to output activation mode).

17.1.5 Activation for Confirmation

Activation for confirmation parameter - limits the time for output activation till event confirmation.

17.1.6 Device Type

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

The types of devices defined in the system:

- ALARM DEVICES,
- ALARM TRANSMISSION DEVICES,
- FIRE FIGHTING PROTECTIVE DEVICES.

17.2 Events for Activation Criterion Implementation (Event Table)

The events for activation of implementation criterion (scenario) are a collection of events available for analyse that occur in the system and which may be assigned to a criterion (event table) to create activation individual scenarios.

Event inputs define the following parameters:
- **event type** – defines control panel / system components state to be analysed,
-**event coverage** - determines whether the criterion should be met for any general event of the given type in the system or only given, defined system component group should be taken into account for event occurrence verification,
- **coincidence** - defines coincidences between system components group that will be applied to event occurrence verification. Possible coincidence types defining logical relationships:
  - ***SUM*** - criterion satisfied when the event will happen in any component of the group,
  - ***PRODUCT OF k_with_n*** - criterion fulfilled when the event will occur in at least ***k*** components from ***n*** component group,
- **logic** - true or false.

Table 17.2/1 System events for activation criterion implementation (event table)

XYZ CRITERION					
INPUTS (WE1 to WEn)					OUTPUT
#	EVENT TYPE	**CRITERION** (EVENT COVERAGE)	**COINCIDENCE**	**LOGIC**	**LOGIC**
1	STAGE 1 FIRE ALARM	GENERAL ALARM	-	TRUE/FALSE	TRUE/FALSE
		IN ASSIGNED ZONES	SUM / PRODUCT / K_with_N	TRUE/FALSE	
		ASSIGNED COMPONENTS	SUM / PRODUCT / K_with_N	TRUE/FALSE	
2	STAGE 2 FIRE ALARM	GENERAL ALARM	-	TRUE/FALSE	
		IN ASSIGNED ZONES	SUM / PRODUCT / K_with_N	TRUE/FALSE	
		ASSIGNED COMPONENTS	SUM / PRODUCT / K_with_N	TRUE/FALSE	
3	FAULT	GENERAL	-	TRUE/FALSE	
		POWER	-	TRUE/FALSE	
		OUTPUTS	GENERAL / SUM / PRODUCT / K_with_N	TRUE/FALSE	
		OUTPUTS GROUP	GENERAL / SUM / PRODUCT / K_with_N	TRUE/FALSE	
		INPUTS	GENERAL / SUM / PRODUCT / K_with_N	TRUE/FALSE	
		DETECTION LINES	GENERAL / SUM / PRODUCT / K_with_N	TRUE/FALSE	
		ZONES	GENERAL / SUM / PRODUCT / K_with_N	TRUE/FALSE	
		LINE COMPONENTS	GENERAL / SUM / PRODUCT / K_with_N	TRUE/FALSE	
		ALARM DEVICES	-	TRUE/FALSE	
		ALARM TRANSMISSION DEVICES	-	TRUE/FALSE	
		SAFETY DEVICES	-	TRUE/FALSE	
4	FAULTY DEVICES	GENERAL	-	TRUE/FALSE	
		FROM ASSIGNED INPUTS	SUM / PRODUCT / K_with_N	TRUE/FALSE	
5	DEVICES ENABLED	GENERAL	-	TRUE/FALSE	
		FROM ASSIGNED INPUTS	SUM / PRODUCT / K_with_N	TRUE/FALSE	
6	ACTIVATED DEVICES	GENERAL	-		
		OUTPUTS GROUP	SUM / PRODUCT / K_with_N	TRUE/FALSE	
		FROM ASSIGNED EXITS	SUM / PRODUCT / K_with_N	TRUE/FALSE	

XYZ CRITERION					
INPUTS (WE1 to WEn)					OUTPUT
#	EVENT TYPE	**CRITERION** (EVENT COVERAGE)	**COINCIDENCE**	**LOGIC**	**LOGIC**
7	STAFF ABSENT	-	-	TRUE/FALSE	TRUE/FALSE
8	DELAYS ENABLED	-	-	TRUE/FALSE	
9	ACTIVATION	GENERAL	-	TRUE/FALSE	
		ASSIGNED OUTPUT GROUPS	SUM / PRODUCT / K_with_N	TRUE/FALSE	
		ASSIGNED OUTPUTS	SUM / PRODUCT / K_with_N	TRUE/FALSE	
10	DISABLING / TESTING	GENERAL	-	TRUE/FALSE	
		OUTPUTS	GENERAL / SUM / PRODUCT / K_with_N	TRUE/FALSE	
		OUTPUTS GROUP	GENERAL / SUM / PRODUCT / K_with_N	TRUE/FALSE	
		INPUTS	GENERAL / SUM / PRODUCT / K_with_N	TRUE/FALSE	
		DETECTION LINES	GENERAL / SUM / PRODUCT / K_with_N	TRUE/FALSE	
		ZONES	GENERAL / SUM / PRODUCT / K_with_N	TRUE/FALSE	
		LINE COMPONENTS	GENERAL / SUM / PRODUCT / K_with_N	TRUE/FALSE	
		ALARM DEVICES	-	TRUE/FALSE	
		ALARM TRANSMISSION DEVICES	-	TRUE/FALSE	
		SAFETY DEVICES	-	TRUE/FALSE	
11	DETECTOR TRIGGERING	LINE COMPONENTS	GENERAL / SUM / PRODUCT / K_with_N	TRUE/FALSE	
12	NEW FIRE ALARM	GENERAL ALARM	-	TRUE/FALSE	
		IN ASSIGNED ZONES	SUM / PRODUCT / K_with_N	TRUE/FALSE	
13	CLEARING	GENERAL	-	TRUE/FALSE	
		PSO MODULES	-	TRUE/FALSE	
14	CRITERION	CRITERION	-	TRUE/FALSE	

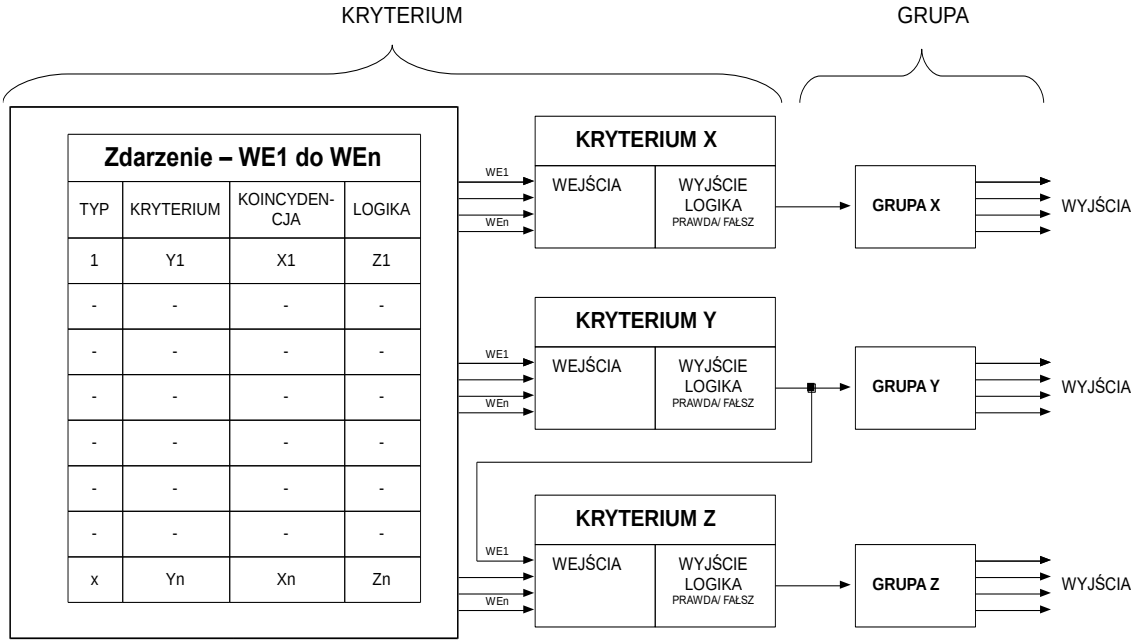


Figure 17.2/1 Graphical interpretation of activation criterion implementation

17.3 Factory Output Groups

Factory output groups are declared in the control panel permanently. It is not possible to modify their parameters.

Table 17.3/1 Factory output groups

GROUP NO.	ACTIVATION CRITERION						TO CONF.	TIME DELAY	TYPE DEVICE	GROUP DESCRIPTION (NAME)
	EVENT INPUTS TABLE					LOGIC OUTPUTS				
	EVENT		CRITERION	COINCIDENCE	TRUE/ FALSE					
	NO.	TYPE								
0	0	LACK	-	-	-	-	-	-	-	INACTIVE OUTPUTS
1	1	FIRE ALARM STAGE I	GENERAL ALARM	SUM	TRUE	TRUE	NO	0	DEV. ALARM	ALARM DEVICES - GENERAL ALARM
2	2	FIRE ALARM STAGE II	GENERAL ALARM	SUM	TRUE	TRUE	NO	0	DEV. ALARM TRANSMISSION	ALARM TRANSMISSION DEVICES - GENERAL ALARM
3	2	FIRE ALARM STAGE II	GENERAL ALARM	SUM	TRUE	TRUE	NO	0	FIRE FIGHTING DEV. PROTECTIVE	FIRE FIGHTING DEV. PROTECTIVE - GENERAL ALARM
4	3	FAULT	FAULT GENERAL	SUM	TRUE	TRUE	NO	0	LACK	SIGNALING FAULT TO THE GENERAL

18 Output Programming and Output Groups

The outputs in POLON 6000 system are programmed in three stages:

- **The output configuration (location in the system and the physical properties parameters).**
- **Output control mode configuration (operation method).**
- **Output groups configuration - outputs assignment to group and designation of activation criterion.**

18.1 Output Configuration

CONFIGURATION STAGES, Example:

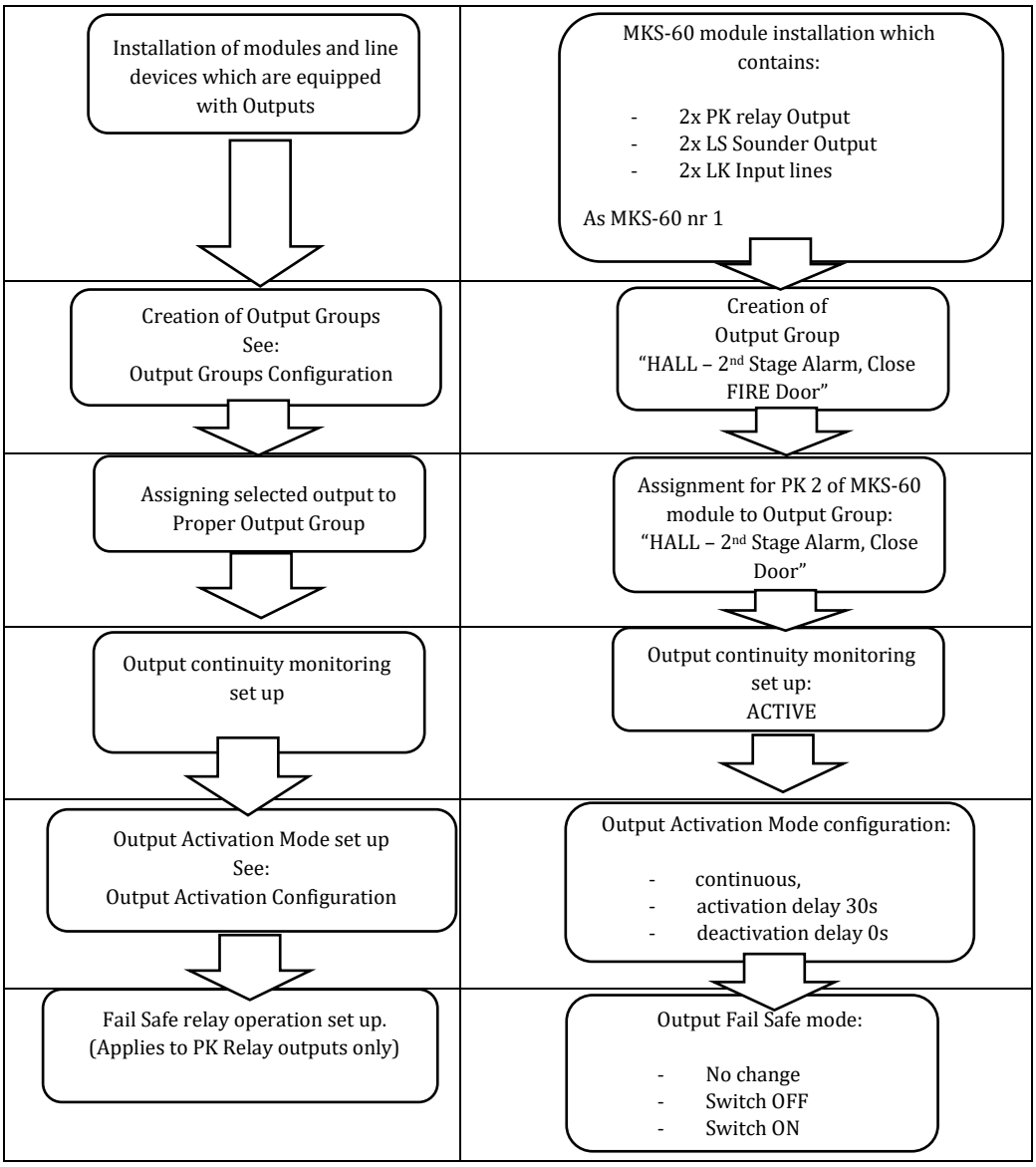


Figure 18.1/1 Programming algorithm - outputs configuration

18.2 Outputs Activation Mode Configuration

Example:

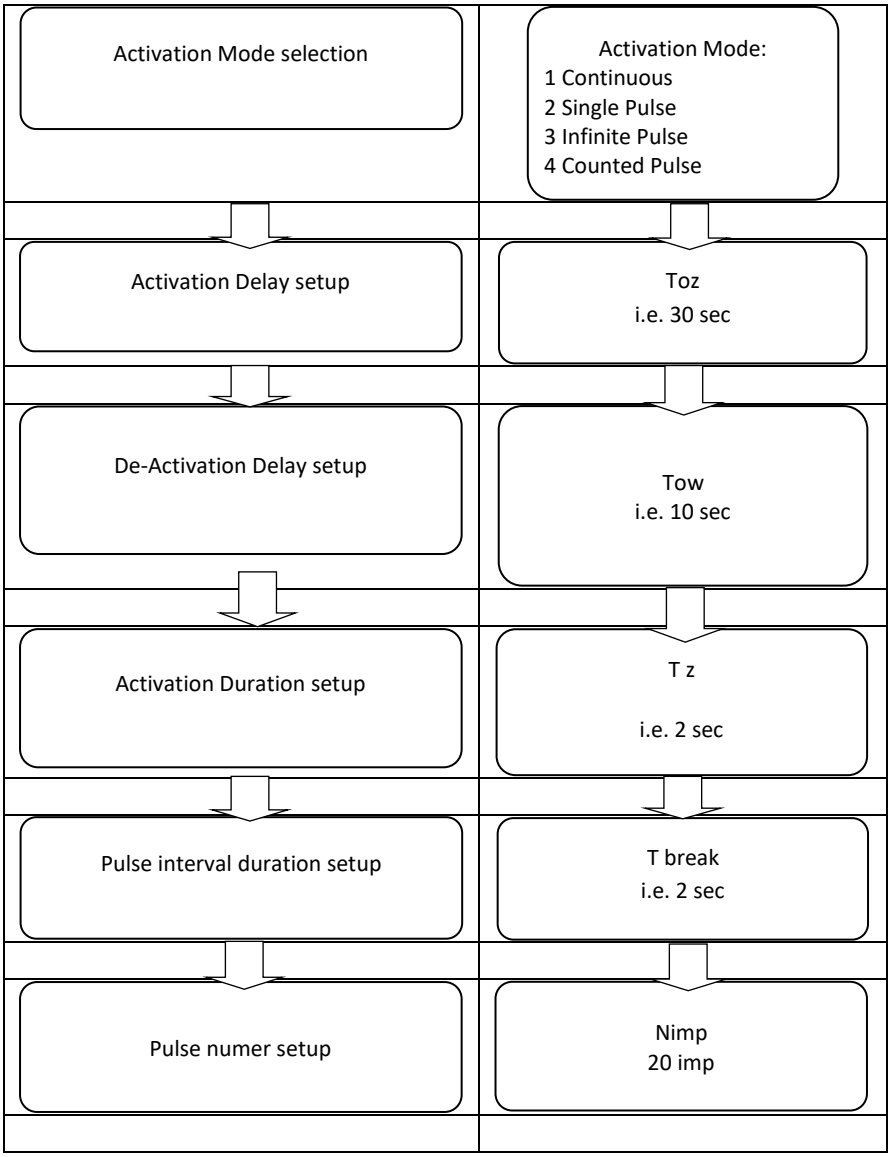


Figure 18.2/1 Programming algorithm – Output operating Mode

18.3 Output Groups Configuration

CONFIGURATION STAGES

Example:

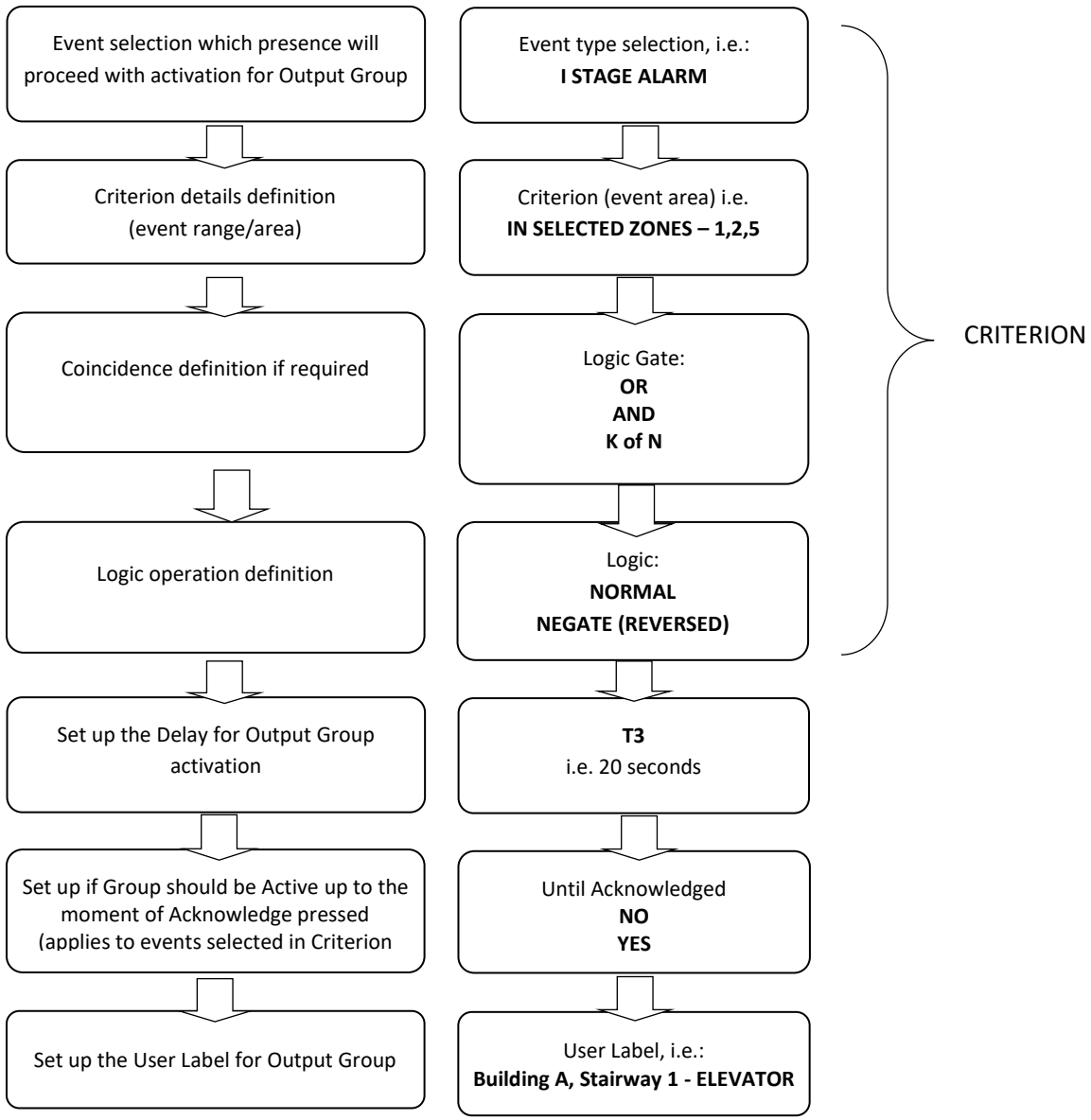


Figure 18.3/1 Programming algorithm - criterion configuration and output groups

19 Control Inputs

The control inputs are used to supervise devices connected with the system by analysis of the control lines states. The reaction of the system to the control line state change reported by input depends on the output operating mode.

The location of the control inputs in the system:

- Functional modules,
- Line components.

19.1 Control Line State

Control inputs based on resistance measure report connected control lines state to the system.
Depending on the input type and mode 2 or 3states analysis is possible:
States reported by input in the 2 states analysis:

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

States reported by input in the 3-states analysis:

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

Table 19.1/1 Characteristic resistances of POLON 6000 system control inputs

Analysis type	Input operating mode	Characteristic resistance				
		R-Normal	R-ActiveX	R-ActiveY	Control line open	Control line shorted
2 states	NO	6.3 kΩ	2.0 kΩ	- (not applicable)	>27 kΩ	<240 Ω
	NC	2.0 kΩ	6.3 kΩ	- (not applicable)		
3 states	NO	6.3 kΩ	2.0 kΩ	750 Ω		
	NC	Mode prohibited				

Detailed information concerning the range of characteristic resistances for each status are provided in documentation for the functional modules and line components with control inputs.

Resistance outside the range is reported by the inputs as control line fault (short or open circuit).

19.2 Operating Mode

The mode of operation determines the way in which the control panel will respond to a change in the status detected by the control input.
It is possible to choose one of four modes:

- ***Mode 0 - Input Inactive***,
- ***Mode 1 - Device Operation Checking***,
- ***Mode 2 - Device State Checking***,
- ***Mode 3 - Fire Alarm***.

19.2.1 Mode 0 - Input Inactive

Signals from the input working in mode 0 are not evaluated.

19.2.2 Mode 1 - Device Operation Checking

State analysis of input in mode 1 depends on activation of output assigned to it and is divided in two phases: before and after output activation. In the analysis the control panel takes into account delay times that determine when the output should be treated as activated or not activated. Parameters determined for mode 1:

- **The number of controlled input**,
- **The delay time** of control after activation,
- **The analysis type** - number of analysed states (relates only to inputs with 3 state analysis),
- **The control delay time** after disabling activation (relates only to inputs with 3 state analysis),
- **User messages** for states *Device enabled, Device faulty*.

Table 19.2.2/1 Control panel state depending on the status of the control line for input in mode 1

ANALYSIS TYPE	CONTROL PANEL STATE BASED ON THE CONTROL LINE STATE					
	BEFORE OUTPUT ACTIVATION			AFTER OUTPUT ACTIVATION		
	R-Normal	R-Active X	R-Active Y	R-Normal	R-Active X	R-Active Y
2 states	STATE SUPERVISING	DEVICE FAULTED		DEVICE FAULTED	DEVICE ENABLED	
3 states	STATE SUPERVISING	DEVICE FAULTD	DEVICE FAULTD	DEVICE FAULTD	DEVICE FAULTD	DEVICE ENABLED

19.2.3 Mode 2 - Device State Checking

The control panel response to the changed input working in mode 2 depends on the configuration. The configuration is based on allocation of line states to the control panel states. Parameters determined for mode 2:

- **Analysis type** - analysed states number (relates to inputs with 3 state analysis),
- **Control panel state** for R-normal,
- **Control panel state** for R-Active X,
- **Control panel state** for R-Active Y (relates only to inputs with 3 state analysis),
- **User messages** for states *Device enabled, Device faulty*.

Table 19.2.2/2 Assignments of the control panel states to the control line states for input in mode 2

ANALYSIS TYPE	CONTROL PANEL STATE BASED ON THE CONTROL LINE STATE		
	R-Normal	R-Active X	R-Active Y
2 state	SUPERVISING STATUS	DEVICE ENABLED	
	SUPERVISING STATUS	DEVICE FAULTY	
	DEVICE ENABLED	SUPERVISING STATUS	
	DEVICE FAULTY	SUPERVISING STATUS	
3 state	SUPERVISING STATUS	DEVICE ENABLED	DEVICE FAULTY
	SUPERVISING STATUS	DEVICE FAULTY	DEVICE ENABLED
	DEVICE FAULTY	SUPERVISING STATUS	DEVICE ENABLED
	DEVICE FAULTY	DEVICE ENABLED	SUPERVISING STATUS
	DEVICE ENABLED	SUPERVISING STATUS	DEVICE FAULTY
	DEVICE ENABLED	DEVICE FAULTY	SUPERVISING STATUS

19.2.4 Mode 3 - Fire Alarm

Control panel interprets report of state R-Active (both X and Y) from input working in mode 3 as fire alarm signal. It is necessary to allocate input to the supervising zone.

In mode 3 input always works as 2-state. The control line states of R-Active X and R-Active Y are both interpreted as fire alarm signal.

Parameters determined for mode 3:

- **The supervising zone number**.

Table 19.2.4/1 Control panel state depending on the status of the control line for input in mode 3

CONTROL PANEL STATE BASED ON THE CONTROL LINE STATE		
R-Normal	R-Active X	R-Active Y
SUPERVISING STATUS	FIRE ALARM IN THE ASSOCIATED ZONE (with fulfilled zone criteria)	

19.2.5 Configuration

Table 19.2.5/1 Configurable parameters for individual operating modes of control inputs

INPUT OPERATING MODE	ZONE NUMBER	OUTPUT NUMBER	CONTROL DELAY 0s..10min [every 1 s]		Analysis type	CONTROL PANEL STATE BASED ON THE CONTROL LINE STATE			METHOD OF ACTION (NO/NC)	USER MESSAGES FOR STATES: DEVICE ENABLED DEVICE FAULTY
			AFTER OUTPUT ACTIVATION Tokz	After output disabling Tokw		R-Normal	R-ActiveX	R-ActiveY		
0 -INACTIVE	-	-	-		-	-	-			
1 - DEVICE OPERATION CHECKING	-	O	O	O	O	-	-	-	O	O
2 - DEVICE STATE CHECKING	-	-	-	-	O	O	O	O	O	O
3 - FIRE ALARM	O	-	-	-	-	-	-	-	O	-

"O" - an important parameter in the operating mode
"-" - parameter irrelevant in the operating mode

19.3 EKS-4001

The functionality of EKS-4001 component inputs in POLON 6000 control panel is limited tue do its working method. Functionality limits:

- Input operating modes: ACTIVATION CHECK or STATE CHECK,
- for ACTIVATION CHECK, the number of controlled output is limited to own output,
- control delay time 40s, 70s or 130s.

19.4 EWK-4001

The functionality of EWK-4001 component inputs in POLON 6000 control panel is limited due do its working method. Functionality limits:

• input operating modes: only STATE CHECK.

20 Input Programming

Configuration steps (with sample values) for the individual input operating modes:

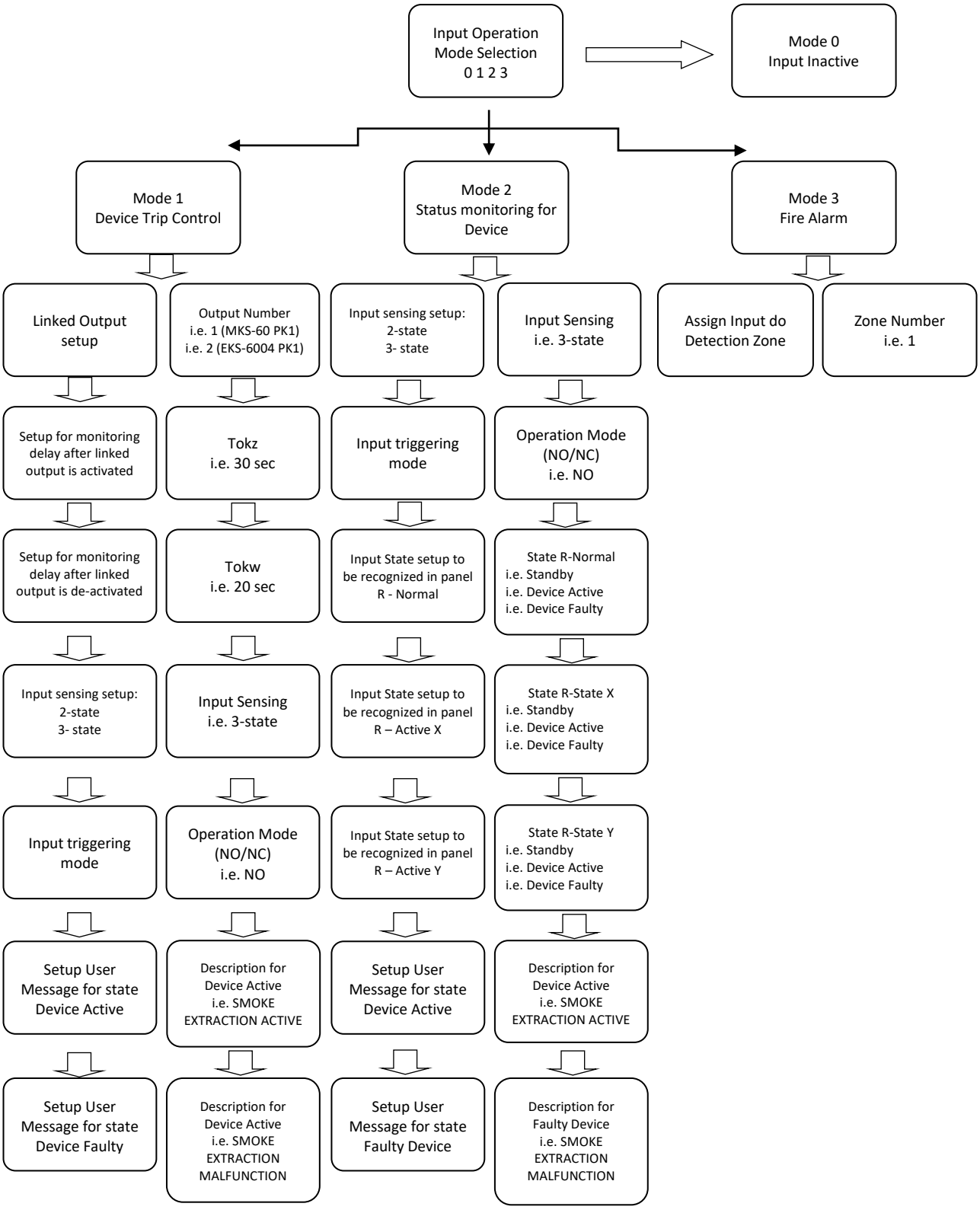


Figure 20/1 Programming algorithm - control inputs configuration

21 System Configuring and Programming

21.1 The Standard Configuration

POLON 6000 system as delivered to the receiver is initially programmed by the manufacturer according to initial operating conditions defined as standard configuration:

- Functional modules – undeclared (only PSO nr 1 is present in system configuration),
- Outputs - inactive,
- Output groups and Criterions - 4 factory default,
- Inputs - inactive,
- Alarming variants - 15 factory default,
- Zones, outputs, output groups, inputs - standard user messages,
- Time T1 - 30 s,
- Time T2 - 60 s,
- Time T3 - 0 s,
- Time T4 - 0 s,
- Event memory - erased.

21.2 User Configuration Programming

In order to adapt the system for operation according to the installation design individual POLON 6000 system programming is necessary. Programming to be carried out according to the User Manual using one of the methods described below. In the case of manual configuration using user interface (PSO-60panel) the configuration data modification is possible after appropriate authorization, at level 3 or 4. The entered configuration data will be saved also in the case of total power supply failure. It is recommended to backup data after system programming, e.g. saving data on a pen drive.

21.3 Configuration and Programming Methods

- User Interface - a detailed description in the User Guide,
- RS-232 Serial Port – printer or GSM transmitter connection only,
- USB Port (RS-232 emulation) – printer connection,
- USB keyboard/mouse – via User interface
- Pen drive (USB port) - read / write configuration file,
- Ethernet - read configuration file.

22 Event Log

POLON 6000 system saves in the event log up to 100,000 events (the number depends on the available memory card capacity) related to system functioning in the given facility. Each event is labelled with precise verbal description and date and time (with 1 s accuracy). In the event memory the following types of events are stored in chronological order:

- alarm events,
- faults,
- service states,
- configuration data changes,
- tests,
- disablements,
- executive devices actuation,
- user reactions, e.g. confirmation, erasing, enabling delays etc.

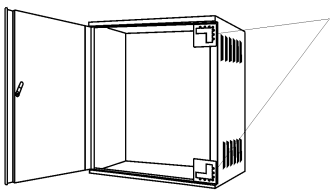
The content of the event memory may be browsed (as well as filtered based on occurrence date and time, event type) on PSO-60 control panel display or optionally printed using MD-60 printer (description for event log is provided in the User Manual).

23 System installation

23.1 General

UWAGA!

Przed uruchomieniem centrali zdjąć zabezpieczenie transportowe drzwi.



Zachować zabezpieczenia na wypadek konieczności odesłania centrali do reklamacji.

Figure 23.1/1 Enclosure door transport protection

23.2 Control Panel Enclosure Wall Installation

Enclosure should be installed on a wall using three M5 screws and raw plugs of at least 8mm diameter.

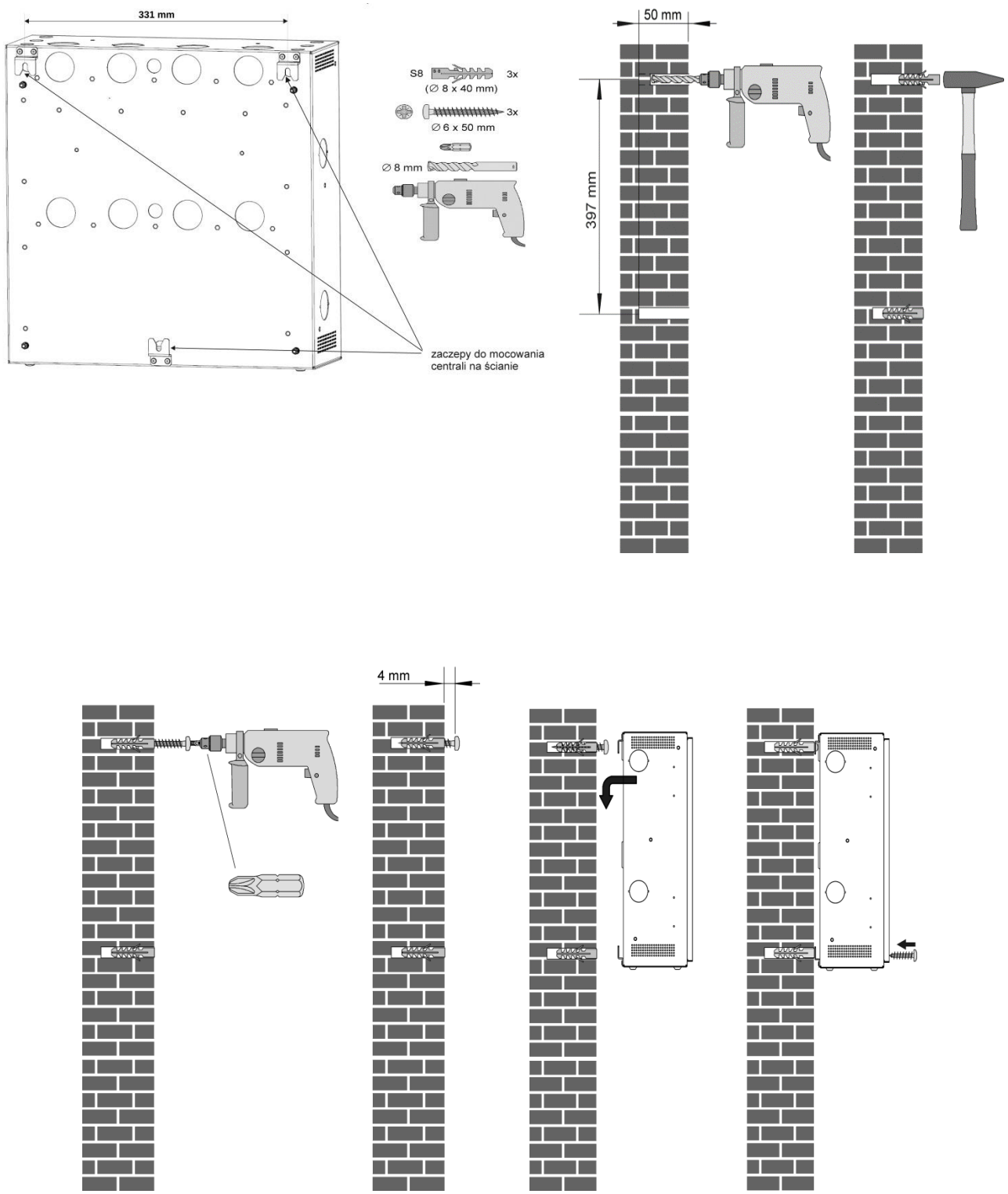


Figure 23.2/1 Installation of the control panel on a wall - steps

23.3 MZ-60-xxx Power Supply Module Installation

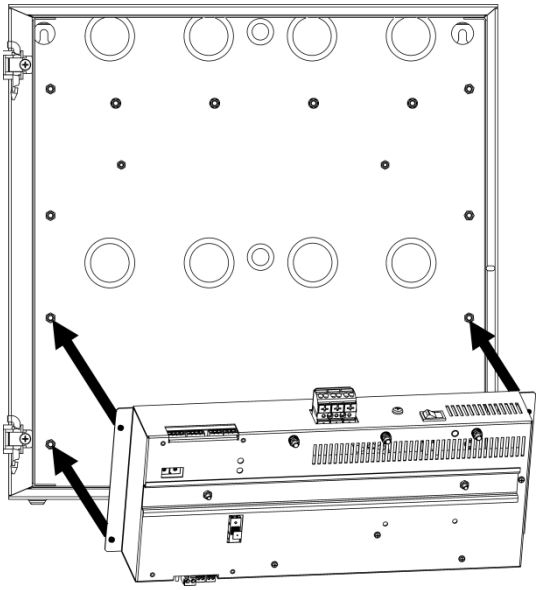


Figure 23.3/1 Installation of MZ-60-xxx power supply

23.4 SM-60 Mounting Rails Installation

The control panel design allows easy access to the installation and maintenance of different control panel components and for installation wiring connection. The MGR-64 module is pressed on a mounting rail using supports. The mounting rail design allows for tilting it for better access to wiring.

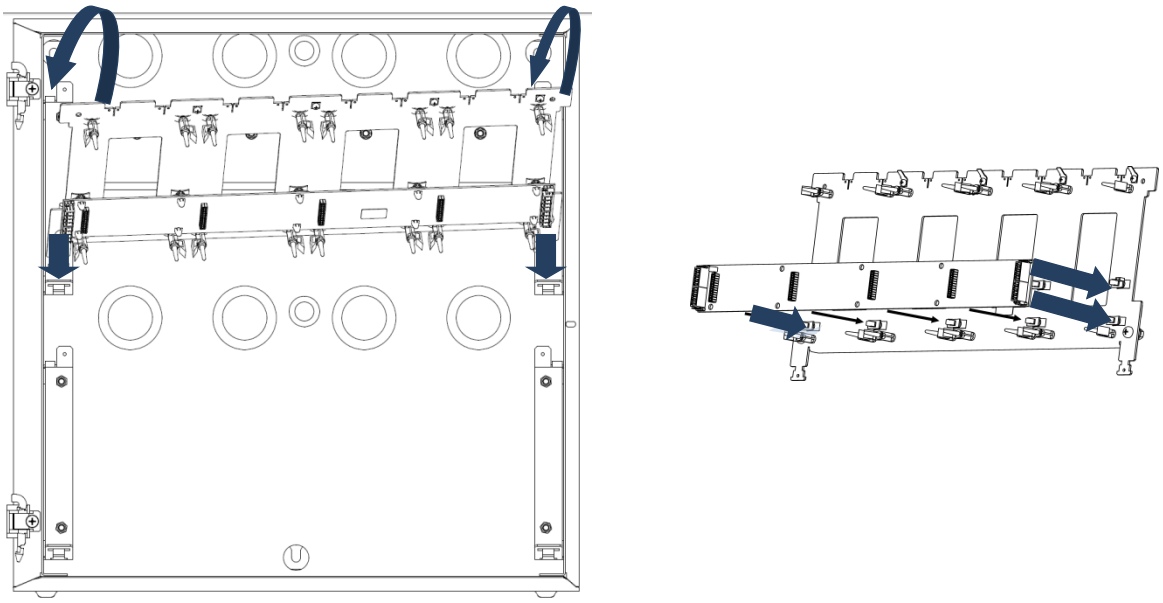


Figure 23.4/1 Installation of SM-60 mounting rail

23.5 Installing Modules

The modules installation is very simple, using brackets inserted in mounting board holes. Each module is fixed using 4 brackets.

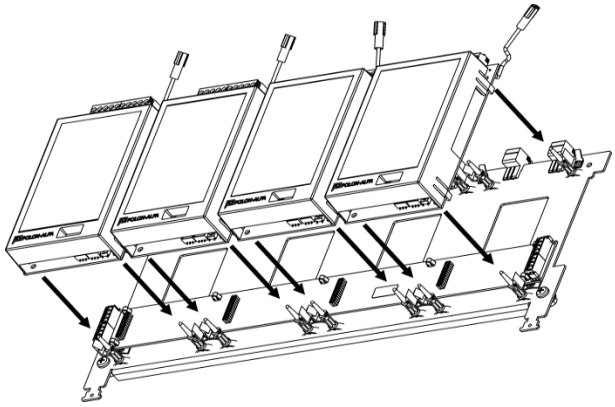


Figure 23.5/1 Installation of Mxx-6x modules

23.6 Connecting Earthing Conductors

On the rear outside wall of the basic enclosure 4 bolts are located for connection with earthing conductors (supplied with the enclosure).

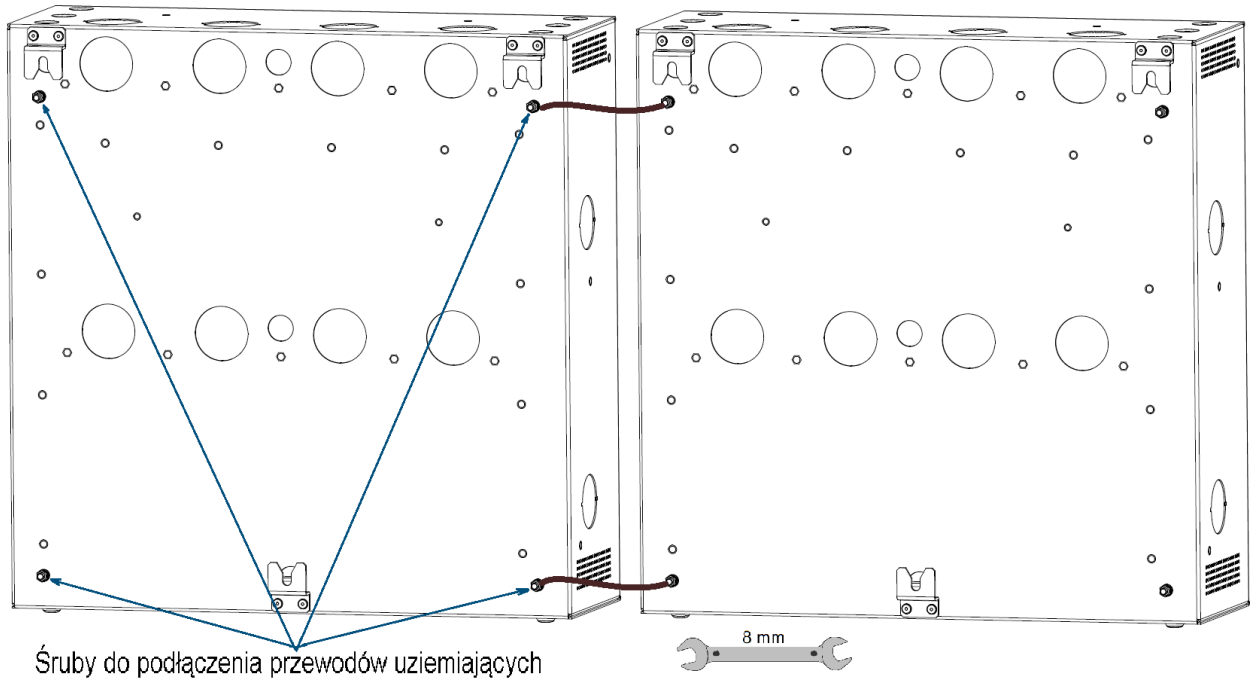


Figure 23.6/1 Connecting earthing conductors of neighbouring enclosures

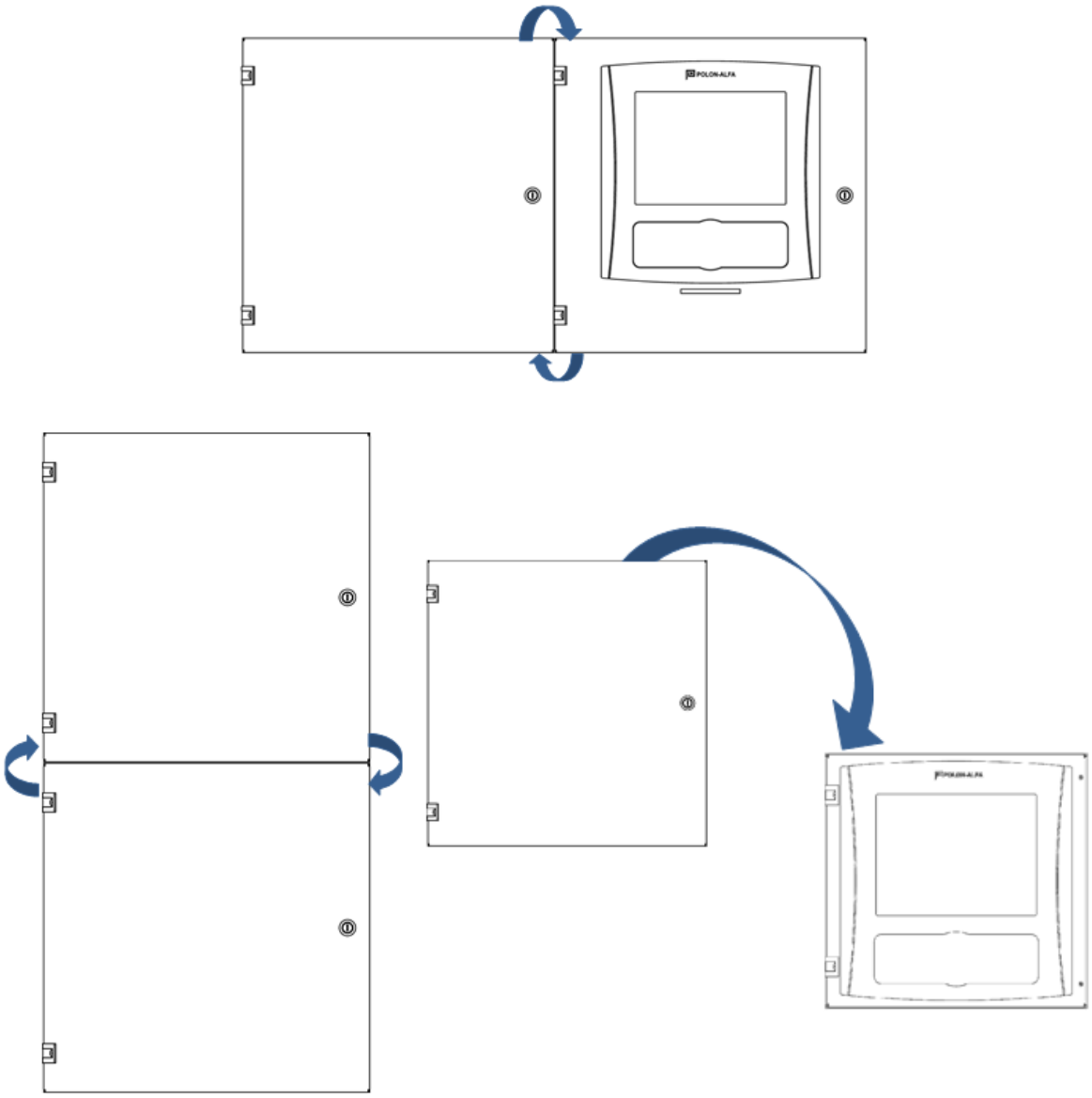


Figure 23.6/2 Recommended grounding conductors electrical connections

23.7 Connecting Power Supply Wiring and Rechargeable Batteries

Terminals for mains power are available in the control panel. In the power supply a pair of terminals is located for connection with rechargeable battery cluster, marked "-AKU +". In addition the red colour wire is equipped with a car fuse socket.

- For the power supply SP-150-27.5PLA: 10 A
- For the power supply SP-300-27.5PLA: 20 A

23.8 Distributed System Inter-Node Connections

23.8.1 Wiring Connections

POLON 6000 system nodes may be combined as follows:

- Using wired dual channel RS-485 bus, or

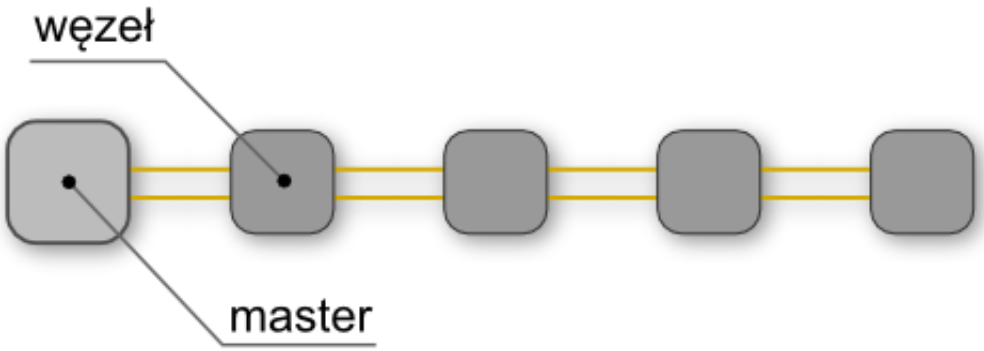


Figure 23.8.1/1 Two RS-485 buses

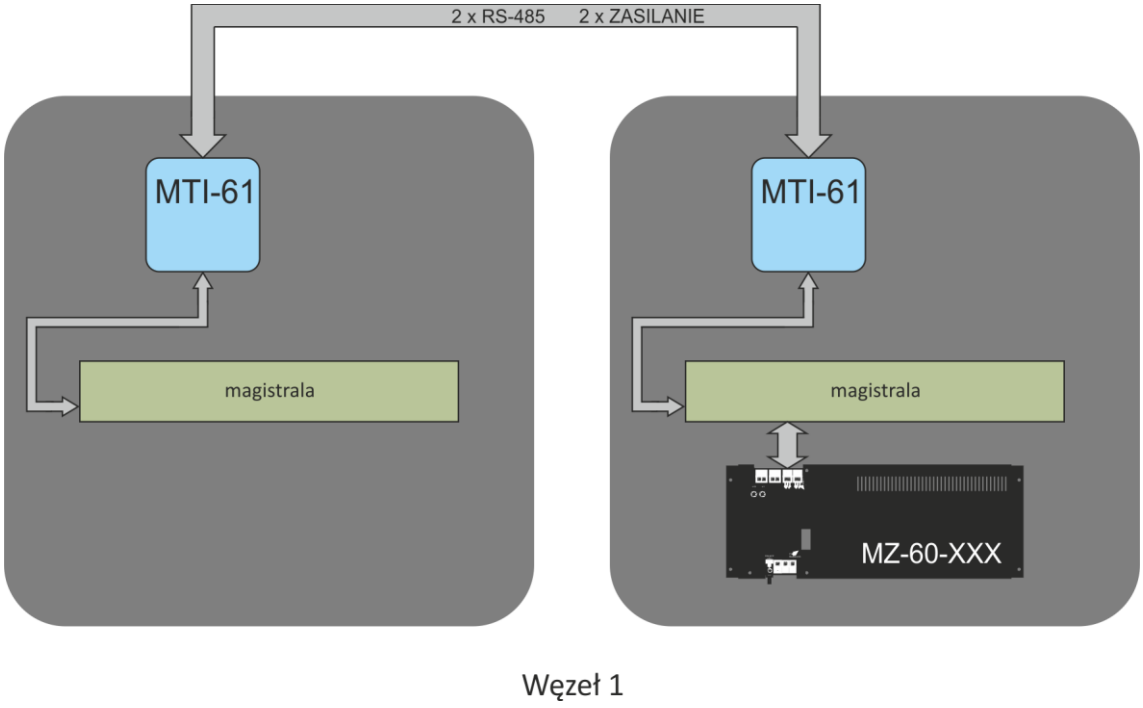


Figure 23.8.1/2 Remote enclosure without power supply combined with enclosure with power supply - MTI-61 modules

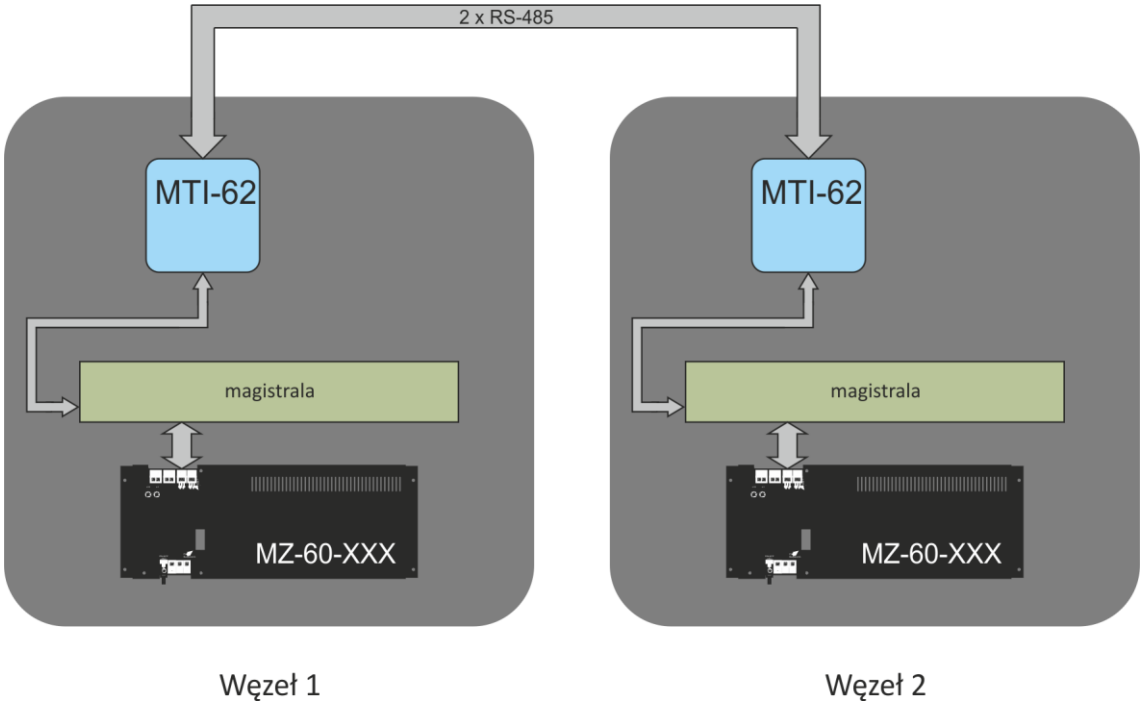


Figure 23.8.1/3 Enclosures with own power supplies - inter-node connection - MTI-62 modules

- In dual wired ring layout.

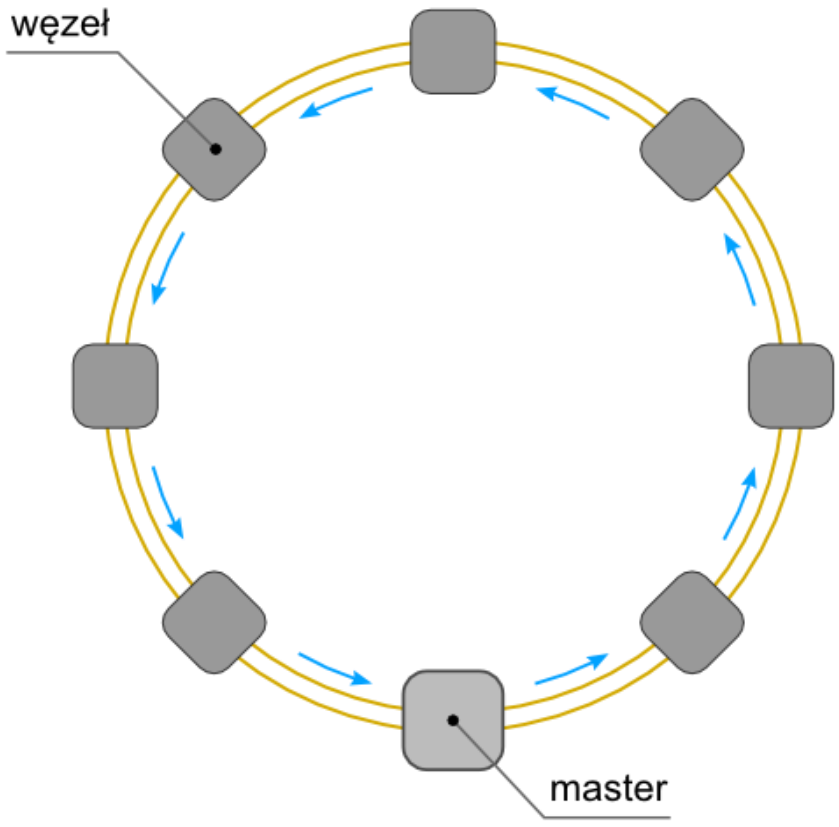


Figure 23.8.1/4 RS-485 dual ring

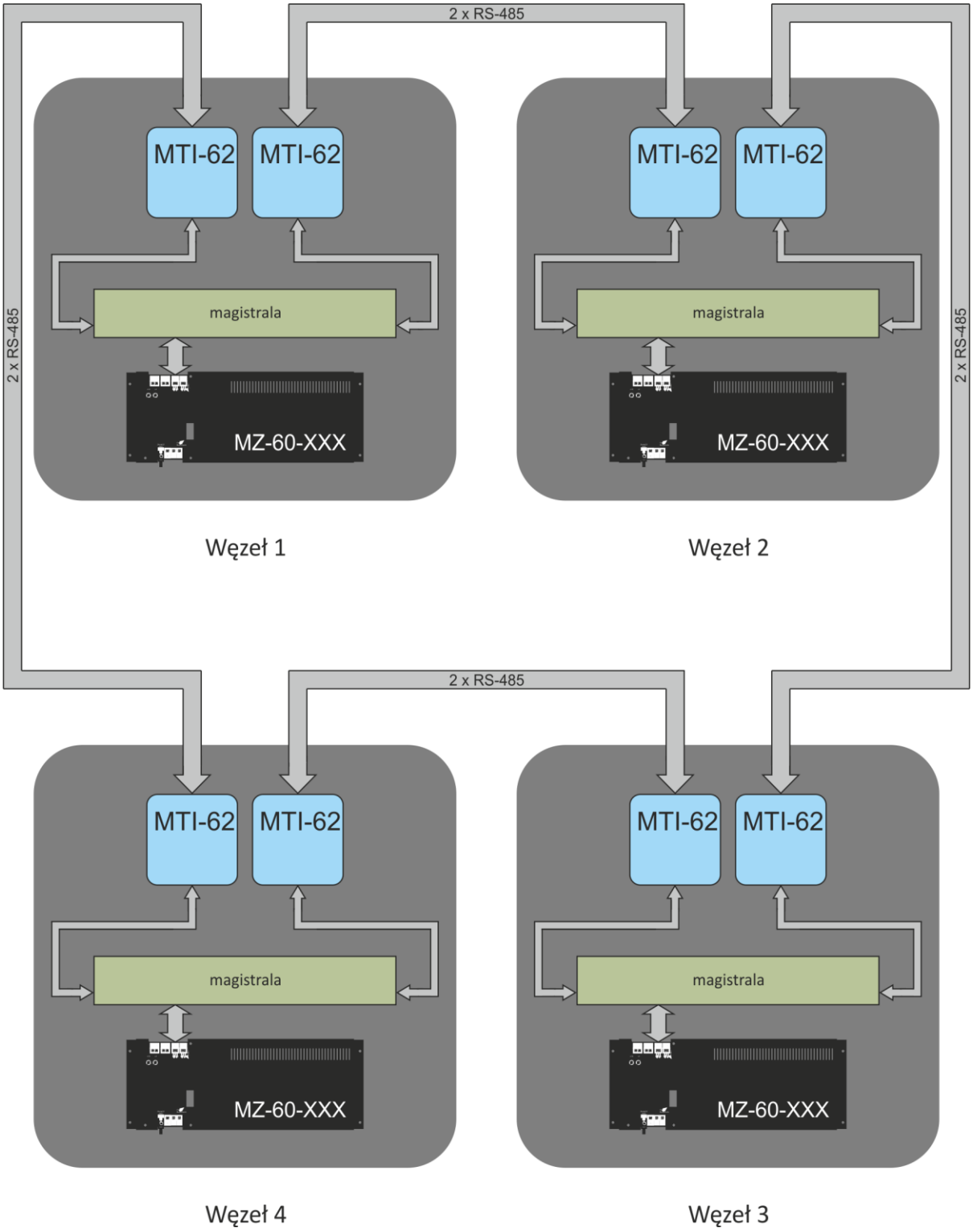


Figure 23.8.1/5 Inter-node dual ring connections - MTI-62 modules

23.8.2 Connecting Shields and Terminating the Bus

Inter-node connections should be made with shielded wires to minimize electromagnetic interference with the system (alternatively fibre optic connection may be utilized).
When using shielded wires the shields should be connected in each enclosure (or node).
The MTI-61 and MTI-62 modules are equipped with S6 jumper that defines shielding connection point:

- position 1-2 for intermediate connection using high voltage capacitor to the chassis,
- position 2-3 for direct connection with the chassis.

When connecting many nodes these S6 jumpers should be alternatively placed in both positions (figures below).

For inter-node connections of **over 100m** in length it is recommended to terminate the bus by setting appropriate configuration jumpers on MTI-61 and MTI-62 modules (figures below):

MTI-61

S1, S2 installed – attached terminator resistors,
S1, S2 removed – disconnected terminator resistors.

MTI-62

S1, S11 installed – attached terminator resistors,
S1, S11 removed – disconnected terminator resistors.

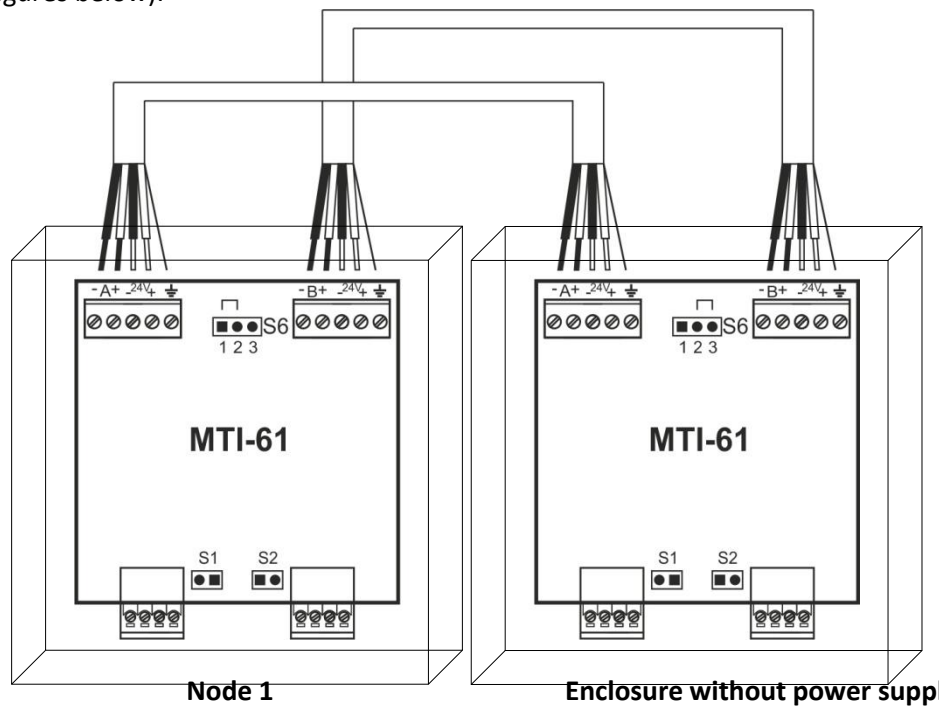


Figure 23.8.2/1 Electrical connections, shielding and terminating - MTI-61 modules

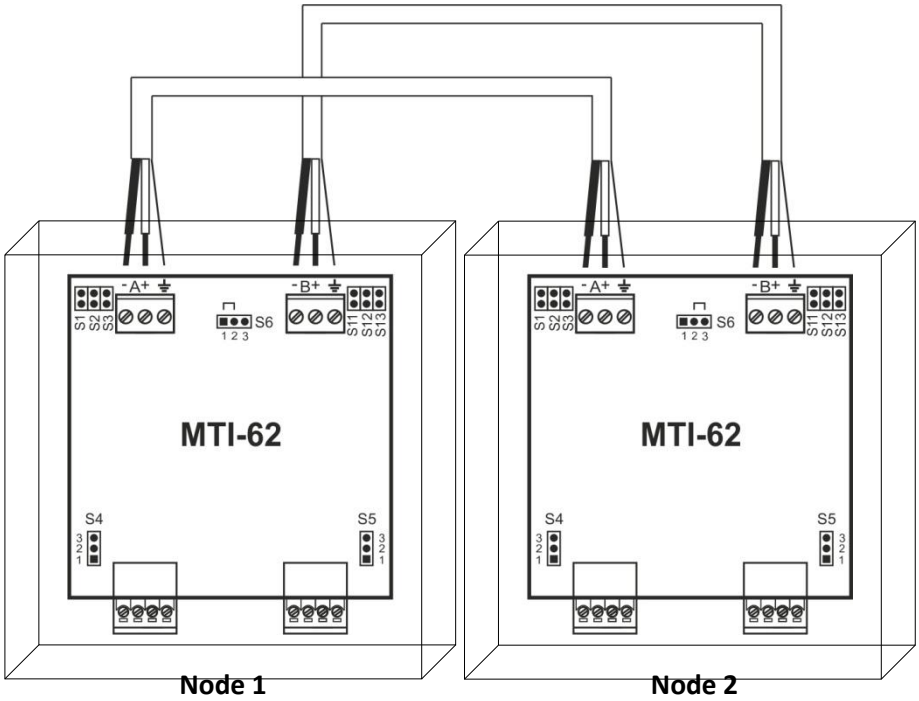


Figure 23.8.2/2 Electrical connections, shielding and terminating - MTI-62 modules

23.8.3 Fibre Optic Connection

Distributed enclosures may be connected using single-mode or multimode fibre optics. The connection can be made depending on the requirements and conditions in the facility with bus or ring (dual ring) layout. In order to implement fibre-optic lines the main POLON 6000 system node and remote nodes must be fitted with MTI-63 modules (two or four, depending on the connection type).

Figure 23.8.3/1 MTI-63 module - SC type plug

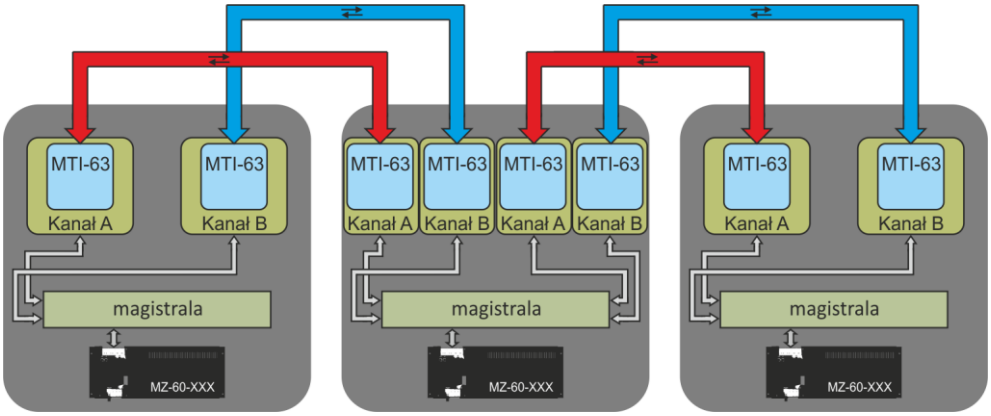


Figure 23.8.3/2 Fibre optic connection - the bus

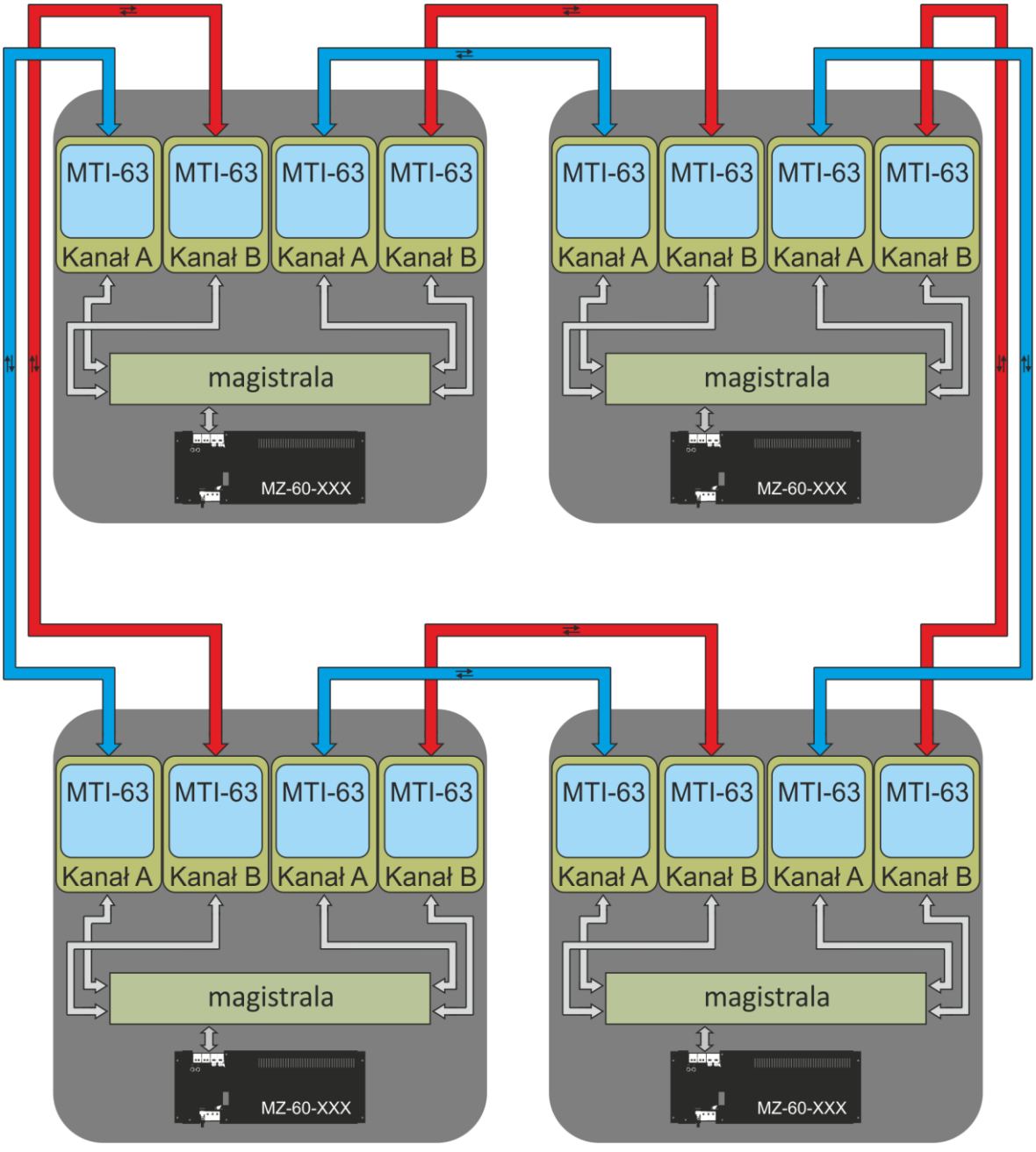


Figure 23.8.3/3 Fibre optic connection - the ring (dual ring)

23.9 Design Guidelines

Reliable installation operation requires looped detection lines. Radial lines should be used in exceptional situations (e.g. if a small number of detectors must be placed at a great distance).

When designing a detection line an address (component number) must be assigned to each addressable line component to allow identification by the control panel. To assure good readability of the installation design and to facilitate servicing it is recommended that each installed addressable line component should have successively increasing addresses - preferably assigned in accordance with numbering algorithm of the control panel at the time of automatic configuration. It is recommended that POLON 6000 system should be fitted with shielded cables. The system should be designed according to all requirements in the technical specification, in particular special care should be taken for the addressable detection line capacity. The resistance of the detection line and line resistance between neighbouring shortcut insulators should be appropriate.

24 Operation and Maintenance

24.1 Proper Use Regulations

The reliability of the control panel is subject to appropriate working conditions, supply voltage, rechargeable batteries state and periodic inspections. Periodic inspections should be carried out by an authorized technician entrusted with installation maintenance by the user. Any fault must b immediately reported to the maintenance technician. When replacing fuses attention should be paid to their nominal values. Do not replace a blown fuse with a spare one of higher nominal value to avoid device fault.

24.2 Periodic Inspections and Regulations for Maintenance

Periodic testing of a distributed POLON 6000 system should be performed at least once a year in accordance with the PKN-CEN/TS 54-14 standard. Every half a year it is necessary to check the protective wire connection for grounding or zeroing the control panel enclosure and to clean the rechargeable batteries cluster terminals.

The rechargeable batteries charging state should be inspected at least once a year. To do this switch the mains voltage off for approximately 2 hours, then switch it back on and check whether the rechargeable batteries cluster will be recharged within 5 hours or less and whether the system will automatically switch to buffering.

Efficiently operated system subject to regular periodic inspections does not require any special maintenance. It is recommended to periodically clean the outer surface of the panel.

25 Packaging, Storage, Transportation

25.1 Packaging

All control panel components are placed in individual packaging that limits the possibility of free movement and eliminates fault during handling and transport.
The following information provided on the packaging:
- manufacturer name or marking,
- component name and type,
- component weight.

The packaging shall bear the following inscriptions: "CAREFULLY BRITTLE", "TOP", "DO NOT KNOCK OVER", "PROTECT AGAINST MOISTURE" or corresponding inscriptions according to PN-85/0-79252 standard.

25.2 Storage Regulations

The control panel modular components shall be stored in enclosed spaces with temperature of 5°C to 40°C and relative humidity of no more than 80%, free of vapours and corrosive gases.

The POLON 6000 system components should not be exposed to heat, solar and heating devices radiation during storage.

25.3 Transportation Regulations

All POLON system components in packaging must be transported in roofed means of transport, taking into consideration transport indications provided on packages and protected from sudden shocks and ambient temperatures outside the range of -25°C to +55°C.

THE END[1]

[1] *ID-E332-001/03.2017*

POLON-ALFA

DECLARATION OF PERFORMANCE

DEKLARACJA WŁAŚCIWOŚCI UŻYTKOWYCH

Nr 1/E332/2015/PL

1. Niepowtarzalny kod identyfikacyjny typu wyrobu: **POLON 6000**

CENTRALA SYGNALIZACJI POŻAROWEJ

Numer typu, data produkcji i numer seryjny umieszczony jest na tabliczce znamionowej wyrobu wg następującego wzoru: **KOD 332 XY ZZZZ**

gdzie: X oznacza rok produkcji, Y- kwartał produkcji, Z-numer seryjny wyrobu.

2. Zamierzone zastosowanie:

Bezpieczeństwo pożarowe – sygnalizowanie o pożarze wykrytym przez współpracujące czujki i ręczne ostrzegacze pożarowe.

3. Producent:

Polon-Alfa Spółka z ograniczoną odpowiedzialnością Sp. k.
85-861 Bydgoszcz ul. Glinki 155

4. System oceny i weryfikacji stałości właściwości użytkowych: **System 1**

5. Normy zharmonizowane:

EN 54-2:1997+A1:2006
EN 54-4:1997+A1:2002+A2:2006

6. Jednostka notyfikowana:

CENTRUM NAUKOWO BADAWCZE OCHRONY PRZECIWPOŻAROWEJ – PAŃSTWOWY INSTYTUT BADAWCZY
nr 1438 przeprowadziło certyfikację wyrobu i wydało
Certyfikat stałości właściwości użytkowych nr 1438-CPR-0374.

7. Deklarowane właściwości użytkowe:

Lp.	Zasadnicze charakterystyki wyrobu	Właściwości użytkowe	Zharmonizowana specyfikacja techniczna EN 54-2:1997 A1:2006 rozdział
1	**Skuteczność w warunkach pożarowych**		
	Wymagania ogólne	Spełnia	4
	Wymagania ogólne dotyczące sygnalizacji	Spełnia	5
	Stan alarmowania pożarowego	Spełnia	7
2	**Opóźnienie reakcji (czas reakcji na pożar)**		
	Odbiór i przetwarzanie sygnałów alarmowych	Spełnia	7.1
	Wyjście związane ze stanem alarmowania	Spełnia	7.7
	Opóźnienie dla wyjść	Spełnia	7.11

1-POLON 6000

POLON-ALFA

Lp.	Zasadnicze charakterystyki wyrobu	Właściwości użytkowe	Zharmonizowana specyfikacja techniczna EN54-2:1997 A1:2006 rozdział
2	Opóźnienie reakcji (czas reakcji na pożar)		
Zależności od więcej niż jednego sygnału alarmowego		Spełnia	7.12
3	Niezawodność eksploatacji		
Wymagania ogólne		Spełnia	4
Wymagania ogólne dotyczące sygnalizacji		Spełnia	5
Stan dozorowania		Spełnia	6
Stan alarmowania pożarowego		Spełnia	7
Stan uszkodzenia		Spełnia	8
Stan blokowania		Spełnia	9
Stan testowania		Spełnia	10
Standardowy interfejs wejście - wyjście		NPD	11
Wymagania dotyczące konstrukcji		Spełnia	12
Dodatkowe wymagania konstrukcyjne dotyczące central sterowanych programowo		Spełnia	13
Znakowanie		Spełnia	14
4	Trwałość niezawodności działania; odporność na działanie ciepła		
Odporność na zimno		Spełnia	15.4
5	Trwałość niezawodności działania: odporność na wibracje		
Odporność na udary		Spełnia	15.6
Odporność na wibracje sinusoidalne		Spełnia	15.7
Wytrzymałość na wibracje sinusoidalne		Spełnia	15.15
6	Trwałość niezawodności działania: stabilność elektryczna		
Kompatybilność elektromagnetyczna (EMC)		Spełnia	15.8
Odporność na zmiany napięcia zasilania		Spełnia	15.13
7	Trwałość niezawodności działania: odporność na wilgoć		
Odporność na wilgotne gorąco stałe		Spełnia	5.5
Wytrzymałość na wilgotne gorąco stałe		Spełnia	5.14
Funkcje fakultatywne			
1	Sygnalizacja		
Sygnalizacja		Spełnia	8.3
Całkowity zanik napięcia zasilania		Spełnia	8.4
Zapisywanie liczby wprowadzeń stanu alarmowania pożarowego		Spełnia	7.13
Alarmowanie współzależne		Spełnia	7.12
Opóźnienie sygnałów na wyjściach		Spełnia	7.11
Blokowanie każdego punktu adresowalnego		Spełnia	9.5
Stan testowania		Spełnia	10

2-POLON 6000

POLON-ALFA

Lp.	Zasadnicze charakterystyki wyrobu	Właściwości użytkowe	Zharmonizowana specyfikacja techniczna EN54-2:1997 A1:2006 rozdział
	Funkcje fakultatywne		
2	**Wyjścia**		
Pożarowe urządzenia alarmowe		Spełnia	7.8
Urządzenia transmisji alarmów pożarowych		Spełnia	7.9
Automatyczne przeciwpożarowe urządzenia zabezpieczające		Spełnia	7.10
Urządzenia transmisji sygnałów uszkodzeniowych		Spełnia	8.9
Standardowy interfejs wejście/wyjście		NPD	11

Lp.	Zasadnicze charakterystyki wyrobu	Właściwości użytkowe	Zharmonizowana specyfikacja techniczna EN 54-4:1997 A1:2002 A2:2006 rozdział
1			
Wymagania ogólne		Spełnia	4
Funkcjonalność		Spełnia	5
Materiały, konstrukcja i wykonanie		Spełnia	6
2	**Niezawodność eksploatacyjna**		
Wymagania ogólne		Spełnia	4
Funkcjonalność		Spełnia	5
Materiały, konstrukcja i wykonanie		Spełnia	6
Dokumentacja		Spełnia	7
Znakowanie		Spełnia	8
3	**Trwałość niezawodności działania: odporność na działanie temperatury**		
Odporność na zimno		Spełnia	9.5
4	**Trwałość niezawodności działania: odporność na wibracje**		
Odporność na uderzenie		Spełnia	9.7
Odporność na wibracje sinusoidalne		Spełnia	9.8
Wytrzymałość na wibracje sinusoidalne		Spełnia	9.15
5	**Trwałość niezawodności działania: stabilność elektryczna**		
Kompatybilność elektromagnetyczna			9.9
6	**Trwałość niezawodności działania: odporność na wilgoć**		
Odporność na wilgotne gorąco stałe			9.6
Wytrzymałość na wilgotne gorąco stałe			9.14

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8. Właściwości użytkowe określonego powyżej wyrobu są zgodne z zestawem deklarowanych właściwości użytkowych.
Niniejsza deklaracja właściwości użytkowych wydana zostaje zgodnie z rozporządzeniem (UE) nr 305/2011 na wyłączną odpowiedzialność producenta określonego powyżej.

Prezes Zarządu Komplementariusza

Bydgoszcz 23.03.2015r.

Dariusz Nagański

4-POLON 6000