

MICROPROCESSOR BASED ADDRESSABLE CONTROL AND MONITORING ELEMENT

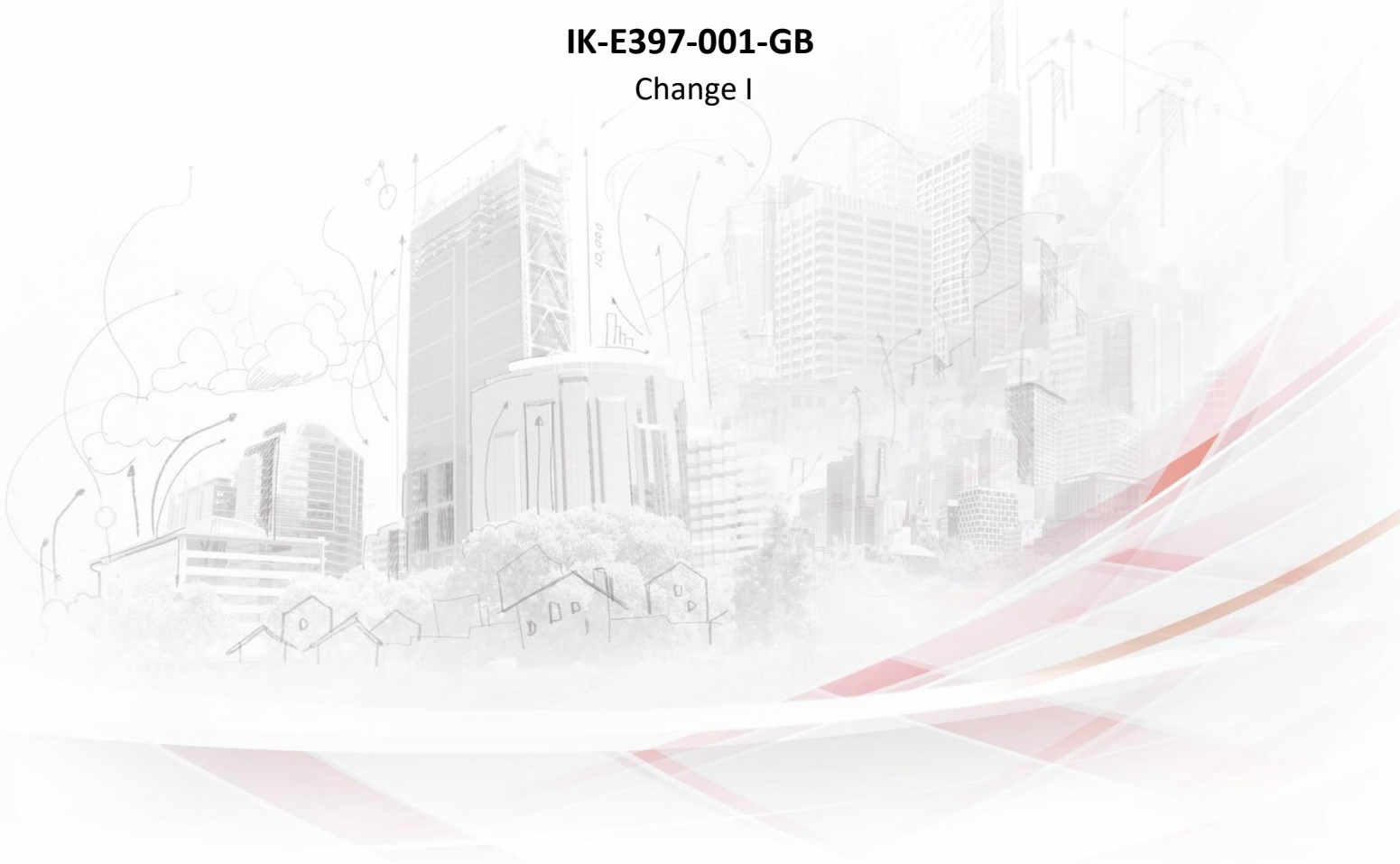
EKS-3222P

POLON 3000 FIRE DETECTION AND ALARM SYSTEM

INSTALLATION AND MAINTENANCE MANUAL

IK-E397-001-GB

Change I



The EKS-3222P control and monitoring element covered by the present manual complies with the requirements of the following European Union Directives:

CPR Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011 laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEG;

LVD Directive 2014/30/EU relating to electrical equipment designed for use within certain voltage limits;

EMC The electromagnetic compatibility (EMC) Directive 2011/65/EU

The CNBOP-PIB, Notified Body No. 1438 has been issued for the product the national certificate of constancy of performance confirming the possession of the technical features/parameters required by EN 54-18:2005+AC:2007 and EN 54-17:2005+AC:2007


The features/technical parameters above the exceeds the requirement of the aforementioned standards and other features/parameters specified in this manual that are not specified in the mentioned standards are confirmed by the Manufacturer.

The Certificate and the Declaration of Performance can be downloaded from www.polon-alfa.com.

Read the manual carefully before the detector assembling and commissioning.

Any nonconformity with the instructions contained in the manual may be harmful or may cause violation of the law in force

POLON-ALFA bears no responsibility for any damage resulting from usage inconsistent with the manual.

A waste product, unsuitable for further use, shall be passed to a waste electric and electronic equipment collection point.	
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NOTE: The manufacturer reserves the right to change specifications of products at any time without prior notice.

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1. Purpose

The EKS-3222P control and monitoring element is an addressable device designed to:

- control automatic protection and fire-fighting devices,
- monitor the above mentioned devices actuation,
- monitor any other equipment.

It is designed to work in the addressable detection lines of the POLON 3000 fire alarm control panels and adapted for both indoor and outdoor use.

The EKS-3222P is equipped with parametric inputs, high-voltage inputs and outputs.

Parametric inputs (IN) of the EKS-3222P element enable the connection of independent, potential-free NC or NO contacts.

The high-voltage inputs (IN HV) of the EKS-3222P element enable the connection of independent contacts with a voltage of (6÷220) VDC or 230 VAC.

The outputs of the EKS-3222P element enable the connection of devices with a current consumption not exceeding 12 A at 230 VAC (starting current max 100 A at max 100 ms or max 250 A at max 50 ms at 230 VAC).

NOTE

Inputs (IN HV) and outputs indicate connector terminals at which voltage may occur exceeding the permissible touch voltage, which is dangerous to humans.

2. Technical Specifications

Operation Voltage	16.5 ÷ 24.6 V
Current draw from detection line (in quiescent mode)	< 610 µA
Short circuit isolator (detection line)	Yes
Device configuration	Programmable from control panel
Number of outputs	2
Controlled device power supply voltage	6 ÷ 220 VDC 230 VAC
Relay controlling output	Potential-free or supervised switchable contact, max current 12 A, max voltage 250 VAC, max power 4000 VA
Fuse	12 A / 250 V; typ TH, slow blow, high power
Control output connected cable monitoring	yes (jumper on the printed circuit board) ON, OFF
Control output fail-safe state	without change, triggered, not triggered
Current draw from power supply unit of controlled device by line continuity monitoring circuit	< 210 µA (6÷220 VDC) < 440 µA (230 VAC)
Number of Inputs	4
Input IN function	Monitoring or alarm
Input IN HV function	Monitoring
Input line capacity	< 12 nF (approx. 100 m YnTKSY 1x2x0,8 mm cable)
Input IN initiation	Potential-free NO or NC
Input IN HV initiation	Live contact
Input IN connected cable monitoring	yes (short-circuit, break/interruption)
Input IN HV connected cable monitoring	N/A
Cable entry: - Cable bushing for surveillance line - IN input cable gland - IN HV input cable gland - Output cable gland	2 x M12, Ø 3-6.5 mm 2 x M12, Ø 3-6.5 mm 2 x M16, Ø 5-10 mm 2 x M16, Ø 5-10 mm
Permissible conductor cross-section	do 2,5 mm ²
Dimensions	Fig. 3.1
Mass	< 0,55 kg
Working temperature range	From -40 °C up to +70 °C
Climate category	40/070/04
Admissible relative humidity	Up to 95 % at 40 °C
Insulation electrical strength	1500 V
IP Rate	IP 66
Material and frame colour	polycarbonate (PC), grey

3. Design description

The EKS-3222P control and monitoring device is made of a printed circuit board with electronic elements and a set of connectors all placed in a single housing.

Wall mounting holes are located in the corners of the frame. Cable entries are in the bottom of the housing.

The M12 cable gland is used to enter detection line or the IN input cable and the M16 - to enter the HV output or IN input cable.

The housing cover is attached to the frame with four screws.

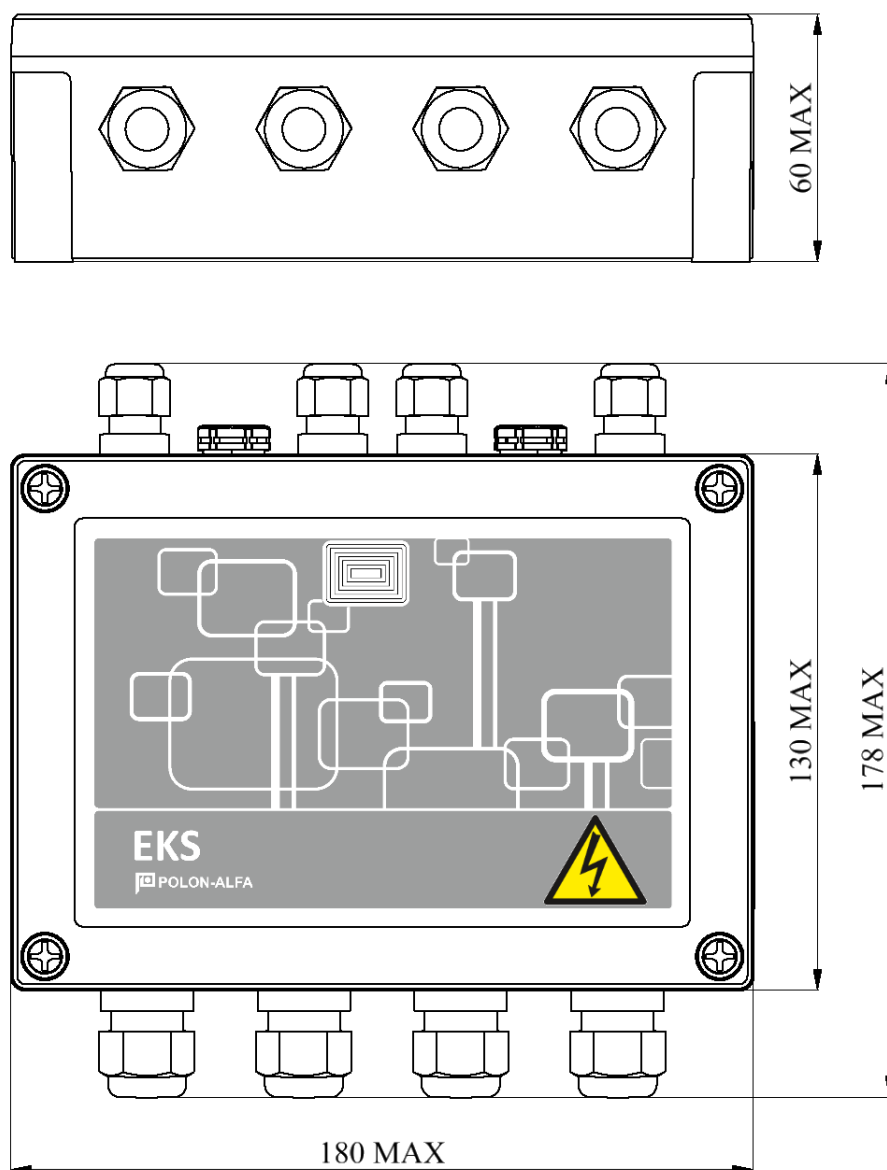


Figure 3.1 EKS-3222P dimensions

4. Principles of operation

Communication between POLON 3000 control panel and the EKS-3222P control and monitoring element is via an addressable two-wire detection line. A unique, fully digital communication protocol allows transfer of any information from the control panel to the element and from the element to the control panel.

The fire protection device (e.g. smoke damper) or fire signaling device (e.g. sounder, beacon) is activated after switching the relay contacts in the control element on a command from the control panel. The relay contacts return to their initial position also upon a command from the control panel.

The EKS-3222P enables the following information to be transmitted to the control panel:

- Writing the address
- Reading the address
- Writing the operating mode
- Reading the operating mode
- Task for outputs with mask
- Start of group outputs
- Stop of group outputs
- Damage of the cable connected to the control output: if it becomes open
- Setting the control output safe state: if there is no power supply - Reporting relay damage
- Setting active X at IN input, switching control or alarm input, NO or NC
- Setting active X or active Y at IN input, three-state control input, NO
- Setting active X at IN HV input, switching control input
- Damage of the cable connected to IN input: in case of short circuit or open circuit
- Short circuit separation
- Location: reporting using a button
- Non-volatile memory corruption: erroneous data stored in non-volatile memory

The way the control element is supposed to operate is determined by the operation mode of this element. The mode of operation of a control element is defined by several data bytes, which indicate the mode of operation and behavior of this element. Automatic configuration of POLON 3000 control panel utilizes the operating mode set by the manufacturer.

Note:

Jumpers marked as ONn, OFFn are used to switch on or off the continuity control of the cable connected to the control output.

If you want to control the continuity of the cable connected to control output 1, the control should be switched on at the control panel and additionally set the jumper to ON1 position in the terminal block at the board edge near the relay. This will result in additional power consumption from an external power source for the controlled device through a cable continuity monitoring system connected to the control output.

The IN input of the control element reacts to a short circuit or open circuit of potential-free contacts. The control panel indicates this change as an active state from the control or alarm input, depending on the operating mode. Short-circuit or open circuit of the input cable is detected with the control element and indicated with the control panel as input cable damage.

IN HV input of the control element reacts to voltage or lack of voltage using the contact. The control panel indicates this change as an active state from the control input.

Example connections of control elements are shown in the Fig. 6.1.

The control element is equipped with an internal short-circuit isolator that separates the operational part of the detection line from the adjacent compact part, which enables its undisturbed operation. The active state coming from the element alarm input is indicated with a flashing red LED located between the detection line terminal block and the IN input terminal block.

The indicator is designed to quickly locate the alarming element and help with periodical functional check of the element. Damage and short-circuit states of the short-circuit insulator are indicated with flashing yellow LED. Jumpers marked as Hix, LOx determine the low power supply level of IN HV outputs and inputs. Full configuration of the control element requires the location of these jumpers to be determined. For example, if you decide to control the continuity of the cable connected to output 1, the jumper should be set in ON1 position, and the controlled device is powered with e.g. 230 VAC, the jumper should be set to HI1, which corresponds to a low state of about 75 V.

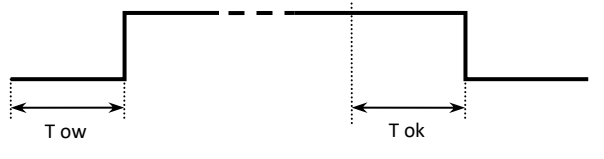

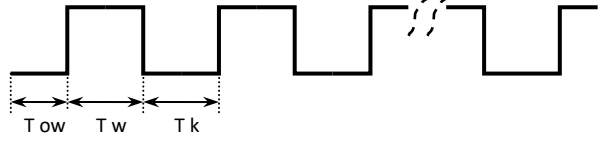
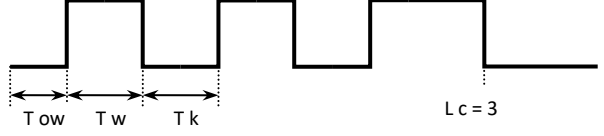
When the controlled device is powered with e.g. 48 VDC, the jumper should be set to LO1, which corresponds to a low state of about 3 V. The same rules apply to IN HV inputs. If the IN HV outputs or inputs are not used, the position of corresponding jumpers is not relevant.

5. Operating modes of the control element

Depending on the type of operation of the control output, its operating mode should be defined.

- a) control output mode (off, continuous, pulse, cyclic, finite cyclic),
- b) timing parameters:
 - triggering delay time (0 ÷ 120 s with 2 s steps, 120 ÷ 1250 s with 10 s steps),
 - delay time (0 ÷ 120 s every 2 s or 120 ÷ 1250 s every 10 s),
 - trigger time time (0 ÷ 120 s every 2 s or 120 ÷ 1250 s every 10 s),
 - reset time time (0 ÷ 120 s every 2 s or 120 ÷ 1250 s every 10 s),
- c) control output safe state (no change, not triggered, triggered),
- d) continuity monitoring of the cable connected to the control output(off, on),
- e) group number - (0, 65535),
- f) number of cycles (0 ÷ 255).

The following table shows the configuration of the control element based on the operation mode of the control output:

Control input operation mode	Parameters to be defined
Off	-
Continous 	Triggering mode Trigger delay time - T_{ow} Reset delay time - T_{ok}
Pulse 	Triggering mode Trigger delay time - T_{ow} Trigger time - T_w
Cyclic 	Triggering mode Trigger delay time - T_{ow} Trigger time - T_w Break time - T_k
Definite Cyclic 	Triggering mode Trigger delay time - T_{ow} Trigger time - T_w Break time - T_k Number of cycles - L_c

6. Operating conditions

Reliable operation of EKS-3222P control and monitoring element depends on proper operating conditions, correct installation and regular periodic inspections. The inspection is carried out in order to determine the proper operation of the element as well as its proper cooperation with the control panel. The inspection should be carried out at least every 6 months by a qualified person who is familiar with the element operation to such extent that its operation irregularities can be detected. The inspection involves the functional check of the element in an operational alarm system.

Note:

Inspections should be carried out with special care. All persons concerned shall be informed if the inspection involves the test of actuation devices. When carrying out any repair work, control elements should be protected with a painting tape. Elements damaged during painting and repair works by workers carrying out these works (e.g. painted, sealed with paint enclosure, etc.) are not subject to warranty. Control element is equipped with "TEST" button to enable testing the element communication with the control panel and determining its location within the premises of the facility. After pressing and holding the "TEST" button for approx. 2 seconds, the element yellow LED starts flashing, which denotes correct communication with the control panel.

To press the "TEST" button, insert a screwdriver into the hole to a depth of not less than 4 mm and move in the direction indicated by the arrow until you hear a "click". The screwdriver tip should have dimensions no larger than 4 x 1 mm. The way to press the TEST button is shown in Figure 6.1.

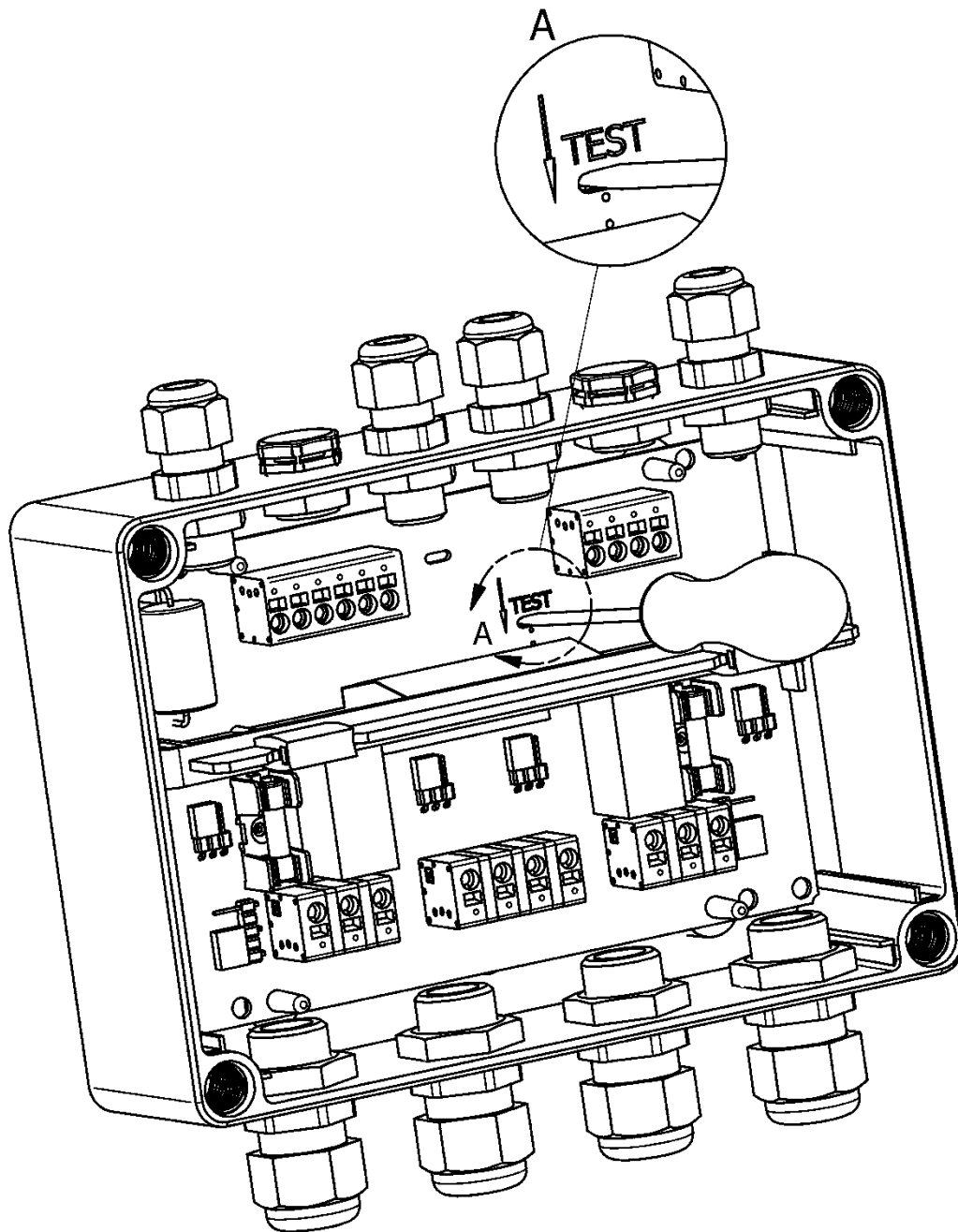


Figure 6.1 TEST button access/pressing method

7. Installation of control elements

It is recommended to install EKS-3000 control and monitoring elements in a detection line near controlled devices.

The elements can operate in loops, loops with simple branches or in radial detection lines of POLON 3000 control panels. (See Operation and Maintenance Manual of POLON-3000 control panel).

Connection method of EKS-3222P (2 high-voltage inputs (IN HV), 2 parametric inputs (IN) and 2 high-power outputs (12 A at 230 V) is shown in the Figure 7.1.

Control element enclosures should be fixed to the walls or ceilings through the corner mounting holes with four screws. Screws with $\Phi 6$ wall plugs are recommended.

Installation cables should be inserted through cable bushings.

Detection line of IN input should be inserted via the M12 cable bushing with a diameter (Φ) 3-6.5 mm. IN HV output or input should be inserted via the M16 cable bushing with a diameter (Φ) 5-10 mm. When inserting cables into the enclosure, make sure that they are properly sealed in the cable bushings and unused ducts are blanked off.

When connecting installation cables, use a screwdriver, the working part of which should be inserted into the smaller opening of the connector, then insert the cable into the larger opening and pull out the screwdriver. It is recommended to use a short bent screwdriver, 3,5×0.5 mm, cat. no. WAGO 210-258 (available for purchase at Polon-Alfa). Connect the cables as described at the connectors. There is a sticker on the enclosure cover that shows the functions of EKS-3222P terminals, depending on the element type, as shown in the Figure 7.1. Connect the shields of detection line cables to the fields marked as SHLD. Route the alarm system cables in accordance with the regulations applicable to low-voltage electrical installations.

Elements should not be installed in rooms with corrosive atmosphere, containing corrosive gases, corrosive fumes or dust.

EKS-3222P control and monitoring elements can be mounted outside the facility, they have two "Pressure equalizing elements" placed between M12 cable entries.

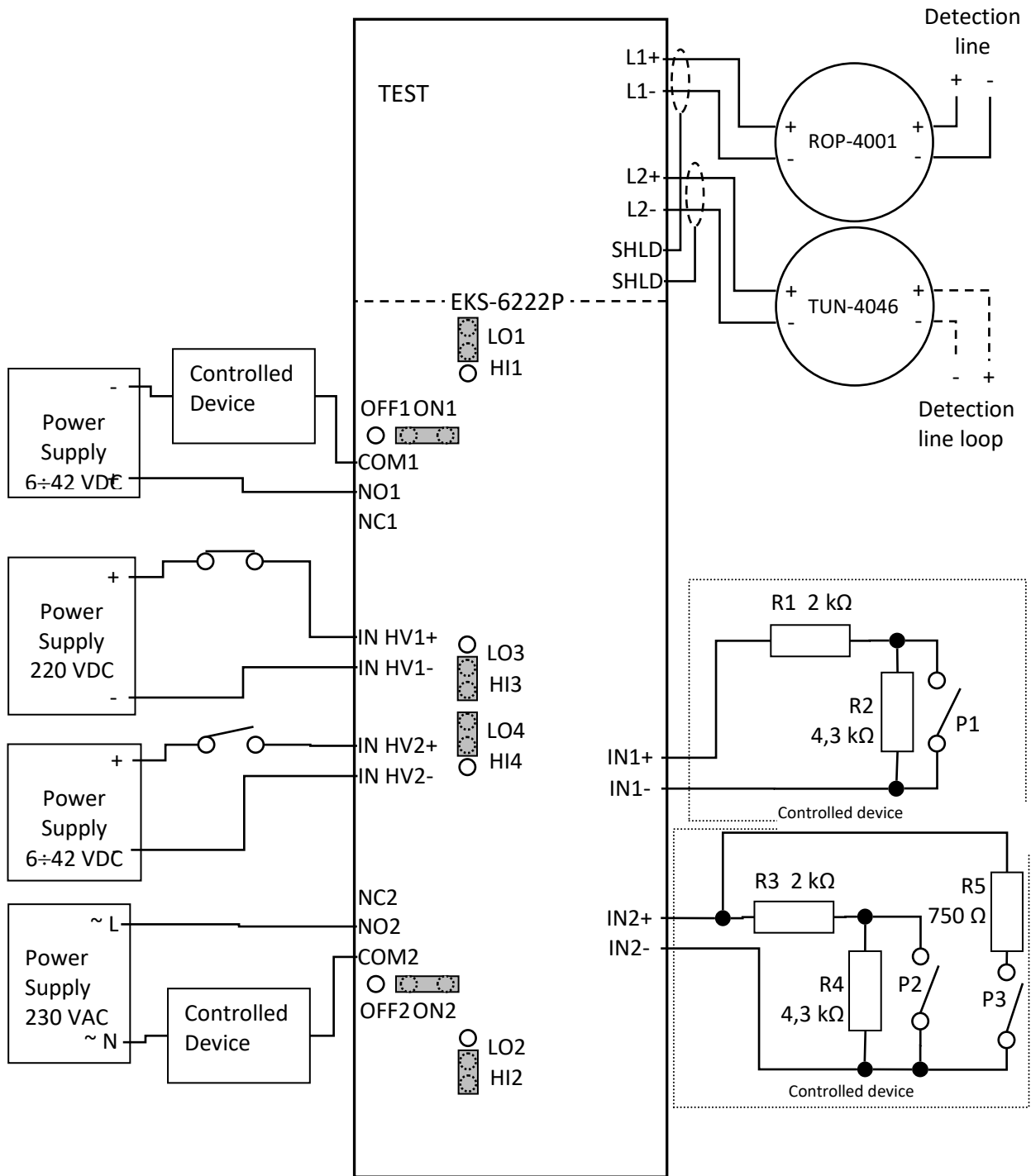


Figure 7.1 EKS-3222P Sample connection diagram

8. Safety Conditions

8.1. Repair and Maintenance

Maintenance and periodic inspections must be carried out by personnel that is authorised or trained by POLON-ALFA. All repairs must be carried out by the manufacturer. POLON-ALFA is not responsible for the operated equipment maintained and repaired by unauthorised personnel.

8.2. Work at height

Work at height related to the installation of control elements must be carried out with special care using equipment and tools in sound condition. Please pay particular attention to the stability of ladders, elevators, hoists, jacks etc. Power tools should be used in accordance with safe working conditions specified in relevant manufacturer's instructions.

8.3. Eye protection against dust

Protective goggles and dust masks should be worn during work that produces large amount of dust, especially when drilling holes in ceilings in order to fix enclosure bases of control elements.

8.4. Protection against electric shock

When installing control elements, observe relevant national regulations for low-voltage electrical installations. Any work may only be carried out by personnel authorised to do so. If used voltage is higher than the permissible low voltage, the voltage must be switched off before opening the enclosure cover.

Fix the detection line shields to the connectors in a snug manner, without excessive slack. The remaining cables should be insulated at the appropriate length so that only the insulated part is accessible after insertion into the connectors. This will reduce accidental short circuits between cables. Avoid crossing detection line and input (IN) cables with output and input (IN HV) cables.

9. Storage and Transport

9.1. Storage

EKS-3222P control and monitoring element should be stored in closed rooms, with no corrosive fumes or gases, at the temperature range from 0 °C to +40 °C, with relative humidity not exceeding 80 % at the temperature of +35 °C.

Elements should not be exposed to direct sunlight or heat from heating equipment during storage. Storage time of elements in the transport packaging should not exceed 12 months.

9.2. Transport

EKS-3222P control and monitoring elements should be transported in closed spaces of transport vehicles, in a packaging corresponding to the requirements of the applicable transport regulations. Transport temperature should not fall below –40 °C or exceed +55 °C and the relative humidity should not exceed 95 % at +45 °C.



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