POLON-ALFA

POLON 3000
FIRE ALARM SYSTEM

CONTROL and MONITORING ELEMENT TYPE EKS-3022

Installation and Maintenance Manual
IK-E398-001-GB

Edition I

The EKS-3022 control element, which i the subject of this Manual, meets the essential requirements of the following regulations of the European Parliament and of the Council (EU) and European Union directives:

CPR CPR/305/2011 Regulation (EU) of the European Parliament and of the Council of 9 March 2011 laying down harmonised conditions for the marketing of consumer products repealing Council Directive 89/106/EEC;

LVD Directive 2014/35/EU on electrical equipment intended for use within certain voltage limits;

EMC Directive 2014/30/EU on electromagnetic compatibility.

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

The Manufacturer's technical features/parameters exceeding the requirements of the listed standards and other features/parameters of the product specified in this manual not specified in the listed standards are confirmed by the Manufacturer.

The certificate and the Declaration of Performance are available on the website www.polon-alfa.com

Before starting installation and operation, read the contents of this manual.

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

The manufacturer of POLON-ALFA is not responsible for damage caused by use not in accordance with these instructions.

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

Note – The right to make changes is reserved

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1. Purpose

EKS-3022 universal control and monitoring element is an addressable device designed for:
- control of automatic safety and fire protection devices,
- monitoring of the above mentioned devices,
- monitoring of equipment condition.

EKS-3022 control and monitoring element is intended for use in addressable detection lines of the POLON 3000 fire alarm control panel.
The element is designed for indoor and outdoor operation.
Device is equipped with parametric inputs and outputs.
The parametric inputs (IN) of the EKS-3022 element enable connection of independent, volt-free normally closed or normally open contacts.
The outputs of the EKS-3022 control and monitoring element allow to connect devices with current consumption not exceeding 2 A (inrush current max. 6 A at max. 5 ms).
Note: (NO, COM, NC) denotes connector terminals where a voltage exceeding permissible low voltage that is dangerous to humans, can be present.

EKS-3022 control and monitoring element is equipped with 2 inputs and 2 outputs.

2. Technical specifications

Control and monitoring Element type	EKS-3022
Detection line supply voltage	16.5 ÷ 24.6 V
Current consumption from the detection line	< 220 µA
Detection Line short-circuit isolator	yes
Configuration of control element	from the control panel
Number of outputs	2
Supply voltage of the controlled device	6 ÷ 220 VDC 230 VAC
Relay control output	potential-free or supervised, changeover contact, max. power 62.5 VA / 60 W, resistive load max. 2 A current at 30 VDC, max. 250 VAC at 0.25 A / 220 VDC at 0.27 A
Continuity control of the cable connected to the control output	yes (jumper on PCB) off, on
Control output safe state	no change, not driven, driven
Current consumption in the continuity control circuit of the cable connected to the control output	< 210 µA (6÷220 VDC) < 440 µA (230 VAC)
Number of Inputs	2 IN
Input Function	(IN) monitoring or alarm
Input initiation	(IN) potential-free NO or NC contact
Monitoring of the cable connected to the input	(IN) short circuit, open
Input line capacity	< 12 nF (approx. 100 m of YnTKSY 1x2x0.8 mm cable)
Cable Entry: - Detection line cable gland - Input IN cable gland - Output cable gland	 2 x M12 2 x M12 2 x M16
Conductor permissible cross-section	up to 2.5 mm^2
Dimensions	
Weight	< 0.5 kg
Operating Temperature	-40 °C to +85 °C
Climate category	40/085/04
Permissible relative humidity	up to 95 % at 40 °C
Electrical strength of insulation	1500 V
Ingress protection	IP 66
Enclosure material and colour	Polycarbonate (PC), Grey

3. Design description

The EKS-3022 control and monitoring element is made in the form of a printed circuit board with electronic components and a set of connectors, that has been put inside an enclosure.
The enclosure has wall mounting holes located in the corners.
In the base of the housing, along the long sides, cable glands are installed, which shown in the figure:
Cable glands are mounted along sides of the enclosure base as shown in the figure .
The M12 gland is used for the detection line cable or the input cable, and the M16 gland is used to for the output cable.
The enclosure cover is attached to the base of the enclosure with four screws.

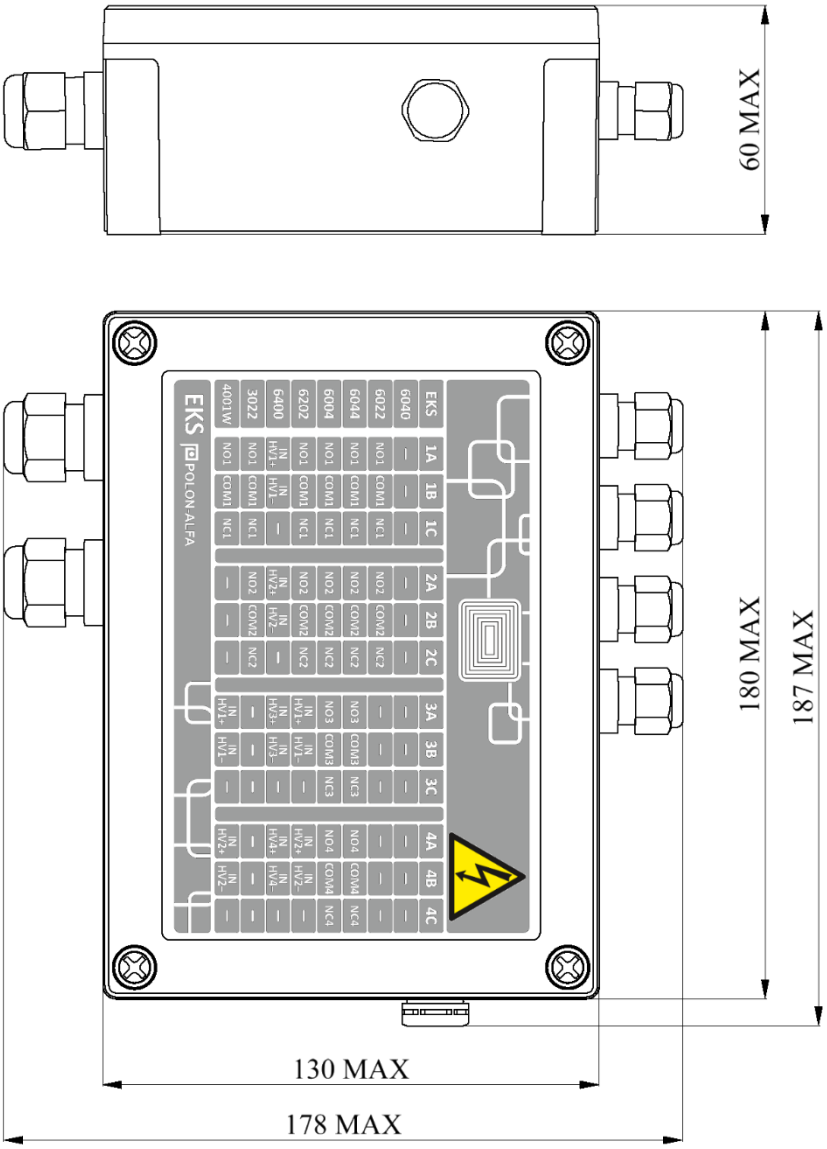


Figure 3.1 EKS-3022 Dimensions

4. Principles of operation

Communication between the POLON 3000 control panel and the EKS-3022 control and monitoring element is carried out via an addressable two-wire detection line. A unique, fully digital communication protocol allows any information to be transmitted from the control panel to the component and from the element to the control panel. Activation of a fire protection equipment (e.g. smoke damper) or a fire signalling device (e.g. sound signalling device, light signalling device) takes place after switching the relay contacts in the control element on command received from the control panel. The relay contacts are also returned to their initial position on command from the control panel.
The EKS-3022 control and monitoring element transfers the following states 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 becomes open,
- setting the control output safe state: if there is no power,
- relay fault reporting,
- setting an active state X from input IN, two-state control or alarm input, NO or NC,
- setting an active X or active Y state from input IN, three-state control input, NO,
- damage of the cable connected to the input IN : in case of short circuit or open circuit,
- short circuit separation,
- location (report from the TEST 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 behaviour of this element. After automatic configuration of the POLON 3000 control panel the inputs IN and outputs are inactive. After setting the input IN to active state, it is possible to set the operating modes for individual inputs. After setting the input to the active state, it is possible to set operating modes for individual inputs.

Note:

Jumpers marked ONx, OFFx are used to switch on or off the continuity control of the cable connected to the control output.
If we want to supervise the continuity of the cable connected to the control output 1, the control should be switched on at the control panel and additionally the jumper set to ON1 position in the terminal block at the board edge near the relay. Current strength will then be additionally increased from an external power source supplying the controlled device by the cable continuity control system.
The INn 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 monitoring or alarm input, depending on the operating mode. Short circuit or open circuit of the input cable is detected by the control and monitoring element and indicated by the control panel as an input cable damage.

An example of the connection of the control and control element is shown in the drawing: **Figure 7..**
The control and monitoring 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.
Fault and short-circuit states of the short-circuit isolator 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

If the outputs are not used, the position of the corresponding jumpers is not relevant.

5. Control and monitoring element operating modes

Based on the type of control input operation, its mode of operation should be defined.

a) activation monitoring,
b) state monitoring,
c) fire alarm.

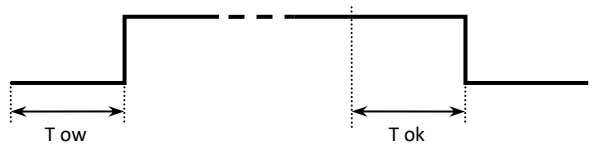
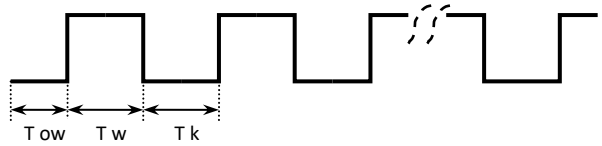
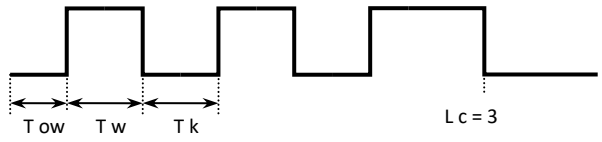
If the input operating mode is selected as activation monitoring or state monitoring , two-state or three-state operation mode is possible.
It is also necessary to set the way the input works with a potential-free NO or NC contact.

A supervised output should be assigned for controlled output.
For the alarm input, it is necessary to assign it to the detection zone.

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

a) Control output mode - (continuous, timed, pulse, pulse finite)
b) Timing parameters:
    - Triggering delay time (0 ÷ 120 sec every 2 sec or 120 ÷ 1250 sec every 10 sec)
    - Delay time (0 ÷ 120 sec every 2 sec or 120 ÷ 1250 sec interval 10 sec)
    - Trigger time (0 ÷ 120 sec every 2 sec or 120 ÷ 1250 sec every 10 sec)
    - Reset time (0 ÷ 120 sec every 2 sec or 120 ÷ 1250 sec every 10 sec)
c) Control output safe state:
    - Yes (triggered, untriggered)
    - No (no change)
d) Continuity monitoring of the cable connected to the control output – (Yes, No)
e) Group number - (0 ÷ 65535)
f) Number of cycles (0 ÷ 255)

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

Control output operation mode	Parameters to be defined
Disabled	-
Continuous 	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 Reset time - T k
Definite cyclic 	Triggering mode Trigger delay time - T ow Trigger time - T w Reset time - T k Number of cycles - L c

6. Maintenance and operation

Reliable operation of the EKS-3022 control and monitoring element depends on maintaining proper operating conditions, installation and regular periodic inspections. The inspection is carried out in order to determine the proper operation of the element and its correct cooperation with the control panel. The inspection should be carried out at least every 12 months by a qualified person who is familiar with element operation to such extent that its irregularities in operation can be detected. The inspection involves the functional check of the element in operational alarm system.

Note:
Inspections should be carried out with special caution. All persons concerned shall be notified if the inspection involves the test of actuation devices.
During all renovation works, control elements should be protected with painter's tape. Elements damaged during painting and repair works by persons conducting these works (e.g. painted casing, sealed with paint enclosure, etc.) are not subject to warranty repairs.

Control and monitoring element is equipped with a "TEST" button to enable testing the element communication with the control panel and determining its location within the premises of the facility. After pressing the "TEST" button and holding it for about 2 seconds, the element starts flashing a yellow LED, which indicates proper communication with the control panel.

7. Installation

It is recommended to install EKS-3022 control and elements on the detection line near controlled devices.
The elements can work in loop, loop with straight branches or in radial detection lines of POLON 3000 control panels (see the Operation and Maintenance Manual for POLON-3000 control panel).
Connection method for the EKS-3022 (2 inputs, 2 outputs) is shown in the figure: Figure 7..
Control element enclosure should be fixed to the walls or ceilings through the corner mounting holes with four screws. Screws with Φ6 wall plugs are recommended. Installation cables should be placed through cable glands.

The detection line or input IN should be positioned through the M12 gland for cable of Φ 3 ÷ 6.5 mm in diameter. The output should be entered through the M16 gland for cable with Φ 5 ÷ 10 mm in diameter. It is important to pay attention to proper sealing in cable grommets and plugging unused entries when inserting cables in the enclosure.
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 wires as described on the connectors. Functions of individual EKS-3022 terminals are located on the top cover of the enclosure as shown in the Figure 7.. Connect the detection line shields to the fields marked SHLD.
The wires of the alarm system should be laid in accordance with the regulations applicable to low-voltage electrical installations.
Control elements are not recommended to be installed in rooms with a corrosive atmosphere, containing gases and caustic vapours as well as dust.
The EKS-3022 control and monitoring elements that are to be installed outside the facility are recommended to be equipped with a "Pressure equalization element". For this purpose, a Φ 12 mm hole must be drilled anywhere on the side wall of the housing base (e.g. near the type plate) and the "Pressure equalizer" secured with a locknut.

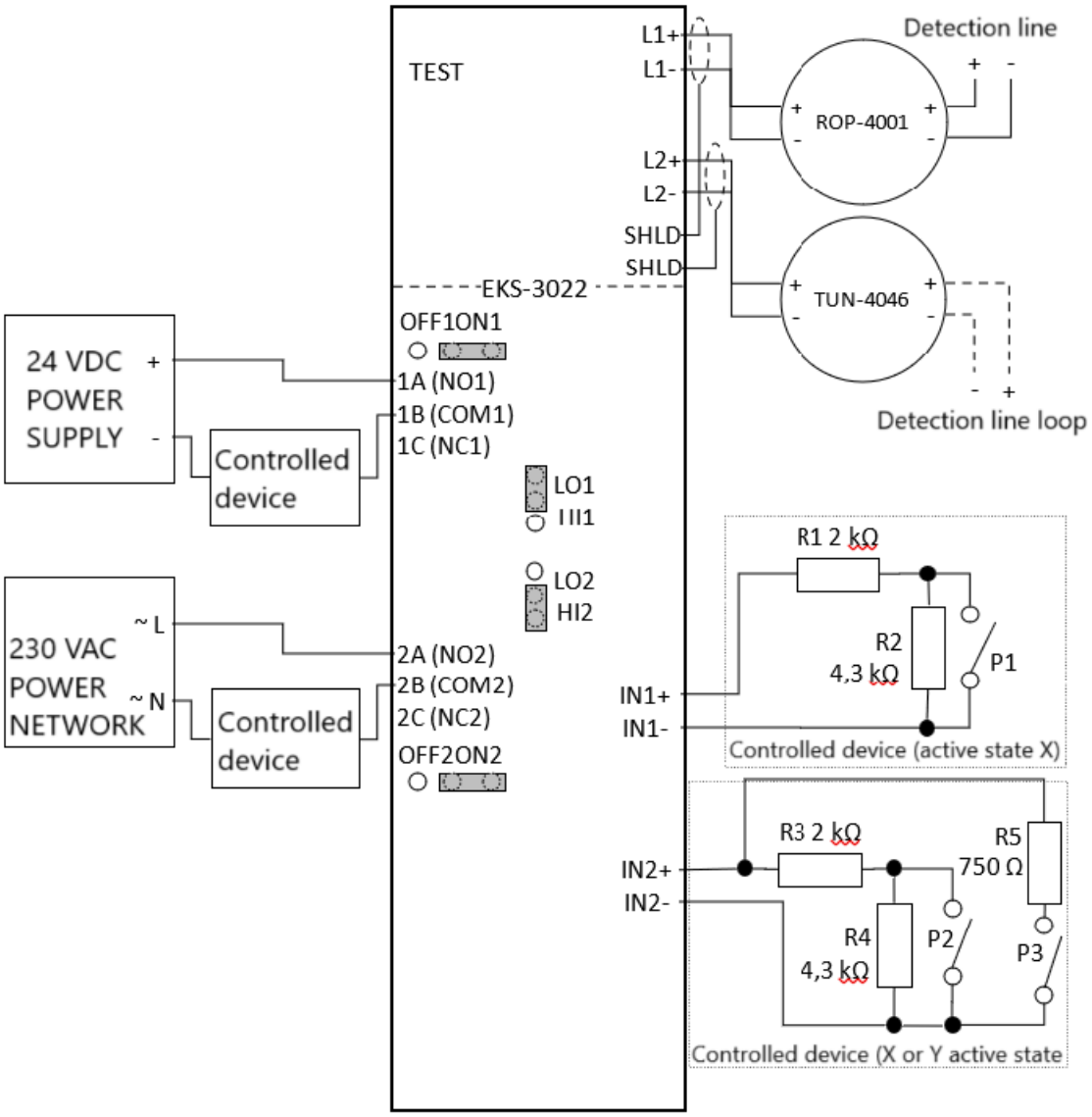


Figure 7.1 EKS-3022 connection diagram

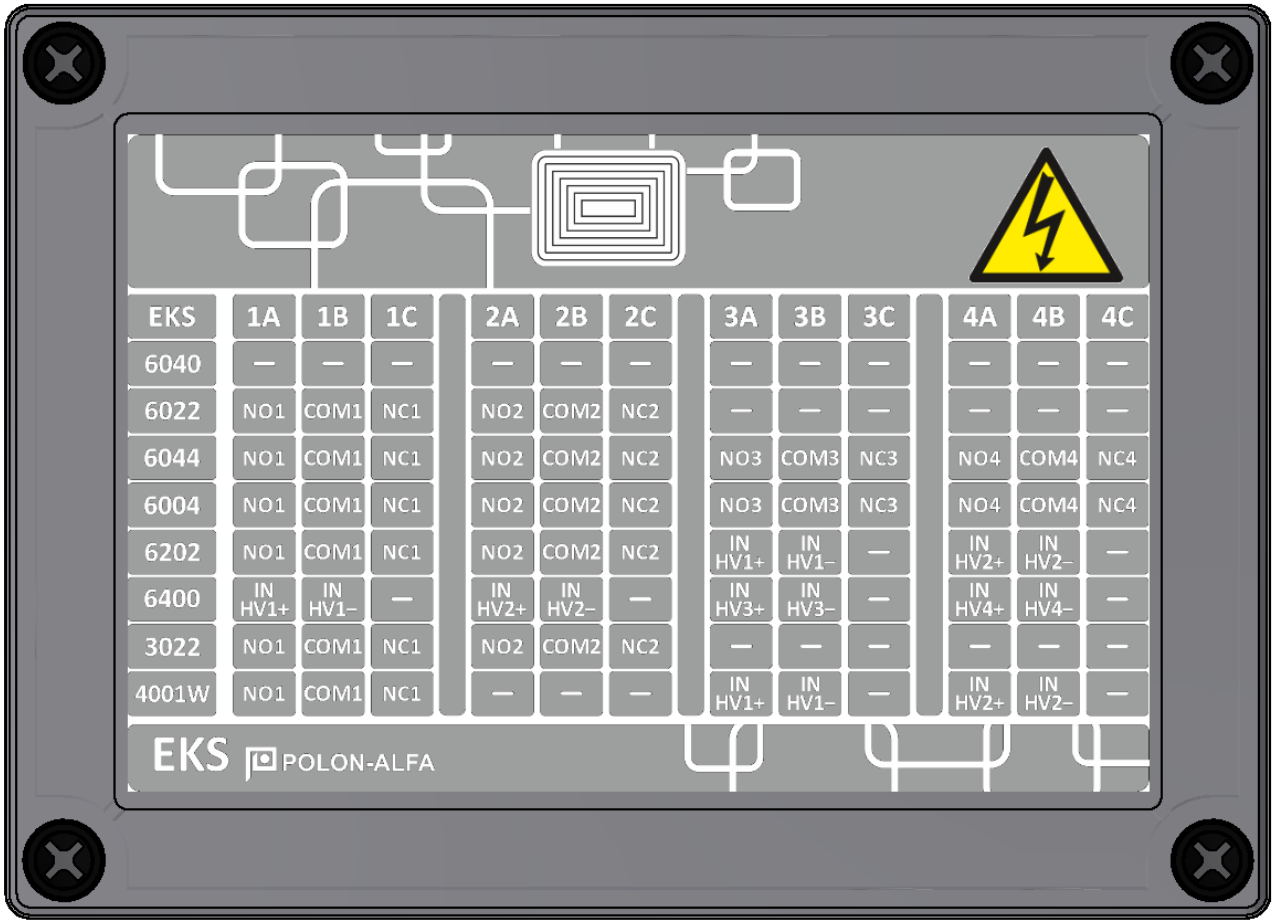


Figure 7.2 EKS-3022 Enclosure Cover with Terminal Functions

8. Safety conditions

8.1. Repairs and maintenance

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

8.2. Works at height

Work at height related to the installation of control elements should be carried out with special caution with the use of functional equipment and tools. Particular attention should be paid to the stability of ladders, lifts, etc.
Power tools must be used in accordance with the conditions of their safe operation specified in the relevant manufacturer's instructions.

8.3. Anti-dusting eye protection

During work that generates a large amount of dust, especially when drilling holes in ceilings to attach the bases of the control enclosures, safety goggles and dust masks should be used.

8.4. Protection against electric shock

When installing the control elements, the relevant national regulations for low-voltage electrical installations must be followed. All work can only be performed by authorized persons.
If the system uses a voltage higher than the permissible touch voltage, this voltage must be switched off before opening the enclosure cover.
Detection line screens must be close fixed with the connectors without unnecessary excess.
Strip the remaining wires at the appropriate length so that only the insulated part is available when inserted into the connectors. This will reduce accidental short circuits between wires.
Avoid crossing the detection line and input (IN) wires with the output wires.

9. Storage and transport

9.1. Storage

The EKS-3022 control elements should be stored in enclosed spaces where no caustic vapours and gases are present, with the temperature between 0 °C to +40 °C, and the relative humidity not exceeding 80 % at a temperature of +35 °C.
During storage, the components should not be exposed to direct sunlight or heat from heating devices.
The shelf life of the components in the transport packaging should not exceed 12 months.

9.2. Transport

The EKS-3022 control elements should be transported in confined spaces of means of transport, in packaging that meets the requirements of the applicable transport regulations.
The temperature during transport should not be lower than -40 °C and above +55 °C, and the relative humidity should not exceed 95 % at +45 °C.

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