

# UNIVERSAL HEAT DETECTOR

## **TUN-6000**

TUN-6046 and TUN-6043 Variants

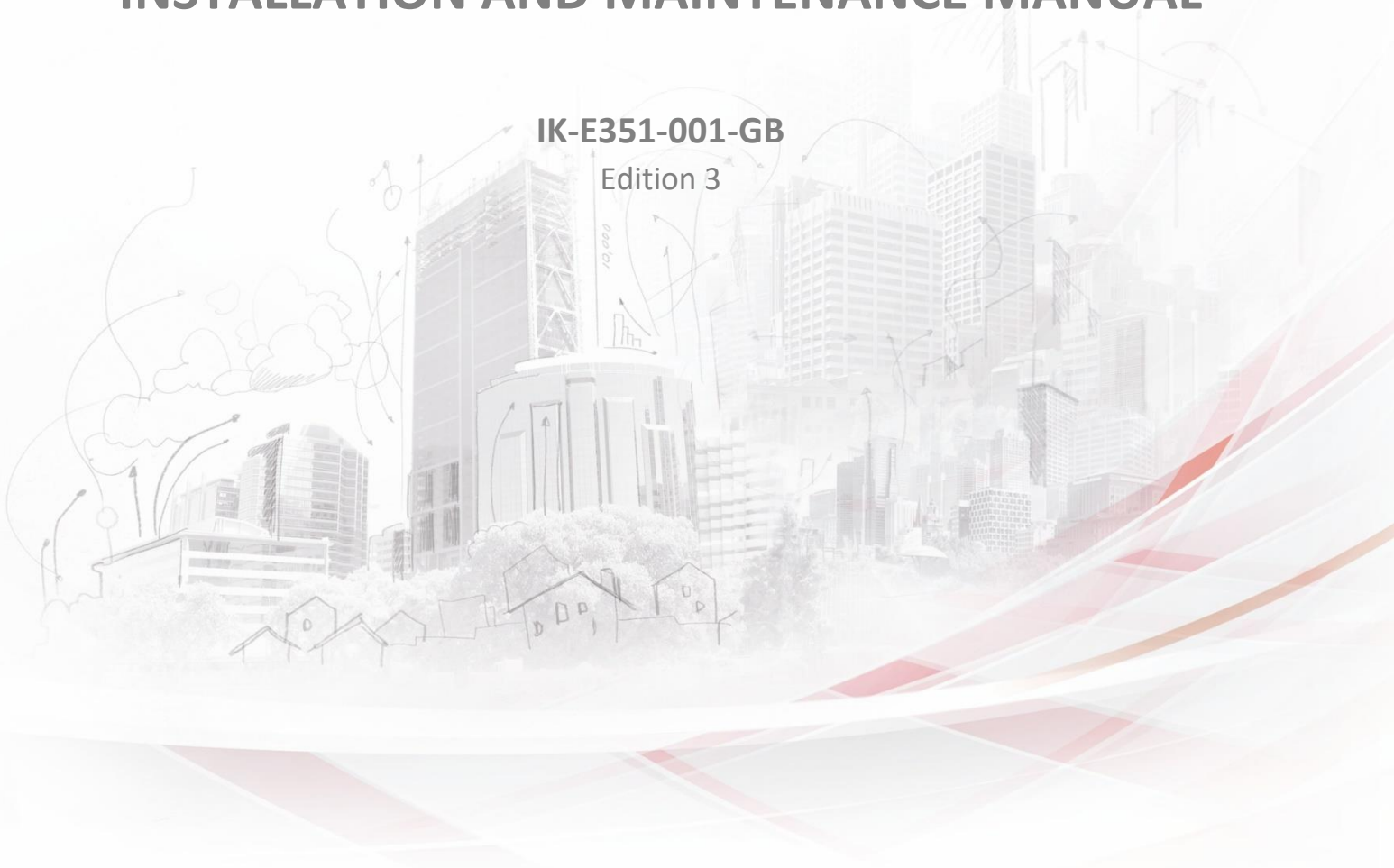
POLON 3000, POLON 4000 and POLON 6000 INTERACTIVE FIRE DETECTION AND ALARM SYSTEM

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## INSTALLATION AND MAINTENANCE MANUAL

**IK-E351-001-GB**

Edition 3



TUN-6000 point heat detectors in TUN-6046 and TUN-6043 variants, which are the subject of this manual, meet the essential requirements of the following regulations of the European Parliament and of the Council (EU) and European Union directives:

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

**EMC** Directive 2014/30/EU on electromagnetic compatibility.

CNBOP-PIB, notified body No. 1438, issued a certificate of constancy of performance confirming the possession of technical features/parameters required by EN 54-5:2017+A1:2018 and EN 54-17:2005 + AC:2007 standards.

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 at [www.polon-alfa.com](http://www.polon-alfa.com)

Read the contents of this manual before starting the installation and operation process. Failure to follow recommendations included in this manual may prove dangerous or result in a violation of applicable regulations.

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

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



**Note** - Right to make changes reserved

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## 1 INTENDED USE

TUN-6000 programmable, addressable, point heat detectors in TUN-6046 and TUN-6043 variants are designed to detect and signal fire hazards or fires in closed rooms, where a rapid temperature increase may occur in the first phase of a fire, or when the temperature in the room rises to a value constituting a fire hazard. The detector enables to program the response method at the installation site, i.e. it is possible to set the detector class and the mode of operation according to EN 54-5.

Division of detectors is based by compatibility with individual control panels and systems, and is presented in the table below.

Detector type	Compatible systems/control panels			
	POLON 4100 POLON 4200 Control panel	POLON 3000 SYSTEM Control panels	All POLON 4000 SYSTEM Control panels	POLON 6000 SYSTEM Control panels
TUN-6046	YES	YES	YES	YES
TUN-6043	YES	YES		

**The TUN-6043 universal smoke detectors do not support interactive alarm variants. All other parameters of the TUN-6046 and TUN-6043 detectors are identical.**

All detectors are equipped with an internal short-circuit isolator.

In the following part of the manual, the TUN-6000 detectors in the TUN-6046 and TUN-6043 variants will be referred to as "detectors".

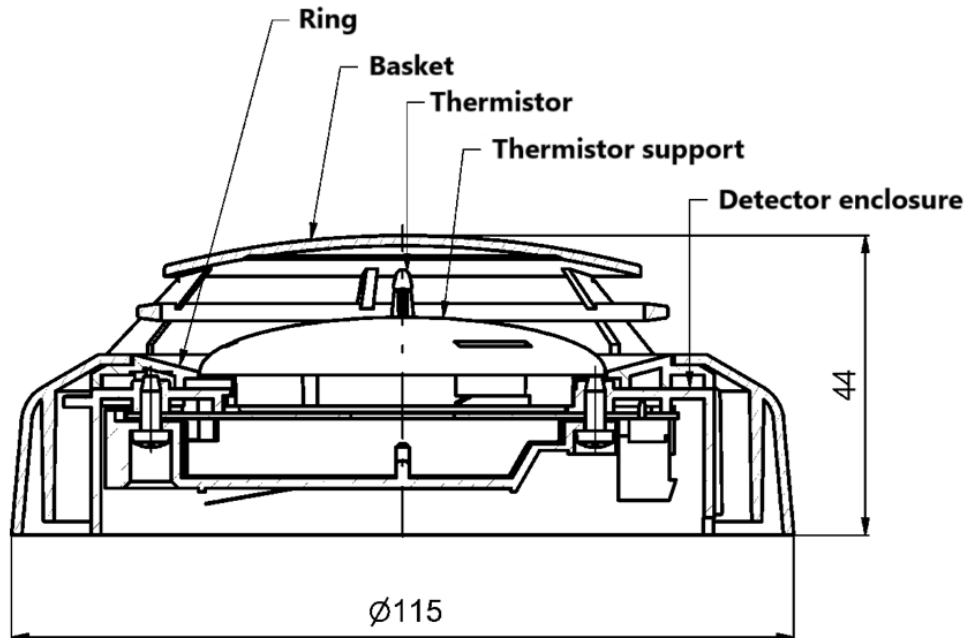
## 2 TECHNICAL SPECIFICATIONS

Operating voltage	16.5 V ÷ 24.6 V
Maximum quiescent mode current consumption	≤ 150 µA
Detector class according to EN-54-5	A1, A2, B, A2S, BS, A1R, A2R, BR
Permissible relative humidity	up to 95 % at 40 °C
Minimum Operating Temperature	- 25 °C
Dimensions (with base)	ø115 mm x 56 mm
Mass	0.2 kg
Detector colour	white
Address encoding	programmable from the control panel

## 3 DESIGN DESCRIPTION

The detector mechanical construction is shown in Figure 3.1. The main part of the detector is the detection system, which consist of a thermistor. The thermistor, protruding above the detector casing is located in the central point and the basket protects it from mechanical damage. The detecting system is fixed to a printed circuit board that contains all electronic elements and the detector operation

monitoring processor. The detector shape and construction enable free ambient air flow and its direct impact on the detection system. The whole structure is placed in a white plastic housing, which consists of: basket, detector cover, ring and a screen. The TUN-6043/6046 detector is installed in the G-40 base where detection line cables are connected to.



*Fig. 3.1. Heat detector design*

## 4 PRINCIPLE OF OPERATION

The heat detector reacts to the increase in temperature that occurring during initial phase of a fire. The detector operates in two ways:

- as a fixed temperature detector - after exceeding its set-up temperature activation threshold, pursuant to its given class;
- as a rate-of-rise heat detector – when a rapid rise of temperature exceeds the level determined for the detector, pursuant to its given class.

The microcontroller monitors detector operation, collecting data concerning the ambient temperature around the detecting circuit, carries out measurement analyses, makes decisions and is responsible for communication between the detector and the fire detection control panel.

The detector alarm mode is signalled with flashing light of a red diode which is located in the detector casing. The indicator enables quick location of the activated detector and is helpful during periodic detector operation inspections. In case the detector is poorly visible or installed in hardly accessible place, it can be equipped with an additional optical actuation indicator (WZ) that should be mounted in an accessible and visible place.

Communication between the POLON 3000, POLON 4000 or POLON 6000 fire alarm control panels and the TUN-6043/6046 detectors is provided by a two-wire addressable detection line. A unique, fully digital communication protocol enables passing any information from the control panel to the detector and

inversely. Apart from sending to the control panel the temperature value estimation and a tendency of its change, the detector can transmit – on the control panel request – the current analogue value.

The microprocessor controlling the detector operation monitors its basic systems proper operation and, in a case of irregularity, delivers relevant information to the control panel.

The detector is equipped with an internal short-circuit insulator that cuts off an efficient part of detection line from the neighbouring shorted section what enables the detector further undisturbed operation. the alarm mode is indicated with pulse red light emitted by the signalling diode.

## 5 DETECTOR OPERATING MODES

The detector has the ability to choose how to react at the installation site, according to a specific class. This is the so-called basic mode of operation of the heat detector. It is set from the control panel by selecting one of the classes: A1, A2, B, A2S, BS, A1R, A2R or BR. Heat detector with selected class A2S, BS only works redundantly. All basic operating modes are compliant with the EN 54-5 standard.

Basic operating mode	Detector Class
1	A1
2	A2
3	B
5	A2S
6	BS
7	A1R
8	A2R
9	BR

Detectors operating in the POLON 6000 system also enables to program an additional mode of operation and a group address. The additional operating mode applies to the terminal configuration of the actuation indicator, while the group address applies when the additional operating mode is equal to 2.

WZ clamp additional working mode	Description
0	Single WZ works in a standard configuration (as in the POLON 4000 system).
1	Multiple WZ connected to the plus power supply. It is possible to connect from 2 to 5 actuation indicators (duplication of the red LED flash).
2	Multiple WZ connected to the power plus flashes on the command of the control panel regardless of the alarm. The mode is applicable to the implementation of a collective alarm (independent of the alarm)

The actuation indicator operating in modes 0 and 1 reflects the internal state of the detector (it is controlled directly by the detector), in mode 2 it is independent of the detector state, and the control panel is responsible for its monitoring.

The detector's operating modes enable the user to best match the system to their specific environment. The method of programming the TUN-6043/6046 detector is described in the Programming Manual for the POLON 3000, POLON 4000 and POLON 6000 control panels.

**The detector is equipped with a magnetic field sensor, which allows you to test the detector's communication with the control panel and determine its location in the facility using a service kit. After the tester head is placed on it, the detector starts flashing a yellow LED, which means proper communication with the control panel.**

## 6 OPERATING AND SERVICING CONDITIONS

During the detectors operation it is necessary to avoid creation of dew or rime on the detector surface as well as to protect against excessive dust contamination.

**During any renovation work, the detector should be removed from the base or secured with a cover provided for this purpose. Covers may be purchased from the manufacturer. The detector should be protected before painting with painter's tape when removed from the base. Detectors damaged during painting and renovation works due to the fault of the persons carrying out these works (e.g. painted detector housing, mesh covered with paint, etc.) are not subject to warranty repairs.**

During operation, the heat detector should be subjected to periodic inspection in accordance with PKN-CEN/TS 54-14:2020-09, which is carried out in order to determine the proper operation of the detector and its correct cooperation with the control panel.

The inspection should be carried out at least **once a year**.

Such operation test can be carried out using a heat detector tester.

A thermistor fault (short circuit or disconnection) is revealed by the detector and a fault signal is sent to the control panel. Any damaged detectors should be submitted to the manufacturer for the repair (**POLON-ALFA S.A.**, 155, Glinki, 85-861 Bydgoszcz, Poland).

Note: The detector dismantling by the user, un-authorized installer or maintenance technician is forbidden!

Detector's installation may only be performed by an authorized personnel.

## 7 DETECTOR INSTALLATION

Heat detectors are installed (height, arrangement) in accordance with the adopted design guidelines. Heat detectors operate in loop lines, loop lines with straight branches or in radial detection lines of the POLON 3000, POLON 4000 and POLON 6000 systems (Installation and Maintenance Manual of this control panels).

The detectors are installed in series 40 bases. The method of connecting the detection line is presented in the instructions for Installation and Maintenance Manual of the G-40 base. Additional optical signalling

of a single detector or a group of detectors may be obtained by attaching the WZ-31 actuation indicator:

- standard configuration of the actuation indicator:

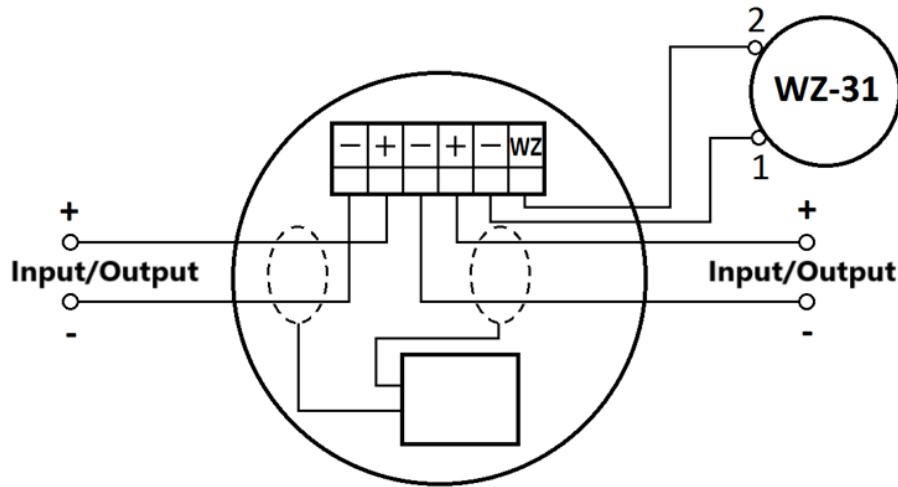


Fig. 7.1. Wiring diagram used for detector operating in zero WZ additional mode

Wiring diagram used for a detector operating in the POLON 3, POLON 4000 system or in the POLON 6000 system with zero additional mode.

- multiple actuation indicators connected to the power plus:

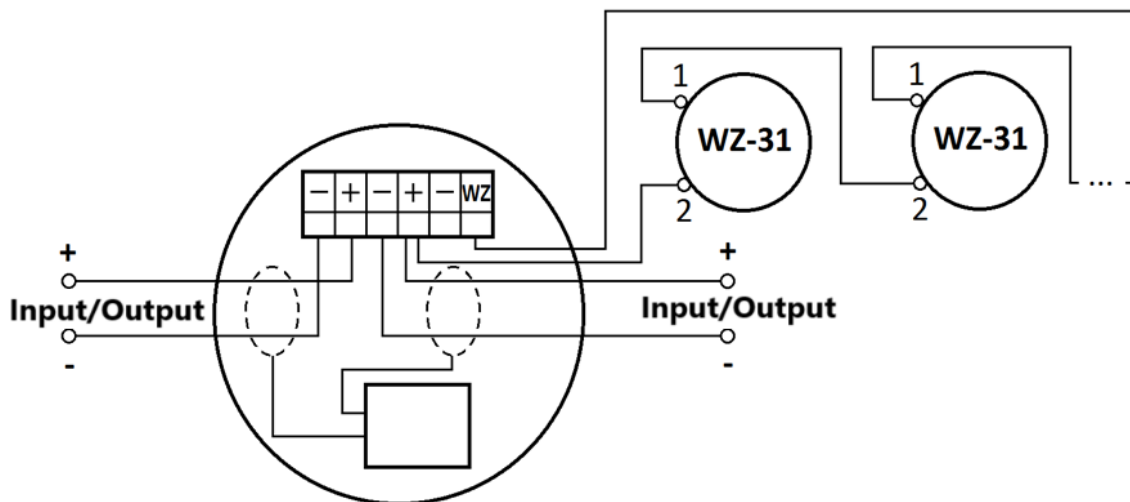


Fig. 7.2. Wiring diagram used for the detector operating in the 6000 system with additional WZ modes.  
2 to 5 actuation indicators may be connected

It is possible to connect 2 to 5 actuation indicators. Mode 2 is used for the implementation of a collective alarm and allows signalling the activation of a group of detectors with the same group address.

The wires of the alarm system are laid in accordance with the applicable regulations to low-voltage installations (below 42 V).



Note: During the detectors operation necessary is to avoid creation of dew or rime on the detector surface as well as to protect against excessive dust contamination.

## 8 SAFETY CONDITIONS

### 8.1 Repairs 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 operation of the equipment maintained and repaired by unauthorized personnel.

### 8.2 Work at Height

Work at height related to the installation of detectors 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 manuals.

### 8.3 Anti-dusting eye protection

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 bodies of detector bases.

## 9 STORAGE AND TRANSPORT

### 9.1 Storage

Detectors 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 35 °C.

A detector should not be exposed to direct sunlight or heat from heating equipment during storage.

Detector storage time in transport packaging should not exceed 6 months.

### 9.2 Transport

Detectors should be transported in confined spaces of means of transport, in packaging corresponding to the requirements of applicable transport regulations. The temperature during transport shall not be lower than -40 °C and above +70 °C, and the relative humidity shall not exceed 95 % at + 45 °C or 80 % at +70 °C.



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