

UNIVERSAL SMOKE AND HEAT DETECTOR

DOT-6000

DOT-6046 / DOT-6043 Variants

POLON 3000, POLON 4000 and POLON 6000 INTERACTIVE FIRE ALARM SYSTEMS

INSTALLATION AND MAINTENANCE MANUAL

IK-E389-001-GB

Edition 1



The DOT-6000 universal smoke and heat detector in the DOT-6046 and DOT-6043 variants, which is the subject of this IMM, 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 construction products repealing Council Directive 89/106/EEC;
- EMC** Directive 2014/30/EU on electromagnetic compatibility.

The product has been issued by CNBOP-PIB, notified body No. 1438, a national certificate of constancy of performance confirming the possession of technical features/parameters required by EN 54-29:2015.

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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 manufacturer has issued a declaration of performance for the product.

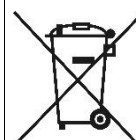
The certificate and the Declaration of Performance are available on the website www.polon-alfa.com

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 POLON-ALFA is not responsible for damage caused as a result of use inconsistent 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! – POLON-ALFA reserves the right to make changes to this manual.

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1 PURPOSE

The DOT-6000 universal smoke and heat detector in the DOT-6046 and DOT-6043 variants is designed to detect the initial stage of fire development during which smoke appears and/or temperature increases. It is characterized by significant resistance to air movement and pressure changes. The use of a dual smoke detection system and a dual heat detection system ensures increased resistance to false alarms such as water vapour and dust, while maintaining small dimensions and high aesthetics of the detector.

The division of detector types is based on their compatibility with individual control panels and systems, and is presented in the table below.

Detector variant	Compatible systems/control panels			
	POLON-4100 POLON-4200 Control panels	All series 4000 Control panels	POLON 3000 Control panels	POLON 6000 Control panels
DOT-6046	YES	YES	YES	YES
DOT-6043	YES		YES	

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

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

In the following part of the manual, the DOT-6000 universal smoke and heat detector in the DOT-6046 and DOT-6043 variants will be referred to as the "detector" without further name of the product.

2 TECHNICAL SPECIFICATIONS

Operating voltage	16.5 V ÷ 24.6 V
Maximum current consumption	≤ 150 µA
Operating Temperature:	
- for modes with a heat sensor in class A	-25 °C to +50 °C
- for other modes	-25 °C to +55 °C
Permissible relative humidity	up to 95 % at 40 °C
Dimensions (with socket)	(ø115x54) mm
Number of basic operating modes	6
Weight	0.18 kg
Standard detector colour	white
Address encoding	programmed from the control panel
Heat sensor classes	A1R, A2R, BR, A2S, BS
Suitability for test fire detection	TF1, TF2, TF3, TF4, TF5, TF6, TF7, TF8, TF9

3 DESIGN

The detector contains two sets of fire detectors: heat and smoke. The heat detector consists of two thermistors, and the smoke detector is a special arrangement set of coupled diodes: two transmitting and receiving. These diodes are mounted in such a way that the light emitted by the transmitting diodes does not reach the receiving diode directly, while being also protected against interference from external light by a labyrinth. The metal mesh prevents small insects and larger contaminants from entering the smoke detector. The whole unit is placed in a housing made of white plastic.

4 PRINCIPLE OF OPERATION

The DOT-6000 detector operation basis is Tyndal principle - scattering light rays on smoke particles. Smoke particles penetrating into the measuring chamber reflect the light emitted by the transmitting diode. The scattered light reaches the photodiode, causing a photoelectric current. The heat penetrating into the detector causes changes in the resistance of the thermistors. Information about fire factors from four detectors is subjected to advanced signal analysis by a microprocessor, which assesses the degree of fire hazard.

Communication between the POLON 3000, POLON 4000 or POLON 6000 control panel and the detectors is provided through an addressable, two-wire detection line. The unique, fully digital communication protocol enables the transmission of any information from the control panel to the detector and from the detector to the control panel, e.g. assessment of the ambient condition (smoke, temperature), the tendency of its change and the current analogue temperature value and smoke density.

The microprocessor is controlling the correct operation of the detectors basic systems and in the event of any irregularities - it transmits the relevant information to the control panel.

The smoke and heat detector is an analogue detector with a digital self-regulation mechanism, i.e. it maintains a constant sensitivity during measuring chamber contamination progress. After exceeding the assumed threshold (technical alarm threshold), the detector sends information to the control panel about partial contamination of the measuring chamber in order to inform the service teams of necessity to take appropriate action.

The detector is equipped with an internal short-circuit isolator, which cuts off an efficient detection line from the adjacent compact part, which enables further uninterrupted operation of the detector.

The detector alarm status is signalled by an impulse, red light of two diodes located on opposite sides of the detector housing. The indicator allows for quick location of the alarming detector and is a useful feature in periodic detector's inspection. In case the detector is hardly visible or installed in a difficult-to-reach place, an additional optical alarm indicator (WZ-31) may be connected and installed in an accessible and visible place.

The fault, technical alarm and short-circuit isolator activation states are signalled by yellow flashes of the LED.

5 DETECTOR OPERATING MODES

The detector has six basic operating modes (in addition to the alarm variants in the control panel) that allow the user to best match its characteristics to work in a specific environment:

Selecting a smoke detector (at least one must be selected):

- **Smoke sensor Ouv: (0/1)**
- **Smoke sensor Oir: (0/1)**
- **Heat sensor - class:**
 - **disabled: (0),**
 - **A1R class heat sensors enabled: (1),**
 - **A2R class heat sensors enabled: (2),**
 - **BR class heat sensors enabled: (3),**
 - **A2S class heat sensors enabled: (4),**
 - **BS class (5) heat sensors are enabled.**

Interaction:

- **Independent sensors (0)** - sensors operate independently (OR function),
- **Interdependent sensors (1)** – increasing the fire agent on one sensor sensitizes the other sensor and accelerates fire detection,
- **Coincidence sensors (2)** - sensors operate in coincidence (AND function), in order for the detector to signal an alarm, the alarm threshold for two sensors (different fire factors) must be exceeded, i.e. for smoke and heat; the mode is used to increase immunity to false alarms,
- **Sensors in coincidence or heat detector with redundant temperature threshold (3)** - equivalent to the coincidence of a smoke detector (OIR) and heat detector (temperature rise of approximately 4 °C in a short period of time) or without coincidence as a redundant heat detector of class A2S or BS, respectively. This mode provides very high immunity to false alarms. This mode is designed to detect fires where smoke and heat are present at the same time, e.g. a fire in a garage, and is not suitable for detecting smoldering fires where smoke is not accompanied by an increase in temperature.

Sensitivity of smoke sensors:

- **Normal: (0)**
- **reduced by 20 %: (1)**

Damage and technical alarms of switched off sensors are not transmitted to the control panel.

Depending on the sensors activated, the suitability of the detector for fire detection is specified in the table below.

Mode	Sensor On			Sensors Dependence 0 - 3	Test fire detection									Compliance of the operating mode with standards
	OUV	OIR	2 x T		TF1	TF2	TF3	TF4	TF5	TF6	TF7	TF8	TF9	
47h	x	x	x	1	+++	++	++	+++	+++	++	+++	+++	+++	EN 54-5, EN 54-7, EN 54-29
43h	x	x		1	+++	++	++	+++	+++		+++	+++	+++	EN 54-7
04h			x	0						++				EN 54-5
07h	x	x	x	0	++	++	+++	+++	+++	++	+++	+++	+++	EN 54-5, EN 54-7
87h	x	x	x	2	++				+++					EN 54-5 / EN 54-7 coincidence
C7h	x	x	x	3	++				+++	++				EN 54-5, EN 54-29

6 POLON 6000 SYSTEM OPERATION

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

Additional mode of operation of the WZ clamp	Description
0	A single WZ works in a standard configuration (as in the 4000 system).
1	Multiple WZ connected to the plus power supply. It is possible to connect 2 to 5 alarm 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 alarm 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 is controlled by the control panel.

7 OPERATING CONDITIONS AND MAINTENANCE

During detector operation, dew and frost should not be allowed to form on the detector surface and protect against excessive contamination with dust.

During any repair work the detector should be removed or protected with a cover provided for this purpose. Covers can be purchased from the manufacturer. If the detector is removed, the socket should be protected before painting with painter's tape. 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, ...) are not subject to warranty repairs.

Optical smoke detector should be subjected to periodic inspection, which is carried out in order to confirm the proper operation of the detector and its correct cooperation

with the control panel. The inspection should be carried out at least **every 12 months**.

Operation inspection can be carried out using a smoke imitator (which does not produce heat). Checking the operation of the heat detector is carried out with the use of a temperature imitator (which does not produce smoke).

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 over the detector it starts flashing a yellow LED which means proper communication with the control panel.

Long-term use of the detector may cause dust to accumulate inside the smoke detector. After exceeding the self-regulation range, as a result of progressive contamination of the smoke detector, the detector enters the technical alarm state sending information to the control panel about excessive contamination. The control panel signals the need to clean the detector's optics: the labyrinth, the holder, the lenses of the transmitting diodes and the photodiode. Servicing should be done as soon as possible to prevent false alarms.

The method of mounting and dismounting the detector is shown in Figs. 7.1 and 7.2. To disassemble the detector given steps are required:

- a) pressing the catch (Fig.7.1) and turning the guard in the basket to the right until the guard is removed;
- b) removing the net from the maze;
- c) turning and removing the maze;
- d) carrying out the necessary cleaning.

It is recommended to use a gentle brush, vacuum cleaner or compressed air. It is allowed to wash the maze with warm water and dishwashing liquid. After the cleaning process no stains can remain on the inner surfaces of the maze. When installing the detector it is critical not to bend the thermistor legs.

After cleaning, the detector should be reassembled. To do this:

- a) the maze must be placed in the guides and rotated to a perceptible click;
- b) net must be placed on the maze;
- c) cover placed on the basket so that the alarm indicator LED is slightly to the right of the glass;
- d) cover turned to the left;

After assembly, the detector should be checked using a smoke imitator (not producing heat) and then using a temperature imitator (not producing smoke).

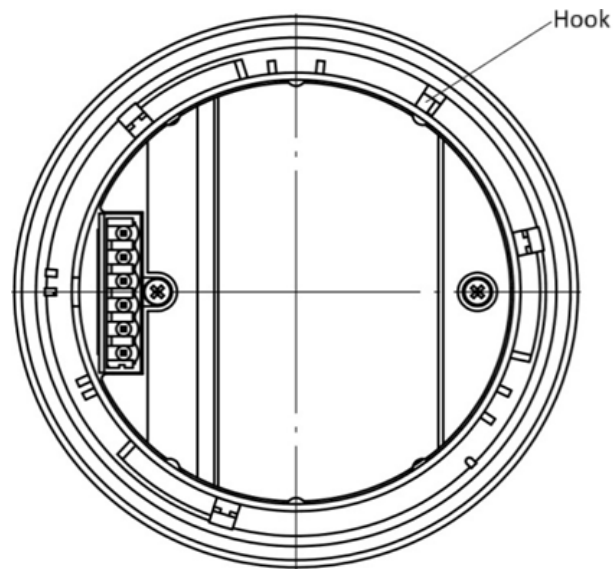


Fig. 7.1 View of the detector from below

NOTE - If cleaning does not give the desired result, the detector should be sent to the manufacturer for repair.

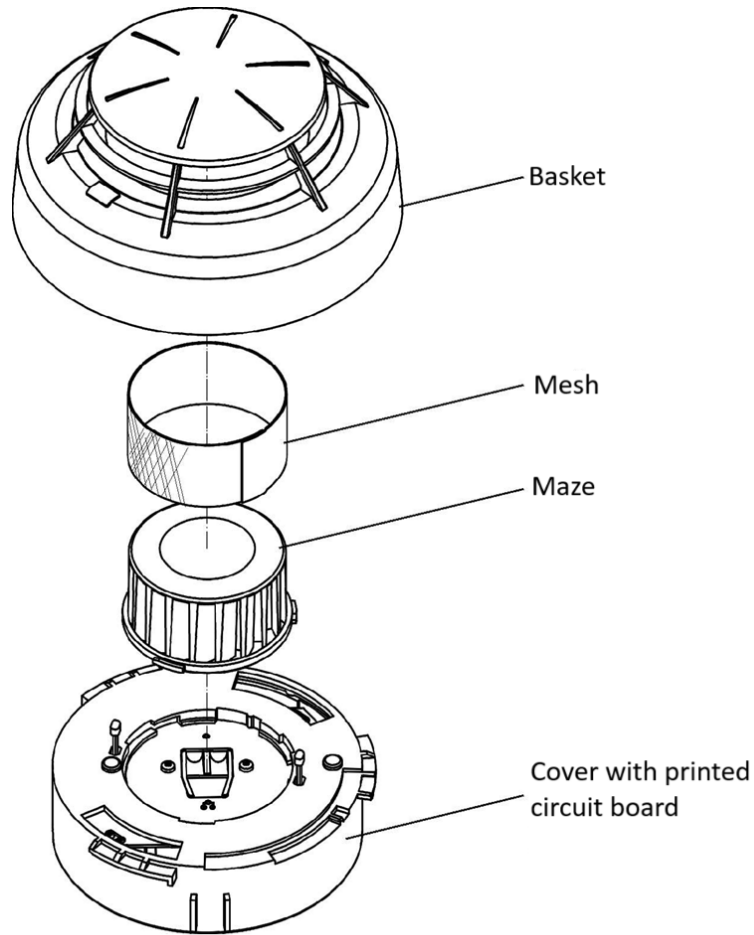


Fig.7.2 Detector elements after disassembly

8 INSTALLATION

The detectors are installed (height, arrangement) in accordance with the adopted design guidelines. Detectors are installed in rooms where smoke and/or temperature may rise when a fire occurs.

The detectors can operate in loop/lines of the POLON 3000, POLON 4000 and POLON 6000 control panels (see the Technical and Operational Documentation of the control panels).

The detectors are installed in G-40 bases. The method of connecting the detection line is shown in the installation and maintenance manual of the G-40 socket. Additional optical signaling of a single detector or a group of detectors can be obtained by attaching the WZ-31 alarm indicator.

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

NOTE - The detectors should not be installed in rooms with a corrosive atmosphere, containing corrosive gases and vapours as well as dust. Condensation of water vapour on the detectors is unacceptable.

The detectors are installed in G-40 sockets. The method of connecting the detection line is shown in the installation and maintenance manual of the G-40 socket. Additional optical signalling of a single detector or a group of detectors can be obtained by attaching the WZ-31 alarm indicator:

- standard configuration of the alarm indicator,

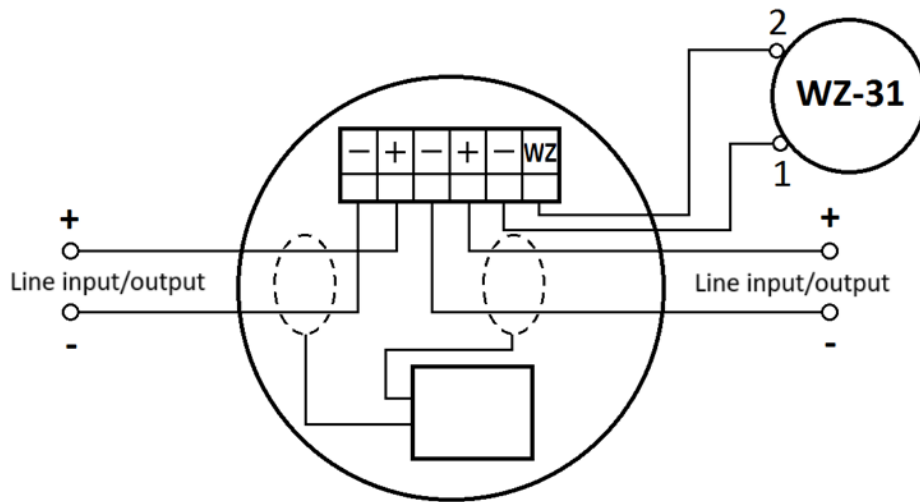
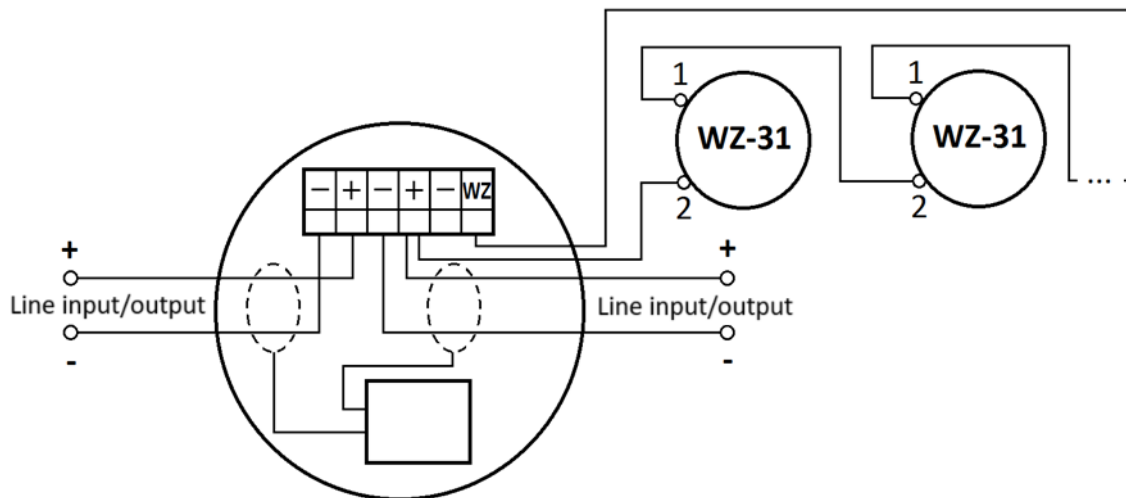


Fig.8.1 Wiring diagram used for the detector operating in zero additional mode WZ

- multiple alarm indicator connected to the power supply (in the 6000 system):



*Fig.8.2 Detector operating with additional WZ wiring diagram.
Between 2 to 5 tripping indicators can be connected*

9 SAFETY CONDITIONS

9.1 Repairs and Maintenance

Maintenance work and periodic inspections must be carried out by authorized personnel of companies 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.

9.2 Working at Height

Any detector installation works carried out at height must be executed with particular care utilising tools and machinery in good working condition.

Special attention shall be given to the stability of ladders, platforms, etc.

Any electric tool shall be used strictly obeying the safety rules specified in the manufacturer instruction manuals.

9.3 Protecting your eyes from dust

It is obligatory to use protective anti-dusting glasses and masks during detector installation works that produce high amount of dust, such as hole drilling for detector base mounting on ceilings/walls.

10 STORAGE AND TRANSPORTATION

10.1 Storage

The detectors should be stored in enclosed spaces where there are no caustic vapours and gases, where the temperature is between 0 °C and +40 °C, and the relative humidity does not exceed 80 % at +35 °C.

During storage, the detectors should not be exposed to direct sunlight or heat from heating devices.

The shelf life of detectors in transport packaging should not exceed 12 months.

10.2 Transport

The detectors 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 +70 °C, and the relative humidity should not exceed 95 % at + 45 °C or 80 % at +70 °C.



POLON-ALFA S.A.

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