

DUT-6046 UNIVERSAL SMOKE AND HEAT DETECTOR

POLON 4000 and POLON 6000 INTERACTIVE FIRE DETECTION AND ALARM SYSTEM

INSTALLATION AND MAINTENANCE MANUAL

IK-E336-001GD

III A Edition



The DUT-6046 multi-sensor smoke and heat detector 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;

EMC the electromagnetic compatibility (EMC) Directive 2014/30/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 technical features/parameters required by EN 54-5:2000+A1:2002, EN 54-7:2000+A1:2002+A2:2006, EN 54-17:2005+AC:2007.

The features/technical parameters above that exceeds the requirements of the aforementioned standards and the other features/parameters specified in this manual that are specified in the mentioned standards are confirmed by the Manufacturer.

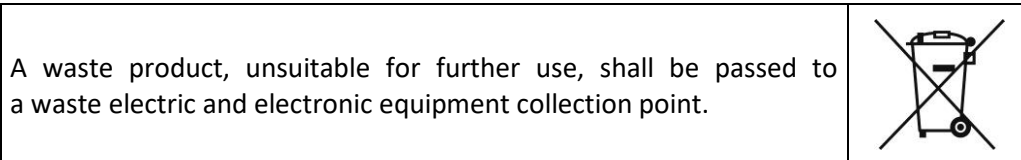
Declaration of Performance has been issued for DUT-6046 detector.

The certificate and the Declaration of Performance can be downloaded from www.polon-alfa.pl web site.

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.



NOTE: The manufacturer reserves the right to change specifications of products at any time without prior notice.

1 PURPOSE

The DUT-6046 universal addressable smoke and heat detector is designed for detection of fire initial phase when smoke occurs and/or temperature rise is observed. It is characterised by a high resistance against air movement and pressure change. Application of dual smoke detection system and dual heat detection system ensures increased resistance to false alarms such as steam and dust, maintaining at the same time small detector overall dimensions and high aesthetics level.

The DUT-6046 universal addressable smoke and heat detectors are intended to operate in the POLON 4000 and POLON 6000 fire detection and alarm system control panel addressable lines. They are equipped with internal short circuit isolators.

2 TECHNICAL SPECIFICATIONS

Operating voltage	16.5 V ÷ 24.6 V
Maximum current draw	≤ 150 µA
Operating temperature:	
- for '1', '3' and '4' modes	from -25 °C to +50 °C
- for '2', '5' and '6' mode	from -25 °C to +55 °C
Allowable relative humidity	up to 95 % at 40 °C
Dimensions (without base)	Ø 115 mm x 44 mm
Number of basic operation modes	6
Mass (without base)	0.2 kg
Standard colour	white
Address coding method	programmable at the control panel
Test fire detection suitability	TF1, TF2, TF3, TF4, TF5, TF6, TF7, TF8, TF9

3 DESIGN DESCRIPTION

The detector is equipped with two sensor sets that detect two fire factors: heat and smoke. The heat detection set consists of two temperature-sensitive resistors (thermistors) whereas smoke is detected by a special optical module consisting of two light transmitting diodes and a receiving one. They are mounted in such a way that the light emitted by the transmitting diode does not reach the other diode directly; a labyrinth protects the diodes from external light interference. A metal protective net prevents the detector from irruption of small insects or pieces of dirt. The whole structure is placed in a white plastic housing.

4 PRINCIPLE OF OPERATION

The DUT-6046 detector operation basis is the Tyndall effect – light ray scattering on smoke particles. When smoke particles penetrate the measuring chamber, they reflect the light emitted by the transmitting diode. The reflected light reaches the optical diode producing photocurrent. The heat entering the detector evokes the thermistor resistance change. Information about fire factors delivered by both sensors are thoroughly analysed by a microprocessor that evaluates a fire hazard level.

Communication between the POLON 4000/POLON 6000 system fire alarm control panel and the DUT-6046 detectors is provided using 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, e.g. evaluation of surrounding conditions (smokiness, temperature), tendency of their change as well as the current temperature analogue value and smokiness density.

The detector operation controlling microprocessor monitors correctness of its basic circuits operation and, in case an irregularity is found, delivers relevant information to the control panel.

The DUT-6046 detector is an analogue detector with a digital self-regulation mechanism, i.e. it maintains constant sensitivity during the measurement chamber contamination progress. In case a

settled technical alarm threshold is exceeded, the detector sends information to the panel about the measurement chamber partial contamination in order to inform service teams of a necessity to undertake appropriate actions.

The detector is equipped with an internal short circuit isolator that cuts off an efficient detection line from the neighbouring shorted section what enables further undisturbed detector operation.

The alarm mode is indicated with pulse red light emitted by two illuminating diodes installed on opposite sides of the detector casing. The indicator enables fast location of the activated detector and is helpful in periodic detector inspections. In case the detector is hardly visible or is installed in a difficult-to-reach space, an additional optical alarm indicator (WZ-31) may be connected in an accessible and visible place.

A fault mode, technical alarm and an actuation of a short circuit isolator are signalled with yellow flashes of an illuminating diode.

5 DETECTOR OPERATION MODES

The detector is furnished with four basic operation modes (apart from alarm variants in the control panel) that enable the best adjustment of its characteristics to given operation environment:

1 st mode	Interdependent, with O _{UV} , O _{IR} and 2 x T _{A1R} detectors
2 nd mode	Interdependent, with O _{UV} and O _{IR} detectors
3 rd mode	Equivalent to heat detector of A1R class with 2xT _{A1R} detectors
4 th mode	Independent, with O _{UV} , O _{IR} and 2 x T _{A1R} detectors
5 th mode	Equivalent to O _{UV} smoke detector
6 th mode	Equivalent to O _{IR} smoke detector

Faults and technical alarms of deactivated sensors are not transmitted to the control panel.

Depending on the sensors activated, the following table defines the suitability of the detector for fire detection

Mode	Sensor ON			Interaction		Suitability for fire detection								
	O _U v	O _{IR}	2 x T _{A1R}	No interaction	Inter- dependent	TF1	TF2	TF3	TF4	TF5	TF6	TF7	TF8	TF9
1	x	x	x		x	+++	++	++	+++	+++	++	+++	+++	+++
2	x	x			x	+++	++	++	+++	+++		+++	+++	+++
3			x	x							++			
4	x	x	x	x		++	++	+++	+++	+++	++	+++	+++	+++

5	x					++	++	+++	+++	+++		+++	+++	+++
6		x					+	++	+++	+++		+++	+++	++

6. OPERATION IN POLON 6000 SYSTEM

For the POLON 6000 system, the detector mode is set by configuring the sensors (as in the POLON 4000 system).

Additionally, the WZ output is configured.

WZ output operation mode:

- **as in the 4000 system** - WZ flashes like a diode in a detector reporting an alarm,
- **duplication of red diode flash** - the WZ flashes like a diode in a detector reporting an alarm but a multiple alarm indicator connected to the supply plus is to be used,
- **flashing independent of the alarm**, whereby the output group must be declared.

7 OPERATION AND SERVICING CONDITIONS

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

For the period of repair works, the detector should be taken out or protected with appropriate for this purpose cover. Such a cover can be obtained from an installer or purchased from the manufacturer. In case the detector is taken out, its base should be protected against being painted utilising a painting tape. Detectors which are damaged during painting and renovation works due to a fault of the persons executing such works (e.g. painted detector casing, stuck-with-paint net, etc.) are not subject to warranty repairs.

The DUT-6046 addressable universal detector should be subjected to periodical inspection according to PKN-CEN/TS 54-14:2006 in order to confirm the detector proper operation and its appropriate interoperation with the control panel. The inspection frequency depends on the detector operation conditions but it should be carried out at least once in 6 months.

The smoke sensor operation should be tested using a smoke simulator (emitting no heat) and afterwards the heat sensor should be tested using a heat imitator (generating no smoke).

The detector is equipped with a magnetic field sensor that makes it possible to test communication between the detector and the control panel and to determine its location in the premises by means of a service kit. When the tester head is applied to the detector, the detector starts flashing its yellow LED, which indicates correct communication with the control panel.

The DUT-6046 smoke detector long-lasting operation may result in dust accumulation inside its smoke sensor. After exceeding the self-regulation range due to the smoke sensor contamination progress, the detector triggers the technical alarm mode sending excessive contamination information to the control panel. The panel signals a necessity to clean the detector optical module: the labyrinth, holder, lenses of the transmitting diodes and photodiode. Servicing activities should be taken up as soon as possible to avoid false alarm evoking.

The detector assembling and dismantling is shown in Fig. 1 and Fig. 2. In order to dismantle the detector it is necessary to:

- a) press the latch (Fig. 1), turn the cover right in the basket until it is taken out;
- b) remove the net from the labyrinth;
- c) turn and take the labyrinth out;
- d) perform the necessary cleaning.

A delicate brush as well as a vacuum cleaner are recommended for cleaning works; compressed air can be possibly used. It is permitted to wash the labyrinth with warm water with addition of washing-up liquid. No damp patches should remain on the labyrinth internal surfaces after washing and drying. During cleaning, it is important to avoid the thermistor's legs bending.

After cleaning the detector should be assembled. In order to do it, it is necessary to:

- a) place the labyrinth into the leads and turn it until a click is felt;
- b) put the net on the labyrinth;
- c) insert the cover into the basket so that the activation indicator diode is placed a little to the right in relation to the glass;
- d) turn the cover to the left.

After assembling, the detector operation should be tested using a smoke simulator (emitting no heat) and afterwards with a heat imitator (generating no smoke) and installed in a detection line.

Note: In case the cleaning does not produce the required result, it is necessary to send the detector to the manufacturer for repair.

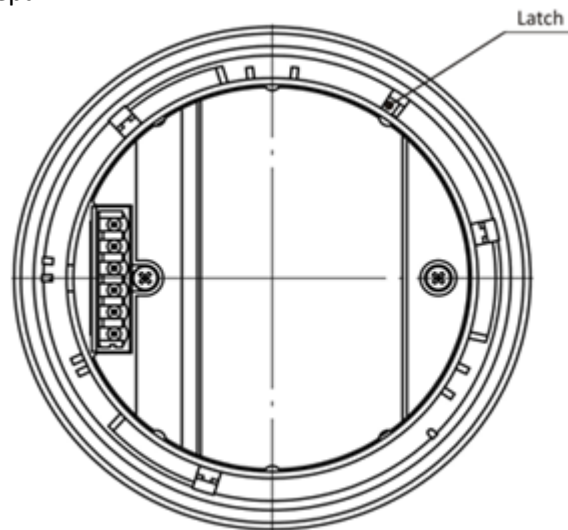


Fig. 1 Detector view from below

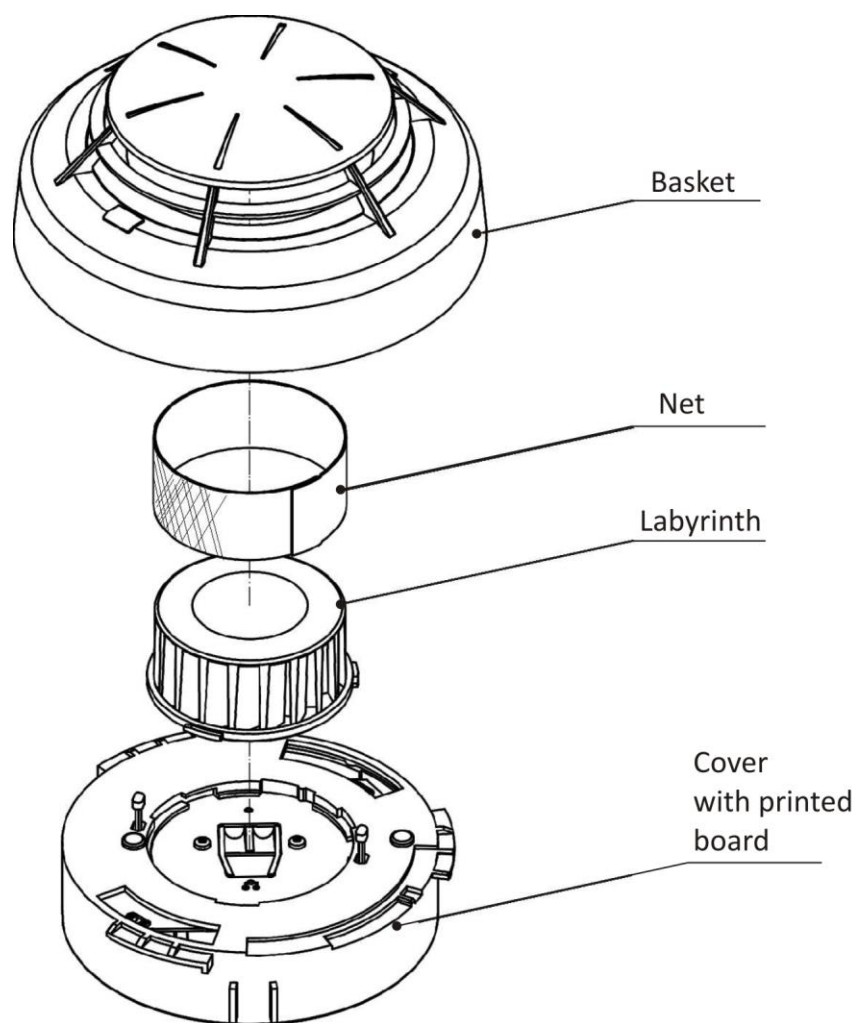


Fig. 2 Detector elements after dismantling

8 DETECTOR INSTALLATION

The DUT-6046 detectors are installed (height, arrangement) according to the settled guidelines. They are mounted in premises where a smoke and/or a temperature rise may occur when a fire starts to develop.

The detectors are intended to operate in loops, in loops with straight branches or in radial detection lines of the POLON 4000 system control panels (see the POLON 4000 system control panels Operation and Maintenance Documentation).

The detectors are installed in the 40 model range bases. The detection line connection is presented in the G-40 base Installation and Maintenance Manual. An additional optical alarm signal of a detector or a group of detectors can be obtained by connecting the WZ-31 alarm indicator.

Alarm system cables are routed in accordance with the regulations obligatory for low voltage (below 42 V) systems.

Note: The detectors should not be installed in premises of corrosive atmosphere, containing caustic gases and vapours as well as dust. Steam condensation on detectors is impermissible.

The detectors are installed in G-40 bases. The detection line connection method is described in the G-40 base installation and maintenance manual. Additional optical signalling of a single detector (group of detectors) can be obtained by connecting the WZ-31 alarm indicator:

- standard configuration of the alarm indicator,

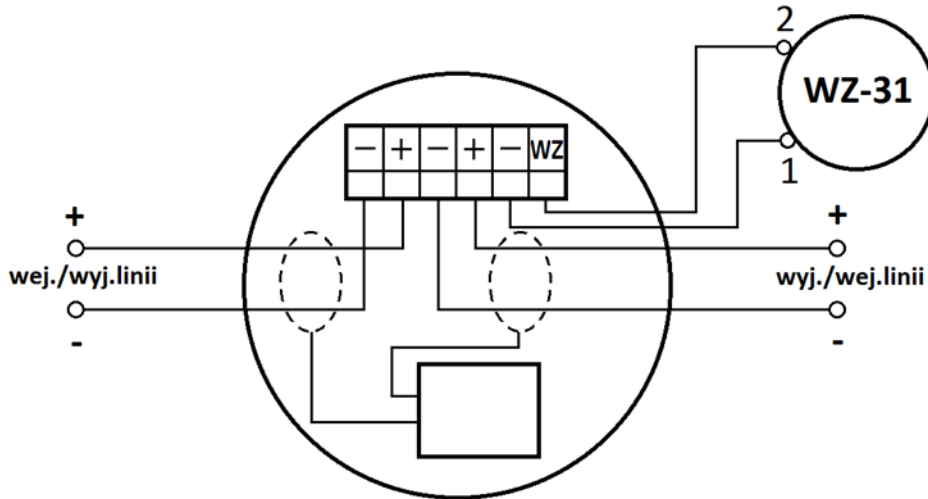


Fig. 3 Wiring diagram for standard configuration of the alarm indicator

- more than one alarm indicator (2-5)

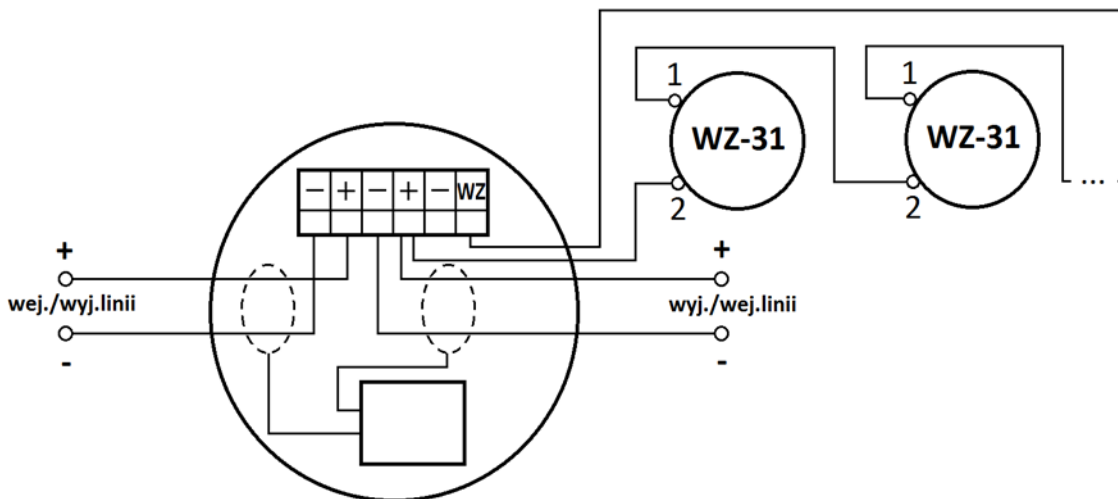


Fig. 4 Wiring diagram for more that one alarm indicator (2-5)

9 SAFETY CONDITIONS

9.1 Repairs and maintenance

Any maintenance works or periodic inspections shall be executed by skilled personnel employed by companies authorised and trained by POLON-ALFA.

Any repairs must be carried out by the manufacturer. POLON-ALFA bears no responsibility for the operation of any apparatus being repaired by unauthorised personnel.

9.2 Works 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 stability of ladders, elevators, lifts, etc.

Any electric tools shall be used strictly obeying the safety rules stated in instruction manuals by manufacturers.

9.3 Anti-dusting eye protection

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 in ceilings.

10 STORAGE AND TRANSPORTATION

10.1 Storage

The DUT-6046 detectors should be kept in closed premises free of caustic gases and vapours at the temperature between +0 °C and +40 °C, and relative humidity not exceeding 80 % at +35 °C.

In the time of storing, the detectors should not be exposed to either direct sunlight or heat from heating equipment.

The detectors storage period in transportation packing should not exceed 12 months.

10.2 Transportation

The DUT-6046 detectors should be carried in closed transport means spaces, in packing that meets the requirements of transportation regulations in force. The temperature during transportation should not be lower than -40 °C and higher than +70 °C, and relative humidity should not be higher than 95% at + 45 °C or 80% at +70 °C.

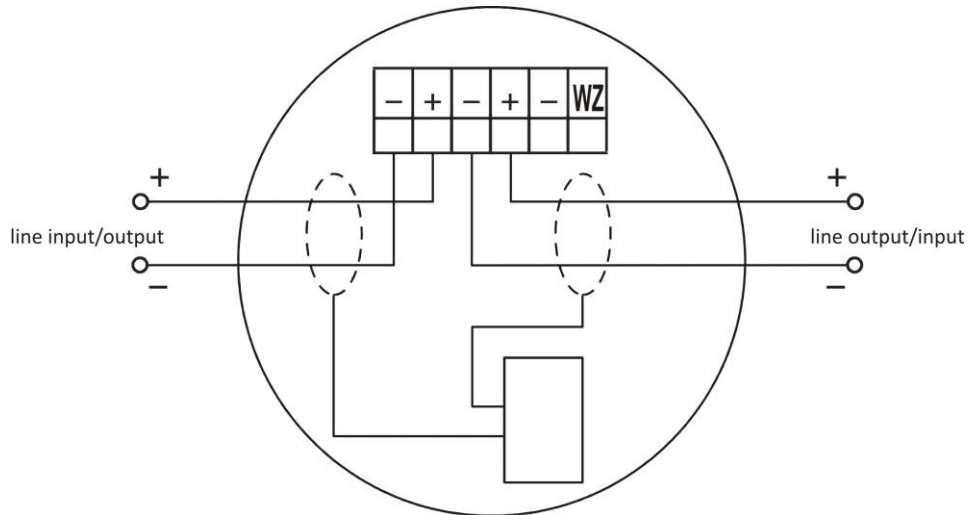


Fig. 3 Clamps of base interoperating with DUT-6046 plug



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