

DOT-4046 MULTI-SENSOR SMOKE AND HEAT DETECTOR

POLON 4000 and POLON 6000 INTERACTIVE FIRE DETECTION AND ALARM SYSTEM

INSTALLATION AND MAINTENANCE MANUAL

IK-E301-001GB

IVB Edition



The DOT-4046 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 2004/108/EC on electromagnetic compatibility.

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 54-7:2000+A1:2002+A2:2006, EN 54-5:2000+A1:2002, EN 54-17:2005+AC:2007.

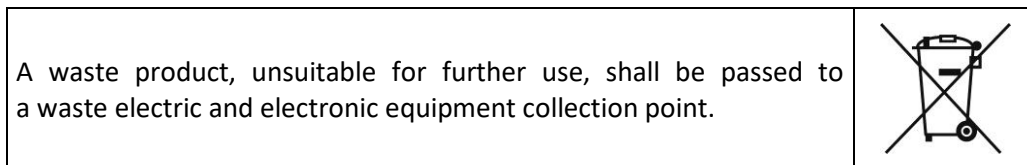
The features/technical parameters above that exceeds the requirements of the aforementioned standards and other features/parameters specified in this manual that are not specified in the mentioned standards are confirmed by Manufacturer.

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 DOT-4046 multi-sensor addressable smoke and heat detector is designed for detection of a fire initial phase when a smoke occurs and/or temperature rise may be observed. The detector is characterised by a high resistance level against wind movement and pressure change.

The DOT-4046 multi-sensor addressable detectors are intended to operate in the POLON 4000 fire detecting 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 '6' and "8" modes	from -25 °C to +50 °C
- for '5' mode	from -25 °C to +55 °C
- for '2', '4', '7' and '9' modes	from -25 °C to +65 °C
Allowable relative humidity	up to 95 % at 40 °C
Dimensions (without base)	Ø 115 mm x 59,5 mm
Number of basic operation modes	4
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 SAFETY CONDITIONS

3.1 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.

3.2 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.

3.3 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.

4 DESIGN DESCRIPTIONS

The DOT-4046 detector is equipped with two sensors that detect two fire factors: heat and smoke. Heat is detected by a temperature-sensitive resistor (thermistor) whereas smoke is detected by a special optical module consisting of a light transmitting diode 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.

5 PRINCIPLE OF OPERATION

The DOT-4046 detector operation basis is 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 the microprocessor that evaluates a fire hazard level.

Communication between the POLON 4000 system fire alarm control panel and the DOT-4046 detectors is provided through a two-wire addressable detection line. A unique, fully digital communications protocol enables passing any information from the control panel to the detector and inversely, e.g. evaluation of surrounding conditions (smokiness, temperature), tendency of its change as well as 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 DOT-4046 detector is an analogue detector with 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 of 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.

An alarm mode is indicated with a pulse red light emitted by an illuminating diode installed in 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, a technical alarm and an actuation of a short-circuit isolator are signalled with yellow flashes of the diode.

6 DETECTOR OPERATION MODES

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' mode - multi-criteria, equivalent to interoperation of the smoke detector (O_{IR}) and the heat detector (T_{A1R}) in A1R class;
- '2' mode - multi-criteria, equivalent to interoperation of a smoke detector (O_{IR}) and a heat detector (T_{BR}) in BR class;
- '3' mode - independent, equivalent to independent operation of two detectors, providing the same suitability as O_{IR} detector and T_{A1R} detector in A1R class. This setups ensure high false alarm resistance at lower sensitivity as in '1' mode. In this mode a DOR-4046 detector substitutes two detectors and eliminates a necessity to install DOR-4046 and TUP-4046 detectors in A1R class side by side;
- '4' mode - independent, equivalent to independent operation of two detectors, providing the same suitability as O_{IR} detector and T_{BR} detector in BR class. This setup ensures high false alarm resistance at lower sensitivity as in '2'

mode. In this mode a DOR-4046 detector substitutes two detectors and eliminates a necessity to install DOR-4046 and TUP-4046 detectors in BR class side by side.

Additionally, the detector provides a possibility to program three modes intended for particular detector operation diagnostics:

- '5' mode - in which only a smoke detector (DOR) operates;
- '6' mode - in which only a heat detector (TUP) in class A1R operates;
- '7' mode - in which only a heat detector (TUP) in class BR operates.

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 DOT-4046 addressable multi-sensor detector should be subjected to periodical inspection according to PKN-CEN/TS 54-14:2006 standard, which is executed in order to confirm the detector proper operation and its appropriate interoperation with the control panel. The inspection 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 DOT-4046 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 a technical alarm mode sending excessive contamination information to the control panel. The panel signals a necessity to clean the detector optical module: the labyrinth and lenses of both diodes – the transmitting one and photodiode. Servicing activities should be taken up as soon as possible to avoid false alarm evoking.

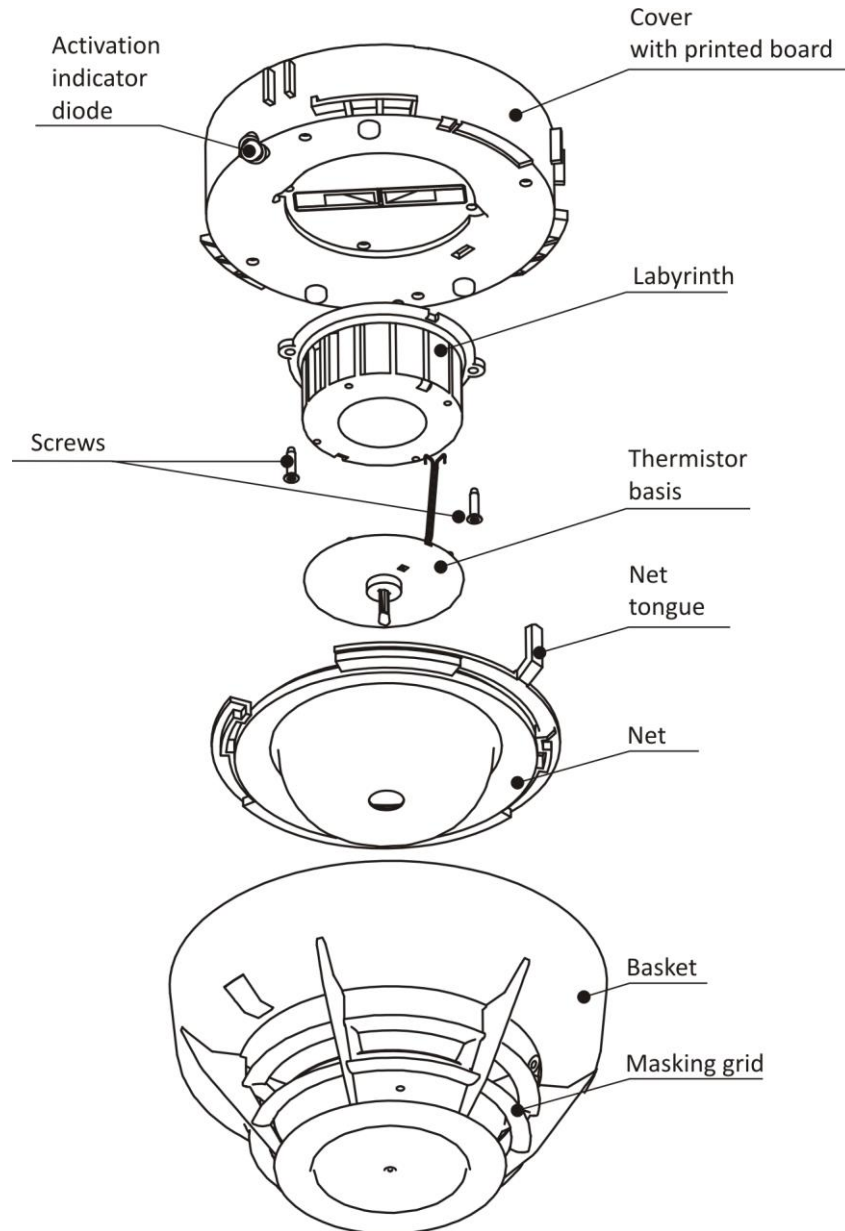


Fig. 1 Detector elements after dismantling

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

- a) pressing the net long tongue, turn the cover right in the basket until it is taken out;
- b) remove and bend aside the thermistor basis from the labyrinth;
- c) unfasten two screws that fix the labyrinth and take the labyrinth out;
- d) perform the necessary cleaning.

A delicate brush as well as 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.

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

- a) fasten the labyrinth with two screws;
- b) locate thermistor basis placing the thermistor leads into the labyrinth notches;
- c) lay down the basket in the position as shown on the figure;

- d) insert the masking grid into the basket paying attention to its positioning – alignment with the juts;
- e) insert the net into the basket paying attention to positioning – alignment with the juts;
- f) insert the cover into the basket so that the activation indicator diode is placed a little to the right in relation to the glass;
- g) turn the cover to the left.

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

7 DETECTOR INSTALLATION

The DOT-4046 detectors are installed (height, arrangement) according to the guidelines settled by the Scientific and Research Centre for Fire Protection. They are mounted in premises where a smoke and 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 Installation and Maintenance Manuals).

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 corrosive atmosphere that contains caustic gases and vapours as well as dust. Steam condensation on detectors is impermissible.

8 STORAGE AND TRANSPORTATION

8.1 Storage

The DOT-4046 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.

8.2 Transportation

The DOT-4046 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.

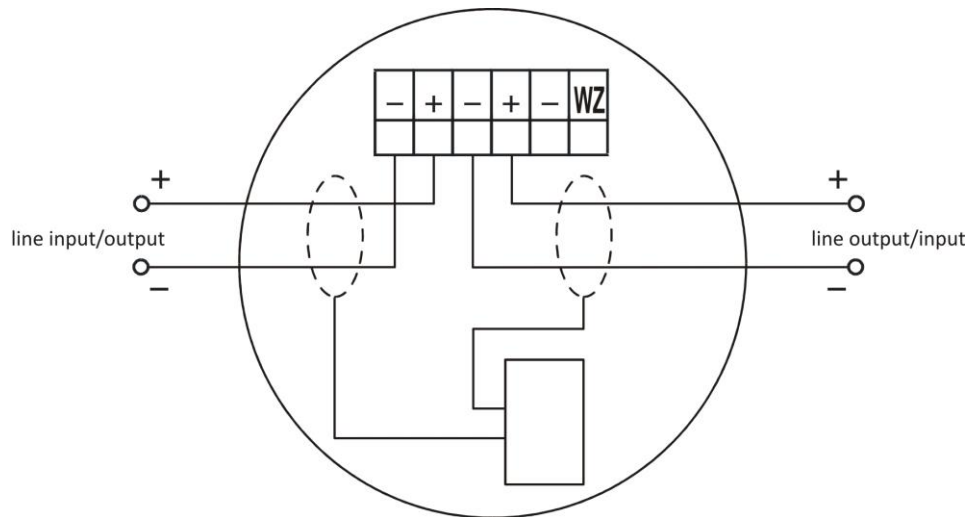


Fig. 2 Clamps of base interoperating with DOT-4046 plug



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