

DPR-4046
ADDRESSABLE
MULTI-SENSOR DETECTOR

POLON 4000 and POLON 6000 INTERACTIVE FIRE DETECTION AND ALARM SYSTEM

INSTALLATION AND MAINTENANCE MANUAL

IK-E302-001GB

IIID Edition



The DPR-4046 addressable multi-sensor detector covered by the present manual complies with the requirements of the Technical Approval No. AT-0111-0144/2007 issued by the Scientific and Research Centre for Fire Protection (CNBOP) and the following European Union Directive:

EMC 2004/108/WE on electromagnetic compatibility.

The DPR-4046 multi-sensor smoke and heat detector has been approved with the Certificate of Accordance No. 2488/2007 issued by the Scientific and Research Centre for Fire Protection (CNBOP) Józefów, Poland, a EU notified authority No. 1438, confirming its compliance with the requirements of the Technical Approval that complies with the provisions of the PN-EN 54-7:2002(U) and PN-EN 54-10:2002(U) standards.

The certificate may 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.

A waste product, unsuitable for further use, shall be passed to a waste electric and electronic equipment collection point.



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

1 PURPOSE

The DPR-4046 processor-based addressable multi-sensor detector is designed for detection of a fire initial phase when a smoke or flame and smoke occur. The detector is characterised by high resistance against air movement and pressure change.

The DPR-4046 multi-sensor addressable detectors are intended to operate in the POLON 4000 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	≤ 170 µA
Maximum installation height *)	12 m
Maximum supervised area *)	60 - 80 m ²
Flame sensor sight angle	120 °
Operating temperature:	from -25 °C to +50 °C
Allowable relative humidity	up to 95 % at 40 °C
Dimensions (without base)	Ø 115 mm x 43 mm
Mass (without base)	0.15 kg
Standard colour	white
Address coding method	programmable at the control panel
Test fire detection suitability	TF1, TF2, TF3, TF4, TF5, TF8

*) see design guidelines

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 DESCRIPTION

The DPR-4046 detector is equipped with two sensors that detect two fire factors: flame and smoke. Flame occurrence is detected by a photo-element whereas the smoke sensor consists of a measurement chamber with a special module of interconnected two diodes: a transmitting one and the other acting as a receiver. They are mounted in such a way that the light emitted by the transmitting diode does not reach the other diode directly. The measurement chamber is enclosed by a labyrinth that protects the diodes from external light interference. A metal protective net prevents the chamber against small insects or pieces of dirt irruption. The whole structure is placed in a white plastic housing.

5 PRINCIPLE OF OPERATION

The DPR-4046 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 a photocurrent. The fire flame blinks entering the detector are analysed by the detector circuit. 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 system fire alarm control panel and the DPR-4046 detectors is provided through 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), tendency of their change as well as 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 DPR-4046 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 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.

The alarm mode is indicated with 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, technical alarm and actuation of a short circuit isolator are signalled with yellow flashes of the diode.

6 DETECTOR OPERATION MODES

Detector is provided with three operation modes (apart from alarm variants in the control panel):

- '1' mode - multi-criteria, equivalent to interoperation of a smoke detector (DOR) and a flame detector (PPO), declared at the control panel at the 3rd or 4th level;
- '2' mode - independent, utilising only a smoke detector (DOR), declared at the control panel at the 4th level;
- '3' mode - independent, utilising only a flame detector (PPO), declared at the control panel at the 4th level.

The '2' and '3' modes are intended for particular sensors operation diagnostics.

7 SERVICING CONDITIONS

The DPR-4046 addressable multi-sensor detector should be subjected to periodical inspection in order to confirm its proper operation and its appropriate interoperation with the control panel. The inspection should be carried out at least once per year.

The smoke sensor operation should be tested using a smoke simulator and the flame sensor should be tested using a flame imitator.

The DPR-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 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 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.

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

- a) pull out the blockade;
- b) pressing the net long tongue, turn the cover right in the basket until it is taken out;
- c) remove and bend aside the holder with the photodiode board from the labyrinth;
- d) unfasten two screws that fix the labyrinth and take the labyrinth out;
- e) 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.

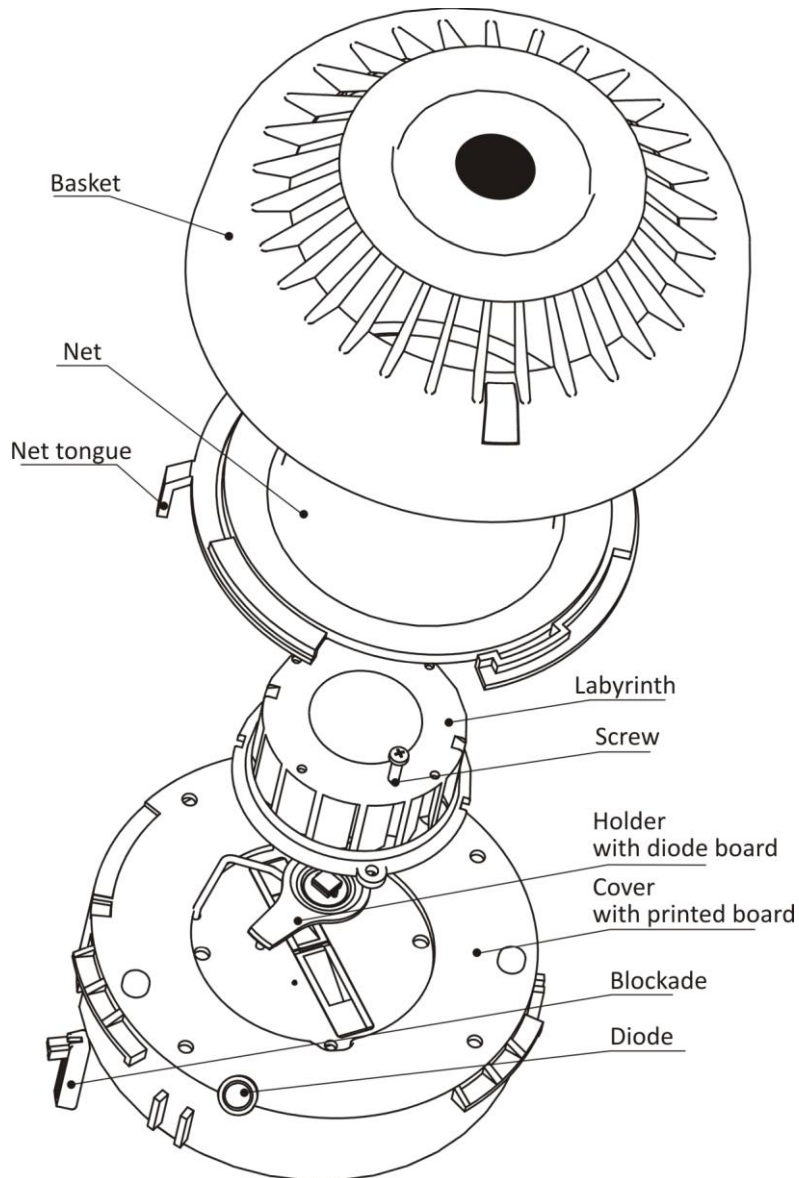


Fig. 1 Detector elements after dismantling

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 the holder with the photodiode board placing them into the labyrinth;
- c) lay down the basket in the position as shown on the figure;
- d) insert the masking net into the basket – alignment with the tongues;
- e) insert the net into the basket paying attention to positioning – alignment with the tongues;
- 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;
- h) push the blockade down.

Note: After executing periodic inspection or servicing actions, it is obligatory to declare the detector's '1' operation mode from the control panel 3rd level.

7 DETECTOR INSTALLATION

The DPR-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 or flame and smoke may occur when a fire occurs.

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 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 DPR-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 DPR-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.

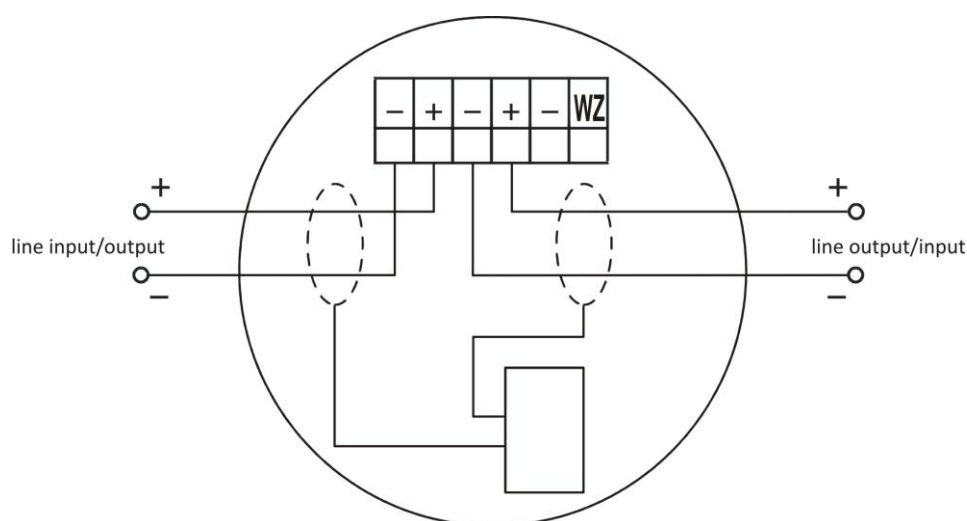


Fig. 2 Clamps of base interoperating with DPR-4046 plug



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