

WIRELESS RADIO DETECTOR ADAPTER WITH SHORT INSULATOR

ACR-4001

POLON 4000 and POLON 6000 INTERACTIVE FIRE DETECTION AND ALARM SYSTEM

INSTALLATION AND MAINTENANCE MANUAL

IK-E322-001GB

II Edition



The ACR-4001 wireless radio detector adapter 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** 2014/30/UE 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 the technical features/parameters required by EN 54-17:2005, EN 54-18:2005+AC:2007, EN 54-25:2008+AC:2010

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

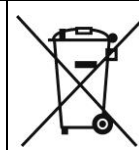
The certificate and the Declaration of Performance may be downloaded from www.polon-alfa.pl web site.

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 ACR-4001 wireless radio detector adapter is an addressable element that enables connection of wireless radio detectors (being seen from the control panel as a side detection line) into the POLON 4000 and POLON 6000 fire detection and signalling system detection line. Each radio controlled detector, declared in the adapter, possesses its own address and is seen from the control panel as a separate one. The adapter is equipped with an internal short circuit isolator which cuts off a damaged section of a detection line and ensures proper operation of remaining elements.

Application of the adapter and wireless radio detectors is recommended when it is difficult or impossible to route a detection line to a detector, for instance in historical buildings, churches, etc.

The ACR-4001 wireless radio detector adapter is designed to be installed in the G-40 base.

2 TECHNICAL SPECIFICATIONS

Radio path operation frequency range	863 - 870 MHz
Radiation level	< 25 mW
Frequency stabilization method	frequency synthesizer and quartz resonator
Radio communication method	multiple with confirmation
Range – dependent on environment damping	up to 100 m
Modulation type	FSK
Antenna type	integrated
Operation voltage	16,5 V - 24 V
Max. quiescent current	6 mA
Number of interoperating elements	16 DUR-4047 radio detectors
Operation temperature	from -25 °C to +55 °C
Admissible relative humidity	up to 95 % at 40 °C
Dimensions (without base)	Ø 115 x 122 mm
Mass	130 g

3 SAFETY CONDITIONS

3.1 Repairs and maintenance

Any maintenance works or periodic inspection 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 operation of any apparatus being repaired by unauthorised personnel.

3.2 Works at height

Any adapter 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 ACR-4001 adapter is placed in a casing made of white plastic which is composed of: a basket, a cover and a screen. The adapter interoperates with the G-40 installation base, where the detection line wires are fixed to.

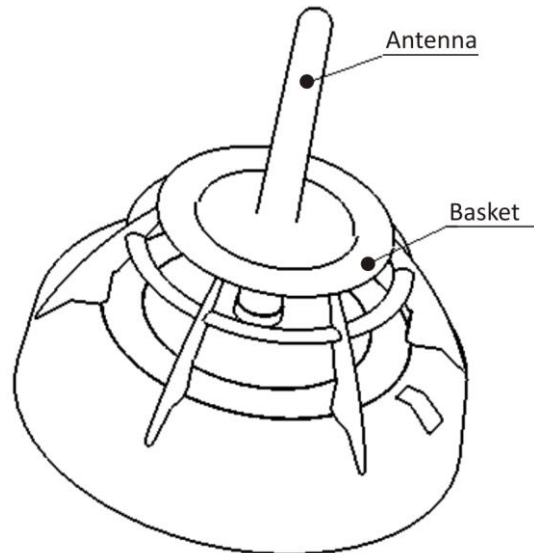


Fig. 1. Adapter overall view

5 OPERATION DESCRIPTION

The ACR-4001 adapter is a line element operating in an addressable detection line that monitors radio controlled detectors and manual call points. A fire detected by a detector is transmitted via the adapter to the control panel whereas it is signalled in the adapter with a red flashing diode light.

Any radio detector fault or lack of communication information is also transmitted to the control panel; in this case the diode flashes with a yellow light. A single detector fault does not have any impact on the work of remaining detectors that interoperate with the adapter.

The adapter is equipped with an internal short circuit isolator that cuts off the shorted section of the detection line and ensures proper operation of the remaining elements. The short circuit separation is signalled with yellow diode flashings and appropriate information is passed to the control panel.

Detailed information regarding designing rules of detection lines with ACR-4001 adapters enabling their proper use is contained in the POLON 4000 and POLON 6000 system control panel operation and maintenance documentation.

6 OPERATION AND SERVICING CONDITIONS

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

For the period of any repair works, the adapter should be taken out or protected with appropriate foil or painting tape. In case the adapter is taken out, its base should be protected against being painted utilising a painting tape. Adapters which are damaged during painting and

renovation works due to a fault of the persons executing such works are not subject to warranty repairs.

The ACR-4001 adapter and the interoperating elements should be subjected to periodical inspection according to PKN-CEN/TS 54-14:2006 standard, which is executed in order to confirm the detectors proper operation and their appropriate interoperation with the control panel.

7 ADAPTER INSTALLATION

The proper place to mount the adapter and detectors should be chosen experimentally in order to avoid any impact of invisible metal building construction elements which can screen/reflect the radio signal.

The ADC-4001M adapter is recommended for mounting on the ceiling, far from radio interference sources, in a central point between radio detectors. The adapters can operate in loop-shaped lines, in loop-shaped lines with straight branches or in radial detection lines of the POLON 4000 or POLON 6000 system control panels (see the POLON 4000/POLON 6000 control panels Operation and Maintenance Documentation).

The adapters are installed using the 40 model range bases. The detection line connection is shown in Fig. 2. The fire alarm circuit cables should be routed in accordance with the low-voltage (below 42 V) installation regulation in force.

Note: The adapters should not be installed in premises with corrosive atmosphere or in premises containing caustic gases and vapours as well as dust. Steam condensation on adapters is not permissible.

8 RADIO SET COMMISSIONING (ACR-4001 ADAPTER + DUR-4047 DETECTORS)

The ACR-4001 adapter and the DUR-4047 detectors disposition is crucial; any obstacle in the form of walls, ceilings, doors or windows results in radio signal damping and it can reduce the operation range from 100 m (in open space) down to just few meters in case of unfavourable detector arrangement in the building.

It should be ensured that not more than two adapters operating in the same mode are installed in radio range, i.e. consecutive adapters placed one next to another should be programmed to operate in 1, 3, 5, 7 or 9 mode. The modes from 3 to 10 are available only for adapters supported with software not older than v. 1.3 and for detectors with software version not lower than v. 1.4. For detectors supported with software versions of v. 1.0, v. 1.1 and v. 1.2 it is possible to choose the adapter's 1 or 2 mode only. The mode 1 is not recommended due to highest number of interferences from neighbouring frequency bands coming from other radio spectrum users.

Table of corresponding operation modes	
Normal operation	Testing
1	2
3	4
5	6
7	8
9	10

The above table presents corresponding operation modes: in the time of normal work and during testing. For a given operation mode pair (e.g. 3 – 4), the adapter and the detector work at the same frequency

set. In case the adapter's operation mode is changed for another one (of a non-corresponding pair), then 'lack of communication with the detector' fault may occur for several minutes (if the detector was earlier equipped with batteries). Therefore, operation mode choice should be made at the design stage, in accordance with the rule that the neighbouring adapters (in radio range) are set up with different operation modes: consecutively '1', '3', '5', '7' and '9'.

When the DUR-4047 detector and ACR-4001 adapter are mounted in historic buildings, due to the devices working conditions (signal damping value) that may be hard to estimate, it is necessary to simulate the devices disposition in advance.

- I. The devices mounting place choice is based on estimation: the detector and the adapter 'see' each other – there are no obstacles between them and the distance is smaller than 60 m.
- II. The adapter mounting place choice – when the detector's (detectors') location is known – should be made using the TZCR-4001 testing radio set (supplied from battery, with purposely worsened radio spectrum parameters – in order to ensure unfailing work of a real adapter). After the detector (with batteries connected) is inserted into the base where it is intended to operate, communication between the detector and adapter is checked (red flashes are emitted by a diode placed in the adapter –minimum 1 red flash to provide 30 dB damping margin) using the testing adapter.

Since the adapter communicates with every detector in its operation range, during the test only one detector should operate!

- III. The disposition choice, when the adapter mounting place is known and the detectors arrangement can be altered.

When testing communication between the adapter and the detector, it is advised to carry out the device tests at the level as close as possible to the real conditions (under the ceiling, not just above the floor).

The devices configuration should start from the radio adapter connecting to the POLON 4000/POLON 6000 control panel detection line. None of detectors should be equipped with batteries. In order to check the signal strength in the premises where the detectors are to be mounted, one detector should be used.

1. At the control panel level, numbers of all detectors that are to interoperate with a given adapter (max. 16 detector numbers) should be entered. For this purpose, it is necessary to choose at the control panel (at the 3rd access level) the 'SYSTEM CONFIGURATION -> LINE SETUP -> ACR CONFIGURATION' menu.
 - a) The number of the line, where the adapter is installed, should be chosen;
 - b) The manufacturer's serial number should be entered – after its confirmation, the current adapter configuration shall be read in and displayed;
 - c) At 1 – 16 positions the serial numbers of the detectors interoperating with the adapter should be entered.

Note: Special attention should be given to avoid the same detector assignment to two different adapters as it may cause serious problems during configuration.

- d) The ACR adapter configuration should be saved.
 - e) In case of such necessity, the a), b), c) and d) actions should be repeated for other radio adapters.
2. In the control panel menu (at the 3rd access level), it is necessary to choose the 'SYSTEM CONFIGURATION -> LINE SETUP -> AUTOMATIC CONFIGURATION' menu and to pursue automatic elements declaration for a particular detection line. The control panel may signal detector faults as batteries are not connected and the detectors do not work.

Note: Since wireless radio detectors constitute a line branch, AUTOMATIC CONFIGURATION is possible only when the adapter is installed in a loop-shaped detection line. If it is installed in a radial line, only manual configuration can be carried out.

3. In the control panel menu (at the 3rd access level), it is necessary to choose the 'SYSTEM CONFIGURATION -> LINE SETUP -> MANUAL CONFIGURATION' menu and to settle the ACR-4001 adapter's '2' operation mode (alternatively '4', '6', '8' or '10' – service modes). A collective 'TESTING' indicator is lit in the control panel and, after pressing the button located near the indicator, the 'ACR-4001 IN SERVICE MODE' communique is displayed.
4. One of the declared detectors should be equipped with batteries. As soon as the detector enters the adapter operation range, the indicating diode emits red modulated flashes. In case the detector is unable to establish communication with the adapter, the diode emits modulated yellow flashes. The number of red flashes indicates the signal level (from 1 to 3).
5. It is necessary to test, whether proper radio communication with the adapter is established in the place where the detector is to be installed – regular 3 diode red flashes and no yellow flashes. Additionally, it is possible to check in the control panel 'SYSTEM ELEMENTS TESTING -> TESTS SETUP -> COMMUNICATION WITH RADIO DETECTOR TEST' menu, the number of successful attempts out of latest 31 ones. Optimally the 'COMMUNICATION QUALITY' parameter value should amount to 31; it cannot be lower than 20. Three minutes should be provided for reaching the proper value and its stabilization. Additionally, the 'TRANSMISSION HISTORY' enables latest transmissions history analysis. In order to provide 30-dB radio band damping, the graph columns should be of maximum height.
Note: The 'TRANSMISSION TIME' parameter should not exceed 10 sec.; if the parameter amounts to more than 60 sec. for the whole 3-minute test period, it is necessary to ascertain that the adapter operates in the 2 (or 4, 6, 8, 10) mode.
Subsequently, the detector should be placed in a consecutive base and its transmission correctness should be checked as in p. 5.
6. When all the places where detectors are to be installed are checked, the detectors should be equipped with batteries and mounted in the bases which were determined beforehand. It is important to prove at the control panel that every communication fault with the installed detectors has been eliminated.
7. After confirmation that the whole circuit operates properly, the control panel should be set up in the 'SYSTEM CONFIGURATION -> LINE SETUP -> MANUAL CONFIGURATION' menu at the '1' mode (or '3', '5', '7', '9' – normal operation mode) of the ACR-4001 adapter. The collective 'TESTING' indicator should go out; if it does not happen, it is necessary to check whether, after pressing the button located near the diode, the communique 'ACR-4001 IN SERVICE MODE' is still displayed, or another test is being executed.

Note: In case a detector is located in a place where radio communication is hindered (i.e. the detector does not receive a confirmation of any information sent for each time – it receives for instance one confirmation per 20 transmission attempts), it can result in faster batteries discharge and the detector shortened operational period. Low transmission quality is indicated at the control panel by the 'LOW RADIO LINK QUALITY' technical alarm.

9 STORAGE AND TRANSPORTATION

9.1 Storage

The ACR-4001 adapters 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 storage period for adapters kept in transport packing should not exceed 6 months.

9.2 Transportation

The ACR-4001 adapters 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.

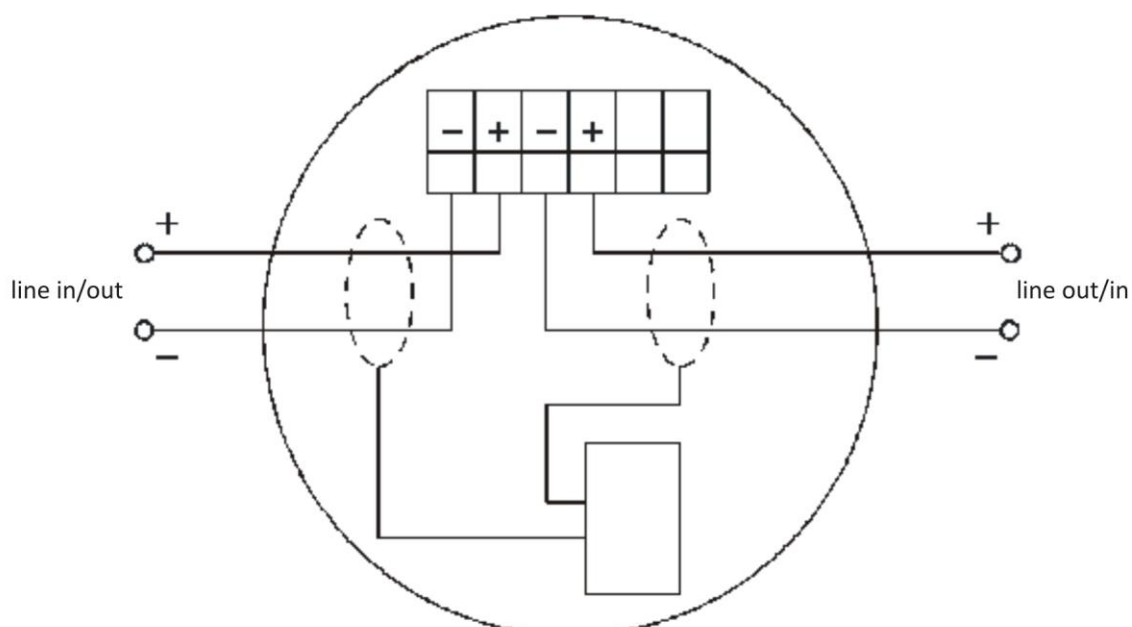


Fig. 2. Contacts of base interoperating with adapter plug



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