ISO 9001:2008

OPTICAL SMOKE DUAL-POINT DETECTOR

Model: **SP-2.1**

USER'S
MANUAL

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EN 54-7:2000/A2:2006

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1. FUNCTIONS

1.1. The SP-2.1 smoke optical 2-point detector is designed to detect smoky fires indoors in premises with separated spaces (e.g. in premises with suspended ceilings) and to transmit the alarm signal to a control panel.

1.2. The detector is counted on the continuous 24-hours operation in connection with control panels by 2-wire 10-30 V fire alarm loops. To connect the detector to a 4-wire FACP and to increase false alarm immunity of AC fire alarm system you should use MUSH-2 module.

1.3. The detector has two independent channels (sensors) – upper and lower, controlling the level of specific optical air density in the space behind the suspended ceiling and inside the room. Upon receiving a signal from the first and (or) the second sensor about exceeding the threshold specific optical density, the detector issues the alarm notification in the first and (or) the second loop.

1.4. The detector has built-in drift compensation that allows the unit to adjust sensitivity as it exceeds maximum permissible dust level with the LED indication of improper operating.

1.5. The detector has internal diagnostics feature providing a visual fault indication.

1.6. The detector has one red and one yellow LED indicators that indicate the following conditions: standby mode, fire status of the lower sensor, fire status of the upper sensor, fire status of both sensors, fault condition of the upper sensor, fault condition of the lower sensor, fault condition of both sensors.

2. TECHNICAL SPECIFICATIONS

2.1 Supply voltage range, V…….. 10-30
2.2. Standby current consumption, mA……..≤ 0,25
2.3. Alarm current consumption
in the whole range of supply voltages, mA…… 8,5±2,5
2.4. Operating temperature range, ˚C ……from -10 to +55
2.5. Weight, g ……300
2.6. Dimensions, mm……..Ø100x600
2.7. Average lifespan, years …….. ≥10

3. ITEMS SUPPLIED WITH THE DETECTOR

SP-2.1 smoke dual-point detector	see Note 2	including B102 base
Manual	1 pc.	Per a package
Package	1 pc.	

Notes:

1. The distance between the detector's sensors is defined by the vertical dimension "A" (see fig. 3) and can be 200, 400 and 600 mm depending by the order.
2. The number of detectors in a package depends on the dimension "A". A package contains up to 20 pcs of detectors with the dimension "A" 200 mm and 400 mm. A package contains up to 12 pcs of detectors with the dimension "A" 600 mm.
3. The K4 mounting ring is applied to install the detector onto a suspended ceiling.
4. You can order MUSH-2 module to be supplied with the detector.

4 DESIGN AND OPERATION PRINCIPLE

4.1. The operation principle of the unit is based on the way to control the optical medium density by the infrared beam scattering intensity in two points of the space.

4.2. The detector is the construction containing two sensors placed on one vertical axis and connected with a rigid rod. Each sensor comprises a plastic housing including the optical system, signal processing electronic unit and LED control. The detector is connected to the B102 base by the help of a four-contact joint fitted on the lower sensor.

4.3. The detector shall be in standby mode when there is no smoke in sensitive zones of optical systems of both sensors which is indicated with the built-in first red LED periodical flashing.

4.4. With smoke appearing in the sensitive zone of a sensor's optical system when specific air density exceeds the threshold value, the electronic circuit issues the Fire signal.

4.5. The detector resets from the fire mode to the standby mode when the mains supply is switched off for not less than 3 s and then is switched on.

4.6. When the detector's internal resistance with current limited at 8,5±2,5 mA, the Fire notification shall be issued in AL. When the Fire notification is issued this way, you can not fit CLRin the detector circuit provided that the detector's activation (current increase on 8.5 mA) will be properly interpreted by FACP (e.g. will not exceed short-circuit threshold).

4.7. The sensors' statuses are indicated with one red and one yellow LEDs. The standby mode is indicated with the red LED short-term flashing. A fault and its type is indicated when the corresponding sensor is being scanned. When a sensor's fault occurs, a user identifies the fault type by the yellow LED light (single flashes mean a sensor's fault and double flashes – critical contamination level), and the relation of the indicated fault to the upper or the lower sensor is determined by the position relative to the red indicator: if a fault has been indicated before the red LED flashs then this is the fault indication of the lower sensor, if after – of the upper one.

The detector can indicate the following statuses:

- standby mode – short-term flashes of the red LED with 0.8-1.2 Hz frequency;
- Fire of the lower sensor – pulsing light of the red LED with 0.4-0.6Hz frequency;
- Fire of the upper sensor – pulsing light of the red and the yellow LED with 0.4-0.6Hz frequency;
- Fire of both sensors – steady light of the red LED and pulsing light of the yellow LED with 0.4-0.6Hz frequency;
- fault of the lower sensor – short-term single flashes of the yellow LED and then short-term single flash of the red LED;
- fault of the upper sensor – short-term single flash of the red LED and then short-term single flash of the yellow LED;
- critical contamination level of the lower sensor – short-term double flash of the yellow LED and then short-term single flash of the red LED;
- critical contamination level of the upper sensor – short-term single flash of the red LED and then short-term double flash of the yellow LED.

4.8. The way of turn-by-turn sensors statuses indication provide the various combinations of the above-given statuses but the priority one will be always the indication of fire condition.

4.9. The reset of the detector from fault mode to standby mode occurs within 10 min after the contamination level is set below the permissible level or after electric modes are reset to the feasible area.

4.10. Alarm indication has a great priority over fault indication.

5. INSTALLATION

5.1. The detector is connected to an alarm loop with the B102 base. B102 bases should be secured onto the detectors' site of mounting directly onto suspended ceiling or using the K-4 mounting ring. The centre-to-centre distance between mounting holes of the B102 base is 70±0,2 mm. When the base is mounted to a suspended ceiling the diameter of hole in the ceiling should be from 52 to 60 mm. When the detector with the K-4 ring is mounted, the hole's diameter in the suspended ceiling should be 110-120 mm.

5.2. It is possible to connect to one screw joint of the B102 base up to two wires with the section 0,2-1,5 sq. mm.

5.3. The wiring diagrams for the detector to control panels are shown in Figure 1, 2. The appearance of detectors is shown in Figure 3.

6. PREPARATION FOR OPERATING AND SEQUENCE OF OPERATIONS

6.1 Open the package after receiving the detectors, check contents.

ATTENTION! If detectors were in below 0^{o} C temperature conditions before opening the package, allow them to acclimatize inside the structure for at least 4 hours.

6.2 Check the detector for proper operating.

6.2.1 Connect the detector to a 20-30 V DC source with ≥50 mA load current ("plus" connect to the contact "2" through 1 kOhm current limiting resistor , "minus" – to the contact "3").

6.2.2 Switch a power supply source on and the red LED shall shortly flash). In 60 s after energizing insert a tester (a metal or plastic pin Ø1-1,2 mm, 4-5 cm long) into the test hole on the cover and at the same time switch the stopwatch on.

6.2.3. When the detector triggers (goes to "Fire mode of the lower sensor"), stop the stopwatch and determine the response time (lag) that should be ≤15s.

6.2.4. Repeat p.6.2.2 for the upper sensor.

6.2.5. When the detector triggers (goes to "Fire mode of the upper sensor"), stop the stopwatch and determine the response time (lag) that should be ≤15s.

7. MAINTENANCE

7.1 Check at least every three months the indication of modes and if you detect emergency status of lower/upper sensor, vacuum the detector to keep unit working efficiently by firstly turning off the mains supply and vacuuming through the vents during one minute using a soft brush attachment or using another 0,5-3 kg/cm^2compressor.

7.2 After cleaning it up if the detector within 10 minutes will not go to standby mode, then it should be replaced by another one.

7.3 After maintenance you should check the detector for proper operating according to p.6.2..

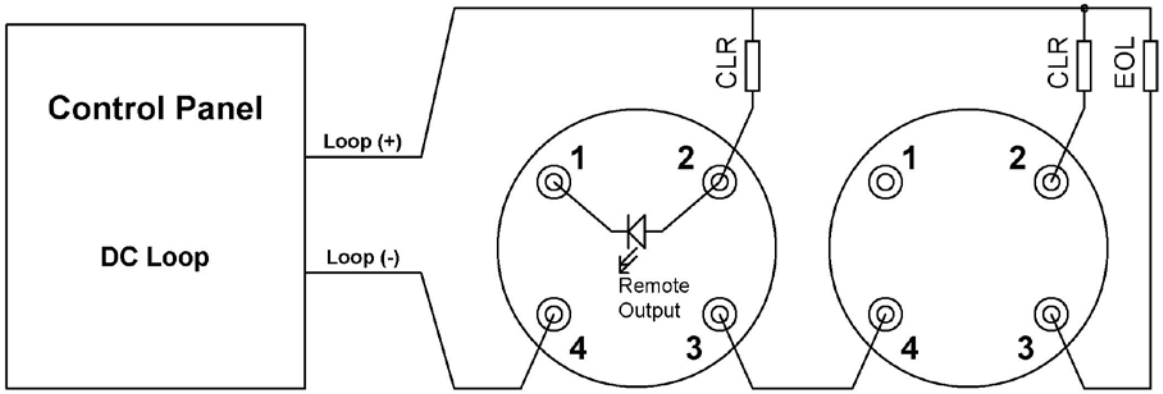
8. GUARANTEE

8.1 The detector is warranted by the manufacturer for 18 months upon the date of the detector's commissioning but not more than for 30 months from the date of approval by the manufacturer's quality control department.

8.2 The manufacturer shall repair or replace detectors within the guarantee term provided that the rules of installation, timely maintenance, transportation and storage of detectors have been kept.

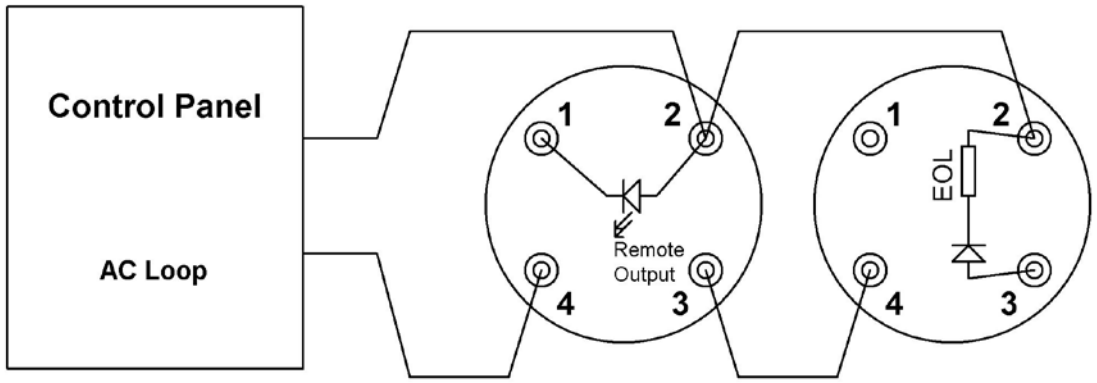
8.3 In the case faults according to a reclamation have been removed the guarantee term is prolonged for the while detectors were not in use because of faults.

Figure 1 **WIRING DIAGRAM FOR THE SP-2.1 TO DC CONTROL PANEL**



24 V: EOL resistor=5,6 kOhm, CLR= (0 - 3) kOhm
12 V: EOL resistor =3,3 kOhm, CLR= (0 - 1) kOhm

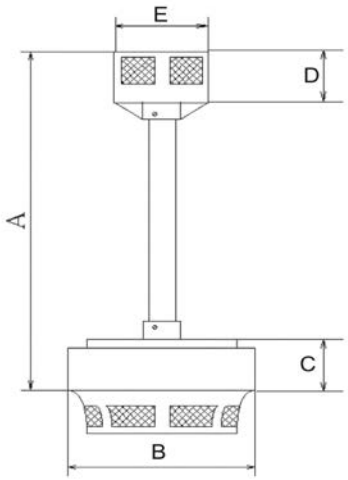
Figure 2 **WIRING DIGRAM FOR THE SP-2.1 TO AC CONTROL PANEL**



EOL resistor is specified by control panel manufacturer (from 1 to 10 kOhm)

Figure 3

APPEARANCE AND DIMENSIONS



A is specified by the purchase order - 200, 400 or 600 mm
B - Ø100 mm
C – 25 mm
D – 35mm
E - Ø51 mm

QUALITY AND PACKING CERTIFICATE

Optical smoke detector, model SP-2.1, serial numbers:

_____pieces Compliant with EN 54-7 Manufacturing date __ __.__ __.201__	_____pieces Packed in compliance with the factory rules Packing date __ __.__ __.201__

Quality control mark_____