



USER'S
MANUAL

SP-2.4 SMOKE OPTICAL DUAL-POINT DETECTOR

Comply with EN 54-7:2000/A2:2006.

1. PURPOSE

1.1. The SP-2.4 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 two 2-wire 10-30 V fire alarm loops.

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.

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

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

1.6. The detector incorporates two red and one yellow LED indicators that indicate the following conditions: standby mode, alarm state of the lower sensor, alarm state of the upper sensor, alarm state of both the upper and lower sensors, fault condition of the upper sensor, fault condition of the lower sensor, fault condition of both the upper and lower sensors.

1.7. The detector goes to the fault mode when the maximum permissible contamination level loading is exceeded or the electric modes of the optical system exceed permissible limits.

2. TECHNICAL SPECIFICATIONS

2.1. Supply voltage range, V.....	10-30
2.2. Standby current consumption on the outputs “2”-“3”, mA.....	≤ 0,25
2.3. Standby current consumption on the outputs “1”-“4”, mA.....	≤ 0,05
2.4. Alarm consumption current in the whole range of supply voltages on each pair of outputs “2”-“3”, “1”-“4”, mA.....	12±3
2.5. Operating temperature range, °C.....	from -10 to +55
2.6. Dimensions, mm.....	Ø100x600
2.7. Weight, g.....	300
2.8. Average service life, years.....	≥10

3. ITEMS SUPPLIED WITH THE DETECTOR

The SP-2.4 smoke 2-point detector	see Note 2	the B103-04 base including
Datasheet	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 decorative ring is applied to install the detector to a suspended ceiling.

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 circuit. The detector is connected to the B103-04 base with the help of a four-contact joint fitted on the lower sensor.

4.3. The detector connected to a control panel 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 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 alarm signal in the loop corresponding to the sensor.

4.5. The detector resets from alarm mode to standby mode when both alarm loops are deenergized for at least 3 s and then are energized again.

4.6. When the detector's internal resistance with current limited at 12 ± 3 mA is intermittently reduced, the Fire notification shall be issued in AL.

4.7. The sensors' statuses are indicated with two red and one yellow LEDs. The standby mode is indicated with the first 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 inducing fault to the upper or the lower sensor is determined by the position relative to the first red indicator: if a fault is indicated before the red LED flashes 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 first red LED;
- alarm of the lower sensor – pulsing light of the first red LED;
- alarm of the upper sensor – steady light of the second red LED;
- alarm of both the lower and upper sensor – pulsing light of the first red LED and the steady light of the second red LED;
- fault of the lower sensor – short-term single flash of the yellow LED and then short-term single flash of the first red LED;
- fault of the upper sensor – short-term single flash of the first 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 first red LED;
- critical contamination level of the upper sensor – short-term single flash of the first 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 AL with the B103-04 base. B103-04 bases should be secured onto the detectors' site of mounting directly onto suspended ceiling or with the help of the K-4 mounting ring. The centre-to-centre distance between mounting holes of the B103-04 base is $70 \pm 0,2$ mm. When the base is mounted to suspended ceiling the hole's diameter should be from 52 to 60 mm. When the detector with the K-7 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 B103-04 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 detector's appearance 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° 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 10-30 V DC source with ≥ 50 mA load current ("plus" connect to the contacts "2" and "1", "minus" – to the contacts "3" and "4").

6.2.2 Switch a power supply source on and the first red LED shall shortly flash). Within 30 s after energizing insert a tester (a metal or plastic pin $\varnothing 1-1,2$ mm, 4-5 cm long) into the test slot on the cover and at the same time switch the stopwatch on.

6.2.3. When the first red LED will go to pulsing condition at the moment of triggering, stop the stopwatch and determine the response time (lag) that should be ≤ 15 s.

6.2.4. Repeat p.6.2.2 for the upper sensor.

6.2.5. When the second red LED will go to steady condition at the moment of triggering, stop the stopwatch and determine the response time (lag) that should be ≤ 15 s.

7. GUARANTEE

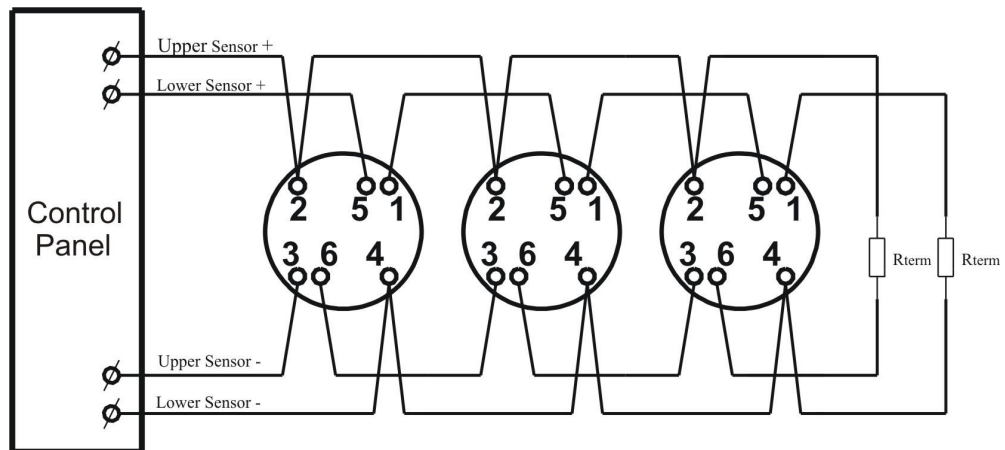
7.1 The detector is warranted by the manufacturer for 18 months upon the date of the detector's commissioning but not more than for 30 months from the date of approval by the manufacturer's quality control department.

7.2 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.

7.3 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-2.4 TO DC CONTROL PANEL $I_{\text{alarm}}=12\text{mA}$**

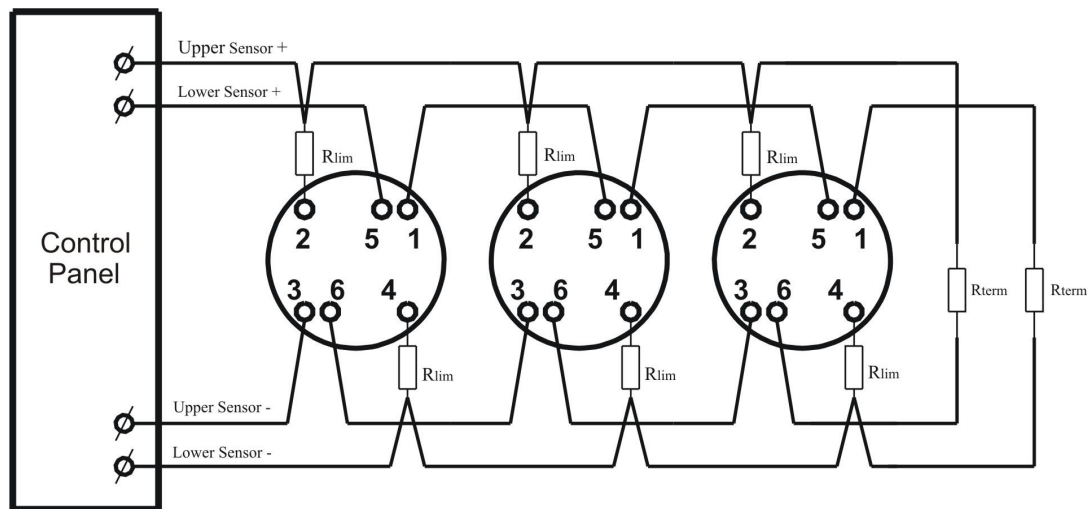


For 24 V: EOL resistor=2,4 – 3,9 kOhm

For 12 V: EOL resistor =1,2 – 2 kOhm

Figure 2

**WIRING DIGRAM
FOR THE SP-2.4 TO DC CONTROL PANEL with TRIGGER CURRENT <12 MA**



For 24 V: EOL resistor =2,4 – 3,9 kOhm

For 12 V: EOL resistor =1,2 – 2 kOhm

CLR is specified by the control panel model.

If you need to set current 5-8 mA in alarm mode then CLR is calculated by the formula:

$$\text{CLR} = (U_{\text{AL}} - 7) / I_{\text{alarm}}$$

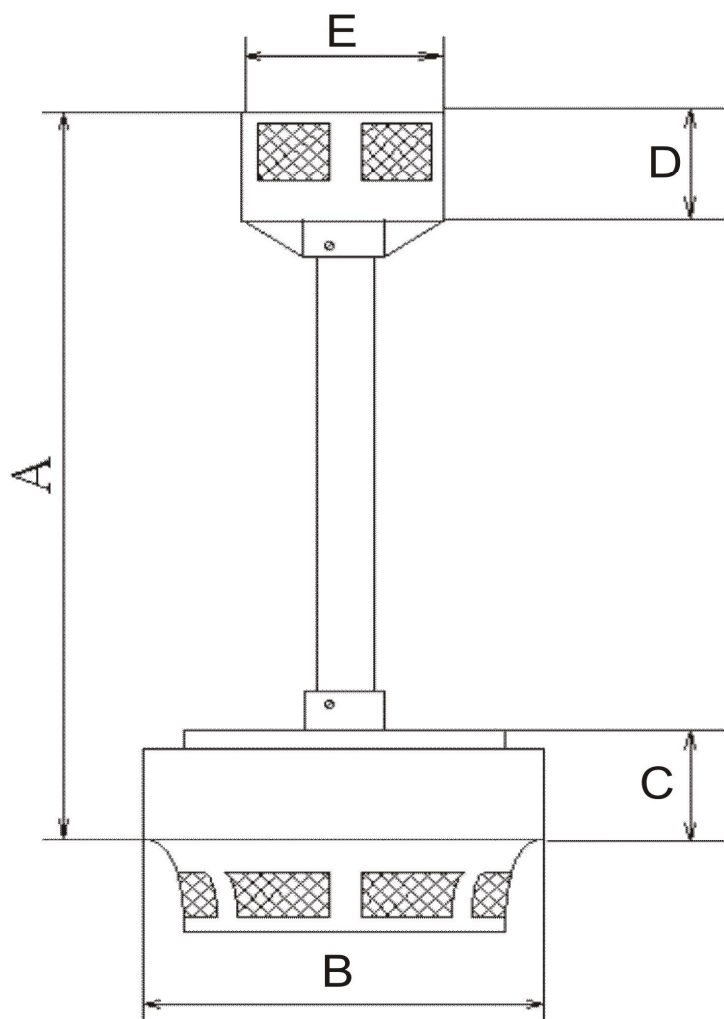
U_{AL} – rated supply voltage of alarm loop (specified by the control panel model)

I_{alarm} – alarm current (specified by the control panel type)

The limiter is the upper and lower trigger current limit. The brightness of LED light slackens at <5 mA current in alarm mode. The upper limit limits the current inside the detector.

Figure 3

APPEARANCE AND DIMENSIONS



A is determined by the order - 200, 400 or 600 mm

B - Ø100 mm

C – 25 mm

D – 35mm

E - Ø51 mm

