

IP 212-31 DIP-31

OPERATIONS MANUAL

1 GENERAL

1.1 IP 212-31 DIP-31 Threshold Photoelectric Smoke Detector (hereinafter referred to as the detector) is to be used in fire detection and fire alarm systems to detect smoke producing fires in closed premises of buildings by sensing the light reflected by smoke particles in its sensing chamber and sending a fire alarm.

1.2 Two LEDs on the detector provide information on the detector's conditions, which can be Quiescent Conditions, Pre-Alarm, Fire Alarm, Fault, and Contaminated Chamber.

1.3 The detector is to be brought into an alarm loop of a fire control and indicating equipment (unit), is powered via the alarm loop, and triggers fire alarms by increasing the loop current as a result of reducing its effective resistance.

1.4 The detector is powered via an alarm loop of a control and indicating equipment (unit) such as Signal-10, S2000-4, Signal-20P, S2000-ASPT, Signal-20M, Signal-20, which provides loop voltage up to 30 V and limits the current in a loop at a level not exceeding 20 mA. The minimum powering voltage in the loop is to be 10 V.

1.5 The detector is intended for round-the-clock operation and is classified as a repairable and periodically maintained item.

1.6 The version of DIP-31 firmware is v.1.05.

1.7 The detector can be tested using a System Sensor remote test unit, or Astra-942 Laser Tester from the TEKCO Company, or OT-1 Optical Tester from the RUBEZH Company.

2 SPECIFICATIONS

2.1	Sensitivity, dB/m	- 0.05 to 0.2
2.2	Rated power voltage, V	- 24
2.3	Consumed current,	
	- In the quiescent mode, uA	- 140 max
	- In the fire alarm mode, mA	- 10 max
2.4	Internal resistance of the detector in the Fire Alarm mode at the current value:	
	- 8 mA	- 2.6 kOhm max;
	- 2 mA	- 4.5 kOhm max
2.5	Start-up time, s	- 40 max
2.6	Operating temperature range, °C	- Minus 10 through +55
2.7	Relative air humidity, %	- Up to 93 at +40 °C
2.8	Enclosure protection degree	- IP40
2.9	Overall dimensions, mm:	
	- Diameter	- 100 max
	- Height	- 47 max
2.10	Weight, kg	- 0.1 max
2.11	Alarm loop wire cross-section, sq. mm	- 0.125 through 2.5
2.12	Immunity to background illumination due to artificial and natural lighting, lux	- 12,000 min
2.13	Radio-frequency electromagnetic field immunity as per GOST R 51317.4.3-99	- Test severity level 3
2.14	Immunity to electrostatic discharge as per GOST R 51317.4.2-99	- Test severity level 3
2.15	Class of electric shock protection as per GOST 12.2.007.0-75	- III
2.16	Air velocity at mounting location, m/s	- 15 max
2.17	MTBF, hours	- 60,000 min
2.18	Expected lifetime, years	- 10 min

Test Alarm Time specification, s:

Test Fire Type	Heat Release Rate	Upward Flow	Limit Value	Actual Value
TF2: Smouldering wood fire	small	weak	840	343 max
TF3: Smouldering cotton fire	small	weak	750	215 max
TF4: Flaming plastics fire	high	strong	180	115 max
TF5: Flaming liquid (n-heptane fire)	high	strong	240	154 max

3 STANDARD DELIVERY

Item	Quantity, pcs.	Remark
IP 212-31 DIP-31 Smoke Detector (body)	10	
IP 212-31 DIP-31 Detector Base	10	
Operations Manual	1	
Protective (Dust) Cover	10	
Grouping Package	1	
VUOS-31 Remote Indicator	10	Ordered separately
MK-2 or MK-3 Recessed Mounting Kit for mounting the detector onto suspended ceiling	10	Ordered separately

4 DESIGN

The essential parts of the DIP-31 detector are as follows (see Figure 1): the detector base (Position 1) with guiding grooves (Position 2), two light emitting indicators (Position 3), the printed circuit board and the sensing chamber (Position 4), the detector body (Position 5), the detector cover (Position 6), the sensing chamber cover (Position 7), and the screen (Position 8).

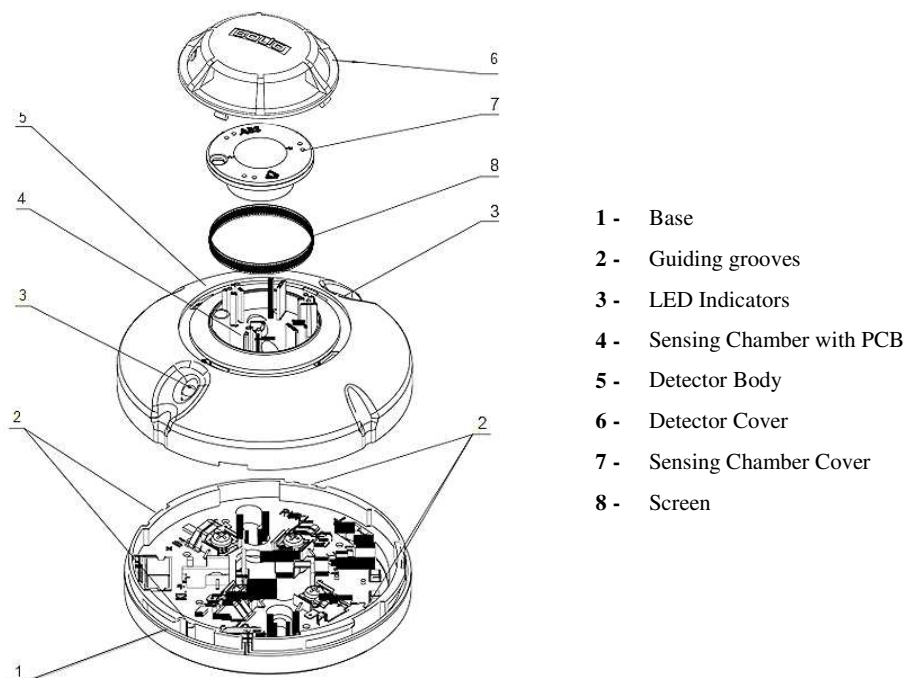


Figure 1

5 MOUNTING AND DETACHMENT

5.1 The detector is to be mounted to the surface of bearing structures using its base (see Figure 2). To install the detector base, drill two holes into the surface according to the drilling pattern in Figure 2 and attach the base by means of screws and wall plugs or tapping screws.

5.2 To install the detector onto fire resistant tiles of suspended ceiling, use MK-2 or MK-3 mounting kit for attaching the detector base (Figure 3, Position 1). Make a mounting hole for the mounting kit according to the marking (Figure 3).

5.3 Until installation works are completed, the sensing chamber of the detector should be covered by the protection cover provided (Figure 3, Position 3).

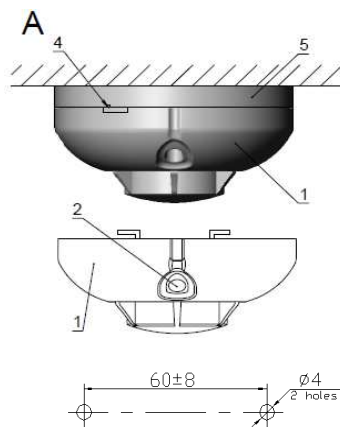


Figure 2

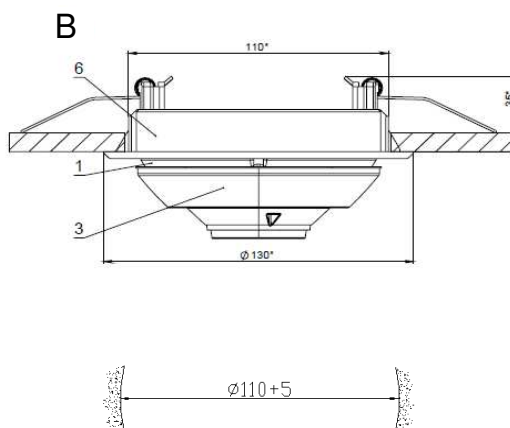


Figure 3

5.4 To protect the detector against unauthorized removing or to provide secure attachment in the presence of vibrations, lock the detector by doing the following.

Prior to installing the detector base, detach the key (Figure 4, Position 3) from it and cut out the rib (Figure 4, Position 1) of the locking click (Figure 4, Position 2).

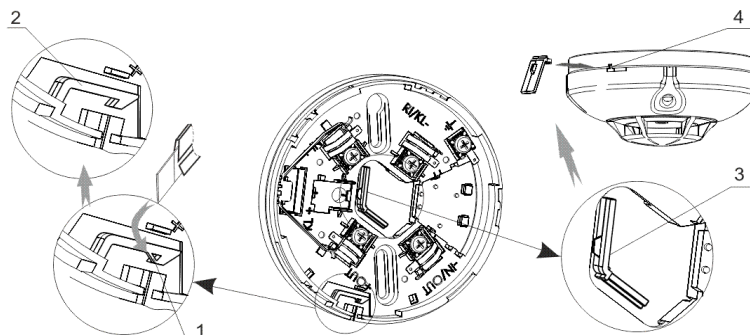


Figure 4

5.5 For installing the detector body, place it onto the base as shown in Figure 5 (A) and rotate clockwise until reaching into the guiding grooves. Then rotate it until rest as shown in Figure 5 (B).

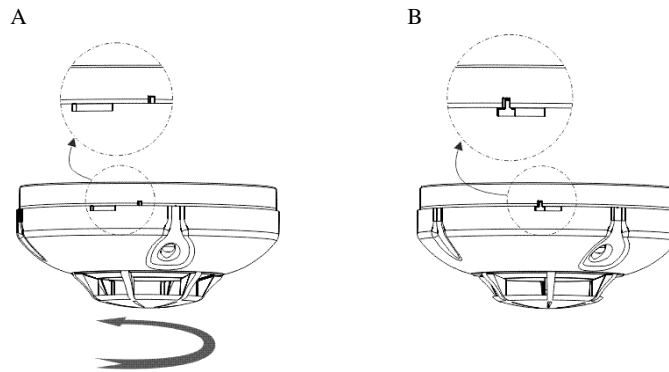


Figure 5

5.6 For releasing the detector, insert the key (Figure 4, Position 3) into the slot (Figure 4, Position 4), push inward and in the same time rotate the detector body counterclockwise. Then remove the key from the slot and rotate the detector body further in the same direction until it is separated from the base.

5.7 Mounting and dismounting can only be carried out with the equipment in de-energized state.

6 WIRING

6.1 The detectors, along with VUOS-31 remote indicators or without them, are electrically wired into the alarm loops of control and indicating equipment per the schematic shown in Figure 6.

In general for generating events *Fire Alarm 1 (Pre-Alarm)* and *Fire Alarm* in two-threshold alarm loops, an additional resistor is to be brought in series with the detector. DIP-31 have already had additional resistors built in within them, which facilitates mounting the detectors for their operation with fire control and indicating equipment (units) such as Signal-10, S2000-4, Signal-20P, S2000-ASPT, Signal-20M, Signal-20.

6.2 While connecting the detectors into alarm loops of fire alarm and control units Signal-10, Signal-20P, S2000-4 and devices Signal-20M, S2000-ASPT as per Figure 6, the following types of alarm loops can be assigned:

- 1: Fire Smoke (two-threshold);
- 2: Fire Combined (single-threshold).

For both cases the end resistor in a loop is $R_t = 4.7K \text{ Ohm}$.

6.3 The detector is protected against reverse polarity of connecting alarm loops.

6.4 Wiring shall be carried out with the equipment in de-energized state.

6.5 When connecting wires, it is advised to use cable shoes.

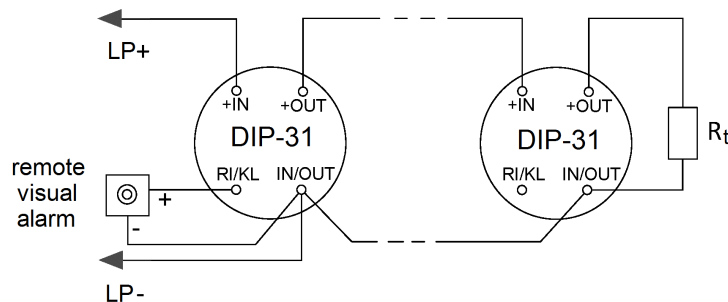


Figure 6

The detector provides indication of the following conditions by means of two red built-in visual indicators as follows:

QUIESCENT CONDITIONS: Flashing once every 6 s;

PREALARM: Two flashes every 6 s (when two successive measured levels of sensing chamber signal are 75% of the fire condition level);

FIRE ALARM: Light steadily;

CONTAMINATED CHAMBER: Three flashes every 6 s (if the signal level has slowly reached 75 percent of the maximum contamination level. Drift compensation is performed every 24 hours).

FAULT: Four flashes spaced 200 ms apart every 6 s (if the measuring function of the detector is out of order).

7 TESTING

7.1 Apply power to the control and indicating equipment to which loop the detector is connected. The control and indicating equipment should be known good device.

7.2 In the absence of smoke, the detector is in the quiescent conditions, red light emitting indicators flashing once per 6 s.

7.3 To check the detector response, present the can with aerosol simulated smoke to the sensing chamber of the detector and release a single burst of smoke agent. Not later than 40 s after exposure to aerosol the detector shall go into the fire alarm conditions, the detector's light emitting diodes starting to light steadily. The fire alarm shall be received and indicated by the control and indicating equipment.

Note: For testing smoke detectors you are advised to use aerosol smoke products such as Smokesabre 01-001, CHEK01-001, or similar.

7.4 A more simplified functional test can be conducted by lighting one of the detector's LEDs or the LED of the connected remote indicator VUOS-31 with the laser beam of the remote test unit. The detector will go to the fire alarm conditions. The distance between the remote test unit and the illuminated LED shall be at least 0.5 m.

Note: A VUOS-31 remote indicator with the red LED (and colour free LED cap) is suitable for testing with a laser tester. Other remote indicators can be not suitable for this purpose.

7.5 If no fire alarm is registered by the control and indicating equipment, or light emitting indicators operate in a way which differs from the specified one, the detector is unhealthy and shall be replaced.

WARNING!

Prior to testing the detector's operability in an actual fire alarm system, disconnect outputs of the control and indicating equipment that control fixed fire suppression systems, voice announcement systems, general ventilation and smoke control systems.

8 MAINTENANCE AND REPAIR

8.1 At least once a year the following maintenance works shall be performed:

- Inspection for visible physical damage;
- Visual checking of dust on the surface of the insect screen. In case of any dust, remove it with a vacuum cleaner (by pumping of air).

At least once every two years check the detector operability as described in Clause 7 of this manual.

8.2 When the detector indicators flash triply every 6 s, which indicates the Contaminated Chamber conditions, clean the sensing chamber by doing the following:

- 1) Remove the detector from the base as described in Clause 5.5 of this manual.
- 2) Remove the detector cover (Figure 1, Position 6) from the detector body by holding it by the stiffeners and rotating it slightly counterclockwise. Then take out one-by-one the sensing chamber cover (Figure 1, Position 7) and the screen (Figure 1, Position 8).
- 3) Clean the sensing chamber cover, the screen, and the sensing chamber itself with a soft brush.

WARNING! The sensing chamber shall be mandatory cleaned when the smoke detector enters the Contaminated Chamber conditions. Otherwise, this can trigger false alarms.

8.3 Maintenance of the detector as a part of a fire alarm system is to be arranged in accordance with the technical guide “Maintenance of fire alarm systems and public address and general alarm systems of type 1-2 in Orion ISS”, and maintenance of the detector as a part of a fire extinguishing installation is to be arranged as per the technical guide “Maintenance of fixed fire suppression systems based on S2000-ASPT Fire Alarm and Extinguishing Control Unit”.

8.4 When the light indicators of the detector issue four flashes spaced 200 ms apart every 6 s, which means the Fault condition, the detector needs to be repaired. A defective detector is subject to repair by the manufacturer or in authorized repair centers. While submitting the product for repair, please always apply a report describing the possible failure to it.

WARNING! The manufacturer does not accept any claims without a malfunction report applied.

8.5 A product's failure resulted from consumer's not observing mounting or operation rules shall not be a reason for claims and warranty repair.

WARNING!

Do not try to remove the printed circuit board; this will automatically void the warranty liabilities.

8.6 Claims should be submitted to the following address:

NVP BOLID, #4 Pionerskaya Str., Korolyov, Moscow Region, 141070, Russia

Tel./fax: **+7 (495) 775-71-55** (PBX). E-mail: info@bolid.ru.

8.7 In case of any issue related to use of the product, please contact the technical support: +7 (495) 775-71-55 or e-mail: support@bolid.ru.

9 TRANSPORTING, STORAGE, DISPOSAL

9.1 The detectors in a transport container are to be transported by any type of covered vehicles in accordance with the requirements of actual regulatory documents.

9.2 The detectors shall be stored in consumer packages in heated warehouse premises at temperatures +5°C through +40°C and relative humidity up to 80% at +20°C.

9.3 In a transport container the detectors can be stored in unheated warehouse premises at ambient temperatures -50°C through +50°C and relative humidity up to 95% at +35°C.

9.4 The detector should be disposed of considering that there are no toxic components in it. The detector's enclosure is made of recyclable ABS plastic.

9.5 The content of precious materials: does not require accountability for storage, retirement and disposal (Clause 1.2 of GOST 2.608-78).

9.6 The content of non-ferrous metals: does not require accountability for retirement and further disposal.

10 MANUFACTURER WARRANTY

The warranty period is 18 months since the day of putting the detector into operation but no more than 24 months from the manufacturer's date of production.

11 CERTIFICATION INFORMATOIN

11.1 DIP-31 complies with the requirements of Technical Regulations “On Fire Safety Requirements” (Federal Law No.123-FZ dated July 22, 2008, GOST R 53325-2012) and is awarded with Conformity Certificate No. C-RU.4C13.B.001193.

11.2 DIP-31 complies with the requirements of Technical Regulations of Custom Union TR CU 020/2011 and is awarded with Declaration of Conformity EA9C № RU 4-RU.ME61.B.00019/18.

11.3 DIP-31 complies with the requirements of Technical Regulations TR EAEU 037/2016 “On the restriction of the use of hazardous substances in electronic and radio electronic equipment” and is awarded with Declaration of Conformity EA9C № RU 4-RU.PA01.B.21887/20.

12 INFORMATION ON ACCEPTANCE, PACKAGING, AND MARKING

12.1 IP 212-31 DIP-31 threshold photoelectric smoke detectors are manufactured, accepted in line with mandatory requirements of national standards and actual technical documentation, approved as ready for operation, and packaged.

12.2 The detector is marked with its factory number, quarter and year of production on its enclosure, and the BOLID trademark is placed on the detector body and the package.

