ИСО 9001

EAC

**ANALOG ADDRESSABLE
PHOTOELECTRIC SMOKE DETECTOR IP 212-34A**

DIP-34A-03-S

User's Manual

BOLID®

TABLE OF CONTENTS

This User's Manual (the full version) explains the principles and rules of operating IP 212-34A DIP-34A-03-S Analog Addressable Photoelectric Smoke Detector (hereinafter referred to as the detector).

Only the personnel who have studied this manual are allowed to operation activities. All activities on mounting, start-up, programming, and testing shall be performed in compliance with the requirements of the regulatory documentation in force at the place of operation.

List of abbreviations:
FACP: Fire Alarm Control Panel;
ISS: Integrated Security System;
PL: Polling Loop.

1 Description and Operation

1.1 Purpose

1.1.1 IP 212-34A DIP-34A-03-S analog addressable photoelectric smoke detector (hereinafter referred to as the detector) is to be used in fire detection and fire alarm systems and is intended to detect fires accompanied by the appearance of smoke in closed premises of various buildings and structures by sensing light reflected off smoke particles and sending fire alarm signals automatically.

1.1.2 The detector is designed to operate under a polling loop controller such as S2000-KDL, S2000-KDL-2I, S2000-KDL-2I rev.01, S2000-KDL-S as a component of Orion ISS. The detector communicates data and consumes power via a two-wire multiplex addressable polling loop.

1.1.3 The IP 212-34A DIP-34A-03-S detector features extended operating temperature range.

1.1.4 The detector is intended for round-the-clock operation.

1.1.5 The detector is designed to be operated in residential, commercial, and industrial areas.

1.1.6 The detector is classed as a restorable, regularly maintainable item.

1.2 Specifications

Table 1.2.1

	Parameter	Value
1.2.1	Power input voltage (from the polling loop), V	8 through 11
1.2.2	Consumed current, mA, max	0.6
1.2.3	The number of detectors per a single polling loop, pcs.	Up to 127
1.2.4	Maximum effective resistance of the polling loop wires, ohms, max	100
1.2.5	Minimum insulation resistance between the polling loop wires, kilo-ohms, min	50
1.2.6	Start-up time, s, max	60
1.2.7	Sensitivity, dB/m	0.05 through 0.2
1.2.8	Enclosure protection degree as per GOST 14254-2015 - Using an MK-4 mounting kit - Using an MK-8 mounting kit	IP41 IP43 IP44
1.2.9	Resistance to mechanical exposure as per OST 25 1099-83	Arrangement Category III
1.2.10	Vibration exposure: - Frequency range, Hz - Max acceleration, g	1-35 0.5
1.2.11	Environmental category as per OST 25 1099-83	O3
1.2.12	Operating temperatures, °C	Minus 50 through plus 55
1.2.13	Relative humidity, %, at +25 °C	Up to 95
1.2.14	Weight, kg, max	0.2
1.2.15	Overall dimensions: - diameter, mm, max - height, mm, max	100 47
1.2.16	Non-stop operation	24/7
1.2.17	MTBF in the quiescent mode, hours, min	80,000
1.2.18	Survival probability after 1,000 hours	0.98758
1.2.19	Expected lifetime, years	10

1.2.20 As to immunity to man-made radio disturbance, the detector meets the requirements for Test Severity Level III of the relevant standards listed in Appendix "Б" to GOST R 53325-2012.

1.2.21 The detector passes the industrial interference standards prescribed for Class 'Б' equipment as per GOST R 30805.22.

1.3 Scope of Delivery

The detector is supplied in a ten-unit packaging.

The scope of delivery is shown in Table 1.3.1.

Table 1.3.1

Item	Q-ty
IP 212-34A DIP-34A-03-S smoke detector	10 pcs.
DIP-34A-03 mounting base with electric contacts	10 pcs.
Accessory kit:	
Dust protective cover	10 pcs.
Address label	10 pcs.
MK-2 Mounting Kit* for recessed mounting on a ceiling	—
MK-3 Mounting Kit* for recessed mounting on a ceiling	—
MK-4 Mounting Kit* to improve ingress protection up to the IP43 degree	—
MK-8 Mounting Kit* to improve ingress protection up to the IP44 degree	—
Wire cage* to protect against mechanical damage	—
Documentation:	
IP 212-34A DIP-34A-03-S Analog Addressable Photoelectric Smoke Detector. Operations Manual.	1 pc.

* – Supplied by separate order

1.4 Arrangement and Operation

1.4.1 The detector is composed of a printed circuit board, a disassemblable enclosure, and a mount base.

The printed circuit board features a microcontroller, a smoke chamber, a tact switch, and an LED.

On the detector cover there is a moveable light pipe which leads to the LED, with pressing on the light pipe impacting the force to the button.

The microcontroller uses the smoke chamber to detect optical radiation reflected off smoke particles. Having processed the data received from the smoke chamber, the microcontroller sends alarms based on a growth of values and exceeding the threshold.

Detector's firmware provides correction of slow growth of background signals in the smoke chamber resulted from accumulated dust on the smoke chambers walls.

As soon as the value of corrected background signal attains a threshold specified for the detector, a *Service Required* message is issued, but the detector is still for some time able to send *Fire Alarm* messages in case of the increased smoke concentration. This provides some time to take measures on cleaning the detector. Unless the detector is cleaned, in case of further increase of background signal a *Fault* message is sent, with detection of fires being impossible.

Fault messages are issued in case of the detector sensitivity has dropped from initial values due to degradation of optical channel elements or contamination.

The microcontroller use the LED to indicate conditions of the detector, and also it can accept light from a laser tester.

Lighting with the beam of a laser tester or pressing on the light pipe is necessary for some manipulations with the detector described in para "2 Intended Use".

As a laser tester, one can use laser DIP-Test manufactured by Bolid, System Sensor testers, TEKO Astra-942, and Rubezh OT-1 testers.

1.4.2 The detector meets the requirements of Appendix "P" of the Russian code of rules "СП5.13130.2009". The detector answers to requests for levels of smoke concentration and contamination in the smoke chamber. Based on analysis of responded data one can make a decision on carrying out preventive maintenance of the detector.

1.4.3 The detector supports DPLS_v2.xx protocol and provides getting values of voltage of the addressable polling loop at the point the detector is located.

1.4.4 The detector can be in one of the following operation modes:

– *Norm*: The smoke concentration is within normal range;

– *Fire Alarm*: The value of smoke concentration has exceeded the given fire threshold;

– *Service Required*: The smoke chamber is contaminated and shall be cleaned;

– *Fault*: Optical channel of the detector has failed or has been inoperable due to contamination;

– *Test*: Manual action onto the detector (pushing on the light pipe or lighting it with the beam of a laser tester) followed by sending a *Test* message;

– *Programming*: A *Set Device Address* command has been received via the polling loop from the polling loop controller;

– *Startup*: The detector has been fed from the PL controller, but no request on the detector address has yet been received.

1.4.5 The detector supports requests for information parameters specified in Table 1.4.5.1.

Table 1.4.5.1

Parameter	Description	Value Range	Factory Value
Device Type	The name of the detector in Orion ISS	DIP-34A-03, DIP-34A	DIP-34A-03[1]
Firmware Version	Current version of the detector firmware	1.00 … 2.55[1]	1.01[1]
Address	The address of the detector within the polling loop	1 … 127	127
ADC Value	Smoke level	0 ... 244	0 ... 10
	Press on the button	245 for *Test* 246 ... 249 for *Fault*	245
Contamination	Dust level	0 … 244	0 ... 10

(1) – If the detector is operated by an S2000-KDL of version below v.2.10 or by an S2000-KDL-2I of version below v.1.10 then the Device Type will be displayed as "DIP-34A".

1.5 Measuring Instruments, Tools, and Accessories

While mounting, commissioning, and maintaining the detector, please use the instruments, tools, and accessories shown in Table 1.5.1

Table 1.5.1

Instrument	Specifications
Digital multimeter	AC/DC voltage up to 500 V, AC/DC current up to 5 A, resistance up to 2M Ohm
Flat head screwdriver	3.0×50 mm
Cross slot screwdriver	2×100 mm
Side-cutting pliers	160 mm
Pliers	160 mm

1.6 Marking

1.6.1   Every detector has a marking applied to the back of its enclosure.

1.6.2   The marking contains the company logo, the name of the detector, its decimal number, factory number, the year and quarter of production, and conformity marks.

1.6.3   Sealing the detector is not applicable.

1.7 Packaging

The detectors along with accessory kit and operation documentation are packed into a cardboard box.

2 Intended Use

2.1 Operating Restrictions

The design of the detector doesn't provide its operation in aggressive and / or dusty environments as well as in explosion hazardous and flammable premises.

Correct performance of the detector cannot be guaranteed if electromagnetic environment does not meet the requirements defined in Section 1.2 of this manual.

2.2 Preparing for Use

2.2.1 Safety Precautions During Preparation

– The detector design meets the requirements of electric and fire safety including emergency operation in accordance with Russian standards GOST 12.2.007.0-75 and GOST 12.1.004-91;

– The detector has no circuits under a hazardous voltage;

– Do SHUT OFF power from the equipment before mounting, installing, and maintaining this one;

– Installation and maintenance shall be carried out by professionals qualified for Accident Prevention of Class II or higher.

2.2.2 Design

Figure 2.2.2.1 shows the appearance of the detector.

Figure 2.2.2.1

Overall dimensions are presented on the side view, in Figure 2.2.2.2 and on the bottom view, in Figure 2.2.2.3.
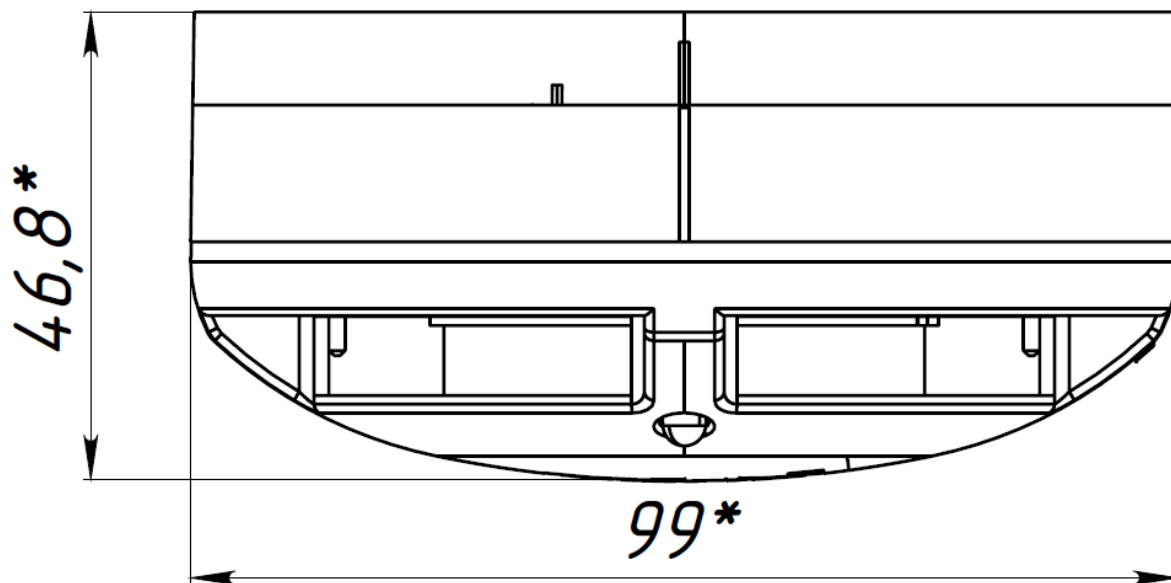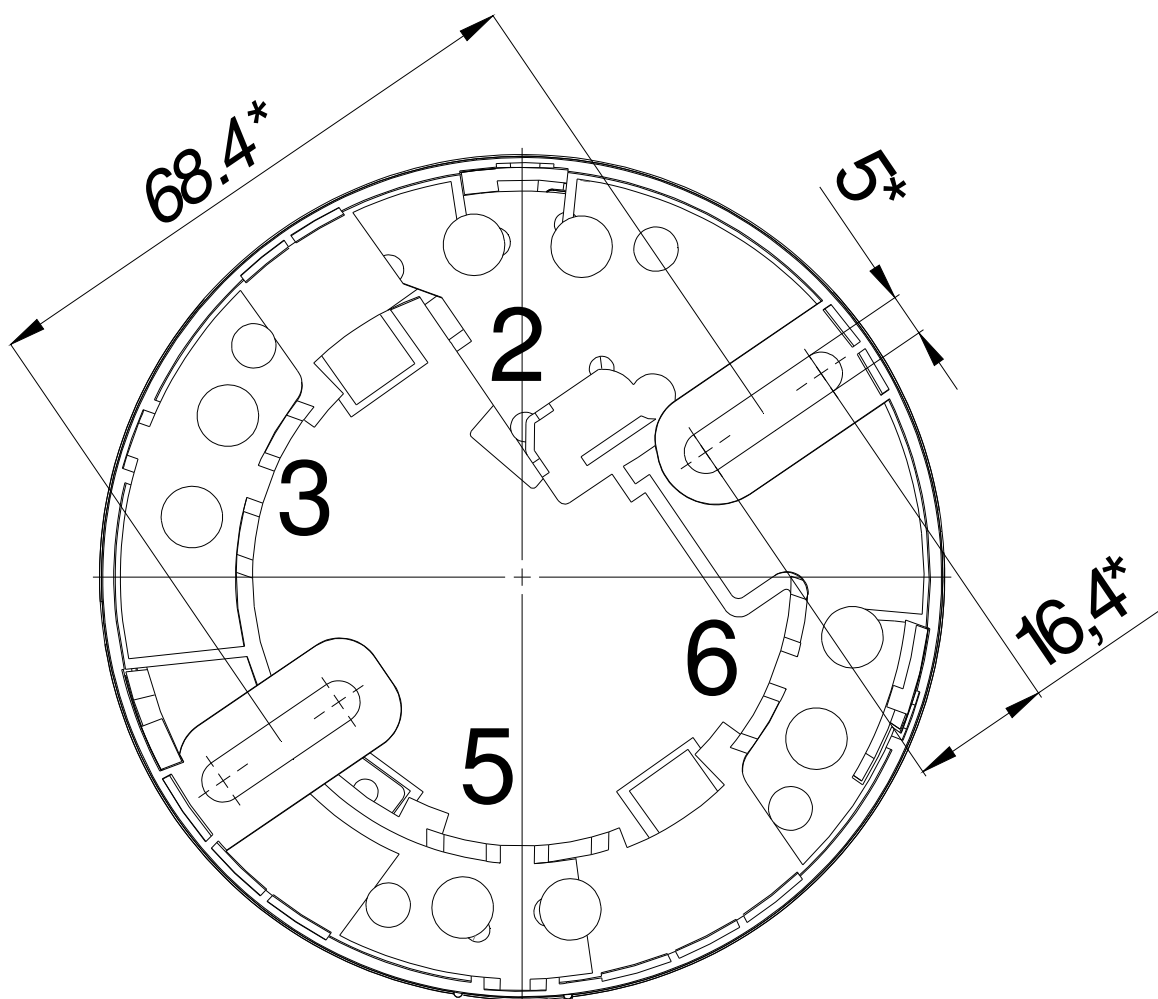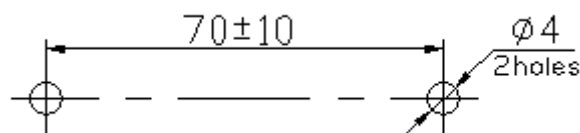

Figure 2.2.2.2

Figure 2.2.2.3

The mounting dimensions for the detector are shown in Figure 2.2.2.4.

Figure 2.2.2.4

2.2.3 Mounting the Detector

While considering mounting location for the detectors, please be guided by actual national codes and mounting rules for fire detectors, for example, by the code of practice "СП 484.1311500.2020", in particular by the requirements shown in the table 2.

| Room Height, m	Detection Zone Radius, m
Below and equal to 3.5	6.40
Above 3.5 up to 6.0 including	6.05
Above 6.0 up to 10.0 including	5.70
Above 10.0 up to 12.0 including	5.35

If it is not possible to install detectors on a flat slab, these ones can be suspended by steel ropes (strings) or installed on walls, columns and other bearing building structures as per Clause 6.6.9 of the code of practice "СП 484.1311500.2020".

Mounting kits MK-2 and MK-3 (supplied per a separate order) can be used for attaching the detectors to a suspended ceiling.

To improve the degree of enclosure protection up to IP43, an MK-4 mounting kit can be used.

To provide mechanical protection for the detector, a Protection Wire Cage can be used, which is to be supplied separately.

For mounting the detector, the base plate supplied is to be used (see Figure 2.2.3.1).
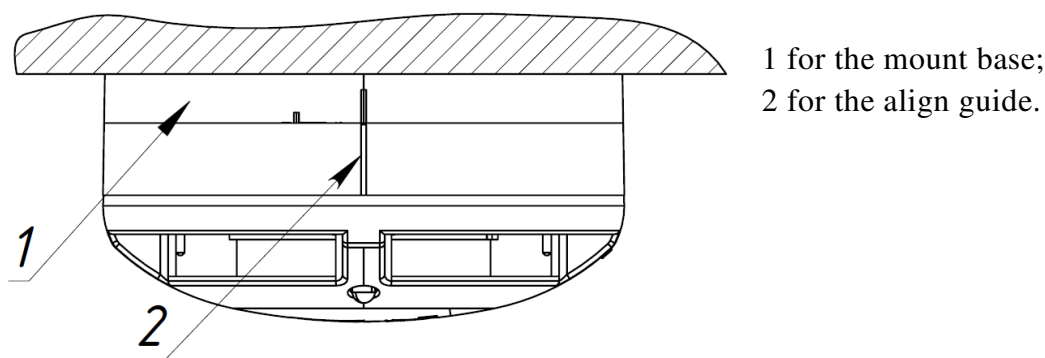
1 for the mount base;
2 for the align guide.
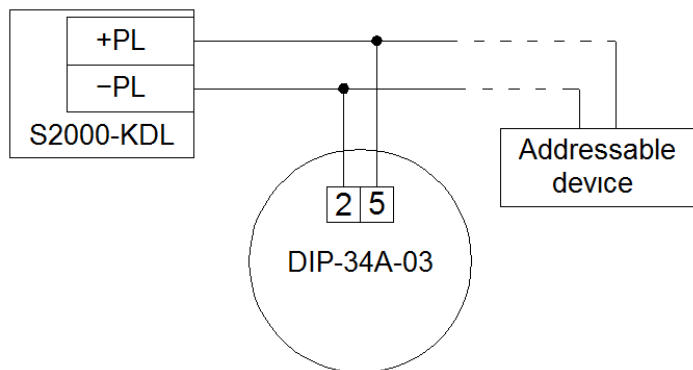
Figure 2.2.3.1

Attention!

To install the detector on the mounting base, align the guide on the detector with the short guide on the base plate and turn the detector clockwise until the detector guide is aligned with the guide 2 as shown in Figure 2.2.3.1.
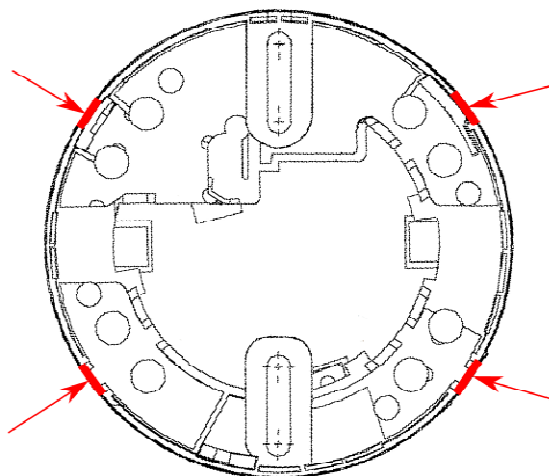
Prior to installing or removing the detector, deenergize it.

2.2.4 Wiring

Figure 2.2.4.1 shows the typical diagram for wiring the detector into the polling loop of a PL controller with specifying number of terminals of the mount base. The first terminal of the detector base can be used to connect a shield of the connecting wire.

Figure 2.2.4.1

Figure 2.2.4.2

For leading wires up to the mount base, on its side surface there are weak spots shown in Figure 2.2.4.2. They can be removed to pass wires under the mount base.

2.2.5 Opening the Detector

To clean the smoke chamber against dust, one has to open the detector. For doing so, detach the detector from the base and use a flat head screwdriver to gently release small cover latches locked by the rear plate via the rectangular notch at the place shown in Figure 2.2.5.1. Then open the detector enclosure along the cover perimeter.
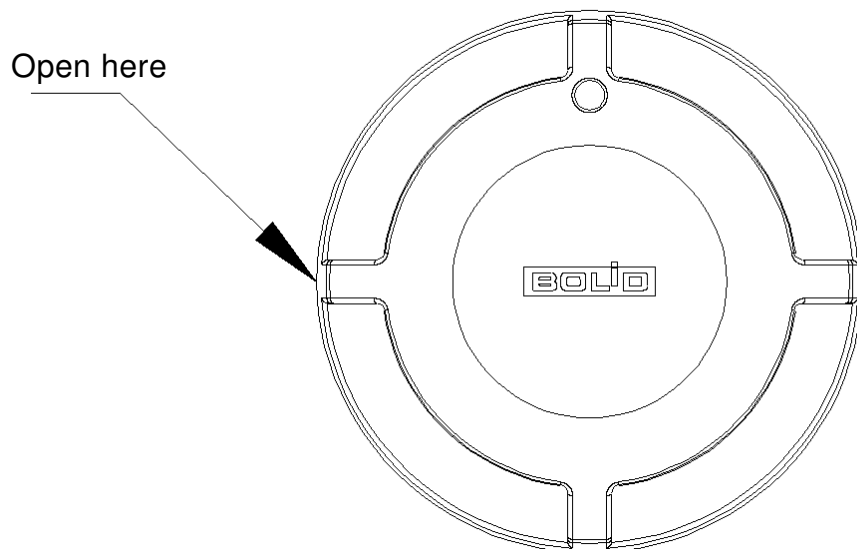
Figure 2.2.5.1

2.2.6 Indication

Table 2.2.6.1 shows the operation modes of the detector and the relevant local indication patterns. The pattern period is 4 s, the number of steps in the pattern is 8, and the time between steps is 0.5 s.

Table 2.2.6.1

Operation Mode	Indication Pattern ● LED lights ○ LED is off
Norm (Quiescent)	●○○○○○○○
Fire Alarm	●●○○○○○○
Test	Solid light
Service Required	●○○○●●●○
Programming	●●●●○○○○
Pressing on the Light Pipe / Exposing to the Laser Beam	Solid light
Startup	Solid light
Fault	Other

2.2.7 Programming

2.2.7.1 Functional settings

The detector can be operated under the following input types:
– **1: Fire Smoke**
– **6: Auxiliary**
– **8: Smoke Analog Addressable**
– **21: Fire**
– **22: Fault Monitoring**

Input Type "**1: Fire Smoke**" and Input Type "**8: Smoke Analog Addressable**" are used to provide compatibility with earlier systems.

For operating in fixed fire-fighting systems, the detector should be assigned with Input Type **21: Fire** in a combination with parameters Request Type, Algorithm, Requery Timeout, Analysis Delay after Reset. Type 21 provides operating an input as required by Russian regulations "СП 484.1311500.2020".

If Input Type is set to **1: Fire Smoke** or **21: Fire** with TA Request Type, a *Fire Alarm* event is generated based on the internal factory set threshold of environment optical density – 0.1 dB/m. In this case, no preliminary *Prealarm* message is generated.

If Input Type is set to **8: Smoke Analog Addressable** or **21: Fire** with AA Request Type, the detector returns the polling loop controller measured values of environment optical density, and the polling loop controller itself will compare them with *Fire* and *Prealarm* thresholds specified in the controller configuration.

The parameter *Analysis Delay after Reset* should be selected not less the value specified in Table 2.2.7.1.

<div align="right">**Table 2.2.7.1**</div>

Input Type	21: Fire	
Request Type	**TA**	**AA**
Analysis Delay after Reset	8 seconds	2 seconds

To get more detailed information about input types and setting them in the controller configuration, please refer to the operating documentation for the polling loop controller and UProg Configuration Tool utility.

2.2.7.2 Setting Address

The detector provides storage of polling loop communication address in its non-volatile memory. The factory value of the address is 127. In order to assign a polling loop address to the detector, send one of the following commands from the network controller to the polling loop controller:

– *Set Device Address*
– *Change Device Address*

A *Set Device Address* command assigns an address to the detector without regard to what address the detector is assigned to at the time. This option can be used when the same address is erroneously assigned to two or more devices. For doing so, issue a command for programming the detector with the required address from the control panel or the PC. Then within 5 min maximum push on the light pipe or light it with the laser beam of a laser test tool. The network controller shall display events about loss of communication with the device with the old address and connecting with a device with the new address. For the case of two or more devices which have the same address, there will be no messages about missing the device with an old address.

If one need to change the detector address that is known, send the *Change Device Address* command from the control panel or the PC specifying the current address and the new address as the parameters. The network controller shall display messages about disconnecting the device with the old address and then detecting the device with newly programmed address.

Finally, write the assigned address onto the address label provided and stick this label to the detector mount base.

To assign the address to the detector, you also can use an S2000-APA standalone addressable device programmer.

2.3 Using the Detector

To be admitted to work with the detector, the personnel are obliged to have studied this manual and to have an accident prevention knowledge assessment certificate.

The detector is used along with a poling loop controller as a part of Orion ISS. To have more information about operating the system, please refer to documentation for S2000M, Orion Pro Software Suite, Sirius FACP, and the PL controller in use.

2.3.1 Testing Operability

Perform functional testing as described in Section 3.4 of this manual.

2.3.2 Extreme Situation Actions

Warning!
If sparks, fire, smoke, or smell of burning is found at the installation site of the detector, the detector must be de-energized and sent for repair

2.3.3 Troubleshooting

Table 2.3.3.1

Symptom	Possible Cause	Solution
No LED indication	No power is applied	Check the voltage between the mount base contacts 2 and 5
	Indication is disabled by settings	Check the type of indication control for the detector in the configuration of the PL controller
No data communications over the polling loop	No physical connection between the detector and the polling loop controller	Check the cable and joints for integrity
	The detector is too far from the polling loop controller	Minimize the polling loop length to the detector. The polling loop length shall be as required by specifications for the PL controller
	Two or more addressable devices in the polling loop have the same address	Check for proper addressing
A *Service Required* message has been received	Smoke chamber contaminated	Clean the smoke chamber. Send the detector for repair
A *Fault* message has been received	Parts of optical channel are faulty	

3 Maintenance

3.1 General

The detector shall be maintained under the following schedule:

Table 3.1

Task Description	Frequency
Visual checking	Six-monthly
Check for operability	Once a year

3.2 Safety Precautions

The detector shall be maintained by personnel qualified for Accident Prevention of Class II or higher.

3.3 Maintenance Procedures

3.3.1 Visual checking of the detector includes checks for no mechanical damages, fastening reliability, and proper condition of connecting wires and contact joints. Also the surface of the insect proof mesh of the smoke chamber shall be checked for being dusted. If any dust is present, please remove it using a vacuum cleaner (by exhausting air).

3.3.2 On receiving a *Service Required* message from the detector, one should clean the sensing chamber. The description of the dust remove routine can be found online at the Bolid website.

3.3.3 Operability of the detector is to be tested in line with Section 3.4 of this manual.

Warning!

To avoid contamination of the detector, do not remove the dust protective cover until the surrounding area is clear of dirt and dust.

Removing the detector's PC board from its housing automatically voids the manufacturer's warranty. The detector is not intended for installation in areas where air speed exceeds 15 m/s.

3.4 Performance Testing

3.4.1 For the time the detector is being tested, disable the outputs of the control and indicating equipment that control fixed fire suppression systems and notify the proper authorities.

3.4.2 Turn on the network controller and the polling loop controller, the detector proceeding to the *Startup* mode. The connection with the polling loop controller being established, the detector enters the *Quiescent* mode.

3.4.3 Hold a can of aerosol simulating smoke to the sensing chamber of the detector and release a burst of smoke agent. The detector shall send a Fire Alarm message to the given address.

3.4.4 A more simplified functional test can be performed by pressing the light pipe down or by lighting it with the laser beam of a laser test tool. After stimulation, the detector proceeds to the *Pressing on the Light Pipe / Exposing to the Laser Beam* operation mode and then to the *Fire Alarm* mode:

– If S2000-KDL of versions 1.35 and below is in use, the network controller shall display a *Fire Alarm* message on the specified address;

– If S2000-KDL of versions 1.36 and higher is in use, the network controller shall display a *Test* or *Fire Alarm* message on the specified address depending on the given test settings.

3.4.5   After aerosol has dispersed or the light pipe is no longer pushed or lighted, verify the detector proceeds to the normal (Quiescent) operation mode.

3.4.6   If the network controller has registered no messages said above from the address of the detector or if the detector and the detector LED operated by different way than that described above, the detector appears to be inoperable and must be replaced.

3.4.7   When testing is finished, make sure the detector is ready for routine operation. Restore all links between outputs of control devices and actuators with automated fire-fighting equipment and notify the proper authorities that the system is back in normal operation.

Conduct all tests with equipment known to be in good conditions!

3.5   Technical Examination

Technical examination is not applicable for this equipment.

3.6   Preservation (Depreservation, Represervation)

Preservation is not applicable for this equipment.

4   Repair

4.1   Repair of faulty detector is to be conducted by the manufacturer or in authorized repair centers. The product shall be sent for repair in compliance with Company Standard QMS 8.5.3-2015, which can be found online at our website https://bolid.ru/support/remont/.

> **Warning!**
> The equipment shall be submitted for repair being assembled and clean and along with all the parts listed in the documentation.
> Claims are accepted only if a reclamation report describing the failure is applied to the submitted equipment.

4.2   A detector fault resulted from consumer's not observing rules of mounting and operation is not a reason for claims and warranty repair.

4.3   Claims shall be submitted to the following address:
NVP BOLID, #4 Pionerskaya Str., Korolyov, Moscow Region, 141070, Russia
Phone: +7 (495) 775-71-55, E-mail: info@bolid.ru.

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

5   Storage

5.1   Storage in a transport container is permitted at ambient temperatures minus 50 through plus 50°C and relative humidity up to 95% at plus 35 °C.

5.2   Storage in the consumer package is permitted only in heated premises at temperatures plus 5 through plus 40°C and relative humidity up to 80 % at plus 20 °C.

6   Transporting

6.1   The detector can be transported in a transport container at ambient temperatures minus 50 through plus 50°C and relative humidity up to 95 % at plus 35°C.

7   Disposal

7.1   The detector is to be disposed of considering that there are no toxic components in it.

7.2   The content of precious materials: doesn't require accountability for storage, retirement, and disposal (Clause 1.2 of GOST 2.608-78).

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

8   Manufacturer Warranty

8.1   The manufacturer guaranties the product meets with technical requirements stated in the manuals if the user follows the instructions for transportation, storage, installation, and usage.

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

9   Certification Information

9.1   DIP-34A-03-S detector meets the requirements of Technical Regulations of Eurasian Economic Union TR EAEU 043/2017 'On Requirements for Fire Safety and Fire Extinguishing Equipment' and is covered by the conformity certificate No. ЕАЭС RU C-RU.ПБ68.В.01396/22.

9.2   DIP-34A-03-S detector meets the requirements of Technical Regulations of Eurasian Economic Union TR EAEU 037/2016 'On the restriction of the use of certain hazardous substances in electrical and electronic equipment' and is covered by the conformity declaration
ЕАЭС N RU Д-RU.РА02.В.28332/24.

9.3   DIP-34A-03-S detector meets the requirements of Technical Regulations of Custom Union TR CU 020/2011 'Electromagnetic Compatibility of Technical Equipment' and is covered by the conformity declaration ЕАЭС N RU Д-RU.РА02.В.28335/24.

9.4   Production of DIP-34A-03-S detector is awarded with the conformity certificate GOST R ISO 9001. The certificate can be found online at the website https://bolid.ru in the section ABOUT COMPANY.