

**ICO 9001**

**EAC**

**ANALOG ADDRESSABLE  
RATE-OF-RISE AND FIXED TEMPERATURE DETECTOR**

**IP 101-55-A1R “S2000-IP-03”**

**USER’S MANUAL**

**BOLD**<sup>®</sup>

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This User's Manual explains the principles of operating S2000-IP-03 Analog Addressable Rate-of-Rise and Fixed Temperature Detector of the software version 1.10.

Only the personnel who have studied this manual are allowed to operation activities. All activities on mounting, programming and commissioning 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 Product Purpose

1.1.1 S2000-IP-03 Analog Addressable Rate-of-Rise and Fixed Temperature Detector (hereinafter referred to as the detector) is to be used in fire detection and fire alarm systems to protect premises against fires by monitoring the rate of ambient temperature rise and to generate fire alarms automatically.

1.1.2 The detector is meant to operate under a polling loop controller S2000-KDL, S2000-KDL-2I, S2000-KDL-2I Rev.01, or S2000-KDL-S as a part of an Orion ISS. The detector is powered and communicates data over the multiplex addressable polling loop (hereinafter referred to as PL).

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

1.1.4 The detector is classed as a restorable, regularly maintainable product.

1.1.5 The detector's design doesn't imply operating it in aggressive and dusty environments or in ex-hazardous premises.

## 1.2 Specifications

**Table 1.2.1**

<b>Parameter</b>	<b>Value</b>
1.2.1 Power supply voltage (via Polling Loop)	8 V through 11 V
1.2.2 Consumed current	0.6 mA max
1.2.3 Number of detectors within a Polling Loop	127 max
1.2.4 Maximum active resistance of polling loop wires	100 ohms max
1.2.5 Minimum insulation resistance between polling loop wires	50k ohms min
1.2.6 Start-up Time	60 s max
1.2.7 Detector Class	A1R
1.2.8 Response Temperature (factory setting)	+54°C
1.2.9 Heat detection accuracy	± 1.5°C
1.2.10 Enclosure protection degree as per GOST 14254-2015	IP41
1.2.11 Resistance to mechanical exposure as per OST 25 1099-83	Arrangement Category III
1.2.12 Vibration exposure: - Frequency range - Max acceleration	1-35 Hz 0.5 g
1.2.13 Environmental category as per OST 25 1099-83	O3
1.2.14 Operating temperature	Minus 30°C to +55°C
1.2.15 Relative humidity	Up to 95 % at +40 °C
1.2.16 Weight	0.2 kg max
1.2.17 Overall dimensions: - Diameter - Height	100 mm max 47 mm max
1.2.18 Non-stop operation	Round-the-clock
1.2.19 MTBF	80,000 hours min
1.2.20 Reliability (10 years)	0.98758
1.2.21 Expected service life	10 years

1.2.22 In terms of immunity to electromagnetic interference, the detector meets the requirements of Test Severity Level III as per the relevant standards listed in Appendix 'B' to GOST R 53325-2012.

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

### 1.3 Scope of Delivery

The detectors are delivered in group packages, being packed in ten pieces.  
The standard delivery is shown in Table 1.3.1.

**Table 1.3.1**

Item	Quantity
S2000-IP-03 Detector (body)	10 pcs.
S2000-IP-03 Detector Base	10 pcs.
Accessory Kit:	
Dust Cover	10 pcs.
Address Label	10 pcs.
MK-2 Recessed Mounting Kit*	—
MK-3 Recessed Mounting Kit*	—
Protection Wire Cage*	—
Documentation	
S2000-IP-03 Analog Addressable Rate-of-Rise and Fixed Temperature Detector Operations Manual	1pc.

\* – Supplied by separate order

### 1.4 Arrangement and Operation

1.4.1 The detector comprises a printed circuit board, an assembled detector body, and a mounting base.

The printed circuit board integrates a microcontroller, a thermal resistor, a tact switch, and a LED.

On the detector body cover there is a pushable lightpipe conducive to the LED; pressing on the lightpipe transmits effort to the button.

The microcontroller registers ambient temperature in degrees centigrade based on the resistance of the thermal resistor. Through processing the data received from the thermal resistor, with the growth of their values and exceeding the threshold the microcontroller issues alarms.

Via the LED the microcontroller indicates the detector status and also can receive light beams emitted by a laser test unit.

Exposing lightpipe to the laser light beam or pressing on it is required for some manipulations with the detector described in the section “2 Intended Use”.

System Sensor remote test units, Astra-942 Laser Tester from the TEKO Company, or OT-1 Optical Tester from the RUBEZH Company are acceptable to be used as remote laser testers.

1.4.2 The detector supports DPLS\_v2.xx protocol and provides measuring of the addressable loop voltage at the point where it is connected.

1.4.3 The detector can operate in one of the following modes:

- Norm: The temperature value varies within the normal range;
- Fire Alarm: The temperature value has exceeded the preset fire threshold or is detected to rise at a high rate;
- Fault: The thermal resistor has failed;
- Test: Sending a test event in case of a manual operation (pressing on the lightpipe or lighting the lightpipe with a laser tester beam);
- 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.

## 1.5 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**

<b>Instrument</b>	<b>Specifications</b>
Digital multimeter	AC/DC voltage up to 500 V, AC/DC current up to 5 A, resistance up to 2 MOhm
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 rear side of its body.

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

1.6.3 Sealing the detector is not provided.

## 1.7 Packing

The detectors along with accessory kit and operation documentation are packaged in a cardboard box.

## 2 Intended Use

### 2.1 Operating Restrictions

The design of the detector doesn't imply operating it in aggressive and dusty environments and in explosion and fire hazardous premises.

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

### 2.2 Preparing for Use

#### 2.2.1 Safety Measures During Preparation

- The design of the detector meets the requirements of electrical 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 detector before mounting, installing, and maintaining this one;
- Mounting and maintenance of the detector shall be carried out by persons with the second or higher accident prevention qualification level.

#### 2.2.2 Design

Figure 2.2.2.1 represents the appearance of the detector.



**Figure 2.2.2.1**



Overall dimensions are shown in Figure 2.2.2.2 (the side view) and Figure 2.2.2.3 (the bottom view).

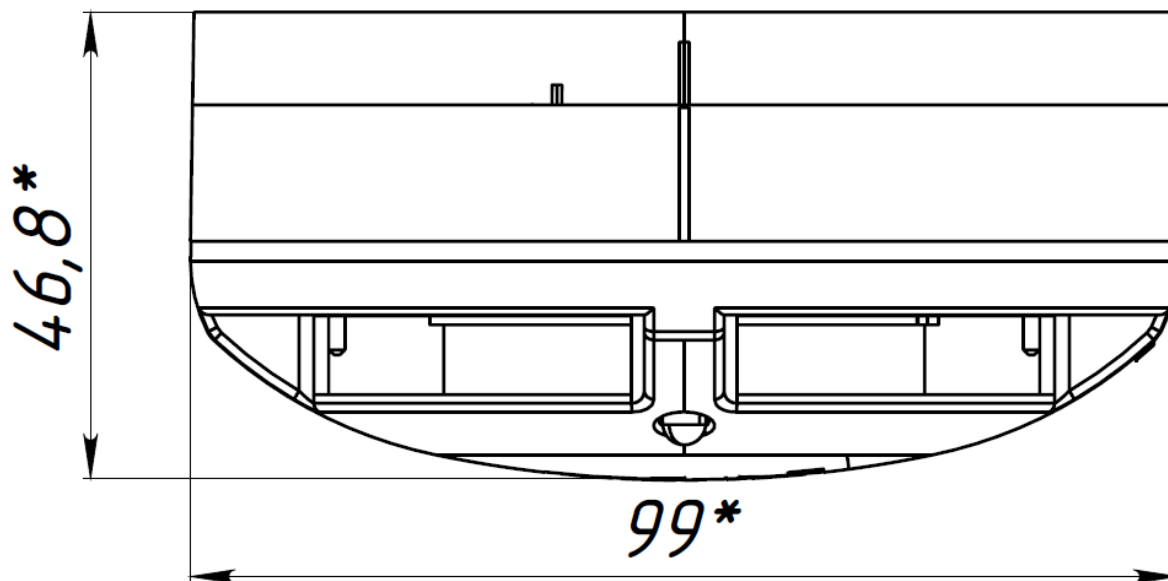


Figure 2.2.2.2

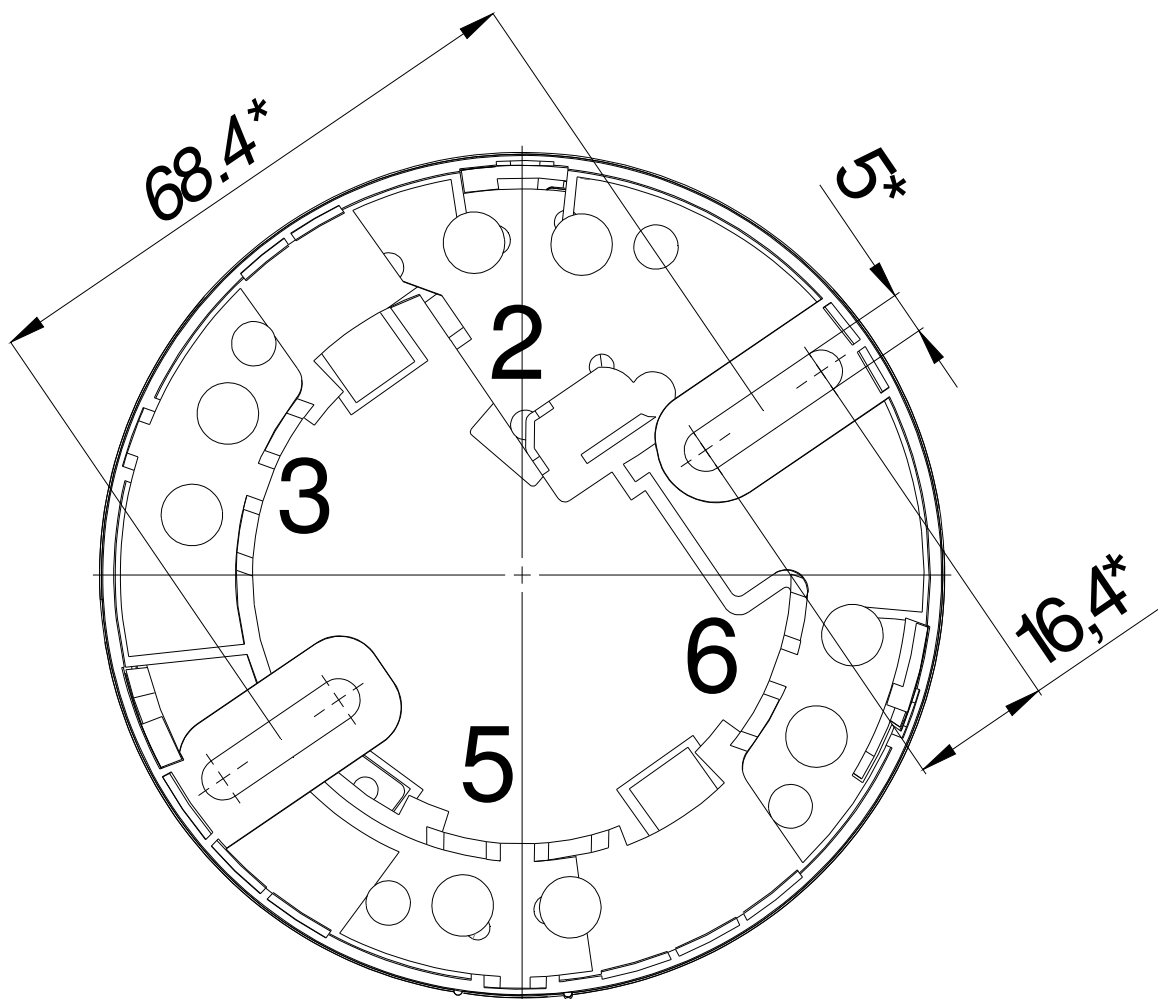
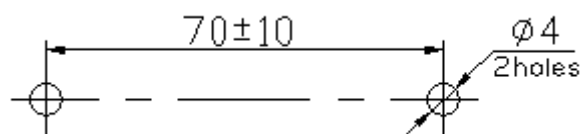


Figure 2.2.2.3

Mounting dimensions are shown in Figure 2.2.2.4.



**Figure 2.2.2.4**

### 2.2.3 Mounting

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 ‘CPI 484.1311500.2020’, in particular by the requirements shown in the table 1.

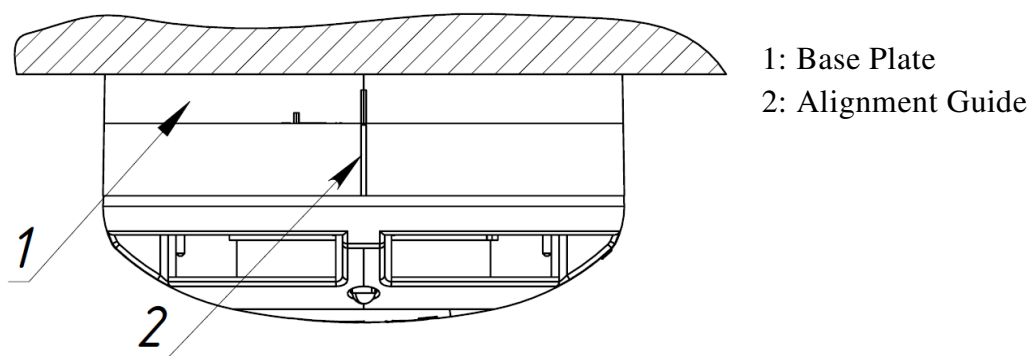
Supervised Room Height, m	Detection Area Radius, m
Up to 3.5	3.55
More than 3.5 to 6.0 inclusive	3.20
More than 6.0 to 9.0 inclusive	2.85

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 ‘CPI 484.1311500.2020’.

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

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).



**Figure 2.2.3.1**

#### **Warning!**



To install the detector into the base plate, align the guide on the detector with the short guide on the base plate. Then turn the detector clockwise until the detector guide is aligned with the guide 2 as shown in Figure 2.2.3.1.

Mounting and dismantling the detector shall be carried out with its power being off.

## 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. The first terminal of the detector base can be used to connect a shield of the connecting wire.

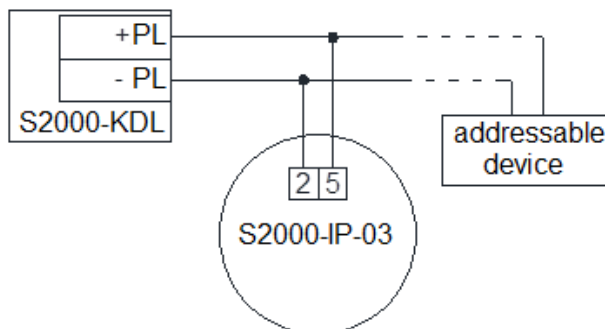


Figure 2.2.4.1

## 2.2.5 How to Open the Detector

To open the detector, detach it from its base and use the blade of a flat-head screwdriver to release small clips through the rectangular hole shown in Figure 2.2.5.1. Then open the detector along the cover edge.

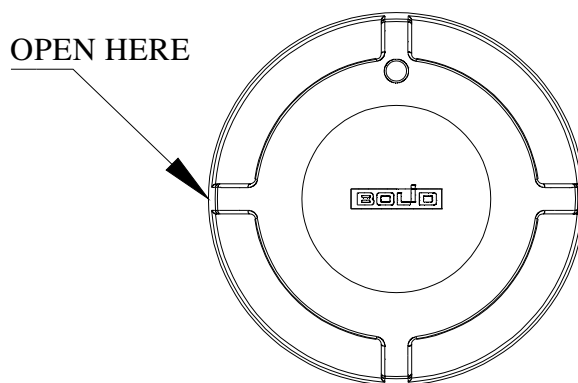


Figure 2.2.5.1

## 2.2.6 Indication

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

Table 2.2.6.1

Detector Status	Indicator Performance ●: On ○: Off
Norm	●○○○○○○○
Fire Alarm or Test	●●○○○○○○
Programming	●●●●○○○○
Fault	Others
Pressing on the Lightpipe / Exposing to the Laserbeam	Illuminates steadily
Startup	Illuminates steadily

## 2.2.7 Programming the Detector

### 2.2.7.1 Configuring

The following values of Input Type are applicable for the detector:

- **3: Heat Fire;**
- **6: Auxiliary;**
- **9: Heat Analog Addressable;**
- **10: Thermostatic;**
- **21: Fire;**
- **22: Fault Monitoring.**

Input Type **3: Heat Fire** and Input Type **9: Heat Analog Addressable** are used for 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 **3: Heat Fire** or **21: Fire** with TA Request Type, a Fire Alarm event is generated as per detector class A1R based on rate of rise of air temperature (at high rates of rise of air temperature) and response temperature threshold (at low rates of rise of air temperature). In this case, no preliminary Prealarm message is generated.

If Input Type is set to **9: Heat Analog Addressable** or **21: Fire** with AA Request Type, the detector returns the polling loop controller measured temperature values that are further compared with Fire and Prealarm thresholds given in the controller configuration.

The parameter Analysis Delay after Reset should be selected not less than 2 s.

If Input Type is selected as **10: Thermostatic**, the detector can be used for measuring temperature in automatic control systems.

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 storing an address for communication within the polling loop in its non-volatile memory. The factory address of the detector 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 the lightpipe 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 you need to change the detector address which 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 base.

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

## 2.3 Operating the Detector

To be admitted to work with the detector, the personnel are obliged to have studied this manual and to have a certificate of verification of knowledge of accident prevention regulations.

The detector is used along with a polling 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

Test operability of the detector as described in Section 3.4 of this manual.

### 2.3.2 Extreme Situation Actions



#### Warning!

If sparks, fire, smoke, and / or smell of burning are found at the installation site of the detector, this one must be de-energized and sent for repair

### 2.3.3 Troubleshooting

**Table 2.3.3.1**

<b>Problem</b>	<b>Possible Cause</b>	<b>Solution</b>
No LED indication	No power applied	Check the presence of voltage between detector contacts 2 and 5
	Indication is disabled for the detector in the configuration of the PL controller	Check the type of indication control for the detector in the PL controller configuration
No communications over the polling loop	A disconnect between the detector and the PL controller	Check the integrity of the cable and jointing
	The detector is too far from the PL 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 whether the addressing is correct
A Fault event has been received	Thermal resistor has failed (open circuit or broken)	Check the thermal resistor condition
	Closing of thermistor contacts (water ingress)	Dry the circuit board

## 3 Maintenance

### 3.1 General

The detector should 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 persons certified with the second or higher accident prevention qualification level.

### 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. Visual checking for dust on the thermal resistor surface is to be carried out. If there is any dust detected, remove it with a vacuum cleaner (by exhausting air).

3.3.2 To verify the detector operates properly, please follow the instructions of Section 3.4 of this manual.

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#### Warning!



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

Removing the detector's PC board from its housing automatically voids the manufacturer's warranty.

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### 3.4 Testing Operability

3.4.1 Prior to testing, disconnect all outputs of control devices and executive modules that can run automated fire-fighting systems and notify the proper authorities that the detector is undergoing maintenance and will be temporarily out of service.

3.4.2 Power on the network controller and the polling loop controller. When been powered on, the detector proceeds to the Startup operation mode. After communication with the polling loop controller is established, the detector proceeds to the Normal operation mode.

3.4.3 Blow the temperature sensor of the detector with hot air of 70 C to 100°C temperature (by a hair dryer). The detector shall generate a Fire Alarm with the relevant address.

3.4.4 A more simplified functional test can be performed by pressing the lightpipe down or by lighting it with the laser beam of a laser test tool. After stimulation the detector proceeds to the Pressing on the Lightpipe / Exposing to the Laserbeam 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 the detector's thermal sensor gets cold or the lightpipe is no longer pushed or lighted, the detector shall enter the normal mode.

3.4.6 If the network controller has registered no messages said above from the address of the S2000-IP-03 or the detector LED operation does not match to 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 normal 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 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 equipment is to be performed by the manufacturer or in authorized repair centers. The equipment 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/>.

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#### Attention!



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 problem is applied to the submitted equipment.

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

4.3 Claims should be submitted to the following address:

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

Phone/fax: +7 (495) 775-71-55 (PBX). E-mail: [info@bolid.ru](mailto:info@bolid.ru).

4.4 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](mailto:support@bolid.ru).

## 5 Storage

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

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

## 6 Transporting

6.1 The detector can be transported in a transport container at ambient temperatures minus 50 through +50°C and relative humidity up to 95 % at +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: does not 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 guarantees the detector 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 S2000-IP-03 Analog Addressable Rate-of-Rise and Fixed Temperature Detector meets the requirements of Technical Regulations of Eurasian Economic Union 'On Requirements for Fire Safety and Fire Extinguishing Equipment' (TR EAEU 043/2017) and is covered by the conformity certificate No. RU C-RU.ПБ68.B.00360/21.
- 9.2 S2000-IP-03 Analog Addressable Rate-of-Rise and Fixed Temperature Detector meets the requirements of Technical Regulations TR EAEU 037/2016 'On the restriction of the use of certain hazardous substances in electrical and electronic equipment' and is covered by Conformity Declaration EAЭC № RU Д-RU.PA01.B.97624/19.
- 9.3 S2000-IP-03 Analog Addressable Rate-of-Rise and Fixed Temperature Detector meets the requirements of Technical Regulations of Custom Union TR CU 020/2011 'Electromagnetic Compatibility of Technical Equipment' and is covered by Conformity Declaration EAЭC № RU Д-RU.HP15.B.06593/20.
- 9.4 Production of S2000-IP-03 Analog Addressable Rate-of-Rise and Fixed Temperature Detector is awarded with the conformity certificate GOST R ISO 9001. The certificate can be found at the website <http://bolid.ru> in the section ABOUT COMPANY.