Addressable Reflective Beam Smoke Detector

S2000-IPDL

Installation Manual

This Installation Manual contains the instructions that must be followed for proper installation and commissioning the S2000-IPDL detector.
The detector is described and the rules to adjust and operate it are discussed in the User's Manual (which can be found at the site of the Bolid Company http://bolid.ru in the section PRODUCTS at the page of S2000-IPDL).

1 SAFETY PRECAUTION

- *The detector is a source of danger neither for human nor for protected material assets (including the emergency situations).*
- *The design and circuitry of the detector ensure its fire safety during operation (including emergency operation).*
- *As to methods of human protection against electric shock, the detector meets the requirements of Class III as per Russian GOST 12.2.007.0.*
- *In terms of voltage values, the detector is not dangerous to human life and health, but during repair, inspection, installation, and operation it is necessary to comply with safety measures in accordance with Regulations for Operation of Consumers' Electrical Installations and Safety Rules for Operation of Consumers' Electrical Installations.*
- *While installing and maintaining the detector please comply with the rules for working at heights.*

2 MOUNTING

2.1 The units of the detector should be attached to the building structures generally with the help of mounting kits supplied:

Kit No.1: Designed to attach the transceiver unit and to fasten the housing additionally (if necessary) on completing commissioning.

Kit No.2: Designed for attaching an S-Type (small) reflector or a remote indicator and control unit.

Kit No.3: For an XS-Type (extra small) reflector.

Kit No.4: For an L-Type (large) reflector.

In specific situations (for example, when the detector components can be fastened only by means of threaded joints) another fixture elements can be used. Anyway, it is necessary to provide reliable fastening without gaps, drifting, and any motion of the detector's elements while in operation.

2.2 Wires can be run either in surface way or recessed. For flush wiring wires shall be lied down by first and then the transceiver unit or remote indicator and control unit can be mounted. For surface wiring installation order doesn't matter.

2.3 Wires should be passed through the side holes in the base located above the side notches in the mounting base. To provide optimal wiring location of the relevant terminal groups should be taken into account.

2.4 While mounting the detectors into fire alarm systems please use wires and cables which meet the requirements of the operation documentation for the polling loop controller S2000-KDL or S2000-KDL-2I.

2.5 The length of the cable connecting the transceiver unit with the remote indicator and control unit should be minimized and not exceed 30 meters.

2.6 In the presence of regular high-power electromagnetic radiation in the premises covered by the detectors the polling loops and other connecting wires shall be protected against electromagnetic interference (by using twisted pair wiring, protective shielding, etc.).

2.7 The terminal blocks of the detector enable connecting wires with cross-section area 0.2 to 1.5 sq. mm (wire diameter 0.5 to 1.3 mm). If wires of 0.8 mm diameter or less are used then their ends shall be looped.

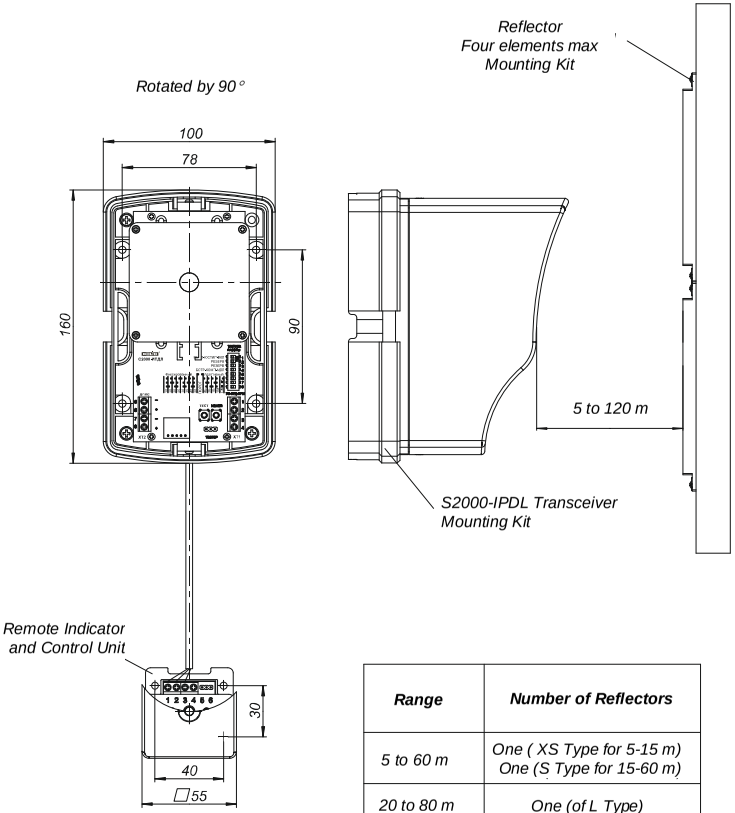
2.8 The housing of the transceiver unit can be removed if only there are no locking screws in the latches at the top and the bottom of the housing. To remove the housing, release both the latches pressing on them and pull the housing at right angle to the lens.

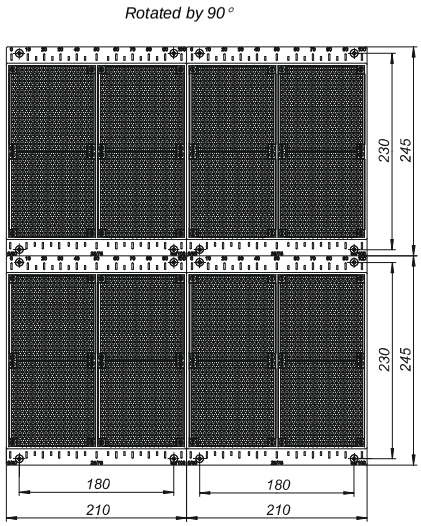
2.9 To place the housing back, insert it into the latches and slightly push until it is fixed. Additional fixation of the housing using two self-tapping screws from Mounting Kit No. 1 should be made only in case of possible danger of mechanical effects on the detector during operation.

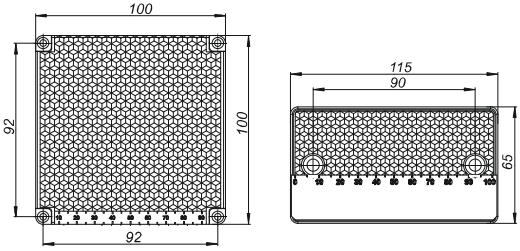
3 WIRING

3.1 The general schematic for wiring the detector is shown in Figure 2.

3.2 The detector operates under a polling loop controller programmed by means of UProg software utility. Using UProg, in the PL controller's configuration the type of addressable device for the detector's address should be set to *3, Heat Fire*. Select the value *2, Controlled by the S2000-KDL* for the parameter *Device Indication Control*. Please refer to the PL controller User's Manual and UProg documentation to read more about selecting the type of addressable devices and configuration parameters.







S-Type Reflector XS-Type Reflector

Figure 1. Overall and Mounting Dimensions

Range	***Number of Reflectors***
5 to 60 m	*One (XS Type for 5-15 m)* *One (S Type for 15-60 m)*
20 to 80 m	*One (of L Type)*
25 to 100 m	*Two (of L Type)*
30 to 120 m	*Four (of L Type)*

1. *Dimensions for information*
2. *The distance between Transceiver Unit and Remote Indicator and Control Unit should not exceed 30 m*

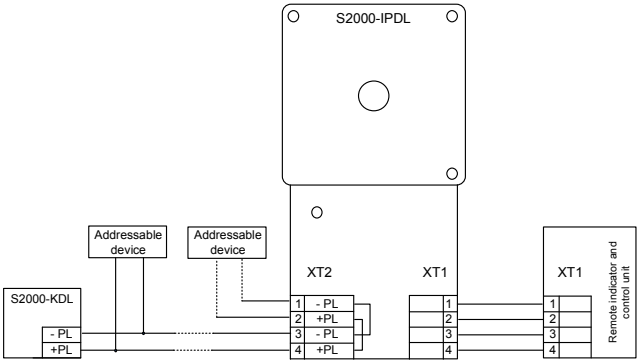


Figure 2. Connection Diagram

4 SETTING ADDRESS

4.1 The detector provides storing its polling loop address in its non-volatile memory. The factory address of the detector is 127. An address can be given by means of the control panel, PC software utility, or S2000-APA addressable device programmer (the rules to operate which are described in its user's manual). An address is assigned to the detector by sending one of the following commands:

- Set Device Address, or
- Change Device Address.

4.2 The command *Set Device Address* is used when the detector should be assigned with an address regardless of which address is given to the detector currently. This way is suitable when, for example, the same address is assigned with two or more devices. If so, issue a command to set the required address from the PC or the control panel. Then, within 5 minutes max since sending the command, press and hold pressed the TEST button of the detector / remote indicator and control unit for at least 5 second until the red indicator illuminates. The panel / PC shall display the events of loss of communication with the device assigned with an old address and finding a device with the new address. If several devices were assigned with equal addresses set then there will be no messages about loss of communications for old addresses.

4.3 If however it is necessary to change the detector address which is known in advance then the *Change Device Address* command shall be used. Send this command specifying the old address and the new address from the panel / PC. The panel / PC shall display events about loss of communication with the device with the old address and establishing communications with the device with the new address.

5 TESTING THE DETECTOR

5.1 Testing Operability

5.1.1 A full-range verification of the detector's operability *before installation* should be done only in case of mandatory requirements of on-receipt inspection for the products (for example, for use on special objects) or if you have doubts about its performance (for example, before sending or after receiving the detector after repair).

5.1.2 If it is impossible or too difficult to pose the transceiver unit and the reflector as far from each other as required then it is recommended to use the surface of a wall or a ceiling as a

reflector, for example to put the transceiver on a table with the lens facing up using the ceiling as a reflector.

5.1.3 For testing operability, power up the control panel or PC and the polling loop controller with the detector connected to the last one.

5.1.4 Activate the alignment mode by sliding the DIP switch “1” to the ON position. Visually inspect fast pulsing (faster than five flashes per second) in red (which means selecting an optimal gain with rewriting the maximum achieved level of received signal) followed by pulsing most of the time in blue (*Very Close*) with normal frequency (approximately twice per second). In particular, there can be rare flashes with amber (*Less*) or red (*More*). Having achieved such condition, you can terminate the alignment by sliding the DIP switch “1” to the OFF position and waiting for approximately one minute until the detector automatically quits this mode having rewritten new values of installation parameters into the non-volatile memory.

After detector’s having entered to the alignment mode the control panel or PC shall receive a Test of Fire Alarm event depending on the current settings

5.1.5 If the alignment mode has established but the LED rapidly flashes with white (*Too Low*) or blue (*Two High*) then take measures to increase the reflected signal in the first case or to reduce the reflected signal in the second one. If you failed to alter this performance then with great probability the detector is improper.

5.1.6 If the detector exits the alignment mode normally it shall enter in the Norm state indicating this by red flashing once per four seconds.

5.1.7 Arm the detector.

5.1.8 Press the TROUBLE button on the detector’s board and observe fast flashing with amber (“Trouble in Progress”) followed by flashing in red with the trouble pattern. After releasing the button the detector will enter normal state in some time.

5.1.9 Press the TEST button on the detector’s board and observe fast green pulsing at first (“Test in Progress”) followed by solid illuminating with red. The full-range verification of the operability of the detector is completed now. If any problems were detected during verification the detector should be sent to the manufacturer for repair, however, it is recommended to contact preliminary the technical support service in order to verify the validity of the checks performed.

5.2 Testing Performance of the Detectors

5.2.1 General Guidelines for Testing

5.2.1.1. Performance of visual indication when the detector displays its conditions in the operation mode and in the alignment mode is crucially different. Table 1 contains descriptions of various conditions of the detector for the operation mode, their textual names, and the ways to display these conditions by means of detector’s indication and on the LCD of an IPDL-152 test station.

5.2.1.2. Prior to testing the detector please read and understand the information from Table 1.

Table 1

LED Performance	Condition	Description	Text on the IPDL-152 Tester Display
Flashes with red once per four seconds	Norm	The received signal meets norm conditions	“Норма” / “Norm”
Lit steady with red		Waiting for establishing communications with the PL controller	
	Test	The TEST button has been pressed	
	Fire	The received signal value has dropped down to the alarm threshold	“Пожар” / “Fire”
Flashes four times with red every four seconds		Programming the detector with an address	
Blinking with red with blue flashes		*Fire in Progress* The received signal value has dropped down to the alarm threshold but the Fire status has not yet been stated	“Набор Пож.” / “Fire in Progress”
--//-- with rare amber flashes		*Operation Mode Changed* Positions of the DIP switches were changed after exiting the alignment mode	“Норма” / “Norm” with “Switched” from time to time
--//-- with green flashes		Establishing of the Test status after pressing the relevant button	
--//-- with amber flashes		Establishing of the Trouble status after pressing the relevant button	
--//-- with white flashes		*Trouble in Progress* Conditions for some Trouble status have occurred but this status has not yet been established	“Набор Неис.” / “Trouble in Progress”
Flashes with red twice per second	Trouble	The TROUBLE button has been pressed	
		Trouble-Beam The received signal has dropped by more than 80%	“Н. луч” / “TR Beam”
		Trouble-Out-of-Range The values written into the EEPROM are out of the permissible range	“Н. допуска” / “TR Out-of-Range”
		Trouble-Memory Main data and backup data stored in the EEPROM are not the same	“Н. память.” / “TR Memory”
		Trouble-High The compensated signal has reached the upper threshold	“Н. превыш.” / “TR High”
		Trouble-Low The compensated signal has dropped down to lower threshold	“Н. снижен.” / “TR Low”

5.2.2 For an S2000-IPDL in field two types of verification are required: the full-range verification of detector's operability with affecting the optical beam and the routine verification of sending the polling loop controller the messages about testing, fire, and trouble. The first testing should be performed after any actions with the transceiver when its position was changed, including, of course, commissioning. Also, when it is reasonable this verification should be done after removing dust and debris from the lens and in case of changes in building structure configuration which can essentially affect the situation with interfering reflections. The second test shall be performed in all other situations when verification of the operability of the fire alarm system is required.

4.2.2 Full-Range Verification

4.2.2.1 The full-range verification of the detector's operability is performed as per classic inspection procedure for single-ended detectors, i.e. affecting the received signal level is carried out by partial or full obscuration of the reflector. Reflectors of all types incorporate a scale showing the percentage of the obscuration for the reflecting surface and, moreover, L-Type reflectors are equipped with an additional scale (at their lower edges) which is to be used when the reflectors are arranged with two ones in a row.

4.2.2.2 Since the S2000-IPDL is a single-ended detector and optical beam crosses the monitored area twice then for simulating the beam degradation by a required value the percentage of obscuration should be more than the verified alarm threshold. Table 2 represents the required percentage of obscuration of the reflective surface in order to verify various alarm thresholds.

Table 2

Alarm Threshold	Degradation of Beam	Recommended Obscuration	
		To Check Non-Activation	To Check Activation
10% (0.5 dB)	19%	10%	30%
15% (0.7 dB)	28%	20%	40%
20% (1 dB)	36%	25%	45%
25% (1.3 dB)	44%	35%	55%
30% (1.6 dB)	51%	40%	60%
35% (1.9 dB)	58%	50%	70%
40% (2.2 dB)	64%	55%	75%
50% (3 dB)	75%	65%	85%

To simulate the Trouble-Beam mode, block all the area of reflective surface of the retroreflector.

4.2.2.3 In premises where interfering reflections are highly probable (with irregular configuration of structures beneath the ceiling) presence of these reflections can cause to actual alarm threshold being just over the set value, and this should be taken into account both while selecting the sensitivity value for the detector (by using DIP switches) and while carrying out the full-range testing.

4.2.3 Routine Testing

4.2.3.1 Routine testing of detector operability is performed by simulating of the Test/Fire mode (depending on the current setting) and Trouble mode by means of relevant buttons incorporated in remote control unit and duplicated in the detector.

4.2.3.2 The relevant button TEST or TROUBLE shall be pressed and held pressed at least for five seconds.

6 GETTING STARTED

In order the detector to operate under a polling loop controller in an Orion ISS, it should be assigned to a polling loop address and relevant settings should be carried out (see User/s Manual).