



*Orion ISS*

**Addressable Radio Link System**

**S2000R**

*User's Manual*

This User's Manual is intended to help for studying operability principles and maintenance of the devices of S2000R Addressable Radio Link Fire and Intrusion Alarm System based on S2000R-ARR32 Addressable Input and Output Module.



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*Please read the instructions completely before connecting, operating, adjusting or maintaining this product*

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The following terms are used throughout the Manual:

**AMR system:** Automatic Meter Reading system, a system for collecting consumption and status data from water meters or energy metering devices and transferring these data to a central database for handling.

**AMI:** Advanced Metering Infrastructure.

**Polling Loop (PL):** The two-wire multiplex addressable polling loop of an S2000-KDL through which the controller communicates data with and supplies power to connected addressable devices.

**Long press:** pressing a button down and holding it for a time of one to three seconds.

**Short press:** pressing a button down and holding it for less than one second.

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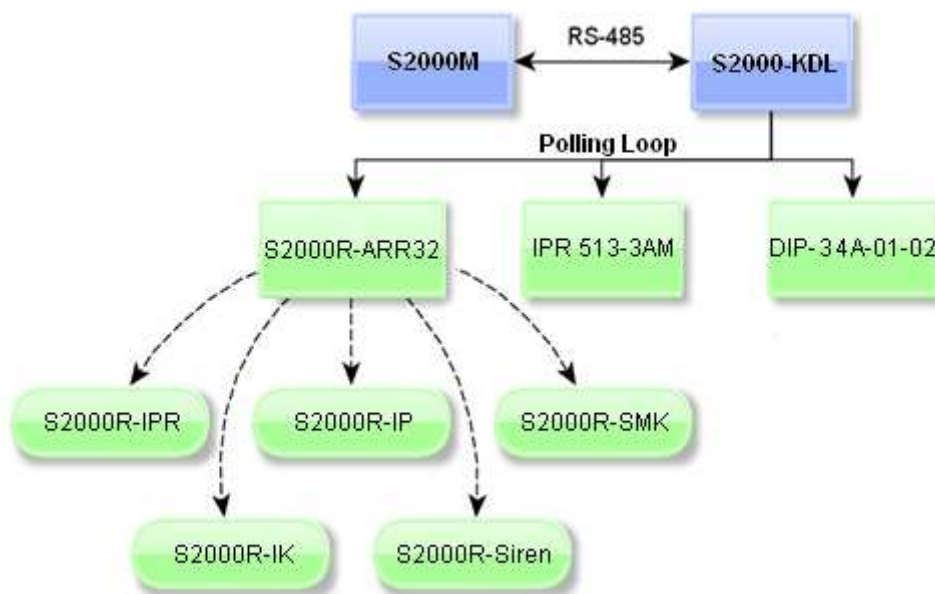
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## 1. GENERAL

This Manual describes specifications and principles of design, mounting, and operation of radio link fire alarm systems, intrusion alarm systems, and AMR&AMI systems based on S2000R-ARR32 Radio Link Input / Output Modules and radio link devices of the S2000R series.

S2000R-ARR32 Radio Link Input / Output Module (hereinafter referred to as the ARR32) is used with a polling loop controller such as an S2000-KDL of version 2.20+ or S2000-KDL-2I of version 1.15+ (hereinafter referred to as the PLC) within an Orion Integrated Security System (ISS). The ARR32 is intended to connect radio link devices of S2000R series into the multiplex addressable polling loop of a PLC. The PLC operates with the radio link devices as with their wired versions.



**Figure 1-1. Schematic Diagram of S2000R Radio Link System**

A single S2000R-ARR32 provides connecting up to the 32 radio link devices into a polling loop. The list of radio link devices supported by the S2000R-ARR32 is represented in Table 1-1.

**Table 1-1. The Radio Link Devices Supported by S2000R-ARR32**

| Input Devices |  |
|---------------|--|
| S2000R-DIP    | Radio link analog addressable photoelectric smoke detector                     |
| S2000R-IP     | Radio link analog addressable rate-of-rise and fixed temperature heat detector |
| S2000R-IPR    | Radio link manual call point   |

| <b>Input Devices</b>                      |  |
|---|--|
| S2000R-SMK                                | Radio link magnetic contact detector   |
| S2000R-IK                                 | Radio link volumetric PIR motion detector  |
| S2000R-IK rev.02*                         | Radio link volumetric PIR motion detector  |
| S2000R-SHIK*                              | Radio link curtain PIR motion detector   |
| <b>Output Devices</b>                     |  |
| S2000R-Siren                              | Radio link light and sound alarm   |
| S2000R-RM                                 | Radio link relay module  |
| S2000R-RM rev.01                          | Radio link relay module (220V)   |
| S2000R-OST*                               | Radio link LED emergency sign board  |
| <b>Pulse Adapters</b>                     |  |
| S2000R-ASR2                               | Radio link pulse adapter   |
| SHV-15D*, SHV-20D*,<br>SGV-15D*, SGV-20D* | Cold/hot water pulse meter with integrated radio link pulse adapter<br>S2000R-ASR1 |

\* - Devices are compatible with an ARR32 of hardware version 8 and higher.

## 2. SPECIFICATIONS

**Table 2-1. Common Radio Link Characteristics**

|  |                             |
|--|-----------------------------|
| Bandwidth, MHz                               | 868.0—868.2,<br>868.7—869.2 |
| Transmitting Power                           | 10 mW max                   |
| Encryption                                   | AES128                      |
| Radio Channels                               | 4                           |
| Radio link devices per a single S2000R-ARR32 | Up to 32                    |
| Effective range in free space                | 300 m*                      |

\* - If the radio system is installed within premises its effective range depends on the number and the material of walls and floors on the radio signal path.

**Table 2-2. S2000R-ARR32 Specifications**

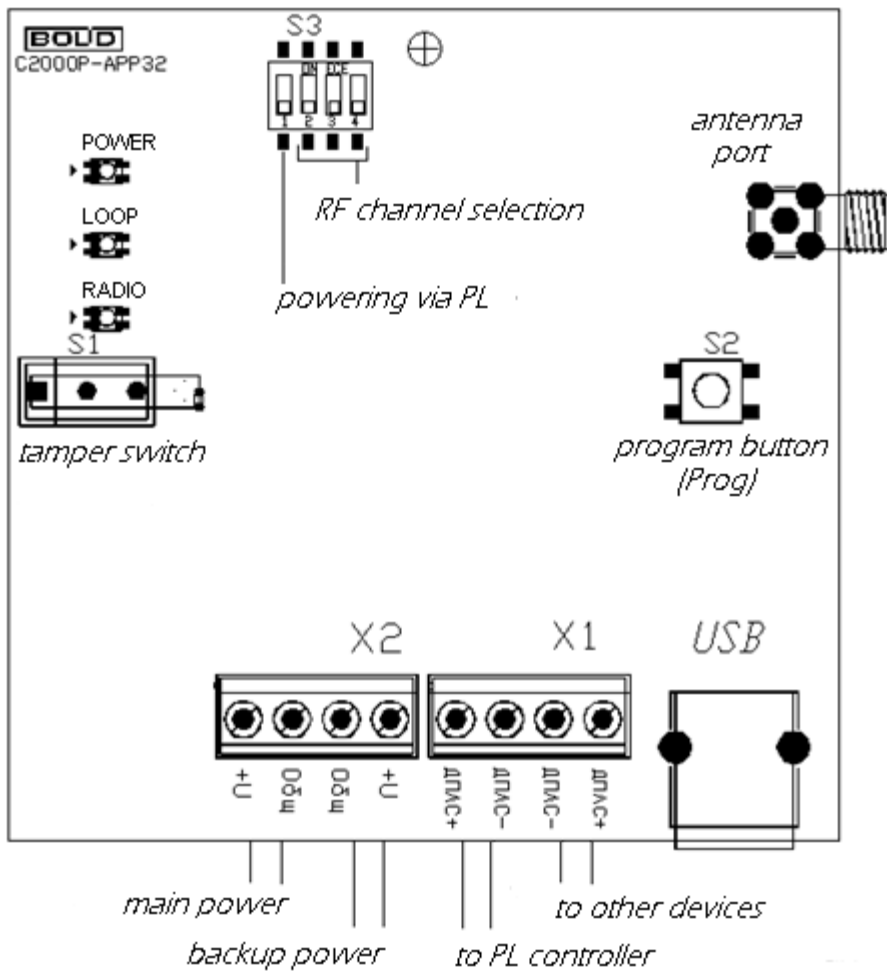
|   |                            |
|---|----------------------------|
| Device Poll Interval:<br>- Programmable within the range of<br>- By default   | 10 to 300 s<br>30 s        |
| ARR32 modules per a single radio channel  | Interval / 10              |
| Loss Detection Time   | 3 Intervals                |
| Input Voltage   | 9 —28 V                    |
| Current consumption while powering via the polling loop:<br>- Maximum consumption, the transceiver is on,<br>- Maximum consumption, the transceiver is off,<br>Current consumption while powering by a 12 V DC power supply:<br>- Average consumption in quiescent mode | 22.5 mA<br>5.7 mA<br>21 mA |
| Ingress Protection Rating   | IP20                       |
| Operating Temperature   | -30 to +50°C               |
| Transportation and Storage Temperature  | -30 to +55°C               |
| Weight  | 0.130 kg                   |
| Overall Dimensions  | 102 x 107 x 39 mm          |

**More Information:**

- The components of an S2000R system are linked over the two-way radio communication channel.
- An ARR32 automatically monitors radio channel operability and in case of an excessive noise on the current channel it can automatically select an alternate channel to operate on.
- The data are transmitted within the S2000R radio link system encrypted with dynamically changed encryption keys.
- S2000R devices dynamically control radio signal strength.
- An ARR32 provides regular monitoring for proper communication with connected radio link devices and conditions of their power supplies.



### 3. S2000R-ARR32 PC BOARD



**Figure 3-1. S2000R-ARR32 PC Board**

#### LEDs:

- POWER: Indicates conditions of power supplies;
- LOOP: Indicates polling loop communication conditions;
- RADIO: Indicates radio communication conditions.

#### Controls:

- S1: Tamper Switch;
- S2: Prog (Program) Button;
- S3: Switches:
  - S3.1: Selects power supply mode;
  - S3.2 and S3.3: Provide assigning RF channel manually;
  - S3.4: Switches between auto and manual modes of channel arrangement.

## 4. POWERING S2000R-ARR32

The S2000R-ARR32 is powered in one of the following ways:

1. Via the polling loop of the connected polling loop controller;
2. By external DC power supplies;
3. Via the USB port when the S2000R-ARR32 is connected to a personal computer for configuring.

The S2000R-ARR32 can be in one of the two power modes defined by current position of the DIP switch S3.1 (see Figure 3-1) as shown in Table 4-1.

**Table 4-1. Power Modes of the S2000R-ARR32**

| Power Mode                 | Current Consumed via Polling Loop                              | S3.1 Switch Position |
|----------------------------|--|----------------------|
| Via the polling loop       | Up to 22.5 mA  | Off                  |
| By external power supplies | 0 mA under normal conditions                                   | On                   |
|                            | 5.7 mA max in case of a failure of the external power supplies |                      |

**Being powered via the polling loop** the ARR32 consumes up to 22.5 mA from the polling loop regardless of the number of radio link devices connected to this one. When the ARR32 is operated in this power mode, external power supplies typically are not in use, their voltage values are not monitored, and their conditions are not indicated.



If you select powering the ARR32 via the polling loop please be sure that total current consumption of the devices brought in the polling loop doesn't exceed the allowed value (see S2000-KDL Manual)

**Being powered by external power supplies** connected to the X2 terminals (see Figure 3-1) normally the ARR32 is not powered via the polling loop. In this power mode the ARR32 monitors for voltage of the external power supplies which should be in the range of 9 to 28 V.

If no power is applied to the main or backup power input or when the power voltage is out of the acceptable range, the S2000R-ARR32 indicates a power failure (see Section 5).

When both external power supplies fail the S2000R-ARR32 switches to a power failure mode. In this mode the S2000R-ARR32 sends the polling loop controller a power failure message and remains functional consuming up to 5.7 mA via the polling loop, with the transceiver being off and communications with the radio link devices being stopped.

## 5. INDICATION

The S2000R-ARR32 is equipped with three two-color LEDs on its front panel (see Figure 3-1):

- POWER: Indicates condition of the power supplies;
- LOOP: Indicates data communication over the polling loop;
- RADIO: Indicates data communication with the connected radio link devices.

**Table 5-1. Operating Indication**

| LED   | Performance                              | Condition  |
|-------|--|--|
| POWER | Off                                      | The mode of powering via the polling loop is selected  |
|       | Illuminates with green                   | Normal power   |
|       | Flashes with amber every second          | Power failure  |
| LOOP  | Flashes with green every 4 s             | Data is being communicated   |
|       | Flashes with amber every 4 s             | No data is communicated  |
|       | Illuminates with amber                   | Zero voltage is detected at the polling loop terminals   |
| RADIO | Flashes with green every 4 s             | Normal communication with all connected radio link devices   |
|       | Flashes with amber twice per second      | No communications with one or more connected radio link devices for more than three Poll Intervals |
|       | Flashes with amber four times per second | No communications with all the radio link devices for more than three Poll Intervals               |
|       | Off                                      | The transceiver is disabled, the ARR32 doesn't communicate with the radio link devices             |

**Table 5-2. Software Error Indication\***

| Condition                 | LED Performance  |
|---------------------------|--|
| Radio Firmware Error      | POWER illuminates with amber while LOOP and RADIO flashes simultaneously with amber two times per second |
| Core Firmware Error       | POWER, LOOP, and RADIO illuminate with amber   |
| Radio and Core Link Error | RADIO illuminates with amber   |

\* - Potential causes of faulty operation and troubleshooting practice are discussed in Appendix B.

**Table 5-3. Operating Mode Indication**

| <b>Operating Mode</b>                         | <b>Indicator Performance</b>  |
|---|---|
| Programming Address                           | LOOP flashes four times with amber every four seconds; POWER and RADIO are off.   |
| Device Connecting                             | RADIO flashes with green twice per second; POWER and LOOP are off.  |
| Connecting Inhibited<br>(no vacant addresses) | RADIO flashes with amber twice per second within 3 seconds; POWER and LOOP are off.   |
| Unsupported Device<br>(while connecting)      | POWER, LOOP, and RADIO illuminate with amber within a half of a second  |
| Device Deleting                               | POWER and LOOP alternately flash with amber twice per second; RADIO is off. On exiting the mode all LEDs illuminate simultaneously with amber for a half of a second. |
| Reset   | POWER flashes with green and amber alternately six times per second; LOOP and RADIO are off.  |
| Updating Core Firmware                        | POWER illuminates with amber; LOOP and RADIO flash one by one with amber four times per second.   |
| Updating Radio Firmware                       | POWER shows amber light; LOOP and RADIO flash one by one with green four times per second.  |
| Testing Radio Frequency<br>Channels           | POWER and LOOP are off; RADIO flashes with green and amber alternately four times per second.   |

## 6. PROGRAMMING



*The system should be preliminary programmed prior to installing the devices at the place of operation*

### PREPARATION FOR PROGRAMMING

1. Remove the ARR32 cover;
2. Connect the antenna supplied to the antenna port on the PCB (see Figure 3-1);
3. Select the power mode of the module (see Section 4);
4. Select the radio frequency channel (see below);
5. Connect the ARR32 to a personal computer by a cable USB A(m) – USB B(m);
6. If necessary, install the driver [http://bolid.ru/files/373/566/usb\\_rs\\_exar.zip](http://bolid.ru/files/373/566/usb_rs_exar.zip).

### SELECTING RF CHANNELS

A radio link system based on ARR32 can operate on one of four radio frequency channels as shown in Table 6-1.

**Table 6-1. RF Channels**

| Channel Number | Frequency Band, MHz |
|----------------|---------------------|
| Channel 0      | 868.0 - 868.2       |
| Channel 1      | 868.75 - 868.9      |
| Channel 2      | 868.9 - 869.0       |
| Channel 3      | 869.0 - 869.2       |

RF channels can be selected by means of switches S3.2—S3.4 (see Figure 3-1) or automatically. After a channel is selected the ARR32 and all connected radio link devices start operating on the selected channel within 90 s.

**Table 6-2. Channel Selection**

| Channel              | DIP Switch Positions |      |      |
|----------------------|----------------------|------|------|
|                      | S3.2                 | S3.3 | S3.4 |
| Auto selected        | Off                  | Off  | On   |
| Dynamically selected | On                   | On   | On   |
| Channel 0            | Off                  | Off  | Off  |
| Channel 1            | Off                  | On   | Off  |
| Channel 2            | On                   | Off  | Off  |
| Channel 3            | On                   | On   | Off  |

**Auto Channel Selection**

- ☞ Place the ARR32 and a radio device where they are supposed to be installed;
- ☞ Set the switch S3.4 on;
- ☞ Start the procedure of analysis of radio link channels.

**Radio Link Channel Analysis Procedure**

**The procedure of analysis of radio link channels** is to be run by pressing the combination “**two short presses and one long press**” on the program button **S2** (see Figure 3-1). The analysis procedure takes four minutes, ARR32 indication being as follows: POWER and LOOP are off, RADIO flashes with green and amber alternately four times per second.

*The procedure of analysis of radio channels can be run from a personal computer using S2000R Configurator (see Section 7).*

In the process of analysis the ARR32 selects the RF channel with the least load. When the procedure has been completed the ARR32 automatically starts operating on the selected channel and saves this channel as a default channel for auto mode.

*If the analysis procedure was not employed, the Channel 0 is considered to be a default auto channel.*

If necessary, the analysis procedure can be aborted by short simultaneously presses on the program button **S2** and the tamper switch **S1**.




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*While analyzing the radio frequency channels the ARR32 stops communicating with radio link devices.*

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## **Auto Mode with Dynamic Channel Selection**

☞ Set the switches S3.2, S3.3, and S3.4 (see Figure 3-1) into «On» position.

In this mode the ARR32 uses the default auto channel selected during the procedure of analysis of RF channels (or the Channel 0 if the procedure was not performed). In case of excessive noise on the automatically selected channel the ARR32 automatically changes this channel for a redundant one (which is far from the current channel in the radio range) in order to keep robust communication with radio link devices.

On restarting the ARR32 which operates in the Auto Mode with Dynamic Channel Selection, this ARR32 returns to operating on the default auto channel.

## **Selecting RF Channels Manually**

☞ Set the switch S3.4 off.

☞ Assign the relevant channel using the switches S3.2 and S3.3 as shown in Table 6-2.



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*The maximum number of the ARR32 modules operating in a radio coverage zone on a single channel shouldn't be more than Device Poll Interval in seconds divided by ten.*

*Device Poll Interval is defined with the help of S2000R Configurator (see Section 7). By default Device Poll Interval is equal to 30 s, so the number of ARR32 which can operate on a single radio channel is three.*

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*The number of the current RF channel in any mode can be monitored by means of S2000R Configurator (see Section 7).*

## **PROGRAMMING**

Programming the radio link system is implemented as the following operations:

1. Connecting radio link devices to the ARR32;
2. Programming radio link devices;
3. Assigning the ARR32 and connected radio link devices to addresses within the polling loop of the polling loop controller;
4. Programming the devices in the configuration of the polling loop controller (selecting Device Type parameters, arranging links between the devices, and selecting control programs).

The ARR32 and radio link devices of the S2000R series are to be programmed using the personal computer, by means of the software utility “S2000R Configurator” (see Section 7).

Programming the devices in the configuration of the polling loop controller is implemented using the personal computer, by means of UProg Configuration Tool (see Section 8).

The software utilities can be free download from the <http://bolid.ru> (see the relevant sections of this Manual).

## CONNECTING RADIO LINK DEVICES TO AND DELETING THEM FROM THE ARR32

### *Installing and Replacing Batteries in the Radio Link Devices*

Starting operating a radio link device, first of all install batteries into it, both the main battery and the backup battery, if applicable. For the devices with pre-installed batteries, remove the insulating spacers from the battery holders.

*Integrated Radio Link Pulse Adapter S2000R-ASR1 is equipped with a built-in non-detachable power supply (see the section of this Manual for the relevant device).*

After applying power to a radio link device powered by ER14505 or ER14250 battery/batteries a process of activating batteries (depassivation) is started. Indication of the radio link device during depassivation is shown in Table 6-3.

For S2000R-Siren Radio Link Light and Sound Alarm devices, the depassivation procedure can be started only after connecting these ones to the ARR32.

**Table 6-3. Light Indication of Battery Depassivation Process**

| Condition   | Indicated by a Radio Link Device As             |
|---|---|
| <b>Depassivation in progress...</b>                             | <b>Flashes with amber four times per second</b> |
| <b>Depassivation completed successively, device is starting</b> | <b>Solid green light within 1 second</b>        |

If depassivation has failed then the radio link device after starting sends ARR32 a message about power supply discharge (see the manual for the relevant device).

### **Connecting the Radio Link Devices**

To add a new S2000R radio link device to the system do the following:

1. Switch the ARR32 to the Device Connecting mode as describe below:

☞ Open the ARR32 casing and activate Device Connecting mode by a **brief press** on the program button **S2** followed by a **long press** on this button (see Figure 3-1);

☞ The ARR32 shall indicate Device Connecting mode by the following way: RADIO flashes with green twice per second while POWER and LOOP are off;



- ☞ If address space of the ARR32 is full (32 radio link devices has already been connected), the ARR32 indicates its inability to enter the Device Connecting mode: RADIO flashes with amber twice per second while POWER and LOOP are off. This condition is indicated for 3 seconds;
- ☞ The ARR32 exits Device Connecting mode automatically, upon the expiry of 3 minutes since last connecting a device or manually, by pressing on the program button **S2** and the tamper switch **S1** simultaneously. In case of the manual operation the ARR32 LEDs perform as follows: all the indicators POWER, LOOP, and RADIO show amber light within a second.

*You can control operation of connecting devices from the personal computer using S2000R Configurator (see Section 7).*

2. For all radio link devices (apart from S2000R-ASR1 which is connected using a service magnet) make a long press on the Prog button of the device (see the relevant Manual for the radio link device) until light indication appears:
  - Indication of the radio link device:
    - The device has been connected successfully: the LED shows solid green light for 2 s;
    - Connecting failed: the LED shows solid red light for 2 s.
  - Indication of the ARR32:
    - If the device has been connected successfully, all the LEDs POWER, LOOP, and RADIO show solid green light simultaneously for a second.
  - When the radio link device is connected it is by default assigned to a polling loop address of «127».

*If the attempt to connect the radio link device has failed please be sure that the ARR32 is switched to the Device Connecting mode and try again. If the problem persists refer to Appendix B (Troubleshooting).*

3. To connect another radio link device, repeat Step 2.

*If more than one radio link device are being connected to the ARR32 before their polling loop addresses are assigned then the first connected device will be assigned to the address 127 while all other devices will be in the mode of waiting for assigning address.*



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*While connecting radio link devices, if a device indicates successful connection but the ARR32 doesn't indicate the relevant condition ensure that there are no another ARR32 in the Device Connecting mode in the radio coverage of the first ARR32.*

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## **Deleting Radio Link Devices from the Memory of the ARR32**

There are two following ways to delete radio link device descriptors from the memory of the ARR32:

1. Deleting individually or by group using S2000R Configurator (see Section 7);
2. Manual deleting of all the radio link devices for which communications are lost:

To delete device descriptors manually:

- ☞ Switch the ARR32 to the mode of deleting non-active radio link devices using a combination “**three short presses and one long press**” on the program button **S2**. In the Device Deleting mode POWER and LOOP LEDs of the ARR32 flash with amber one by one twice per second while RADIO LED is off;
- ☞ Confirm deleting by pressing the tamper button **S1**. Deleting is indicated in the following way: POWER, LOOP, and RADIO synchronously illuminate with green for a half of a second. Then the ARR32 is restarted automatically;
- ☞ The ARR32 exits the Device Deleting mode automatically upon expiry of 3 seconds or manually by pressing down the program button **S2** and tamper button **S1** simultaneously. The indication of the ARR32 is as follows: POWER, LOOP, and RADIO synchronously illuminate with amber for a half of a second.



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*Communication with a device is considered to be lost if the device doesn't respond within three Poll Intervals.*

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## **RESTORING COMMUNICATION BETWEEN THE DEVICES AND THE ARR32**

If radio communication between a radio link device and the ARR32 is lost for a short time then communication can be re-established within a single Device Poll Interval.

In case of a long-term loss of communication (for example, if the ARR32 is de-energized for a long time), in order to save power of the radio link devices the radio communication period increases with each polling loop interval and can reach 60 minutes. So, after a long-term failure communication can be restored in an hour.

If it is necessary to restore communication after a long-term failure immediately, run the Link Quality Test procedure for all the radio link devices by short presses on their Prog buttons (apart from S2000R-ASR1 for which the service magnet is used ) (see sections of this Manual for the relevant devices).

## RESETTING THE ARR32

When the ARR32 is reset, all connected radio link devices and the polling loop address of the ARR32 are erased from its memory and the access password for programming the ARR32 by means of Configurator (if set) is unset:

- ☞ Switch the ARR32 to the Reset mode by pressing and holding the program button **S2** (Figure 3-1) for ten seconds. The Reset mode is indicated in the following way: POWER LED flashes with amber and green alternately six times per second while LOOP LED and RADIO LED are off.
- ☞ Confirm resetting by pressing the tamper switch **S1**. Resetting is indicated by the following way: all the LEDs - POWER, LOOP, and RADIO – simultaneously show solid green light within a half of a second. Then the ARR32 is reset automatically.
- ☞ The ARR32 exits the Reset mode automatically upon the expiry of 15 seconds or manually by pressing down the program button **S2** and tamper button **S1** simultaneously. On exiting the Reset mode the indication of the ARR32 is as follows: POWER, LOOP, and RADIO synchronously illuminates with amber for a half of a second.

## 7. S2000R CONFIGURATOR

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The ARR32 and radio link devices are configured using a special software utility “S2000R Configurator” (hereinafter referred to as Configurator) installed on a PC. This utility provides:

- Connecting radio link devices to the ARR32 and removing them from the radio system;
- Assigning polling loop addresses to the ARR32 and connected radio link devices;
- Adjusting individual properties of the radio link devices;
- Starting the procedure of analysis of radio channels (see Section 6);
- Disabling the program button of the ARR32;
- Monitoring for output parameters of the radio link devices;
- Updating firmware of the ARR32 and radio link devices;
- Testing link quality and reading statistics of radio communication with every individual radio link device;
- Setting Device Poll Interval;
- Setting and deleting passwords to control the ARR32 by means of Configurator;
- Generating backup configuration files for the ARR32.

*The latest version of Configurator is available for free download at <http://bolid.ru>: in the Section PRODUCTS → Orion Integrated Security System → Software → Configuring → S2000R\_Configurator:*

[https://bolid.ru/production/orion/po-orion/po-config/config\\_s2000r.html#download](https://bolid.ru/production/orion/po-orion/po-config/config_s2000r.html#download)

After connecting the ARR32 to the PC via a USB cable, run Configurator. The first window that opens is *Device Search* window which displays all the ARR32 currently connected to the PC. Select the device you need and click *Open*.

If a single ARR32 is connected, it opens automatically.

*If there is no descriptor of the connected ARR32 in the Device Search window, click Rescan. If the problem persists, ensure that the USB cable is connected properly and the relevant driver is installed on the PC.*

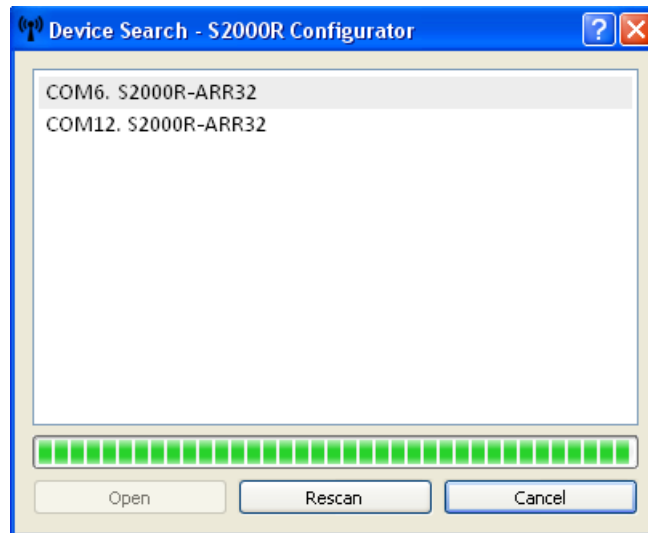


Figure 7-1

After opening of the selected ARR32 the main program window is opened.

While opening the ARR32 configuration, Configurator can ask for the password (see Section *Access Control*).

## PROGRAM INTERFACE

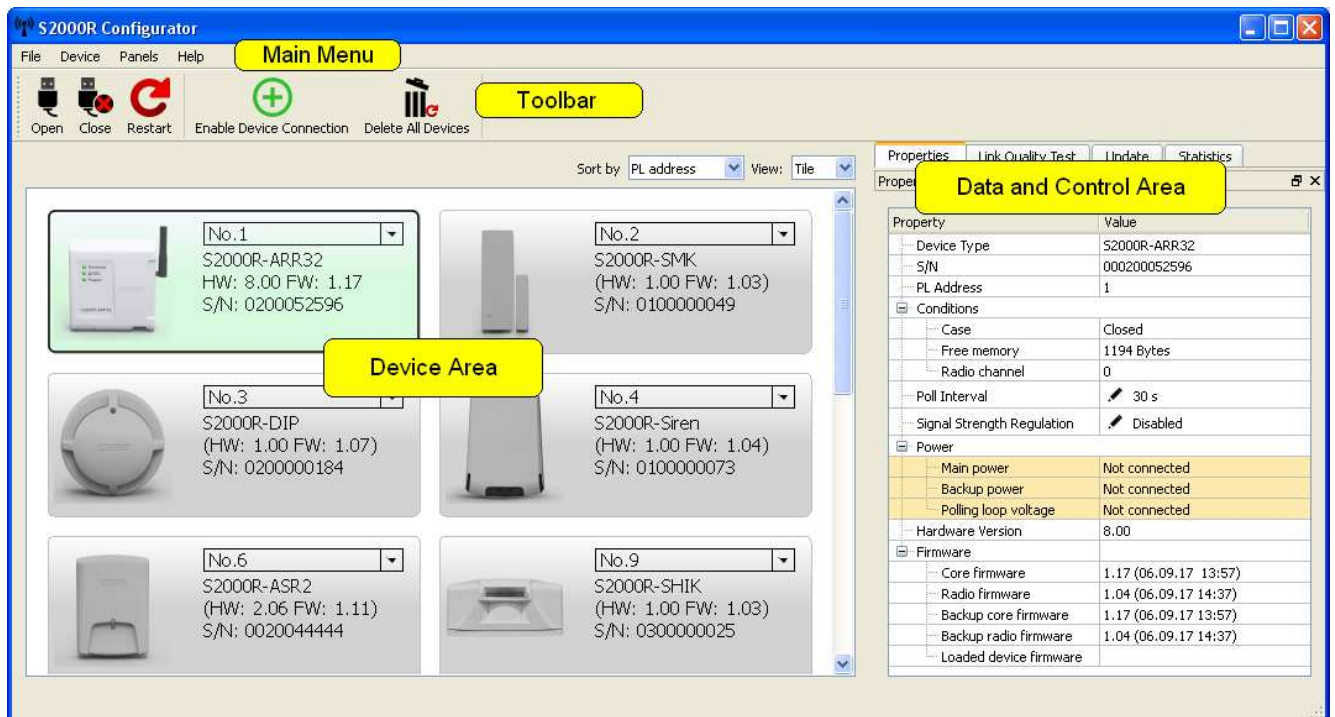


Figure 7-2

The main program window contains:

- Device Area at the left-hand portion of the window
- Data and Control Area at the right-hand portion of the window
- Main Menu
- Toolbar

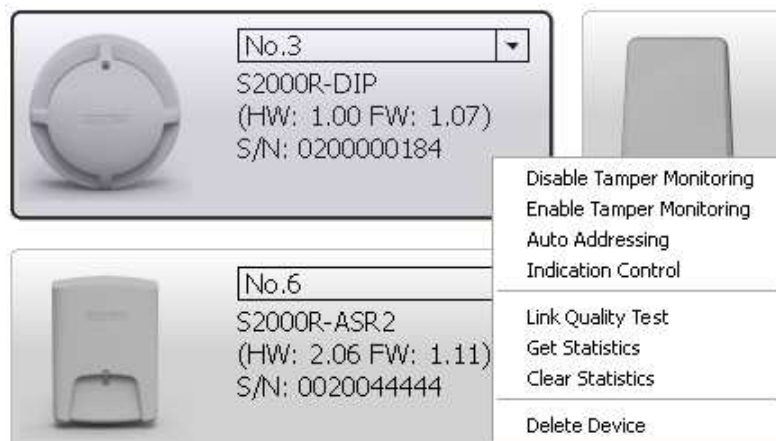
**Device Area** contains icons of the ARR32 and the devices connected to it. The following information is displayed for every radio link device: the polling loop address, the type of the device, the hardware (HW) and firmware (FW) versions of the device, the serial number (S/N) and the received signal strength indicator (RSSI) as a three-color scale.

The icons are highlighted in accordance with the current device status as follows:

- In green for the Norm status;
- In red for the Alarm status;
- In yellow for the:
  - Trouble status for intrusion detectors and
  - Trouble, or Dusty, or Tamper Alarm status for fire detector;
- In grey for Communication Loss;
- In dark green for an ARR32 icon when a radio link device is being connected to it at the time;
- In dark green for an S2000R-ASR2 icon in the mode of 30 s poll interval;
- In dark green for an S2000R-ASR1 icon in the mode of 15 s poll interval;
- In dark green for an S2000R-IK, S2000R-IK rev.02, S2000R-SHIK in the Test mode.

Left click on an icon selects the device for displaying its properties in Data and Control Area. Several devices can be selected for sending common commands.

Right click on the icon opens the device specific drop-down menu. The options from this menu can be applied to all the selected devices.



**Figure 7-3**

**Data and Control Area** includes the following tabs:

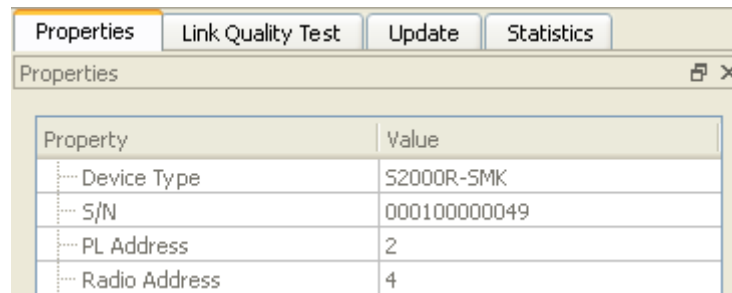
*Properties:* Contains the properties of the radio link device selected at the Device Area. For all the devices the following properties are displayed: the type, the ID (serial number), the polling loop address, the radio address (the internal address of the device in the address space of the ARR32), battery conditions, and tamper switch conditions. Also, depending on the type of the device, sensor readings and customized control elements can be presented.

For the ARR32 the following properties are displayed: the number of the current radio channel, the versions of main and backup firmware, and the version of loaded firmware to update radio link devices.

**Update:** Contains control elements for loading firmware to the memory of the ARR32 and sending updates to the radio link devices.

**Link Quality:** Contains the results of the link quality test run from drop-down menus in Device Area.

**Statistics:** Contains the statistics of radio communications between the radio link device and the ARR32; reading the statistics can be run from the drop-down menu in Device Area.








| Property      | Value        |
|---------------|--------------|
| Device Type   | S2000R-SMK   |
| S/N           | 000100000049 |
| PL Address    | 2            |
| Radio Address | 4            |

**Figure 7-4**

Tabs of Data and Control Area can be hidden by clicking on «X» at the right of tab titles. To open a hidden tab, select the relevant item in the Panels submenu of Main Menu.

**Toolbar** includes the following program tools:

- 
**Open** – Connecting Configurator to the ARR32 connected to the PC
- 
**Close** – Disconnecting Configurator from the current connected ARR32
- 
**Reset** – Sending a command to restart the connected ARR32
- 
**Enable Device Connection** – Sending a command to switch the ARR32 to the mode of connecting radio link devices (see Section 6). After entering this mode the tool is changed by **Disable Device Connection**
- 
**Delete All Devices** – Sending a command to clear all radio link device descriptors from the ARR32 memory



*When all radio link devices are deleted from the ARR32 memory, the settings in the polling loop controller configuration related to the relevant polling loop addresses retain unchanged*

## CONNECTING RADIO LINK DEVICES TO AND DELETING THEM FROM THE ARR32

Connecting radio link devices to and removing these ones from the radio system are described in the Section 6 of this Manual.

### Connecting Radio Link Devices

In order to connect a radio link device to the radio system, the ARR32 should be switched to the mode of connecting radio link devices. To do this, click *Enable Device Connection* on the Toolbar or select the ARR32 in the Device Area, right-click for opening the drop-down menu and select the relevant option.

After ARR32 entering the Device Connecting mode its icon is highlighted with green while the button on Toolbar and the relevant menu option change its view for *Disable Device Connection* for the ARR32 to exit Device Connecting mode.

The ARR32 also exits the Device Connecting mode automatically on expire of three minutes since last connecting a device or upon pressing buttons on the ARR32 PC board (see Section 6).

### Deleting Devices from the ARR32 Memory

To delete a radio link device descriptor from the memory of the S2000R-ARR32, select the device or a group of devices in Device Area, open the right-click menu and select *Delete Device*.



---

*The device descriptor(s) will be deleted only from the memory of the S2000R-ARR32. To delete device descriptors from the memory of the polling loop controller, use UProg.*

---

## ASSIGNING POLLING LOOP ADDRESSES

To assign polling loop address to a **single radio link device**, left-click the Address Menu at the right of the device icon in Device Area and select the required value from the drop-down list.

*For devices which have several inputs/outputs only the first address is assigned, other inputs / outputs are numbered automatically with the sequential addresses.*

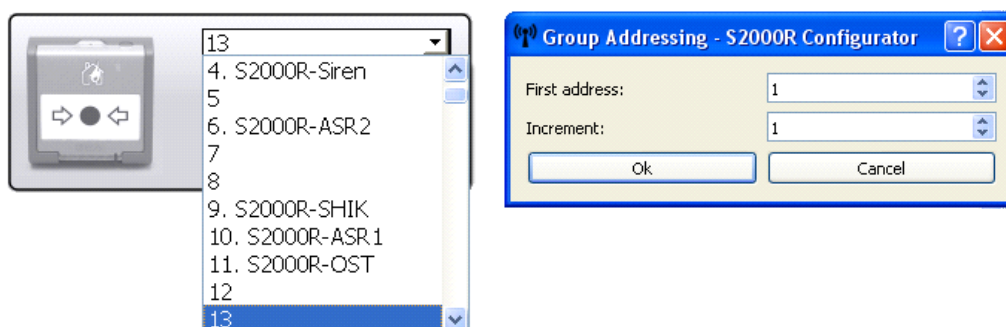


Figure 7-5



To assign polling loop addresses to a **group of the radio link devices**, select the required devices in Device Area, right-click the selection to open the drop-down menu and select *Auto Addressing*. Then specify an initial address and an increment (1 by default) in the opened window “Group Addressing”.

*For the radio link devices which have several inputs / outputs the required number of addresses is allocated automatically.*



*The address of the ARR32 within the polling loop can be assigned only individually.*

---



*While assigning addresses for multi-zone devices manually please pay attention to the assigned values in order to avoid duplication. Refer to the PL Address string for the previously connected radio device on the Device Properties tab in Data and Control Area.*

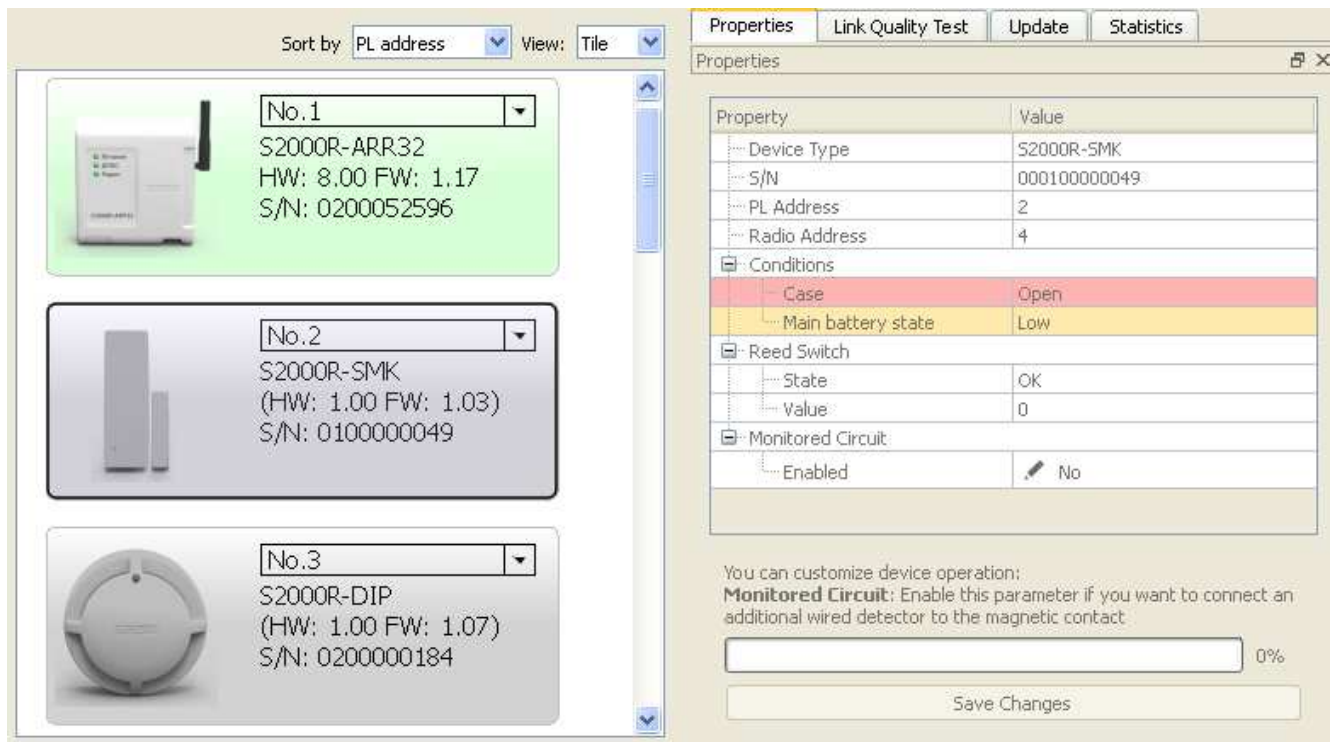
---

## SETTING RADIO LINK DEVICE PROPERTIES

Individual settings of radio link devices depending on the device type are available on the Device Properties tab in Data and Control Area:

- S2000R-SMK:
  - Enabling Monitored Circuit (On / Off).
- S2000R-ASR2:
  - Low pulse rate input / high pulse rate input;
  - Selecting the meter output type (dry contact / NAMUR);
  - Selecting frequency mode;
  - Controlling the Water Leak Sensor input (On / Off).
- S2000R-IP and S2000R-DIP:
  - Enabling tamper alarms;
- S2000R-RM:
  - Selecting the power supply or the battery as a “main” power supply;
- S2000R-IK, S2000R-IK rev.02, and S2000R-SHIK:
  - Operating the test mode;
- S2000R-IK rev.02:
  - Selecting the detection precision.

Option menu can be open by left-clicking on the field with pencil icon (see Figure 7-6).

**Figure 7-6**

After defining individual settings the changes shall be saved in the memory of radio link devices. For doing so click *Save Changes* at the bottom of the Properties tab. Successful completing is accompanied by displaying a *Settings Saved* message.



---

*Settings are transmitted to the radio link devices in the next communication session.*

*In order the settings can be changed successfully please do not disconnect and do not reset the ARR32 before the next communication session is established.*

---



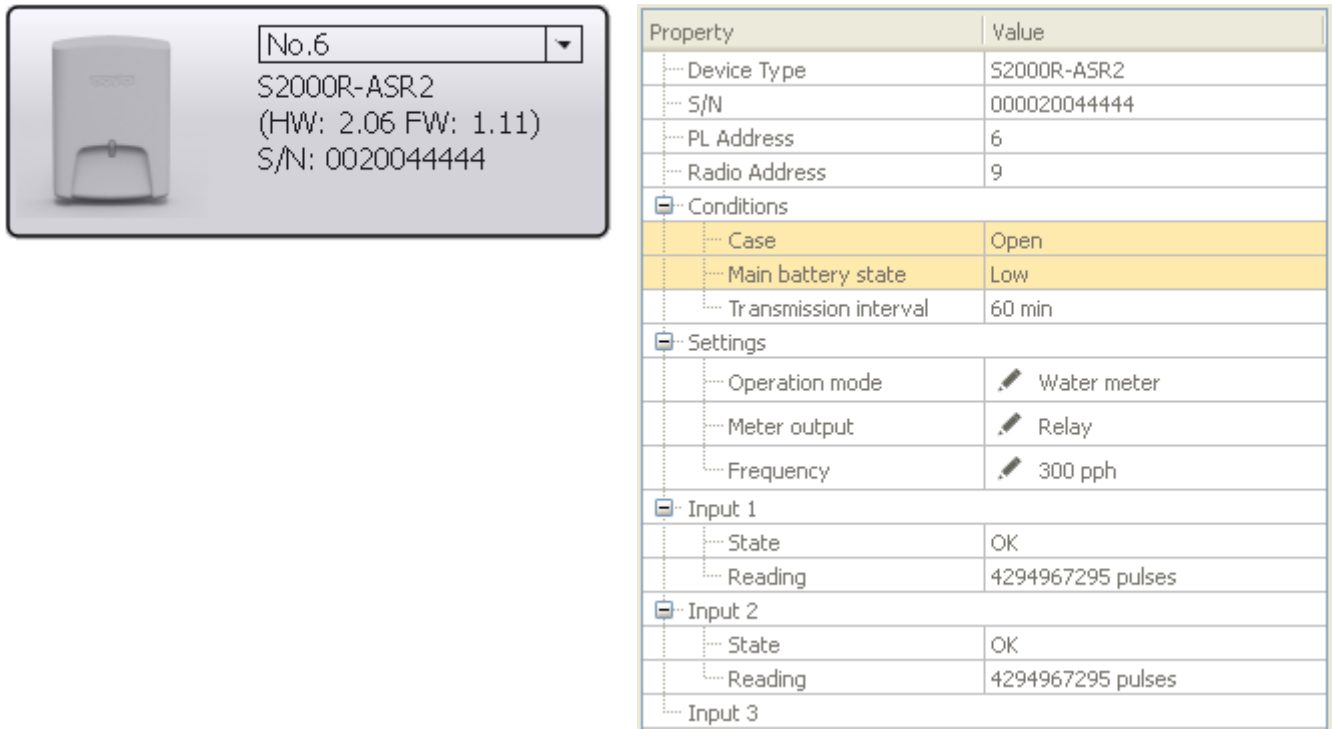
---

*If setting changes the number of the polling loop addresses occupied by the device (enabling/disabling Monitored Circuit and so on) then the address of the device is reset to the default value (127) to avoid address collision.*

---

### **Setting Properties of S2000R-ASR2**

Setting of the S2000R-ASR2 properties should be performed when the Device Poll Interval is set to 30 s. The current poll mode of the S2000R-ASR2 can be seen in the *Poll Interval* string on the Properties tab.



| Property              | Value             |
|-----------------------|-------------------|
| Device Type           | S2000R-ASR2       |
| S/N                   | 000020044444      |
| PL Address            | 6                 |
| Radio Address         | 9                 |
| Conditions            |                   |
| Case                  | Open              |
| Main battery state    | Low               |
| Transmission interval | 60 min            |
| Settings              |                   |
| Operation mode        | Water meter       |
| Meter output          | Relay             |
| Frequency             | 300 pph           |
| Input 1               |                   |
| State                 | OK                |
| Reading               | 4294967295 pulses |
| Input 2               |                   |
| State                 | OK                |
| Reading               | 4294967295 pulses |
| Input 3               |                   |

Figure 7-7

To proceed to the 30 s poll interval mode run Configurator and briefly press the tamper switch on the S2000R-ASR2 PC board down (see the relevant section of this Manual). The S2000R-ASR2 icon in Device Area shall be highlighted in dark-green.

The S2000R-ASR2 quits the 30 s poll interval mode automatically in 10 minutes after exiting Configurator.

### Setting Properties of S2000R-IP and S2000R-DIP

Monitoring for tampering S2000R-IP and S2000R-DIP detectors can be activated/deactivated by means of the right-click menu in Device Area (the menu commands *Disable Tamper Monitoring* and *Enable Tamper Monitoring*).

### Setting Properties of S2000R-RM

Specifying the main power supply for relay modules S2000R-RM is performed in the string *Main Power Supply* on the Properties tab.

The main power supply can be *Battery* (if no 12 V power supply is connected to the module) or *External* (provided that a 12 V power supply is connected).

This setting defines the content of messages transmitted to the polling loop controller when states of the power supplies of the module change:

- For the power supply specified as “main” *Power Failed / Restored* messages will be transmitted;
- For the second power supply *Battery Failed / Restored* messages will be transmitted.

### **Setting Properties of S2000R-IK, S2000R-IK Rev.02, and S2000R-SHIK**

The **Test mode** for detectors S2000R-IK, S2000R-IK rev.02, S2000R-SHIK can be operated in the Test Mode field on the Properties tab.

The icons of detectors being in Test mode are highlighted in dark-green in Device Area.

**Accuracy of measurement** for an S2000R-IK rev.02 can be selected in the *Operation Mode* field on the Properties tab.

### **STARTING THE PROCEDURE OF ANALYSIS OF THE RADIO LINK CHANNELS**

This procedure is intended for automatic selection of the radio frequency channels (see Section “PROGRAMMING”).

To run the procedure, select the ARR32 descriptor in Device Area, right-click it to open the drop-down menu and select *Run Auto Channel Selection*.

*The procedure which is being executed can be aborted by selecting Abort Auto Channel Selection in the drop-down menu for the ARR32 in Device Area or by pressing down the program button **S2** and the tamper switch **S1** on the ARR32 PCB simultaneously for a short time (see Section 3).*

*If the procedure has been aborted the ARR32 restarts automatically.*

### **DISABLING PROG BUTTON**

To provide additional protection against unauthorized access to system operations you can disable the ARR32 Prog Button **S2**, so that any press on this button will be ignored.

To disable programming by button, open the drop-down menu of the ARR32 in Device Area and select the *Disable Prog Button* option.

*If button operations are disabled, then pressing the button **S2** down causes the ARR32 indicators POWER, LOOP, and RADIO to illuminate with amber for 5 seconds.*

To unlock button operations repeat the above action, the drop-down menu command being changed for *Enable Prog Button*.

## MONITORING FOR DEVICE OUTPUT PARAMETERS

Current readings of detectors and pulse counters (such as temperature values of S2000R-IP detectors, S2000R-ASR2 readings, and so on) as well as current conditions of additional monitored circuits are shown on the Properties tab in Data and Control Area.

## UPDATING FIRMWARE OF THE S2000R-ARR32 AND RADIO LINK DEVICES

To update firmware of the radio link devices as well as firmware of the Core or Radio part of the ARR32, upload the required versions of the firmware into the ARR32 memory. To do this, click *Upload* on the *Update* tab in Data and Control Area and specify a target location for the relevant file.

For multi-purpose files which contain several versions of firmware the required version should be selected.

### ***Updating Firmware of Radio Link Devices***

The current version of radio device firmware loaded in the ARR32 memory is shown on the *Update* tab and on *Properties* tab for the ARR32 in the section “*Loaded Device Firmware*”.

After uploading firmware of radio link devices to the memory of ARR32, Configurator automatically generates a list of the devices for which the uploaded firmware is intended and displays this list on the *Update* tab.

The current version of the firmware is highlighted in the list of devices with one of the following colors:

- In blue if the version of firmware downloaded in the ARR32 memory is similar to the current version of the firmware of the radio link device,
- In green if the version of firmware downloaded in the ARR32 memory is higher than the current one, or
- In red if the version of firmware downloaded in the ARR32 memory is lower than the current one and updating is not recommended.

To start updating, select the relevant devices in the list and click on *Update Selection*.

The ARR32 indicates updating firmware as discussed in Section 5.

*If necessary, transmission of firmware to a radio link device can be terminated by clicking the Stop button.*

*If the radio link device fails to operate after updating its firmware, refer to Appendix B (Troubleshooting).*



The small power supply in an S2000R-ASR2 after a long period of operation can fail to support transmitting firmware over the radio channel.

Please change the S2000R-ASR battery for a fresh one prior to uploading S2000R-ASR2 firmware

### Updating Firmware of the S2000R-ARR32

S2000R-ARR32 firmware consists of two parts: Core Firmware and Radio Firmware. These parts are to be updated separately. Current versions of firmware can be seen as *Radio Firmware Version* and *Core Firmware Version* properties of the ARR32 on the *Properties* tab.

After Core Firmware and Radio Firmware are written into the ARR32 memory, the versions of the written firmware are displayed on the Properties tab for the ARR32 in the strings *Backup Radio Firmware* and *Backup Core Firmware*.

ARR32 firmware will be updated automatically on restarting the ARR32. To restart the ARR32, select *Device* → *Restart* in the Main Menu or press the relevant button on the toolbar.

The ARR32 indicates updating firmware as discussed in Section 5.

### TESTING LINK QUALITY AND RADIO COMMUNICATION STATISTICS

To test **current quality of radio communication** between the ARR32 and radio devices, select one or more radio devices in Device Area, then open the right-click menu and select *Link Quality Test*.

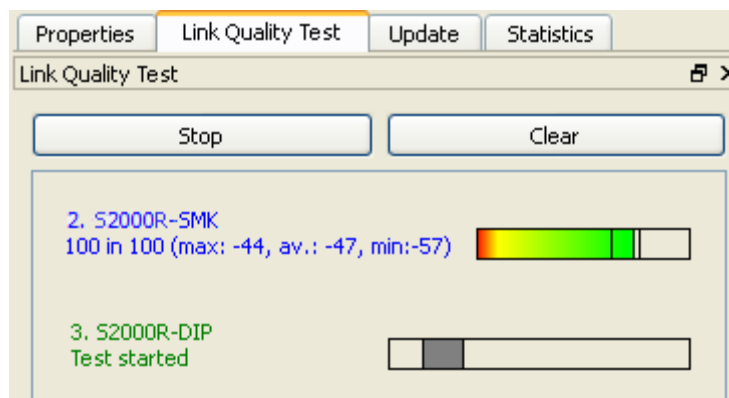


Figure 7-8

As the test has been completed for each device, the program shows the results on the *Link Quality Test* tab in Data and Control Area. The results include the number of successfully delivered data packets relatively to the total number of data packets sent during the test as well as the maximum, average, and minimum values of received signal strength indicator (RSSI) in -dBm.

| -dBm        | Link Quality  |
|-------------|---------------|
| -20 to -80  | Strong signal |
| -80 to -90  | Signal is OK  |
| -90 to -110 | Weak signal   |

Analysis of **radio communication statistics** can be useful when communication errors appear caused by time-shared environmental aspects. Refer to *Appendix B. Troubleshooting* to get more information about analysis of the statistics.

To read the statistics of radio communications with the ARR32 from the memory of a radio link device or a group of the devices, select the device or the group of the devices in Device Area, right-click to open the drop-down menu and select *Get Statistics*.

As the statistics has been received for a device, the data are displayed on the *Statistics* tab in *Data and Control Area*. The data contain the total number of the packets that were sent and the statistics for the numbers of resending packets before they were transmitted successfully.

To delete the statistics of communication from the device memory, select a radio link device or several devices in Device Area, right-click to open the drop-down menu and select *Clear Statistics*.

## SETTING DEVICE POLL INTERVAL

For radio link detectors the Poll Interval can be set to a value in the range of 10 seconds to 5 minutes.

When kicking in the detectors send alarm messages immediately regardless of Poll Interval value.

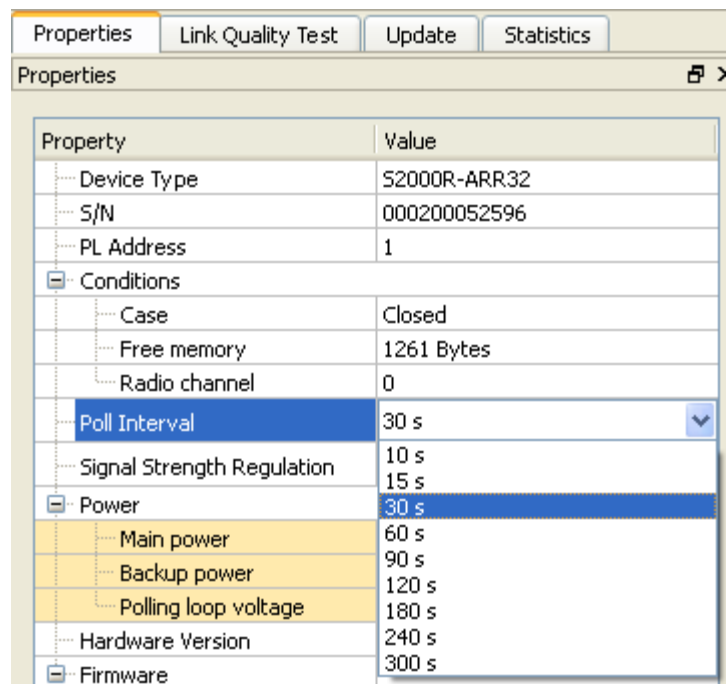


Figure 7-9

To set the required interval, select the ARR32 in Device Area and select the relevant value in the drop-down list *Poll Interval* on the Properties tab in Data and Control Area. Restart the ARR32 in order the changes to be saved and come into force.



---

*All the ARR32 operating on the same radio channel should poll the detectors with the same Poll Interval. If the Auto Mode with Dynamic Channel Selection is used to select a channel then the poll interval for the radio link detectors should be identical for all the ARR32 in the radio coverage range.*

**WARNING: The time of system response doesn't depend on Device Poll Interval. Please do not set Device Poll Interval to a value less than 30 s unless necessary**

---




---

*The defined Poll Interval is not applied to output devices such as relays and light and sound alarms.*

*Output devices are always polled with a constant, unchangeable period (see manuals for the relevant devices)*

---

## ACCESS CONTROL

Access to controlling and programming the ARR32 by means of Configurator can be password protected. A password is stored in the memory of the ARR32 and is requested in case of an attempt to connect the ARR32. In *Device Search* window an ARR32 protected by password appears with a key icon  at the left side of the string.

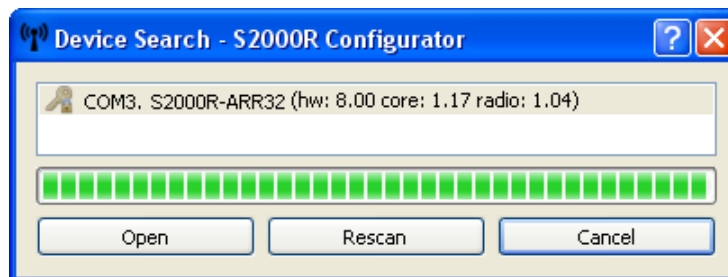


Figure 7-10

On an attempt to connect to an ARR32 protected by a password the *Password Required* window appears. Until the correct password is entered Configurator doesn't provide any information about the connected ARR32 and doesn't provide access to the control functions of Configurator.

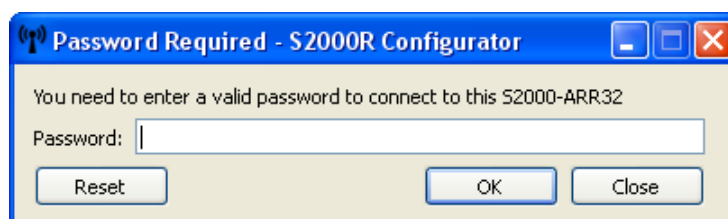


Figure 7-11



If an entered password is wrong the relevant message is displayed in the dialog window.



**Figure 7-12**

Click *Retry* to try entering the password again or *Cancel* to undo connecting to the ARR32.

### ***Lost Password***

If the password is lost then access to the ARR32 can be restored by resetting the current configuration and loading the backup configuration from the file (see "Backup Configuration Files for ARR32").

To reset the configuration open the ARR32 enclosure and click *Reset* in the *Password Required* dialog or in the window of the message about wrong password. The ARR32 will enter the Reset mode (see Section 6) and require confirming operation by pressing down the tamper switch **S1** once for a short time.



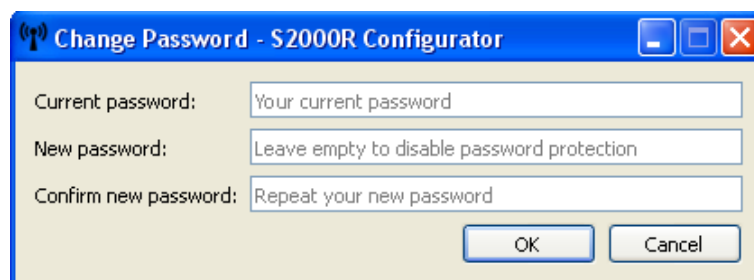

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*On resetting the configuration all descriptors of the connected radio link devices and the given polling loop address of the ARR32 will be deleted from the ARR32 memory. Also the access password will be discarded.*

---

### ***Setting and Deleting Password***

To set a password or to change a current password, select *Device* → *Change Password* in the main menu of Configurator. Then enter the required password and confirm operation in the opened dialog.



**Figure 7-13**

If you need to cancel password protection for the ARR32, enter your current password and leave the fields *New Password* and *Confirm New Password* blank.

## BACKUP CONFIGURATION FILES FOR ARR32

To generate a file with a list of the connected radio link devices and the assigned polling loop addresses, select *File → Save CFG to File* in Main Menu and specify the path to store the saved file.

To load the configuration from a backup file, select *File → Load CFG from File* in Main Menu and specify the path to the configuration file.

### ***Copying Configuration to another ARR32***

If a configuration created for an ARR32 is loaded to another ARR32 then to restore radio communication the radio link devices must be re-connected without deleting them from the ARR32 memory.

Radio addresses of the radio link devices in the ARR32 memory and assigned polling loop addresses of these ones remain unchanged.



---

*When loading a backup configuration file of one ARR32 to another ARR32 please be sure that hardware of both ARR32 modules is compatible*

---

## 8. PROGRAMMING THE POLLING LOOP CONTROLLER

The radio link devices are programmed for operation with the polling loop controller by means of the software utility "UProg" (hereinafter referred to as UProg). For setting parameters of the ARR32 and the radio link devices, UProg of versions 4.1.0.52 and higher should be used.

The last actual version of UProg is available for free download at <http://bolid.ru>: in the Section PRODUCTS → Orion Integrated Security System → Software → Configuring → UProg:

<https://bolid.ru/production/orion/po-orion/po-config/uprog.html>

Programming is carried out in accordance with User's Manual for the polling loop controller in use.

### INPUTS

The following Input Types can be assigned to the devices of S2000R Series in UProg:

**Table 8-1. Types of Inputs for the Devices of S2000R Series**

| Type of the Device |                   | Type of the Input                   |
|--------------------|-------------------|-------------------------------------|
| S2000R-ARR32       |                   | 5: Intrusion with Tamper Monitoring |
| S2000R-IPR         |                   | 16: Fire Manual                     |
| S2000R-IP          |                   | 3: Heat Fire                        |
|                    |                   | 6: Auxiliary                        |
|                    |                   | 9: Heat Analog Addressable          |
|                    |                   | 10: Thermostatic                    |
| S2000R-DIP         |                   | 1: Smoke Fire                       |
|                    |                   | 6: Auxiliary                        |
|                    |                   | 8: Smoke Analog Addressable         |
| S2000R-SMK         | Magnetic Contact  | 4: Intrusion                        |
|                    |                   | 5: Intrusion with Tamper Monitoring |
|                    |                   | 6: Auxiliary                        |
|                    |                   | 7: Entrance                         |
|                    |                   | 11: Panic                           |
|                    | Monitored Circuit | 4: Intrusion                        |
|                    |                   | 5: Intrusion with Tamper Monitoring |
|                    |                   | 6: Auxiliary                        |
|                    |                   | 7: Entrance                         |
|                    |                   | 11: Panic                           |
|                    |                   | 17: Flood                           |
| S2000R-IK          |                   | 5: Intrusion with Tamper Monitoring |
|                    |                   | 7: Entrance                         |

| Type of the Device |                | Type of the Input                   |
|--------------------|----------------|-------------------------------------|
| S2000R-IK Rev.02   |                | 5: Intrusion with Tamper Monitoring |
|                    |                | 7: Entrance                         |
| S2000R-SHIK        |                | 5: Intrusion with Tamper Monitoring |
|                    |                | 7: Entrance                         |
| S2000R-ASR2        | Pulse Input 1  | 13: Counting                        |
|                    | Pulse Input 2  | 13: Counting                        |
|                    | Flood Detector | 17: Flood                           |
| S2000R-ASR1        |                | 13: Counting                        |

## OUTPUTS

Control modules S2000R-Siren, S2000R-OST, S2000R-RM, and S2000R-RM rev.01 should be assigned with one of the Control Programs by means of UProg (see the User's Manual for the polling loop controller).

You should select a Control Program so that the relevant device can operate as required by your installation.

## DEVICE INDICATION CONTROL

The devices of the S2000R Series do not support controlling their light indication by the polling loop controller. So, only the following values can be selected for the Device Indication Control parameters of the addressable devices in UProg:

- 0: Indication Disabled;
- 1: Standalone Indication Control.

## SETTING ADDRESSES

While assigning polling loop addresses in the configuration of the polling loop controller, in order a programmed S2000R device to capture a given address send a Program Loop Address command to the device and briefly press the Prog button on the device PCB (refer to the User's Manual of the relevant device).

For S2000R-IP and S2000R-DIP detectors this also can be done by pressing the relevant detector light emitter down or lighting the light emitter by the laser beam of a laser test tool.

For an S2000R-ASR1 pulse adapter set a magnet to the service contact for a short time.

## **DEFEAT PROTECTION FOR S2000R-SMK**

Defeat protection of an S2000R-SMK magnetic contact (see the relevant section of this Manual) is enabled by setting on the active state for the *Defeat Protection* field in UProg (the active state is indicated by a plus sign «+»). This setting should be done only for the base address of the S2000R-SMK.

## **POWER SAVING MODE FOR S2000R-IK, S2000R-IK REV.02, AND S2000R-SHIK**

The function of power saving mode for S2000R-IK, S2000R-IK rev.02, and S2000R-SHIK detectors (see the relevant sections of this Manual) is turned on by selecting the active state for the *Save Mode* field in UProg (the active state is indicated by a plus sign «+»).

Arming the detectors operating in the power saving mode can take a time within Device Poll Interval (see Section *Setting Device Poll Interval*). In order the system to operate correctly the arming delay for the detectors should be defined no less than Device Poll Interval.

## **COUNTING THRESHOLD FOR S2000R-ASR2 AND S2000R-ASR1**

ARR32 transmits the polling loop controller readings of counting inputs when these reading values exceed a given Counting Threshold (upon accumulation the given difference of readings).

This threshold value is set in UProg in the field Counting Threshold.

## 9. DESIGN AND MOUNTING

### DESIGNING A SYSTEM BASED ON S2000R-ARR32

Designing a system based on S2000R-ARR32 it is necessary to take into account RF transparentness of the floors, walls and other construction elements at the mounting location, as well as presence of obstructions and interference sources.

Connecting radio link devices to the ARR32 and adjusting the system should be performed prior to installing the system elements in the field.

#### ***RF Range***

Estimated distances between ARR32 and a radio link device to provide reliable wireless connectivity depending on relative positions of system elements are shown in Table 9-1.

The actual coverage can differ from the approximate values to be more or less depending on the particular mutual arrangement of the system.

**Table 9-1. Radio Coverage**

| <b>Relative Positions</b>   | <b>Max Recommended Distance</b> |
|---|---------------------------------|
| Free air, line-of-sight   | 300 m                           |
| Within premises, line-of-sight  | 120 m                           |
| Rooms separated by reinforced concrete construction elements          | 50 m                            |
| Rooms separated by wood or gypsum plaster board construction elements | 80 m                            |
| Separate buildings, sight through windows                             | 140 m                           |

#### ***Mounting Location Considerations***

---

##### **CAUTION**



*A final decision about mounting locations of the ARR32 and radio link devices should be made taking into account the results of testing link quality (see Section “Mounting the ARR32 and Radio Link Devices”)*

---

**Avoid installing** the ARR32 and radio link devices at locations as follows:

- On metal surface or near large metal things;
- Near electrical equipment and electric motors;
- In embayment areas formed by reinforced concrete structures;
- Near current-carrying elements and electric cables.

Optimally the ARR32 should be positioned at the middle of the distance between the radio link devices which are the most separated from each other, at the height of 1.5 to 2 meters.



---

*When several ARR32 are to be installed in the same area or an ARR32 are to be installed near another radio source then a minimum distance of 0.5 meters must be maintained between the individual ARR32 modules or the ARR32 and the radio source.*

---

### ***Installing the ARR32 Under Conditions of Screening***

If you need to install the ARR32 in the environment of screening materials (in embayment areas formed by reinforced concrete construction elements or in metal cabinets) it is necessary to use a remote antenna instead of the internal built-in antenna. Position the remote antenna out of the screened area and use a cable of a minimum length. No remote antenna is provided with the ARR32.

### ***Installing ARR32 and Radio Link Devices in Separate Buildings***

When radio link input/output modules and radio link devices are supposed to be installed in various buildings they should be located in close vicinity of window embrasures facing each other.

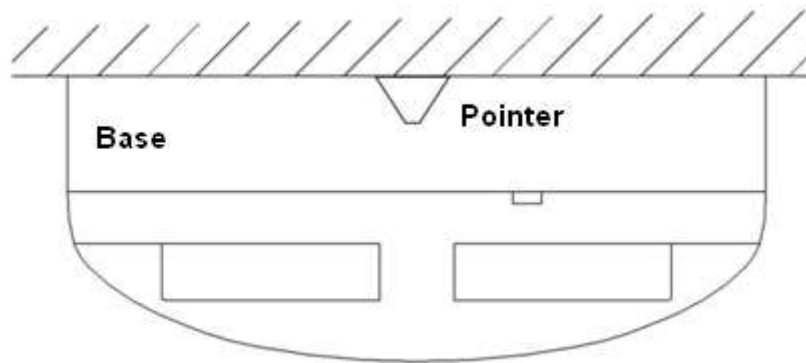
## **MOUNTING THE ARR32 AND RADIO LINK DEVICES**

While mounting radio link devices please follow the instructions of the descriptions of the relevant devices (see Section *Radio Devices of the S2000R Series*).

### ***Mounting S2000R-IP and S2000R-DIP***

S2000R-IP and S2000R-DIP detectors must be attached in such a way that the antenna of a detector secured in its base is directed towards the ARR32 (an imaginary line between the ARR32 and the radio link detector should not come across the main detector battery).

To facilitate mounting, there is a molded pointer in the form of an arrow on the detector base which points to the location of the antenna (see Figure 9-1).

**Figure 9-1****Testing Link Quality**

Before installing the ARR32 and the radio link devices it is necessary to ensure that reliable radio communications the ARR32 and every device can be established.

To check the reliability of radio communications, the Link Quality Test procedure is intended:

1. Place the ARR32 at the location where you are going to install this device;
2. Place the radio link device at the place where the device is supposed to be installed;
3. Start the Link Quality Test procedure for the radio link device by a brief press on its Prog button (see the description of this procedure for the radio link device in its manual). For such detectors as S2000R-IP and S2000R-DIP this procedure can be run also by a brief press on the light guide of the indicator or lighting it with the laser beam of a laser test tool. The procedure lasts one minute. During the procedure the radio link device indicates current quality of the link as shown in Table 9-2;
4. If link quality is low, select another location for the device or the ARR32 and repeat testing.

**Table 9-2. Link Quality Indication**

| Device LED Performance     | Condition   | Signal Strength, dBm |
|----------------------------|---|----------------------|
| Flashes with green         | Strong signal   | -20...-80            |
| Flashes with green and red | Normal signal   | -80...-90            |
| Flashes with red           | Weak signal<br>(not recommended to install)                   | -90...-110           |
| Shows red light for 1 s    | No communications or the device is not connected to the ARR32 |                      |

*Link quality can also be estimated by means of S2000R Configurator. To do this, locate the radio link device and the ARR32 at the places they are supposed to be attached, connect the ARR32 to the personal computer and run the relevant test (see Section 7).*



## Overall Dimensions of the ARR32

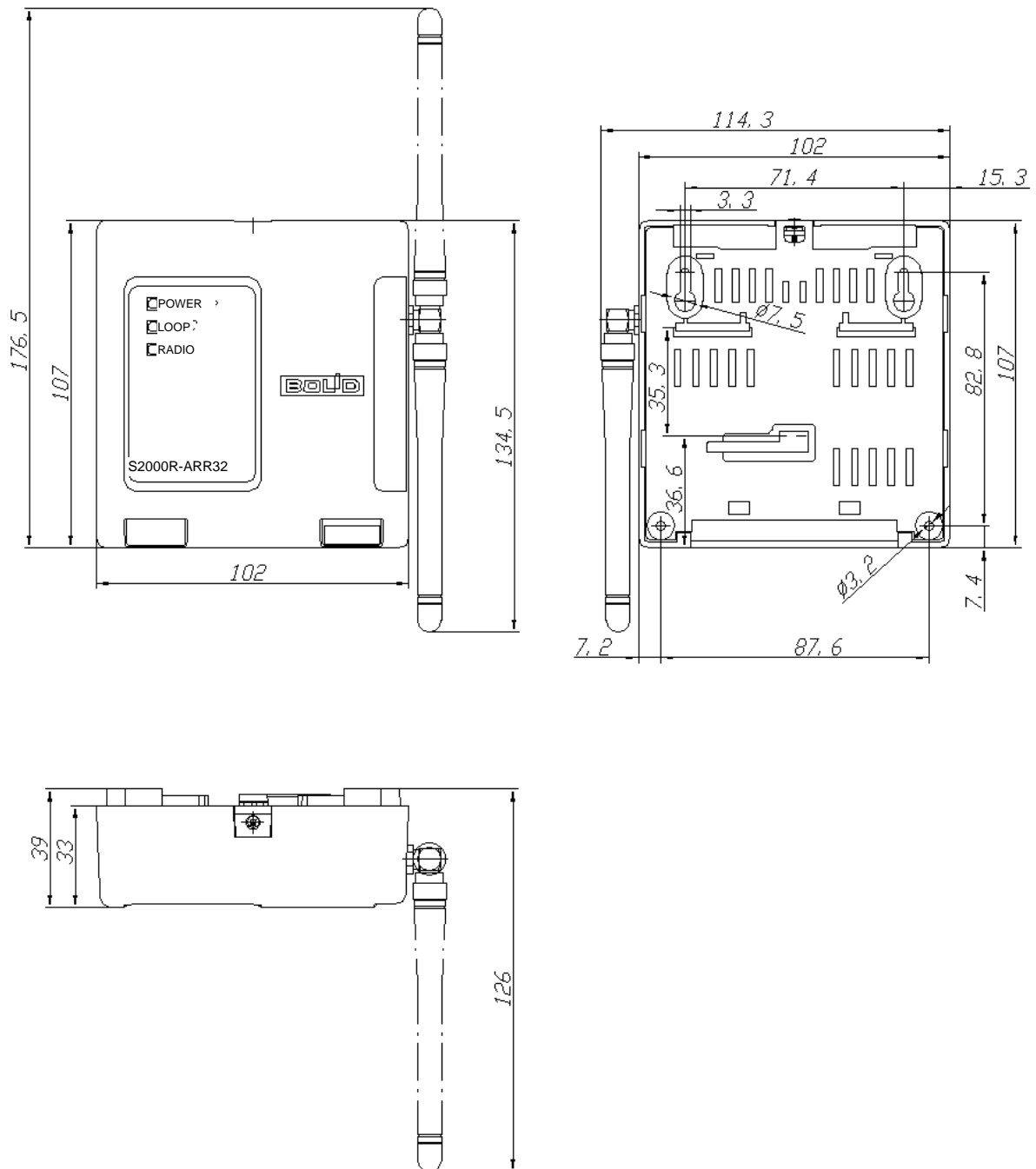


Figure 9-2. Overall and Mounting Dimensions

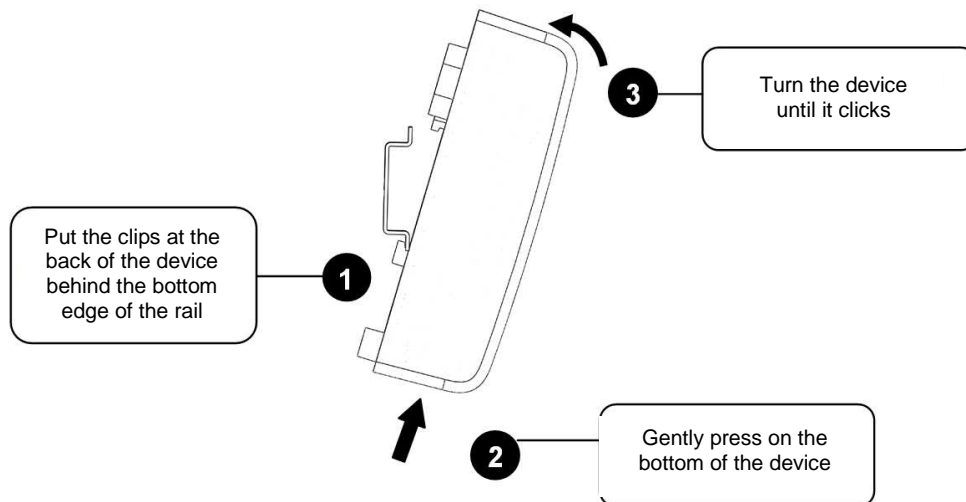
### Mounting the ARR32

#### Mounting on a Wall

- The ARR32 should be mounted on a solid, plane, clean, and dry surface;
- The ARR32 enclosure is equipped with four fastening points including two upper holes for hanging and two bottom holes for fastening;
- Overall dimensions of the ARR32 and the distances between mounting holes are shown in Figure 9-2.

### Mounting onto the DIN Rail

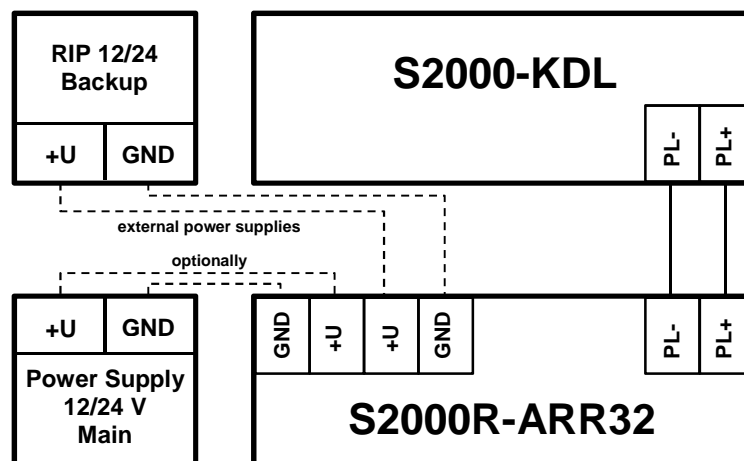
The ARR32 can be mounted on the DIN rail as shown in Figure 9-3.



**Figure 9-3. Mounting the ARR32 on the DIN Rail**

### Connecting the ARR32

The ARR32 is connected in accordance with the schematic shown in Figure 9-4. If the ARR32 is powered via the polling loop, no external power supply should be connected.



**Figure 9-4. ARR32 Connection Diagram**

## 10. RADIO DEVICES OF THE S2000R SERIES

### S2000R-IP

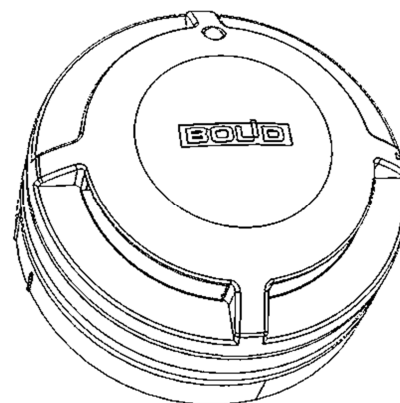
#### General

S2000R-IP Analog Addressable Radio Link Rate-of-Rise and Fixed Temperature Heat Detector (hereinafter referred to as the detector) of Response Class A1R is designed to protect premises against fire by monitoring ambient temperature. When the temperature reaches a response value or the temperature rises too rapidly, the detector generates an alarm.

The detector provides monitoring for current values of ambient temperature in degrees Centigrade. The detector also monitors its case against tampering and separation from the attachment point as well as keeps a check on main and backup battery voltage and quality of the radio link.

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

The detector's operability can be tested with the help of a laser test tool made by System Sensor or similar.



#### Specifications

**Table 10-1. S2000R-IP Specifications**

|  |                               |
|--|-------------------------------|
| Batteries:                               |                               |
| Main                                     | ER14505 (AA), 3.6 V           |
| Backup                                   | CR2032, 3 V                   |
| Operating by Battery in Quiescent Mode*: |                               |
| By the main battery                      | 4-8 years                     |
| By the backup battery                    | 2 months min                  |
| Accuracy of Temperature Measurements     | $\pm 1^{\circ}\text{C}$       |
| Response Temperature                     | +54 to +65 $^{\circ}\text{C}$ |
| Fault Detection Time                     | 60 s max                      |
| Ingress Protection Rating                | IP40                          |
| Operation Temperatures                   | -30 to +50 $^{\circ}\text{C}$ |

|  |                |
|--|----------------|
| Transportation and Storage Temperature | -30 to +55°C   |
| Weight                                 | 0.12 kg        |
| Overall Dimensions, Diameter × Height  | 100 mm × 48 mm |

\* - Operation time depends on the transmission interval, radio link quality, and ambient temperatures

### S2000R-IP PC Board

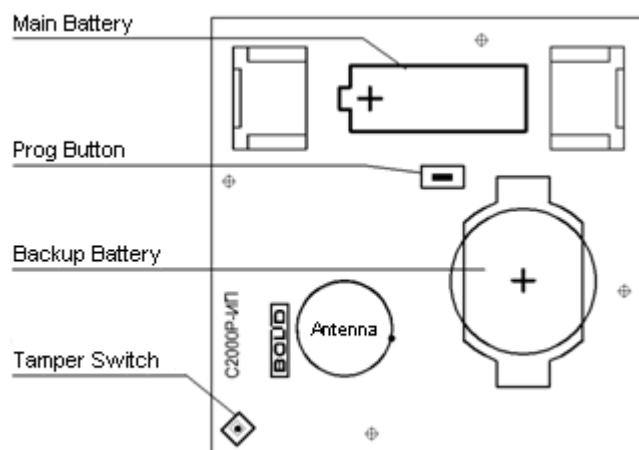


Figure 10-1

### Indication

Table 10-2. S2000R-IP Start Indication

| Mode                              | LED Performance                              |
|-----------------------------------|--|
| Battery depassivation in progress | Illuminates with amber four times per second |
| Proceeding to quiescent mode      | Illuminates with green for 1 s               |

Table 10-3. S2000R-IP Operation Indication

| LED Performance                     | Condition                               |
|-------------------------------------|---|
| Flashes with red every 3 s          | Fire Alarm                              |
| Flashes with green every 10 s       | Norm                                    |
| Flashes with amber every 10 s       | Discharge of the main or backup battery |
| Two flashes with amber every 15 s   | Trouble                                 |
| Three flashes with amber every 15 s | No communications with the ARR32        |

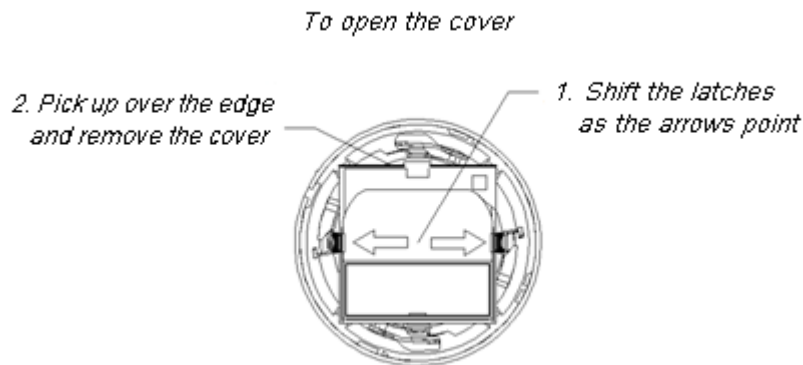
Table 10-4. Link Quality Indication

| LED Performance            | Condition   |
|----------------------------|---|
| Flashes with green         | Strong signal   |
| Flashes with green and red | Normal signal   |
| Flashes with red           | Weak signal (not recommended to install)                      |
| Shows red light for 1 s    | No communications or the device is not connected to the ARR32 |

## Getting Started

Remove the protective cover from the PC board.

Remove the insulating spacers from the holders of the main and backup batteries and wait until depassivation is completed.



**Figure 10-2**

The depassivation procedure activates batteries after long term storage and can take up to 5 minutes. The process of depassivation is indicated as shown in Table 10-2. If depassivation fails the detector indication is similar to indication of low batteries (see Table 10-3).

In case of deep battery passivation (after storage for a longer than two years) a passivation process can last up to four hours. In this process the device operate in quiescent mode and depassivation is started every 30 minutes until it has been completed successfully.



Until depassivation succeeds the detector indicates discharged conditions of main battery (with transmitting the relevant state to the control and indicating equipment).

If upon expiry of four hours the battery condition has not yet been normalized then the batteries must be replaced.

## **Connecting and Programming**

Connect the detector to the ARR32 and set its parameters in the configuration of the polling loop controller as discussed in Sections 6, 7, and 8 of this Manual.

When the detector has been connected on the ARR32, put the protective cover on it.

## **Mounting Location Considerations**

Considering the mounting location for the S2000R-IP, please follow:

- The instructions from Section 9 of this Manual.
- All your applicable local codes, standards, regulations, and ordinances.

## **Testing Link Quality**

The Link Quality Test procedure is designed to estimate stability of radio link between the detector and the ARR32 at their current locations and when obstructions exist on the path of radio signals. You are recommended to carry out the Link Quality Test before the devices are attached at their locations.

A Link Quality Test is started by a short press on the Prog button (see Figure 10-1) or by a short press on the detector light guide or lighting this one by the laser beam of a laser test tool. The procedure lasts 60 seconds, the detector being indicating the results of the test as shown in Table 10-4.

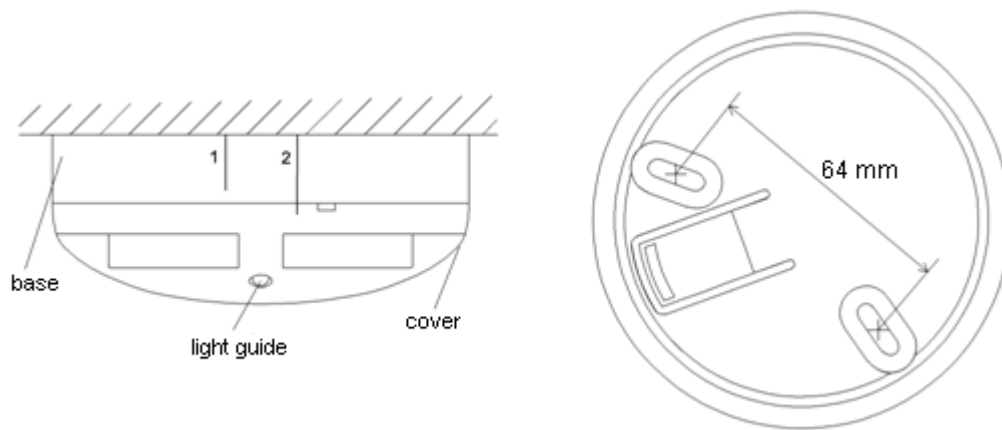
As testing the detector is in progress you can move the detector and the ARR32 to find the best locations for them.

*You can also estimate quality of the link using S2000R Configurator as discussed in Section 7.*

## **Mounting**

The detector's base is to be mounted on a flat surface using the two screws provided.

To attach the detector to the mounting base, place the detector into the base and rotate clockwise until the detector drops into place and the matchmark moulded on the detector lines up with the short mark 1 on the mounting base. Continue rotating clockwise until the matchmark on the detector lines up with the matchmark 2 as shown in Figure 10-3 and the detector locks into place.



**Figure 10-3**

## Testing

After mounting, the detector's operations should be tested in accordance with one of the procedures described below.

### Simplified Test Procedure

- Ensure the detector indicates that it is in Normal state;
- Start testing quality of the link with the ARR32 by pressing the detector's light guide for a short time or by lighting the light guide by the laser beam;
- Ensure the detector indicates the link quality procedure has been started (see Section 9);
- Ensure that a Detector Test message has been delivered to the control and indicating equipment;
- Wait until the detector enters in Normal state.

### Complete Test Procedure




---

*Prior to carrying out the complete testing procedure be sure that a fire alarm from the detector will not start any announcement and/or fire extinguishing system*

---

- Test quality of the link between the detector and the ARR32;
- Ensure that the detector indicates its being in Normal state;
- Blow a stream of hot air (from a hair dryer) with a temperature of 70°C to 100°C on to the sensing element of the detector;
- Ensure that the detector indicates its being in Fire Alarm state;
- Ensure that the fire alarm has been delivered to the control and indicating equipment;
- Wait until the detector enters in Normal state.

## Maintenance

Inspect the detector at least annually. If necessary, clean the detector and test its operability.

On receiving a low battery message for the main or backup battery replace both the batteries.

---

*WARNING: DO NOT use a metal thing to take the batteries out. To remove the backup battery, press on a free edge of the battery as shown in the picture below.*

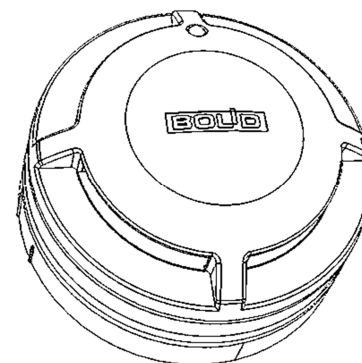




## S2000R-DIP

### General

S2000R-DIP Radio Link Analog Addressable Photoelectric Smoke Detector (hereinafter referred to as the detector) is designed to protect premises against fire by monitoring the smoke level values in its smoke chamber and sending alarms when the smoke level exceeds the preset values. The detector provides monitoring of current smoke and dust levels in its smoke chamber. The detector also monitors its case against tampering and separation from the attachment point as well as keeps a check on main and backup battery voltage and quality of the radio link.



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

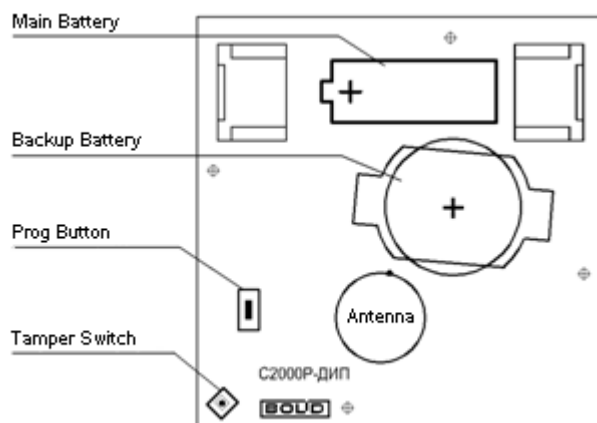
The detector's operability can be tested with the help of a laser test tool such as made by System Sensor or similar.

### Specifications

**Table 10-5. S2000R-DIP Specifications**

|  |                     |
|--|---------------------|
| Batteries:                               |                     |
| Main                                     | ER14505 (AA), 3.6 V |
| Backup                                   | CR2032, 3 V         |
| Operating on Battery in Quiescent Mode*: |                     |
| By the main battery                      | 4-8 years           |
| By the backup battery                    | 2 months min        |
| Sensitivity                              | 0.05 - 0.2 dB/m     |
| Response Time                            | 10 s max            |
| Fault Detection Time                     | 60 s max            |
| Ingress Protection Rating                | IP40                |
| Operation Temperatures                   | -25 to +55°C        |
| Transportation and Storage Temperature   | -30 to +55°C        |
| Weight                                   | 0.12 kg             |
| Overall Dimensions, Diameter × Height    | 100 mm × 48 mm      |

\* - Operation time depends on the transmission interval, radio link quality, and ambient temperature

**S2000R-DIP PC Board**

**Figure 10-4**
**Indication**
**Table 10-6. S2000R-DIP Start Indication**

| Mode                                 | LED Performance                              |
|--------------------------------------|--|
| Battery depassivation in progress... | Illuminates with amber four times per second |
| Proceeding to quiescent mode         | Illuminates with green for 1 s               |

**Table 10-7. S2000R-DIP Operation Indication**

| LED Performance                     | Condition                               |
|-------------------------------------|---|
| Flashes with red every 3 s          | Fire Alarm                              |
| Flashes with green every 10 s       | Norm                                    |
| Flashes with amber every 10 s       | Discharge of the main or backup battery |
| Two flashes with amber every 15 s   | Trouble                                 |
| Three flashes with amber every 15 s | No communications with the ARR32        |

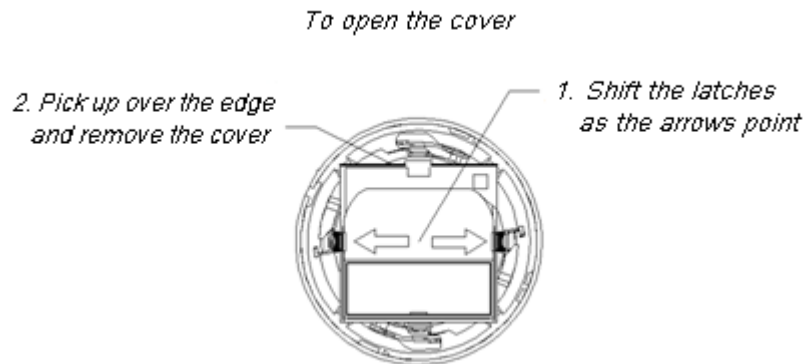
**Table 10-8. Link Quality Indication**

| LED Performance            | Condition   |
|----------------------------|---|
| Flashes with green         | Strong signal   |
| Flashes with green and red | Normal signal   |
| Flashes with red           | Weak signal (not recommended to install)                      |
| Shows red light for 1 s    | No communications or the device is not connected to the ARR32 |

## Getting Started

Remove the protective cover from the PC board.

Remove the insulating spacers from the holders of the main and backup batteries and wait until depassivation is completed.



**Figure 10-5**

The depassivation procedure activates batteries after long term storage and can take up to 5 minutes. The process of depassivation is indicated as shown in Table 10-6. If depassivation fails the detector indication is similar to indication of low batteries (see Table 10-7).

---

*In case of deep battery passivation (after storage for a longer than two years) a passivation process can last up to four hours. In this process the device operates in the quiescent mode and depassivation is started every 30 minutes until it has been completed successfully.*



*Until depassivation succeeds the detector indicates discharged conditions of the main battery (with transmitting the relevant state to the control and indicating equipment).*

*If upon expiry of four hours the battery condition has not yet been normalized then the batteries must be replaced.*

---

## Connecting and Programming

Connect the detector to the ARR32 and set its parameters in the configuration of the polling loop controller as discussed in Sections 6, 7, and 8 of this Manual.

When the detector has been connected on the ARR32, put the protective cover on it.

## Mounting Location Considerations

Considering the mounting location for the S2000R-DIP, please follow:

- The instructions from Section 9 of this Manual.
- All your applicable local codes, standards, regulations, and ordinances.

## Testing Link Quality

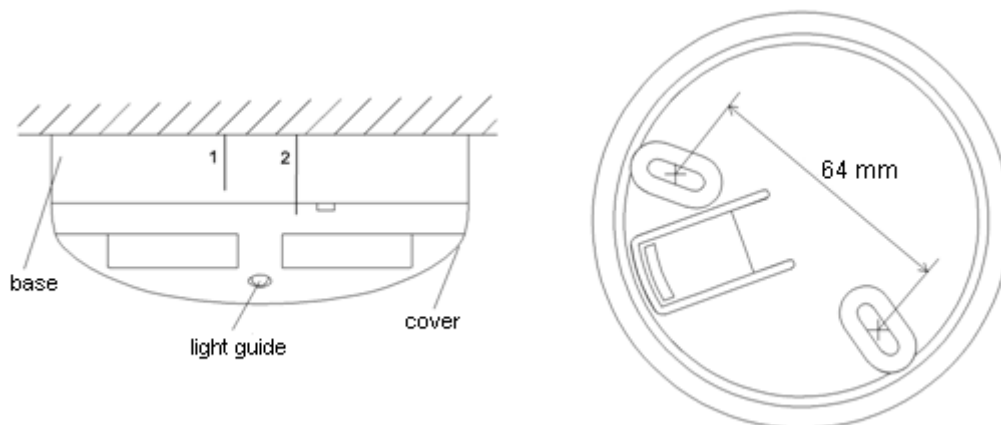
The Link Quality Test procedure is designed to estimate stability of radio link between the detector and the ARR32 at their current locations and when obstructions exist on the path of radio signals. You are recommended to carry out the Link Quality Test before the devices are attached at their locations.

A Link Quality Test is started by a short press on the Prog button (see Figure 10-4) or by a short press on the detector light guide or lighting this one by the laser beam of a laser test tool. The procedure lasts 60 seconds, the detector being indicating the results of the test as shown in Table 10-8.

As testing the detector is in progress you can move the detector and the ARR32 to find the best locations for them.

*You can also estimate quality of the link using S2000R Configurator as discussed in Section 7.*

## Mounting



**Figure 10-6**

The detector's base is to be mounted on a flat surface using the two screws provided.

To attach the detector to the mounting base, place the detector into the base and rotate clockwise until the detector drops into place and the matchmark moulded on the detector lines up with the short mark 1 on the mounting base. Continue rotating clockwise until the matchmark on the detector lines up with the matchmark 2 as shown in Figure 10-6 and the detector locks into place.

## Testing

After mounting, test the detector's operations in accordance with one of the procedures described below.

### Simplified Test Procedure

- Ensure the detector indicates that it is in Normal state;
- Start testing quality of the link with the ARR32 by pressing the detector's light guide for a short time or by lighting the light guide by the laser beam;
- Ensure the detector indicates that the link quality test procedure has been started (see Section 9);
- Ensure that a Detector Test message has been delivered to the control and indicating equipment;
- Wait until the detector enters in Normal state.

### Complete Test Procedure



---

*Prior to carrying out the complete testing be sure that a fire alarm sent by the detector will not start any announcement and/or fire extinguishing system*

---

- Test quality of the link between the detector and the ARR32;
- Ensure that the detector indicates its being in Normal state;
- Spray some smoke detector test aerosol into the smoke chamber of the detector;
- Ensure that the detector indicates its being in Fire Alarm state;
- Ensure that the fire alarm has been delivered to the control and indicating equipment;
- Wait until the detector enters in Normal state.



---

*To avoid damage to the measurement equipment and the detector, use only the smoke detector test aerosol or tester which is designed specifically for testing smoke detectors*

---

## Maintenance

- At least annually inspect the screen assembly under the detector cover. If there is any dust on the screen assembly, clean this one with a vacuum cleaner (by pumping air).
- When a *Service Required* message is received from the detector remove the dust from the sensing chamber.
- On receiving a low battery message for the main or backup battery replace both the batteries.

*WARNING: DO NOT use a metal thing to take out the batteries. To remove the backup battery, pull the battery edge up from the side of one of cutouts of the battery holder as shown in the picture below.*



## S2000R-IPR

### General

S2000R-IPR Radio Link Resettable Manual Call Point (hereinafter referred to as the call point) is to be used in fire alarm and fire suppression systems to trigger a fire alarm or to activate the fire suppression system manually.

The case of the call point has a protective flip cover which can be sealed.

The call point is switched to Fire conditions by pressing on the central plastic operation element, the central element then being mechanically latched.

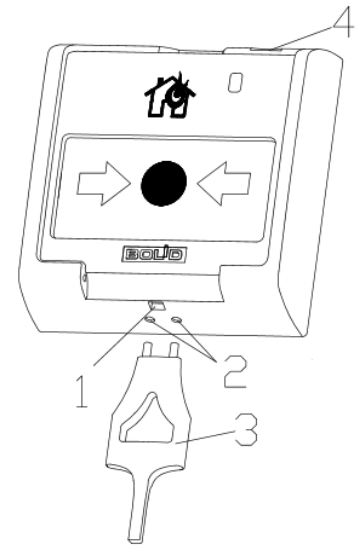
The call point can be simply returned from the Fire Alarm state to the Normal state with a special key provided.

The call point monitors its tamper condition, battery status, and radio link quality.

The call point is intended for round-the-clock operation.

### The elements of the call point are the following:

- 1: The hole to insert the key to reset the activated call point;
- 2: The holes to insert the key to open the call point case;
- 3: The special key (provided) to reset the activated call point and to open its case;
- 4: The place to apply a seal.

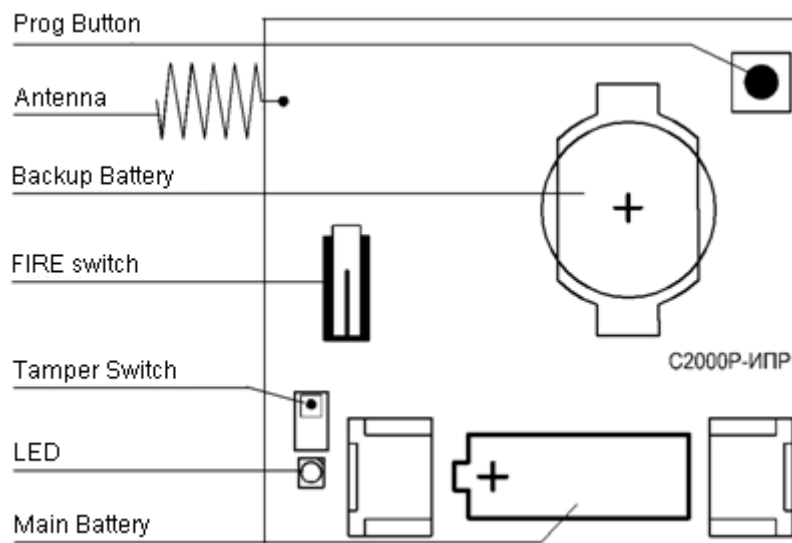


### Specifications

**Table 10-9. S2000R-IPR Specifications**

|  |                       |
|--|-----------------------|
| Batteries:                               |                       |
| Main                                     | ER14505 (AA), 3.6 V   |
| Backup                                   | CR2032, 3 V           |
| Operating on Battery in Quiescent Mode*: |                       |
| By the main battery                      | 6-12 years            |
| By the backup battery                    | 2 months min          |
| Ingress Protection Rating                | IP41                  |
| Operating Temperature                    | -30 to +50°C          |
| Transportation and Storage Temperature   | -30 to +55°C          |
| Weight                                   | 0.140 kg              |
| Overall Dimensions                       | 94 mm x 90 mm x 33 mm |

\* - Operation time depends on the transmission interval, radio link quality, and ambient temperature

**S2000R-IPR PC Board**

**Figure 10-7**
**Indication**
**Table 10-10. S2000R-IPR Operation Indication**

| LED Performance                     | Condition                               |
|-------------------------------------|---|
| Flashes with red every 3 s          | Fire Alarm                              |
| Flashes with green every 10 s       | Norm                                    |
| Flashes with amber every 10 s       | Discharge of the main or backup battery |
| Three flashes with amber every 15 s | No communications with the ARR32        |

**Table 10-11. S2000R-IPR Mode Indication**

| Mode                                 | LED Performance                          |
|--------------------------------------|--|
| Battery depassivation in progress... | Flashes with amber four times per second |
| The device is starting up            | Illuminates with green for 1 s           |

**Table 10-12. Link Quality Indication**

| LED Performance            | Condition   |
|----------------------------|---|
| Flashes with green         | Strong signal   |
| Flashes with green and red | Normal signal   |
| Flashes with red           | Weak signal (not recommended to install)                      |
| Shows red light for 1 s    | No communications or the device is not connected to the ARR32 |



## **Getting Started**

- Open the call point case with the help of the special key provided.
- Remove the insulating spacers from the holders of the main and backup batteries and wait until depassivation is completed.

*The depassivation procedure activates batteries after long term storage and can take up to 5 minutes. The process of depassivation is indicated as shown in Table 10-11. If depassivation fails the call point indicates low battery conditions.*

## **Connecting and Programming**

Connect the call point to the ARR32 and set its parameters in the configuration of the polling loop controller as discussed in Sections 6, 7, and 8 of this Manual.

## **Mounting Location Considerations**

Considering the mounting location for the S2000R-IPR, please follow:

- The instructions from Section 9 of this Manual.
- All your applicable local codes, standards, regulations, and ordinances.

## **Testing Link Quality**

The Link Quality Test procedure is designed to estimate stability of radio link between the call point and the ARR32 at their current locations and when obstructions exist on the path of radio signals. You are recommended to carry out the Link Quality Test before the devices are attached at their locations.

A Link Quality Test is started by a short press on the Prog button (see Figure 10-7). The procedure takes 60 seconds, the call point being indicating the results of the test as shown in Table 10-12.

As testing link quality is in progress you can move the call point and the ARR32 to find the best locations for them.

*You can also estimate quality of the link using S2000R Configurator as discussed in Section 7.*

## **Mounting**

The call point is to be mounted on a flat vertical surface using the two screws provided.

## **Testing**

After mounting the call point test its operability as described below.



*Prior to testing the call point be sure that fire alarm triggered by this one will not activate any announcement and/or fire extinguishing system*

---

- Ensure that the call point indicates its being in Normal state;
- Press the resettable element of the call point causing its mechanical part to kick in;
- Ensure that the call point indicates its being in Fire Alarm state;
- Ensure that the fire alarm has been delivered to the control and indicating equipment;
- Using the supplied key, reset the call point and wait until the call point indicates its being in Normal state.

### **Maintenance**

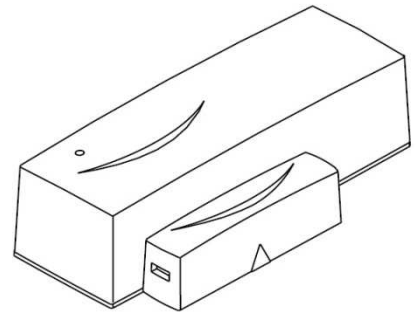
- While maintaining your fire alarm system, test the proper operation of the call point at least every 3 months;
- On receiving a low battery message for the main or backup battery replace both the batteries.

## S2000R-SMK

### General

S2000R-SMK Radio Link Magnetic Contact Detector (hereinafter referred to as the detector) is designed to be used in intrusion alarm systems to detect open or closed position of a door, window or another moveable assembly.

Additional wired non-addressable fire or intrusion detectors with dry contact outputs (hereinafter referred to as the Monitored Circuit) can be connected to the detector.



The detector also monitors its own conditions, namely:

- Tampering of the detector's case,
- Tearing the detector from the mounting point,
- Placing a defeat magnet within the range of the reed switch contacts,
- Battery voltage,
- Radio link communication conditions.

The S2000R-SMK is designed for round-the clock operation.

### Specifications

**Table 10-13. S2000R-SMK Specifications**

|   |   |
|---|---|
| Power Supply  | ER14505 (AA), 3.6V  |
| Operating on battery in quiescent mode*:<br>Monitored Circuit is disabled<br>Monitored Circuit is enabled     | 6 to 12 years<br>3 to 5 years                               |
| Operating gap:<br>"Closed"<br>"Open"  | Less than 10 mm<br>More than 25 mm                          |
| Resistance of the Monitored Circuit by states:<br>Short Circuit<br>Alarm 1<br>Norm<br>Alarm 2<br>Open Circuit | 0...0.2 K<br>1...2.87 K<br>4...7 K<br>10...20 K<br>40 K...∞ |

|   |   |
|---|---|
| Ingress Protection Rating                 | IP41  |
| Operation Temperatures                    | -30°C to +50°C                                |
| Transport and Storage Temperatures        | -30°C to +55°C                                |
| Weight                                    | 0.070 kg                                      |
| Overall Dimensions:<br>Detector<br>Magnet | 93 mm × 30 mm × 27 mm<br>55 mm × 10 mm × 8 mm |

\* - Operation time depends on the transmission interval, radio link quality, and ambient temperature

### S2000R-SMK PC Board

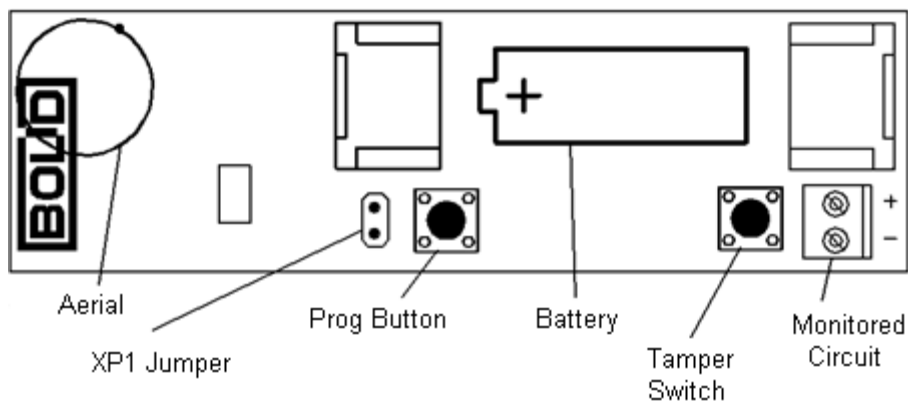


Figure 10-8

### Indication

Table 10-14. S2000R-SMK Operation Indication

| LED Performance                     | Condition                        |
|-------------------------------------|----------------------------------|
| Flashes with red every 10 s         | Alarm                            |
| Flashes with green every 10 s       | Norm                             |
| Flashes with amber every 10 s       | Battery discharge                |
| Three flashes with amber every 15 s | No communications with the ARR32 |

Table 10-15. S2000R-SMK Mode Indication

| Mode                                 | LED Performance                          |
|--------------------------------------|--|
| Battery depassivation in progress... | Flashes with amber four times per second |
| The device is starting up            | Illuminates with green for 1 s           |

Table 10-16. Link Quality Indication

| LED Performance               | Condition   |
|-------------------------------|---|
| Flashes with green            | Strong signal   |
| Flashes with green and red    | Normal signal   |
| Flashes with red              | Weak signal (not recommended to install)                      |
| Shows solid red light for 1 s | No communications or the device is not connected to the ARR32 |

### Getting Started

- Open the detector case.
- Remove the insulating spacer from the battery holder and wait until depassivation is completed.

*The depassivation procedure activates batteries after long term storage and can take up to 5 minutes. The process of depassivation is indicated as shown in Table 10-15. If depassivation fails the device indicates low battery condition.*

### Connecting and Programming

Connect the detector to the ARR32 and set its parameters in the configuration of the polling loop controller as discussed in Sections 6, 7, and 8 of this Manual.

### Tamper Switch and Tearing Protection

By default, the detector monitors only tamper switch conditions. To provide monitoring for tearing the detector from its mounting point, remove the pre-formed knock-out plug on the base of the Detector and release the spring.

### External Monitored Circuit

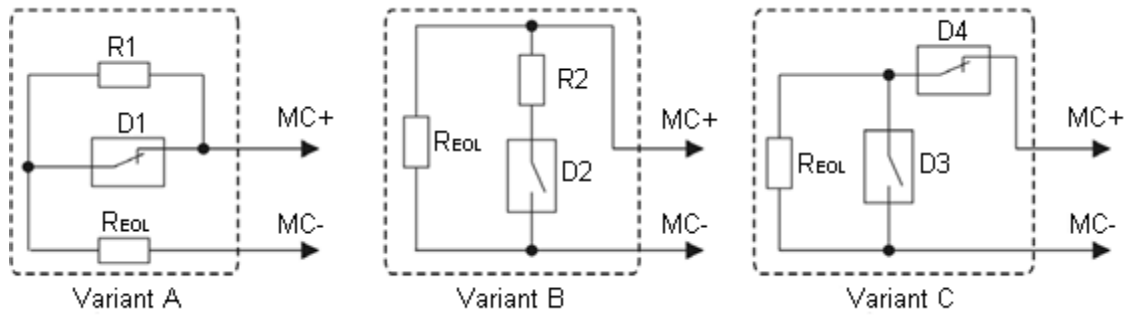
The S2000R-SMK provides connecting wired intrusion and fire detectors with alarm output of dry contact type. The detectors are not supposed to be powered via the Monitored Circuit.

To activate analysis of the monitored circuit conditions, either close the jumper **XP1** (see Figure 10-8) and re-connect the detector to the ARR32 or set the relevant parameter using S2000R Configurator (see Section 7). In last case the jumper can be not closed.

If monitoring the external circuit is activated then the Monitoring Circuit occupies the address in the polling loop address space which follows the address of the relevant S2000R-SMK.

If the Monitored Circuit is not in use, it is recommended to disable monitoring in order to clear the address space of the polling loop and to extend the expected life time of the detector's battery.

Figure 10-9 shows the variants of connecting monitored circuits to the detector.



**Figure 10-9**

$R_{EOL} = 5.6\text{ K}$ ;  $R1 = 2.4\text{ K}$ ;  $R2 = 5.6\text{ K}$ ;  
 D1 is for a fire normally closed detector;  
 D2 is for a fire normally open detector;  
 D3 is for an intrusion normally open detector;  
 D4 is for an intrusion normally closed detector.

**Table 10-17. Monitored Circuit Resistance Values and Their ATD Values**

|               | Short Circuit | Alarm 1  | Norm      | Alarm 2   | Open Circuit |
|---------------|---------------|----------|-----------|-----------|--------------|
| Resistance, K | 0...0.2       | 1...2.8  | 4...7     | 10...20   | 40...∞       |
| ATD value     | 11...32       | 88...149 | 170...198 | 212...232 | 243...255    |

**Defeat Protection**

The Defeat Protection option is designed to detect attempts of penetration into protected premises by defeating the S2000R-SMK with the help of an external powerful magnet.

This option is to be enabled/disabled in the configuration of the polling loop controller (see Section 8 of this Manual).



*In order Defeat Protection to operate correctly, the Magnet must not be fitted closer than 5 mm to the detector. Otherwise, both reed switch contacts can trigger and a relevant alarm will be sent*

**Mounting Location Considerations**

Considering the mounting location for the S2000R-SMK, please follow:

- The instructions from Section 9 of this Manual.
- All your applicable local codes, standards, regulations, and ordinances.

## Mounting

The S2000R-SMK is to be mounted within the protected premises. The Detector is mounted on the fixed frame while the Magnet is fitted on the opening part of the fixture (such as a door, window sash, etc.).

The Detector and the Magnet should be mounted together along the opening edge of the monitored surfaces, so that the parallel gap between them is less than 10 mm and the arrow on the Magnet is shifted less than 3 mm relative to the arrow on the Detector.

If necessary, use one or both spacers provided to install the Magnet properly.

To reach the mounting holes, remove the covers of the Detector and the Magnet.

To use the option of monitoring for tearing the detector from its mounting point, remove the pre-formed knock-out plug from the base of the Detector.

## Testing Link Quality

The Link Quality Test procedure is designed to estimate stability of radio link between the magnetic contact detector and the ARR32 at their current locations and when obstructions exist on the path of radio signals. You are recommended to carry out the Link Quality Test before the devices are attached at their locations.

A Link Quality Test is started by a short press on the Prog button (see Figure 10-8). The procedure takes 60 seconds, the detector being indicating the results of the test as shown in Table 10-16.

As testing link quality is in progress you can move the detector and the ARR32 to find the best locations for them.

*You can also estimate quality of the link using S2000R Configurator as discussed in Section 7.*

## Testing Operation



---

*Before testing the magnetic contact detector ensure that alarms from the S2000R-SMK will not activate other intrusion alarm system and equipment*

---

- Be sure the S2000R-SMK indicates normal conditions.
- Trigger the detector by moving the Magnet more than 25 mm away from the Detector.
- Ensure that the Detector indicates alarm conditions.
- Ensure that a relevant alarm message has been delivered to the control and indicating equipment.
- Switch the detector to the normal operating condition by bringing the Magnet to the Detector closer than 10 mm and wait until the Detector indicates normal conditions properly.

## ***Self-Diagnostic Procedures***

To inspect operability and facilitate mounting, the S2000R-SMK can be switched to the self-diagnostic mode. In the self-diagnostic mode four tests are sequentially run manually, with the LED flashing triply in red between the tests.

To start the self-diagnostic procedures press the tamper switch (see Figure 10-8) three times for a short time and then once for a long time. While having entered the self-diagnostic mode, the detector LED flashes triply with red.

### **Test 1. Inspecting Operation of the Reed Switch Contacts**

Once being switched to the self-diagnostic mode the detector automatically runs the first test – inspecting the reed switches. If you bring a magnet to the detector from the side of the first (SW1) or the second (SW2) reed switch, the detector's LED illuminates with red or green light indicating proper operation of the reed switch contacts.

To proceed to the next test, press the Prog Button on the Detector.

### **Test 2. Checking XP1 Jumper Availability**

After the LED flashes triply with red indicating proceeding to the next test, the detector checks availability of the XP1 jumper and indicates the results as shown in Table 10-18.

**Table 10-18. Indication of Availability of XP1 Jumper**

| <b>LED Performance</b>  | <b>Description</b>  |
|-------------------------|---|
| Shows solid green light | The jumper is fitted.<br>The data from the Monitored Circuit are being processed. |
| Shows solid red light   | No jumper has been found.<br>No data from the Monitored Circuit are processed.    |

Please press Prog Button to go to the next test.

### **Test 3. Battery Voltage**

After the LED flashes triply with red indicating proceeding to the next test, the detector measures the battery voltage and indicates the results as shown in Table 10-19.

**Table 10-19. Indication of Battery Voltage**

| <b>LED Performance</b>  | <b>Description</b>     |
|-------------------------|------------------------|
| Shows solid green light | Normal battery voltage |
| Shows solid red light   | Low battery voltage    |



Please press Prog Button to go to the next test.

#### **Test 4. Inspecting Monitored Circuit Condition**

After the LED flashes triply in red indicating proceeding to the next, fourth test, the detector switches to a wait mode. Then, on each press of Prog Button the S2000R-SMK measures the resistance of the Monitored Circuit and indicates the results as shown in Table 10-20.

**Table 10-20. Indication of Monitored Circuit Condition**

| <b>LED Performance</b>        | <b>Description</b>    |
|-------------------------------|-----------------------|
| Flashes with green            | Short circuit failure |
| Flashes twice with green      | Alarm 1               |
| Flashes triply with green     | Norm                  |
| Flashes four times with green | Alarm 2               |
| Flashes five times with green | Open circuit failure  |

To complete self-diagnostic procedures, press the tamper switch. The S2000R-SMK flashes six times with amber indicating exiting the diagnostic mode and then restarts automatically.

#### ***Maintenance***

- Inspect operability of the S2000R-SMK at least once per 3 months.
- If the S2000R-SMK indicates low battery conditions, replace the battery.

**S2000R-IK****General**

S2000R-IK Radio Link Volumetric PIR Motion Detector (hereinafter referred to as the detector) is designed for use in intrusion alarm systems to detect intrusions or intrusion attempts in closed protected premises.

The detector continuously monitors its tamper condition, battery status, and transmission path status.

Electromagnetic compatibility of the detector meets the requirements of the third immunity level accordingly to Russian standards.

The S2000R-IK is designed for round-the clock operation.

**Specifications****Table 10-21. S2000R-IK Specifications**

|   |                      |
|---|----------------------|
| Battery                                 | ER14505 (AA), 3.6 V  |
| Operating on battery in quiescent mode* | 4 to 8 years         |
| Detection Range                         | 0.3 m to 12 m        |
| Detectable Walk Rate                    | 0.3 m/s to 3 m/s     |
| White Light Immunity                    | Better than 6500 Lux |
| Pre-operation Time                      | 15 s max             |
| Ingress Protection Rating               | IP41                 |
| Operation Temperatures                  | -30°C to +50°C       |
| Transport and Storage Temperatures      | -30°C to +55°C       |
| Weight                                  | 0.08 kg              |
| Overall Dimensions                      | 70 x 95 x 45 mm      |

\* - Operation time depends on the transmission interval, radio link quality, and ambient temperature

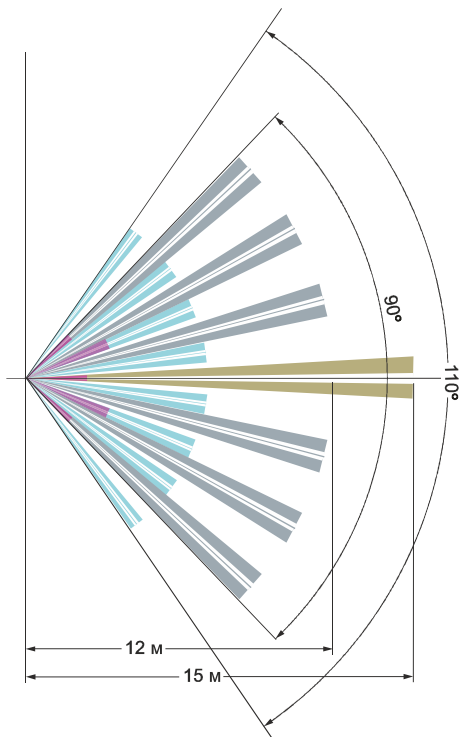


Figure 10-10. Detection Pattern

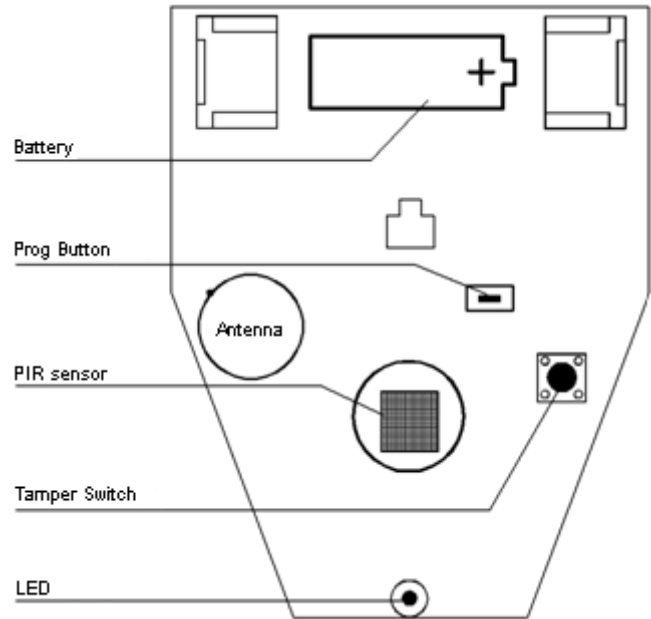


Figure 10-11. S2000R-IK PC Board

**Indication**

Table 10-22. S2000R-IK Operation Indication

| LED Performance                     | Condition                        |
|-------------------------------------|----------------------------------|
| Flashes with red every 10 s         | Alarm                            |
| Flashes with green every 10 s       | OK                               |
| Flashes with amber every 10 s       | Low battery                      |
| Three flashes with amber every 15 s | No communications with the ARR32 |
| Two flashes with amber every 15 s   | PIR sensor is out of order       |

Table 10-23. S2000R-IK Mode Indication

| Mode                                 | LED Performance                          |
|--------------------------------------|--|
| Battery depassivation in progress... | Flashes with amber four times per second |
| The device is starting up            | Illuminates with green for 1 s           |

**Table 10-24. Link Quality Indication**

| LED Performance               | Condition   |
|-------------------------------|---|
| Flashes with green            | Strong signal   |
| Flashes with green and red    | Normal signal   |
| Flashes with red              | Weak signal (not recommended to install)                      |
| Shows solid red light for 1 s | No communications or the device is not connected to the ARR32 |

**Table 10-25. S2000R-IK Test Indication**

| Event                               | LED Performance                |
|-------------------------------------|--------------------------------|
| Starting or finishing the test mode | Illuminates with amber for 1 s |
| Response of the IR detector         | Illuminates with red for 1 s   |



*To conserve battery life, it is recommended to disable indication in quiescent mode while setting the detector parameters in the configuration of the polling loop controller in use*

## Getting Started

- Open the detector case.
- Remove the insulating spacer from the battery holder and wait until depassivation is completed.

*The depassivation procedure activates batteries after long term storage and can take up to 5 minutes. The process of depassivation is indicated as shown in Table 10-23. If depassivation fails the device indicates low battery condition.*

## Connecting and Programming

Connect the detector to the ARR32 and set its parameters in the configuration of the polling loop controller as discussed in Sections 6, 7, and 8 of this Manual.

The **power saving operation mode** of the S2000R-IK provides extending the battery life. In this mode the detector turns off while being disarmed and turns on while being armed.

How to manage power saving mode of the S2000R-IK is described in Section 8.

## Mounting Location Considerations

Considering the mounting location for the S2000R-IK, please follow:

- The instructions from Section 9 of this Manual.

- All your applicable local codes, standards, regulations, and ordinances.
- The additional requirements below:
  - Do not install where the detector is directly above heating appliances, near vent openings, or exposed to direct sunlight.
  - Make sure the detection area doesn't have things which can waver (curtains, plants), electric bulbs, glass or mesh partitions, or areas obscured by large things.
  - When the detector is armed, ensure all windows and balcony doors are closed and no forced ventilation, calorifer, or air conditioner is on. There should be no animals or birds within the premises.
  - Do not install directly above an entrance gate or entrance door.

### **Mounting**

Mount the S2000R-IK to a flat vertical surface using two screws provided.

### **Testing Link Quality**

The Link Quality Test procedure is designed to estimate stability of radio link between the detector and the ARR32 at their current locations and when obstructions exist on the path of radio signals. You are recommended to carry out the Link Quality Test before the devices are attached at their locations.

A Link Quality Test is started by a short press on the Prog button (see Figure 10-11). The procedure takes 60 seconds, the detector indicating the results of the test as shown in Table 10-24.

As testing link quality is in progress you can move the detector and the ARR32 to find the best locations for them.

*You can also estimate quality of the link using S2000R Configurator as discussed in Section 7.*

### **Testing**

Just after mounting, the S2000R-IK should be tested for proper working condition.

- Ensure the detector is in normal state in accordance with system indication.
- Trigger the detector by walking through the detection area.
- Ensure that the detector indicates the intruder alarm, and a relevant message is received by control and indicating equipment.
- Wait until the detector returns to normal state.

## **Test Mode**

To inspect operability of the infrared sensor and to simplify selecting mounting location of the detector, the test mode can be used.

In this mode the S2000R-IK provides an easy-to-see indication of activation of the infrared sensor immediately, regardless of sending data over the radio channel.

To start and to exit test mode, perform the following combination of presses on the Prog button: **three times for a short time and once for a long time**. Starting/exiting the test mode is accompanied with the relevant indication (see Table 10-25).

*Turning the test mode on and off can also be carried out by means of S2000R Configurator (see Section 7).*

## **Maintenance**

- Inspect operability of the S2000R-IK at least once every 3 months.
- If the S2000R-IK indicates low battery conditions, replace the battery.

## S2000R-ASR2



### WARNING:

The device is compatible with an S2000R-ARR32 of hardware version 8 or higher

### General

S2000R-ASR2 Radio Link Pulse Adapter (hereinafter referred to as the ASR2) is designed to acquire and to handle the pulses from one or two connected consumption meters with pulse output (such as water meters, heat meters, gas meters, electricity meters, etc.) and to transmit the data over the radio link to the control and indicating equipment.

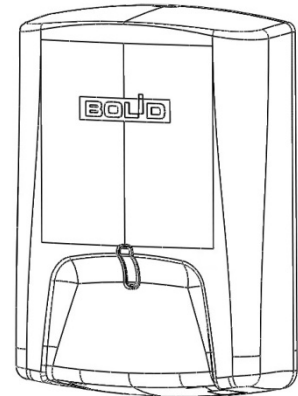
The ASR2 is equipped with two low pulse rate inputs and one high pulse rate input.

The low pulse rate inputs can be used to operate with consumption meters with dry contact outputs or NAMUR outputs. The inputs are intended to acquire pulses in one of the four modes with frequencies 300 to 5000 pulses per hour. When a meter with NAMUR circuit is connected to such input the ASR2 monitors its pulse output for short circuit and open circuit conditions transmitting alarms on a state change.

The high pulse rate input 3 can be used as high frequency input to acquire up to 100 pulses per second from a metering device, or this input can be configured to receive events from a connected passive water leak or flood detector.

The ASR2 monitors its own tamper conditions, battery conditions, and communication conditions.

The ASR2 is designed for round-the clock operation.



### Specifications

**Table 10-26. S2000R-ASR2 Specifications**

|  |                  |
|--|------------------|
| Battery                                | CR2477T, 3 V     |
| Operating on battery in quiescent mode | Up to 7 years*   |
| Max Frequency at Input 1 and Input 2   | 5000 pulses/hour |

|                                     |                 |
|-------------------------------------|-----------------|
| Pulse Width at Input 1 and Input 2  |                 |
| - Up to 300 pulses/hour             | 6 s             |
| - Up to 500 pulses/hour             | 3.6 s           |
| - Up to 3000 pulses/hour            | 600 ms          |
| - Up to 5000 pulses/hour            | 360 ms          |
| Max Frequency at Input 3            | 100 pulses/s    |
| Pulse Width at Input 3              | at least 5 ms   |
| Transmission Interval (closed case) | 60 min          |
| Transmission Interval (open case)   | 30 s            |
| Ingress Protection Rating           | IP41            |
| Operation Temperatures              | -20°C to +50°C  |
| Transport and Storage Temperatures  | -30°C to +55°C  |
| Weight                              | 55 gram         |
| Overall Dimensions                  | 59 × 82 × 22 mm |

\* - At frequency of 300 pulses/hour. Operation time depends on link quality and ambient temperature

### S2000R-ASR2 PC Board

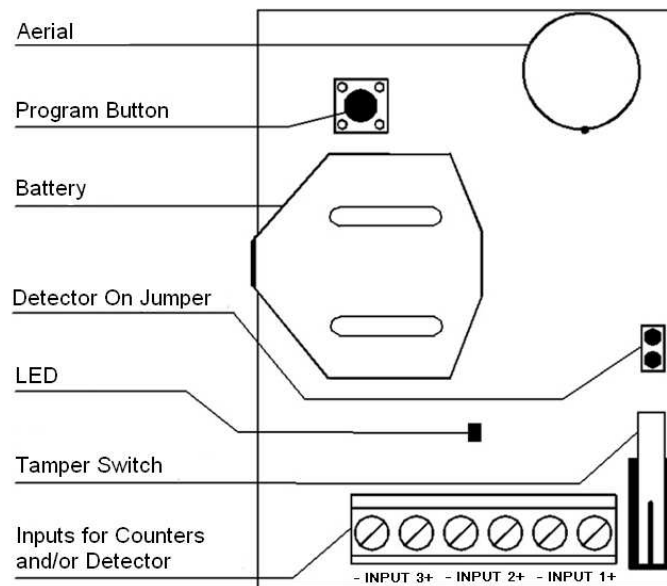


Figure 10-12



## Indication

**Table 10-27. S2000R-ASR2 Operation Indication**

| LED Performance                     | Condition                        |
|-------------------------------------|----------------------------------|
| Flashes with red every 10 s         | Alarm (open case)                |
| Flashes with green every 10 s       | OK                               |
| Flashes with amber every 10 s       | Low battery                      |
| Three flashes with amber every 15 s | No communications with the ARR32 |

**Table 10-28. Link Quality Indication**

| LED Performance               | Condition   |
|-------------------------------|---|
| Flashes with green            | Strong signal   |
| Flashes with green and red    | Normal signal   |
| Flashes with red              | Weak signal (not recommended to install)                      |
| Shows solid red light for 1 s | No communications or the device is not connected to the ARR32 |

## Getting Started

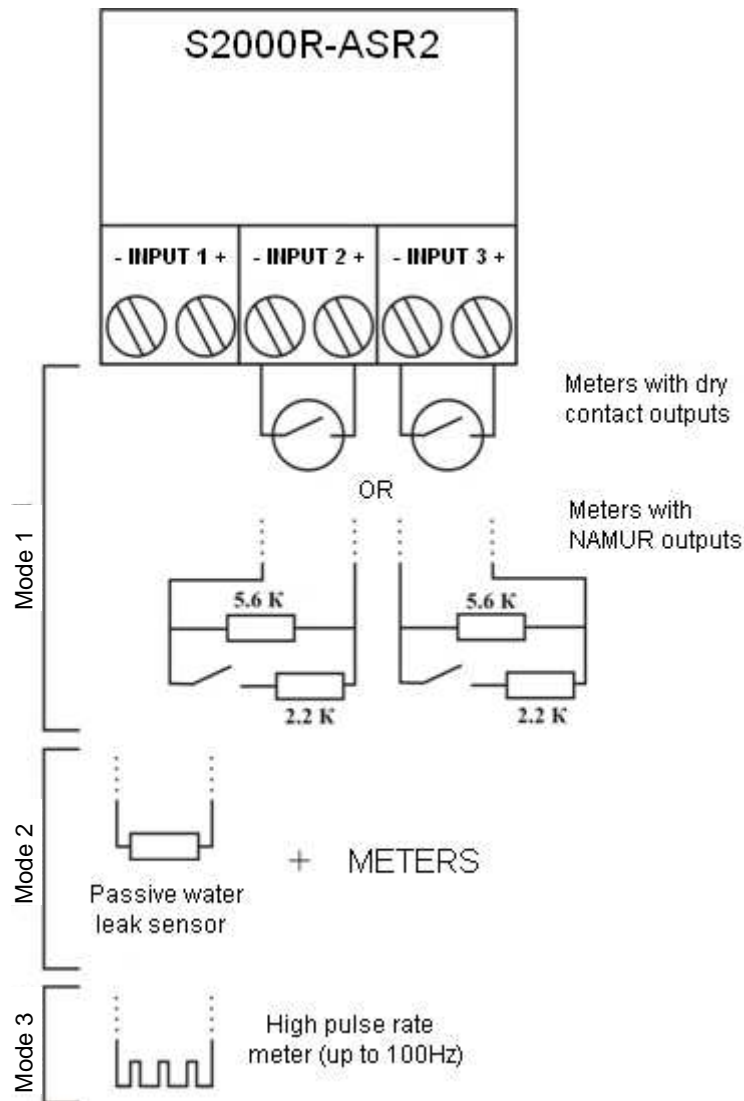
Open the device case and remove the insulating spacer from the battery holder.

## Connecting and Programming

Connect the ASR2 to the ARR32 and set its parameters in the configuration of the polling loop controller as discussed in Sections 6, 7, and 8 of this Manual.

The ASR2 can operate in three base operation modes. Depending on the operation mode it can occupy one, two, or three addresses in the address space of the polling loop:

- Two low pulse rate inputs (Input 1 and Input 2):
  - The first address for a meter 1;
  - The second address for a meter 2
- Two low pulse rate inputs and a water leak / flood detector (Input 1, Input 2, Input 3):
  - The first address for a meter 1;
  - The second address for a meter 2;
  - The third address for the water leak / flood detector
- High pulse rate input (Input 3)
  - The first address for a meter 1



**Figure 10-13. Variants of Connecting Meters and Detectors**

Operating with two low pulse rate outputs, the ASR2 can be configured for one of two available meter types (dry contact or NAMUR output meters) and one of four available pulse input frequency modes:

- Up to 300 pulses per hour;
- Up to 500 pulses per hour;
- Up to 3000 pulses per hour;
- Up to 5000 pulses per hour.

By default the ASR2 is configured to operate with NAMUR output meters and with pulse input frequency up to 300 pulses per hour. You can change this operation mode using S2000R Configurator (see Section 7).

*Do NOT select input frequency mode (pulses / hour) which is higher than that which is required for your actual meters in order to lower energy consumption and to extend the life of the battery.*



---

*The ASR2 should be programmed while operating in the 30-second poll mode. To switch the ASR2 to this mode run S2000R Configurator (see Section 7) and press down the tamper switch on the ASR2 PC board (see Figure 10-12) for a short time.*

---

### **Water Leak / Flood Detector**

You can enable or disable monitoring for conditions of the connected passive water leak / flood detector by means of the software utility S2000R Configurator as discussed in Section 7.

The water leak / flood detector occupies the polling loop address which follows the addresses of the utility meters.

### **Mounting Location Considerations**

The ASR2 should be installed closely to the connected meters.

Considering the mounting location for the S2000R-ASR2, please follow the instructions from Section 9 of this Manual.

### **Testing Link Quality**

The Link Quality Test procedure is designed to estimate stability of radio link between the pulse adapter and the ARR32 at their current locations and when obstructions exist on the path of radio signals. You are recommended to carry out the Link Quality Test before the devices are attached at their locations.

A Link Quality Test is started by a short press on the Prog button (see Figure 10-12). The procedure takes 60 seconds, the detector being indicating the results of the test as shown in Table 10-28.

As testing link quality is in progress you can move the ASR2 and the ARR32 to find the best locations for them.

*You can also estimate quality of the link using S2000R Configurator as discussed in Section 7.*

### **Updating Firmware**



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*The small power supply in an S2000R-ASR2 after a long period of operation can fail to support transmitting firmware over the radio channel.*

*Please change the S2000R-ASR battery for a fresh one prior to uploading S2000R-ASR2 firmware*

---

### **Mounting**

Mount the S2000R-ASR2 to a clean flat vertical surface using double-sided tape provided.

To connect meters and a water leak / flood detector to the S2000R-ASR2, remove (squeeze out) the pre-formed knock-out plugs on the bottom of the device and run wires through the holes. The polarity doesn't matter.

***Maintenance***

If the ASR2 indicates low battery conditions please replace the battery.

## S2000R-SIREN

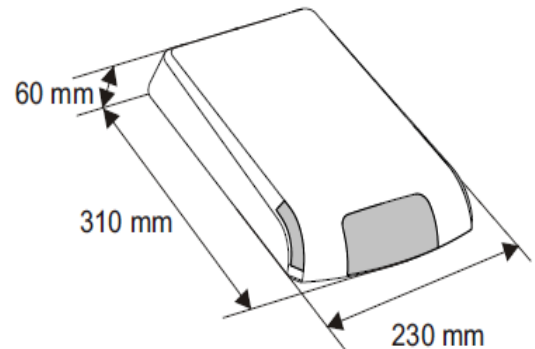
### General

S2000R-Siren Radio Link Light and Sound Alarm (hereinafter referred to as the alarm) is designed for light and sound indication of fire alarms, intrusion alarms, and other emergency conditions. The alarm controls light and sound indication independently.

The S2000R-Siren detects lid and rear tampering as well as monitors battery status and communication conditions.

The alarm is intended to be installed inside and outside the premises, inside closed unheated premises. The alarm is intended for round-the-clock operation.

Electromagnetic compatibility of the S2000R-Siren meets the requirements of the third immunity level accordingly to Russian standards.



### Specifications

**Table 10-29. S2000R-Siren Specifications**

|   |                     |
|---|---------------------|
| Batteries (×2)  | ER34615M (D), 3.6 V |
| Operating on batteries in quiescent mode*                   | 5 years             |
| Operating by a single battery pack in alarm mode (in total) | 60 hours min        |
| Device Poll Interval (stable)                               | 5 s                 |
| Alarm Light Color   | Red (625 nm)        |
| Alarm Sound Output  | Min 100 dB at 1 m   |
| Ingress Protection Rating                                   | IP54                |
| Operation Temperature                                       | −30°C to +50°C      |
| Transport and Storage Temperature                           | −30°C to +55°C      |
| Weight  | 1.2 kg              |
| Overall Dimensions  | 230 x 310 x 60 mm   |

\* - Operation time depends on the ambient temperature and radio link quality

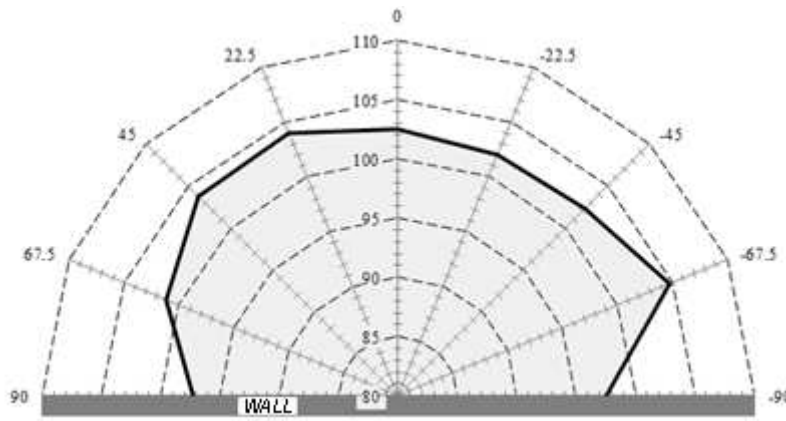


Figure 10-14. Alarm Sound Distribution in Horizontal Orientation, dB

**S2000R-Siren PC Board**

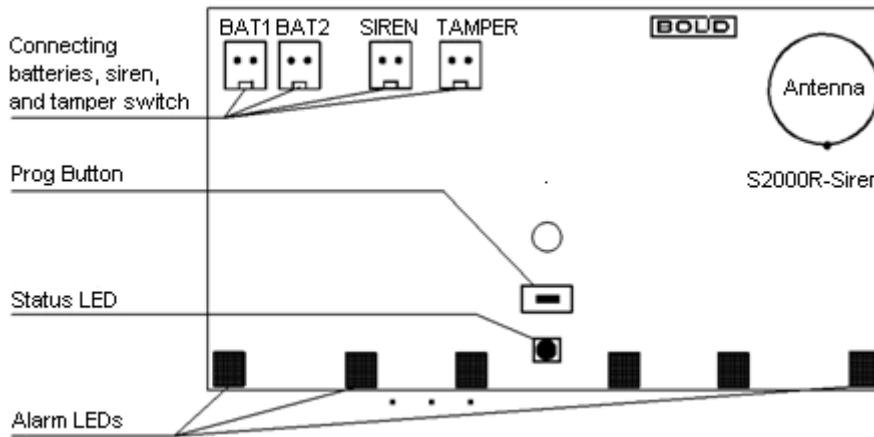


Figure 10-15

**Indication**

Table 10-30. S2000R-Siren Operation Indication

| LED Performance                     | Condition  |
|-------------------------------------|--|
| Flashes with red every 10 s         | Alarm (the case is open)   |
| Flashes with green every 10 s       | OK   |
| Flashes with amber every 10 s       | The main or backup battery is discharged or depassivation has failed |
| Three flashes with amber every 15 s | No communications with the ARR32                                     |

Table 10-31. S2000R-Siren Mode Indication

| Mode   | LED Performance                              |
|--|--|
| Start  | Illuminates with green for 1 s               |
| Battery depassivation:<br>– Depassivation in progress or periodic testing of the battery | Flashes with amber 15 times per four seconds |

Table 10-32. Link Quality Indication

| LED Performance               | Condition   |
|-------------------------------|---|
| Flashes with green            | Strong signal   |
| Flashes with green and red    | Normal signal   |
| Flashes with red              | Weak signal (not recommended to install)                      |
| Shows solid red light for 1 s | No communications or the device is not connected to the ARR32 |

### Getting Started

Connect the supplied batteries to the BAT1 and BAT2 terminals observing polarity (sequence of connection makes no difference).

Just after connecting the batteries the alarm inspects their conditions. If even one of the two connected batteries is operable the alarm starts operation with the relevant indication.

Being in quiescent mode the alarm tests the batteries every 12 hours.

After the S2000R-Siren is connected to the ARR32, the procedure of depassivation is started.

*The depassivation procedure activates batteries after long term storage and can take up to 5 minutes. The process of depassivation is indicated as shown in Table 10-31. If depassivation fails the device indicates low battery condition.*

### Connecting and Programming

Connect the alarm to the ARR32 and set its parameters in the configuration of the polling loop controller as discussed in Sections 6, 7, and 8 of this Manual.

The S2000R-Siren occupies two successive addresses within the polling loop:

- A first address for light alarms, and
- A second address for sound alarms.



*Due to powering by standalone power supplies of limited capacity it is strongly recommended to assign Sirena tactics for both output while programming the S2000R-Siren in the configurations of the polling loop controller and the S2000 control panel*

## **Mounting Location Considerations**

Considering the mounting location for the S2000R-Siren, please follow:

- The instructions from Section 9 of this Manual.
- All your applicable local codes, standards, regulations, and ordinances.

## **Testing Link Quality**

The Link Quality Test procedure is designed to estimate stability of radio link between the alarm and the ARR32 at their current locations and when obstructions exist on the path of radio signals. You are recommended to carry out the Link Quality Test before the devices are attached at their locations.

A Link Quality Test is started by a short press on the Prog button (see Figure 10-15). The procedure lasts 60 seconds, the device being indicating the results of the test as shown in Table 10-32.

As testing the alarm is in progress you can move the alarm and the ARR32 to find the best locations for them.

*You can also estimate quality of the link using S2000R Configurator as discussed in Section 7.*

## **Mounting**

Mount the S2000R-Siren to a flat vertical surface using the three screws provided.

## **Testing**

Just after mounting, the S2000R-Siren should be tested for proper working.

- Ensure the alarm is in normal state in accordance with system indication.
- By simulating alarm conditions, cause the S2000R-Siren to sound and to show alarm lights.

## **Maintenance**

- Inspect operability of the S2000R-Siren at least annually.
- If the S2000R-Siren indicates low battery conditions, replace both the batteries.



---

*In case of deep discharge of the batteries the S2000R-Siren transmits the polling loop controller a message about an equipment trouble (impossibility to switch alarms on under the current power conditions)*

---



## S2000R-RM

### General

S2000R-RM Radio Link Relay Module (hereinafter referred to as the module) is designed to control executive devices such as lamps, sirens, magnetic locks and so on by closing / opening power circuits or signal circuits of these devices.

The module features two relay outputs controlled over the radio link. The relay outputs are galvanically isolated from each other and from the power supply circuits.

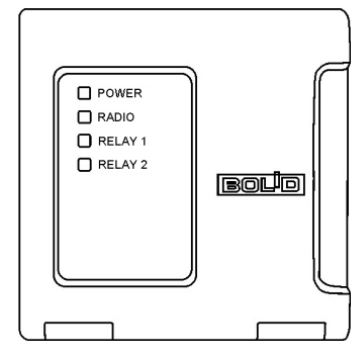
The module incorporates an input to connect external control buttons or monitored circuits with dry contact output.

The module is intended to be powered by an external 12 / 24 V power supply or by an AA 3.6 V lithium thionyl chloride battery.

The module monitors battery conditions and detects presence of an external power supply.

The module is designed to be used within closed areas and is not intended to operate in aggressive media, dust conditions, or in explosion-hazardous premises.

The module is designed for round-the-clock operation.



### Specifications

**Table 10-33. S2000R-RM Specifications**

|  |                 |
|--|-----------------|
| External Power Voltage                         | 5 to 24 V       |
| Consumed Current                               | 30 mA max       |
| Outputs  | 2 relay outputs |
| Max Switched Power                             | 30 VA           |
| Max Switched Voltage                           | 100 V           |
| Max Switched Current (for a single input)      | 2 A             |
| Inputs (or monitored circuits)                 | 1               |
| Resistance of the Monitored Circuit by states: |                 |
| Short Circuit                                  | 0...0.2 K       |
| Alarm 1  | 1...2.87 K      |
| OK   | 4...7 K         |
| Alarm 2  | 10...20 K       |
| Open Circuit                                   | 40 K...∞        |

|   |                               |
|---|-------------------------------|
| Battery                                 | ER14505 (AA), 3.6 V           |
| Operating on battery in quiescent mode* | 3 years                       |
| Device Poll Interval (stable)           | 5 s                           |
| Ingress Protection Rating               | IP20 (IP30 for wall mounting) |
| Operation Temperature                   | -30 to +50°C                  |
| Transport and Storage Temperature       | -30 to +55°C                  |
| Weight                                  | 0.2 kg                        |
| Overall Dimensions                      | 102 × 107 × 39 mm             |

\*- When the Poll Interval is 5 s and the module is activated 10 times per an hour. Operation time depends on radio link quality and ambient temperature.

### S2000R-RM PC Board

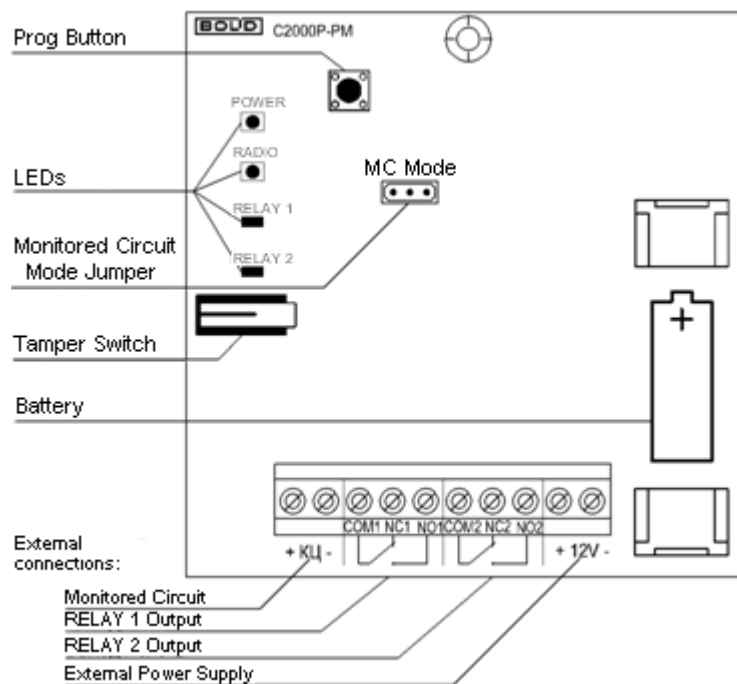


Figure 10-16

### Indication

The module can operate in two power modes: from an external 12 / 24 V dc power supply or by an AA 3.6 V lithium power cell. The power mode is selected automatically with the priority of an external power supply. The current power supply mode and conditions of the power supplies are indicated by POWER LED as shown in Table 10-34.

**Table 10-34. Indicating Conditions of Power Supplies of the S2000R-RM**

| <b>POWER LED</b>              | <b>Conditions</b>  |
|-------------------------------|--|
| Lit with green                | The module is powered by the external power supply. The battery is available and charged     |
| Lit with amber                | The module is powered by the external power supply. No battery or the battery is discharged. |
| Flashes with green every 10 s | No power from an external power supply. The battery is OK.                                   |
| Flashes with amber every 10 s | No power from an external power supply. Low battery.   |

**Table 10-35. Indicating S2000R-RM Battery Depassivation**

| <b>Condition</b>  | <b>POWER LED Performance</b>             |
|---|--|
| Depassivation in progress...                              | Flashes with amber four times per second |
| Depassivation has completed and the device is starting up | Shows solid green light for 1 s          |

RADIO LED indicates conditions of radio communications with the ARR32 as shown in Table 10-36.

**Table 10-36. Indicating Status of Communications between S2000R-RM and ARR32**

| <b>RADIO LED</b>                     | <b>Radio Communication Conditions</b>                          |
|--------------------------------------|--|
| Flashes with green every 10 s        | Communicating data with the ARR32                              |
| Flashes triply with amber every 15 s | Loss of radio link or the module is not connected to the ARR32 |

Conditions of the relays are indicated by the relevant LEDs "RELAY 1" and "RELAY 2" depending on the current power supply mode (see Table 10-37).

**Table 10-37. Indicating S2000R-RM Relay Conditions**

| <b>RELAY 1, RELAY 2 LEDs</b> | <b>Relay Conditions</b>                                   |
|------------------------------|---|
| Off                          | COM and NC are coupled. Initial state of the relay.       |
| Solid green light            | COM and NO are coupled. Powered by external power supply. |
| Flashes in green             | Relay switches. Powered by battery.                       |

**Table 10-38. Link Quality Indication**

| RADIO LED Performance         | Condition   |
|-------------------------------|---|
| Flashes with green            | Strong signal   |
| Flashes with green and red    | Normal signal   |
| Flashes with red              | Weak signal (not recommended to install)                      |
| Shows solid red light for 1 s | No communications or the device is not connected to the ARR32 |

**Getting Started**

Open the module case and remove the insulating spacer from the battery holder. Wait until depassivation is completed.

*The depassivation procedure activates the battery after long term storage and can take up to 5 minutes. The process of depassivation is indicated as shown in Table 10-35. If depassivation fails the module indicates a power supply discharge.*

**Connecting and Programming**

Connect the module to the ARR32 and set its parameters in the configuration of the polling loop controller as discussed in Sections 6, 7, and 8 of this Manual.

The S2000R-RM occupies two or three addresses within the polling loop of the polling loop controller:

- The first address for Relay 1;
- The second address for Relay 2;
- The third address for Monitored Circuit (if connected).

**External Button and Monitored Circuit (MC)**

The S2000R-RM provides connecting an external button to control Relay 1 manually or external detectors with dry contact outputs.

To select the Detector or Button mode, set MC Mode jumper in the relevant position (see Table 10-39) and then connect the relay module to the ARR32. The current mode is stored in the non-volatile memory and can be changed only after re-connecting to the ARR32 (see Section 6).

**Table 10-39. MC Mode Jumper Positions**

| Jumper Position      | Monitored Circuit Mode                             |
|----------------------|--|
| Position «1»         | Detector (a detector with dry contact output).     |
| Position «2» or open | Button (a button for activation Relay 1 manually). |

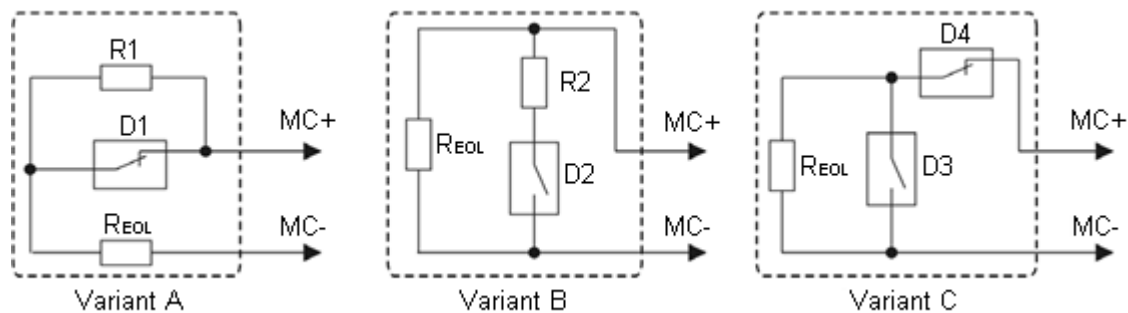
In the Button mode, Relay 1 flips to the opposite state when the input of Monitored Circuit is closed for more than a half of a second.

In the Detector mode, the Monitored Circuit occupies an additional address within the polling loop which follows addresses of the relays. The module sends messages depending on the resistance at the input of the Monitored Circuit as shown in Table 10-40.

Figure 10-17 shows the variants of connecting monitored circuits to the detector.

**Table 10-40. Monitored Circuit Resistance Values and Their ATD Values**

|               | Short Circuit | Alarm 1  | Norm     | Alarm 2   | Open Circuit |
|---------------|---------------|----------|----------|-----------|--------------|
| Resistance, K | 0...0.2       | 1...2.87 | 4...7    | 10...20   | 40...∞       |
| ATD value     | 0...5         | 23...57  | 73...105 | 127...170 | 204...255    |



$R_{EOL} = 5.6 \text{ K}$ ;  $R1 = 2.4 \text{ K}$ ;  $R2 = 5.6 \text{ K}$ ;  
 D1 is for a normally closed detector;  
 D2 is for a normally open detector;  
 D3 is for a normally open detector;  
 D4 is for a normally closed detector.

**Figure 10-17**

### Selecting Main Power Supply

The S2000R-RM provides assigning the external 12 V dc power supply or the battery as a “main” power supply (for transmitting in events). The “main” power supply can be selected by means of S2000R Configurator as described in Section 7 of this Manual.

Regardless of this setting an external power supply is of high priority (that is, if an external power supply is applied the module will be powered by this one, not by the battery).

### Mounting Location Considerations

Considering the mounting location for the S2000R-RM, please follow the instructions of Section 9 of this Manual.

### Testing Link Quality

The Link Quality Test procedure is designed to estimate stability of radio link between the module and the ARR32 at their current locations and when obstructions exist on the path of radio signals. You are recommended to carry out the Link Quality Test before the devices are attached at their locations.

A Link Quality Test is started by a brief press on the Prog button (see Figure 10-16). The procedure lasts 60 seconds, the RADIO LED being indicating the results of the test as shown in Table 10-38.

As testing is in progress you can move the module and the ARR32 to find the best locations for them.

*You can also estimate quality of the link using S2000R Configurator as discussed in Section 7.*

## Mounting

Mount the S2000R-RM to a flat vertical surface using the two screws provided or on a DIN rail.

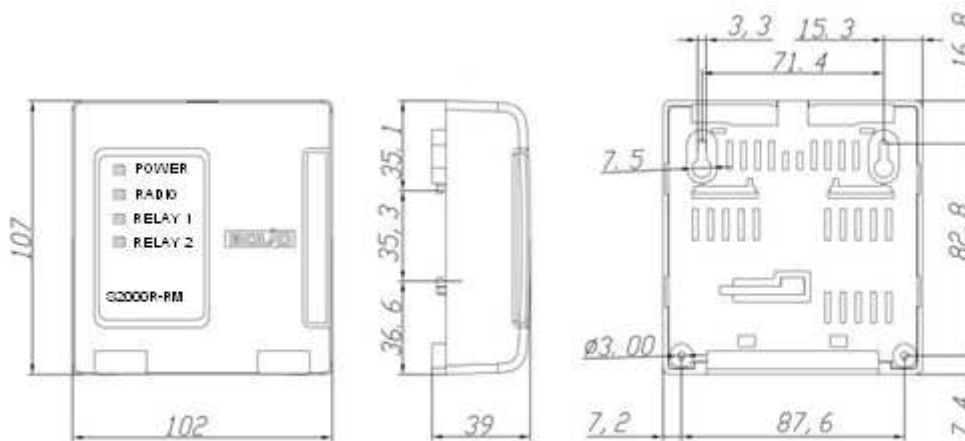


Figure 10-18

## Testing Operation

Just after mounting, the S2000R-RM should be tested for proper operation.



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*Before testing the module disconnect it from the executive devices to avoid their undesired activation*

---

- Ensure that the module indicates normal conditions of its power supplies.
- Activate both the relay outputs by simulating activation conditions.
- If Monitored Circuit operates in the Button mode, push the control button down several times and ensure the relay 1 changes its state.
- If Monitored Circuit operates in the Detector mode, activate the detector in various modes and ensure that the control and indicating equipment receives the relevant messages.

## Maintenance

- Inspect operability of the S2000R-RM at least annually.
- If the S2000R-RM indicates low battery conditions, replace the battery.

## S2000R-RM REV.01

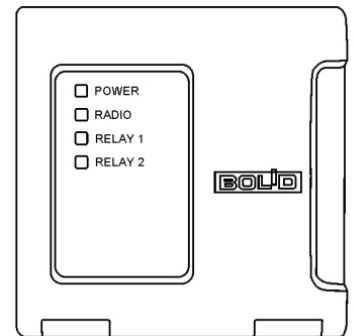
### General

S2000R-RM Radio Link Relay Module rev.01 for 220 V (hereinafter referred to as the module) is designed to control executive devices which require 220 Vac.

The module features two relay outputs which are galvanically isolated from each other and from the power supply circuits and which are controlled over the radio link.

Each output is equipped with a fuse to protect the relevant control circuit against overload and short-circuits.

The module is powered by mains power 220 Vac (the main power supply).



*The outputs are controlled only if the module is powered by 220 V mains. The outputs are shut off when mains power fails or is not available.*



*The electric circuits of the modules are not galvanically isolated from the power input and are under dangerous voltage in normal operation. All works with the module (excluding checking its operability) must be carried out when mains power is shut off*

The module incorporates a lithium battery intended to be used for operations with the module when its case is open (when being connected to the ARR32 and so on) and for sending messages in case of mains power loss.

The module is designed to be used within closed areas and is not intended to operate in aggressive media, dust conditions, or in explosion-hazardous premises.

The module is designed for round-the-clock operation.

### Specifications

**Table 10-41. S2000R-RM rev.01 Specifications**

|  |   |
|--|---|
| AC Power Voltage                                   | 90...264 V (rated voltage 220 V at 50 Hz) |
| Consumed Power                                     | 1 VA max                                  |
| Outputs  | 2   |
| Max Switched Voltage:                              |   |
| - for alternating current ( $\cos\varphi > 0.90$ ) | 250 V                                     |
| - for direct current                               | 30 V                                      |

|  |                             |
|--|-----------------------------|
| Max switched current for a single output | 3 A                         |
| Internal Power Supply                    | CR2032, 3.0 V               |
| Operating on Battery*                    | 3 months min                |
| Ingress Protection Rating                | IP20 (IP30 if wall mounted) |
| Operating Temperature                    | -30 to +50°C                |
| Transport and Storage Temperature        | -30 to +55°C                |
| Weight                                   | 0.2 kg                      |
| Overall Dimensions                       | 102 × 107 × 39 mm           |

\*- Operation time depends on radio link quality and ambient temperature.

The design of the module meets the requirements of electrical and fire safety in line with Russian Standards ГOCT 12.2.007.0-75 and ГOCT 12.1.004-91.

Only the technicians with the second or higher safety certification level can be permitted to mount and maintain the module.

### S2000R-RM Rev.01 PC Board

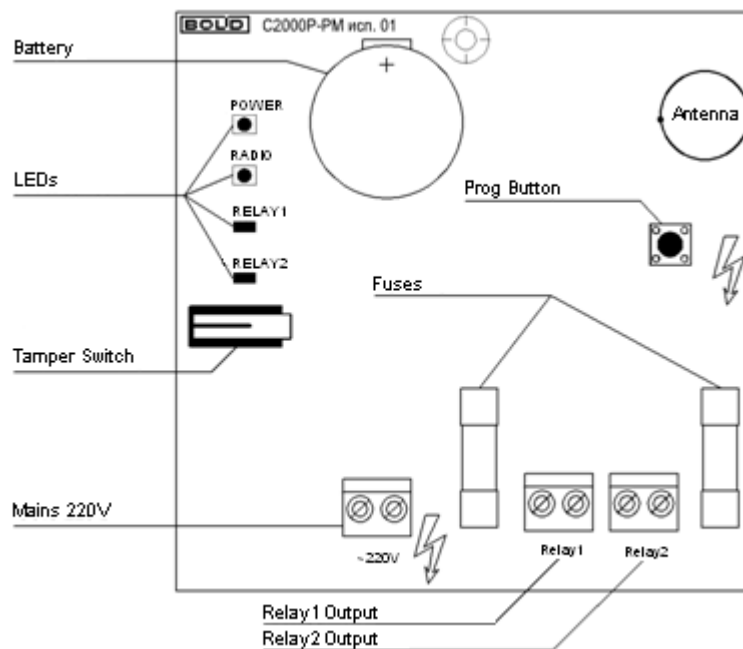


Figure 10-19. Elements on the PCB

### Indication

Availability of mains power and backup battery conditions are indicated by POWER LED as shown in Table 10-42.



**Table 10-42. Indicating Power Supply Conditions of the S2000R-RM Rev.01**

| <b>POWER LED</b>             | <b>Conditions</b>  |
|------------------------------|--|
| Lit with green               | The module is powered by mains. The battery is available and charged     |
| Lit with amber               | The module is powered by mains. No battery or the battery is discharged. |
| Flashes with amber every 5 s | Loss of mains power. The battery is charged.                             |
| Flashes with red every 15 s  | Loss of mains power. The battery is discharged.                          |

RADIO LED indicates conditions of radio communications with the ARR32 as shown in Table 10-43.

**Table 10-43. Indicating S2000R-RM Rev.01 Operation Conditions**

| <b>RADIO LED</b>                     | <b>Radio Communication Conditions</b>                           |
|--------------------------------------|---|
| Flashes with red every 10 s          | Alarm (the module case is open)                                 |
| Flashes with green every 10 s        | OK  |
| Flashes twice with amber every 15 s  | Trouble (loss of mains power)                                   |
| Flashes triply with amber every 15 s | Loss of radio link or the module is not connected to the ARR32. |

Conditions of the relays are indicated by the LEDs "RELAY 1" and "RELAY 2" (see Table 10-44).

**Table 10-44. Indicating S2000R-RM Rev.01 Relay Conditions**

| <b>Relay Contacts</b> | <b>RELAY 1, RELAY 2 LEDs</b> |
|-----------------------|------------------------------|
| Closed                | Solid green light            |
| Open                  | Off                          |

**Table 10-45. Link Quality Indication**

| <b>RADIO LED Performance</b>  | <b>Condition</b>  |
|-------------------------------|---|
| Flashes with green            | Strong signal   |
| Flashes with green and red    | Normal signal   |
| Flashes with red              | Weak signal (not recommended to install)                      |
| Shows solid red light for 1 s | No communications or the device is not connected to the ARR32 |

**Table 10-46. Indicating Backup Battery Test**

| Battery Condition | POWER LED   |
|-------------------|---|
| OK                | Shows solid green light for 5 seconds                       |
| Discharged        | Flashes with amber three times per second within 10 seconds |

**Getting Started**

Open the module case and remove the insulating spacer from the battery holder. The battery test shall be run, the result of the test being indicated by the POWER LED as shown in Table 10-46.

If the battery is operable then after testing the module is ready for connecting and programming.

**Connecting and Programming**

The module is to be radio connected to the ARR32 and programmed prior to connection to the mains power.

Connect the module to the ARR32 and set its parameters in the configuration of the polling loop controller as discussed in Sections 6, 7, and 8 of this Manual.

The S2000R-RM rev.01 occupies two addresses within the polling loop of the polling loop controller:

- The first address for Relay 1;
- The second address for Relay 2.




---

*If the backup battery is healthy but mains power is lost then the S2000R-RM rev.01 transmits the polling loop controller a message about an equipment trouble (impossibility to control outputs under the current power conditions) and indicates this condition as shown in Table 10-43*

*Upon applying mains power the module transmits a message about restoring of the equipment*

---

**Mounting Location Considerations**

Considering the mounting location for the S2000R-RM rev.01, please follow the instructions from Section 9 of this Manual.

## Testing Link Quality

The Link Quality Test procedure is designed to estimate stability of radio link between the module and the ARR32 at their current locations and when obstructions exist on the path of radio signals. You are recommended to carry out the Link Quality Test before the devices are attached at their locations.

A Link Quality Test is started by a short press on the Prog button (see Figure 10-19). The procedure lasts 60 seconds, the RADIO LED being indicating the results of the test as shown in Table 10-45.

As testing the alarm is in progress you can move the module and the ARR32 to find the best locations for them.

You can also estimate quality of the link using S2000R Configurator as discussed in Section 7.

## Mounting

Mount the S2000R-RM rev.01 to a flat vertical surface using the two screws provided or on a DIN rail.

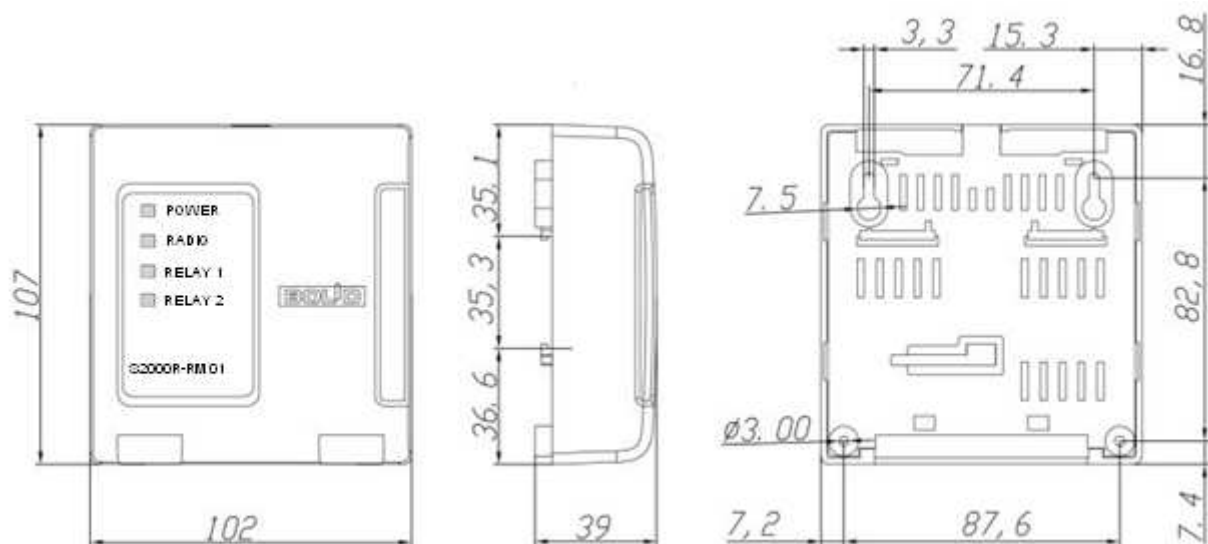


Figure 10-20. Overall and Mounting Dimensions of the S2000R-RM rev.01

## Connecting Mains Power and Executive Devices

The module's outputs are the normally open relay contacts.

To provide protection against overload and short circuits, a fuse is brought into the circuit of each relay.



*If you need to check or to change the fuses, shut off mains power (220 V) prior to opening the module case*

The outputs are controlled by commands sent over the radio link in accordance with parameters configured in the configuration of the polling loop controller by UProg Configuration Tool.

Only qualified electricians with the second or higher safety qualification level are permitted to connect mains power and controlled circuits of executive devices to the module.

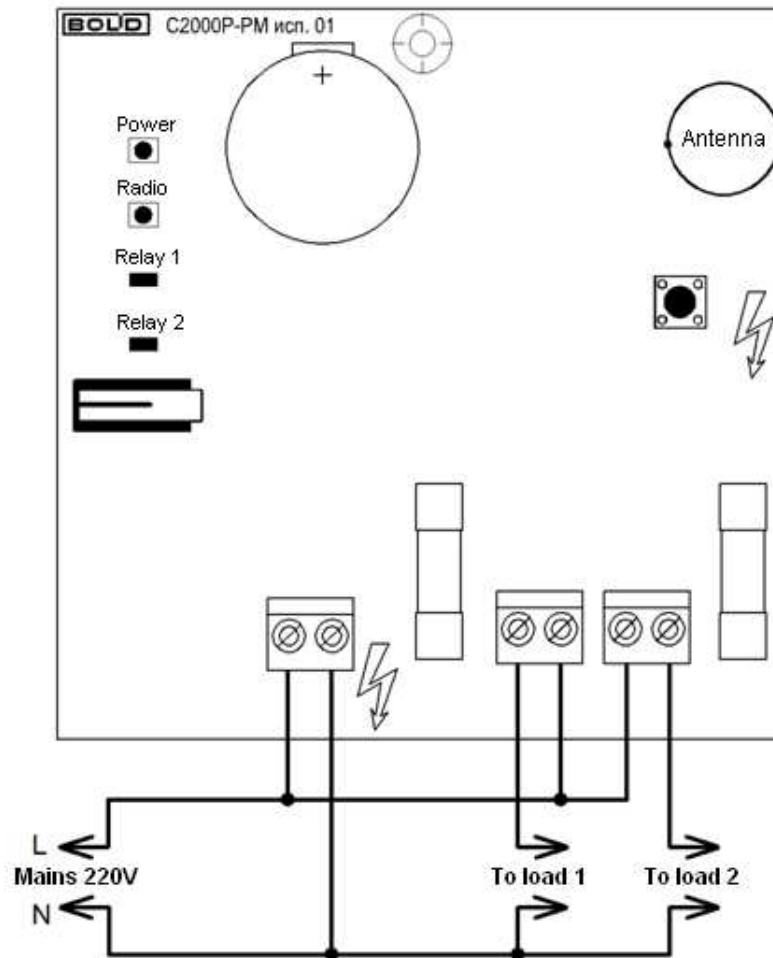


Figure 10-21. Connection Diagram with a Variant of Connecting the Load

### Testing Operation

Just after mounting, the S2000R-RM rev.01 should be tested for proper operation.



*Before testing the module disconnect it from the executive devices to avoid their undesired activation*

- Ensure that the module indicates normal conditions of its power supplies.
- Activate both the relay channels by simulating activation conditions.
- Shut off mains power and open the case of the module. Make sure the module enters the alarm mode and a tamper alarm message has been delivered to the control and indicating equipment.
- Close the module's case and apply input power to the module.

## Maintenance

- At least annually inspect operability of the module as well as cable conditions and contacts.
- Replace the backup battery if the module sends a low battery message



*Do shut off mains power prior to changing the battery*

---

## S2000R-OST



**WARNING:**

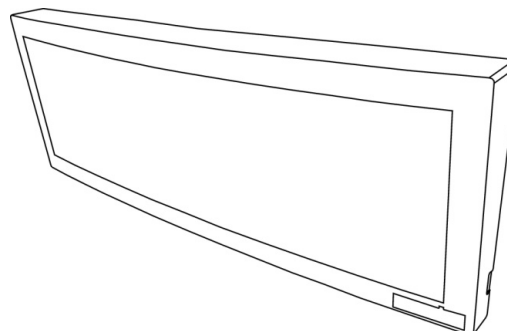
The device is compatible with an S2000R-ARR32 of hardware version 8 or higher

### General

S2000R-OST Radio Link LED Emergency Sign Board (hereinafter referred to as the S2000R-OST) is used to display alarm messages of fire alarm systems, to identify escape routes and to display information.

The S2000R-OST is intended for round-the-clock operation.

The S2000R-OST is available with such signage as “EXIT”, “FIRE”, “AUTO OFF”, Arrow Left Sign, Arrow Right Sign, Man / Arrow Left Down Sign, Man / Arrow Right Down Sign, “ESCAPE EXIT” or any customizable lettering/pictogram.



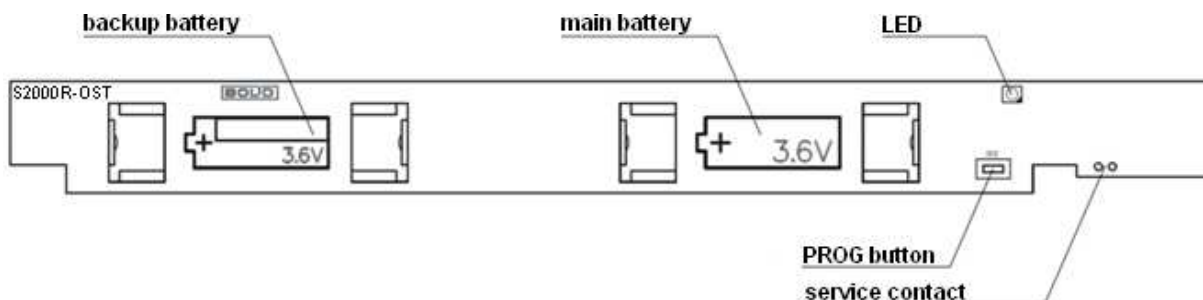
### Specifications

**Table 10-47. S2000R-OST Specifications**

|   |                         |
|---|-------------------------|
| Batteries (x2)                            | ER14505M (AA), 3.6 V    |
| Operating on Batteries in Quiescent Mode* | 5 years                 |
| Poll Interval (stable)                    | 10 s                    |
| Full On-batteries Illumination Time       | Up to 60 hours          |
| Ingress Protection Rating                 | IP41                    |
| Operation Temperature                     | -30°C to +50°C          |
| Transportation and Storage Temperature    | -30°C to +55°C          |
| Weight                                    | 0.262 kg                |
| Overall Dimensions                        | 303 mm x 112 mm x 33 mm |

\*- Operation time depends on how often indication is activated as well as on radio link quality and ambient temperature.

### S2000R-OST PC Board



**Figure 10-22**

**Indication****Table 10-48. S2000R-OST Indication in Quiescent Mode**

| LED Performance                     | Condition                        |
|-------------------------------------|----------------------------------|
| Flashes with green every 10 s       | Norm                             |
| Flashes with amber every 10 s       | Low battery (main or backup)     |
| Three flashes with amber every 15 s | No communications with the ARR32 |

**Table 10-49. S2000R-OST Operation Mode Indication**

| Mode                                 | LED Performance                          |
|--------------------------------------|--|
| Battery depassivation in progress... | Flashes with amber four times per second |
| Device is starting up                | Illuminates with green for 1 s           |

**Table 10-50. Link Quality Indication**

| LED Performance               | Condition   |
|-------------------------------|---|
| Flashes with green            | Strong signal   |
| Flashes with green and red    | Normal signal   |
| Flashes with red              | Weak signal (not recommended to install)                      |
| Shows solid red light for 1 s | No communications or the device is not connected to the ARR32 |

**Getting Started**

Open the case of the S2000R-OST and remove the insulating spacers from the holders of the main and backup batteries. Wait until depassivation is completed.

For an S2000R-OST depassivation will be performed twice, for the main battery and the backup battery separately.

*The depassivation procedure activates batteries after long term storage and can take up to 5 minutes.*

*The process of depassivation is indicated as shown in Table 10-49. If depassivation fails the device indicates low battery.*

**Connecting and Programming**

Connect the S2000R-OST to the ARR32 and set its parameters in the configuration of the polling loop controller as discussed in Sections 6, 7, and 8 of this Manual.

## **Mounting Location Considerations**

Considering the mounting location for the S2000R-OST, please follow all your applicable local codes, standards and regulations and instructions from Section 9 of this Manual.

## **Testing Link Quality**

The Link Quality Test procedure is designed to estimate stability of radio link between the S2000R-OST and the ARR32 at their current locations and when obstructions exist on the path of radio signals. You are recommended to carry out the Link Quality Test before the devices are attached at their locations.

A Link Quality Test is started by a short press on the Prog button (see Figure 10-22). The procedure lasts 60 seconds, the LED being indicating the results of the test as shown in Table 10-50.

While testing the alarm is in progress you can move the S2000R-OST and the ARR32 to find the best locations for them.

*You can also estimate quality of the link using S2000R Configurator as discussed in Section 7.*

## **Mounting**

Mount the S2000R-OST to a flat vertical surface using the four screws provided.

## **Testing**

Just after mounting, the S2000R-OST should be tested for proper operation.

- Ensure the S2000R-OST is in normal state in accordance with system indication.
- By simulating operating conditions, cause the activation of the S2000R-OST.

## **Maintenance**

- Inspect operability of the S2000R-OST at least annually.
- If the S2000R-OST transmits low battery conditions for the main or backup battery, replace both the batteries.



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*In case of deep battery discharge the S2000R-OST transmits the network controller messages about equipment failure (impossibility to perform its functions under the current conditions)*

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**S2000R-SHIK****WARNING:**

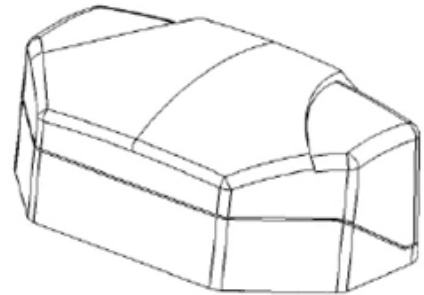
The device is compatible with an S2000R-ARR32 of hardware version 8 or higher

**General**

S2000R-SHIK Radio Link Curtain PIR Motion Detector is to be used in intrusion alarm systems to detect intrusions or attempts to intrude into closed protected premises. The detector continuously monitors its tamper conditions, battery status, and radio link quality.

Electromagnetic compatibility of the detector meets the requirements of the third immunity level accordingly to Russian standards.

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

**Specifications****Table 10-51. S2000R-SHIK Specifications**

|   |                       |
|---|-----------------------|
| Battery                                   | ER14505 (AA), 3.6 V   |
| Operating on Batteries in Quiescent Mode* | 4-8 years             |
| Max Detection Range                       | 8 m                   |
| Max Recommended Installation Height       | 5 m                   |
| Detectable Walk Rate                      | 0.3 m/s to 3 m/s      |
| White Light Immunity                      | Better than 6500 Lux  |
| Pre-operation Time                        | 15 s max              |
| Ingress Protection Rating                 | IP41                  |
| Operation Temperature                     | -30°C to +50°C        |
| Transportation and Storage Temperature    | -30°C to +55°C        |
| Weight                                    | 0.12 kg               |
| Overall Dimensions                        | 80 mm x 47 mm x 40 mm |

\*- Operation time depends on the transmission interval, link quality, and ambient temperature.

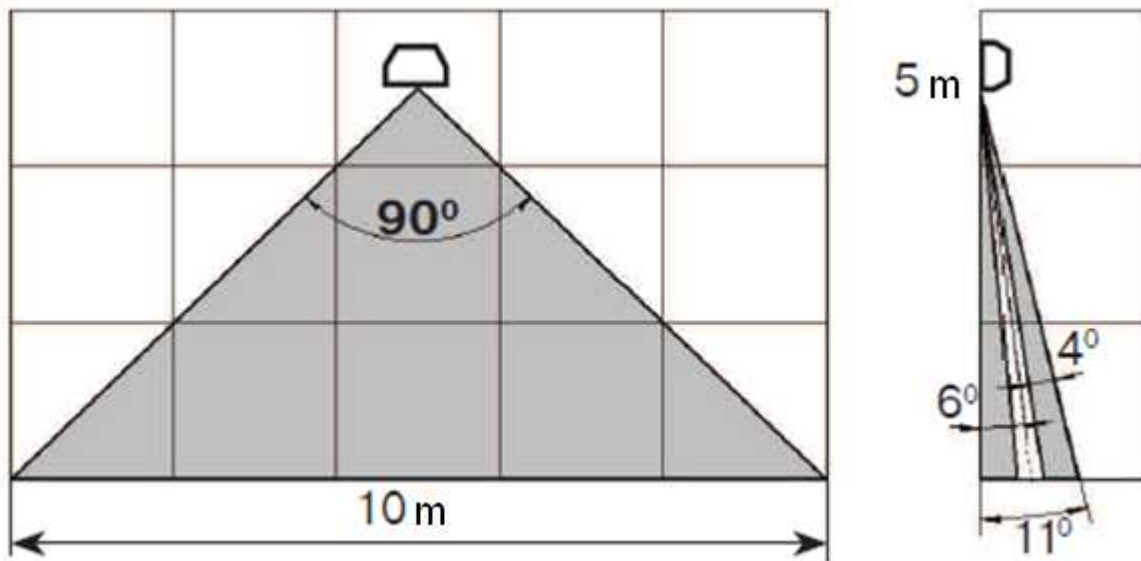


Figure 10-23. Detection Pattern

### S2000R-SHIK PC Board

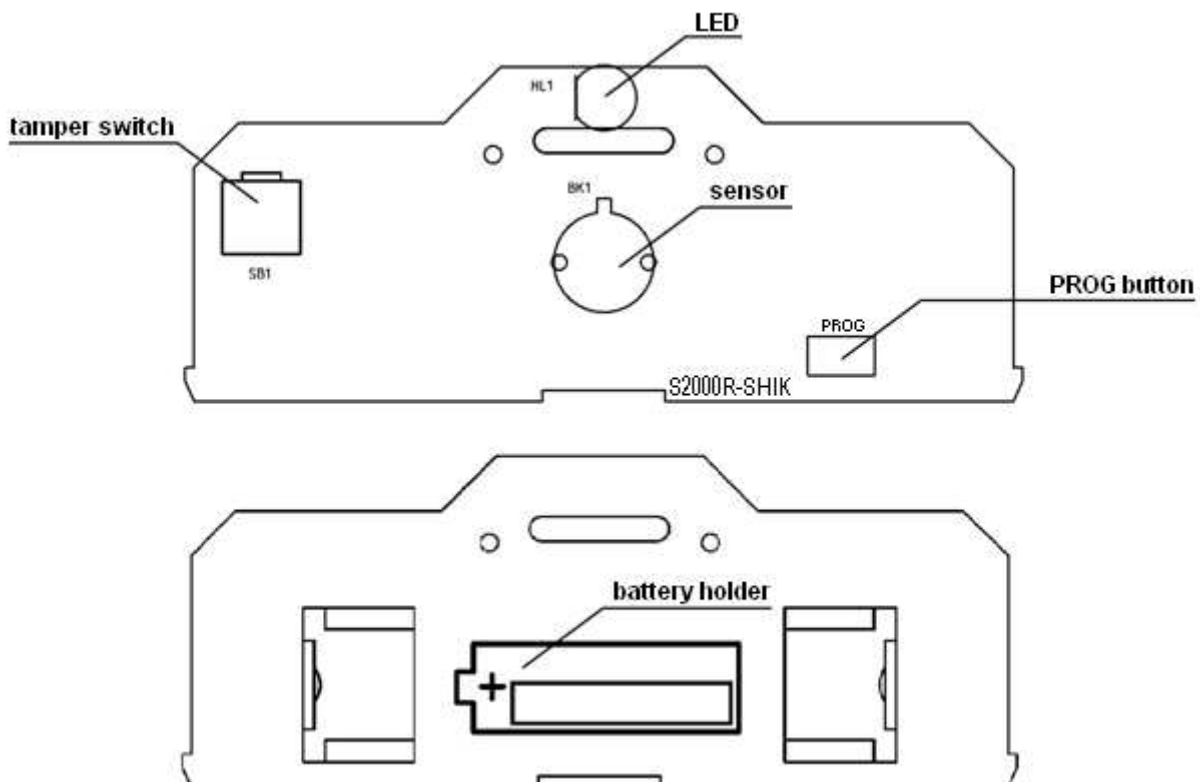


Figure 10-24

**Indication****Table 10-52. S2000R-SHIK Indication in Quiescent Mode**

| LED Performance                      | Condition                             |
|--------------------------------------|---------------------------------------|
| Flashes with red every 10 s          | Alarm                                 |
| Flashes with green every 10 s        | Norm                                  |
| Flashes with amber every 10 s        | Low battery                           |
| Flashes triply with amber every 15 s | No communications with the ARR32      |
| Flashes twice with amber every 15 s  | Pyroelectric detector is out of order |

**Table 10-53. S2000R-SHIK Operation Mode Indication**

| Mode                                 | LED Performance                          |
|--------------------------------------|--|
| Battery depassivation in progress... | Flashes with amber four times per second |
| Device is starting up                | Illuminates with green for 1 s           |

**Table 10-54. Link Quality Indication**

| LED Performance               | Condition   |
|-------------------------------|---|
| Flashes with green            | Strong signal   |
| Flashes with green and red    | Normal signal   |
| Flashes with red              | Weak signal (not recommended to install)                      |
| Shows solid red light for 1 s | No communications or the device is not connected to the ARR32 |

**Table 10-55. S2000R-SHIK Test Indication**

| Event                               | LED Performance                |
|-------------------------------------|--------------------------------|
| Starting or finishing the test mode | Illuminates with amber for 1 s |
| Response of the IR detector         | Illuminates with red for 1 s   |



*To conserve battery life, it is recommended to disable indication in quiescent mode for the detector in the configuration of the polling loop controller in use*

**Getting Started**

Open the case of the S2000R-SHIK and remove the insulating spacer from the holder of the battery. Wait until depassivation is completed.

The depassivation procedure activates batteries after long term storage and can take up to 5 minutes. The process of depassivation is indicated as shown in Table 10-53. If depassivation fails the detector indicates low battery conditions.

### **Connecting and Programming**

Connect the S2000R-SHIK to the ARR32 and set its parameters in the configuration of the polling loop controller as discussed in Sections 6, 7, and 8 of this Manual.

The **power saving operation mode** of the S2000R-SHIK provides extending the battery life. In this mode the detector turns off while being disarmed and turns on while being armed.

How to manage power saving mode of the S2000R-SHIK is described in Section 8.

### **Mounting Location Considerations**

Considering the mounting location for the S2000R-SHIK, please follow:

- The instructions from Section 9 of this Manual.
- All your applicable local codes, standards, regulations, and ordinances.
- The additional requirements below:
  - Do not install where the detector is directly above heating appliances, near vent openings, or exposed to direct sunlight.
  - Make sure the detection area doesn't have things which can waver (curtains, plants), electric bulbs, glass or mesh partitions, or areas obscured by large things.
  - When the detector is armed, ensure all windows and balcony doors are closed and no forced ventilation, calorifer, or air conditioner is on. There should be neither animals nor birds within the premises.
  - Do not install directly above an entrance gate or entrance door.

### **Mounting**

Mount the S2000R-SHIK to a flat vertical surface using two screws provided.

The maximum recommended height to install the detector is 5 meters.

### **Testing Link Quality**

The Link Quality Test procedure is designed to estimate stability of radio link between the detector and the ARR32 at their current locations and when obstructions exist on the path of radio signals. You are recommended to carry out the Link Quality Test before the devices are attached at their locations.

A Link Quality Test is started by a short press on the Prog button (see Figure 10-24). The procedure takes 60 seconds, the detector indicating the results of the test as shown in Table 10-54.

As testing link quality is in progress you can move the detector and the ARR32 to find the best locations for them.

*You can also estimate quality of the link using S2000R Configurator as discussed in Section 7.*

## **Testing**

Just after mounting, the S2000R-SHIK should be tested for proper working condition.

- Ensure the detector is in normal state in accordance with system indication.
- Trigger the detector by walking through the detection area.
- Ensure that the detector indicates the intrusion alarm, and a relevant message is received by control and indicating equipment.
- Wait until the detector returns to normal state.

## **Test Mode**

To inspect operability of the infrared sensor and to simplify selecting mounting location of the detector, the test mode can be used.

In this mode the S2000R-SHIK provides an easy-to-see indication of activation of the infrared sensor immediately, regardless of sending data over the radio channel.

To start and to exit test mode, perform the following combination of presses on the Prog button: **three times for a short time and once for a long time**. Starting/exiting the test mode is accompanied with the relevant indication (see Table 10-55).

*Turning the test mode on and off can also be carried out by means of S2000R Configurator (see Section 7).*

## **Maintenance**

- Inspect operability of the S2000R-SHIK at least every 3 months.
- If the S2000R-SHIK indicates low battery conditions, replace the battery.

**S2000R-IK REV.02****WARNING:**

The device is compatible with an S2000R-ARR32 of hardware version 8 or higher

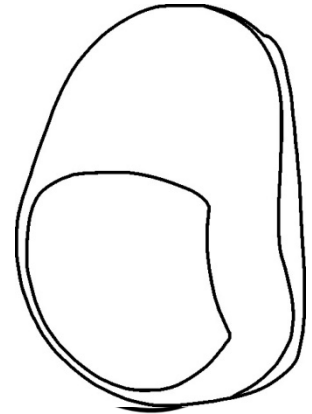
**General**

S2000R-IK Rev.02 Radio Link Volumetric PIR Motion Detector (hereinafter referred to as the detector) is designed for use in intrusion alarm systems to detect intrusions or intrusion attempts in closed protected premises. The detector features pet immunity for animals up to 10 kg or 20 kg.

The detector continuously monitors its tamper condition, battery status, and radio link quality.

Electromagnetic compatibility of the detector meets the requirements of the third immunity level accordingly to Russian standards.

The S2000R-IK rev.02 is designed for round-the clock operation.

**Specifications****Table 10-56. S2000R-IK Rev.02 Specifications**

|  |                      |
|--|----------------------|
| Battery                                      | CR123A, 3.0 V        |
| Operating on battery in quiescent mode*      | 4 to 8 years         |
| Detection Range:                             |                      |
| Fine Mode (animals up to 10 kg are ignored)  | 12 m                 |
| Rough Mode (animals up to 20 kg are ignored) | 9 m                  |
| Detectable Walk Rate                         | 0.3 m/s to 3 m/s     |
| White Light Immunity                         | Better than 6500 Lux |
| Pre-operation (Start-up) Time                | 15 s max             |
| Ingress Protection Rating                    | IP41                 |
| Operation Temperatures                       | -30°C to +50°C       |
| Transport and Storage Temperatures           | -30°C to +55°C       |
| Weight                                       | 0.1 kg               |
| Overall Dimensions (W×H×D)                   | 70 x 105 x 56 mm     |

\* - Operation time depends on the transmission interval, radio link quality, and ambient temperature

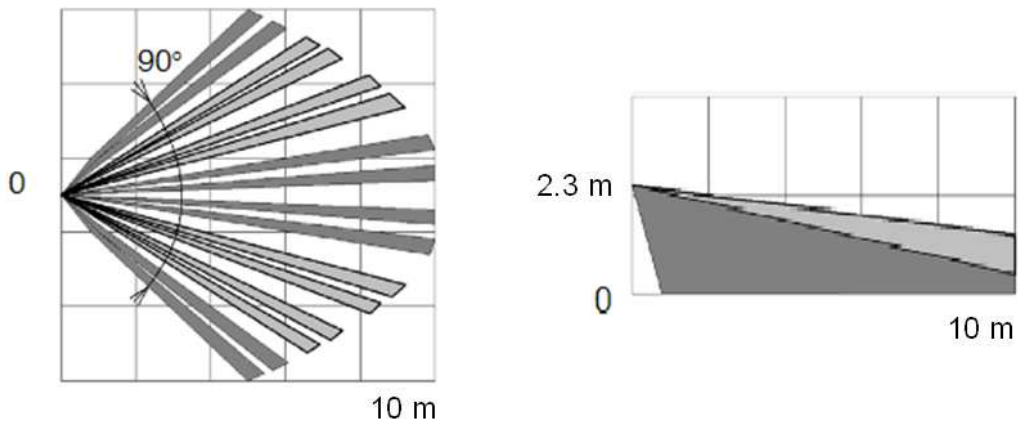


Figure 10-25. Detection Pattern

**S2000R-IK Rev.02 PC Board**

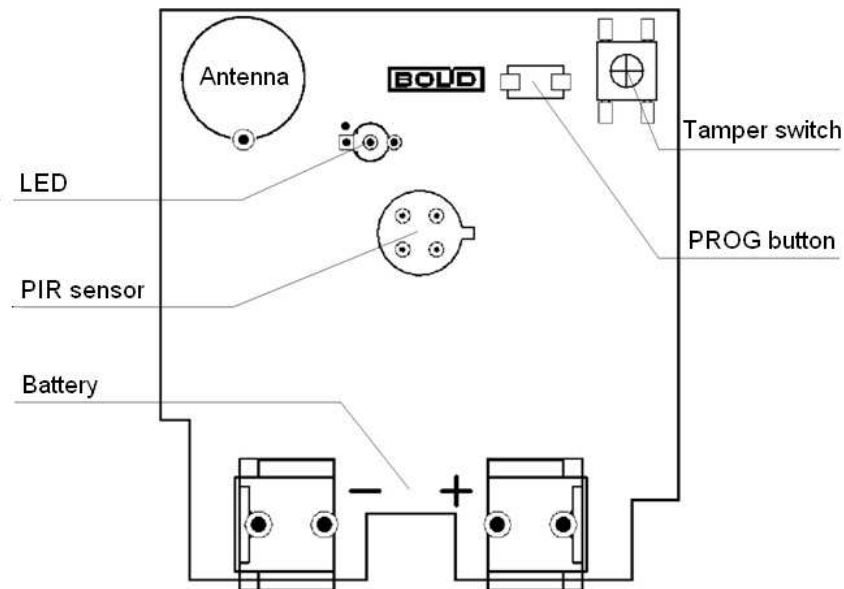


Figure 10-26. S2000R-IK Rev.02 PC Board

**Indication**

Table 10-57. S2000R-IK Rev.02 Operation Indication

| LED Performance                     | Condition                        |
|-------------------------------------|----------------------------------|
| Flashes with red every 10 s         | Alarm                            |
| Flashes with green every 10 s       | OK                               |
| Flashes with amber every 10 s       | Low battery                      |
| Three flashes with amber every 15 s | No communications with the ARR32 |
| Two flashes with amber every 15 s   | PIR sensor is out of order       |

**Table 10-58. Link Quality Indication**

| LED Performance               | Condition   |
|-------------------------------|---|
| Flashes with green            | Strong signal   |
| Flashes with green and red    | Normal signal   |
| Flashes with red              | Weak signal (not recommended to install)                      |
| Shows solid red light for 1 s | No communications or the device is not connected to the ARR32 |

**Table 10-59. S2000R-IK Rev.02 Test Indication**

| Event                               | LED Performance                |
|-------------------------------------|--------------------------------|
| Starting or finishing the test mode | Illuminates with amber for 1 s |
| Response of the IR sensor           | Illuminates with red for 1 s   |



*To conserve battery life, it is recommended to disable indication in quiescent mode while setting the detector parameters in the configuration of the polling loop controller in use*

## **Getting Started**

Open the detector case and remove the insulating spacer from the battery holder.

## **Connecting and Programming**

Connect the detector to the ARR32 and set its parameters in the configuration of the polling loop controller as discussed in Sections 6, 7, and 8 of this Manual.

The **power save mode** of the S2000R-IK rev.02 provides extending the battery life. In this mode the PIR sensor turns off while being disarmed and turns on while being armed.

How to manage power save mode of the S2000R-IK rev.02 is described in Section 8.

**Selecting operation mode** of the S2000R-IK rev.02 provides preventing nuisance alarms by detector's disregarding the motion caused by animals weighting up to 10 kg (the Fine mode) or up to 20 kg (the Rough mode).

The detection accuracy of the detector can be selected by means of S2000R Configurator (see Section 7).

## **Mounting Location Considerations**

The detector is recommended to be installed at the height of 2.3 meters.

Considering the mounting location for the S2000R-IK rev.02, please follow:



- The instructions from Section 9 of this Manual.
- All your applicable local codes, standards, regulations, and ordinances.
- The additional requirements below:
  - Do not install where the detector is directly above heating appliances, near vent openings, or exposed to direct sunlight.
  - Make sure the detection area doesn't have things which can waver (curtains, plants), electric bulbs, glass or mesh partitions, or areas obscured by large things.
  - When the detector is armed, ensure all windows and balcony doors are closed and no forced ventilation, calorifer, or air conditioner is on. There should be no animals or birds within the premises.
  - Do not install directly above an entrance gate or entrance door.

### **Mounting**

Mount the S2000R-IK rev.02 to a flat vertical surface using the two screws provided.

### **Testing Link Quality**

The Link Quality Test procedure is designed to estimate stability of radio link between the detector and the ARR32 at their current locations and when obstructions exist on the path of radio signals. You are recommended to carry out the Link Quality Test before the devices are attached at their locations.

A Link Quality Test is started by a short press on the Prog button (see Figure 10-26). The procedure takes 60 seconds, the detector indicating the results of the test as shown in Table 10-58.

As testing link quality is in progress you can move the detector and the ARR32 to find the best locations for them.

*You can also estimate quality of the link using S2000R Configurator as discussed in Section 7.*

### **Testing**

Just after mounting, the S2000R-IK rev.02 should be tested for proper working condition.

- Ensure the detector is in normal state in accordance with system indication.
- Trigger the detector by walking through the detection area.
- Ensure that the detector indicates the intruder alarm, and a relevant message is received by control and indicating equipment.
- Wait until the detector returns to normal state.

## **Test Mode**

To inspect operability of the infrared sensor and to simplify selecting mounting location of the detector, the test mode can be used.

In this mode the S2000R-IK rev.02 provides an easy-to-see indication of activation of the infrared sensor immediately, regardless of sending data over the radio channel.

To start and to exit test mode, perform the following combination of presses on the Prog button: **three times for a short time and once for a long time**. Starting/exiting the test mode is accompanied with the relevant indication (see Table 10-59).

*Turning the test mode on and off can also be carried out by means of S2000R Configurator (see Section 7).*

## **Maintenance**

- Inspect operability of the detector at least once every 3 months.
- If the S2000R-IK rev.02 indicates low battery conditions, replace the battery.

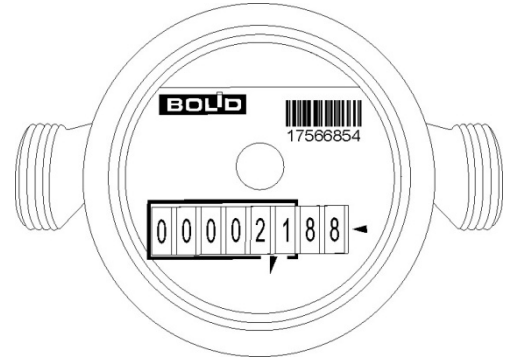
**WATER METERS SHV-15D, SHV-20D, SGV-15D, SGV-20D****WARNING:**

The device is compatible with an S2000R-ARR32 of hardware version 8 or higher

**General**

Pulse meters of cold water (SHV-15D, SHV-20D) and hot water (SGV-15D, SGV-20D) comprise S2000R-ASR1 Radio Link Integrated Pulse Adapters (hereinafter referred to as the ASR1).

This Manual describes operation principle, programming, and work instructions for ASR1. Information on the mechanical part of the meters along with installation instructions and operation rules are described in the manual which comes with the meters and can be found online at <http://betar.ru>, <http://resurs.bolid.ru>, and <http://bolid.ru>.



The ASR1 acquires pulses of the water meter and transmits the data over the radio channel to the control and indicating equipment.

The ASR1 senses bringing an external magnet to it and monitors power supply condition and radio link quality.

The ASR1 is designed for round-the-clock operation.

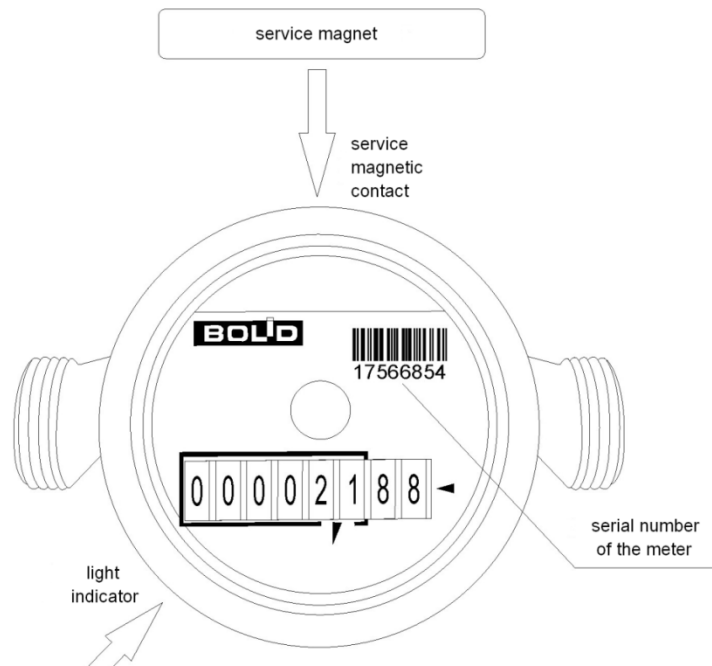
The ASR1 supports operation with Resource AMR&AMI system: <http://resurs.bolid.ru>

**Specifications****Table 10-60. S2000R-ASR1 Specifications**

|   |                |
|---|----------------|
| Battery                                   | ER14250, 3.6 V |
| Operating on Batteries in Quiescent Mode  | Up to 7years*  |
| Pulse Value                               | 10 l/pulse     |
| Transmission Interval in Quiescent Mode   | 60 min         |
| Transmission Interval in Programming Mode | 15 s           |
| Operation Temperature                     | +5°C to +50°C  |
| Transportation and Storage Temperature    | -30°C to +55°C |

\*- Operation time depends on the link quality and ambient temperature.

**View of the Water Meter with Integrated ASR1**



**Figure 10-27**

**Indication**

Light indication of the ASR1 is issued just after activation of the device (see *Getting Started* below).

The light indicator of the ASR1 is situated inside the meter housing as shown in Figure 10-27.

Light indication is emitted for every session of communication between the ASR1 and the ARR32 (every 60 minutes in the quiescent mode and every 15 seconds in the programming mode).

Indication of the ASR1 in the quiescent mode is shown in Table 10-62.

**Table 10-61. S2000R-ASR1 Operation Mode Indication**

| Operation Mode                       | LED Performance                          |
|--------------------------------------|--|
| Battery depassivation in progress... | Flashes with amber four times per second |
| Device is starting up                | Shows solid green light for 1 s          |

**Table 10-62. S2000R-ASR1 Operation Indication**

| LED Performance    | Condition                                   |
|--------------------|---|
| Flashes with green | OK  |
| Flashes with amber | Low battery                                 |
| Flashes with red   | There is a magnet near the meter (sabotage) |

| LED Performance                     | Condition                        |
|-------------------------------------|----------------------------------|
| Three flashes with amber every 15 s | No communications with the ARR32 |

Table 10-63. Link Quality Indication

| LED Performance               | Condition   |
|-------------------------------|---|
| Flashes with green            | Strong signal   |
| Flashes with green and red    | Normal signal   |
| Flashes with red              | Weak signal (not recommended to install)                      |
| Shows solid red light for 1 s | No communications or the device is not connected to the ARR32 |

### Service Magnetic Contact

The ASR1 can be started and programmed with the help of the service magnetic contact located as shown in Figure 10-27.

The impact on the service contact is performed by placing the service magnet provided to the meter housing in the specified area. The magnet should be brought to the bottom of the plastic meter housing above the sealing belt (see Figure 10-28).

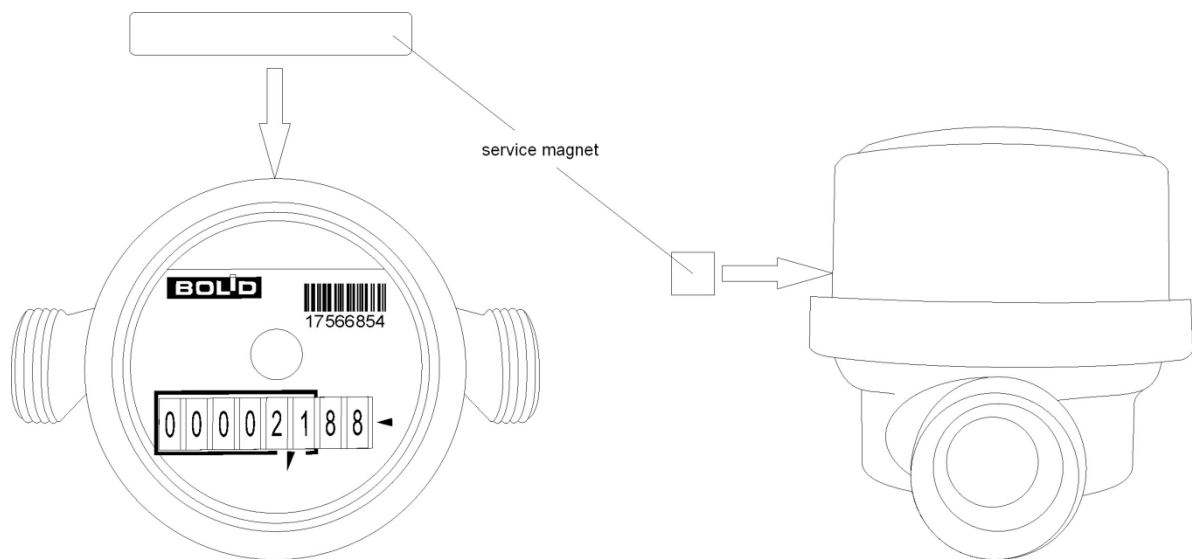


Figure 10-28



*If the service contact doesn't respond to the magnet then repeat the attempt by turning the magnet with another side to the meter*

## Getting Started

While stored the ASR2 is deactivated (in the sleep mode). To activate the ASR1, briefly set the service magnet to the service contact. Successful activation is accompanied by start of light indication.

After activation of the ASR1 the battery depassivation procedure runs.

*The depassivation procedure activates batteries after long term storage and can take up to 5 minutes. The process of depassivation is indicated as shown in Table 10-61. If depassivation fails contact the supplier to replace the equipment.*



---

*The ASR1 should be activated strictly before starting operating the meter (prior to water starting flowing through the meter)*

---

## Connecting and Programming

Connect the ASR1 to the ARR32 and set its parameters in the configuration of the polling loop controller as discussed in Sections 6, 7, and 8 of this Manual.

To connect the ASR1 to the ARR32, switch the ARR32 to the Device Connecting mode and then set the service magnet to the service contact of the ASR1 for a time more than 5 seconds.



---

*The ASR1 should be programmed with Transmission Interval set to 15 seconds (in the programming mode). For doing so run S2000R Configurator (see Section 7) and place the service magnet to the meter housing from the side of the magnetic contact for a short time (Figure 10-27).*

*The ASR2 quits the programming mode automatically on expire of 10 minutes since closing Configurator.*

---

## Mounting Location Considerations

Considering the mounting location for the S2000R-ASR1, please follow all your applicable local codes, standards and regulations and instructions from Section 9 of this Manual.

## Testing Link Quality

The Link Quality Test procedure is designed to estimate stability of radio link between the S2000R-ASR1 and the ARR32 at their current locations and when obstructions exist on the path of radio signals. You are recommended to carry out the Link Quality Test before the devices are attached at their locations.

A Link Quality Test is started by placing of the service magnet to the service contact of the ASR1 (see Figure 10-27).

The procedure lasts 60 seconds, the LED being indicating the results of the test as shown in Table 10-63.

While testing the alarm is in progress you can move the S2000R-ASR1 and the ARR32 to find the best locations for them.

*You can also estimate quality of the link using S2000R Configurator as discussed in Section 7.*

### **Checking Readings**

Readings transmitted over the radio channel should be checked with readings of the register not earlier then after expiry of Transmission Interval (see Table 10-60) since water stopped flowing through the meter.

While comparing readings, the register readings are considered to be the reference ones.

While checking readings, a difference between readings sent over the radio channel and the reference ones which is within the pulse value (see Table 10-60) is considered as normal and acceptable.

While verifying the meter, the service can correct the current register values.

### **Monitoring for Magnetic Fraud Attempts**

When an external magnetic field is applied to the meter, a fraud alarm is sent to the control and indicating equipment.

If a fraud attempt is detected the readings must be checked.

### **Maintenance**

- Meters with integrated ASR1 are to be verified in line with their manual provided and posted at <http://resurs.bolid.ru> and <http://betar.ru>;
- If readings on the meter dial differ from the readings sent over the radio channel (see *Checking Readings*) please contact service to adjust ASR1 readings.

## APPENDIX A. BATTERIES

The radio link devices of the S2000R series incorporate self-contained power supplies. Some of the devices are equipped with backup power supplies which provide operating of the devices when their primary power supplies fail. The devices monitor conditions of their power supplies and send low battery messages to the system when necessary in order their batteries to be replaced.

**Table A- 1. Power Supplies Used with S2000R Devices**

| Device           | Main Power Supply   | Backup Battery |
|------------------|---|----------------|
| S2000R-DIP       | ER14505, 3.6 V  | CR2032, 3 V    |
| S2000R-IP        | ER14505, 3.6 V  | CR2032, 3 V    |
| S2000R-IPR       | ER14505, 3.6 V  | CR2032, 3 V    |
| S2000R-SMK       | ER14505, 3.6 V  | No battery     |
| S2000R-IK        | ER14505, 3.6 V  | No battery     |
| S2000R-IK rev.02 | CR123A, 3.0 V   | No battery     |
| S2000R-SHIK      | ER14505, 3.6 V  | No battery     |
| S2000R-Siren     | Two batteries ER34615M, 3.6 V wrapped in a heat shrink sleeve |                |
| S2000R-RM        | External power supply 12 V                                    | ER14505, 3.6 V |
| S2000R-RM rev.01 | Mains power 220 V   | CR2032, 3 V    |
| S2000R-ASR2      | CR2477T, 3.0 V  | No battery     |
| S2000R-OST       | ER14505, 3.6 V  | ER14505, 3.6 V |

Due to the characteristics of lithium-thionyl chloride cells (ER14505 and ER34615M) the batteries must be activated (depassivated) after long time storage. A depassivation procedure is run by the radio link devices automatically: for the S2000R-Siren alarm the procedure is run just after radio connecting to the ARR32 and for all the other devices it is run just after battery installation.

The procedure of depassivation is indicated by the devices LEDs as discussed in Section 6 and the sections for the relevant devices. Duration of the depassivation procedure depends of the time of storage and can be up to 5 minutes.



*If the primary battery or the backup battery of a radio link device failed, both the batteries of the device should be changed for fresh ones.*



## APPENDIX B. TROUBLESHOOTING

| Problem  | Solution  |
|--|---|
| Unstable operation of the ARR32 while powered via the polling loop | <p><i>Description:</i></p> <p>Incidental radio communication malfunctions, restarts of the ARR32 etc.</p> <p><i>Solution:</i></p> <ul style="list-style-type: none"> <li>- Be sure that the total current consumption by the devices connected to the polling loop doesn't exceed the permitted threshold (see the manual for the polling loop controller).</li> </ul>  |
| Unable to switch the ARR32 to the Device Connecting mode           | <ul style="list-style-type: none"> <li>- Make sure the address space of the ARR32 is not full. The maximum number of devices to be connected is 32.</li> <li>- Make sure that powering via the polling loop is enabled or an external power supply is applied.</li> </ul>   |
| Unable to connect a radio link device to the ARR32                 | <p><i>Description:</i></p> <p>The ARR32 is in the Device Connecting mode but the radio link device to be connected indicates a connection failure when the Prog button is pressed down for a long time (the LED shows solid red light for two seconds).</p> <p><i>Solution:</i></p> <ul style="list-style-type: none"> <li>- Make sure the ARR32 is in the Device Connecting mode (see Section 6);</li> <li>- Make sure the antenna is connected to the ARR32 board;</li> <li>- Make sure there are no other radio emitters at your location and no more than three ARR32 operate on the selected radio channel (see Section 6). If so, eliminate the problem and try again;</li> <li>- Make sure the current version of ARR32 Radio firmware is compatible with the current version of radio link device firmware. Otherwise, in case of incompatibility use S2000R Configurator (see Section 7) to update ARR32 Radio firmware up to a compatible version (see Section 7) and try again.</li> </ul> <p><i>If it is necessary to update firmware, begin with updating device firmware and then update Radio firmware of the ARR32.</i></p> |

| Problem                              | Solution   |
|--------------------------------------|--|
| ARR32 Core firmware error            | <p><i>Description:</i></p> <p>POWER, LOOP, and RADIO LEDs of the ARR32 shows solid amber light.</p> <p><i>Solution:</i></p> <p>Update Core firmware of the ARR32 by means of S2000R Configurator (see Section 7).</p> <p><i>If S2000R Configurator is unable to connect the invalid ARR32, contact technical support for assistance.</i></p>   |
| ARR32 Radio firmware error           | <p><i>Description:</i></p> <p>POWER LED of the ARR32 illuminates with amber while LOOP and RADIO flashes simultaneously twice per second.</p> <p><i>Solution:</i></p> <p>Update Radio firmware of the ARR32 by means of S2000R Configurator (see Section 7).</p> <p><i>WARNING: Make sure that the version of the firmware is compatible with the current versions of firmware of the connected radio link devices</i></p>   |
| ARR32 Core firmware updating failure | <p><i>Description:</i></p> <p>The ARR32 reboots itself at regular intervals and starts a procedure of updating Core firmware. POWER LED shows solid amber light, LOOP LED and RADIO LED flash alternately with amber four times per second.</p> <p><i>Solution:</i></p> <p>Power off the ARR32 and connect it to a USB port of the PC using the USB cable provided pressing and holding the program button S2 (see Section 3). Run S2000R Configurator and update ARR32 Core firmware ARR32 (see Section 7).</p> <p><i>WARNING: Make sure the version of firmware is compatible with the version of the ARR32 PC board</i></p> |
| Core/Radio link error                | <p><i>Description:</i></p> <p>RADIO LED shows solid amber light.</p> <p><i>Solution:</i></p> <p>The device should be repaired by a qualified professional. Please contact technical support.</p>   |

| Problem  | Solution  |
|--|---|
| <p>After a loss of radio link between the radio link devices and the ARR32 for a long time, on restoring communication conditions radio link is not restored</p> | <p><i>Description:</i></p> <ul style="list-style-type: none"> <li>- The ARR32 indicates loss of radio link with the radio link devices.</li> <li>- The radio link devices indicate they are not connected to the ARR32.</li> </ul> <p><i>Solution:</i></p> <p>Start the procedure of testing link quality for the radio link devices by a short press on the Prog buttons (see the sections of this Manual for relevant devices).</p>   |
| <p>Faulty operation after updating firmware</p>  | <p><i>Description:</i></p> <p>After updating firmware the device has lost communications with the ARR32 and a Link Quality Test (see Section 9) run by the device indicates a loss of radio link.</p> <p><i>Solution:</i></p> <p>Make sure that the version of updated firmware is compatible with the current version of Radio ARR32 firmware. If no, follow the instructions of the problem "Unable to connect a radio link device to the ARR32" above.</p>   |
|  | <p><i>Description:</i></p> <p>After updating firmware the device has lost communications with the ARR32, the LED shows solid light and any press on the Prog button is ignored.</p> <p><i>Solution:</i></p> <ul style="list-style-type: none"> <li>- Restart the device by doing the following: power the device off, and then wait until the LED fades and try to power the device on again. If the device operates normally now, repeat updating firmware of the radio link device;</li> <li>- If, otherwise, restarting the device comes to nothing then switch the device to the backup version of the firmware. To do so, power the device off and wait until the LED fades, then press and hold the Prog button and simultaneously power the device on (except for an S2000R-OST, see below). As soon as the LED has flashed two times release the Prog button. Then, when the LED</li> </ul> |

| Problem | Solution   |
|---------|--|
|         | <p>starts showing solid light press the following combination of units:</p> <ul style="list-style-type: none"><li>° Prog + LED for S2000R-IP/DIP; or</li><li>° Prog + tamper switch for S2000R-IPR/SMK/IK/IK rev.02/SHIK/RM/RM ver.01, S2000R-Siren, S2000R-ASR2</li></ul> <p><i>An S2000R-OST can be switched to the backup version of the firmware by applying power to the device when its service contact is closed (see Figure 10-22).</i></p> <p>If firmware version was changed successfully the device LED flashes with green four times per second. When the LED starts flashing in such way release the buttons which were pressed down. After the radio link device returns to normal operation, update its firmware up to the required version.</p> <p><i>When such problems appear, make sure that device firmware in use is correct.</i></p> |

## APPENDIX C. RADIO DEVICE-TO-ARR32 COMPATIBILITY

| Device                                | Hardware Version of S2000-ARR32 | Software Version of S2000-ARR32 | S2000-ARR32 PCB Rev. |
|---------------------------------------|---------------------------------|---------------------------------|----------------------|
| S2000R-IP                             | 6.0 and higher                  | 1.15 and higher                 | Rev.06 and higher    |
| S2000R-DIP                            | 6.0 and higher                  | 1.18 and higher                 | Rev.06 and higher    |
| S2000R-IPR                            | 6.0 and higher                  | 1.12 and higher                 | Rev.06 and higher    |
| S2000R-SMK                            | 6.0 and higher                  | 1.16 and higher                 | Rev.06 and higher    |
| S2000R-IK                             | 6.0 and higher                  | 1.18 and higher                 | Rev.06 and higher    |
| S2000R-RM                             | 6.0 and higher                  | 1.16 and higher                 | Rev.06 and higher    |
| S2000R-RM rev.01                      | 6.0 and higher                  | 1.16 and higher                 | Rev.06 and higher    |
| S2000R-Siren                          | 6.0 and higher                  | 1.18 and higher                 | Rev.06 and higher    |
| S2000R-SHIK                           | 8.0 and higher                  | 1.18 and higher                 | Rev.09 and higher    |
| S2000R-OST                            | 8.0 and higher                  | 1.18 and higher                 | Rev.09 and higher    |
| S2000R-ASR2                           | 8.0 and higher                  | 1.18 and higher                 | Rev.09 and higher    |
| SHV-15D, SHV-20D,<br>SGV-15D, SGV-20D | 8.0 and higher                  | 1.18 and higher                 | Rev.09 and higher    |
| S2000R-IK rev.02                      | 8.0 and higher                  | 1.18 and higher                 | Rev.09 and higher    |



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