Seclue security systems

THE SECURITY DETECTOR WIREWAVE
FOR PERIMETERS

"Sectoria-K250"
SSSS 22.002-01

TC 4372-002-24009810-14

Manufacturer: DOO " Seclue technologies"

INSTALLATION GUIDE AND OPERATION
SSSS 22.002-01 Manual

Novi Sad Serbia

CONTENT

1. INTRODUCTION 3

2. PURPOSE 3

3. TECHNICAL DATA 4

4. SCOPE OF DELIVERY 5

6. DEVICE AND OPERATION OF THE ALARM 6

6.1 WORKING PRINCIPLE 6
6.2 THE SENSITIVE ELEMENT 6
6.3 DESCRIPTION OF THE BLOCK DESIGN 7
6.3.1 TU construction 7
6.3.2 RU construction 7
6.3.3 Controls and indications 8

7. INSTALLATION PROCEDURE 9

7.1 INSTALLATION ON A FENCE 9
7.2 WIRE AND CABLE ENTRY 11
7.3 CONNECTING CABLE LINES 12

8. PREPARING THE DETECTOR FOR OPERATION 13

8.1 CHECKING THE DETECTOR'S POWER SUPPLY 13
8.2 CHECKING THE DETECTOR'S OPERABILITY 13
8.3 SETTING UP THE DETECTOR 13
8.4 CHECKING THE DETECTOR 14

9. MAINTENANCE REGULATIONS 14

10. RULES OF STORAGE AND TRANSPORTATION 15

13. TYPICAL MALFUNCTIONS AND METHODS OF THEIR ELIMINATION 15

1. INTRODUCTION

1.1 This manual is intended to study the rules of installation and operation of security wire-wave detectors for perimeters "Sectoria-K250", TC 4372-002-24009810-14.

1.2 The following designations are accepted in the manual: detector – detector "Sectoria-K250"; TU – transmitting unit; RU – receiving unit; MPW – The mounting point for TU and RU wires on defenses, etc.; SE – sensitive element (WSE – wired SE); UW – upper wire SE; LW – lower wire SE; DZ – detection zone; MK - mounting kit; PSU – power supply unit; RCD – reception and control device; RC - remote control.

1.3 The detector is designed to protect long, winding borders and can be installed along the top or bottom of defenses, as well as in open or wooded areas.

1.4 Volumetric DZ (section A, fig. 1.1, fig.1.2, fig.1.3) is formed around a two-wire SE, which repeats all the turns and height differences of the guard line.

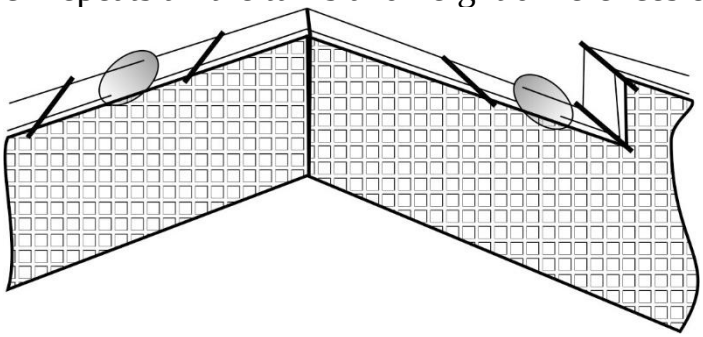


Fig. 1.1

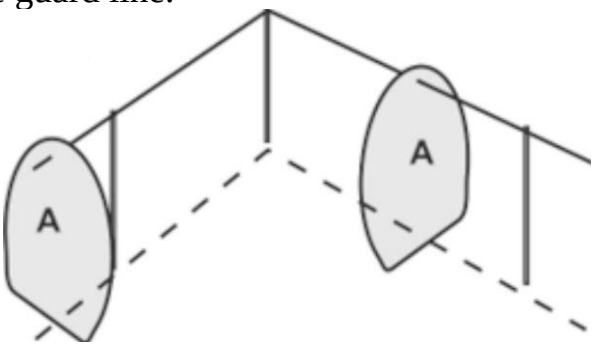


Fig. 1.2

1.5 The detector can be mounted on open rough or flat terrain, up to 2 m high (Fig. 1.2), near the canvas (Fig. 1.3) or in the upper part of the defense (Fig. 1.1, Fig. 1.3).

1.6 The detector consists of a SE in the form of a two-wire line, dielectric consoles or supports, RU and TU and two grounding rods.

1.7 RU of the detector is connected to the PS, the control panel, the beginning of SE (two-wire line) and to the ground.

1.8 TU is connected to the end of SE and to the ground.

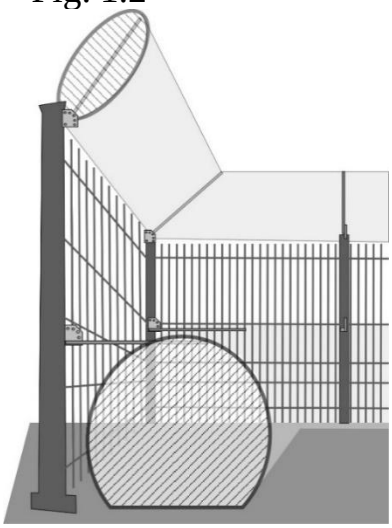


Fig. 1.3

2. PURPOSE

2.1 The detector is universal and can block borders, both on flat and rough terrain. SE repeats the turns and height differences in rough terrain, repeatedly the irregularities of the landscape of the area.

2.2 Depending on the tasks to be solved, the SE wires mounting method is selected, and the SE can be mounted accordingly:

a) in the upper part of the defense in the form of a "visor" with any angle of inclination (see Fig. 2.1a), UW and LW are fixed on dielectric consoles (WSE1, WSE2), the angle of inclination of which can be quickly changed, while the consoles can made of any isolating material;

b) along the web of the fence (walls of a building or structure) to control a break, a climbing over the fence, while UW is fixed at the ends of the dielectric consoles (WSE3), and LW is either 5-10 cm deep into the ground (see Fig. 2.1b), or fixed on the same dielectric consoles;

c) along the surface of the earth (see Fig. 2.1c), while UW is fixed on dielectric supports (WSE4), and LW is sunk 5-10 cm into the ground. In the case where there are dielectric or electrically conductive pillars on the protected border, UW can be fixed on consoles WSE1...WSE3, which mounted on existing poles.

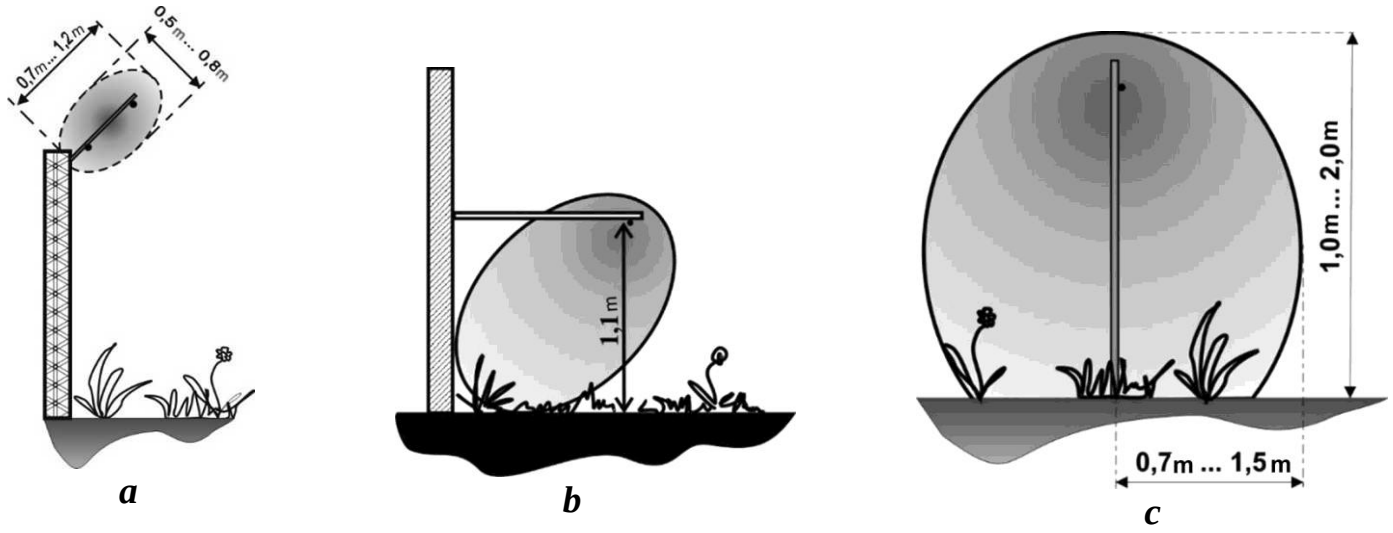


Fig. 2.1

2.4 If necessary, physical obstacles can be included the barbed wire in DZ (Fig. 2.2).

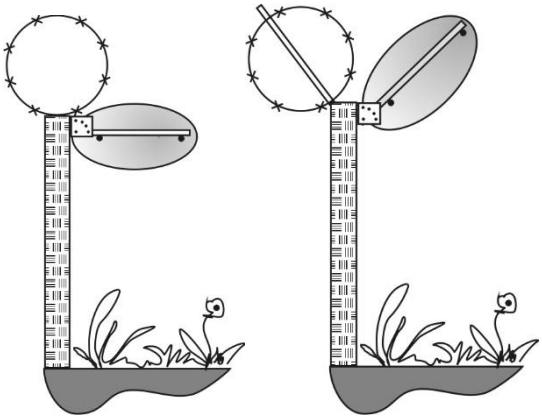


Fig. 2.2

3. TECHNICAL DATA

3.1 The detector provides continuous round-the-clock operation.

3.2 The range of the detector (the length of the detection zone) is from 5 to 250 m.

3.3 The detector ensures operability in temperate and cold climates, but at temperatures from minus 50 ° C to plus 50 ° C. The maximum limits of the temperature range are from minus 65 °C to plus 85 ° C.

3.4 The detector is powered by a DC source with a rated voltage of 24 V with an acceptable voltage range of 10 to 36 V.

3.5 The maximum current consumed by the detector via a DC circuit does not exceed 30 mA, and the maximum power consumed by detector, does not exceed 0.35 watts. However, when turning on the power, it is necessary to take into account the doubled starting current (charging the capacitors and starting the internal power supply).

3.6 The detector provides the ALARM signal to the control circuit for a duration of 5+1 sec. The ALARM signal is formed by changing the resistance value of the output control circuit from a value of less than 35 om to a value of more than 200 kOm (by opening the "dry" contact group of the output relay). When measuring the resistance value of the output control circuit, the voltage should not exceed 39 V, and the current should be limited to no more than 100 mA.

3.7 The detector provides detection with a probability of at least 0.98 of intruders crossing the zone and issuing an ALARM signal to the control circuit. The operating time for a false alarm is provided for at least 1000 hours.

3.8 ALARM signals are generated by opening the optocoupler at the output of the broadcaster. The optocoupler is connected to the wires of the built-in RU cable.

3.9 In standby mode, the optorelay is closed and the resistance value on the wires of the output control circuit is 0+30 Om.

3.10 In the ALARM mode, the resistance value on the wires of the output control circuit is more than 200 kOm.

3.11 The detector provides the formation of an ALARM signal and a corresponding indication on RU in case of intrusion of intruders into the detection zone, breakage or short circuit of SE wires, when changing the values of the tuning organs.

3.12 The detector provides the formation of a continuous ALARM signal when the power supply voltage is turned off (without indication on the front panel RU).

3.13 It is allowed to generate an ALARM signal when touching the detector blocks, SE and grounding wires with a hand or an electrically conductive object.

3.14 When removing the protective cover RU, the contacts of the output opto relay open.

3.15 The detector ensures operability near power lines up to 500 kV.

3.16 The detector ensures round-the-clock operation.: - when exposed to solar radiation; - when passing outside the detection area of vehicles; - when exposed to electromagnetic interference (voltage pulses in power supply circuits, electric discharges, and other electromagnetic fields); - wind speeds up to 40 m/s; - exposure to precipitation in the form of rain up to 40 mm/hour; - exposure to precipitation in the form of snow up to 40 mm/hour.

3.17 The detector does not generate an alarm signal when: - crossing areas by single small birds (no more than 150 mm); - movement of a group of people at a distance of at least 1.5 m from UW SE (for the "visor" installation option) and at a distance of at least 2.5 m from UW SE (for the "ground" installation option); - the movement of vehicles at a distance of at least 2 m from UW SE (for the "canopy" installation option) and at a distance of at least 5 m from UW SE (for the "surface" installation option).

3.18 The detector does not generate an Alarm signal when single small animals (cat, dog) with a height at the withers of not more than 0.5 m and weighing up to 20 kg are moving in the area.: - for the "visor" installation option – at a distance of at least 0.8 m from UW SE; - for the surface installation option – at a distance of at least 1.2 m from UW SE.

3.19 The detector has the possibility of remote monitoring of operability. The remote monitoring signal (constant voltage from the supply range) must be applied to terminals "A" and "B" of cable RU without observing the polarity for a period of at least 0.3 s. In case of good condition, the detector generates an ALARM signal in response to the DC signal.

3.20 The detector has built-in single-level protection against induced voltage in all external circuits up to 500 m long (250 m for “overhead” lines). The input circuit protection is activated when the input voltage exceeds ~39...40 V. Despite this, if the length of the overhead lines connected to the terminals exceeds 100 m, additional lightning protection devices must be installed.

3.21 Overall dimensions of the housings of RU detector units are - Ø130×50 mm, with mounting elements - 188×130×50 mm, TU detector units are 120×35×30 mm.

3.22 The weight of RU and TU blocks are not more than 0.7 kg.

3.23 The service life of the detector units is at least 10 years.

4. SCOPE OF DELIVERY

5.1 Basic detector delivery package:

NAME	Quantity
TU	1
RU	1
Warranty card	1
Installation Guide	1

5.2 In addition, the following MKs may be included in the detector package:
The mounting element for TU and RU wires on walls, defenses, etc.

MPW-22-1	SE wire attachment unit for RU and TU	scope

"SMP1" wire attachment unit (WAU-01P) is designed to attach one or two SE wires using dielectric poles or tree trunks.

wire attachment unit 15x10x300 mm	scope

"SMP2" wire attachment unit (WAU-02P) is designed to attach one or two SE wires along the top of any defenses.

wire attachment unit 15x10x700 mm	scope

"SMP3" wire attachment unit (WAU-03P) is designed for attaching one or two SE wires along the surface of any defense.

WAU-03P/1,2	wire attachment unit 15x10x1200 mm	scope
WAU-03P/1,5	wire attachment unit 15x10x1500 mm	scope

"SMP4" wire attachment unit (WAU-04P) is designed to attach one SE wire above the ground surface (in an open area without obstacles or along any obstacles).

Stepson, fiberglass stand (1,5 m)	scope

Tensioner for WAU-04P - Tensioning unit at the end or at SE (SE wires) bending point (A rope, a lanyard, and a support pin).
Wired sensitive elements Made of insulated and (or) non-insulated wires, the length of the wires is determined at the time of order.
Earthing devices 1,8 m (2 pieces).

6. DEVICE AND OPERATION OF THE ALARM

6.1 Working principle

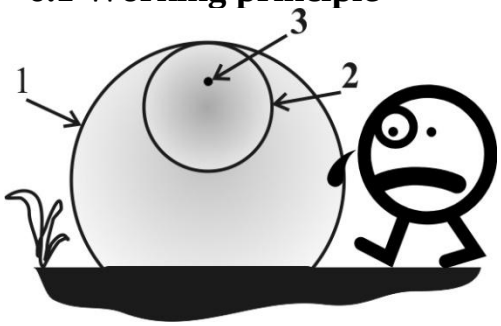


Fig. 6.1

6.1.1 The operation of the alarm based on the detection of a violator by the change of parameters of the electromagnetic field formed around the wired SE.

6.1.2 The width of DZ ("1", "2" see Fig. 6.1) of each line is regulated within 0.3…2 m ("3" – UW of the detector). It is necessary to remember that with large dimensions of the cross-section of the DZ, swaying under the influence of the wind, vegetation and other moisture-containing or electrically conductive objects may get into it.

6.2 The sensitive element

6.2.1 The wired SE, together with TU and RU, is designed to form a volumetric DZ at the protected line.

6.2.2 For the ground-level option, UW is located at a height of (1.0…1.8) m from the ground surface, and LW is either buried 5…10 cm under UW or placed at the selected height.

6.2.3 The volumetric DZ is formed around SE wires, is concentrated along them and has a cross-section in the form of a truncated, depending on the conductivity of the earth, oval. Options for constructing SE and the section of the DZ are shown in Fig. 6.2.

6.2.4 If it is necessary to create DZ along a defense or using existing poles and tree trunks, SE is mounted using MK1 (with shortened consoles), MK2 (standard), and MK3 (with extended consoles). In this case, UW SE is mounted on dielectric consoles that are attached to the defense or poles using appropriate brackets. In this case, UW SE is mounted on dielectric consoles, which are attached to the fence or poles using appropriate brackets.

6.2.5 The bracket design allows you to choose any console angle from 0° to 90° with a res-

olution of ~22° (Fig. 6.3).The angle of inclination can be easily changed depending on the task at hand and the design of the defense.

6.2.6 SE wires are attached to the supports and consoles using clamps and screws.

6.2.7 LW is laid between TU and RU and is fixed either at the bottom of the console or at a selected distance from the ground surface, or it is buried at a depth of 5-10 cm for ground-level placement. The angle of inclination can be easily changed depending on the task at hand and the design of the defense.

6.2.8 When burying the lower wire, it is necessary to monitor the integrity of its insulating sheath.

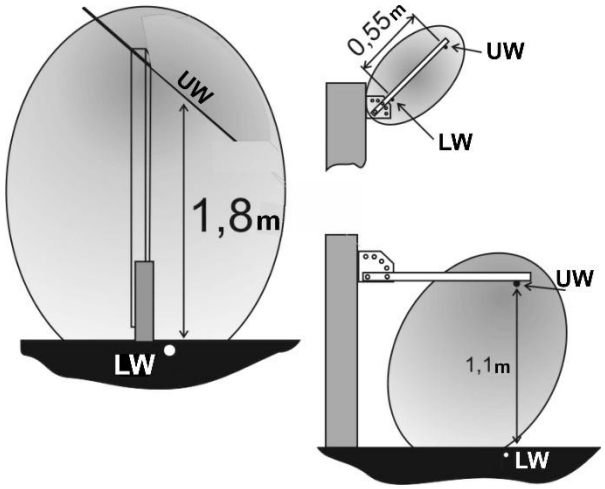
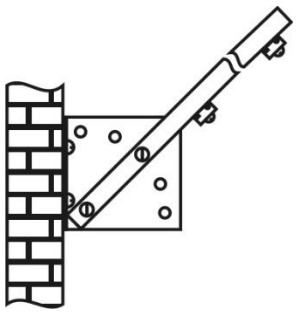


Fig. 6.2

Violation of the insulating properties of the sheath may lead to complete inoperability of the detector.

6.2.9 UW is fixed in the upper part of the supports or consoles in parallel with LW. The maximum sag of the wires in the middle of the span between two adjacent consoles should not exceed 50 mm.

6.2.10 When installing SE on or along an electrically conductive defense, all electrically conductive elements of the defense must be securely grounded.


Fig. 6.3

6.3 Description of the block design

6.3.1 TU construction

6.3.1.1 The design of TU is shown in Fig. 6.4. The protection rating of the device's housing is IP67. The sensor housing is made of aluminum. Inside the housing, there is a unit mounted on a printed circuit board. The UW and LW contacts for connecting the upper and lower SE conductors, respectively, as well as the grounding terminals for the device, are located on the end surfaces of the housing. The UW and LW contacts are protected from foreign meteorological by protective caps. On the front surface, next to the upper and lower SE conductors, there is corresponding marking "UW" and "LW".



Fig. 6.4

6.3.1.2 The SE wires are connected to the UW and LW contacts using screws.

6.3.1.3 Grounding of TU is carried out using an insulated wire with a diameter of 1...2 mm and a special terminal located in the lower part of the housing. The grounding wire is clamped with a screw.

6.3.2 RU construction

6.3.2.1 The RU housing are made of stainless steel. The design of RU is shown in Fig. 6.5. RU detector has a cable built into the end surface and controls and indicators on the front surface (see Fig. 6.5), which are covered by a protective cover. The chassis is marked with the following symbols: "UW", "LW" - clips for connecting UW and LW SE; "A", "V" - regulators; "0", "1", "2" - indicators. The chassis provides access to the LED indicators "0", "1", "2" and the regulators "A", "V" installed on the board. The plate at the base of the housing allows you to mount RU on various surfaces (fence, wall).

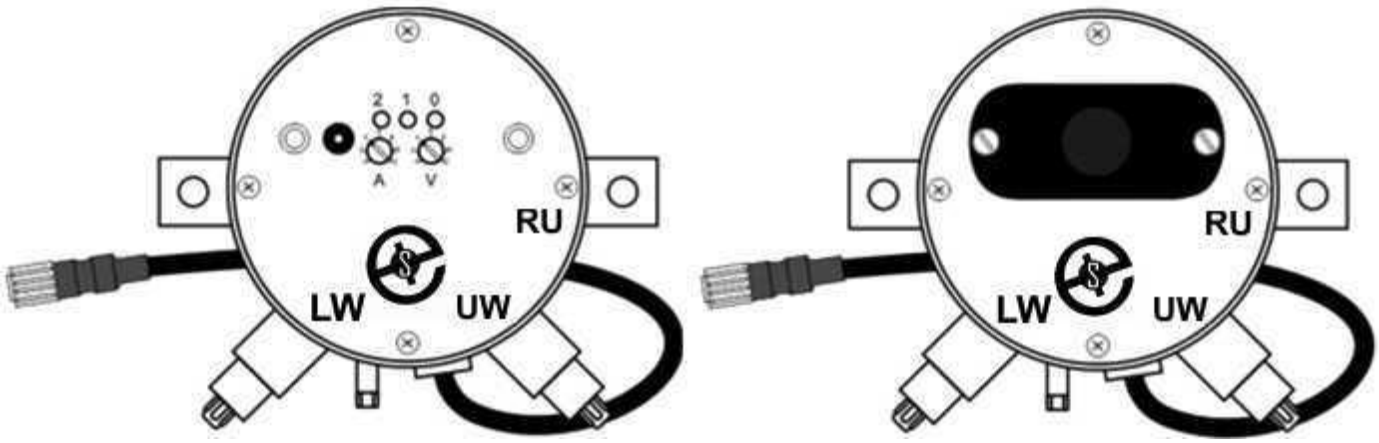


Fig. 6.5

6.3.3 Controls and indications

6.3.3.1 The control elements include the "A" and "V" controls, and the indication is provided by three LED indicators: "0", "1", and "2" (see Fig. 6.6).

6.3.3.2 The sensitivity of the detector can be adjusted manually by rotating the "A" control, according to the marking on the front panel, which ranges from 0 to 12. The value is increased by rotating the knob clockwise, and decreased by rotating it counterclockwise. The value "0" corresponds to the minimum value, and the value "12" corresponds to the maximum value.

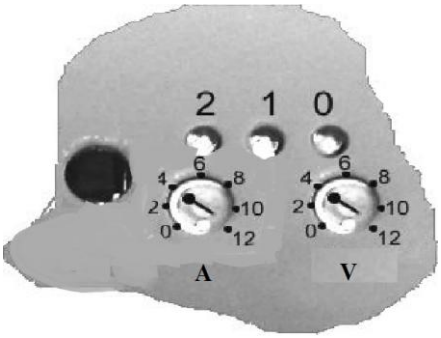


Fig. 6.6

6.3.3.3 The maximum speed of the offender can also be adjusted manually by rotating the "V" knob, according to the label on the front panel, which indicates a value between 0 and 12. The value is increased by rotating the knob clockwise. clockwise, and decrease – counterclockwise. The value “0” corresponds to the minimum value, and the value “12” to the maximum value.

Note. To increase the noise immunity, the maximum speed should be chosen as low as possible, provided that the ALARM signal is reliably generated when the intruder is moving at maximum speed.

6.3.3.4 The indication is automatically turned on when the protective cover is removed from RU front panel. The "2" indicator shows that the signal exceeds the noise threshold, the "1" indicator shows that the signal exceeds the set threshold, and the "0" indicator shows that the signal exceeds the maximum value that can trigger an ALARM signal. Note. The ALARM signal is generated when the spectral characteristics of the signal match the filter parameters determined by the sensitivity and maximum speed settings.

6.3.3.5 RU cable is connected to external devices (CS...) using a built-in ten-core cable in a shielding sheath. The cable has five twisted pairs. The purpose of the cable cores given in Table 6.1. The purpose of the wires determined by the color of the twisted pairs.

Table 6.1

Pair color	Wire color	Appointment
Orange	**orange**	**+Usup**
	white	**- Usup**
Синий	**blue**	**+Sout-External synchronization output**
	white	**-Sout-External synchronization output**
Brown	**brown**	**+Sin-External synchronization input**
	white	**-Sin-External synchronization input**
Green	**green**	**Contacts of the output relay: NC - standby mode, HP - alarm**
	white	
Gray	**gray**	**Remote control**
	white	

7. INSTALLATION PROCEDURE

7.1 Installation on a fence

7.1.1 Before carrying out design and installation work, it is necessary to mentally imagine how DZ will be adjacent to the defense and form a controlled line. Passing through internal or external corners, height differences, or moving from one side of the defense to the other, for example, when "circumventing" a building wall, is carried out in accordance with Fig. 7.1... Fig. 7.4. It is necessary to ensure smooth connections between SE segments by selecting the installation locations and angles of the consoles. It should also be noted that a large number of SE "kinks" or UW proximity to conductive defenses significantly increases signal loss and reduces the maximum allowable length of the protected area.

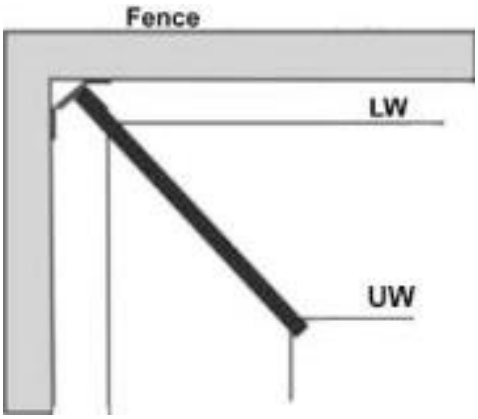


Fig. 7.1

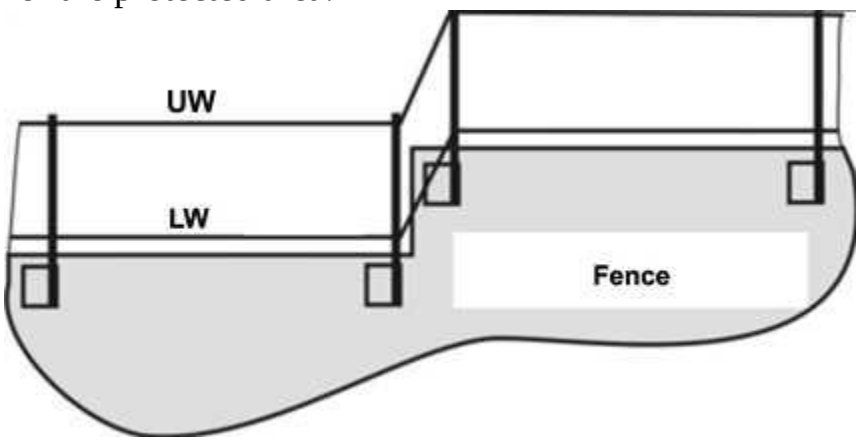


Fig. 7.2

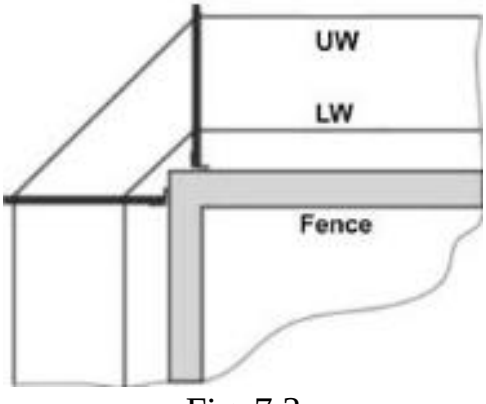


Fig. 7.3

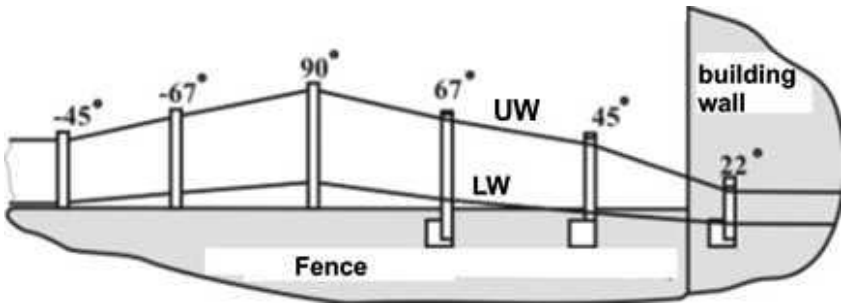


Fig. 7.4

7.1.2 Clear the defense and the area around DZ of construction debris and wires, remove obstructing grass, shrubs, and tree branches, and secure wires and cables that are swaying in the wind.

7.1.3 Install the brackets with dielectric consoles from the MK2 mounting parts kit on the defense with an interval of ~ 3…5 meters. Attach the brackets 1 to the defense 3 using screws, bolts, or other fasteners 2 in accordance with Fig. 7.5. Install the dielectric console 4 on the bracket 1. Attach the lower wire 6 to the bottom of the console 4 using a clamp and a screw 7. Also fix 4 UW 8 at the top of the console.

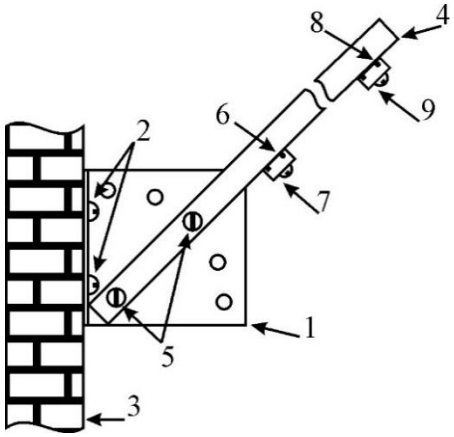


Fig. 7.5

7.1.4 Use screws to fix RU on the defense at end of the alarm the area near the attachment points UW and LW on the end consoles, orienting them with UW and LW inputs downwards and making it convenient to connect SE wires. Fig. 7.6 shows the mounting of the TU unit 1 to the special console 2. Using two screws 3 with washers. Attach TU 1 to the special console 2. Fix TU 1 using screws 3 with washers to the special console 2. Fix TU 1 in such a way that it is located under the console 2 (from the ground). Secure UW and LW with clamps 4, screws 5 with washers and nuts 6 with washers. Install the special console bracket under MK2 end console.

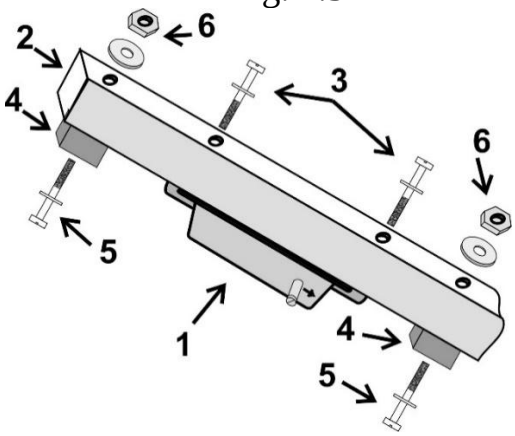


Fig. 7.6

7.1.5 Attach bracket 1 to defense 2 using screws, bolts, and other fasteners 3 in accordance with Fig. 7.7. Install dielectric console 2 on bracket 1 under RU. Attach upper wire 5 and lower wire 6 to console 2 using clamps 4 and screws 5.Install the UK-01P-2 bracket under the MK2 end console. Attach bracket 1 to defense 2 using screws, bolts, and other fasteners 3 in accordance with Fig. 7.7. Install dielectric console 2 on bracket 1. Attach upper wire 5 and lower wire 6 to con-sole 2 using clamps and screws 4. Connect UW 5 to UW terminal, which is protected from external influences using a protective cap. Connect the lower wire 6 to LW terminal, which is protected from external influences by a protective cap. Attach UW and LW SE to the lower surface of the console using clamps and screws.

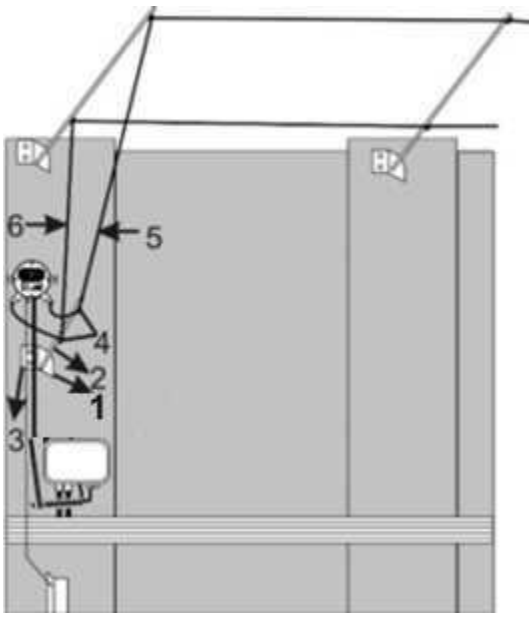


Fig. 7.7

7.1.6 Install several detectors in series according to Fig. 7.8 and Fig. 7.9, taking into account the above recommend dations.

7.1.7 Connect adjacent RU sections to the same grounding device (Fig. 7.7).

7.1.8 Connect all TU to their own grounding devices, which should be at least 1 m apart. Grounding conductors are laid not parallel to each other on the surface of the defense (wall) to the grounding conductor itself. As a grounding conductor, use an insulated copper wire with a diameter of at least 0.5 mm.

7.1.9 LW is selected as insulated (SE-1 or SE-3) or uninsulated (SE-2). If UW and LW are selected as uninsulated, care must be taken to ensure that they do not touch the enclosures of the or other electrically conductive objects.

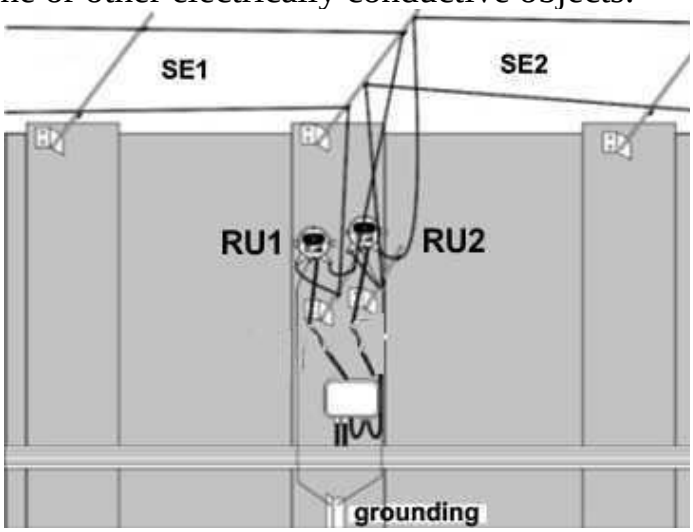


Fig. 7.8

7.1.10 Install grounding pins with a resistance of no more than 30 Ω under RU and each TU and connect them to the grounding terminals of the units.

7.1.11 Start fixing UW with the middle of the section. Fix UW at the top of the console, pull it simultaneously in opposite directions with a force of 5…10 kg, and fix it at the top of the adjacent dielectric consoles with screws. Pull and fix UW in opposite directions.

7.1.12 LW is mounted depending on the selected 3O constraints and maintenance strategy. Fix LW at the bottom of the console parallel to UW, or ensure that LW is parallel to UW.The wire should be buried in the ground to a depth of ~10 cm, and it should be protected with a plastic corrugated sleeve to prevent damage to the LW.

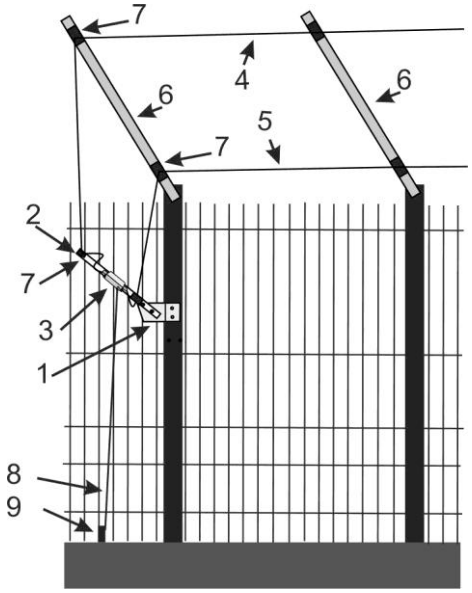


Fig. 7.9

7.1.13 The preparation and installation of UW in TU (RU) should be carried out in accordance with Section 7.2.7.

7.1.14 The distance between adjacent TU sections (between the corresponding end consoles) should be >500 mm.

7.1.15 When laying SE wires to adjacent TU sections, it is necessary to ensure the least capacitive coupling between them. To do this, avoid their parallel or close location (in case of wind, the wires should not approach by less than 100 mm) and achieve a projection of their intersection close to the perpendicular. Each TU is grounded to its own grounding device.

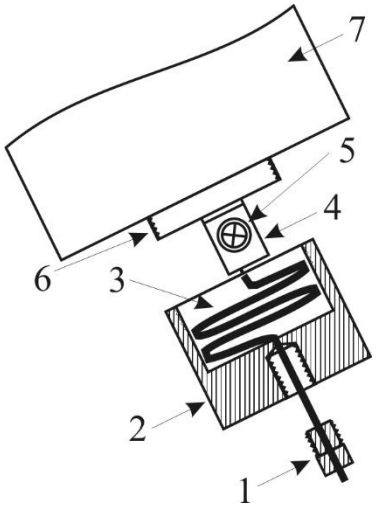


Fig. 7.10

7.2 Wire and cable entry

7.2.1 Preparation and insertion of UW and LW into RU, following Fig.7.10. Remove the end of the wire (UW or LW) by 10 mm from the insulating layer, twist the cores and solder. Unscrew the nut sleeve 1 (RU 7), unscrew the protective cap 2. Install the extracted parts on the wire 3 in the order shown in Fig. 7.10. Unscrew the screw 5 of contact 4 UW (LW) by several turns. The pressure washer should move away from the contact surface, making room for the tinned part of the wire 3. Insert the tinned part of the wire 3 into the hole under the washer of contact 4. Hold the wire 3, secure it with the screw 5, apply grease to the hardened parts UW and LW, screws and washers, which are used to secure UW and LW, put the excess wire in a spiral into the protective cap 2, as shown in the fig. 7.10, and wrap it up to the stop (connect to the threaded sleeve 6. Pass the excess wire into the hole

of the protective cap 2 and tighten the nut sleeve 1 to the stop. While holding the wire 1, secure it with screw 6, insert the rubber sleeve 4 and washer 3 into the sleeve hole and tighten the sleeve nut 2 all the way.

7.2.2 Prepare and connect UW and LW to TU and RU, following Fig. 7.11. Release the end of UW (LW) 1 by 10 mm from the insulating layer and twist the cores. Remove the protective cap 2. Pass the wire 1 inside the protective cap 2 through the hole in it. Release the side hole in terminal 3 by unscrewing the clamping screw 4 a few turns. Insert the twisted part of wire 1

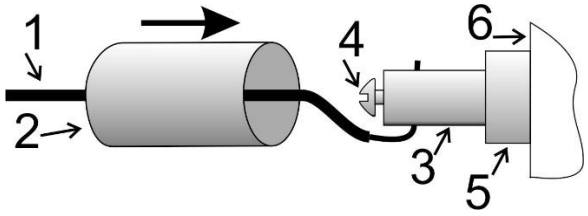


Fig. 7.11

into the side opening of terminal 3. Fix the wire 1 in terminal 3 with screw 4, apply the lubricant the installed connection UW and LW, the screws and washers used to attach UW and LW, and put the protective cap 2, as shown in the figure, on the bushing 5 all the way (to the end wall of the unit 6).

7.3 Connecting cable lines

7.3.1 In accordance with the electrical scheme of the project, connect the conductors of the communication cable (with an adjacent with PSU, RCD or hub) to the terminal contacts located in RU (see Fig. 7.12). Connect a pair of control wires from the control panel to the terminals "TRAIN1". In the case of monitoring the "TRAIN1" circuit without an external resistor (a jumper in the Rs1 terminals), it is necessary to limit the current to a value not exceeding 100 mA). Connect the output of the power supply unit to the two "+/-SUP" terminals. Connect the wires from the "+/-Synchr OUT" adjacent detector, if it is the master, to the "+/- Synchr OUT" terminals, or connect the "+/- Synchr IN " wires from the adjacent detector, if it is the slave, to the "+/- Synchr OUT" terminals.

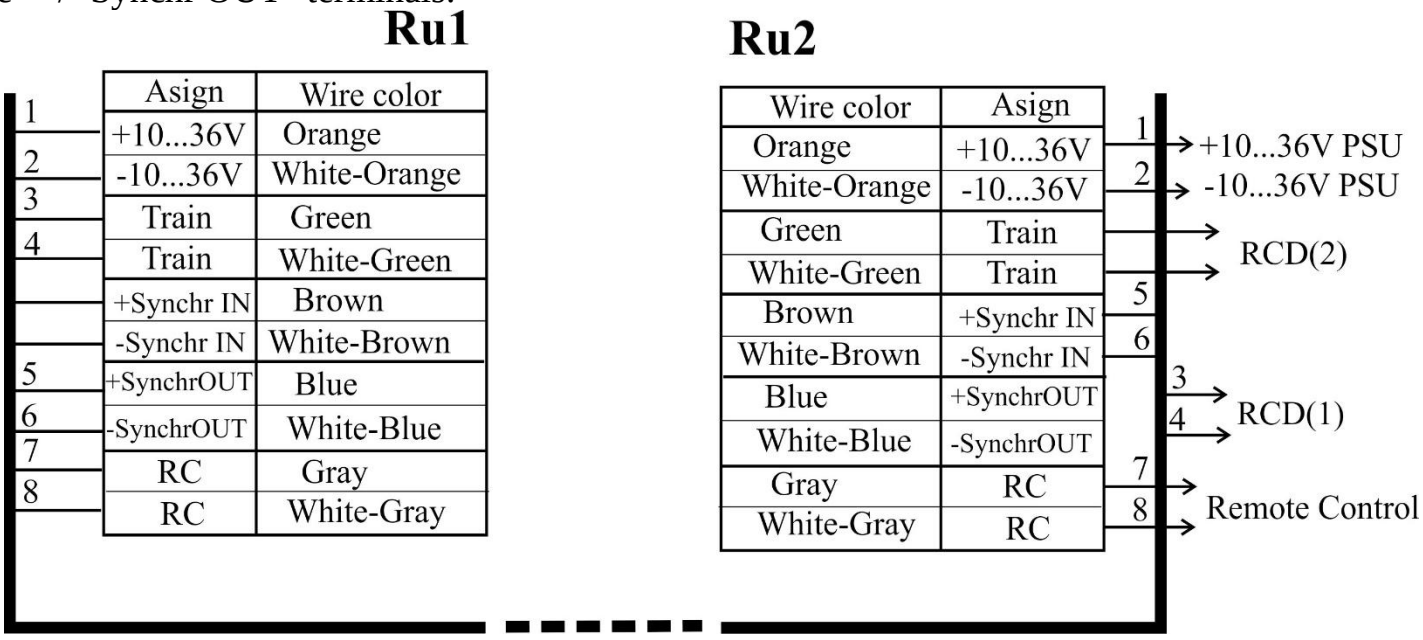


Fig. 7.12

Notes. 1) To connect the cable wires, press the contact lever, insert the conductive core into the opened contact hole, and release the lever; 2) Install the terminal resistor necessary for the receiving and monitoring device into the terminals of the RC and monitor the terminals of the RC, while the value of the RC is determined by the resistance required to maintain the STANDBY MODE of the receiving and monitoring device; 3) The cross-section diameter of the wires connected to the terminals should not exceed 2.5 mm.

7.3.2 Insert the grounding wire into the contact hole of the grounding terminal and fix it with a bolt.

8. PREPARING THE DETECTOR FOR OPERATION

8.1 Checking the detector's power supply

8.1.1 Open the protective cover RU. 8.1.2 Apply the supply voltage to the terminals "Uit" RU, and the indicators must turn on and off again. "0", "1", "2".

8.2 Checking the detector's operability

8.2.1 The operators should be positioned within line of sight, one at RU and the other at a distance of 5 m from SE (starting position).

8.2.2 After 60 seconds after switching on, the detector switches to STANDBY MODE, in which the indicators on the front panel of RU do not light up (if there are no people in the area).

8.2.3 If STANDBY MODE is not set, turn off the power, eliminate possible defects in accordance with the instructions in sec. 14 and repeat clause 11.1.4.

8.2.4 Check the detector in the REMOTE MONITORING MODE, for which, for a period of 1...2 seconds, using the health check button on the receiving and monitoring device or in another way, briefly apply a voltage of 12…36 V to the terminals "DC" RU. In response to the DC signal, the detector should form an ALARM, and the "0" indicator should pulse (turn on and off eight times) on RU panel.

8.3 Setting up the detector

8.3.1 Reset the controls to their original position: Turn the control "A" all the way counterclockwise to the initial position (minimum sensitivity), and turn the control "V" all the way clockwise (highest maximum speed).

8.3.2 Adjust the sensitivity according to the width of the zone (regulator "A", see Fig.8.1) and the speed (regulator "V") of the movement of the "intruder" moving in the positions "tall", "bent", "bent low". When the controls are rotated clockwise, the corresponding parameter increases.

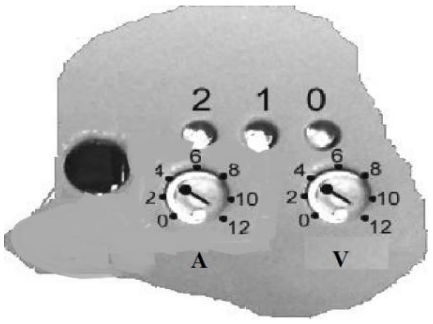


Fig. 8.1

8.3.3 Check the absence of people and animals at a distance of 5 m from SE wires. The first operator should be positioned at SE in such a way that it is easy to observe the glow of the indicators, and the second operator should be at the turn at a distance of 4-5 m from SE wires and 10-15 m from the RU. Pause for 3-5 minutes…

8.3.4 Command the operator at the turn to approach SE wires (for the ground-level version of the SE) in the "up" position at a speed of about 0.5...0.7 m/s and stop when the indicator "0" is turned on, while defining the horizontal size (width) of SE as twice the distance from the operator to UW SE. If the width of the zone is insufficient, the operator must turn the control "A" clockwise and check the width of the zone, while it is necessary to set it to the position in which an alarm signal is generated when the "intruder" hits the imaginary zone (the "0red" indicator flashes 8 times). Continue adjusting until the desired result is achieved. If necessary, increase the size of the PO by rotating the regulator "A" clockwise, or decrease the size of the PO by rotating the regulator "A" counterclockwise. Between the operator's approaches to the SE, pause for 2...3 minutes while in the starting position.

8.3.5 Instruct the operator at SE to cross the controlled boundary in both directions in the "bent" position (for the visor option between SE wires in any way) at the maximum possible speed, pausing 2-3 minutes between crossings. Rotate the axis of the "V" controller counterclockwise 1-2 degrees until the alarm stops forming (the "0red" indicator). Continue adjusting until the desired result is achieved. Create a small margin by turning the "V" control axis 0.5 degrees clockwise. If necessary, adjust the width of the PO by repeating clause 8.3.4.

8.3.6 For the operator to move away from the wires at a distance of more than 5 m. The operator has to watch the "0" indicator and not move for several minutes. The indicators should not light up or blink. If the "0" indicator is turned on, identify and remove the source of interference or reduce the width of the zone by repeating clause 8.3.4.

8.3.7 For ground-level options, give the command to the operator at SE to cross the zone in the "standing" or "crouching" positions while running, as fast as possible. Monitor the alarm signal formation (8-fold flashing of the indicator "0red").

8.3.8 Close the protective cover RU and check the operability of the detector by monitoring the operation signals using the central control panel.

8.4 Checking the detector

8.4.1 The operator at the turn must cross the line in any places and in various positions (for the ground-level version of the zone "standing", "bending", "squatting"), subject to mandatory crossing of the zone. After each activation of the alarm indication, the operator at the turn should immediately move away from the conditional centerline at a distance of at least 5 m. 8.4.2 The operator must monitor the formation of ALARM signals.

8.4.3 The Operator must make crossings at various points of the controlled boundary. Pause for 3-5 minutes in the starting position between the operator's approaches to the SE. The operator at RU should record the issuance of an alarm signal based on the intermittent glow of the "0red" indicator.

8.4.4 For the surface version without a defense, determine the width of the zone, for which to give the operator at SE a command to cross the boundary in the "height" position. When the alarm is activated, mark the distance from the operator to UW SE.

8.4.5 Close the protective cover RU and check the operability of the detector by monitoring the trigger signals using the control panel.

8.4.6 In case of false alarms of the detector, change the setting and perform a check and a control run of the detector.

The detector is in standby mode.

9. MAINTENANCE REGULATIONS

9.1 Maintenance of the detector provides for the planned semi-annual performance of a complex of preventive work in the following scope: external inspection of the detector; checking the condition of SE wires; checking the mounting and connection elements of the SE; checking the operability of the detector.

9.2 Methods of carrying out maintenance operations.

9.2.1 Upon external inspection, check: whether the protective covers RU is tightly closed; no discoloration, traces of corrosion; no gusts and cuts on the wires SE and connecting cables; no sagging of SE wires more than 50 mm and no ice on SE wires; reliable mounting of detector blocks, SE wires and grounding.

9.2.2 To check the detector's operability, the operators should be positioned within line of sight, one at RU and the other at SE in the initial position. The operator must overcome obstacles at various points of the guard line and return to the starting position. The operator at RU should record the alarm signal. Overcome after (2…3) m. In alarm mode, the corresponding indicator lights intermittently on the front panel of the RU.

9.2.3 Check the secure fastening of the mounting brackets of SE elements and the fastening of the wires to the dielectric consoles and contacts UW and LW, if necessary, secure them.

9.2.4 Check the condition of SE wires and connecting cables.

9.3 Routine maintenance requires: an ampervoltmeter; screwdrivers; keys; pliers; wire cutters; ladder.

10. RULES OF STORAGE AND TRANSPORTATION

10.1 The detector must be stored in the manufacturer's packaging.

10.2 The detector must be transported in its original packaging.

13. TYPICAL MALFUNCTIONS AND METHODS OF THEIR ELIMINATION

Manifestation	Probable cause	Method of elimination
1. The indicators do not turn on on RU panel	a) There is no supply voltage b) the cables are incorrectly connected	a) Fix the faulty cables b) check the correct connection
2. An ALARM is continuously issued	a) the upper or lower wire is broken or "shorted" of these wires; b) the total length of SE is greater or less than specified in clause 3.2.	a) restore the integrity of SE wires b) bring the length of SE in accordance with the instructions in section 3.2

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