Astra-642

Ultrasonic Volumetric Detector

Operating Manual

The operating manual describes the operating principle, operational and maintenance conditions pertaining to ultrasonic volumetric detector Astra-642 (hereinafter "detector") (Fig.1).
The manufacturer reserves the right to introduce changes which update and retrofit the detector without prior notice. All such changes will be described in an updated revision of the operating manual.

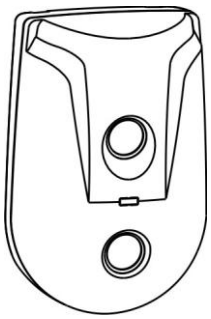


Fig. 1

1 Function

The detector detects intrusion into a protected volume of a closed room and generates an alarm notification by opening output contacts of the signaling relay.

The detector is powered by any DC source with rated voltage of 12V and pulsation amplitude not exceeding 0.1V.

2 Operating Principle

2.1 The operating principle of the ultrasonic channel (hereinafter referred to as the US-channel) is based on the Doppler Effect – changes in frequency of ultrasonic waves emitted by the detector, when they are reflected from a moving object.
An electric signal from the ultrasonic sensor is sent to a microcontroller, which – if signals are present in both channels and in accordance with a present operation algorithm – generates the "Alarm" notification by opening the output circuit of the optic-electronic relay.

2.2 Schematics of the detection zone are shown in Fig. 2.

***Note** – The US-channel detection zone depends on a specific room: some objects absorb or reflect ultrasound, thus distorting the detection zone.*

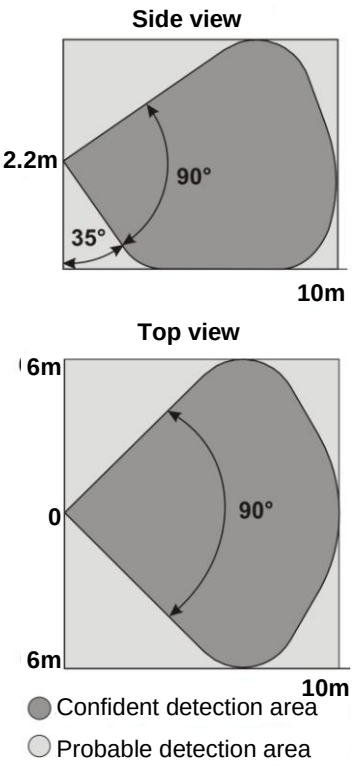


Fig. 2

3 Specifications

Technical Parameters of US-channel

Intrusion detection range, m, min 10
Confident detection area angle
in horizontal and vertical plane, ° 90
Operating frequency, kHz 25
Movement speed detection range, m/s ..... from 0.3 to 2.0
Recommended mounting height, m 2.2

General Technical Parameters

Power supply voltage, V ..... from 8 to 15
Current consumption, mA, max 25
Readiness time, s, max 20
Permissible current through relay contacts, A, max 0,08
Permissible voltage on relay contacts, V, max 100
Resistance of the circuit, included in the alarm loop
in standby mode, Ohm 16
Overall dimensions, mm, max ..... 106.5×72×38
Weight, kg, max 0.08

Operating Conditions

Temperature range, °C ..... from -10 up to +50
Relative air humidity, % ..... up to 95 at + 35 °C
no moisture condensation

4 Delivery Set

Ultrasonic volumetric detector Astra-642 ..... 1 pcs.
Bracket ..... 1 pcs.
Screw 2,9x25 (or 2-3x30) ..... 2 pcs.
Dowel 5x25 ..... 2 pcs.
Sealing material ..... 1 pcs.
User Instruction ..... 1 copy.

5 Structure

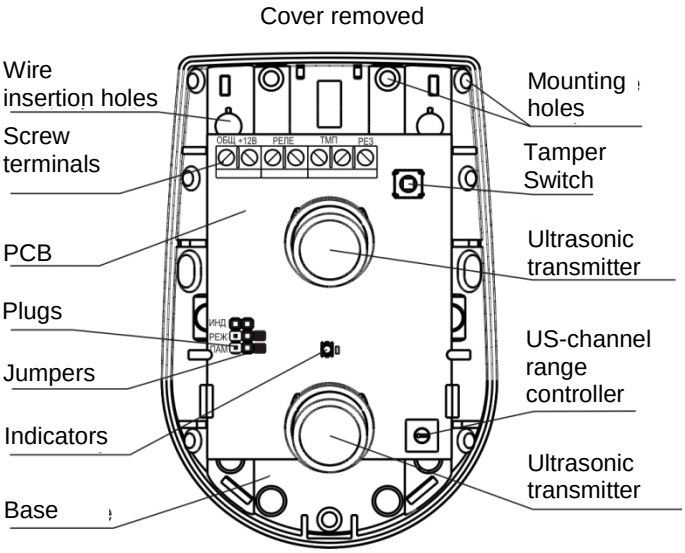


Fig. 3

Structurally, the detector is a unit comprised of a base and a removable cover.

The unit houses a printed circuit board with radio elements, screw terminal blocks for external connections, ultrasonic transmitter and receiver (Fig. 3).

A switch installed on the printed circuit board generates a "Tampering" notification when the cover is detached by opening the TMP circuit (irrespective of whether or not the detector power supply is switched on).

The following indicators are mounted on the printed circuit board: red – for detector status monitoring, blue – for interference indication.

The US-channel detection range can be adjusted using the US-channel range controller.

6 Information Capacity

Table 1 – Notification – Indicator and relay

Type of notification	Indicator	Relay
Detector standby mode start	Blinks **red and blue alternatively** after power up. Duration – up to **20 s**	For up to **20 s**
Norm	Not lit	
Alarm	Lights up **red once for 4 s** if a person is detected moving in the detection area (if indication is permitted)	For **4 s**
Alarm in "Alarm memory" mode	**Fig. 4**	For **4 s**
Failure	Lights up **red** until failure is eliminated	Until failure elimination
Interference	Blinks **blue** for as long as interference is present (if indication is permitted)	
Tampering	Not lit	ТМП
"⎍" –relay is closed, "⎍" –relay is open, "ТМП ⎍" – TMP circuit is open		

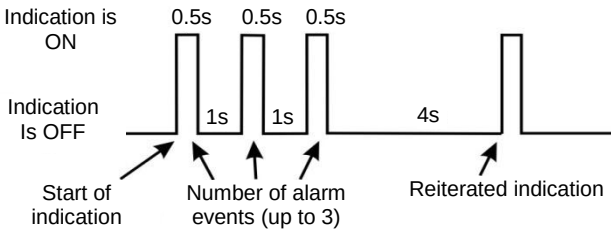


Fig. 4

7 Operating Modes

Table 2 – Operating modes and settings

Operating mode	Plug	Jumper position
Indication ON	**ИНД**	+
Indication OFF		–
High detectability	**РЕЖ**	+
Normal detectability		–
"Alarm memory" ON	**ПАМ**	+
"Alarm memory" OFF		–
"+" - jumper is installed on both plug pins "–" - jumper is removed (or installed on one plug pin)		

- **The "Alarm memory" mode** allows registering the fact and number of zone violations in prortected area, and is reflected in corresponding notification .

The mode is activated in 1 minute after installation of **ПАМ** plug or in 1 min. after starting of detector stand-by mode with jumper installed previously on **ПАМ** plug. "Alarm" notification is indicated in 1 min. after violation of protected area. To switch the mode off and reset indication, remove jumper from **ПАМ** plug or switch power off.

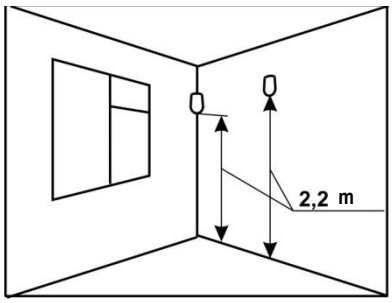
8 Installation and Pre-starting Procedure

8.1 Works on installation, mounting, maintenance and operation of detector should be performed by only qualified persons.

8.2 After transportation in conditions differing from those of operation keep detector unpacked under supposed operation conditions for at least 4 hours.

8.3 Selecting a Location

8.3.1 Recommended mounting height



8.3.2 The detector shall be mounted on load-bearing, vibration-free structural elements.

8.3.3 Alarm loop and power circuit wires shall not be located near power cables.

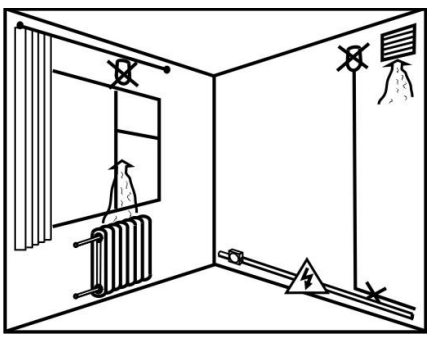
8.3.4 This detector type allows mounting several detectors in the same room. Detectors shall be placed **not closer than 5 m** from each other.

8.3.5 It is not permitted to operate the detector in a room with noise levels exceeding 75 dB.

8.3.6 Do not mount the detector near curtains (blinds) and other object which may move when air currents move through the room.

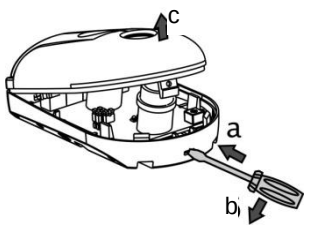
8.3.7 When a room is being protected, it is recommended to close doors and ventilation windows, switch off fans, air conditioners and other possible sources of strong air currents, and make sure there are no animals and insects in the room.

8.3.8 Non-recommended mounting locations

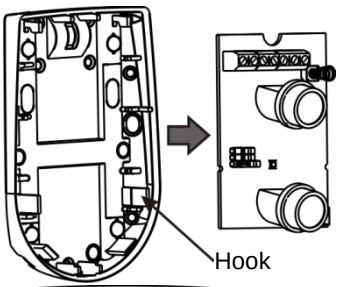


8.4 Installation Procedure

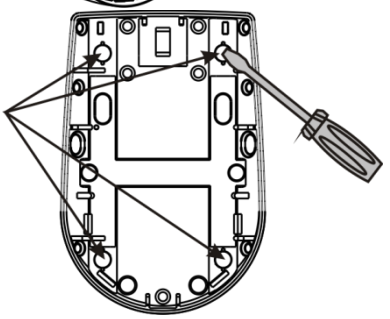
Step-1
Push out cover lock from base slot.
Remove cover



Step-2
Unbend hook on the base.
Remove PCB

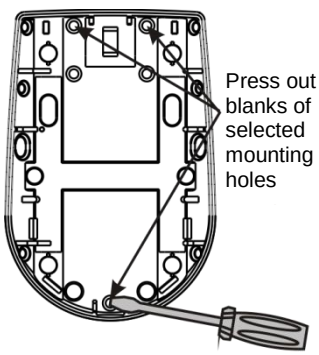


Step-3
Press out blanks of selected wire holes

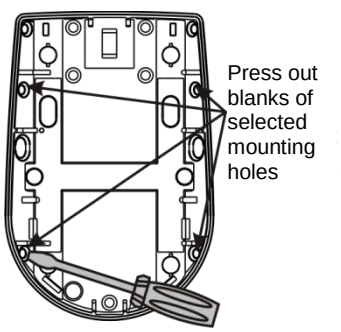


Step-4 Choose mounting option: **a, b** or **c**

Step-5a
WALL-MOUNTED

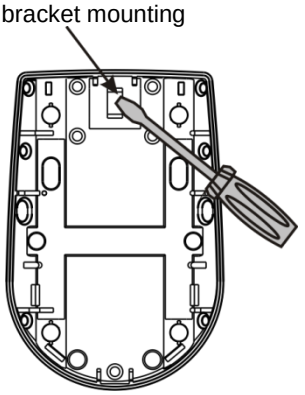


Step-5b
CORNER-MOUNTED



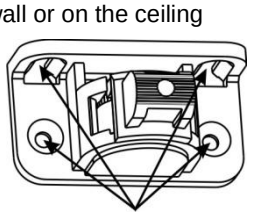
Step-5c
BRACKET-MOUNTED

Press the slot blank for bracket mounting



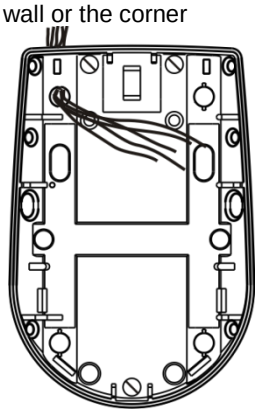
Step-6a,b
Bring the base against a wall at a required height and mark the wall.
The detector base shall be positioned in strict accordance with item 4a figure

Step-6c
Bring the bracket against a place you want to mount the detector on and mark the mounting holes.
Mount the bracket on a wall or on the ceiling



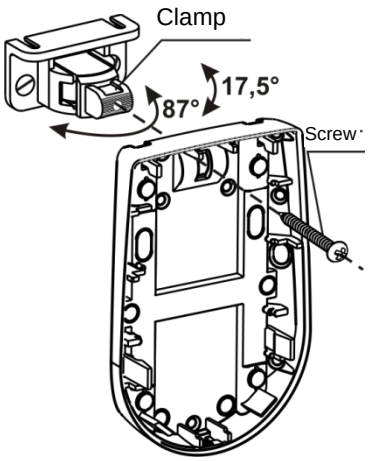
Mounting holes

Step-7a,b
Pull power supply and alarm loop wires through the dedicated wire insertion hole in the detector base.
Attach the base to the wall or the corner



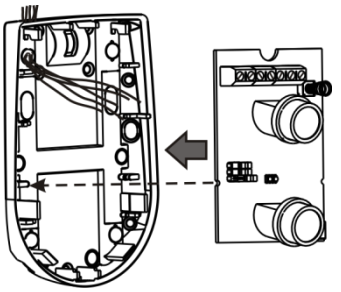
Proceed to step 9

Step-7c
Superpose bracket clamp with base slot of the detector. Drive a screw partially into the bracket clamp from the inside of the detector base.
Position the detector as required and tighten the screw. **The bracket provides for detector rotation for 87º in horizontal plane**

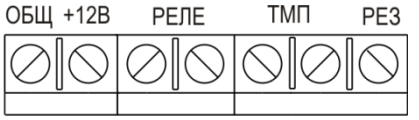


Step-8
Pull power supply and alarm loop wires through the dedicated wire insertion hole in the detector base

Step-9
Place the printed circuit board back into the base, match the PCB slots with guides on the base. Press on the PCB until it clicks in position



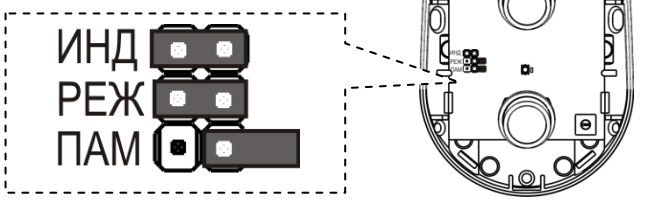
Step-10 Connect the wires to detector terminals.



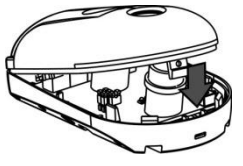
A reserve terminal **РЕЗ** is provided for connection of a terminal resistor

Step-11
Seal the wire insertion hole and other holes with the sealing materials included in the delivery set to prevent air currents and insects from getting into the detector

Step-12
Install jumper on **ИНД** and **РЕЖ** plugs.
Remove jumper from the **ПАМ** plug



Step-13
Place the detector cover back into its position (until it clicks shut)

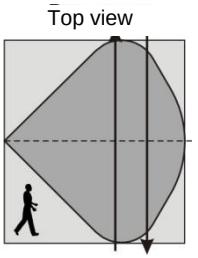


Step-14

Switch on the detector power supply, **red and blue** indicators shall **alternatively** blink for not more than 60 s – it means the detector is being switched to the standby mode.
If within **30 s** after switching to the standby mode the detector gives the "**Interference**" notification:
1 Make sure there is no extra emission on the operating frequency of the detector and exclude such emission if present.
2 Remove any object, vibrating/moving rhythmically by the detector.

Step-15

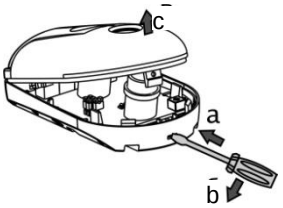
Make a **TEST-pass** through a protected area with speed of **0.3** m/s and **2** m/s.
Make sure the "Alarm" notification is given for every movement (the indicator lights up **red** for **4 s**).
Repeat the **TEST-pass** in different directions



Step-16

Push out cover lock from base slot.

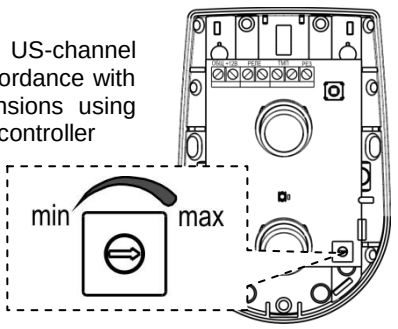
Remove detector cover



Step-17

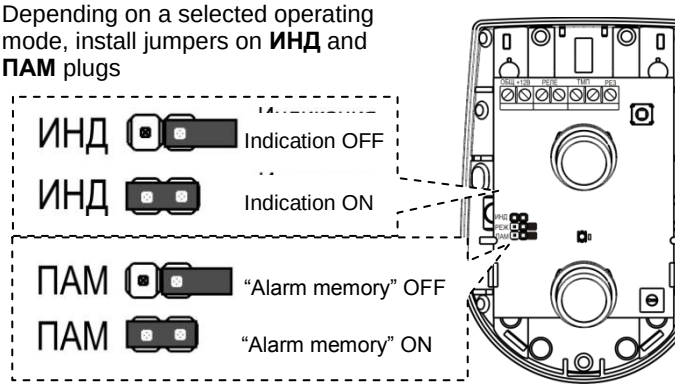
If required, adjust the US-channel detection range in accordance with protected room dimensions using the US-channel range controller

min – 5 m range;
max – 10 m range



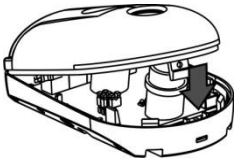
Step-18

Depending on a selected operating mode, install jumpers on **ИНД** and **ПАМ** plugs



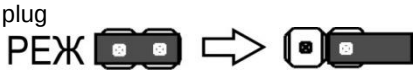
Step-19

Place the detector cover back into its position (until it clicks shut)



Step-20

If during alarm system testing in the initial operating period (1-2 weeks) you receive false "Alarm" notifications due to specific characteristics of a protected room, remove jumper from **РЕЖ** plug



8.5 To provide for reliable operation of the alarm system it is recommended to **test** and **maintain** the detector **at least once a month.**
The detector shall be tested in the following way:
- walk through the detection zone;
- make sure that the "Alarm" notification is present on the control panel and, if indication is permitted, on the detector indicator (lights up once for 4 s for each movement).

The detector shall be maintained in the following way:
- inspect integrity of the detector body, reliability of contacts and mounting, clean the detector from any dirt accumulated.

9 Labeling

The following data are shown on the label glued to the body:
- manufacturer trademark;
- detector abbreviated designation;
- firmware version;
- month and year of manufacture (last two digits);
- conformity mark (if the conformity certificate is available);
- bar code, duplicating textual data.

10 EC Conformity Declarations

This product is in conformity with the provisions of:
EMC 89/336/EEC
EN 61000-6-3:2005 Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments
EN 50130-4/1995 + A1:1998 + A2:2003 + Corrig. 2003 Alarm systems - Part 4: Electromagnetic compatibility - Product family standard: Immunity requirements for components of fire, intruder and social alarm systems
EN 60950-1: 2001+A11:2004+Corrig.2004 Safety of information technology equipment

11 Recycling

The detector does not pose any life or health risk to individuals or to the environment. Once its service life is complete, the detector may be utilized with no special environment protection measures.

12 Manufacturer Warranties

12.1 Quality Management System meets provisions of ISO 9001-2011.
12.2 The manufacturer warrants that the detector will meet requirements of technical specifications if a user follows all shipping, storage, mounting and operating guidelines.
12.3 Guaranteed storage life – 5 years and 6 months from the manufacture date.
12.4 Guaranteed service life – 5 years from the commissioning, but not more than 5 years and 6 months from the manufacture date.
12.5 The manufacturer shall repair or replace a faulty detector during the warranty period.
12.6 The warranty becomes void if:
- the user does not follow guidelines of the operating manual;
- the detector is mechanically damaged;
- the detector is repaired by a party other than the Manufacturer.

12.7 The warranty covers the detector only. All equipment manufactured by other parties and used with the detector is covered by its respective warranty.
The manufacturer shall not be responsible for personnel death, injury, and damage to equipment or other accidental or deliberate losses based on user's claims that the detector failed to function properly.

Warranty service and technical support:
ТЕКО-TD

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