BRK-RL

Mobile microwave barrier

Installation manual

English version 15/01/2009

Dear **Customer**,

We thank you very much for choosing our item. Now we would like to invite you to read carefully the following instructions before installing the product in order to use all its capacities.

Warning: We remind you that the installation should be realized by a qualified person. The installer must respect all the standards and regulations. The manufacturer or distributor will decline any responsibility in case of improper use by the user or incorrect installation by the installer. Any modifications carried out NOT by a qualified person can damage the device.

This operation manual contains information concerning application, design, operation, technical specifications, structure of security detector **BRK-RL** and installation / maintenance instructions necessary for the most effective usage of its technical potential.

Note: Manufacturer constantly works on the improvement of the device, thus some modifications can be made, which, however, do not affect its normal function.

PACKAGE CONTENTS (MICROWAVE BARRIER)

Item description	Quantity
Transmitter	1
Receiver	1
Installation assembly kit • 2 tripods (support) • 2 springs • 2 fixing screws (self-tapping screw) • 2 fixing springs	1
Power supply accumulator	4
Bag	1
Installation manual	1

Note: For the operation of the mobile microwave detectors you may need a charger unit for the detector accumulators, and a PST unit to receive the signals from the detector.

PACKAGE CONTENTS (ALARM RECEIVER)

Item description	Quantity
Receiver unit	1
Power supply accumulator	1
Charger unit for receiver accumulator	1
Antenna	1
Bag	1

CONTENT

The **BRK-RL** is a mobile double position microwave detector for outdoor applications. It comprises a transmitter and a receiver unit, which create a perimeter protection with coverage up to 100 m. The transmitter and receiver should be mounted facing each other during operation. The dimensions of the detection zone vary according to the distance between the receiver and transmitter units.

The **BRK-RL** microwave barrier is an advanced detection system, utilizing microwave technology, eliminating false alarms while maintaining high security standards for the detection of human intruders into the protected area.

The **BRK-RL** is designed to the temporary protection of medium areas. It can be quickly and easily installed by using the provided tripod. It provides a solid barrier protection and blocks all perimeter activities. The barrier rejects interferences caused by birds and small animals due to its powerful method of false alarm elimination.

The **BRK-RL** is designed for continuous round-the-clock operation and keeps its characteristics within a wide temperature range of -40 °C up to +50 °C.

Main features

- Detection zone range: 5 – 100 m
- Operating temperature: -40 °C to +50 °C
- Accumulator capacity: approx. 600 hours
- Detection speed range: 0.3 – 8.0 m/s
- Detect human intruders walking, running or crawling
- Immunity to small animals and birds motion in the detection zone 5 m away from the detector
- Quick and easy installation on the provided tripod
- Anti dust and water resistant housing (IP55)
- Protection against: Power supply failure, direct sunlight, precipitation (rain and snow), wind up to 20 m/s, snow up to 0.4 m, grass up to 0.3 m.

SELECTING MOUNTING LOCATION

The installation of the **BRK-RL** requires that the transmitter and the receiver face each other, so that the two antennas may be correctly aligned.

- The two units must be positioned in direct line at the edge of the area.
- The protected zone must be free from obstacles like walls, fences, trees, ditches, metal objects or other microwave detectors and systems.
- For proper operation of **BRK-RL,** type of ground should be one of the following: asphalt, cement, soil, clay, gravel or grass (mown).

Avoid the following locations

Avoid installation of **BRK-RL** on the following type of ground: thick vegetation, grass (not mown), water, sand and metal.

The ground must not have movable parts near the sensitive zone, any grassy areas must be frequently mown, there should not be any flowing water (especially longitudinally), ground where structural features may be changed.

The installation site should satisfy the following requirements (see fig 1 and fig 2):

- The surface of the site should be leveled with a maximum slope angle of 15°
- No obstacles as bushes or group of trees or walls and fences, metal objects, within a distance of 2 m from the centerline between the two units
- Depth of snow on the ground should not be more than 0.4 m
- Height of the grass on the ground should not exceed 0.3 m. It is important to mow the grass regularly to avoid its movement interfering with the microwave signal.

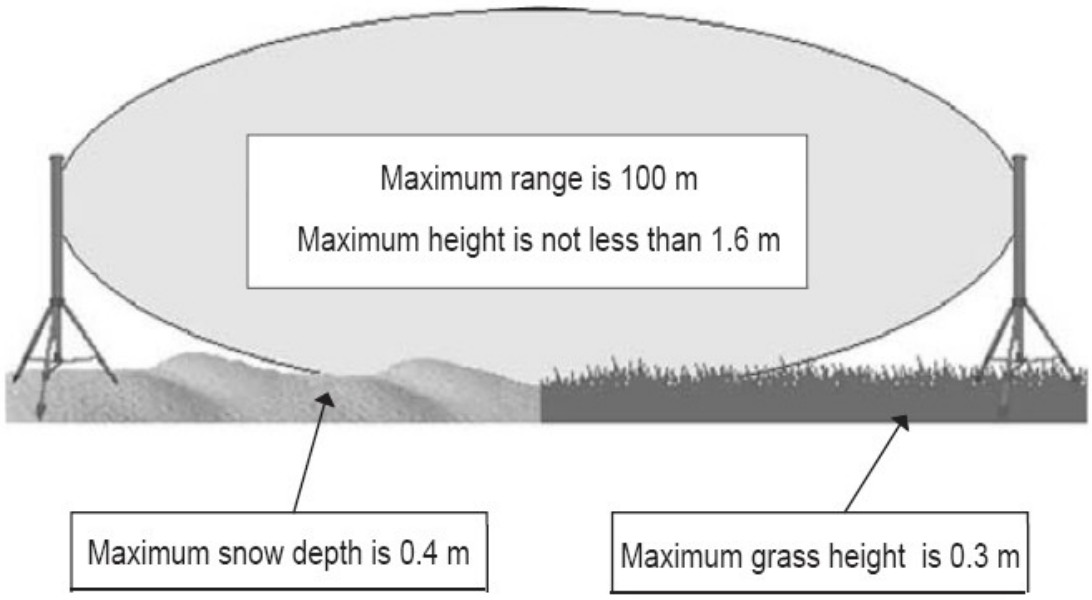

Fig. 1. Approximate detection (protection) zone shape

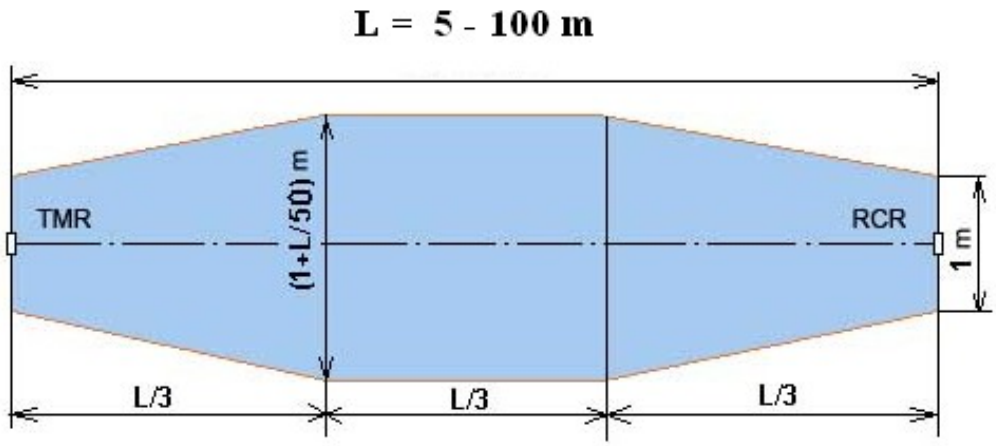

Fig. 2. Approximate clear zone shape

Note: The real detection zone is always narrower than the clear zone in Figure 2. But no obstacles allowed to be in the clear zone to avoid false alarms.

- No transport vehicle moving is allowed within a distance of 3 m from the centerline between the two units.
- In case the detector is installed near railroad lines and main roads, the distance should be at least 6 m from the centerline between the two units.

MOUNTING THE DETECTOR

Installation on tripod

The detector has an individual power supply and a built-in radio channel transmitter. The receiver and transmitter unit is shown in Figure 3.

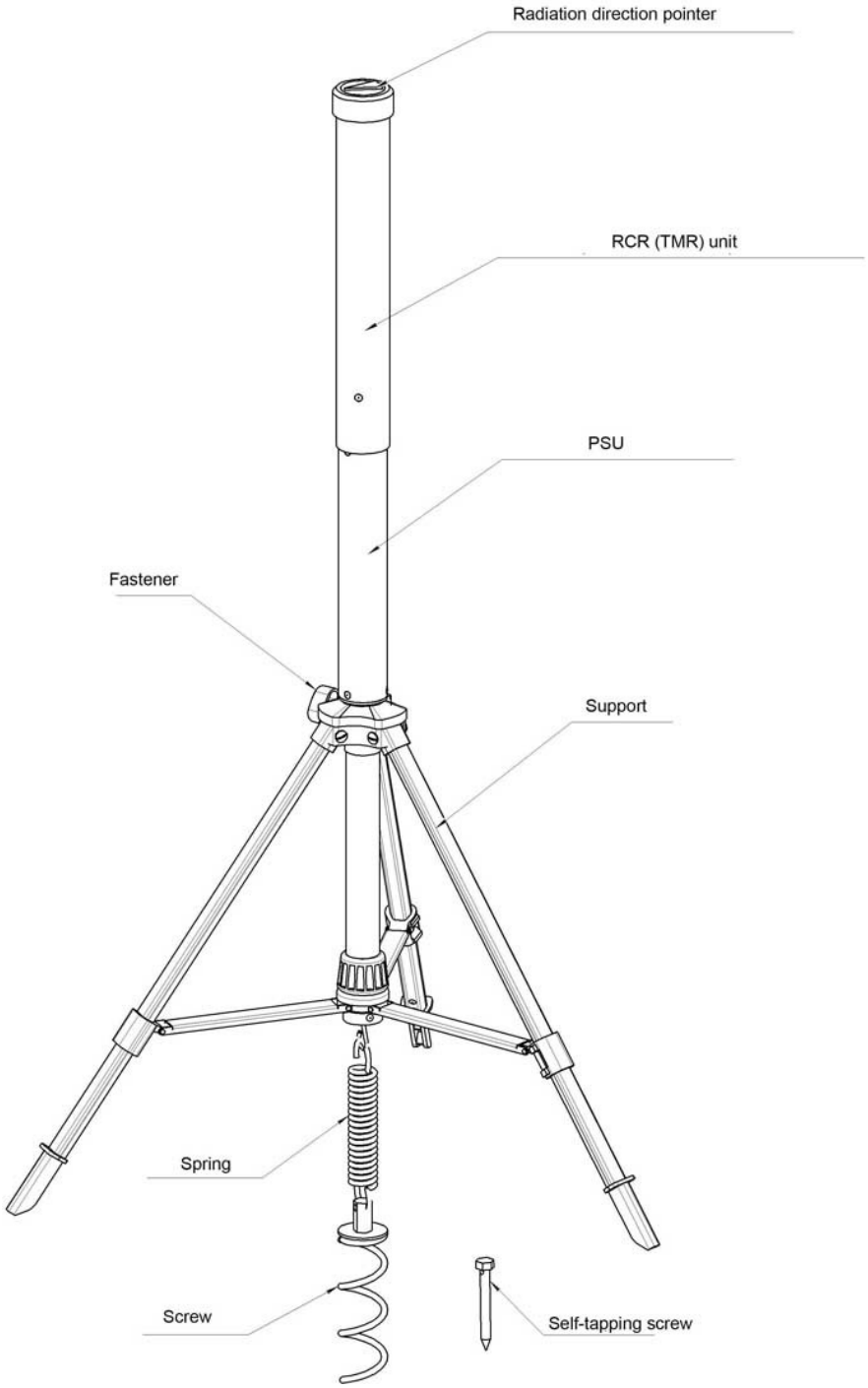

Fig. 3. Detector's design

Receiver and transmitter units are enclosed in cylinder pipes made of impact-proof glass-fibre plastic. The units include electronic modules. The radio channel transmitter is built in the receiver unit. The units have anti-dust and water resistant housing.

To carry out receiver / transmitter installation, put up the tripod. The accumulator should be fixed on the tripod first, then the receiver / transmitter unit should be fixed on it. To tightly fasten the detector to the ground, use a screw from the set for soft surfaces or a self-tapping screw for hard surfaces. To insert a screw/self-tapping screw in the ground use the spanner from the set.

Note: Connect the accumulator to the detector carefully, not to damage the pins.

Installation procedure

- Install the tripod and fasten the support with a spring and a screw.
- Install the power supply unit on the tripod.
- Fix the transmitter unit to the accumulator and direct it at the place where the receiver will be installed (the pointer on top of the transmitter shows radiation direction).
- Use the screw on the tripod to fix the accumulator.
- Install and fix the receiver unit the same way as the transmitter. The distance and area between the receiver and transmitter should comply with requirements in the manual.

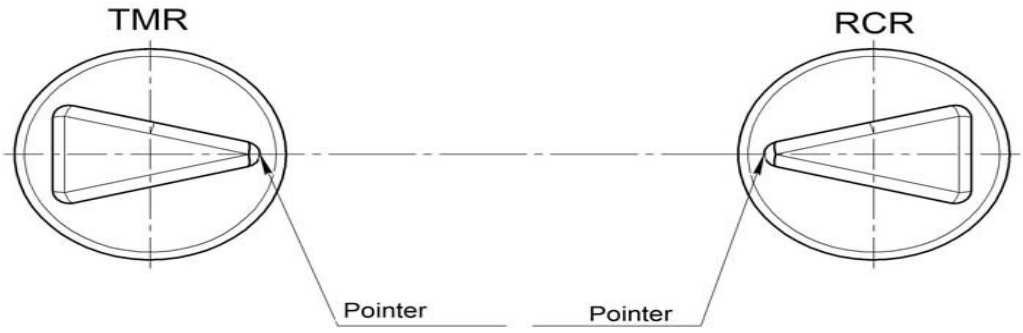

Fig. 4. Detectors' alignment

Cross installation

In order to avoid "dead zones" under aerials and to increase the protected area it is possible to install multiple **BRK-RL** systems with overlapping. Overlap configurations are performed

with the units located at the angles of protected area. The minimum overlap for effective protection must be at least 1.5 - 2 m (depending on the transmitter and receiver distance).

Note: The recommended way is to install transmitters only or receivers only at the point of overlap.

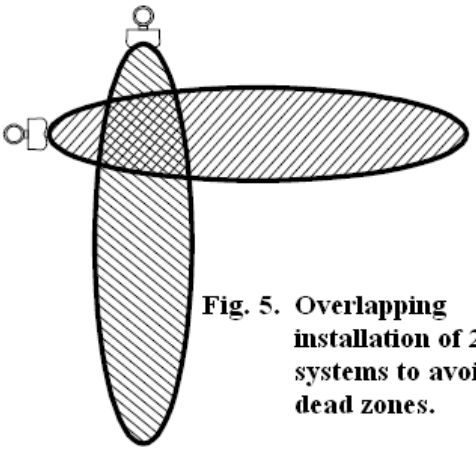

Fig. 5. Overlapping installation of 2 systems to avoid dead zones.

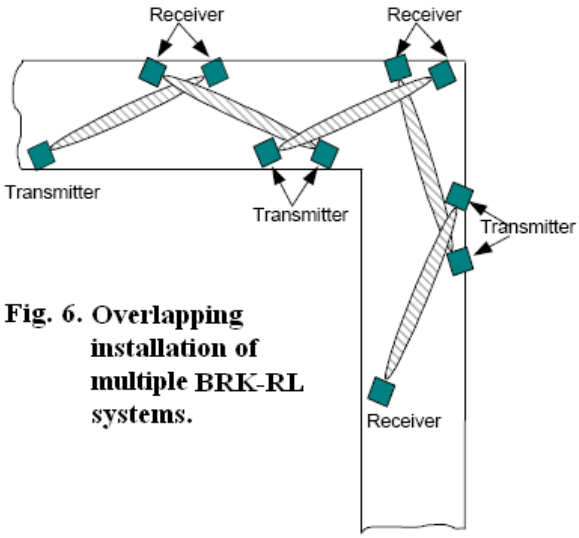

Fig. 6. Overlapping installation of multiple BRK-RL systems.

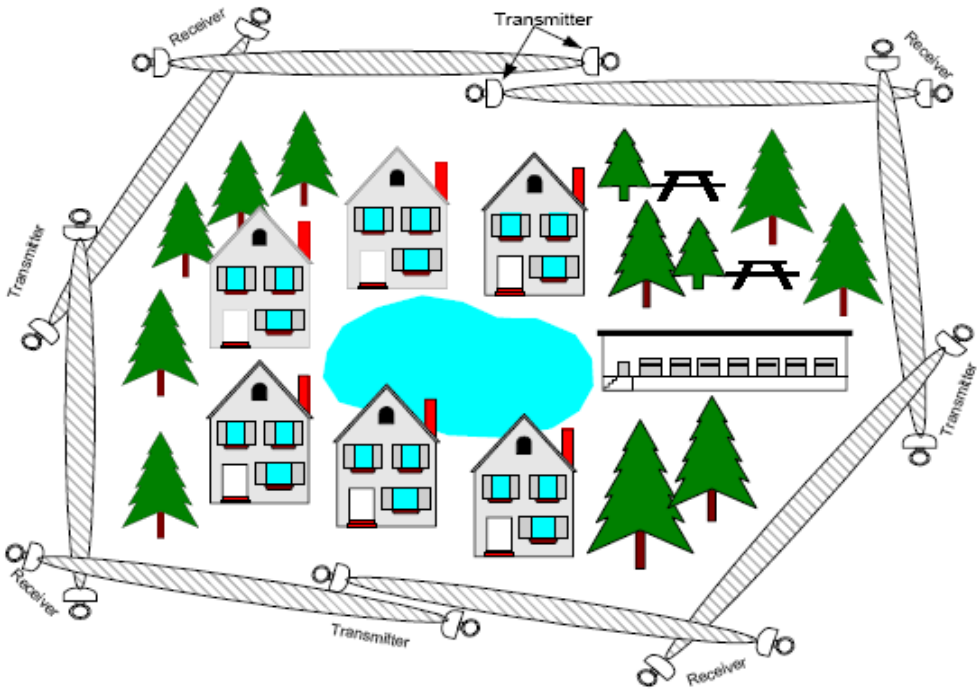

Fig. 7. Overlapping installation of BRK-RL systems for perimeter protection

Note: Avoid installation in a way where the reflected microwave signals (by metal fences and other metal objects or by wet surfaces after rain and snow) may cause interference and false alarms.

DETECTOR WIRING

Note: The meaning of signs on the devices the following:
ПРД = Transmitter unit
ПРМ = Receiver unit.

Connection to alarm control panel

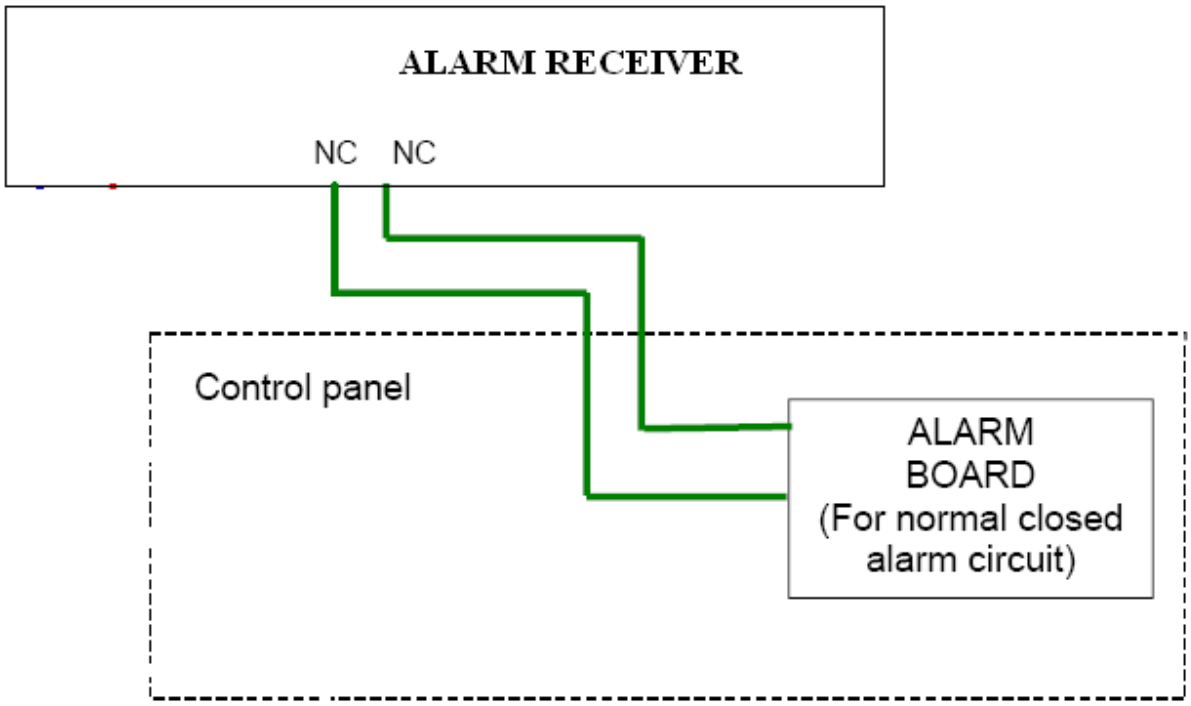

Fig. 8. Connection to alarm control panel

Note: The alarm relay loading capacity is up to 72 V @ 0.1 A.

Note: All the electronic connections should be carried out only after power is disconnected.

POSITIONING AND FOCUSING

Direct the transmitter at the place where the receiver will be installed (the pointer on top of the transmitter shows radiation direction).

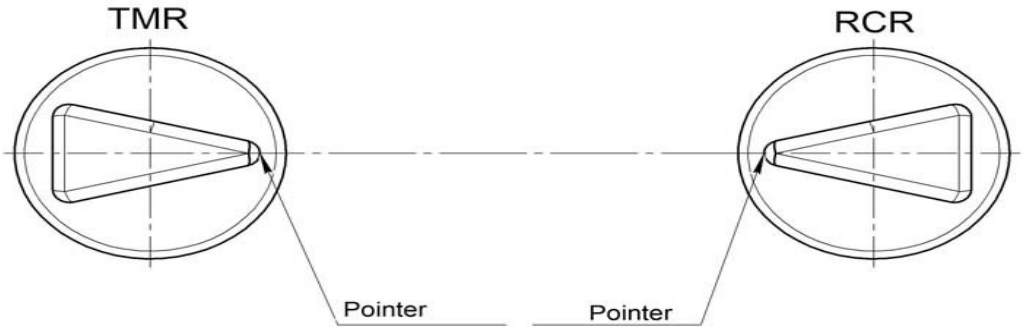

Fig. 9. Detectors' alignment

1. The distance and area between the receiver and transmitter should comply with requirements in the manual.
2. Connect the transmitter and the receiver to the accumulators, then to the tripod.
3. In standby mode no alarm message should be generated at the alarm receiver unit.
4. Perform check-crossings along the full detection zone length, to check if the detector indicates an alarm signal (with the number of the detector) on the alarm receiver unit. Check-crossings should be performed:
   - in an upright and crawling position in the middle of the detection zone
   - in an upright and crawling positions at the distance of 3-5 m from the transmitter and receiver units
5. After each alarm signal you need to press the СБРОС (reset) button on the alarm receiver unit to reset the alarm.

OPERATION AND TUNING

The transmitter and receiver units have to be placed on the opposite sides of a protected site. The transmitter sends microwave impulses to the receiver. The receiver analyzes the amplitude and temporal characteristics of the received signal and if these characteristics match the **intruder** model, the detector transmits an alarm signal to the alarm receiver unit.

To switch on the alarm receiver unit set the toggle switch into the ПИТ (On) position. After power up (number registration switch /learning toggle/ is off) the alarm receiver unit is in the standby mode. The display shows "–", no tone signals are generated, the output relay circuit is closed.

After a receiver unit is fixed to the accumulator, the detector generates an alarm message which indicates power up of the detector.

The alarm receiver unit is designed for reception of messages from detectors and indication of them. The alarm receiver unit is shown in Figure 10. The unit is enclosed in a metal housing and consists of two electronic modules: radio channel receiver with sound and alarm indicators and a voltage converter module. An antenna is fixed on top of the receiver housing, the accumulator is fixed on the back side. The number registration switch is covered with a lid. The alarm receiver unit receives radio signals from detectors, analyses their individual numbers and generates alarm signals.

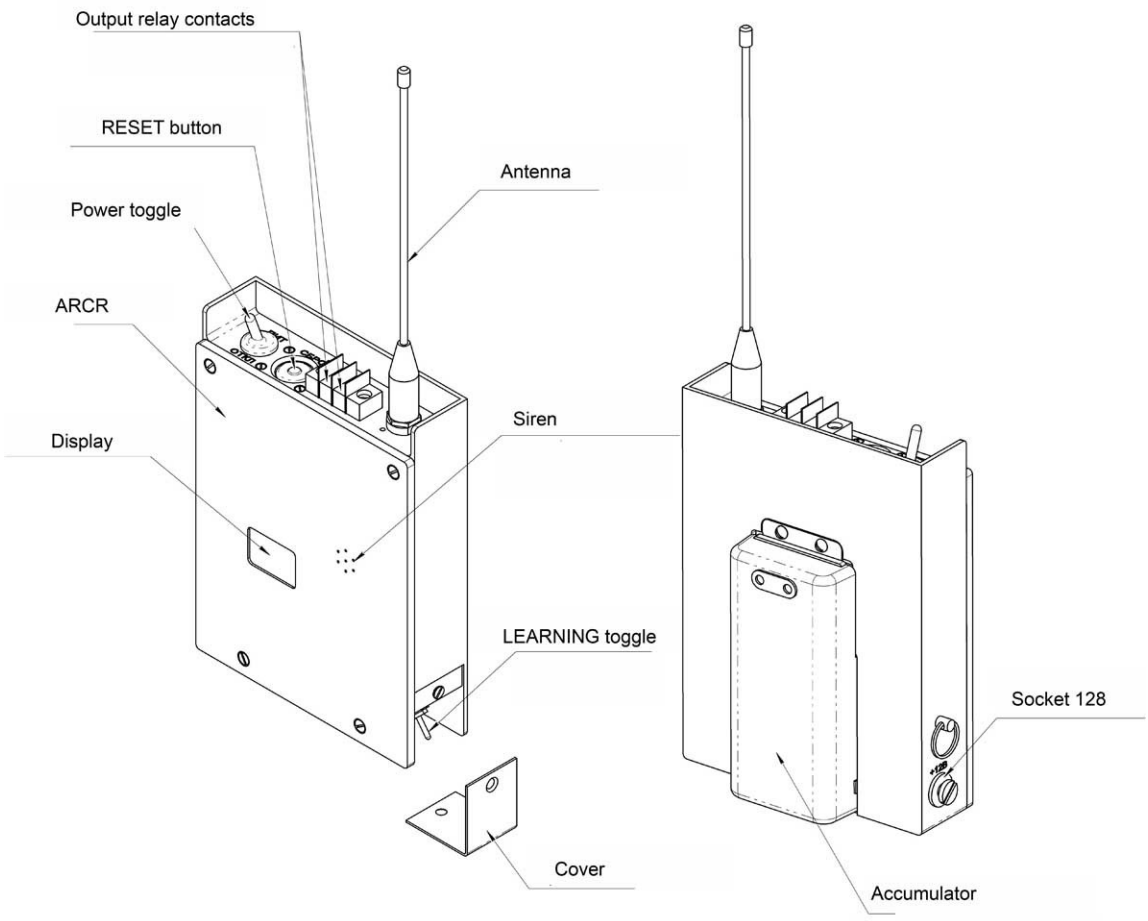

Fig. 10. Alarm receiver design

Note: Up to 20 detector can be registered to one alarm receiver unit. So the protected perimeter can be up to 2000 m long if the maximum number of detectors are used.

Note: With normal antenna the alarm receiver radio channel range is up to 1000 m.

Note: The radio channel operating frequency is 433,92 MHz

Detector signals

The self-diagnostics of the detector has 3 signals:

1. Standby – the detector is in standby mode, no alarm transmission to the alarm receiver. Only a "– " sign can be seen at the display of the alarm receiver. The relay contact of the alarm receiver is closed.

2. Alarm – the detector sends alarm signal to the alarm receiver unit. The number of the detector (which caused alarm) is flashing at the display of the alarm receiver until reset. The relay contact of the alarm receiver opens for at least 3 sec. The detector generates an alarm if:

- the receiver unit is switched on (when the accumulator is connected to the receiver)
- a walking or crawling human crosses the detection zone
- the transmitter unit has low power supply voltage or any trouble
- there is interference from neighboring transmitter
- a foreign electromagnetic field influence

3. Trouble – there are generated trouble message in the alarm receiver unit. The number of the detector (which caused trouble) and a "П" sign (no radio check signal) / "P" sign (low receiver battery) is flashing at the display of the alarm receiver until reset. Trouble message is generated if:

- the receiver unit has low power supply voltage
- no radio contact with the receiver for 8 minutes

Note: The detector generates operation check signals to control radio channel operability. The alarm receiver unit controls the interval between the signals. If the alarm receiver unit does not receive any operation check signals from the detector for 8 minutes, it generates a trouble message. Operation control messages are sent once in 100 sec.

Alarm receiver indication

1.Standby – There is only a "– " sign at the display

2.Alarm – The number of the detector (which caused alarm) is flashing at the display until reset. You can hear three short "beep" signals per second. The alarm relay contact opens for 3 second.

3.Radio communication trouble – The number of the detector (which caused trouble) and a "П" sign is flashing at the display until reset. You can hear two short "beep" signals per second.

4.Receiver battery trouble – The number of the detector (which caused trouble) and a "P" sign is flashing at the display until reset. You can hear two short "beep" signals per second.

If an alarm receiver unit receives new messages before old messages have been reset, messages with higher priority will be shown first. However, after indication of a message with higher priority is reset, messages with lower priority will be indicated, too.

The priority list of message types

- ALARM (highest priority)
- TROUBLE (no radio check signal)
- TROUBLE (low voltage)

When all alarms are reset, the alarm receiver unit enters the standby mode.

Note: A point after the number of the detector means the operation of the alarm relay.

Note: Alarm and trouble messages are generated in the alarm receiver unit until the СБРОС (reset) button is pressed.

Note: If necessary, it is possible to connect the alarm receiver unit to a security system via the output relay. The security system will be able to indicate alarms only without indicating the detector number.

Detector's state checking

To check all registered device state in the alarm receiver unit, hold the СБРОС (reset) button for 2 seconds until you hear a tone. The first registered device state will be indicated on the display. Message indication types:

- detector number is glowing (the detector is in the standby mode)

- detector number is alternating with “H” (the detector is inactive)
- detector number is alternating with “P” (accumulator voltage is low)
- detector number is alternating with “П” (radio connection between a detector and alarm receiver unit is broken)
- detector number is flashing (ALARM)

When detector status is indicated no tone messages are generated.

To check the other registered device state, press the СБРОС (reset) button shortly (without holding it). The next registered detector number is indicated with a tone signal. Only one type status with a higher priority can be indicated for each detector.

Do one of the following to exit to standby mode:
- press the СБРОС (reset) button for a long time
- wait 20 sec after the СБРОС (reset) button was pressed.

Detector registration in the alarm receiver

The alarm receiver unit controls operation only of the detectors whose individual numbers have been saved in its memory. Detectors’ individual numbers can be deleted from the alarm receiver unit memory and new or extra numbers can be saved in it.

Note: A detector’s number is saved in a nonvolatile memory cell of the alarm receiver unit. Detector individual numbers saved by the manufacturer are marked on detector housings.

To save a detector number in the alarm receiver unit memory turn off the alarm receiver unit. Then turn the toggle switch at the bottom of the unit in the ОБУЧНИЕ position and switch on the alarm receiver unit. The unit will enter the number registration mode and the display will show memory cell #1. If it is vacant, the number will glow. You can **register** devices to vacant memory cell **by turning on the power supply of the detector** (which you want to register). If a detector’s number is saved in it, the indicated number will flash and an “П” signal will appear on the display. To view the next memory cell press the СБРОС button shortly (for about 0.2 sec). To quit the number registration mode, switch off the alarm receiver unit and turn the toggle switch in the position opposite to ОБУЧЕНИЕ.

Note: If a registered detector signal alarm in registration mode or if you try to register again a

registered detector, the number of the registered detector is flashing, and you can hear a sound with 5-6 short “beep” signals repeated 3 times.

Note: One detector can only be registered to one memory cell. If you want to change the memory cell of a registered detector, you need to clear the registration, and register it again in the new memory cell.

To delete a detector number from the alarm receiver memory, choose the memory cell in the number registration mode, hold the СБРОС button long (for 2 sec) until a tone signal is generated and the symbol “У” is indicated on the display. The memory cell number will glow.
To save a new number in the alarm receiver follow the instructions on the previous page.

Note: If a signal is sent by a detector whose number has not been registered in the alarm receiver unit memory, the message is ignored.

Alarm receiver unit usage requirements

- The alarm receiver unit should be located as far as possible from power lines, large metal objects or radio noise sources as possible. The alarm receiver unit should be located at least 1 m from reinforced concrete constructions.
- The distance between two alarm receiver units should be more than 3 m – if less it reduces the operating range of the radio channel.
- No broadcasting radio-stations are allowed at the distance of 5 m from the alarm receiver.
- Max radio channel range is guaranteed under the condition no objects obstruct the line of sight
- Radio channel range reduces due to a person’s presence next to the alarm receiver unit.
- If the alarm receiver unit is in a stationary position, installation height should be 1.5±0.2 m. The antenna should be in an upright position.
- Take the alarm receiver unit out of the bag when it is kept in a stationary position and fix the antenna on it.
- If the alarm receiver unit is used outside, it is recommended to avoid precipitation.

Note: The alarm receiver unit can be connected to AC power supply (220 V) via the IVEP-1 charger plugged in the “+12V” socket of the alarm receiver. It is not necessary to use the accumulators in this case.

VERIFYING OF INTERFERENCE PRESENCE

To verify the absence of interference on the receiver, switch off the power supply of the transmitter. If the receiver doesn't signal alarm in this case, there are interference problem (the receiver has signal from another transmitter).

In case of interference, you can proceed as one of the following:

- Change the positions or the distances of the units
- Change technology of detection.

ACCUMULATOR CHARGING

Alarm receiver accumulator charging

- Remove the accumulator from the alarm receiver and remove the rubber stopper from the accumulator housing.
- Connect the charger to the AC power supply and insert the accumulator into the charging compartment.
- After the 12 hours charging period disconnect the charger from the AC power supply.
- Disconnect the accumulator from the charger.

Detector accumulator charging

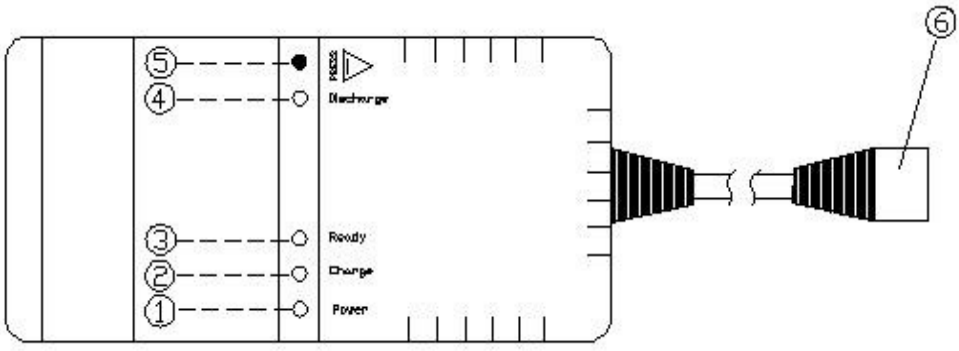

Fig. 11. Controls and leds of the traveler charger

1 – charger power led

2 – charging

3 – battery full led

4 – battery low or discharging led

5 – DISCHARGE button

6 – power supply plug

- Connect the charger to AC power supply. The POWER led (1) indicates the charger can be used.
- Insert an accumulator into the charging compartment. The CHARGE led (2) should glow, then the charger enters the test mode for 1 min. The test mode is indicated by the flashing READY led (3). Use discharge function if it is necessary (you can see the discharge at the next chapter).
- When the testing is finished, the device enters the CHARGING mode which is indicated by the glowing CHARGE led. If an accumulator is defective, the READY led (3) flashes and the CHARGE led (2) goes out or flashes.
- When the charging is finished, the READY led (3) starts glowing, and the CHARGE led (2) goes off.
- If the charger is not disconnected from power supply during 2 minutes after charging was finished, the charger will automatically enter the recharging mode which will be indicated by the flashing READY led (3).
- Disconnect the accumulator from the charger.
- Unplug the charger.

Detector accumulator discharging

- Hold the PRESS button (5) for 2 sec. The DISCHARGE led (4) glows. Then the charger enters the testing mode for 1 min. The charge mode is indicated by the flashing READY led (3). Then accumulator discharge begins, the DISCHARGE led (4) glows.
- After accumulator discharge - that can last for some hours - the device enters the charging mode.
- Discharging can be aborted by pressing the DISCHARGE button (4) once again. The charger will enter the test mode and then the charging mode.

Note: After a storage period of 3 months or before the 1st use, discharge and charge the batteries for at least 3 times.

Note: It is always recommended to discharge the batteries before charging by using the charger to increase the lifetime of the accumulators.

TEST AND MAINTENANCE

Note: After tuning the system it is recommended to check functionality for 2-3 days, to verify the installation and tuning with all detections being registered and analyzed. During this period detector's operation should be checked twice a day by performing test crossing of the detection zone.

It is recommended to perform routine inspection of the system with the following tests.

Walk test

1. Cross the detection area in different locations with different speed and body position (crawling, etc.).
2. Verify detection by observing alarm signal relay.

Detector maintenance

1. Check the functionality of the detectors with walk test.
2. Check the lifetime of the accumulators.
3. Check the tightness of fastening elements.

Clear zone examination

1. Visually check if the detector condition is in compliance with mounting location chapter of the installation manual. Cut off tree branches and bushes, mow the grass (considering the possible growth up to the next clear zone examination) and remove unnecessary objects from the clear zone.
2. In wintertime remove snowdrifts from the sector or increase the installation height of the detector.

Special maintenance

1. After snowstorms, heavy rains, hurricanes, and in case if intensive vegetation growth, it is recommended to perform extra maintenance operations.

Walk test, detector maintenance and clear zone examination is recommended according to detector's environment and accumulators, but at least once a year (of course the accumulator changing is necessary frequently).

TROUBLESHOOTING

Trouble	Possible reasons for trouble	Troubleshooting
Alarm signaling in the alarm receiver without test crossing.	Power supply voltage of the transmitter is low.	Charge or change the battery of the transmitter.
	The detector has not been installed or used in accordance with the installation manual requirements.	Check the compliance of installation and usage conditions with installation manual requirements (especially the detector's direction).
High false alarm rate.	The detector has not been installed or used in accordance with the installation manual requirements.	Check the compliance of installation and usage conditions with installation manual requirements.
	The receiver is affected by a neighboring transmitter.	Carry out position adjustment as described in the manual.
No alarm message during test crossing.	Distance between detectors and receiver unit exceeds the max value.	Reinstall the detector in compliance with the requirements in the manual.
	Detector's individual number is not saved in the receiver unit memory.	Check the detector individual number is saved in the receiver memory. If not, register the detector individual number in the receiver memory.
	Foreign radio signals of the same frequency neutralize alarm messages.	Try to realize the source of the neutralizing.
	Power supply voltage of the receiver is low.	Charge or change the battery of the transmitter.
Note: To find out which unit is in malfunction it is recommended to replace the units one by one with operable ones and perform check crossings.		

SPECIFICATIONS (MICROWAVE BARRIER)

Microwave frequency	9.5 ± 0.2 GHz

Maximum transmitting power	50 mW
Maximum length of protection zone	100 m
Minimum length of protection zone	5 m
Maximum width of protection zone	approx. 3 m
Maximum height of protection zone	approx. 1.6 m
Accumulator capacity	approx 500 hours
Charging time	approx 16 hours
Recharging capacity times	approx 600
Detection speed	0.3…8 m/s
Warm up time after power up	30 sec
Warm up time after alarm message	20 sec
Flatness of ground	approx. 0.3 m
Maximum height of grass on the ground	0.3 m
Maximum height of snow on the ground	0.4 m
Dimensions of units	510 x 210 x 150 mm
Weigth of units	approx. 3 kg
Operating temperature	-40 °C ~ +50 °C
Weatherproofness	IP 55

SPECIFICATIONS (ALARM RECEIVER)

Operating frequency	433 MHz
Operating range	up to 1000 m
Accumulator capacity	approx 48 hours
Charging time	approx 12 hours
Warm up time after power up	30 sec
Recharging capacity times	approx 400
Alarm message duration	approx. 3 s
Warm up time after alarm message	20 sec
Alarm relay loading capacity	72 V @ 0.1 A
Dimensions of units	175 x 145 x 75 mm
Weigth of units	approx. 1.4 kg

Disclaimer

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