OPAL

Outdoor dual technology motion detector

$C\!E$

IMPORTANT

The device should be installed by qualified personnel.

Prior to installation, please read carefully this manual.

Changes, modifications or repairs not authorized by the manufacturer shall void your rights under the warranty.

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The following symbols may be used in this manual:

i - note,

⚠ - caution.

CONTENTS

The OPAL detector detects motion in the protected area. It is designed for outdoor use. This manual applies to the detector with electronics version D. The detector meets the requirements of the EN 50131-2-4 standard for Grade 2.

⚠️ **The Grade 2 certificate applies to the indoor use. The outdoor use of the detector (despite full Grade 2 functionality) is not covered by the certificate (there is no standard for the outdoor detectors).**

1. Features

- Motion detection with two sensors: passive infrared sensor (PIR) and microwave sensor (MW).
- Digital motion detection algorithm.
- Digital temperature compensation.
- Pet immunity up to 20 kg.
- Immunity to false alarms caused by objects moving but not changing their position (e.g. branches of trees).
- Creep zone.
- Microwave based anti-mask feature.
- Capability of separate sensor configuring / testing.
- Three LED indicators.
- Remote LED enable / disable.
- Remote configuration mode enable / disable.
- Supervision of motion detection system and supply voltage.
- Tamper protection against cover removal and tearing enclosure from the wall.
- Weatherproof enclosure featuring a very high mechanical strength.

2. Description

The alarm will be triggered when infrared sensor (PIR) and microwave sensor detect motion within a time period shorter than 4 seconds.

Anti-mask feature

Detection by the microwave sensor of an object moving at a distance of 10-20 centimeters from the detector is interpreted as an attempt to mask the detector and results in activation of anti-mask output for two seconds. Objects permeable to microwaves, but isolating the infrared radiation are not detected by the anti-mask feature.

ℹ️ *The anti-mask feature meets the EN 50131-2-4 requirements.*

Supervision features

In the event of the voltage drop below 9 V (± 5%) for more than 2 seconds or the motion detection system failure, the detector will signal a trouble. The trouble is indicated by the activation of alarm output and the steady light of all LED indicators. The trouble signaling will continue as long as the trouble persists.

LED indicators

The LEDs indicate:

- warm-up – all LEDs flashing alternately for about 40 seconds;
- motion detected by microwave sensor – green LED ON for 4 seconds;
- motion detected by PIR sensor – yellow LED ON for 4 seconds;
- alarm – red LED ON for 2 seconds;
- trouble – all LEDs ON for entire duration of the trouble.

The LEDs are also used in the configuration mode (see: "Configuring the detector").

You can enable / disable the LEDs. When disabled, the LEDs will not indicate the states described above.

Enabling the LEDs by using a jumper

If you put a jumper across the LED pins, the LEDs will be enabled, i.e. they will indicate the events described above (the LED indicators can't be enabled / disabled remotely). If you do not put a jumper across the pins, the LEDs will be disabled, but they can be enabled / disabled remotely.

Remote LEDs enable / disable

The LED terminal is provided to allow remote LEDs enable / disable. When the terminal is connected to common ground, the LEDs are enabled. When the terminal is disconnected from common ground, the LEDs are disabled.

If the detector is used in the INTEGRA / INTEGRA Plus alarm system, you can connect to the terminal the OC type control panel output programmed e.g. as "Zone test status" or "BI switch".

Remote configuration mode enable / disable

The SVCE terminal is provided to allow remote configuration mode enable / disable. The configuration mode is enabled, when the terminal is connected to the common ground.

If the detector is used in the INTEGRA / INTEGRA Plus alarm system, you can connect to the terminal the OC type control panel output programmed e.g. as "Service mode status" or "BI switch".
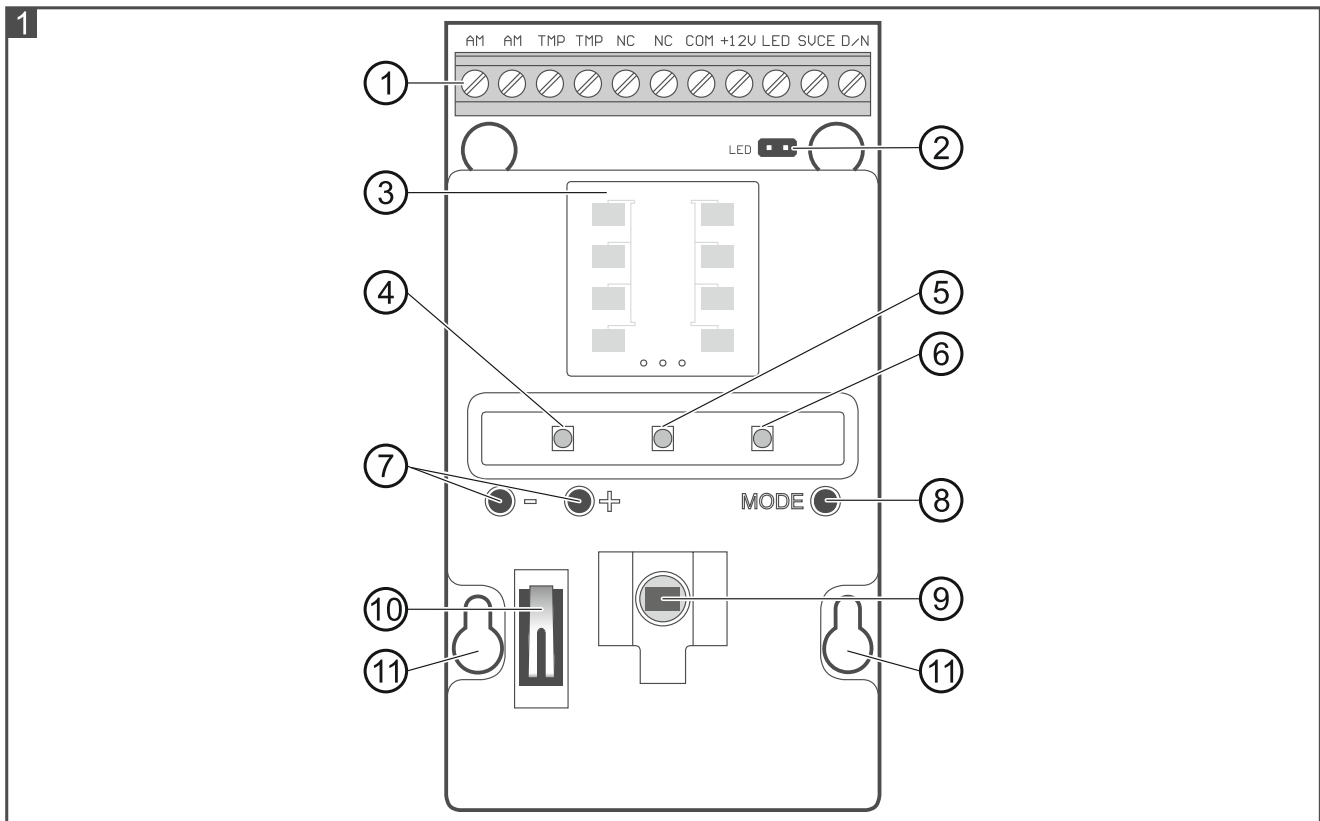
3. Electronics module

⚠️ **Do not remove the plastic cover from the circuit board to prevent damage to the components located on the board.**

Do not touch the pyroelectric sensor, so as not to soil it.

① terminals:

AM - anti-mask output (NC relay).

TMP - tamper output (NC).

NC - alarm output (NC relay).

COM - common ground.

+12V - power input.

LED - remote LED control.

SVCE - remote control of configuration mode.

D/N - terminal not used.

② pins to enable / disable the LED indicators.

③ microwave sensor.

④ green LED.

⑤ red LED.

⑥ yellow LED.

⑦ buttons used during sensors sensitivity setting.

⑧ MODE button used for configuring the detector (see: "Configuring the detector").

⑨ PIR sensor (dual element pyrosensor).

⑩ tamper switch activated by cover removal.

⑪ fixing screw holes.

On the other side of the electronics module there is a tamper switch activated by removing the detector from the wall.

i *When mounting the detector on the angle or ball bracket, it is necessary to install additional tamper switch (it is included in the detector delivery set).*

4. Installation

⚠️ **Disconnect power before making any electrical connections.**

If the detector is to be pet immune, it should be mounted at 2.4 m height with no vertical tilt. It is especially important when mounting on a ball bracket.

- Install the detector at the recommended height (Fig. 2-I).
- If traffic nearby or objects moving out of the protected area cause an alarm, move the detector slightly downwards or reduce the detector sensitivity (Fig. 2-II).
- Install the detector so that the expected movement of an intruder will be across the coverage pattern (Fig. 2-III).
- Don't install the detector closer than 3 meters from the moving objects (e.g. tree branches, bushes, laundry etc.) (Fig. 2-IV).
- Don't direct the detector on reflective surfaces or on fans or a heat sources (Fig. 2-V).
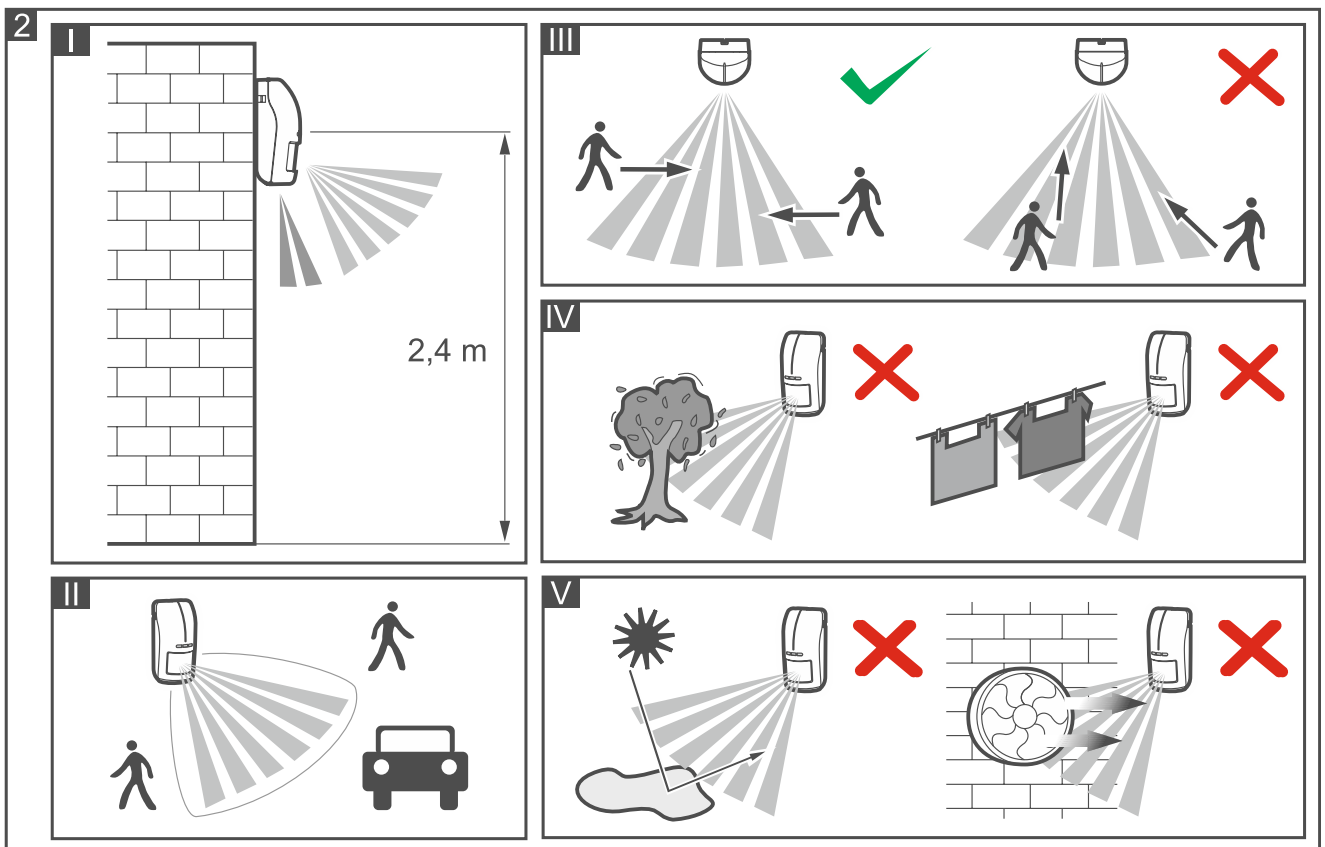

i *When putting two or more cables into the enclosure, it is advisable to place them in heat shrink tube. It reduces the risk of getting water into the enclosure.*

1. Remove the front cover (Fig. 3).
2. Remove the electronics module (Fig. 4).
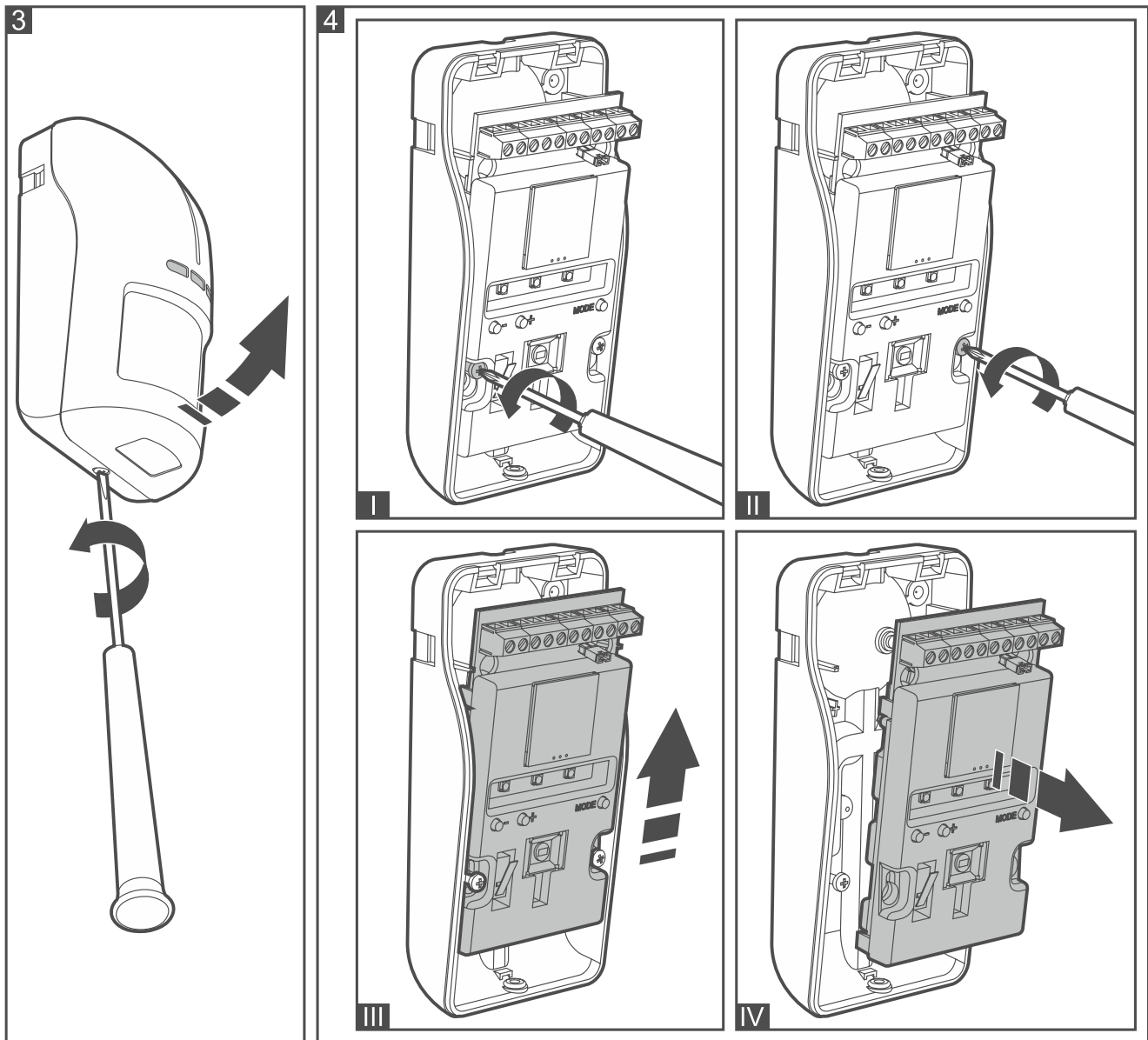
3. Make the opening for cable in the enclosure base.

4. Mount the enclosure base to the wall (see: "Wall mounting"), to the angle bracket (see: "Angle bracket mounting") or to the ball bracket (see: "Ball bracket mounting"). In Figure 5 possible ways of mounting the detector are shown.

5. Fasten the electronics module in the enclosure base.

6. Connect the wires to the corresponding terminals.

7. Configure the detector (see: "Configuring the detector").

8. Replace the cover.
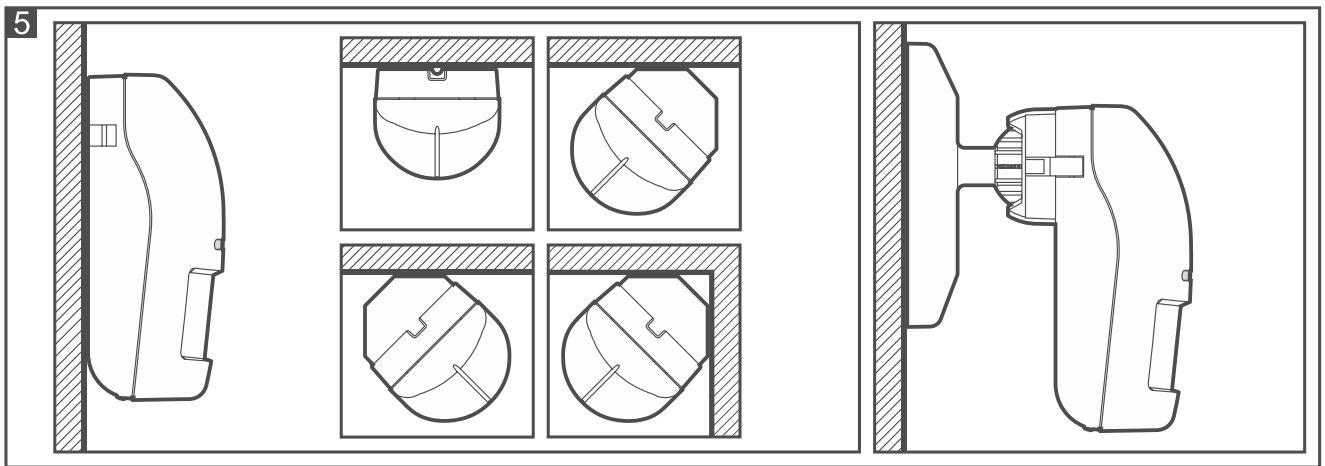
Wall mounting

1. Run the cable through the opening in the enclosure base.
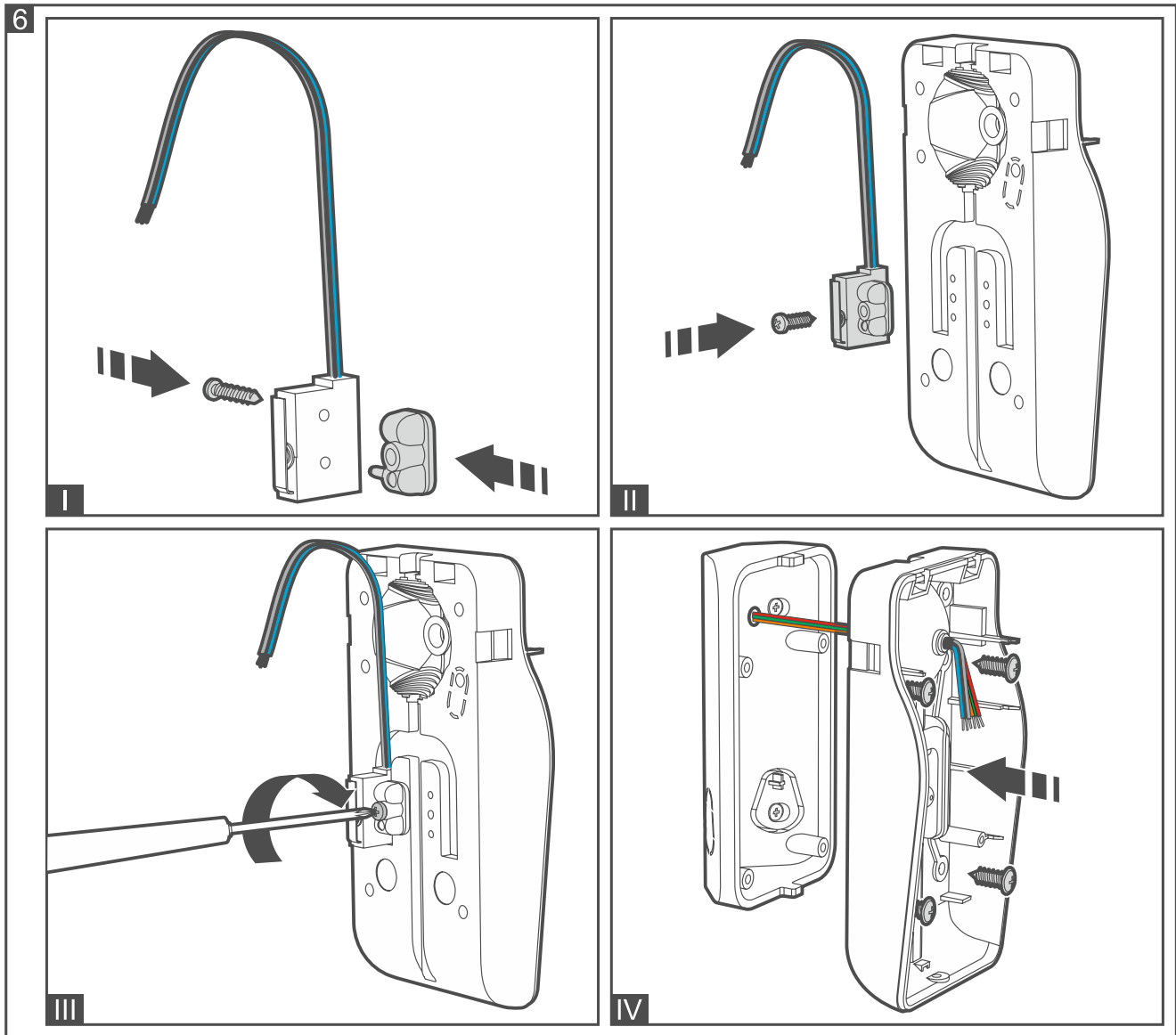2. Using wall plugs (screw anchors) and screws, fasten the enclosure base to the wall.

Angle bracket mounting

1. Attach extra tamper switch:
   – screw the holder to the tamper switch (Fig. 6-I),
   – screw the tamper unit to the enclosure base (Fig. 6-III).

i *Figure 6 shows mounting the tamper switch in one of two available positions. The place of tamper switch installing depends on the way of angle bracket mounting. If the tamper switch is to be installed in the other position, place tamper switch holder on the other side.*

2. Prepare openings in the bracket for screws and a cable.
3. Pass the cable through the prepared opening.
4. Using wall plugs (screw anchors) and screws, fasten the bracket to the wall.
5. Run the cable through the opening in the enclosure base.
6. Using screws, fasten the enclosure base to the bracket (Fig. 6-IV).

Ball bracket mounting

1. Attach extra tamper switch:
   - screw the holder to the tamper switch (Fig. 7-I),
   - put the unit making the surface bigger on the tamper switch (Fig. 7-II),
   - screw the tamper unit to the ball bracket (Fig. 7-IV).
2. Run the cable through the opening in the handle of the bracket.
3. Using wall plugs (screw anchors) and screws, fasten the ball bracket to the wall (Fig. 7-V).
4. Run the cable through the opening in the enclosure base (Fig. 7-VI).
5. Using screws, fasten the enclosure base to the ball bracket (Fig. 7-VII).
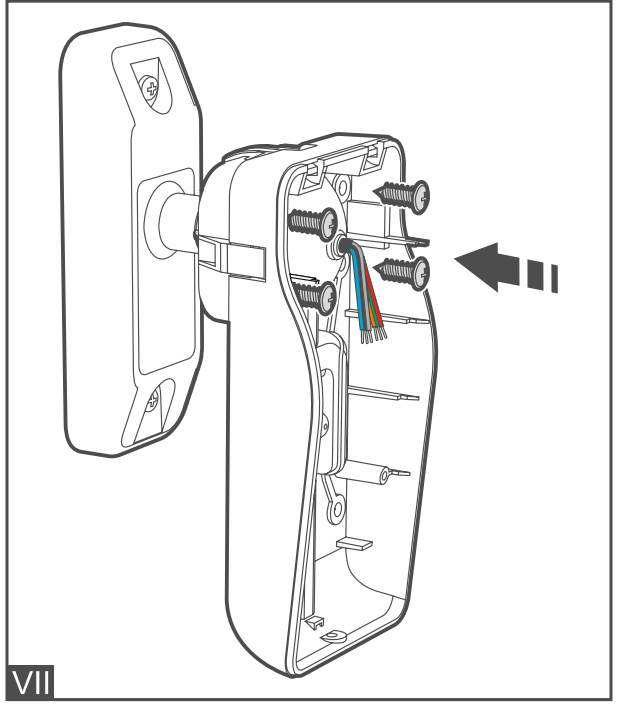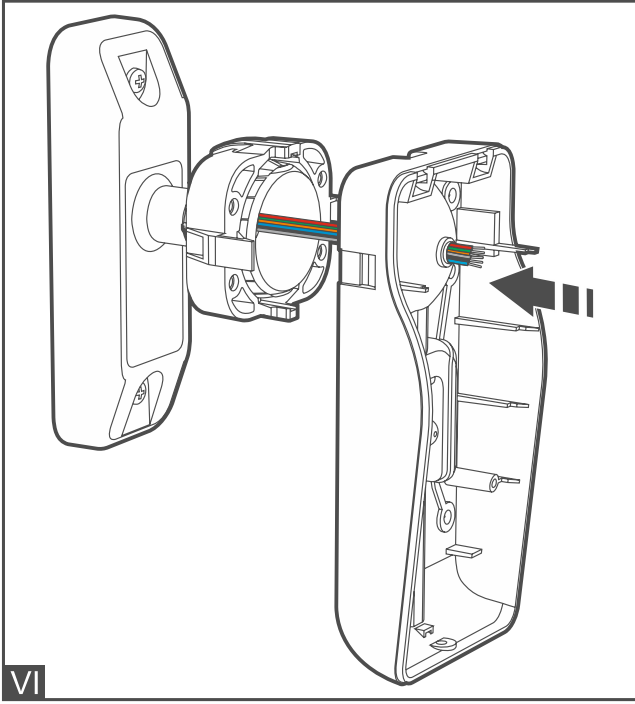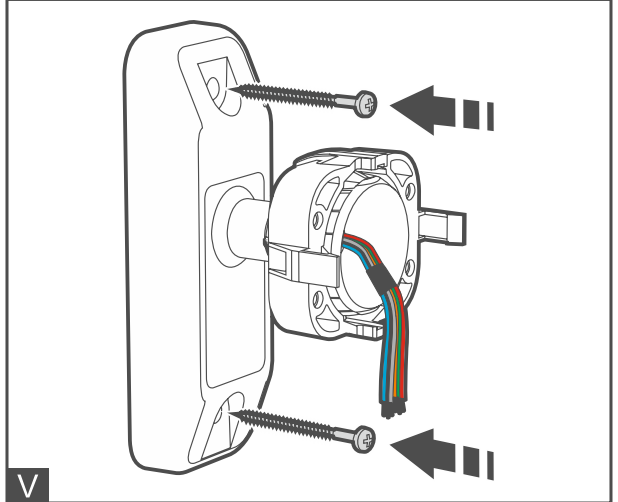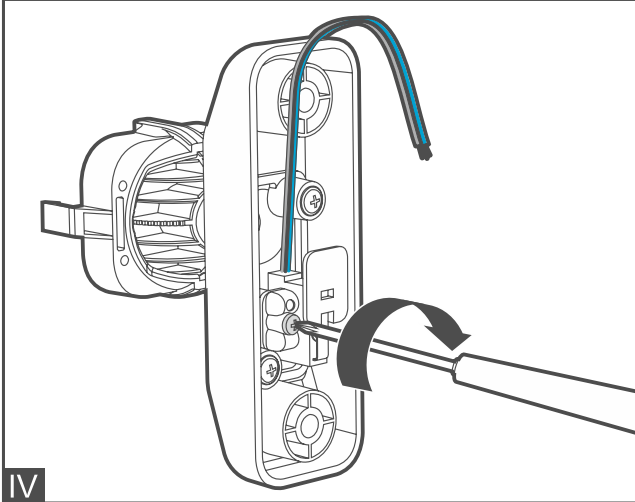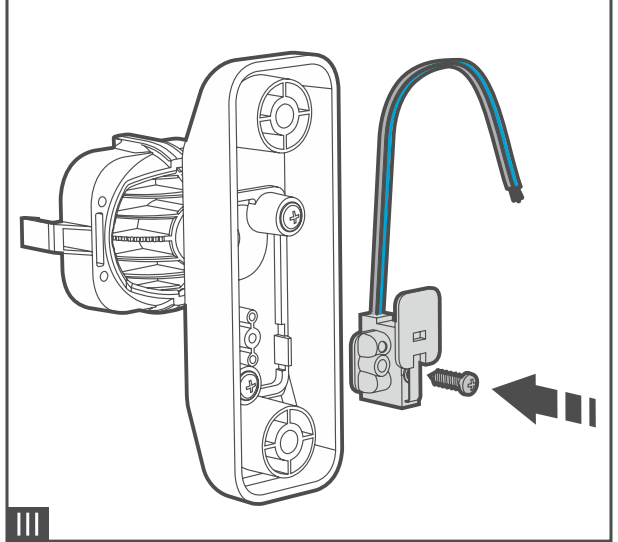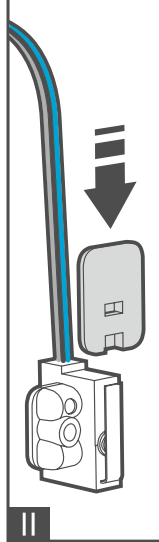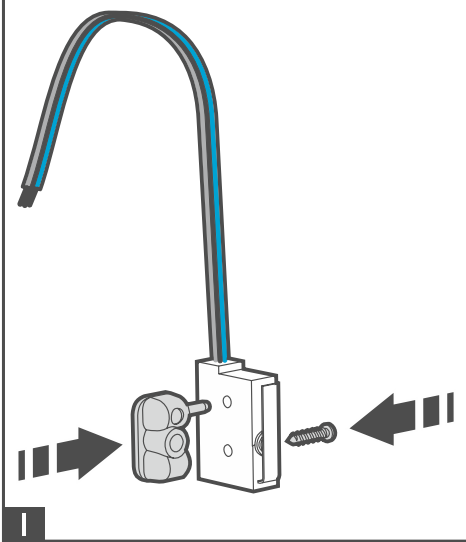
Connecting the additional tamper switch

The additional tamper switch is provided with three wires:

– black – common wire,

– blue – wire for NC circuit,

– grey – wire for NO circuit.

The tamper switch can be connected in series to the detector tamper output (TMP) or to additional tamper circuit.

5. Configuring the detector

The detector allows you to configure working parameters of each sensor separately:

– detection sensitivity of the microwave sensor,

– detection sensitivity of the PIR sensor.

Each sensor has 16 sensitivity thresholds.

> *i* | *All parameters set in the configuration mode are written in the detector non-volatile memory and are retained even after power loss.*
>
> *If the detector is to be pet immune, for the infrared and microwave sensors do not set the detection sensitivity higher than default.*

Starting configuration mode

Press the detector MODE button for 2 seconds or apply the common ground to the SVCE terminal. After starting the configuration mode, the green LED starts to blink, it means that you can configure the sensitivity of the microwave sensor.

Signaling in the configuration mode

The way in which LEDs operate during configuration of the sensors is as follows:

The microwave sensor

green LED – blinking informs of microwave sensor configuration, blinking frequency informs of sensitivity (higher blinking frequency = higher sensor sensitivity),

yellow LED – signals motion detection – ON for 2 seconds.

The PIR sensor

yellow LED – blinking informs of PIR sensor configuration, blinking frequency informs of sensitivity (higher blinking frequency = higher sensor sensitivity),

green LED – signals motion detection – ON for 2 seconds.

> *i* | *Reaching the bottom or top limit of adjustment setting is indicated by the LED which is ON for 3 seconds.*

Configuring by means of the detector buttons

By pressing buttons **-** (value decreasing) and **+** (value increasing) set the sensitivity / detection threshold of the sensor.

> *i* | *Pressing buttons **-** and **+** simultaneously restores default settings for the configured sensor. Keeping the buttons pressed for 3 seconds restores default settings for all sensors.*

Press the MODE button briefly in order to proceed and configure another sensor. Blinking of the proper LED will indicate which sensor is being configured (see: "Signaling in the configuration mode").

Ending configuration mode

Press the detector MODE button for 2 seconds or remove the common ground from the SVCE terminal.

i | *If the configuration mode was activated by means of the MODE button, it is automatically exited after 20 minutes since the last operation performed by the user.*

6. Start-up and walk test

1. Power-up the detector. All LEDs will begin alternately blinking for 40 seconds, which indicates the detector warm-up.
2. When the LEDs stop blinking, check that moving within the coverage area will make the LED light up red. Figure 8 shows the coverage areas of the motion detector (a - minimum, b - default, c - maximum, d - creep zone).
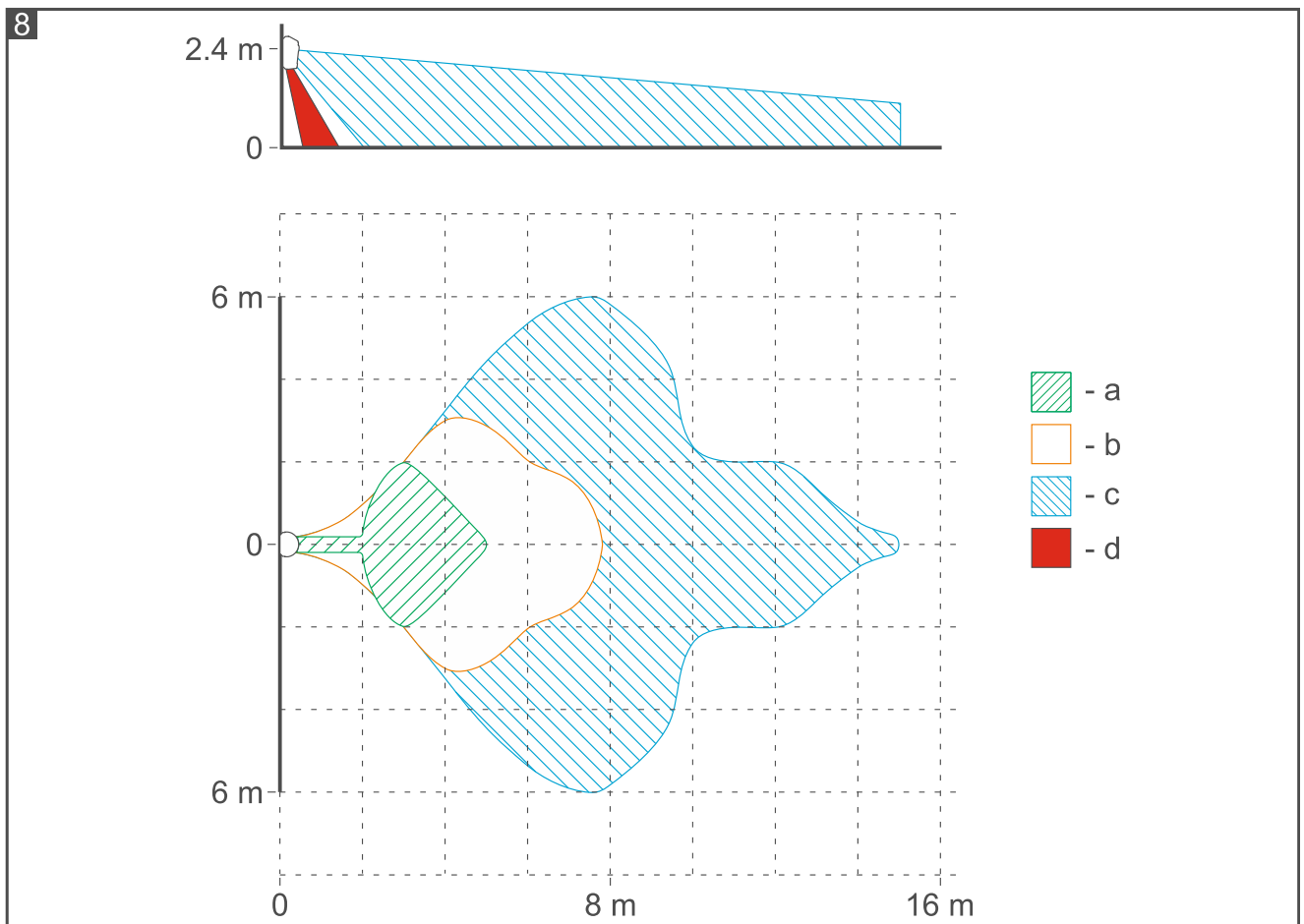
Separate testing of sensors

Testing of the sensors is done in the detector configuration mode. Starting the mode, choosing the sensor and the way of changing sensitivity are described in detail in the chapter "Configuring the detector".
1. Start the configuration mode.
2. Choose the sensor to be tested.

3. Check that moving in the coverage area will make the violation signaling LED light up.
4. If it is needed, readjust sensitivity and check the sensor operating.

7. Specifications

Supply voltage .... 12 VDC ±15%
Standby current consumption ....12 mA
Maximum current consumption ....20 mA
Outputs
    alarm (NC relay, resistive load).. 40 mA / 24 VDC
    anti-mask (NC relay, resistive load) .... 40 mA / 24 VDC
    tamper (NC) .... 100 mA / 30 VDC
Relay contact resistance
    alarm output.. 34 Ω
    anti-mask output .... 34 Ω
Microwave frequency ....24 GHz
Detectable speed .... 0.3...3 m/s
Alarm signaling period... 2 s
Warm-up period .... 40 s
Recommended installation height ....2.4 m
Security grade according to EN 50131-2-4 ....Grade 2
Standards complied with ....EN50131-1, EN 50131-2-4, EN50130-4, EN50130-5
IP code..IP54
Environmental class according to EN50130-5 ....IIIa
Operating temperature range...-40...+55 °C
Maximum humidity ....93±3%
Dimensions .... 65 x 138 x 58 mm
Detector weight (without a bracket).. 174 g