RADION

Transmitter

BOSCH

en Reference Guide

Table of contents

1	**Transmitter introduction**	**5**
1.1	About documentation	5
1.2	Bosch Security Systems, Inc product manufacturing dates	5
1.3	Battery requirements	5
2	**General installation**	**7**
2.1	Installation workflow	7
2.2	Unpacking information	8
2.3	Wall tamper switch installation	8
2.4	Magnet cover installation	8
2.5	Complete installation	8
2.6	Maintenance	9
3	**RADION repeater**	**10**
3.1	Installation considerations	10
3.2	Wiring considerations	10
3.3	Specifications	11
3.4	LEDs	11
4	**RADION glassbreak**	**13**
4.1	Installation considerations	13
4.2	Testing	14
4.3	Low battery	16
4.4	Wall Tamper Tab	16
4.5	Maintenance	16
5	**RADION TriTech**	**17**
5.1	Mounting height and range adjustment	17
5.2	Sensitivity settings	18
5.3	Walk testing	18
6	**RADION PIR**	**20**
6.1	Walk testing	20
7	**RADION PIR C**	**22**
7.1	Walk testing	22
8	**RADION smoke**	**24**
8.1	Battery replacement	25
8.2	Smoke test	25
8.3	Sensitivity test	25
8.4	Test/Silence button	26
8.5	LED	26
8.6	Clean the detector and replace the optical chamber	26
9	**RADION contact SM**	**28**
9.1	Installation considerations	28
10	**RADION contact RM**	**30**
10.1	Installation considerations	30
11	**RADION specialty**	**32**
11.1	Applications for this product	33
11.2	Installation consideration	33
12	**RADION universal transmitter**	**34**
12.1	Installation considerations	35
12.2	Reed switch settings	35

13	**RADION keyfob**	**37**
13.1	RADION keyfob FB	38
13.2	RADION keyfob TB	38
14	**RADION panic**	**40**
15	**Appendices**	**42**

1 Transmitter introduction

This document contains the basic information that a trained installer needs to install the RADION system. It supplements the documents listed inside the packaging (graphical installation guides).

This reference guide contains:

– A description of the general installation procedure.
– Device-specific installation procedures.
– Specification information.

How to use this document

The information contained in this document is constructed in a manner that is systematic and sequential for the installer on a “point of need” basis. The following represents a basic outline of that information;

– Chapter 1 (this chapter) – introductory information and how to use this document.
– Chapter 2 – basic RADION system-wide general installation information and workflow check list.
– Remaining chapters – RADION device-specific installation information.
– Appendix – description of various icons and symbols used within the RADION documentation.

Icons and symbols

When you see the following logo in the RADION graphical installation guides (which are shipped with each RADION transmitter), refer to the appropriate section in this document for further information.

Additional icons and symbols, that appear in the RADION graphical installation guides, are explained in the appendix section of this guide. Refer to the *Appendices, page 42* for more information.

1.1 About documentation

Copyright

This document is the intellectual property of Bosch Security Systems, Inc. and is protected by copyright. All rights reserved.

Trademarks

All hardware and software product names used in this document are likely to be registered trademarks and must be treated accordingly.

1.2 Bosch Security Systems, Inc product manufacturing dates

Use the serial number located on the product label and refer to the Bosch Security Systems, Inc. website at http://www.boschsecurity.com/datecodes/.

1.3 Battery requirements

Refer to the information contained below for transmitter battery requirements.

Notice!

Dispose of used batteries according to manufacturer's instructions.

RADION Device	Battery Size	Battery Type	Cell Voltage	Quantity (Cells)
RFPR-12 PIR motion detector	CR123A	Lithium	3 VDC	1
RFPR-C12 PIR motion detector (curtain)	CR123A	Lithium	3 VDC	1
RFRP repeater	Non-replaceable	Lithium polymer	3.7 VDC nominal	1
RFSM smoke detector	CR123A	Lithium	3 VDC	2
RFUN universal transmitter	CR123A	Lithium	3 VDC	1
RFBT bill trap	AAA	Lithium	1.5 VDC	1
RFDL-11 TriTech detector	AA	Alkaline	1.5 VDC	4
RFDW-SM standard door/window contact	AAA	Lithium	1.5 VDC	1
RFDW-RM recessed door/ window contact	AAA	Lithium	1.5 VDC	1
RFGB glassbreak	CR123A	Lithium	3 VDC	1
RFKF-TB key fob RFKF-FB-key fob	CR2032 (coin cell)	Lithium	3 VDC	1
RFPB-SB- panic button RFPB-TB- panic button	CR2032 (coin cell)	Lithium	3 VDC	1

Table 1.1: Battery Requirements

2 General installation

Phases of installation

The installation of the RADION system is achieved by following the sequential process as defined in this chapter. Overall, there are four main phases;

- Planning
- Physical installation of the devices
- System enrollment/configuration
- System testing (walk test, pattern test)

It is essential that these steps or phases are adhered to in the order mentioned above for proper functionality and operation.

When installing a RADION system, you must plan your installation based on the control panel and RADION device specifications, and the radio-frequency signal strength (RFSS) between devices, receivers, and control panels.

Installation considerations

- RADION devices are intended only for indoor, dry applications.
- Mount RADION devices on flat, rigid surfaces. Some devices can be optionally corner mounted as indicated in the installation instructions.
- Avoid mounting RADION devices in areas with large, metallic objects, electrical panels, or electric motors. They might reduce the radio-frequency (RF) range of a RADION device.
- Avoid installing the devices where excessive humidity, moisture, or temperatures outside of the acceptable operating range exist.
- Wire all objects according to their specifications.
- RADION devices use batteries of varying types. When installing batteries, observe safety and polarity recommendations as indicated in the documentation for those products.

2.1 Installation workflow

To install, configure, and test the system, use the workflow below and follow in sequential order, from top to bottom, checking each box as you complete a step.

Notice!

Always power down the control panel when connecting modules, or other wiring. Power down the control panel by unplugging the transformer and disconnecting the battery

☐ Plan the installation of the RADION system

☐ Install the RADION components (refer to the graphical installation guides and this system reference guide for details)

☐ Program wireless points in the control panel

☐ Enroll point RF ID for wireless points

☐ Verify LED responses on devices

☐ Perform a local walk test for installed detectors

☐ Review signal strength and margin of each point

☐ Complete the installation

2.2 Unpacking information

When unpacking the receiver, repeater, or bill trap device, it is important to remove the cardboard insert as illustrated below;

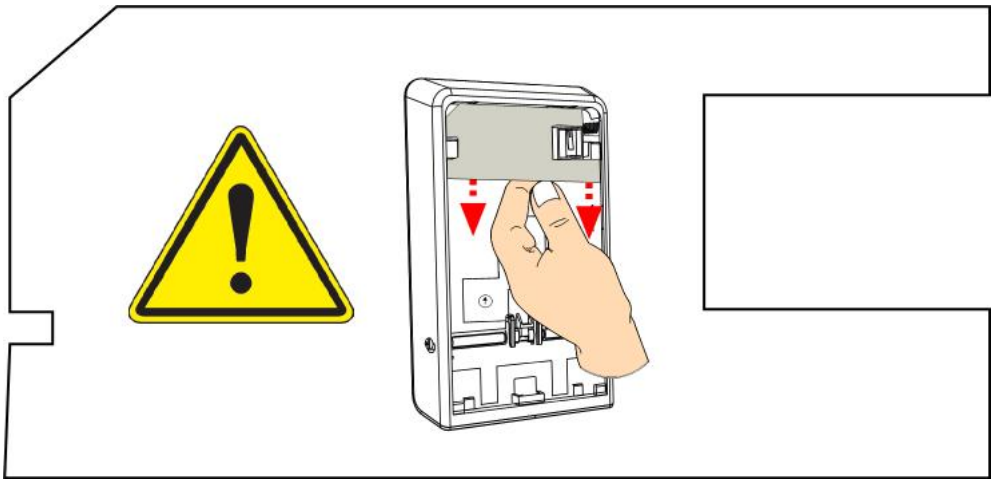


Figure 2.1: Insert for the receiver and repeater

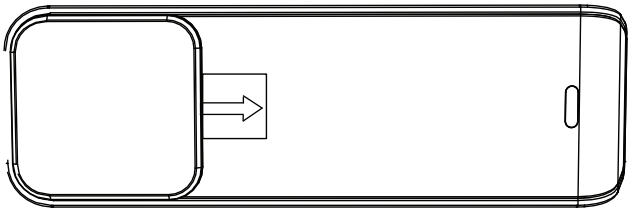


Figure 2.2: Insert for the bill trap

2.3 Wall tamper switch installation

RADION transmitter devices contain a feature that activates the wall tamper switch located on the base of the device. In order to properly install the device, you must consider the following:

- To properly install a device with active wall tamper functionality, insert a screw in the designated screw slot location.
- Failure to insert a screw into the wall tamper slot prevents the wall tamper feature from generating a tamper signal when the transmitter is pulled away from a wall.

2.4 Magnet cover installation

During the installation of the plastic magnet cover, the cover is not designed to be separated from the base after the base and cover are snapped together. Damage to the plastics may occur if separated.

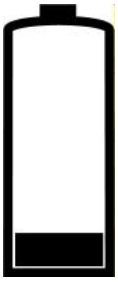
2.5 Complete installation

Testing the entire RADION system can only be achieved by performing an area wide test through the control panel and corresponding keypad(s). This is achieved by performing an overall service walk test. Refer to your control panel documentation for system-walk, or other system-wide testing procedures.

To ensure proper operation of the RADION devices, test the basic functionality of the device locally. Depending on the RADION device to be tested, perform the following procedures for functionality:

- When testing the receiver, power up the compatible control panel in which the receiver is connected to and observe the LED behavior on the receiver.
- Local walk testing can be performed on the motion detectors as defined in the tritech and PIR chapters of this guide.
- Magnet testing can be performed by opening or closing the door/window in which the magnet is installed on.

2.6 Maintenance



It is recommended to check the battery of each device annually. This will ensure proper operation and functionality of the devices.

Battery Life Extension feature (PIR and TriTech)

In the normal operating mode, an alarm can be transmitted only after three (3) minutes have passed since the previous alarm restoral. This 3 minute lockout time reduces unnecessary RF transmissions in high traffic areas, thereby extending battery life.

3 RADION repeater

The RFRP is a combined receiver and transmission device that improves the overall transmission, communication, and reliability capabilities of its assigned compatible receiver. An LED on the front provides device status.

Features include:

– LED Display
– Cover and Wall Tamper protection

Notice!

The repeater is designed to improve the communication performance of the RADION wireless portfolio, and not to extend the range of the wireless devices. Install the transmitters within the suggested range for optimal performance and reliability.

Notice!

Use a supported transformer as defined in the specification table for the repeater. Do not connect power supply to a receptacle controlled by a switch.

3.1 Installation considerations

Use the provided anchors and screws to mount the repeater in locations accessible for future maintenance. Mount the repeater onto a wall.

Notice!

Mount the repeater in a location removed from metal. Metal objects (duct work, wire mesh screens, boxes) reduce RF range

3.2 Wiring considerations

Notice!

Do not install long cable runs next to high-current power feeds. Keep cable lengths as short as possible to minimize noise pickup.

Ensure that the wiring used meets the following specifications:

– Two-conductor unshielded wire.
– The minimal requirement for wire length is 1.83 m (6 ft) from the repeater

3.3 Specifications

Dimensions	139.70 mm x 209.60 mm x 31.80 mm (5.50 in x 8.25 in x 1.25 in)
Power/Voltage (Standby battery)	16.5 VAC, 40VA (~) (EN voltage range: 16.5 VAC– 18 VAC) AC Type (device) Rated 3.7 VDC, 3050mAH EVE ENERGY CO Part No P0046-LF (Not user replaceable). For standby battery to be operative, the tamper switch is required to be engaged. Power source type: A Low battery level: 3.5V
Transformer power/voltage	Must meet country specific requirements
Current Draw	60 mA
Wire Gauge	0.65 mm (22 AWG) to 2.0 mm (18 AWG)
Temperature (operating)	Functional range: -10˚ C to +49˚ (+14˚ F to +120˚ F) EN 50130-5 Class II only: -10˚ C to 40˚ C (+14˚ F to +104˚ F)
Relative Humidity	0% to 93% (non-condensing)
Device testing	To ensure proper functionality, the device must be tested at least once every year by an installer.
Wall and Cover Tamper Switch	Transmits a tamper signal when someone removes the device from its base or pulls it away from the wall.
Frequency	433.42 MHz

Table 3.1: Specifications

3.4 LEDs

The repeater utilizes an external LED indicator to status the operation of the repeater. Refer to the table below for LED descriptions.

LED Condition	Pattern Description
On (Normal)	– Indicates the repeater is functioning normally.
Off	– Indicates there is a power failure to the repeater, or that the receiver is not wired correctly.
Continuous Flash: 1 sec rate for 5 sec	– Indicates the repeater is being powered up, and conduction manufacturing test initializations.

LED Condition	Pattern Description
Continuous Flash: A 3-pulse signal, followed by a short delay after the 3rd pulse	– Indicates the repeater has experienced a low battery condition.
Continuous Flash: A 2 flash pattern continuous pulse between On and Off states with a short delay after the 2nd pulse	– Indicates an AC power failure is detected. – A communication failure within internal hardware components inside the receiver

4 RADION glassbreak

The RFGB is a wireless transmitter used for detecting breaking glass. Throughout this document, the term “glassbreak” refers to glass break.
Features include:

– Monitored battery status

Dimension	101.42 mm x 112.90 mm x 35.00 mm (3.99 in x 4.44 in x 1.38 in)		
Power/Voltage	Battery/CR123A, 3 VDC (⎓) Power source type: C Low battery level: 2.15V		
Battery replacement	Duracell DL123A, Lithium, Panasonic CR123A Lithium, or Sanyo CR123A Lithium. Check your battery yearly to ensure proper functionality.		
Battery life	Up to 5 years		
Device testing	To ensure proper functionality, the device must be tested at least once every year.		
Accoustic Capabilities	Glass types and thickness	**Type**	**Thickness**
		Plate	2.4 mm to 6.4 mm (3/32 in to 1/4 in)
		Tempered	3.2 mm to 6.4 mm (1/8 in to 1/4 in)
		Laminated	3.2 mm to 6.4 mm (1/8 in to 1/4 in)
		Wired	6.4 mm (1/4 in)
	Minimum pane size for all types of glass	1.2 m (4 ft)	
Microphone	Omni-directional 360˚ electret		
Operating Temperature	Functional range: -10°C to +49°C (+14°F to +120°F) EN 50130-5 Class II only: -10˚ C to 40˚ C (+14˚ F to +104˚ F)		
Relative Humidity	0% to 93% (non-condensing)		
Wall and Cover Tamper Switch	Transmits a tamper signal when someone removes the device from its base or pulls it away from the wall.		
Frequency	433.42 MHz		

Table 4.1: Specifications

4.1 Installation considerations

For the best detector performance, select a mounting location that is:

– Mounted on the ceiling within a maximum range of 20 ft (6 m)

- For armor-coated glass installations, mount the sensor no more than 12 ft (3.65 m) from the glass
- Mount the detector in the direct line of sight of the glass to be protected
- On an opposite, or adjoining wall, within a range of 20 ft (6 m) for plate, tempered, laminated, and wired glass
- In a suitable environment: temperature between -18 and 50˚ C (0 and 120˚ F); and humidity between 10 and 90% non-condensing

Avoid mounting the detector in:

- Glass airlocks and glass vestibule areas
- Humid rooms
- Small utility rooms
- Rooms with noisy equipment (white noise) such as air compressors, bells, and power tools
- Rooms smaller than 10 ft x 10 ft (3 m x 3 m)
- Rooms with lined, insulating, or sound supressing drapes
- A corner of a room

Avoid locations that expose the detector to possible false-alarm sources such as:

- Glass airlocks and vestibule areas;
- Kitchens;
- Corner mounting;
- Residential car garages;
- Stairwells
- Bathrooms; and
- Small acoustically live rooms

Notice!

Glassbreak detectors are intended only as a component of a perimeter protection system. Use glassbreak detectors in conjunction with motion detectors.

4.2 Testing

Test the detector at least once yearly. Use the Sentrol 5709C hand-held tester to enter the sensor into test mode and to test the alarm.

Test the sensor alarm

To test the sensor functionality, enter the detector into test mode. In normal mode, the sensor does not generate an alarm on sound signals from the tester unless the tester is held next to the sensor.

Each time the sensor alarms, it also goes into test mode for one minute.

Initiating test mode with the Sentrol 5709C hand-held tester:

1. Set the tester for tempered or laminated glass, unless the protected glass is plate glass.
2. Hold the tester on top of the detector.
3. Activate the tester. The detector alarms and goes into test mode for one minute. During test mode, the LED blinks continuously. To extend test time, activate the tester within the range of the sensor at least once each minute.

Performing the alarm test with Sentrol 5709C hand-held tester:

1. Hold the tester near the surface of the glass to be protected and aim the speaker at the sensor. Be sure the tester is at the point on the glass farthest from the detector.

Notice!
If blinds or drapes are present, test the area by holding the hand-held tester behind the closed blinds or drapes.

2. Press the test button on the tester. The LED on the detector stays on for 4 seconds to indicate the glass is within detection range of the sensor. If the LED does not stay in a solid state momentarily, but continues to blink, adjust the positioning of the detector so that it is closer to the window, and re-test. Check the battery strength of the hand-held testing device before the test.

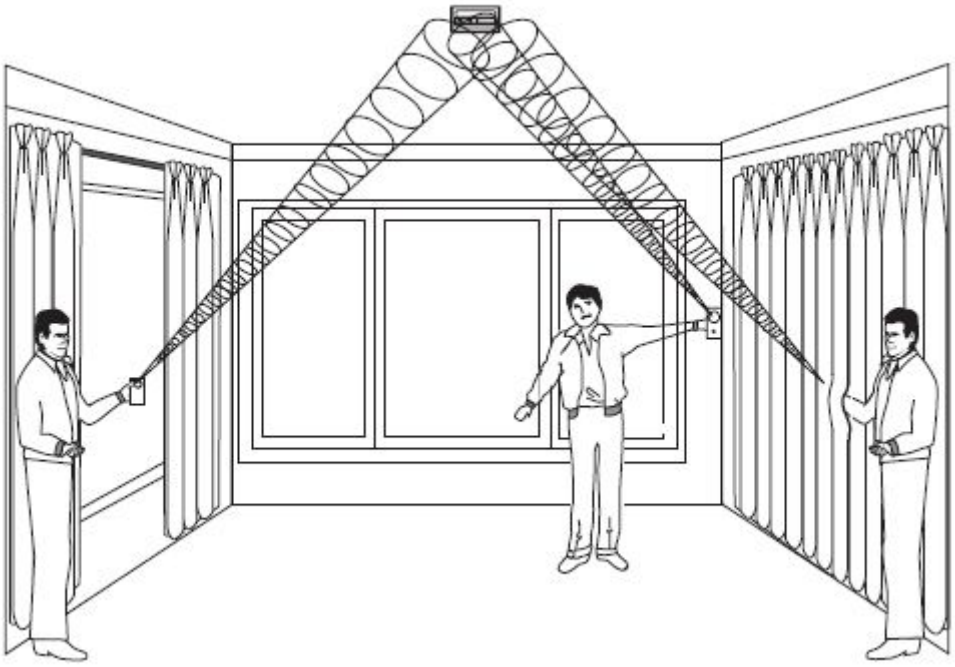


Figure 4.1: Testing behind curtains

The detector switches from test mode to normal mode after at least 1 minute of silence from the hand-held tester.

Notice!
When the detector is in normal mode, the LED is off unless a loud sound is detected.

Room acoustics can artificially extend the range of a glassbreak sensor. The specified sensor range is for worst-case conditions. While the sensor likely functions at a greater range, it might not detect a low volume breaking sound, or room acoustics might change at a later point in time. Do not exceed the rated range of the sensor, regardless of what the tester shows.

Test the sensor operability

When the detector is in normal mode, the LED is off unless a loud sound is detected. Therefore, to ensure the glassbreak has power and that the microphone is functional, perform a simple hand clap test.

To perform a hand clap test, simply clap your hard loudly under the sensor. Verify the LED blinks twice.

4.3 Low battery

When a low battery state is detected, the detector measures the battery, and sends a report to the receiver/control panel.

4.4 Wall Tamper Tab

Use the wall tamper tab to activate an alarm when the glass break has been removed from the wall.

4.5 Maintenance

Clean the cover with a damp (water) cloth as needed to keep it free of dust and dirt. Always test the sensor after cleaning it.

5 RADION TriTech

The RFDL-11 is a motion detector which uses artificial intelligence to detect motion and provide immunity to false alarms. An integral RF transmitter reports low battery and tamper status, and sends a supervisory signal to the control panel. Features include:

- 11m x 11m (35 ft by 35 ft) coverage
- Flexible mounting height
- Compatible with Bosch RADION wireless systems
- Draft and Insect immune
- Cover activated tamper indication. Optional wall-activated tamper is included

Dimension	138.00 mm x 72.00 mm x 64.00 mm (5.43 in x 2.83 in x 2.52 in)
Relative humidity	0% to 93%, (non-condensing)
Temperature (operating)	Functional range: -10°C to +49°C (+14°F to +120°F) EN 50130-5 Class II only: -10˚ C to 40˚ C (+14˚ F to +104˚ F)
Internal coverage directionality	Vertical: -4˚ to -10˚
Sensitivity selection	Field selectable for standard or intermediate sensitivity
Power/voltage	Four AA Alkaline batteries, 1.5 VDC (⎓). 1.5 VDC x 4 = 6 VDC total. Power source type: C Low battery level: 3.6V
Battery replacement	Duracell MN1500, Panasonic AM-3PIX. Check your battery yearly to ensure proper functionality.
Battery life	Up to 5 years
Device testing	To ensure proper functionality, the device must be tested at least once every year by an installer.
Wall and cover tamper switch	Transmits a tamper signal when someone removes the device from its base or pulls it away from the wall.
Frequency	433.42 MHz

Table 5.1: Specifications

5.1 Mounting height and range adjustment

Loosen the vertical adjustment screw. Adjust the board to the desired angle. Choose mounting height and desired range, and set the vertical angle. Reference the table below for proper height and adjustment values.

Mounting height	Range	
	6.1 m (20 ft)	10.7 m (35 ft)
2 m (6.5 ft)	-7˚	-5˚

2.1 m (7.0 ft)	-9˚	-6˚
2.4 m (8.0 ft)	-10˚	-7˚

Notice!
The mounting height must be 2 m (6.5 ft) and the vertical angle must be set at -5˚ for installations containing pets.

The vertical adjusting screw must be securely tightened after setting the angle.

5.2 Sensitivity settings

Standard sensitivity
Use this setting when pets are present in the monitored area. Standard sensitivity provides excellent detection performance and is the least sensitive to false alarms.

Intermediate sensitivity
Only use this setting in non-pet installations with minimal environmental disturbances. Intermediate sensitivity provides the highest level of detection performance.

5.3 Walk testing

Notice!
To maximize battery life, the LED elements do not activate unless the unit is in the Walk Test mode.

Perform a walk test to determine the boundaries of the coverage area. Perform this test at the time of installation and monthly thereafter. To ensure continual daily operation, instruct the end user to walk through the far end of the coverage pattern. This ensures an alarm output prior to arming the system.
Start Walk Test mode from the detector**.** Insert a slotted screwdriver to open the detector cover and then close the detector cover to start a 90-sec Walk Test mode.

Notice!
In the normal operating mode, an alarm can be transmitted only after three (3) minutes have passed since the previous alarm restoral. This 3 minute lockout time reduces unnecessary RF transmissions in high traffic areas, thereby extending battery life.

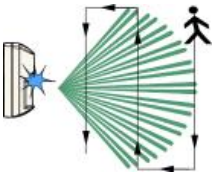
During this test mode, motion detected within the detector's coverage area causes a transmitted alarm and LED activation. Each alarm will also extend the Test Mode. Watch for the green LED to indicate the edges of the Microwave pattern. Adjust as necessary.
Please reference the LED table below for LED descriptions.

LED Condition	**Cause**
Steady LED	PIR activation (Walk Test)
Steady green	Microwave activation
Steady blue	Alarm signal

LED Condition	Cause
Flashing blue	Warm-up period after power-up
No LED upon initial power up	PIR failure. Replace unit.

Walking Testing the system

1. Start at the pattern's expected boundary and walk across the pattern moving closer to the detector. Set the adjustment as low as possible for proper catch performance.



2. Adjust the Microwave Range Adjustment Potentiometer to as low a setting as possible for proper catch performance.

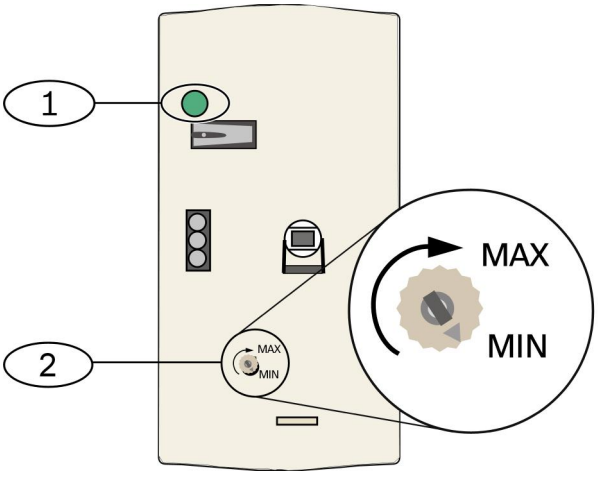


Figure 5.1: Sensitivity settings

1 – Alarm LED (blue, green, or red)
2 – Microwave Range Adjustment Potentiometer

3. At each pass, observe the color on the Alarm LED (refer to the *Sensitivity settings* figure above).
4. Walk test from the opposite direction to determine the coverage pattern boundaries from both sides.
5. When walk test is completed, the detector returns to normal operation after 90 sec of inactivity.

6 RADION PIR

The RFPR-12 is a high performance PIR motion detector that uses advanced signal processing. An integrated wireless transmitter sends a battery report with each transmission, and transmits a supervisory signal to the control panel. Features include:

– 12 m x 12 m (40 ft x 40 ft) coverage
– Flexible Mounting Height

Dimensions	111.00 mm x 60.00 mm x 43.00 mm (4.40 in x 2.40 in x 1.70 in)
Relative humidity	0% to 93%, non-condensing
Temperature (operating)	Functional range: -10°C to +49°C (+14°F to +120°F) EN 50130-5 Class II only: -10˚ C to 40˚ C (+14˚ F to +104˚ F)
Power/voltage	One CR123A Lithium battery, 3 VDC (⎓) Power source type: C Low battery level: 2,15V
Battery replacement	Duracell DL123A , Panasonic CR123A, or Sanyo CR123A. Check your battery yearly to ensure proper functionality.
Battery life	Up to 5 years
Device testing	To ensure proper functionality, the device must be tested at least once every year by an installer.
Wall and cover tamper switch	Transmits a tamper signal when someone removes the device from its base or pulls it away from the wall.
Frequency	433.42 MHz

Table 6.1: Specifications

6.1 Walk testing

Perform a walk test to determine the boundaries of the coverage area.
Insert a slotted screwdriver into the designated hole to open the cover and then close the detector cover to start a 90-sec Walk Test mode.
During this test mode, motion detected within the detector’s coverage area causes a transmitted alarm and LED activation. Each alarm will also extend the Test Mode. Adjust as necessary.

Notice!
Excessive use of the Walk Test Mode may reduce battery life. Use only for initial setup and maintenance testing.

Notice!
In the normal operating mode, an alarm can be transmitted only after three (3) minutes have passed since the previous alarm restoral. This 3 minute lockout time reduces unnecessary RF transmissions in high traffic areas, thereby extending battery life.

Refer to the LED table below for LED descriptions.

LED condition	Cause
Steady blue	PIR activation (Walk Test)
Flashing blue	Warm-up period after power-up
Flashing blue (four-pulse sequence)	PIR failure. Replace unit.

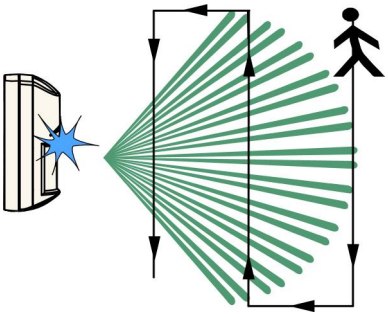


Figure 6.1: Walk test

1. Start at the pattern's expected boundary and walk across the pattern moving closer to the detector (*refer to the Walk test figure above*).
2. While the detector is in the Walk Test Mode, turn ON all heating and air conditioning sources which would normally be active during the protection period. Stay away from the sensor and outside the coverage pattern and watch for alarms.
3. The LED flashes at the completion of a 90-sec span of time, indicating that the Walk Test mode is ending. This occurs when there is no activity in the sensor's coverage pattern during the 90-sec interval.
4. When walk testing is completed. the detector returns to normal operation after 90 seconds of inactivity.

7 RADION PIR C

The RFPR-C12 is a high performance curtain PIR motion detector that uses advanced signal processing to provide outstanding catch performance and unsurpassed false alarm immunity. The detector contains an integrated RF transmitter. The transmitter sends a battery report with each transmission, and transmits a supervisory signal to the control panel. Features include:

– 12 m x 1.5 m (40 ft x 5 ft) curtain coverage
– Flexible Mounting Height

Dimensions	111.00 mm x 60.00 mm x 43.00 mm (4.40 in x 2.40 in x 1.70 in)
Relative humidity	0% to 93%, non-condensing
Temperature (operating)	Functional range: -10°C to +49°C (+14°F to +120°F) EN 50130-5 Class II only: -10˚ C to 40˚ C (+14˚ F to +104˚ F)
Power/voltage	One CR123A Lithium batteries, 3 VDC (⎓) Power source type: C Low battery level: 2,15V
Battery replacement	Duracell DL123A, Panasonic CR123A, or Sanyo CR123A. Check your battery yearly to ensure proper functionality.
Battery life	Up to 5 years
Device testing	To ensure proper functionality, the device must be tested at least once every year by an installer.
Wall and cover tamper switch	Transmits a tamper signal when someone removes the device from its base or pulls it away from the wall.
Frequency	433.42 MHz

Table 7.1: Specifications

7.1 Walk testing

Perform a walk test to determine the boundaries of the coverage area.
Insert a slotted screwdriver into the designated hole to open the cover and then close the detector cover to start a 90-sec Walk Test mode.
During this test mode, motion detected within the detector’s coverage area causes a transmitted alarm and LED activation. Each alarm will also extend the Test Mode. Adjust as necessary.

Notice!
Excessive use of the Walk Test Mode may reduce battery life. Use only for initial setup and maintenance testing.

Notice!
In the normal operating mode, an alarm can be transmitted only after three (3) minutes have passed since the previous alarm restoral. This 3 minute lockout time reduces unnecessary RF transmissions in high traffic areas, thereby extending battery life.

Refer to the LED table below for LED descriptions.

LED condition	Cause
Steady blue	PIR activation (Walk Test)
Flashing blue	Warm-up period after power-up
Flashing blue (four-pulse sequence)	PIR failure. Replace unit.

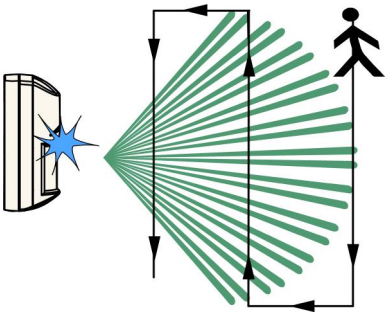


Figure 7.1: Walk test

1. Start at the pattern's expected boundary and walk across the pattern moving closer to the detector (*refer to the Walk test figure above*).
2. While the detector is in the Walk Test Mode, turn ON all heating and air conditioning sources which would normally be active during the protection period. Stay away from the sensor and outside the coverage pattern and watch for alarms.
3. The LED flashes at the completion of a 90-sec span of time, indicating that the Walk Test mode is ending. This occurs when there is no activity in the sensor's coverage pattern during the 90-sec interval.
4. When walk testing is completed. the detector returns to normal operation after 90 seconds of inactivity.

8 RADION smoke

The RFSM is a non-latching wireless smoke detector that sends an alarm signal to the receiver. The following features include:

- A visual status LED
- A built-in sounder for alarm alerts
- Under normal conditions, the red LED flashes once every 8 sec while the sensor monitors the surrounding environment. When the sensor detects smoke, the LED changes from flashing to steady ON and the sounder produces a loud, continuous tone. Refer to the LED table for more information.

Replaceable optical chamber	For easy maintenance
Power/voltage	Two CR123A Lithium batteries, 3 VDC (⎓) Power source type: C Low battery level: 2.15V
Current draw	Standby: 45 uA Alarm: 70 mA
Battery replacement	Duracell DL123A, Panasonic CR123A, or Sanyo CR123A. Check your batteries yearly to ensure proper functionality.
Battery life	Minimum of 5 years or greater
Device testing	To ensure proper functionality, the device must be tested at least once every year.
Sensitivity	0.14+/- 0.04 bM/m (0.97 – 2.99%/ft obscuration – RFSM-A only)
Temperature (operating)	Functional range: -10˚ C to +49˚ (+14˚ F to +120˚ F) EN 50130-5 Class II only: -10˚ C to 40˚ C (+14˚ F to +104˚ F)
Relative humidity	0% to 93% (non-condensing)
Cover and wall tamper switch	Transmits a tamper switch signal when the detector is removed from its base, or the unit is pulled away from the wall.
Drift compensation adjustment	-1.64%/m (0.5%/ft) maximum
Sounder	85 dBA at 3 m
Self-diagnostics feature	Monitors detector sensitivity and operational status.
Frequency	433.42 MHz

Table 8.1: Specifications

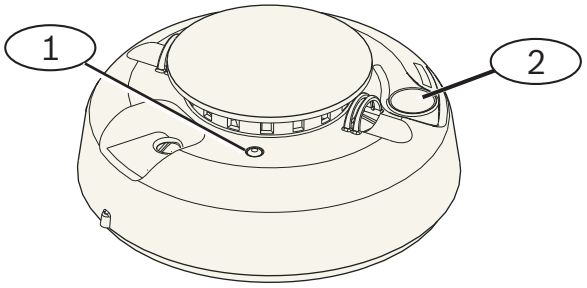


Figure 8.1: Smoke detector

1 – High intensity LED
2 – Test/Silence button

8.1 Battery replacement

Under normal conditions, the LED normally flashes every 8 sec to indicate normal operating conditions. Replace the battery when the LED stops flashing, and the sensor chirps every 45 sec.
Silence the low battery trouble chirps for 24 hr by pushing the **Test/Silence** button. Refer to the Smoke detector illustration for locating the **Test/Silence** button.

8.2 Smoke test

Test smoke detectors annually by using a listed aerosol smoke tester to simulate an alarm. Follow the instructions on the can.
The LED should remain ON while the detector provides a continuous tone. The detector automatically resets when smoke is no longer present. A detector that fails to activate with the smoke test might require cleaning or replacement.

Notice!
To avoid a fire department dispatch, contact central monitoring station, or put the system into Test mode before activating the detector using this method.

8.3 Sensitivity test

Notice!
The control panel recognizes Test Mode as a test. It does not send an alarm.

The detector includes a Sensitivity Level Test mode for determining the detector's sensitivity:
1. Press and hold the **Test/Silence** button for 4 sec. The LED flashes 1 to 9 times.
2. Count the number of LED flashes and use the *Smoke detector sensitivity conditions* table to determine the status of the detector's sensitivity and the recommended action.

Flashes	Action Recommended
1	Self-diagnostics failure. Return detector for service or replacement.
2 to 3	Detector is becoming insensitive. Clean detector and re-test. If error persists, replace the detector.
4 to 7	Detector is within normal sensitivity settings.
8 to 9	Detector is becoming too sensitive. Confirm that the smoke chamber is snapped down securely. Clean the sensor and re-test.

Table 8.2: Smoke detector sensitivity conditions

8.4 Test/Silence button

Refer to the RADION smoke detector illustration for location of the **Test/Silence** button.

– Testing. Press the Test/Silence button for 4 sec. The detector performs a Sounder test and a Sensitivity test.
– Silence alarm. Press to silence the sounder during an alarm. After a few minutes, the sounder and alarm resume if smoke is still present**.**

Remote monitoring station alarm test
Press the button for fifteen (or 20) seconds to send a fire alarm signal to the remote monitoring station.

Notice!
To avoid a fire department dispatch, contact the remote monitoring station or put the control panel into the corresponding test mode before performing this test.

8.5 LED

LED	Status
Flashing	Flashes every 8 sec under normal operation.
ON	Detects smoke, sending an alarm.
OFF	Malfunction, replace the batteries, clean the detector, or replace the optical chamber as required.

Table 8.3: LED

8.6 Clean the detector and replace the optical chamber

Clean the detector cover with a dry or damp cloth as needed to keep it free from dust and dirt. Clean the detector interior at least yearly.
Cleaning the detector:

1. Remove the detector from the mounting base.
2. Remove the batteries.
3. Slide a slotted screwdriver into the slot on the detector cap and gently push down to pry off the cap.

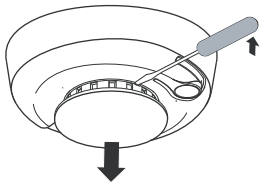


Figure 8.2: Remove the detector cap

4. Squeeze the optical chamber where indicated and pull it up and away from the detector.

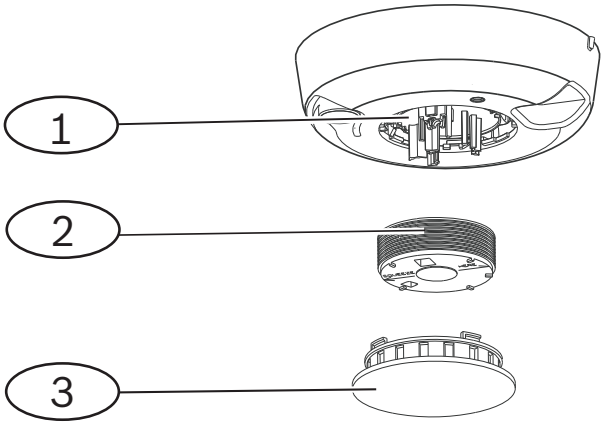


Figure 8.3: Remove the detector cap

1 – Optical base
2 – Optical chamber
3 – Alarm cap

5. Use compressed air or a soft-bristled brush to remove dust and dirt from the smoke chamber base.
6. Align the optical chamber with the base and snap down into place.
7. To attach the detector cap, line the cap up with the detector, press the cap onto the detector, and turn clockwise to snap it firmly into place.
8. Observing the proper polarity, install the batteries and the battery cover. If the batteries are not installed properly, the detector will not fit onto the mounting base. Ensure that the batteries are properly installed.
9. Mount the detector onto the mounting base.
10. Test the detector’s sensitivity.

9 RADION contact SM

The RFDW-SM is a standard surface-mount wireless transmitter device used for monitoring doors and windows.
Features include:

- An internal reed switch
- A cover and wall tamper switch

Power/voltage	One AAA Lithium battery, 1.5 VDC (⎓) Power source type: C Low battery level: 0.9V
Battery replacement	Energizer L92. Check your battery yearly to ensure proper functionality.
Battery life	Up to 5 years
Device testing	To ensure proper functionality, the device must be tested at least once every year by an installer.
Dimensions (transmitter)	19.50 mm x 82.55 mm x 12.80 mm (0.76 in x 3.25 in x 0.50 in)
Dimensions (magnet)	24.5 mm x 18.5 mm x 12.5 mm (0.97 in x 0.72 in x 0.49 in)
Temperature (operating)	Functional range: -10°C to +49°C (+14°F to +120°F) EN 50130-5 Class II only: -10˚ C to 40˚ C (+14˚ F to +104˚ F)
Relative humidity	0% to 93% (non-condensing)
Wall and Cover Tamper Switch	Transmits a tamper signal when someone removes the device from its base or pulls it away from the wall.
Frequency	433.42 MHz

Table 9.1: Specifications

9.1 Installation considerations

You have a variety of installation options to consider when installing the device. You must acknowledge the unique installation approach prior to installation. Some installation considerations include:

- Suitable surfaces for installation include wood, steel, and aluminum.
- The location of the magnet and transmitter in relationship to the door/window frame dimensions. Verify you have proper clearance with the latch of the window or door you are installing the device onto. Failure to do so will make it extremely difficult to access and open the device for maintenance purposes.
- In some cases, you might need an additional spacer when installing the transmitter and magnet in the corner of a recessed door or window frame to close the gap in height between the magnet and transmitter.
- For additional security, you can use an adhesive with the screws to secure the transmitters and magnets during installation.

- When installing the magnet, verify that the notches in the magnet base, line up with the notches in the transmitter base, otherwise the magnet and transmitter do not function effectively.
- When installing the magnet base, install the face of the magnet base flush to the surface edge of the installation location. This prevents damage to the magnet plastic base whenever a window or door is opened.
- Adhere to the distances prescribed in the graphical table found in the graphical *Installation and Operation Guide* when installing the magnet adjacent to the transmitter.

How to read the Graphical Magnet Distances table

Contained in the RADION contact SM *Installation Guide* is a graphical table along with the *X – Y – Z* coordinates graphic. Use the table in conjunction with the graphic to determine desired distances between the magnet and the transmitter based on the type of installation (wood or metal).

Notice!

The content in the Installation Guide table applies to EN installations.

10 RADION contact RM

The RFDW-RM is a recessed-mounted wireless transmitter device used for monitoring doors and windows. Features include:

- Self-contained transmitter with magnetic reed switch
- Tamper protection
- Recessed mounting on doors or windows

Power/voltage	One AAA Lithium battery, 1.5 VDC (⎓) Power source type: C Low battery level: 0.9V
Battery replacement	Energizer L92. Check your battery yearly to ensure proper functionality.
Battery life	Up to 5 years
Device testing	To ensure proper functionality, the device must be tested at least once every year by an installer.
Dimensions (transmitter)	19.00 mm x 104.80 mm (0.75 in x 4.12 in)
Dimensions (magnet)	22 mm x 28 mm x 15 mm (0.87 in x 1.10 in x 0.59 in)
Relative humidity	0% to 93%, non-condensing
Temperature (operating)	Functional range: -10°C to +49°C (+14°F to +120°F) EN 50130-5 Class II only: -10˚ C to 40˚ C (+14˚ F to +104˚ F)
Frequency	433.42 MHz

Table 10.1: Specifications

10.1 Installation considerations

You have a variety of installation options to consider when installing the device. You must acknowledge the unique installation approach prior to installation. Some installation considerations include:

- The installation of this device is suitable for wood surfaces. This device is not suitable for steel surfaces.
- The transmitter housing was designed to be open with a coin. Using a screwdriver may cause damage to the plastic top.
- When reinserting the PCB (battery and antenna assembly), verify that the PCB assembly fits into the grooves of the transmitter housing.
- When reinserting the plastic top, verify that the top fits into the designed grooves of the transmitter housing.
- When installing the transmitter in an overhead location, be mindful that the PCB assembly may fall out of the transmitter housing.
- The removal of the plastic flaps is optional, depending on your installation needs.
- For added security, you can use an adhesive with the screws to secure the transmitters and magnets.

Notice!

EN requirements

For further information regarding certified installations, please refer to EN product requirements.

How to read the Graphical Magnet Distances table

Contained in the recessed door/window contact *Installation Guide* is a graphical table along with the *X – Y* coordinates graphic. Use the table in conjunction with the graphic to determine desired distances between the magnet and the transmitter based on the type of installation.

11 RADION specialty

RFBT is a designed transmitter (bill trap) specifically used in financial or retail environments. It transmits a silent, wireless alarm signal without local notification (no LED activation) when a bill, or any other form of paper currency is removed from the transmitter – typically, the last bill in the bottom of a cash drawer.

Features include:

– Brief illumination of LED to signify armed and operational status
– Wall tamper alarm when removed from the cash drawer.

Dimensions	48.80 mm x 154.10 mm x 23.60 mm (1.92 in x 6.06 in x 0.93 in)
Power/voltage	1.5 VDC, Lithium (⎓) Power source type: C Low battery level: 0.9V
Battery replacement	Energizer L92. Replace your battery yearly to ensure proper functionality.
Battery life	Up to 5 years
Device testing	To ensure proper functionality, the device must be tested at least once every year.
Relative humidity	0% to 93%, non-condensing
Temperature (operating)	Functional range: -10°C to +49°C (+14°F to +120°F) EN 50130-5 Class II only: -10˚ C to 40˚ C (+14˚ F to +104˚ F)
Frequency	433.42 MHz

Table 11.1: Specifications

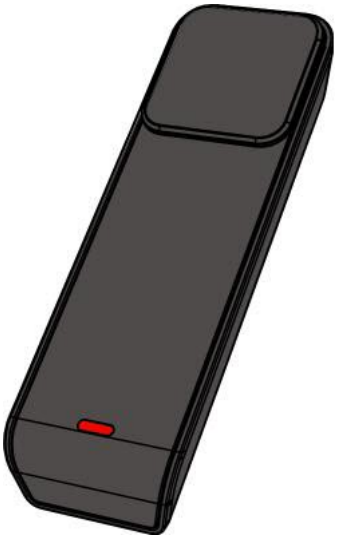


Figure 11.1: Specialty

11.1 Applications for this product

Usage of this product is to provide concealed protection against theft in a financial institution such as a bank, or in other commercial environments such as retail businesses and shops. In some cases, the cash drawer is removed from the teller or cashier station, and stored inside a bank vault at the close of each business day. In this scenario, the bank vault system is always armed, and the bill trap remains in a non-faulted condition. It is recommended to use the 3M double sided tape when inserting into the cash drawer.
In other occasions, the bill trap itself may be removed from the cash drawer at the end of a workers shift. In this situation, the bill trap unit will generate a tamper condition upon removal. In this type of application, it is important that the system must be configured such that the tamper does not generate a silent alarm. For this occasion, the hook and loop may be a more suitable mounting technique.

11.2 Installation consideration

During the installation process, use the self-adhesive Velcro strips located on the bottom of the bill trap base, to secure and stabilize the bill trap in the cash drawer. This is achieved by performing the following:

1. Separate the Velcro strips from one another.
2. Peel off the protective backing of the Velcro strips.
3. Press the two bottom sections of the Velcro onto the bottom of the cash drawer, in the desired location.
4. Line up and press down on the bill trap so that the Velcro on the bottom of the bill trap is aligned with the Velcro strips inside the cash drawer.

Warning!

It is important to check the Velcro strips on a weekly basis for wear and replace when appropriate in order to prevent potential false alarms.

12 RADION universal transmitter

The RFUN is a wireless transmitter used for monitoring doors, windows, and other dry contact devices.

Features include:

- A cover and wall tamper switch
- Single input with magnetic contact
- Ability to connect to an external detector

Wire gauge	0.65 mm (22 AWG) to 1.5 mm (16 AWG)
Wiring distance	Maximum distance of 7.62 m (25 ft)
Power/voltage	Lithium battery, 3 VDC (⎓ Power source type: C Low battery level: 2.15V)
Battery replacement	One Duracell DL123A, or Panasonic CR123A, or Sanyo CR123A. Check your battery yearly to ensure proper functionality.
Battery life	Up to 5 years
Device testing	To ensure proper functionality, the device must be tested at least once every year by an installer.
Temperature (operating)	Functional range: -10˚ C to +49˚ (+14˚ F to +120˚ F) EN 50130-5 Class II only: -10˚ C to 40˚ C (+14˚ F to +104˚ F)
Relative Humidity	0% to 93% (non-condensing)
Terminal block	For connecting other dry contact devices such as another magnetic reed switch.
Wall and cover tamper switch	Transmits a tamper signal when someone removes the device from its base or pulls it away from the wall.
Frequency	433.42 MHz

Table 12.1: Specifications

Dual EOL Resistor Option

Use a 2.2 k Ω EOL and 1.5 k Ω EOL resistor.

Refer to the diagram below.

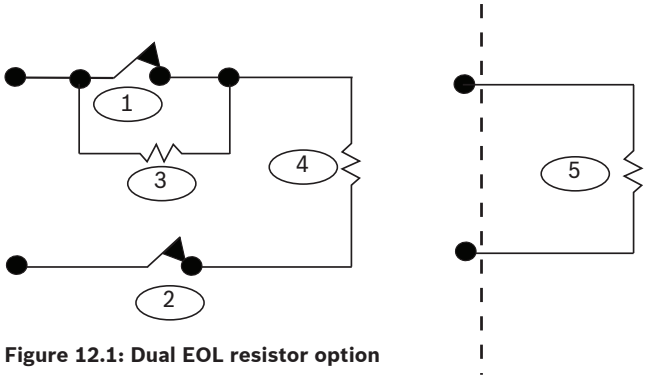


Figure 12.1: Dual EOL resistor option

Applicable to ICP-CC488, sol 16+, 16i, 64, *144/6000

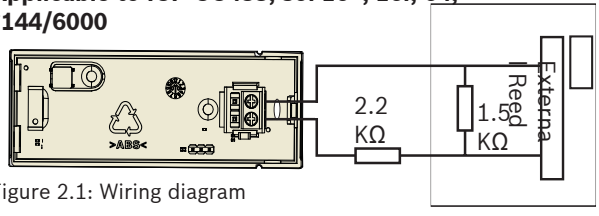
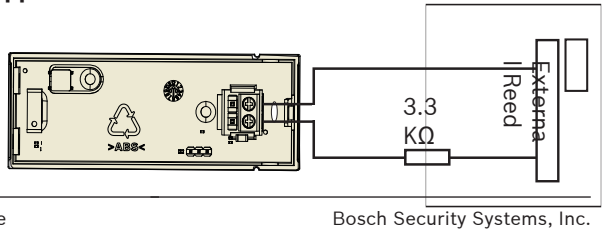


Figure 2.1: Wiring diagram

* The solution 144/6000 can use the external contact as well as its normal contact by learning it in as channel 1 and channel 2.

Applicable to CC488



1 – Normally-closed (NC) alarm
2 – Normally-closed (NC) tamper
3 – 1.5 k Ω alarm EOL
4 – 2.2 k Ω tamper EOL
5 – Input disabled – no contact, 2.2 k Ω EOL

12.1 Installation considerations

You have a variety of installation options to consider when installing the device. You must acknowledge the unique installation approach prior to installation. Some installation considerations include:

- The location of the magnet and transmitter in relationship to the door/window frame dimensions. Verify you have proper clearance with the latch of the window or door you are installing the device onto. Failure to do so will make it extremely difficult to access and open the device for maintenance purposes.
- In some cases, you might need an additional spacer when installing the transmitter and magnet in the corner of a recessed door or window frame to close the gap in height between the magnet and transmitter.
- On surface areas that are not conducive to mounting via the screws, you can secure transmitters and magnets using an industrial strength adhesive.
- When installing the magnet, verify that the notches in the magnet base, line up with the notches in the transmitter base, otherwise the magnet and transmitter do not function effectively.
- When installing the magnet base, install the face of the magnet base flush to the surface edge of the installation location. This prevents damage to the magnet plastic base whenever a window or door is opened.
- Adhere to the distances prescribed in the graphical table found in the graphical *Installation and Operation Guide* when installing the magnet adjacent to the transmitter.

How to read the Graphical Magnet Distances table

Contained in the universal transmitter *Installation and Operation Guide* is a graphical table along with the *X* – *Y* – Z coordinates graphic. Use the table in conjunction with the graphic to determine desired distances between the magnet and the transmitter based on the type of installation (wood or metal).

Notice!

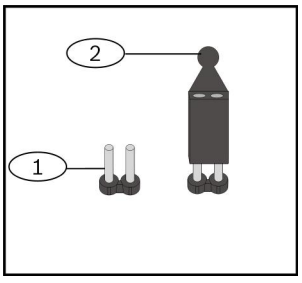
The content in the graphical table applies to EN installations.

12.2 Reed switch settings

Set the detector to enable or disable the reed switch.

Notice!

Please note, insert the jumper onto the pin prior to installing the battery. Failure to do so may result in unexpected operation of the device.



Callout – Description
1 – No jumper disables the internal reed switch
2 – Jumper on enables the internal reed switch

13 RADION keyfob

RADION keyfobs (two button and four button) are personal transmitters carried by the user that allow the user to remotely arm or disarm a security area.

Dimensions	63.70 mm x 35.50 mm x 13.00 mm (2.51 in x 1.40 in x 0.51 in)
Power/voltage	One Lithium battery (CR2032) 3 VDC Power source type: C Low battery level: 2.1V
Battery replacement	Panasonic CR2032, Duracell DL2032. Check your Battery yearly to ensure proper functionality
Battery life	Up to 5 years
Temperature (operating)	Functional range: -10°C to +49°C (+14°F to +120°F) EN 50130-5 Class II only: -10˚ C to 40˚ C (+14˚ F to +104˚ F)
Relative humidity	0% to 93% (non-condensing)
Frequency	433.42 MHz

Table 13.1: Specifications

Notice!
Please note, the battery does not come installed. Refer to the specification table for the correct battery type when replacing an old battery.

Keyfob buttons
Refer to your control panel's documentation to program the functions of the programmable buttons.
Pressing either the arm or disarm button causes the LED to flash for about 2 sec., indicating the keyfob sent commands to the control panel.

Notice!
Pressing the Arm and Disarm buttons in unison for 1 sec transmits a panic alarm.

13.1 RADION keyfob FB

The RFKF-FB four button keyfob is designed for arming (lock icon) and disarming (unlock icon) the system remotely. You can configure the programmable buttons at the control panel for additional control functionality. To operate the programmable buttons, simply press and hold either button for at least one sec in order for the desired feature to work.

- Uniquely coded arm and disarm buttons
- Panic alarm
- LED indicator
- Programmable option buttons

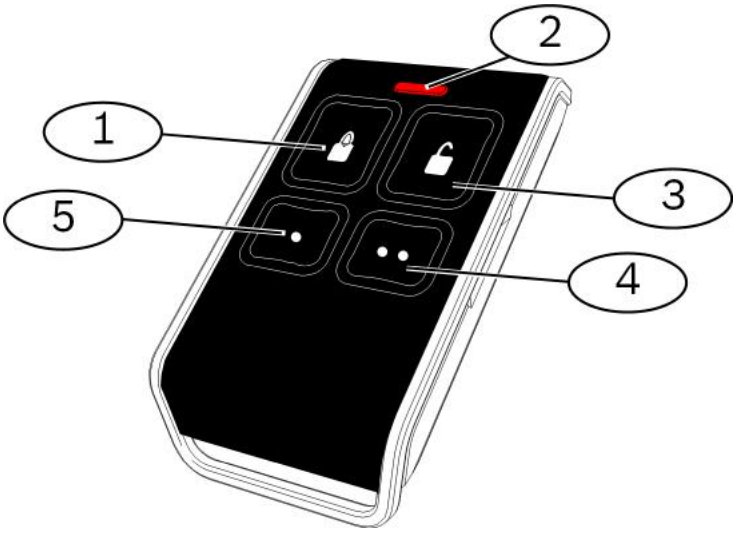


Figure 13.1: Keyfob buttons and LED

1 – Arm button
2 – LED
3 – Disarm button
4 – Programmable button
5 – Programmable button

13.2 RADION keyfob TB

The RFKF-TB two button keyfob is designed for arming (lock icon) and disarming (unlock icon) the system remotely. To operate these buttons, simply press and hold either button for at least one sec in order for the desired feature to work.

- Uniquely coded arm and disarm buttons
- Panic alarm
- LED indicator

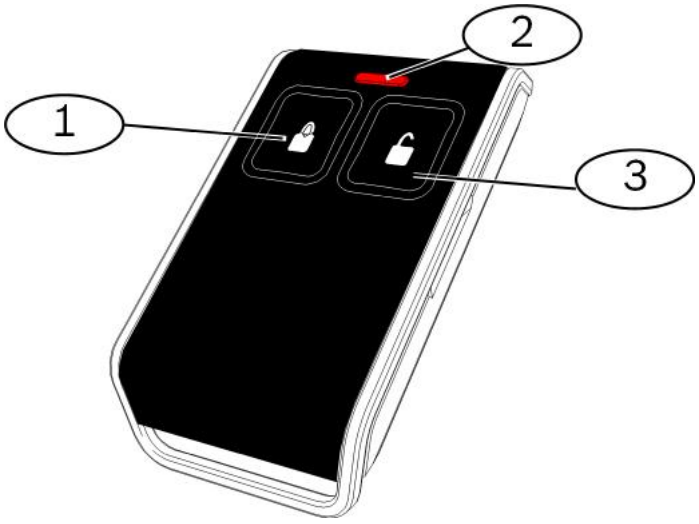


Figure 13.2: Keyfob buttons and LED

1 – Arm button
2 – LED
3 – Disarm button

14 RADION panic

The RFPB-SB/RFPB-TB is a transmitter that sends a panic alarm signal to the security system when one (single button panic), or both panic buttons (2-button panic) are pressed for 1 sec. The single-button, or two-button panic transmitter can be used in a variety of options such as a pendant, wrist strap, belt clip, depending on the desired accessory. The RADION panic offers the following features:

- Each transmitter has a unique code
- Panic alarm signal
- One or two button versions
- LED indicator
- Optional accessories

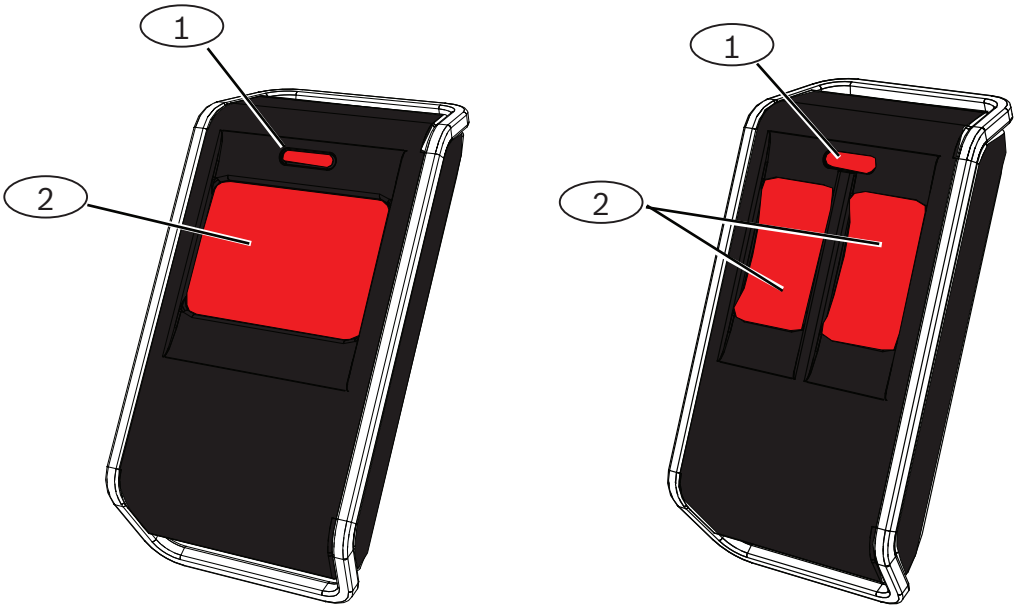


Figure 14.1: Panic Buttons

1 – Panic buttons
2 – LED

Relative humidity	0% to 93% (non-condensing)
Temperature (operating)	Functional range: -10°C to +49°C (+14°F to +120°F) EN 50130-5 Class II only: -10˚ C to 40˚ C (+14˚ F to +104˚ F)
Dimensions	63.70 mm x 35.50 mm x 13.00 mm (2.51 in x 1.40 in x 0.51 in)
Power/voltage	One CR2032 Lithium battery, 3 VDC Power source type: C Low battery level: 2.1V
Battery replacement	Panasonic CR2032, Duracell DL2032. Check your Battery yearly to ensure proper functionality
Battery life	Up to 5 years

LED	Red
Frequency	433.42 MHz

Table 14.1: Specifications

Notice!

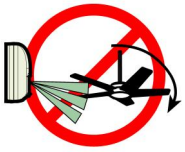
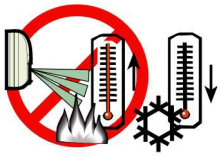
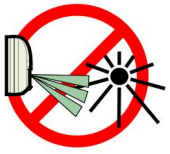
Please note, the battery does not come installed. Verify that the correct battery as defined in the specification table is installed in the proper polarity.

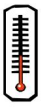
Optional Accessories	
Pendant	Pendant transmitters provide single or two-button activation confirmed by emitting LED flashes with all transmissions to clearly show users when the unit is operating. Users can wear the pendants on a neck cord. The pendants are ideal to meet the needs of patrolling guards, bank employees, and retail store employees.
Belt Clip	Belt Clip transmitters provide single or two-button activation confirmed by emitting LED flashes with all transmissions to clearly show users when the unit is operating. The single-button design is ideal for assisted living installations whereas the two-button design reduces accidental activation.
Wrist Strap	Wrist Strap transmitters provide single or two-button activation confirmed by emitting LED flashes with all transmissions to clearly show users when the unit is operating.

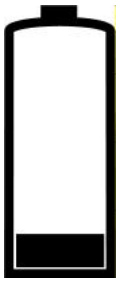
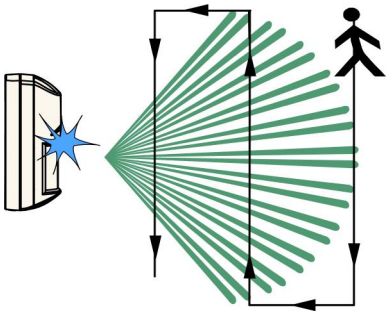
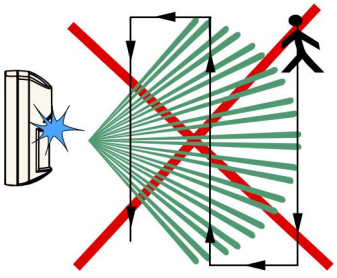
15 Appendices

Icons and symbols

Use the table below for descriptions of the icons and symbols used in the reference guide.

Description	Icon/symbol
Not pet friendly.	
Signifies that the item is the correct choice, selection, or location.	
Pet friendly (appropriate height and weights below graphic.	
Point away from rotating machines.	
Point away from objects that rapidly change temperature	
Do not mount the device that has direct exposure to sunlight.	
Do not point toward window.	
Intended for indoor use only.	

Electrostatic discharge symbol	
Symbol against disposing batteries into the garbage	
Humidity range	
Temperature range	
Frequency range	
Duration of time	
Questions are answered in the reference guide.	
Universal sign for connecting or disconnecting power.	
Universal sign for connecting to a power source.	

Battery-related information.	
Perform a walk test	
Walk test has concluded	
Device has wall tamper detection.	

Bosch Security Systems, Inc.
130 Perinton Parkway
Fairport, NY 14450
USA
www.boschsecurity.com
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Bosch Sicherheitssysteme GmbH
Robert-Bosch-Ring 5
85630 Grasbrunn
Germany