TECHNICAL MANUAL

GRIFOXRF

Indoor/outdoor advanced wireless double-technology detector with volumetric protection for intrusion detection systems

090030916

IT08020000001624

EL.MO. SPA

FOREWORD

FOR THE INSTALLER:
Comply strictly with current standards governing the installation of electrical systems and security systems, and with the manufacturer's directions given in the manuals supplied with the products.
Provide the user with full information on using the system installed and on its limitations, pointing out that there are different levels of security performance that will need to suit the user's requirements within the constraints of the specific applicable standards. See that the user looks through the warnings given herein.

FOR THE USER:
Check the system's operation thoroughly at regular intervals, making sure the equipment can be armed and disarmed properly.
Make sure the system receives proper routine maintenance, employing the services of specialist personnel who meet the requirements prescribed by current regulations.
Ask your installer to check that the system suits changing operating conditions (e.g. changes in the extent of the areas to be protected, change in access methods, etc...).

This device has been designed, built and tested with the utmost care and attention, adopting test and inspection procedures in accordance with current legislation. Full compliance of the working specifications is only achieved in the event the device is used solely for its intended purpose, namely:

Indoor/outdoor advanced wireless double-technology detector with volumetric protection for intrusion detection systems

The device is not intended for any use other than the above and hence its correct functioning in such cases cannot be assured. Consequently, any use of the manual in your possession for any purpose other than those for which it was compiled - namely for the purpose of explaining the product's technical features and operating procedures - is strictly prohibited.
Production processes are closely monitored in order to prevent faults and malfunctions. However, the componentry adopted is subject to an extremely modest percentage of faults, which is nonetheless the case with any electronic or mechanical product.
Given the intended use of this item (protection of property and people), we invite you to adapt the level of protection offered by the system to suit the actual situation of risk (allowing for the possibility of impaired system operation due to faults or other problems), while reminding you that there are specific standards for the design and production of systems intended for this kind of application.

We hereby advise you (the system's operator) to see that the system receives regular routine maintenance, at least in accordance with the provisions of current legislation, and also check on as regular a basis as the risk involved requires that the system in question is operating properly, with particular reference to the control unit, sensors, sounders, dialler(s) and any other device connected. You must let the installer know how well the system seems to be operating, based on the results of periodic checks, without delay.

Work involved in the design, installation and maintenance of systems incorporating this product should be performed only by personnel with suitable skills and knowledge required to work safely so as to prevent any accidents. It is vital that systems be installed in accordance with current legislation. The internal parts of certain equipment are connected to the mains and therefore there is a risk of electrocution when maintenance work is performed inside without first disconnecting the primary and emergency power supplies. Certain products include batteries, rechargeable or otherwise, as an emergency backup power supply. If connected incorrectly, they may cause damage to the product or property, and may endanger the operator (explosion and fire).

EU DECLARATION OF CONFORMITY

Hereby, EL.MO. S.p.A. declares that the radio equipment GRIFOXRF is in compliance with Directive 2014/53/EU. The full text of the EU declaration of conformity is available at the following Internet address: elmospa.com – registration is quick and easy.

DISPOSAL INSTRUCTIONS

According to Directive 2012/19/EU on the Waste of Electric and Electronic Equipment (WEEE), it is here specified that this Electrical-Electromechanical Device started to be commercialized after 13th August 2005, and it shall be disposed of separately from ordinary waste products.

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1. GENERALS

GRIFOXRF is an advanced miniaturized wireless IR detector characterized by high performances and designed for protection of large indoor/outdoor areas. It can be wall or angle mounted, or installed using the swivel mount included in the optional accessory kits.
The detector's functions are selectable using dip switches; the radio section encoding can be set to be compatible with the protocols used by the Helios system or by the Villeggio system with fw. 5.x or higher. The detector is also compatible with RIVERRF wireless concentrators connected to NET series, ETRG2 series or TITANIA control units, with RX8CH receivers and with HALLEY and HALENTE wireless interfaces.

Note: Use the HELIOS protocol for Villeggio control units with fw. lower than 5.0.0, and in case RIVERRF is used; the Villeggio protocol can only be used by Villeggio control units with fw. 5.0.0 or higher and by other compatible devices.

The detector uses a digital PIR sensor in order to achieve a very high detection precision and immunity to interferences.
The detector's appealing look allows its installation in any kind of setting.

2. FEATURES

2.0.1 General features

- **High performance miniaturized wireless detector.**
- **Choice between the Helios (default) or Villeggio wireless transmission protocols.**
- **Designed for an efficient wireless MW and IR volumetric protection.**
- **DIGITAL high-immunity PIR sensor with temperature compensation.**
- **Anti-dazzling silicon filter.**
- **IR lens with vertical curtain protection with 81° horizontal beam opening, 4-8 m range to achieve optimum protection of the area.**
- **MW section with small-dimensioned, low-noise 24 GHz planar antenna, pulsed circuit and neon lights filter, 80° horizontal and 32° vertical beam opening. 4 to 8 m range.**
- **Sophisticated MW section management circuit with activation and signal processing started by the IR section motion detection.**
- **Sophisticated alarm generation circuit with wireless encoded transmission and transmitter equipped with special amplifiers, to achieve a 150 m operative range in open field.**
- **Front LED operative status indicators.**
- **Advanced AND management.**
- **Internal dip switches to set the operation modes.**
- **Powered by the provided 2ER14505 7.2 V lithium battery.**
- **Advanced internal battery charge state control: any anomalies are queued after the first useful transmission.**
- **Transmissions for supervision, alarm, tamper.**
- **Fixed 26 minutes timer for supervision transmission towards the receiver device.**
- **Preset identification code, randomly chosen among more than two billions (2^{31}) different combinations, for a quicker installation.**
- **Extremely compact dimensions and pleasing design of the plastic case, arranged for wall mounting. The back of the case is ready for cable feeding, with protection grommet.**
- **Accessories: mod. ANGSGX bracket for corner mounting, mod. CUPSGX protection sunshield for outdoor installation and mod. SNDSGX joint for tilted mounting.**

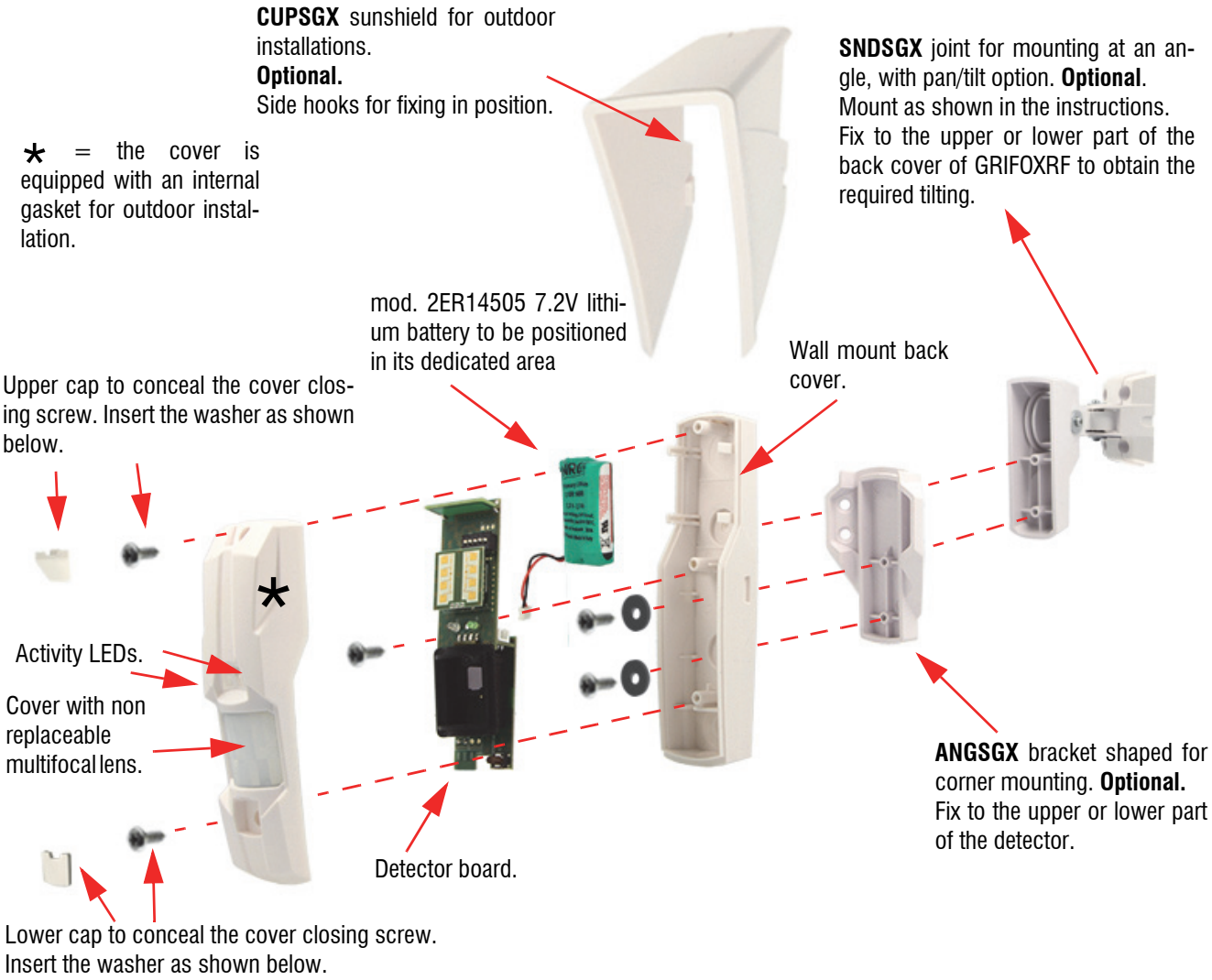
2.1 Technical specifications

Model:	**GRIFOXRF**		
Protection class:	IP55 when using the supplied mandatory protection gaskets.		
Performance level:	II° (none when the swivel mount is used)		
EN 50131 compliance:	grade 1, environmental class III.		
Power supply:	supplied mod. 2ER14505 7.2 V lithium battery.		
Low battery detection:	when less than 5 V (re-arm at 5.5 V).		
Minimum operating voltage:	4 V dead battery.		
Power consumption of the detector @7.2 V			
Idle:	33 µA		
During an alarm:	16 mA		
Function selections:	dip switches on board, see the electrical diagrams.		
TX frequency:	digital transmissions on LPD (Low Power Devices) frequencies.		
TX protocol:	Selectable to be compatible with Helios or Villeggio systems.		
Max transmitted power	10 mW		
Wireless range:	150 m in open field, limited by environmental conditions.		
Average battery life			
2 years with the Helios protocol, 2.5 years with the Villeggio protocol. **Note:** the average is calculated with 20 total communications per day and a supervision transmission every 26 minutes. Inhibition time set to 5 minutes. Setting the inhibition time to 30 s significantly shortens battery life.			
Timings			
First power-up:	40 s (the IR section is disabled during this time).		
Walk-Test time:	8 minutes (after the first power-up).		
Time between first and second IR pulses:	10 s only with sensitivity set to its minimum value.		
IR inhibition delay during Walk-Tests after an alarm transmission:	5 s		
Supervision interval:	26 minutes, preset.		
MW section		**Infrared section**	
Anti-noise digital filter	for neon lamps.	**Lens type:**	volumetric lens.
Integration:	fixed, 2 pulses.	**Number of sensitive zones:**	see covering diagrams.
TX frequency:	24.125 GHz.	**Covered area:**	see covering diagrams.
Range:	8 m, reducible to 4 m with dip 4 set to ON.	**Range:**	8 m, reducible to 4 m with dip 4 set to ON, see covering diagrams.
Sensitivity:	1 IR pulse + 2 MW pulses in 3.5 s.	**PIR sensor:**	digital type, highly immune to RF interferences. Equipped with anti-dazzling silicon filter.
		IR stage gain:	optimised according to the temperature.
Visual indicators:	Blue LED: Power On, alarm, MW section WALK TEST, alarm and tamper with different flashing. Green LED: Power On, alarm, IR section WALK TEST		
Visual indication examples:	Both LEDs ON for first Power On; Both LEDs blinking slowly for Walk-Test alarm transmission; Green LED ON for 3.5 s for IR pulse during the Walk-Test; Blue LED single flash for RF transmission in operation.		
Protection:	against case opening		
Operating conditions:	from −10 to +55 °C — 93% r.h.		
Dimensions and weight:	H 155 – W 39 – D 44 mm, 140 g with battery and no accessories.		
Parts supplied:	screws, rubber washers, dowels, technical manual, mod. 2ER14505 7.2 V battery, rubber washers for the front screws.		

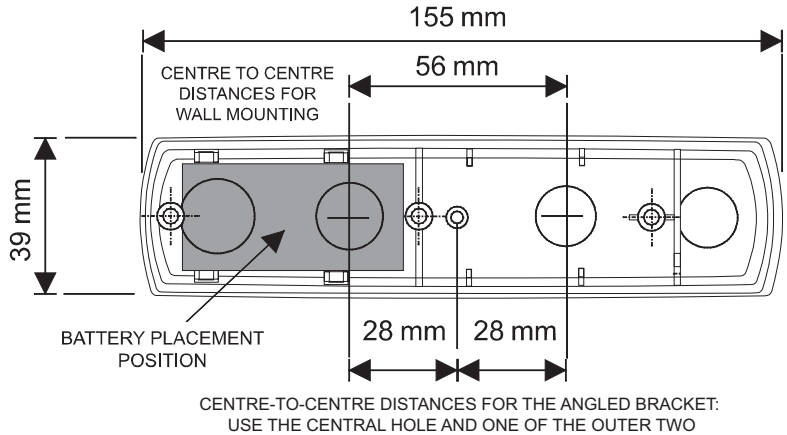
GRIFOXRF complies with the EN50131-5-3+A1 standard for grade 1 and environmental class III.
GRIFOXRF is an accessory for expressly compatible devices.

3. VIEW OF THE DETECTOR

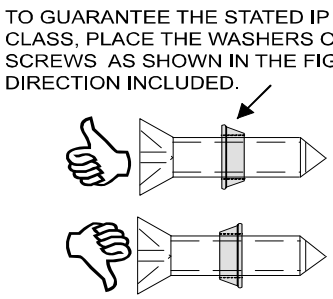
Exploded diagram of the detector, including accessories.



Back view with fixing centre-to-centre distances.



Detail for the front screws washers.



ATTENTION

The detector is suitable for outdoor installations if the indicated washers and gaskets are used. For a better sealing, apply a line of silicone around the screw holes.

4. INSTALLATION

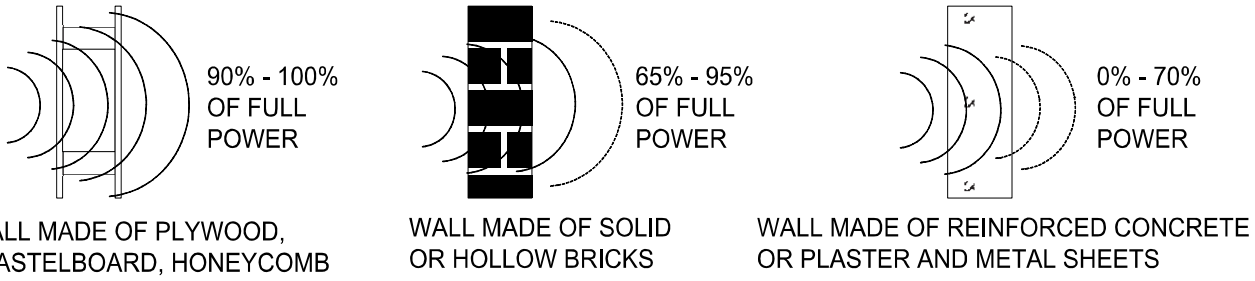
4.1 General installation suggestions

- Do not touch the PIR sensor with your fingers while installing or handling the board.
- When installing indoors with the detector aimed at glazing or plastic curtains, you must ensure that the microwave range does not extend beyond them: where necessary, adjust the microwave range to the minimum setting.
- Do not fit sensors so that they are directly next to each other or so that they are aimed directly at each other without enough distance between them: keep them at least 15 m apart.
- Do not install near swaying metal shutters or vibrating metallic walls (e.g. chillers).
- Carefully consider the wireless signal attenuation caused by building materials.

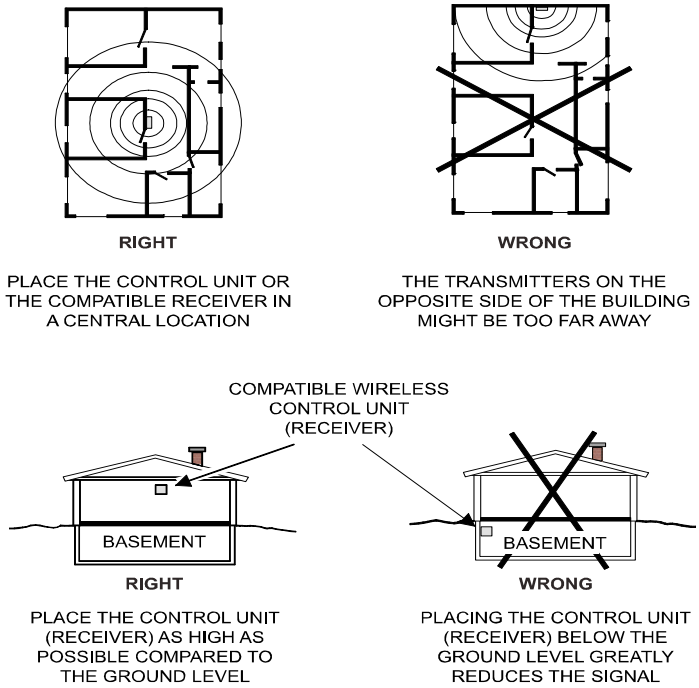
4.2 Effects of building and furniture materials

The GRIFOXRF installation has to abide by some rules in order to avoid performance drops caused by bad positioning. Indeed, it is very important to carefully analyse the operative area where the wireless receiver is going to be installed, the actual area covered by the detectors and the proper installation position in relation to the materials used for the construction of the building. The drawings below show correct and wrong installation positions, items that can interfere with the RF signal and materials that can weaken it.

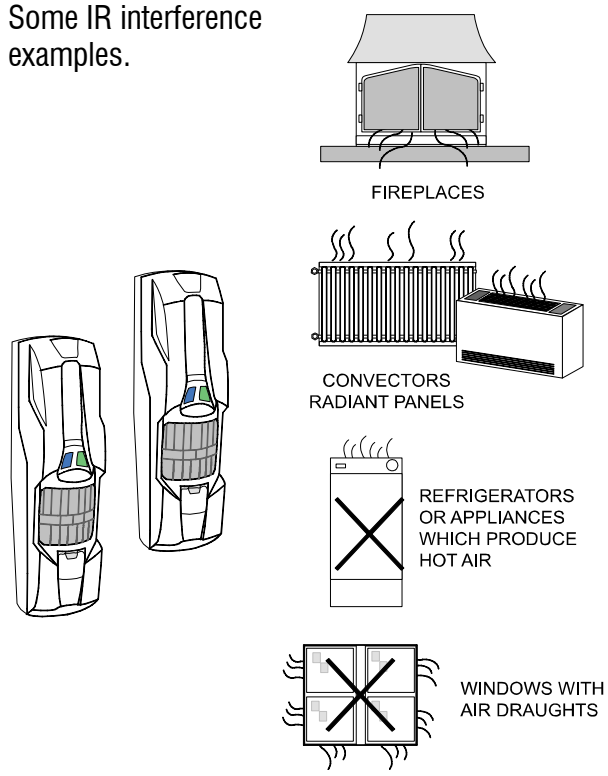
Radio-frequency weakening due to typical building materials.



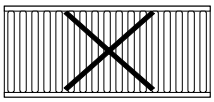
Installation positions.



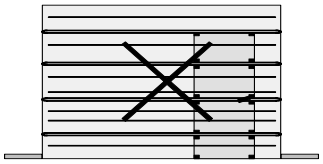
Some IR interference examples.



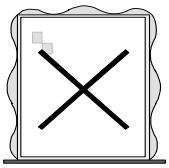
Some items that can modify and/or weaken the wireless range.



METAL GRIDS (E.G. IN BASEMENT WINDOW WELLS) AND REINFORCED CONCRETE WALLS



METAL DOORS



MIRRORS

4.3 Opening, fixing and closing operations

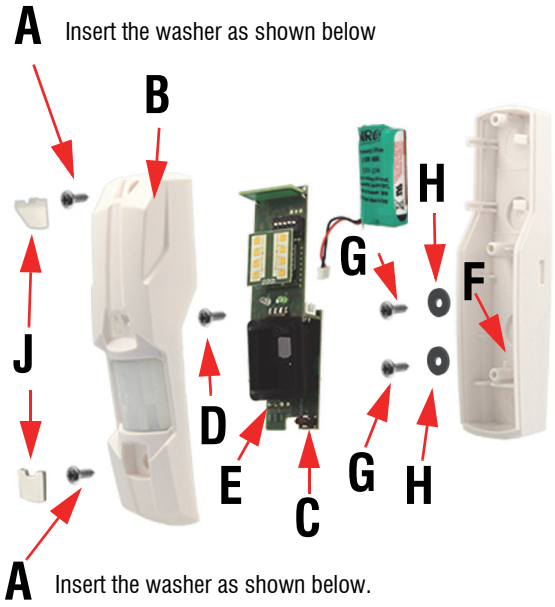
The electronic board can be damaged by electrostatic discharge.
The installer shall free himself of electrostatic charges before opening the housing and he shall keep free from electrostatic charges during the whole installation or maintenance process.

Opening/closing process:

1) Unscrew the fixing screws with washers from the upper and lower part of the cover (**A**).
2) Remove the front cover **B**.
3) To close the cover, proceed in reverse. Be sure to have the Tamper spring **C** perfectly fit in its place, see note at the end of “Memorizing a transmitter to a compatible control unit” on page 12. Conclude the procedure by fastening the self-tapping screw in the cover, then placing the cover caps **J** to hide the heads of the screws.

Removing/reinstalling the board:

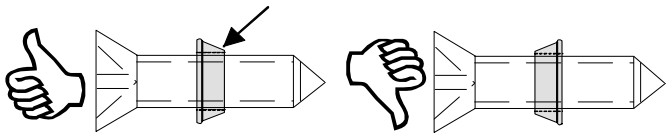
1) Remove the fixing screw of the board, **D**.
2) Remove the board **E** by gently rotating it forward, then pulling it out until it is free from the lower hook **F**, also see the details for battery replacement on page 11.
3) To reinstall the board, proceed in reverse.



Wall installation and hole drilling:

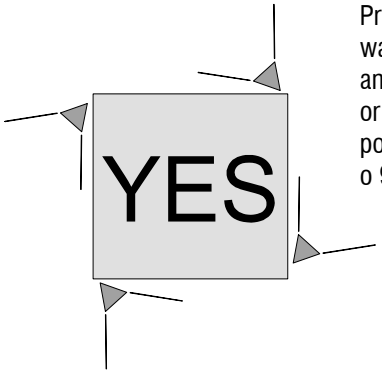
Remove the front cover and the board, then use the holes of the back cover seen on page 5 (centre distance 56 mm) as a drilling template. Place the supplied **H** washers around the **G** screws (see above and read the attention note below).
To use the angle joint or bracket, see their leaflet. Fasten the detector only after analysing the installation options and after **understanding** the limitations and warnings described in this manual.

TO GUARANTEE THE STATED IP PROTECTION CLASS, PLACE THE WASHERS ON THE FRONT SCREWS AS SHOWN IN THE FIGURE, DIRECTION INCLUDED.

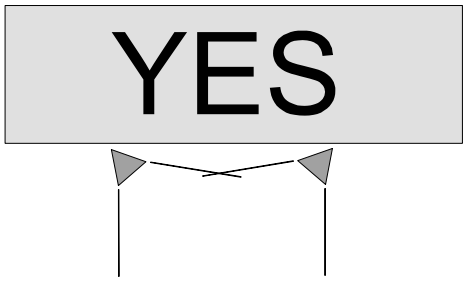


ATTENTION
The detector is suitable for outdoor installations if the indicated washers and gaskets are used. For a better sealing, apply a line of silicone around the screw holes.

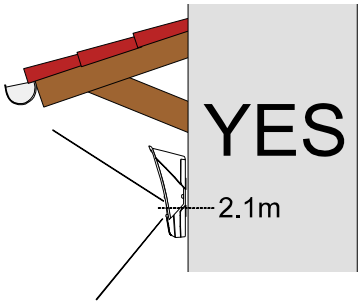
For more details on outdoor installations, with optional sunshield and swivel mount, see the following images, detailing allowed and not advisable situations:



Protection of outdoor walls, with sunshield and tilted swivel mount or angle bracket for positioning at an angle o 90° tilting.

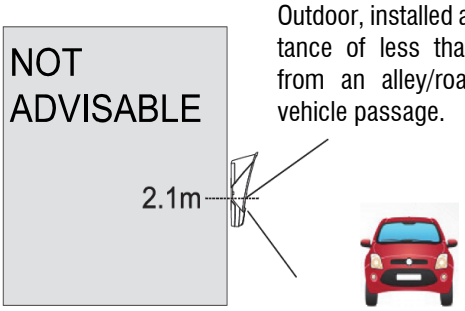


Protection of outdoor walls, with sunshield and angle bracket or tilted swivel mount, slightly overlapping areas.

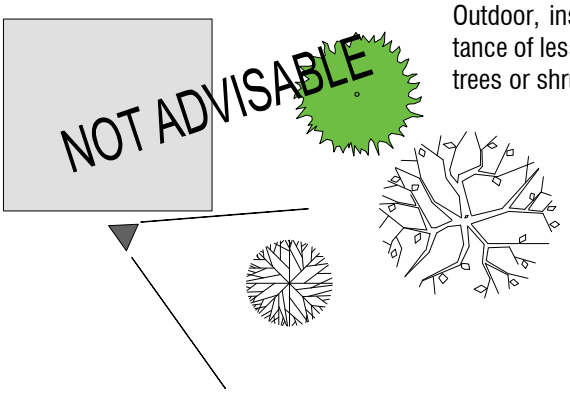


Outdoor, protected by a porch or a balcony, with sunshield.
If necessary, use the angle bracket for a 90° positioning or the swivel mount.

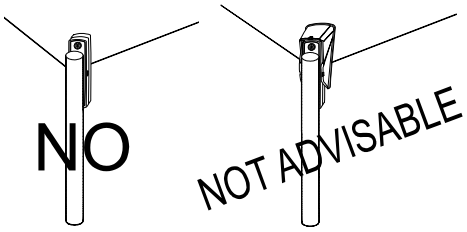
Protection of outdoor walls, completely overlapping areas and detectors installed less than 15 m from each other.



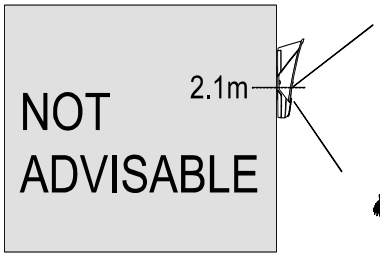
Outdoor, installed at a distance of less than 8 m from an alley/road with vehicle passage.



Outdoor, installed at a distance of less than 8 m from trees or shrubs.



Outdoor, on a pole, with or without sunshield.
Bad weather can cause false alarms.



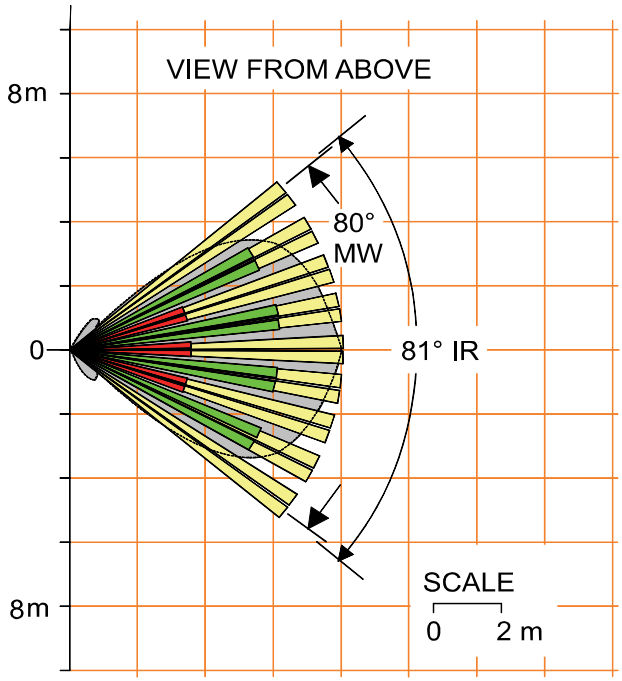
Outdoor installation with animal passage.

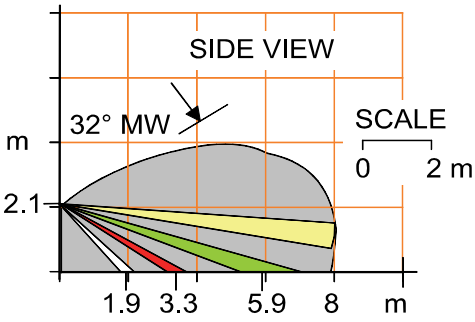
IMPORTANT: do not install the detector directly aiming towards the sun.

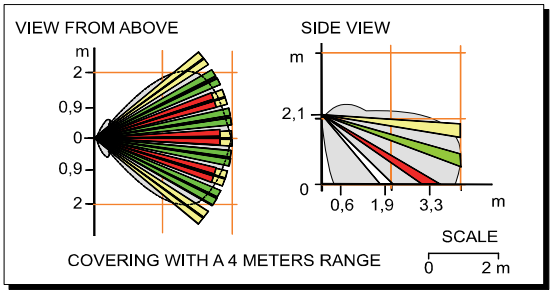
5. COVERAGE DIAGRAMS

Range: 8 - 4 m **Covering:** volumetric, 81° opening **Beam arrangement:**18 areas on 4 plans

Note: the covering diagram refers to wall mounting (without bracket or swivel mount) at 2.1 m height.

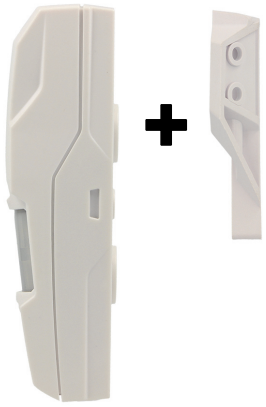






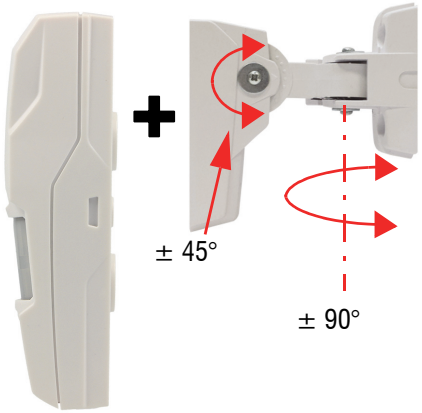
Use of the optional **ANGSGX** bracket and **SNDSGX** swivel mount:

Bracket (in upper position) for corner mounting at 2.1m height.

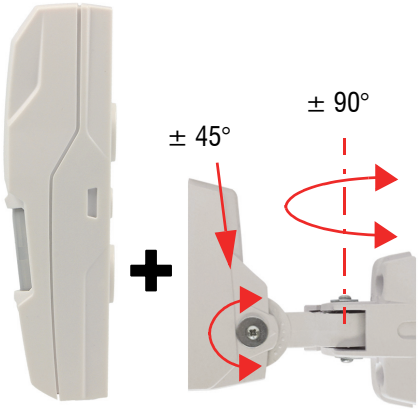


Bracket (in lower position) for corner mounting at 2.1m height.

Swivel mount (in upper position) for customized tilting.

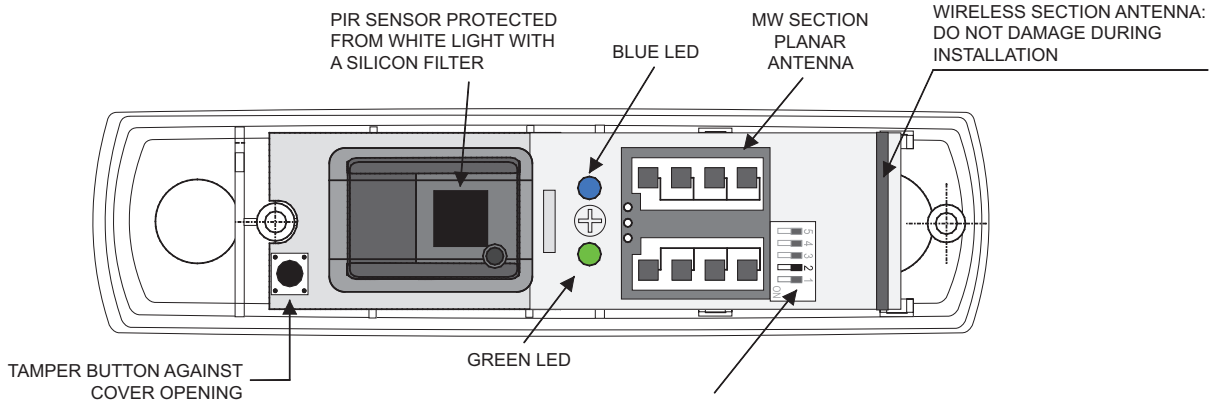


Swivel mount (in lower position) for customized tilting.



6. WIRINGS

Internal view of the board:

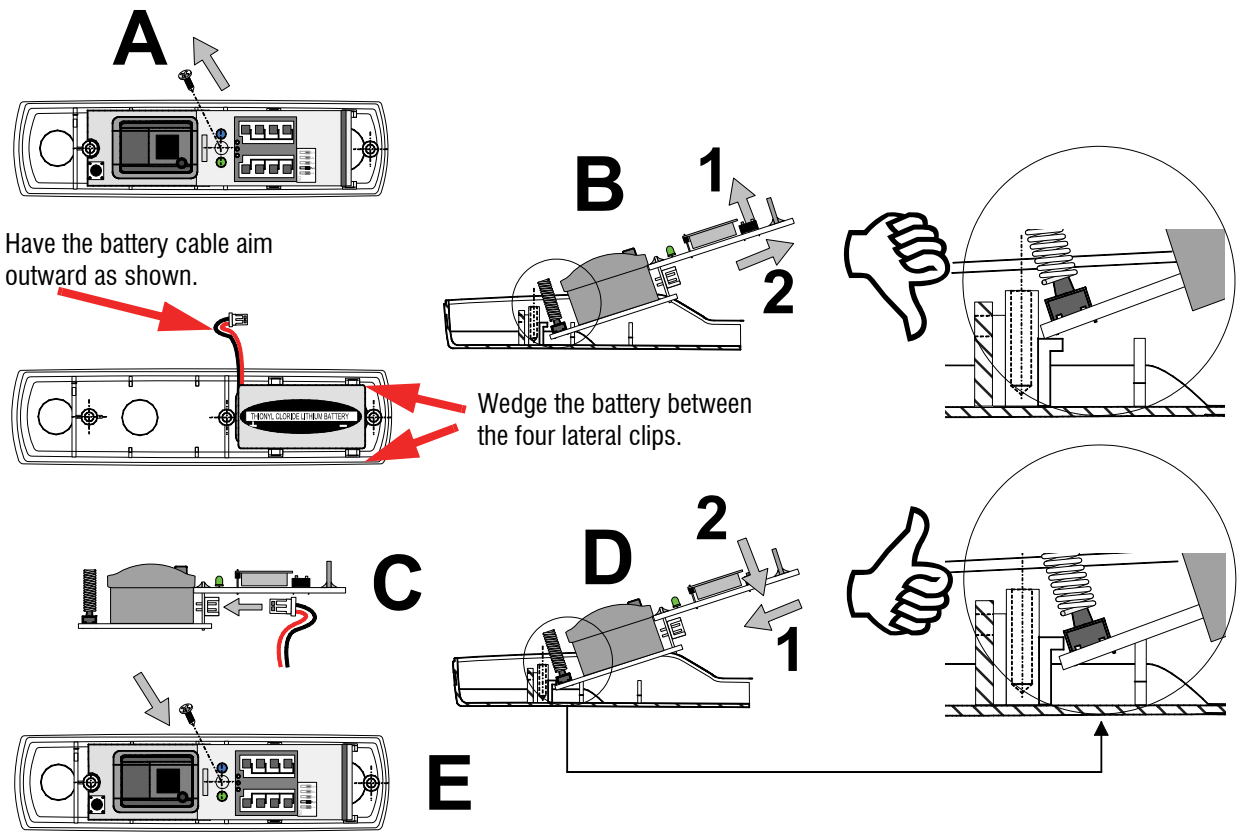


ATTENTION:
DO NOT TOUCH THE SILICON FILTER WITH YOUR FINGERS DURING INSTALLATION

PROGRAMMING SELECTIONS

IR SENSOR INHIBITION TIMER			
30 SECONDS	5	ON	5 MINUTES (DEFAULT)
4 METERS RANGE	4		8 METERS RANGE
MIN SENSITIVITY	3		MAX SENSITIVITY
V PROTOCOL	2		**H** PROTOCOL (DEFAULT)
DISABLED LEDS	1		LEDS ENABLED WHILE OPERATIVE
LEDS ENABLING FOR OPERATIVE INDICATIONS			

Sequence for battery connection



7. FIRST POWER-ON

The GRIFOXRF detector requires extra care during the first powering. The correct procedure is summarized here:

1. Set and connect the supplied 7.2 V battery, making sure that the polarity is correct, as explained in the previous chapter.
2. Press and release the Tamper button 3-4 times.
3. Reset any memory of low battery stored in control unit or in the compatible receiver device.

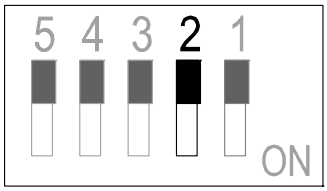
WARNING: a new battery, or a battery that has not been used for a long time, can sometimes trigger a low battery alarm at its first activations. This is due to the chemical properties of the **Thionyl Chloride Lithium** batteries and it can be solved by running the aforementioned operations.
If the battery has been exposed to low temperatures, it is suggested to keep it at room temperature for a while before installing it.

8. SETUP PROCEDURE

8.1 Setting the communication protocol

GRIFOXRF is an accessory of wireless systems based on the HELIOS or Villeggio control units (or other expressly compatible models). The communication protocol has to be set properly in order to let the control unit understand which events are being transmitted.
Select the protocol using dip switch 2:

HELIOS PROTOCOL (DEFAULT) **H**



VILLEGGIO PROTOCOL **V**

Note: set this protocol also when using Villeggio control units equipped with firmware version 5.0.0 or lower, and to acquire GRIFOXRF to a RIVERRF.

Note: use for Villeggio control units with firmware version 5.0.0 or higher and with other expressly compatible devices.

ATTENTION: setting the wrong dip switch position will generate a transmission that the control unit can not read.

Note: the Villeggio protocol (use with compatible devices only) improves both communication reliability and battery life.

Note: please note that, in case you need to acquire GRIFOXRF to a RIVERRF concentrator, the protocol must always be set to **H** (Helios) even if RIVERRF is connected to Villeggio NG-TRX/2K control units.

8.2 Memorizing a transmitter to a compatible control unit

A. Open the plastic cover and check that the device is properly powered.
B. Enter the programming menus of the compatible control unit and browse to the acquisition menu.
C. Cause a transmission by pressing and releasing the Tamper button; once the transmission code has been memorized, it will be possible to set the specific settings of the device.
D. Install the transmitter where allowed, following the drawings in the "INSTALLATION" chapter and checking its functioning with some test transmissions (using the WALK-TEST function).
E. Close the detector cover, making sure that the Tamper button is correctly pressed.

ATTENTION: positioning the Tamper button **incorrectly** while closing the cover may cause a Tamper circuit anomaly, which in turn triggers a tamper alarm at **each supervision transmission**.
The tamper code is queued to any transmission communication with the control unit: therefore it is possible to get an alarm even during the day, when the control unit is disarmed: the detector detects a movement and sends an alarm that gets correctly ignored (since the unit is disarmed), but the queued tamper event generates a tamper alarm.

9. OPERATION

The GRIFOXRF detector, being battery-powered, has a peculiar functioning:

- When the stabilization time ends (both LEDs ON for 40 seconds), it automatically enters the WALK-TEST status, allowing the installer to see the LED indications for the following 8 minutes.
- The detector is normally in stand-by mode; the MW section is off until the IR section perceives something (the LEDs are off).
- As soon as the set IR pulses are detected, the IR section enters a pre-alarm status (green LED ON) for 3 or 6 seconds. Simultaneously, the MW section is turned ON and, if during these 3 or 6 seconds the set number of MW pulses are detected (the blue LED flashes), an alarm transmission is sent (both LEDs on for 1.5 s).
- If no MW alarms occur within these 3 or 6 seconds, the device goes back to stand-by mode; it will be ready to receive new IR alarms 2 seconds after the green LED has turned OFF.
- During the WALK TEST, after each alarm transmission, 10 seconds must pass before the detector can transmit a new alarm sequence. During this inhibition time, all LEDs are OFF.
- The detector becomes operative after 8 minutes from the beginning of WALK-TEST.
  Note: to start the WALK-TEST again, shut down the detector, wait 30 seconds and restart it. Remove and insert the battery connector with care.
- In operating mode, a single blue LED flash reveals an RF connection. After each alarm transmission, the detector will be inhibited for the time set using dip switch 5 (default = 5 minutes).

10. VISUAL INDICATIONS

The LED lights of the GRIFOXRF detector signal the following operative states:

Green LED = during the WALK-TEST, this LED flashes each time the PIR sensor detects any movement. It never lights up alone during detector operation.
For accurate covering tests, see the description of the WALK-TEST state.

Blue LED = during the WALK-TEST, this LED flashes each time the MW section detects something. While the detector is in operating mode, this LED flashes during transmissions.

LED indications:

Blue and Green LEDs steadily glowing=	stabilization during the first powering.	Green LED flashing during Walk-test=	single IR pulse.
Blue and Green LEDs flashing=	tamper.	Blue LED flashing during Walk-test=	single MW pulse.
Blue LED flashing in operation=	RF transmission.	Both LEDs on for approx. 2 s during Walk-test=	alarm.

11. HOW TO CHANGE AND DISPOSE THE BATTERY

The GRIFOXRF detector uses a 2ER14505 2.4 Ah 7.2 V lithium battery. Replace it only with a new battery of the same model. While replacing it, strictly follow the instructions below:

1. Remove the dead battery.
2. Press and release the Tamper button 3-4 times to discharge any charged capacitor.
3. Insert the new battery.
4. Press and release the Tamper button 3-4 times.
5. Reset any low battery alarms in the control unit or in the compatible receiving device.

Dispose of the dead battery according to the regulations in force, using the special containers.
Dispose of the detector according to the regulations in force in the country where it is installed.
The materials used for this product are very harmful and polluting if dispersed in the environment.

12. NOTE

Indoor/outdoor advanced wireless double-technology detector with volumetric protection for intrusion detection systems
mod. GRIFOXRF - TECHNICAL MANUAL - January 2016 edition - rev. July 2017 090030916

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