

MR-4000

Flush Mount PIR Detector



Visonic Ltd

Installation Instructions

1. INTRODUCTION

The **MR-4000** is the best flush mounted PIR for wired installations, specially designed to fit into virtually any standard single-gang electrical box. For existing construction, **MR-4000** may be installed directly into the wall without requiring an electrical box or special installation kit.

Superior Engineering Gives you These Added Features:

- Flush Mounting in a Standard Electrical Box
- Ideal for Pre-Wired Installations
- 145° Ultra-Wide Angle Coverage (Standard)
- Super RFI Protection
- Virtually Zero False Alarms
- Interchangeable Lenses
- 12° Vertical and Horizontal Adjustment
- Programmable Pulse Counter
- Plug-In Wiring Connector
- Completely Sealed Construction

MR-4000 provides a variety of outstanding features including adjustable pulse counter and RFI protection up to 1000 MHz to ensure the highest level of reliability and false alarm immunity along with added flexibility.

User-friendly design includes installation aids for precise positioning at the desired height.

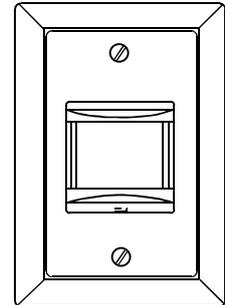


Figure 1. Model MR-4000 for Vertical Installation

<p>Maximum coverage: 10 m (30 ft) radius/145°</p> <p>Application: provides the largest and widest room coverage for general purpose applications.</p> <p>(Standard Lens)</p>	<p>Maximum coverage: 13.5 m (45 ft) radius/90°</p> <p>Application: general use - high density coverage.</p>	<p>Maximum coverage: 9 m (30 ft) at 90°.</p> <p>Application: this lens provides 3 vertical "finger curtains" which may be used as 3 individual traps within the protected area. The coverage of each curtain should be walk-tested-separately.</p> <p>NOTE! A wide dead zone exists between the curtains.</p>	<p>Maximum coverage: 15 m (50 ft) radius 90°.</p> <p>Application: allows pets to move freely, under coverage pattern, undetected.</p> <p>Mounting Height: 0.8 to 1.5 m (2.5 to 5 ft.)</p>	<p>Maximum coverage: 27 x 3 m (90 x 10 ft)</p> <p>Application: corridors and long walls.</p> <p>Mounting Height: 0.8 to 1.2 m (2.5 to 4 ft.)</p> <p>Beam Splitting: By dual-element detector that creates two detection zones for each segment in the lens array, doubling the number of detecting beams in the coverage pattern.</p>
<p>Figure 2 Lens No. 4 Ultra-Wide</p>	<p>Figure 3 Lens No. 1 Wide-Angle</p>	<p>Figure 4 Lens No. 3 Triple Curtain</p>	<p>Figure 5 Lens No. 5 Pet Alley</p>	<p>Figure 6 Lens No. 2 Long-Range</p>

2. SPECIFICATIONS

OPTICAL

Standard Lens: Lens No. 4 is the standard pattern supplied with each **MR-4000**. It provides 34 beams in 3 detection layers, 145° ultra-wide angle, maximum coverage area of 9 m (30 ft) radius.

Interchangeable Lenses (same as used with MR-3000 series):

- Lens No. 1 - Wide-Angle 90°, 13.5 m (45 ft) radius.
- Lens No. 2 - Long-Range, 27 m x 3 m (90 ft x 10 ft.)
- Lens No. 3 - Triple curtain, 9 m (30 ft.)
- Lens No. 5 - Pet Alley, 90°, 15 m (50 ft) radius.

Adjustment: Vert. calibration 0° to -12°. Hor. calibration ±7.5°

ELECTRICAL

Voltage: 9 to 16 VDC. **Current:** 25 mA.

Relay Output: Normally Closed (fail safe) contacts. 18-ohm resistor in series with contacts. Rating - 0.1 A resistive /24 VDC.

Alarm-Period: 2-3 seconds.

Pulse Counter: Selectable 1 or 3 pulse operation.

Tamper Contacts (optional): Normally Closed. Rating - 0.5 A resistive / 24 VDC.

LED: Switchable ON or OFF.

Detector: Dual-element low-noise pyroelectric sensor.

MOUNTING

Flush mounted into virtually any standard single-gang electrical box or installed directly into the wall (without box).

ENVIRONMENTAL

Operating Temperature: -10°C to 50°C (14°F to 122°F).

Storage Temperature: -20°C to 60°C (-4°F to 140°F).

RFI Protection: No alarm when tested on 21 different frequencies from 20 to 1000 MHz with 124 Watt radio transmitter at 3 m (10 ft) distance (equivalent to field strength of 20 V/m).

PHYSICAL

Dimensions: 125 x 85 x 48 mm. (5 x 3.3 x 1.9 in).

Weight: 90 g (3 oz).

Color: Soft white.

MODELS AVAILABLE

MR-4000: Standard model for vertical mounting.

MR-4000R: For horizontal mounting.

ACCESSORIES:

TS-1: Tamper switch module.

MRB-403: Standard single-gang back box.

3. INSTALLATION

3.1 Closing and Opening the Detector

Position the front cover (see fig. 7) in the detector housing with the small latches aligned with their corresponding latch holders. Push the front cover gently until a click is heard. The lens assembly, which is located behind the front cover, is adjustable vertically. Locking screws are provided to secure the lens assembly after vertical adjustment and to hold the detector in the electrical box.

Opening the detector:

Using a screwdriver, release the cover, by gently pushing on the latches, from the rear of the detector housing, until the front cover disengages.

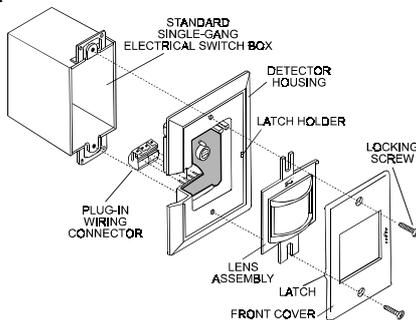


Figure 7 - MR-4000 Construction

3.2 Changing Lenses

Fig. 8 shows parts and construction of MR-4000 Lens Assembly.

Note: The Positioning Guides of model MR-4000R are slightly different from model MR-4000 and are located on the sides of the Lens Housing - see figure 11. To change or adjust a lens, release and remove the two lens-locking clips, located on both sides of the lens, by pushing them from inside the cover (see fig. 9).

Install the new lens with the smooth surface outside and the lens number held at the upper left corner, opposite the lens positioning pointer - see figure 8. From inside the lens assembly, carefully center the lens by sliding it to the right or left. The lens is centered when both lens edges emerge equally above the frame of the lens housing.

Holding firmly in place, insert the lens locking clips from the outside (flanges pointed outward) and firmly push into place until a click is heard - see figures 8 and 10.

Before closing the detector, lens assembly should be held in correct position relative to detector. Positioning guides and pointer of lens assembly assure correct positioning of the lens assembly relative to the front cover. Figure 11 shows lens housing positioning of both models: MR-4000 and MR-4000R.

Model MR-4000: The pointer is placed close to "A" (imprinted on cover's inner side).

Model MR-4000R: The pointer is placed close to "B". The two guiding studs assure correct positioning of the lens assembly in each model and allow movement of the lens assembly for vertical adjustment.

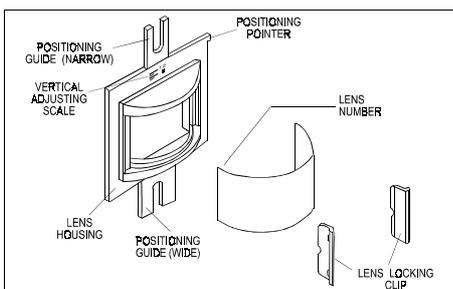


Figure 8 - Lens Assembly (MR-4000)

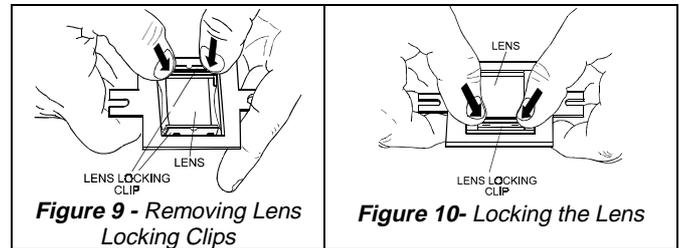


Figure 9 - Removing Lens Locking Clips

Figure 10 - Locking the Lens

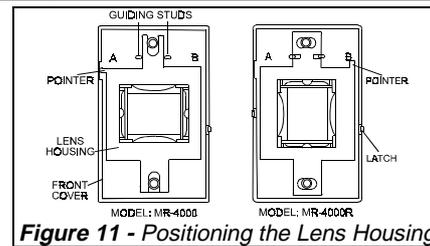


Figure 11 - Positioning the Lens Housing

3.3 Selecting Mounting Location

A. The MR-4000 detector is much more sensitive to motion crossing the beams of its coverage pattern than to motion towards or away from the detector. Therefore, select the mounting location so that the expected motion of an intruder will cross the beams of the selected pattern.

NOTE: Passive infrared detectors are sensitive to changes in infrared energy caused by an object moving across the unit's field of view. The changes in infrared energy, detected by a PIR, depend on the amount of infrared energy transmitted by the moving object. The changes also depend on the temperature difference between the object and the background. As a result, the PIR may fail to respond under certain temperature and background conditions, in which the temperature difference is too small. It is therefore recommended that the PIR be aimed towards the coolest place in the protected area, to obtain the maximum sensitivity in installations where high ambient temperatures are expected.

B. Select the most convenient mounting height. An adjustment table determines the recommended angle for any combination of range and mounting height (see Table 1). Take in consideration that unprotected areas exist directly above and below the detector and increases when covered area is increased.

C. Where pets are present, consider the use of lens No. 5 (Pet Alley). For best detection performance install the MR-4000 at the lowest possible height that enables directing of the pattern above the level of the pets' activity.

D. MAGIC-RED is extremely immune to air turbulence and RFI interference. However, to minimize false alarms, it is highly recommended to avoid aiming the detector at heaters, sources of bright light, or windows subjected to direct sunlight. Also avoid running wiring close to high-power electrical cables.

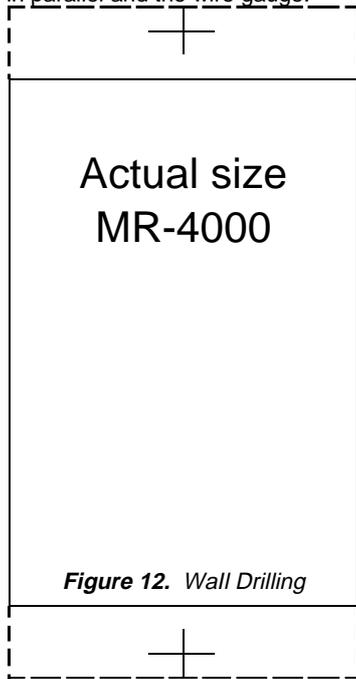
3.4 Mounting

A. The MR-4000 is a flush mounted PIR designed to fit into virtually any standard single-gang electrical switch box (fig. 8). The box should be installed according to its specific instructions.

B. Due to its sealed design, the MR-4000 can also be installed directly into a prepared space in the wall, without requiring a box enclosure. Figure 13 provides an actual size cutout drawing which may be used when drilling the holes in the wall.

3.5 Wiring

Use 22 AWG or larger wires. The maximum wiring length between the unit and its power source depends on the number of units connected in parallel and the wire gauge.



Note!

For MR-4000R, the cutout drawing should be rotated 90°.

Figure 12. Wall Drilling

The table shown in the right side provides maximum wiring length for a single unit, using different gauge wires. If two or more units are connected in parallel, maximum wiring length described in the table should be divided by number of units.

Wiring Gauge	22	20	18	16
Wiring length (m)	250	370	545	1000
Wiring length (ft)	750	1100	1800	3000

Relay connection

Connect Relay N.C. terminals (pins 1 & 2) to a normally closed burglar protection zone of control panel. Relay contacts opens when an intruder is detected or during power loss. Relay contacts are rated at 100 mA, 24 VDC maximum (resistive load only). 18-ohm resistor is internally connected in series to relay contacts.

Supply Voltage connection

Connect the 12 VDC (-) and (+) terminals (pins 3 & 4) to a 9-16 VDC source. Check for correct polarity. The power source should have a back-up battery that is capable of supplying power for at least four hours of operation, during power failure. Current drain of each sensor is approximately 20 mA.

Plugging in the Connector

Plug the connector into the connector pins in the unit (fig. 9). Verify that:

- The connector is mounted in the correct position - i.e., the +12 VDC wire is plugged into pin 4.
- The connector is installed to the end of its pins.

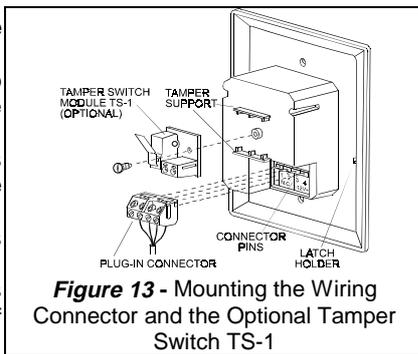


Figure 13 - Mounting the Wiring Connector and the Optional Tamper Switch TS-1

Tamper Switch (Optional)

Tamper switch module TS-1 must be installed first (see Fig. 13). Connect Tamper TS-1 terminals to a normally closed 24-hour protection zone of the control panel. Tamper contact will open when the cover is removed.

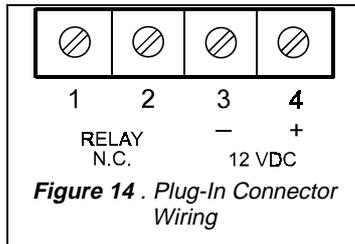


Figure 14 . Plug-In Connector Wiring

Important! For proper operation of the tamper switch, the gap between back wall of installation box and the tamper's switch lever (in depressed position) must be filled with material. In this manner, the tamper switch is depressed when unit is installed in the mounting box. For this purpose, attach a piece of wood to the back wall of the mounting box, just behind the location of the tamper switch. Afterwards, carefully adjust the height, by trimming the wood, until MR-4000 can be installed into the box and the tamper switch functions properly. Make sure the piece of wood is well secured to the mounting box and that no excess pressure is applied to the tamper switch.

3.6 Adjusting the Coverage Area

MR-4000 provides the most powerful tools for quick, easy and accurate pattern adjustments. The LED selector, horizontal adjustment, vertical calibrated scale, height selection table and beam masking material are all unique features which enable precise pinpointing of the pattern both vertically and horizontally.

LED Selector

The LED selector consists of a 3-pin connector and a jumper to switch the walk test LED either ON or OFF - Fig. 15

ON position is used for walk-test. The LED lights for a few seconds whenever motion is detected.

OFF position is used to disable the LED after testing, to prevent unauthorized persons from tracing the coverage pattern.

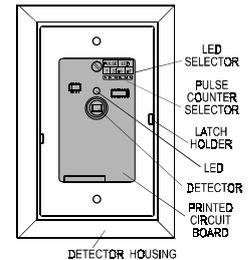


Figure 15 - Printed Circuit Board

Horizontal Adjustment

MAGIC-RED coverage pattern can be adjusted horizontally approximately $\pm 7.5^\circ$, by rotating the lens to the left or right side. To adjust, remove the lens locking clips, rotate the lens to the desired position and lock the lens in place.

Vertical Adjustment

The vertical adjusting scale (printed on the lens assembly), indicates the angle (in degrees) between the upper layer of the coverage pattern and the horizontal line of the unit. The scale enables pattern adjustment from 0° to -12° downward according to the installation height and the required coverage range.

The vertical adjusting scale is imprinted on the lens assembly in two parts. Settings from 0° to -6° are imprinted on the frame below the lens and settings from 6° to -12° are imprinted on the frame above the lens - see figures 1, 2, 8 and 9.

Setting of the vertical adjusting scale is done by aligning the edge of the rectangular opening in the front cover with the line marked with the appropriate number on the scale - see figure 17. Table 1 gives recommended scale adjustment for combinations of mounting height and coverage distance.

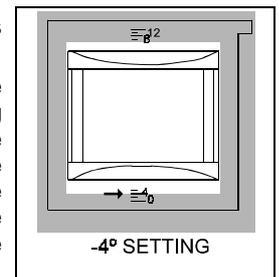
Table 1 - Vertical Adjusting Scale

HEIGHT	COVERAGE RANGE												
	ft →	7	10	13	17	20	23	26	30	36	45	60	90
↓	m	2	3	4	5	6	7	8	9	11	13,5	18	27
3	1	0°	0°	0°	0°	0°	0°	0°	0°	0°	0°	0°	0°
4	1.2	-8°	-6°	-5°	-4°	-3°	-2°	-2°	-2°	-1°	-1°	-1°	0°
5	1.5	-	-12°	-9°	-7°	-6°	-5°	-5°	-4°	-3°	-2°	-2°	-1°
6	1.8	-	-	-	-11°	-9°	-8°	-7°	-6°	-5°	-4°	-3°	-2°
7	2	-	-	-	-	-12°	-10°	-9°	-8°	-6°	-5°	-4°	-3°
8	2.5	-	-	-	-	-	-	-11°	-10°	-8°	-7°	-5°	-3°

Example: If you require coverage range of 9 m (30 ft) and wish to install the sensor at a height of 1.8 m (6 ft) from the ground, set the Vertical Adjustment Scale to -6° .

Vertical adjustment is performed as follows:

- First, refer to table 1 and determine the correct scale setting according to unit's mounting height and the required coverage range. The table should be used only to the maximum coverage range of the selected lens, as indicated in the Lens Selection.



- Slightly loosen the two locking screws which fasten the unit to the mounting box until the lens assembly can be positioned up and down (with slight friction) between the front cover and the detector housing.
- Moving the lens assembly up or down, set the adjusting scale to the correct setting according to table 1 and tighten the two screws firmly.

Beam Masking Material

A special beam masking material, supplied with each MAGIC RED sensor can be used to mask individual segments in the lens array which are exposed to potential sources of false alarm (heaters, blowers, pets etc.).

The material is transparent to visible light but blocks infrared energy. To block individual beam(s), locate the corresponding segment(s) in the array.

Cut the masking material to the exact dimensions of the segment(s) to be blocked, remove the backing paper and apply the masking material accurately to the inside (grooved) surface of the appropriate segment(s). In some cases, more than one layer of the lens masking material may be required to completely block the infrared energy.

3.7 Setting the Pulse Counter

Model MR-4000 is equipped with a programmable pulse counter which can be set to count 1 or 3 pulses, before activating the alarm relay. To set the pulse counter, place the jumper on the desired setting (1 or 3) - see figure 16.

3 pulses: This setting provides the maximum protection against false alarms caused by all types of environmental disturbances. Three pulses may be selected for wide-angle, multi beam lenses 1, 4 and 5.

Note: Do not select 3-pulse operation when using lenses 2 or 3.

When the pulse counter is set to 3, no alarm will occur unless the unit registers three pulses within approximately two minutes. This ordinarily requires crossing more than one beam. (Each dual-beam produces two pulses. One additional beam element is needed to provide the third pulse).

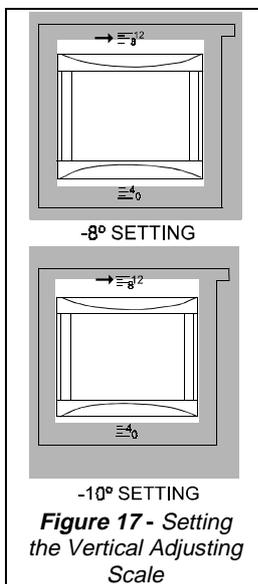


Figure 17 - Setting the Vertical Adjusting Scale

1 Pulse This setting actually disables the pulse counter. It should be used when it is necessary to activate an alarm on the first detected pulse, such as with long-range lenses. One pulse should be selected when using lenses 2 and 3, or in high security installations when fast "catch" performance is of greatest importance.

Self-Adjusting Walk-Test Override

The unique pulse counter incorporated in the MR-4000 features an automatic override to single-pulse mode during walk-testing. After alarm signaling, the pulse counter converts automatically to single-pulse setting for several seconds. During this time period each detection pulse will activate an immediate alarm. This feature enables convenient walk-testing of each beam in the coverage pattern - exactly as for a unit without a pulse counter. Two minutes after the end of walk-testing the pulse counter returns automatically to its original setting and is ready for a new counting sequence.

3.8 Final Testing

- Apply 12 VDC and allow 5 minutes for the unit's stabilization.
- Adjust the vertical pattern angle according to Table 1.
- Set pulse counter per para. 3.7
- MASK beams which face potential sources of false alarm.
- Slowly walk-test the whole protected area across coverage beams while observing the LED. The LED lights whenever you enter or exit coverage beam. Allow 5 minutes interval between tests for unit's settling down.
- Check the operation of the alarm relay and the tamper switch.

Warning: After walk testing disable the LED by setting the LED selector to OFF position.

Important: Whenever you open and close the detector, make sure that the scale is adjusted to the correct setting and that the locking screws are firmly tightened, so that the position of the lens housing cannot be changed.

3.9 Maintenance

Proper operation, range and coverage pattern should be checked at least once a week according to para. 3.8. To assure proper continuous operation, the end user should be instructed to walk through the entire coverage pattern and to assure an alarm output, each time, before the alarm system is armed.

WARRANTY

Visonic Ltd. and/or its subsidiaries and its affiliates ("the Manufacturer") warrants its products hereinafter referred to as "the Product" or "Products" to be in conformance with its own plans and specifications and to be free of defects in materials and workmanship under normal use and service for a period of twelve months from the date of shipment by the Manufacturer. The Manufacturer's obligations shall be limited within the warranty period, at its option, to repair or replace the product or any part thereof. The Manufacturer shall not be responsible for dismantling and/or reinstallation charges. To exercise the warranty the product must be returned to the Manufacturer freight prepaid and insured.

This warranty does not apply in the following cases: improper installation, misuse, failure to follow installation and operating instructions, alteration, abuse, accident or tampering, and repair by anyone other than the Manufacturer.

This warranty is exclusive and expressly in lieu of all other warranties, obligations or liabilities, whether written, oral, express or implied, including any warranty of merchantability or fitness for a particular purpose, or otherwise. In no case shall the Manufacturer be liable to anyone for any consequential or incidental damages for breach of this warranty or any other warranties whatsoever, as aforesaid.

This warranty shall not be modified, varied or extended, and the Manufacturer does not authorize any person to act on its behalf in the modification, variation or extension of this warranty. This warranty shall apply to the Product only. All products, accessories or attachments of others used in conjunction with the Product, including batteries, shall be covered solely by their own warranty, if any. The Manufacturer shall not be liable for any damage or loss whatsoever, whether directly, indirectly, incidentally, consequentially or otherwise, caused by the malfunction of the Product due to products, accessories, or attachments of others, including batteries, used in conjunction with the Products.

The Manufacturer does not represent that its Product may not be compromised and/or circumvented, or that the Product will prevent any death, personal and/or bodily injury and/or damage to property resulting from burglary, robbery, fire or otherwise, or that the Product will in all cases provide adequate warning or protection. User understands that a properly installed and maintained alarm may only reduce the risk of events such as burglary, robbery, and fire without warning, but it is not insurance or a guarantee that such will not occur or that there will be no death, personal damage and/or damage to property as a result.

The Manufacturer shall have no liability for any death, personal and/or bodily injury and/or damage to property or other loss whether direct, indirect, incidental, consequential or otherwise, based on a claim that the Product failed to function. However, if the Manufacturer is held liable, whether directly or indirectly, for any loss or damage arising under this limited warranty or otherwise, regardless of cause or origin, the Manufacturer's maximum liability shall not in any case exceed the purchase price of the Product, which shall be fixed as liquidated damages and not as a penalty, and shall be the complete and exclusive remedy against the Manufacturer.

Warning: The user should follow the installation and operation instructions and among other things test the Product and the whole system at least once a week. For various reasons, including, but not limited to, changes in environmental conditions, electric or electronic disruptions and tampering, the Product may not perform as expected. The user is advised to take all necessary precautions for his /her safety and the protection of his/her property.

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