



INSTALLATION INSTRUCTIONS

No. 4278EX PASSIVE INFRARED MOTION DETECTOR

GENERAL INFORMATION

The No. 4278EX PIR is designed for use only with the VECTOR VISTA Series Point Annunciation systems. It provides 12 zones of wide-angle coverage with a range of up to 40 feet (12.2m), or long range curtain coverage with a range of up to 80 feet (24.4m) and has the following important features:

- Quad element pyroelectric sensor providing the reliability of two completely separate dual detectors covering the same area.
- High precision, computer designed parabolic optical system.
- Horizontally adjustable optical system for accurate aiming of protection pattern.
- Pulse count option
- Low current drain which allows for direct powering from the multiplex polling loop.
- Wall corner mounting plate.
- Walk Test LED with disable switch
- Dual channel signal processing for enhanced immunity to environmental disturbances (reduced false alarms).
- Two wire interface to control - power and signal on same wire pair.
- Auxiliary sensor loop permits interface of any other nearby alarm sensor (for example, reed contact).
- 100% rejection of visible light interference.
- Tamper protected housing.

The detector is designed to operate at all times. The LED on the unit will be disabled during normal operation to limit the power drawn from the polling loop.

PRINCIPLES OF OPERATION

The optical system divides the area into a series of protected zones. A quad element sensor measures the level of infrared energy in each zone. When an intruder crosses or enters any zone, a signal will be generated in response to the change in infrared energy.

The detector is configured with an alternate polarity quad element sensor and two independent signal processing amplifiers. In effect, two passive infrared sensors share a common optical system. Both sensors must detect motion at the same time for the PIR to report an alarm. In this way, immunity is provided against false alarms attributed to channel noise, random detector disturbances, and power supply line transients, while "catch" performance is not compromised.

COVERAGE CONSIDERATIONS AND TYPICAL LAYOUTS

The range will depend upon the mirror system in use. Protective patterns are shown in Diagrams 1 and 2 for a normal mounting height of 7 ft (2.1m). The unit may be mounted higher for increased range but mounting above 8.5 ft (2.6m) is not recommended.

"Dead Zone" Caution: Note in Diagram 1 that a "dead zone" is indicated, within which a person could be moving and not be detected by any of the unit's protective zones. Other dead zones may occur between the detector and the downward fields of view as the unit's mounting height is increased.

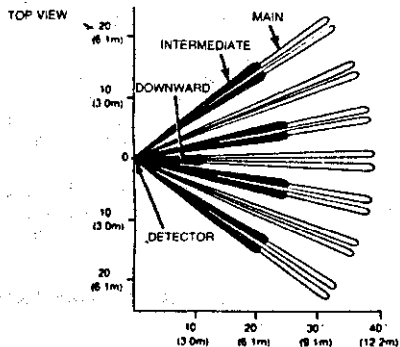


Diagram 1: WIDE ANGLE PROTECTION PATTERN

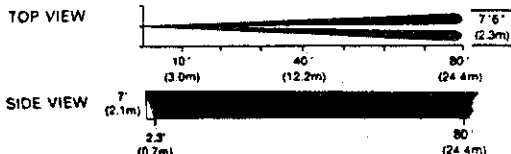
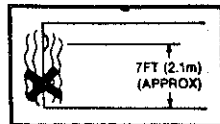


Diagram 2: LONG RANGE CURTAIN MIRROR COVERAGE

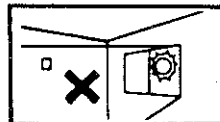
Selecting a Mounting Location:

The detector responds to changes in energy which occur when an intruder moves into or out of a protective zone. Best coverage will be obtained if the mounting site is selected such that the likely direction of intruder motion is ACROSS the pattern.

Passive I.R. units are remarkably resistant to false alarm hazards, but the following recommendations should be observed:



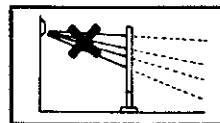
Install the detector at a height of approximately 7 (2.1 m) feet from floor. Do not mount on an unstable surface. **IMPORTANT!** Avoid running alarm wiring close to heavy-duty electrical power cables.



Do not install where the detector is exposed to direct sunlight or directly above strong sources of heat.



Avoid locating a unit in areas which contain objects likely to produce a rapid change in temperature, such as central heating, radiators or ducts (or heaters of any kind), air conditioners, open flame, etc.



Make sure the detection area does not have obstructions (curtains, screens, large pieces of furniture, plants, etc.) which may block the pattern of coverage.

INSTALLATION

A. Changing From Wide Angle to Long Range Coverage:

1. Remove front cover by inserting a screwdriver blade in the groove between cover and base at one of the locations shown in Diag. 3, rotating blade to override snap fit, and then lifting cover off.
2. Spread either or both plastic prongs holding the wide angle [40 ft (12.2m)] mirror and remove the mirror (Diag. 4).
3. Insert one side of the long range [80 ft (24.4m)] mirror under a prong and snap the other side under the other prong. Make sure that the mirror sides are squarely in their corner rests and are held securely under the prongs.

NOTE: Mirror surface should be free of dirt, foreign matter and fingerprints. Use a clean dry soft cloth to wipe mirror surfaces, if required.

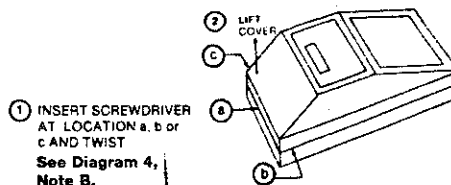


Diagram 3: COVER REMOVAL

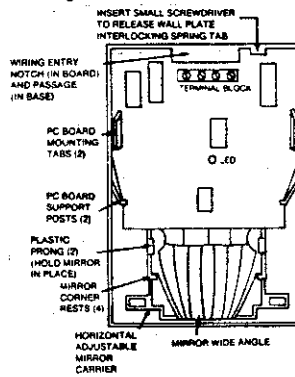


Diagram 4: INTERIOR OF DETECTOR

NOTES:

- A. Thin exterior wall in wiring entry area can be cut/broken away for surface wiring.
- B. Hole along upper edge of housing permits use of cover securing screw (required for VdS/Skafor compliance) and holes within wiring entry area permit addition of wiring clamp (required by VdS). Keep housing screw hole covered (with label supplied or tape) if screw not used.

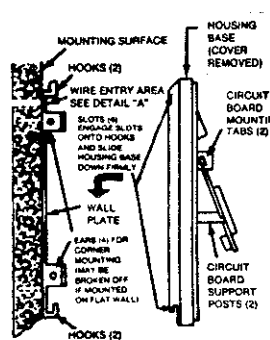
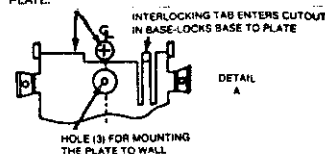


Diagram 5: MOUNTING DETAILS

FOR CONCEALED WIRING, CUT A 5/16 (8mm) DIAMETER (MAX) WIRING HOLE IN MOUNTING SURFACE. CENTER OF HOLE MUST BE ON LINE WITH TOP EDGE OF WALL PLATE.



DETAIL A

B. Mounting With Wall Plate:

1. Remove the front cover as shown in Diagram 3.
2. Mount the wall plate to a firm vertical surface (flat on wall or in corner). See Diagram 5 and Detail A.
3. Feed wiring through top access hole of detector but do not connect to terminal block yet. See Diagram 4, Note A.
4. Attach unit to wall plate by engaging all four hooks on the plate into slots on the rear of the base and by pressing downward (see Diagram 5).
NOTE: The PIR is locked to the wall plate by a spring tab that engages a small opening in the housing base (see Diag. 5). The PIR can only be removed by cover removal, depression of the tab from the inside with a small-blade screwdriver and then sliding the PIR upward (see Diag. 4).

C. Mounting Without Wall Plate (mandatory for VdS application):

The PIR may be mounted on a flat wall or in a corner directly (without using the wall plate). Two pairs of knockout areas are provided on the housing base, just above the mirror, where mounting screws can penetrate the plastic. These are accessible by removing the circuit board (spread the circuit board mounting tabs shown in Diagrams 4 and 5).

Do not open the knockout areas unless they will be used for mounting, with the heads of the mounting screws completely covering the openings.

For flat wall mounting, a wiring passage is provided at the rear of the housing base to enable circuit wires to be routed into the PIR's wire entry area. See Diagram 4, Note A and Diagram 5, Detail A.

After the base is mounted, the circuit board should be carefully replaced. Align the notches at the left and right edges of the circuit board with the base's mounting tabs and make certain that the projections in both notches fully engage the slots in the mounting tabs. In addition, the board should rest securely on the two support posts, and the wiring entry notch at the board's upper edge should rest on the long wall of the wiring entry passage. See Diagrams 4 and 5.

D. Coverage Adjustment:

The PIR is equipped with a moveable mirror carrier which allows adjustment of the coverage pattern in the horizontal direction after the unit is mounted. See Diagram 4. Although it can be used in conjunction with either mirror, this feature is particularly useful when using the Long Range/Curtain Mirror, because it can compensate for mounting on an uneven wall, and assist in accurately aiming down long corridors through doorways, and around obstructions. Adjustment is accomplished by depressing one of the rectangular plastic ears at the lower left and right sides of the mirror holder. This pivots the mirror assembly to the left or right up to 5°. Detents maintain the position once released.

E. Ceiling Mounting:

The versatility of the PIR permits optional ceiling mounting as an alternative to the wall mounted configurations described herein. Mounting the unit on the ceiling, using the Long Range Curtain Mirror, can provide a 15 to 18 ft. (4.6 to 5.5m) forward-looking "curtain" pattern as illustrated in Diagram 6.

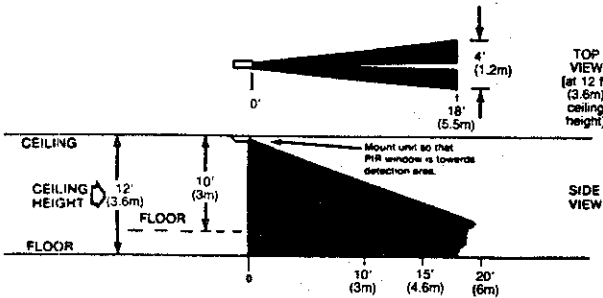


Diagram 6: CEILING MOUNTED UNIT USING LONG RANGE ("CURTAIN") MIRROR.

F. Inverted Mounting:

If small pets have access to the area protected by the detector, this section pertains. The detector may be installed approximately 3 to 3½ ft (0.9 to 1.1m) from the floor, provided furniture or other objects do not obscure the pattern of protection.

The detector and wall plate must be mounted inverted (the PIR window at the top) with the wall plate tilted forward (downward). Four self-adhesive rubber spacers have been provided to aid in tilting the wall plate.

It must be noted that although this procedure adjusts the PIR zones so that small animals will not be detected, a crawling intruder will ALSO go undetected.

1. The spacers are to be used with the wall plate only when the wide angle mirror is in use.

Mounting flat on a wall:

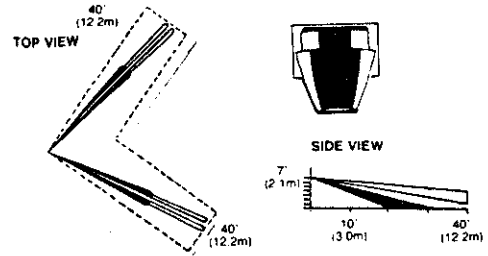
Slack two spacers between the wall and each of the two mounting bosses on the rear of the wall plate at the end opposite to the wiring entry.

Corner mounting:

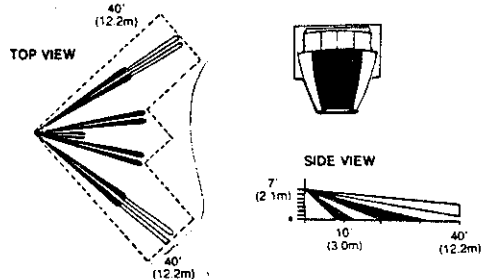
Affix one of the spacers to the rear surface of each of the two corner mount tabs on the wall plate, on the end opposite to the wire entry access cutout.

2. Follow the "Normal Mounting" steps 2, 3 and 4 described previously, but orient the wall plate so that the wire entry access cutout in the wall plate is positioned at the bottom.
3. When the detector is mounted in an inverted position, those portions of the detector mirror which normally provide downward beams of protection will now provide beams that point upward. This will apply to both mirrors (long range and wide angle). If possible, install the detector so that these now upward-pointing beams are not directed at ceiling areas that include heating or air conditioning ducts and vents or light fixtures. If these IR sources cannot be avoided, the upward-pointing segment of the mirror should be masked to avoid the possibility of false alarms. See the section on Mirror Masking later in this document.

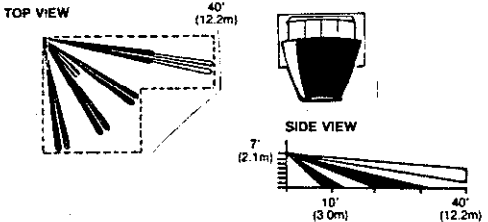
DOUBLE HALLWAY



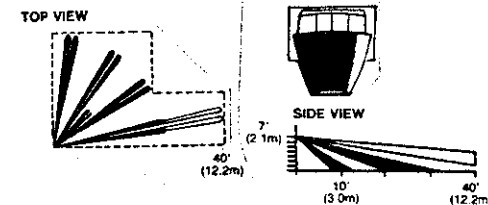
DOUBLE HALLWAY AND SMALL ROOM



SMALL ROOM & LEFT HALLWAY



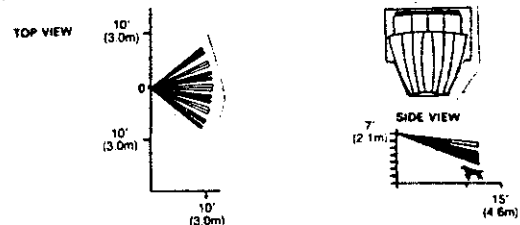
SMALL ROOM & RIGHT HALLWAY



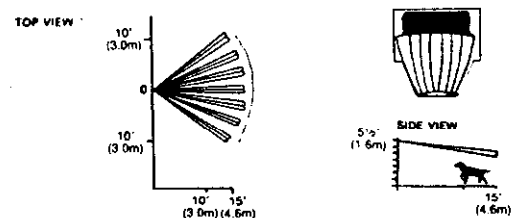
IMPORTANT! When hallway pattern masking is used, be sure the PIR is set for Instant Response Mode. Failure to do so may result in allowing an intruder to go undetected.

NOTE: If the hallway is less than 10 feet (3 m) wide, the full 40 feet (12m) coverage will not be obtained, but will be slightly reduced. To minimize this effect, the mirror can be aimed left or right as described in the "Coverage Adjustment" section of this document.

WIDE ANGLE PET ALLEY (PIR Mounted At 7 Ft. (2.1m) In A 10' x 10' (3m x 3m) Room)



WIDE ANGLE PET ALLEY (PIR Mounted At 5½ Ft. (1.7m) In A 15' x 15' (4.6m x 4.6m) Room)



The two mirrors included with the detector can be tailored to provide many different coverage patterns (see examples above). This eliminates the need to purchase additional optics.

Diagram 7: PROTECTION PATTERNS WITH MASKING SEGMENTS

G. Mirror Masking:

The masking strips that have been supplied are designed for application to one or more mirror segments to produce a protection pattern that suits the particular requirements of the protected area. Simply peel off the appropriate pressure-sensitive adhesive strip(s) and apply over the desired mirror segment(s). Individual masking strips have been provided for each of the mirror segments on the wide-angle mirror. Two strips are provided for masking multiple segments of the long-range

(curtain) mirror. Each mirror segment that is masked results in the elimination of one zone of protection from the coverage pattern. By masking appropriate segments of a mirror, you can adjust the coverage to suit the area to be protected, or to eliminate coverage from areas where you anticipate environmental disturbances that might reduce the PIR's stability (a heater or other heat-producing object, for example).

WIRING CONNECTIONS

Bring all wires in through the PIR's wiring entry near the terminal block and make connections as indicated in Diagram 8.

SIGNAL PROCESSING:

With the Mode Select Switch in the **NORMAL** position (see Diagram 8), the signal processing circuitry of the PIR provides maximum immunity against unwanted alarms caused by environmental disturbances, external electrical sources, heaters, etc. The detector will then normally signal an alarm within 3 to 4 steps, since the processing logic requires more complex motion than just a momentary event. When the detector verifies an intrusion, it signals the control and lights the LED (unless disabled).

With the Mode Select Switch in the **INSTANT RESPONSE** position, the delay involved in signal processing is eliminated. An instant alarm response (and lighting of the LED unless disabled) is provided when an intruder enters any single protective zone. Use instant response mode when the long range mirror is installed, or where the detector is used to protect narrow corridors, or where single protective zones are directed through doorways or room openings.

NOTE: VECTOR Control/Communicators can be programmed for "pulse count" on some addresses. Do not use this feature with this detector. The **NORMAL** mode (see above) provides an advanced form of pulse count and should not be used with further processing.

CONNECTIONS:

See Diagram 8 for connections, which should be made as follows:

1. Polling loop (+) and (-) terminals: Connect these terminals to the system polling loop. Observe polarity.
2. External sensor terminals: Connect these terminals in a series loop to external N.C. sensors that can be assigned to any zone response provided by the system, independent of the zone response used by the PIR.

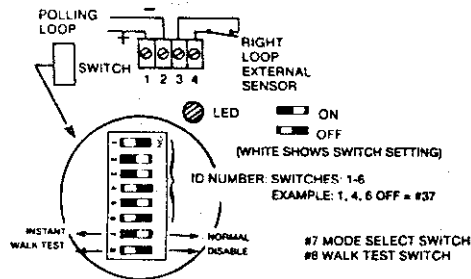


Diagram 8: WIRING CONNECTIONS AND SWITCH SETTINGS

Refer to the Installation Instructions for the control communicator regarding the polling loop, ID numbers, and enabling of tamper detection (a pre-connected tamper switch is activated by removal of the unit's cover).

SELECTING AN ID NUMBER

Make all identification number selections by arranging the switches on the circuit board. The ID number is equal to the sum of the switch values in the "OFF" position. Each switch has a different value and should be set according to the following table:

SWITCH NUMBER	SWITCH VALUE	SWITCH NUMBER	SWITCH VALUE	ID No
1	32	1	1	1
2	16	2	2	2
3	8	3	4	3
4	4	4	8	4
5	2	5	16	5
6	1	6	32	6

EXAMPLE: 1 + 4 + 6 OFF = ID #37

TESTING

IMPORTANT: Wait at least two minutes after applying power before attempting to walk-test unit.

Testing of the detector should be conducted with the protected area cleared of all people. In some business establishments, it may be more convenient to do this after the business is closed. The protective system's control should be disarmed during the procedure to prevent reporting unwanted alarms.

Zone Locator

The Zone Locator (supplied) permits the actual zone coverage patterns provided by the detector to be accurately determined during installation or subsequent testing.

1. Remove the detector's cover.
2. Install the Zone Locator as follows (refer to Diagrams 9 and 10).
 - A. Locate the foam cushion at the rear of the detector element and rest the upper edge of the Zone Locator against its surface as shown at "P" in the diagram.
 - B. Pivot the Zone Locator into place.

- C. The upper (rubber bumper) portion should be flat against the foam cushion and the lower (red spot) portion should be flat against the detector element.

With the Zone Locator temporarily installed as described above, the image of the Zone Locator's reflective red spot (see Diagram 11) can be seen reflected in various facets of the detector's mirror by a person looking back at the unit from the zones of protection.

When the red spot is visible in a particular portion of the mirror, the viewer is within that particular protection zone.

NOTE: In dimly lit areas, a flashlight aimed at the mirror from the viewer's position will make the red spot more visible.

Remove the Zone Locator when testing is completed and replace the detector's cover.

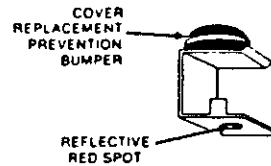


Diagram 9. ZONE LOCATOR

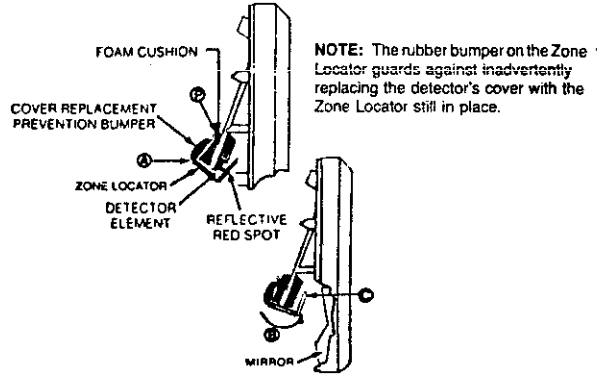


Diagram 10. INSTALLATION OF ZONE LOCATOR

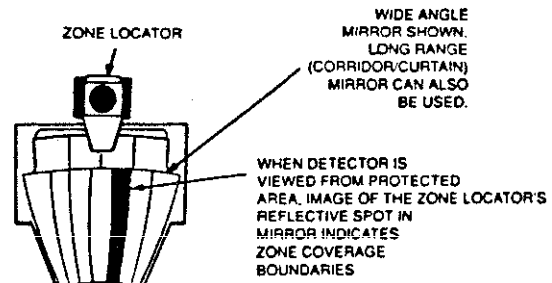


Diagram 11. TYPICAL REFLECTION

Walk-Test:

Place the walk test switch #8 to WALK TEST position, replace the front cover and walk through the protective zones. The LED will light whenever motion is detected. Be sure that the mode select switch #7 is in the same position in which it will be used. For example place it in the INSTANT position, if the long range mirror is installed. See "Signal Processing" above.

BE SURE TO PLACE THE WALK TEST SWITCH IN THE "DISABLE" POSITION AFTER THE INITIAL WALK TEST IS COMPLETED. Subsequent periodic walk tests must be done in conjunction with the indicators of the associated control panel.

The absolute range of all Passive IR units is subject to variation because of different types of clothing, backgrounds and ambient temperature. For this reason, ensure that the most likely intruder routes are well within the PIR's protective zones and that walk-testing is carried out along these routes.

MAINTAINING PROPER OPERATION

In order to maintain the detector in proper working condition, it is important that the following be observed by the user.

1. Power should be proved at all times.
2. Units should never be re-aimed or relocated without the advice or assistance of the alarm service company.
3. The physical surroundings of the protected area should not be changed. If furniture or stock is moved, or air-conditioning or additional heating is installed, the system may have to be readjusted by the alarm service company.
4. Walk-test should be conducted frequently (at least weekly) to confirm continued proper coverage by each detector.

TROUBLESHOOTING

PROBLEM	PROBLEM CAUSE	REMEDY
Intermittent Alarm	Rapid temperature change. Check for electric or gas heaters, open flames, electric arcs, etc.	Locate source and reposition detector.
	Drafts causing drapes, light fixtures, display material to move.	Eliminate source of motion.
PIR does not appear to be operating	Polling loop voltage supplied to detector is inadequate, intermittent, or polarity reversed.	Assure that proper polarity and adequate voltage is supplied and that wiring is intact (no opens or shorts) and connection secure. Check for presence of 8-11V PP at terminals of unit. If too low, polling loop run to control may be excessive for the wire gauge used, or polling loop current drain may be excessive. Increase wire gauge or add No. 4197 Polling Loop Extender module to location in the loop where voltage boost is necessary and connect it to a power source. Alternatively, the detector can be tested using a 9-volt source (such as a 9-volt battery or a 9-volt power supply).
LED Inoperative	SW #8 not set to walk test	Set SW #8 to W.T position
	LED malfunction. Check for broken shorted leads.	Return unit for service
Detection Area Changes	Repositioned furniture or equipment in the protected area.	Caution customer about layout changes. Reposition detector.
	Mounting surface is unstable. A few degrees of vertical shift can change range substantially.	Mount on secure surface.
Trouble Display :	Improper ID address code	Set switches 1 - 6 to proper code.

SPECIFICATIONS

Detection Method:	Passive Infrared
Coverage:	40 ft (12.2m) x 50 ft (15.2m) (wide angle mirror) 80 ft (24.4m) x 7.5 ft (2.3m) (long range/curtain mirror)
Detection Zones:	12 zones (7 main, 4 intermediate, 1 downward) (wide angle mirror) 1 zone, 7 tiers (long range/curtain mirror)
Operating Modes:	Signal Processing/Instant Response (Installer selectable)
Detectable Walk Rate:	0.5 - 5 ft/sec. (0.15-1.5 m/sec)
Mounting Height:	7 ft nominal (2.1m), wall mounting
Indicator:	Red LED
Input Voltage:	8 - 11V peak to peak at polling loop terminals.
Current Drain:	Less than 1 mA (LED inactive), 9mA approx (LED active)
Operating Temperature:	0° - 50°C
Operating Humidity:	Up to 95% RH (max.), non-condensing
Dimensions:	3-1/4" W x 4-5/8" H x 2" D (85mm x 120mm x 50mm)

**WARNING
THE LIMITATIONS OF THIS PASSIVE INFRARED MOTION DETECTOR**

While the Intrusion Detector is a highly reliable intrusion detection device, it does not offer guaranteed protection against burglary. Any Intrusion Detection device is subject to compromise or failure to warn for a variety of reasons:

- Passive Infrared Motion Detectors can only detect intrusion within the designed ranges as diagrammed in this installation manual.
- Passive Infrared Motion Detectors do not provide volumetric area protection. They do create multiple beams of protection, and intrusion can only be detected in unobstructed areas covered by those beams.
- Passive Infrared Detectors cannot detect motion or intrusion that takes place behind walls, ceilings, floors, closed doors, glass partitions, glass doors, or windows.
- Mechanical tampering, masking, painting or spraying of any material on the mirrors, windows or any part of the optical system can reduce the detection ability of the Passive Infrared Motion Detector.
- Passive Infrared Detectors sense changes in temperature; however, as the ambient temperature of the protected area approaches the temperature range of 32° to 40°C, the detection performance can decrease.
- This Passive Infrared Detector will not operate without appropriate DC power connected to it, or the DC power is improperly connected (i.e., reversed polarity connections).
- Passive Infrared Detectors, like other electrical devices, are subject to component failure. Even though they are designed to last as long as 10 years, the electronic components could fail at any time.

We have cited some of the most common reasons that a Passive Infrared Motion Detector can fail to catch intrusion. However, this does not imply that these are the only reasons, and therefore it is recommended that weekly testing of this type of unit, in conjunction with weekly testing of the entire alarm system, be performed to ensure that the detectors are working properly.

Installing an alarm system may make one eligible for lower insurance rates, but an alarm system is not a substitute for insurance. Homeowners, property owners and renters should continue to act prudently in protecting themselves and continue to insure their lives and property.

We continue to develop new and improved protection devices. Users of alarm systems owe it to themselves and their loved ones to learn about these developments.

**ADEMCO
LIMITED WARRANTY**

Alarm Device Manufacturing Company, a Division of Pittway Corporation, and its divisions, subsidiaries and affiliates ("Seller"), 165 Eileen Way, Syosset, New York 11791, warrants its products to be in conformance with its own plans and specifications and to be free from defects in materials and workmanship under normal use and service for 18 months from the date stamp control on the product or, for products not having an Ademco date stamp, for 12 months from date of original purchase unless the installation instructions or catalog sets forth a shorter period, in which case the shorter period shall apply. Seller's obligation shall be limited to repairing or replacing, at its option, free of charge for materials or labor, any part which is proved not in compliance with Seller's specifications or proves defective in materials or workmanship under normal use and service. Seller shall have no obligation under this Limited Warranty or otherwise if the product is altered or improperly repaired or serviced by anyone other than Ademco factory service. For warranty service, return product transportation prepaid, to the Ademco facility supporting your area.

THERE ARE NO WARRANTIES, EXPRESS OR IMPLIED, OF MERCHANTABILITY, OR FITNESS FOR A PARTICULAR PURPOSE OR OTHERWISE, WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF. IN NO CASE SHALL SELLER BE LIABLE TO ANYONE FOR ANY CONSEQUENTIAL OR INCIDENTAL DAMAGES FOR BREACH OF THIS OR ANY OTHER WARRANTY, EXPRESS OR IMPLIED, OR UPON ANY OTHER BASIS OF LIABILITY WHATSOEVER, EVEN IF THE LOSS OR DAMAGE IS CAUSED BY THE SELLER'S OWN NEGLIGENCE OR FAULT.

Seller does not represent that its product may not be compromised or circumvented; that the product will prevent any personal injury or property loss by burglary, robbery, fire or otherwise; or that the product will in all cases provide adequate warning or protection. Buyer understands that a properly installed and maintained alarm may only reduce the risk of a burglary, robbery or fire without warning, but it is not insurance or a guarantee that such will not occur or that there will be no personal injury or property loss as a result. CONSEQUENTLY, SELLER SHALL HAVE NO LIABILITY FOR ANY PERSONAL INJURY, PROPERTY DAMAGE OR OTHER LOSS BASED ON A CLAIM THE PRODUCT FAILED TO GIVE WARNING. However, if Seller is held liable, whether directly or indirectly, for any loss or damage arising under this Limited Warranty or otherwise, regardless of cause or origin, Seller's maximum liability shall not in any case exceed the purchase price of the product, which shall be the complete and exclusive remedy against Seller.

This warranty replaces any previous warranties and is the only warranty made by Seller on this product. No increase or alteration, written or verbal, of the obligation of this Limited Warranty is authorized.



ALARM DEVICE MANUFACTURING CO.
A DIVISION OF PITWAY CORPORATION
165 Eileen Way, Syosset, New York 11791
Copyright © 1990 PITWAY CORPORATION