



# No. 1994 PASSIVE INFRARED/MICROWAVE MOTION DETECTOR

## INSTALLATION INSTRUCTIONS

### GENERAL INFORMATION

The No. 1994 PIR/Microwave Motion Detector provides both passive infrared and microwave detection for an area up to 40 feet (12m) wide by 50 feet (15m) long.

Normally, this "double action" protection assures that an alarm output will appear *only* if an intruder is detected by *both* of the detector's sensors (PIR and Microwave), thus minimizing the possibility of false alarms. In addition, Microwave Supervision is provided, so that in the unlikely event of a failure in the microwave module, protection will still be provided by the PIR sensor alone (the unit's RED Walk Test LED will then be flashing to call attention to the condition)

### The following features are included:

- Dual element pyroelectric sensor.
- Latching memory function
- Walk test LED
- Separate monitor LEDs for microwave and PIR
- ESD/EOS/RFI Protection
- Tamper protected cover.
- Microwave supervised output.
- Wall/Corner mountable design.

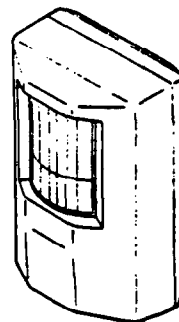


Diagram 1: No. 1994 PIR/MICROWAVE  
MOTION DETECTOR

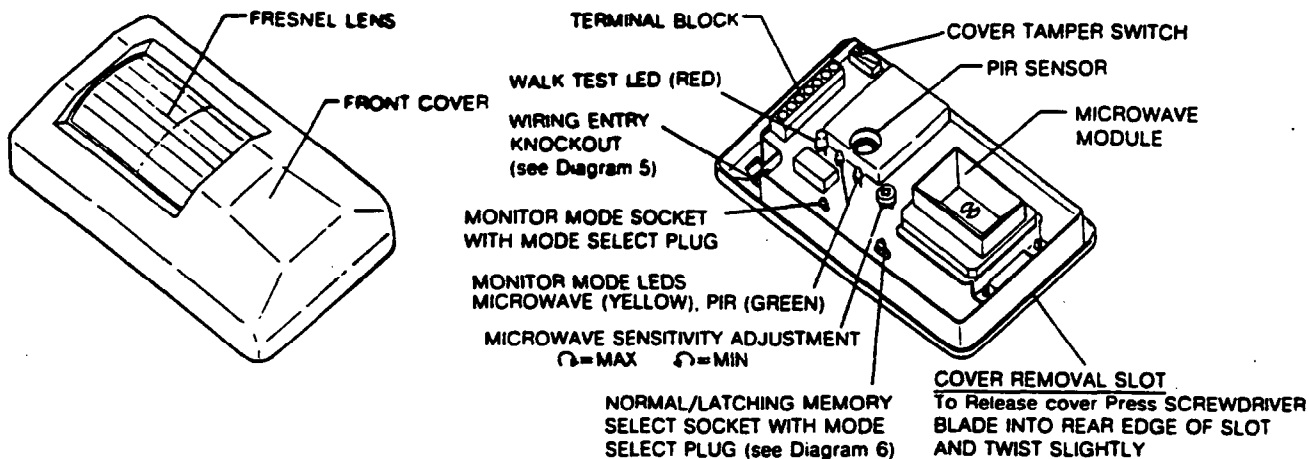


Diagram 2: IDENTIFICATION OF PARTS

## COVERAGE CONSIDERATIONS AND LOCATION NOTES

Diagram 3 shows the detection area for a normal mounting height of 7 feet 3 inches (2.2m), and with the microwave sensor set at its maximum sensitivity.

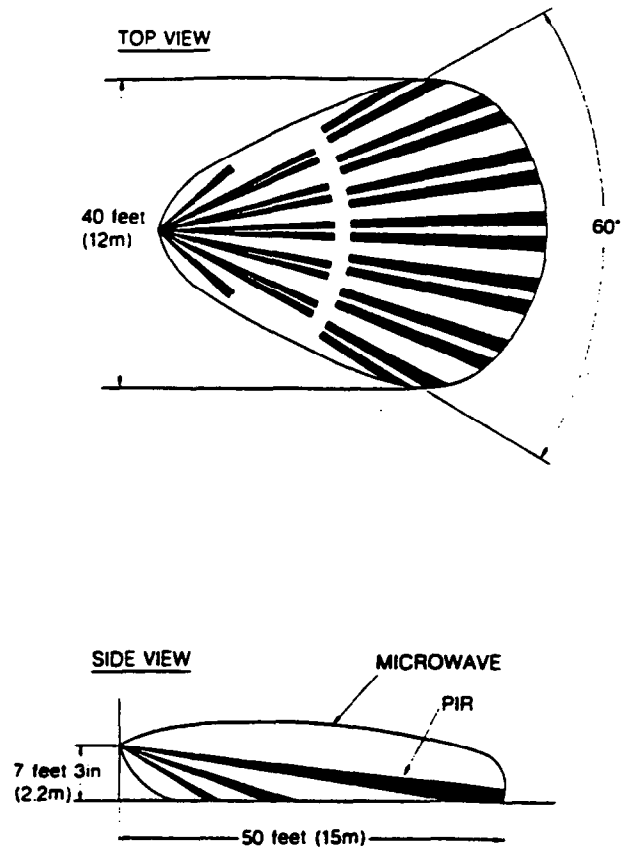
Reduced range and width can be obtained at other settings of the microwave sensitivity adjustment (see Diagram 2).

### Selecting a Mounting Location

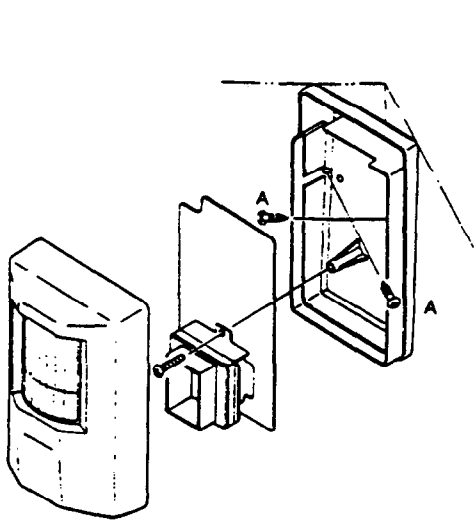
- Best coverage will be obtained with the unit located so that the likely direction of intruder motion is across the PIR pattern.
- Mount on a stable, firm surface.
- Do not install where exposed to direct sunlight or directly above strong sources of heat.
- Avoid locations containing objects likely to produce rapid changes in temperature, such as central heating, radiators, ducts or heaters, air conditioners, open flame, etc.
- Unit should not point toward a fluorescent light.
- Do not aim into areas where movement may be present during the armed period.
- Make sure that the detection area does not have obstructions (curtains, screens, large furniture, plants, etc) which may block the coverage pattern.
- Avoid running alarm wiring close to heavy-duty electrical power cables.

## MOUNTING

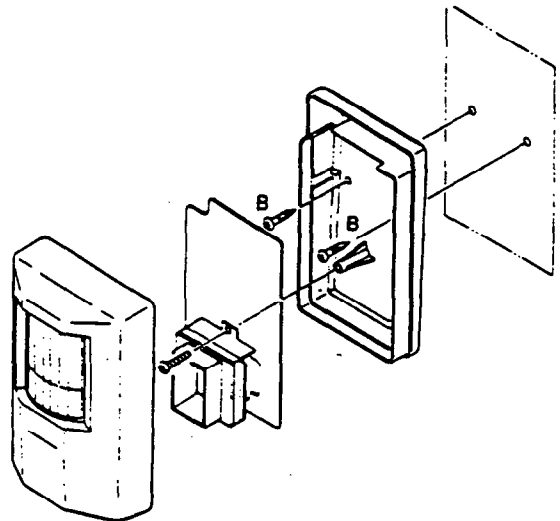
1. Remove the front cover by pressing a screwdriver blade firmly into the slot at the lower edge of the housing base (toward the slot's rear edge) and twisting slightly (see Diagram 2).
2. Carefully remove the printed circuit board from the housing base. It is held in place by a single screw near its center. Note how it rests in the base.
3. Break away the appropriate thin-walled wiring entry knockout in the base, depending on whether surface or concealed wiring will be run (see Diagram 5) and route the wiring through the opening before mounting the base.
4. Mount the base with two screws as shown at A-A in Diagram 4a (for corner mounting) or at B-B in Diagram 4b (for wall mounting).
5. Replace and secure the printed circuit board in the base. **IMPORTANT:** Be sure that the edge of the board rests on the narrow ledge along the inner wall of the base.



**Diagram 3: DETECTION AREA**



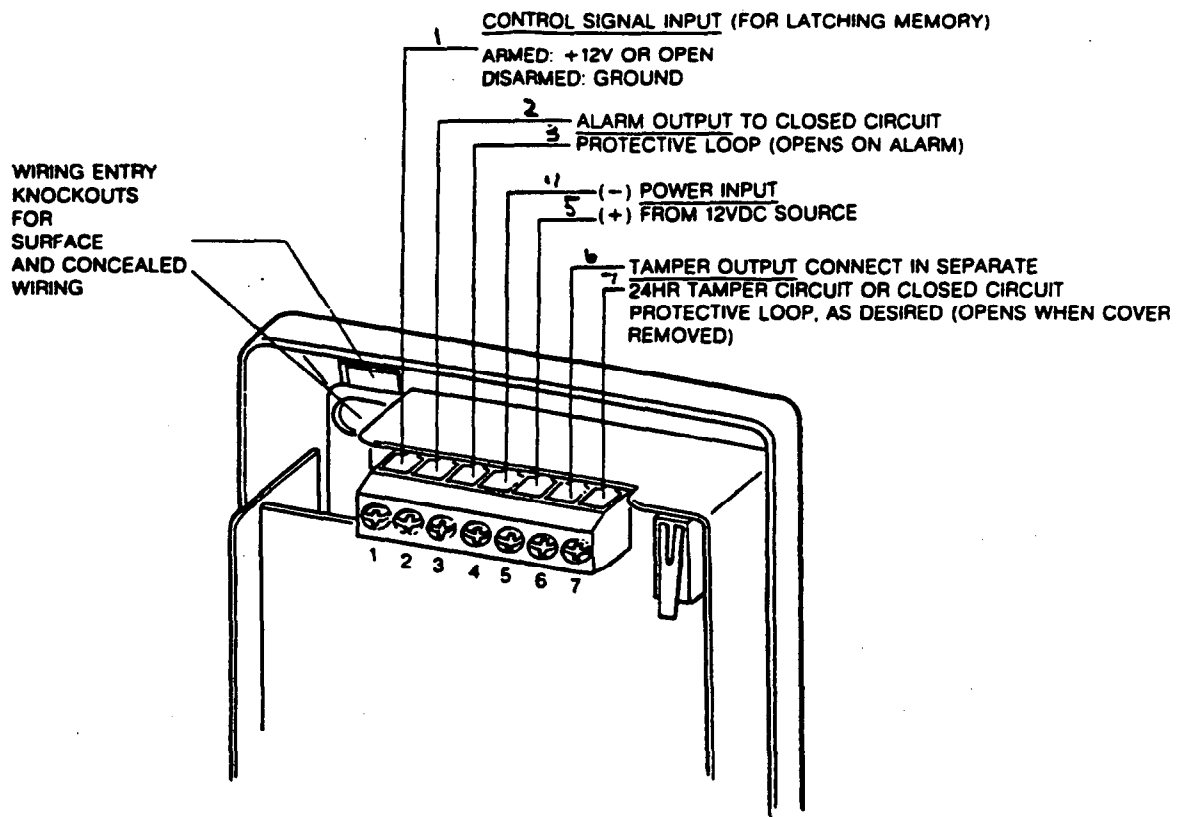
**Diagram 4a: CORNER MOUNTING**



**Diagram 4b: WALL MOUNTING**

**WIRING CONNECTIONS**

Connect the wiring as shown in Diagram 5



**Diagram 5: WIRING CONNECTIONS**

## Normal Mode

With one of the MODE SELECT PLUGS (two are provided) in the NORMAL (1-2) position in the Normal/Latching Memory Select socket (see Diagram 6), the Walk Test (RED) LED will light and the alarm contacts will open *whenever* the detector senses an alarm condition. The other MODE SELECT PLUG may optionally be placed in the Monitor Mode socket for continual indication (via the YELLOW and GREEN LEDs) of the unit's individual response to microwave and PIR disturbances (see PIR/Microwave Monitor Mode section below, under TESTING).

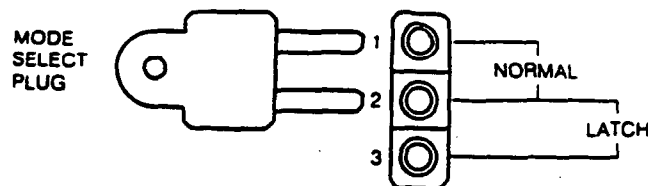
If it is desired to disable the LEDs entirely during the use of the detector, do not insert either MODE SELECT PLUG. The alarm contacts will still function normally.

**Note:** To avoid loss of a MODE SELECT PLUG that is not in use, "park" it by placing one of its pins in any vacant socket hole within the unit.

## Latching Memory Mode

When used with a control that can provide a suitable switched signal to the detector's Control Signal terminal to indicate whether the main protective system control is ARMED (+12V or open) or DISARMED (GND), the detector can provide Latching Memory Operation. A MODE SELECT PLUG must be placed in the LATCH (2-3) position in the Normal/Latching Memory Select socket (see Diagram 6).

In this mode, the Walk Test (RED) LED will be inactive during the ARMED period, but should an intrusion occur in the protected area, the alarm contacts will open and this occurrence will be stored in the detector's memory. When the system is DISARMED, the LED will light steadily if an alarm occurred earlier and will remain lit until cleared. The LED can be cleared by momentarily ARMING and the DISARMING the system (thus momentarily applying a control signal). The LED will then respond ON and OFF normally to motion detected in the protected area during the DISARMED period.



**Diagram 6: NORMAL/LATCHING MEMORY SELECT SOCKET**

## TESTING

### Walk Test

**IMPORTANT:** Wait at least two minutes after connecting power before attempting to walk test the unit.

Testing of the detector should be conducted with the protected area cleared of all people. In some business establishments, it will 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.

1. Make sure all wiring connections are correct.
2. Conduct the walk test with the MODE SELECT PLUG in the Normal/Latching Memory Select socket position that it will occupy during actual use of the detector. Note: If LED Disable operation will be required, conduct the walk test with a MODE SELECT PLUG temporarily in NORMAL position and remove and "park" it at the completion of the test.

3. Test operation, with the cover in place, by walking through the detection area and observing the Walk Test (RED) LED. It will light whenever motion is detected. Walk across the PIR's beam pattern (see Diagram 2) as well as toward and away from the unit and along the most likely intruder routes.

### **PIR/Microwave Monitor Mode**

Responses of the detector to its PIR and microwave sensors can be monitored individually by placing one of the MODE SELECT PLUGS in the detector's Monitor Mode socket and observing the YELLOW (Microwave) and GREEN (PIR) Monitor LEDs. This provides a means of checking for conditions that may result in false alarms.

- Normally, both monitor LEDs (YELLOW and GREEN) should be out when there is no apparent movement in the detection area.
- If the YELLOW (Microwave) LED lights, the microwave sensor may be responding to vibration, motion of an object, or a nearby fluorescent lamp.
- If the GREEN (PIR) LED lights, the passive infrared sensor may be responding to a heat source or airflow.

## **TROUBLESHOOTING**

### **Trouble 1: INTERMITTENT ALARM (LED OPERATIVE)**

#### **Probable Causes:**

- A. Rapid temperature change. Check for electric or gas heaters, open flames, electric arcs, etc.  
**Remedy:** Locate source and reposition detector.
- B. Drafts causing drapes, light fixtures, display material to move.  
**Remedy:** Eliminate source of motion.
- C. Light from a nearby fluorescent lamp.  
**Remedy:** Eliminate source of light.

### **Trouble 2: INTERMITTENT OR CONTINUOUS ALARM**

#### **Probable Causes:**

- A. DC voltage supplied to detector is inadequate, intermittent, or polarity reversed.  
**Remedy:** Ensure that proper polarity and adequate voltage is supplied and that wiring is intact (no opens or shorts) and connections secure.
- B. Protective loop is interrupted (open).  
**Remedy:** Determine whether interruption is in protective loop wiring or at detector's alarm relay contacts. Disconnect protective loop at detector relay contact terminals and check continuity across terminals. If absent at detector terminals (and proper voltage is supplied to the detector), return unit for service. If present, check protective loop wiring.

### **Trouble 3: LED INOPERATIVE**

#### **Probable Causes:**

- A. Mode Select Plug has been removed from the Normal/Latching Memory Select socket.  
**Remedy:** Replace Mode Select Plug, if required.
- B. LED malfunction. Check for broken/shorted leads.  
**Remedy:** Return unit for service.

### **Trouble 4: DETECTION AREA CHANGES**

#### **Probable Causes:**

- A. Repositioned furniture or equipment in the protected area.  
**Remedy:** Caution customer about layout changes. Reposition detector.
- B. Mounting surface is unstable. A few degrees of vertical shift can change range substantially.  
**Remedy:** Mount on secure surface.

MODE/LED SUMMARY							
MODE	MODE SELECT PLUGS			LEDS			CONTROL STATUS
	NORMAL/LATCH SELECT SOCKET		MONITOR MODE SOCKET	RED (WALK TEST)	YELLOW (MICRO)	GREEN (PIR)	
	NORMAL	LATCH					
NORMAL WITH LED(S) ENABLED	INSERTED	OPEN	OPEN (INSERTED) <sup>①</sup>	ACTIVE	OFF (ACTIVE) <sup>①</sup>	OFF (ACTIVE) <sup>①</sup>	N.A.
NORMAL WITH LED(S) DISABLED	OPEN		OPEN	OFF	OFF	OFF	
LATCHING MEMORY	OPEN	INSERTED	OPEN	OFF	OFF	OFF	ARMED
				<sup>②</sup> LIT STEADILY	OFF	OFF	DISARMED (EARLIER ALARM)
				ACTIVE	OFF	OFF	DISARMED (NO EARLIER ALARM)
WALK	INSERTED IN EITHER POSITION		OPEN	ACTIVE	OFF	OFF	DISARMED (IF PLUG IN LATCH POSITION)
PIR/MICROWAVE MONITOR	OPEN	OPEN	INSERTED	OFF	ACTIVE	ACTIVE	N.A.
MICROWAVE SUPERVISORY (UPON FAILURE)	INSERTED IN EITHER POSITION OR OPEN		OPEN	<sup>③</sup> FLASHING	OFF	OFF	N.A.

① : OPTIONAL

② : MEMORY OF ALARM: TO CLEAR, ARM SYSTEM CONTROL MOMENTARILY, THEN DISARM.

③ : LIT STEADILY if also indicating Memory of Alarm upon disarming.

**NOTE:** ALARM RELAY IS ACTIVE AT ALL TIMES, as long as specified voltage is being supplied at the power input terminals.

## 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 provided at all times. Loss of power to the unit will result in the alarm contacts reverting to an alarm state. The unit's DC source should have standby power available for at least 4 hours of operation during emergencies
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-tests should be conducted frequently (at least weekly) to confirm continued proper coverage by each detector.

## TO THE INSTALLER

Regular maintenance and inspection (at least annually) by the installer and frequent testing by the user are vital to continuous satisfactory operation of any alarm system.

The installer should assume the responsibility of developing and offering a regular maintenance program to the user, as well as acquainting the user with the proper operation and limitations of the alarm system and its component parts. Recommendations must be included for a specific program of frequent testing (at least weekly) to insure the system's operation at all times.

## SPECIFICATIONS

Infrared Sensor:	Dual Element Pyroelectric
Microwave Frequency:	X-Band Module 10.525 GHz
Microwave Power:	10mW Peak (typical)
Coverage:	Up to 40ft (12m) x 50ft (15m)
Adjustable Microwave Range:	20ft (6m) to 50ft (15m)
Mounting Height:	7.25ft (2.2m) normal (wall or corner mounting)
Supply Voltage:	12VDC nominal (11.5 to 16 VDC)
Current Drain:	40mA typical
Standby Capability:	Power source should be capable of at least 4 hours of battery standby
Alarm Output:	Normally Closed: 0.09A, 24 VDC max.
Tamper Switch:	Normally Closed: 0.09A, 24 VDC max.
Supervised Microwave Output:	WALK TEST LED flashing
Alarm Signal Hold Time:	3 sec. typical
Temperature Range:	-4°F to 131°F (-20°C to 55°C)
Dimensions:	3-1/8"W x 5-5/16"H x 2-3/8"D (80mm x 135mm x 60mm)
Weight:	9.7oz (275g)

### THE LIMITATIONS OF YOUR MICROWAVE/PASSIVE INFRARED MOTION DETECTOR

While this 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. For example:

- These Motion Detectors can only detect intrusion within the designed ranges as diagrammed in this installation manual.
- The passive infrared sensor in this Motion Detector does not provide volumetric area protection. It does create multiple beams of protection, and intrusion can only be detected in Unobstructed areas covered by those beams.
- Passive infrared Detectors can not detect motion or intrusion that takes place behind walls, ceilings, floors, closed doors, glass partitions, glass doors, or windows.
- Metal objects (or other reflectors, such as foil faced insulation or water in bottles) can alter the Microwave sensor's protection pattern.
- Mechanical tampering, masking, painting, or spraying of any material on the lenses, 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 90° to 105°F (32° to 40°C), the detection performance can decrease.
- This Detector will not operate without appropriate DC power connected to it, or if the DC power is improperly connected (i.e., reversed polarity connections).
- These Detectors, like other electrical devices, are subject to component failure. Even though this equipment is designed to last as long as 10 years, the electronic components in it could fail at any time.

We have cited some of the most common reasons that this 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 the owner eligible for a lower insurance rate, 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.

#### 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 Ademco Factory Service, 165 Eileen Way, Syosset, New York 11791.

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