

# Installation Instructions for the OD850 Outdoor PIR/Microwave Intrusion Detector

## 1.0 Description

The OD850 is a 50 ft. by 50 ft. (15 m by 15 m) PIR/Microwave intrusion detector that is intended for use outdoors and in other harsh environments. By using Motion Analyzer II PIR signal processing and Linear Travel Distance (LTD) microwave processing, the detector can measure the linear travel distance of a target to provide excellent catch performance of people while ignoring stationary objects with slight movement such as tree limbs and hanging signs. The combination of advanced processing techniques and mechanical design combine to provide a detector that offers superior performance in a wide range of weather conditions.

## 2.0 Specifications

- **Dimensions (HxWxD):** 6.5 in. x 3.25 in. x 2.25 in. (16.5 cm x 8.25 cm x 5.7 cm)
- **Input Power:** 10-15 VDC @ 22 mA standby. Maximum current 62 mA. Use only a Listed Limited Power Source.
- **Standby Power:** No internal standby battery. Standby power **must** be provided by a Listed Limited Power Source. *For UL Certificated installations, four hours (88 mAh) standby power must be provided by the control panel or by a Listed burglary power source.*
- **Alarm Relays:**
  - Form "A":** Normally closed, supervised alarm contact opens on alarm.
  - Form "C":** Unsupervised, timed relay contact transfers on alarm and follows an installer programmable timer.
- **Contact Ratings:** 3 W, 125 mA max., 25 VDC max. for DC resistive loads; and protected by a 4.7  $\Omega$ , 1/2 W resistor in the common "C" leg of the relay. To be connected to a SELV (Safety Extra-Low Voltage) circuit only.

**NOTE:** Do not use with capacitive or inductive loads.

- **Temperature Range:** The temperature range is -31°F to +140°F (-35°C to +60°C) for all installations including *UL Certificated installations*.
- **Microwave Frequency:** 10.525 GHz (*UL Listed*)
- **Coverage:** 50 ft. by 50 ft. (15 m by 15 m)
- **Tamper:** Normally Closed (with cover on). Contacts rated 125 mA max., 25 VDC max. To be connected to a SELV (Safety Extra-Low Voltage) circuit only. Connect tamper circuit to a 24-hour protection circuit.
- **Options:** B335 Low Profile Swivel Mount Bracket (supplied), B328 Swivel Mount Bracket, B338 Ceiling Mount Bracket, Pole Mount Bracket (supplied).

**NOTE:** The use of brackets may reduce range and increase dead zone areas.

- **Patents:** This product is covered by one or more of the following U.S. patents #4,660,024, #4,764,755, #5,208,567, #5,262,783, and #5,450,062. Other patents pending.
- **Compliance:** This device complies with Part 15 of the FCC Rules and with RSS-210 of Industry and Science Canada. Operation is subject to the following two conditions:
  - (1) this device may not cause harmful interference, and
  - (2) this device must accept any interference received, including interference that may cause undesirable operation.

Changes or modifications not expressly approved by Detection Systems, Inc. can void the user's authority to operate the equipment.

## 3.0 Installation Considerations

*For UL installation requirements, the unit shall only be installed outdoors for primary protection in high security installations where unwanted alarms would be tolerated. Otherwise, the outdoor device should be used for supplementary protection only, and be connected to a trouble zone or to a zone that is not programmed for off-premises transmission.*

- **Never** install the detector in an environment that causes an alarm condition in one technology. Good installations start with the LED **OFF** when there is no target motion. It should never be left to operate with the LED in a constant or intermittent green or red condition.
- Point the unit away from traffic (roads/alleys) even if they are outside the coverage area.
- Avoid installations where hanging signs, trees or other objects that will be moved by wind are within the coverage pattern or where wildlife may be moving within the coverage pattern .
- Point the unit away from objects that may change temperature rapidly.

**NOTE:** The PIR detector will react to objects rapidly changing temperature within its field-of-view.

- Eliminate interference from nearby sources.

**NOTE:** Microwave energy will pass through glass and most common non-metallic construction walls.

### 3.1 Tamper Options

The unit has a built-in cover tamper that will signal when the detector unit (Figure 3c) is separated from the mounting plate (Figure 3b). Optionally, the unit can be installed so the tamper will also signal if the entire unit is pulled away from the surface on which it is mounted.

**NOTE:** The wall/cover tamper option is only available when the unit is surface mounted. The cover tamper is automatic with all mounting options.

- Determine whether the tamper switch is to be used as a cover tamper or a wall/cover tamper:
  - for a wall/cover tamper, using an appropriate screw, fasten the Mounting Plate Tamper section (Figure 3a) to the wall.
  - for a cover tamper, do not attach the Mounting Plate Tamper section to the wall.

## 4.0 Mounting

**WARNING:** *All wires should remain disconnected from the power supply until all detector mounting and wiring procedures are completed.*

- Select a location likely to intercept an intruder moving **across** the coverage pattern.



**NOTE:** This detector features a Fresnel lens to focus infrared energy onto a sensor and an offset Look Down lens that adds a Look Down Zone. The coverage pattern of these lenses is shown in Figure 1.

- **The surface must be solid and vibration-free.**
- Mounting height range is 7 to 9 feet (2.1 to 2.7 m). Recommended mounting height is 7 feet ( 2.1 m).

**NOTE:** Mounting height recommendations are based on level surfaces. If the terrain is not level, adjust the mounting height and detector angle to provide the best coverage. Refer to the coverage patterns and Section 8.0.

- Choose from the available mounting methods:
  - 4.1 surface mount using a single-gang electrical box
  - 4.2 surface mount without an electrical box
  - 4.3 pole mount
  - 4.4 bracket mount using an optional bracket

**NOTE:** The Mounting Plate has a waterproof label (Figure 3j) which **must not** be removed. When mounting, simply drive the mounting screws through the label or punch through the label as needed for wiring.

#### 4.1 Surface Mount Using a Single-Gang Electrical Box

- Install a single-gang electrical box at the desired detector location.
- Attach the mounting plate (Figure 2a) to the single-gang box with appropriate screws.

#### 4.2 Surface Mount Without an Electrical Box

- Select an appropriate location.
- Using the Mounting Plate as a template, mark the location of the mounting screws and the wire run (see 5.0 Wiring).
- Attach the Mounting Plate (Figure 3b) to the wall with appropriate screws.

#### 4.3 Pole Mount Using the Supplied Bracket

**NOTE:** Do not mount to fence posts that may sway in the wind.

- Attach the supplied Pole Bracket to the Mounting Plate (Figure 2b) using appropriate screws and mounting holes.
- Use hose clamps (two recommended; not supplied) large enough to fit around the pole to fasten the detector mounting plate to the pole.

#### 4.4 Surface Mount Using the Supplied Bracket or an Optional Bracket

- Follow the instructions that come with the bracket to attach the bracket to the surface in an appropriate location.
- If using the supplied B335 Swivel Mount Bracket, connect the bracket to the Mounting Plate as indicated in Figure 2c.
- If using the optional B328 Swivel Mount Bracket, connect the bracket to the Mounting Plate as indicated in Figure 2d.
- If using the optional B338 Ceiling Mount, connect the bracket to the Mounting Plate as indicated in Figure 2e.

### 5.0 Wiring

**WARNING:** Only apply power after all connections have been made and inspected.

- Connect wiring per the following Terminal Descriptions (Figure 3e):

#### 5.1 Terminal Descriptions

- **1 (-) & 2 (+): Input Power (12 VDC).** Use no smaller than #22 AWG (0.8 mm) wire pair.
- **3 (NC), 4 (C): Alarm Relay Contacts.** Form "A" (Normally Closed,

supervised) alarm contact opens on alarm. Contacts rated 125 mA max., 25 VDC max.

- **5 & 6:** Normally Closed Tamper Contacts, rated 125 mA max., 25 VDC max.
- **7 (NC), 8 (C) & 9 (NO):** Timed Alarm Relay Contacts. One Normally Closed and one Normally Open contact with a Common. Contacts rated 125 mA max., 25 VDC max.

**NOTE:** Do not connect any terminal to any power supply providing more than 25 VDC.

## 6.0 Settings and Adjustments

### 6.1 DIP Switches

The DIP Switches (Figure 3h) are used to specify a number of settings as follows:

#### 6.2 LED Disable (SW0; Factory Setting ON)

This switch setting determines whether or not the LED will light during alarm situations. This switch should be ON (LED enabled) during walk testing, but may be OFF (LED disabled) during normal detector operation to save power.

The following chart lists the conditions indicated by the LED:

LED Indicator	Condition	
Green	Steady	PIR alarm
	Flashing	Microwave alarm
Red	Steady	Dual Alarm (both technologies)
	Flashing	Power-up

#### 6.3 PIR Sensitivity (SW1; Factory Setting ON)

The detector features two user-selectable PIR Sensitivity settings as follows:

- **Standard Sensitivity:** Recommended setting for maximum false alarm immunity. Tolerates environment extremes on this setting.
- **Intermediate Sensitivity:** Recommended setting for any location where an intruder is expected to cover only a small portion of the protected area. Tolerates normal environments on this setting. This setting will improve your intruder catch performance.

The appropriate switch settings for these sensitivities are:

SW1	PIR Sensitivity
OFF	Intermediate
ON	Standard

#### 6.4 Timed Relay Outputs (SW2 & SW3; Factory Setting both OFF)

The detector has a Form "C," unsupervised, timed relay contact that transfers one second after an alarm and follows a user-selectable timer. The time will expire at the set time after the last alarm (it resets on each new alarm). For information on wiring this contact, see 5.0 Wiring. To select the Relay Activation Time, set the switches as follows:

SW3	SW4	Relay Activation Time
OFF	OFF	2 seconds
ON	OFF	1 minute
OFF	ON	5 minutes
ON	ON	10 minutes

#### 6.5 AND/OR Mode (SW4; Factory Setting ON)

This setting specifies whether the detector alarms in the AND mode (when both technologies simultaneously sense an alarm condition) or in the OR mode (when either the PIR or Microwave

technology senses an alarm state). Setting the switch ON selects the AND mode (recommended); setting the switch OFF and cutting the jumper (see Figure 3i) selects the OR mode.

**NOTE:** OR mode is **not** recommended for most installations. OR mode will provide faster detection in some conditions, but may also increase the likelihood of nuisance alarms as the detector will activate the alarm relay on a single technology activation..


### 6.6 Day/Night Mode (SW5; Factory Setting OFF)



With the control unit armed and this switch OFF, the unit will alarm day or night. With the control unit armed and this switch ON, the unit will not alarm during daylight.

**NOTE:** If the LEDs are enabled (SW0), then LED indications will still continue.

**NOTE:** The seventh switch (SW6) is not used.

### 7.0 Attaching Detector Unit to Mounting Plate

- When all wiring has been connected to the detector (but not to the power supply) and all the settings have been made, slide the detector unit (Figure 3c) onto the mounting plate (Figure 3b) and down until it is firmly seated. Avoid pinching the wires.
- With a small screwdriver, lock the detector unit to the mounting plate by turning the Locking Cam (Figure 3d) one half turn to lock . Avoid using excessive force.

**NOTE:** Figure 3d1 shows the Locking Cam in the unlocked  position; while Figure 3d2 shows it locked. 

### 8.0 Testing the Detector

**NOTE:** The detector unit should be fastened to the mounting plate before testing the unit.

- Place the LED Disable (SW0) in the ON position.
- Connect the wires to the power supply and apply power.

**NOTE:** Wait at least two minutes, after applying power, to start walk tests. During the warm-up period, the LED will flash red until the unit has stabilized (approximately one to two minutes) and has seen no movement for two seconds. When the LED stops flashing, the detector is ready to be tested. With no motion in the protection area, the LED should be OFF. If the LED is ON, recheck the protection area for disturbances affecting the microwave (flashing green) or PIR (green) technologies.

#### Establishing PIR Pattern Coverage

- Walk test **across** the pattern at its farthest edge, then several times closer to the detector. Start walking from outside of the intended protection area, and observe the LED. The edge of the pattern is determined by the first green (PIR) activation of the LED (or the first red activation if the flashing green microwave LED activates first).
- Walk test from the opposite direction to determine both boundaries.

**NOTE:** The center of the pattern should be pointed toward the center of the intended protection area.

- While standing 10 to 20 ft. (3 to 6 m) from the detector, slowly bring your arm up and into the pattern to mark the lower boundary on PIR alarm. Repeat from above for the upper boundary.

**NOTE:** The center of the pattern should **not** be tilted upward.

If the desired coverage cannot be achieved, try angling the coverage pattern up or down using a swivel bracket to assure the pattern is not aimed too high or low.

#### Establishing Microwave Coverage

**NOTE:** Wait one minute after removing/replacing the detector unit so the microwave portion of the detector can settle. Wait

at least ten seconds between the following walk testing procedures.

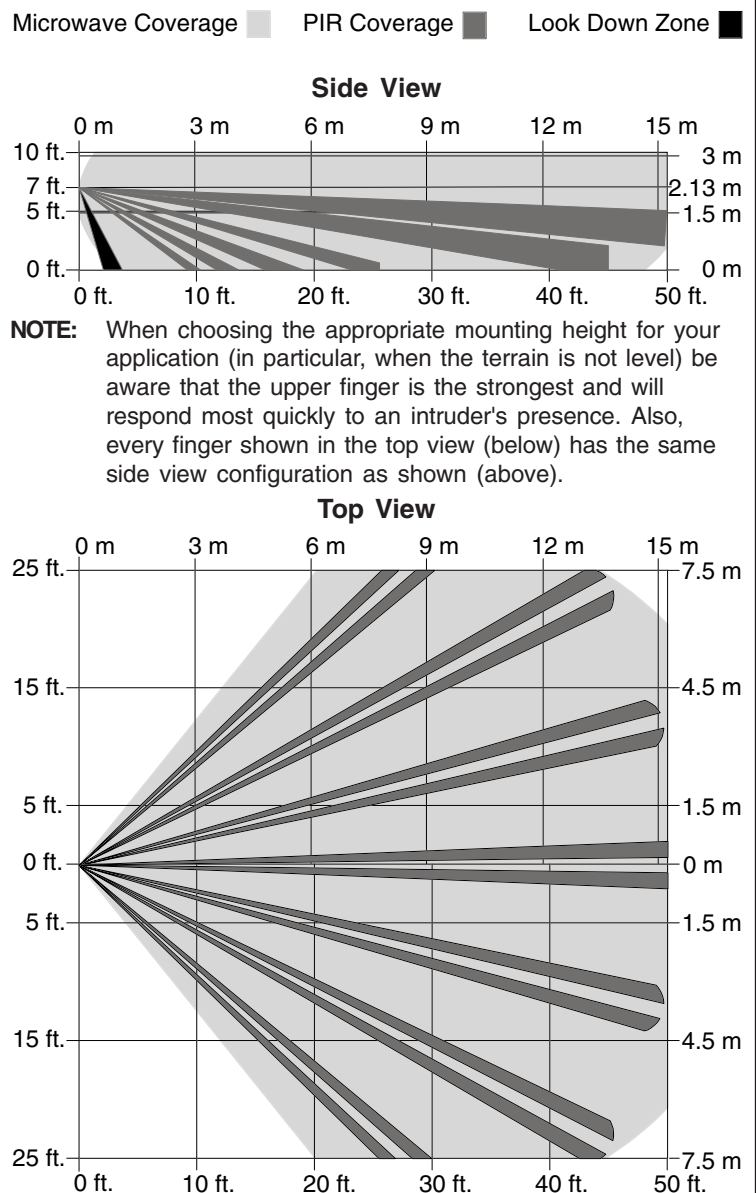
- The LED should be OFF before walk testing.
- Walk test **across** the pattern at the intended coverage's **farthest** end. Start walking from outside the intended protection area and observe the LED. The edge of the microwave pattern is determined by the first flashing green (microwave) activation of the LED (or the first red activation if the green PIR LED activates first).
- If adequate range can not be reached, increase the Microwave Range Adjust **slightly**. Continue walk testing (waiting one minute after removing/replacing the cover) and adjusting the range until the farthest edge of desired coverage has been accurately placed.

**CAUTION:** Do not use excessive force when adjusting the microwave pot.

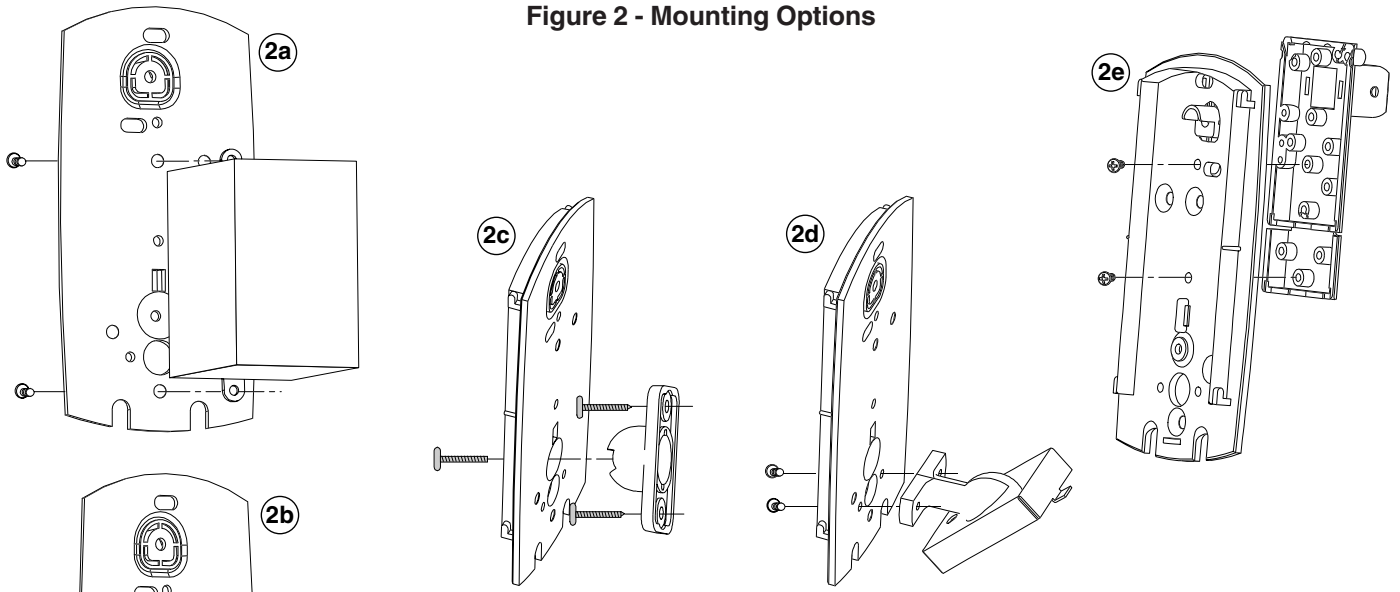
**NOTE:** If you adjust the range, set the adjustment as low as possible for proper catch performance. Be sure to walk test throughout the coverage pattern after any adjustment.

- When all walk testing is completed, the LED Disable switch can be set to disable the LED if so desired.

Figure 1 - Coverage Patterns



**Figure 2 - Mounting Options**



**Figure 3 - Assembly**

