



# Installation Instructions

## D9580 Long Range Passive Infrared Intrusion Detector

### 1.0 General Description

The D9580 is a high performance microprocessor-based intrusion detector designed to provide an alarm condition upon the detection of an intruder moving into or through its coverage pattern.

Technology designed into the D9580 is based on the transmission of infrared energy; all objects transmit infrared energy. The warmer an object is, the more infrared energy transmitted. With PIR receiver technology, the D9580 detects the change in infrared energy that occurs when a target passes through its view.

The coverage pattern, consisting of sensor fingers (to detect the target) is arranged in a side-by-side array. The total number of fingers is determined by the optical module used. The fingers are grouped by polarity into pairs, with each pair consisting of one zone.

To detect motion, the D9580 must first see a change in infrared energy in one finger followed by a change of energy in the remaining finger. Therefore, disturbances that occur in only one finger do not constitute motion and are ignored.

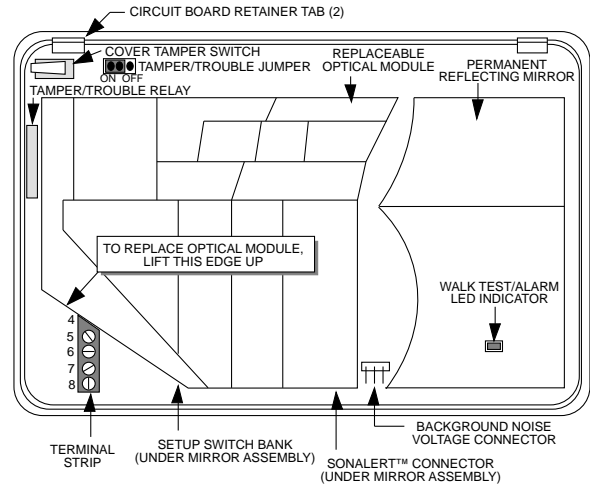
The "catch sensitivity" may be changed by the installer to provide a degree of sensitivity determined by each installation.

Microprocessor controlled self-test, supervision, and temperature compensation circuits provide reliable uniform operation in a wide variety of installation environments. This results in a highly advanced detector offering superior performance with freedom from false alarms.

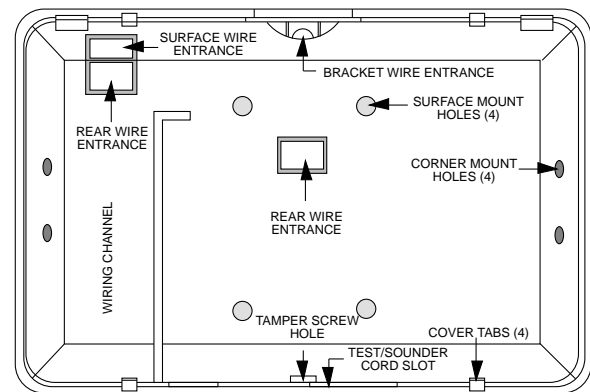
### 2.0 Specifications

- **Coverage:**

Standard Broad	OA80	80 ft. by 50 ft.	(24.4 m by 15.3 m)
Long Range (Optional)	OA120	120 ft. by 25 ft.	(36.6 m by 7.6 m)
Long Range (Optional)	OA200	200 ft. by 10.5 ft.	(61.0 m by 3.2 m)
- **Input Power:** 6.0 to 15.0 VDC; 25 mA nominal, 18 mA maximum @ 12 VDC.
- **Standby Power:** There is no internal standby battery. Connect to DC power sources capable of supplying standby power if primary power fails. Twenty-five mA-H required for each hour of standby time needed. *Four hours (100 mA-H minimum) are required for U. L. Certificated installations.*
- **Sensitivity:** Field selectable for Standard, Intermediate, or High.
- **Temperature Compensation:** Microprocessor controlled temperature compensation circuitry provides uniform catch performance at critical temperatures.
- **Alarm Relay:** Silent operating Form "C" relay. Contacts rated 125 mA, 28 VDC maximum for DC resistive loads. *Do not use with capacitive or inductive loads.*
- **Tamper/Trouble Loop:** Normally Closed (with cover in place) tamper switch. Contacts rated at 28 VDC, 125 mA maximum. In series with silent operating Normally Closed (not in trouble condition) relay. Contacts rated 100 mA, 28 VDC maximum for DC resistive loads.
- **Temperature:** The storage and operating range is -20° to +120°F (-29° to +49°C). *For U. L. Certificated installations, the range is +32° to +120°F (0° to +49°C).*
- **Sonalert™ Connector:** Using a Sonalert™ type sounder (low voltage) will provide an audible tone when the unit is in alarm. *A sounder is intended only as an aid for walk testing during installation.*  
*Sonalert™ is a trademark of Mallory.*
- **Options:** OA120 Long Range Mirror, OA200 Long Range Mirror, and TC6000 Test Cord.
- **U. S. Patent Numbers:** #4,764,755, #4,920,268, and #5,083,106.



Front view with cover off



Base

### 3.0 Mounting

Select a location likely to intercept an intruder moving *across* the coverage pattern (review patterns on page 4). **The recommended mounting height is 7.5 ft. (2.3 m) or 10 ft. (3.1 m) when using the OA200 Mirror.** Each mounting surface should be solid and vibration free.

- Remove the cover by inserting a thin screwdriver into each of the two slots at the bottom and the two slots at the top of the cover. Twist gently until the cover snaps free of the tabs on the base.

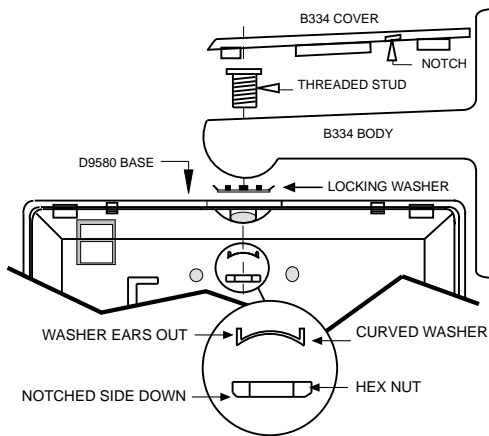
#### 3.1 Bracket Mounting

**Note:** The use of the B334 Mounting Bracket (included) is strongly recommended when installing this detector.

Because variations exist in the surfaces of most mounting walls, most units are not mounted at perfect angles to the floor or walls. This may cause the pattern to point away from the "ideal" direction.

**For example:** A shift of only 1 degree will cause a pattern shift of 1.7 ft. (10.5 m) at 100 ft. (30.5 m). Under worst case conditions, this will cause the pattern to be aimed over the head of intruders at maximum range, or into walls of narrow corridors. What may seem to be poor range or catch performance, may be the result of improper alignment.

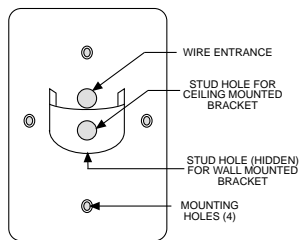
To insure proper catch performance, a bracket mounted detector permits the flexibility needed to properly adjust the direction of the coverage pattern.



### Bracket to Base Assembly

#### If Mounting to the B334 Mounting Bracket:

- Remove the cover of the bracket by inserting a thin screwdriver into the notch on the side of the bracket and twisting gently.
- Insert the alarm and power wiring through the center hole from the rear of the B334 base. (Do not insert wiring if the bracket is to be surface mounted).
- Mount the B334 to a standard single-gang switch or outlet box using the supplied Bevel Head screws. (If surface mounting the unit, use the wall screw/anchor assemblies or appropriate alternatives).
- Remove the circuit board from its base. Press the two circuit board retainer tabs outward and lift the circuit board away from the base.
- Remove the sticker covering the entrance from the back of the detector base.
- Insert the threaded stud through the appropriate stud hole in the B334 bracket. Use the bottom hole for wall mounting, the front hole for ceiling mounting. *Make sure the hex head is seated in place.*
- Complete the assembly by securing the detector base to the B334 bracket using the supplied locking washer, curved washer and hex nut (see Bracket to Base Assembly drawing).
- Hand tighten the hex nut.
- Thread the bracket wiring through the stud and along the wiring channel in the detector's base to the area of the circuit board's terminal strip.
- Return the circuit board to its base. Slide the back of the circuit board under the tabs at the back of the base, then snap the front into place.
- Aim the detector in the desired general direction and tighten the hex nut using the supplied hex wrench.
- Should the detector require re-alignment, loosen the hex nut, re-position the detector, and then re-tighten the nut.



### B334 Bracket

#### 3.2 Surface or Corner Mounting

- Remove the circuit board from its base. Press the two circuit board retainer tabs outward and lift the circuit board away from the base.
  - Select and break away the appropriate thin-wall wire entrance covering in the detector base.
  - Using the base as a template, mark the location of the mounting holes on the mounting surface. Pre-start the mounting screws.
  - Route the wiring to the rear of the base and through the wire entrance. Firmly mount the base to the mounting surface.
- Note:** Be sure all wiring is unpowered (de-energized) before routing.
- Return the circuit board to its base. Slide the back of the circuit board under the tabs at the back of the base, then snap the front into place.

## 4.0 Wiring

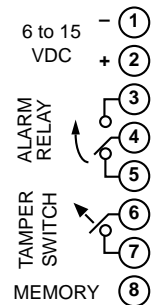
**CAUTION:** ONLY APPLY POWER AFTER ALL CONNECTIONS HAVE BEEN MADE AND INSPECTED.

**Note:** Do not coil excess wiring inside unit.

Locate the two-piece terminal strip on the side of the circuit board assembly. Remove the wiring connector from the terminal strip by inserting a screwdriver between the wiring connector and terminal strip, and gently prying apart.

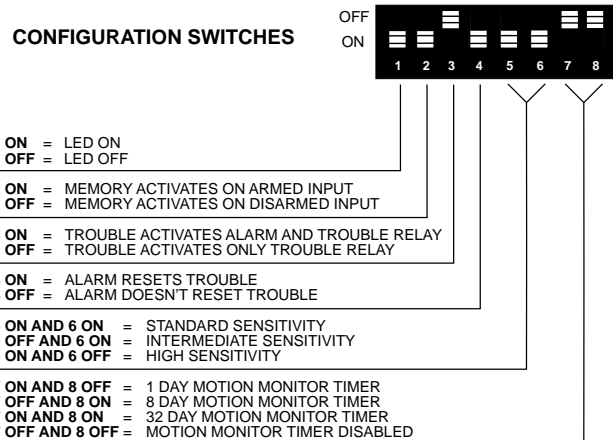
- Terminals 1 (-) & 2 (+):** Power limits are 6 to 15 VDC. Use no smaller than #22 AWG (0.8 mm) wire pair between the unit and the power source.
- Terminals 3, 4, & 5:** Alarm relay contacts rated 125 mA, 28 VDC maximum for DC resistive loads. Use terminals 4 & 5 for Normally Closed circuits. *Do not use with capacitive or inductive loads.*
- Terminals 6 & 7:** Tamper/Trouble contacts rated at 28 VDC, 125 mA.
- Terminal 8:** Memory Input. Connect (+) or (-) input for memory control (see Section 5.2 Alarm Memory).

Re-install the wiring connector to the terminal strip.



## 5.0 Configuration Switch Settings

The D9580 has several features that are controlled using the configuration switches.

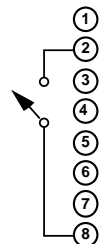


### 5.1 LED Operation (S1)

- ON:** Allows the Alarm/Test LED to operate when activated by motion or the memory circuit.
- OFF:** The LED will not operate on alarm activation, but will indicate a supervision trouble condition or a stored alarm event. Switches S1 and S2 must be ON for LED operation when not using the memory feature.

### 5.2 Alarm Memory (S2)

- To use the alarm memory function, place switch S2 in the correct position for either an armed or disarmed input. Alarm memory is then controlled by switching (applying and removing) voltage to terminal 8. The voltage range that may be applied is +6 to +15 VDC.
  - To supply voltage, connect a switch between terminals 2 and 8 as shown.
- Note:** If switched voltage is supplied from another source, then wiring must also be provided from terminal 1 to the negative side of the alternate source.
- When the voltage applied to terminal 8 switches from the disarmed to the armed condition, any stored alarm is cleared from memory, the Alarm/Test LED indicator is disabled, and the memory is ready to store the next alarm.
  - When the voltage applied to terminal 8 switches from the armed to the disarmed condition, the LED is allowed to operate. A stored alarm will cause the LED to turn on continuously. If there is no stored alarm, the LED will respond in a normal manner; that is, it will turn on only during a present alarm.



Control Voltage	Memory Polarity Switch S2
+6 to +15 Volts = Armed	On
0 Volts = Disarmed	
+6 to +15 Volts = Disarmed	Off
0 Volts = Armed	

**Note:** If not using the memory feature, switch S2 should be On and no connection needs to be made to terminal 2.

### 5.3 Supervision Output (S3)

- **ON:** A Supervision Alarm will activate both the Alarm Relay and the Tamper/Trouble Relay.
- **OFF:** A Supervision Alarm will activate only the Tamper/Trouble Relay.

### 5.4 Trouble Reset (S4)

- **ON:** After a 10 second quiet period, an alarm activation will reset the trouble condition.
- **OFF:** Input power must be momentarily interrupted to reset a trouble condition.

### 5.5 Sensitivity Mode (S5 and S6)

Sensitivity modes depend on the type of coverage desired and the installation environment.

- **Standard Sensitivity:** Tolerates environment extremes on this setting. *Not recommended for OA120 and OA200 patterns. The detector is shipped in Standard Sensitivity mode.*
- **Intermediate Sensitivity:** The 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.
- **High Sensitivity:** The setting for fast response to intruder signals. For use in quiet environments where thermal and illumination transients are not anticipated.

If both switches are in the Off position, the unit will default to the Intermediate setting.

**Note:** Although the sensitivity modes provide different degrees of tolerance to environmentally caused alarms, the installer should assure peak background noise voltage readings do not exceed  $\pm 0.15$  VDC. (See Section 8.0 Final Tests).

### 5.6 Motion Monitor (S7 and S8)

Set switches S7 and S8 for the desired Motion Monitor time (see Section 6.0 Supervision Features). **The detector is shipped with the Motion Monitor feature disabled.**

## 6.0 Supervision Features

The D9580 performs several supervision features that, combined with the advanced motion detection capabilities of the detector, provide an extremely high level of security. A supervision trouble condition is indicated at the detector by the Alarm/Test LED (see the Supervision Display Chart).

- The LED indicates the cause of the supervision trouble once per second using coded pulses. The supervision trouble signal activates the Tamper/Trouble Relay available at terminals 6 and 7, which should be connected to a 24-hour zone.

The supervision features function as follows:

- **PIR:** The operation of the PIR is electronically checked approximately every 12 hours. If the PIR fails, the Alarm/Test LED will flash 4 times and the Tamper/Trouble Relay will activate. If switch S3 is On, the Alarm Relay will also activate.
- **Relay:** If the Alarm Relay fails, the LED will flash 5 times and the Tamper/Trouble Relay will activate. If switch S3 is On, the Alarm Relay will also activate.
- **Input Power:** If the input power falls below approximately 4.3 Volts, the Alarm Relay activates, the Tamper/Trouble Relay activates, and the LED will flash five times.
 

**Note:** If input power falls below 2.8 Volts, the D9580 can no longer indicate the low power trouble condition.
- **Microprocessor:** If the microprocessor fails, an alarm condition is signaled.
- **Motion Monitor Supervision:** This feature verifies that the detector has a clear view of the detection area. When selected using switches S7 and S8, a supervision timer is activated. A trouble condition will be indicated if the

detector has not alarmed at least once during the selected time period (this feature can be disabled by placing both switches in the Off position). The time period selected should be long enough to allow adequate time for holiday weekends.

Refer to Section 5.0 (Configuration Switch Settings) for proper switch settings.

If the time period selected has elapsed from the last alarm, the LED will flash 2 times and the Tamper/Trouble Relay will activate. If switch S3 is On, the Alarm Relay will also activate.

If the memory feature is being used, the supervision timer will stop while the control is placed in the armed (away) mode. The timer will resume when the control is subsequently placed in the disarmed (home) mode. Under these conditions, the actual time that passes would be equal to that selected by switches S7 and S8 plus the length of time that the control is armed.

It is recommended that the 32 day timer be selected when alarm memory is not being used. This verifies that the unit is operational and avoids nuisance trouble conditions caused by holidays, vacations, etc.

**Note:** The Tamper/Trouble Relay may be disabled by placing the Tamper/Trouble Relay Jumper in the Off position (see drawing on page 1).

The Tamper Switch is operational, even if the Tamper/Trouble Relay is disabled.

### Supervision Display Chart

LED	CAUSE
ON	Unit Alarm or Stored Alarm
Flashing 2	Motion Monitor Timeout
Flashing 4	PIR Self-test Failure
Flashing 5	Low Input Power or Relay Failure

## 7.0 Setup and Walk Testing

If a different optical module is to be used:

- Slide the current module free from its housing. Install the new optical module onto the housing. Make sure it snaps into place.

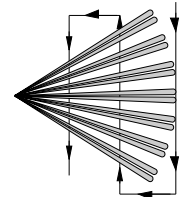
**Note:** Excessive handling of the front mirrored surfaces may lead to performance degradation.

- Replace the front cover.

**Note:** All testing must be performed with the front cover in place.

- Apply power to the unit.
- Wait at least two minutes, after applying power, to start walk tests.

**Note:** Walk testing should be done across the coverage pattern as shown.



- The edge of the coverage pattern is determined when the Alarm/Test LED indicator (and optional Sonalert™, if installed) first turns on.

**Note:** The use of a Sonalert™ type device (sounder) will provide an audible tone during the time the unit is in alarm. Of the three available connector pins, the center pin is positive (+) with respect to either outside pin (outside pins are common (-)).

Sonalert™ is a trademark of Mallory.

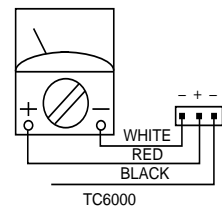
Walk test the unit from all directions to determine the boundaries.

- After completion of the walk tests, remove the Sonalert™ (if installed).

## 8.0 Final Tests

**Note:** Meter readings are very important in determining background disturbance levels and catch margin sensitivity.

- Connect a 20,000 ohm/volt (or greater) DC VOM to the Noise Voltage connector pins as shown. Set meter scale for about 3 VDC. Route meter wiring through the slot in the base. (Use of the TC6000 is recommended, but is not essential for meter use.)



- The base reference level for reading background noise or target voltages is approximately 1.5 VDC. Installations in quiet environments, therefore, will result in a steady meter reading between 1.4 and 1.6 VDC.

Voltage changes greater than 0.75 VDC from the reference level are desirable for good catch performance. If changes are less than  $\pm 0.75$  VDC, the device may fail to respond at this distance if the temperature difference between the intruder and the background is very small.

- Turn on all heating and cooling sources that would normally be in operation during times of protection. Stand away from the unit and outside the coverage pattern, then monitor the background noise for at least **three minutes**.

D9580 readings should not deviate from the reference level more than  $\pm 0.15$  VDC. For readings outside these limits; eliminate the cause, re-point the unit slightly, or mask off the affected zones.

## 9.0 Other Information

### 9.1 LED Indicator Operation

- If viewing the operation of the Alarm/Test LED indicator is not desired *after* setup and walk tests are completed, place switch S1 in the Off position.

### 9.2 Sealing the Wire Entrance

- The foam plug that is provided with the unit is for sealing the wire entrance from drafts and insects.

### 9.3 Maintenance

- At least once a year, the range and coverage should be checked according to Sections 7.0 and 8.0 (Walk Testing and Final Tests).
- To ensure continued daily operation, the end user should be instructed to daily walk through the far end of the coverage pattern. This assures an alarm output prior to arming the system.

### 9.4 Mirror Module Information

- Excessive handling of the mirror surfaces may lead to performance degradation. Should these surfaces become soiled or otherwise dirty, clean using a soft clean cloth and any commonly available mild window cleaner.

### 9.5 Masking

- Refer to the mirror module and pattern drawings for masking information.
- Before attempting any masking, be sure the chosen mirror surface is the correct one. When attempting to remove any masking, many adhesives will either destroy the mirror's surface or leave enough residue behind to reduce coverage performance.
- Shaded areas of the mirror drawings do not affect the pattern and, therefore, are not maskable.

### 9.6 Tips for Supervision Usage

The following are recommendations for typical applications and are intended only as a guide:

- When the Tamper/Trouble Loop (terminals 6 and 7) is used, a trouble activation should be configured to only activate the Tamper/Trouble Relay (switch S3 Off). This allows the detector to better distinguish between intrusion detection alarms and supervision trouble conditions. The results are easier identification of installation and detector problems, and reduced false alarm reports.
- When using the Motion Monitor supervision feature:
  - Setting the Motion Monitor timer to shorter periods can be used to force a protection walk test of remotely located zones on a daily basis. Switch S4 should be On to reset the trouble condition if this is done.
  - It is recommended that shorter time periods (1 day) be selected when used with alarm memory enabled because the supervision time period does not include the amount of time the system is armed.

## 10.0 FCC Compliance Notice

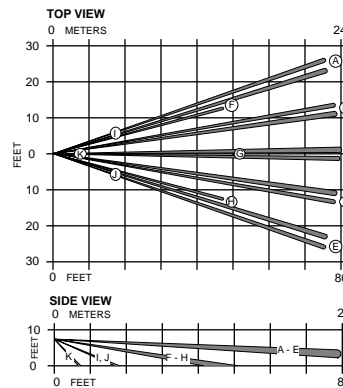
This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy; and if not installed and used in strict accordance with the manufacturer's instructions and recommendations, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be

determined by turning the equipment on and off, the user is encouraged to try to correct the interference by one or more of the following measures:

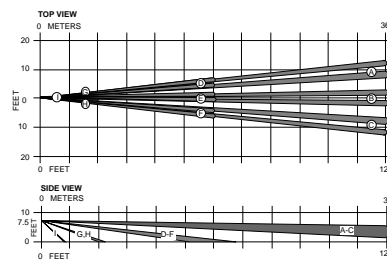
- Re-orient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that of the receiver.
- Consult the installing company or an experienced radio/TV technician for help.

The booklet, "How to Identify and Resolve Radio/TV Interference Problems", prepared by the Federal Communications Commission (FCC) may prove helpful. This booklet is available from the U. S. Government Printing Office, Washington, D. C. 20402. Please specify Stock No. 004-000-00345-4.

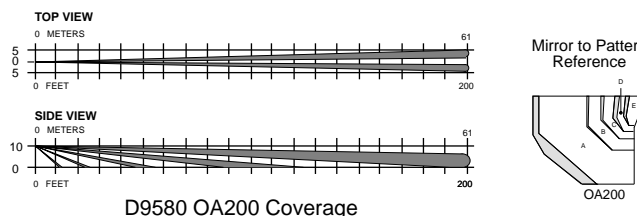
## 11.0 Coverage Patterns



D9580 OA80 Coverage



D9580 OA120 Coverage



D9580 OA200 Coverage



Radionics, Inc., 1800 Abbott Street  
Salinas, CA, 93901, U.S.A.  
Customer Service: (800) 538-5807