Installation Instructions for the DS860 Series TriTech Microwave/PIR Intrusion Detectors

1.0 Specifications

- **Dimensions (HxWxD):** 5 in. x 2.8 in. x 2.2 in. (12.7 cm x 7.1 cm x 5.6 cm)
- **Input Power:** 9 to 15 VDC, 16 mA DC nominal (up to 48 mA DC during walk testing or trouble conditions). Use only an Approved Limited Power Source.
- **Standby Power:** No internal standby battery. Standby power **must** be provided by an Approved Limited Power Source. Sixteen mAh required for each hour of standby time needed. *For UL Listed Requirements, four hours (64 mAh) minimum are required.*
- **Alarm Relay:** Silent operating Normally Closed reed relay. Contacts rated 3 watts, 125 mA, 28 VDC maximum for DC resistive loads; and protected by a 4.7 ohm, 0.5 watt resistor in the common "C" leg of the relay. To be connected to a SELV (Safety Extra-Low Voltage) circuit only. Do **not** use with capacitive or inductive loads.
- **Temperature Range:** -40°F to +120°F (-40°C to +49°C). *For UL Listed Requirements, the temperature range is +32°F to +120°F (0°C to +49°C).*
- **Microwave Frequency:**
  - **DS860:** 10.525 GHz (UL Listed)
  - **DS860A:** 10.687 GHz (Export only, **not** UL Listed)
  - **DS860B:** 9.9 GHz (Export only, **not** UL Listed))
- **Coverage:**
  - **Broad (standard):** 60 ft. by 60 ft. (18 m by 18 m)
  - **Long Range (optional):** 100 ft. by 10 ft. (30 m by 3 m)
- **Internal Pointability:** +2° to –10° Vertical, ±10° Horizontal.
- **Tamper:** Normally Closed (with cover on). Contacts rated at 28 VDC, 125 mA max. To be connected to a SELV (Safety Extra-Low Voltage) circuit only. Connect tamper circuit to 24-hour protection circuit.
- **Options:** B328 Gimbal Mount Bracket, B335 Low Profile Swivel Mount Bracket, B338 Ceiling Mount Bracket, OLR92 Long Range Barrier Lens

NOTE: Use of a bracket may reduce range and increase dead zone areas.

- **U.S. Patent Numbers:** Protected under one or more of the following U.S. Patent Numbers: #4,660,024, #4,764,755, #5,077,548, #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.

2.0 Installation Considerations

NOTE: The DS860 is **not** recommended for installations containing pets or small animals. Use the DS820 or DS835 for such installations.

- **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 tri-color LED in a constant or intermittent green, yellow, or red condition.
- Point the unit away from outside traffic (roads/alleys).

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

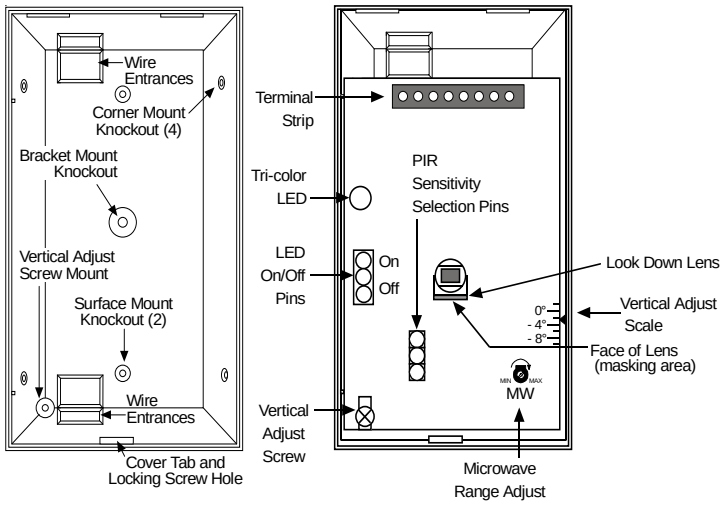
- Avoid installations where rotating machines (e.g. ceiling fans) are normally in operation within the coverage pattern. Point the unit away from glass exposed to the outdoors and objects that may change temperature rapidly.

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

- Eliminate interference from nearby outside sources.

3.0 Mounting

- Select a location likely to intercept an intruder moving **across** the coverage pattern. The surface should be solid and vibration-free. Mounting height range is 6 to 8 ft. (1.8 to 2.4 m). Recommended mounting height is 7.5 ft. (2.3 m).
- Remove the cover. Insert a flathead screwdriver into the locking tab hole at the bottom front of the detector. Pull the cover up and forward.



- Remove the circuit board from the base. Loosen the Vertical Adjust Screw and slide the circuit board down, then out.
- Break away the appropriate thin-wall wire entrance and mounting hole coverings in the base.
- Using the base as a template and aligning it so that the detector will be mounted with the terminal block at the top and the PIR lens at the bottom, mark the location of the mounting holes on the mounting surface. Pre-start the mounting screws.

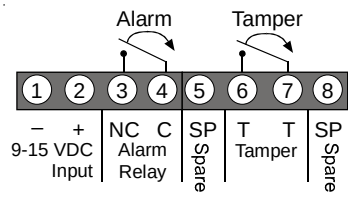
- Route wiring as necessary. Route to the rear of the base and through the wire entrance. **Make sure all wiring is unpowered before routing.**
- Securely attach the base to the mounting surface.
- Return the circuit board to the base and tighten the Vertical Adjust Screw.

4.0 Wiring

CAUTION

Only apply power after all connections have been made and inspected. Do not coil excess wiring inside detector.

NOTE: Input power must use only an Approved Limited Power Source. Alarm and Tamper Contacts to be connected to a SELV (Safety Extra-Low Voltage) circuit only.



- **Terminals 1 (–) & 2 (+):** Voltage limits are 9 to 15 VDC. Use no smaller than #22 AWG (0.8 mm) wire pair between the detector and the power source.
- **Terminals 3 & 4:** Alarm relay (reed) contacts rated 3 watts, 125 mA, 28 VDC maximum for DC resistive loads and protected by a 4.7 ohm, 0.5 watt resistor.

NOTE: Do not use with capacitive or inductive loads.

- **Terminals 5 and 8:** Spare.
- **Terminals 6 & 7:** Tamper contacts rated at 28 VDC, 125 mA.

NOTE: Plug the wire entrance hole with the foam plug provided after all wiring connections have been made.

5.0 LED Operation

The detector uses a tri-color LED to indicate the various alarm and supervision trouble conditions that may exist. See chart below.

LED	Cause
Steady red	Unit alarm
Steady yellow	Microwave activation (walk test)
Steady green	PIR activation (walk test)
Flashing red	Warm-up period after power-up
Flashing red (4 pulse sequence)	Replace Unit

IMPORTANT

If the detector experiences a Microwave or PIR self-test failure, it is in need of replacement.

NOTE: During walk testing, the LED will light for the first technology (microwave or PIR) and then light red to indicate a detector alarm. The LED will not indicate activation of the second technology by lighting its color.

6.0 Feature Selection

6.1 LED On/Off Pins

Off On

The ON position allows operation of the tri-color LED. If LED indication is not desired after setup and walk tests are completed, place in the OFF position. The OFF position does not prevent the LED from indicating supervision trouble conditions.

6.2 PIR Sensitivity Selection Pins

STD INT

For selection, place the plug across the pins marked STD for Standard or INT for Intermediate mode.

- **Standard Sensitivity:** The recommended setting for maximum false alarm immunity. Tolerates environmental extremes on this setting.
- **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. This setting will improve your intruder catch performance.

7.0 Set-up and Walk Tests

Select the vertical starting angle from this chart:

DS860		
Mounting Height	**Broad**	**Long Range**
	60 ft. (18 m)	100 ft. (30 m)
6.5 ft. (2 m)	-4°	-2°
7.5 ft. (2.3 m)	-5°	-3°
8.0 ft. (2.4 m)	-6°	-3°

To adjust the vertical starting angle for the desired mounting height and range, loosen the vertical adjust screw and slide the board up, to point the angle down. Note the settings on the vertical adjust scale.

- Place the LED plug in the ON position and replace the cover.

7.1 Establishing PIR Pattern Coverage

- Turn the Microwave range adjust to minimum.
- Replace the cover and snap it into place. This will close the tamper switch.
- **Wait two minutes minimum** after applying power to start walk tests.

NOTE: During the warm-up period, the tri-color LED will flash red until the unit has stabilized (approximately 1 to 2 minutes) and has seen no movement for two seconds. When the tri-color LED stops flashing, the detector is ready to be tested. With no motion in the protection area, the tri-color LED should be OFF. If the LED is on, re-check the protection area for disturbances affecting the microwave or PIR technologies.

- 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 tri-color LED. The edge of the pattern is determined by the first green, PIR activation of the LED (or the first red activation if the yellow microwave LED activates first).
- Walk test from the opposite direction to determine both boundaries. The center of the pattern should be pointed toward the center of the intended protection area.

NOTE: The pattern may be moved ±10° horizontally by rotating the lens window left or right.

- Slowly bring your arm up and into the pattern to mark the lower boundary on PIR alarm. Perform this task at 10 to 20 ft. (3 to 6 m) from the unit. Repeat from above for the upper boundary. **The center of the pattern should not be tilted upward**.

NOTE: If desired coverage cannot be achieved, try angling the coverage pattern up or down to assure the pattern is not aimed too high or low. The angle of the PIR pattern may be vertically positioned between -10° and +2° by loosening the Vertical Adjust screw and sliding the circuit board up or down. Moving the board up will angle the pattern downward.

- Tighten the screw snug when positioning is completed.

7.2 Establishing Microwave Coverage

NOTE: It is important to wait one minute after removing/replacing the cover so the microwave portion of the detector can settle, and to wait at least ten seconds between the following walk testing procedures.

- The tri-color 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 tri-color LED. The edge of the microwave pattern is determined by the first yellow, 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.

NOTE: Do **not** adjust the microwave range higher than required. Doing so will enable the detector to catch movement outside of the intended coverage pattern.

- Walk test the unit from all directions to determine all the Microwave pattern boundaries. Wait at least ten seconds between walk tests.

7.3 Establishing Detector Coverage

- The tri-color LED should be OFF before walk testing.
- Walk test the unit from all directions to determine the detection boundaries. A detector alarm is signaled by the first red activation of the tri-color LED after an initial green or yellow activation.

8.0 Supervision Features

The supervision features function as follows:

- **PIR/Microwave:** The complete circuit operation of these subsystems is checked approximately every 24 hours. If the PIR or MW subsystem fails, the tri-color LED will flash red 4 times per cycle and the unit should be replaced.
- **Default**: If the microwave subsystem fails, the detector will default to PIR technology protection. The PIR signal sensitivity will automatically change from INT to STD.

9.0 Maintenance

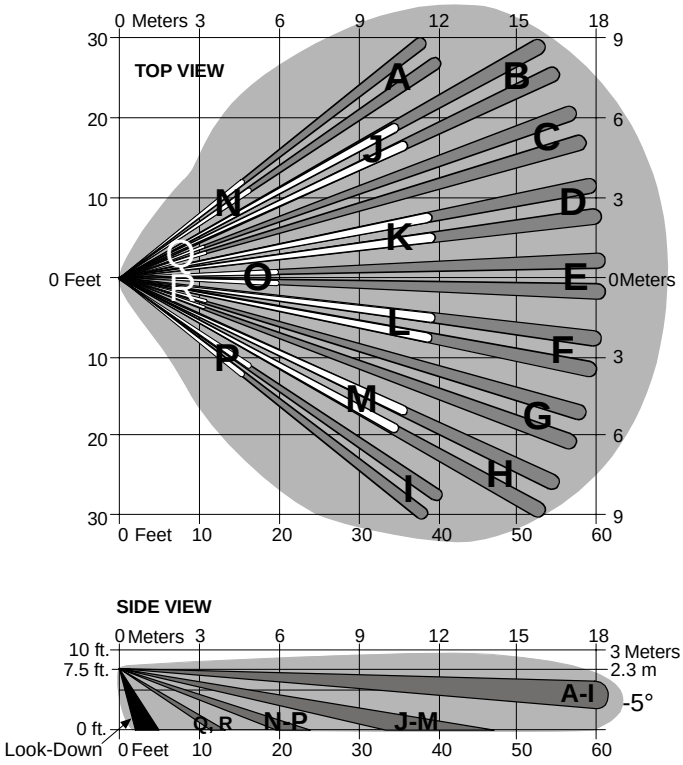
At least once a year, the range and coverage should be verified. To ensure continual daily operation, the end user should be instructed to walk through the far end of the coverage pattern. This ensures an alarm output prior to arming the system.

10.0 Coverage Patterns

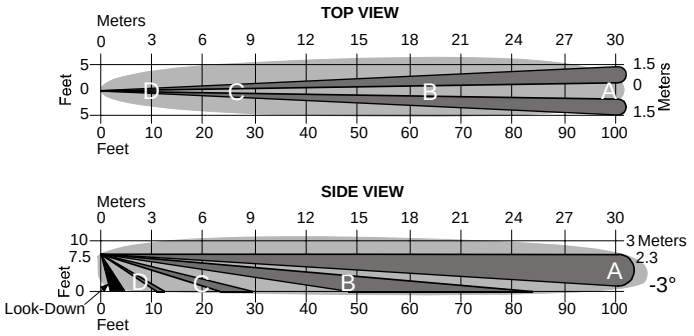
The DS860 has a standard broad coverage pattern or an optional long-range coverage pattern. The protected coverage area is where the microwave and PIR patterns overlap.

An optional Look Down lens is located under the detector. **This lens must be unmasked before it is operational. Use caution to remove the black mask only. Do not attempt to remove the white lens assembly.** The Look Down lens is **not recommended** for installations containing pets or small animals. The Look Down zone is shown in black on the Coverage Pattern drawings.

Standard Broad Coverage

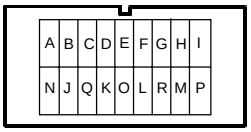


Long Range Barrier Coverage

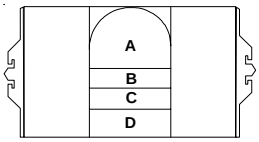


10.1 Pattern Masking

The PIR coverage pattern may be masked using masking tape or electrical tape on the inside (grooved side) of the lens to cover the appropriate pattern areas as shown in the following illustrations. Always walk test for the desired coverage after masking.



DS860 Standard Lens



Optional Long Range Barrier Lens

NOTE: Masking only eliminates the PIR portion of the coverage and has no effect on the microwave pattern.

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