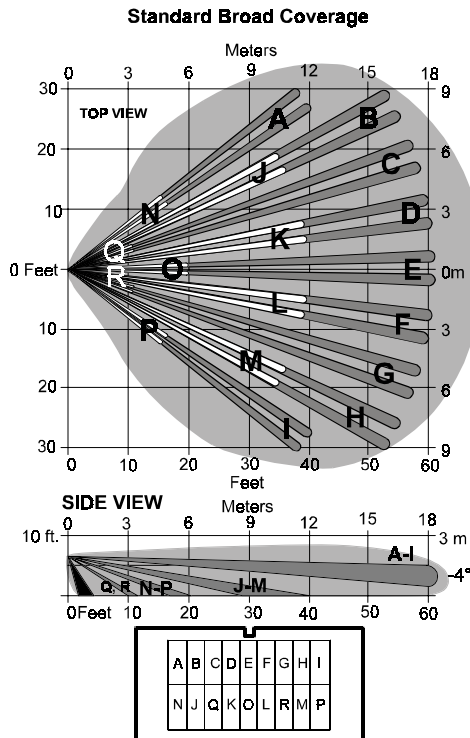




# QUEST 2160 Microwave/PIR Intrusion Detector

## Specifications

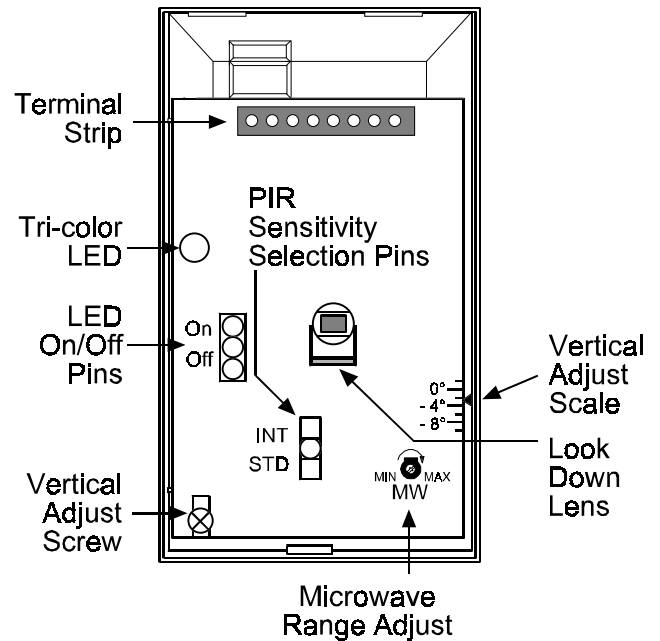
- Input Power:** 9 to 15 VDC, 16 mA DC nominal (up to 48 mA DC during walk testing or trouble conditions).
- Standby Power:** No internal standby battery. Connect to DC power sources capable of supplying standby power. Sixteen mA-H required for each hour of standby time needed.
- Alarm Relay:** Silent operating normally closed/common (Form A) reed relay. Contacts rated 3 watts, 0.125 amps, 28 VDC maximum for DC resistive loads, and protected by a 4.7 ohm, 1/2 watt resistor in the common "C" leg of the relay. *Do not use with capacitive or inductive loads.*
- Operating Temperature:** -40° to +120°F (-40° to +49°C). For U.L. Listed Requirements, the temperature range is +32° to +120°F (0° to +49°C).
- Microwave Frequency:** 10.525 Ghz ± 25.000 MHz.
- Coverage:** 60 ft. by 60 ft. (18 m by 18 m).
- Internal Pointability:** +2° to -10° Vertical, ±10° Horizontal.
- Tamper:** Normally Closed (with cover on). Contacts rated at 28 VDC, 0.125 A max. Connect tamper circuit to 24 hour protection circuit.
- Options:** QUEST SB2 swivel bracket (use of a bracket may reduce range and dead zone area).



**NOTE:** The protected coverage area is where the microwave and PIR patterns overlap.

## Installation Hints

- Never install the detector in a location that causes an alarm in one technology. Installations should start with the LED **OFF** when no target motion is present. Never leave it 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). **Remember:** 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. **Remember:** The PIR detector will react to objects rapidly changing temperature within its field-of-view.
- For hostile environments due to nearby traffic, mount the unit seven to eight feet (2 to 2.5 m) high and aimed downward. This will form a short-range interior trap pattern.
- Eliminate interference from nearby outside sources.
- The Look Down is located under the detector on the circuit board. The Look Down zone is shown in black in the pattern drawings. The Look Down lens is not recommended for installations containing pets or small animals. It may be masked with tape like the other zones.



## 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 six to eight ft. (1.8 to 2.4 m). **Recommended mounting height is 6-1/2 ft. (2 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 Adjustment screw and slide the circuit board down then out.
- Using the base as a template, mark the location of the holes on the mounting surface.
- Route wiring (unpowered) as necessary. Route to the rear of the base and through the wire entrance.
- Firmly mount the base to the mounting surface. Return the circuit board to the base and tighten the Vertical Adjust Screw.

## Wiring

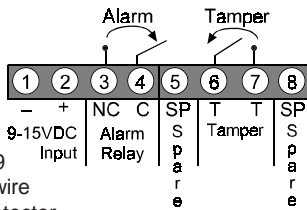


Apply power only after all connections have been made and inspected. Do not coil excess wiring inside the detector.

- **Terminals 1 (-) & 2 (+):** Voltage limits are 9 to 15VDC. Use no smaller than #22 AWG wire pair (500 feet/150m max) between the detector and the power source.
- **Terminals 3 & 4:** Alarm relay (reed) contacts rated at 3 watts, 0.125 amps, 28VDC maximum for DC resistive loads and protected by a 4.7 ohm, 1/2 watt resistor.

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

- **Terminals 5 & 8:** Spare.
- **Terminals 6 & 7:** Tamper contacts rated at 28VDC, 0.125A.
- **Plug the wire entrance hole with the foam plug that has been provided.**



## LED Operation

The detector uses a tri-color LED to indicate the various alarm and supervision troubles 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	Warmup period after power-up
Flashing red (4 pulse sequence)	Microwave or PIR failure. Replace unit.

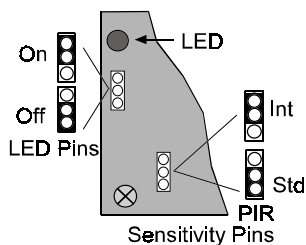
If the detector experiences a Microwave or PIR self-test failure, it is in need of replacement.

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.

## Feature Selection

**LED On/Off pins:** The ON position allows operation of the tri-color LED. If the tri-color LED indication is not desired after the setup and walk tests have been completed, place the plug in the OFF position.

**NOTE:** The OFF position does not prevent the tri-color LED from indicating a supervision trouble condition.



**PIR Sensitivity Selection Pins:** Selection of the PIR response sensitivity may be selected by placing the plug across the pins marked STD for standard or INT for intermediate mode.

**Standard Sensitivity:** This is the recommended setting for maximum false alarm immunity. It tolerates environment 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. It tolerates normal environments on this setting. This setting will improve your intruder catch performance.

## Set-up and Walk Tests

Select the vertical starting angle from the chart to the right.

Adjust the vertical starting angle for the desired mounting height and range.

- Place the LED plug in the ON position and replace the cover.
- **Wait at least two minutes**, after applying power, before starting walk tests.

**NOTE:** During the warm-up period, the tri-color LED will flash red until the unit has stabilized and has seen no movement for two seconds (approximately one to two minutes). 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, re-check the protection area for disturbances affecting the microwave (yellow) or PIR (green) technologies.

QUEST 2160	
Mounting Height	Broad
6.5 ft. (2 m)	-3°
7.5 ft. (2.3 m)	-4°
8.0 ft. (2.4 m)	-4°

## Establishing PIR pattern coverage

- Turn the Microwave range adjust to minimum.
- 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.
- 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. (3.1 to 6.1 m) from the unit. Repeat from above for the upper boundary. **The center of the pattern should not be tilted upward.**

If desired coverage can not 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.

**NOTE:** The pattern may be moved  $\pm 10^\circ$  horizontally by moving the lens window left/right.

## 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 10 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.

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 detection pattern boundaries.



## Establishing Detector Coverage

- With no motion in the protected area, 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.

## Supervision Features

The supervision features function as follows:

- **PIR/Microwave:** If the PIR or microwave subsystem fails, the tri-color LED will flash red four times per cycle. The complete circuit operation of these subsystems is checked approximately every 12 hours.
- **Default:** The detector will default to PIR technology protection if the microwave subsystem fails. When defaulting to PIR, the PIR signal processing will change from INT to STD.

## Other Information

**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.

**Pattern Masking:** The PIR coverage pattern may be masked using masking tape or electrical tape on the inside of the lens.

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

## To The Installer

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

The installer should assume the responsibility of developing and offering a repair 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 ensure the systems operation at all times.

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### WARNING

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

While this Intrusion Detector is a highly reliable intrusion 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 designated 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 cannot 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.
- The 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 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.

## **ADEMCO SIX YEAR 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 this PIR/Microwave Detector 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 72 months from the date stamp control on the product. Seller's obligation shall be limited to replacing, at its option, free of charge for materials and labor, a detector 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 detector is altered or improperly repaired or serviced by anyone other than Ademco factory service. In case of defect, return the detector to Ademco Distribution, Inc. or an authorized Ademco distributor for an immediate replacement.

THERE ARE NO WARRANTIES, EXPRESS OR IMPLIED, OF MERCHANTABILITY, OR FITNESS FOR A PARTICULAR PURPOSE OR OTHERWISE, WHICH SHALL EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF. IN NO CASE SHALL THE 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 detector may not be compromised or circumvented; that the detector will prevent any personal injury or property loss by burglary, robbery, fire or that the detector 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, fire or other events occurring without providing an alarm, 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 THAT THE DETECTOR 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 DETECTOR, WHICH SHALL BE THE COMPLETE AND EXCLUSIVE REMEDY AGAINST SELLER. This warranty replaces any previous warranties and is the only warranty made by the Seller on this detector. No increase or alteration, written or verbal, of the obligations of this Limited Warranty is authorized.



**ALARM DEVICE MANUFACTURING COMPANY**

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