

SRN-2000 SERIES

Professional All Purpose PIR Detector



Visonic Ltd

Installation Instructions

1. PRODUCT DESCRIPTION

1.1 Introduction

The SRN-2000 series employs an innovative approach by combining several different design techniques to **solve the industry's biggest problem - false alarms.**

By incorporating programmable pulse counter, coverage-range control adjustment, RF protection up to 1000 MHz, visible light rejection filter, maskable lens patterns, background noise test point and dual element low-noise pyroelectric detector, the SRN-2000 does more than give lip service - **it truly masters the false alarm problem.**

As the only PIR manufacturer in the world to produce its own Fresnel lens assemblies, Visonic Ltd. offers an outstanding variety of **45 easy-to-change lenses** - more than the entire combined industry competition.

Illustrated in the "**Super Red Lens Library:**"

- 9 wide-angle lenses up to 140°.
- 3 long-range corridors up to 120 ft.
- 6 pet alleys.
- 3 finger curtains.
- 8 lenses for combined ceiling and room coverage.
- 10 unique lenses for multiple 2-3 room and corridor coverage.
- 6 solid curtains.

The "Super-Red Lens Library" provides the most extensive selection of coverages and saves you **time and money in every installation.**

Flexibility takes on new meaning with the SRN-2000 series. With 45 interchangeable lenses, 30° vertical and horizontal adjustments, and surface, corner or flush mounting installation from 0 to 5 m (17 feet) height you know SRN-2000 is **the only universal PIR you can truly standardize on... without compromising!!!**

Other features include LED selector, anti-tamper switch, silent relay and a broad power supply range. A special material allows masking of specific beams to eliminate potential false alarm sources.

1.2 Features

SUPER-RED SRN-2000 series offers the following features:

Incomparable Flexibility:

- 30° Vertical and Horizontal Adjustments
- 0-5m (17 feet) Installation Height
- Visible Pattern Locator
- Surface, Corner and Flush Mounting
- Switchable Walk-Test Indicator
- N.C. Silent Relay
- Tamper Switch
- Low Current Drain 17mA
- 9-16 VDC supply voltage

False Alarm Immunity:

- **Programmable Pulse Counter (SRN-2000)** - to virtually eliminate environmental disturbances
- **Adjustable Coverage Range** - to adjust coverage range to room size
- **Unprecedented RF Immunity** - rejects RF interference up to 1000MHZ
- **Light Rejection Filter** - rejects visible light variations
- **Maskable Lens Patterns** - to block thermal disturbances
- **Test-Point** - to identify and eliminate background disturbances
- **Dual-Element Low-Noise Pyroelectric Detector** - rejects thermal variations with maximum signal to noise ratio.

Special features are available with other models. See para. 3.1.

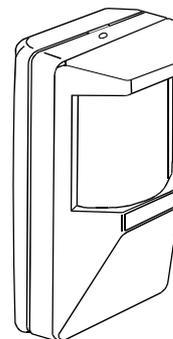


Figure 1 - Detector's view

2. SPECIFICATIONS

OPTICAL

Standard Lenses: SRN-2000 Lens No. 100
SRN-2020 Lens No. 100
SRN-2000H Lens No. 52
SRN-2000R Lens No. 55

Interchangeable Lenses: See SUPER-RED Lens Library

Adjustment: Vertical: +10° to -20° Calibrated scale.
Horizontal: up to 30°

ELECTRICAL

Voltage: 9 to 16 VDC

Current: 20mA

Relay output: Normally Closed (fail safe) contacts. 18 ohm resistor in series with contacts. Rating-0.1A resistive/24VDC.

Alarm period: 2-3 seconds

Tamper contacts: Normally Closed. Rating - 0.5A resistive/24 VDC

LED: Walk Test - (switchable)

Testing: Background noise Test Point

Detector: Dual-element low-noise pyroelectric detector

Coverage-Range Control: Adjustable from 100% to 50% of the nominal lens coverage range.

Pulse Counter: (model SRN-2000) Programmable to 1, 2 or 3 pulses with self-adjusting walk-test override.

MOUNTING

Wall or corner mounting. Optional bracket model SRF-201 for flush mounting.

ENVIRONMENTAL

Operating temperature: -10°C to 50°C (14°F to 122°F).

Storage temperature: -20°C to 60°C (-4°F to 140°F).

RFI Protection: No alarm when tested on 21 different frequencies from 20 to 1000 MHz with 20 Watts radio transmitter at 1.2m (4 ft) distance or 124 Watts at 3m (10 ft) distance (corresponds to field strength of 20V/m).

PHYSICAL

Dimensions: 70 x 120 x 48 mm (2.7 x 4.7 x 1.9 in)

Weight: 140 g (4.5 ounces).

Colors: white.

3. MODELS AND LENSES

3.1 Super Red SRN-2000 Models

SRN-2000: Standard model, with pulse counter.

SRN-2020: Similar to SRN-2000, but without pulse counter.

SRN-2000H: Horizontally mounted PIR provides the largest Solid Curtain coverage 18x18m (60x60 ft) and five interchangeable

lenses. See Lens Library.

SRN-2000R: Ceiling mounted PIR provides maximum 6x18m (20x60 ft) floor coverage when mounted at 6m (20 ft) height.

SRN-2000M: Similar to SRN-2000, but with additional alarm latching memory for multiple PIR installation on a single zone.

SRN-2000PC: Equipped with a programmable pulse counter - up

to 9 pulses within one minute.

SRN-2000C: 9 Volt battery-operated PIR, providing the lowest standby current drain - 0.004mA. Designed to operate with virtually all wireless transmitters on the market.

SRN-2000CH: Horizontally mounted, battery-operated PIR (similar to SRN-2000C), providing same Solid Curtain patterns as SRN-2000H.

SRN-2000CR: Ceiling mounted, battery-operated PIR (similar to SRN-2000C), with same coverage pattern as SRN-2000R.

SRN-2000W: Self-contained fully supervised wireless PIR, with built-in RF transmitter.

3.2 Lens Selection

Coverage

Lens No. 100 is the standard pattern supplied with SUPER-RED SRN-2000 and SRN-2020 sensors (not applicable to models SRN-2000H, R, CH, CR).

Printed circuit board elevation scale is factory preset at -5° For application of PCB elevation scale, see Table 1.

Lens No. 100 Specifications

Total Number of Beams: 36

3 Layers: Upper, Intermediate and Downward.

Upper Layer - 9 twin beams, optically split to 18 beams.

Intermediate Layer - 5 twin beams (split), angled 10° below Upper Layer

Downward Layer - 4 twin beams (split), angled 25° below Upper Layer.

Angle span: 90° Wide Angle.

Coverage range: maximum 18x18m (60x60ft).

If the standard No. 100 lens does not meet your coverage requirements, refer to the **SUPER RED LENS LIBRARY** and select the pattern you need. Your nearest VISONIC LTD. distributor will be glad to supply you with any lens that suits your particular requirements.

LENS LIBRARY

SUPER-RED offers a selection of more than 45 lenses to provide the best coverage pattern for any installation.

The SUPER-RED LENS LIBRARY is divided into the following nine sections:

Section 1: Corner Mounting Wide-Angle 90° - 100°.

This section comprises six lenses which provide the maximum room coverage, when the PIR is installed in the corner.

Section 2: Ultra-Wide-Angle 120° -140°.

This section comprises three lenses which provide the largest and widest room coverage in applications where the PIR is wall mounted or flush mounted.

Section 3: Pet-Alleys.

This section comprises six lenses featuring a single horizontal beam layer which allows pets to move under the coverage pattern, undetected.

Section 4: Long-Range Corridors up to 36 m (120 ft).

This section comprises three lenses specially designed for long range and narrow areas such as corridors, aisles and long walls.

Section 5: Multiple Room and Corridor Coverage.

This section comprises ten lenses, each providing a combination coverage of one or two Long-Range corridors and one or two Wide-Angle rooms simultaneously, using a single PIR.

Section 6: Combined Ceiling, Stair and Room Coverage.

This section comprises eight lenses providing multiple coverage of ceiling and stairs in addition to the normal room area coverage.

Section 7: Finger Curtains.

This section comprises three lenses providing coverage of multiple vertical Finger Curtains which may be used to prevent access from two walls simultaneously and detect movement through curtains located in the area between the walls.

Section 8: Lenses for Energy Management PIRs.

This section comprises four high density lenses specially designed for use with models SRN-2000E, ET and EF in Energy Management applications.

Section 9: Solid Curtain PIRs.

This section comprises five lenses specially designed for models SRN-2000H and SRN-2000CH, providing various types of Solid Curtain coverages.

3.3. SRN-2000H

SOLID CURTAIN PIR

Description

The SRN-2000H is a horizontally mounted PIR which provides a variety of Solid-Curtain coverages. The unit may be used to provide wall and large show window coverage or as an internal invisible barrier to detect movement between two areas. Lens No. 52 is the standard lens supplied with SRN-2000H.

Fitted with lens No. 52 this unit produces a solid curtain coverage extending out from the mounting wall to the opposite wall-up to a maximum of 18m (60 ft) and down to the floor (Fig. 3).

A Pet-Alley curtain can be created by installing the SRN-2000H near the floor; angle the unit 45 towards the ceiling. The height of the curtain from the floor can be adjusted precisely by rotating the lens.

In addition to lens No. 52, Visonic offers several interchangeable lenses providing coverage combinations of solid curtains and beams. For more details refer to SUPER RED LENS LIBRARY

Mounting

The SRN-2000H should be mounted horizontally on its angular shaped back, pointing to the floor at a declination of 45°.

The preferred location is at the wall-to-ceiling juncture. Wall or ceiling mounting is also possible as long as the 45° angle is maintained. (Fig. 5).

The unit can be mounted at any height up to 18 m (60 ft), providing the largest curtain coverage on the market -18x18 m (60x60 ft). All lenses, except lens No. 52, require mounting the unit with the lens to the left (when facing the unit).

Adjustment

The curtain coverage can be adjusted 10 to left or right by sliding the printed circuit board against the graduated scale. Vertical adjustment of ±15° is provided by rotating the lens (applicable for lens No. 52 and 56 only). In other regards, the SRN-2000H is virtually identical to the SRN-2020.

3.4 SRN-2000R

CEILING MOUNTED PIR

The SRN-2000R is a ceiling mounted PIR.

Fitted with lens No. 55, the unit produces four finger curtains projected from the ceiling, down to the floor.

When mounted at 3m (10ft) height the unit provides a pattern of 3x9m (10x30 ft) maximum (measured at floor level).

The maximum recommended mounting height is 6m (20ft) providing a floor coverage area of 6x18m (20x60 ft) maximum.

In all other regards, the SRN-2000R is virtually identical SRN-2000H.

3.5 Changing Lenses

To change or adjust a lens release and remove lens retainers located on both sides of the by pushing them from the inner side of cover (Fig. 7). Insert a new lens with the grooved surface facing out and the lens number in the upper right corner.

From inside the cover, carefully center the lens by sliding it right or left, until it edges protrude equally at both sides.

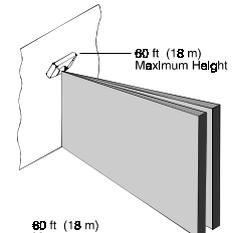


Figure 3 - Curtain Coverage-Lens No. 52

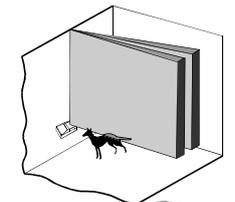


Figure 4 - Pet-Alley Curtain - Lens No. 52

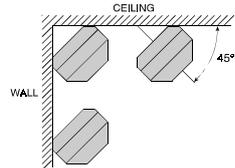


Figure 5 - SRN-2000H Mounting Alternative

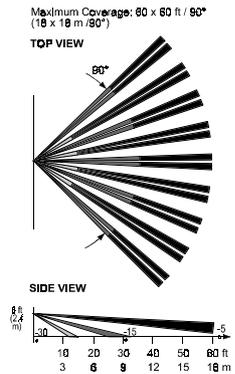


Figure 2 - Coverage Pattern-Lens No. 100

Holding the lens firmly in place, insert the lens retainers from the front (ridges pointed outward) and firmly push them into place until a click is heard (Fig. 8).

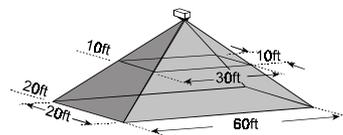


Figure 6
SRN-2000R Coverage Pattern

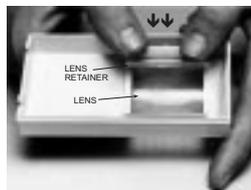


Figure 7. Lens Retainer Removal

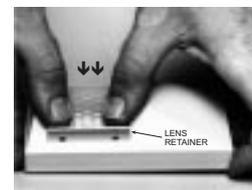


Figure 8. Locking the Lens in Place

4. INSTALLATION

4.1. Selecting Mounting Location

SUPER RED passive infrared detector can be mounted directly onto the wall (surface mounted), or in a corner. It may also be flush mounted, using optional flush mounting bracket SRF-201 (Fig. 9). Always mount the unit on a firm and stable surface.

- A.** Select the mounting location so that the expected motion of an intruder will cross the beams of the coverage pattern provided by the lens in actual use.

It is recommended to aim the PIR detector toward the coolest place in the protected area, in order to obtain the maximum sensitivity where high ambient temperatures are expected.

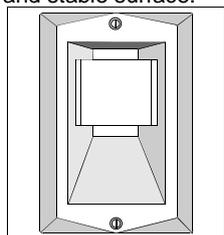


Figure 9. Flush mounting bracket SRF-201

- B.** Select the most **convenient** mounting height.

You may mount the unit anywhere from ground level up to 5 m (17 ft). An accurate adjustment table determines the recommended angle for any combination of range and mounting height (see Table 1). Take into account that installations at increased height result in larger blind areas close to the detector.

- C.** Where a single-layer pattern has been selected because pets are present, it is recommended that the detector be installed at the lowest possible height allowing the beams to be directed above the level of the pet's activity.

- D.** SUPER RED is extremely immune to air turbulence and RF interference. However, to minimize false alarms, it is highly recommended to avoid aiming the detector at heaters, sources of bright light, or windows subjected to direct sunlight. Also avoid running wiring close to high power electrical cables.

4.2 Mounting

- A.** To open the cover, insert a small screwdriver into the slot on top of the unit and press down lightly. The cover (equipped with the lens) hinges outward and removes easily.

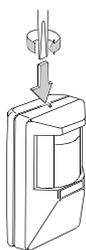


Figure 10 - Removing cover

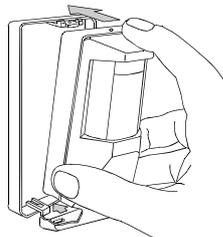


Figure 11 - Replacing cover

- B.** Mount the base (equipped with the printed circuit board) in the location and height selected for optimum coverage.

For surface mounting use the two knockout holes at the back of the base; for corner mounting, use the knockouts on the angled sides. The unit must be fastened tightly to the mounting surface to avoid possible vibrations.

- C.** To close front cover (after wiring), insert the legs located on the bottom of the base into their respective slots in the bottom of the cover and close by exerting slight upward pressure.

4.3 Wiring

- A.** For wiring the system use #22 AWG or larger wires. Maximum wiring length between the unit and its power source depends on the number of units connected in parallel and the

wire gauge. The following table provides the maximum wiring length for a single unit, using different gauge wires.

Wiring Gauge	22	20	18	16
Wiring length (ft)	750	1100	1800	3000
Wiring length(m)	230	330	550	900

If two or more units are connected in parallel, the maximum wiring length described in the table should be divided by the number of units.

- B.** To route the wires into the sensor use either the wiring knockouts or one of the lower mounting holes.
- C.** Make no splices within the unit and avoid contact between uninsulated conductors and the printed circuit board.

- D.** Connect wires to terminal block in the following order (Fig.12):

- Connect **Tamper N.C.** terminals to a normally closed 24-hour protection zone of the control panel. Tamper contact will open when cover is removed.

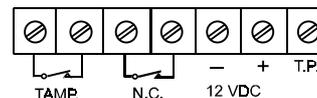


Figure 12 - Terminal Block Wiring

- Connect **Relay N.C.** terminals to a normally closed burglar protection zone of the control panel.

Relay contacts will open when an intruder is detected or during power loss.

The relay contacts are rated at 100 mA, 24 VDC maximum (resistive load only). An 18-ohm resistor is internally connected in series to the relay contacts.

- Connect the **12VDC (+) and (-)** terminals to a 9 to 16 Volt DC power source and check for correct polarity.

The power source should have a back-up battery that is capable of supplying power for at least four hours of operation, during power failure. Current drain of each sensor is approximately 17mA.

- E.** Seal all openings in the base with tape or RTV to prevent insects from entering the unit.

4.4 Adjusting the Coverage Area

SUPER-RED provides you with the most powerful tools for quick, easy and accurate pattern adjustments.

The coverage-range control adjustment, LED selector, horizontal adjustment, vertical calibrated scale adjustment, vertical adjustment table and beam masking material are all unique features which enable precise pattern positioning, both vertically and horizontally.

LED selector

The LED selector consists of a pin connector and jumper to switch the walk-test LED either ON or OFF.

Horizontal Adjustment

SUPER-RED coverage pattern can be adjusted horizontally approximately $\pm 15^\circ$ by rotating the lens to the left or right.

To adjust the lens, remove the lens-locking devices, rotate the lens carefully to the desired position and lock the lens.

Vertical Adjusting Scale

The vertical scale adjustment (printed on left side of the P.C. board) and the plastic pointer on the base indicate (in degrees) the vertical angle between the upper layer of the coverage pattern and the horizontal line of the unit.

Table 1 gives the optimum scale adjustment for various combinations of mounting height and coverage range (indicated in feet and meters).

The scale enables pattern adjustment from +10° upward to -20° downward, according to the installation height and the required coverage range. All SUPER-RED sensors are shipped from our factory pre-set to -5° (downward).

To change vertical-pattern adjustment, loosen the screw which fastens the printed circuit board to the base.

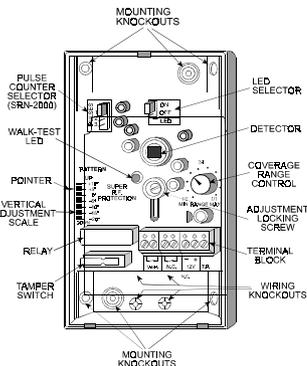


Figure 13-Printed Circuit Board

Slide the P.C. board up/down to desired angle and tighten screw.

Table 1 - Vertical Adjustment Scale

Mounting Height	Coverage Range															
	7	10	13	17	20	23	26	30	33	40	50	60	80	100		
ft ⇒	2	3	4	5	6	7	8	9	10	12	15	18	24	30		
↓ m	0.6	0.9	1.2	1.5	1.8	2.1	2.4	2.7	3.0	3.6	4.5	5.4	7.2	9.0		
2	0.6	+8°	+6°	+5°	+4°	+3°	+2°	+2°	+2°	+1°	+1°	+1°	0°	0°		
3	1	0°	0°	0°	0°	0°	0°	0°	0°	0°	0°	0°	0°	0°		
4	1.2	-8°	-6°	-5°	-4°	-3°	-2°	-2°	-2°	-1°	-1°	-1°	0°	0°		
5	1.5	-16°	-12°	-9°	-7°	-6°	-5°	-5°	-4°	-4°	-3°	-2°	-1°	-1°		
6	1.8	-	-18°	-14°	-11°	-9°	-8°	-7°	-6°	-5°	-4°	-3°	-2°	-2°		
7	2	-	-	-18°	-13°	-12°	-10°	-9°	-8°	-7°	-6°	-5°	-4°	-3°		
8	2.5	-	-	-20°	-17°	-15°	-13°	-11°	-10°	-9°	-7°	-6°	-5°	-4°		
10	3	-	-	-	-20°	-18°	-16°	-14°	-12°	-10°	-9°	-7°	-5°	-4°		
12	3.6	-	-	-	-	-	-18°	-17°	-15°	-12°	-10°	-9°	-7°	-5°		
14	4.2	-	-	-	-	-	-	-20°	-18°	-15°	-13°	-10°	-8°	-6°		
17	5	-	-	-	-	-	-	-	-20°	-17°	-14°	+0°	-8°	-		

Example: If you require coverage range of 40 ft (12 m) and wish to install the sensor at a height of 6 ft (1.8 m) from the ground, set the Vertical Adjustment Scale to -5°.

Coverage-Range Control Adjustment

The potentiometer - marked "RANGE" on the P.C. board - should be set according to the actual room size, relative to the lens's range coverage specification.

For example, if you are using lens No. 100 (which is specified for 60 ft) in a 30 ft room, set the range control to 1/2 (30/60 = 1/2).

In installations requiring maximum detection sensitivity or when hot ambient temperatures are expected, it is recommended that the range control potentiometer be set to maximum.

Beam Masking Material

A special beam-masking material supplied with each SUPER-RED sensor can be used to mask individual segments in the lens array which are exposed to potential sources of false alarm (heaters, blowers, pets, etc).

The material is transparent to visible light but blocks any infrared energy. To block individual beam(s), locate the corresponding segment(s) in the array. Cut the masking material to the exact dimensions of the segment(s) to be blocked, remove the backing paper and apply the masking material accurately to the inside (smooth) surface of the appropriate segment(s). In some cases, more than one layer of the lens masking material may be required to completely block the infrared energy.

4.5 Setting the Pulse Counter (model SRN-2000 only)

Model SRN-2000 is equipped with a programmable pulse counter which can be set to count 1, 2, or 3 pulses, before activating the alarm relay. To set the pulse counter, place the jumper on the desired setting (1,2 or 3.)

3 Pulses: This setting provides the maximum protection against false alarms caused by all types of environmental disturbances.

Three pulses may be selected for all applications where wide-angle, multi-beam lenses are used - such as illustrated in Sections 1, 2, 3, 6 and 7 of the SUPER-RED Lens Library (except lens No. 53). When the pulse counter is set to 3, no alarm will sound unless the unit registers three pulses within approximately one minute. This ordinarily requires crossing more than one beam. (Each dual-beam produces two pulses. One additional beam element is needed to provide the third pulse.)

Note: Three pulses should never be used with lens No. 53 or with the long-range lenses in Sections 4 and 5 of the Lens Library.

2 Pulses: This setting can be used to increase the sensor's immunity to false alarms when long-range or low-density lenses (which normally require one pulse setting) are used. Two pulses should be used only in cold or temperature-controlled locations and when actual room size is much less than the range specified for the lens in use. Otherwise, one pulse should be selected.

1 Pulse: This setting actually disables the pulse counter. It should be used when it is necessary to activate an alarm on the first detected pulse, such as with long-range lenses.

One pulse should be selected when using the long-range lenses illustrated in Sections 4 and 5 of the Lens Library, lens No. 53 or in high-security installations when fast "catch" performance is of highest importance.

Self-Adjusting Walk-Test Override

The unique pulse counter incorporated in the SRN-2000 features an automatic override to single-pulse mode during walk-testing. After alarm signaling, the pulse counter converts automatically to single-pulse setting for several seconds. During this time period each detection pulse will activate an immediate alarm.

This feature enables convenient walk-testing of each beam in the coverage pattern - exactly as for a unit without a pulse counter.

Two minutes after the end of walk-testing, the pulse counter returns automatically to its original setting and is ready for a new counting sequence.

4.6 Final Testing

- Apply 12 VDC power and allow five minutes for the unit to stabilize before testing.
- Adjust the vertical-pattern angle according to Table 1.
- Set the LED selector to ON and replace the cover.
- Set the pulse counter (SRN-2000) according to Section 4.5.
- Walk-test the entire protected area by walking slowly across the coverage-pattern beams while observing the LED. The LED lights up whenever you cross a protective beam. Allow two seconds between each test for the unit to restabilize.
- MASK beams which face potential sources of false alarms. (See Section 4.4).
- If desired, disable the LED by setting LED selector to OFF.

4.7 Test Point (T.P.)

The test point T.P. terminal provides a good means for analyzing the sensor in the event of an environmental problem or suspicion of a faulty sensor. Using a DC voltmeter (20K ohms per Volt), connect its positive lead to the T.P. terminal and the negative lead to the (-) VDC terminal. See Figure 12.

For easy testing, temporarily connect two wires to these terminals and route them out of the unit. The meter can then be connected to the wires. Set the meter to 5 VDC range and completely cover the lens array, using a piece of cardboard so that motion cannot be detected. The meter should indicate approximately 2.0 VDC. If the meter indicates more than 2.3 VDC or less than 1.7 VDC, the unit should be replaced.

Uncover the lens and allow the meter to stabilize; do not move. Any motion into or out of a detection beam or an environmental disturbance which affects the PIR will cause the meter to deflect above or below the 2.0 volt level. Meter variations of more than ±1 volt (i.e. above 3.0 volt or below 1.0 volt), will trigger an alarm.

4.8 Maintenance

The proper operation, range and the coverage pattern of the unit should be checked at least once a year according to Section 4.6 "Final Testing." To assure proper continuous operation, the end user should be instructed to walk through the entire coverage pattern and to assure an alarm output, each time, before the alarm system is armed.



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