1. INTRODUCTION

The SRN-2000 series of passive infrared detectors presents a technological break-through that is revolutionizing the PIR industry. The SRN-2000 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 40 easy-to-change lenses - more than the entire combined industry competition.

2. FEATURES

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

Incomparable flexibility:
- 30° vertical and horizontal adjustments
- 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 - to virtually eliminate environmental disturbances.
- Adjustable coverage range
- Unprecedented RF immunity – rejects RF interference up to 2000 MHz.
- 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 Section 3.

3. SUPER-RED SRN-2000 MODELS

SRN-2000: Standard model, with pulse counter.
SRN-2000 C/PC: Same as SRN-2000 but with a change-over relay contact (Form-1C).

SRN-2000 UL: Same as SRN-2000 but with UL compliance.

4. LENS SELECTION

Coverage

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 60 ft (18 m) radius.

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.

For UL installations, use only UL approved lenses listed at the end of Section 4.

LENS LIBRARY

SUPER-RED offers a selection of more than 40 lens patterns 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 120 ft.
This section comprises three lenses especially 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 coverage.

Lenses to be used for UL installations.
Lenses No. 30, 34, 41, 43, 45, 47, 76, 100, 102, 104. For coverage patterns, see Section 16 – “UL Lens Library”.

5. CHANGING LENSES
To change or adjust a lens, release and remove the lens-locking devices located on both sides of the lens by pushing them from the inside of the cover.

Insert new lens with the grooved surface outside and lens number held on the upper right corner. From inside the cover, carefully center the lens by sliding it to the right or left; the lens is centered when the distance from its side edge to the edge of the cover is the same on each side of the cover. Holding firmly in place, insert locking devices from the outside (ridges pointed outward) and firmly push into place until a click is heard.

6. SELECTING MOUNTING LOCATION
The 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 the optional flush mounting bracket SRF-201 (see Fig. 4). An optional PIR mounting bracket BR-1 is also available; see Section 8 and Fig. 7. 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 selected pattern.

Remember: Passive infrared detectors are sensitive to changes in infrared energy caused by an object moving across the unit’s field of view. Since the changes in infrared energy, detected by a PIR, depend on the amount of infrared energy transmitted by the moving object and the temperature difference between the object and the background, the PIR may fail to respond under certain temperature and background conditions, in which the temperature difference is too small. It is therefore recommended that the PIR be aimed towards the coolest place in the protected area, in order to obtain the maximum sensitivity in installations where high ambient temperatures are expected.

B. Select the most convenient mounting height. An accurate adjustment table determines the recommended angle for any combination of range and mounting height (see Table 1). Take into consideration that unprotected areas exist directly above and below the detector and increases when covered area is increased.

C. Where a single-layer pattern has been selected because pets are present, it is recommended that the sensor 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 RFI interference. However, to minimize any possible 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.

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

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 the 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.

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8. BR-1 PIR MOUNTING BRACKET

The BR-1 is a general purpose, adjustable mounting bracket which accommodates the SRN-2000. The BR-1 is installed on a wall. It is vertically adjustable 30° downward and horizontally 45° left, 45° right (see Figure 7).

9. WIRING

A. For wiring the system use # 22 AWG or larger wire. The 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 numbers.

<table>
<thead>
<tr>
<th>Wiring Guage</th>
<th>22</th>
<th>20</th>
<th>18</th>
<th>16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wiring Length (ft)</td>
<td>750</td>
<td>1100</td>
<td>1800</td>
<td>3000</td>
</tr>
</tbody>
</table>

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 board.

D. Connect wires to the terminal block in the following order. (Refer. to Figure 8).

- 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.
- 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.

Note: Model SRN-2000 C/PC provides changeover Form – 1C relay contacts (i.e. N.C + N.O).

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

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

The UL listed control unit or power source should have a back-up operation, during power failure. The maximum current drain of each sensor in standby is approximately 20mA.

10. 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 ±15° by rotating the lens to the left or right. To adjust the lens, remove the lens-locking devices (see Section 5), 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 table should be used only to the maximum coverage range of the selected lens, as indicated in the Lens Library.

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 -3°.

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Figure 7. BR-1 Universal Adjustable PIR Mounting Bracket

Figure 8. Terminal Block Wiring

Figure 9. Printed Circuit Board
Coverage Range-Control
The coverage range control - marked RANGE may be used to eliminate false alarms in special harsh environments. For optimal detection sensitivity it is recommended that the range control always be set to maximum (1/1). The range should only be reduced when a false alarm problem cannot be corrected by lens masking or repositioning the unit and only when the coverage range is less than 1/2 of the maximum range. After changing the coverage range, walk test the entire coverage area.

11. SETTING THE PULSE COUNTER
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 two minutes. 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.

Warning: For UL certificated installation, a pulse count of 3 may be used only with lens No. 100. With pulse count setting of 3, a 5 to 7 step movement may be required to trigger the PIR at a range of more than 40ft.

12. FINAL TESTING
A. Apply 12 VDC power and allow five minutes for the unit to stabilize before testing.
B. Adjust the vertical-pattern angle according to Table 1.
C. Set the LED selector to ON and replace the cover.
D. Adjust the vertical-pattern angle according to Table 1.
E. 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.
F. Make sure beams which face potential sources of false alarms (see Section 10).

Warning: After walk testing, disable the LED by setting the LED selector to OFF.

13. 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 (20 k ohms per volt), connect its positive lead to the T.P. terminal and the negative lead to the (-) 12 VDC terminal. See Fig. 8.

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 ± 1 volt (i.e. above 3.0 volt or below 1.0 volt) will trigger an alarm.

14. MAINTENANCE
The proper operation, range and the coverage pattern of the unit should be checked at least once a year according to Section 12 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.

15. SPECIFICATIONS

OPTICAL:
Standard Lenses: SRN-2000 lens No. 100
Interchangeable Lenses: -see SUPER-RED Lens Library

Lens to be used for UL installations: Lens No. 100
Adjustment: Vertical +10° to -20° calibrated scale. Horizontal up to 30°.

ELECTRICAL:
Voltage: 9 to 16 VDC
Current: 20 mA

Relay output: Normally closed (fail safe) contacts. 18 ohm resistor in series with contacts. Rating -0.1A resistive/24 VDC.
Model SRN-2000 C/PC provides Form-1C contacts.
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 pyro-electric detector.
Pulse counter: (model SRN-2000) Programmable to 1, 2, or 3 pulses with self-adjusting walk-test override.

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.
Note: For UL certificated installation, a pulse count of 3 may be used only with lens No.100 – see Section 11.

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

**BR-1 PIR Mounting Bracket**
Vertically adjustable 30° downward. Horizontally adjustable 45° left, 45° right.

**ENVIRONMENTAL**
Operating temperature: 0° C to 49° C (32° F to 120° F)
Storage temperature: -20° C to 60° C (-4° F to 140° F)

**PHYSICAL**
Dimensions: 2.7x4.7x1.9 inch (7x12x4.8 cm)
Weight: 4.5 ounces (0.14 Kg)
Color: White

## 16. UL LENS LIBRARY

The following lenses may be used for UL certificated installation.

**Note:** The arrow ▲ on the pattern graph indicates the dead zone of the detector which extends from the mounting surface to the location indicated by the arrow.

### Section 1: Corner mounting

**Wide-Angle 90°**
Lens No. 100 is the standard lens supplied with model SRN-2000. It provides maximum room coverage in applications where the PIR is installed in the corner.

Lens No. 100 may be used for general purpose applications providing 90° field of view with maximum coverage of 60 ft.

**No 100**
- No of Beams: 36
- Field of View: 90°
- Maximum Coverage: 60 ft

### Section 2: Ultra-Wide-Angle

**140°**
Lens No. 76 provides the largest and widest room coverage in applications where the PIR is wall mounted or flush mounted.

Lens No. 76 provides 140° Ultra-Wide-Angle field of view and maximum coverage area of 40x80 ft.

**No 76**
- No of Beams: 36
- Field of View: 140°
- Maximum Coverage: 40x 80 ft

### Section 3: Pet-Alley

Lens No. 102 consists of a single horizontal beam layer which allows pets to move under the coverage pattern undetected.

For optimum coverage throughout the protected area and for minimum dead zones, this lens requires mounting the PIR from 2.5 to 5 ft height and adjusting the coverage pattern carefully above the maximum expected height of the pets activity.

Lens No. 102 can be used for corner mounting providing 90° field of view and maximum coverage range of 60 ft.

**No 102**
- No of Beams: 18
- Field of View: 90°
- Maximum Coverage: 60 ft

### Section 4: Long Range 100 to 120 ft.

Lenses No. 30 and 34 are specially designed for long and narrow areas such as corridors, aisles and long walls.

Lens No. 30 provides long corridor coverage up to 120 ft. For optimum coverage, this lens requires a mounting height of to 2.5 to 4 ft.

**No 30**
- No of Beams: 4
- Field of View: 6°
- Maximum Coverage: 10 x 120 ft

**No 34**
- No of Beams: 16
- Field of View: 90°
- Maximum Coverage: 10 x 100 ft

### Section 5: Multiple Room and Corridor Coverage

This group of lenses provide maximum economy in installation costs by producing unique coverage patterns which otherwise can be achieved only with 2 or 3 PIRs. Each lens in this group provides a combination coverage of Long-Range corridors and Wide-Angle rooms simultaneously – using a single PIR.

**No 41**
- No of Beams: 28
- Field of View: 90°
- Maximum Coverage: 10 x 100 ft Beam

**No 41**
- No of Beams: 28
- Field of View: 90°
- Maximum Coverage: 10 x 100 ft Beam
Section 6: Combined Ceiling and Room Coverage

Lens No. 104 is a unique lens providing an "Upward looking" ceiling coverage in addition to the "down-looking" room coverage. The "upward looking" pattern is directed approximately 20° above the main layer providing a 90° field of view with maximum coverage of 30 ft. For optimum coverage, lens No. 104 may be used for corner mounting providing a 90° field of view with maximum room coverage of 45 ft.

To avoid possible false alarms, lenses with Upward-Looking beams are recommended not to be used where air conditioning vents, ducts, or other potential sources that may produce rapid temperature changes, are located in the ceiling.