

# SRN-2000E SERIES

Energy Management PIR Detectors



Visonic Ltd

Installation Instructions

## 1. INTRODUCTION

Visonic Ltd., a leader in passive infrared technology, has developed a broad line of energy management PIR sensors for lighting and air conditioning control. The line includes three models of PIR sensors based on the popular SRN-2000 passive infrared detector. The energy management PIRs have the same outstanding lens selections of the standard SUPER RED series, with extended coverage and sensitivity. This includes the choice of over forty different lenses from the SUPER-RED LENS LIBRARY. Lens No. E-15 is the standard lens fitted on these energy management detectors (see Figure 1).

### 1.1 Features

The SRN-2000E series offers many of the same features as the SRN-2000, including:

- 30° vertical and horizontal adjustment.
- Visible beam locator ability
- Surface, corner, flush and swivel bracket mounting.
- Switchable LED alarm indicator
- Form-C relay
- 9 – 16 VDC supply voltage

### 1.2 Models Available

**SRN-2000E:** Incorporates a sensitivity adjustment facility for sensitivity adjustment of up to 6.5 times that of a standard PIR. Upon detection, a fixed timer maintains the output relay energized for 2-3 seconds.

**SRN-2000ET:** Has all the features of the SRN-2000E with the addition of an adjustable timer (0.5 seconds to 20 minutes) and a load selector (Air-conditioning/Lighting).

**SRN-2000EF:** Similar to the SRN-2000ET, with timer adjustment between 4 seconds and 20 minutes and the addition of a photocell to inhibit relay operation during daylight conditions (adjustable).

### 1.3 Lens Selection

All the lens patterns illustrated in Sections 1 through 7 of the SUPER-RED LENS LIBRARY can be used with the energy management models.

In addition, Visonic Ltd. provides 2 ultra-high density lenses (No. 18 and 51) which may detect (at maximum sensitivity) very slight movements, and control the room air-conditioning system.

Lens No. E-15 is the standard lens supplied with these models. It provides a high-density pattern of 100 degrees and maximum coverage of 37.5 x 37.5 m (125 x 125 ft) (at maximum sensitivity). Lens No. 52 may be used in applications such as concert halls, theaters or meeting rooms where the unit can be mounted and the pattern adjusted slightly above and parallel to the seats for maximum coverage and sensitivity.

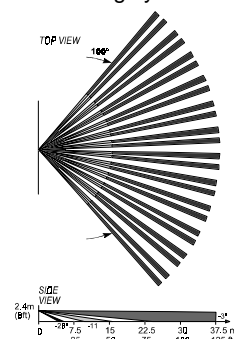
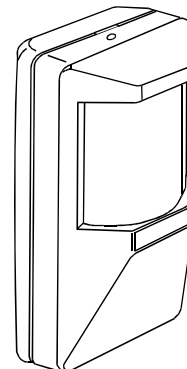


Figure 1. Lens No. E-15 Coverage Pattern (at maximum sensitivity)

## 2. SPECIFICATIONS

### OPTICAL

**Standard Lens:** Lens No. E-15 provides a 100° wide angle pattern comprising 58 beams in 3 detection layers. 37.5 x 37.5 meter (125 x 125 ft.) coverage at maximum sensitivity.

**Interchangeable Lenses:** E-15, E-18, E-52, E-51. Refer to lens library for complete description.

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

### ELECTRICAL

**Voltage:** 9 - 16 VDC.

**Current Drain:** 45 mA max. (relay energized)  
7 mA max. quiescent current

**Relay Output:** Form C contacts (normally open, normally closed), rated 5A resistive/24 VDC.

**Relay "ON" Timer:**

**SRN-2000E:** Fixed, 2-3 seconds

**SRN-2000ET:** Adjustable, 0.5 sec. to 20 minutes.

**SRN-2000EF:** Adjustable, 4 sec. to 20 minutes

**LED:** Walk Test - (switchable).

**Testing Facility (T.P.):** Background noise test point.

**Detector:** Dual-element low-noise pyroelectric sensor.

**Sensitivity Control:** Adjustable, up to 2.5 times normal range.

### MOUNTING

Wall or corner mounting. BR-1 swivel mounting bracket and SRF-201 flush mounting bracket optional.

### ENVIRONMENTAL

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

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

**RFI Protection:** Greater than 20 V/m to 1000 MHz.

### PHYSICAL

**Size(H x W x D):** 120 x 70 x 48 mm (4-3/4 x 2-3/4 x 1-7/8 in).

**Weight:** 140 g (4.5 oz).

**Color:** White.

### MODELS AVAILABLE (Para. 1.2)

**SRN-2000E** - Standard model with fixed timer (2-3 sec.)

**SRN-2000ET** - with 0.5 sec to 20 min timer and load selector.

**SRN-2000EF** - with 4 sec to 20 min timer, load selector and daylight sensor

### ACCESSORIES

**BR-1:** Universal swivel PIR mounting bracket.

**SRF-201:** Flush mounting bracket.

**ENER-300 Series:** Switching modules which integrate with the detector for switching high-current loads (lights and air-conditioners).

# 3. INSTALLATION

## 3.1. Changing Lenses

To change or adjust a lens, remove the front cover of the detector, as explained in para. 3.3. Release and remove the lens retainers located on both sides of the lens by pushing them from the inner side of the cover (Fig. 2).

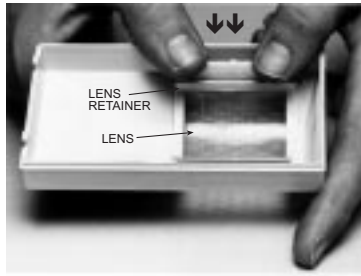


Figure 2. Lens Retainer Removal

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.

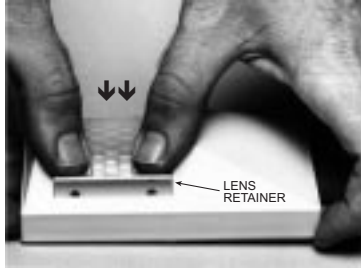


Figure 3. Locking the Lens in Place

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. 3).

## 3.2. Selecting a Mounting Location

Units of the SRN-2000E series can be mounted directly onto the wall (surface mounted) or mounted in a corner. An optional swivel bracket is also available. They may also be flush mounted using the optional flush mounting bracket SRF-201. Whatever the method, mount the unit on a firm and stable surface.

A. Select a mounting location so that the expected motion within the area will cross the beams of the selected pattern.

**NOTE:** Passive infrared detectors are sensitive to changes in infrared energy caused by an object (of a different temperature than the background) moving across the unit's field of view.

B. Select the most convenient mounting height. The flexible features of the SRN-2000E series enable mounting anywhere from 0 to 5m (17 ft). An accurate adjustment table determines the recommended angle for any combination of range and mounting height (Table 1). Take into consideration that installations at increased height result in larger "dead spots" close to the detector.

C. The SRN-2000E series is extremely immune to air turbulence and RF interference. However, to minimize unwanted activations, it is highly recommended to avoid aiming the detection pattern at heaters, sources of bright light, or windows subjected to direct sunlight. Also avoid running wiring close to high-power electrical cables.

## 3.3. 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 can be removed 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 (see Figure 5). For BR-1 swivel bracket mounting, refer to the instructions provided with the bracket.

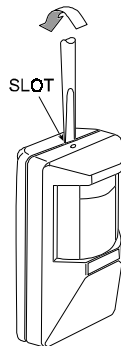


Figure 4. Removing the Cover

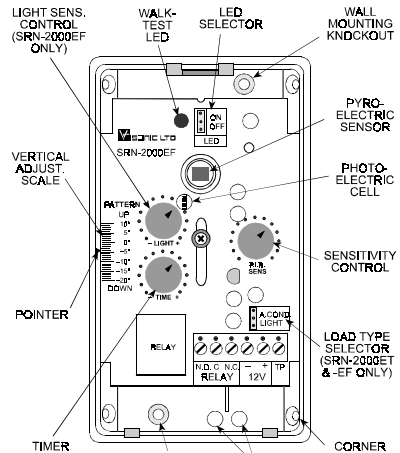


Figure 5. Printed Circuit Board Layout

The unit must be fastened tightly to the mounting surface to avoid possible vibrations.

C. After wiring, seal all openings in the base with RTV to prevent insects and air drafts from entering the unit air drafts from entering the unit.

D. To close the front cover after wiring, insert the legs located on the bottom of the base into their respective

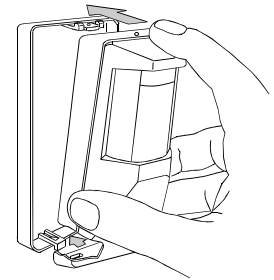


Figure 6. Replacing the Cover

slots in the bottom of the cover and close by exerting slight upward pressure (Fig. 6).

## 3.4. Wiring

**NOTE:** Field wiring should be made with copper conductors only!

For wiring the system, use #22 AWG or larger wires. 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 wires.

Wiring Gauge (AWG)	22	20	18
Wiring length(m)	200	300	500
Wiring length (ft)	656	984	1640

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

To route the wires into the sensor, use either the wiring knockouts or one of the lower mounting holes. Refer to Figure 7 and connect wires to the terminal block as follows:

A. Connect external load to be switched across the C and N.O. relay terminals, provided that the external circuit stays within the 5A / 24V resistive load limits. If this rating is exceeded by the load, connect the relay output

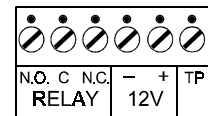


Figure 7. Terminal Block Wiring

terminals to trigger an intermediate heavy duty relay or an energy controller unit such as the Visonic Ltd. ENER-300.

B. Connect the 12V (+) and (-) terminals to a 9 - 16 VDC power source, taking care not to reverse the polarity.

C. Leave the TP terminal free (para. 3.10)

### 3.5 Adjusting the Coverage Area

#### A. Horizontal Adjustment

The 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-retainers, rotate the lens carefully to the desired position and re-lock the lens, as outlined in para. 3.1

#### B. Vertical Adjusting Scale

The vertical scale adjustment (printed on the 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 vertical 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 SRN-2000E series sensors are shipped from our factory pre-set to -5° (downward). To change the vertical-pattern adjustment, loosen the screw which fastens the printed circuit board to the base. Slide the board up or down to the desired degree setting and tighten the screw firmly.

If no wall exists at the rated range of the detector, or if you want the pattern to terminate on the floor at a certain distance, the following formula can be used to estimate the necessary vertical calibration:

$$\frac{\text{Mounting Height}}{\text{Range (ft)}} \times 60 = \text{Vertical Calibration (-}^\circ\text{)}$$

Example: a detector is mounted at 7 ft; you want the pattern to hit the floor 21 feet away. Applying the formula, you will get:

$$7 / 21 \times 60 = 20$$

Setting the vertical calibration to -20° will aim the pattern so that the farthest beam fingers will look at the floor, 21 feet away.

#### C. Sensitivity Control Adjustment

The potentiometer marked PIR SENS on the PC board should be set according to the desired coverage range and sensitivity.

For example, if you desire the full 37.5 X 37.5 meters (125 X 125 ft) range available on the standard lens supplied with the SRN-2000E series detector, the sensitivity control must be set to maximum.

If you want to obtain a higher sensitivity, in order to detect slight movements – replace the standard lens with the high density lens (No. 51).

Table 1 - Vertical Adjustment Scale

Mounting Height	Coverage Range															
	7	10	13	17	20	23	26	30	33	40	50	60	80	100	125	150
ft □	2	3	4	5	6	7	8	9	10	12	15	18	24	30	37.5	45
□ m	0.6	0.8	1.0	1.2	1.5	1.8	2.1	2.4	2.7	3.0	3.7	4.5	5.4	6.7	8.1	9.8
2	+8°	+6°	+5°	+4°	+3°	+2°	+2°	+2°	+1°	+1°	+1°	0°	0°	0°	0°	0°
3	0°	0°	0°	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°	0°	0°
5	1.5	-16°	-12°	-9°	-7°	-6°	-5°	-4°	-4°	-3°	-2°	-2°	-1°	-1°	-1°	-1°
6	1.8	-	-16°	-14°	-11	-9°	-8°	-7°	-6°	-5°	-5°	-4°	-3°	-2°	-2°	-1°
7	2	-	-	-18°	-13°	-12°	-10°	-9°	-8°	-7°	-6°	-5°	-4°	-3°	-2°	-2°
8	2.5	-	-	-20°	-17°	-15°	-13°	-11	-10°	-9°	-7°	-6°	-5°	-4°	-3°	-2°
10	3	-	-	-	-20°	-18°	-16°	-14°	-12°	-10°	-9°	-7°	-5°	-4°	-3°	-3°
12	3.6	-	-	-	-	-18°	-17°	-15°	-12°	-10°	-8°	-7°	-5°	-4°	-4°	-4°
14	4.2	-	-	-	-	-	-20°	-18°	-15°	-13°	-10°	-8°	-6°	-5°	-4°	-4°
17	5	-	-	-	-	-	-	-	-20°	-17°	-14°	-10°	-8°	-7°	-6°	-6°

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°.

#### D. Beam Masking Material

A special beam-masking material supplied with each SRN-2000E series sensor can be used to mask individual segments in the lens array. Use the material to block segments that are looking at potential false activation sources (heaters, blowers, pets, etc.) or unwanted areas.

The material is transparent to visible light but blocks any infrared energy. In some cases, more than one layer of the lens masking material may be required to completely block the infrared energy.

### 3.6 Setting the Load Selector Switch (SRN-2000ET and SRN-2000EF)

Set the load selector switch to the appropriate position for your application. Set the switch to the LIGHT position to control room

lighting. Set the switch to A. COND position when controlling an air conditioning system.

When the A.COND position is selected, there will be a 3-minute delay period from the moment the operation timer is reset until a new activation of the relay is possible. This provides an inhibit period to allow for proper cycling of the compressor.

### 3.7 Setting the Operation Timer (SRN-2000ET and SRN-2000EF)

The operation time is set by the potentiometer marked TIME. The adjustable timer (4 seconds to 20 minutes) is incorporated to energize the relay for the required operation period. The countdown restarts as the timer is reset by each detected movement. The relay therefore stays energized for a full countdown period following the last detected movement.

### 3.8 Setting the Daylight Control (SRN-2000EF only)

The SRN-2000EF features a photocell sensor which allows you to select the ambient light level at which the unit is active. The light level is adjusted with the LIGHT control (see Figure 5).

To permit automatic activation of electric lighting when there is less natural light – turn the LIGHT control **clockwise** (towards the **[+]** position). Setting the control all the way to the **[+]** allows the lighting to be switched on in total darkness only.

To permit automatic activation of electric lighting when there is more natural light – turn the LIGHT control **counterclockwise** (towards the **[-]** position). Setting the control all the way to the **[-]** allows the lighting to be switched on in any ambient light – even in broad daylight.

### 3.9 Final Testing

**Attention!** when walk-testing, refer to the coverage pattern which applies to the lens in actual use.

- Remove the cover, apply 12VDC power and allow five minutes for the unit to stabilize before testing.
- Adjust the vertical calibration angle per Table 1.
- Set the shortest operation time – the TIME control fully counterclockwise (SRN-2000ET & EF only).
- Verify that the load type selector is in the LIGHT position (SRN-2000ET & EF only).
- For testing purposes, Set the LIGHT control all the way to the **[-]**, to allow operation in any ambient light (SRN-2000EF only).
- Set the LED selector to ON and replace the cover.
- Walk-test the entire coverage area by walking across the coverage-pattern segments while observing the LED. The LED will light up whenever you cross a detection segment. Keep still a few seconds after each activation, until the LED goes out and the unit restabilizes.
- After walk testing, set the LIGHT control to mid-position (SRN-2000EF only). More accurate adjustment will be possible in the evening, at the actual dimness threshold beyond which you wish the lights to come on automatically.
- At the end of the test, you may disable the LED by setting the LED selector to OFF.

### 3.10 Test Point (TP)

The test point terminal (TP) provides a good means for analyzing the sensor in the event of an environmental problem or suspicion of a faulty unit.

Using a DC voltmeter, connect the positive lead to the TP terminal and the negative lead to the (-) power terminal. For easy testing, temporarily connect a length of two-conductor wire to these terminals and route the wires out. Replace the cover on top of the wire. Connect the meter to the ends of these wires.

Cover the detector with a piece of cardboard. The meter should indicate approximately 2.0 Volts DC (between 1.6 and 2.4 VDC). If these limits are exceeded, the detector unit should be replaced.

Uncover the lens and allow the meter to stabilize. Do not stand within the detector pattern. Any motion or environmental disturbance detected by the unit will cause the meter to deflect above or below the 2.0 VDC level. Meter variations of more than ±1 Volt (above 3 Volts or below 1 Volt) will trigger the load-switching relay.

## WARRANTY

Visonic Ltd. and/or its subsidiaries and its affiliates ("the Manufacturer") warrants its products hereinafter referred to as "the Product" or "Products" to be in conformance with its own plans and specifications and to be free of defects in materials and workmanship under normal use and service for a period of twelve months from the date of shipment by the Manufacturer. The Manufacturer's obligations shall be limited within the warranty period, at its option, to repair or replace the product or any part thereof. The Manufacturer shall not be responsible for dismantling and/or reinstallation charges. To exercise the warranty the product must be returned to the Manufacturer freight prepaid and insured.

**This warranty does not apply in the following cases:** improper installation, misuse, failure to follow installation and operating instructions, alteration, abuse, accident or tampering, and repair by anyone other than the Manufacturer.

This warranty is exclusive and expressly in lieu of all other warranties, obligations or liabilities, whether written, oral, express or implied, including any warranty of merchantability or fitness for a particular purpose, or otherwise. In no case shall the Manufacturer be liable to anyone for any consequential or incidental damages for breach of this warranty or any other warranties whatsoever, as aforesaid.

This warranty shall not be modified, varied or extended, and the Manufacturer does not authorize any person to act on its behalf in the modification, variation or extension of this warranty. This warranty shall apply to the Product only. All products, accessories or attachments of others used in conjunction with the Product, including batteries, shall be covered solely by their own warranty, if any. The Manufacturer shall not be liable for any damage or loss whatsoever, whether directly, indirectly, incidentally, consequentially or otherwise, caused by the malfunction of the Product due to products, accessories, or attachments of others, including batteries, used in conjunction with the Products.

The Manufacturer does not represent that its Product may not be compromised and/or circumvented, or that the Product will prevent any death, personal and/or bodily injury and/or damage to property resulting from burglary, robbery, fire or otherwise, or that the Product will in all cases provide adequate warning or protection. User understands that a properly installed and maintained alarm may only reduce the risk of events such as burglary, robbery, and fire without warning, but it is not insurance or a guarantee that such will not occur or that there will be no death, personal damage and/or damage to property as a result.

**The Manufacturer shall have no liability for any death, personal and/or bodily injury and/or damage to property or other loss whether direct, indirect, incidental, consequential or otherwise, based on a claim that the Product failed to function.** However, if the Manufacturer is held liable, whether directly or indirectly, for any loss or damage arising under this limited warranty or otherwise, regardless of cause or origin, the Manufacturer's maximum liability shall not in any case exceed the purchase price of the Product, which shall be fixed as liquidated damages and not as a penalty, and shall be the complete and exclusive remedy against the Manufacturer.

**Warning:** The user should follow the installation and operation instructions and among other things test the Product and the whole system at least once a week. For various reasons, including, but not limited to, changes in environmental conditions, electric or electronic disruptions and tampering, the Product may not perform as expected. The user is advised to take all necessary precautions for his /her safety and the protection of his/her property.

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# Visonic Ltd

VISONIC LTD (ISRAEL): P.O.B 22020 TEL-AVIV 61220 ISRAEL. PHONE: (972-3) 645-6789, FAX: (972-3) 645-6788

VISONIC INC. (U.S.A.): 10 NORTHWOOD DRIVE, BLOOMFIELD CT. 06002-1911. PHONE: (860) 243-0833, (800) 223-0020 FAX: (860) 242-8094

VISONIC LTD. (UK): UNIT 1, STRATTON PARK, DUNTON LANE BIGGLESWADE, BEDS. SG18 8QS. PHONE: (01767) 600857 FAX: (01767) 601098

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