

# SRN-2400

Professional Quad PIR Detector



Installation Instructions

## 1. INTRODUCTION

SRN-2400 is a QUAD Passive Infrared Detector which employs a quad-element pyroelectric sensor, providing two completely separate dual element PIR detectors for increased reliability (Fig. 2). The two separate dual passive infrared detectors use the same optical system to cover the same area.

The zones monitored by detector 1 are positioned slightly below the zones monitored by detector 2. Both detectors must be tripped simultaneously to activate an alarm. This provides a high immunity against false alarms caused by various heat sources or rodents, which are located in the field of view of only one detector and not in the other. The SRN-2400 principle of operation and its unique special processing method increase the immunity to internal circuit noise and random environmental disturbances, without compromising detector sensitivity.

Both dual PIR Detectors have independent alternate polarity pulse count signal processing circuits - one for each detector. When alternate polarity pulse count signal processing is selected, each PIR (1 and 2) must detect motion in both of their fields: (+) and (-). This means that motion must be detected in all four fields (beams) of a zone to report an alarm - see Figure 2.

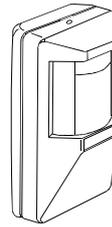


Figure 1.- SRN-2400

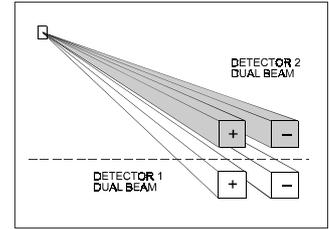


Figure 2.- SRN-2400 Quad Elements

This signal processing provides the SRN-2400 with unprecedented protection against false alarms.

A special model - the SRN-2400S - with Form 1C contacts (N.O. + N.C.) is also available. For detailed specifications regarding interchangeable lenses, refer to Appendix A, "SRN-2400 Lens Library". For other lenses, refer to the "SUPER-RED LENS LIBRARY" which offers a selection of more than 40 lens patterns to provide the best coverage pattern for any installation.

## 2. SPECIFICATIONS

### OPTICAL

**Detection Patterns:** Ten different patterns and the SUPER-RED LENS LIBRARY are available. (Appendix A.).

**Calibrated Adjustment:** Vertical: 0° - 12° . Horizontal 0° - 30°.

### ELECTRICAL

**Voltage:** 9 to 16 VDC.

**Current:** 17 mA at 12 VDC.

**Alarm Output:** Normally closed (fail-safe) contacts. 18 Ω resistor in series with contacts. Rating – 0.1 A resistive / 24 VDC.

Model SRN-2400S provides FORM 1C contacts.

**Tamper Output:** Normally closed. Rating - 0.5A resistive/24VDC.

**Alarm Period:** 2 ±1 seconds.

**Pulse Counter:** Alternate polarity pulse count operation. Independent control of upper and lower detectors.

**LED:** Walk test enabled or disabled with internal jumper link.

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

**MOUNTING:** Surface or corner mounting, height: up to 3m (10 ft).

**Optional Swivel Brackets:**

**BR-1:** For wall mounting, adjustable 30° down and 45° left ,right.

**BR-2:** BR-1 + corner mounting adapter.

**BR-3:** BR-1 + ceiling mounting adapter.

### ENVIRONMENTAL

**Note:** This device is designed for indoor use only.

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

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

**RFI Protection:** > 20V/m (20 to 1000 MHz).

### PHYSICAL

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

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

**Color:** White.

### MODELS AVAILABLE

**SRN-2400:** standard model.

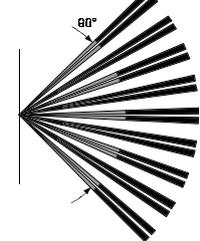
**SRN-2400-S:** Same as SRN-2400, but with Form 1C relay contacts.

### NO-100-standard

No of Beams: 36 • Field of View: 90°

Maximum Coverage: 20 m (60 ft)

TOP VIEW



SIDE VIEW

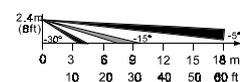


Figure 3. Lens No 100.

See App. A for more lenses

## 3. INSTALLATION

### 3.1 Changing Lenses

To change or adjust a lens, release or remove the lens locking devices located on both sides of the lens by pushing them out from inside the cover. Insert a new lens with the grooved surface outside and the 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 the locking devices from outside (ridges pointed outward) and firmly push into place until a click is heard.

### 3.2 Mounting

**Attention! This unit is designed for indoor use only**

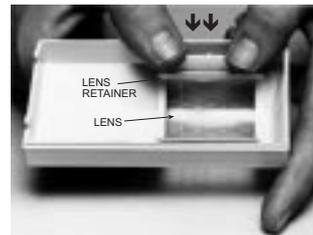


Figure 4. Removing Lens-Locking Devices

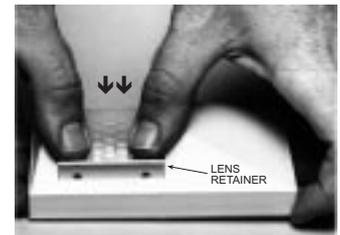


Figure 5. Locking the Lens in Position

SRN-2400 can be installed directly on a wall (surface-mounted) or in a corner. Special swivel mounting brackets are also available as an option (para. 3.3 and Fig. 8). 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.
- 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 the 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.
- Note:** *The recommended mounting height for the wide angle coverage pattern is 2 m (7 ft), and for the long range coverage - 0.75 to 1.2 m (2.5 to 4 ft).*
- Built-in installation aids enable you to mount the unit anywhere up to 3 m (10 ft) height. An accurate adjustment table determines the recommended angles for various combinations of range and mounting height (Table 1).
- C. With pet alley coverage pattern, it is recommended that the sensor be installed at the lowest possible height that enables directing the upper detection beams about 0.3 m (1 ft) above the maximum level of the pet's activity.
- D. SRN-2400 is extremely immune to air turbulence and RF interference. However, to minimize possible false alarms, it is highly recommended to avoid aiming the detector at heaters, sources of light, or windows subjected to direct sunlight. Also avoid running wiring close to high-power electrical cables.
- E. To open the cover, insert a small screwdriver into the slot on top of the unit (Fig. 6). Press the blade in slightly and lever backwards. The cover (with the lens) hinges outward and removes easily.
- F. 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.

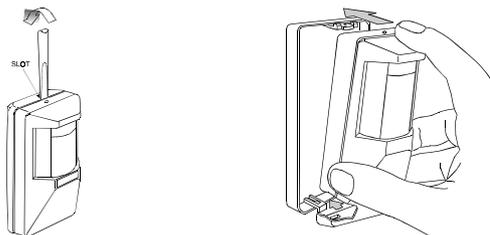


Figure 6. Removing the Cover Figure 7. Replacing the Cover

### 3.3 Optional Brackets

The BR-1 is a swivel, surface-mounted bracket for greater flexibility when setting the desired detection range. The BR-2 is a swivel bracket kit for room corners. It includes the BR-1 and a corner mounting adapter. The BR-3 is a swivel bracket kit for ceilings. It includes the BR-1 and a ceiling mounting adapter.

**ATTENTION:** *with swivel brackets in use, the effective detection range may differ from that indicated in Table 1 – the vertical adjusting scale.*

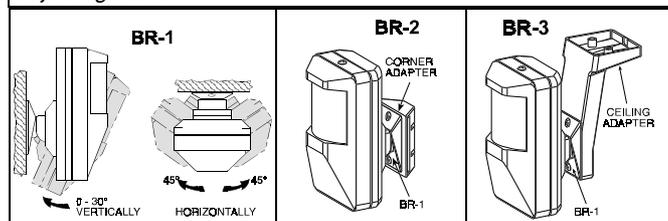


Figure 7. - Optional Swivel Brackets

### 3.4 Wiring

Connect wires to the terminal block in the following order.(Fig. 9.)

- A. Connect **TAMP**. N.C. terminals to a normally closed, 24-hour protection zone of the control panel. The tamper contact will open when the cover is removed.
- B. Connect **RELAY** N.C. terminals to a normally closed burglar protection zone of the control panel. The relay contacts will open when motion is detected or upon power loss.

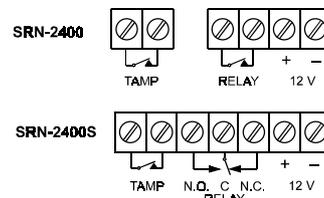


Figure 9. -Terminal Block Wiring

**Note:** *Model SRN-2400S provides changeover Form-1C relay contacts (N.C. + N.O.).*

- C. Connect the **12 V (+)** and **(-)** terminals to a 9 to 16 Volt DC power source and check for correct polarity. The power supply must have at least 4 hours of battery backup. The current drain of each SRN-2400 sensor is about 20 mA.

### 3.5 Adjusting the Coverage Area

SRN-2400 provides you with the most powerful tools for quick, easy and accurate pattern adjustment. The 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 selector consists of a pin header and a jumper to switch the walk-test LED either ON or OFF.

#### Horizontal Adjustment

The SRN-2400 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 (Para. 3.1), rotate the lens carefully to the desired position and lock the lens.

#### 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 recommended 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. The scale enables pattern adjustments from  $+10^\circ$  upward to  $-12^\circ$  downward, according to the installation height and the required coverage range. SRN-2400 sensors are shipped from our factory preset to  $-5^\circ$  (downward).

To change the vertical pattern adjustment, loosen the screw which fastens the printed circuit board to the base. Slide the P.C. board up or down to the desired angle and tighten the screw firmly. In operation, a person must cross both the upper and the lower PIR's together to initiate an alarm. (Fig. 1). It is of utmost importance that a walk test be made over the entire coverage area to assure that both upper and lower beams will be crossed. This is

of particular significance when using the long-range pattern.

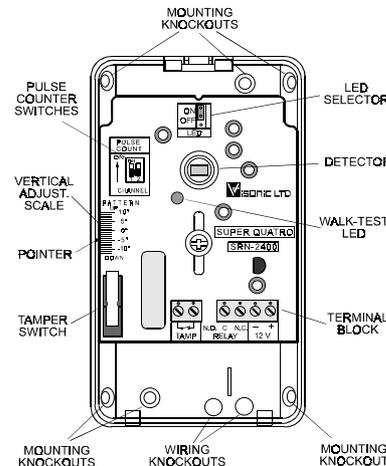


Figure 10 . PCB Layout

**IMPORTANT:** The vertical adjustment chart is to be used as a general guide for a variety of users. Quad PIRs need to be aligned very accurately in order to achieve the desired range. If the vertical angle recommended in the chart does not provide the range you require, try adjusting the board +/- a few degrees. You should not need to adjust the board more than +/- 3 degrees. Thoroughly walk-test the unit to ensure consistent detection at the required range.

To assure optimum performance of the SRN-2400 PIR, additional care must be taken when making the vertical adjustment of both the board and the optional swivel bracket (if used).

### Beam Masking Material

A special beam masking material supplied with each SRN-2400 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.

Table 1.- Vertical Adjustment Scale

Mounting Height ft → ↓	Coverage Range											
	7	10	13	17	20	23	26	30	36	45	60	90
m	2	3	4	5	6	7	8	9	11	13.5	18	27
3	1	0°	0°	0°	0°	0°	0°	0°	0°	0°	0°	0°
4	1.2	-8°	-6°	-5°	-4°	-3°	-2°	-2°	-1°	-1°	-1°	0°
5	1.5	-	-12°	-9°	-7°	-6°	-5°	-5°	-4°	-3°	-2°	-1°
6	1.8	-	-	-	-11°	-9°	-8°	-7°	-6°	-5°	-4°	-3°
7	2	-	-	-	-	-12°	-10°	-9°	-8°	-6°	-5°	-4°
8	2.5	-	-	-	-	-	-	-	-11°	-10°	-8°	-7°
10	3	-	-	-	-	-	-	-	-	-11°	-9°	-7°

Example: if you require coverage range of 30 ft (9 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 -6°.

Note: The p.c. board elevation scale is factory preset at -5°.

### 3.6 Pulse Counter

The SRN-2400 QUAD PIR is equipped with two independent alternate polarity pulse count circuits and controls (Fig. 2 and 10). The lower detector (1) is controlled with pulse count switch 1.

The upper detector (2) is controlled with pulse count switch 2. Placing both switches at ON selects alternate polarity pulse count

operation for both detectors. A person must cross both the (+) and (-) beams of both dual element detectors (1 and 2) before activation of the alarm relay. This means that motion must be detected by all 4 beams shown in Figure 1. Use of the pulse count is recommended only in a temperature controlled environment where the temperature does not exceed 28°C (82°F).

Placing both switches at OFF actually disables the pulse counters of both detectors. This should be done if it is necessary to activate an alarm in the first crossing of a vertical pair of beams, such as with a long range lens or in high security installations when high 'catch' performance is required. Still, both detectors (one beam each) must be triggered.

To ensure proper detection when using any of the long range lenses (No. 30, 34, 41, 43, 45, 47), **pulse count one must be selected for both the upper and lower detectors.** Set both switches to OFF.

With two pulse count switches you can select pulse count operation on only one detector (1 or 2). This flexibility may prove useful in certain applications which require different catch performance levels in the same area.

### 3.7 Walk Testing

A. Apply 12 VDC power and allow five minutes for the unit to warm up and stabilize before testing.

B. Adjust the vertical pattern angle according to Table 1.

Note: be careful to position the P.C. board so that the upper and lower beams reach the maximum required distance. This can be achieved by careful vertical adjustment and walk testing.

C. Place the LED jumper across the ON pins to activate the LED.

D. Set the pulse counter per Para. 3.6 above.

E. Walk-test the range and coverage area by walking slowly across the field of view (in opposite directions) and observe the LED. The LED lights up whenever you are detected by the SRN-2400. Allow 10 seconds between each test for the unit to stabilize.

F. After testing, the LED can be disabled to prevent unauthorized persons from tracing the coverage pattern. To disable the LED, install the LED jumper across the OFF pins.

**IMPORTANT:** The range and coverage area should be checked at least once a year. To assure proper continuous functioning, the user should be instructed to perform a walk test at the far end of the coverage pattern to assure an alarm signal.

### 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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# Appendix A. SRN-2400 LENS LIBRARY

**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.

## 1: Corner Mounting Lens 90°

Lens No. 100 is the standard lens supplied with the SRN-2400. It provides maximum room coverage in applications where the PIR is installed in the corner. See Section 2.

Lens No. 100 may be used for general purpose applications providing 90° field of view with maximum coverage of 20m (60 ft).

## 2: Wide Angle Lenses

Lens No. 76 provides the largest and widest room coverage in applications where the PIR is wall mounted.

Lens No. 76 provides 140° Ultra-Wide-Angle field of view and maximum coverage area of 12 x 24 m (40 x 80 ft.)

## 3: Pet - Alley Lens

Lens No. 102 consists of 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 0.8 to 1.5 m (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 20 m (60 ft).

## 4: Long Range Lenses

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 27 m (90 ft). For optimum coverage, this lens requires a mounting height of 0.8 m to 1.2 m (2.5 to 4 ft).

Lens No. 34 provides a long-range barrier coverage of maximum 27 m (90 ft) with 6 fill-in beams and a 90° short range field of view. This unique coverage allows mounting the PIR higher than with lens No. 30.

## 5: Multiple Room and Corridor Coverage Lenses

This group of lenses provide maximum economy 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.

### A. One Corridor and One Room

Lenses No. 41 and 43 provide a long-range 27 m (90 ft) corridor coverage combined with a 90° wide-angle field of view and maximum room coverage of 15 m (50 ft).

In lens No. 41 the long-range beam is located at the left side of the wide-angle pattern while in lens No. 43 the long-range beam is at the right side.

### B. One Corridor and Two Rooms.

Lens No. 45 provides a long-range 27 m (90 ft) corridor coverage beam located at the center of a 90° wide-angle field of view with maximum coverage of 15 m (50 ft).

### C. Two Corridors and One Room

Lens No 47 provides two long-range corridor beams and a 90° wide-angle field of view with maximum room coverage of 15 m (50 ft) located between the 2 corridor beams.

## 6: Combined Ceiling and Room Coverage Lenses

Lens No 104 is a unique lens providing an "upward looking" ceiling coverage in addition to the "downward looking" room coverage.

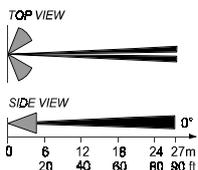
The "upward looking" pattern is directed approximately 20° above the main layer providing a 90° field of view with maximum coverage of 9 m (30 ft).

For optimum coverage, lens No. 104 may be used for corner mounting providing a 90° field of view with maximum room coverage of 15 m (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.

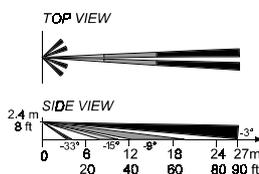
### NO-30

No of Beams: 4 ■ Field of View: 6°  
Maximum Coverage: 3 x 27 m (10 x 90 ft)



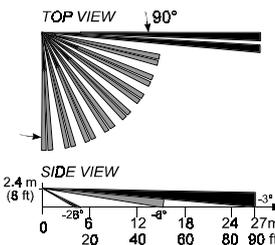
### NO-34

No of Beams: 16 ■ Field of View: 90°  
Maximum Coverage: 3 x 27 m (10 x 90 ft)



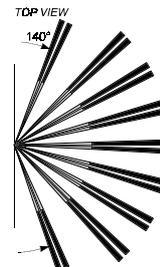
### NO-41

No of Beams: 28 ■ Field of View: 90°  
Maximum Coverage: 15 m/90°  
3 x 27 m Beam (10 x 90 ft)



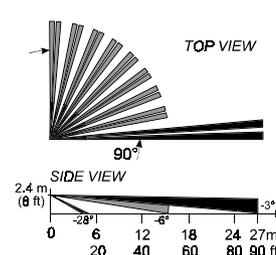
### NO-76

No of Beams: 18 ■ Field of View: 140°  
Maximum Coverage: 12 x 24 m (40 x 80 ft)



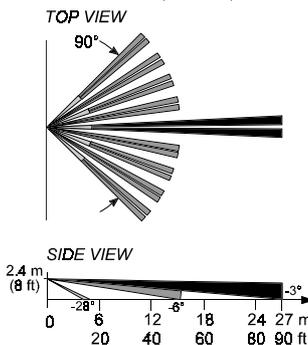
### NO-43

No of Beams: 28 ■ Field of View: 90°  
Maximum Coverage: 15 m/90°  
3 x 27 m Beam (10 x 90 ft)



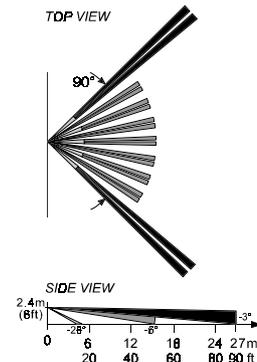
### NO-45

No of Beams: 28 ■ Field of View: 90°  
Maximum Coverage: 15 m/90°  
3 x 27 m Beam (10 x 90 ft)



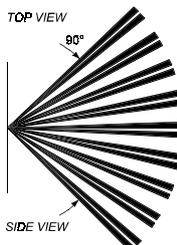
### NO-47

No of Beams: 28 ■ Field of View: 90°  
Maximum Coverage: 15 m/90°  
2 Beams (10 x 90 ft)



### NO-102

No of Beams: 18 ■ Field of View: 90°  
Maximum Coverage: 20 m (60 ft)



### NO-104

No of Beams: 54 ■ Field of View: 90°  
Maximum Coverage: 15 m (45 ft)

