EXPLOSION-PROOF SENSOR INSTALLATION GUIDE

ProTech

Protection Technologies Incorporated

Instructions for:

SDI-77XL2-EX VERSION - EXPLOSION-PROOF

Dated October 1, 2006

SPECIAL EX SERIES VERSION

GENERAL:

The SDI-77XL2-EX Model of Stereo Doppler was developed to protect Hazardous Locations due to the presence of flammable gasses or vapors, combustible dusts or easily ignitable fibers. The SDI-77XL2-EX electronic assembly is configured to install into a special explosion-proof enclosure. The sensor is suitable for applications in Hazardous Locations under the following classifications:

• Class I, Div. 1 & 2, Groups C, D • Class II, Div. 1 & 2, Groups E, F, G • Class III • NEMA 7CD, 9EFG	The unit is suitable for installation at petroleum refineries, chemical and petrochemical plants, storage areas and other processing facilities where hazardous substances are handled or stored.

SPECIFICATIONS:

Input Voltage:	8.5 to 20 VDC
Current Consumption:	150 mA @12 VDC (LED's off)
RF Power Density:	120 uW/cm2 max. at the face of the unit
Weight:	40 lbs.
Operating Temperature:	-30 F to 130 F (-34 C to 54 C)
Operating Humidity:	0 to 100% Relative Humidity
Relay Contact Rating:	0.1A, 50V
Microwave Frequency:	Factory adjusted to one of the following frequencies: 10,525 MHz USA 10,587 MHz International 9,900 MHz International 9,470 MHz International
Electrical Access:	Housing provided with 1/2" pipe thread. Special hole size, location and thread available upon request.

OPTIONAL ACCESSORIES:

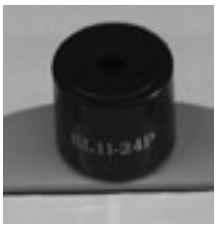
- PH-4EXWLMT – Wall Mount Bracket
- PH-4A (2 Required) Universal Pole Mount Bracket for 4 in. to 8 in. (10 cm to 20 cm) diameter pole

PH-4EXWLMT
Wall Mount Bracket

BASIC COMPONENTS-EX SERIES:

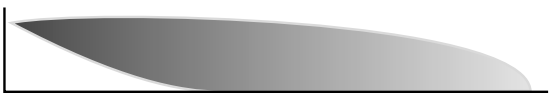
Housing Base

XL-Minisounder

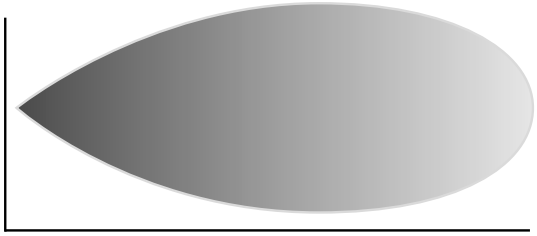


Housing Cover with Viewing Porthole

Standard Coverage Pattern at Maximum Range

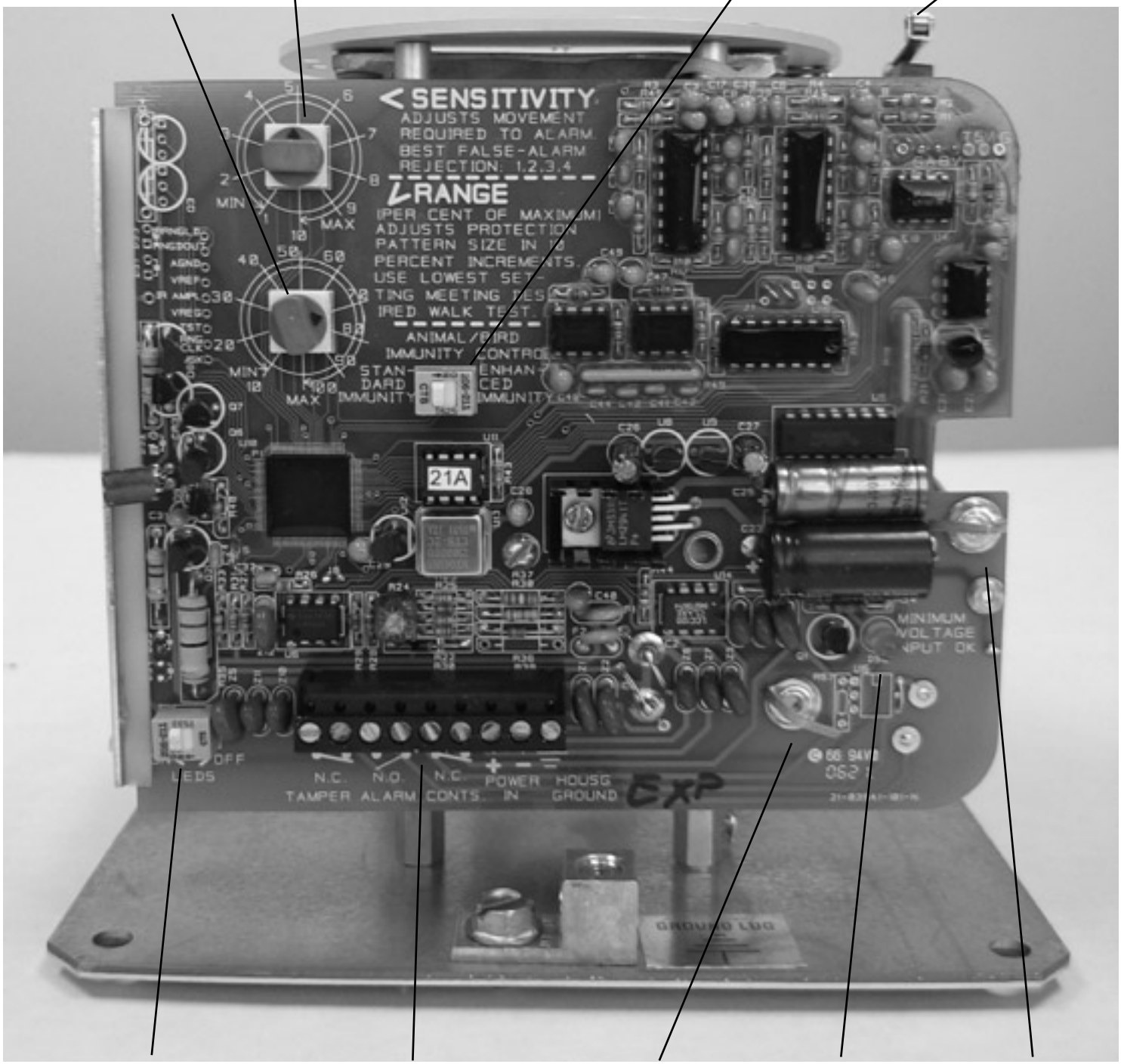


Side View **100 ft. / 30m**



Top View **100 ft. x 40 ft. / 30m x 13m**

SDI-77XL2-EX – Microwave Electronic Assembly (MEA)



Sensitivity Control Switch (pg. 5)

Range Control Switch (pg. 5)

Enhanced Bird/Animal Immunity Control Switch

Tamper Switch

LED On/Off Switch

Removable Terminal Strip (pg. 4)

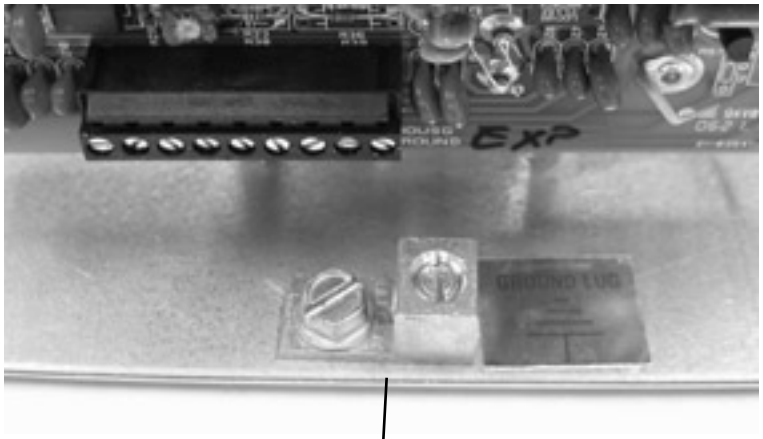
Cable Holder (pg. 4)

Voltage OK LED

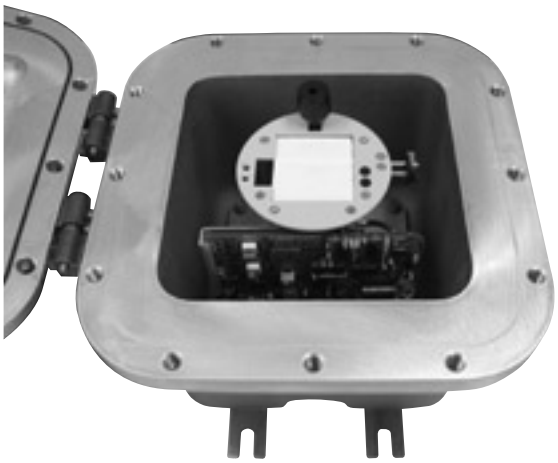
Cable Holder (pg. 4)

ASSEMBLY PROCEDURE-EX SERIES

It is necessary that the HOUSING BASE and HOUSING COVER be in the correct orientation for the cover-to-base mounting holes to align. The correct orientation of the Microwave Electronic Assembly is with the Ground Lugs located at the bottom of the unit. In multiple sensor applications the HOUSING BASE and HOUSING COVER are interchangeable with other bases and covers.



Ground Lugs



INSTALLING THE SENSOR

Remove the electronic assembly from the housing by the loosening the four bolts on the sensors base plate. Mount the HOUSING BASE in the desired location. Locate threaded electrical access hole in a convenient orientation providing explosion proof electrical connection to the sensor.

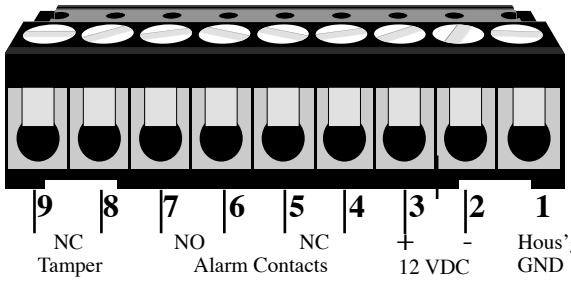
Note: If precise sensor aiming is necessary to avoid environmental hazards in the protected area, use the optional PH-4EXWLMT Wall Mount Bracket.

- The optimum mounting height is between 6 – 8 ft. (1.8 – 2.5 m.)
- Remove the terminal block from the main printed circuit board and wire according to the wiring diagram below.
- Re-install the wired terminal block on the main printed circuit board and install the MEA in the HOUSING BASE using the four mounting bolts provided.

WIRING THE REMOVABLE TERMINAL STRIP

1. For power connections, A minimum 18 AWG wire is recommended for wire runs greater than 55 ft. (17m).
2. Remove terminal strip from the Microwave Electronic Assembly and wire according to the diagram.
3. Observe the correct polarity at the power terminals.

REMOVABLE TERMINAL STRIP



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ADJUSTING THE SENSOR

The SDI-77XL2-EX provides good detection in all ten sensitivity settings with respect to movement toward or away from the sensor. Keep in mind that in the lower sensitivity settings (1, 2, 3, 4, and 5) transverse detection ("crosscatch") is very sluggish. Therefore, it is important for the sensor to be located so that the most likely point of travel is toward or away from the sensor.

Proper mounting location of the SDI-77XL2-EX will enable lower sensitivity settings. Lower sensitivity settings will enhance false-alarm-free performance.

Note: Each sensor should be periodically walk-tested to ensure that the required detection is attained.

SENSITIVITY	SETTING	MOVEMENT REQUIRED IN INCHES / CM
HIGHEST	10	4"/ 10CM
	9	8"/ 20CM
	8	12"/ 30CM
	7	16"/ 40CM
	6	20"/ 50CM
	5	24"/ 60CM
	4	28"/ 70CM
	3	32"/ 80CM
	2	36"/ 90CM
LOWEST	1	40"/ 100CM

VERY IMPORTANT:

The most critical adjustment for false alarm rejection is the SENSITIVITY CONTROL. Settings of 1, 2, 3 or 4 are best.

The key to success in many applications is the proper adjustment of the sensor's Range Control Switch, Sensitivity Control Switch and Bird/Animal Control Switch. Note: Refer to diagram on Page 2 for detail.

RANGE CONTROL SWITCH

The Range Control Switch adjusts the overall size of the sensor's detection area. It may be necessary to set the sensor at the higher settings (70, 80, 90 and 100 percent of maximum) to attain the desired protection pattern coverage.

Note: Although the sensor can be set at maximum range and operate properly, the "rule of thumb" is to set the range control switcth at the lowest setting to attain the desired range.

SENSITIVITY CONTROL SWITCH

The Sensitivity Control Switch adjusts the amount of movement required for an alarm condition. The Sensitivity Control Switch is very precise as the SDI-77XL2-EX can determine the exact "distance in inches/cm." that an object must move to initiate an alarm. The table above shows the amount of movement required based on the switch setting.

ENHANCED BIRD/ANIMAL IMMUNITY CONTROL SWITCH

A two-position switch adjusts the sensor's immunity to birds and small animals. Note: The SDI-77XL2-EX sensor is shipped in the *Standard Immunity Setting*.

Standard Immunity Setting - Offers excellent immunity with respect to birds and small animals and is the best setting in most applications. The SDI-77XL2-EX sensor will provide good nuisance alarm rejection as well as good detection sensitivity in the *Standard Immunity Setting*.

Enhanced Immunity Setting - Often used as a last resort to eliminate nuisance alarms caused by an abundance of birds and animals in the protected area.

Caution: In the Enhanced Immunity Setting the speed of detection is significantly reduced. Therefore, the SDI-77XL2-EX may not detect an intruder or a vehicle traveling at a rate of speed above 3 ft. / 1m Per Second.

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WALK TESTING THE SENSOR

Walk Testing using the XL-MINISOUNDER

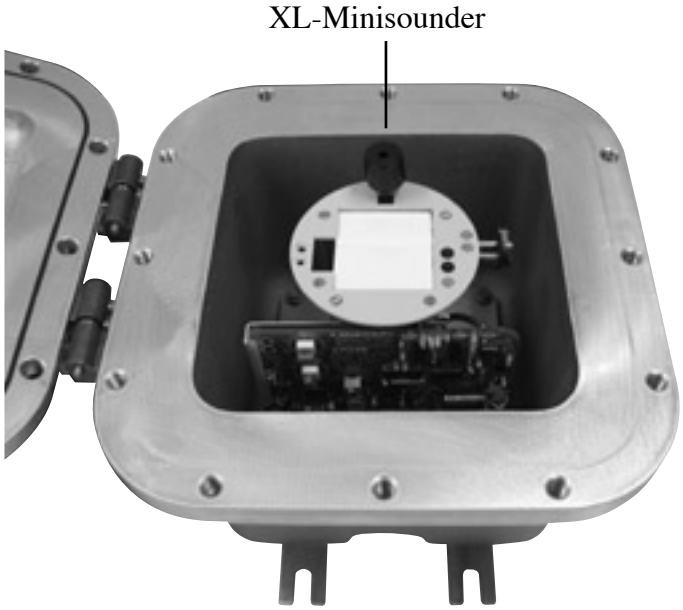
With the housing cover removed, locate the sounder receptacle located on the metal faceplate as shown in the figure below.
Plug the SOUNDER into the SOUNDER RECEPTACLE. If the sounder does not give an audible tone when plugged in, reverse polarity. The sounder is silent when the sensor in not in alarm. The sounder sounds a constant tone with the sensor is in alarm.

Note: Sensor will have approximately 10 ft. (3m) greater range with cover removed.

Walk Testing using the LED's
The sensor can be walk-tested with the housing cover installed on the housing by viewing the walk-test LED's through the PORTHOLE installed in the housing cover.

Locate the Green and Red LED's on the sensor Front Bezel.
Green LED ON – Indicates the MW sensor is stable and ready for walk-test.
Red LED ON – Indicates MW sensor in Alarm.

Note: Green LED goes off when MW sensor is nearing an alarm condition.



TROUBLESHOOTING

The sensor does not work; the LED's do not come on.

1. Check input voltage at terminals 2 (-) and 3 (+) or view the **Voltage OK LED** on PC board to verify that it is on. You must deliver 8.5 to 20 VDC at the input terminals.
2. Check to see if the LED switch is in the "ON" position.

The sensor Alarm LED is on constantly and does not reset.

3. If input voltage is OK, return sensor to manufacturer.

You cannot attain the maximum specified range of the sensor.

4. If the microwave portion does not detect as specified, check Range and Sensitivity Control.
5. Are large objects blocking the protection pattern? If the sensor only sees 1/2 of an intruder, it is likely only 1/2 the expected range will be attained.

You are experiencing false alarms.

6. Check input voltage as described in item 1. It is best to check voltage with primary power disconnected from the main power source and the sensor operating on standby battery only. This should be the worst case or lowest voltage situation.
7. Check Sensitivity Control. PROTECH recom-mends a setting of 1, 2, 3, 4, or 5 for commercial/industrial applications.
8. Did you drive a vehicle along the perimeter to ensure the sensor is not seeing a large object (bus, truck, train, etc.) outside the protected area? Remember that the sensor will see a man at 100 ft. but may see a bus at 500 ft. PROTECH highly recommends that the XL-SOUNDER be utilized for walk-testing.
9. Is the sensor looking at moving, flowing or rippling water? Water is very reflective and moving water is a very severe hazad. Do not aim the sensor so the the sensors protection pattern will see water.
10. Is the sensor mounted near fluorescent lighting? Nearby fluorscent lighting can cause problems so it is best to leave the fluorscent lighting off during the protected hours or to mount the sensor more the 20 ft. from fluorescent lighting that will be turned ON during the protected hours.

Note: If all of the above has been checked out and the problem persists, please contact PROTECH Technical Support.

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INSTALLATION CHECK LIST

❑ Is each sensor individually zoned? More than one sensor per alarm zone should not be considered or tolerated! More than one sensor per zone makes it virtually impossible to troubleshoot intermittent problems. Please advise your installation supervisor of PROTECH's position on this very important matter before proceeding with the installation.

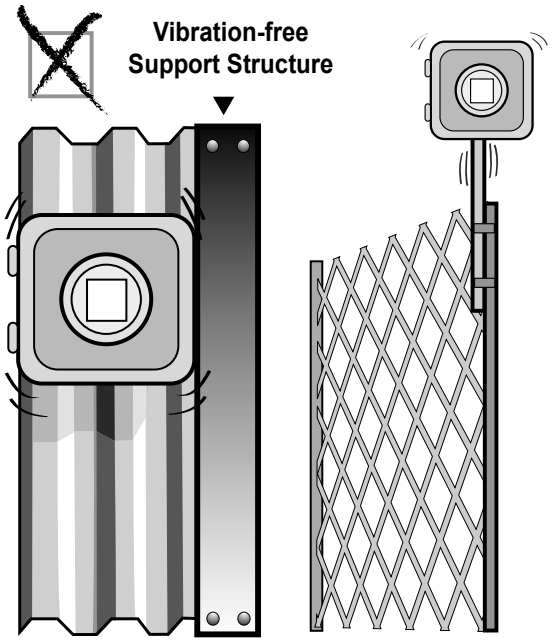
❑ Is the Green **Voltage OK LED** on? The **Voltage OK LED** verifies that proper input voltage is provided at the sensor. It is best to view the **Voltage OK LED** with the AC power disconnected and the sensor powered by standby battery only. This would be worst case condition and deliver lowest voltage to sensor.

❑ Did you realize the **SENSITIVITY CONTROL** rotary switch is the most critical field setting for false-alarm-free performance? PROTECH recommends a field setting of 1, 2, 3, 4, or 5 in commercial applications. A field setting of "1" will provide the greatest false alarm rejection performance.

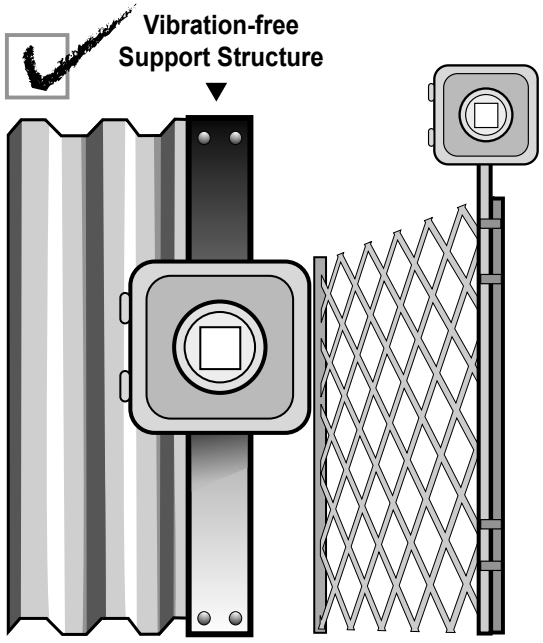
❑ Did you realize the **RANGE CONTROL** rotary switch adjusts the overall size of the sensor's detection area? Generally, to attain the maximum specified range of the sensor it will be necessary to set the **RANGE CONTROL** rotary switch near the maximum range settings of 80, 90, or 100 percent of maximum.

CHOOSE A SOLID MOUNTING BASE FOR THE SENSOR

DON'T mount the sensor on a surface prone to extreme vibration, such as chain link fence without support or on the flimsy siding of a metal building.



DO mount on a solid wall or pillar. If mounting on a metal building, be sure to find a support structure to ensure a vibration free mounting.



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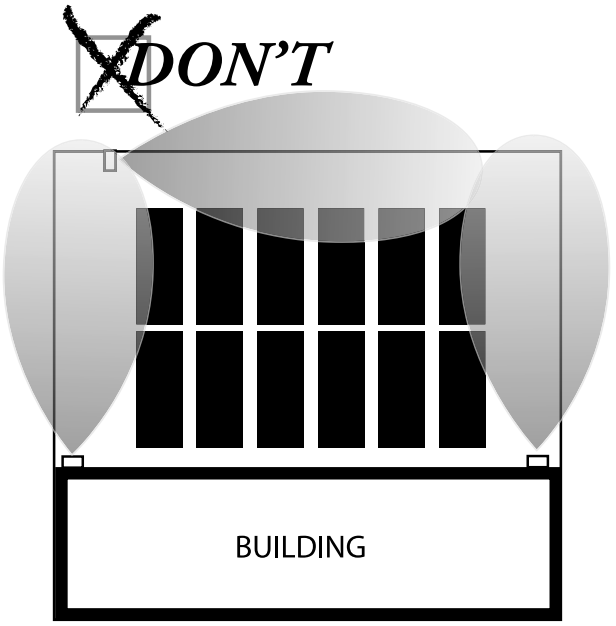
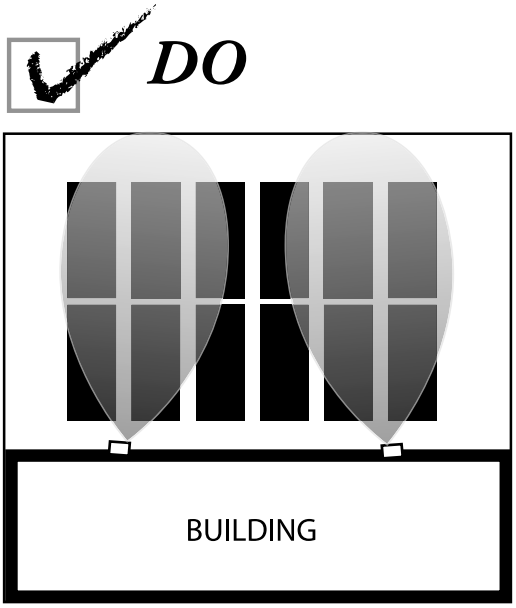
USE AS A MOTION SENSOR NOT AS A PERIMETER SENSOR

DON'T use the PIRAMID EX as a perimeter sensor. You will have to adjust the sensor's sensitivity at a very high setting for good transverse detection. The sensor is likely to experience nuisance alarms when adjusted in the higher sensitivity settings.

DO use the PIRAMID EX as a motion sensor with a "wide field of view" lens module. You will be able to adjust the sensor's sensitivity setting in the lower positions to help ensure virtually false-alarm-free performance.

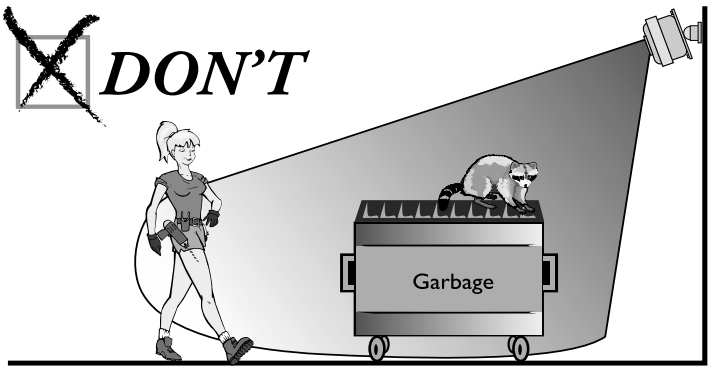


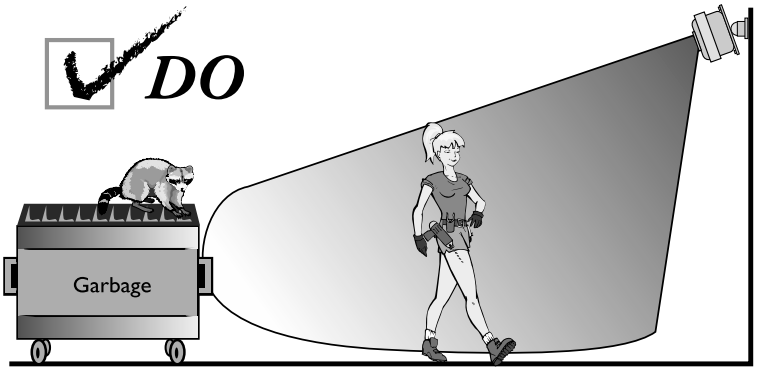


BEWARE OF GARBAGE ATTRACTING ANIMALS AND BIRDS

DON'T leave garbage cans and trash bins in the sensor's field of view, as they are known to attract animals and birds. Small animals and birds close to the sensor appear as much larger targets and are difficult for the sensor to ignore.

DO store garbage cans and trash bins out of the sensor's field of view.





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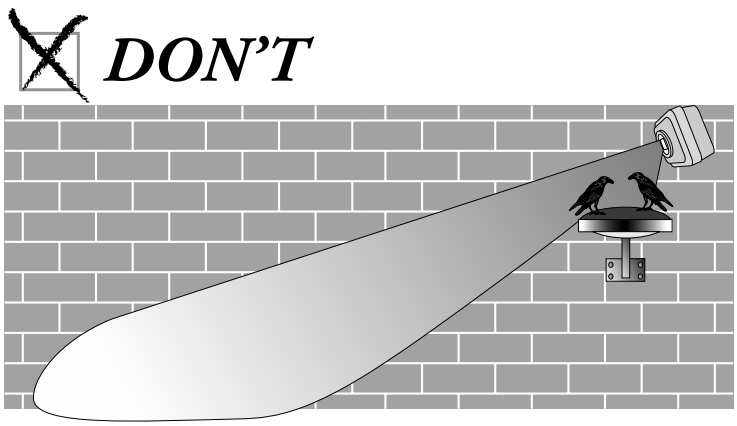
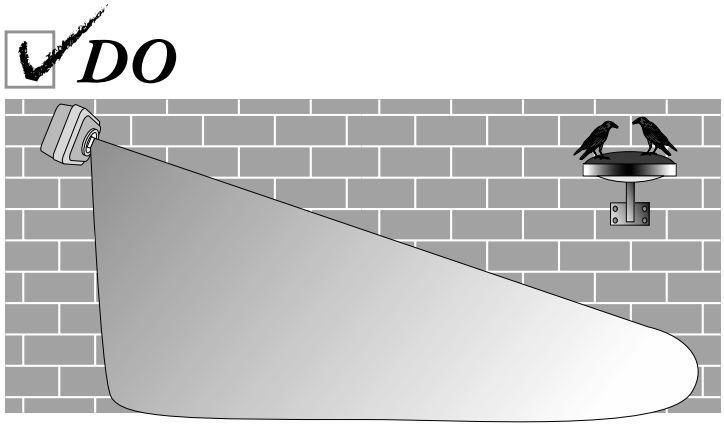
BEWARE OF BIRDS PERCHING IN THE SENSOR'S FIELD OF VIEW

DON'T mount the sensor where lighting fixtures, signs or building structures that can serve as a perch for birds or animals directly in front of the sensor.

DO mount the sensor where it has a clear field of view without obstructions.

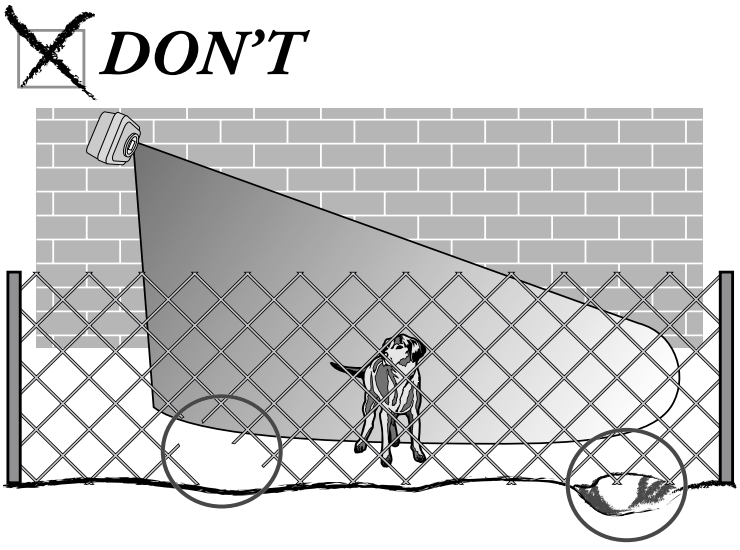


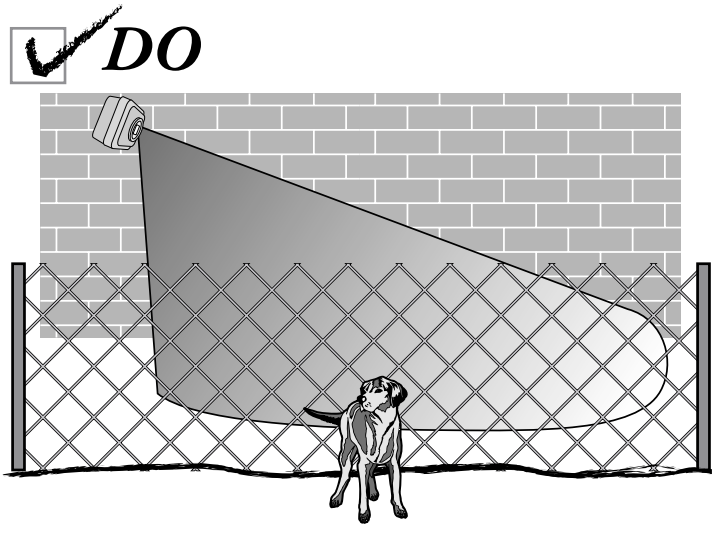


BEWARE OF ANIMAL ENTRY THROUGH GAPS OR HOLES IN THE FENCE

DON'T ignore openings in the fence or gate areas that can serve as easy entry for animals (dogs, cats, raccoons, etc.) into the protected area.

DO patch holes and secure the fence so animals do not have free access into the protected area. Also, try to eliminate large gaps under gates that enable easy animal entry.





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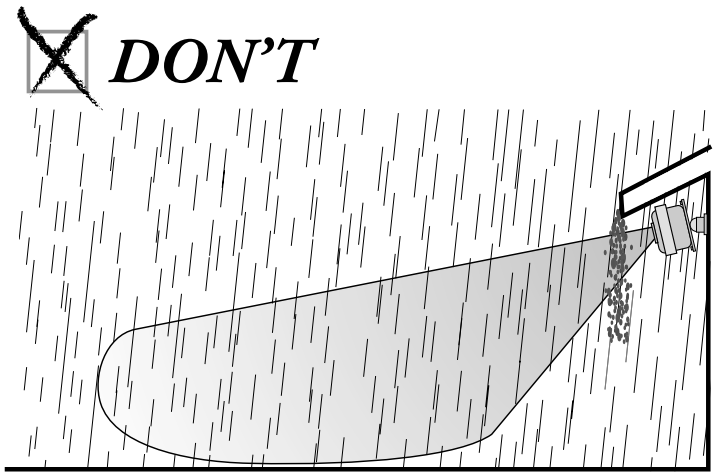
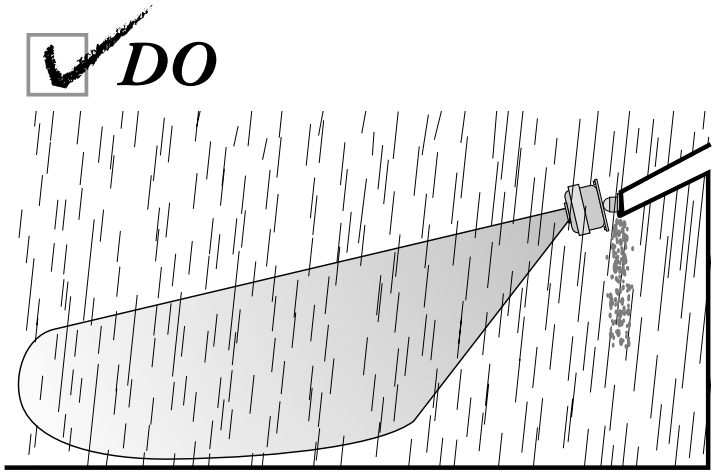
USE CAUTION WHEN MOUNTING UNDER THE EAVES OF A ROOF

DON'T mount the sensor under the eaves (overhang) of a non-guttered roof. During heavy rains the runoff directly in front of the sensor's face can create nuisance alarms.

DO mount the sensor under the roof eaves **only** if the roof has a rain gutter.

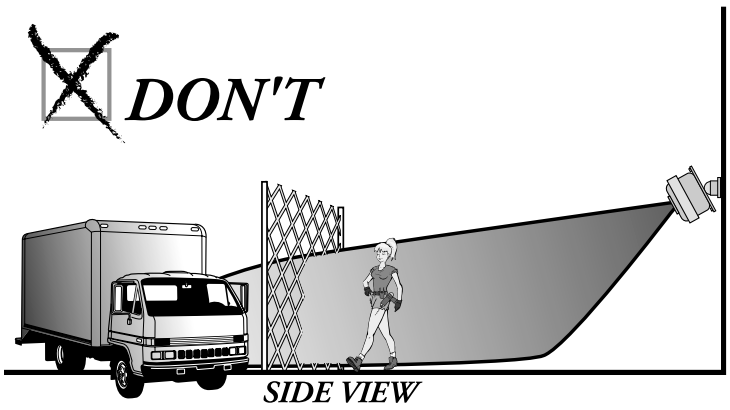


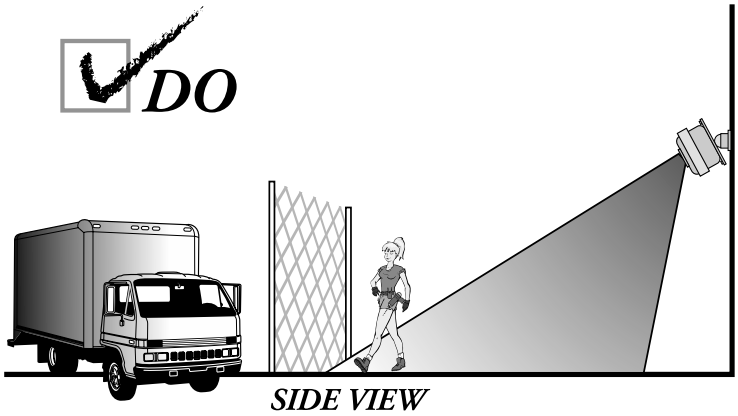


BEWARE OF LARGE OBJECTS OUTSIDE OF THE PROTECTED AREA

DON'T point the sensor so that it may detect a large object (car, bus, truck, train, etc.) outside of the protected area. Remember that the sensor can detect a large object like a truck or bus at distances approaching 500 ft. (152.4m).

DO aim the sensor downward so that the protection pattern coverage terminates into the ground within the protected area. Carefully test by driving a vehicle **(under 10 mph / 16 kph)** around the perimeter to ensure the protection pattern is contained within the protected area.





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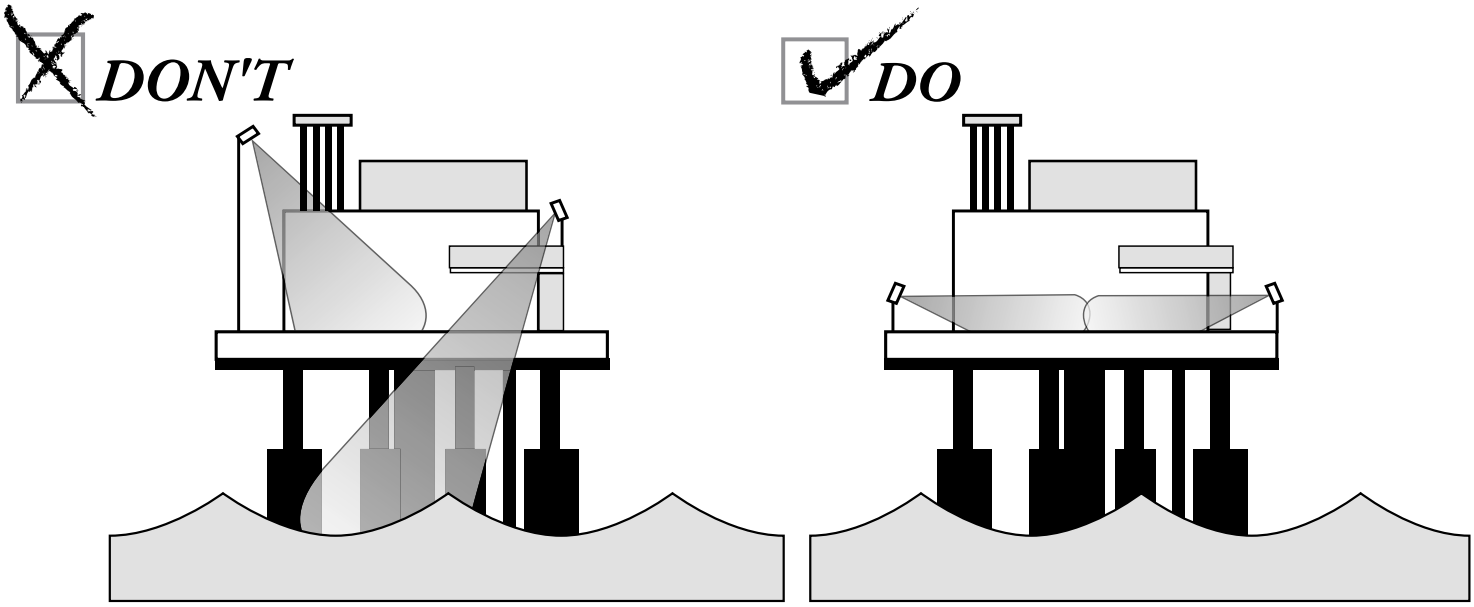
DON'T aim the sensor so that the protection pattern will see moving, flowing, or rippling water, as this will cause nuisance alarms.

DO mount the sensor a little lower on docks or oil platforms where water is nearby and try to aim parallel to the platform. It is best to terminate the protection pattern into the structure so that it does not see nearby water.



CAUTION: PROTECH recommends RANGE CONTROL settings of 50% or less and SENSITIVITY CONTROL settings of 1 or 2 when sensors are used near water.

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