

DS160/DS161

Request To Exit PIR sensors

Installation Instructions

1.0 Description

The DS160 is a Passive Infrared Detector (PIR) which is UL Listed as an Access Control Device under the UL 294 Standard. It is designed for "Request To Exit" (REX) interior applications.

The technology designed into the DS160 is based on the principle that all objects emit infrared energy. The warmer an object is, the more infrared energy emitted. Its Passive Infrared technology allows the DS160 to detect the change in infrared energy that occurs when a person passes through its field of view.

The DS160 has features such as Sequential Logic Input (SLI) which eliminates unauthorized entry. SLI allows you to arm the detector using any dry contact device, including a second detector, a card reader, or the access control system. This opens up many possibilities to better control this type of application.

A built-in sounder can be activated automatically if the door has been propped open, and can be controlled from any dry contact device. The DS160 detection pattern provides a dense "C" shaped coverage that is ideal for most request to exit applications. In addition, complete pattern control allows it to be adjusted to a single zone, placed over a doorknob, for example. There are 15 possible coverage patterns to accommodate most applications. This, combined with the ability to monitor the door and intelligently control the lock, adds considerable security to these types of applications.

The DS160 uses Motion Analyzer II signal processing to help prevent false activation due to environmental conditions. The relay output consists of two Form "C" contacts that can be adjusted to latch from approximately 0.5 to 64 seconds. The latch time features two modes of operation, resettable (where the relay timer will not time out as long as someone is in the field of view) and non-resettable (where the relay will remain latched for a fixed period of time). The relay can also be programmed to fail safe or fail secure in the event of power loss.

The DS160 may either be ceiling or wall mounted, and its pattern may be aimed and/or masked for more effective use based upon installation needs. It is not designed as a primary means of exit for emergency egress applications.

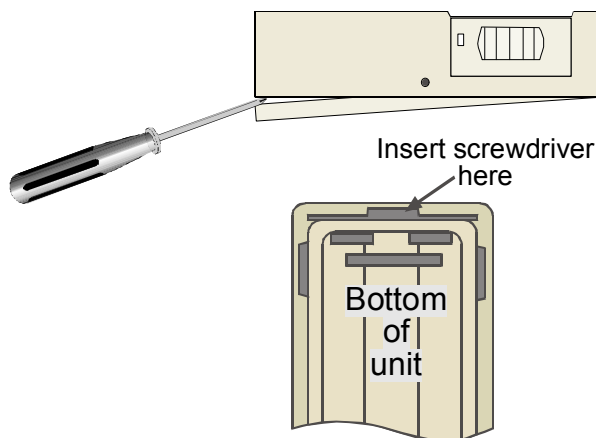
The DS160 is available in a light grey (DS160) or a black (DS161) enclosure along with an optional trim plate (light gray TP160 or black TP161) that can cover a single gang box. Panic hardware must be used with this or any other egress device.

2.0 Specifications

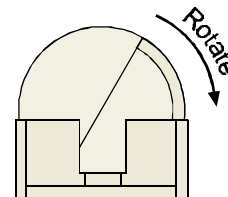
- **Input Power:** 12 - 30 VDC or AC
- **Current Draw:** 39 mA @ 12 VAC, 76 mA @ 30 VAC Alarm
39 mA @ 12 VDC, 60 mA @ 30 VDC Alarm
8 mA nominal Standby current
- **Relay:** Two Form "C" contact sets rated for 1 amp each @ 30 VDC or AC max for resistive loads.
- **Sounder:** 85 dB with adjustable volume
- **Temperature:** -20° to +120°F (-29° to +49°C). *For UL Listed Installations, the temperature range is +32° to +120°F (0° to +49°C).*
- **Humidity:** 0 - 95% non-condensing. *0-85% non-condensing for UL Listed Installations.*
- **Dimensions:** 1.8 in. H x 7 in. W x 1.75 in. D (4.5 cm x 17.8 cm x 4.4 cm)
- **Trimplate (optional):** TP160 (light gray) TP161 (black)
3 in. H x 8.25 W (7.6 cm x 21 cm)

3.0 Installation

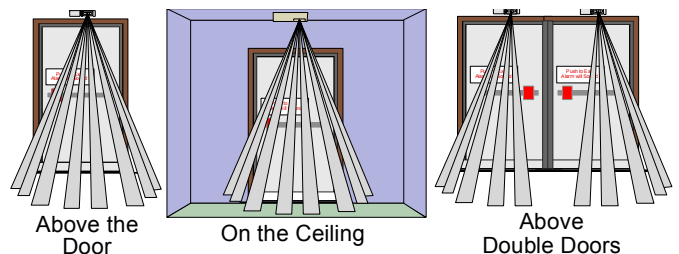
3.1 Remove the cover using a small flat blade screwdriver.



3.2 Rotate the detector clockwise to remove it from the base.



3.3 Select a mounting location

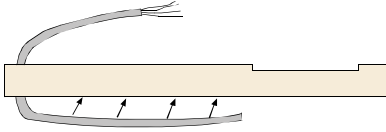




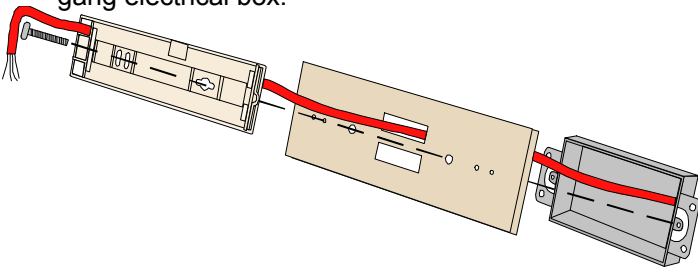
Before you mount the unit, please review Section 7, "Coverage Patterns" for more information on the placement and location of the DS160.

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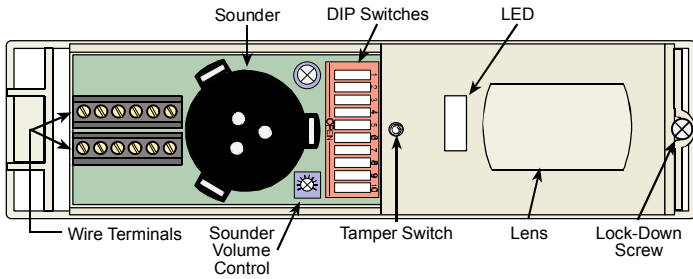
3.4 Route the wiring through the base **before** mounting the base to the wall/ceiling. If using the optional trim plate (TP160 or TP161), See Section 3.5.



3.5 If using the optional trim plate (TP160 or TP161) be sure to run your wiring through the trim plate and into the base before mounting the base and trim plate onto a single gang electrical box.



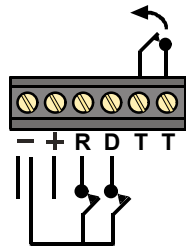
3.6 Note location of detector features.



4.0 Wiring

4.1 Power, Remote Input, Door Contacts and Tamper

- (-) Connect to the negative side of the power supply.
- (+) Connect to the positive side of the power supply. The voltage must be between 12 and 30 VAC or DC.
- (R) The "R" terminal is for Sequential Logic Input (SLI), the keycard input or for remote control of the sounder. The contact must be **Normally Closed (NC)**. See Section 5.7 for more information.
- (D) The "D" terminal allows the detector to monitor door contacts. See Sections 5.6 and 5.7 for more information. If used, these contacts must be **Normally Closed (NC)** door contacts. **Do Not share these contacts with any alarm systems.**
- (T) and (T) **Normally Closed (NC)** Tamper contacts.

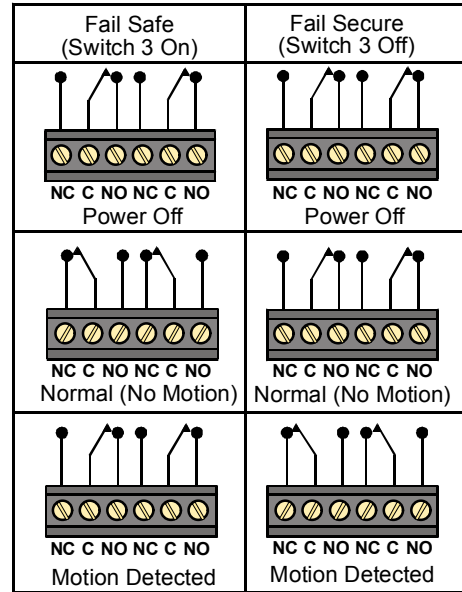


Before you wire the unit, please review the "Wiring Examples" in Sections 4 and 5 for more information on the wiring of the DS160.

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4.2 Contact Output Wiring

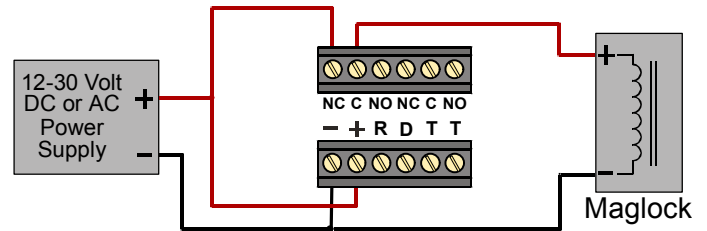
The normal settings of the contact outputs will change depending on the setting of the Relay Mode switch S3. See Section 5.3.



4.3 Wiring Examples

4.3.1 Basic hook-up

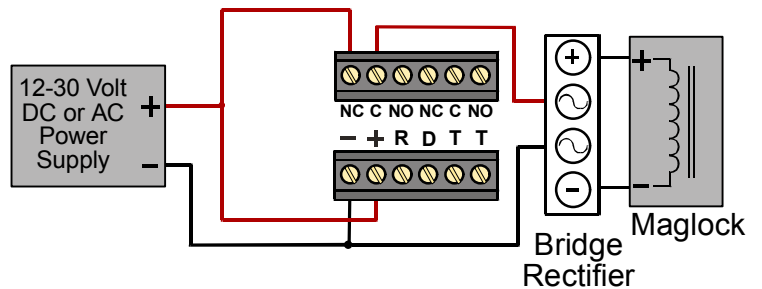
The basic hook-up consists of the DS160, a power supply and a magnetic lock. When the DS160 sees motion, power is removed from the magnetic lock.



Relay contacts shown with Switch 3 ON (Failsafe Mode) and Power On

4.3.2 Spike Protection

Many magnetic locks and electric door strikes have built-in "spike protection" (this protection may also be called "diode protected"). If your lock is not spike protected, you should install a bridge rectifier (such as a KBL005) between the relay contacts and the magnetic lock/door strike as shown below.

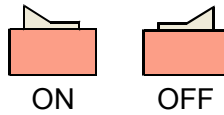
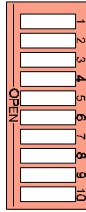


Relay contacts shown with Switch 3 ON (Failsafe Mode) and Power On

NOTE: Failure to spike protect the detector may result in shortening the life of the relay contacts.

5.0 Switch Settings

You may change the switch settings by pressing the rocker to the "On" or "Off" position.



5.1 LED Operation - Switch 1

Switch 1 ON - LED operates normally when motion is detected.

Switch 1 OFF - LED is turned off.

5.2 Timer Reset Mode - Switch 2

Switch 2 ON - The relay timer will start when the detector sees motion and will restart if there is additional motion. The relay will only drop out when there is no more motion and the timer expires.

Switch 2 OFF - The relay timer will start when the detector sees motion and the relay will drop out when the timer runs out, even if there is still motion present. If there is still motion present, the timer will start again.

The time period is selected in Section 5.4

5.3 Relay Mode - Switch 3

Switch 3 Off - The relays operate in the Fail Secure mode. *The Fail Secure mode must be authorized by your Local Authority.* See Section 4.2, Contact Output Wiring, for the contact information.

Switch 3 ON - The relays operate in the Fail Safe mode. See Section 4.2, Contact Output Wiring, for the contact information.

5.4 Relay Timer - Switches 4, 5 & 6

Setting switches 4, 5 & 6 determines the amount of time the output relays will energize (between 1/2 and 64 seconds), when motion is detected.

Use the following chart to set the relay timer:

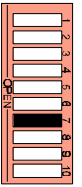
Relay Timer	Switch		
	4	5	6
1/2 Second	OFF	OFF	OFF
1 Second	OFF	OFF	ON
2 Seconds	OFF	ON	OFF
4 Seconds	OFF	ON	ON
8 Seconds	ON	OFF	OFF
16 Seconds	ON	OFF	ON
32 Seconds	ON	ON	OFF
64 Seconds	ON	ON	ON

5.5 Signal Processing - Switch 7

The Signal Processing setting determines how sensitive to movement the detector is.

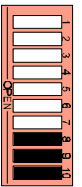
Switch 7 ON - High sensitivity (REX mode).

Switch 7 OFF - Low sensitivity (security sensor).



5.6 Door Secure Mode - Switches 8, 9 & 10

If the detector is activated but the door is not opened, the relay will drop out after ten seconds. If the detector is activated and the door is opened, then closed, the relay will drop out after 2 seconds. This is to prevent unauthorized people from entering.



The Relay Timer, See Section 5.4, must be set for 16 seconds or more for the Door Secure Mode to operate properly.

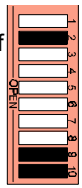
Switches 8, 9 & 10 ON - Door Secure Mode is enabled (wire per Section 5.7.5 for door secure).

Switches 8, 9 & 10 OFF - Door Secure Mode is disabled.

5.7 Remote Input Function - Switches 2, 9 & 10

The Remote Input Function switches determine what the DS160 will do when the contact attached to terminal "R" is closed.

Keycard Input - An input to the "R" Terminal will activate the detector. This is normally used with a keycard reader outside of the door/building. The internal sounder will not activate when the keycard input is selected. The keycard inputs are affected by resettable/non-resettable mode (Switch 2). The relay will remain activated as long as the keycard input is closed. The timer starts when the keycard input is force activated. If Switch 2 is ON, toggling the keycard input again will restart the timer (this is the suggested setting). If Switch 2 is Off, toggling the keycard input will not restart the timer.



Direct Sounder Enabled - With this selection, the sounder will be turned on as long as the contact on terminal (R) is open. It does not affect the relay or timer.

Sequential Logic Input - The detector will only activate if the Sequential Logic Input (Terminal "R") is open, or for ten seconds after it closes again. Any movement after 10 seconds after the contact on the "R" terminal closes will be ignored.

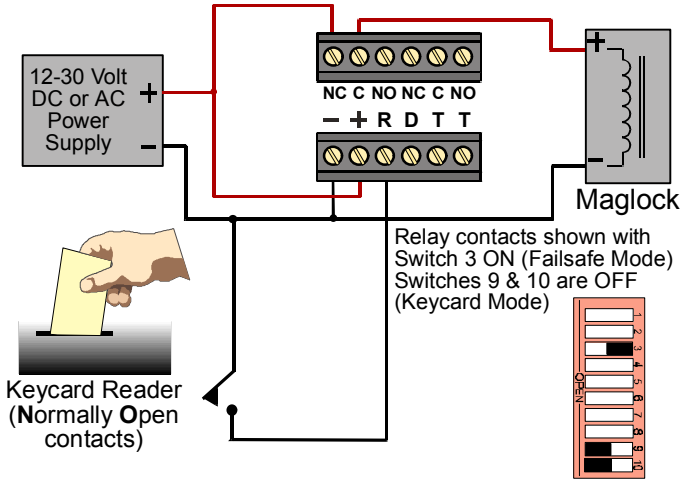
Monitor Door Contacts - Door contacts connected to terminal "D" will monitor if the door is open or closed. If the detector is activated and the door is still open when ten seconds remain on the timer, the sounder will turn on. If the door is opened without activating the detector, the sounder will turn on. The sounder will remain ON until the door is closed or the detector is activated. The timer must be set to at least 16 seconds for this feature to work.

Use the following chart to set the Remote Input Function:

Function	Switch	
	9	10
Keycard Input	OFF	OFF
Direct Sounder Enable	OFF	ON
Sequential Logic Input	ON	OFF
Monitor Door Contacts	ON	ON

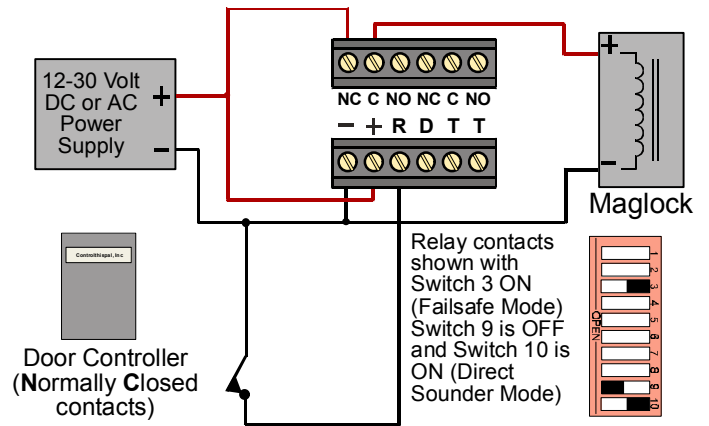
5.7.1 Wiring Example: DS160 and a Keycard Reader

This setup is normally used when a keycard reader is on one side of the door and the DS160 is on the other side of the door. Both swiping a keycard or motion being detected by the DS160 will remove power from the magnetic lock.



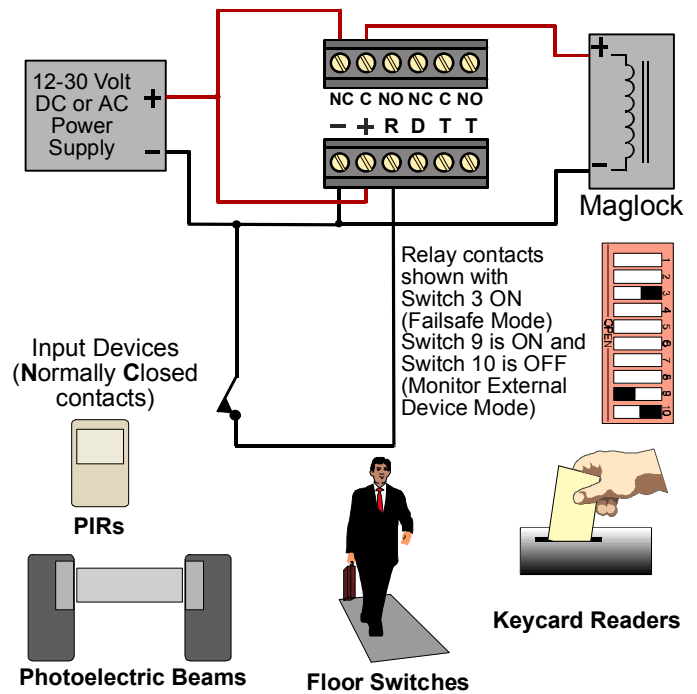
5.7.2 Wiring Example: Direct Sounder Enable

The Direct Sounder Enable setting can be used to turn on the DS160 sounder from a remote contact. The DS160 internal sounder will remain on as long as the external contacts remain open. The sounder input may come from devices such as a door controller or door contacts. **Turning the sounder ON does not affect the relay or relay timer. The direct sounder input will not remove power from the magnetic lock.**



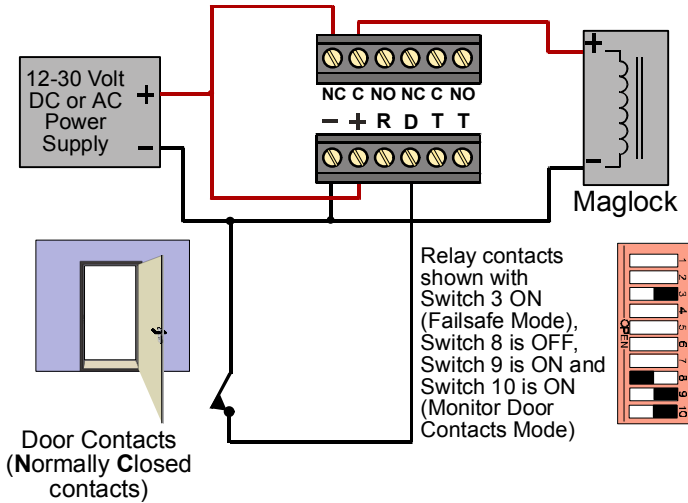
5.7.3 Wiring Example: Sequential Logic Input

The detector will only activate by motion if the Sequential Logic Input (Terminal "R") is open, or for ten seconds after it closes again. For example: If a second detector placed before the DS160 is activated, and for ten seconds after it resets, the DS160 will activate when it sees motion. Any movement after 10 seconds after the contact on the "R" terminal closes will be ignored.



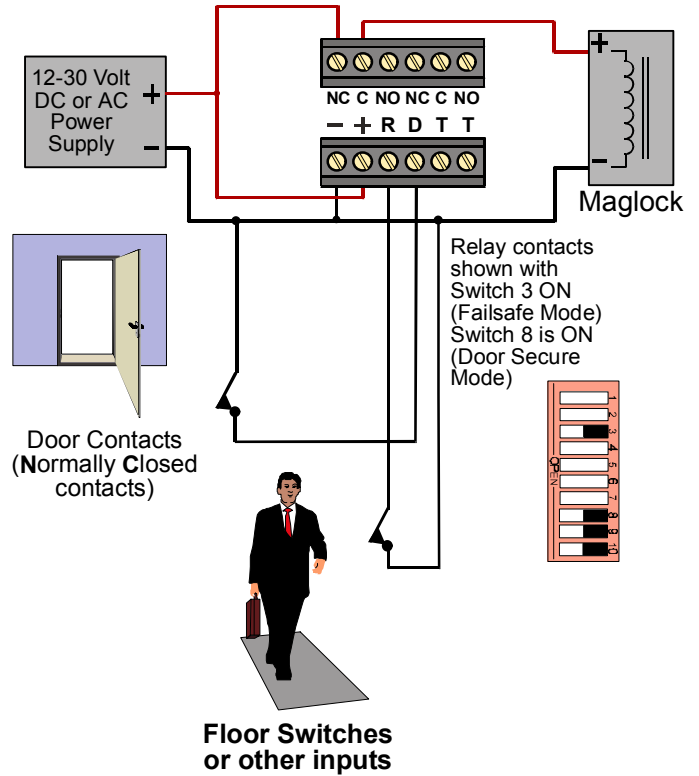
5.7.4 Wiring Example: Monitor Door Contacts (First Option)

In the Monitor Door Contacts Mode, a person entering the field of view of the detector will activate the relay and timer. Door contacts connected to terminal "D" will monitor if the door is open or closed. If the relay timer gets to 10 seconds or less (only if set up for 16 seconds or greater [see Section 5.4]) and the door is still open, the DS160 internal sounder will activate. The sounder will also activate if the door is opened without first activating the detector or keycard input. The sounder will remain ON until the door is closed or by someone moving in the field of view.



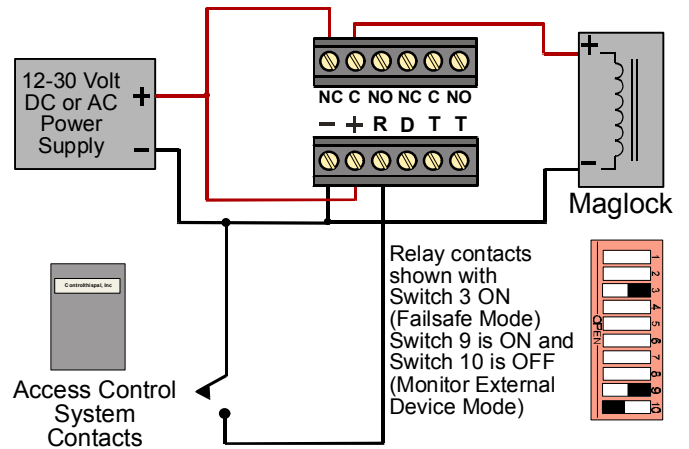
5.7.5 Wiring Example: Monitor Door Contacts (Second Option)

If the detector is activated but the door is not opened, the relay will drop out after ten seconds. If the detector is activated and the door is opened, then closed, the relay will drop out after 2 seconds. This is to prevent unauthorized people from entering.



5.7.6 Disabling the Request-To-Exit (Example 1)

The DS160 may be disabled by using the "R" terminal along with an external device such as an access control or burglar alarm system. When the contact connected to the "R" terminal closes, the DS160 will be disabled after a 10 second delay. The DS160 will return to normal operation as described in Section 5.7.3 after the contact is closed.

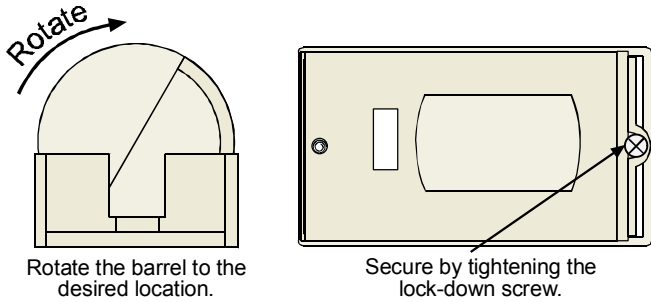


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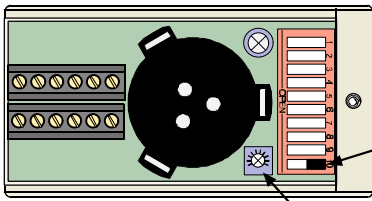
The NFPA 101 "Life Safety Code®" requires that secured doors have a "manual release device that shall result in direct interruption of power to the lock - independent of the access control system electronics".

6.0 Complete Installation

6.1 Secure detector inside base



6.2 Adjust the sounder volume

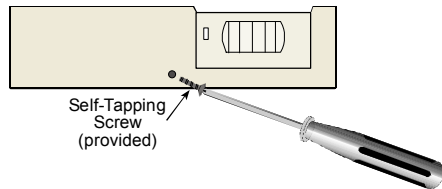


To test the volume, turn Switch 10 on and apply power. The sounder will turn on as long as Terminal R is open.

To adjust the volume, turn the Volume Control with a screwdriver. Turn clockwise to increase the volume, and counterclockwise to decrease.

6.3 Replace the cover and secure with screw

Use a drill to remove screw knockout in the cover only, then start screw and tighten to secure.



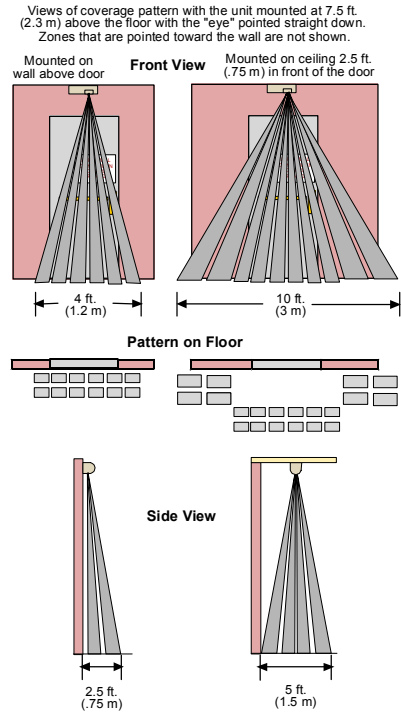
7.0 Coverage Patterns

The coverage (detection area) of the DS160 will vary depending upon the mounting height above the floor, the angle of the lens, and if the unit is mounted on a wall above the door or on the ceiling.

The unit may also be masked to allow only some parts of the coverage pattern to be active.

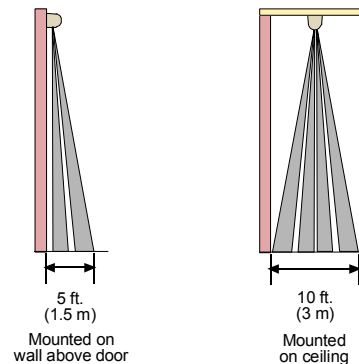
7.1 Some examples:

When the unit is mounted on the wall and the lens is pointed straight down, some of the detection zones will be pointed toward the wall and will not detect movement.

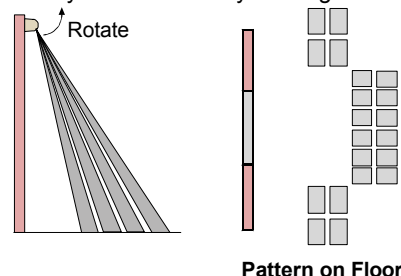


The higher the unit is mounted, the larger the coverage area. Do not mount the DS160 more than 15 ft. (4.6 m) above the floor.

Side view of coverage pattern with the unit mounted at 15 ft. (4.6 m) above the floor with the "eye" pointed straight down

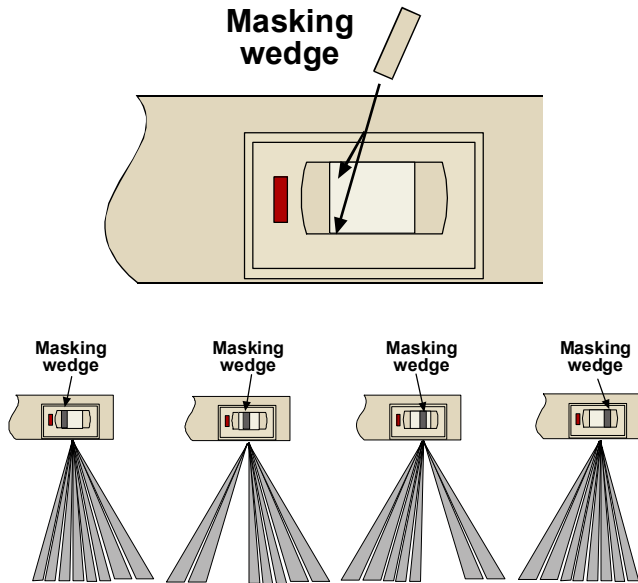


If the DS160 is mounted on the wall above the door, you can move the coverage pattern away from the wall by rotating the detector's lens.

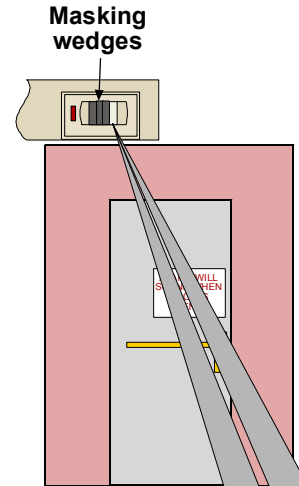


7.2 Masking

The DS160 is supplied with 3 Masking wedges which can be used to disable any part of the coverage pattern. Each wedge will cover approximately 25% of the coverage pattern.



Up to 3 Masking wedges can be used if you wish to detect only in a very small area, such as around a doorknob or crash bar.

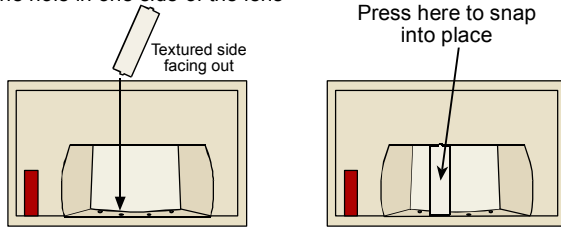


IMPORTANT

Remember that the coverage pattern depends on how high the DS160 is mounted, the location of the unit and the position of the lens on the detector. If you desire a setup as shown above, the DS160 should be mounted just above the door - on the hinge side - with the lens pointed down and slightly out.

To insert a masking wedge, insert the bottom peg first. Then press on the center of the wedge until it snaps into place.

Select a section of the lens to mask
Insert the tab on the end of the wedge
in the hole in one side of the lens



To remove a wedge, place the tip of a small screwdriver behind the wedge and pry up. Be careful to not scratch the lens when removing the wedge.

