

## 1 | Overview

The DS778 is a long range, passive infrared intrusion detector with pointable mirrored optics.

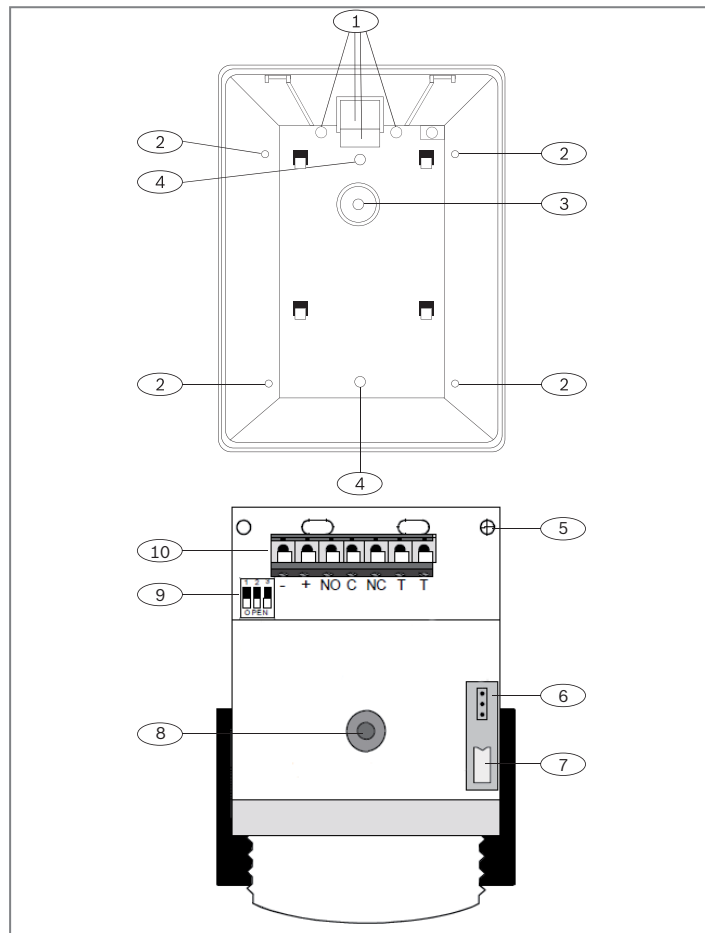


Figure 1.1: Detector base interior view (top) and detector body interior view (bottom)

Callout	Description
1	Wiring knockouts for surface or corner mounting
2	Corner mounting holes (4)
3	Bracket mounting hole
4	Surface mounting holes or single gang box holes (2)
5	Chassis screw
6	Background noise voltage pins
7	Tamper switch
8	LED
9	Configuration switches
10	Terminal strip

## 2 | Installation considerations

Select a location for mounting the detector that is most likely to intercept an intruder moving across the coverage pattern. The recommended mounting height range is 2 m to 2.6 m (6.5 ft to 8.5 ft).

Mount to a surface that is solid and vibration-free. Avoid direct hot and cold drafts, direct sunlight, heat sources, windows, air conditioning outlets, and small animals. This detector does not detect through glass.

Refer to Section 9.

## 2.1 | Mounting

Mount the detector and adjust the mirrors to provide proper coverage.



### NOTICE!

For bracket mounting, refer to the instructions supplied with the bracket.

- To remove the cover, insert a thin slotted screwdriver into the notch at the bottom of the cover and pry up.
- Remove the chassis screw in the upper right corner of the assembly. To remove the circuit board/mirror unit from the enclosure, push the circuit board/mirror unit toward the top of the enclosure until it clears its four retainer tabs, then lift out.
- Mark the location for the mounting screws. Use the enclosure as a template. Start the mounting screws.
- Open the appropriate wiring knockout and route the wiring through (Refer to Section 3.0).
- Securely attach the detector.
- Replace the circuit board/mirror unit.
- Adjust the mirror.

## 2.2 | Vertical mirror adjustment

Adjust the mirror vertically to enable proper coverage.



### NOTICE!

Excessive handling of the mirror surfaces lead to performance degradation.

- Adjust vertically from +2° to -18° by sliding the mirror forward or back. Refer to Figure 2.1 to set the correct vertical angle based on the mounting height and desired range. Angle adjustment marks are on the sides of the mirror (refer to Figure 2.2).
- Slide the mirror forward or back until the angle hash marks are in-line with the markers on each side of the frame.

Mounting height [m (ft)]	Vertical angle setting	
	30 m (100 ft)	60 m (200 ft)
2 (6.5)	-2°	-1°
2.3 (7.5)	-2°	-2°
2.6 (8.5)	-3°	-2°

Figure 2.1: Mounting height/range chart

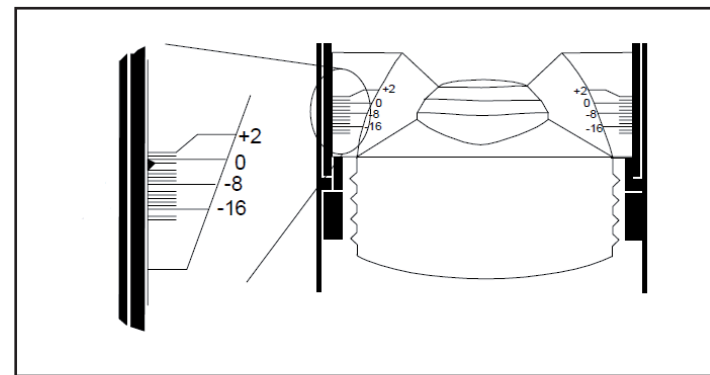


Figure 2.2: Setting vertical angle

## 2.2 | Horizontal mirror adjustment

For narrow hallways, adjust the mirror horizontally to enable proper coverage. By default, the detector pattern is centered, leaving a gap in the coverage pattern down most of the hallway (refer to Figure 2.3). Adjust the detector pattern (mirror) to remove this coverage gap (refer to Figure 2.4).

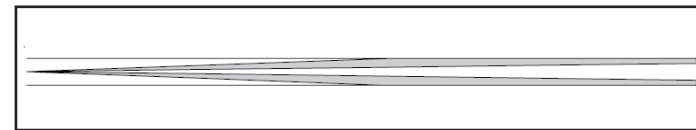


Figure 2.3: Narrow hallway, detector centered, pattern centered

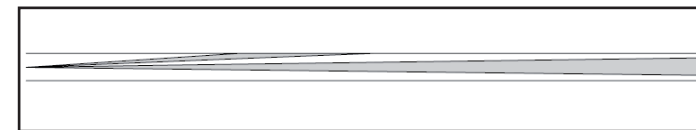


Figure 2.4: Narrow hallway, detector centered, pattern rotated 1° (1 click)

- Depending on the dimensions of the hallway, mount the detector in the center. Adjust the horizontal angle  $\pm 10^\circ$  by rocking the mirror side to side (1 click = 1°). Refer to Figure 2.5 for horizontal angle adjustment.
- Walk test the installation carefully to ensure adequate coverage.

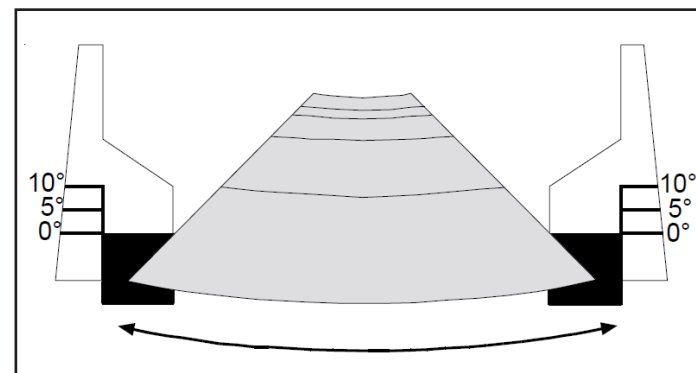


Figure 2.5: Horizontal angle (pattern) adjustment (1 click = 1°)

## 3 | Wire the detector

Connect the wires to the terminal block. Seal the wire entrance with the provided foam plug.



### NOTICE!

Only apply power after all connections have been made and inspected.

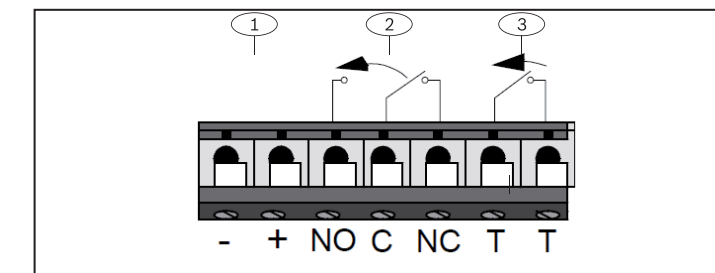


Figure 3.1: Contacts shown in normal condition (no alarm or tamper) with power applied

Callout	Description
1	Power: 6 - 15 VDC, use no smaller than 22 AWG (0.6 mm) wire pair
2	Normally Open (NO), Common, Normally Closed (NC) Reed relay for silent operation: Contacts rated at 3 watts, 125 mA, 28 VDC maximum for DC resistive loads and protected by a 4.7 ohm resistor in the common "C" leg of the relay. Do not use with capacitive or inductive loads.
3	Tamper: Normally Closed Tamper Contacts, rated 28 VDC, 125 mA

## 4 | Configure the LED

Use the LED (switch 1) to enable or disable the detector LED when it is activated by an intruder signal.

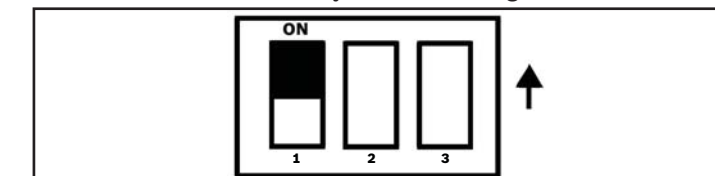


Figure 4.1: LED ON/OFF switch set to on

LED On/Off	Switch 1
LED Enabled	ON
LED Disabled	OFF

Figure 4.2: LED switch settings

## 5.0 | Configure sensitivity

Use switches 2 and 3 to set the detectors sensitivity.

**High Sensitivity** (switch 2 ON) - Provides fast response to intruder signals when used in quiet environments without thermal and illumination interference (refer to Figure 5.1).

**Intermediate Sensitivity** (switch 3 ON) - This is the recommended setting for any location where an intruder is expected to cover only a portion of the protected area. This setting tolerates normal environmental conditions. Refer to Figure 5.1 to set the sensitivity switches.

Sensitivity	Switch 2	Switch 3
High	ON	OFF
Intermediate	OFF	ON
Not recommended	ON	ON

Figure 5.1: Sensitivity switch settings

## 6 | Walk test

1. Replace the cover.
2. Apply power to the unit.
3. Wait at least two minutes to start the walk test.
4. Walk test across the coverage pattern. Refer to *Figure 6.1*.
5. Determine the edge of the coverage by activating the alarm LED. This changes depending upon the sensitivity switch settings.
6. Walk test the unit from both directions to determine the boundaries.
7. If you cannot achieve the desired range, try angling the mirror up or down to assure the coverage pattern is not aimed too high or low.

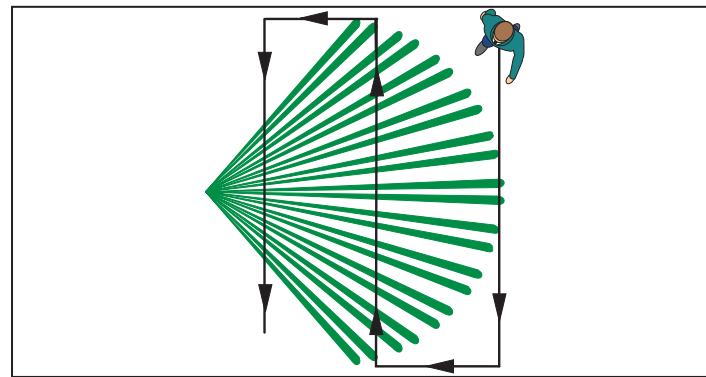


Figure 6.1 Walk test pattern

## 7 | Final tests

Use an ohm/volt meter to measure the background noise voltage.



### NOTICE!

Meter readings are very important in determining background disturbance levels and catch margin sensitivity.

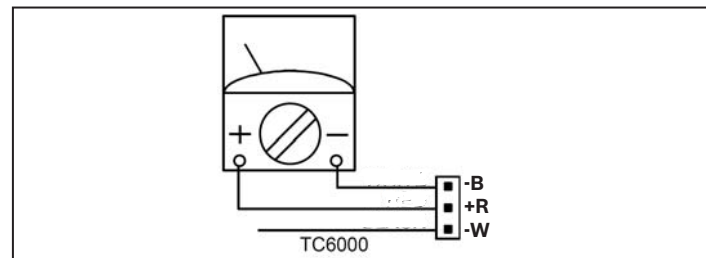


Figure 7.1 Meter reading

1. Connect a DC VOM to the Noise Voltage pins (use TC6000).
2. Replace the cover, routing the TC6000 cable through the notch in the top of the case.
3. Set meter scale for about 3.0 VDC.
4. The base reference level for reading background noise is approximately 2.0 VDC.

5. Installations in quiet environments result in a steady reading between 1.9 VDC and 2.1 VDC.
6. Voltage changes greater than 0.75 VDC from the reference level are desirable for good catch performance.
7. If changes are less than +0.75 VDC, the device might fail to respond if the temperature between the intruder and the background is minimal.
8. Turn on all heating and cooling sources that are normally in operation during times of protection.
9. Stand away from the unit and outside the coverage pattern, then monitor the background noise for at least 3 minutes.
10. Readings should not deviate from the reference level by more than  $\pm 0.15$  VDC.
11. For readings outside these limits; eliminate the cause, re-aim the unit slightly, or mask off the affected zones.

## 8 | Maintenance

At least once a year, check the range and coverage in accordance with *Section 5*. Instruct the end user to walk through the outer edge of the coverage pattern. This ensures an alarm output prior to arming the system.

## 9 | Masking

Before attempting any masking, be sure the mirror surface is the correct one. Use *Figure 10.1* to determine the relationship between mirror sections and the pattern. Attempting to remove masking might destroy the mirror surface or leave enough residue behind to reduce coverage performance. Refer to *Figures 9.1 and 10.1*.

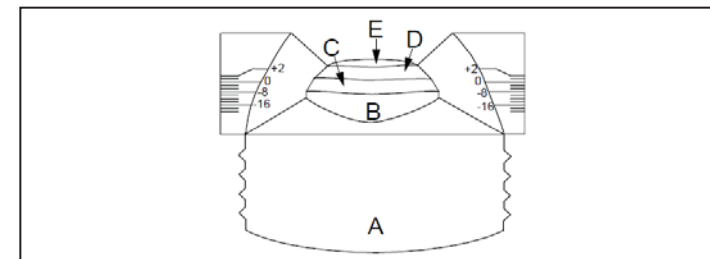


Figure 9.1 Mirror segment to pattern reference

## 10 | Coverage patterns

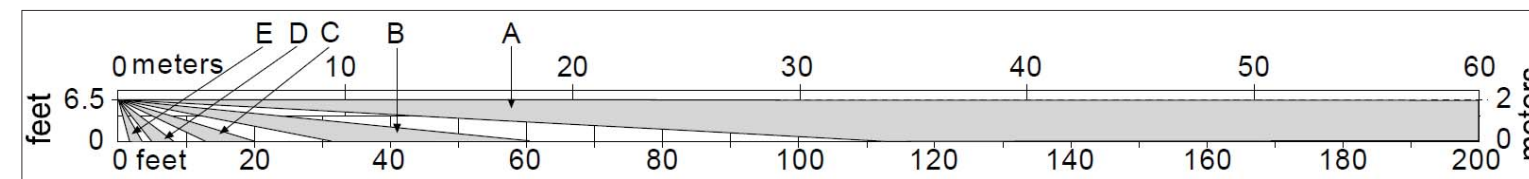


Figure 10.1 Side view

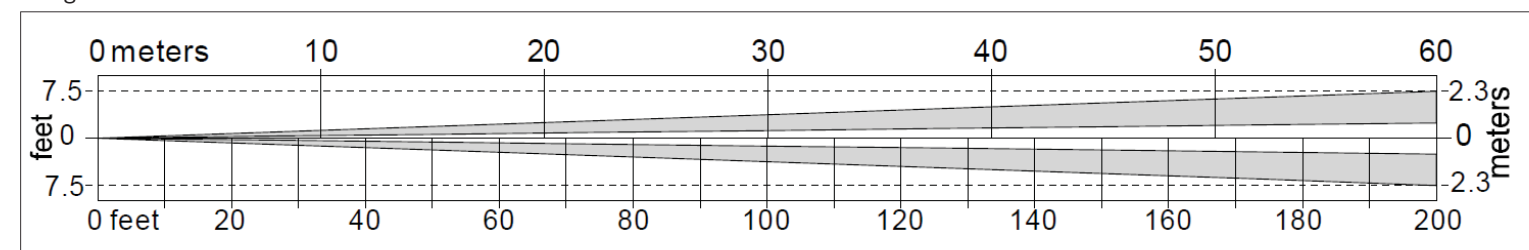


Figure 10.2 Top view

## 11 | Specifications

Input power	6 VDC to 15 VDC; 18 mA at 12 VDC
Operating temperature	The storage and operating range is -40°F to +120°F (-40°C to +49°C). For UL Certificated installations, the temperature range is +32°F to +120°F (0°C to +49°C).
Coverage	60 m by 4.5 m (200 ft by 15 ft)
Sensitivity selection	Adjustable for Intermediate or High
Alarm relay	Form "C" reed relay with contacts rated at 28 VDC, 125 mA maximum for DC resistive loads.
Tamper	Normally closed (with cover in place) tamper switch rated at 28 VDC, 125 mA maximum
LED operation	On/Off selectable
Standby power	No internal standby battery. Unit is intended to be connected to DC power sources capable of supplying standby power in the event primary power fails. 18 mAh are required for each hour of standby time needed. For UL Certificated Installations, a minimum of 4 hours (72 mAh) is required.

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Use the serial number located on the product label and refer to the Bosch Security Systems, Inc. website at <http://www.boschsecurity.com/datecodes/>.



## Long Range PIR Detector DS778



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