DT-900 Series DUAL TEC® Motion Sensor Supplemental Information

MOUNTING LOCATION

Aim the sensor toward the interior of the room, away from windows, moving machinery, and heating/cooling sources.

Make sure the sensor has a clear line-of-sight to all areas you wish to protect. If the PIR is blocked, the unit will not alarm.

TAMPER

The sensor covers and wall mounting are tamper protected. A screw **must** be installed in the wall to utilize the tamper feature.

WIRING

Reverse polarity will not damage the sensor.

Knockouts are provided to allow wire entry via 1/2" EMT or surface wiring conduit.

NOTE: For proper wiring methods, refer to the National Electrical Code NFPA 70.

INFORMER MODE

The INFORMER circuit counts the number of events registered by both the microwave and PIR technologies, and uses the resulting ratio to determine if either technology is working properly or is misapplied. Establish the INFORMER mode using switch S2. (See Step 7.)

Mode 1: *Set S2 to position 1.* In Mode 1, 32 PIR events without a microwave event will cause the unit to go into PIR INFORMER. 128 microwave events without a PIR event will cause the unit to go into microwave INFORMER.

Mode 2: *Set S2 to position 2.* In Mode 2, 16 PIR events without a microwave event will cause the unit to go into PIR INFORMER. 16 microwave events without a PIR event will cause the unit to go into microwave INFORMER.

NOTE: The Mode 2 setting is not recommended. Use **only** if fast INFORMER activation is required.

Disabled: To disable INFORMER function, set S2 to the open position.

When an INFORMER condition occurs, the trouble relay opens, and the LEDs display an INFORMER trouble code. The sensor performs a self-test within the hour to determine if the problem is internal.

If a self-test error is detected, the self-test LED pattern, all three LEDs flashing, replaces the INFORMER LED pattern.

If no self-test error occurs, the unit continues to display the INFORMER LED pattern and relay remains open. The problem is misapplication. Walk-test the sensor to pinpoint the cause. (Refer to **Troubleshooting** Table 3.)

INPUT MODES

The DT-900 Series accommodates several international operating requirements using two operating modes—Standard mode with remote LED enable and Command Input capability or European 2-Wire CENELEC mode (INPUT 1 and INPUT 2). For Standard Mode, remove jumper J4 and install jumper J6. For CENELEC mode, remove jumper J6 (See Figure 1).

Table 1 Standard Mode—J6 Installed

	Input Condition	
	HIGH/Not connected	**LOW**
INPUT 1	LEDs Disabled	LEDs Enabled
INPUT 2	Normal operation	Self-test

Table 2 CENELEC Mode—J6 Removed

	Operating Mode			
	Alert	**Local Test**	**Standby**	**Remote Test**
INPUT 1	high	low	high	low
INPUT 2	high	high	low	low

NOTE: For Standard Mode/INPUT 2 (remote self-test) use only—install jumper **J4.**

Table 4 Cenelec Functions

	Operating Mode			
	Alert	**Local Test**	**Standby**	**Remote Test**
Walk Test LED's	Disabled	Enabled	Disabled	Disabled
Microwave Oscillator	On	On	Off	On
Alarm Outputs	Enabled	Enabled	Frozen	Enabled
Alarm Memory Activated	Yes	No	No	Yes
Alarm Memory Reset	Only when Entering	No	No	No
Alarm Memory Displayed (Red LED flashing)	Disabled	Enabled	Enabled	Disabled
Trouble	Disabled	Enabled	Enabled	Disabled

Remote Test Mode causes the unit to enter a remote self-test (ongoing self-test). The Anti-Mask Output becomes a "test running" output and remains open for the duration of the test. If the unit passes all the self-tests, the alarm relay is activated for one second.

TROUBLESHOOTING

Vertical Adjustment

Various mounting locations may require fine vertical adjustment (e.g. uneven walls or floors, etc.). During the walk-test, if the PIR is short-ranged, turn the Vertical Adjust Screw **counterclockwise.** If the PIR is over-ranged, turn the Vertical Adjust Screw **clockwise.** (See Step 5.)

Self-Test

The sensor microcontroller automatically performs a series of self-tests in the following instances: when the unit is powered up, when the tests are installer initiated, upon Command Input, or every hour during normal operation. When a self-test error occurs, the Trouble relay opens and all 3 LEDs flash until the problem is corrected. If the problem persists and the LEDs continue to flash, the unit is defective and must be returned for repair.

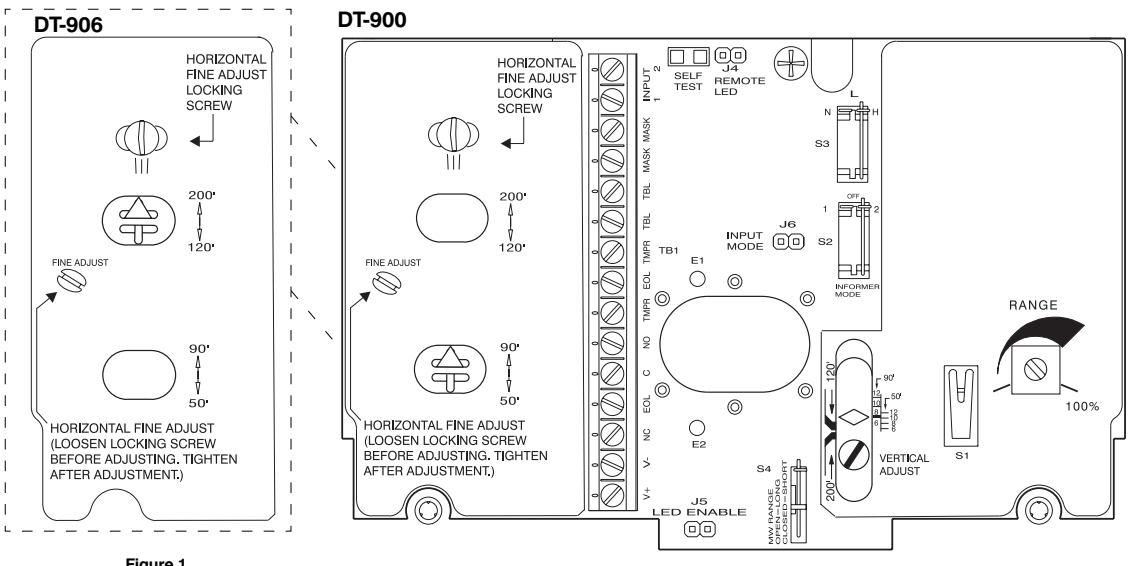


Figure 1
DT-900 Printed Circuit Board

Feet	6	8	10	12	14	50	90	120	200
Meters	1.8	2.4	3	3.7	4.3	15	27	37	61

Trouble Memory

If the LED pattern disappears before you see it, you can retrieve the pattern. The trouble memory feature stores the last LED pattern from a self-test detected problem or an INFORMER condition.

To recover the LED pattern, first open the Top Cover (see Step 2). Using a small screwdriver, momentarily short circuit the two Self-Test pads located on the printed circuit board (see Supplemental Information, Figure 1). The trouble LED pattern will be re-displayed.

Short the pads with the screwdriver again to clear the LED pattern and initiate a self-test.

Anti-Mask

The DT-900 Series anti-mask feature detects attempts to block or cover the sensor by sending an active infrared beam out into the sensor's field-of-view, at regular 8 second intervals. If the DT-900/DT-906 is blocked or covered (i.e. with a box or fabric) the beam is reflected back to the sensor. After two consecutive reflected beams, the sensor signals a trouble condition—green and red LEDs flash rapidly and the mask relay opens.

INFORMER Conditions

Table 3 describes two trouble alerts which are reported by the INFORMER circuit. To use this troubleshooting matrix:

1) Find the trouble alert that describes the condition of the walk-test LEDs (with no motion in the area).
2) Walk-test the sensor, carefully watching the reaction of the diagnostic LEDs.
3) Refer to the **Possible Causes** column of the matrix for an explanation of the way in which the diagnostic LEDs reacted to the walk-test.

Table 3 INFORMER Troubleshooting Matrix

Condition of LEDs with No Motion PIR (Green) ALARM (Red) MW (Yellow)	Reaction of LEDs to Walk-Test PIR (Green) ALARM (Red) MW (Yellow)	Type of Problem	Possible Causes
○ ● ●	○ ○ ○ (Pattern disappears)	RATIO IMBALANCE	MW environmental problem MW unstable MW range too long PIR was blocked
	○ ● ●	RATIO IMBALANCE	PIR range too short PIR aimed wrong PIR not reporting
● ● ○	○ ○ ○ (Pattern disappears)	RATIO IMBALANCE	PIR environmental problem PIR unstable MW range too short
	● ● ○	RATIO IMBALANCE	MW range too short MW not reporting

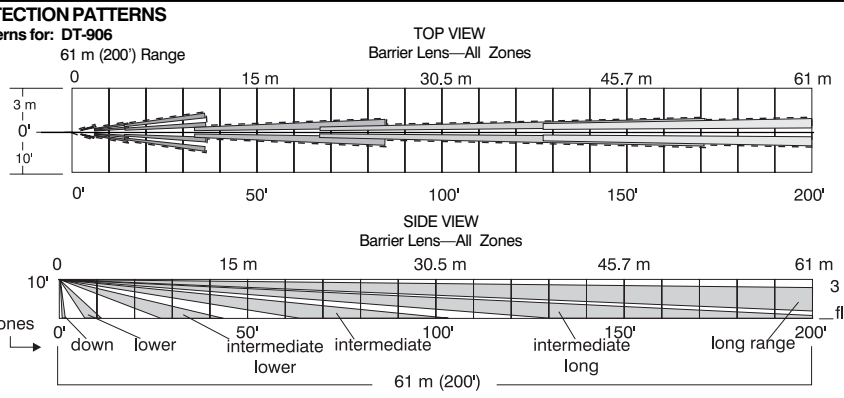
LED Legend: ● = LED is Flashing Slow ○ =LED is OFF

NOTE: If you enter the detection pattern and the LEDs go off, you can retrieve the LED pattern to pinpoint the problem. Refer to **Trouble Memory** above.

DETECTION PATTERNS

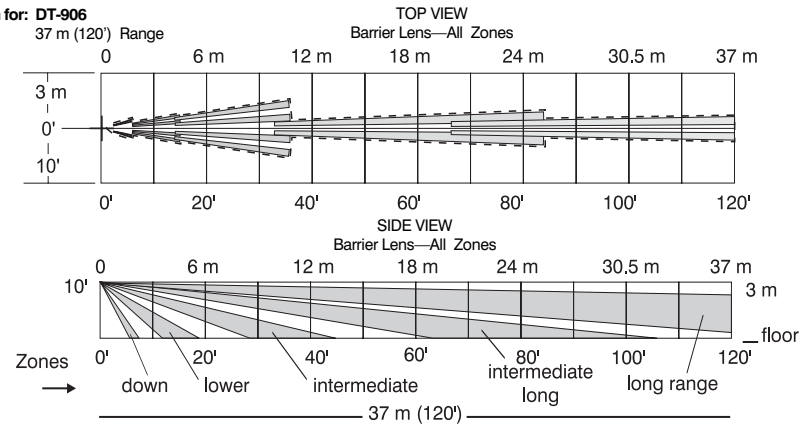
Patterns for: DT-906

61 m (200') Range



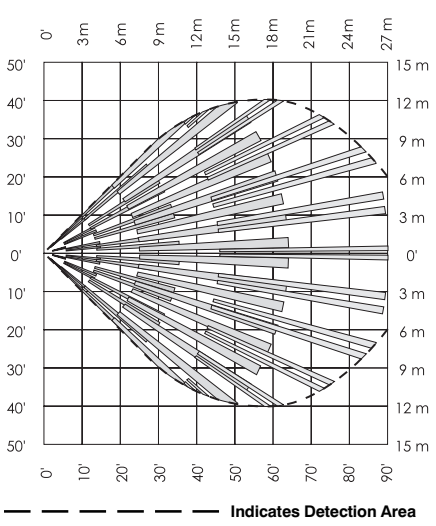
Pattern for: DT-906

37 m (120') Range



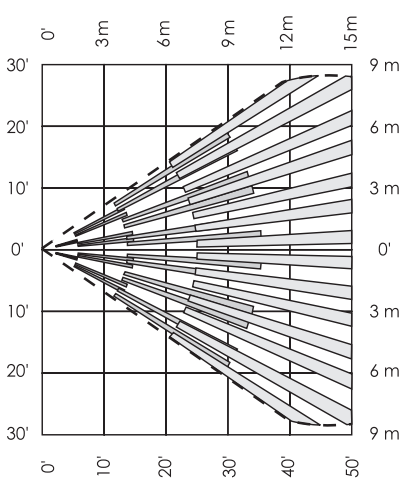
Patterns for: DT-900

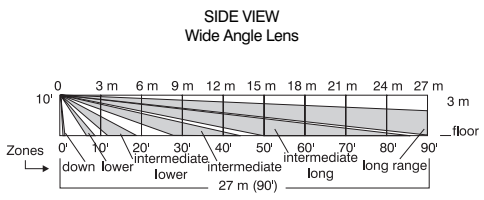
27 m (90') Range

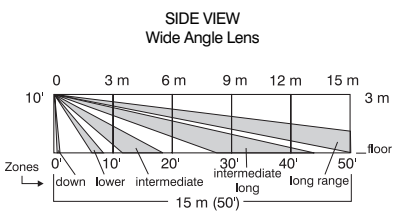


Patterns for: DT-900

15 m (50') Range







PRODUCT SPECIFICATIONS

Range:
DT-906
37 m x 3 m / 61 m x 5 m
120' x 10' / 200' x 15'
DT-900
15 m x 12 m / 27 m x 21 m
50' x 40' / 90' x 70'

Alarm relay:
Energized Form C
25 VDC, 125 mA
22 ohm series protection resistor

Power requirements:
10 - 15 VDC
50 mA (max) at 12 VDC
AC Ripple: 3V peak-to-peak at nominal 12 VDC

PIR white light immunity:
6500 Lux

RFI immunity:
30 V/m, 10 MHz - 1000 MHz

Trouble relay:
De-energized Form B
(Normally closed)
30 VDC, 25mA

Mask relay:
De-energized Form B
(Normally closed)
30 VDC, 25mA

Input 1 & 2:
Self-test initiate
Active low 0 to 1.5V
Inactive high 5 to V+

Sensitivity:
2 - 4 steps within field of view

Tampers:
Wall, top & bottom covers
30 VDC, 25 mA (NC)

PIR fields of view:
61 m (200') Range
2 long
6 intermediate long
4 intermediate
4 intermediate lower
8 lower
2 down
37 m (120') Range
6 long
4 intermediate long
4 intermediate
8 lower
2 down
27 m (90') Range
18 long
18 intermediate long
16 intermediate
12 intermediate lower
8 lower
2 down
15 m (50') Range
18 long
16 intermediate long
12 intermediate
8 lower
2 down

Microwave frequencies:
X band

Operating temperature:
0° to 49° C / 32° to 120° F

Relative humidity:
5% to 95% relative humidity (non-condensing)

Dimensions:
20 cm x 16.5 cm x 15.2 cm
8" x 6 1/2" x 6"

Weight:
1.36 kg / 3 pounds

Packaged product:
1.6 kg / 3.5 pounds

Approvals/listings:
CE (EMC Directive: residential, commercial, light industrial)
FCC certified
Industry Canada
DTI
UI listed
ULC listed

IMPORTANT: DT-900 Series sensors should be tested at least **once each year** to ensure proper operation.

FCC NOTICE: This equipment has been tested and found to comply with the limits for a field disturbance sensor, pursuant to Part 15 of the FCC Rules. The user is cautioned that changes or modifications not expressly approved by C&K Systems could void the user's authority to operate this equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

IC Notice: Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

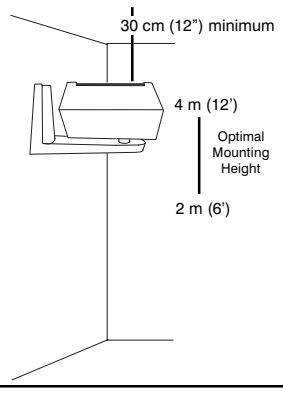
Note: The ULC label or listed marking on a product is the only evidence provided by Underwriters Laboratories of Canada to identify products that have been produced under the Listing and Follow-Up Service.

5-051-344-00 Rev D

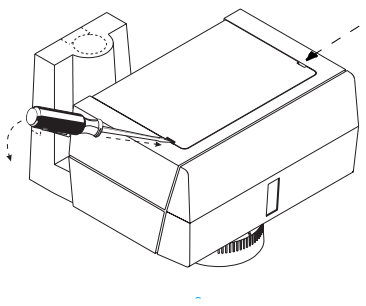
http://www.cksys.com

DT-900 Series DUAL TEC® Motion Sensor for Commercial and Light Industrial Applications—Installation Instructions

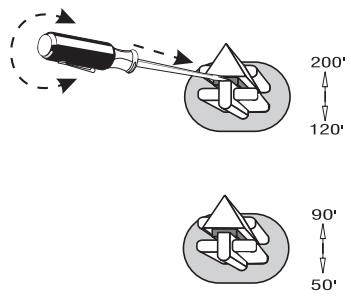
Step 1
Select mounting height.



Step 2
Carefully push screwdriver into slots to disengage latches and open top cover.



Step 3
Firmly insert screwdriver into slot in arrow and rotate PIR Mirror Selector to the correct range.

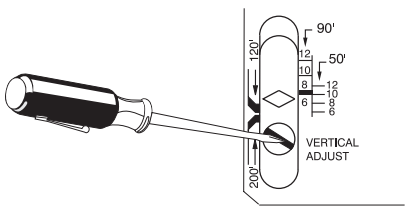


Step 4
Set switch S4 to establish microwave range.

MODEL	RANGE	Switch S4	MIRROR Selector
DT-906	61 m (200')	OPEN*	200' *
DT-906	37 m (120')	CLOSED	120'
DT-900	27 m (90')	OPEN*	90' *
DT-900	15 m (50')	CLOSED	50'

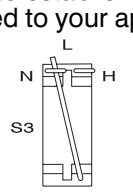
*Factory default setting.

Step 5
Locate correct sensor range scale and rotate Vertical Adjustment Screw until the diamond corresponds to the sensor mounting height (coarse adjust).



NOTE: Fine adjust may be needed during walk-test. See Supplemental Information.

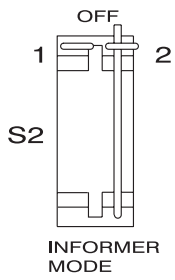
Step 6
Set switch S3 to establish the sensitivity best suited to your application.



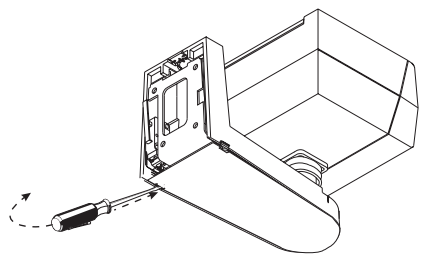
SENSITIVITY	S3
HIGH	H
NORMAL	N*
LOW	L**

*Factory default setting. **Not connected
**Not recommended for DT-906

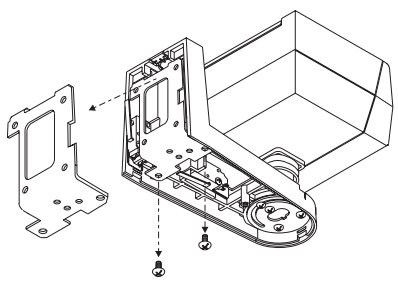
Step 7
Select INFORMER® mode with switch S2, if desired. (See **Supplemental Information**).



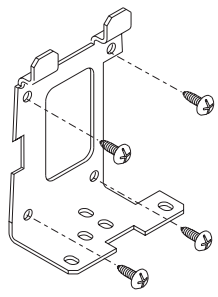
Step 8
Carefully push screwdriver into slot to disengage latch and remove bottom cover.



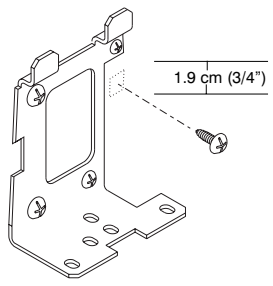
Step 9
Unfasten screws and remove mounting plate from sensor.



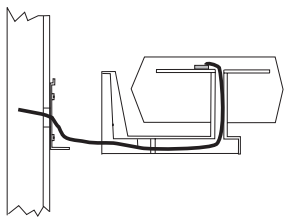
Step 10
Attach mounting plate to wall at desired height, using four fasteners (not supplied).



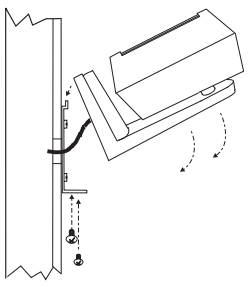
Step 11
Install M5 (#10) screw in wall 1.9 cm (3/4") below mounting screw, as shown, for tamper activation.



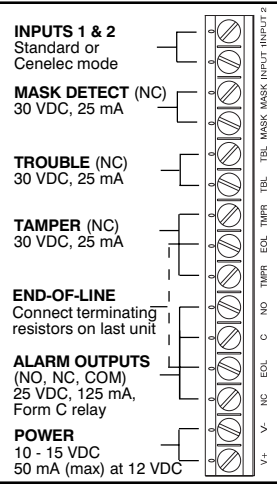
Step 12
Pull about 30 cm (12") of wire from wall through the opening in the mounting plate and route wire to the terminal strip.



Step 13
Hang the sensor on the mounting plate hooks and fasten with the two mounting plate screws.

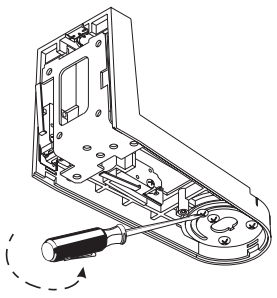


Step 14
Wire the unit as shown.
Use 2.0 - 0.3 mm² (14-22 AWG).

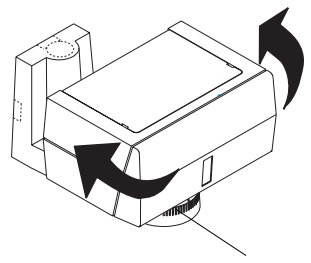


NOTE: Secure wires to mounting plate with tie wraps.

Step 15
Loosen horizontal locking screw in sensor support base.



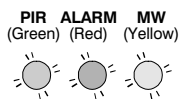
Step 16
Grasp housing and rotate it to the desired position (coarse adjust). If fine adjust is needed see Steps 20-22.



NOTE: Reference marks = 5° change.

Step 17
Apply power to sensor and prepare for walk-test.

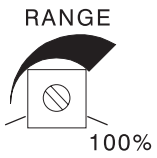
- Wait 90 seconds for power-up self-test to run. All LEDs will flash.



NOTE: LEDs flashing after 90 sec. = defective

Step 18
Turn the microwave potentiometer **counterclockwise** to decrease the microwave range to **minimum**.

During walk-test, gradually turn the potemtiometer **clockwise** increasing microwave sensitivity until the desired range is obtained.

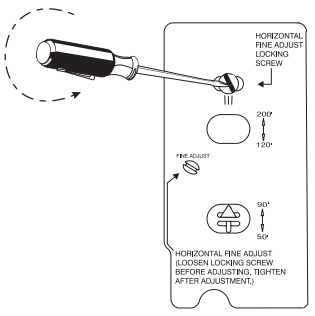


Step 19
Walk-test the sensor to check for adequate detection coverage and to verify the sensor is fully functional. Two to four normal steps should make the LEDs light and trigger an alarm.

NOTE: If an on-going self-test problem, mask condition or an INFORMER condition occurs, the LEDs display a pattern that identifies the trouble. See **Supplemental Information** (Table 3).

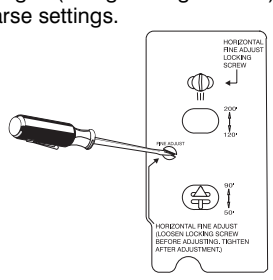
NOTE: When there is no motion in the detection area, all three LEDs should be off.

Step 20
For finer horizontal adjustments, loosen the PIR horizontal fine locking screw on PCB.

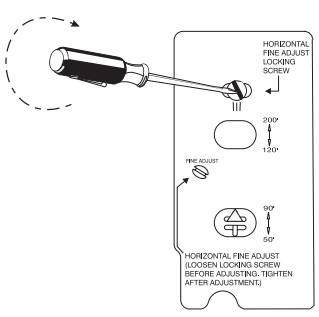


Step 21
Rotate horizontal fine adjust knob to the desired position.

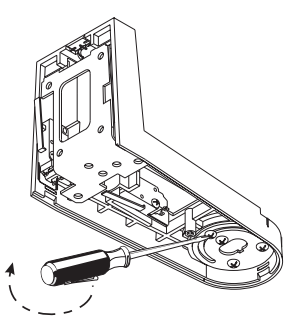
NOTE: Fine adjustment allows for small changes (3 degrees right or left) between coarse settings.



Step 22
Tighten horizontal fine locking screw on PCB.



Step 23
Tighten horizontal locking screw in sensor support base.



Step 24
Remove jumper at J5, on the PCB, to disable the LEDs after walk-testing.

Step 25
Complete installation by closing top cover and replacing bottom cover.