ACel-DT PIR – ULTRASONIC SENSOR   IP20

User Manual

Operation

The presence detector 1324009508 integrates advanced PIR and Ultrasonic technologies in one unit. The combination of these technologies helps to eliminate false triggering problems even in difficult applications. It is suitable for indoor application which is ideal for using in open plan office, multi-stall public restroom, conference room, under-ground parking lots, classroom, library, etc.

By using the knobs on 1324009508 or the IR remote control 1324009524 (Accessory), the time, ultrasonic sensor sensitivity, lux, sens. function (compensation for air flow) and triggering method can be adjusted.

Function

The presence detector has an integrated light sensor that ensures, lighting is only switched on when it detects movement and the daylight level (lux level) is below the preset level.

The light stays on as long as movement is detected, and the off-delay ensures that the light remains switched On for a period after the last detected movement.

The presence detector can be used with its factory settings, or the settings can be modified using the remote control – IR Remote 1324009524 (accessory).

It is also possible to switch the light On / Off with a push button.

The push button will switch On the light regardless the lux level.

When the light is switch On with the push button, it stays On as long as movement is detected and the Time (off-delay) has not run out.

If the light is switch Off with the push button, it stays Off as long as movement is detected and the off-delay has not run out.

Installation

Position:
The detector responds to movement and heat in relation to its surroundings.

Avoid positioning the detector close to heat sources such as cookers, electric radiators, ventilation systems or any moving objects, cause by air flow, etc.

Also surfaces that are highly reflective, like large window or glass sections can cause unwanted activation **Fig. 1**.

It's recommended that the detector is mounted on the ceiling. If the detector is mounted suspended from the ceiling the ultrasonic range is decreased.

Location:
The recommended installation height of this detector is 2 - 3m, and 2.5m is the optimal mounting height. The detection range of PIR sensor can reach up to ø8m, and ultrasonic sensor is an oval shape of 8m x 10m with small movement (i.e. hand wave), and an oval shape of 10m x 16m with large movement (i.e. walk).

The detection angle is 360° for both PIR and ultrasonic sensors.
See **Fig. 2**.

Enlarging the detection range:
By using the presence detector 13240095011 it is possible to enlarge the detection range. It is possible to connect up to 2 pcs. 1321009511 to one 1321009508, which will control the load according to it's settings. 1321009511 has the same detection range as 1321009508

To get complete coverage, when using more sensors, it is recommended to calculate with approx. 20% overlap in the in ultrasonic detection range.
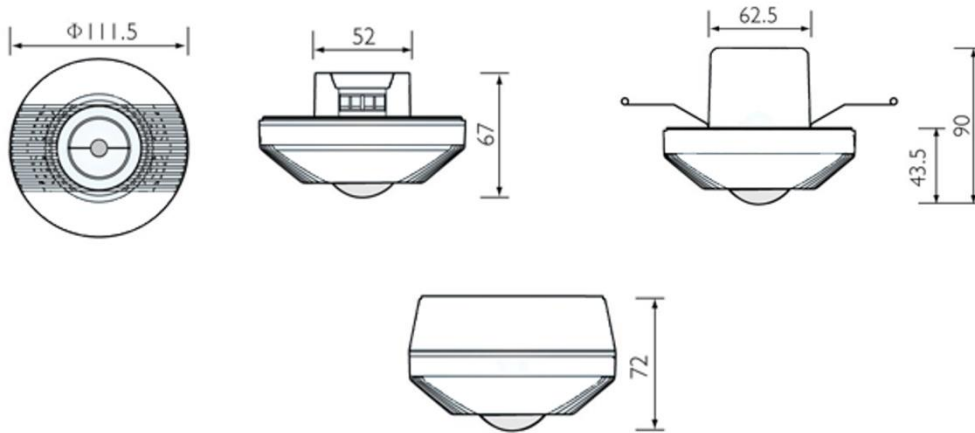See Fig. 3.

Installation:

Flush mount with a standard junction box or surface mounted by
using the surface mounting base. When using the surface mounting base, there are 7 pairs of fixing holes with various distances from 41mm to 85mm.

NOTE:

The direction of the ultrasonic sensor should aim to the main detection area to achieve the best detection coverage.

Connection:

See connection diagram **Fig. 4 – 6**.

After connecting the detector to power, it takes approx. 30sec for the detector to warm up. During this time the load will be switch ON.

Hereafter the detector will run according to it's settings.

Limiting the detection range of PIR sensor:

If the detection range is too large, it can be reduced by fitting the
enclosed lens mask.

It makes it possible to reduce the maximum detection range of Ø8 m to Ø6 m or Ø2 m and the angle of 360° can be reduced in
steps of 30°. Fig. 8.

Settings

The settings can be modified on the knobs below the cover or by using the IR Remote 1324009524 (accessory).

Factory setting, Fig. 7:

Lux: 100 lux

Time (Off-delay): 15 minutes

Meter: 80%, approx. 8 x 13 meter

Sens.: OFF

Trigger method: PIR+US

Lux:

Setting the lux level between 10 and 1000 lux. Indications of 10, 100, 300 and 1000 are approximately.

Time:

Setting the off-delay. This has 6 preset settings:
1, 5, 15 and 30 minutes as well as Pulse (interval of 1 seconds On , 9 sec. Off) and test setting.

Under test, Load will be switched ON for 2 sec., every time a movement is detected.

Meter:

Setting the detection range. This has 4 preset settings: "-", min setting, which is approximately 2 x 3 m,
4 x 6 m, 7 x 8 m
and "+", max. setting, which is approximately 10 x 16 m.

Sens.:

Turning the compensation for air flow On or Off

Trigger method:

Setting the triggering method. This has 4 preset settings: PIR/US, PIR, US and PIR+US. This setting is use to select the desired detection method.

IR Remote

Settings when using the IR Remote 1321009524 (accessory):

On & Off:

By pressing the "On" button, load will be switched On for 8 hrs. It's confirmed by the LED's which will be flashing.

The presence detector can be returned to Auto mode by pressing "On" again.

By pressing the "Off" button, load will be switched Off for 8 hrs. It's confirmed by the LED's which will be flashing.

The presence detector can be returned to Auto mode by pressing "Off" again.

Lock & Unlock:

Press "unlock" to unlock the presence detector, so that the settings can be modified.

Press "lock" to lock the presence detector, after the settings have been made, to save the changed setting.

For all settings the presence detector must be unlocked, the setting selected and the presence detector locked again before the setting is activated. If the presence detector is not locked, it will lock automatically after 2 minutes and any modified settings will be saved.

Reset:

If pressing "reset" all setting made by the IR Remote will be deleted. The presence detector will run according to the setting made on the knobs.

Test:

Load will be switched ON for 2 sec., every time movement is detected.

Lux:

Fixed settings for 10, 30, 100, 400, 1000 lux and a user defined lux value (Learn actual lux). User-defined lux value works in the range 10 – 1000 lux.

Press the button, Learn actual lux, until the presence detector's red and green LED's are flashing. This means the presence detector has enter into learning mode. Learning time is 10sec.

If the "Learn actual lux" was successfully, it's confirmed by the LED's which goes On

Then presence detector returns to Auto mode.

If "Learn actual lux" is out of the range of 10 – 1000 lux, the LED's in the presence detector will, after 10sec, flash quickly for 5sec to
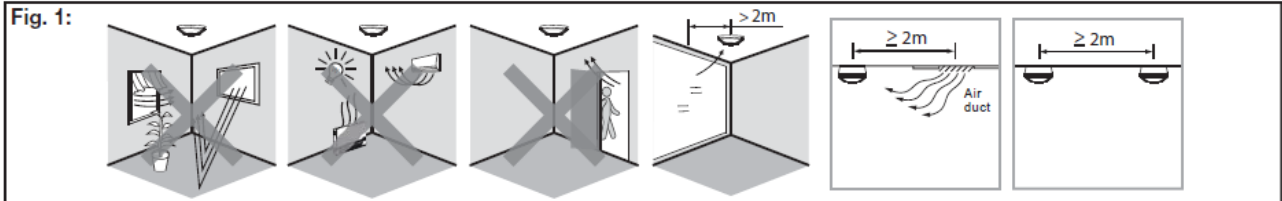
indicate that "Learn actual lux" was unsuccessfully. In that case the following values will be used:
Lux level is above 1000 lux, the presence detector will use 1000 lux as lux setting. Lux level is below 10 lux, the presence detector will use 10 lux as lux setting.
Memo:
The "Memo" button is uses to store and duplicate the values of
Time1 and Lux.
1. Press "Unlock", at the sensors, where the setting should be learned from (the sensor must have setting learned via IR-remote).
2. Press "Memo" for more than 3 sec. to save the settings (after 3 sec. the green LED will flash, as an indication for saved settings)
3. Press "Lock"
4. On the sensor, to which the setting shall be transferred, press "Unlock"
5. Press "Memo" (the green LED will flash, as an indication for saved settings)
6. Press "Lock". Time 1 and Lux are now transferred.
Time:
For setting the off-delay, press Time 1 and then one of the 6 preset settings: 1, 5, 15, 30 and 60 minutes as well as Pulse
(interval of 1 seconds On , 9 sec. Off).
US + and US -:
Press "US + or US - " to set the sensitivity of ultrasonic sensor.
Each time one of the buttons are pressed, the sensitivity of

The presence detector is increase or decrease by 10%, which is indicated by the green LED flashing.
When the sensitivity of presence detector is at its highest or lowest level, the green LED stays On for approx. 2sec.
The default sensitivity is 80%.
Sens.:
Press "Sens. On" or "Sens. Off" to turn the compensation for air flow On or Off
Trigger method:
Setting the triggering method. Press the corresponding button: PIR/US, PIR only, PIR+US or US only.
This setting is use to select the desired detection method.

Terminology

Trigger method:
PIR+US (PIR and US):
Where a defined detection or detection of minor motion is necessary, choose this triggering method. It can also reduce false triggering problem. For example, a classroom, an open-plan office, etc.
Load will turn on when both PIR and Ultrasonic sensors detects movement.
When load is On either PIR or Ultrasonic detecting movement will keep the load On.
US only or PIR/US (PIR or US):
When there is high level of minor motion or obstacle (furniture or partitions) existing in the monitored space, or it is a multi-stall space. For example, a multi-stall public restroom, an office with partitions, etc.
In PIR/US mode load will be turned on when either PIR or

Ultrasonic sensors detects movement.
In US only mode, load will be turned on when Ultrasonic sensors detects movement.
PIR only:
If the monitored space is free of obstacle or has high level of airflow or the detection area is needed to be well specified. For example, a small-scale office with air-conditioning, a small conference room, etc.
In PIR only mode, load will be turned on when PIR sensors detects movement.
The detector is equipped with 2 led's, a red and a green. The LED's are used to indicate wherever the movement was detected by PIR or ultrasound. Red LED indicates PIR and the green indicates ultrasound.
Sens:
The sensitivity (Sens.) function is used to reduce the sensitivity against air flow.
Meter:
The meter setting is used to reduce the sensitivity of the ultrasonic detection range.

Time:
The time setting is used to set the off-delay, before the load switches OFF, after the last detected movement.
Lux:
The lux setting is used to set the light level, for when below, the load can switch ON.

Trouble shooting

Problem:
Load does not turn on
Possible cause:
1. Incorrect wiring.
2. The ambient light level is too high.
Proposed solution:
1. Refer to wiring diagrams (See **Fig. 4 - Fig. 6**) and check if the load is malfunctioned.
2. Check the set Lux value and adjust it if necessary (to a higher lux value).

Problem:
Load does not turn off
Possible cause:
1. Off delay time is too long.
2. Detector has false triggering.
3. Incorrect wiring.
Proposed solution :
1. Check the set off delay and adjust it if necessary (to a lower value).
2. Check for any objects, which may cause false triggering and remove them from the detectors range.
3. Refer to wiring diagrams (See **Fig. 4 - Fig. 6**).

Problem:
Red LED does not turn on
Possible cause:
1. PIR is not chose as the triggering method.
2. The movement is out of the PIR detection range.
3. The lens mask is used an it covers the movement.
Proposed solution:
1. Choose PIR sensor as the triggering method.
2. The movement should be in the valid detection range (ø8m).
3. Remove or reposition the lens mask

Problem:
Green LED does not turn on
Possible cause:
1. Ultrasonic sensor is not chose as the triggering method.
2. The movement is out of the detection range.
Proposed solution:
1. Choose ultrasonic sensor as the triggering method.
2. The movement should be in the valid detection range (10x16 m).

Problem:
False triggering
Possible cause:
There are heat sources, airflow, highly reflective objects or any objects which may be swayed in the wind within the detection range.
Proposed solution:
Avoid aiming the detector toward any heat sources, such as air conditioning, electric fans, heaters or any highly reflective surfaces. Make sure there are no swaying objects within the detection range.
NOTE:
Effects that might have influents on ultrasonic detection:
Airflow:
Airflow can cause false triggering of the ultrasonic sensor.
If air flow is thought to cause false triggering, try setting the Sens.
Knob to ON.
This function will reduce the sensitivity of ultrasonic sensor approx. 10% ~ 40% according to the strength of the airflow.
Sound wave absorbing materials:
The sensitivity and range can be affected by the materials such as carpet, sound absorbable materials, curtains, etc

Wiring:
A reverse connection in between N and L will cause lower sensitivity of ultrasonic sensor sensitivity and also reduce the detection range.

Technical data
Input:
Power supply ....230 V ± 10% 50 Hz
Power consumption ....2 W
Output:
Relay contact   NO, 230 V, μ 10 A potential free
Load Incandescent lamps .....2300 W
Fluorescent tubes, not
Compensated ....1200 VA
Halogen incandescent lamps 2300 W
Energy-saving bulbs ....58 x 18 W
Max. compensation capacity .140 μF
Max. inrush current ....165 A/20 m sec.
Performance:
Lux range.....................10 – 1000 lux
Time delay ....1 – 30 min.
Detection range ....360°
Ultrasonic .....0 x 16 meter (138 m2)
PIR ....ø8 meter (50 m2)
Installation and ceiling height 2 - 3 meter
Protection degree ....IP 20
Insulation class ....CL. I
Ambient temperature ..0°C ... +45°C
Approvals:
CE according to ....EN 60669-2-1

Dimensions for ACel-DT PIR

Installation for ACel-DT PIR

Fig. 1:

Location for ACel-DT PIR

Fig. 2:

Side view

Top view

360°

PIR ø4m
PIR ø8m

PIR ø8m
US 16m

US 10m
US 16m

US 8m
US 10m

2.5m

12m

7.5m

Classroom

14m

8m

Open office

Conference room

8m

10m

Ultrasonic Body Motion
16 x 10 m (Oval) = 138 m²

PIR Body Motion
ø8 m = 50 m²

Ultrasonic Small Motion
10 x 8 m (Oval) = 66 m²

PIR Small Motion
ø4 m = 12,5 m²
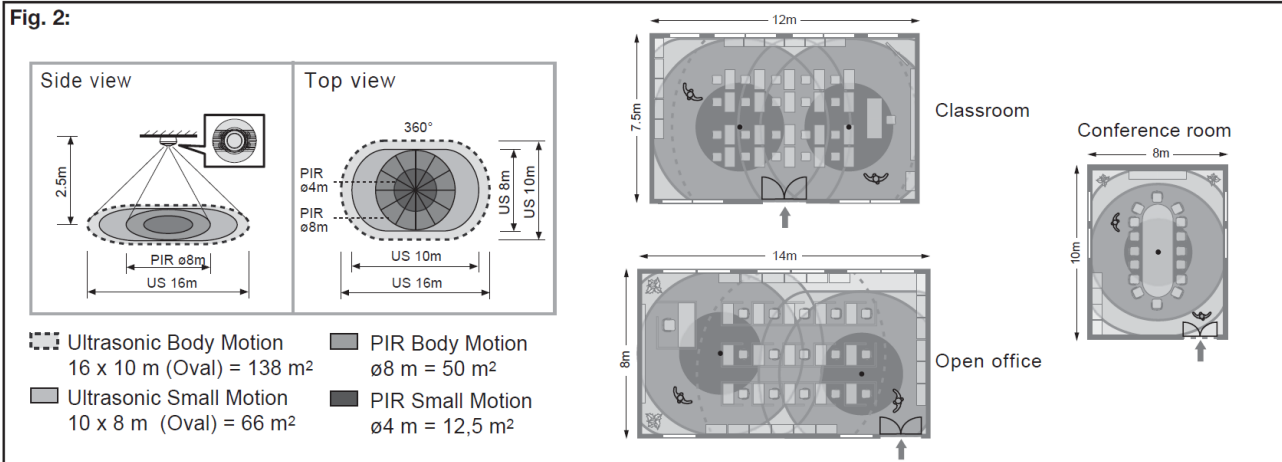
Enlarging the detection range + diagram for ACel-DT PIR

Fig. 3:

20%
overlap

8m

14m

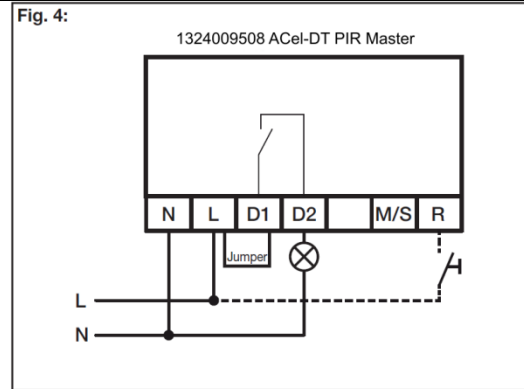Fig. 4:

1324009508 ACel-DT PIR Master

| N | L | D1 | D2 | | M/S | R |

Jumper

L

N

Diagram for ACel-DT PIR Master + Slave

Fig. 5:

1324009508 ACel-DT PIR Master

| N | L | D1 | D2 | | M/S | R |

Jumper

1324009511 ACel-DT PIR Slave

| L | L | N | N | | S | S |

L

N
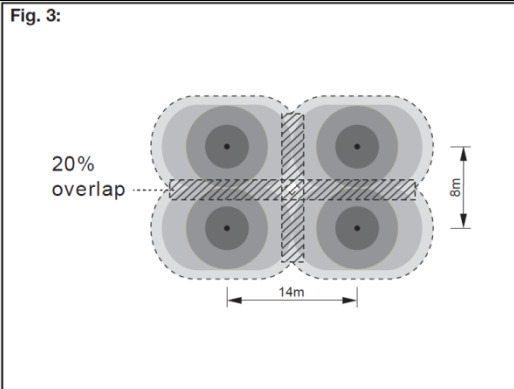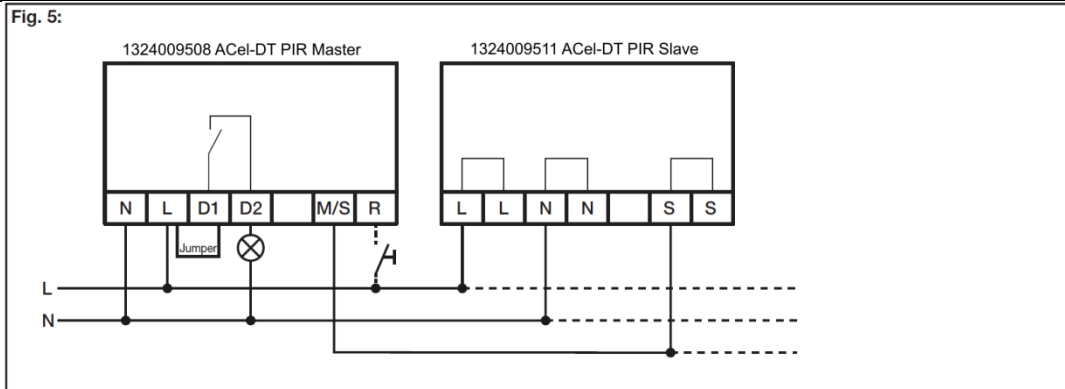
Diagram for ACel-DT PIR Master + HVAC and factory setting

Fig. 6:

1324009508 ACel-DT PIR Master

| N | L | D1 | D2 | | M/S | R |

L

N

230 V - HVAC

Fig. 7:

1000   10
Lux
300   100

15s   Test
30m.   1m.   Time
15m.   5m.

Meter   4x6m   7x6m

PIR only   US only
PIR/US   PIR+US

OFF
ON   Sens.
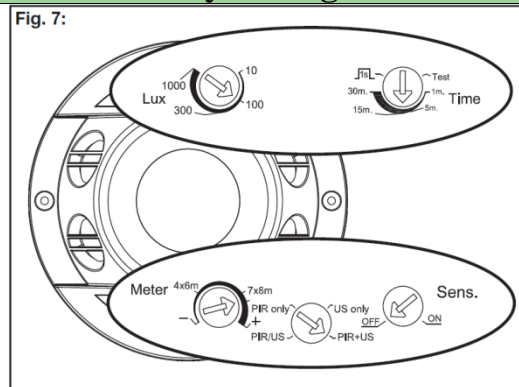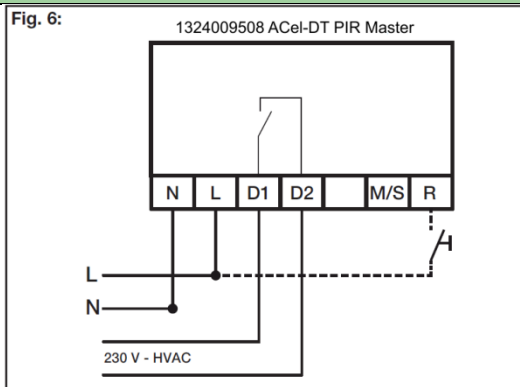
Limiting the detection range of ACel-DT PIR

Fig. 8:

ø2m

ø2m
ø6m
ø8m
30°

ø6m

ø6m
ø8m
30°