theben

Application Notes
Optical Sensor
thePixa P360

Contents

1 Introduction

This application note serves as support for the correct application of thePixa optical sensor. Typical installations/applications are shown and possible sources of interference are pointed out. Optical detection technology creates new challenges for the installation, which must be known before installation. **Taking the application note into account facilitates trouble-free operation after start-up.**

1.1 Basics

The technology for optical detection of motion/presence is very interesting, because additional information or data can be collected compared to a conventional PIR detector, for example.

The optical sensor thePixa detects motion (larger movements) and presence (smaller movements) based on changes in a fleeting camera image. The respective detections are projected onto a 15 x 20 grid based on the system's field of view and are thus assigned to up to 6 freely adjustable zones and transferred to the corresponding system. If the field of view is impaired by objects or e.g. smoke/vapour or even dust particles, this results in poorer detection.
In demanding applications with a lot of extraneous light, reflections, etc., an additional sensor (e.g. on PIR-based technology) can be integrated to achieve reduced faulty switchings and increased safety as well as an optimised system.

Compliance with data protection is a central point, which is confirmed by the DEKRA certification.

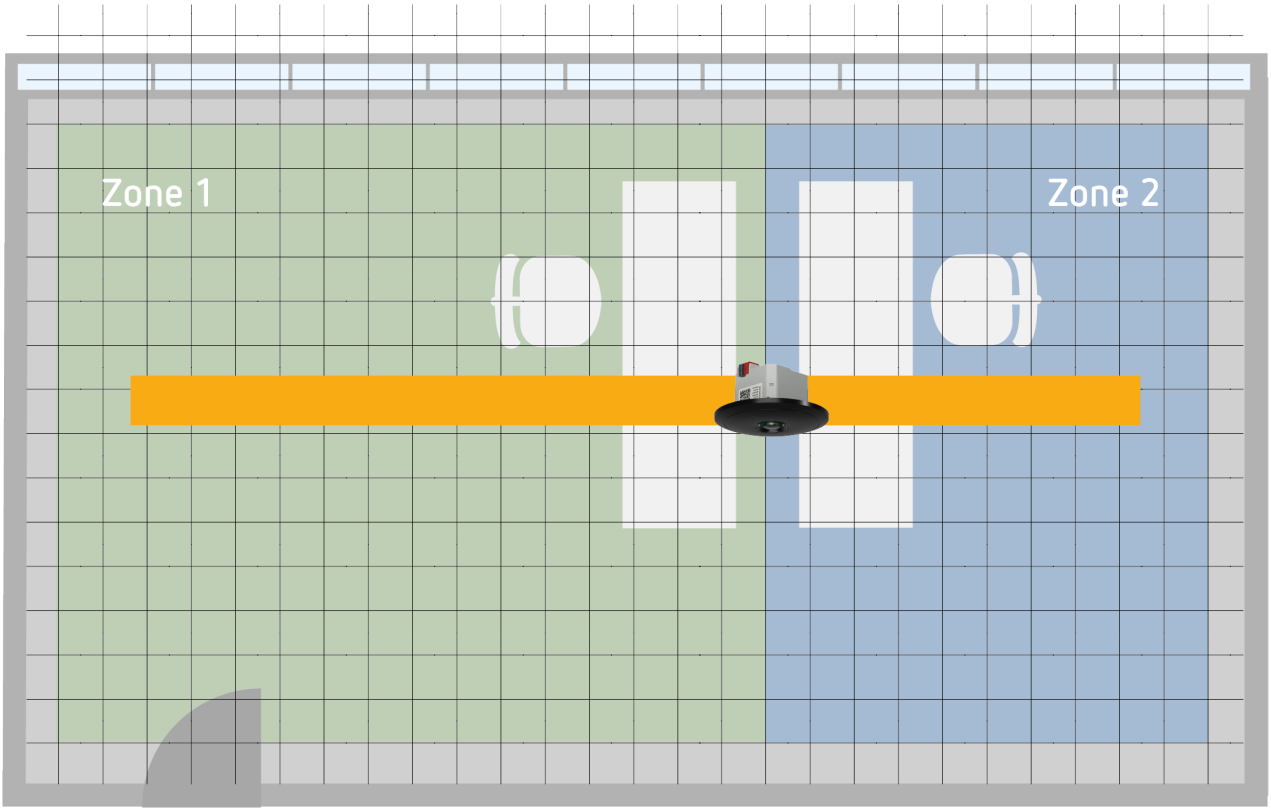
1.2 Counting objects

The number of persons counted may vary slightly depending on the application and ambient conditions.

Example: If 2 people get close to each other, this can be interpreted as 1 person.

2 Application examples

2.1 Office with daylight



Initial situation:

Two workplaces are detected in an office using one thePixa (zone 1 + zone 2). Apart from a door, the office also has a window front from which daylight comes in.

The following has to be considered:

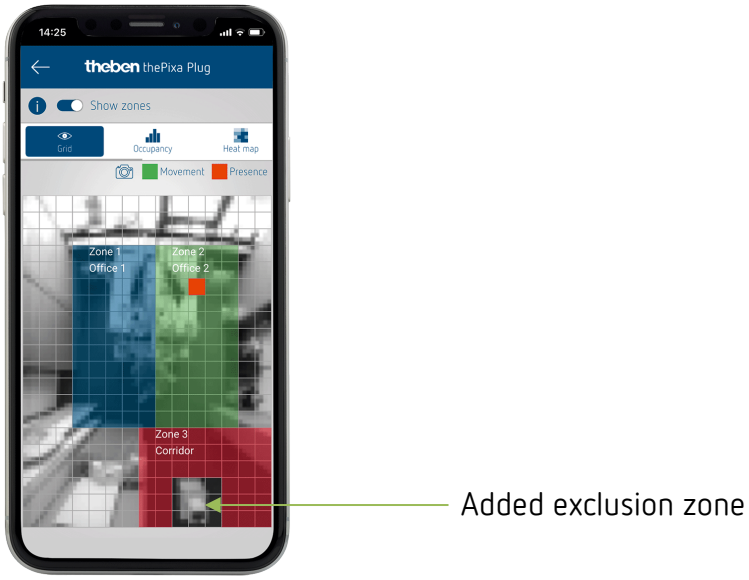
The detection zones should only include the base area. It is imperative to suppress the walls and windows by using thePixa Plug app – either by reducing the detection area or by inserting an exclusion zone. If the walls are not supressed, reflections can negatively influence thePixa (faulty switching). Mirrors or smooth surfaces (e.g. of the floor, stainless steel surface, etc.) can also intensify this effect. In this way, changes outside the window will also not be detected.

Changes in brightness outside the window (e.g. due to passing vehicles) might result in a change in brightness indoors. A punctual change in brightness indoors can also be interpreted as a movement or presence by thePixa, depending on the situation. If this is the case, the sensitivity should be reduced (e.g. only at night). Reducing the sensitivity can also help if switching on or off the lighting next door affects your own zones. Moreover, thePixa KNX allows

to ignore such switch-ons or switch-offs for a short time by means of additional parameters and an additional communication object (see KNX manual).

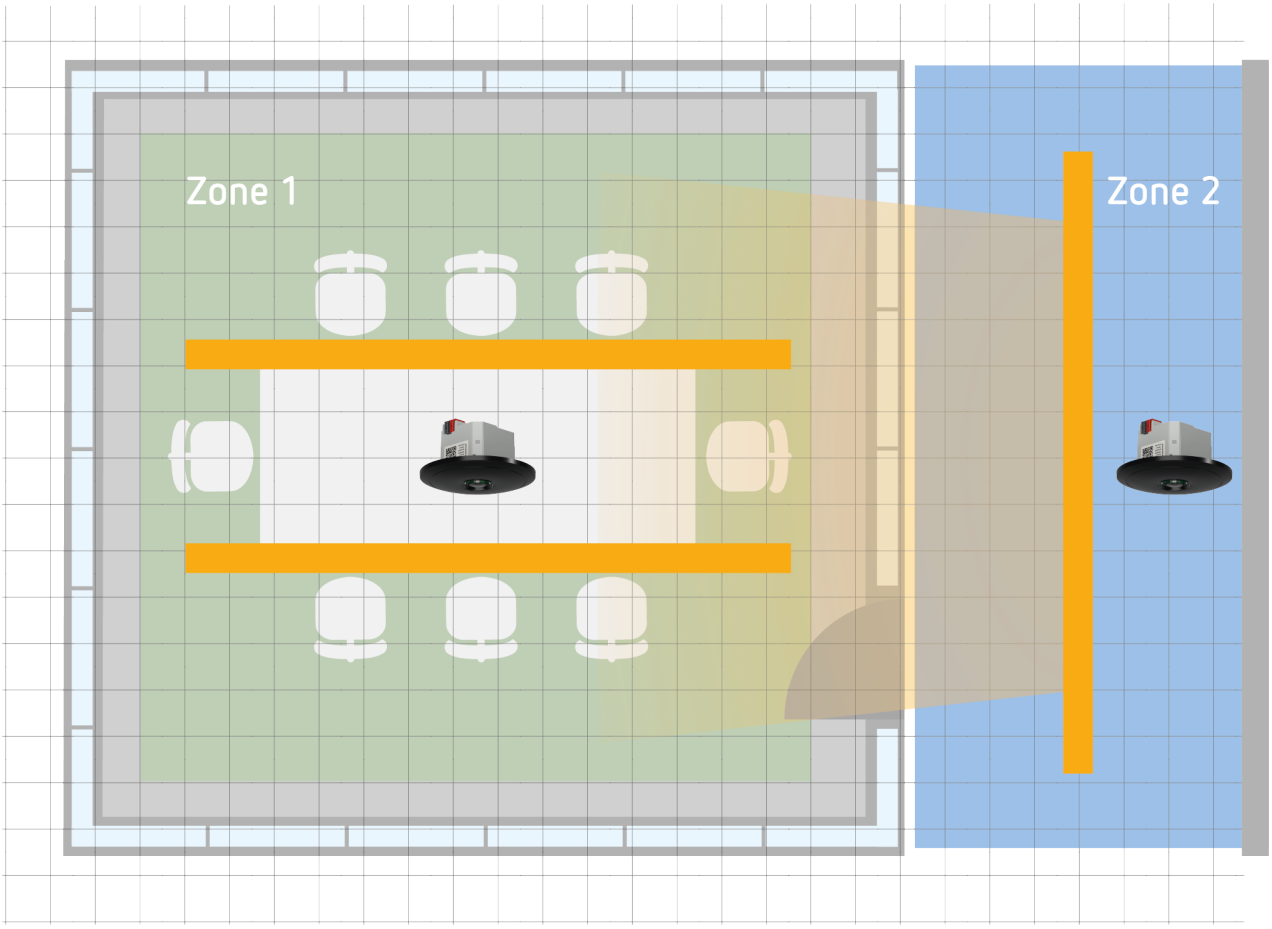
At workplaces, larger monitors or flashing LEDs, for example, can be problematic and lead to faulty switching, especially at night. Here too, it is important to eliminate sources of interference as best as possible by appropriate zoning.

Example of an exclusion zone:



Where appropriate, the detection sensitivity can also be reduced for the night. If the automatic night mode is not needed (e.g. if no light is switched/controlled), it can also be deactivated.

2.2 Meeting room behind glass partitions



Initial situation:

A small meeting room, composed of glass partitions and with one door, is monitored with one thePixa (zone 1). The adjacent corridor also has one thePixa (zone 2).

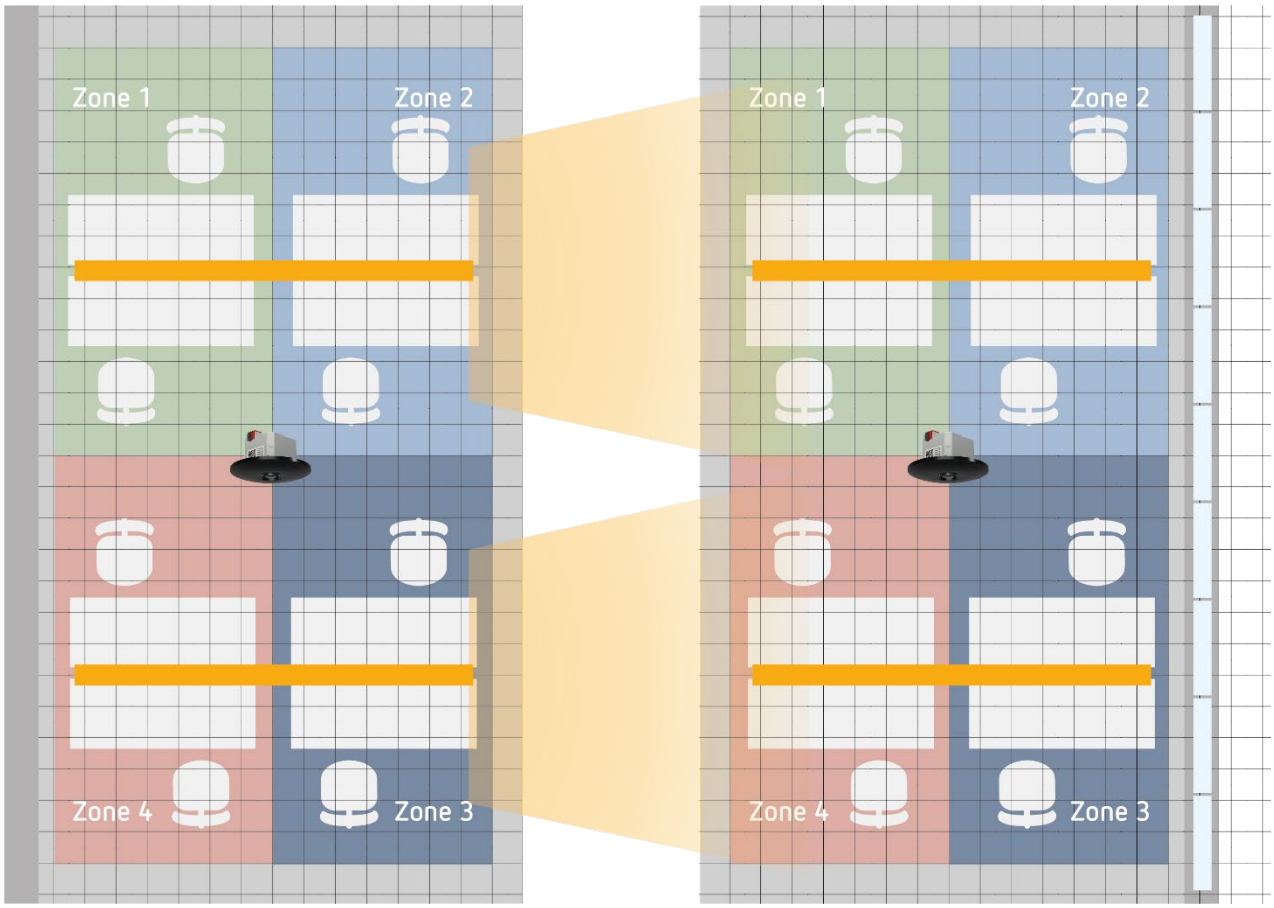
The following has to be considered:

The detection zone should only include the base area. It is imperative to suppress glass partitions using thePixa Plug app – by reducing the size of the detection zone. If the glass partitions are not suppressed, movements from outside the room can also be falsely detected.

Changes in brightness outside the glass partitions, triggered by switching the lighting on or off (zone 2), can result in changes in brightness inside the meeting room. A punctual change in brightness in the meeting room can also be interpreted as a movement or presence by thePixa (zone 1), depending on the situation. Cast shadows – caused by people passing by – also briefly change the brightness indoors. If this is the case, the sensitivity should be reduced (e.g. only at night).

If the automatic night mode is not needed (e.g. if no light is switched/controlled), it can also be deactivated.

2.3 Open-plan office with daylight



Initial situation:

In an open-plan office, 4 workplaces are each detected with one thePixa (zones 1-4, max. 6 detection zones possible). The open-plan office has a window front from which daylight comes in.

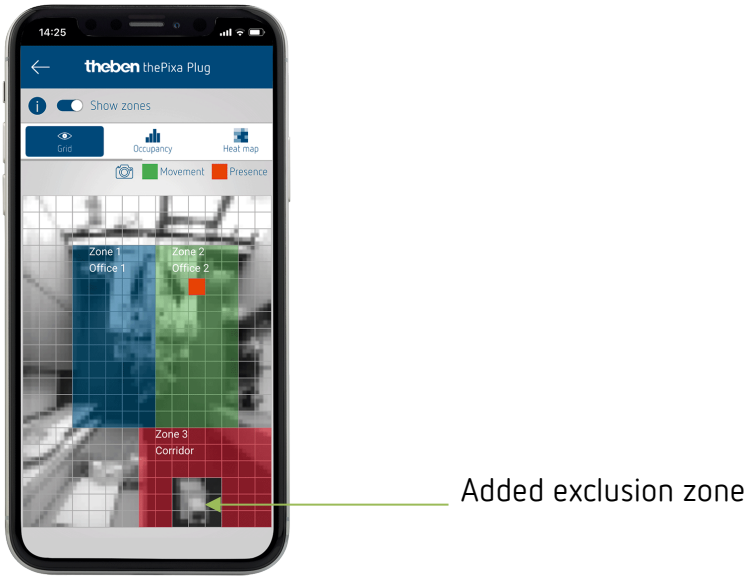
The following has to be considered:

The detection zones should only include the base area. It is imperative to suppress the walls and windows by using thePixa Plug app – either by reducing the detection area or by inserting an exclusion zone. If the walls are not supressed, reflections can negatively influence thePixa (faulty switching). Mirrors or smooth surfaces (e.g. of the floor, stainless steel surface, etc.) can also intensify this effect. In this way, changes outside the window will also not be detected.

Changes in brightness outside the window (e.g. due to passing vehicles) might result in a change in brightness indoors. A punctual change in brightness indoors can also be interpreted as a movement or presence by thePixa, depending on the situation. If this is the case, the sensitivity should be reduced (e.g. only at night). Reducing the sensitivity can also help if switching on or off the lighting next door affects your own zones. Moreover, thePixa KNX allows to ignore such switch-ons or switch-offs for a short time by means of additional parameters and an additional communication object (see KNX manual).

At workplaces, larger monitors or flashing LEDs, for example, can be problematic and lead to faulty switching, especially at night. Here too, it is important to eliminate sources of interference as best as possible by appropriate zoning.

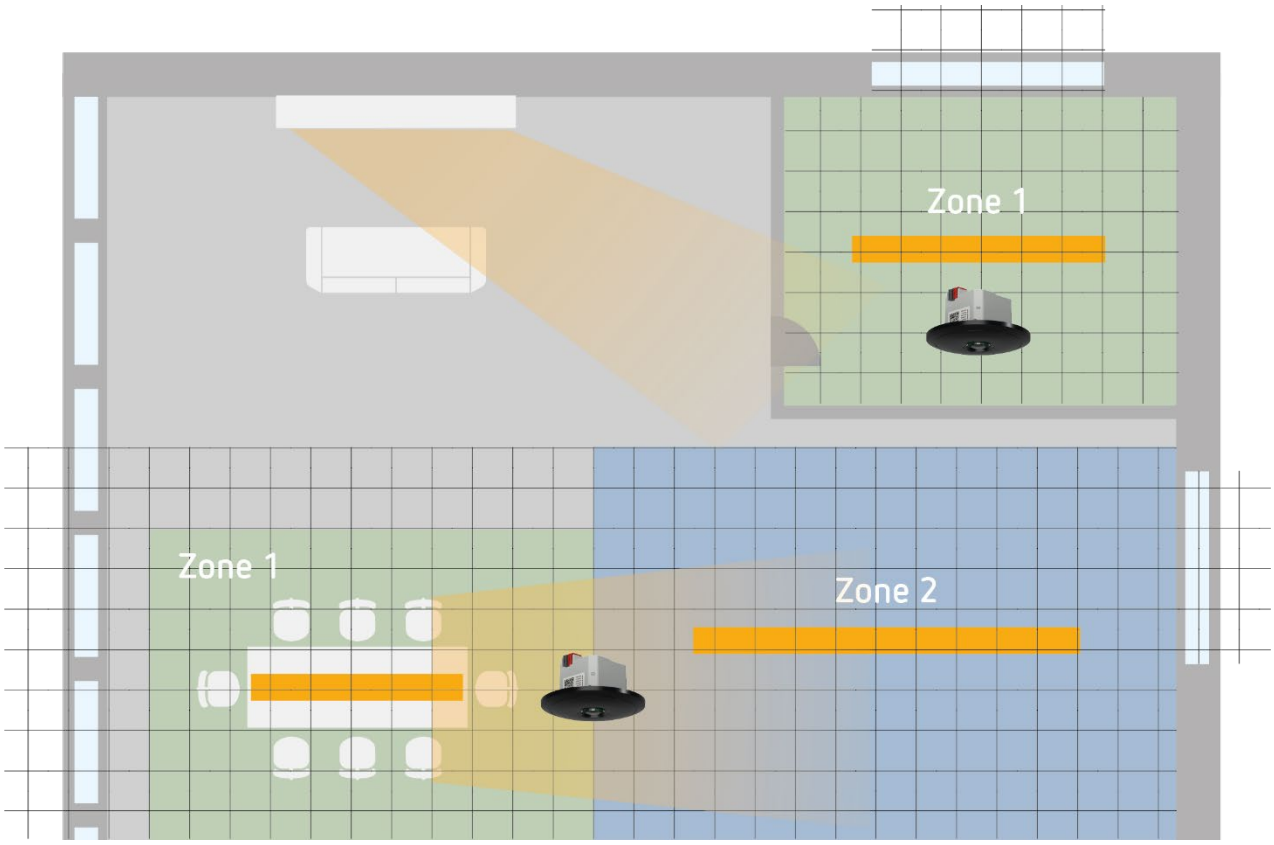
Example of an exclusion zone:



Where appropriate, the detection sensitivity can also be reduced for the night.

If the automatic night mode is not needed (e.g. if no light is switched/controlled), it can also be deactivated.

2.4 Living area with daylight



Initial situation:

In the dining area, one thePixa monitors the dining table (zone 1) as well as the entrance area (zone 2). Next to the living room is a separate room, which is also monitored by one thePixa (zone 1). The living area has window fronts from which daylight comes in.

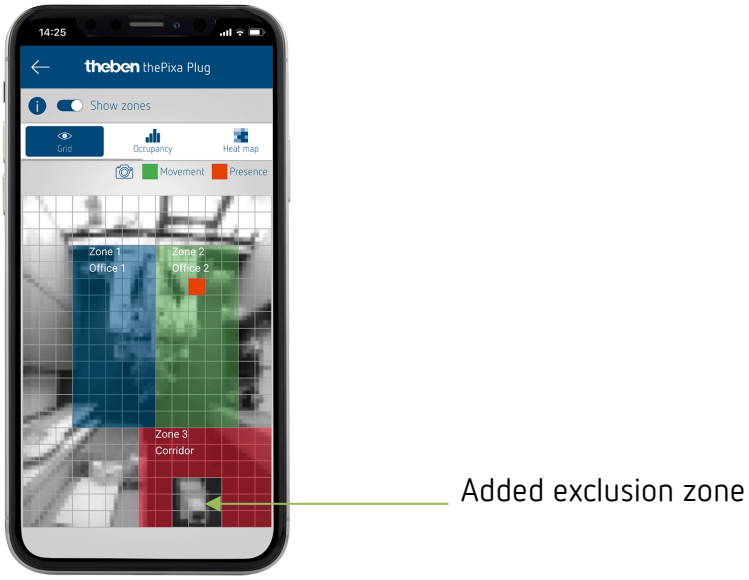
The following has to be considered:

The detection zones should only include the base area. It is imperative to suppress the walls and windows by using thePixa Plug app – either by reducing the detection area or by inserting an exclusion zone. If the walls are not supressed, reflections can negatively influence thePixa (faulty switching). Mirrors or smooth surfaces (e.g. of the floor, stainless steel surface, etc.) can also intensify this effect. In this way, changes outside the window will also not be detected.

Changes in brightness outside the window (e.g. due to passing vehicles) might result in a change in brightness indoors. A punctual change in brightness indoors can also be interpreted as a movement or presence by thePixa. If this is the case, the sensitivity should be reduced (e.g. only at night). Reducing the sensitivity can also help if switching the lighting on or off at the dining table affects zone 2 at the entrance, and vice versa. Moreover, thePixa KNX allows to ignore such switch-ons or switch-offs for a short time by means of additional parameters and an additional communication object (see KNX manual).

If the TV is switched on, this can lead to faulty switching in the adjacent room, especially at night. Here too, it is important to eliminate sources of interference as best as possible by appropriate zoning.

Example of an exclusion zone:



When appropriate, the detection sensitivity can also be reduced for thePixa in the adjacent room at night.

If the automatic night mode is not needed (e.g. if no light is switched/controlled), it can also be deactivated.

3 Installation instructions

3.1 Partitions

Initial situation:

thePixa is to be installed in a toilet with a washbasin vestibule without any daylight.

The following has to be considered:

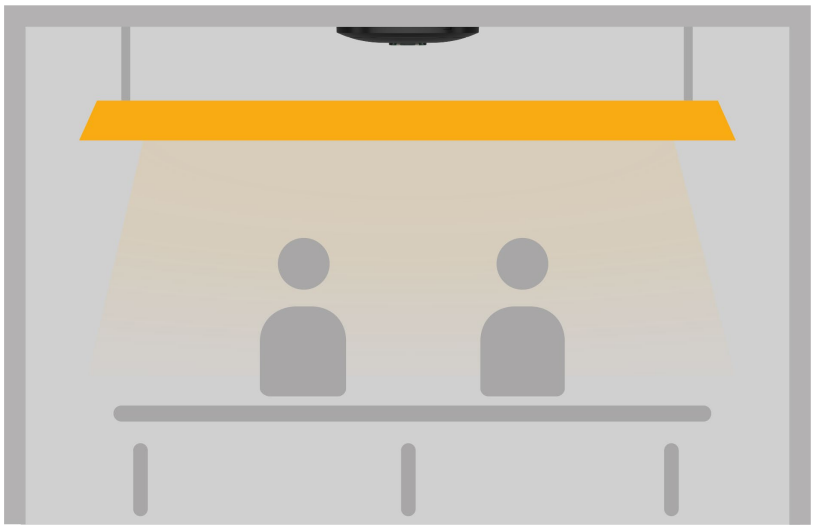
If thePixa is mounted directly above or very close to one of the toilet partitions and operated in night mode, the direct proximity of the device to the upper edge of the partition will result in a blurring effect in infrared mode in absolute darkness. Movements underneath can then no longer be detected.

Therefore, thePixa should be mounted further away from the partitions.

3.2 Suspended lamps

Initial situation:

thePixa is to be installed in a meeting room with a suspended lamp.



The following has to be considered:

If thePixa is mounted directly above or very close above a suspended lamp and operated in night mode, the direct proximity of the device to the lamp will result in a blurring effect in infrared mode in absolute darkness. Movements underneath can then no longer be detected.

thePixa should be placed underneath the lamp using a suspension device to give the device a clear view.

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This document contains application examples of thePixa optical sensor for specific application areas. The application examples are to be regarded as a guide for correct use. It is the responsibility of the customer to check whether the device is suited for the desired application. No liability is assumed for completeness in this document. Furthermore, the document can be adapted or supplemented by Theben AG at any time. More detailed information on thePixa optical sensor can be found on our website.