

# PC M4.0

## Enhanced building efficiency, safety and marketing intelligence

Being able to accurately track and record the precise number of people present in building or moving through high-traffic areas at any given time is an invaluable asset. IEE's People Counter offers the following functions:

- Occupancy Monitoring in real time to:
  - control minimum and maximum occupancy
  - support evacuation measures
- Detection and analysis of pedestrian flows. With the web-based Occupancy Monitoring software, the count data that has been collected can be displayed in real time (live GUI). The software also has the capacity to provide historical data analysis, data aggregation and time plotting – allowing organizations to calculate such things as the maximum number of people, and the average time an individual spends in a particular area
- Optimization of a building's ventilation and energy efficiency
- Wrong way detection – detecting and counting people moving in the wrong direction

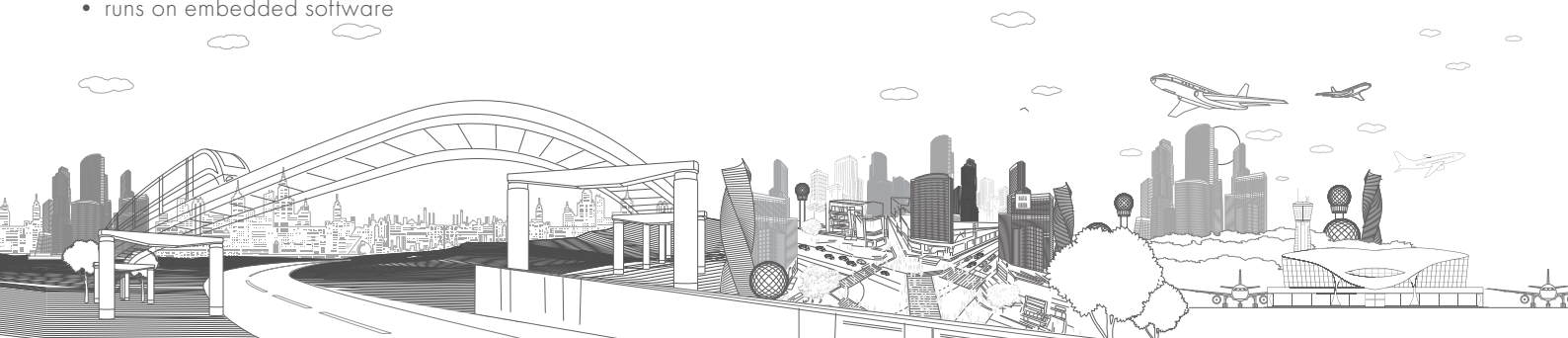
### Potential application areas

- Airports
- Offices
- Retail markets/shopping malls
- Canteens
- Museums
- University campuses
- Conference rooms
- Laboratories
- Banks
- Movie theaters
- Public transportation facilities

### Key advantages of the People Counter



- offers an accuracy of > 99%
- based on 3D ToF technology
- performs bi-directional counting
- has configurable data storage
- runs on embedded software

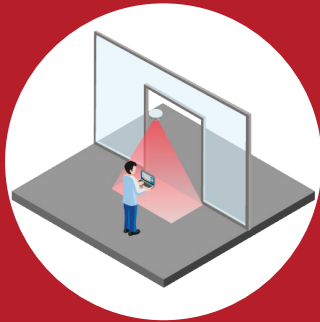


# How the People Counter works

IEE has developed a 3D sensor that uses MLI (Modulated Light Intensity) technology. This technology is based on the optical Time-of-Flight (ToF) principle, where an active, non-scanning light source emits modulated near-infrared light. The phase shift between the light emitted by the source and the light reflected by the people and objects in the field of view (FoV) is measured to create a real-time topographic image of the monitored area. The 3D MLI Sensor™ calculates the exact number of people transiting the detection area and triggers an alarm when it detects situations such as tailgating or piggybacking.



Install



Configure



Counts people passing

# Advantages

## High accuracy

Sophisticated AI-based algorithms ensure a reliable detection of people and objects in the detection area. With an accuracy of greater than 99% in the field, the People Counter provides more reliable data than the passive infrared sensors, laser scanners or 2D video-based systems currently on the market.

## Application outputs

The following data is available via the web interface:

- total forward and backward count
- occupancy (number of people in a zone)
- occupancy low/high alarm (when the configurable threshold is met)
- current in (number of people present in the detection zone at any time)
- current in low/high alarm (if the configurable threshold is met)
- wrong way detection

## Self-diagnostics

A self-diagnostic routine runs at start-up and is regularly repeated to detect any sensor malfunction.

## Semi-automatic calibration

After configuring basic parameters such as mounting height, detection width and length, the sensor calibrates itself within a few seconds. During this calibration, the sensor checks the empty detection area and captures the presence of fixed objects and walls.

## Easy installation and integration

The People Counter's Design Housing provides easy and aesthetic integration into existing building architecture. The Design Housing can be integrated into dropped ceilings ("flush mount") offering increased flexibility for all kinds of ceiling structures. After a basic configuration, such as detection area and mounting height, has been carried out, the sensor calibrates itself within a few seconds.

## Embedded software

Due to its integrated firmware the sensor does not require any additional computer or server to process the data it captures.

## Reliability in changing light conditions

As the sensor emits its own illumination, the performance is not influenced by artificial light. The sensor works in the dark.

## Sensor Management Tool (SMT)

The computer-based, multi-lingual Sensor Management Tool enables the management of multiple sensors and offers the following features:

- multi-sensor configuration and backup
- software updates via the ethernet network
- the ability to copy any given configuration to multiple sensors
- multi-sensor status monitoring and advanced diagnostics
- password-protected configuration
- language selection

## Integrated audible alarm

An integrated alarm signal can provide an acoustic confirmation of a people count. The integrated alarm can also sound when an occupancy threshold for single-door areas has been met or if a sensor malfunction has been detected.

## Doors and staircases

Doors swinging through the detection area do not pose a problem for the People Counter. The sensor also functions in stairwells.

## Network protocols

- IP address, fixed or DHCP
- Application output: web interface HTTP or XML-RPC
- Time synchronization via SNTP
- Firmware updates via Ethernet
- communication protocols: XML-RPC, JSON, MQTT

# One Device, Multiple Applications

## Occupancy Monitoring

### Smart Buildings Analytics Platform

The Analytics Platform offers real-time monitoring, extended data analysis and reporting functionalities, such as:

- Real-time monitoring of multiple zones and/or multiple doors
- The option to set thresholds in each occupancy zone to trigger an alarm, send e-mails, or switch relays
- Statistics such as average length of stay, occupancy and total entries/exits
- Data plotting, including occupancy and entries/exits, on user-definable graphs
- The ability to define report templates to streamline future analysis or to generate periodic customizable PDF reports that can be sent automatically by e-mail
- A web-based interface and a PostgreSQL database

### Building safety

Safety-critical building complexes with high people flow are often subject to maximum occupancy regulations. Installed above each access point, the People Counter performs a bi-directional count of all people entering or exiting. By comparing all entries and exits in real time, the occupancy of a room, a particular floor or an entire building can be determined, to comply with safety-related occupancy restrictions in place, or to support evacuation measures.

Similarly, in areas that require a minimum occupancy, such as laboratories or surveillance and control rooms, the People Counter monitors the occupancy level and alert when the occupancy is too low.

### Building infrastructure

By counting the number of people in critical building areas it is possible to identify flow bottlenecks. These data allows infrastructure managers to harmonize the people flow to increase safety and satisfaction level of the building users.

### Space utilization

Measuring the use of different areas in the building (open offices or meeting rooms,...) helps to optimize space and energy consumption in times where management of resources is crucial.

### Energy efficiency or air quality

Knowing how many people are in a certain building area can be useful in a variety of decisions, like adapting the use of air-condition, cooling or heating. This helps to optimize the indoor air quality and save energy costs.

### Marketing intelligence

A key indicator of a store's performance is its conversion rate or the percentage of visitors who actually make a purchase. Marketing metrics such as CPM (cost per thousand) and SSF (shoppers per square foot) can only be generated if accurate statistics on visitor numbers are available. By tracking visitor traffic and density, the People Counter helps store managers to analyze sales data to better plan staffing levels.

### Wrong Way Detection

The People Counter detects people moving against the flow of traffic in the pre-defined wrong way and triggers an alarm to indicate a potential security risk. This type of monitoring typically takes place at arrival gates in airport, or at turnstiles in subways or train stations.

### Queue Management

The People Counter can be used to accurately monitor the number of people in a queue and determine the waiting time, providing a valuable input for operational staff. Ultimately, it can lead to a reduction of the waiting time and an improvement of the overall service level.



Maximum occupancy



Minimum occupancy  
Monitoring in laboratories



Air quality



Retail occupancy monitoring



Queue management



Wrong way detection

# Technical Data

Device properties	PC96M4.0	PC64M4.0
Mounting height	2.3m to 3.4m	3.4m to 5.5m
Detection area	1.6m x 1.0m to 3.0m x 2.0m	2.1m x 1.4m to 4.6m x 2.9m
Field of view/illumination	90° x 60°	60° x 40°
Type of illumination	Modulated near infrared light (NIR)	
Weight	0.8kg (core housing) + 0.16kg (design housing)	
Dimensions of the core housing	Ø 138mm x H 60mm	
Dimensions of the design housing	Ø 147mm (integration cutout diameter), Ø 181 mm (outside rim diameter), 70mm (height)	
Operational temperature range	-20°C to +50°C	
Core housing ingress protection	IP 30	
Supply voltage	24Vdc ± 15%	
Power consumption	max. 1.0A at 24Vdc	
Housing material	Polymer	
Technology	3D Time-of-Flight (ToF)	
Communication protocol	XML-RPC, JSON, MQTT	



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people counting use cases

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