

Tailgate Detector **TDflex™** M25



TDflex™ is an award-winning tailgate detection solution that prevents unauthorized access at:

- Doors
- Mantraps
- Airlocks
- E-gates
- Turnstiles
- Access points without doors

Tailgate Detector - TDflex™ The Essential Security Layer for Your Access Control Systems

Today's access control systems are designed to help control and manage authorized access to secure areas. Ensuring that every individual has properly presented a valid ID or successfully cleared biometric identification is a major challenge faced by security professionals. Preventing tailgating and piggybacking, in other words misleading or outsmarting the system, is a problem existing solutions do not sufficiently address.

IEE's Tailgate Detector TDflex™¹ offers a solution that ensures only authorized people can enter a restricted area by adding an additional and essential security layer.

Efficient Security Staff Support

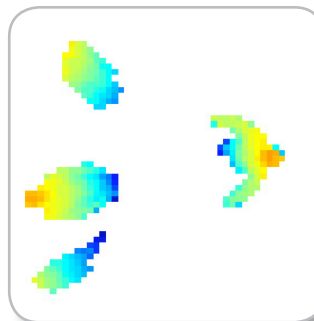
With IEE's TDflex™, businesses can optimize the scheduling of their security staff. As the sensor is fully automated, security staff do not need to physically monitor access points – they will be alerted if there is a security breach – and TDflex™ reduces the potential for human error.



3D MLI Sensor™

How TDflex™ 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 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.



Topographic image



Access allowed



Alarm

¹All references to TDflex™ in this brochure refer to TDflex™ M2S, which is a different generation from previous TDflex™ products and offers different features.

Features



High Accuracy

Sophisticated algorithms and extensive test scenarios ensure reliable detection of people and objects in the detection area. These test scenarios, which consist of people carrying or wheeling luggage, wearing hats, or walking closely together, show that TDflex™ can both handle people carrying objects and detect multiple individuals in close proximity.

Reliability in Changing Light Conditions

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

Embedded Software

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

Sensor Management Tool

The computer-based, multi-lingual sensor management tool enables management of multiple sensors and offers the following features:

- Multi-sensor configuration and backup
- Fast 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

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.

Digital I/O Module

TDflex™ comes with a separate I/O module that features seven digital inputs and eight digital outputs. This module, which is powered via TDflex™, should be installed on the secure side, in order to maximize security.

Audible Feedback for Confirmation and Alerts

TDflex™ has an integrated buzzer which can be used to give individual acoustic feedback for such things as:

- Pre-alert
- Tailgate alert
- Access allowed/impeded
- More than one have entered (real mantrap mode)

Self-Diagnostics

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

Data Logging

Historical data and system events:

- Tailgate alerts
- Abort credits
- Bypass on/off
- Superuser requests
- System errors

Superuser Mode

This is a temporary directional bypass, triggered by a person using a specific superuser badge with an access control device, that allows the superuser to:

- escort visitors without credentials
- enter with carts containing very large objects of any shape

Features

People Counting

In addition to its access control features, TDflex™ can also be used as a People Counter:

- Forward/Backwards counts
- Current number of people in the detection area
- Zone occupancy. Triggering of an alert (SMS, e-mail, relay), if occupancy exceeds or falls below the set thresholds
- If there are multiple access points, the occupancy of the entire area can be monitored in the IEE Occupancy Tool (XML-RPC option required)
- Historic counting data logging, analysis and reporting

Advanced Anti-Tamper Protection

With its optical, mechanical and electronic functionalities, TDflex™ now offers improved anti-tamper protection. This greatly reduces the chance that anyone can manipulate the sensor.

Seamless Integration into Existing Access Control Systems (ACS)

TDflex™ interfaces with any ACS via digital inputs and outputs (I/Os). These signals allow you to control the doors and trigger alerts if there has been a security breach.

If a person who has authenticated decides not to enter the secure area, TDflex™ sends an "abort credit" signal to the ACS.

In addition to the digital I/Os, the ACS can also communicate directly with TDflex™ via XML-RPC (optional).

Easy Installation

The TDflex™ Design Housing - available in white, black and gray - provides easy and aesthetic integration into existing building architecture. The Design Housing can be integrated into dropped ceilings ("Flush mount"), on the ceiling ("On-ceiling") or, by using an extension, below the ceiling ("Under-ceiling") offering increased flexibility for all kinds of ceiling structures. TDflex™ is compatible with single or double doors swinging into the field of view and can be installed either on the unsecure side (preferred) or the secure side.



Flush mount



On-ceiling



Under-ceiling

Operating Modes

TDflex™ is a Tailgate Detector with two main operating modes:

- Virtual mantrap
- Real mantrap

Virtual Mantrap Mode

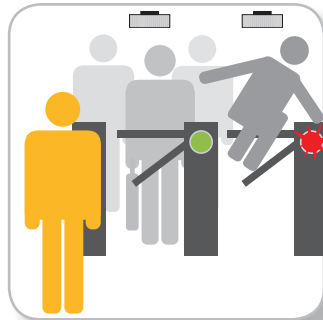
In this mode, TDflex™ monitors single access points to and from a secure area and is usually installed in front of doors. It is also possible to monitor mechanical or optical turnstiles, or virtual access points without any physical barrier.

If an unauthorized person attempts to gain access, TDflex™ generates an alert. This means that, depending on the security strategy, the door can be locked as a preventative measure ("high security strategy"), or if the secure area is breached, an alert can be triggered.

TDflex™ can also monitor people leaving the secure area to ensure there is no tailgating – effectively forcing people to badge out.

In the virtual mantrap mode the following outputs are provided:

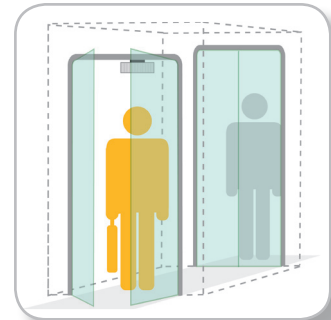
- Access recommendation
- Pre-alert
- Tailgate alert
- Status indicators
- Abort credit



Unauthorized access at turnstiles

Real Mantrap Mode

In the real mantrap mode, TDflex™ monitors any space within two or more interlocking doors. In this mode, TDflex™ does not consider authentication credits (inputs) from the access control system; it continuously provides the occupancy status of the mantrap. This is then used to safely control the doors.



Mantrap

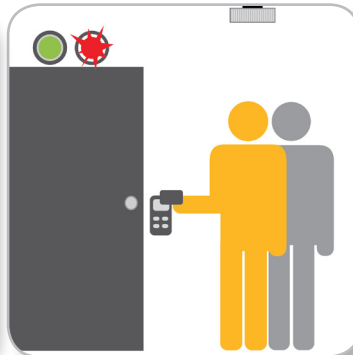
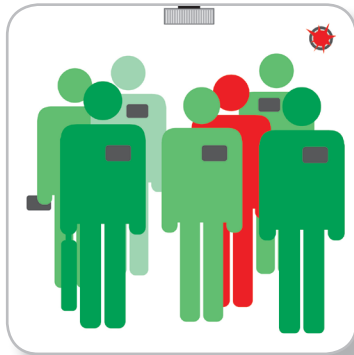
With the classic strategy of "single person transfer", which enforces the transit of one person at the time, TDflex™ provides the following outputs:

- Empty
- Only one person
- Suspicious e.g. more than one person or a person behaving abnormally

As an alternative to "single person transfer", TDflex™ can also ensure secure transit of multiple people at a time, by counting the people inside the mantrap. This allows for higher throughput without compromising security.

Unparalleled Flexibility in Different Infrastructures

Virtual Mantrap Mode



No Door

Entry/Exit readers:

- Generates an alert if a person without ID transits.

Passive RFID:

- Counts the number of people in the detection area.
- Generates an alert if a person without ID enters the detection area.
- No credit allocation.

One Door

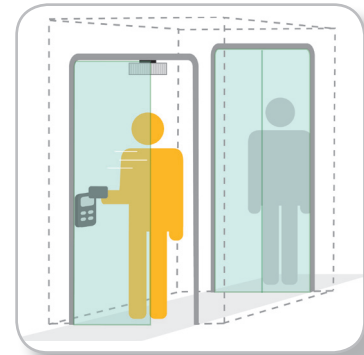
High security strategy:

- One person at a time.
- The door is locked if more than one person is detected in the field of view.

High throughput:

- Generates an alert if a person without ID enters or exits.
- Crowding is allowed.

Real Mantrap Mode



Two Doors

Single person transfer:

- Outputs "empty", "one person" or "suspicious".

Multiple person transfer:

- Counts the number of people present in the mantrap. This number is checked by an external logic against the number of credits.



Technical Data

Device Properties	TDflex9696M2S	TDflex6464M2S
Mounting height	2.5 to 3 m	3.0 to 5.0 m
Maximum detection area at virtual gate	2.8 m x 1.1 m to 3.8 m x 1.6 m	2.6 m x 1.0 m to 4.6 m x 1.9 m
Maximum detection area in mantrap	3.6 m x 1.9 m to 4.6 m x 2.5 m	3.6 m x 1.8 m to 4.6 m x 2.75 m
Field of view/illumination	90° x 60°	60° x 40°
Type of illumination	Modulated near infrared light (NIR)	
Weight	1.6 kg (Core housing) + 1.6 kg (Design housing)	
Dimensions of the Core Housing	W 167 mm x H 133 mm x D 94 mm	
Dimensions of the Design Housing	206 mm (integration cutout diameter), 247 mm (outside rim diameter), 115 mm (height)	
Operational temperature range	-20°C to +50°C	
Enclosure rating (device with fan)	IP 40	
Supply voltage range	24 V DC ± 15%	
Power consumption	max. 2A at 24 V DC	
Core housing material	Anodized aluminum	
Technology	3D MLI Sensor™	



Core Housing

Design Housing



Tailgate Detector TDflex™ M2S



Contact

Want to learn more about our access control solutions?

- Contact your local dealer
- Send an e-mail to infrastructure@iee.lu
- Surf to www.iee.lu/markets:public

People Counter PC



A high-accuracy people counting solution that:

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

Enhanced Building Security and Improved 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. An exact count not only allows organizations to optimize their staffing and energy demands, it is also a key component in marketing intelligence gathering initiatives.

The People Counter offers the following functions:

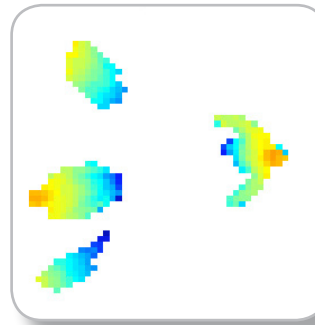
- Occupancy Monitoring in real time to:
 - control minimum and maximum occupancy
 - support evacuation measures
- Detection and analysis of pedestrian flows. With the web-based Occupancy Monitoring software, the count data that has been collected can be displayed in real time (live GUI). The software 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



How the People Counter Works

3D MLI Sensor™ Technology

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 is measured to create a real-time topographic image of the monitored area. The overhead-located 3D MLI Sensor™ processes 3D data in order to detect and count the number of people in a specific area and track the direction of their movements.



Topographic image

Unparalleled Accuracy >99%

Extensive test scenarios have demonstrated that the People Counter's sophisticated algorithms ensure reliable segmentation, tracking and counting of people.

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.

Advantages

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"), on the ceiling ("on-ceiling") or, by using an extension, below the ceiling ("under-ceiling") 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.



Flush mount



On-ceiling



Under-ceiling

Reliability in Changing Light Conditions

Since the sensor emits its own illumination, the performance is not influenced by artificial light and the sensor also works in the dark.

Embedded Software

Due to its integrated people-counting firmware, the sensor does not require any additional computers or servers to process the data it captures. Its 'chip on board' function means that the sensor is capable of outputting count data or generating alarms.

Self-Diagnostics

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

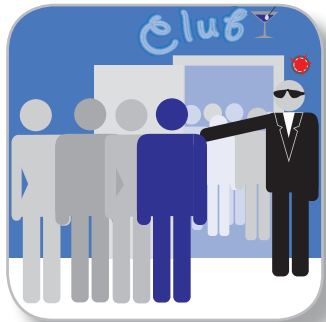
Integrated Audible Alarm

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 pose no problem for the People Counter. The sensor also functions in stairwells.

One Device, Multiple Applications



Maximum Occupancy Monitoring in night clubs

Occupancy Monitoring

Minimum and Maximum Occupancy Monitoring for Enhanced Building Safety

Safety-critical building complexes, high security areas or retail stores, where there is usually a high pedestrian volume, 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. In the event of a building evacuation, valuable information about the exact number of people in the building at that time can be made available to emergency services.



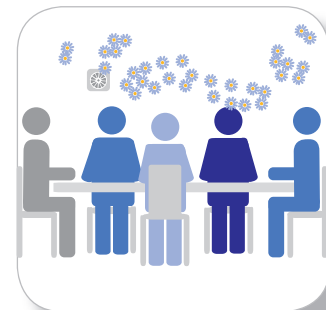
Minimum Occupancy Monitoring in laboratories

A separate Occupancy Monitoring software allows the data management of up to 30 groups of 30 sensors, both for real-time analysis and for statistical analysis.

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

Demand Controlled Ventilation (DCV)

DCV is a ventilation control strategy that provides the right amount of fresh air needed by the occupants in a specified area. It ensures that areas such as seminar rooms, offices and museums are ventilated in an optimal and energy-efficient manner. After calculating the number of occupants, the People Counter provides this information to the DCV unit, allowing the ventilation to be instantly adapted based on the fluctuating demand. This helps to optimize the indoor air quality and save energy.



Occupancy Monitoring for DCV

Marketing Intelligence for Retail Environments

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.



Retail Occupancy Monitoring

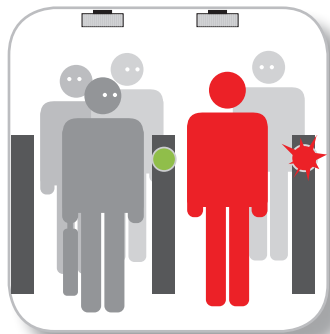
Web-based Occupancy Monitoring Tool

The People Counter's Occupancy Monitoring Tool offers real-time monitoring, extended data analysis, and recording 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 SMSes, or switch relays.
- Statistics such as average length of stay, average occupancy and total entries and exits
- Data plotting, including occupancy and entrances and 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 MySQL database

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.



Wrong way detection

Wait Time Determination and Queue Management

If installed at multiple locations overlooking queues at airport check-in desks or security lanes, the People Counter can be used to accurately monitor the number of people in a queue, as well as the length of time they are required to wait, providing valuable input for operational staff to manage service levels. Ultimately, it can lead to a reduction in wait time, ensures overall better service to passengers, and prevents handling agents from having to pay quality infringement fees to the airlines.



Queue management

Dwell Measurement and Loitering Detection

The People Counter not only accurately recognizes people standing close to each other in the detection area as individuals; it can also track them – even if they are barely moving or standing still. The sensor counts each person and provides a histogram of dwell times: providing crucial statistical information for retailers. This type of application is typically used to determine how much time customers spend in front of sales displays in supermarkets.

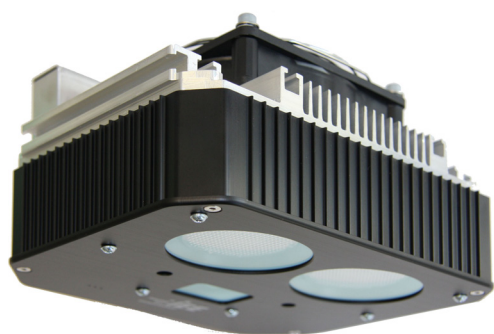


Loitering detection

If installed above the entrance to a secured area, the People Counter can detect people loitering outside entrances and can trigger a warning signal to security staff in the event of suspicious behavior i.e. when a pre-determined loitering time is exceeded.

Technical Data

Device Properties	PC9696M2	PC6464M2
Mounting height	2.5 to 3 m	3.0 to 5.0 m
Detection area	1.5 m x 0.9 m to 2.5 m x 1.5 m	1.5 m x 0.8 m to 3.2 m x 1.6 m
Field of view/illumination	90° x 60°	60° x 40°
Type of illumination	Modulated near infrared light (NIR)	
Weight	1.3 kg (Core Housing) + 1.6 kg (Design Housing)	
Dimensions of the Core Housing	W 167 mm x H 133 mm x D 94 mm	
Dimensions of the Design Housing	206 mm (integration cutout diameter), 247 mm (outside rim diameter), 115 mm (height)	
Operational temperature range	-20°C to +50°C	
Core housing ingress protection	IP 40	
Supply voltage	24 V DC ± 15%	
Power consumption	max. 2.7 A at 24 V DC	
Housing material	Powder coated aluminum	
Technology	3D MLI Sensor™	



Core Housing



Design Housing



Network Protocols

- IP address, fixed or DHCP
- Configuration/application output: web interface HTTP or XML-RPC (optional)
- Time synchronization via SNTP
- Firmware updates via Ethernet

Logging

- Access to current status and counting history
- Configurable counting logging interval, e.g. 10 s -> Minimum log history 2 days 9 hours

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

Optional Relay Modules

The People Counter offers two types of relay or interface modules that:

- connect directly to the sensors via the data cable and switch if the following events take place: the occupancy threshold is exceeded, detection of movement in the wrong direction, the threshold is exceeded in either the forward or reverse direction, the current in (number of people currently in the field of view) threshold is exceeded
- connect to the computer running the Occupancy Monitoring Tool via USB and switch when the occupancy thresholds are met

Sensor Management Tool

The computer-based, multi-lingual sensor management tool enables the management of multiple sensors and offers the following features:

- Fast software updates via the Ethernet network
- Sensor configuration and backup
- Copy a given configuration to multiple sensors

Languages

Language packs can be uploaded into the sensors and can be changed at any time in the Sensor Management Tool.

For a detailed overview of the accessories such as design housing, ceiling brackets, power supplies and cables, please ask an authorized dealer for a price list.

Potential Application Areas

- Airports
- Banks
- Entertainment venues
- Laboratories
- Military and police infrastructure
- Movie theatres
- Museums
- Night clubs
- Offices
- Public transportation facilities
- Retail environments, malls and shops
- Seminar rooms
- University campuses

People Counter PC



Contact

Interested in learning more about our people counting and occupancy monitoring solutions?

- Contact your local dealer
- Send an e-mail to infrastructure@iee.lu
- Surf to www.iee.lu/markets:public

Volumetric Object Surveillance VOS



Protection of paintings and sculptures from vandalism and theft:

- suitable for 2D and 3D objects
- offers configurable alarm zones
- allows for easy and aesthetic overhead mounting
- based on 3D MLI Sensor™ technology

Reliable Protection of Art from Vandalism and Theft

Striking the balance between protecting valuable objects and encouraging the public to visit and come within touching distance of sculptures, paintings and other works of art, is a challenging task. With the help of increasingly precise and unobtrusive protective measures, this challenge can be met without compromising the object's safety.

IEE's Volumetric Object Surveillor (VOS) provides 3D protection around paintings and sculptures, and triggers an alarm when someone breaks through the "optical curtain" and, consequently, touches the work of art.

Security Staff Optimization

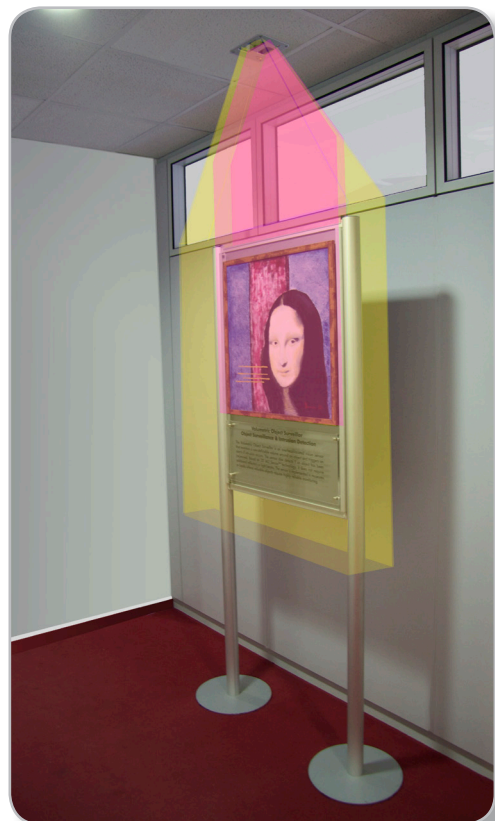
The Volumetric Object Surveillor supports the existing security personnel by activating an integrated alarm as soon as intrusion occurs. The staff can take appropriate measures, whilst at the same time the visitors are alerted that they need to step back.

Configurable Detection and Alarm Zones

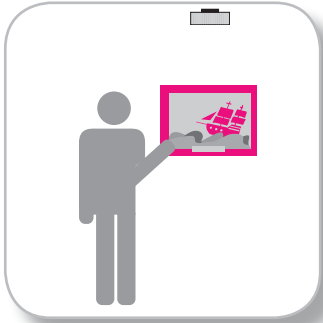
Objects can be clipped sideways into two distinct and configurable alarm zones, as well as from the bottom, as illustrated in this picture.

- If the outermost layer of the surveillance area is compromised, a preliminary audible alarm can be activated - either near the object or delivered discretely to security personnel.
- If anyone ventures into the area closest to the object (the second layer), a second alarm can be triggered, alerting security personnel to the increased threat level.

Any attempt to move the object or remove it altogether will result in the activation of a continuous alarm. As the sensor is calibrated to the exact dimensions of the object and its precise position within the surveillance area, any attempt to deceive the sensor by manipulating the object or the surveillance area will be immediately recognized, and security staff notified.



Protects only where protection is required



Suitable for 2D and 3D Objects

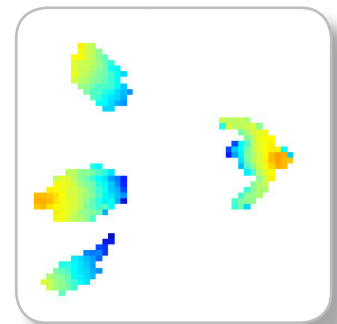
The Volumetric Object Surveillor can be configured and re-configured for use with all types of valuable objects, whether 2D objects such as paintings or 3D objects like sculptures or display cases.



How VOS Works

3D MLI Sensor™ Technology

IEE has developed a 3D sensor using MLI (Modulated Light Intensity) technology. MLI technology is based on the optical time of flight (TOF) principle, whereby 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 is measured to create a real-time topographic image of the monitored area. Through sophisticated embedded algorithms, the overhead-located 3D MLI Sensor™ processes topographic or 3D data very effectively, and is able to monitor the volume around an object and recognize when the surveillance area is compromised.



Topographic image



Advantages

Easy Installation and Integration

The Volumetric Object Surveillor's optimized Design Housing can easily be installed without requiring invasive aesthetic changes to the existing architecture or design of the surveillance area. The Design Housing is available for in-, on- and under-ceiling mounting, providing installation flexibility for all kinds of ceiling structures.

After the installer has configured basic settings, such as detection width, length and monitoring height, the sensor calibrates itself within a few seconds.



Flush mount



On-ceiling



Under-ceiling

Reliability in Changing Light Conditions

Since the sensor emits its own illumination, the performance is not influenced by artificial light and the sensor also works in the dark.

Embedded Software

Due to its integrated VOS firmware, the sensor does not require any additional computers or servers to process the data it captures. The decision to trigger an alarm is made by the sensor, and can be immediately transferred to the alarm system in place.

Self-Diagnostics

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

Integrated Audible Alarm

An integrated alarm signal can provide an acoustic confirmation that the surveillance area (either the outer or inner layer) has been compromised.



Core Housing



Design Housing

Technical Data

Device Properties	VOS9696M2	VOS6464M2
Monitoring height	2.5 to 3 m	3.0 to 5.0 m
Detection area	1.5 m x 0.9 m to 2.5 m x 1.5 m	1.5 m x 0.8 m to 3.2 m x 1.6 m
Field of view/illumination	90° x 60°	60° x 40°
Type of illumination	Modulated near infrared light (NIR)	
Weight	1.3 kg (Core Housing) + 1.6 kg (Design Housing)	
Dimensions of the Core Housing	W 167 mm x H 133 mm x D 94 mm	
Dimensions of the Design Housing	206 mm (integration cutout diameter), 247 mm (outside rim diameter), 115 mm (height)	
Operational temperature range	-20°C to +50°C	
Core Housing ingress protection	IP 40	
Supply voltage range	24 V DC ± 15%	
Power consumption	max. 2.7 A at 24 V DC	
Housing material	Powder coated aluminum	
Technology	3D MLI Sensor™	

Network Protocols

- IP address fixed or DHCP
- Application output: web interface HTTP or XML-RPC (optional)
- Firmware updates via Ethernet

Logging

- Access to current status
- Configurable logging interval, e.g. 10 s -> minimum log history 2 days 9 hrs

Web-Based User Interface

- Application outputs: early alarm, main alarm, combined alarm, system error
- Selection of different digital outputs with configurable polarity
- Real-time interactive graph for input and output testing of electrical installation (e.g. alarm)
- Password-protected configuration

Optional Relay Module

The optional relay module allows you to connect directly to VOS via the data cable and switch a relay if any of the following events occur:

- violation of the early alarm zone

- violation of main alarm zone
- violation of any alarm zone
- System error

Sensor Management Tool

The computer-based multi-language sensor management tool enables the management of several sensors and offers the following features:

- Fast software updates over the Ethernet network
- Sensor configuration and backup
- Copy a given configuration onto multiple sensor

Languages

Language packs can be uploaded into the sensors and can be changed at any time in the Sensor Management Tool.

For a detailed overview of the accessories such as design housing, ceiling brackets, power supplies and cables, please ask an authorized dealer for a price list.

Volumetric Object Surveillance VOS



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