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Product Manual

TOF People Counter

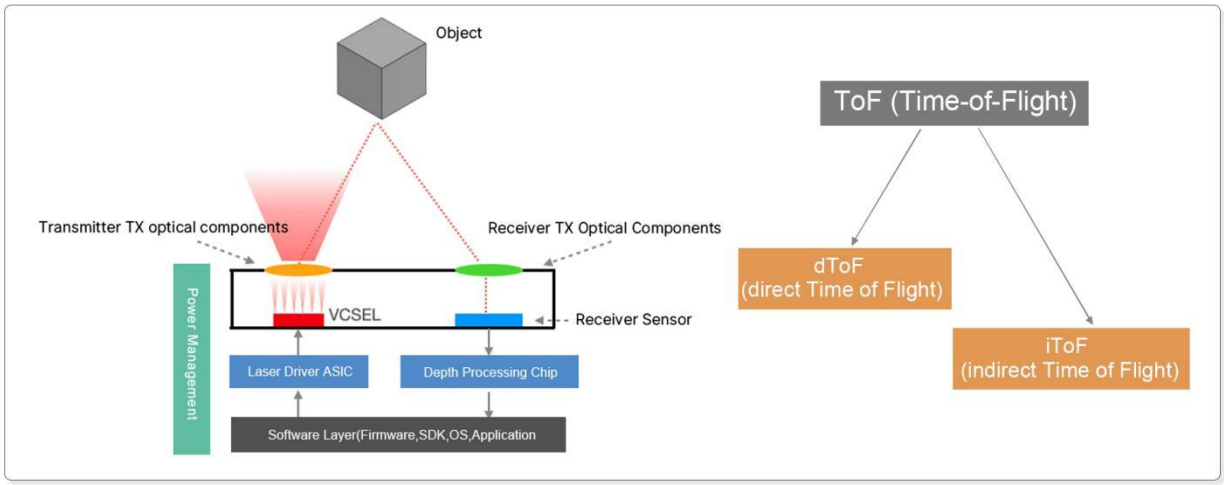
FP221

Smart Counter Provider

Core Technology

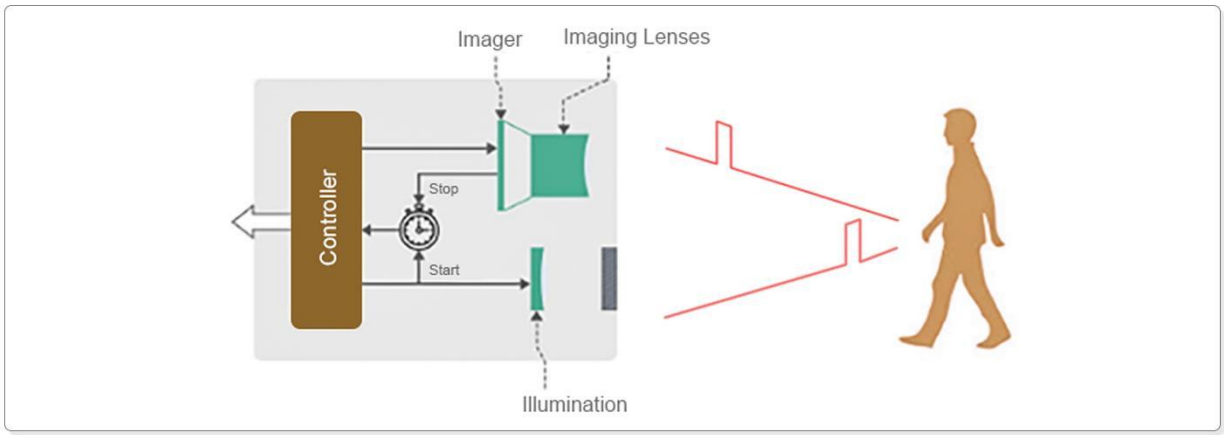
ToF time of flight technology principle

ToF (Time-of-Flight) is based on measuring the time required for light waves (usually near-infrared light) to reach an object and return, and then using the speed of light to convert the time measurement into distance, thereby deriving the shape and position of the object in its surroundings. By using ToF technology, no cameras are required, personal information is fully protected, and it works even in low or no light. Depending on the modulation method of the emitted light, ToF can be divided into dToF (Direct-ToF, direct time of flight) and iToF (Indirect-TOF, indirect time of flight).



dToF (Direct Time of Flight)

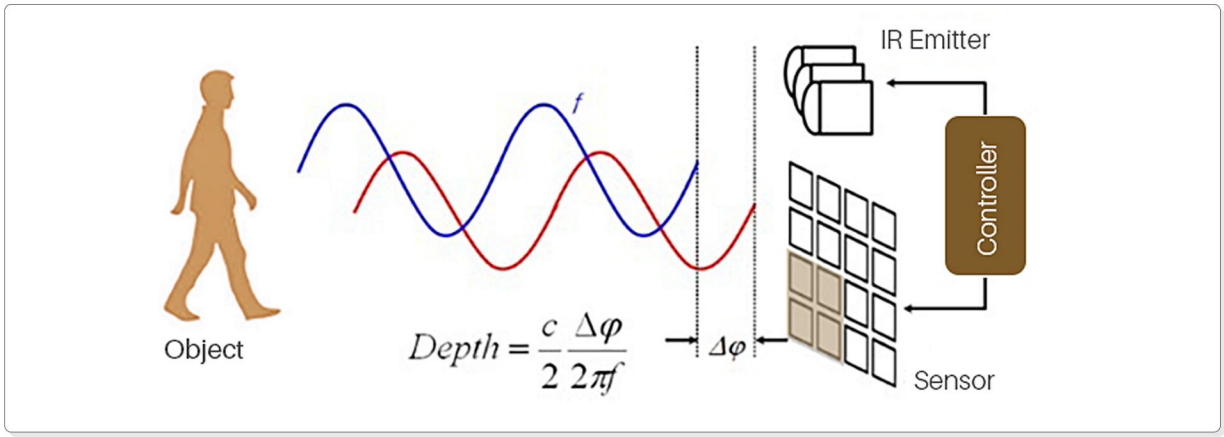
dToF (direct Time-of-Flight), the light source is pulse modulated, that is, the time interval between the transmitted pulse and the received pulse is measured. The direct ToF sensor emits a short light pulse that lasts only a few nanoseconds, and then measures the time required for part of the emitted light to return. This method has a simple measurement method, fast response, and high imaging speed, but it has high hardware requirements, and the ambient scattered light has a certain impact on the measurement results.



Core Technology

iToF (indirect time of flight)

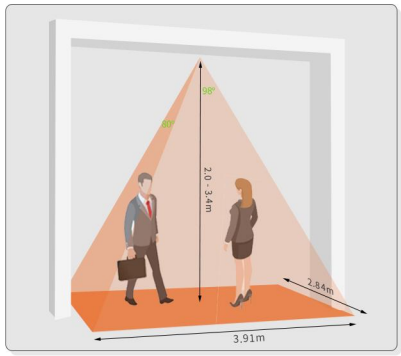
iToF (indirect Time-of-Flight) uses continuous wave modulation to modulate the emitted light into a certain periodic signal, usually a sine wave or square wave, and measures the phase difference between the emitted signal and the signal reflected back to the receiving end after reaching the measured object, and indirectly calculates the flight time. This method is particularly effective in high-speed, high-resolution 3D imaging of close-range and long-distance objects.



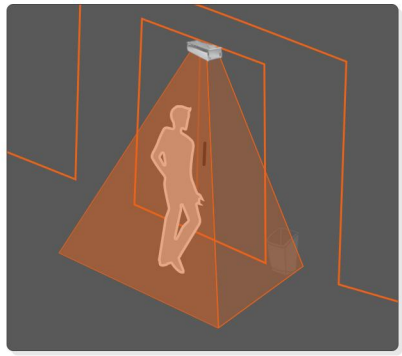
Technical Advantages

TOF people counter FP221 uses iToF (indirect time of flight) technology. This technology has excellent real-time performance and stable measurement accuracy. It will not decrease due to the increase of the measurement range, and it has strong anti-interference ability and is not affected by ambient light. Unlike binocular vision and camera imaging to obtain images and videos, TOF only obtains 3D depth information, eliminating privacy concerns. In addition, compared with Wi-Fi, Bluetooth, thermal imaging and infrared beams, it has high measurement accuracy. Considering the technical difficulty, radar is at a disadvantage in terms of cost performance. Overall, ToF is an anonymous, accurate and cost-effective technology.

High Real-time Performance



Extended Measurement Range



Adaptable Amidst Complexity

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Privacy Protection

This TOF people counter device, relying on advanced 3D TOF technology, is deployed in public places, focusing on accurately counting passenger flow and providing data support for efficient operation of the venue.

The device adheres to the bottom line of privacy protection and does not collect face recognition data. It only collects anonymous passenger flow data, such as personnel flow trajectory, length of stay, etc., which is used to count passenger flow. It does not involve any personal information and complies with GDPR.

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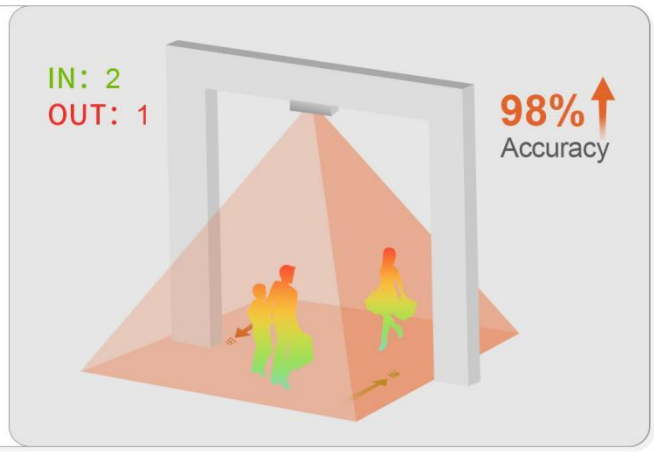
Product Features

Real-time and accurate statistics

Real-time and accurate recognition of human body, with an accuracy rate of up to 98%. Resistant to ambient light, can be used outdoors and adapt to dark environments.



Anonymous detection

The use of TOF technology does not rely on visible light images, and directly obtains the depth map and grayscale image of the object instead of the RGB image, which can effectively and thoroughly protect the privacy of personnel.

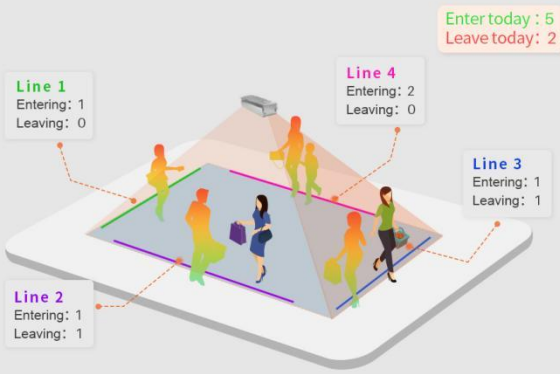
Distinguish between adults, children and staff

Through specific tags, staff can be accurately filtered. Customizable elevation cutoff points are supported to distinguish between adults and children and count them separately.

Product Features

Two-way line crossing number counting

Supports custom drawing of detection lines (up to 4) to achieve two-way counting of people crossing the line at multiple entrances and exits. At the same time, the device supports wandering filter detection function to conduct more accurate passenger flow analysis.



Regional population statistics

Supports custom drawing of multiple detection areas (up to 4), accurately counting the number of people in the specified area, and counting the time people stay in the specified area.

Data upload timeliness

The data can be uploaded to the passenger flow platform at a customized time, including real-time, 5 minutes, 30 minutes, etc. It supports multi-protocol data reporting and secondary development to connect to third-party platforms.

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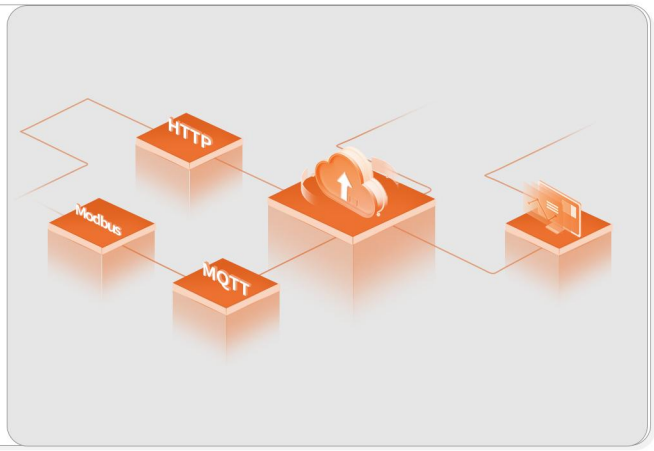
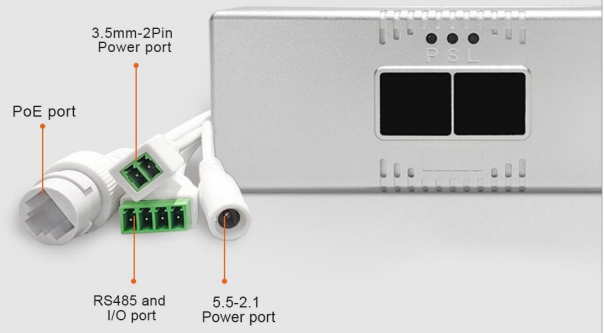
Product Features

Multi-protocol support

Data is transmitted to the server via HTTP POST / HTTPS POST / Modbus-RTU / Modbus-TCP / MQTT protocols, supporting secondary development and data docking. Users can log in to the WEB interface through a browser to enter the management platform to view or export data.



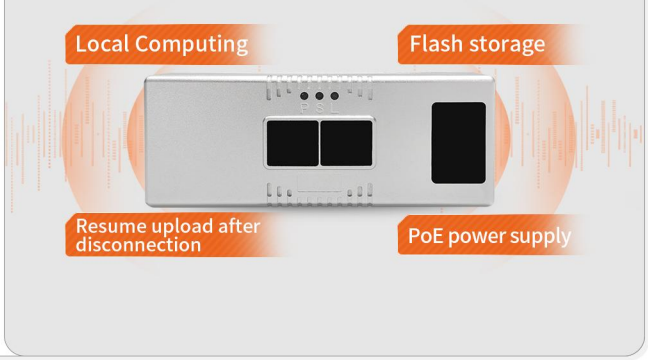


Rich open interfaces

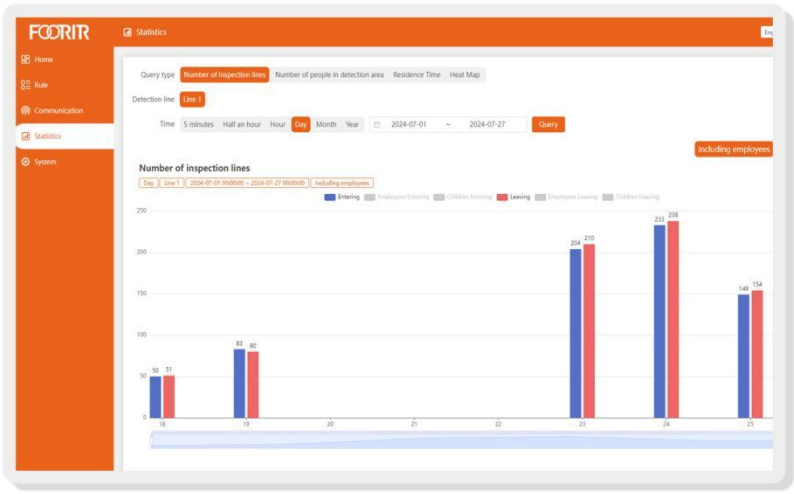
The device integrates various connection methods such as RS485, IO interface and PoE power supply, fully adapting to different installation environments and data transmission requirements to ensure efficient and flexible deployment and application.

Network smart devices

Supports local computing, no local server required, and supports resuming data transmission after disconnection. It has large-capacity local storage function and can store up to 1.5 million data records.



Standalone Mode Data Display



Debugging Terminal Statistics Page

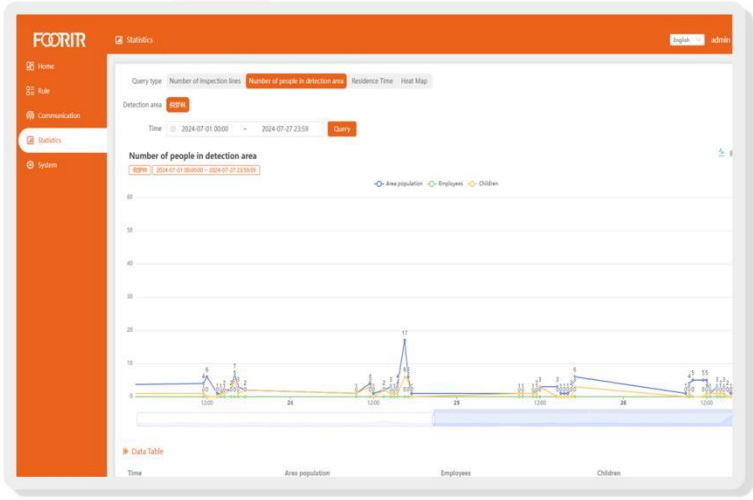
TOF people counter supports stand-alone mode.Stand-alone mode is to connect the device and the debugging computer to the same network, and query detailed statistical data through the Web interface debugging terminal, includingNumber of inspection lines,Number of people in detection area,Residence Time, Heat Map.

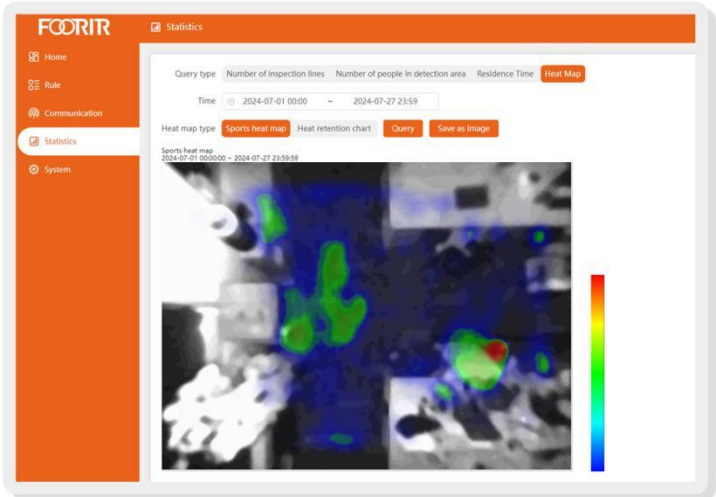
The query data supports the option to include or exclude employees.

Supports switching between line charts and bar charts.

Supports downloading generated data images and exporting data tables.

The query dimensions can be selected as 5 minutes, half an hour, hour, day, month, and year, and can be displayed according to user needs.

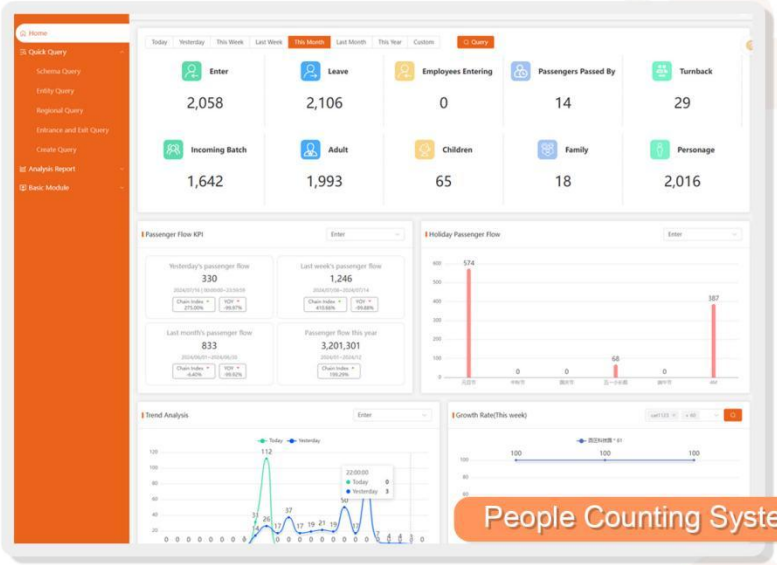




Heat Data Analysis

The device supports the generation of movement heat maps and stay heat maps.Users can use color blocks to quickly analyze the density of crowd movement and the distribution of stay time, thereby gaining an in-depth understanding of market demand and consumer behavior habits, providing strong support for decision-making.

Online Mode Data Display

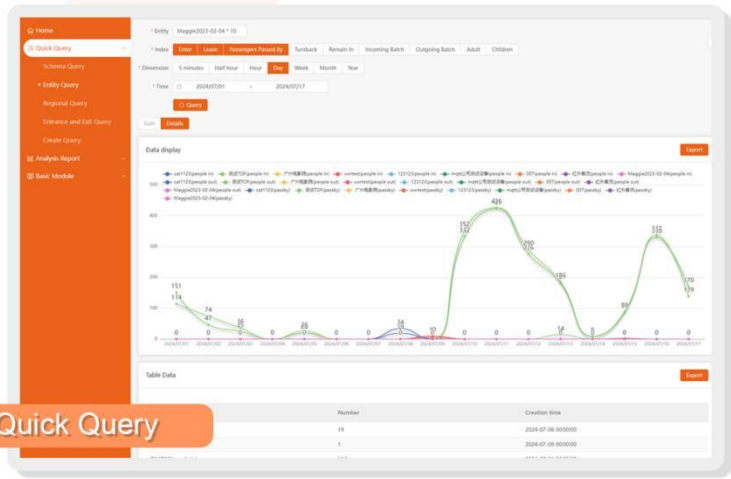


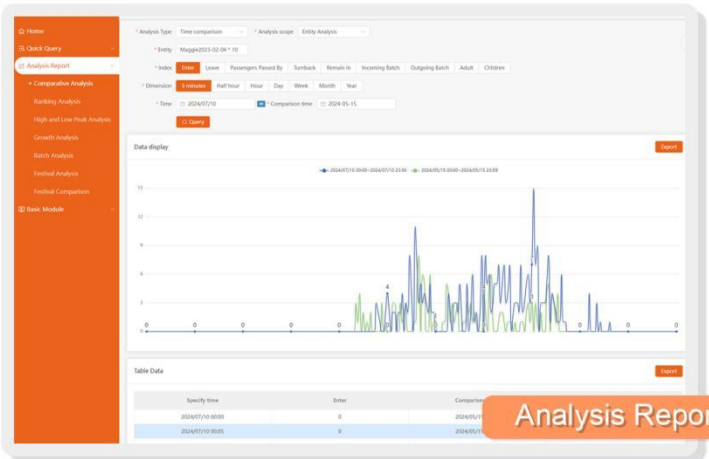
TOF people counter data is uploaded to the cloud platform for visual management.
The cloud platform provides users with real-time quick query and multi-dimensional analysis reports to help make accurate operational decisions.

The query indicators include the number of people entering, leaving, passed by, turning back, adult and children, incoming batch, outgoing batch, the number of families and individuals, etc.

Quick query includes schema query, entity query, regional query, entrance and exit query, and users can also create custom queries.

The query dimensions can be selected as 5 minutes, half an hour, hour, day, week, month, year, and can be displayed according to user needs.





The analysis report covers comparison analysis, ranking analysis, high and low peak analysis , growth analysis, batch analysis, festival analysis and festival comparison, presenting the analyzed passenger flow data in multiple dimensions.

Applicable Scenarios

TOF people counter is applicable to a wide range of scenarios, covering many public and commercial places. In crowded areas such as shopping malls, scenic spots, and smart toilets, it can effectively count and analyze passenger flow and provide managers with important operational data. At the same time, in environments such as libraries, museums, restaurants, factories, supermarkets, parks, and buildings, it helps managers understand the dynamics of passenger flow and optimize resource allocation. In addition, emerging scenarios such as exhibition halls and gyms are also beginning to apply this technology.

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