

PASINS 3D Passenger Flow Detector Product Specification

Shenzhen Hongyida Technology Co., Ltd.

(Model: PASINS HSS-BI-T/M series)

1. Product Overview

PASINS 3D Passenger Flow Detector is a privacy-protected entrance/exit compliance detection and security alarm product, specifically designed for entrance/exit access management scenarios in high-security facilities. The product innovatively integrates a LiDAR Vision sensing module with an edge intelligent computing module, achieving detection of passenger count, spatial positioning, and trajectory tracking at entrances/exits through 3D spatial data acquisition and AI human behavior analysis technology.



This product overcomes the limitations of traditional video surveillance, including privacy concerns and lighting environment requirements. By using 3D point cloud data without color information for multi-angle detection and behavior analysis, it performs behavior detection, intelligent recognition, and linkage control for passenger flow status while completely protecting personal privacy.

1.1 Product Appearance

PASINS 3D Passenger Flow Detector (PASINS HSS-BI-T/M series) adopts a ceiling-mounted design with a slim circular structure. The overall product dimensions are $\Phi 145\text{mm} \times 57\text{mm}$ (diameter $\times$ thickness). The standard version features a D-ToF (Direct Time-of-Flight) optical sensor on the front panel, with network and power interfaces on the side. The product appearance is illustrated below:



Model: HSS-BI-T/M series

1.2 Module Layout

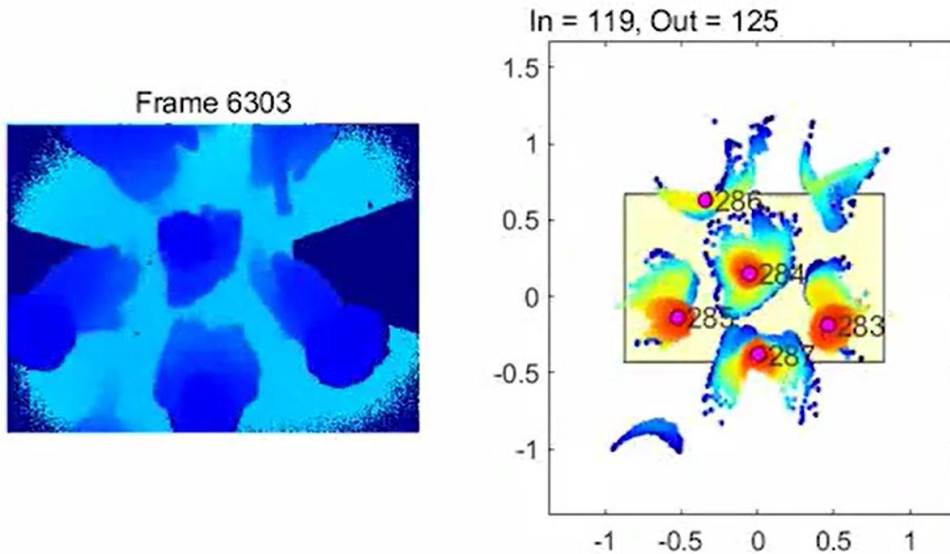
The device adopts a modular design internally, consisting of three core components:

- **LiDAR Vision Module:** 3D spatial point cloud data acquisition and output
 - **Computing Module:** Integrated CPU, GPU, NPU, and memory units for local data processing, intelligent analysis, and data storage
 - **Communication Module:** Gigabit Ethernet interface
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2. Technical Principles

2.1 LiDAR Vision Detection Technology

PASINS 3D Passenger Flow Detector employs ToF (Time-of-Flight) active optical measurement technology. By emitting and receiving near-infrared laser signals, it real-time acquires 3D coordinate data within the detection area. The device uses 940nm non-visible laser as the detection light source, compliant with IEC 60825-1:2014 Class 1 eye safety standard, ensuring biological safety during use.



Compared with traditional vision technology, this product offers three major technical advantages:

- **Privacy Protection:** The collected 3D point cloud data contains only spatial coordinate information without any color or texture data, fundamentally avoiding personal privacy leakage risks
- **Environmental Adaptability:** Unaffected by ambient lighting conditions, it operates normally in complete darkness or strong light environments with stable detection accuracy
- **Measurement Precision:** 3D coordinate data achieves centimeter-level accuracy, enabling precise capture of human posture changes and spatial position movements

2.2 Intelligent Analysis Principles

Intelligent analysis is based on the computational capability of the high-performance computing module, integrating neural networks and intelligent recognition algorithms to complete autonomous recognition, detection, and alarm functions.

The high-performance computing module integrates a 64-bit 8-core processor, with integrated GPU and NPU, providing 6 TOPS computing power. It offers powerful local data processing capability. The product integrates 3D point cloud recognition algorithms optimized for indoor scenarios and neural networks, achieving the following core functions:

- **Motion Feature Analysis:** Identification of passenger movement direction and trajectory changes
- **Detection Algorithm:** Employs deep learning technology

- **Data Localization:** The device adopts a “data localization” privacy protection architecture, where all raw data is processed locally, and only analysis results are uploaded to the server, ensuring data security

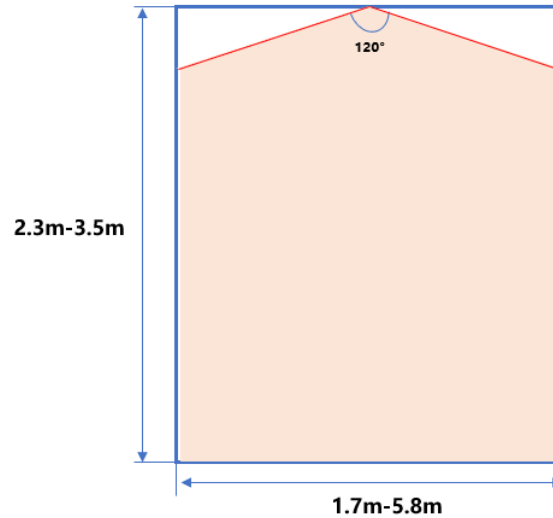
3. Application Functions

Function Category	Function List	Function Description
Passage Detection	Single Person Detection	Detection of single-person passage and passage direction identification within the detection area
	Multi-Person Detection	Detection of multi-person passage and passage direction identification within the detection area
	Bidirectional Counting	Records and reports passenger flow for two-way passage within the detection area
Data Services	Intelligent Learning	The integrated detection algorithm model supports continuous iterative upgrades
	Data Visualization	Product provides embedded WEB server, supporting device configuration and real-time detection data display via browser
	Data Interface	Product provides data communication interface for data integration with third-party management systems, providing real-time detection data

4. Installation and Deployment

4.1 Installation Requirements

PASINS 3D Detector is suitable for entrance/exit areas ranging from 2 m² to 10 m², and adopts ceiling-mounted installation. The typical installation diagram is shown below:



Installation Recommendations:

1. **Installation Location:** It is recommended to install at the center of the detection area to ensure the detection range covers the passage area
2. **Installation Height:** Optimal height is 2.8m - 3.2m, maximum not exceeding 3.5m, minimum not lower than 2.3m
3. **Horizontal Deviation:** Device horizontal error must be less than 5° to ensure 3D coordinate measurement accuracy
4. **Installation Space:** No obstructions within 1 meter below the sensor to avoid detection blind spots

4.2 Coverage Area

PASINS 3D Detector adopts ceiling-mounted installation. At heights between 2.3-3.5m, the detection coverage is as follows (Example of model HSS-BI-T/M2):

Installation Height (m)	Detection Width (m)	Detection Depth (m)
2.3	1.7	0.6
2.4	2.0	0.7
2.5	2.4	0.8
2.6	2.7	1.0
2.7	3.1	1.1
2.8	3.4	1.3
2.9	3.8	1.4
3.0	4.1	1.5
3.1	4.5	1.7
3.2	4.8	1.8
3.3	5.2	2.0

Installation Height (m)	Detection Width (m)	Detection Depth (m)
3.4	5.5	2.1
3.5	5.8	2.6

4.3 Electrical and Communication Requirements

1. **Power Input:** DC 24V, maximum power consumption 48W
2. **Network Communication (Standard):** 1 × Gigabit Ethernet port (RJ45)
3. **Operating Temperature:** -10°C ~ +50°C
4. **Relative Humidity:** ≤90% (non-condensing)

4.4 Installation Procedure

The product installation steps are recommended as follows:

1. **Step 1:** Determine installation location and mark drilling points
2. **Step 2:** Secure device base to ceiling
3. **Step 3:** Connect power and network cables
4. **Step 4:** Adjust device levelness and secure
5. **Step 5:** Power on the device
6. **Step 6:** Complete device activation and configuration through graphical tool software

5. Technical Specifications

Model: HSS-BI-T/M series

5.1 Computing Module Parameters

No.	Parameter	Specification
1	CPU	Quad-core 2.2GHz and Quad-core 1.8GHz
2	GPU	G52 MC3 @ 1GHz
3	NPU	6 TOPS
4	Communication Interface	1 × RJ-45 Gigabit Ethernet
5	System Environment	Ubuntu 22.04

5.2 LiDAR Vision Module Parameters

No.	Parameter	Specification
6	Laser Wavelength	940 nm
7	Laser Safety	Class 1 (IEC 60825-1:2014) Eye Safety Level
8	Detection Angle	HSS-BI-T/M1: Horizontal FOV 90°, Vertical FOV 70°

No.	Parameter	Specification
		HSS-BI-T/M2: Horizontal FOV 120°, Vertical FOV 70°
9	Detection Frequency	20Hz
10	Installation Height	2.3m - 3.5m
11	Detection Range	See “4.2 Coverage Area”
12	Detection Accuracy Deviation	1 Standard Deviation < 3cm

5.3 Intelligent Recognition Performance

No.	Parameter	Specification
13	Data Processing Latency	< 100 ms
14	Target Detection Output	ID, Coordinates, Region, Direction, Count
15	Region Identification	Multi-region identification (up to 2 regions), customizable region range
16	Target Type Recognition	Human body, Non-human objects

5.4 System Functions

No.	Parameter	Specification
17	Operation Tools	Web-based graphical operation interface (multi-language support)
18	Supported Protocols	TCP/IP Protocol IPv4/IPv6
19	Account Management	Support for multiple account settings
20	Log Management	Provide device operation and account maintenance logs

5.5 Other Characteristics

No.	Parameter	Specification
21	Dimensions	Diameter × Thickness: Φ145mm × 57mm
22	Operating Temperature	-10°C ~ +50°C
23	Relative humidity	0%–95% RH, non-condensing
24	Illuminance	0K LUX – 100K LUX
25	Power Input	DC 24V, 2A
26	Installation Method	Ceiling-mounted

6. Product Models

Product model list is as follows:

No.	Product Name	Model	Product Description
1	Passenger Flow II	HSS-BI-T/M1	LiDAR Vision passenger flow detection product. Integrates LiDAR vision module, intelligent recognition module, network communication module, and power supply module. Integrates human entry/exit behavior intelligent recognition algorithm. Suitable for human motion detection and passenger counting in various indoor/outdoor passages, gates, scenic areas, and other entrance/exit areas. Product detection FOV: $90^{\circ} \times 70^{\circ}$, installation height: 2.5m-3.5m, detection range ground width: 1.4m-3.4m, depth: 1.0m-2.4m. Provides 1000M network port. Offers data integration interface supporting third-party system data integration.
2	Passenger Flow III	HSS-BI-T/M2	LiDAR Vision passenger flow detection product. Integrates LiDAR vision module, intelligent recognition module, network communication module, and power supply module. Integrates human entry/exit behavior intelligent recognition algorithm. Suitable for human motion detection and passenger counting in various indoor/outdoor passages, gates, scenic areas, and other entrance/exit areas. Product detection FOV: $120^{\circ} \times 70^{\circ}$, installation height: 2.3m-3.5m, detection range ground width: 1.7m-5.5m, depth: 0.7m-2.4m. Provides 1000M network port. Offers data integration interface supporting third-party system data integration.

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