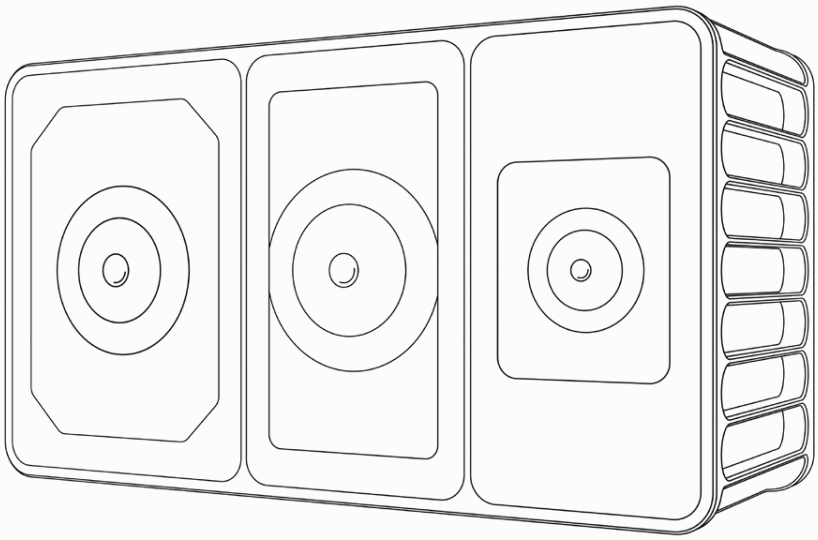
Odin1 User Manual

Version number: v0.1

Release date: 2025.7

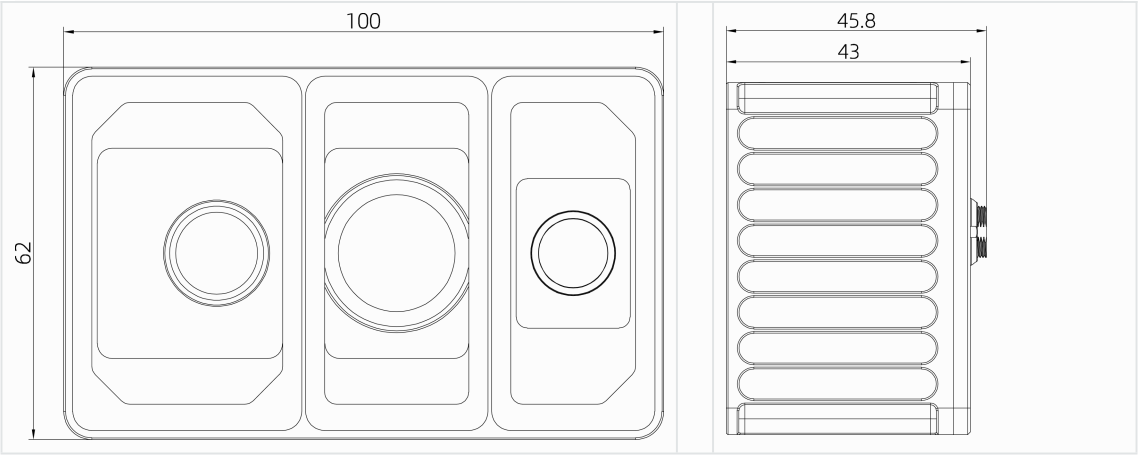


1. Product Overview

1.1 Product Introduction

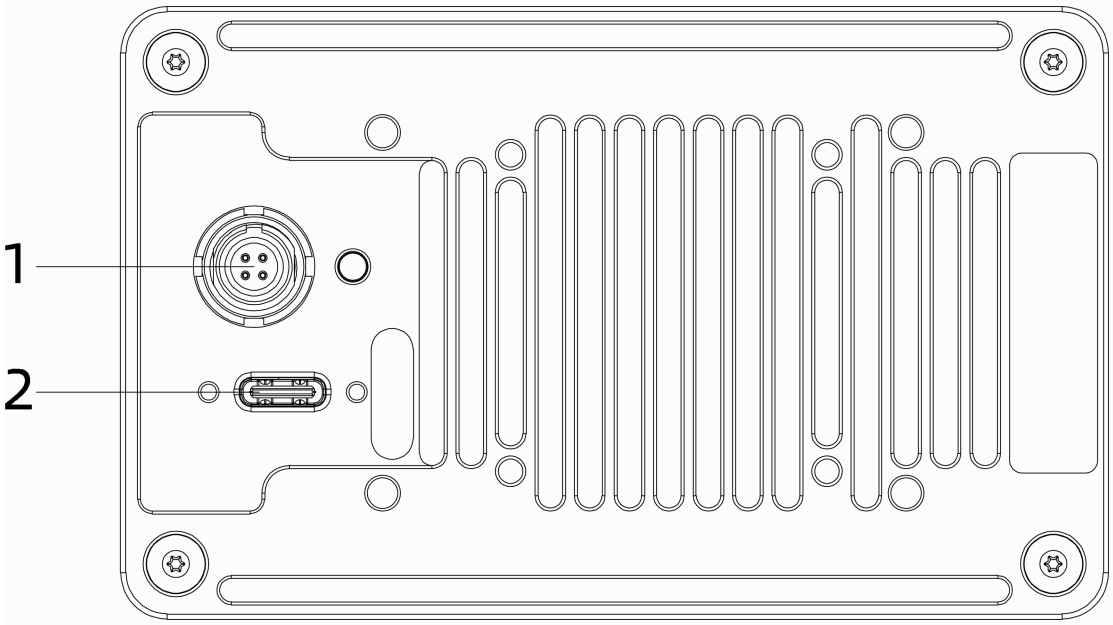
Stay in shape Odin1 It is the world's first deep fusion multi-sensor high-performance hardware with built-in high-performance SLAM The spatial memory module of the algorithm, like the "hippocampus" of the human brain, brings key spatial perception and spatial memory capabilities to robots and drones. Cooperate MindCloud The platform can optimize, annotate and reconstruct the collected three-dimensional data, and ultimately form a reusable "spatial memory", thereby achieving a complete closed loop from front-end perception to back-end training, from the real world to the virtual scene.

1.2 Appearance size



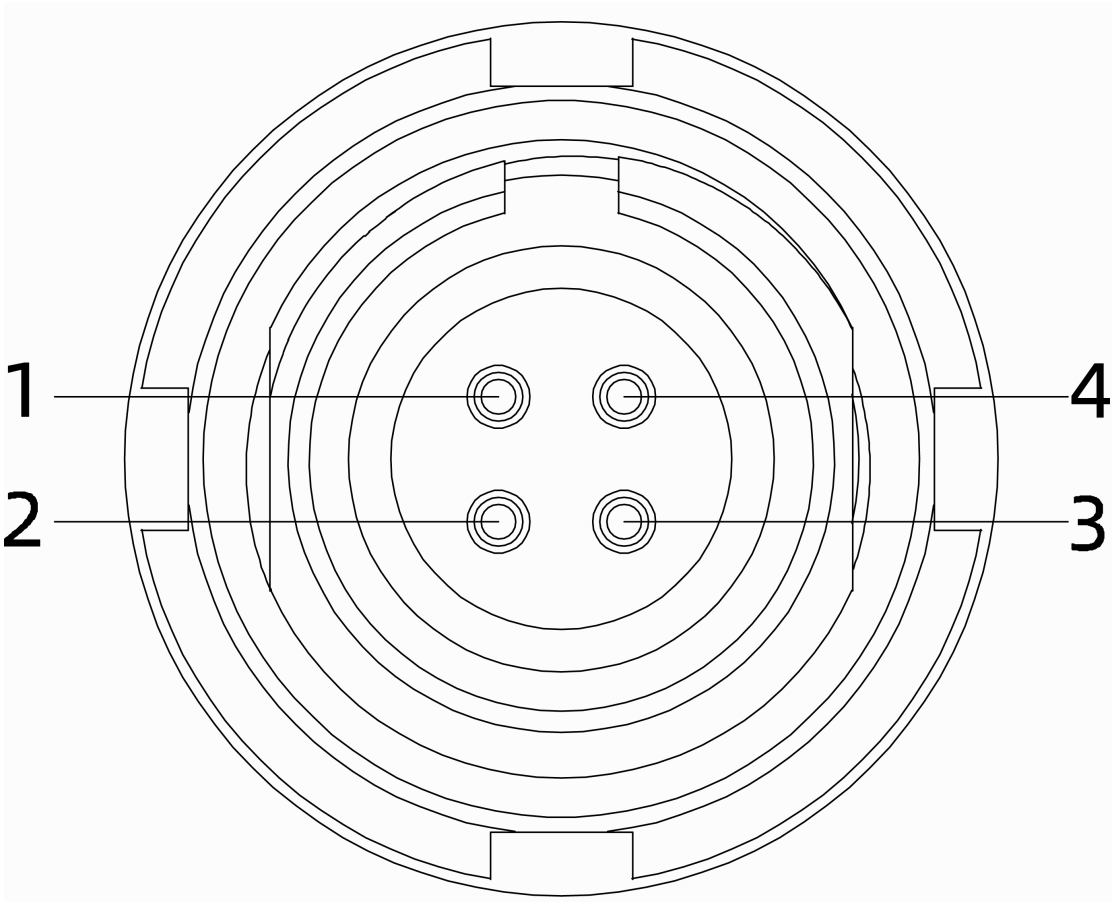
2. Hardware description

2.1 Physical interface



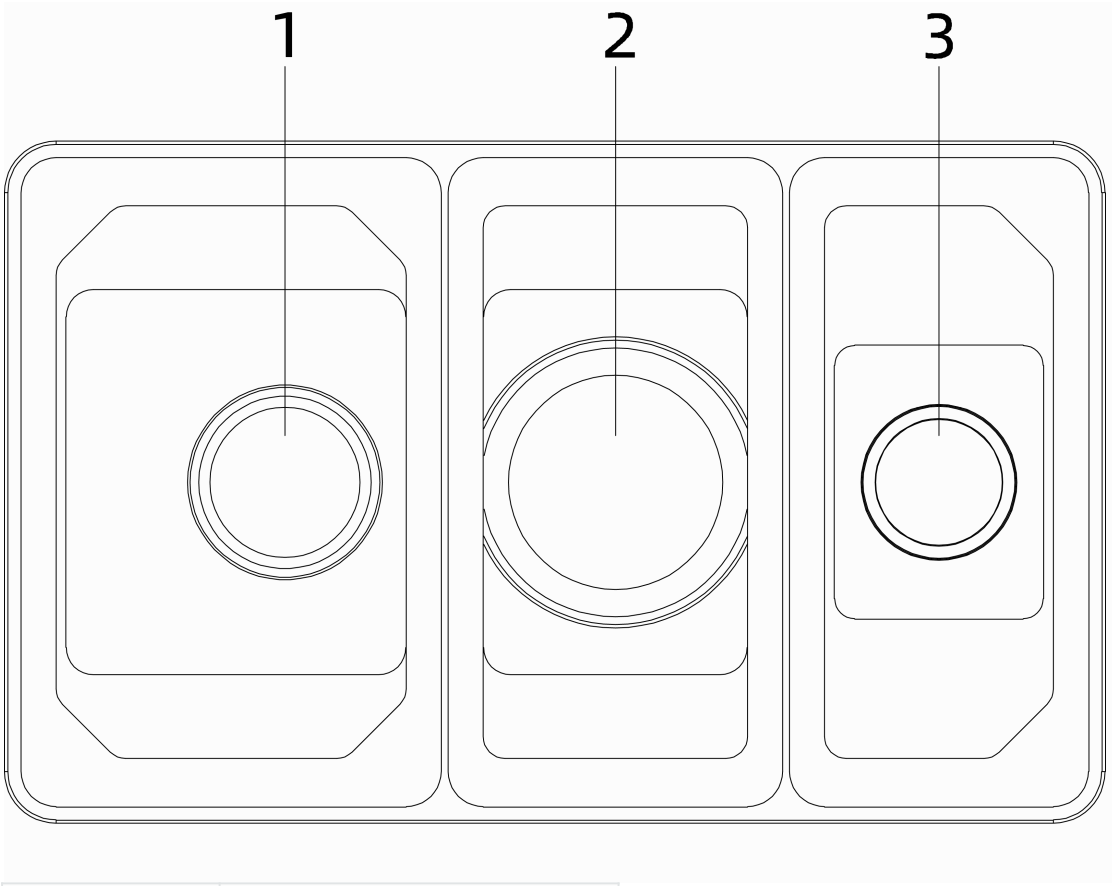
Serial number	Interface type	Cable model	Function description
1	Four-core aviation socket	FGG.0T Series push-pull self-locking plug	Power supply interface
2	USB-C 3.0	USB 3.0	High-speed data output

2.2 Interface definition



Four-core aviation socket pins	Signal	property	describe	Wire Harness Color	Function
1	Power+	Power	DC 9–24V	red (positive electrode)	Power cord
2	FSYNC	FSYNC	Bidirectional synchronous signal	green	Hard synchronization signal line
3	GP IO	GP IO	Two-way synchronization IO	white	GP IO
4	Ground	Power	Ground	black (negative electrode)	Power cord

2.3 Core components



Serial number	part
1	Laser emitting terminal (TX)
2	Laser receiver (RX)
3	RGB camera

3. Installation Guide

Official installation Odin1 Before, please read the following precautions:

1. Clean the installation surface and window:

- Before installation, be sure to remove dust, oil and other dirt from the installation location and the lidar optical window. It is recommended to use a clean air blow to remove dust, and then use a lint-free cloth (such as a lens cloth) to gently wipe the window with a little water to ensure it is completely clean. Residual stains will affect measurement accuracy.

1. Ensure that the view is unobstructed:

- When installed, the angle of the field of view in front of the sensor (FOV） area (0.2 Mine) No obstruction is allowed. Special attention: Even transparent glass, acrylic plates, etc., installed directly in front of the sensor will significantly interfere with the laser signal, resulting in a degradation of performance.

1. Flexible installation direction (including optimization suggestions):

- This product supports installation in any direction (including flip-up). During flip: The bottom of the device is at least 0.2 meters away from the object to ensure optimal performance.
- The device will automatically adapt to the installation posture (such as flip, tilt), and the internal sensor will be calibrated.

1. Extra loads are prohibited:

- The body of the device (especially the heat dissipation housing and optical windows) cannot withstand additional weight or pressure (such as stacking items on it or pressing hard). Please only fix it through the designed installation interface (such as the threaded hole at the bottom).

1. Ensure cooling space:

- There is enough space around the equipment for heat dissipation. Requirements: Minimum clearance distance between the equipment body

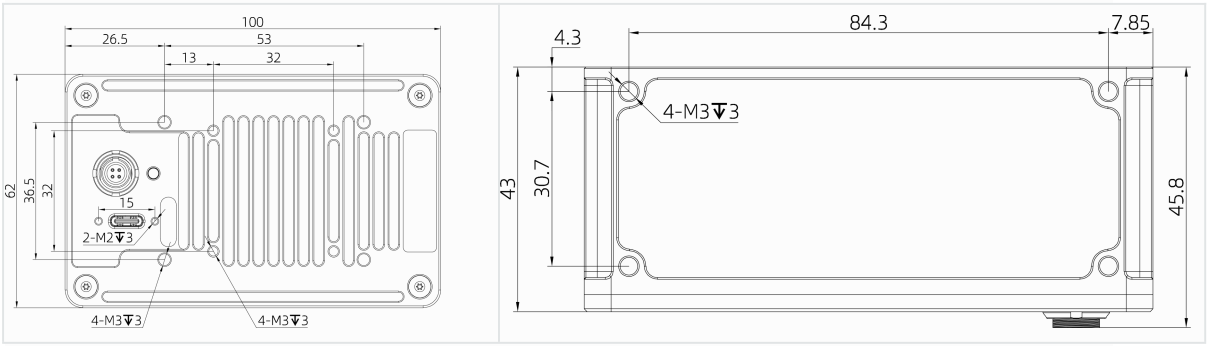
and surrounding objects (such as inner wall of the shell, cable bundle, etc.) ≥ 10mm, Ensure the air can flow smoothly and prevent overheating.

1. Stable installation:

- It is strongly recommended to install the equipment on a sturdy bracket, with the bottom of the sensor being more than 0.2 meters away from the object to prevent the field of view from being blocked.

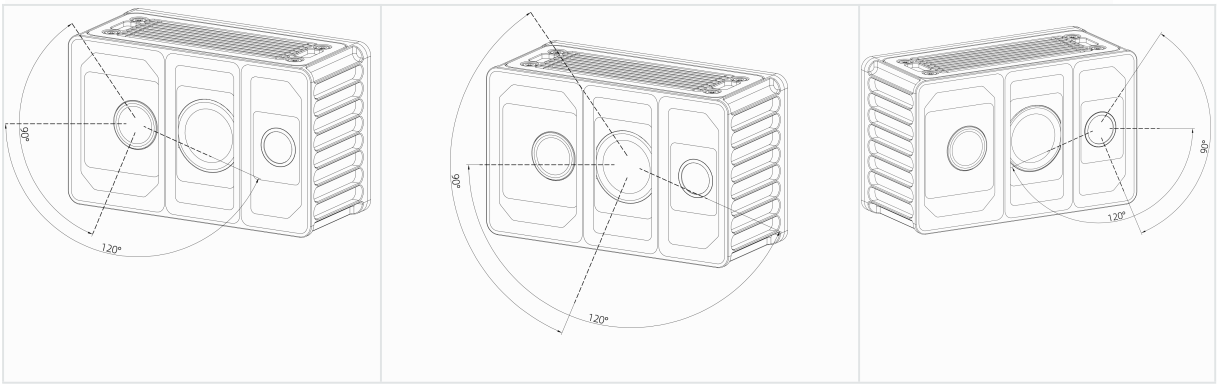
3.1 Mechanical installation

Odin1 There are 4 mounting holes at the bottom +4 There are 4 mounting holes for cooling fan and 4 mounting holes for side. Please follow the size and size of the installation hole shown in the figure below and the size of the installation hole Odin1 Install to the appropriate location.



Effective field of view (FOV） scope:

Odin1 Depth of FOV It is about 120 °H × 90 °V, As shown in the figure below. Please note when installing FOV Effective range to avoid obstruction FOV area.



4. Power and connection

4.1 Design Guide for External Power Supply Systems

1. Voltage range required for this equipment to support DC 9–24V Wide voltage input, recommended to use 12 V/2A DC power supply must ensure that the power supply is not less than 15 W, Otherwise, it may not start properly. In low temperature conditions, it is recommended to appropriately increase the power supply voltage to ensure start-up reliability.
2. Precautions for power adaptation

- When direct connection to the power supply through the aviation plug, it is necessary to ensure that the power output voltage is always at 9–24 V Within range.
- When using extension cables, the line voltage drop must be compensated, but the final input voltage must not exceed 26 V Upper limit.

1.

Voltage surge protection warning　More than 26 on the power line V Voltage fluctuations in voltage (such as sudden power outage of parallel equipment, electromagnetic interference, etc.) may cause permanent damage to the equipment. It is recommended to add an overvoltage protection circuit to the power supply circuit.

2.

Power consumption characteristics description

Work status	Power characteristics
Stable operation	≤15W（ Typical value 11 W）
Cold start peak value	Maximum 15 W（ continued ≤10 Second)

1. Key parameters for power supply selection According to the equipment peak current of 1.67 A（@9V） With 26 V With upper voltage limit characteristics, the power supply must meet:

- Continuous output capability ≥1.8A

- Overvoltage protection threshold ≤26V
- Recommended power margin ≥25W

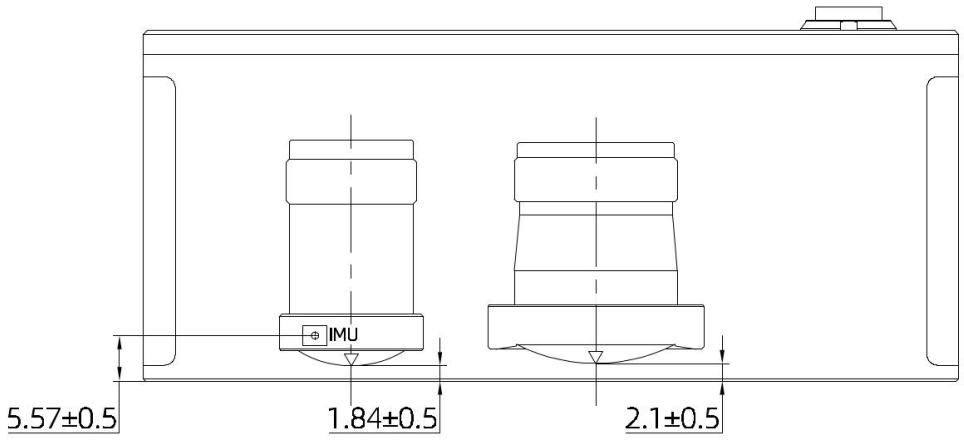
4.2 Connection steps

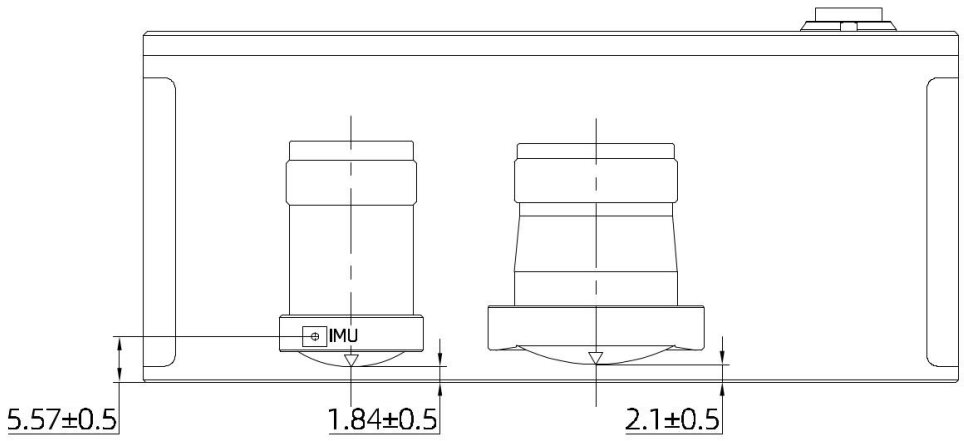
- Connect the power supply through the aviation plug
- connect USB To the host (data transfer)
- Power-on self-check

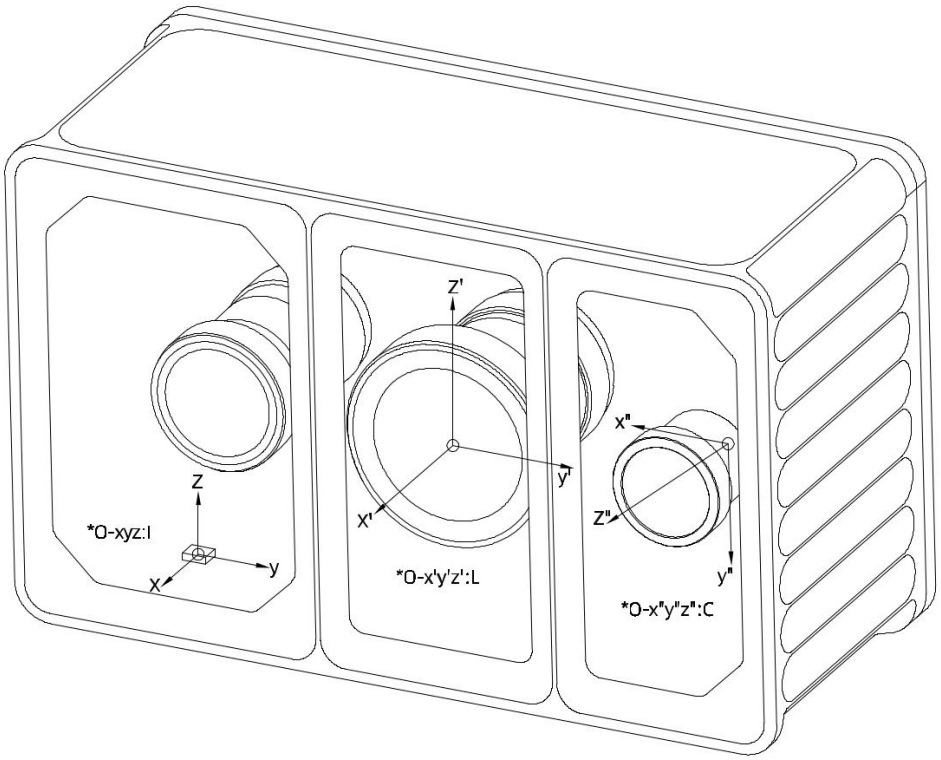
5. Data output

5.1 Coordinate system definition

Odin 1 The definition of Cartesian coordinates is shown in the figure below. **I** for imu Coordinate system, **L**It is a point cloud coordinate system, **C**is the camera coordinate system.







5.2 Foreign reference description

平移向量 (extrinsic_T):

$$\vec{t} = \begin{bmatrix} -0.0254, & 0.0330, & 0.0221 \end{bmatrix}$$

旋转矩阵 (extrinsic_R):

$$R = \begin{bmatrix} 1.0 & 0.0 & 0.0 \\ 0.0 & 1.0 & 0.0 \\ 0.0 & 0.0 & 1.0 \end{bmatrix}$$

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meaning: P_imu = T^{imu} {lidar}*P_lidar, Among them T^{imu} {lidar} is lidar relative to IMU external parameter matrix.

5.3 Data output type (ROS1 and ROS2）

Detailed reference:https://github.com/manifoldsdk/odin_ros_driver

6. Maintenance and troubleshooting

6.1 Daily maintenance

1. Cleaning specifications:

- Use air blow to remove lens dust
- It is prohibited to use corrosive solvents to wipe the window glass. Corrosive solvents will destroy the surface coating of the glass.； When corrosive solvent enters through the gaps on the edge of the window glass, it will corrode the waterproof adhesive of the glass, resulting in waterproof failure. Banned corrosive solvents include but are not limited to: alcohol, isopropanol, white oil, turpentine oil, etc.

1. Storage conditions

Temperature: -10 ℃~45℃	humidity: <85% RH

6.2 Frequently Asked Questions

Phenomenon	Solution
Point cloud missing	Check for window stains /Check lens stains
Positioning drift	Restart the device and initialize the stationary state
USB Recognition failed	Update driver or replace Type-C Cable

7. Technical parameters

Classification	Parameter name	Specification /Value
Depth module	Depth resolution	240 * 180
	Range measurement range (Max)	30m@10% Reflectivity (<500lux) 70m@90% Reflectivity (<500lux)
	Range measurement range (Min)	0.2m
	Point frequency	Up to 700,000 pts/s
	Ranging accuracy	±3cm@1o[1]
	Field of view (FOV, level X vertical)	120° H X 90° V
	Angle resolution	0.5° x 0.5°
	Laser wavelength	940 nm
	Laser safety level	Class 1 Human eye safety
	Frame rate	Up to 15 FPS
RGB Camera module	Resolution	1600 X 1296
	Exposure method	Global exposure (Global Shutter)
	FOV(HXV)	129° H x 104° V x 173° D
The whole machine parameters	built-in SLAM Positioning accuracy	±5cm+1%[2]
	weight	About 280 g
	volume (LXWXD)	About 100 x62x43(main body)/46(Aviation plug included) unit: mm
	Power consumption	Rated 11 W, Peak 24 W
	Protection level	IP66
	Operating voltage	9-26 V
	Operating temperature	-10° C~40° C
	Storage temperature	-10° C~45° C
Data output	Point the cloud	Really colored SLAM/Original point cloud
	photo	original RGB image
	IMU	High frequency raw data
	Position	High frequency rotation, position

Classification	Parameter name	Specification /Value
		data
	Software interface	Provide complete SDK&ROS Interface, support Linux Platform supports deployment customization SLAM algorithm

【1】 ** **Indoor testing environment, at 80% Lambertian Data calculation for 20 consecutive frames on the reflector Std Accuracy value. 5 m Under conditions, +/-3cm@1sigma, 5-30 1 sigma Accuracy value <1% ****

【2】 Under laboratory conditions