Solid State Lidar

LD07

LD07 is a short-range one-dimensional solid laser radar, small in size and low in price, especially suitable for obstacle avoidance applications of robots.

The LD07 is a short-range solid-state radar with a range of 30-300mm. It is mainly composed of a linear laser and cameras. After the laser is sending out by the linear laser device , it is captured by the camera. Based on the fixed structure of the laser and the camera, combining with triangulation measuring principle, we can calculate the distance between the object and LD07.Then according to the camera fixed parameters , we can get the angle value of the measured object in the radar coordinate system . Thus , we obtain the complete point cloud map of target object.

The common usage of LD07 obstacle avoidance applications is shown as the figure below.

Two laser lines are installed in the front side towards the ground at a certain angle to measure the distance and angle of obstacles. Alternatively, another one is installed on the side and the laser line is emitted vertically to the ground for walking along the edge of the obstacle. This method is especially useful for avoiding low obstacles such as electric wires, slippers and carpets etc.
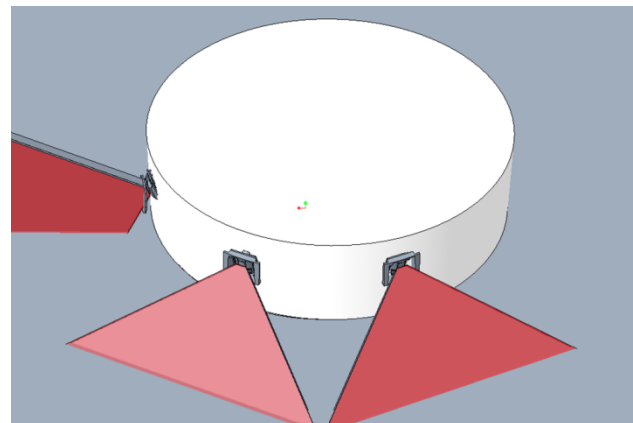
Features

- 5 mm obstacles accurate recognition
- 10 mm accurately along the wall
- 28HZ measurement frequency
- Ultra-thin appearance
- Laser safety FDA Class I
- 90° FOV
- 10000h service life

Application Field

- Education
- Scientific research
- Algorithm
- Robot obstacle avoidance
- Autonomous navigation
- Navigation and positioning
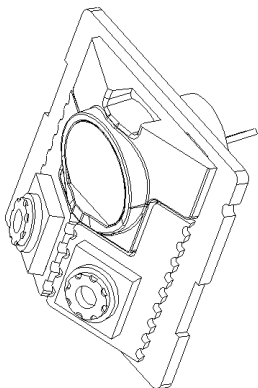
LD07

Schematic diagram of LD07 obstacle avoidance application

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Contents

1. Specifications

1.1. Electrical and Mechanical Parameters

Parameters	Unit	Minimum	Typical	Maximum	Remarks
Input Voltage	V	3.1V	3.3V	3.63V	
Start up Current	mA	-	200	-	
Work Current	mA	-	145	-	
Size	mm	24*19.7*15.3(L*W*H)			
Weight	g	-	6.6	-	Without cable
Interface	-	UART @ 921600			
UART High Level	V	2.9	3.3	3.5	
UART Low Level	V	-0.3	0	0.4	
Operating Temperature	℃	-10	25	40	
Storage Temperature	℃	-30	25	70	

1.2. Optical Parameters

Parameters	Unit	Minimum	Typical	Maximum	Remarks
Laser Wave Length	nm	805	808	811	Infrared band
Laser Power	mW	-	50	-	
Laser Safety Standard	-	IEC-60825 Class 1			

1.3. Performance Parameter

Parameters	Unit	Minimum	Typical	Maximum	Remarks
Range	mm	30	-	300	70% target reflectivity
Scan Frequency	Hz	-	28	-	Adaptive adjustment according to ambient light conditions
Ranging Accuracy	%	-	±3.5	-	Within 100mm
	%	-	±4	-	From 100mm to 300mm
Viewing Angle	°	-	90	-	Measured at 120mm
Angular Error	°	-	-	2	
Angular Resolution	°	-	0.5	-	
Anti-ambient Light	KLux	-	-	25	
Life Time	h	10000	-	-	

2. Data Interface

2.1. Communication and Interface

LD07 uses the ZH1.5T-4P 1.5mm connectors to connect with the external system to implement power supply and data receiving. The specific interface definition and parameter requirements are as following:
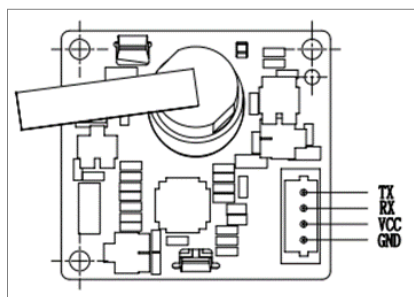
| No	Signal	Type	Description	Minimum	Typical	Maximum
1	TX	Output	UART TX	0V	2.8V	3.63V
2	RX	Input	UART RX	0V	2.8V	3.63V
3	VCC	Power	Power	3.1V	3.3V	3.63V
4	GND	Power	GND	-	0	-

The data communication of LD07 adopts standard asynchronous serial port (UART) for one-way transmission, and its transmission parameters are shown in the table below:

Baud Rate	Data Bits	Stop Bits	Parity Bit	Flow Control
921600	8 Bits	1	No	No

LD07 is needed to send instructions to work normally. Please refer to "LDROBOT_LD07_ development manual" for detailed usage.

2.2. Coordinate System Definition

The coordinate system of LD07 is shown as below picture. The laser exit direction is taken as the front side, the projection of the laser center on the PCB plane is taken as the origin of coordinates, and the polar coordinate system is established with the normal line of the PCB plane in 0 degree. The angle increases gradually going with clockwise direction.
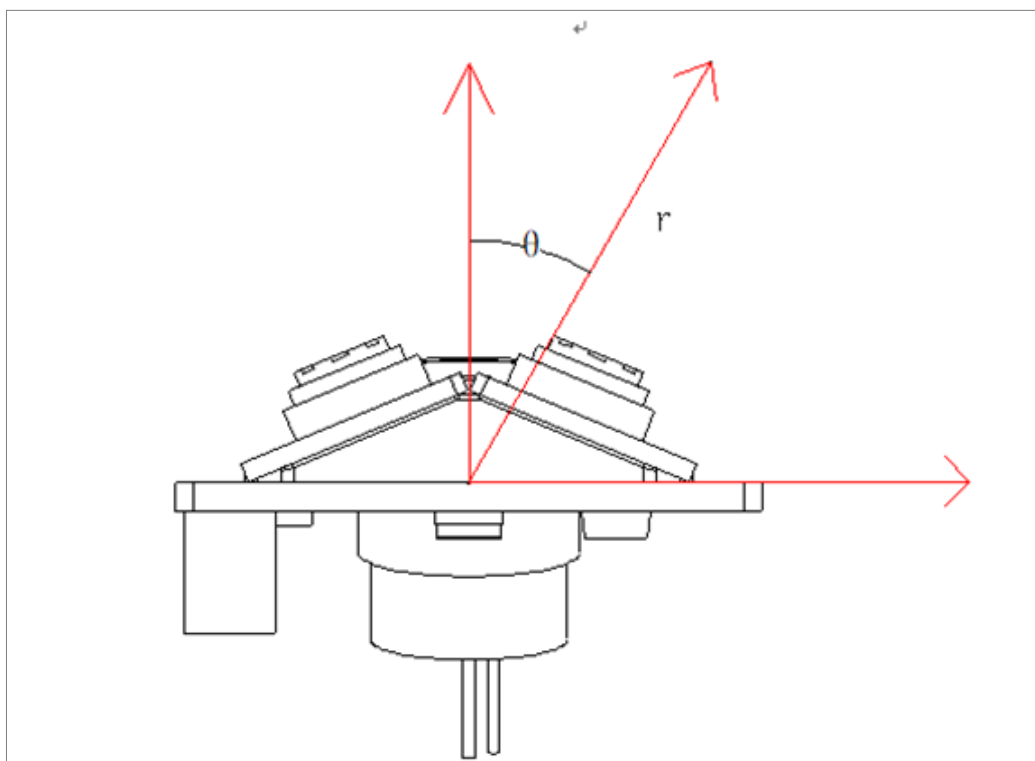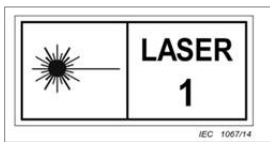
3. Mechanical Dimensions

Please refer to the following figure for other installation dimensions（Unit: mm）：
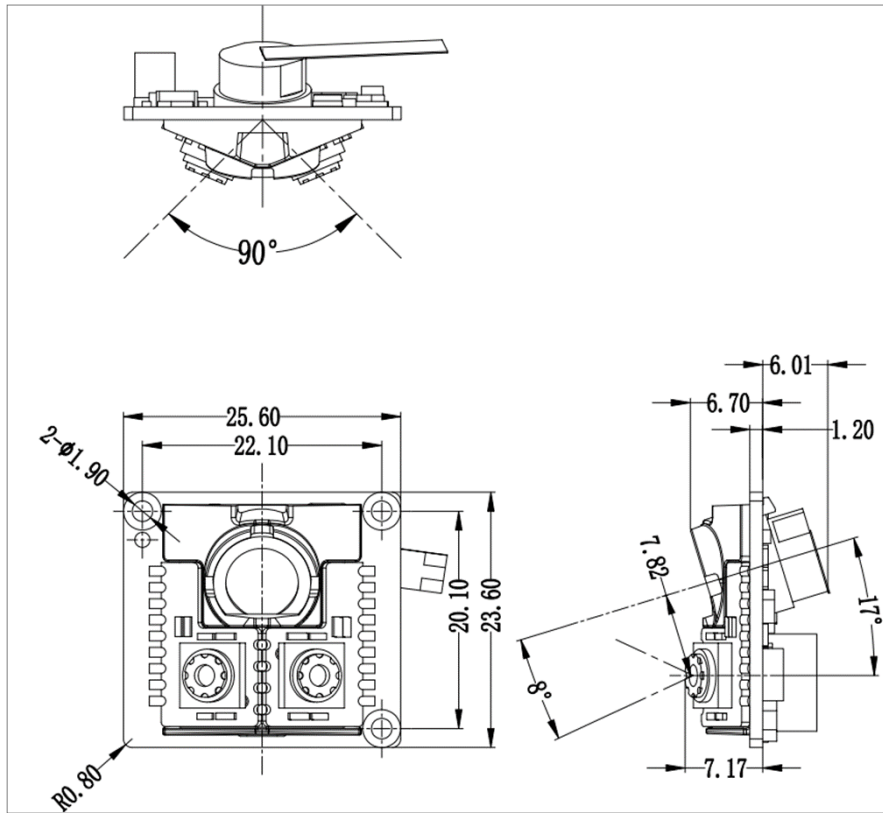
4. Safety and Application Scope

LD07 uses a lower powered infrared laser as emission light source to ensure the safety of human and pets. This Lidar has passed testing and conformed to Class I, 21 CFR 1040.10 and 1040.11 safety level, except for the deviation of Laser Notice No. 50 of June 24, 2007.

Caution: The personal adjustment or reassembly of the Lidar may result in hazardous radiation exposure.

5. Customized Requirements

Its software, hardware parameters and structure can be customized according to customer's demand. If you have any requirement, please contact LDROBOT.