

LDS-02

The previous LDS sensor(LDS-01) is discontinued and replaced with LDS-02 since 2022.

Overview



- 360 Laser Distance Sensor LDS-02 is a 2D laser scanner capable of sensing 360 degrees that collects a set of data around the robot to use for SLAM (Simultaneous Localization and Mapping) and Navigation.
- The LDS-02 is used for TurtleBot3 Burger and Waffle Pi models.
- Only Tx UART interface is available for the LDS-02 sensor.
- The USB interface(USB2LDS) supports easier connection to a PC or SBC.

Specifications

General Specifications

Items	Specifications
Operating supply voltage	5V DC \pm 10%
PWM Frequency	10 ~ 30 KHz (Square wave, High : 3.3V, Low : 0V)
PWM Duty Cycle	0 ~ 100%
LASWER Wave Length	Low powered Infrared Laser ($\lambda=793$ nm)
LASER safety	Class I, 21 CFR 1040.10 and 1040.11
Current consumption	240 mA (Start up current 400 mA)
Detection distance	160 ~ 8,000 mm
Interface	3.3V USART (115200 bps, 8 data bits, no parity, 1 stop bit), Tx Only
Ambient Light Resistance	25,000 lux
Life Time	1,000 hrs
Sampling Rate	2.3kHz (Fixed)
Operating Temperature	-10 ~ 40 °C
Storage Temperature	-30 ~ 70 °C
Dimensions	70(W) X 90(D) X 42(H)mm
Mass	131 g

Measurement Performance Specifications

Items	Specifications
Distance Range	160 ~ 8,000mm
Distance Accuracy (160 ~ 300 mm)	\pm 10mm

Items	Specifications
Distance Accuracy(300 ~ 6,000 mm)	±3.0%
Distance Precision(6,000 ~ 8,000 mm)	±5.0%
1 Scan Frequency	5Hz or above
Angular Range	360 °
2 Angular Resolution	1 °

NOTE :

- 1 Scan Frequency may vary by each product.
- 2 Due to the fixed sampling rate, the Angular Resolution may vary by the Scan Frequency. { : .notice}

Data Packet

The LDS-02 adopts one-way communication and begins to send measuring data packet once working stably without any instruction packet.

Header	Length	Speed (2Byte)	Start Angle (2Byte)	Data (36Byte)	End Angle (2Byte)	Timestamp (2Byte)	CRC
0x54	0x2C	Speed_L, Speed_H	Angle_L, Angle_H	Data	Angle_L, Angle_H	Time_L, Time_H	CRC

The **Data (36Byte)** consists of 12 point measurements for distance(2Byte) and confidence(1Byte) as below.

Point1 Distance (2Byte)	Point1 Confidence	Point2 Distance (2Byte)	Point2 Confidence	...	Point12 Distance (2Byte)	Point12 Confidence
Distance_L, Distance_H	Confidence	Distance_L, Distance_H	Confidence	...	Distance_L, Distance_H	Confidence

• Packet Example

- Speed : 0x0868 (2152 °/s)
- Start Angle : 0x7EAB (32427 divide by 100 = 324.27 °)
- End Angle : 0x82BE (33470 divide by 100 = 334.70 °)
- Timestamp : 0x1A3A (6714 ms)

Header	Length	Speed (2Byte)	Start Angle (2Byte)	Data (36Byte)	End Angle (2Byte)	Timestamp (2Byte)	CRC
0x54	0x2C	0x68, 0x08	0xAB, 0x7E	Data	0xBE, 0x82	0x3A, 0x1A	0x50

• Data Example

- Point1 Distance : 0x00E0 (224 mm)
- Point1 Confidence : 0xE4 (228)
- Point2 Distance : 0x00DC (220 mm)
- Point2 Confidence : 0xE2 (226)
- Point12 Distance : 0x00B0 (176 mm)
- Point12 Confidence : 0xEA (234)

Point1 Distance (2Byte)	Point1 Confidence	Point2 Distance (2Byte)	Point2 Confidence	...	Point12 Distance (2Byte)	Point12 Confidence
0xE0, 0x00	0xE4	0xDC, 0x00	0xE2	...	0xB0, 0x00	0xEA