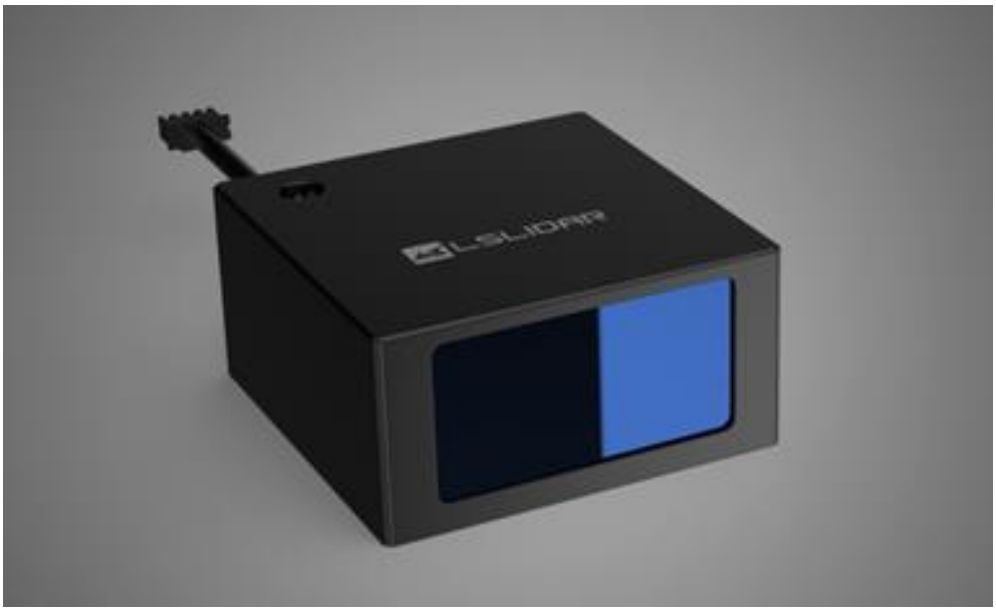
LS72B

User Manual

V1.0.1 2024.12



Leishen Intelligent System Co., Ltd. **http://www.lslidar.com/**

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Safety Instruction

Before using the product, please read and follow the instructions of this manual carefully, and refer to relevant national and international safety regulations.

ΔAttention

Please do not disassemble or modify the sensor privately. If you need special instructions, please consult our technical support staff.

ΔLaser Safety Level

The laser safety of this product meets the following standards:

- IEC 60825-1:2014
- 21 CFR 1040.10 and 1040.11 standards, except for the deviations (IEC 60825-1, third edition) stated in the Laser Notice No. 56 issued on May 8, 2019.

Please do not look directly at the transmitting laser through magnifying devices (such as microscope, head-mounted magnifying glass, or other forms of magnifying glasses).

Eye Safety

The product design complies with Class 1 human eye safety standards. However, to maximize self-protection, please avoid looking directly at running products.

ΔSafety Warning

In any case, if the product is suspected to have malfunctioned or been damaged, please stop using it immediately to avoid injury or further product damage.

Housing

The product contains high-speed rotating parts, please do not operate unless the housing is fastened. Do not use a product with damaged housing in case of irreparable losses. To avoid product performance degradation, please do not touch the photomask with your hands.

Operation

This product is composed of metal and plastic, which contains precise circuit electronic components and optical devices. Improper operations such as high temperature, drop, puncture or squeeze may cause irreversible damage to the product.

Power Supply

Please use the connecting cable and matching connectors provided with the sensor to supply power. Using cables or adapters that are damaged or do not

meet the power supply requirements, or supply power in a humid environment may cause abnormal operation, fire, personal injury, product damage, or other property loss.

Light Interference

Some precise optical equipment may be interfered with by the laser emitted by this product, please pay attention when using it.

Vibration

Please avoid product damage caused by strong vibration. If the product's mechanical shock and vibration performance parameters are needed, please contact us for technical support.

Radio Frequency Interference

The design, manufacture and test of this product comply with relevant regulations on radiofrequency energy radiation, but the radiation from this product may still cause other electronic equipment to malfunction.

Deflagration and Other Air Conditions

Do not use the product in any area with potentially explosive air, such as areas where the air contains high concentrations of flammable chemicals, vapours or particles (like fine grains, dust or metal powder). Do not expose the product to the environment of high-concentration industrial chemicals, including near evaporating liquefied gas (like helium), so as not to impair or damage the product function.

Maintenance

Please do not disassemble the LiDAR without permission. Disassembly of the product may cause its waterproof performance to fail or personal injury

1. Preface

This manual describes the ranging mechanism, specification parameters, dimensions of mechanical structures and data format of LS72B laser ranging sensor for short distance. The product manual is updated with product technological upgrades. For the latest version, please contact the technical support of LSLIDAR.

1.1. Overview

The LS72B utilizes the TOF (Time of Flight) method that enables distance ranging at a fixed angle. It is designed to achieve a ranging accuracy of ± 5 cm and a maximum ranging distance of 150 meters. With such high performance, the LS72B mainly applies to scenarios that require precise ranging and obstacle avoidance, such as indoor service robots, AGV, cleaning and sterilization robots, drones, and so on.

1.2. Mechanism

Based on the TOF (time of flight) methodology, the LS72B measures the distance between a target object and the sensor, by calculating the difference between the emission and return times of modulated laser. The laser emitter sends out the modulated pulse laser, and an internal timer starts timing (t_1). The laser encounters the target object, part of the energy returns. When the LS72B receives the return laser signal, the timer will stop timing (t_2). The formula for distance between the LS72B and the target object:

$$\text{Distance} = \text{Speed of Light}^*(t_2 - t_1)/2$$

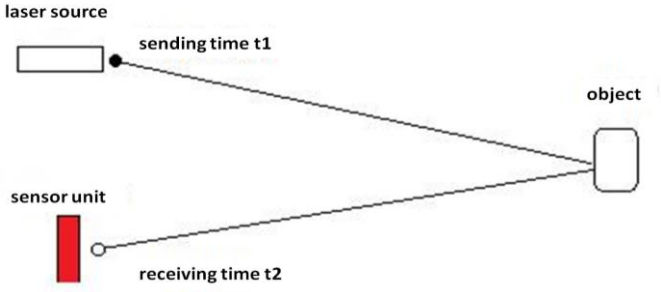

Figure 1.1 Mechanism of LS72B

1.3. Specifications

Table 1.1 Specifications of LS72B

Module	Parameters	
Optical Properties	Ranging Distance	0.2 m ~150 m (@10%)
	Ranging Accuracy	± 5 cm (1 σ)
	Frame Frequency	10 Hz~ 200 Hz (configurable)
	Echo Mode	Single echo
Laser Properties	Safety Class	Class I
	Wavelength	905 nm
Electrical Properties	Power Consumption	⩽2 W
	Operating Voltage	6~18 V
	Dimensions (L*W*H)	70*70*35 mm
	Interfaces	CAN
Operating Parameters	Operating Temperature	-40℃~85℃
	Storage Temperature	-40℃~105℃
	IP Grade	IP 67

1.4. Structure

There are 4 mounting holes at the bottom of LS72B. Please prepare four M3*7 mechanical screws with spring washers and flat washers to lock and fix the LS72B.

Mounting requirements:

(1) Mounting screws: M3*7;

(2) Screws: GB70;

(3) Spring washers: GB93;

(4) Flat washers: GB93.1;

(5) Electric screwdriver torque: 0.9 NM.

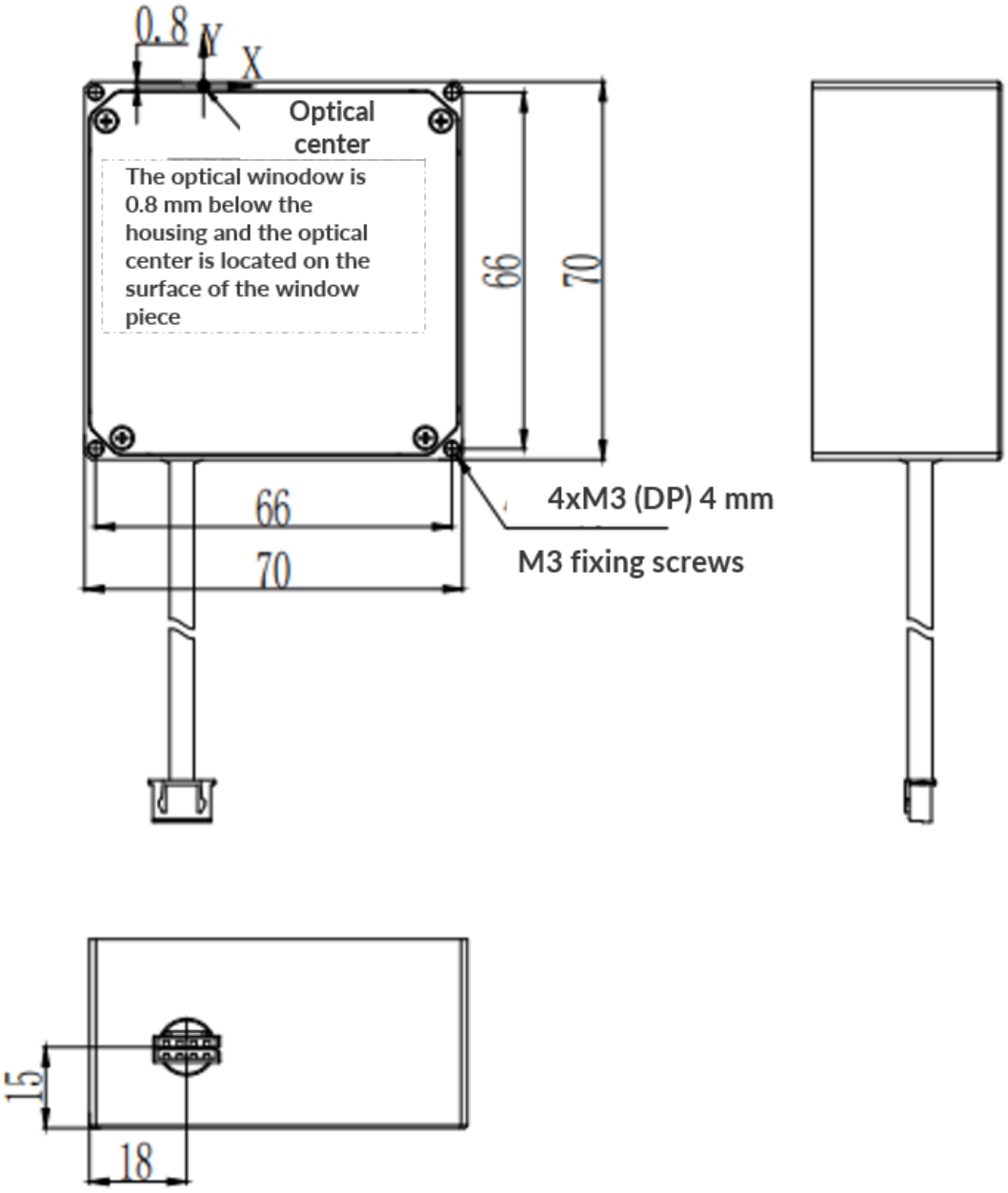

Figure 1.2 LS72B Dimensions (unit: mm)

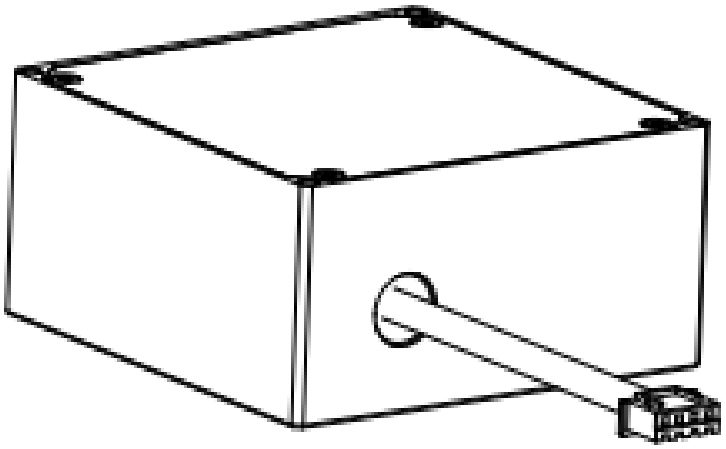

Figure 1.3 LS72B External View

2. Electrical Interface

The model of the connector on the LS72B is XH-4P.

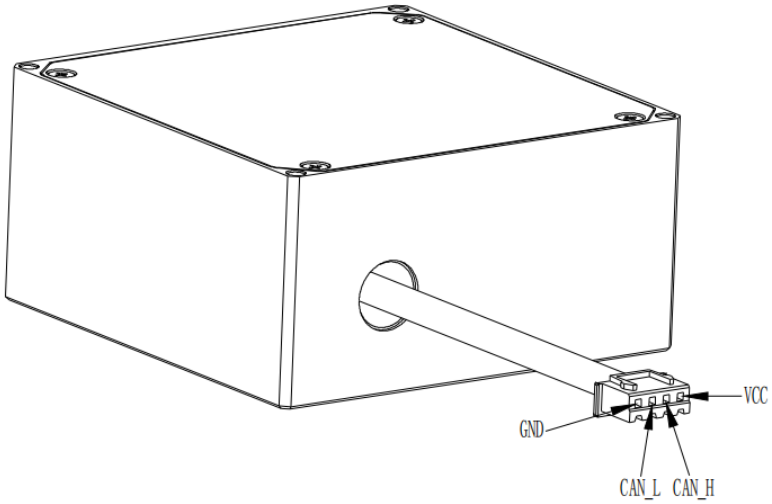

Figure 2.1 LS72B Connector Interface

Table 2.1 PIN Definition of LS72B's Connector Interface

No.	PIN	Color	Description	Typical Value	Range
1	VCC	Red	Power supply +	12 V	6~18 V
2	CAN_H	Green	CAN Bus high level	-	-
3	CAN_L	Blue	CAN Bus low level	-	-
4	GND/CAN_GND	Black	Power supply-/CAN signal ground	-	-

Table 2.2 General Operating Standard

Item	Min.	Typical Value	Max.	Note
Power supply voltage	6 V	12 V	18 V	The power supply not in the range may lead to inaccurate ranging or irreversible damage.
Ripple Voltage	-	100 mV	-	-
Overall power consumption	-	2 W	-	-
Explicit differential power output	1.2 V	2 V	3 V	-
Implicit differential power output	-0.12 V	-	0.12 V	-

3. Communication Protocol

The LS72B adopts CAN communication. You can connect this product to an external system and follow the system's communication protocols to obtain real-time ranging distance data, device information, status, and to setup operating modes.

CAN communication baud rate: 500 KHz.

3.1. Data Output Format

Table 3.1 LS72B Data Output Format

Frame Name	CAN ID	Direction	Total Length (Byte)	Signal Name	Offset (Byte)	Signal Length	Initial Value	Data Range	Description
Point cloud frame	4F0	Sending	4	Distance	0	2	0	[0,65535]	Ranging distance value, unit: cm, the least significant value is stored at the lowest memory address
				Intensity	2	2	0	[0,65535]	Receiving signal intensity, the least significant value is stored at the lowest memory address

3.2. Parameters Configuration Description

Table 3.2 LS72B Configuration Data Format

Frame Name	CAN ID	Direction	Total Length (Byte)	Signal Name	Offset (Byte)	Signal Length	Initial Value	Data Range	Description
Configuration Frame	501	Receiving	8	Point cloud output fram	0	1	200	[10,200]	Point cloud number generated each second

				e freq uenc y					
				Rese rved	1	7	0	/	/

3.3. Read Output Frequency and Version Number

1) Read command：05 04 a5 00 00 00 00 00 00 00

The CAN ID number is 05 04, followed by eight data bytes.

2) The data format sent by the device after receiving the read command is as follows:

Table 3.3 Data Format Sent by LS72B

Frame Name	CAN ID	Direct ion	Total Length (Byte)	Signal Name	Offset (Byte)	Signal Length	Initial Value	Data Range	Description
Devic e Param eters	405	Send ing	8	Com man d	0	1	a5		Read output frequency and software version number
					1	1	200	[10,20 0]	Current output frequency
					2	3			Version number; 1.0.0, the most significant value in the sequence is stored first
				Rese rved	5	3			Date; year, month, day

4. Data Display Software

If the computer cannot identify the serial port, please install the driver *CH341SER.EXE*  CH341SER.EXE (the driver is included in the Data Display Software file folder).

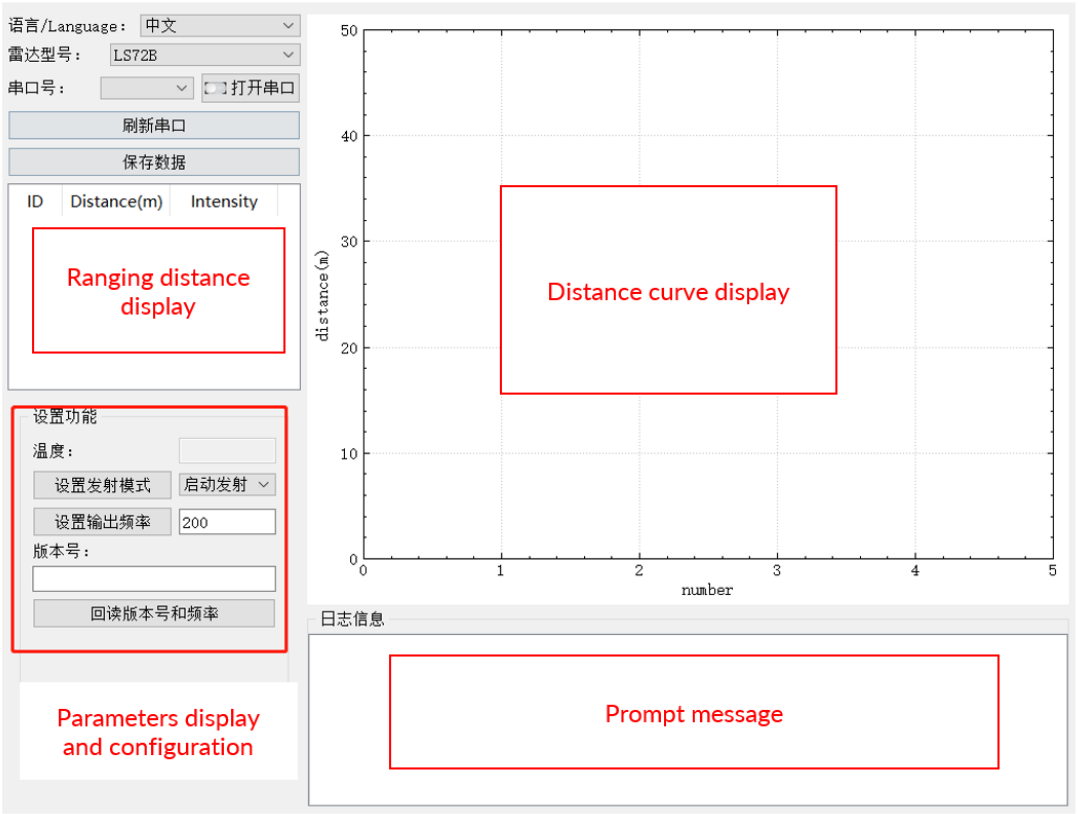

Figure 4.1 Data Display Software Interface

5. Maintenance

Shipping Requirements

This product is packed with the packaging materials specially customized by our company, which can resist certain vibrations and impacts. For long-distance transportation, special packaging materials must be used to avoid irreversible damage during transportation.

Installation Requirements

Please use screws that meet the specifications to fix the base, and make sure the base has good heat dissipation. Wear powder-free clean gloves during installation to avoid optical cover contamination and mechanical damage.

Storage Conditions

It is recommended to store the products in a ventilated and dry place where the temperature is 23 ±5 °C, and the relative humidity is 30% ~ 70%. Do not store in environments where the humidity, pH, etc. exceed the protection level.

Dirt Treatment

If the sensor's mask is dirty during use, such as with fingerprints, muddy water, dry leaves or insect corpses, etc., the sensor's ranging effect will be directly affected. Please clean it according to the following steps:

Tools: PVC gloves, clean cloth, absolute ethanol (99%)

Environment: ventilated and dry, away from fire

(1) Put on PVC gloves and fix the base with your fingers; if it is not stubborn stains, use a dust-free cloth or dry air to gently remove the stains;

(2) For stubborn stains, evenly spray the ethanol in the spray bottle on the location to be cleaned and wait for the stain to be dissolved. Then use a dustless cloth dipped in ethanol solvent, and gently wipe the mask. If the cloth is contaminated, please replace it in time. After cleaning the stain, use a new dustless cloth to remove any remaining liquid.

Revision History

Ver.	Revision Data	Revision Content	Issued/Revised By
V1.0.0	2024-06-24	Initial version	Leishen
V1.0.1	2024-12-13	Specifications table updated; data display software updated	LS1499

*This product information is subject to change without notice.

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