DLRF-C1.2-F (905nm/1.2Km)
Laser Range Finder Module

Technical Specification

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1. General

DLRF-C1.2-F semiconductor laser rangefinder is an innovative product that integrates advanced technology and humanized design carefully developed by LUMISPOT. Using a unique 905nm laser diode as the core light source, this model not only ensures human eye safety, but also sets a new benchmark in the field of laser ranging with its efficient energy conversion and stable output characteristics. Equipped with high-performance chips and advanced algorithms independently developed by LUMISPOT, the DLRF-C1.2-F achieves excellent performance with long life and low power consumption, perfectly meeting the market demand for high-precision and portable ranging equipment.

2. Main application

Used in UAV, sighting, outdoor handheld products and other ranging applications (aviation, police, railway, electricity, water conservancy, communication, environment, geology, construction, fire station, blasting, agriculture, forestry, outdoor sports, etc.)

3. Features

- **High precision ranging data compensation algorithm: optimization algorithm, fine calibration**

DLRF-C1.2-F semiconductor laser rangefinder, in pursuit of the ultimate accuracy of the road, innovatively adopted the advanced range data compensation algorithm, the algorithm through the combination of complex mathematical model and measured data, to generate accurate linear compensation curve. This technical breakthrough enables the rangefinder to carry out real-time and accurate correction of errors in the ranging process under various environmental conditions, so as to achieve the excellent performance of the full range accuracy control within 1 meter, and the short-range ranging accuracy is accurate to 0.1 meters.

- **Optimized ranging method: accurate measurement, improve ranging accuracy**

The laser rangefinder adopts the high repetition frequency ranging method, through the continuous transmission of multiple laser pulses, and the accumulation and processing of the echo signal, so as to effectively suppress the noise and interference, and improve the signal to noise ratio. By optimizing the optical path design and signal processing algorithm, the stability and accuracy of the measurement results are ensured. This method can achieve accurate measurement of the target distance, even in the face of complex environments or small changes, but also to ensure the accuracy and stability of the measurement results.

- **Low power consumption design: Efficient energy saving and optimized performance**

With the ultimate energy efficiency management as the core, this technology significantly reduces the energy consumption of the overall system without affecting the distance and accuracy by finely regulating the power consumption of key components such as the main control board, the drive board, the laser and the receiving amplifier board. This low-power design not only reflects the commitment to environmental protection, but also greatly improves the economy and sustainability of the equipment, becoming an important milestone in promoting the green development of ranging technology.

- **Working capacity under extreme conditions: excellent heat dissipation, guaranteed performance**

DLRF-C1.2-F laser rangefinder with its excellent thermal design and stable manufacturing process, showing extraordinary performance under extreme working conditions. While ensuring high precision ranging and long range detection, the product can withstand extreme operating ambient temperatures of up to 60 ° C, demonstrating its high reliability and durability in harsh environments.

- **Miniaturized design, no burden to carry**

The DLRF-C1.2-F laser rangefinder uses an advanced miniaturization design

concept, which highly integrates the precision optical system and electronic components in a lightweight body weighing only 11 grams. This design not only greatly improves the portability of the product, allowing users to easily carry it around in a pocket or bag, but also makes it more flexible and convenient to use in complex outdoor environments or confined Spaces.

4. Technical parameter

Item	Parameter
Wavelength	905nm±5nm
Ranging capacity	0.5~1200m (Building)
Ranging accuracy	±0.5m (≤80m) ±1m (＞80m)
Resolution	0.1m
Ranging frequency	60～800Hz （Self-Adaptive）
Accurate ratio	≥98%
Beam divergency	≤6mrad
Power supply	DC 3.0V~5.0V
Operating power consumption	≤1.8W
Standby power consumption	≤0.8W
Communication type	UART (TTL_3.3V)
Baud rate	115200/9600
Dimension	25×26×13mm
Weight	11g+0.5g
Operating temperature	-40°C~+ 60°C
Storage temperature	-45°C~+70°C
False alarm rate	≤1%
Impact	1000g,20ms
Vibration	5~50~5Hz, 1 octave /min, 2.5g

Note:

- Visibility ≥10km, humidity ≤70%
- Large target: the target size is greater than the spot size

5. Interface

Communication interface: UART(TTL_3.3V), 500000bps.

Electrical interface: The interface model is FWF08002-S06B13W5M. See the following table for the interface definition.

6-pin connection definition

No	Pin	Color	Remarks
1	GND	Green	Power input -/ Serial port
2	VIN+	Yellow	Power input +(DC3.0V~5.0V)
3	UART_TX	Red	TTL serial port transmitter, High-Frequency Output Pin
4	NC	Orange	Vacant
5	UART_RX	Brown	TTL serial port receiver, 3.3V level
6	POWER_EN	Black	Module power supply is enabled, TTL_3.3V level; Module on (>2.5V or suspended), module off (<0.3V);

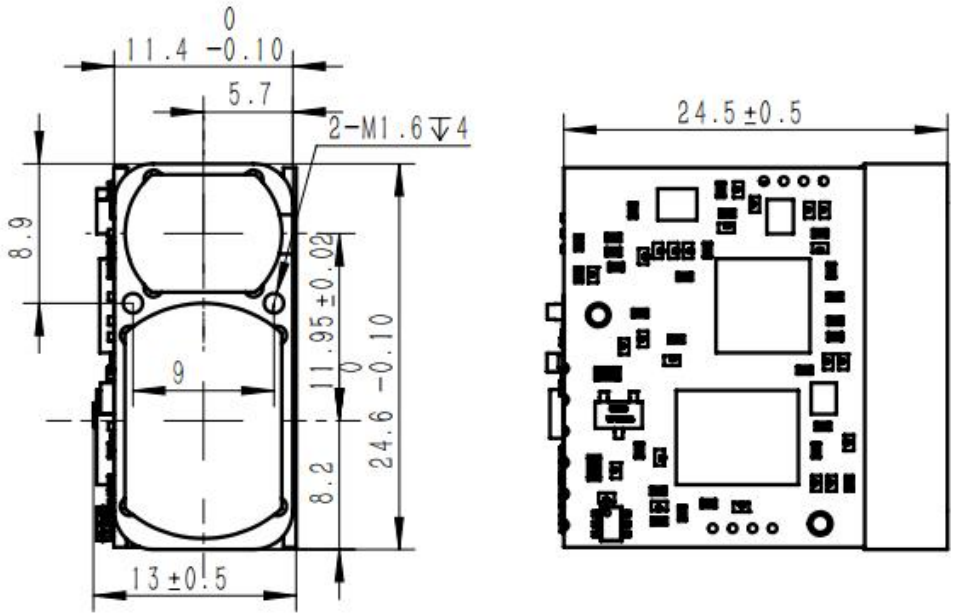
Sequence description: The serial number of the terminal pins of the interface is 1 to 6 from top to bottom.

6. Safety & notifications

- The laser emitted by this rangefinder module is a 905nm laser that is safe for human eyes, but it is recommended not to look directly at the laser.
- The window lens in front of LRF needs to be coated with an anti reflective film (905 ± 20nm, T>95%).
- This measuring module is non-airtight, and must ensure that the relative humidity of the use environment is less than 70%, and ensure that the use of the environment is clean and sanitary, so as not to damage the laser.

- The range measurement of the range module is related to the atmospheric visibility and the nature of the target, and the range measurement will be reduced in the case of fog, rain and wind sand. Green leaf clusters, white walls, exposed limestone and other targets have better reflectivity, which can increase the measurement range. In addition, when the Angle of the target to the laser beam increases, the measurement range will be reduced.
- Do not plug and unplug the cable in the energized state; Ensure that the power supply polarity is correctly connected; otherwise, the device will be permanently damaged.
- After the ranging module is powered on, there are high-pressure and heating components on the circuit board. Do not touch the circuit board with your hands when the ranging module is working.

7. Layout dimension



DLRF-C1.2-F LRF Layout Drawing

8. Communication protocol

Laser ranging module adopts serial communication mode, the default baud

rate is 500000bps.

Data format: eight bits of data, one start bit, one stop bit, no parity check. The data consists of header bytes, command part, data length, parameter part, and check bytes.

Communication mode: master and rangefinder adopt the master-slave communication mode, the master sends the control command to the rangefinder, and the rangefinder receives and executes the command. The range finder sends back the data and status of the range finder according to the range finder period, and the communication format and command content are shown in the following table.

a) Master transmitting

The high-frequency LRF starts command is as follows:

Bytes	1	2	3	4	5	6	7	8
Description	0x55	0xAA	0xCB	0xCC	0xCC	0xCC	0xCC	0xFB

The high-frequency LRF turn off command is as follows:

Bytes	1	2	3	4	5	6	7	8
Description	0x55	0xAA	0xCC	0xCC	0xCC	0xCC	0xCC	0xFC

B) Output Data Format

Example: 5C D1 00 00 2E

5C: Fixed frame header (1 byte)

D1 00 00: Three-byte measured distance value = 209 cm (little-endian format: 0000D1). Range: 0 – 130,000 cm.

2E: Checksum (1 byte). Calculated by:

Taking the sum of bytes from the second byte to the third byte (positions 02~03) → Inverting the least significant byte of the sum.

Note: If the converted distance value equals 3FFFFF (4194303 cm), it indicates an invalid measurement (no target detected).