

ELRF-C16-Mini

Laser Range Finder Module

# Technical Specification



*Lumispot*

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## 1. Overview

ELRF-C16-mini laser range finder module is a laser range finder module developed based on the 1535nm erbium laser independently developed by *Lumispot* it adopts single pulse TOF ranging mode . It is composed of laser, transmitting optical system, receiving optical system and control circuit board, and communicates with host computer through TTL serial port provides host computer test software and communication protocol, which is convenient for users to develop the second time. It has the characteristics of small size, light weight, stable performance, high impact resistance, first-class eye safety, etc., and can be applied to hand-held, vehicle-mounted, pod and other photoelectric equipment.

## 2. Structural Composition and Main Performance Indicators

ELRF-C16-Mini laser rangefinder consists of a laser, a transmitting optical system, a receiving optical system and a control circuit. The main performance is as follows:

### 2.1 Ranging Capacity

Visibility under the conditions of visibility is not less than 8km, humidity  $\leq 80\%$ :

- For large targets (buildings,diffuse reflectance  $\geq 0.6$ ) ranging distance  $\geq 4\text{km}$ ;
- For vehicles (2.3m $\times$ 2.3m target, diffuse reflectance  $\geq 0.3$ ) ranging distance  $\geq 3\text{km}$ ;
- For personnel (1.7m $\times$ 0.5m target plate target, diffuse reflectance  $\geq 0.3$ ) ranging distance  $\geq 1.5\text{km}$ ;
- For UAV (0.2m $\times$ 0.3m target, diffuse reflectance  $\geq 0.3$ ) ranging distance $\geq 800\text{m}$ .

### 2.2 Main functions

- a) single ranging and continuous ranging;
- b) Multi-target ranging;
- c)Range gating;
- d) Self-test function.

### 2.3 Performance

No.	Item	Parameters
1.	Eye-safety level	Class 1
2.	Wavelength	1535±5nm
3.	Beam divergency	1mrad±0.2mrad
4.	Receiving aperture	Φ15mm
5.		≥4km(Big target:≥3m×3m)
6.	Ranging ability	≥3km(Vehicle:2.3m×2.3m)
7.		≥1.5km(Human:1.7m×0.5m)
8.		≥800m(UAV:0.2m×0.3m)
9.	Minimum ranging distance	≤10m
10.	Ranging accuracy	≤±1m
11.	Measurement frequency	1~10Hz
12.	Distance resolution	≤30m
13.	Measurement accuracy	≥98%
14.	False alarm rate	≤1%
15.	Data interface	TTL serial port
16.	Power supply voltage	DC3~5V
17.	Average power consumption	≤0.8W @1Hz working,5V ≤1.5W @10Hz working,5V
18.	Peak power consumption	≤3W,5V
19.	Standby power consumption	≤0.5W(Power on); ≤10mW(Power off)
20.	startup time	300ms
21.	Dimensions	≤27.5mm×15.9mm×24.6mm
22.	Weight	16g
23.	Operating temperature	-40℃~+70℃
24.	Storage temperature	-55℃~+75℃
25.	Impact	>75g@6ms(1000g/1ms can be customized)
26.	Vibration	Vibration environment of combined wheeled vehicles

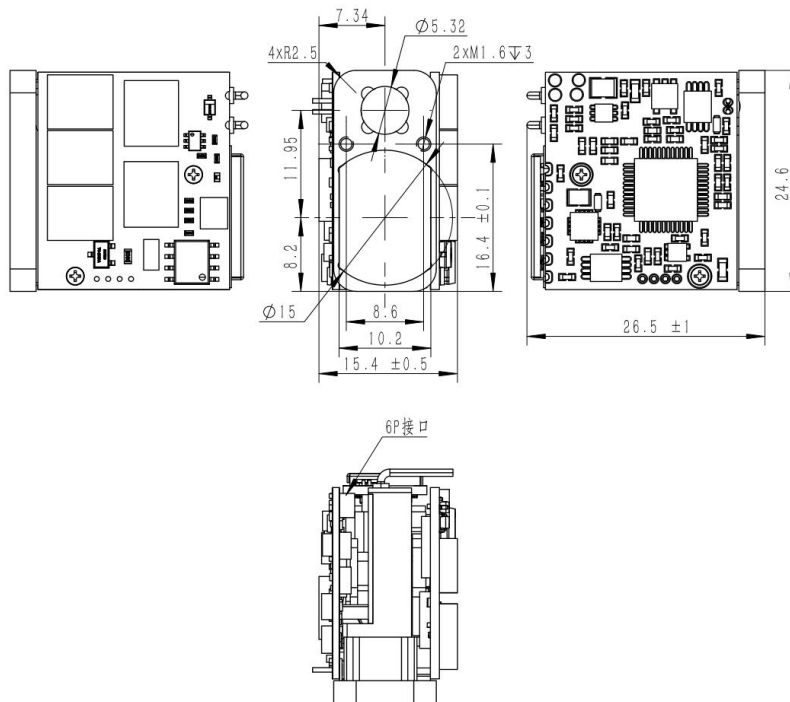
## 2.4 Interface

Communication interface: TTL

Electrical interface: The interface model is FWF08002-S06B13W5M, and the interface definition is detailed in the following table.

Wire No	Definition	Remarks
		Module power enable, TTL 3.3V level;
1	POWER_EN	Module on (>2.7V or floating) Module off (<0.3V)
2	UART_RX	Serial receive pin, TTL 3.3V level
3	UART_TX	Serial transmit pin, TTL 3.3V level
4	NC	
5	Power positive	Power supply, 3~5V
6	GND	Serial ground

## 2.5 Mounting drawing



### 3. User Precautions

- The laser emitted by this rangefinder is 1535nm, which is safe for human eyes. Although it is an eye-safe wavelength, it is advised not to look directly into the laser.
- When adjusting the parallelism of the optical axis, be sure to cover the receiving lens to avoid permanent damage to the detector due to excessively strong echoes.
- This rangefinder module is not airtight. Ensure that the relative humidity of the environment is below 80% and maintain a clean and sanitary environment to prevent damage to the laser.
- The range of the rangefinder is related to atmospheric visibility and the nature of the target. Range will be reduced in fog, rain, and sandstorms. Targets like green tree clusters, white walls, and exposed limestone have better reflectivity and can increase range. Additionally, increasing the angle of the laser beam to the target will reduce the range.
- Do not emit lasers at highly reflective targets such as glass or white walls within 15 meters to avoid echo overstrength and damage to the APD detector.
- Do not plug or unplug cables while the device is powered on.
- Ensure the correct polarity of the power supply connection to avoid permanent damage to the equipment.

### 4. Note

If you need to install a window lens in front of the rangefinder module, please note:

- The material must be flat glass;
- Effective aperture projection: 1.5 mm for the LRF module's transmit/receive lens outer diameter; Optical window effective aperture: 2 mm (lens outer diameter);
- Since lens absorbs part of laser, it is recommended that the lens thickness be controlled within 2–4 mm according to its dimensions;
- The air gap between optical and the module should be minimized , 4 mm is

recommended. The lens should be kept parallel to the front surface of the module.

A structural element should be installed between the window and the rangefinder to separate the transmit and receive lenses;

- AR coating for 1525–1545 nm with transmittance of 99% is recommended.