

ELRF-J40

Laser Range Finder Module

Technical Specification



Lumispot

Version 2025.6

1. Overview

ELRF-J40 laser rangefinder module is developed based on our self-designed 1535nm erbium laser. It adopts a single-pulse TOF (Time-of-Flight) ranging method, with a maximum measurement range of $\geq 10\text{km}$. The module consists of the laser, transmission optical system, receiving optical system, and control circuit board. It communicates with the host computer via RS422 serial port and provides test software and communication protocols for easy secondary development by users. The module features small size, light weight, stable performance, high impact resistance, and is Class 1 eye-safe. It can be applied in handheld, vehicle-mounted, and pod-based electro-optical equipment.

2. Structural Composition and Main Performance Indicators

ELRF-J40 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 visibility conditions is not less than 20km, humidity $\leq 80\%$, distance $\geq 12\text{km}$ for large targets (buildings), distance $\geq 10\text{km}$ for vehicles ($2.3\text{m} \times 2.3\text{m}$ targets, diffuse reflectance ≥ 0.3); For personnel ($1.75\text{m} \times 0.5\text{m}$ target, diffuse reflectance ≥ 0.3) ranging distance $\geq 5\text{km}$.

2.2 Main functions

- a) single ranging and continuous ranging;
- b) Range strobe, front and rear target indication;
- c) Self-test function.

2.3 Performance

- a. Wavelength: $1535\text{nm} \pm 5\text{nm}$;

- b. Laser divergence Angle: $\leq 0.3\text{mrad}$;
- c. Continuous ranging frequency: 1~10Hz adjustable;
- d. Ranging accuracy: $\leq \pm 1.5\text{m}$;
- e. Accuracy: $\geq 98\%$;
- f. Minimum measuring range: $\leq 50\text{m}$;
- g. Ranging resolution: $\leq 30\text{m}$;
- h. Power supply voltage: DC5V ~ 28V;
- i. Weight: < 130g;
- j. Power consumption: standby power consumption $\leq 120\text{mW}$, average power consumption $\leq 6\text{W}$, peak power consumption $\leq 14\text{W}$;
- k. Size: $\leq 83 \times 61 \times 48\text{mm}$;
- l. Working temperature: $-40^{\circ}\text{C} \sim +60^{\circ}\text{C}$;
- m. Storage temperature: $-55^{\circ}\text{C} \sim +70^{\circ}\text{C}$;
- n. Impact: 75g@11ms
- o: Vibration: Vibration environment of combined wheel vehicle

2.4 Interface

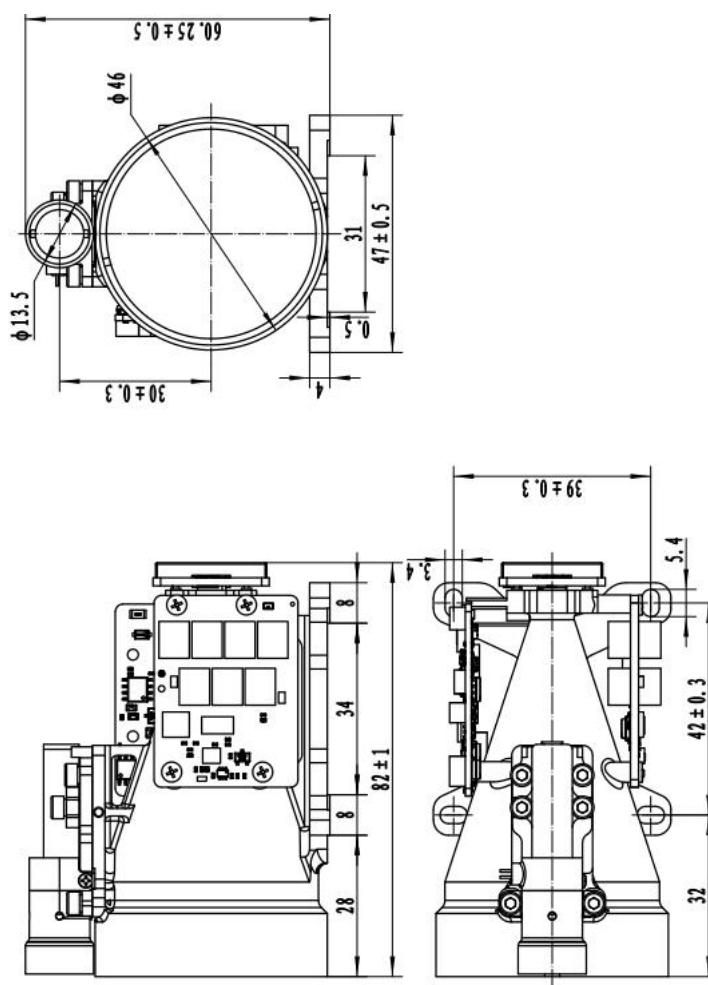
Communication interface: RS422, 115200bps

Electrical interface: The interface model is A1002WR-S-10P, and the interface definition is detailed in the following table.

Wire No		Definition	Remarks
1	VIN+		Power supply +
2	VIN-		Power supply -
3	POWER_EN		Module power supply enabled, TTL_3.3V level; Module on (> 2.7V or suspended) Module off (< 0.3)
4	RS422 TX+		RS422 receive +
5	RS422 TX-(UART_TXD)		RS422 Reception -

		(UART serial port transmission, TTL3.3V level)
6	RS422 RX-(UART_RXD)	RS422 transmission – (UART serial port reception, TTL3.3V level)
7	RS422 RX+	RS422 transmit +
8	Reserved	
9	Reserved	
10	GND	Communication earthing

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 50 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.