



OTL-LSP LRS 1040F Laser Range Finder Module



Product Overview

The **OTL-LSP LRS 1040F** laser range finder 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 **≥ 10 km**.

The module consists of a laser, a transmitting optical system, a receiving optical system, and a control circuit. 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.

Main Specifications

Laser Wavelength	1535 nm ± 5 nm	Laser Divergence Angle	≤ 0.3 mrad
Measuring Range	≥ 10 km (large targets: buildings) ≥ 10 km (vehicles: 2.3 × 2.3 m) ≥ 5 km (personnel: 1.75 × 0.5 m)	Ranging Frequency	1 ~ 10 Hz (adjustable)
Ranging Accuracy	≤ ±15 m	Power Supply Voltage	DC 5 V ~ 28 V
Accuracy	≥ 98%	Power Consumption	Standby: ≤ 120 mW Average: ≤ 6 W Peak: ≤ 14 W
Minimum Measuring Range	≤ 50 m	Weight	≤ 130 g
Ranging Resolution	≤ 30 m	Size (L × W × H)	≤ 83 × 61 × 48 mm
		Operating Temperature	-40°C ~ +60°C
		Storage Temperature	-55°C ~ +70°C



1535 nm
Wavelength



≥ 10 km
Max. Range
(Large Target)



≥ 10 km
Max. Range
(Vehicle)



≥ 5 km
Max. Range
(Personnel)



≤ ±15 m
Ranging
Accuracy



1 ~ 10 Hz
Ranging
Frequency



≤ 130 g
Weight



≤ 83 × 61 × 48 mm
Size



-40°C ~ +60°C
Operating
Temperature

Key Features

Long Measurement Range
≥ 10 km (large targets)
≥ 10 km (vehicles, 2.3 m × 2.3 m)

High Accuracy
Ranging accuracy ≤ ±15 m,
accuracy ≥ 98%.

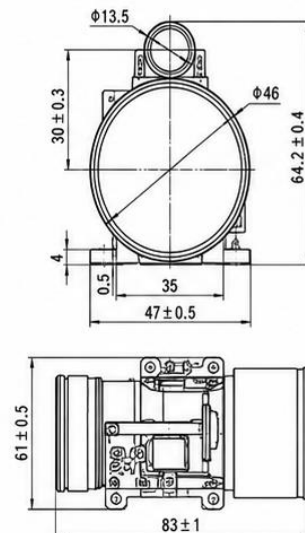
Eye-Safe (Class 1)
1535 nm laser wavelength,
safe for human eyes.

Multiple Functions
Single / continuous ranging,
range strobe, front & rear target indication,
self-test function.

Compact & Lightweight
≤ 83 × 61 × 48 mm, ≤ 130 g

Standard Interface
RS422, 115200 bps,
easy integration.

Dimensions (Unit: mm)



OTL-LSP LRS 1040F

Laser Range Finder Module | Technical Datasheet

PRODUCT OVERVIEW

The OTL-LSP LRS 1040F laser rangefinder module is described in the source as a module based on a self-designed 1535 nm erbium laser. It uses single-pulse time-of-flight (TOF) ranging and specifies a maximum measurement range of ≥ 10 km. The module consists of a laser, transmitting optical system, receiving optical system, and control circuit board. It communicates with the host computer through an RS422 serial port; the source states that test software and communication protocols are provided for secondary development.

The source describes the module as small and lightweight, with stable performance, high impact resistance, and Class 1 eye-safety classification. Stated applications include handheld, vehicle-mounted, and pod-based electro-optical equipment.

The source lists target-dependent ranging figures: ≥ 12 km for large targets (buildings), ≥ 10 km for vehicles, and ≥ 5 km for personnel, under the conditions specified in the source.

PRODUCT HIGHLIGHTS

Feature	Specification from source
Laser wavelength	1535 nm $\pm$ 5 nm
Target-dependent range	≥ 12 km large targets; ≥ 10 km vehicles; ≥ 5 km personnel
Measurement performance	Ranging accuracy $\leq \pm 1.5$ m; accuracy $\geq 98\%$; minimum range ≤ 50 m
Flexible operation	Single and continuous ranging; adjustable 1–10 Hz frequency
Target functions	Range strobe; front and rear target indication; self-test
Host interface	RS422, 115200 bps; test software and communication protocol
Compact module	Weight < 130 g; dimensions $\leq 83 \times 61 \times 48$ mm
Power consumption	Standby ≤ 120 mW; average ≤ 6 W; peak ≤ 14 W

Technical Specifications

Optical, electrical, mechanical, and environmental data

RANGING CAPACITY

Parameter	Value in source
General maximum measurement range	≥ 10 km
Large target (building)	≥ 12 km
Vehicle target	≥ 10 km; target 2.3×2.3 m; diffuse reflectance ≥ 0.3
Personnel target	≥ 5 km; target 1.75×0.5 m; diffuse reflectance ≥ 0.3
Atmospheric conditions	Visibility ≥ 20 km; relative humidity $\leq 80\%$

OPTICAL AND RANGING PERFORMANCE

Parameter	Value in source
Laser wavelength	$1535 \text{ nm} \pm 5 \text{ nm}$
Laser divergence angle	≤ 0.3 mrad
Continuous ranging frequency	1–10 Hz, adjustable
Ranging accuracy	$\leq \pm 1.5$ m
Accuracy	$\geq 98\%$
Minimum measuring range	≤ 50 m
Ranging resolution	≤ 30 m
Laser safety classification	Class 1, as stated in source

ELECTRICAL, MECHANICAL & ENVIRONMENTAL

Parameter	Value in source
Power supply	DC 5–28 V
Standby power consumption	≤ 120 mW
Average power consumption	≤ 6 W
Peak power consumption	≤ 14 W
Weight	< 130 g
Dimensions	$\leq 83 \times 61 \times 48$ mm
Working temperature	-40 °C to $+60$ °C
Storage temperature	-55 °C to $+70$ °C
Impact	75 g @ 11 ms
Vibration	Vibration environment of combined wheel vehicle (source wording)

Interfaces & Installation

Host communication, connector pinout, and mounting

COMMUNICATION INTERFACE

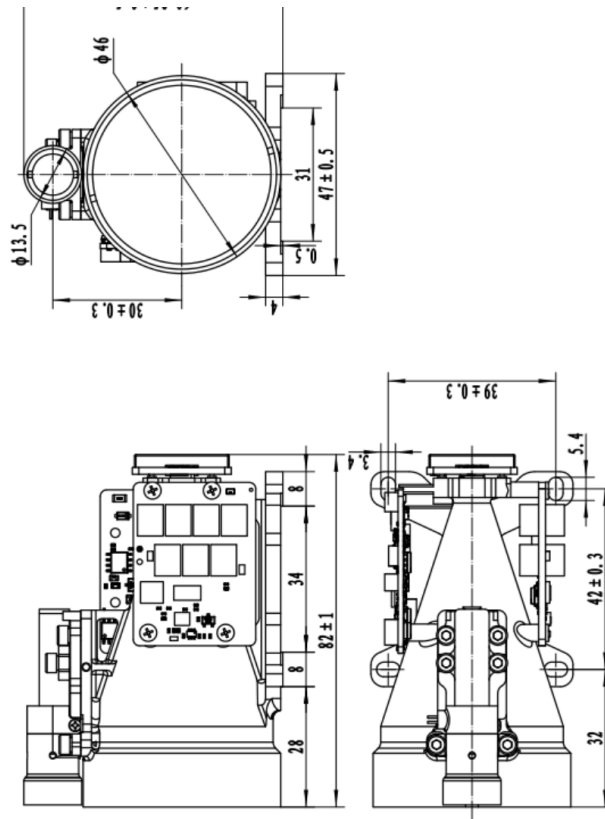
Item	Specification
Communication interface	RS422
Baud rate	115200 bps
Connector model	A1002WR-S-10P
Power enable logic	TTL 3.3 V; module ON when >2.7 V or suspended/floating; OFF when <0.3 V

ELECTRICAL CONNECTOR PIN DEFINITION

Pin	Signal	Description / source note
1	VIN+	Power supply +
2	VIN-	Power supply -
3	POWER_EN	Module power enable, TTL 3.3 V
4	RS422 TX+	Source describes as RS422 receive +
5	RS422 TX- (UART_TXD)	Source describes as RS422 reception -; UART transmission, TTL 3.3 V
6	RS422 RX- (UART_RXD)	Source describes as RS422 transmission -; UART reception, TTL 3.3 V
7	RS422 RX+	Source describes as RS422 transmit +
8	Reserved	Reserved
9	Reserved	Reserved
10	GND	Communication ground

ENGINEERING REVIEW REQUIRED: the source pinout appears to have inconsistent TX/RX signal names versus descriptions. This catalog preserves the source wording; confirm the pinout with the manufacturer before wiring.

MOUNTING DRAWING



Mounting drawing reproduced from page 4 of the supplied specification. Refer to the source drawing for exact dimension callouts.

User Precautions

Handling, environmental limits, and safe integration

SAFETY AND HANDLING

- The source identifies the emitted wavelength as 1535 nm and describes the laser as eye-safe; do not look directly into the laser.
- When adjusting optical-axis parallelism, cover the receiving lens to avoid permanent detector damage caused by excessively strong echoes.
- The module is not airtight. Keep relative humidity below 80% and maintain a clean environment.
- Measurement range depends on atmospheric visibility and target reflectivity. Fog, rain, and sandstorms reduce range; increasing the angle between the target and laser beam can also reduce range.
- Do not emit the laser at highly reflective targets such as glass or white walls within 50 m, to avoid strong echoes that may damage the APD detector.
- Do not plug or unplug cables while the device is powered on.
- Check power-supply polarity carefully to avoid permanent equipment damage.

INTEGRATION CHECKLIST

- Confirm the connector pinout and RS422 signal direction with the manufacturer before wiring.
- Keep operation within the stated temperature and humidity limits.
- Validate target type, reflectivity, and visibility when assessing ranging performance.
- Use the supplied communication protocol and test software for host integration.

SOURCE AND REVIEW NOTES

Source: OTL-LSP LRS 1040F English technical specification, Version 2025.3, supplied PDF.

The source states a general range of ≥ 10 km and target-specific ranges of ≥ 12 km for large targets, ≥ 10 km for vehicles, and ≥ 5 km for personnel.

The TX/RX pinout descriptions are retained as written in the source and highlighted for confirmation before wiring.



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