



## 50km Laser Range Finder Module

M2550x long range laser rangefinder module is a military pulse laser rangefinder designed for aircraft, unmanned aerial vehicle, tank, artillery and other application scenarios. It has the advantages of small size, light weight, low power consumption, stable performance, long measuring distance, long service life, eye safety and so on. JIOPTICS® is an important technical equipment to improve the product aiming accuracy. Welcome to buy 50km Laser Range Finder Module from us.

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Ranging range: Visibility under the conditions of not less than 35km, for vehicles (2.3mX2.3m target), 0.3 diffuse reflectance, ranging distance  $\geq 25000\text{m}$ ; Visibility under the conditions of not less than 40km, large target, ranging distance  $\geq 50000\text{m}$ ;

### JIOPTICS® 50km Laser Range Finder Module Parameters

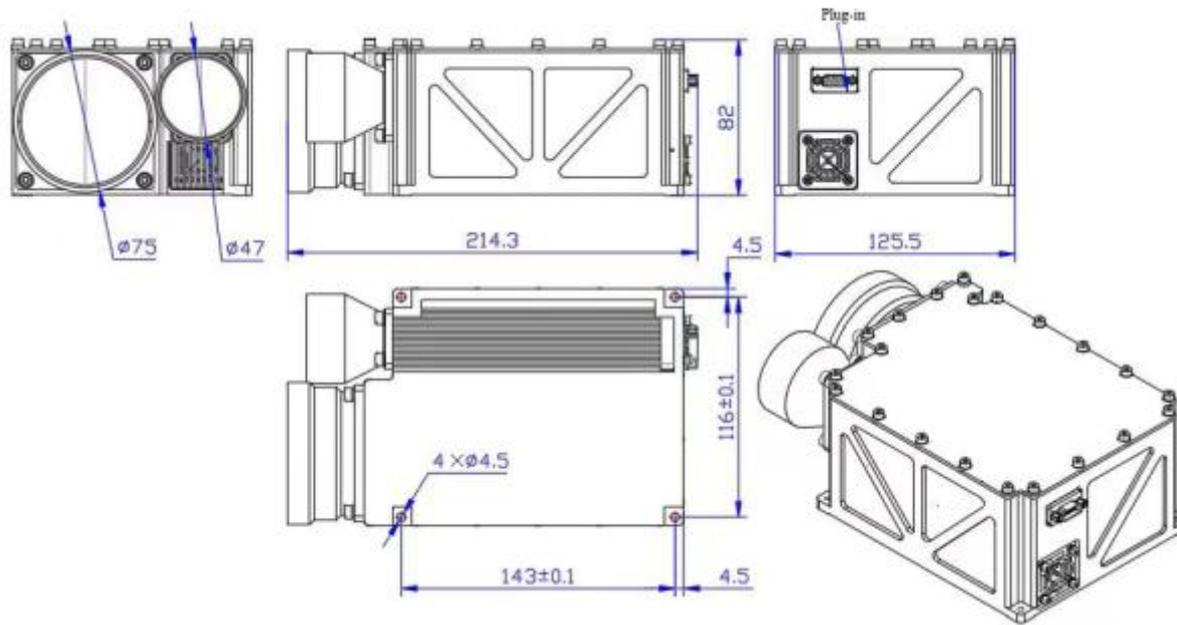
Parameters	Specification	Note.
Wavelength	1570 $\pm$ 5nm	
Ranging capability	200m~50km	
Ranging ability	$\geq 25\text{km}$ (2.3m $\times$ 2.3m, 0.3 reflectivity vehicle, visibility $\geq 35\text{km}$ ) $\geq 50\text{km}$ (for large targets, visibility $\geq 40\text{km}$ )	Humidity $\leq 80\%$
Ranging accuracy	$\pm 5\text{m}$	
Ranging repetition rate	1~10hz(adjustable)	
Accuracy	$\geq 98\%$	
Divergence angle	$\leq 0.6\text{mrad}$	
Receiving aperture	67mm	
Communication interface	RS422	
Supply voltage	DC18~32V	
Operating power	$\leq 50\text{W}$ (@1hz)	Tested under room temperature

Stand-by power	≤20W	Tested under room temperature
Dimension	≤214.3mm×125.5mm×82mm	
Weight	≤2.5kg	
Temperature	-40℃~65℃	
Heat-dissipating	By fan	

## Communication interface

Line NO.	Definition	Note.
1	Direct current	+24V Direct current
2		
3		
4		
5	GND(direct current)	+24V GND
6		
7		
8		
9	Serial port T+ (from a laser rangefinder to upper computer+)	RS422
10	Serial port R- (from upper computer to a laser rangefinder-)	
11	Serial port T- (from a laser rangefinder to upper computer-)	
12	Serial port R+ (from upper computer to a laser rangefinder+)	
13	RS422 GND (connection is not necessarily required)	
14	SYN+	RS422 differential external trigger, width > 10us
15	SYN-	

## Dimension



## Calculation of ranging ability

### (1) Targets and condition requirements

Visibility  $\geq 35\text{km}$

Humidity  $\leq 80\%$

For vehicles with  $2.3\text{m} \times 2.3\text{m}$  dimension

Reflectivity  $= 0.3$

Ranging ability  $\geq 25\text{km}$

### (2) Analysis and verification

The main parameters that affect ranging ability are peak power of lasers, divergence angle, transmitting and receiving transmittance, wavelength of laser, etc.

For this laser rangefinder, it takes  $\geq 3\text{MW}$  peak power of lasers,  $0.6\text{mrad}$  divergence angle,  $1570\text{nm}$  wavelength, transmitting transmittance  $\geq 90\%$ , receiving transmittance  $\geq 80\%$  and  $67\text{mm}$  receiving aperture.

It is a laser rangefinder for small targets, ranging ability can be calculated by the following formula.

Ranging formula for small targets:

$$P_r = \frac{4P_t \tau_t \tau_r A_s A_r \rho}{\pi \theta_t^2 R^4} \cdot e^{-2\sigma \frac{R}{V}}$$

$P_r$ : Detectable optical power

$P_t$ : Transmitting power of laser rangefinder ( $3\text{MW}$ )

$\tau_t$ : Transmitting transmittance(0.9)

$\tau_r$ : Receiving transmittance(0.8)

$A_r$ : Optical receiving area(67mm receiving aperture)

$A_s$ : Effective reflection area of targets(5.29 m<sup>2</sup>)

$\rho$ : Target reflectivity(0.3)

$\sigma$ : Atmosphere attenuation coefficient(0.02)

$V$ : Visibility(according to testing condition)

$R$ : Distance to targets

As long as detectable optical power that reflected by targets is larger than minimum detectable power, a laser rangefinder is able to range distance to a target. For a laser rangefinder with 1570nm wavelength, generally, the minimum detectable power(M.D.S) of APD is  $5 \times 10^{-9}W$ .

Under 35km visibility with 27km distance to targets, the minimum detectable power is lower than M.D.S of APD( $5 \times 10^{-9}W$ ), therefore, under a condition with 35km visibility, a laser rangefinder can range distance for (2.3m $\times$ 2.3m) targets up to 26~27km(might be close or less than 27km).