



15km Range Finder Module

The M0815X laser rangefinder module is a military pulse laser rangefinder designed for application scenarios such as aircraft, unmanned aerial vehicles, tanks, and aerial guns. It has small size, light weight, low power consumption, stable performance, long measurement distance, and long service life, Human eye safety and other advantages, JIOPTICS® is an important technical equipment to improve product aiming accuracy. Welcome to buy 15km Range Finder Module from us.

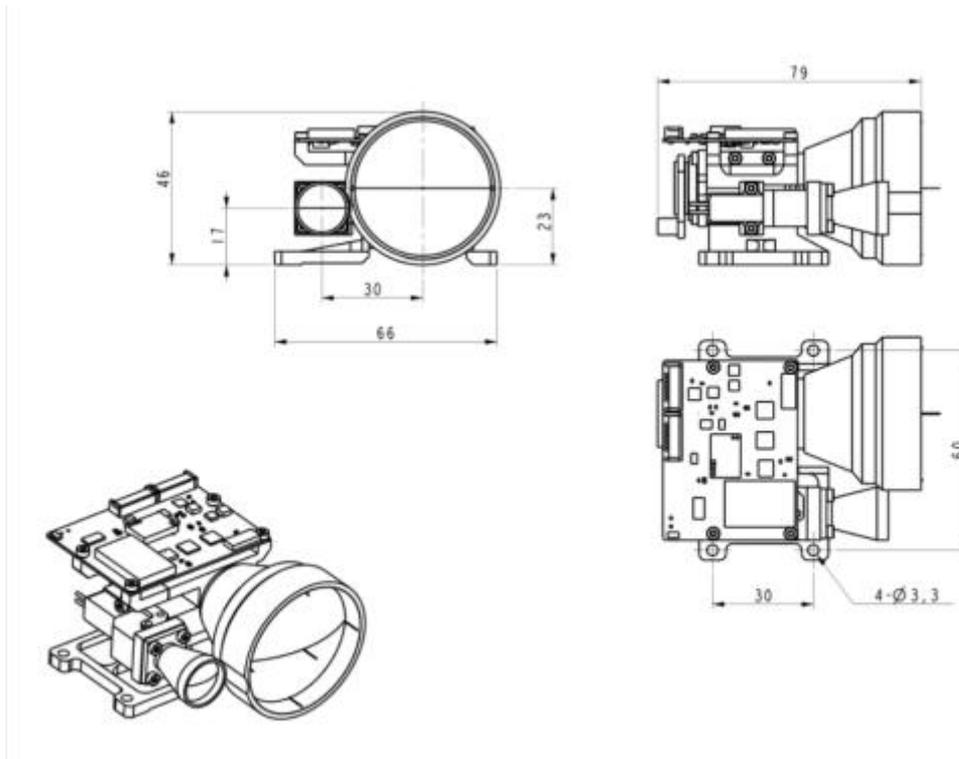
Ranging range: visibility is not less than 10km under general viewing conditions, diffuse reflectance is 0.3 for vehicles (2.3 mX2.3 m target), ranging distance $\geq 8000\text{m}$; Visibility is not less than 20km under general viewing conditions, for vehicles (2.3 mX2.3 m target), 0.3 diffuse reflectance target, ranging distance $\geq 15000\text{m}$;

JIOPTICS® 15km Range Finder Module Technical parameter

Item	technical parameter	Instruction
Working wavelength	1535 \pm 5nm	
Ranging capability	50-15km	
Ranging range	50m~8km	2.3m \times 2.3m vehicle target, 0.3 diffuse reflectance, visibility $\geq 10\text{km}$;
	50m~15km	Energy intensity $\geq 20\text{km}$, 0.3 large reflectivity target;
Ranging accuracy	$\pm 2\text{m}$	3 δ
Ranging frequency	1~10Hz adjustable	
Accuracy rate	$\geq 98\%$	
Divergence angle	$\leq 0.5\text{mrad}$	
Receiving caliber	40mm	
Communication Interface	RS422	
Voltage	DC18~32V	
Working power	$\leq 1.2\text{W}(@1\text{hz})$	Normal temperature test

consumption		
	≤0.5W	Normal temperature test
Size	≤79mm×66mm×46mm	
Weight	≤120g	

Structure installation interface



External Interface

Connector model: MDC1-15SW1			
Pin number	Definition	Function	Remark
1	VEE	power input positive	DC9-36V
2	GND	power input ground	
3	RS422_T/R+	RS485+/RS422 send positive	
4	RS422_T/R-	RS485+/RS422 send negative	
5	RS422_RXD-	RS422 receive negative	
6	RS422_RXD+	RS422 receive positive	
7	RS232-TX	RS232 send	
8	RS232-RX	RS232 take over	

9	TTL-TX	TTL send	3.3V
10	TTL-RX	TTL take over	3.3V
11	GND	place of communication	
12	NC	Alternate	
13	NC	Alternate	
14	NC	Alternate	
15	NC	Alternate	

Environmental adaptability

a) working temperature: $-40^{\circ}\text{C} \sim +60^{\circ}\text{C}$ 。

b) Storage temperature: $-45^{\circ}\text{C} \sim +70^{\circ}\text{C}$ 。

C) Random vibration: 15~2000Hz, 3 directions. The specific test conditions are shown in Table

Table 1 Random vibration test conditions

Serial number	Frequency range (Hz)	Acceleration spectral density (g ² /Hz)	Vibration time (min)
1	15~190	0.01	Vibration in every direction 15 min
2	190~210	0.1	
3	210~380	0.01	
4	380~420	0.025	
5	420~2000	0.01	

OEM/ODM ranging modules and custom solutions

The M0815X is designed for system integrators looking for a convenient, powerful and compact laser ranging solution. It provides reliable performance in a wide range of applications.

It is very small, ultra-light, has low power consumption and can be measured over a long distance. It is suitable for handheld devices (thermal imaging), weapon mounting applications, portable systems and lightweight sensor suites and unmanned aerial vehicles or UGVs.

Calculation of ranging ability

(1)Targets and condition requirements

Visibility \geq 10km

Humidity \leq 80%

For vehicles with 2.3m \times 2.3m dimension

Reflectivity=0.3

Ranging ability≥8km

(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≥50kw peak power of lasers, 0.3mrad divergence angle, 1535nm wavelength, transmitting transmittance≥90%, receiving transmittance≥80% and 40mm 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(50kw)

τ_t : Transmitting transmittance(0.9)

τ_r : Receiving transmittance(0.8)

A_r : Optical receiving area(40mm receiving aperture)

A_s : Effective reflection area of targets(5.29 m²)

ρ : Target reflectivity(0.3)

σ : Atmosphere attenuation coefficient(0.16)

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 1535nm wavelength, generally, the minimum detectable power(M.D.S) of APD is 5×10⁻⁹W.

Under 10km visibility with 10km distance to targets, the minimum detectable power is lower than M.D.S of APD(5×10⁻⁹W), therefore, under a condition with 8km visibility, a laser rangefinder can range distance for (2.3m×2.3m) targets up to 9~10km(might be close or less than 10km).