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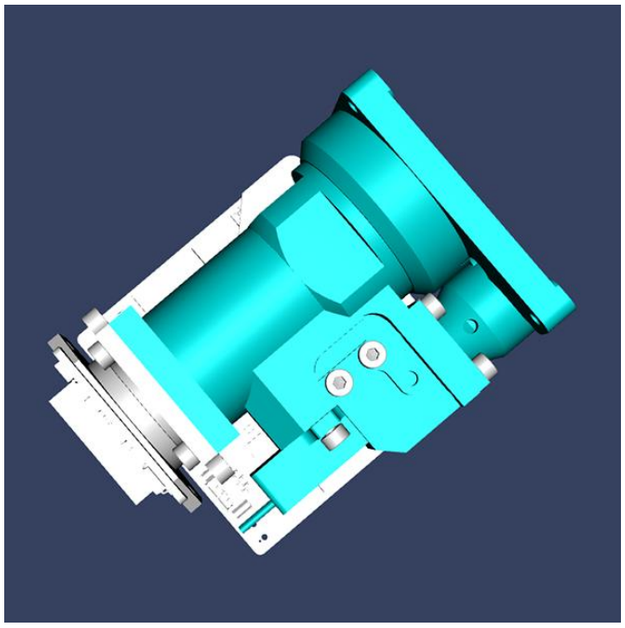


8km Laser Range Finder Module

The miniature 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 8km Laser Range Finder Module from us. Ranging range: visibility is not less than 5km under general viewing conditions, diffuse reflectance is 0.3 for vehicles (2.3 mX2.3 m target), ranging distance ≥ 4000m; Visibility is not less than 10km under general viewing conditions, for vehicles (2.3 mX2.3 m target),0.3 diffuse reflectance target, ranging distance ≥ 8000m;

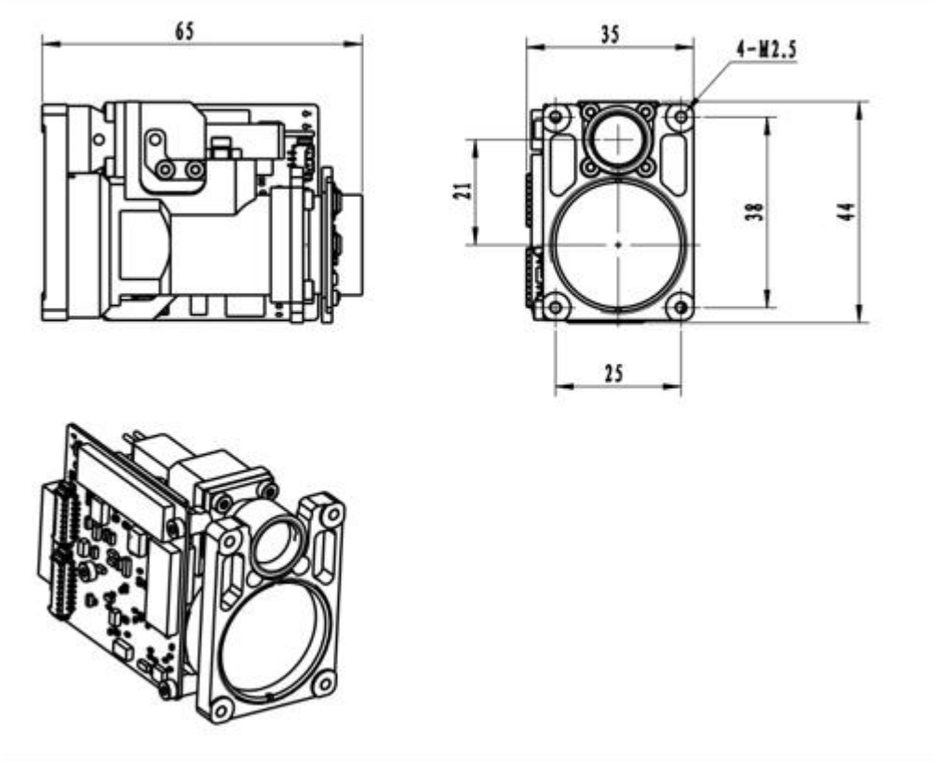
JIOPTICS® 8km Laser Range Finder Module Technical Parameter

Item	Technical parameter	Instruction
Working wavelength	1535±5nm	
Ranging capability	50m~8km	
Ranging range	50m~4km	2.3m×2.3m vehicle target, 0.3 diffuse reflectance, visibility ≥5km;
	50m~8km	Energy intensity ≥10km, 0.3 large reflectivity target;
Ranging accuracy	±2m	3δ
Ranging frequency	1 ~ 10 Hz is adjustable	
Accuracy rate	≥98%	
Divergence angle	≤0.5mrad	
Receiving caliber	25mm	
Communication Interface	422、485、232、TTL（3.3V）	
Voltage	DC9~36V	
Working power consumption	≤1.2W(@1hz)	Normal temperature test

Tel:+86-13570832601 **Email:**sales@jioptics.com

Standby power consumption	≤0.2W	Normal temperature test
Size	≤65mm×44mm×35mm	
Weight	≤75g	

Structure installation interface



External interface

Connector model：MDC1-15SW1			
Pin nunmber	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+/RS42 send negative	
5	RS422_RXD-	RS422 accept negative	
6	RS422_RXD+	RS422 accept positive	
7	RS232-TX	RS232 send	
8	RS232-RX	RS232 take over	3.3V
9	TTL-TX	TTL send	3.3V
10	TTL-RX	TTL take over	
11	GND	place of communication	
12	NC	Alternate	
13	NC	Alternate	
14	NC	Alternate	
15	NC	Alternate	

Environmental adaptability

a)Working temperature：-40℃～+60℃。
b)Storage temperature：-45℃～+70℃。
C)Random vibration: 15～2000Hz, 3 directions. The specific test conditions are shown in Table 1.
Table 1 Random vibration test conditions

Serial number	Frequency Range (Hz)	Acceleration spectral density (g2/Hz)	Vibration time (min)
1	15～190	0.01	Vibrate in each direction for 15min
2	190～210	0.1	
3	210～380	0.01	
4	380～420	0.025	
5	420～2000	0.01	

The impact test conditions are shown in Table 2.

Half-sine pulse		
Peak acceleration g		Pulse width ms
Vertical	15	11±2
Horizontal	15	11±2
Portrait	15	11±2

Impact direction: 3 directions, 3 consecutive impacts in each direction

OEM/ODM ranging modules and custom solutions

The M0408X 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

Targets and condition requirements
Visibility≥8km
Humidity≤80%
For vehicles with 2.3m×2.3m dimension
Reflectivity=0.3
Ranging ability≥4km

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 ≥40kw peak power of lasers, 0.5mrad divergence angle, 1535nm wavelength, transmitting transmittance≥90%, receiving transmittance≥80% and 25mm 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(40kw)

τ_t: Transmitting transmittance(0.9)

τ_r: Receiving transmittance(0.8)

A_r: Optical receiving area(25mm receiving aperture)

A_s : Effective reflection area of targets(5.29 ㎡)

ρ : Target reflectivity(0.3)

σ : Atmosphere attenuation coefficient(0.2)

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 8km visibility with 6km distance to targets, the minimum detectable power is almost close to 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 6km(might be close or less than 6km).