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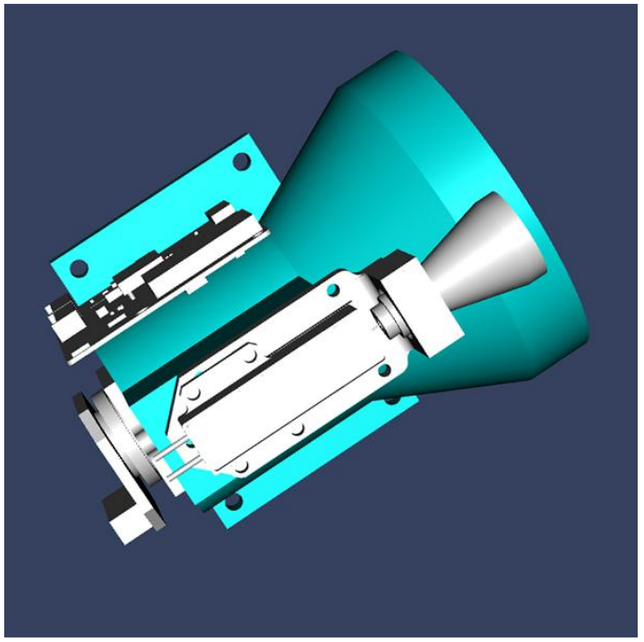

20km Laser Range Finder Module

The M1220x 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 20km Laser Range Finder Module from us.
Ranging range: visibility under the conditions of visibility is not less than 15km, for vehicles (2.3mX2.3m target), 0.3 diffuse reflectance, ranging distance ≥12000m; Visibility under the conditions of not less than 25km, large target, ranging distance ≥20000m;

JIOPTICS® 20km Laser Range Finder Module Parameters

Parameters	Specification	Note.
Wavelength	1535±5nm	
Ranging capability	50m~20km	
Ranging ability	≥12km(2.3m×2.3m, 0.3 reflectivity vehicle, visibility≥15km)	Humidity≤80%
	≥20km(for large targets, visibility≥25km)	
Ranging accuracy	±3m	
Ranging repetition rate	1~10hz(adjustable)	
Accuracy	≥98%	
Divergence angle	≤0.3mrad	
Receiving aperture	56mm	
Communication interface	RS422	
Supply voltage	DC18~32V	
Operating power	≤2W(@1hz)	Tested under room temperature

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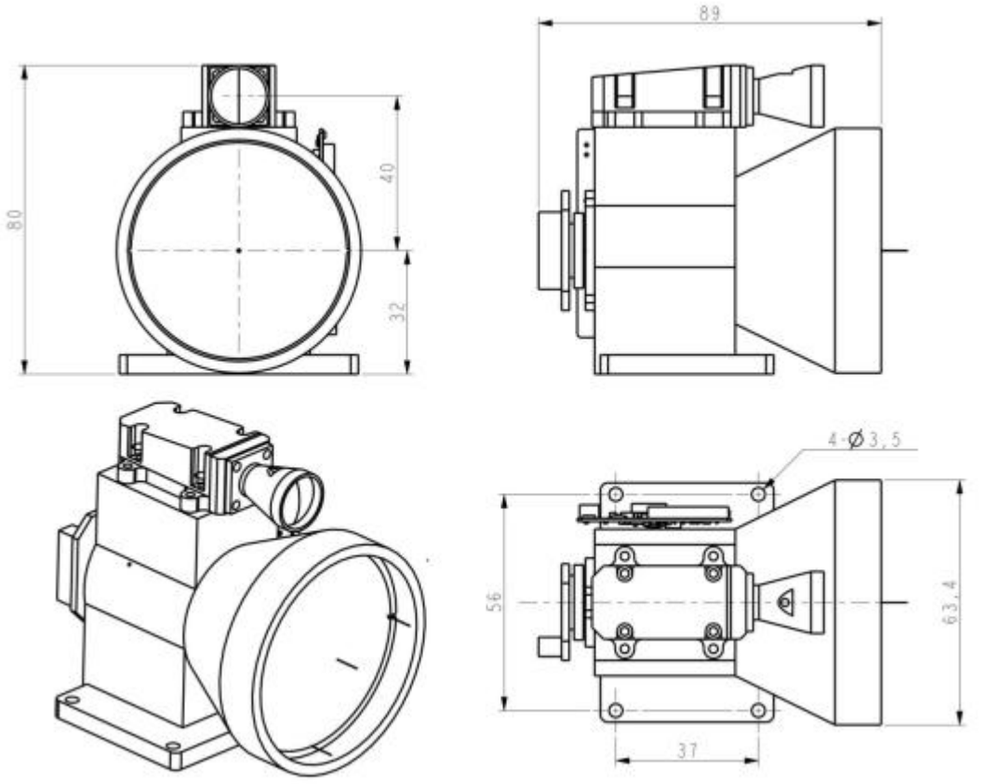
Stand-by power	≤0.5W	Tested under room temperature
Dimension	≤89mm×63.4mm×80mm	
Weight	≤350g	
Temperature	-40℃~65℃	
Heat-dissipating	By thermal conduction	

Communication interface

Line NO.	Definition	Note.
1	RS422 RX+	RS422 receive+
2	RS422 RX-	RS422 receive-
3	RS422 TX-	RS422 Transmit-
4	RS422 TX+	RS422 Transmit+
5	GND	For Communication interface
6	+24V	Power supply 24V
7	GND	For power supply
8		For spare

Dimension



Calculation of ranging ability

(1)Targets and condition requirements
Visibility≥15km
Humidity≤80%
For vehicles with 2.3m×2.3m dimension
Reflectivity=0.3
Ranging ability≥12km
(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≥80kw peak power of lasers, 0.3mrad divergence angle, 1535nm wavelength, transmitting transmittance≥90%, receiving transmittance≥80% and 56mm 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(56mm receiving aperture)

A_s: Effective reflection area of targets(5.29 ㎡)

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 15km visibility with 14km distance to targets, the minimum detectable power is lower than M.D.S of APD(5×10-9W), therefore, under a condition with 15km visibility, a laser rangefinder can range distance for (2.3m×2.3m) targets up to 13~14km(might be close or less than 14km).