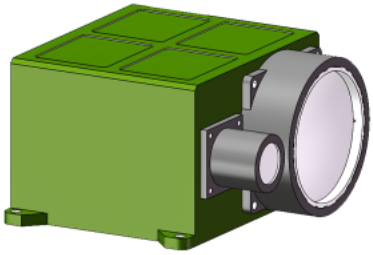
1535nm Laser Rangefinder-15K25



Parameters

Parameters	Specification	Note.
Wavelength	1535±5nm	
Ranging capability	100m~15km	
Ranging ability	≥15km(2.3m×2.3m, 0.3 reflectivity vehicle, visibility≥20km)	Humidity≤80%
	≥25km(for large targets, visibility≥30km)	
Ranging accuracy	±3m	
Ranging repetition rate	1~5hz(adjustable)	
Accuracy	≥98%	
Divergence angle	≤0.3mrad	
Receiving aperture	63mm	
Communication interface	RS422	
Supply voltage	DC18~32V	
Operating power	≤20W(@1hz)	Tested under room temperature
Stand-by power	≤5W	Tested under room temperature
Dimension	≤117mm×71mm×121mm	
Weight	≤1kg	
Temperature	-40℃~65℃	
Heat-dissipating	By thermal conduction	

Communication interface

Line NO.	Definition	Note.
1	Direct current	+24V Direct current
2		
3		
4		
5	GND(direct current)	+24V GND
6		
7		

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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-	

Calculation of ranging ability

(1)Targets and condition requirements

Visibility≥20km

Humidity≤80%

For vehicles with 2.3m×2.3m dimension

Reflectivity=0.3

Ranging ability≥15km

(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 ≥ 100kw peak power of lasers, 0.3mrad divergence angle, 1535nm wavelength, transmitting transmittance≥90%, receiving transmittance≥ 80% and 63mm 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(100kw)

τ_t : Transmitting transmittance(0.9)

τ_r : Receiving transmittance(0.8)

A_r :Optical receiving area(63mm receiving aperture)

A_s : Effective reflection area of targets(5.29 ㎡)

ρ : Target reflectivity(0.3)

σ : Atmosphere attenuation coefficient(0.08)

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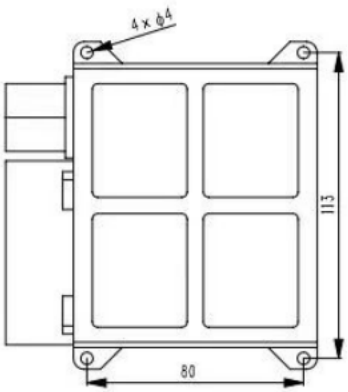
V : Visibility(according to testing condition)

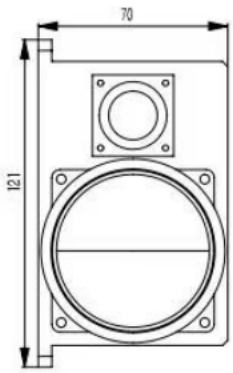
R : Distance to targets

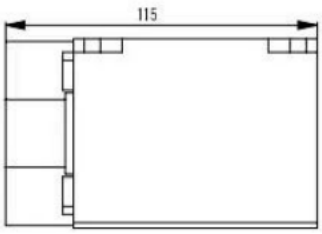
As long as detectable optical power that reflected by targets is larger than minimum detectable power $M.D.S$, a laser rangefinder is able to range distance to a target. For a laser rangefinder with 1535nm wavelength, generally, the minimum detectable power(M.D.S) of APD is 5×10^{-9}W.

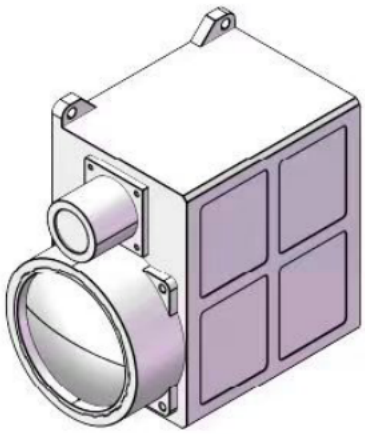
Under 20km visibility with 16km distance to targets, the minimum detectable power is lower than M.D.S of APD(5×10^{-9}W), therefore, under a condition with 15km visibility, a laser rangefinder can range distance for (2.3m × 2.3m) targets up to 15~16km(might be close or less than 16km).

Dimension









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