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1570nm Laser Rangefinder-20K35
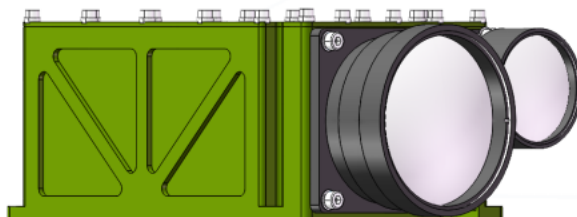
Parameters

Parameters	Specification	Note.
Wavelength	1570±5nm	
Ranging capability	100m~20km	
Ranging ability	≥20km(2.3m×2.3m, 0.3 reflectivity vehicle, visibility≥30km) ≥35km(for large targets, visibility≥35km)	Humidity≤80%
Ranging accuracy	±3m	
Ranging repetition rate	1~10hz(adjustable)	
Accuracy	≥98%	
Divergence angle	≤0.8mrad	
Receiving aperture	67mm	
Communication interface	RS422	
Supply voltage	DC18~32V	
Operating power	≤20W(@1hz)	Tested under room temperature
Stand-by power	≤2W	Tested under room temperature
Dimension	≤215mm×126mm×81mm	
Weight	≤2.3kg	
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+）	
10	Serial port R-（from upper computer to a laser rangefinder-）	
11	Serial port T-（from a laser rangefinder to upper computer-）	RS422
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≥30km
Humidity≤80%
For vehicles with 2.3m×2.3m dimension
Reflectivity=0.3
Ranging ability≥20km
(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 ≥1MW peak power of lasers, 0.8mrad divergence angle, 1570nm wavelength, transmitting transmittance≥90%, receiving transmittance≥80% and 67mm 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(1MW)

τ_t : Transmitting transmittance(0.9)

τ_r : Receiving transmittance(0.8)

A_r :Optical receiving area(67mm receiving aperture)

A_s : Effective reflection area of targets(5.29 ㎡)

ρ : Target reflectivity(0.3)

σ : Atmosphere attenuation coefficient(0.03)

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 1570nm wavelength, generally, the minimum detectable power(M.D.S) of APD is $5×10^{-9}$W. Under 30km visibility with 22km distance to targets, the minimum detectable power is lower than M.D.S of APD($5×10^{-9}$W), therefore, under a condition with 30km visibility, a laser rangefinder can range distance for (2.3m × 2.3m) targets up to 21~22km(might be close or less than 22km).

Dimension