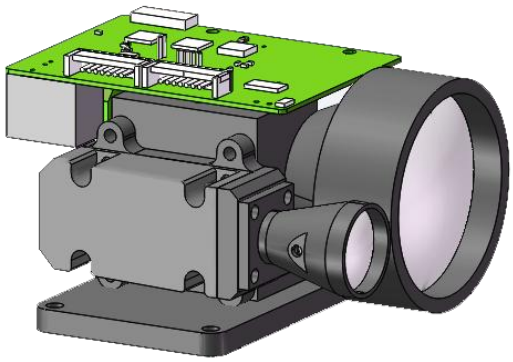
1535nm Laser Rangefinder 6K10

(Type#: LRF-1535-6K10)



1. Parameters

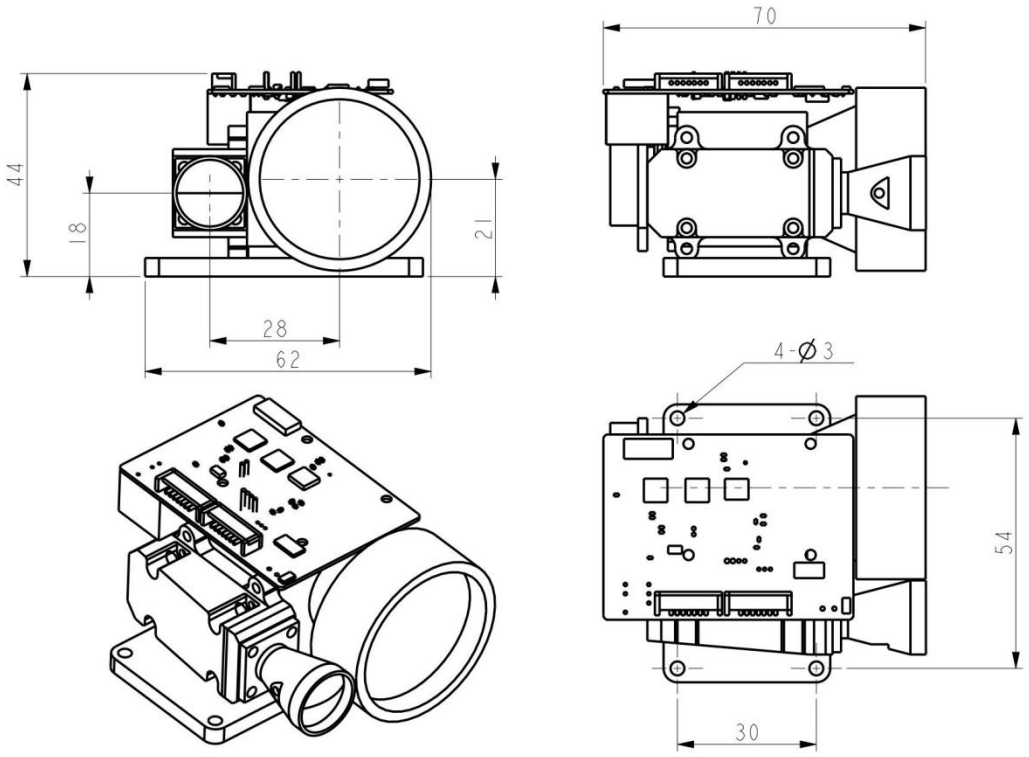
Parameters	Specification	Note.
Wavelength	1535±5nm	
Ranging capability	50m~6km	
Ranging ability	⩾6km(2.3m×2.3m, 0.3 reflectivity vehicle, visibility≥8km)	Humidity⩽80%
	⩾10km(for large targets, visibility⩾12km)	
Ranging accuracy	±2m	
Ranging repetition rate	1~10hz(adjustable)	
Accuracy	≥98%	
Divergence angle	≤0.3mrad	
Receiving aperture	33mm	

Communication interface	RS422	
Supply voltage	DC18~32V	
Operating power	≤2W(@1hz)	Tested under room temperature
Stand-by power	≤0.5W	Tested under room temperature
Dimension	≤70mm×62mm×44mm	
Weight	≤120g	
Temperature	-40℃~65℃	
Heat-dissipating	By thermal conduction	

2. 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

3. Dimension



4. 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≥6km

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, 0.3mrad divergence angle, 1535nm wavelength, transmitting transmittance ≥ 90%, receiving transmittance ≥ 80% and 33mm 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(33mm 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 $M.D.S$, 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 5×10-9W.

Under 8km visibility with 8km 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 7~8km(might be close or less than 8km).