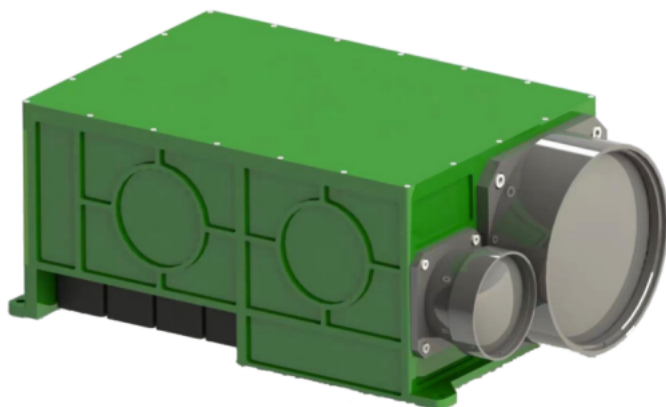


## 1570nm Laser Rangefinder-120k16



### Features

- (1) There are three modes-operating mode, standby mode and error mode. With standby mode, pumping power and thermal-control power can be switch off. Operating mode is set as a default, if you want to switch to standby mode and set it as a default, it can be realized by laser communication instructions. In addition, it can also achieve power fail safeguard function.
- (2) When power switch on, it can monitor and give feedback immediately. If it's in error, it will self-check and report (every 1s on self-check).
- (3) It is able to collect times of transmitting laser pulse.
- (4) With external trigger operating mode(No more than 25Hz).
- (5) With overvoltage safeguard function.
- (6) With overcurrent safeguard function: when current in laser LD exceeds the maximum value, it will switch to standby mode and send error report.
- (7) With overheat safeguard function: when radiator temperature exceeds the maximum value in standby mode, it will switch to standby mode and send error report.

### Parameters

Parameters	Specification		
Wavelength	1570nm		
Maximum Range	$\geq 120\text{km}$	Ranging from sky to ground	reflectivity $\geq 0.1$
			Altitude of aircraft $\geq 6\text{km}$

	≥16km	Ranging from ground to sky, target area:0.1 m <sup>2</sup>	reflectivity≥0.3 visibility≥16km
Minimum Range	≥400m		
Ranging repetition rate	≥20Hz		
Divergence angle	≤0.6mrad		
Ranging accuracy	≤±5m		
Power supply	DC 22V~30V		
Power (under room temperature)	≤300W		
Continuous operating time	≥3min@20hz		
Operating temperature	-40℃~+55℃		
Storage temperature	-50℃~+65℃		
Dimension	≤410mm×231mm×161mm(lens cap is not included)		
Weight	≤10kg		

## Communication interfaces

With bold and clear marks, special design of socket and connectors is tend to protect it from reverse and false connection. For external interface, it adopts military J30J micro-connectors(names vary according to different manufacturers) Socket: XS1

Table 1 and table 2 show the socket and plug of external interface, table 3 shows definition of Pin NO.

**Table 1 Socket of external interface of laser rangefinder**

NO.	Item	Model	Mark
1	Socket of power supply and communication interface	J30JM-15ZKP29	XS1

**Table 2 Plug of external interface of laser rangefinder**

NO.	Item	Model	Mark
1	Plug of power supply and communication interface	J30J-15TJL - C1(L100)	XP1

**Table 3 Definition of Pin NO.**

PIN NO.	Abbr.	Note.	Definition
1	PWR+	DC, 28V+	
2	PWR+	DC, 28V+	
3	PWR+	DC, 28V+	
4	PWR+	DC, 28V+	
5	RTN_P	DC, 28V-	
6	RTN_P	DC, 28V-	
7	RTN_P	DC, 28V-	
8	RTN_P	DC, 28V-	
9	LRF_COM_T+	RS422(COM)Y	Laser rangefinder transmit+
10	LRF_COM_T-	RS422(COM)Z	Laser rangefinder transmit-

PIN NO.	Abbr.	Note.	Definition
11	LRF_COM_R-	RS422(COM)B	Laser rangefinder receive-
12	LRF_COM_R+	RS422(COM)A	Laser rangefinder receive+
13	GND_ LRF_COM	RS422(COM)GND	
14	LRF_Trigg_R+	external trigger receive+	
15	LRF_Trigg_R-	external trigger receive-	

## Calculation of ranging ability

### (1) Targets and condition requirements

Ranging ability: 120km(ranging from sky to ground, reflectivity: $\geq 0.1$ , Altitude of aircraft: $\geq 6$ km)

Ranging ability: $\geq 16$ km(ranging from ground to sky, target area: $0.1 \text{ m}^2$ , reflectivity: $\geq 0.3$ , visibility $\geq 16$ km)

### (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  $\geq 10$  MW peak power of lasers,  $0.6$  mrad divergence angle,  $1570$  nm wavelength, transmitting transmittance  $\geq 90\%$ , receiving transmittance  $\geq 80\%$  and  $140$  mm receiving aperture.

It is a laser rangefinder for small targets, ranging ability can be calculated by the following formula. Ranging formula for small targets:

$$P_r = \frac{P_t \tau_0 D^2 \rho}{4 R^2} e^{-2 \sigma R}$$

$P_r$ : Detectable optical power

$P_t$ : Transmitting power of laser rangefinder( $10$  MW)

$\tau_t$ : Transmitting transmittance( $0.9$ )

$\tau_r$ : Receiving transmittance( $0.8$ )

$A_r$ : Optical receiving area( $140$  mm receiving aperture)

$\rho$ : Target reflectivity( $0.2$ )

$\sigma$ : Atmosphere attenuation coefficient( $0.001$ )

$R$ : Distance to targets



With 6km flying altitude and 145km distance to targets, the minimum detectable power is lower than M.D.S of APD( $5 \times 10^{-9} \text{W}$ ), therefore, under a condition with 6km flying altitude, a laser rangefinder can range distance for large targets(from sky to ground) up to 140~145km(might be close or less than 145km).

## Dimension

