



# Laser Target Designer&Laser Rangefinder -LDR20K1

Model:LDR20K1

## PRODUCT DESCRIPTION

The LDR20K1 is a well-designed and applied in practice, stable performance lightweight, compact Laser Target Designator and Range Finder that emits laser light to a specific target and calculates distance information based on the time of flight of the laser light. Pulse energy  $\geq 20\text{mJ}$ , NATO target ranging capability  $\geq 3\text{km}$ , very suitable for airborne, maritime and land-based photoelectric applications of the compact observation system, provide RS422 upper computer test software and communication protocols, convenient for users to secondary development.



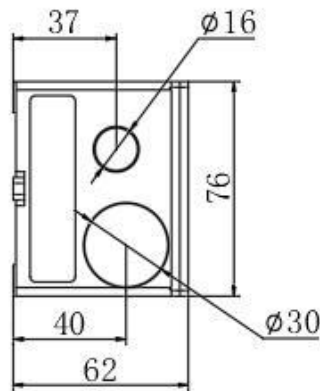
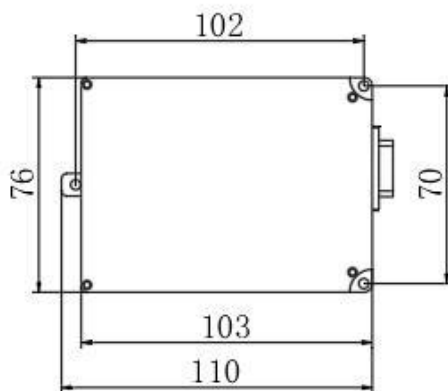
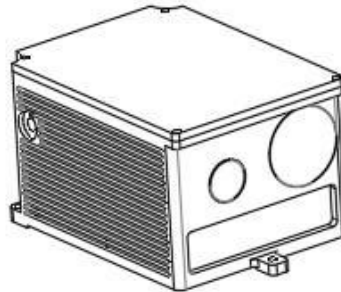
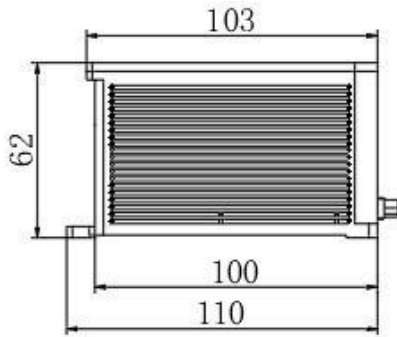
## TECHNICAL SPECIFICATIONS

Project		Performance Indicators
Model		LDR20K1
Laser Type		Nd: YAG
Laser Wavelength		1.064 $\mu\text{m}$
Pulse Energy		$\geq 20\text{mJ}$
Adjacent Pulse Energy Fluctuation Range		$\leq 5\%$
Laser Class (according to IEC 60825-1 Ed 1.2 of 2007-03)		Class 4
Launch Lens Diameter		$\Phi 30\text{mm}$
Receiver Lens Diameter		$\Phi 16\text{mm}$
Irradiation Frequency		10~20Hz
Ranging Frequency		5~10Hz
Laser encoding accuracy		1 $\mu\text{S}$
Pulse Width		8-15ns
Beam Divergence		0.5mrad
Beam Shape		Orbicular
Exposure Time	Long Exposure	1min
	Emergency Exposure	30S
Power-up Preparation Time	Normal temperature	1min
	High temperature	30S
	Low temperature	3min
Measuring Range (Reflectance 30%; visibility $\geq 6\text{km}$ .)	Big Target (4m $\times$ 6m)	$\geq 4000\text{m}$
	NATO objective(2.3m $\times$ 2.3m)	$\geq 3000\text{m}$
	People(0.5m $\times$ 1.7m)	$\geq 2000\text{m}$
	Drones(0.2m $\times$ 0.3m)	$\geq 1000\text{m}$
Ranging Accuracy		$\pm 1\text{ m}$
Resolution		1m
Precision Rate		98%
False Alarm Rate		5%
Multiple target discrimination		3 Objectives
Multiple target Range Logic		Near, middle and far
Continuous Ranging Time		$\geq 2\text{min}$ , rest: 30s
Insulation resistance	Environmental conditions	Standard Atmospheric Conditions



	Insulation Resistance	≥20MΩ
	Megohmmeter Output Voltage	100V
Service Life		≥ 2 million times
Operating Temperature		-40°C~+60°C
Storage Temperature		-50°C~+65°C
Supply Voltage		Voltage range DC22V ~ 30V, power supply characteristics to meet the requirements of GJB181B-2012 for the power equipment in the provisions of the relevant requirements
Power Wastage	Standby Power Consumption	10W
	Average power consumption	40W
	Peak Power Consumption	80W
Weight		350g
Dimension (L×W×H)		103mm×76mm×62mm
Data Interface		RS422/TTL
Electrical Interface		J30J-25TJL-200
Anti-vibration		Generalized low-limit integrity vibration test (GJB150.16A-2009 Figure C.17)
Impact Resistance		75g/6ms
Protection Class		IP67
ESD Class		(Lens position) Contact discharge 6kV Air discharge 8kV
Electromagnetic Compatibility (EMC)		CE/FCC Certification
Eco-friendly		RoHS2.0

## STRUCTURAL DRAWING (mm)





## ELECTRICAL INTERFACE

The connector model of electrical interface is J30J-25TJL-200, and the specific wiring definition is shown in the table below.

Pin	Definition	Description
1, 2, 3, 4, 5, 6, 7	24V+	INPUT
14, 15, 16, 17, 18, 19, 20	24V-	INPUT
11	R+	RS422
12	R-	
9	T+	
10	T-	
13	GND	
8	TRIGGER	
21	TRIGGER GND	

## COMMUNICATION PROTOCOL

### Notes:

Serial port setting: Baud rate: 115200 Checksum: None Data bits: 8 Stop bits: 1

1. General data bit explanation involved in this protocol

NO.	Data bit	Meaning
1	<0x55、0xAA>	The header of the data frame.
2	<0x66、0xBB>	The end of the data frame.
3	<Length (1B)>	Total number of bytes in this packet.
4	<Data direction (1B)>	0x01: Data or instruction is written from PC to MCU; 0x02: Data or instruction is returned from the microcontroller to the PC.
5	<Energy (2B)>	Controls the light output energy of the laser, range: 0 to 254 (the specific setting range is subject to the laser manufacturer's specifications).

2. Data return

When the setting is successful, the monitoring system returns the received data. When the setting fails, no data is returned.

### I. Light-out instruction set

Laser light-out command check bit, algorithm: none

When setting instruction, the instruction is sent in the laser stop state.

1. Energy setting instruction:

0x55	0xAA	Lengths (1B)	Data orientation (1B)	Energy Setting Command (1B)
Energies (1B)	Calibration (1B)	0x66	0xBB	

Description: <Energy Setting Instruction> 0x06.

<Energy> Range: 0-254 corresponds to 0.4-2V.

Example: Energy 200: 55 AA 09 01 06 C8 00 66 BB



## 2. Single light out instruction

0x55	0xAA	Lengths (1B)	Data orientation (1B)	Single shot command (computing) (1B)
Energies (1B)	Calibration (1B)	0x66	0xBB	

Description: <single light out command> 0x08.

<Energy> This version is not user changeable, please send 0xFF.

Example: 55 AA 09 01 08 FF 00 66 BB

## 3. re-frequency light out instruction

0x55	0xAA	Lengths (1B)	Data orientation (1B)	Heavy Frequency Output Command (HFOC) (1B)
Frequency (1B)	Calibration (1B)	0x66	0xBB	

Description: <Refrequency out light command> 0x05;

<Frequency> Unit: 0.1Hz.

1HZ: 55 AA 09 01 05 0A 00 66 BB

10HZ: 55 AA 09 01 05 64 00 66 BB

20HZ: 55 AA 09 01 05 C8 00 66 BB

## 4. External Trigger Output Command

0x55	0xAA	Lengths (1B)	Data orientation (1B)
External Trigger Output Command (1B)	Calibration (1B)	0x66	0xBB

Description: <External trigger out light command> 0x07.

After successful setting, the laser works under the drive of external trigger signal.

Example: 55 AA 08 01 07 00 66 BB

## 5. Stop Output Command

0x55	0xAA	Lengths (1B)	Data orientation (1B)
EStop Light Out command (1B)	Calibration (1B)	0x66	0xBB

Explanation: <Stop light out command> 0x09.

Example: 55 AA 08 01 09 00 66 BB

## II. System Status Read Instruction Set

PC sends <Read System Status Instruction> to MCU, then MCU returns <System Status Data> to PC.

### 1. Read system status instruction

0x55	0xAA	Lengths (1B)	Data orientation (1B)
Read System Status Command (1B)	Calibration (1B)	0x66	0xBB

Description: <Read system status instruction> 0x0F;

Example: 55 AA 08 01 0F 00 66 BB

Return:

0x55	0xAA	Lengths (1B)	Data orientation (1B)
Read System Status Command (1B)	0x00	0x00	Error code (1B)
0x00	0x00	Temp (2B)	0x00
Energies (1B)	Frequency (1B)	0x00 stop Trigger within 02 03External trigger	0x00
0x00	0x00	0x00	0x00
0x00	Cumulative number of times (4B)	Calibration (1B)	0x66
0xBB			

Description: <Read System Status Instruction> 0x0F;



<Temperature> Returned temperature = actual temperature \* 10 + 1000

<Accumulation count> Unit (100 times).

Third, ranging instruction set

Check digit, Algorithm: Sum all byte data of data frame, then divide with 256 to get the balance.

## 1. Set Selective Distance Instruction

0x55	0xAA	Lengths (1B)	Data orientation (1B)	Set Selection Distance Command (1B)
Selective distance (3B)	Calibration (1B)	0x66	0xBB	

Description: <Set Selection Distance Command> 0x1A;

<selective distance> Unit: 0.1 meter;

## 2. distance return command

0x55	0xAA	Length (1B)	Data orientation (1B)	Distance return command (1B)
Number of targets (1B)	1st target distance (3B)	2nd target distance (3B)	3rd target distance (3B)	Calibration (1B)
0x66	0xBB			

Description: <Distance Return Direction> 0x0B;

<Data direction> 0x02

<selective distance> Unit: 0.1 meter;

<Number of targets> Number of targets, up to 3 target values are returned for a single distance measurement;

**At the end of each measurement, it is automatically returned to the calculation by the monitoring system.**