

25mJ Miniature Laser Rangefinding Target Designator

Model:LDR25K1

\square **PRODUCT DESCRIPTION**

The LDR25K1 Laser Rangefinding and Indication System is a state - of - the - art equipment crafted for high - precision ranging and laser - coded indication.

For ranging, it can accurately measure distances up to 5000m or more. For target indication, its effective range reaches 2000m or further. The system is lightweight, with a total weight of only 380g or less, and it's compact for easy portability.

The system offers customizability of the laser divergence angle within the range of 0.5 - 1mrad, enabling it to adapt to diverse operational environments. It complies with international standards, ensuring global compatibility and reliability.

With its reliable performance in durability, precise measurement, and portability, the LDR25K1 Laser

Rangefinding and Indication System is the preferred choice for professionals demanding high - efficiency and high precision operations.



\blacksquare TECHNICAL SPECIFICATIONS

Ranging/Target Designator Parameters						
Laser Ranging and Target Indication Working Modes	It starts working once the power is turned on.					
Maximum Measuring Range	\geq 5000m (visibility: 10km, target reflectivity: 0.2, target size: 2.3m × 4.6m).					
Minimum Ranging Distance	100m					
Ranging Accuracy	±2m					
Ranging Logic	Three targets.					
Laser Target Indication Distance	≥2000m					
Ranging Frequency	1 ~ 20Hz					
Target Indication Frequency	1 ~ 20Hz					
Accurate Measurement Rate	98%					
Continuous Ranging Time	5min(1Hz)/1min (5Hz)/208 (20hz)					
Laser Continuous Target Indication Time	Short-cycle Laser Target Designator: The duration of one Target Designator shall be no more than 25 seconds, the interval shall be no less than 15 seconds, and there are 8 consecutive cycles of Target Designator. After one short-duration Target Designator, the restart interval shall be no less than 30 minutes.					
Coding	Comply with the requirements of MIL-STD-810F; possess the ability of user-defined code extension.					
Laser Coding Pattern	Have the capability of receiving external synchronization signals. Precise frequency codes (eight groups of pre-stored periodic code encodings); customizable code patterns, etc.					
Coding Accuracy	±1µs					
Laser Parameters						
Laser Type	LD-pumped Nd:YAG crystal					
Cooling Method	Passive heat dissipation, without temperature control					



Wavelength	1064 nm \pm 3nm		
Single Pulse Energy	$\geq 25 \text{mJ}$		
Energy Fluctuation	$< 10\%$ (standard deviation of energy / average energy value $\times 100\%$)		
Repetition Frequency	Adjustable from 0 to 20Hz		
Pulse Width	$\geq 15 \text{ns} \pm 5 \text{ns}$		
Beam Divergence Angle	\leq 0.5mrad		
Laser Optical Axis Instability	0.05mrad		
Laser Start-up Time	30s		
Laser Safety Level	Class 4		
En	vironmental Adaptability		
Operating Temperature	-40°C~60°C		
Storage Temperature	-55°C~70°C		
Vibration and Shock Levels	Meet the vibration and shock requirements for airborne equipment in		
	MIL-STD-810F.		
	Electrical Parameters		
Power Supply Voltage	20 - 28VDC (Typical 24V)		
	Standby Power Consumption: $\leq 10W$		
Overall Power Consumption	Average Power Consumption: $\leq 50W$		
	Peak Power Consumption: $\leq 80W$		
Communication Interface	TTL (standard)		
Baud Rate	115200bit/s		
]	Mechanical Parameters		
Weight	≤380g		
Overall Dimensions	≤68mm×52mm×90mm		
Non-parallelism between the Installation	0.5mrad		
Reference Base and the Optical Axis	0.5mad		

R STRUCTURAL DRAWING (mm)



\mathbf{R} ELECTRICAL INTERFACE

Communication Interface: One TTL level serial port. The connector model and interface definitions are shown in Table 1. Table 1 Electrical Interface Definitions: (Using TTL)

Socket: MOLEX 53048-0810
Corresponding Plug: MOLEX 51021-0800



Pin	Definition	Explanation
1	24V	Power +
2	24V	Power +
3	24VGND	Power -
4	24VGND	Power -
5		
6	TTL_RX	Upper Computer -> Laser Target Designator Component
7	TTL_TX	Laser Target Designator Component -> Upper Computer
8	TTL_GND	Serial Port Ground

\square COMMUNICATION PROTOCOL

1. Communication Standards

Asynchronous Serial Communication Standard: TTL

Baud Rate: 115200bps

Transmission Format: 8 data bits, 1 start bit, 1 stop bit, no parity bit.

For each byte of information, the least significant bit (lsb) is transmitted first. In the case of multi-byte information, the low byte is transmitted first.

2. Output Information

Output information refers to the commands sent by the host computer system to the laser ranging and target designator module, including:

1) Information Header (0x55);

2) Command Word 1;

3) Command Word 2;

4) Command Word 3;

5) "Information Trailer" is the checksum, which is the result of the XOR operation of bytes 1 - 4.

The relevant definitions of Command Word 1 are shown as follows:

Table	2 Definitions	of Command	Word 1

BIT07	BIT06	BIT05	BIT04	BIT03	BIT02	BIT01	BIT00		
0x00: Standby	0x00: Standby								
0x01: Start Se	lf-Test								
0x02: Single F	Ranging								
0x03: Continu	ous Ranging (1)	Hz)							
0x04: Continu	ous Ranging (5)	Hz)							
0x05: Short Ill	lumination (Dur	ation 25s, Inter	val 15s, target d	esignator 8 cycl	es)				
0x08: Stop Ra	0x08: Stop Ranging / target designator								
0x09: Strobe V	0x09: Strobe Value Setting								
0x0A: Report	0x0A: Report the Cumulative Number of Laser Pulses								
0x19 - 0x20: N	Modification of	Laser Coding F	arameters 9 - 16)					
0x29 - 0x30: F	Reading of Lase	r Coding Paran	neters 9 - 16						

The relevant definitions of Command Word 2 are shown as follows:

Table 3 Definitions of Command Word	2
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BIT07	BIT06	BIT05	BIT04	BIT03	BIT02	BIT01	BIT00	
When using th	When using the laser target designator: Laser Coding 1 - 16.							
When perform	ing laser rangin	g: 1 - First Targ	et, 2 - Last Targ	get.				
When setting the strobe value: Low byte of the distance strobe value.								
When modifying the parameters of Laser Coding 9 - 16: Low byte of the laser coding, cycle × 100 (5000 represents 50ms,								
with a range of	f 46ms - 56ms).							

The relevant definitions of Command Word 3 are shown as follows:



Table 4 Definitions of Command Word 3							
BIT07 BIT06 BIT05 BIT04 BIT03 BIT02 BIT01 BIT00							
When using the	When using the target designator: Set the time of the laser target designator (1 - 25).						
When setting the strobe value: High byte of the distance strobe value.							
When modifying the parameters of Laser Coding 9 - 16: High byte of the laser coding, cycle × 100 (5000 represents 50ms,							
with a range of	of 46ms - 56ms).						

3. Input Information

Input information refers to the status information received by the Upper Computer system from the laser target designator module, including:

1) Information Header (0x55);

2) Status Word;

3) Target Distance/Cumulative Number of Laser Pulses (2 bytes); with the low byte first and the high byte second;

Parameters of Laser Coding 9 - 16, cycle × 100 (5000 represents 50ms, with a range of 46ms - 56ms); with the low byte first and the high byte second;

4) Current Temperature of the Laser Target Designator Module

5) "Information Trailer" is the checksum, which is the result of the XOR operation of bytes 1 - 5.

The relevant definitions of the Status Word information are shown in Table 5:

Table 5 Definitions of Status Word Information

BIT07	BIT06	BIT05	BIT04	BIT03	BIT02	BIT01	BIT00
0: No laser 1:	0: Ranging is	Laser Mark	1: Over-temperature		0: None 1:	00: Standby	01: Ranging
There is a laser	valid.	1/0	Warning 0:		External	02: Indicatin	ıg
	1: Ranging is	Alternating	Temperature Normal		Trigger		
	invalid.						

Definition of Target Distance Information: The distance value is represented by 2 bytes (16 bits) as an integer, and it can be directly converted into decimal.

In standby mode, the self-test returns the status every 10 seconds. In ranging and target designator modes, the status is returned according to the laser frequency.

Definition of Cumulative Number of Laser Pulses: Since the range represented by a 16-bit binary number is from 0 to 65535, and the service life of the laser ranging target designator is 1 million times, it is agreed that the number of laser emissions is a multiple of 20, with a range from 0 to 1310700.

Current Temperature of the Laser Ranging Target Designator Module: d7 - d0: Represented by two's complement, with a value range from -128 to +127, and the unit is (°C).

Note:

1. The status feedback frame automatically returns one frame every 10 seconds, that is, the status frame is fed back every 10 seconds in the states of power-on, standby, stopping ranging, and stopping target designator.

2. After 1Hz ranging for 5 minutes and 5Hz ranging for 1 minute (both are 300 times of ranging), the device automatically stops ranging.

3. After the coding change setting, the parameters are saved in the flash and will not be lost when the power is turned on again.

4. BIT05 in Table 5 is 1/O alternating, indicating that the feedback data has been updated.

5. Each time the target designator is started, a cycle of continuous target designator is carried out, and it will automatically stop after completion. Therefore, the coding only involves the interval time of laser pulses, and the starting of the target designator is accompanied by the irradiation time parameter (1 - 25s).

6. When sending the short target designator command, the target designator cycle is selected from the coding of 1 - 16, and the target designator cycle is the cycle set by coding 9 - 16.