

RangePRO Model GSLR-1K Laser Rangefinder Module

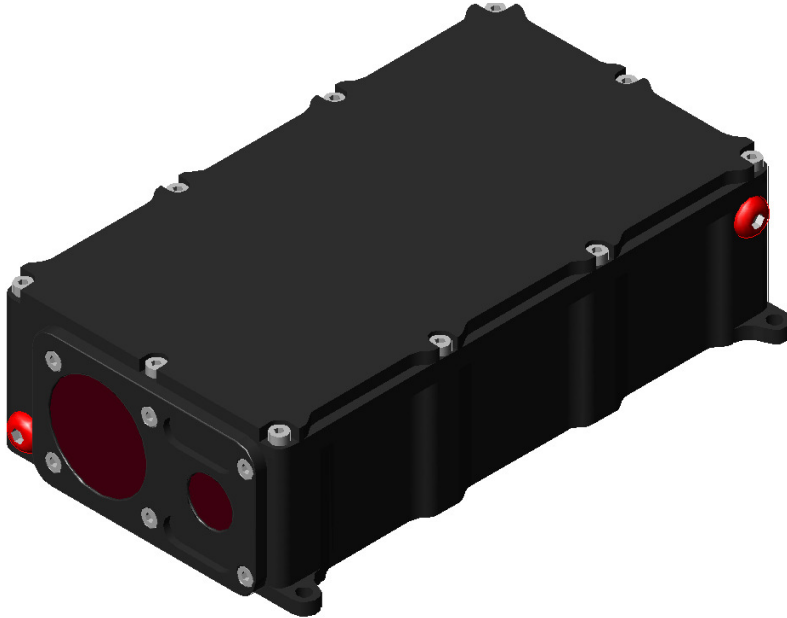


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$$P_R = \frac{P_L \times \chi^2 \times \delta \times D_L^2 \times A_t \times \cos\beta}{4 \times R^2 \times A_L}$$

RangePRO Model GSLR-1K Laser Rangefinder Module

1 DESCRIPTION

The RangePRO Model GSLR-1K is a very compact OEM laser rangefinder module providing an advanced digital ranging capability for military, paramilitary and commercial applications. All assemblies are integrated onto a precision bore-sighted platform.

It is designed to be integrated with host systems and other platforms such as weapon, sensing, or surveillance and tracking stations, and thermal imaging cameras. It requires power and control command input, and provides range-to-target and self-diagnostic data output.

The GSLR-1K ranges at low repetition rates over distances to 6km depending on target size, target reflectivity, atmospheric conditions and customer supplied external optics (typically greater than 3km for vehicle type targets).

The transmitter is a collimated eye-safe laser system. It can provide ranging rates from single shot up to 12 per minute.


As an option the GSLR-1K can be fitted with a dual (IR and red) pointer laser module that is boresighted to the rangefinder to provide an accurate pointing reference, both in the visible and IR spectrum.

Advanced digital signal processing techniques are employed to provide accurate, reliable ranging. Signals from the detector are digitally sampled. The samples are examined to determine all potential real target returns. If a valid target is detected within the user-set range gate it's range data is output, if more than one target is detected within the range gate the nearest or farthest may be selected for data output.

All signal and range computation is done "on the fly". Using this philosophy, the only task remaining after the sampling has expired is to transfer the range data through the serial port. Effectively the speed of the signal processing is limited only by the data output rate.

The system employs an adaptive range threshold to compensate for changing noise levels. The worst case for noise is when the system electronics are being operated at the high end of their temperature specification and when ranging is being performed in strong sunlight. The best case is the reverse situation. The adaptive range threshold feature results in more reliable ranging (fewer false alarms) when noise is elevated and higher sensitivity (further ranging) when noise is reduced, thus maximising the system capability under varying conditions. The threshold is calculated on a "shot-by-shot" basis.

RangePRO laser rangefinder software is easily upgradeable, upgrades can be downloaded in the field via a PC.


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2 SYSTEM SPECIFICATIONS

Notation - use of brackets in tables: [notes & qualifications] (units).

2.1 System Performance

PARAMETER		SPECIFICATION
Control		
Control Functions		all control functions and range data via comms port
Ranging		
Laser Type		Nd:YAG/OPO
Wavelength (nm)		1,565 to 1,575 [1,570 nominal]
Output Energy [per pulse] (mJ)		nominally 8 [up to max. allowable for Class 1M]
Beam Diameter [at exit] (mm)		9
Beam Divergence (mrad)		< 2
Receiver Aperture (mm)		21
Detector		InGaAs with time variant gain
Range Read-out Limits (m)	minimum	50
[factory selectable]	maximum	10,000
Ranging Performance¹	man [0.45x1.8m]	2,000
[Std. Clear ²; max.] (m)	small [1.0x1.0m]	2,500
	vehicle [2.3x2.3m]	4,000
	building (large)	7,500
Range Accuracy [typical] (m)		± 2 [4 rms over 10 shots]
Target Dis-	Lateral [1m² targets @ 2,000m]	≤ 20
crimination (m)	Axial [between 500 & 5,000m]	≤ 20
Ranging Rate (per minute)	typical	5
	max.	12 ppm or intervals of 5 shots at 1 shot/sec rate with cool down period [total duration 30secs]

¹ Target albedo 0.2 @ 1,570nm.

² Standard Clear atmosphere; Extinction Coefficient 0.038 km⁻¹ @ 1,570nm (Beta Spec); sea level visibility = 23.5km.

$$P_R = \frac{P_L \times \tau^2 \times \delta \times D_L^2 \times A_T \times \cos\beta}{4 \times R^2 \times A_L}$$

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PARAMETER	SPECIFICATION
Safety & Protection	
Laser Classification ³ LRF transmitter	Class 1M
Visible Emission Filter	blocking
Visible Emission [@ ≥ 5m]	nil
Audible Emission [@ ≥ 5m]	nil
Support	
MTBF [ground mobile] (shots)	> 150,000
Operational Life (years)	10

2.2 Communications

PARAMETER	SPECIFICATION
Port(s)	one serial port [shared with power input]
Type	RS-422
Data Rate	19,200

2.3 Physical Characteristics

PARAMETER	SPECIFICATION	
Mass [approx.] (g)	365	
Dimensions (mm)	Length [body only]	122
	Length [overall]	127
	Width [body only]	67
	Width [overall]	79
	Height	34.5
Specific Gravity	> 1 [non-floatation]	
Mounting	3-point mount [clearance M3 or tapped M3 holes]; 2x 3mm dia. reference pins ⁴	

³ Australian/New Zealand Standard AS/NZS IEC 60825.1:2011 *Safety of Laser Products - Equipment classification and requirements.*

⁴ Some kinematic isolation should be provided by the installer.

$$P_R = \frac{P_L \times \lambda^2 \times \delta \times D_L^2 \times A_t \times \cos\beta}{4 \times R^2 \times A_L}$$

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2.4 Electrical Requirements

PARAMETER		SPECIFICATION
Supply Voltage [external] (Vdc)		5 to 9 [6 nominal]
Current Drain (mA) [average]	typical [quiet standby]	0.015
	peak [while charging]	0.35 [12 12ppm]

2.5 Environmental

PARAMETER			SPECIFICATION
Temperature (°C)	Operate ⁵	min. ⁶	-32
		max. ⁷	+55
	Survive	min. ⁶	-40
		max. ⁷	+71
Vibration and Shock ⁸			MIL-STD-810F, ground mobile
Sealing ^{8,9}			immersion proof
EMI/EMC ^{8,9}			MIL-STD-461E

2.6 Connector/Pin Details

PARAMETER		SPECIFICATION
Power Input & Comms Port Connection: Connector, Micro D-sub 9 Way		
Purpose		dc power input and RS-422 Serial Comms
Pins	1	+V, dc power in [5A rating]
	2	TX- [signal]
	3	TX+ [signal]
	4	RX+ [signal]
	5	RX- [signal]
	6	GND POWER [5A rating]
	7	GND [Chassis]
	8	RS-422 COMMON
	9	N/C

⁵ With some performance degradation at temperature extremes (TBD).

⁶ Without wind chill.

⁷ Without solar radiation.

⁸ Refer to manufacturer for details.

⁹ With compliant line connectors attached.

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3 OUTLINE DRAWING

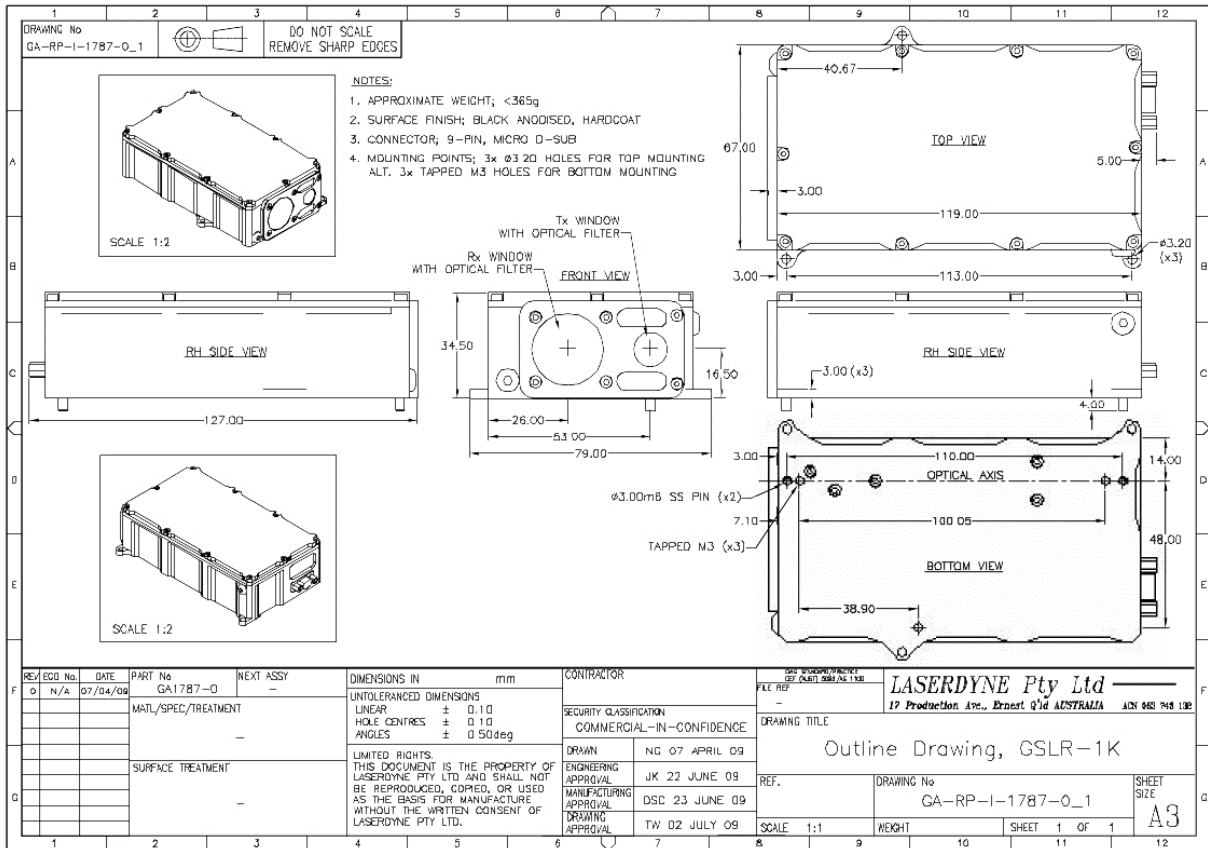


Figure 3-1: Outline Drawing



A Division of Laserdyne Pty Ltd
A.C.N. 053 743 132

17 Production Ave
Molendinar
Queensland 4214
Australia

Tel: (07) 5594 9772 Int'l Tel: 61 7 5594 9772
Fax: (07) 5594 9981 Int'l Fax: 61 7 5594 9981

email: laserdyne@laserdyne.com.au
website: www.laserdyne.com.au

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