

## *RangePRO Model L20LC* Laser Rangefinder Module



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

## *RangePRO Model L20LC* Laser Rangefinder Module

### 1 DESCRIPTION

The RangePRO Model L20LC is an OEM laser rangefinder module providing an advanced digital ranging capability for military, paramilitary and commercial applications.

It integrates with host systems 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 L20LC ranges at low repetition rates over distances to 20km depending on target size, target reflectivity, atmospheric conditions and customer supplied external optics (typically greater than 10km for vehicle type targets).

The system is fitted with an alignment telescope to facilitate alignment and pointing.

The transmitter is a collimated eye-safe laser system. It can provide ranging rates from single shot up to 1Hz bursts.

The unit is fully sealed, purged and backfilled with dry air.

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, its 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.


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

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### 2 SYSTEM SPECIFICATIONS

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

#### 2.1 System Performance

PARAMETER		SPECIFICATION
<b>Control</b>		
<b>Control Functions</b>		all control functions and range data via comms port
<b>Ranging</b>		
<b>Laser Type</b>		Nd:YAG/OPO
<b>Wavelength (nm)</b>		1,565 to 1,575 [1,570 nominal]
<b>Output Energy (mJ)</b>		nominally 8 [up to max. allowable for Class 1M]
<b>Beam Diameter [at exit] (mm)</b>		20
<b>Receiver Aperture (mm)</b>		75
<b>Detector</b>		InGaAs with time variant gain
<b>Range Read-out Limits (m)</b>	minimum	200
	maximum	20,000
<b>Ranging Performance [Standard Clear Atmosphere<sup>1</sup>] (m)</b>	standard [1x1m] <sup>2</sup>	6,500
	vehicle [2.3x2.3m] <sup>3</sup>	10,000
	building [8x8m]	18,000
<b>Range Accuracy (m)</b>		± 5 [4m rms]
<b>Target</b>	Lateral [1m <sup>2</sup> targets at 5,000m]	≤ 20
<b>Discrimination (m)</b>	Axial [between 100 & 5,000m]	≤ 100
<b>Ranging Rate [max.]</b>	single shot (per minute)	10 [continuously]
	burst mode (Hz)	1 <sup>4</sup>

<sup>1</sup> Extinction coefficient = 0.0448km<sup>-1</sup> @ 1,570nm; sea level visibility = 23.5km.

<sup>2</sup> Target albedo = 0.1 (black) @ 1,570nm.

<sup>3</sup> Target albedo = 0.2 @ 1,570nm.

<sup>4</sup> Continuous operation at 1Hz requires appropriate thermal mounting by the integrator. Otherwise operation is at 1Hz at a max. 70% duty cycle, e.g. max. 20s at 1Hz and 9s off. (Refer to manufacturer for modes of operation particular applications.)

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

## RangePRO Model L20LC Laser Rangefinder Module

PARAMETER		SPECIFICATION
<b>Safety &amp; Protection</b>		
Laser Safety Classification <sup>5</sup>		Class 1M
Nominal Hazard Distances for: (m) <sup>3</sup>	eye [NOHD]	< 0
	skin [NSHD]	< 0
Visible Emission Filter		blocking
Visible Emission [@ ≥ 10m]		nil
Audible Emission [@ ≥ 10m]		nil
<b>Support</b>		
MTBF (MIL-HDBK-217FN1)	hours	14,000 in standby (25degC)
	laser shots	> 500,000
Operational Life (years)		10
Reliability % (100hrs)		99.3

### 2.2 Communications

PARAMETER	SPECIFICATION
Port(s)	One Serial port [shared with power input]
Type	RS-232 or RS-422 bidirectional [customer specified]
Data Format	8 bit; no parity
Data Rate (Baud)	9,600 [others on request]
Data Sent	Range [diagnostics optional]

### 2.3 Physical Characteristics

PARAMETER	SPECIFICATION	
Mass [approx.] (kg)	3.4	
Dimensions [approx.] (mm) <sup>6</sup>	Length	273
	Width	143
	Height	80.3
Specific Gravity	> 1 [non-floatation]	
Mounting	3-point mount	

<sup>5</sup> Australian/New Zealand Standard AS/NZS 2211.1:1997 *Laser Safety Part 1: Equipment classification, requirements and user's guide.*

<sup>6</sup> Excluding connectors, mounting feet or optional telescope.

## *RangePRO Model L20LC* Laser Rangefinder Module

### 2.4 Electrical Requirements

PARAMETER		SPECIFICATION
Supply Voltage [external] (Vdc)		12 to 32 [28 nominal]
Power Consumption (W)	typical (standby)	< 1
	peak (while charging)	< 12

### 2.5 Environmental

PARAMETER			SPECIFICATION
Temperature (°C)	Operate	min.	-20
		max.	+44 [plus 1,120Wm <sup>-2</sup> solar radiation]
	Survive	min.	-46
		max.	+70
Vibration and Shock <sup>7</sup>			MIL-STD-810E, wheeled vehicle
Sealing <sup>8</sup>			immersion proof
EMI/EMC <sup>7,8</sup>			MIL-STD-461D
Resistance to Contaminants			ARMY(AUST) 6656, para. 3.2.2.5

### 2.6 Connector/Pin Details

PARAMETER		SPECIFICATION	
<b>Connector A: Power Input &amp; Comms Port Connection:</b> Connector, MilSpec, Panel, Plug, Bayonet, 8 Way, 12 Shell, Pattern 105, square flange, Mil-C26482, MS3112E12-8P			
Purpose		dc power input and Serial Comms	
Pins		if RS-232	if RS-422
	A	+V, dc power in	
	B	TX	TX+
	C	GND	TX-
	D	RX	RX+
	A	GND	RX-
	B	GND POWER	
	C	GND CHASSIS	
	D	unused	

<sup>7</sup> Refer to manufacturer for details.

<sup>8</sup> With compliant line connectors attached.

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

## *RangePRO Model L20LC* Laser Rangefinder Module

### 3 SET-UP

#### 3.1 Mounts

The RangePRO has three mounting points, being M6 tapped holes, 6.5mm deep, located on the underside of the module. All three should be used when mounting the module.

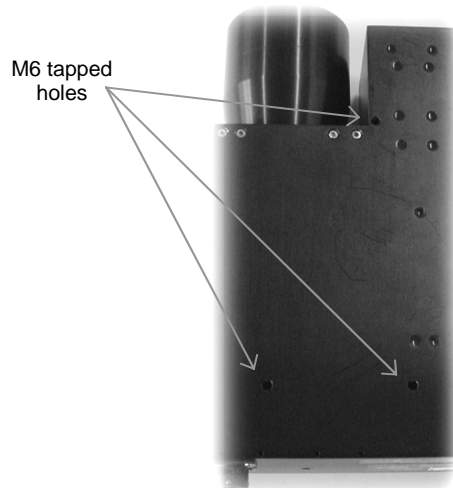


Figure 3-1: Mounts

#### 3.2 Connections

**CAUTION:** do not connect or disconnect when external power is applied;  
user-supplied connections must be correctly wired (see Connector/Pin Details).

The RangePRO has one connection point, being an 8 Way MilSpec panel plug on the rear of the module. Connect the appropriate user-supplied cable to this connector.



Figure 3-2: Connections

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

## RangePRO Model L20LC Laser Rangefinder Module

### 4 OUTLINE DRAWINGS

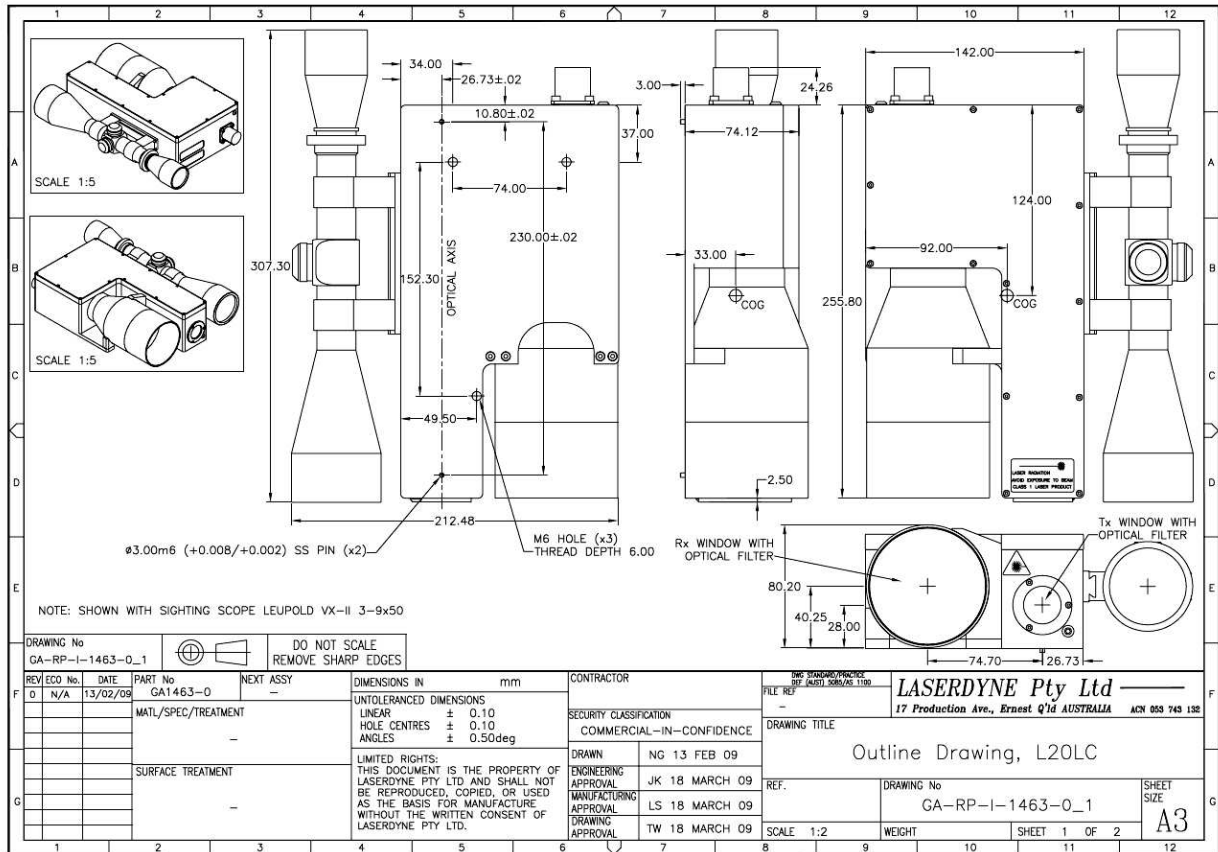


Figure 4-1: Outline Drawing



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