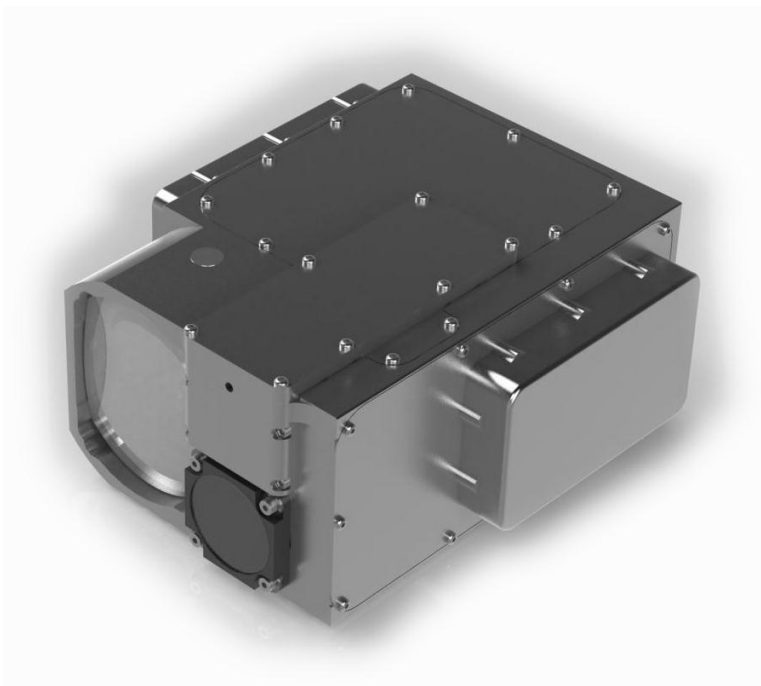


## *RangePRO Model HPCL-20K0* Laser Rangefinder Module



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## ***RangePRO Model HPCL-20KO* Laser Rangefinder Module**

### **1 DESCRIPTION**

The RangePRO Model HPCL-20KO is a very compact OEM laser rangefinder module providing an advanced digital rangefinding capability for military, paramilitary and commercial applications. All assemblies are integrated onto a precision bore-sighted platform. It offers higher performance than the smaller HPCL-10KO model, while remaining a spatially economic package.

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 HPCL-20KO ranges at low repetition rates over distances to 30km depending on target size, target reflectivity, atmospheric conditions and customer supplied external optics (typically up to 12km for a vehicle type target).

The transmitter is a collimated eye-safe laser system. It can provide ranging rates from single shot up to 40 per minute, depending on ambient temperature.

The receiver incorporates an APD detector for maximum sensitivity.

The unit is an open frame construction type, unsealed for environmental purposes but enclosed for EM shielding.

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.

## *RangePRO Model HPCL-20K0* Laser Rangefinder Module

### 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 [per pulse] (mJ)</b>		nominally 8 [up to max. allowable for Class 1M]
<b>Beam Divergence [full angle; typical] (mrad)</b>		<1
<b>Beam Diameter [at exit] (mm)</b>		23
<b>Receiver Aperture [main] (mm)</b>		equivalent 50mm
<b>Detector [main]</b>		APD with time variant gain
<b>Range Read-out Limits (m) [factory selectable]</b>	min.	100
	max.	30,000
<b>Ranging Performance<sup>1</sup> [Std. Clear<sup>2</sup>; max.] (m)</b>	man [0.45x1.8m]	> 7,500
	vehicle [2.3x2.3m]	12,000
	building [large]	26,000
<b>Extinction Ratio<sup>3</sup> (dB)</b>		45.1
<b>Range Accuracy [typical] (m)</b>		± 2 [4 rms over 10 shots]
<b>Target Discrimination (m)</b>	Lateral [1m <sup>2</sup> targets @ 5,000m]	≤ 10
	Axial [between 500 & 5,000m]	≤ 20
<b>Ranging Rate (per minute)</b>	typical	10
	max. <sup>4</sup>	intervals of 20 shots at 1Hz with cool down period [total duration 30secs]

<sup>1</sup> Target albedo 0.3 @ 1,570nm.

<sup>2</sup> Standard clear atmosphere; extinction coefficient 0.038 km<sup>-1</sup> @ 1,570nm (Beta Spec); sea level visibility = 23.5km.

<sup>3</sup> Target range 1000m; target albedo 100%; target size large; standard clear atmosphere; probability of detection 90%.

<sup>4</sup> At room temperature. A longer cool down period (TBD) will be required at high temperature.

## *RangePRO Model HPCL-20K0* Laser Rangefinder Module

PARAMETER	SPECIFICATION
<b>Safety &amp; Protection</b>	
Laser Classification <sup>5</sup>	Class 1M
Visible Emission Filter	blocking
Visible Emission [@ ≥ 5m]	nil
Audible Emission [@ ≥ 5m]	nil
<b>Support</b>	
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) {lb}	800	
Dimensions (mm) {in}	length [body]	131
	width [body]	114.5
	height [body]	65
Mounting	rear	3-point rear mount, tapped M4 holes (7.5mm deep); 2 x 3mm dia. holes for guide pins <sup>6,7</sup>
	front	tapped M3 hole (5.0mm deep)

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

<sup>6</sup> Some kinematic isolation is recommended to be provided by the installer.

<sup>7</sup> Tapped mounting holes and mechanical interface surfaces are electrically conductive.

## *RangePRO Model HPCL-20K0* Laser Rangefinder Module

### 2.4 Electrical Requirements

PARAMETER		SPECIFICATION	
Supply Voltage [external] (Vdc)		9 to 30	
Current Drain @ 12VDC (A) [average]	standby mode	< 0.02	
	firing	at 0.2Hz	< 0.6
		at 1Hz	< 1
	low power mode	< 0.02	

### 2.5 Environmental

PARAMETER		SPECIFICATION	
Temperature (°C)	Operate <sup>8</sup>	min. <sup>9</sup>	-32
		max. <sup>10,11</sup>	+65
	Survive	min. <sup>9</sup>	-40
		max. <sup>10</sup>	+85
Vibration and Shock <sup>12</sup>		MIL-STD-810F, ground mobile	
EMI/EMC		unit is enclosed in EM shield/cover	

### 2.6 Connector/Pin Details

PARAMETER		SPECIFICATION
Power & Comms Connection: D-Sub Connector, Panel, Plug, 9 Way		
Pins	1	RS-422 Rx+ (LRF input)
	2	RS-422 Rx- (LRF input)
	3	not used
	4	RS-422 Tx+ (LRF output)
	5	RS-422 Tx- (LRF output)
	6	not used
	7	V in (+) (DC power)
	8	V in (-) (GND / 0V)
	9	not used

<sup>8</sup> With some performance degradation at temperature extremes (TBD).

<sup>9</sup> Without wind chill.

<sup>10</sup> Without solar radiation.

<sup>11</sup> Limited operation at higher temperature (TBD) with further degradation of performance.

<sup>12</sup> Refer to manufacturer for details.

# Product Specification

## RangePRO Model HPCL-20K0 Laser Rangefinder Module

### 3 OUTLINE DRAWING

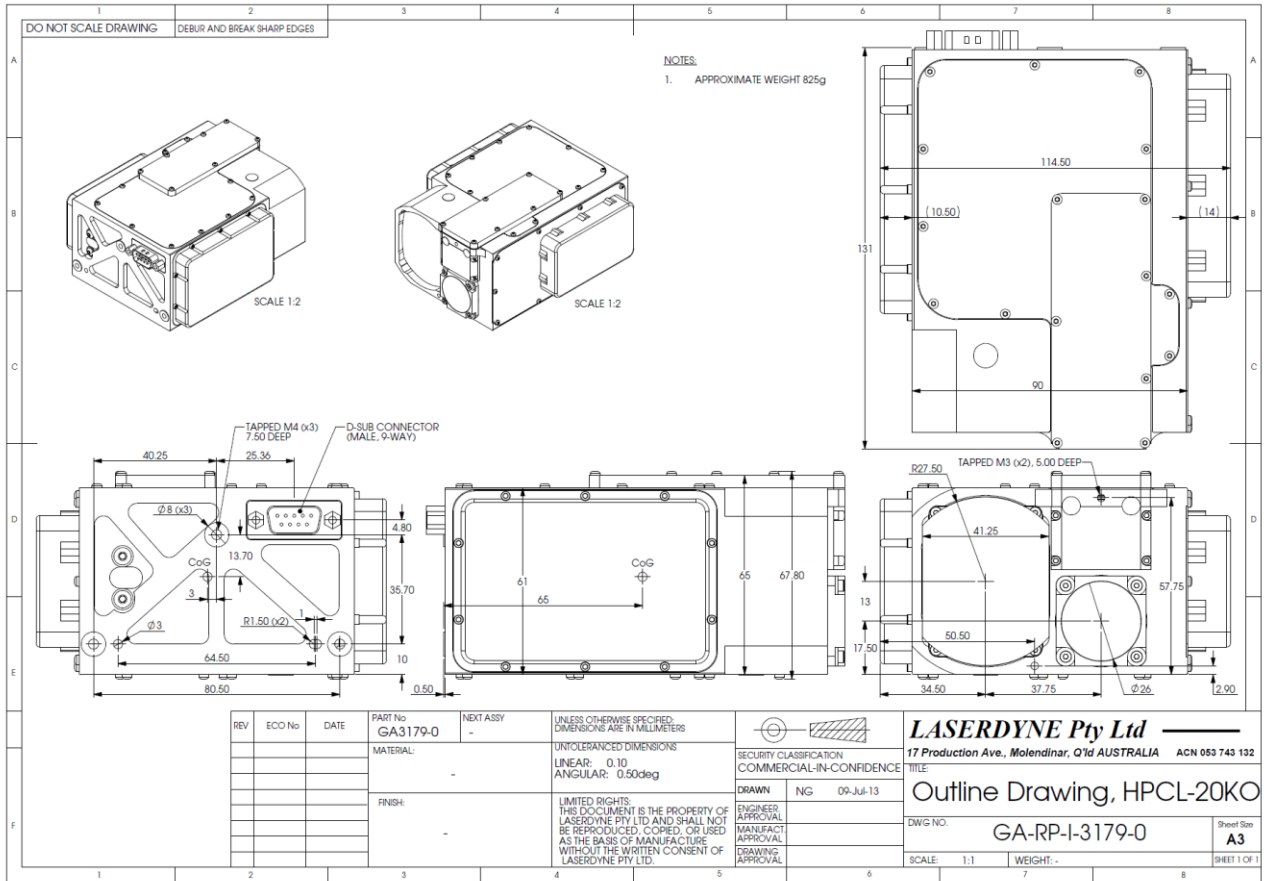


Figure 3-1: Outline Drawing



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

**P.O. Box 6541**    **17 Production Ave**  
**GCMC Bundall**    **Molendinar**  
**Queensland 9726**    **Queensland 4214**  
**Australia**    **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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