

# Continuous-Wave (CW) Single-Frequency IR Laser

NPRO® 125/126 Series



The Lumentum NPRO 125/126 diode-pumped lasers produce continuous-wave (CW), single-frequency output at either 1064 nm or 1319 nm. Key features include fiber-optic or free-space output, narrow linewidth, low noise, frequency tunability, and adjustable power.

The NPRO 125/126 lasers are used for a variety of applications including fiber-optic sensing, coherent communications, remote antenna links, optical heterodyne, lidar oscillators, and passive sonar.

At the heart of each NPRO 125/126 laser is the unique Lumentum, monolithic NPRO laser cavity that delivers true single-frequency laser output. Since its initial development in 1985, NPRO technology has a record of reliability and top-level performance.

Amplitude noise for a typical NPRO 125/126 laser is <0.05 percent rms over the range from 10 Hz to 2 MHz, and less than -165 dB/Hz above 10 MHz (shot-noise limited). This performance is achieved by combining an inherently quiet laser oscillator with a noise reduction circuit, which effectively eliminates the laser's natural relaxation oscillation.

NPRO lasers are built in a compact, OEM-friendly package with all necessary control electronics on the laser head to integrate easily with existing systems or new product platforms.

#### **Key Features**

- 1319 or 1064 nm outputs available
- Fiber-coupled output
- Proven nonplanar ring oscillator (NPRO) design
- Superior power stability
- Narrow linewidth
- Tunability
- Ease of use
- Ideal for OEM applications

#### **Applications**

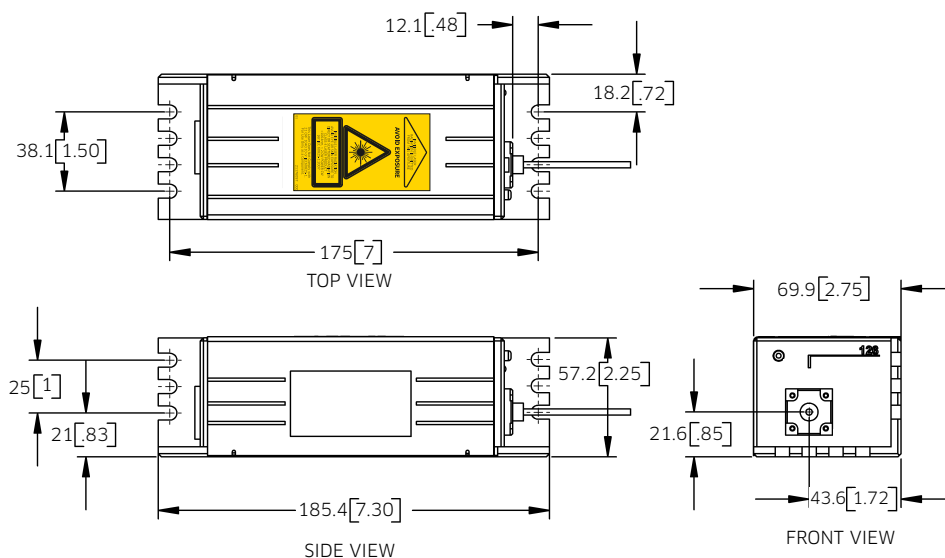
- Fiber optic sensing
- Coherent communications
- Remote antenna links
- Optical heterodyne
- Lidar oscillator
- Passive sonar

#### **Compliance**

- TUV SUD
- CE

## NPRO 125 Laser Head

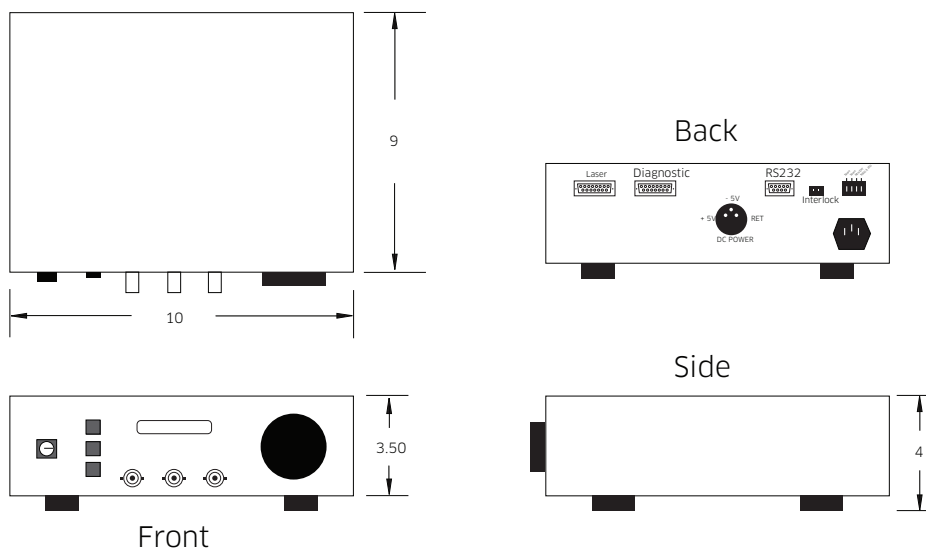
(Specifications in mm (in) unless otherwise noted.)



## Power Supply

(Specifications in inches unless otherwise noted.)

(M125/6-OPN-PS)



**NPRO 125 Specifications<sup>1</sup>**

Parameter	125N-1319-xxx	125N-1064-xxx
Wavelength	1319 nm	1064 nm
CW power	≥100, 150, 200 mW	≥25 mW
Spatial mode	TEM <sub>00</sub>	TEM <sub>00</sub>
Longitudinal mode	Single frequency	Single frequency
Linewidth	<5 kHz/ms	<5 kHz/ms
Coherence length, calculated	>1000 m	>1000 m
Frequency drift <sup>2</sup>	<50 MHz/hr	<50 MHz/hr
Amplitude noise, 10 Hz to 2 MHz	<0.05% rms	<0.05% rms
Power drift over 8 hours <sup>3</sup>	<5% peak-to-peak	<5% peak-to-peak
Thermal tuning range, continuous	>10 GHz	>10 GHz
Thermal tuning range, total	>30 GHz	>30 GHz
Thermal tuning rate	>1 GHz/s	>1 GHz/s
Piezo tuning range, 0 to 100 V	>30 MHz	>30 MHz
Piezo response bandwidth, small signal	>30 kHz	>30 kHz
Warm-up time, from cold start (AC off)	1 min.	1 min.
Dimensions		
Laser head size (w x h x d)	69.9 x 57.2 x 185.4 mm	69.9 x 57.2 x 185.4 mm
Weight	1.2 kg (2.65 lbs)	1.2kg (2.65 lbs)
<b>Fiber optic</b>		
Fiber supplier and part number	Fujikura SM13-P7/125-UV/UV-400	3M FS-PM-5121
Fiber pigtail length	>2 m	>2 m
Fiber pigtail connector alignment	FC/PC, key parallel to slow axis	FC/APC, key parallel to slow axis
Polarization, linear	>30:1, parallel to connector key	>30:1, parallel to connector key
Mode field diameter, NA	9.5 μm, 0.11	7.2 μm, 0.11

1. Fiber-coupled output.

2. Base temperature is constant to within &lt;2°C, total range, after a 30-minute warm-up.

3. Base temperature is constant to within &lt;5°C, total range, after a 30-minute warm-up.

**NPRO 126 Specifications<sup>1</sup>**

Parameter	126N-1319-xxx	126N-1064-xxx
Wavelength	1319 nm	1064 nm
CW power	≥100, 250, 350, 500 mW	≥100, 200, 500, 700 mW
Spatial mode	TEM <sub>00</sub>	TEM <sub>00</sub>
Longitudinal mode	Single frequency	Single frequency
Linewidth	<5 kHz/ms	<5 kHz/ms
Coherence length, calculated	>1000 m	>1000 m
Frequency drift <sup>2</sup>	<50 MHz/hr	<50 MHz/hr
Amplitude noise, 10 Hz to 2 MHz	<0.05% rms	<0.05% rms
Power drift over 8 hours <sup>3</sup>	<5% peak-to-peak	<5% peak-to-peak
Thermal tuning range, continuous	>10 GHz	>10 GHz
Thermal tuning range, total	>30 GHz	>30 GHz
Thermal tuning rate	>1 GHz/s	>1 GHz/s
Piezo tuning range, 0 to 100 V	>30 MHz	>30 MHz
Piezo response bandwidth, small signal	>30 kHz	>30 kHz
Polarization	100:1, vertical	100:1, vertical
Beam roundness	<20% elliptical	<20% elliptical
Waist location, from shutter housing	5 cm nominal outside laser	5 cm nominal outside laser
Waist diameter, 1/e <sup>2</sup> Vertical Horizontal	0.35 mm nominal 0.46 mm nominal	0.38 mm nominal 0.50 mm nominal
Beam divergence, full angle Vertical Horizontal	3.9 mrad nominal 3.0 mrad nominal	4.4 mrad nominal 3.4 mrad nominal
Warm-up time, from cold start (AC off)	1 min.	1 min.
Dimension Laser head size (W x H x D) Weight	69.9 x 57.2 x 185.4 mm 1.2 kg (2.65 lbs)	69.9 x 57.2 x 185.4 mm 1.2kg (2.65 lbs)

1. Free-space output.

2. Base temperature is constant to within <2°C, total range, after a 30-minute warm-up.

3. Base temperature is constant to within <5°C, total range, after a 30-minute warm-up.

**NPRO 12x Integration Requirements**

Parameter	Specification
<b>Input and Ambient</b>	
Voltage, frequency	100 to 240 V AC, 47 to 63 Hz
Power	<550 W (400 W typical)
Operating ambient temperature	15 to 35°C
Relative humidity, noncondensing	10 to 80%
Storage temperature	-20 to 55°C
Altitude (operating/non-operating)	0 to 10,000 ft/0 to 70,000 ft

**Ordering Information**

For more information on this or other products and their availability, please contact your local Lumentum account manager or Lumentum directly at [customer.service@lumentum.com](mailto:customer.service@lumentum.com).

**Laser Head**

Product Code	Description
M125N-1319-100	NPRO 125, CW fiber-coupled, 1319 nm, 100 mW laser head
M125N-1319-150	NPRO 125, CW fiber-coupled, 1319 nm, 150 mW laser head
M125N-1319-200	NPRO 125, CW fiber-coupled, 1319 nm, 200 mW laser head
M125N-1064-025	NPRO 125, CW fiber-coupled, 1064 nm, 25 mW laser head
M126N-1064-100	NPRO 126, CW free-space, 1064 nm, 100 mW laser head
M126N-1064-200	NPRO 126, CW free-space, 1064 nm, 200 mW laser head
M126N-1064-500	NPRO 126, CW free-space, 1064 nm, 500 mW laser head
M126N-1064-700	NPRO 126, CW free-space, 1064 nm, 700 mW laser head
M126N-1319-100	NPRO 126, CW free-space, 1319 nm, 100 mW laser head
M126N-1319-250	NPRO 126, CW free-space, 1319 nm, 250 mW laser head
M126N-1319-350	NPRO 126, CW free-space, 1319 nm, 350 mW laser head
M126N-1319-500	NPRO 126, CW free-space, 1319 nm, 500 mW laser head

**Power Supply**

Product Code	Description
M125/6-OPN-PS	Microprocessor-based

## Safety Labels



**Class 3B 1319 nm**  
M125N-1319-100  
M125N-1319-150  
M125N-1319-200  
M126N-1319-100  
M126N-1319-250  
M126N-1319-350



**Class 4 1319 nm**  
M126N-1319-500



**Class 4 1064 nm**  
M126N-1064-500  
M126N-1064-700



**Class 3B 1064 nm**  
M125N-1064-025  
M126N-1064-100  
M126N-1064-200



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