

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 JDSU, 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

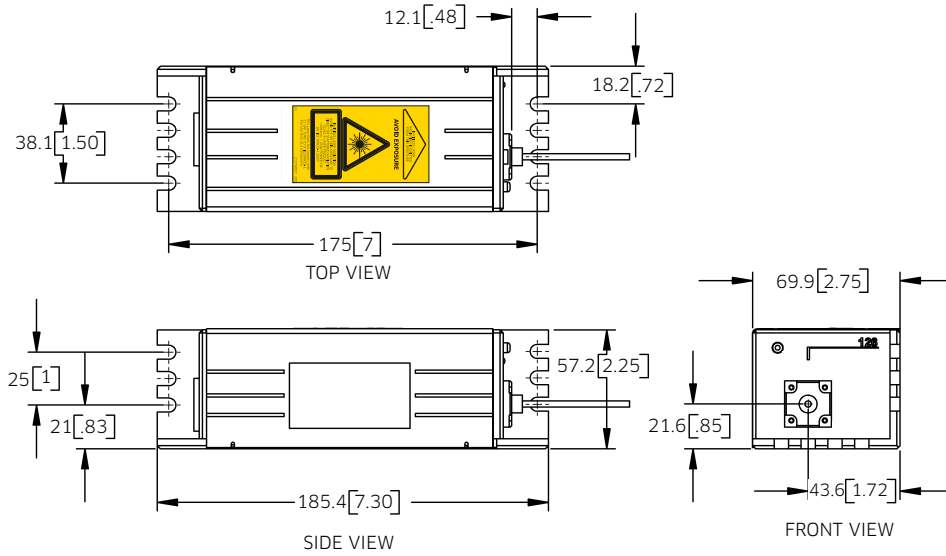
- 1319 or 1064 nm outputs available
- Fiber-coupled output
- Proven nonplanar ring oscillator (NPRO) design
- Superior power stability
- Narrow linewidth
- Tunability
- Ease of use
- Ideal for OEM applications

Applications

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

NPRO 125 Laser Head

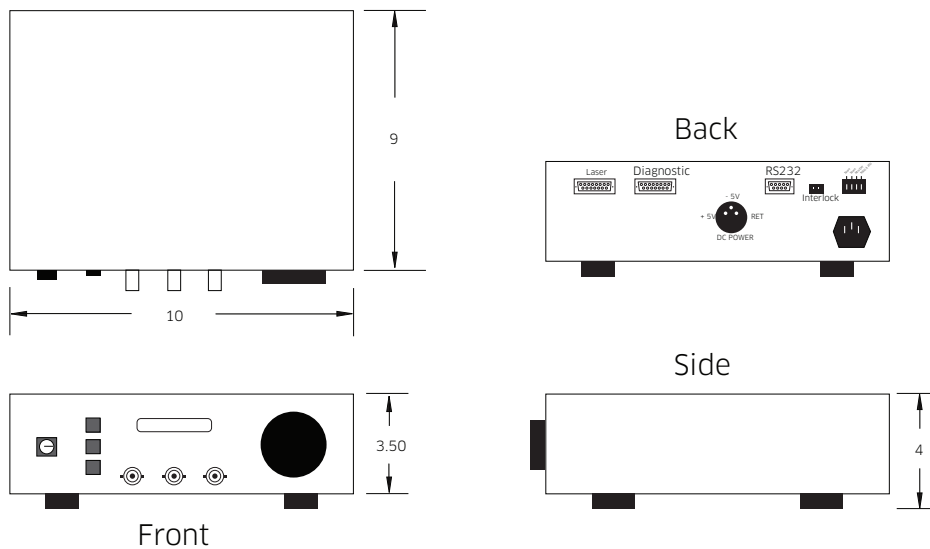
(Specifications in mm (in) unless otherwise noted.)



Power Supply

(Specifications in inches unless otherwise noted.)

(M125/6-OPN-PS)



NPRO 125 Specifications¹

| Parameter | 125N-1319-xxx | 125N-1064-xxx |
|--|----------------------------------|----------------------------------|
| Wavelength | 1319 nm | 1064 nm |
| CW power | ≥100, 150, 200 mW | ≥25 mW |
| Spatial mode | TEM ₀₀ | TEM ₀₀ |
| Longitudinal mode | Single frequency | Single frequency |
| Linewidth | <5 kHz/ms | <5 kHz/ms |
| Coherence length, calculated | >1000 m | >1000 m |
| Frequency drift ² | <50 MHz/hr | <50 MHz/hr |
| Amplitude noise, 10 Hz to 2 MHz | <0.05% rms | <0.05% rms |
| Power drift over 8 hours ³ | <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) |
| Fiber optic | | |
| 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/PC, 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 <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 126 Specifications¹

| 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 ₀₀ | TEM ₀₀ |
| Longitudinal mode | Single frequency | Single frequency |
| Linewidth | <5 kHz/ms | <5 kHz/ms |
| Coherence length, calculated | >1000 m | >1000 m |
| Frequency drift ² | <50 MHz/hr | <50 MHz/hr |
| Amplitude noise, 10 Hz to 2 MHz | <0.05% rms | <0.05% rms |
| Power drift over 8 hours ³ | <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 ² | | |
| Vertical | 0.35 mm nominal | 0.38 mm nominal |
| Horizontal | 0.46 mm nominal | 0.50 mm nominal |
| Beam divergence, full angle | | |
| Vertical | 3.9 mrad nominal | 4.4 mrad nominal |
| Horizontal | 3.0 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) | 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) |

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 |
|------------------------------------|-------------------------------|
| Input and Ambient | |
| 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.

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



North America
Toll Free: 844 810 LITE (5483)

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