

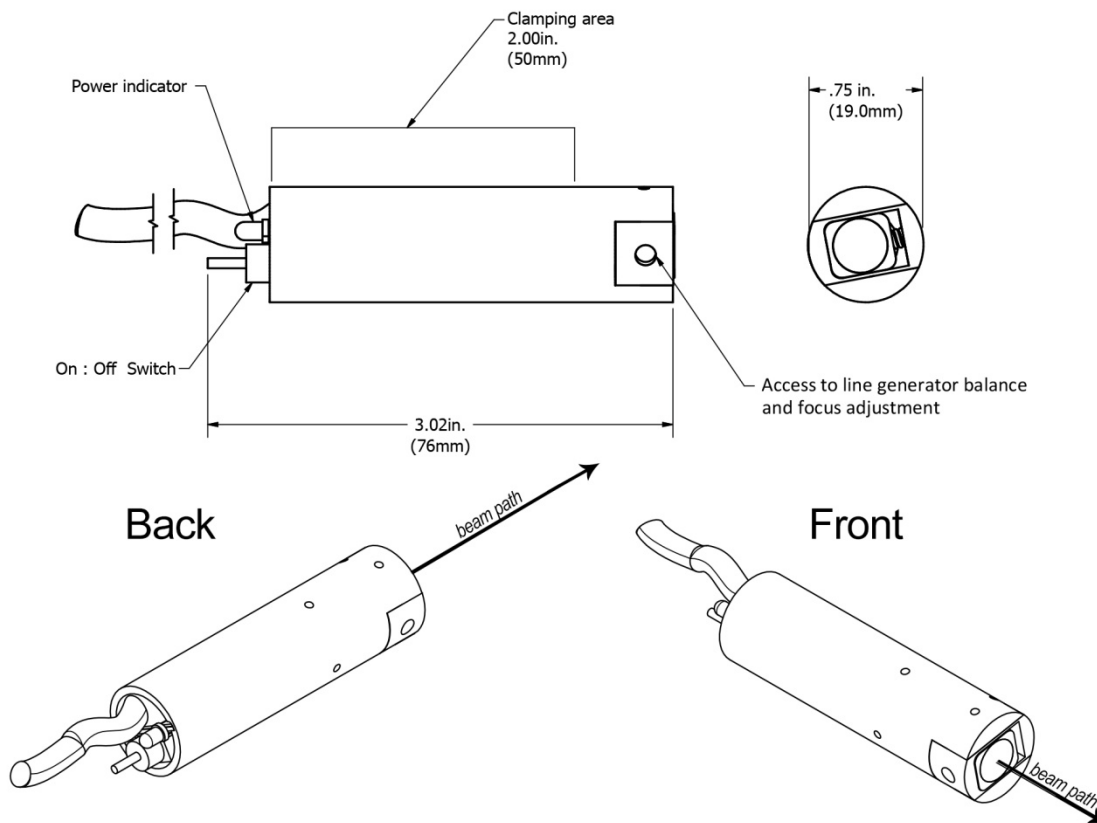
Operating Instructions for PNF Laser Diode Module

General Operating Instructions

Introduction

The PNF™ Series lasers can deliver from 0.1mW to 200mW of output power with a wavelength range between 375nm and 2330nm. Additional design features include uniform intensity (non-Gaussian) line generators, unique Variable Focus™ Technology, high wavelength stability, high optical power stability, and CW or optional digital/analog modulation. The PNF boasts the highest output power and fastest modulation speeds of any similar laser module on the market today. The PNF Series of Machine Vision lasers can be configured for optimal performance at close or long range.

PTI's unique Variable Focus Technology allows the user to calibrate the focus of the module and then re-tune the line generator for optimal performance. The PNF Series of high-power light lasers are uniquely engineered to ensure that even the most demanding requirements can be addressed.



Installation

Do not mount the laser in a thermal insulating material, such as foam plastic. Heat can have adverse effect on laser diodes including decreased output power and large shift in wavelengths. The lifetime of the laser can also be shortened. Lasers below 5mW may not need a heat sink. For best heat dissipation, use a Power Technology's Model MB8 multi-directional XY mounting bracket. It features 34° of alignment freedom on both X and Y axes while pivoting around the centerline of the laser module. If the system is to be run at or near the maximum rated input voltage AND maximum current rating, the use of a heat sink is recommended. A heat sink is always recommended for operating temperatures above 25°C. Mounting brackets are available for all PNF laser modules. Simply ask your sales engineer for more information.



The operating voltage for this Red and Infrared laser module is from 3.3 VDC to 9 VDC. For ultraviolet, violet, blue and green lasers the input voltage is 8VDC. Positive power should be applied to the modules RED wire, and the BLACK wire should be connected to GROUND. If you ordered modulation, the laser will be equipped with a BNC connector. Consult the chart below for the option that you ordered:

Model Code	Description	Input
D	Digital Modulation	0-5VDC, HIGH is ON
DI	Digital Modulation, Inverted Input	0-5VDC, LOW is ON
DH	Digital Modulation, High Speed	0-5VDC, HIGH is ON
DIH	Digital Modulation, High Speed, Inverted Input	0-5VDC, LOW is ON
A	Analog Modulation	0-5VDC, HIGH is ON
AI	Analog Modulation, Inverted Input	0-5VDC, LOW is ON

If the label attached to the laser module reads, "This product complies with 21CFR 1040.10 and 1040.11 IEC60825-1 AM2:2001," a permanently installed switch at the power source will be required to retain the module's certification as a laser system. This certification is void if the unit is enclosed, or otherwise inaccessible, if the labels are modified or removed, or if the system is permanently connected (i.e. soldered, etc.) directly to the power source with the required switch. Modifying the laser will void the CDRH certification, if the distance between the laser head and the power source switch exceeds 2 meters, and an emissions indicator must be mounted near the switch.

Operating Procedures & Control Description

The PNF laser module features an optical power user adjustment. The optical power can be turned ON and OFF via a toggle switch located on the back of the module. Toggle the switch to ON for emission and toggle the switch to OFF to power down the unit.

Focusing

The laser can be focused to a spot at various distances using the supplied spanner wrench included with the unit. To access the focusing area of the module, loosen the two Allen screws on the optics end of the laser. The two screws will be on opposite sides. Once loosened, the line optics holder will hinge outward. **Caution: The lasers full power is now contained in the laser beam. This could be a significant amount of power. Take care and do not point the laser at anyone.** Using the provided spanner wrench, adjust the laser to the desired spot size that meets the requirements for your particular application. Rotate the lens counter-clock wise to make the focal distance shorter Rotate the lens clockwise to make the focal distance longer. Once desired focusing distance is accomplished, close the line optics holder and tighten screws to hold in place. A 3/32 allen wrench is used to adjust position of the line generating lens. Adjust this flat head screw after focusing to re-center the line lens on the laser beam. It is often necessary to re-align the laser module after focusing. While adjusting the screw, watch the optical power distribution on the laser line. You will need to balance the power distribution across the line.

Care should be taken when focusing or cleaning the optics to prevent damage. Reflections onto the internal photodiode from the lens are a vital part of the feedback loop. This photodiode is very sensitive to these reflections. Any adjustment of the lens outside the normal focusing range (beam divergence to beam convergence) will change the amount of reflections, thereby changing feedback characteristics. Therefore, adjusting the focus with the module at full power may destroy the laser diode. Also, reducing the amount of reflections (i.e. removing the lens) may result in destruction of the laser diode due to excessive current.



Maintenance & Service

This laser module contains no user serviceable parts. Depending on environmental conditions, the optics may require occasional cleaning. Use of clean, compressed air is recommended to blow the optics clean. If compressed air fails, clean lens carefully with isopropyl alcohol or high purity acetone and a lint free rag or cotton swab.

Warranty and Repair Return Policy

For systems that incorporate a centering option, adjustment of the centering set-screws will void the diode warranty and possibly the warranty on the entire laser system since damage to the diode is easily achievable.

No return of merchandise will be accepted by PTI without an RMA (Return Material Authorization) number, issued by the factory and prominently displayed on the return package.

No return shipments will be accepted "Collect" or "COD". On warranty returns, PTI will pay for shipping charges on return of merchandise to the customer.

When contacting the factory for an RMA number, please have the following information available: model number, serial number, and a description of the problem.

Laser Safety

Caution: Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.







Caution: The use of optical instruments with this product will increase eye hazard. Do not shine the laser in the direction of other people or at reflective surfaces that might cause exposure to the human eye. Do not mount the laser at eye level.

Modifications that affect any aspect of the product's performance or intended functions will require re-certification and re-identification of the product in accordance with the provisions of 21CFR 1040.10 and 1040.11. A copy of 21CFR 1040.10 and 1040.11 can be downloaded from www.powertechnology.com.

The product labels shown below can typically be found near the output optics.

<p style="text-align: center;">Class 1 Laser: Class 1 Laser Product</p> <p><input type="checkbox"/> Component</p> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p>MAX Power: mW Wavelength: nm</p> <p>AVOID EXPOSURE - LASER RADIATION IS EMITTED FROM THIS APERTURE</p> <p>Model No: Serial No: Mfg Date:</p> <p>DOES NOT comply with 21 CFR 1040.10 and 1040.11 (EC60825-1 AM2:2001)</p> <p>CLASS 1 LASER PRODUCT</p> <p style="text-align: right;">Power Technology Incorporated Alexander, AR USA</p> </div> <p><input type="checkbox"/> System</p> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p>MAX Power: mW Wavelength: nm</p> <p>AVOID EXPOSURE - LASER RADIATION IS EMITTED FROM THIS APERTURE</p> <p>Model No: Serial No: Mfg Date:</p> <p>Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated 7/2001</p> <p>CLASS 1 LASER PRODUCT</p> <p style="text-align: right;">Power Technology Incorporated Alexander, AR USA</p> </div> <p style="text-align: center;">One of the above labels is attached to the laser head.</p>	<p style="text-align: center;">Class 1M Laser: Laser Radiation, Do not view directly with optical instruments</p> <p><input type="checkbox"/> Component</p> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p>MAX Power: mW Wavelength: nm</p> <p>AVOID EXPOSURE - LASER RADIATION IS EMITTED FROM THIS APERTURE</p> <p>Model No: Serial No: Mfg Date:</p> <p>DOES NOT comply with 21 CFR 1040.10 and 1040.11 (EC60825-1 AM2:2001)</p> <p>LASER RADIATION DO NOT VIEW DIRECTLY WITH OPTICAL INSTRUMENTS CLASS 1M LASER PRODUCT</p> <p style="text-align: right;">Power Technology Incorporated Alexander, AR USA</p> </div> <p><input type="checkbox"/> System</p> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p>MAX Power: mW Wavelength: nm</p> <p>AVOID EXPOSURE - LASER RADIATION IS EMITTED FROM THIS APERTURE</p> <p>Model No: Serial No: Mfg Date:</p> <p>Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated 7/2001</p> <p>LASER RADIATION DO NOT VIEW DIRECTLY WITH OPTICAL INSTRUMENTS CLASS 1M LASER PRODUCT</p> <p style="text-align: right;">Power Technology Incorporated Alexander, AR USA</p> </div> <p style="text-align: center;">One of the above labels is attached to the laser head.</p>	<p style="text-align: center;">Class 2 Laser: Laser Radiation, Do not stare into beam</p> <p><input type="checkbox"/> Component</p> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p>MAX Power: mW Wavelength: nm</p> <p>AVOID EXPOSURE - LASER RADIATION IS EMITTED FROM THIS APERTURE</p> <p>Model No: Serial No: Mfg Date:</p> <p>DOES NOT comply with 21 CFR 1040.10 and 1040.11 (EC60825-1 AM2:2001)</p> <p>LASER RADIATION DO NOT STARE INTO BEAM CLASS 2 LASER PRODUCT</p> <p style="text-align: right;">Power Technology Incorporated Alexander, AR USA</p> </div> <p><input type="checkbox"/> System</p> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p>MAX Power: mW Wavelength: nm</p> <p>AVOID EXPOSURE - LASER RADIATION IS EMITTED FROM THIS APERTURE</p> <p>Model No: Serial No: Mfg Date:</p> <p>Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated 7/2001</p> <p>LASER RADIATION DO NOT STARE INTO BEAM CLASS 2 LASER PRODUCT</p> <p style="text-align: right;">Power Technology Incorporated Alexander, AR USA</p> </div> <p style="text-align: center;">One of the above labels is attached to the laser head.</p>
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<p align="center">Class 2M Laser: Laser Radiation, Do not stare into the beam or view directly with optical instruments</p> <p><input type="checkbox"/> Component</p> <div style="border: 1px solid black; padding: 2px;"> <p>MAX Power: mW Wavelength: nm DOES NOT comply with 21 CFR 1040.10 and 1040.11 IEC60825-1 AM2:2001</p> <p>AVOID EXPOSURE - LASER RADIATION IS EMITTED FROM THIS APERTURE</p> <p>Model No: Serial No: Mfg Date:</p>  <p>Power Technology Incorporated Alexander, AR USA</p> </div> <p><input type="checkbox"/> System</p> <div style="border: 1px solid black; padding: 2px;"> <p>MAX Power: mW Wavelength: nm Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated 7/2001</p> <p>AVOID EXPOSURE - LASER RADIATION IS EMITTED FROM THIS APERTURE</p> <p>Model No: Serial No: Mfg Date:</p>  <p>Power Technology Incorporated Alexander, AR USA</p> </div> <p align="center">One of the above labels is attached to the laser head.</p>	<p align="center">Class 3R Laser: Laser Radiation, Avoid direct eye exposure</p> <p><input type="checkbox"/> Component</p> <div style="border: 1px solid black; padding: 2px;"> <p>MAX Power: mW Wavelength: nm DOES NOT comply with 21 CFR 1040.10 and 1040.11 IEC60825-1 AM2:2001</p> <p>AVOID EXPOSURE - LASER RADIATION IS EMITTED FROM THIS APERTURE</p> <p>Model No: Serial No: Mfg Date:</p>  <p>Power Technology Incorporated Alexander, AR USA</p> </div> <p><input type="checkbox"/> System</p> <div style="border: 1px solid black; padding: 2px;"> <p>MAX Power: mW Wavelength: nm Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated 7/2001</p> <p>AVOID EXPOSURE - LASER RADIATION IS EMITTED FROM THIS APERTURE</p> <p>Model No: Serial No: Mfg Date:</p>  <p>Power Technology Incorporated Alexander, AR USA</p> </div> <p align="center">One of the above labels is attached to the laser head.</p>	<p align="center">Class 3B Laser: Laser Radiation, Avoid exposure to beam</p> <p><input type="checkbox"/> Component</p> <div style="border: 1px solid black; padding: 2px;"> <p>MAX Power: mW Wavelength: nm DOES NOT comply with 21 CFR 1040.10 and 1040.11 IEC60825-1 AM2:2001</p> <p>AVOID EXPOSURE - LASER RADIATION IS EMITTED FROM THIS APERTURE</p> <p>Model No: Serial No: Mfg Date:</p>  <p>Power Technology Incorporated Alexander, AR USA</p> </div> <p><input type="checkbox"/> System</p> <div style="border: 1px solid black; padding: 2px;"> <p>MAX Power: mW Wavelength: nm Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated 7/2001</p> <p>AVOID EXPOSURE - LASER RADIATION IS EMITTED FROM THIS APERTURE</p> <p>Model No: Serial No: Mfg Date:</p>  <p>Power Technology Incorporated Alexander, AR USA</p> </div> <p align="center">One of the above labels is attached to the laser head.</p>
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