

Operating Instructions for PMA Laser Diode Module

20MHz analog modulated laser diode module

Introduction

The PMA is a laser module featuring power adjustment via an analog control voltage. A supply voltage and a control voltage are required.

The PMA can be configured with a variety of laser diodes at various output powers and operating wavelengths. Products with IR output or with an output power above 5mW are not intended for surveying, leveling, and alignment applications. Visible units less than 5mW are CDRH certified as laser systems.

Installation

The operating voltage for this laser module is from 4.5VDC to 5.5VDC with 5VDC being optimal. Positive power should be applied to the module's red wire, and the black wire should be connected to ground.

The PMA module features analog beam modulation. A BNC or SMC connector will need to be connected to a customer supplied control voltage. To achieve a CW output, supply 1VDC to the control voltage input. To achieve a percentage of power between 0mW and full power, simply apply a voltage less than 1V that corresponds to the percentage of full power that you desire. For example half power requires a control voltage of approximately 0.5V. The relationship between output power and the control voltage is not exactly linear.

Do not mount the laser in a thermal insulating material, such as foam plastic. Heat can have adverse effect on laser diodes. Such effects include decreased output power and large shifts in wavelengths. Lasers below 5mW may not need a heat sink. For best heat dissipation, use a metal mounting fixture. A heat sink is always recommended for operating temperatures above 25°C.

If the label attached to the laser module reads "This product complies with 21CFR 1040.10 and 1040.11," a permanently installed switch at the power source will be required to retain the modules 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 without the required switch. Modifying the laser will void the CDRH certification. If the distance between the laser head and the power source switch exceeds two meters, an emissions indicator must be mounted near the switch.

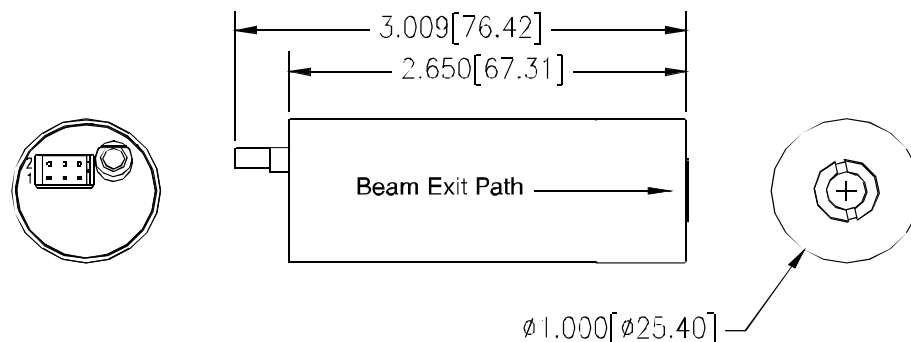
Operating Procedure & Control Description

The PMA features electronic controls. There are no manual controls. A 0 to 1 V control voltage is used to vary the output power to a desired level. The PMA has the following connections:

Identification	Label	Description
Pin 1	+5V	+5VDC
Pin 2	Ground	Power Ground
Pin 3	I _{mon +}	Current Monitor for Laser diode, Positive
Pin 4	Ena/Inh	Enable or Inhibit Option, +5 V
Pin 5	PD _{mon}	Photodiode monitor
Pin 6	I _{mon -}	Current Monitor for Laser diode, Negative

Note: It is important that the system power be ON before the analog control voltage. Any deviation from this sequence may result in diode failure and will void your warranty.





Module power: The PMA requires a 5VDC supply voltage in addition to the analog control voltage. The tolerance is 0.5VDC. Pin 1 is +5VDC and Pin 2 is ground.

Current Monitor: By measuring the voltage between Pin 3 (Positive) and Pin 6 (Negative), you may monitor the current supplied to the laser diode. The output is 1mV per mA of drive current.

Photodiode Monitor: The photodiode monitor allows you to monitor the output current of the laser's photodiode. Two configurations are possible. The configuration depends on the type of laser diode installed. If an N-type laser diode is installed monitor between Pin 5 (PDmon) and Pin 2 (ground). This is the typical configuration. If a P-type laser is installed, monitor between Pin 5 (PDmon) and Pin 1 (+5VDC). In either configuration, the output is 1mV per μ A of photodiode current.

Enable/Inhibit option – If the PMA was ordered with an Enable or Inhibit option, you may connect Pin 4 (Ena/Inh) to +5VDC to activate the option. For the laser to function with the Enable option installed, Pin 4 must be connected to +5VDC. When the Inhibit option is installed, +5VDC on Pin 4 will Inhibit (disable) the laser.

Maintenance & Service

This laser module contains no user servicable parts. Depending on environmental conditions, the optics may occasionally need to be cleaned. When cleaning is required, use of clean, compressed air is recommended to blow the optics clean. If compressed air fails, clean lens carefully with alcohol and a lint-free cloth or Q-tip.

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. Damage to the diode often results from incorrect adjustment of the centering set screws.

The warranty is void if PTI's labels are removed.

No return of merchandise will be accepted by PTI without an RMA (Return Material Authorization) number, issued by the factory and predominantly 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 numbers, and a description of the problem.

Laser Safety

Class 3b and 4 lasers are not intended for use in surveying, leveling, alignment, or medical applications.

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 laser in the direction of other people or at reflective surfaces that might cause exposure to the human eye. Do not unintentionally 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 on the laser head near the output optics.

<p style="text-align: center;">Class II Laser: Visible Laser Radiation Do Not Stare Into Beam</p> <p style="text-align: center;"> <input type="checkbox"/> Component <input type="checkbox"/> System </p> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px; width: 45%;"> <p style="text-align: center; font-size: small;">Laser Light From This ↑ Emitted Aperture</p> <p style="text-align: center;">CAUTION</p> <p style="text-align: center; font-size: x-small;">VISIBLE LASER RADIATION DO NOT STARE INTO TO BEAM</p> <p style="text-align: center; font-size: x-small;">1 MILLIWATT MAX. OUTPUT CLASS II LASER PRODUCT</p> <p style="font-size: x-small;">WAVELENGTH: nm</p> <p style="font-size: x-small;">MODEL:</p> <p style="font-size: x-small;">SERIAL:</p> <p style="font-size: x-small;">DATE OF MFG:</p> <p style="font-size: x-small;">THIS MODULE IS DESIGNATED FOR USE AS A COMPONENT AND THEREFORE DOES NOT COMPLY WITH FDA 21 CFR 1046.10 AND 1046.11</p> <p style="font-size: x-small;">POWER TECHNOLOGY INC. PO BOX 191117 LITTLE ROCK, AR 72219</p> </div> <div style="border: 1px solid black; padding: 5px; width: 45%;"> <p style="text-align: center; font-size: small;">Laser Light From This ↑ Emitted Aperture</p> <p style="text-align: center;">CAUTION</p> <p style="text-align: center; font-size: x-small;">VISIBLE LASER RADIATION DO NOT STARE INTO TO BEAM</p> <p style="text-align: center; font-size: x-small;">1 MILLIWATT MAX. 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OUTPUT CLASS IIIb LASER PRODUCT </p> <p style="font-size: x-small;">WAVELENGTH: nm</p> <p style="font-size: x-small;">MODEL:</p> <p style="font-size: x-small;">SERIAL:</p> <p style="font-size: x-small;">DATE OF MFG:</p> <p style="font-size: x-small;">THIS MODULE IS DESIGNATED FOR USE AS A COMPONENT AND THEREFORE DOES NOT COMPLY WITH FDA 21 CFR 1046.10 AND 1046.11</p> <p style="font-size: x-small;">POWER TECHNOLOGY INC. PO BOX 191117 LITTLE ROCK, AR 72219</p> </div> <div style="border: 1px solid black; padding: 5px; width: 45%;"> <p style="text-align: center; font-size: small;">Laser Light From This ↑ Emitted Aperture</p> <p style="text-align: center;">DANGER</p> <p style="text-align: center; font-size: x-small;">LASER RADIATION AVOID DIRECT EXPOSURE TO BEAM</p> <p style="text-align: center; font-size: x-small;"> <input type="checkbox"/> VISIBLE <input type="checkbox"/> INVISIBLE 500 MILLIWATT MAX. 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<div style="border: 1px solid black; padding: 10px;"> <p style="text-align: center; font-size: 2em; font-weight: bold; background-color: black; color: white; padding: 5px;">CAUTION</p> <p style="text-align: center; font-size: small;">VISIBLE LASER RADIATION DO NOT STARE INTO BEAM</p> <p style="font-size: x-small;">PEAK POWER < 1.0mW WAVELENGTH 400-690nm CLASS II LASER PRODUCT</p> </div>	<div style="border: 1px solid black; padding: 10px;"> <p style="text-align: center; font-size: 2em; font-weight: bold; background-color: black; color: white; padding: 5px;">DANGER</p> <p style="text-align: center; font-size: small;">VISIBLE LASER RADIATION - AVOID DIRECT EYE EXPOSURE</p> <p style="font-size: x-small;">AVERAGE POWER <5mW WAVELENGTH 400-690nm CLASS IIIa LASER PRODUCT</p> </div>	<div style="border: 1px solid black; padding: 10px;"> <p style="text-align: center; font-size: 2em; font-weight: bold; background-color: black; color: white; padding: 5px;">DANGER</p> <p style="text-align: center; font-size: small;">VISIBLE AND INVISIBLE LASER RADIATION AVOID DIRECT EXPOSURE TO BEAM</p> <p style="font-size: x-small;">AVERAGE POWER mW WAVELENGTH nm CLASS IIIb LASER PRODUCT</p> </div>

