

## **Operating Instructions for PMH Laser Diode Module**

100MHz digital modulated laser diode module

### **Introduction**

The PMH is a laser module featuring CW to 100MHz beam modulation. The PMH will emulate the customer supplied TTL signal. A supply voltage and a TTL signal are required.

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

The PMH has thermal compensation to keep the output power deviation to less than 5% as long as the ambient temperature is between 10°C – 35°C.

The Bias current and Modulation current are fully adjustable from the input end of the unit.

### **Installation**

Do not mount the laser in a thermal insulating material, such as foam plastic. Heat can have adverse effect on laser diodes. These 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. If the system is to be run at or near the maximum rated input voltage, the use of a heat sink is recommended. A heat sink is always recommended for operating temperatures above 25°C.

The operating voltage for this laser module is from 4.95VDC to 8VDC. Positive power should be applied to the module's red wire and the black wire should be connected to ground.

This laser module features beam modulation. An SMB connector that will need to be connected to a modulation source. The connector may be shorted to achieve CW operation[May not apply to 100MHz modulation].

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 PMH features only two primary current controls: A Bias Current adjustment and a Modulation Current adjustment, each located on the rear of the unit. Turning either control clockwise will increase the current for that control. Turning counter-clockwise will decrease the current for that control. The current for both potentiometers are added together, meaning when one is increased, the total output will automatically increase incrementally. Within the module, PTI has installed a control that inhibits the current from over driving the laser diode. The PMH has the following connections:

Identification	Label	Description
Pin 1	+5V	+5VDC (Red)
Pin 2	NC	No Connection
Pin 3	Ground	Ground (Black)
Pin 4	LD Iop	Laser Diode Current Monitor (10mV/mA) (Blue)
Pin 5	Inhibit	Inhibit Control (Violet)
Pin 6	PDMon	Photo Diode Current Monitor (Optional) (Yellow)

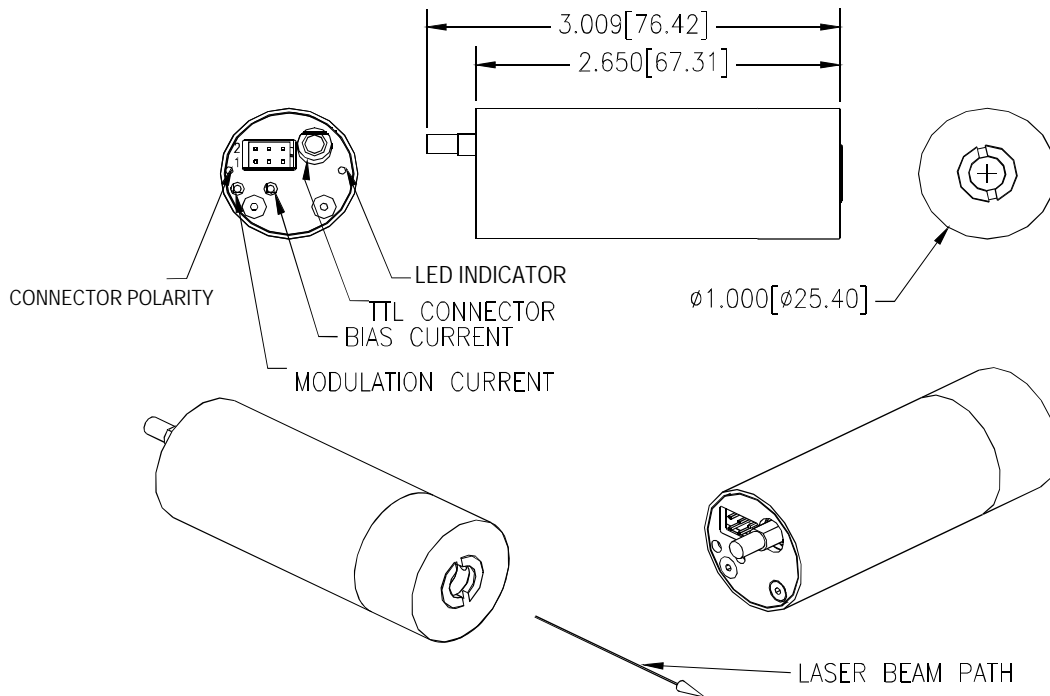


Power Technology supplies a mating connector. If you desire to manufacture your own cable harness, we recommend using Molex part number 22-55-2061 and crimp terminal 16-02-0103 or equivalents.

Laser Diode Current Monitor: The user can measure the current supplied to the laser diode by monitoring between Pin 4 (LD Iop) and ground. The measurement is 10mV per mA of drive current.

Installed on the device, is an Over temp LED indicator which, when ON indicates when the module has exceeded its maximum temperature setting. The laser driver will shut the diode OFF when over temp is reached.

Inhibit: By applying a TTL 5VDC signal to Pin 5, the laser is disabled.



**Maintenance & Service**

This laser module contains no user servicable parts. Depending on environmental conditions, the optics may occasionally need to be cleaned. 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 setscrews.

Removing PTI's Labels will void the warranty.

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](http://www.powertechnology.com).

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

<p align="center"><b>Class 1 Laser:</b> Class 1 Laser Product</p> <p><input type="checkbox"/> <b>Component</b></p> <div style="border: 1px solid black; padding: 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 IEC60825-1 AM2:2001.</p> <p>CLASS 1 LASER PRODUCT</p>  </div> <p><input type="checkbox"/> <b>System</b></p> <div style="border: 1px solid black; padding: 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>  </div> <p align="center">One of the above labels is attached to the laser head.</p>	<p align="center"><b>Class 1M Laser:</b> Laser Radiation, Do not view directly with optical instruments</p> <p><input type="checkbox"/> <b>Component</b></p> <div style="border: 1px solid black; padding: 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 IEC60825-1 AM2:2001.</p> <p>LASER RADIATION DO NOT VIEW DIRECTLY WITH OPTICAL INSTRUMENTS CLASS 1M LASER PRODUCT</p>  </div> <p><input type="checkbox"/> <b>System</b></p> <div style="border: 1px solid black; padding: 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>  </div> <p align="center">One of the above labels is attached to the laser head.</p>	<p align="center"><b>Class 2 Laser:</b> Laser Radiation, Do not stare into beam</p> <p><input type="checkbox"/> <b>Component</b></p> <div style="border: 1px solid black; padding: 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 IEC60825-1 AM2:2001.</p> <p>LASER RADIATION DO NOT STARE INTO BEAM CLASS 2 LASER PRODUCT</p>  </div> <p><input type="checkbox"/> <b>System</b></p> <div style="border: 1px solid black; padding: 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>  </div> <p align="center">One of the above labels is attached to the laser head.</p>
<p align="center"><b>Class 2M Laser:</b> Laser Radiation, Do not stare into the beam or view directly with optical instruments</p> <p><input type="checkbox"/> <b>Component</b></p> <div style="border: 1px solid black; padding: 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 IEC60825-1 AM2:2001.</p> <p>LASER RADIATION DO NOT STARE INTO THE BEAM OR VIEW DIRECTLY WITH OPTICAL INSTRUMENTS CLASS 2M LASER PRODUCT</p>  </div> <p><input type="checkbox"/> <b>System</b></p> <div style="border: 1px solid black; padding: 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 THE BEAM OR VIEW DIRECTLY WITH OPTICAL INSTRUMENTS CLASS 2M LASER PRODUCT</p>  </div> <p align="center">One of the above labels is attached to the laser head.</p>	<p align="center"><b>Class 3R Laser:</b> Laser Radiation, Avoid direct eye exposure</p> <p><input type="checkbox"/> <b>Component</b></p> <div style="border: 1px solid black; padding: 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 IEC60825-1 AM2:2001.</p> <p>LASER RADIATION AVOID DIRECT EYE EXPOSURE CLASS 3R LASER PRODUCT</p>  </div> <p><input type="checkbox"/> <b>System</b></p> <div style="border: 1px solid black; padding: 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 AVOID DIRECT EYE EXPOSURE CLASS 3R LASER PRODUCT</p>  </div> <p align="center">One of the above labels is attached to the laser head.</p>	<p align="center"><b>Class 3B Laser:</b> Laser Radiation, Avoid exposure to beam</p> <p><input type="checkbox"/> <b>Component</b></p> <div style="border: 1px solid black; padding: 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 IEC60825-1 AM2:2001.</p> <p>LASER RADIATION AVOID EXPOSURE TO BEAM CLASS 3B LASER PRODUCT</p>  </div> <p><input type="checkbox"/> <b>System</b></p> <div style="border: 1px solid black; padding: 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 AVOID EXPOSURE TO BEAM CLASS 3B LASER PRODUCT</p>  </div> <p align="center">One of the above labels is attached to the laser head.</p>




**Class 4 Laser:**

Laser radiation, Avoid eye or skin exposure to direct or scattered radiation

**Component**

<b>MAX Power:</b> mW <b>Wavelength:</b> nm DOES NOT comply with 21 CFR 1040.10 and 1040.11 IEC60825-1 AM2:2001	<b>AVOID EXPOSURE - LASER RADIATION IS EMITTED FROM THIS APERTURE</b> Model No: Serial No: Mfg Date:  <b>Power Technology</b> Alexander, AR USA
<b>LASER RADIATION</b> AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION CLASS 4 LASER PRODUCT	

**System**

<b>MAX Power:</b> mW <b>Wavelength:</b> nm Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated 7/2001	<b>AVOID EXPOSURE - LASER RADIATION IS EMITTED FROM THIS APERTURE</b> Model No: Serial No: Mfg Date:  <b>Power Technology</b> Alexander, AR USA
<b>LASER RADIATION</b> AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION CLASS 4 LASER PRODUCT	

One of the above labels is attached to the laser head.

