

## Operating Instruction: IQ Laser Head

IQ head with customer supplied laser driver and thermo-electric cooler controller

### Introduction

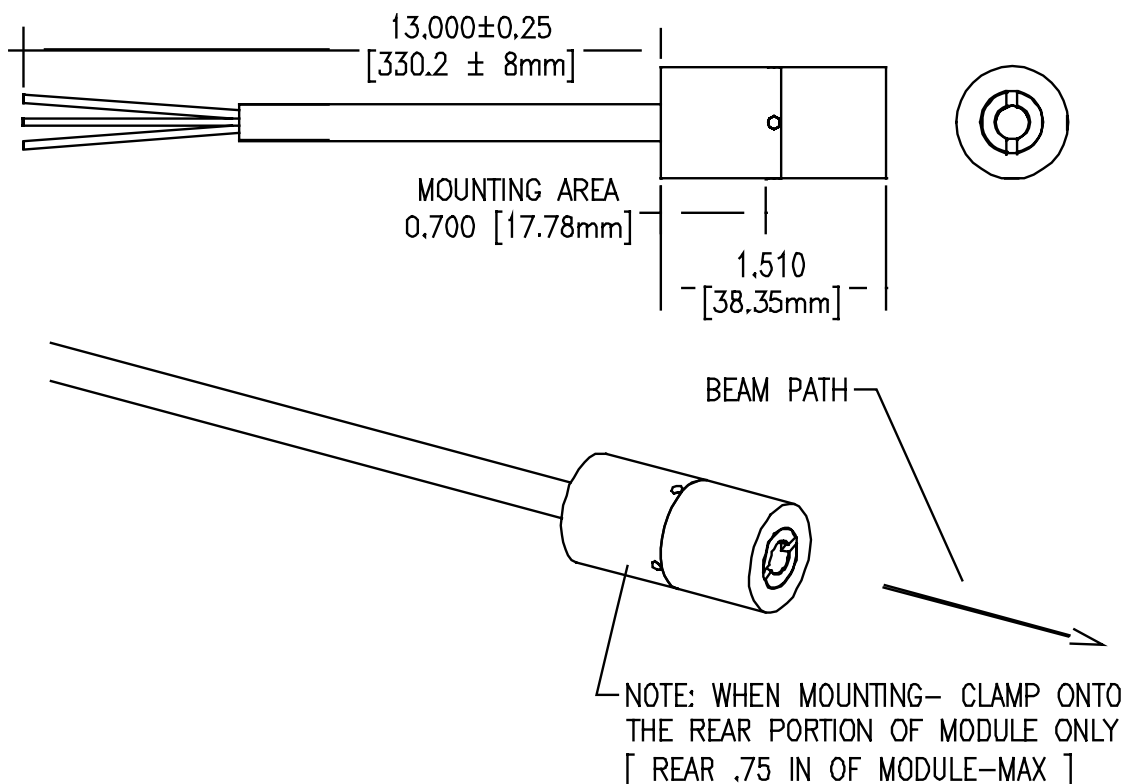
The IQ, Instrument Quality, laser head is designed for precision analytical and measurement applications. For this specific version, the customer supplies the TEC control electronics and the laser diode drive circuitry.

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

### Installation

Mount the IQ laser head according to the drawing below. Do not mount the laser head in a thermal insulating material, such as foam plastic. Heat can have adverse effect on laser diodes including decreased output power and large shifts in wavelengths. 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 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.



The following table illustrates the required connections for the laser diode:

Wire Color	Electrical specifications for N-Type Laser Diode	Electrical specifications for P-Type Laser Diode
White	LD Anode / PD Cathode	LD Anode
Blue	LD Cathode	LD Cathode / PD Anode
Yellow	P/D Anode	PD Cathode

The following table illustrates the required connections for the TE Cooler:

Wire Color	Electrical specifications
Red	TEC Positive, 0 to 8VDC, 2A Maximum
Black	TEC Negative, 0 to 8VDC, 2A Maximum
Orange	10K thermistor,
Orange	10K thermistor

The chart below can be used to accurately measure the temperature of the laser diode. The IQ laser head uses a 10K thermistor. Measure the resistance on the two orange thermistor wires and compare it to the chart below.

Temp. C	Rt	Temp. C	Rt	Temp. C	Rt	Temp. C	Rt
0	32650	13	17250	26	9573	39	5547
1	31030	14	16460	27	9167	40	5327
2	29500	15	15710	28	8777	41	5117
3	28050	16	15000	29	8407	42	4917
4	26690	17	14320	30	8057	43	4727
5	25390	18	13680	31	7723	44	4543
6	24170	19	13070	32	7403	45	4370
7	23010	20	12490	33	7097	46	4200
8	21920	21	11940	34	6807	47	4040
9	20880	22	11420	35	6530	48	3890
10	19900	23	10920	36	6267	49	3743
11	18970	24	10450	37	6017	50	3603
12	18090	25	10000	38	5777		

## Operating Procedure & Control Description

The system is focus adjustable. A spanner wrench is provided for making this adjustment. Care should be taken when focusing or cleaning the optics to prevent damage. Cleaning methods should follow those customary for glass optics.

**Caution:** Do not adjust the focus with the system at full power or operate the laser with the lens removed.

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 system at full power will destroy the laser diode. Also, reducing the amount of reflections (i.e. removing the lens) will result in destruction of the laser diode due to excessive drive current.*

## Maintenance & Service

This laser product contains no user serviceable parts. Occasionally the optics may need cleaning depending on environmental conditions. 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 rag or q-tip.

**Warranty and Repair Return Policy**

This laser diode head does not incorporate a laser diode driver for TE Cooler controller made by Power Technology. For that reason, PTI does not offer any warranty on the laser diode or the TEC element.

For systems that incorporate a centering option, adjustment of the centering setscrews will void the diode warranty and possibly the warranty on the entire laser system since damage to the diode is easily achievable. If the lens is adjusted, the centering option will need to be recalibrated.

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.

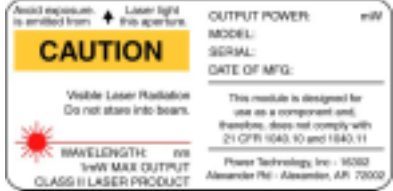


**Caution:** Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

**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, which 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><b>Class II Laser Component:</b> Visible Laser Radiation Do Not Stare Into Beam</p>  <p>One of the above labels is attached to the laser head.</p>	<p><b>Class IIIa Laser Component:</b> Visible Laser Radiation, Avoid Direct Eye Exposure</p>  <p>One of the above labels is attached to the laser head.</p>	<p><b>Class IIIb Laser Component:</b> Visible Or Invisible Laser Radiation Avoid Direct Exposure To Beam</p>  <p>One of the above labels is attached to the laser head.</p>
