Operating Instruction: IQ Laser Head With TMD-219 Laser Diode Driver

IQ head with TMD-219 driver for external TTL modulation

Introduction

The IQ (instrument quality) laser head is designed for precision analytical and measurement applications. The head incorporates a custom-made thermoelectric cooler (TEC) that dissipates heat from the diode's largest heat-bearing surface: the bottom. TEC control electronics are not included in the head and must be supplied by the customer.

A TMD-219 driver is included with the IQ head. This driver, designed for external TTL modulation from CW to 20MHz, provides constant current, preset at the factory, to the laser head. The unit can be modulated from an external user-supplied TTL trigger. This product can be configured with a variety of laser diodes at various output powers and operating wavelengths. IR laser products or units with more than 5mW of output power are not intended for surveying, leveling, and alignment applications. Visible units with less than 5mW of output are CDRH certified as laser systems.

Installation

Do not mount the laser in a thermal insulating material, such as foam plastic. Heat can have adverse effects on laser diodes, such as 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.

This laser product features two sets of red and black wires. One set comes from the IQ laser head. This set should be connected to the customer supplied TEC control electronics. Red is positive. Black is ground. A pair of orange wires also exits the IQ laser head. The orange wires are the 10K thermistor. The polarity of this connection does not matter. During initial setup, monitor the thermistor to determine if the TEC control electronicsis correctly driving the TEC in the hot and cold directions.

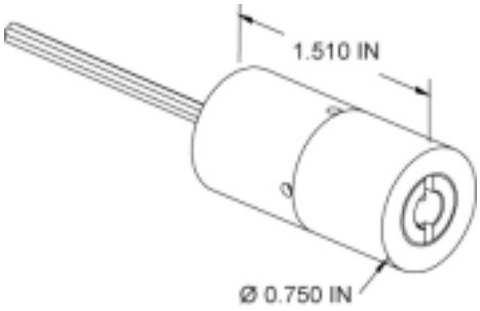
The second set of red and black wires comes from the TMD laser diode driver. Positive power should be applied to the laser diode driver's red wire, and the black wire should be connected to ground. Because the modulation is TTL, external pulse generator operation must toggle between 0VDC and 5VDC. The unit can be operated in CW (with 0VDC on the data input) or pulsed up to 20MHz. The system will not operate until the coaxial input connector is attached to a pulse generator or a shorted termination (which allows the system to operate in CW).

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 without the required switch. Modifying the laser will void the IEC 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 indicates the required connections:

From the IQ laser head:

Wire Color	Electrical specifications
Red	TEC Positive, 0 to 8.7VDC, 2A max
Black	TEC Negative, 0 to 8.7VDC, 2A max
Orange	10K thermistor
Orange	10K thermistor



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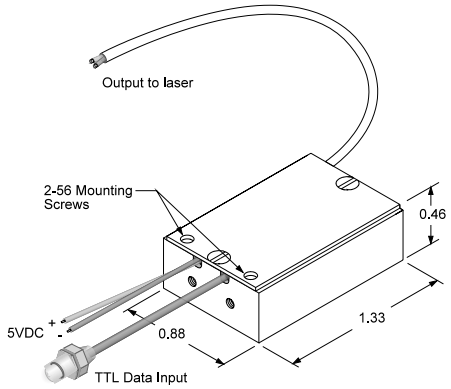
From the TMD-219:

Wire Color	Electrical specifications
Red	5VDC, 150mA max required current
Black	Ground



The chart below can be used to measure the temperature of the laser diode. The IQ 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 unit operates in constant current mode only. Therefore, the output power of your laser will be fixed and will vary only with environmental changes. The unit does not have a feedback system to regulate laser power, so the laser will not automatically adjust for these changes.

The driver can be modulated from an external user-supplied TTL trigger. Two optional potentiometer controls are available to provide adjustable drive current. **Option X22** is a ¾ turn potentiometer located on the end of the two orange wires. This pot enables users to adjust drive current to the laser and to, therefore, change the output power from zero to 100% of the rated power of the system. **Option D2** enables users to control the current digitally.

The unit is focus adjustable. A spanner wrench is provided for making this adjustment. To prevent damage, take care when focusing or cleaning the optics. Cleaning methods should follow those customary for glass optics.

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Maintenance & Service

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

Warranty and Repair Return Policy

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 prominently displayed on the return package. When contacting the factory for an RMA number, please have the following information available: model number, serial numbers, and a description of the problem.

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.

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.

Class 1 Laser: Class 1 Laser Product	**Class 1M Laser:** Laser Radiation, Do not view directly with optical instruments	**Class 2 Laser:** Laser Radiation, Do not stare into beam
☐ **Component** 	☐ **Component** 	☐ **Component** 
☐ **System** 	☐ **System** 	☐ **System** 
One of the above labels is attached to the laser head.	One of the above labels is attached to the laser head.	One of the above labels is attached to the laser head.

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Class 2M Laser:
Laser Radiation, Do not stare into the beam or view directly with optical instruments

☐ **Component**

☐ **System**

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

Class 3R Laser:
Laser Radiation,
Avoid direct eye exposure

☐ **Component**

☐ **System**

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

Class 3B Laser:
Laser Radiation,
Avoid exposure to beam

☐ **Component**

☐ **System**

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

Class 4 Laser:
Laser radiation, Avoid eye or skin exposure to direct or scattered radiation

☐ **Component**

☐ **System**

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

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