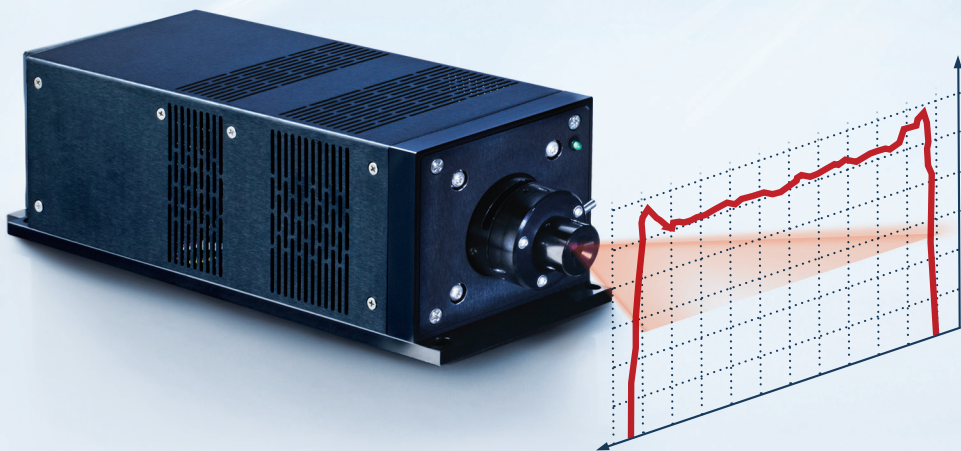




STRUCTURED LIGHT AND
LASER BEAM SHAPING SOLUTIONS

FIRELINE LASER



INSTRUCTION MANUAL

WARNING!

The laser light emitted by this unit may be in the infrared (non-visible) region of the electromagnetic spectrum. Avoid Exposure to direct or scattered radiation from the laser. Use extreme caution at all times when the laser is in use.

The output power of these laser devices is sometimes high enough to cause permanent damage to the human eye. You should wear appropriate laser safety goggles at all times when the laser is operational.

All laser safety warning labels are provided on the unit and be taken into note. Warning labels comply with IEC 60825-1

LASER RADIATION DO NOT STARE INTO BEAM OR EXPOSE USERS OF TELESCOPIC OPTICS

Max Output Power: 1mW
Wavelength: 400-700nm

Complies with 21 CFR 1040.10 & 1040.11 except for deviations pursuant to Laser Notice No.50 dated June 24, 2007

Oseia Inc. 1869, 32e Avenue, Lachine, Quebec, Canada, H8T 3J1

CE RoHS CLASS 2 IEC 60825-1:2014

LASER RADIATION DO NOT STARE INTO BEAM OR EXPOSE USERS OF TELESCOPIC OPTICS

Max Output Power: 1mW
Wavelength: 400-700nm

Complies with 21 CFR 1040.10 & 1040.11 except for deviations pursuant to Laser Notice No.50 dated June 24, 2007

Oseia Inc. 1869, 32e Avenue, Lachine, Quebec, Canada, H8T 3J1

CE RoHS CLASS 2M IEC 60825-1:2014

WARNING - LASER RADIATION AVOID EXPOSURE TO BEAM

Max Output Power: 500mW
Wavelength: 400-700nm

OEM non-certified component Laser, DOES NOT comply with 21 CFR 1040.10 & 1040.11

Oseia Inc. 1869, 32e Avenue, Lachine, Quebec, Canada, H8T 3J1

CE RoHS CLASS 3R IEC 60825-1:2014

WARNING - LASER RADIATION AVOID EXPOSURE TO BEAM

Max Output Power: 500mW
Wavelength: 400-700nm

OEM non-certified component Laser, DOES NOT comply with 21 CFR 1040.10 & 1040.11

Oseia Inc. 1869, 32e Avenue, Lachine, Quebec, Canada, H8T 3J1

CE RoHS CLASS 3B IEC 60825-1:2014

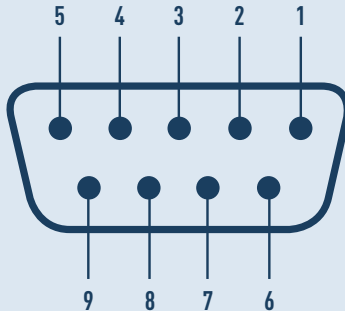
OPERATING THE LASER

- Once the power switch is set to ON, the green power LED will turn on indicating laser is being powered and then after a few seconds the status LED will go from red to orange signifying the laser is lasing.
 - The time delay is due to the stabilization of the laser's thermoelectric cooling device (TEC). The laser will not be lasing until the diode temperature stabilizes at 25°C set temperature. If the temperature largely exceeds ambient conditions, the status LED will be lit red instead of orange, and the laser will not emit radiation.
 - Stable output power is obtained approximately 2-3 minutes after the laser begins lasing at ambient temperature and slightly longer at the extremes of the temperature range.
- This laser has several built in safety features.
 - ON/OFF switch
 - Key Switch
 - Remote safety interlock
 - For the laser to provide an output power, all three of the following conditions must be met:
 1. ON/OFF switch in the ON position
 2. Key switch is in the "I" position
 3. Remote safety interlock is closed meaning the included plug (internally shorted) is properly inserted OR that if the interlock is connected to an external safety circuit, that it is closed.



HD15 INTERFACE

A HD15-RA-SMT-Socket-Female is provided to interface with the laser.



Pin 1 = GND

Pin 6 = Laser diode temperature monitoring

Pin 2 = NC

Pin 7 = Laser diode current monitoring

Pin 3 = SDA

Pin 8 = Laser power monitoring

Pin 4 = SCL

Pin 9 = Modulation

Pin 5 = NC

Pin 3 and Pin 4

ON time counter = These pins can be used to monitor the usage time of the laser. It requires an optional external unit that must be ordered beforehand.

Pin 6

Laser Diode Temperature Monitoring = Pin 6 can be used to monitor the laser diode temperature. The diode temperature is preset to approx 25°C (voltage readout 2.5V). This lead provides a voltage that can then be converted to a temperature using a graph provided by Osela.

Pin 7

Laser Diode Current Monitoring = Pin 7 can be used to monitor the current into the laser diode. It outputs a voltage which can be converted into current with a 1V = 10A ratio.

Pin 8

Laser Power Monitoring = Pin 8 can be used to monitor the optical power output of the laser. It outputs a voltage which can be converted into power with a 1V = 10W ratio.

Pin 9

Modulation = Pin 9 allows for modulation in intensity and/or frequency of the output power by applying an external voltage.

0 - 0.7VDC = 100% output power

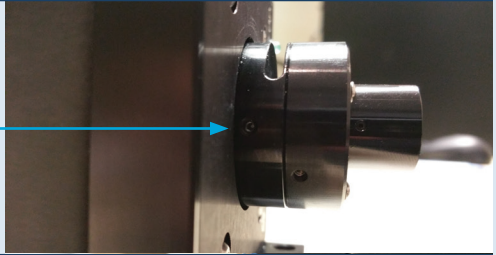
0.7 - 4.2VDC = Linear decrease in power output

4.2 - 5VDC = 0% output power

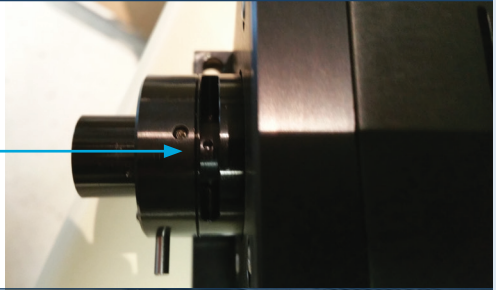
FOCUSING THE LASER

The laser can be focused with the aid of a 1/16" dowel pin and L5/64 hex wrench enclosed with the laser.

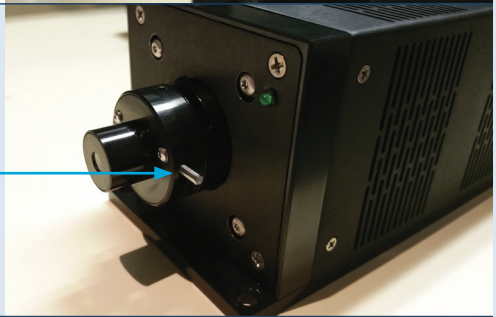
Use the hex wrench (counter clockwise) to unlock focus set screw



Fit the dowel pin in the notches to shift focal point. A half turn either way will allow you to move the focal point from 100mm to infinity. Don't forget to lock the focus set screw after the laser has been focused.



The Fireline laser comes with a shutter as a safety precaution that will block the output beam. When the shutter lever is in the Horizontal position (as shown in picture) the beam is blocked and by lowering the lever, the output beam will be unblocked.



OPERATING ENVIRONMENT

The lasers operating temperature range is from -10°C to $+50^{\circ}\text{C}$. In order to prevent the laser diode from damage the laser will stop emitting radiation outside this temperature range and the status indicator LED will go from orange to red. Only once the laser stabilizes back to within its proper working temperature range will the red LED indicator turn orange and the laser will begin to re-emit radiation again.

HEAT SINK AND VENTILATION

The laser should be mounted on a flat, thermally dissipating surface cooled at 10°C to 35°C in order to maintain a high-level of pointing stability, heat dissipation, and reliability. The laser should be operated in an environment in where there is normal aeration.

SPECIFICATIONS

Bore sight (mrad)	< 3 mrad
Wavelength Drift	≈ 0.1 nm over entire operating temperature
Pointing Stability	< 6 $\mu\text{rad}/^{\circ}\text{C}$
Modulation Rise/Fall time	< 10 μ sec, 100% modulation depth (10 Kohm input impedance)
Protections (Built in)	ESD, Over voltage (up to 30 VDC), Over-temp Shutoff (> 50 deg C)
Long term Power stability (8 hours)	< 3 %, 2 minute warm up time
Operating Voltage	12V DC
Working Temp Range	-10 to to $+50^{\circ}\text{C}$
Weight	< 1.8 kg
Power Supply Cable	18 inches 3 conductors Alpha wire 5610B2001, with flying leads
ESD Protection	Level 4

LASER SAFETY

AVIOD EXPOSURE TO DIRECT OR SCATTERED RADIATION FROM THE LASER.

It is extremely important to follow laser safety and wear appropriate eyewear when working around lasers. Do not shine laser in the direction of other people or at reflective surfaces that might cause exposure to the human eye. Do not intentionally mount laser at eye level.

Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure. Modifications, which affect any aspect of the product's performance or intended functions, will require re-certification of the product in accordance with the provisions of 21CFR 1040.10 and 1040.11.

Class 3B and 4 lasers are not intended for use in surveying, leveling, alignment, or medical applications. Laser classification is performed according to United States Center for Devices & Radiological Health (CDRH) document 21 CFR 1040.10, and or the International Electro Technical Commission (IEC) document 60825-1:2nd edition.

CLASS 1M	Denotes lasers that do not pose a hazard under normal or single fault conditions. No risk to eyes including use of optical instrument. No risk to skin. Laser emitting devices are lasers that are safe under reasonably foreseeable conditions of operation, including the use of optical instruments for intra-beam viewing.
CLASS 2M	No risk to skin. Includes lasers emitting visible radiation (400 nm to 700 nm) where eye protection is normally provided by an aversion response (blink reflex). No risk to eyes for short time exposure including use of optical instruments. This means that the low power light is not intended for direct viewing.
CLASS 3R	Direct intra-beam viewing is potentially hazardous; a label must be used.
CLASS 3B	Denotes lasers that pose a hazard when viewed directly, whether magnifying viewing aids are used or not.
CLASS 4	Class 4 laser can burn the skin, or cause devastating and permanent eye damage as a result of direct, diffuse or indirect beam viewing. These lasers may ignite combustible materials, and thus may represent a fire risk. Great care must be taken to control the beam path.

PRODUCT WARRANTY

The laser is guaranteed to be free from material & manufacturing defects for a period 12 months (diode dependent, please inquire) from the date of shipment. Should the product fail during this period, the company will, at its discretion, repair or replace the damaged unit. The repaired or replaced unit will be covered for the remainder of the original equipment warranty period. The warranty does not apply to the units examined by the company that are found to have failed due to abuse, acts of nature, mishandling, alteration, improper installation or negligence.

Removal of the laser safety sticker renders warranty null and void. All returns require a Return Merchandise Authorization number (RMA#). This number can be obtained by contacting the distributor from which the unit was purchased.

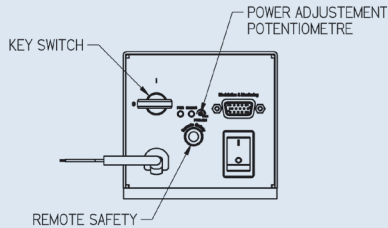
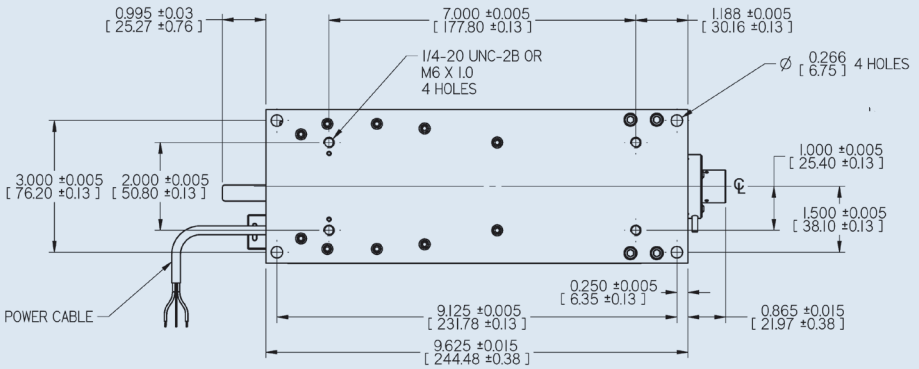
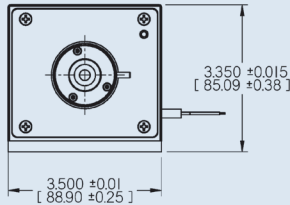
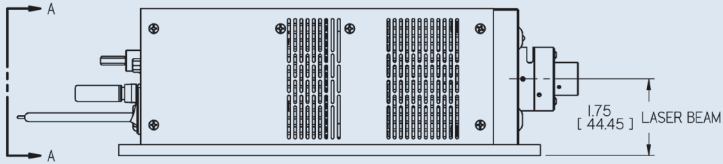
TROUBLESHOOTING

Please see table for some tips when laser is not operating as supposed to.

ISSUE	POSSIBLE FIX
The power switch is in ON position but LEDs are off and laser is not lasing	<ul style="list-style-type: none">• Verify that 12VDC is being correctly supplied to power leads of laser (white = 12VDC, Black = Grnd)
The power LED is Green and the Status LED is Orange but no laser output	<ul style="list-style-type: none">• Verify that the SHUTTER of the laser is in the open position• Verify that PIN 9 of the DB9 (modulation pin) is receiving the appropriate voltage <p>Modulation operation Pin 9</p> <p>Synchro (standard) = 0-0.7VDC -> 100% power 0.7-4.2VDC -> linear decrease 4.2-5VDC -> 0% power</p> <p>Reverse Synchro (RS) = 0-0.7VDC -> 0% power 0.7-4.2VDC -> linear increase 4.2-5VDC -> 100% power</p> <p>TTL modulation (T) = 0-2VDC -> 100% power 3-5VDC -> 0% power</p> <p>Reverse TTL (RT) = 0-2VDC -> 0% power 3-5VDC -> 100% power</p>
The laser beam is pulsing involuntarily	<ul style="list-style-type: none">• Verify to make sure PIN 2 of the DB9 connector is not receiving a pulsed signal.• The laser has built in over temperature protection. If the internal temperature goes beyond this threshold, the laser will automatically stop lasing until the temperature goes down at which point it will begin lasing again. During the phenomenon where the laser is on thermal shutdown, the status LED will be RED.
The power LED is green and the Status LED is RED	<ul style="list-style-type: none">• Verify that Key switch interlock is in the ON position (1 symbol)• Verify that the Remote Safety interlock is properly connected

If you are encountering any of these issues and the above recommendations do not work, or an issue that is not listed, please contact the company you purchased the laser from for assistance.

MECHANICAL SPECIFICATIONS



VIEW A-A (BACK PANEL VIEW)