

# Fiber Coupled Laser

## BWF-2

### User Manual



# BWF-2

## PREPARE FOR LASER OPERATIONS:

### Warning!!! Laser Safety!!!

LASER RADIATION--AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION;  
CLASS IV LASER PRODUCT.

- 1) Never expose eyes to the laser beam path or look directly into the laser beam.
- 2) Do not install the laser or use it at height of eye level.
- 3) Do not place any reflective object in the path of the beam. Reflected/scattered light/beam from such object is dangerous to the eyes and skin.
- 4) Do not wear rings, metal watch bands, or jewelry when operating the laser.
- 5) Turn the power off when the laser is not being used to prevent stray reflections from occurring.
- 6) Point the laser beam at a specific target, which doesn't reflect the laser beam.
- 7) If possible, have an enclosed path for the laser beam.
- 8) Designate a specific area for laser use only. Only allow trained operators in this area.
- 9) Post warning signs to indicate that the laser is being used.

## Additional Information on Safety

CDRH-Division of Industry and Consumer Education (DICE)  
Office of Communication and Education  
Center for Devices and Radiological Health  
Food and Drug Administration  
10903 New Hampshire Avenue  
Silver Spring, MD 20993

Laser Institute of America  
13501 Ingenuity Drive, Suite 128  
Orlando, FL 32826  
Toll Free: 1.800.345.2737  
Telephone: +1.407.380.1553  
Fax: +1.407.380.5588

## Warning!!!

- 1) If the laser includes a non-detachable fiber pigtail with an SMA connector, it is not recommended to connect an additional fiber. However, low power operation can be done under select situations where the connected fiber is a larger Numerical Aperture (NA) and a larger fiber core diameter.
- 2) Never disconnect/connect the output fiber from/to the receptacle during laser operation. This may destroy the internal fiber optics.
- 3) Never use an output fiber with a smaller core size or NA than **specified in the attached TEST RESULTS sheet**. In addition, **Epoxy free fibers should be used**; otherwise it may also cause damage to the internal fiber optics.
- 4) Carefully clean the tip of the output fiber and make sure the fiber tip is dry before connecting the fiber to the SMA receptacle. Verify cleanliness by inspection.

## LASER OPERATIONS

- **Preparation:**
  1. Verify the fuse is installed into the fuse socket.
  2. Turn the Emergency Stop Switch on the front panel clockwise to make sure it is not in the pressed position.
  3. Plug the key provided by B&W Tek, Inc. into the LD ENABLE key switch on the front panel.
  4. For receptacle version only, connect an applicable fiber patch cord to the SMA receptacle on the front panel
  5. Connect the power cord provided by B&W Tek, Inc. to the power inlet on the rear panel, and connect the other end of the power cord to a grounded wall socket (110VAC or 220VAC).
  6. B&W Tek, Inc. will not take responsibility for any damage caused by using parts not provided by B&W Tek, Inc.
- **Turn on Power Switch.** The POWER indicator will be on. The fan(s) on the rear panel and the temperature control system will begin to work.
- **Turn on LD ENABLE Key Switch.** The READY indicator will be on in 5~10 seconds and the laser will then be ready for emission.
- **LD CURRENT Adjustment.** The laser drive current setting can be increased or decreased by turning the knob (LD CURRENT) clockwise or counterclockwise.  
**Note: When the firing indicator is off, the LCD display will not display the current drive setting.**
- **LD On/Off button.** When the above operations have been completed, press the LD On/Off button once to turn on the FIRING indicator and laser emission. The current drive setting will be displayed on the LCD display. Press the LD ON/OFF button once again to stop the laser emission and turn off the FIRING indicator.
- **Turn Off Laser.** Push the LD On/Off button. Turn off the LD ENABLE key switch. Then turn off the POWER switch.
- **Emergency Stop Switch.** To shut down the laser in an emergency, press the Emergency Stop Switch on the front panel. To release the switch, turn it clockwise.
- **External/Remote Control.** The laser can also be controlled externally/remotely through a cable connected to the DB-9 connector and/or BNC connector on the rear panel.
  - To enable the laser, connect pin 1 and pin 2 of the DB-9 connector and then wait for 5-10 seconds. To disable the laser, disconnect pin 1 and pin 2 of the DB-9 connector.
  - To turn on the laser when the laser emission is off and the laser is ready for emission, connect pin 4 and pin 5 of the DB-9 connector for a moment and then disconnect the two pins.
  - To turn off the laser when the laser emission is on, connect pin 4 and pin 5 of the DB-9 connector for a moment and then disconnect the two pins.
  - To control the laser with TTL signal, apply TTL signal to pin 7 (pin 6 is for signal ground) of the DB-9 connector. For units with a BNC connector wired to pins 6 and 7, simply apply the signal onto the BNC connector. If the signal is high or there is no signal applied, the laser will be on. If the signal is low the laser will be off. This function only works when the FIRING indicator is on.
  - For Analog modulation refer to additional reference material provided by B&W Tek, Inc. (optional)
  - To turn on the 650nm aiming laser at full power, connect pin 8 with pin 9, or apply an applicable voltage to pin 8 (pin 6 is for signal ground) (optional).

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## CDRH COMPLIANT SYSTEM

The BWF-2 series laser systems, which are certified to be in compliance with Class IIIb or Class IV, are equipped with key-lock switch, remote interlock, laser radiation emission indicator, emission time delay (in the laser driver), beam attenuator (shutter), emergency switch and appropriate warning labels. The following labels are designed to warn the user of potential hazard.

 <b>LASER APERTURE</b> AVOID EXPOSURE - LASER RADIATION IS EMITTED FROM THE FIBER TIP OUT OF THIS APERTURE	
 <b>DANGER</b>	
 LASER RADIATION—AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION	
Wavelength(nm)	MaxPower(W)
635 – 1550	1 - 20
CLASS IV LASER PRODUCT	
<b>B &amp; W TEK INC.</b> 19 Shea Way, Suite 301 Newark, DE 19713 (302)368-7824	
Model No.	_____ BWF-2 _____
Serial No.	_____
Manufactured	_____
THIS LASER COMPLIES WITH 21 CFR 1040.10 AS APPLICABLE	

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## Warranty

### Warranty Policy:

B&W Tek's laser and power supplies are warranted to be free from defects in materials and workmanship for a period of 12 months from the date of initial shipment. This warranty does not extend to incidental or consequential damages, to damages caused by negligent or improper handling in use or storage, nor for products for which the original identification markings or labels have been removed, defaced or altered.

Special contracts or contracts for non-standard products may have modified terms of warranty and, in such case, the terms as stated in the individual contract must be signed by the duly authorized officer of B&W Tek and will supersede the standard terms.

B&W Tek will make final determination as to cause or existence of defect and, at its option repair or replace the products, which prove to be defective during the warranty period. Products replaced under warranty will be warranted only for the balance of the warranty period from the original supplied equipment.

This warranty extends only to the original purchaser of the equipment from B&W Tek. The purchaser must notify B&W Tek within 15 days of first noticing the defect and promptly return the defective product before expiration of the warranty period.

Products believed by purchaser to be defective shall be returned to B&W Tek, with transportation and insurance prepaid by the purchaser. Repaired or replaced products will be returned to purchaser by B&W Tek, FOB to any city destination within the Continental United States. Transportation beyond these limits will be charged to purchaser.

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## Warranty Procedure

Review terms of purchase and date of shipment to determine validity of warranty claim. Warranty claim should only be made for products within terms of warranty policy.

Call B&W Tek to obtain authorization to return the units in the form of an RMA (Return material authorization) and to receive an RMA number. For customers in the USA and countries where distributorship and/or representation are not available, all claims should be addressed to:

B&W Tek, Inc.  
19 Shea Way, Suite 301  
Delaware Industrial Park  
Newark, DE 19713

Be prepared to furnish:

- a. Product model number and serial number
- b. Date of shipment/purchase
- c. Brief failure description
- d. Name of person and phone number at your organization for further communication

Obtain B&W Tek 's instructions for transportation and packaging and ship the product (freight and insurance prepaid) with the proper documentation containing the RMA number and the information specified above.

B&W Tek will advise the purchaser of its determination of warranty at the earliest possible time. Providing complete information as requested will expedite this procedure.