



**Thunder Optics**

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**TO Lasers**  
**TO-PS-5 Variable Power Supply**  
**User's Manual**

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## Operation Instruction of the Laser

**Note: The laser can be operated only when the temperature of the laser housing comes back near to that of operating temperature (the most proper temperature is 20°C-25°C). Otherwise, the laser may be damaged because the large temperature differences.**

### 1- Checking

- Place the laser head and power supply that have the same serial numbers on the platform. Such as iron board.
- Check the master switch in the front of power supply. It should be in closing state. Press the mark “0”. Then the switch is in closing state.



### 2- Connecting Method

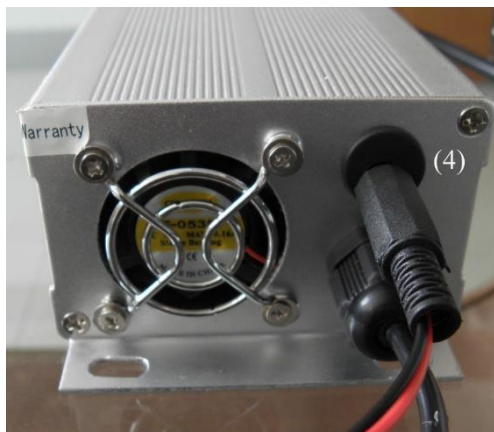
- Connect the plug of laser head firmly with its power supply.
- Connect the plug of power supply to the socket that provides voltage (85~265VAC) indicated on the back of the power supply.



### 3- Opening Method

- Please unveil the label of laser head. If there is a shutter in front of the laser head, please open it.
- Press the master switch to change the state from '0' to '-'.
- After opening the master switch, the red lamp is lighted, the laser starts to work.
- TTL modulation or analogue modulation function is optional. If you choose one of two functions, please refer to TTL modulation or 0-5VDC analogue modulation.

Note: If you choose analogue modulation, you must input 0-5VDC voltage, then the laser can start to work.



### 4- Closing Method

- Close the master switch. Press the mark '0' then the power is closed.
- Pull off the plug of the power supply.
- If the shutter exists, please close the shutter of the laser head. Please attach the label to the aperture.

### 5- The life time of the product is one year.

### 6- Attention : Thunder Optics Lasers does not assume liability for its laser product if any one of the following circumstances occurs.

- Disassembly the laser head by the user.
- Influence to the proper laser performance as a results of inquiry to the outward surface.
- No attachment of the original marks, e.g., serial numbers, of the laser head.
- Invalidity of the repair guarantee after the specified warranty period.



## 7- Laser Safety Warning

- Laser is harmful to human being, and so you must avoid to be radiated directly. Especially, the laser beam should never point to eyes.
- The laser system will generate heat during operating, please put the laser head on a big radiator made of metal. Be sure not to place any other object on it. Forbid shocking and oscillating.
- The products are fit to be operated in the temperature of 20-25°C, circumstances of clean, dry and no static electricity.
- Forbid shocking and oscillating.

## 8- Laser Safety Warning Laser Safety Warning

**Laser products that are normally hazardous when intrabeam ocular exposure occurs (i.e. within the NOHD) including accidental short time exposure. Viewing diffuse reflections is normally safe. Class 3B lasers which approach the AEL for Class 3B may produce minor skin injuries or even pose a risk of igniting flammable materials. However, this is only likely if the beam has a small diameter or is focussed.**

**NOTE** There exist some theoretical (but rare) viewing conditions where viewing a diffuse reflection could exceed the MPE. For example for Class 3B lasers having powers approaching the AEL, lengthy viewing of greater than 10 s of true diffuse reflections of visible radiation and viewing at distances less than 13 cm between the diffusing surface and the cornea can exceed the MPE.

- 1) Laser is harmful to human being, and so you must avoid to be radiated directly. Especially, the laser beam should never point to eyes.
- 2) The laser head should be placed on a platform. Be sure not to place any other object on it.
- 3) The laser should be operated in dry and clean environment.
- 4) Forbid shocking and oscillating.
- 5) The laser housing is not to be opened at any time. Do not try to open the housing of the laser as there are no user serviceable parts inside the laser head.
- 6) It is not permitted to open or remove the housing during at any time.
- 7) Opening the housing of the laser head is dangerous and may also cause laser failure and voiding of the warranty.



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- 8) Never aim the laser product at an individual's eye or permit laser tracking of non-target vehicles or aircraft.
- 9) The laser should only be operated by experienced personnel with appropriate laser safety training.
- 10) Only operate the laser in a restricted area with appropriate signage and interlock systems in place. The laser should be operated within a localized enclosure or in a light-tight room with interlocked entrances to ensure that the laser cannot emit while a door is open.
- 11) The laser beam or its specular reflection should never be directly viewed either by the unaided eye or with optical instruments such as binoculars or telescopes without sufficient protective filters in place.
- 12) Make sure that there is nothing in the laser beam path which can return direct reflections into the laser.
- 13) Enclose as much of the beam path as possible. Even a transparent enclosure will prevent individuals from placing their head or reflecting objects within the beam path.
- 14) Terminations should be used at the end of useful paths of the direct and any secondary beams. Remove all unnecessary mirror-like surfaces from within the vicinity of the laser's beam path.
- 15) Always ensure that there is nothing in the beam path which will be likely to cause dangerous reflections or be ignited by the laser beam.
- 16) Never open the power supply or put any object through the cooling vents into the power supply – they may touch dangerous voltage points or short out parts that could result in a risk of electric shock or cause the laser system to fail.
- 17) "Caution – Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure"
- 18) This is a Class 3B laser product. **INVISIBLE LASER RADIATION. AVOID EXPOSURE TO BEAM.**
- 19) The laser output is of high intensity. The maximum laser output energy from the aperture of the laser is  $< 100 \mu\text{J}$ .
- 20) The output beam may also include output in the pumping frequency.
- 21) A potential eye hazard exists for the direct beam or a specular reflection.  
Always use proper laser eye protection: safety goggles.
- 22) Ensure that the goggles are suitable for the wavelength being emitted and they fit snugly.



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