

Operation Instruction for Model with PSU-W-LED



Caution-Use of controls or adjustments or performance of procedures other than those specified in this manual may result in hazardous radiation exposure.

Note: The laser only can be operated after the case temperature of the laser system return to the room temperature to avoid the damage of the big temperature range.

1. Product features

NOTE:

- A. We suggest that the laser be mounted on a flat, thermally dissipating surface to maintain a high-level of heat dissipation, and reliability.
- B. Slowly change between 10°C-35°C. Or else, the laser will not work well. Do not touch any element of the PC board. Or else, the laser will not work well. If the laser is not already mounted on a thermally dissipating surface, it is strongly advised to do so. Failure to comply with this procedure may cause permanent damage to the laser.
- C. The air duct should not be blocked, and make sure there is nothing placed within 0.05m-0.1m.
- D. If the laser system needs to be installed into equipment, please make sure the airflow clear. If necessary, the extra fans can be used for heat dissipation.



- 1.1. Check the main power and make sure it is in “OFF” state.
- 1.2. Check the key switch and make sure it is in “OFF” state.
- 1.3. Emergency switch: When unexpected accident occurs, you can press it down to switch off the laser. You need to reset the main power and key switch to restart the laser.
- 1.4. Lock: It is the lock of the power control knob. Unlock position see figure.
Knob: The knob is fixed on the maximum current position as factory default. Please unlock it before adjusting the knob.
Turn the knob counter-clockwise, the output power is decreased.
- 1.5. Display: it shows the current as factory default.
- 1.6. Make sure your local voltage is in the range showed at the back panel.



1.7. Interlock: Pull out the crystal plug or disconnect the short wire on the plug(if there are two short wires ,disconnect both of them), laser system will stop working. At this point you must connect the plug or restore short wires, turn off the electronic lock, and then open it, the laser system return to normal working station.

1.8. TTL or Analogue external control signal interface.

1.9. Toggle switch:

1.9.1. Push it to “Local” position, the laser works as CW.

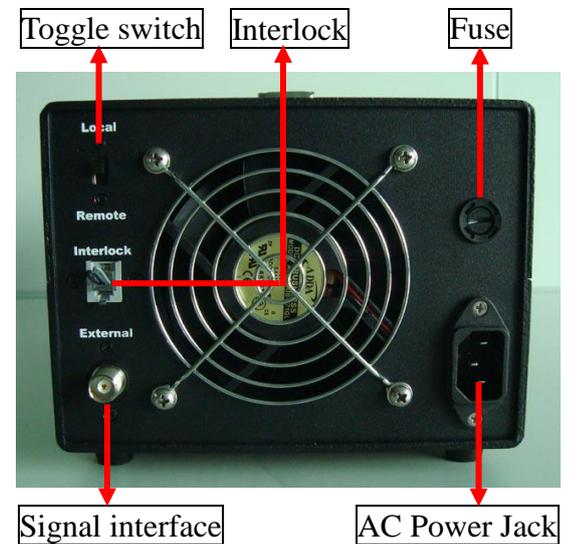
1.9.2. Push it to “Remote” position, the laser works as CW and

the external TTL signal could be added on the laser.

Note: Make sure the key switch is on “off” state before changing the toggle switch.

1.10. Fuse: if the power supply has no function (fan in the driver doesn’t work or the red LED-“power” is off), the most possible problem is the fuse broken. Please note to replace the fuse after switching off the key switch and mains power. (Using 5A and 3A fuse under 110V and 220V respectively.)

Note: The corresponding fuse with default parameters as shown in the table is inserted into the laser driver as the factory default and the client should change the proper fuse according to the operation voltage to avoid the damage of the elements of the laser.



Voltage of Driver	110V	220V	110V/220V
Fuse Default Parameters	5A	3A	3A

1.11. This is modulation cord. The white wire is anode (+), and the other is for cathode (-).

2. Operation

Note: Due to the output power of the laser is high, please place a black metal object that is not combustibile and doesn’t reflect in front of the aperture of the laser. Avoid burning skin and emblazing other objects.

2.1. The connector is with the function of protecting. Please remove it when using the laser. (When the laser is not connected with the power supply, please cover it to avoid the damage of the laser).



- 2.2. Attach the laser head to the connector of power supply firmly. Please make sure to fasten the locking ring on the connector.
- 2.3. Connect the power cord of the power supply to AC Power Jack.
- 2.4. Open the shutter.
- 2.5. Switch on the main power of the power supply. The red LED - “Power” is on.
- 2.6. The laser start to work after 10 seconds, the green LED-“Laser” is on. The warming up time is about 15minutes
- 2.7. Only for unexpected accident occurs, the red LED-“Alarm” will be on. That means the laser system works in abnormal state. Please switch off the mains power. Please reset the mains power and key switch after a few minutes, then to restart the laser system again.
- 2.8. TTL and analogue modulation are optional. As for the TTL or analogue instruction, please refer to the “Notes for TTL Modulation” or “Notes for Analog Modulation ”.
 - 2.8.1. Notes for TTL Modulation
 - a) Without signal input (or the leads open), the laser is in CW operation.
 - b) With signal low level input, the laser outputs minimum value/No output.
 - c) With signal high level input, the laser outputs maximum value.
 - 2.8.2. Notes for Analog Modulation
 - a) Without signal input (or the leads open), laser is in the off state.
 - b) With signal low level input, the laser outputs minimum value/No output.
 - c) With signal 5VDC input, the laser outputs maximum value.
 - d) With other voltage between 0-5VDC, such as 1V, 2V, 3V, 4V, 4.5V, the laser outputs different powers.
- 2.9. Closing the laser system: switch off the mains power of the power supply.
- 2.10. To prevent optic path from dust, you should close the shutter.



3. Operating Environment

- 3.1. Temperature: 10-35°C (environment temperature)
25±3°C (bottom plate temperature /recommended temperature)
- NOTE:** It is not recommended to operate the laser outside of this temperature range for prolonged periods. The unit is designed to shut down if the laser exceeds operating temperature limits. Failure to comply with the environment temperature may cause permanent damage to the laser. All lasers are designed with ESD protection.
- 3.2. It should also be noted that the laser must be operated in an environment with low vibration to meet the power stability specifications.
 - 3.3. Humidity: 50±10% (RH)
If the air humidity overruns the figure, the working capability of the laser system will be affected indirectly (e.g. intracavity crystal deliquescence, circuit board short etc.). And operate the laser in an environment in which there is normal aeration.
 - 3.4. Threshold voltage: (According to the testing report)
Failure to comply with this procedure may cause permanent damage to the laser.
Following is the possibility if the service voltage is unstable:
 - 3.4.1. Integrated circuit will be damaged; crystal cooling exceeds the rated value (crystal cooling circuit

invalid), output power decreased, and fan not run, caused by unstable service voltage.

3.4.2. Unstable power supply makes LD damaged by instantaneous peak current passing.

3.4.3. Unstable voltage static electronic makes potentiometer electric capacity resistor integrated circuit TEC circuit PC board damaged.

3.5. Threshold current: (According to the testing report)

Failure to comply with this procedure may cause permanent damage to the laser. The potentiometer capacitance resistance integrated circuit chiller circuit PC board may be damaged by momentary current or unstable current.

4. Laser safety



4.1. Optical Safety

4.1.1. Wearing a set of proper laser safety goggles is a good idea. Though laser safety goggles can protect a person's vision, it's always best to remember NEVER to look into a laser beam or bright reflection even when wearing laser safety goggles. Safety with high powered lasers is a critical issue that cannot be overlooked. Despite their brilliant beams and ability to burn, high power laser pointers and portable lasers are only a danger to your eyes. The danger that lasers represent to your eyes though is very serious. The visual receptors in your eyes are part of your central nervous system which means if your eyes are damaged, they do not heal or recover.

4.1.2. As far as power output, laser pointers and portable lasers do not release that much power. Especially not when compared to a normal 75W or 100W light globe. What makes the light from lasers so dangerous is that it has two unique properties.

4.1.3. Coherent and focused. The energy is focused on a very small area similar to the way a magnifying glass focuses the sun.

4.1.4. Collimated. The light does not spread out from a laser; it stays in a focused narrow beam that makes lasers almost as dangerous at a distance as close up.

4.1.5. Viewing optics or display screens should be used during operation to make the accessible emission less than Class I, reflected beams can cause serious accident by aiming beam at reflective surfaces, e.g. mirror, glass and bright metal.

4.1.6. Never use your laser in the vicinity of highways and airports. DO NOT target moving vehicles and airplanes.

4.1.7. Never randomly aim a laser out the window

4.1.8. DO NOT use a laser at the place marked "No smoking" "flammable and explosive" and easily caused the danger.

4.1.9. Use an infrared detector to verify that the laser beam is on or off before working on the laser.

4.1.10. Set up controlled access areas with for laser only in well marked areas with controlled access. Be sure to post appropriate warning signs visible to all.

4.1.11. The operation of lasers should be under the supervision of qualified personnel only. When not in use, lasers should be shut down completely and made off-limit to unauthorized personnel.

4.1.12. Limit access to the laser system to persons required to be present.

4.1.13. Laser should be operated in the ambient of clean and dry and no electric.

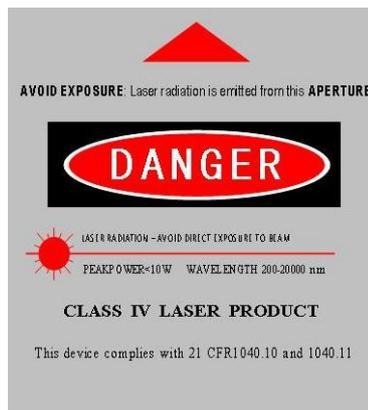
4.1.14. Maintain experimental setups at low level to prevent inadvertent eye encounter with beams.

4.2. Electrical Safety Precautions

4.2.1. Disconnect main power lines before working on any electrical equipment when it is not necessary for the equipment to be operating.



- 4.2.2. Never work on electrical equipment unless there is another person nearby who is familiar with the operation and hazards of the equipment, and who is competent to administer first aid.
- 4.2.3. When possible, keep one hand away from the equipment to reduce the danger of current flowing through the body if a live circuit is accidentally touched.
- 4.2.4. Always use approved, insulated tool when working on equipment.
- 4.2.5. Special measurement techniques are required for this system. Ground references must be selected by a technician who has a complete understanding of the system operation and associated electronics.



Invisible or visible radiation is dangerous to humans and should not be viewed directly or indirectly with or without optical instruments. Please refer to IEC 825-1 "Safety of Laser Products" and 21 CFR 1040.10-1040.11 "Performance Standards for Light Emitting Products" for additional information.

5. Warranty and maintenance

- 5.1. The warranty is one year from the shipping date.
- 5.2. This warranty will not apply to those products which have been repaired or altered other than in accordance with the terms of this agreement.
 - 5.2.1. Abused, misused, improper handling in use, or storage, or used in an unauthorized or improper manner or without following written procedures supplied by manufacturer.
 - 5.2.2. Original identification markings or labels have been removed, defaced or altered.
 - 5.2.3. Any other claims not arising directly from defects in material or workmanship.
- 5.3. Laser should be operated in the ambient of clean and dry and no electric
- 5.4. Always use finger cots, latex gloves, or the equivalent when handling optics, and use a clean, cushioned work surface.
- 5.5. In case you have any question during operation, contact our representative.
- 5.6. Please do not open the laser head without instructions from manufacturer, which may lead to the danger of exposure of hazardous visible and invisible laser radiation. Exceptional care must be taken when operating the laser with the covers removed. Laser protective eye ware must be worn.
- 5.7. Please operate the laser according to the operation instructions.