Laser instruction manual

PSU-A-D

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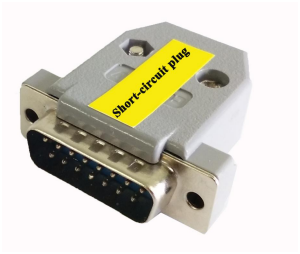
3. Short-circuit plug 	4. Keys 
5. BNC cable 	6. Main power supply cable 

II. Use of symbols

	**Warning: This symbol is used to warn operators of hazards easily caused by visible and invisible laser radiation!**
	**Note: Remind operators to prevent danger, pay attention to whether the operation is correct, the wrong operation and connection may lead to personnel injury or damage of goods.**
	**Danger: Beware of electric shock, high voltage danger!**

III. Safety precautions and instructions

	**Warning: Laser radiation can cause damage to eyes and skin. The safety precautions and instructions mentioned in this manual must be followed in the process of installing or operating this laser system.** **All laser safety rules and standards are applicable. The safety precautions and instructions mentioned in this manual cannot replace the safety standards applicable with other countries.**

Optical safety

	**Please pay extra attention to laser products which wavelength range is greater than 700nm (invisible infrared light) or less than 400nm (invisible ultraviolet light). Because this invisible laser is very dangerous.**

1.1. Do not observe laser or scattered laser radiation directly or indirectly.

1.2. Monitor should also be used even when the Laser level below Class I, it cannot observe directly with naked eyes.

1.3. Wear appropriate laser goggles. Even though laser goggles can protect a person's vision, make sure that never look into the laser beam or highly reflective surface.

1.4. Laser beam on highly reflective surfaces can cause serious injury, such as mirrors, glass, metal, etc. Reflected scattered lasers are also dangerous.

1.5. Do not aim at targets with a laser randomly.

1.6. Do not use the laser at the places marked "No Smoking" or "Flammable and Explosive", which may cause danger.

1.7. For invisible lasers, use an infrared detector or infrared display card to verify if the laser is working before operating the laser.

1.8. Always use clean finger cots, latex gloves and other insulation equipment when handling optic problems.

1.9. Post warning signs in notable location of laser operation area. Set up reminder signs when the laser is operating and impose restrictions on non-operating personnel to the laser working area.

1.10. If the laser is not in use or unattended, the laser should be turned off completely.

1.11. Make sure the beam height is not near eye level to avoid inadvertent eye encounter with beam.

Electrical safety

Unauthorized repair is not recommended and the risks arising therefrom shall be borne by the user. The non-tear tag fails will lose the warranty any unauthorized repair may invalidate the warranty.

2.1. Unplug the main power cord immediately when the equipment is not in use. And keep the laser head connected with the power supply tightly to prevent static damage.

2.2. Any operations to disconnect and connect the laser head to the power supply need to ensure that the power is turned off.

2.3. If conditions permit, please keep enough distance from the device to reduce the risk of electric shock

2.4. Do not touch exposed wiring and components when power is on.

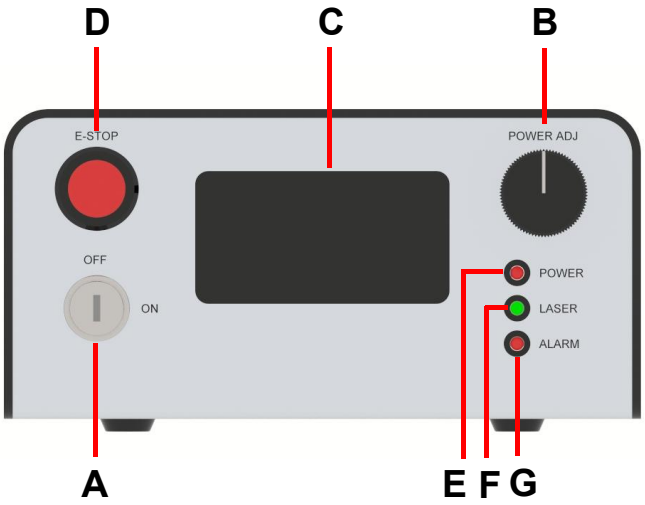
2.5. Ensure that insulated tools are used when maintaining or repairing electrical equipment.

2.6. In order to avoid damage to the laser system caused by lightning strike, static electricity, electrical interference, etc., it is necessary to ensure that the laser system is properly connected to the ground.

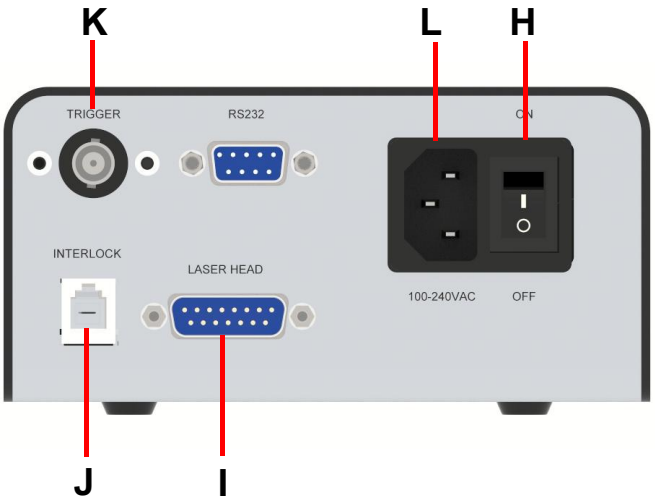
2.7. Follow all ratings on the product instructions to avoid fire disaster or electric shock. Please refer to the product instruction for detailed information about the rating before connecting the product.

IV. Power supply description and function introduction

Power supply front panel function description



Power supply back panel function description



Function description of power supply

	Name of each part	Function introduction
A	Key switch	The laser will turn off when the key switch set to “off”.
B	Adjustment knob	1. Press the knob: Switch over between the functions in the menu. 2. Turn the knob: 2.1. **I:** Adjust current value in the first line of the menu, turn the knob clockwise, the current is increased. Otherwise, the current is decreased. 2.2. **Step:** Switch the step length in the second line of the menu; 2.3. **Trig:** Switch work mode in the third line of the menu; 2.4. **Option:** Switch over between unlock state and lock state in the forth line of the menu. **Note: Please unlock the menu before adjusting the knob.**
C	Display	Display work state.
D	Emergency stop button	If an emergency occurs, press this button to stop the laser. To restart the laser, you need to restart the power switch and key switch to resume work.
E	Power supply indicator	When the power supply is working, the "Power" light up.
F	Laser output indicator	When the laser starts to output, the "Laser" light up.
G	Alarm indicator	If the red light "Alarm" is on, please turn off the power switch. After a few minutes, turn on the power switch and key switch again, and the laser will resume to work.
H	Power switch	Power switch is the main power unit of the power supply, it is switched between “on” and “off”. The power supply will turn off when the power switch is set to "off".
I	Laser head connection and control interface	Plug the laser head to the interface. Fix the screw by side of the interface.
J	Security lock "interlock"	Unplug the crystal plug, or cut off the shorting stub on the plug (you must cut off all the shorting stubs whether there is one or two of them). The laser system will stop working. At this time, you need to plug the crystal plug or resuming shorting stub and restart the key switch, then the laser system can be restored to normal working status.
K	Trigger	Trigger is used for TTL or analog modulation. You need connect BNC when use it. The white cable connect to positive electrode; the black cable connect to negative electrode. First connect the black cable then connect the white cable. The order is reversed when closing.
L	Power supply socket	Supply voltage to the power supply. Make sure your local voltage is in the range showed at the back panel (100-240VAC).

V. Operating environment

	**Harmful laser radiation may occur if the control, adjustment and operation methods specified by us are not followed.**

	**It's not allowed to turn on the laser until the temperature of the laser shell close to the operating temperature, to avoid the device damage caused by excessive temperature differentials.**

	**In order to extend the lifetime of the laser, it is recommended that: do not use it over the given temperature range by us. If it exceeds its limit temperature, the entire system will turn to protective state and cannot output laser. Failure to operate follow this specification may cause fatal damage to the laser. All lasers have electrostatic discharge protection.**

The operating environment conditions of the laser system are as follows:

1. Temperature: 10-35 ° C (ambient temperature)
   25 ± 3 ℃ (suggest base plate temperature)
2. Maximum relative humidity: <90%
3. Main power voltage: less than ± 10% of the nominal voltage.

VI. Preparing for operation

1. Check out if the power switch and the key switch are set to "off".
2. Provide voltage to power supply as indicated on its back panel.
3. Connect a BNC cable to the trigger on the back panel of power supply if need to use modulation function.

VII. Installation and operating instructions

	**Make sure read all the safety instructions mentioned in the previous parts carefully and well understand**

	**Note: The laser system must be installed and operated by a professional who is well knowledged in all laser safety terms and equipment safety. The customer should take all necessary measures to ensure the safety of the laser system. We are not responsible for any damage to the laser or personal injury caused by improper installation and operation. Please contact us if there is any question.**

	➢ **We strongly recommend that place the machine on a well cooling platform to maintain the laser temperature within limits. Otherwise it will cause fatal damage to the laser.** ➢ **The temperature is required to change slowly within 10 ℃ -35 ℃, otherwise the laser will not keep working well.** ➢ **Do not paste anything under the laser.** ➢ **Make sure there are no obstructions at 0.05m-0.1m from the ventilation opening and ensure a good heat dissipation environment.** ➢ **If the laser system needs to be installed inside other equipment, please ensure well ventilation. Additional fans could be used for heat dissipation if necessary. The direction of the cooling air flow should be the same as the laser fan.**

1. Please remove the short-circuit plug of the laser head. (When the laser is not connected with the power supply, please cover it to avoid the static damage to the laser)
2. Connect the laser plug with the power supply. Fix the screw by side of the laser head connection interface.
3. Connect the power supply cable to the power supply socket.
4. Remove the block label in front of the laser head. Open the shutter of laser head if there have one.
5. Turn on the power switch. The red indicator "Power" light up.
6. Turn on the key switch. After about 5 seconds, the green indicator "Laser" lights up and the laser starts to work. The laser will operate stably after about 5 minutes at room temperature.

7. If the red alarm indicator "Alarm" is on, please turn off the power switch. After a few minutes, turn on the power switch and the key switch the laser will back in operating mode.

8. Refer to different instructions according to different modulation mode of product.

8.1. Laser TTL modulation instruction

a） Without signal input, the laser is in CW operation;

b） When the signal input at low level (<0.7V), the laser is off;

c） When the signal input at high level(> 2.3V), the laser is on;

d） The input voltage cannot exceed 5.2V.

8.2. Laser analog modulation instruction

a) Without signal input, the laser is off;

b) When the signal input at low level (<0.7V), the laser is off;

c) When the signal input at 4.5V, the laser outputs maximum value.

d) When the signal input voltage between 0-5V, such as 1.5V, 2.6V ...3.8V... the laser will have different output power

e) The input voltage cannot exceed 5.2V.

9. Turn off the laser system: Turn off the key switch, then turn off the power switch, after that unplug the power supply plug.

10. Close the shutter of laser head if there have one. Attach the block label.

Operation procedure instruction of the power supply

Note: Factory default: 0mA, TTL Mode, Unlock state.

When you restart the laser system, the default values will be the value setted last time.

Constant Current Mode：

Turn on the main power. The red LED - “Power” is on. Then turn on the key switch. The laser starts to work after about 5 seconds delay. The green LED -“Laser” is on. The display shows as followed:

```
▶ I:     ×××mA     ACC
  Step:   ×××
  Trig:   TTL
  Option: Unlock
```

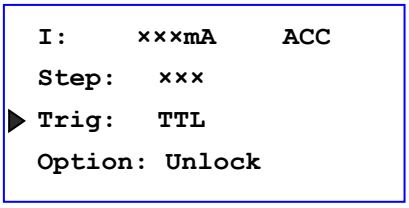
At this time, turn the knob to change the current value.

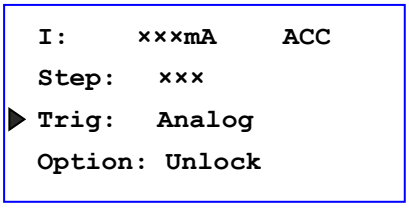
Press the knob to enter into the second line of the menu. Turn the knob clockwise/counter-clockwise to increase/decrease the current value with the setted steps.

The optional steps are 1mA, 10mA, 50mA, 100mA.

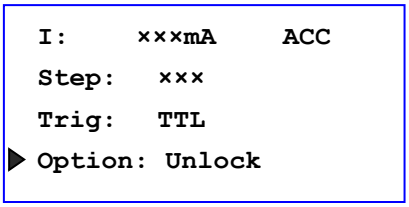
```
  I:     ×××mA     ACC
▶ Step:   ×××
  Trig:   TTL
  Option: Unlock
```

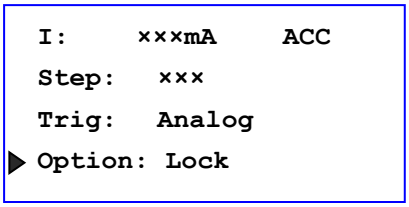
Press the knob to enter into the third line of the menu. Turn the knob, switch between TTL Mode and Analog Mode.





Press the knob to enter into the forth line of the menu. Turn the knob clockwise, switch between unlock state and lock state.





VIII. Warranty and maintenance

	**Warning: Do not open or remove the cover of the laser and the shell of the laser power supply without authorization please, otherwise there will be risk of personnel injury by the laser and invalidating the warranty at the same time. It is recommended to return the laser to us for repair if necessary.**

1. The warranty period of this product is one year from the shipping date.

2. Any of the following cases will not count as warranty object.

2.1 Misused, improper operation, improper storage or unauthorized operation, and some processing operations supplemented by agency;

2.2 Remove or damage or change the initial identification number or label;

2.3 Any other claims not arising directly from defects in materials or workmanship.

3. The laser should be used in a clean, dry, dust-free and static-free environment.

4. If there are any questions during operation, please contact representative.

5. Please do not turn on the laser before reading the instructions to avoid danger. Must wear laser goggle and take special protective measures when removing the laser cover.

6. Please follow the instruction manual to operate the laser.