

Opt Lasers

CLH 2500/5000

Engraving laser head



Product Description

This CNC sub-assembly is a high power engraving laser head with a professional CLHD high speed driver. It is available in two versions: 2,5 W and 5W. Its aluminium body assures proper heat transfer to metal holder or other heatsink.

The diameter of the laser head is 43mm which makes it easy to mount on many CNC spindle holders. The laser head allows to cut or engrave materials such as wood, plywood, acryl, paper, leather, cardstock and many other. Thanks to full analog modulation it is possible to engrave in shades of grey or change the output power during turns. High speed modulation (up to 100 kHz) allows to use high movement speed during engraving even complicated patterns. The length of the wire between laser head and driver is about 35 cm.

The module is not using G2 lenses but other aspherical single element lens. G2 lenses are popular because of the efficiency but in this situation it is not the most important parameter. While engraving, power density is more important - unfortunately G2 lenses are not providing small beam spot (while focused). Our aspherical single element lens are working perfectly in this kind of devices. We also attach three element lens which are making bigger optical power loss but allows to obtain even smaller beamspot which helps to get bigger power density.

Depending on the version module is using:

a) 5W laser head CLH - 5000

Brand new NUBM44 450nm (capable of 6W) laser diode. It is possible to get over 5 W power when just slightly overclocked. Suggested current in datasheet is 3,5A we are using 3,6 -

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3,7A to obtain >5W with single element lens.

b) 2,5W laser head CLH - 2500

Brand new Nichia 1,6 W (capable of 3W) 445 nm NDB7875 laser diode. Suggested current in datasheet is 1,6A and we are using 2A to obtain 2,5W with single element lens.



Lifetime of laser diode is given as 10000h but it is manufacturer statement, real lifetime of the laser diode is closer to 5000h. To reach longer lifetime proper cooling should be applied

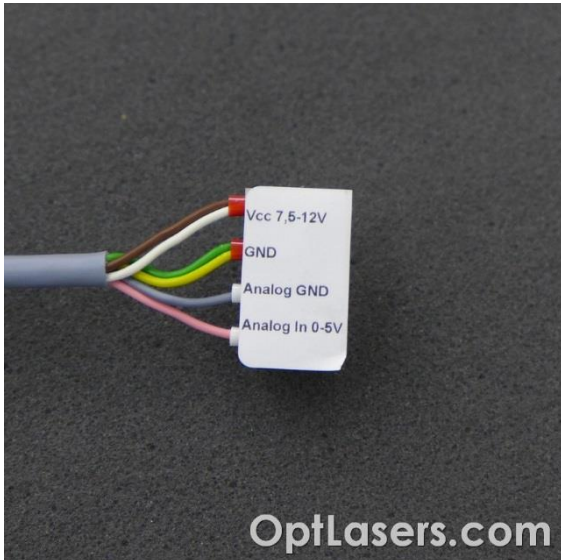
It is also possible to buy a version with additional aluminium holder which allows to mount the engraving laser head on the moving part of the machine. Single 6 mm diameter hole is designed for compressed-air system tube (tube is not included). Holder can be mounted to the machine with M6 screws (2x M6 30 mm length screws are included).

Technical Data

Wavelength	445 nm	
Output optical power at 20°C	2,5 W	5 W
Modulation	TTL or analog	
Modulation frequency	Max 100kHz	
Input voltage	7,5 - 12 V	
Modulation voltage	0 - 5 V	
Focus distance	Adjustable	
Wires	High quality cable	
Laser head diameter	43 mm	
Laser head length	50 mm	

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Connection of the engraving laser head



Caution:

Remember to use both of GND cables.

How to power supply the engraving laser head

Depending on the version, different power supplies are recommended:

Version	Power supply
2,5 W 445 nm	7,5 V 3 A
5 W 445 nm	7,5 V 5 A

Setting the focal length/distance

It is hard to measure the exact distance of waist of a beam from the laser head. Setting the focus distance should be firstly done by turning the lens and then, after making the lens not move, by using your Z axis in CNC machine. Focus depends on type of lens used and their distance from laser diode. Be careful not to unscrew the lens – the lens can fall down and get dirty/destroyed. For three element lens focus length should be in range between 120 and 40mm. For single element lens it should be in range between 100 and 20mm. Nevertheless accurate focus distance should be set according to the test made with your material.

Caution!

- Remember that it is not a toy.
- Laser radiation is dangerous even when scattered or reflected from any surface.
- Always use proper protection laser filter on your CNC machine dedicated to 430 - 480nm in order to avoid reflected

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radiation.

-Never point laser head at people or animals.

-Do not touch the beam, it may cause burns.

-Do not stare at the beam or the beam spot while the material is being cut.



Recommendations and requirements

Modulation input can be used as TTL input with its logic levels of 0V and 5V or as an analog input. Analog modulation means that by using 2,5 V on ANG input you get 50% output power, analogically by using 4 V you get 80% output power, etc.

It is very important to ensure proper cooling so laser head is meant to be mounted in metal part, similar which is holding spindle. Maximum working temperature for laser head is 35 degrees Celsius. User should monitor the temperature and switch off the laser head in case of overheat.

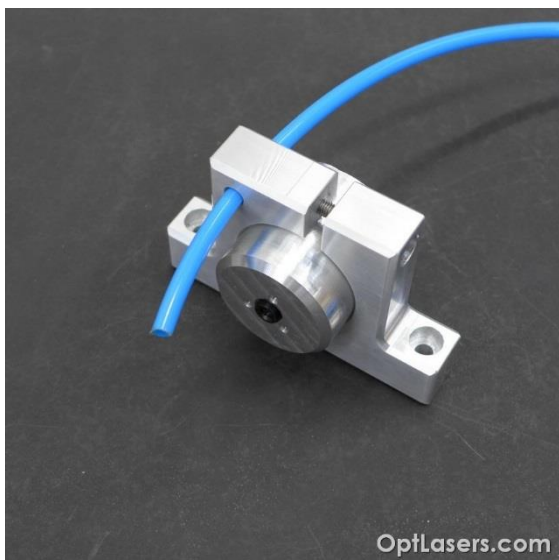
Cleaning the optics is important since dirty optics reflect some % of power back to the diode what may be damage it irreparably.

Air flow is very important during the engraving process since it is blowing out dark smoke which can cause optical obstacle for a laser beam.

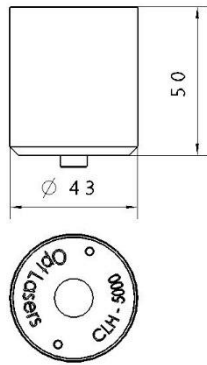
Protection

The analog input is protected by a 5V1 Zener diode on occasion there appears the voltage higher than 5V. Despite everything, this input should not be used with higher voltages.

The output of the driver is protected by Shottky diode which doesn't allow the reverse voltage to appear.

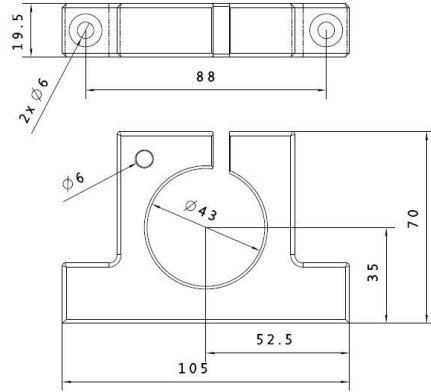


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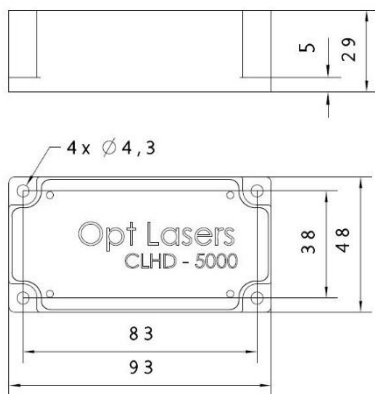
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Dimensions of the laser head



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Dimensions of the aluminum mount



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Dimensions of the CLHD - 5000



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Additional components (depending on set, different parts are included)

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Parameters of cutting

Note, that this speeds and parameters are effects of tests and can be different for some materials, cooling systems as well setting of the focus distance.

Vinyl 2mm: 100mm/min; 5W; 1 pass (*)

Wood 3mm: 200mm/min; 5W; 3 passes (1 pass for each mm)

Plywood 10mm: 300mm/min; 5W; 10 passes (1 pass for each mm)

InchJet Photographic paper:

400mm/min; 5W; 1pass

Paper: 600mm/min 2W

Red Plexiglass 3mm: 100 mm/min 4 pass.
NO SMOKE

Laser have no effects on:

Transparent acrylic/plexiglass

*= the smoke must be removed quickly

