

Hylewicz CNC-Technik

Laser engraving device User manual

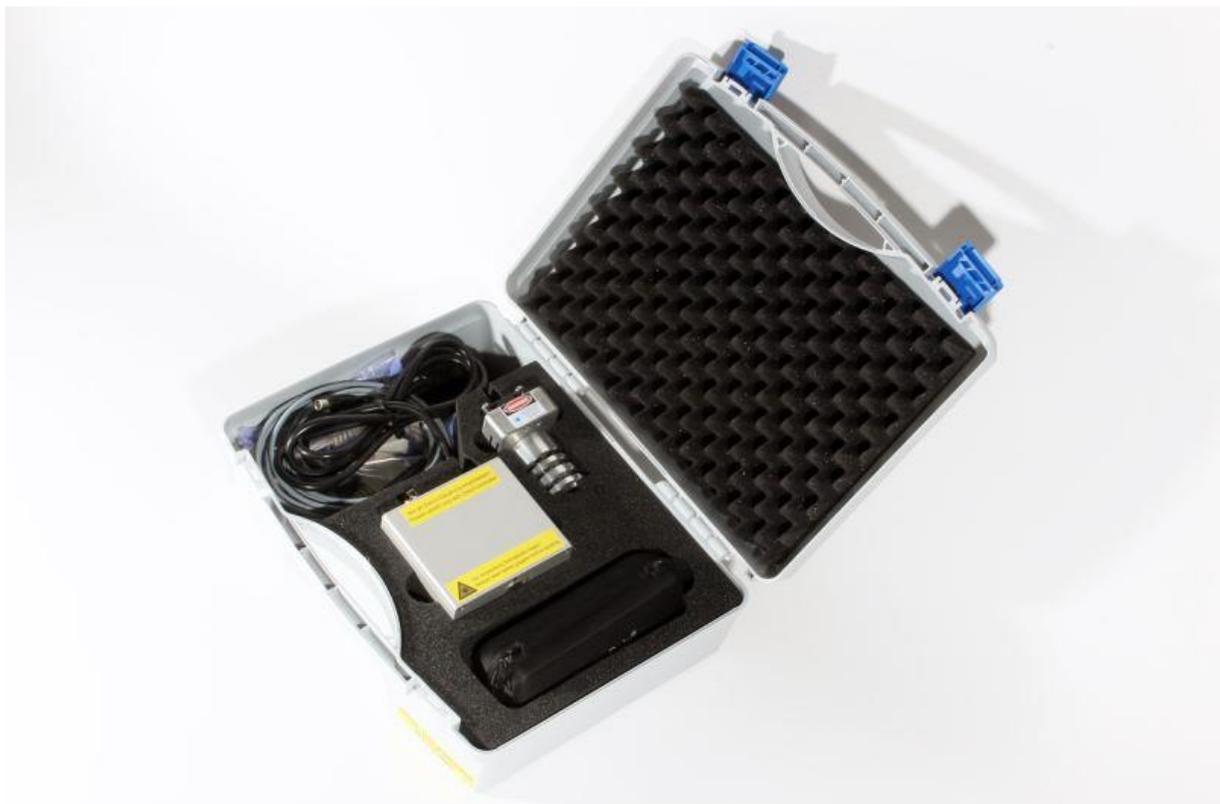
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Laser engraving device

User manual



Short description

The case contains the complete electronics to place the laser module in service, as well as the complete laser engraving device, including appropriate high-quality safety glasses, which are necessary to use our laser engraving device. A High-Z portal machine with computer and appropriate CAM/CNC-control-software (WinPCNC, ConstruCam-3D, etc.) is necessary to put the machine into service. This manual describes the installation, startup and service of our laser engraving device.

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1 General

The engraving device was designed on the basis of the strict observance of standard regulations and guidelines and has been tested insensitively and carefully. However, we provide no guarantee of fault-free operation. The manufacturer ensures that the engraving device in connection with the most suitable mechanical components, used within the meaning of the description and user manual are suitable for their designated use. The possibility is excluded of any liability whatsoever being assumed for damages, claims or costs, indirect and direct consequential damage or other damage, from lost profit, operational disruptions and stoppages, loss of business information and so on. The engraving device is an application, which only works in conjunction with a portal unit and appropriate software. It is no self-contained machine or handheld device. In view of the fact that, despite intensive endeavors, errors can never be completely avoided, we are thankful at all times for tips and suggestions for improvement.

1.1 Description of symbols



HINT: Special instructions relating to the effective use of the equipment



ATTENTION!: General and additional information or instructions and prohibitions for avoiding damage.



Instructions or restrictions designed for the protection of personnel and safety of the device



Not to be used by persons with pacemakers

This sign stands for activities involving a high risk for persons with pacemakers.



Warning of hazardous electrical voltage

This sign stands for activities involving system components carrying live voltage.



Warning of hot surface

This sign stands for activities where hot items need to be handled.



Laser Radiation Warning - Avoid irradiation of eyes and skin by beam- or scattered radiation.

This sign stands for activities where special protection measures are required.

2 Function overview

The laser engraving device produces a laser beam. By pulse width modulation (PWM Signal output via CAM-software) the power of the Laser can be controlled.

For the usage of the laser engraving device a safeguarding by three functions exists in order to prevent unintentional activation of the laser.

- mains switch on the rear side (On/Off)
- front side key switch (0/1)
- E-stop-/toggle controlled connection to Zero3 ()

3 SECURITY MEASURES

3.1 Organizational safety precautions

- Always keep this user manual at hand when working on the machine. (in the tool compartment or container provided for this purpose)!
- Further to this installation manual, personnel shall also comply with general and specific statutory regulation on accident prevention and environmental protection! Please give adequate instructions to the operating staff.
- Please add instructions including the information on the responsibilities of supervision and obligations to report for the observance of operational specifics, e.g. concerning labor organizations, operational sequences and appointed personnel.
- In order to reduce risks to your staff, personal protective equipment must be used in so far as this is necessary or deemed to be so by regulations. In accordance with the corresponding rules and regulations, the user must make sure the operating personnel is provided with the required personal safety equipment and makes use of it!
- At regular intervals, please check that personnel are conscious of safety and the hazards involved in their work and are taking account of the Operating Instructions.
- The personnel should not have long hair, loose clothing or jewellery including rings. Injury may result for example from hair being caught up in the machinery or from rings catching on moving parts.
- Personnel entrusted with work on the machine must observe all safety notes and hazard warnings!
- Ensure that all safety and danger hints on the machine are clearly readable!
- Maintain a clean and orderly work area
- In case of safety-relevant changes, the machine/ plant or its operation must be stopped immediately and report the malfunction to the concerned site/person!
- Do not change or modify the machine in any way that might affect safety, unless such change or modification has been approved expressly by the manufacturer
- Spare parts and accessories must satisfy the requirements specified by the manufacturer. This is always guaranteed with **original** spare parts.
- Prescribed intervals for regular maintenance work or such intervals specified in the Operating Instructions must be observed!
- Workshop equipment appropriate to the task in hand is absolutely necessary for the execution of maintenance work.



Hint: Please note the manufacture's documentation of our supplying company!



Hint: Please also note the additional safety instructions for the device in the following sections.

3.2 Selection and qualification of personnel, basic duties

- Assign a machine operator with regard to traffic laws and establish a procedure for him to inform a third person of unfavorable safety conditions!
- Employ only trained and instructed staff and set out clearly the individual responsibilities of the personnel for operation, set-up, maintenance and repair!
- Work on / with the machine / unit may only be carried out by reliable personnel. (Statutory minimum age limits must be observed)!
- Please secure that only personnel, who are accordingly assigned for work on the Unit, are deployed (trained laser protection officer)!

- Personnel to be trained, taught, instructed or those placed in an apprenticeship may only work on the system whilst under the constant supervision of an experienced person!
- Any work on the system may only be carried out by qualified and authorized personnel...

3.3 Safety guidelines

All unauthorized modifications to the unit or the usage of any spare parts or replacement parts not approved by Hylewicz CNC-Technik can lead to the warranty being rendered null and void.

The application is equipped with a forced-air ventilation system. The heat-generating components can reach temperatures over 70°C when using in normal operating condition. Allow adequate ventilation. Ventilation openings must not be sealed, covered or dirty. In order to ensure the safety of the components, please use supplied cable for our laserhead. (5 pol. laser access line).

3.4 Safety references on distinct operational phases

In normal operation

- Before operating the machine, ensure that only authorized personnel are present within the working range of the engine!
- Any working methods that might endanger safety are to be avoided!
- Take precautions to ensure that the unit is only used when in safe and reliable state!
- Operate machine only when all protective devices and safety-conditioned devices, say, detachable protective devices, emergency-off- devices, exhaust, are available and are functional
- The operator is obliged to check the machine for visible damage and faults at least once per shift. You must immediately report any changes (including changes in the working characteristics) to the organization or person responsible! Instantly stop the device!
- If changes to the normal operations are discovered the machine should be taken out of operation. Have the faults rectified immediately!
- Observe instructions for switching on and off the plant, running up of plant, control displays in accordance with the operating instructions.



Hint: Please also note the additional safety instructions in the following sections!

Setup, maintenance, repair, disposal

- Specified implementation also includes adhering to the operating and maintenance conditions stipulated by the manufacturer! These activities must be carried out by qualified personnel only.
- Inform operating personnel about the special- and maintenance work before the beginning of work! Name a supervisor!
- Please note that the switch-on and switch-off processes must be ensured according to the operating and maintenance manual and instructions for maintenance work!
- Secure a wide area around the maintenance area as far as is necessary!
- If the machine / unit is completely switched off for maintenance and repair work, ensure that it is protected from unexpected startup, for example by securing the main switch or displaying a warning sign on the main switch.
- When carrying out installation work above your head, use appropriate and safe climbing aids and working platforms. Wear a safety harness when carrying out maintenance work at greater heights!
- All handles, steps, railings, landings, platforms, ladders have to be kept free of dirt!
- Check the tightness of all threaded connections and take up slack if necessary after maintenance.

- If it is necessary to disassemble safety features during maintenance or repair work, these features must be reassembled and tested immediately following the completion of such work.
- Provide a safe and environment-friendly disposal of consumables, ancillary materials and replaced parts!



Hint: Please also note the additional safety instructions in the following sections!



WICHTIG: Operating without suction can lead to deposits in the form of dust and vapor. These deposits lead to damage on the portal machine!

SPECIAL DANGERS

Laser beams



- Work on laser equipment or operating materials may only be carried out by a skilled worker, in accordance with the guidelines for accident prevention regulation GUV-V B2 as well as GUV-I 832 for laser systems with appropriate safety equipment (laser safety curtains, safety glasses, and housings with laser protection glass).

Electrical energy

- Work on electrical equipment or operating material may only be carried out by a qualified electrician according to electrical principles or by specially instructed personnel under the control and supervision of such an electrician and in accordance with the applicable electrical engineering rules.



- To guarantee health and safety, people with pacemakers are not allowed to enter the switch cabinet area!



- Machines and unit parts which must undergo inspection, maintenance and repair work must be disconnected from the mains supply, if specified. Before starting any work, you must check the de-energized parts for the presence of power and earth or short-circuit them in addition to insulating adjacent live parts and elements.
- Use only original fuses with the specified current rating. Immediately switch off the installation if disturbances in the supply of electric energy occur!
- Inspect/check electrical equipment of machine regularly. A damaged mains cable should be replaced immediately!



- If repairs must be performed on live parts a second person must be present who can in an emergency stop any dangerous movements with the emergency stop switch or activate the main isolator disconnect switch to cut the voltage secure the working area with a red-and-white safety chain and a warning plate. Use insulated tools only!



Hint: Please also note the additional safety instructions in the following sections!

Gas, dust, sparking

- Carry out welding and grinding work on the machine only if this has been expressly authorized, as there may be a risk of explosion and fire. Before welding, flame-cutting and grinding, clean machine and its surroundings, free from dust and combustible material and ensure sufficient ventilation (Risk of explosion)! Observe all national regulations if work is to be carried out narrow rooms!

Hydraulics, Pneumatics, Steam



- Thermal influences (laser beam) can evolve toxic and irritant vapours.
- Work on hydraulic equipment must be undertaken only by persons with special knowledge and experience in hydraulics!
- Check all pressure lines, hoses and screw connections regularly for leaks and visible damage. Eliminate any faults immediately! Spurting hydraulic fluid may cause injury and fire.
- Parts of the system and pressure lines which are to be opened (hydraulic, pneumatic, and delivery lines) must be depressurized according to assembly descriptions before repair work is started.
- Hydraulic- and pneumatic lines are to be laid out and mounted in an expert way. Do not confuse the connections! Fittings, length and quality of the piping must correspond to requirements.

Oils, grease and other chemical substances



- Thermal influences (laser beam) can evolve toxic and irritant vapors.
- When handling oil, grease and other chemical substances, observe the product-related safety regulations!
- Take care when handling hot functional fluids and consumables (risk of burning or scalding).

3.5 Safety devices

- Power cord plug, key switch and in connection with Zero3 emergency stop monitors correct startup.

3.6 Potential dangers for persons

Remaining hazardous areas

- All safety components regarding the machine are based on years of experience and according to the relevant standards. Nevertheless, dangers handling the equipment cannot be completely excluded.
- The operating and service personnel should know remaining, possible dangers und and pay them close attention, in order to reduce risks to personnel, disadvantages regarding the machine and other property.
- Safety-devices are only fully effective if properly used. You must be particularly careful when using program types with reduced safety facilities (Setup, maintenance and repair).

3.7 Operator obligations

- The plant safety can only then be successful, if all necessary measures are applied. The user of the device shall be obliged to plan these measures and to make sure that they are taken.
- The operator is obliged to maintain the safety obligations and periphery of the device as in the moment of entrance into service.
- Ensure through appropriate in-house regulations and controls that the workplace always is clean and clear. Furthermore the operator must ensure that users know application-specific regulations and protective measures and train their staff to have a security-conscious behavior.

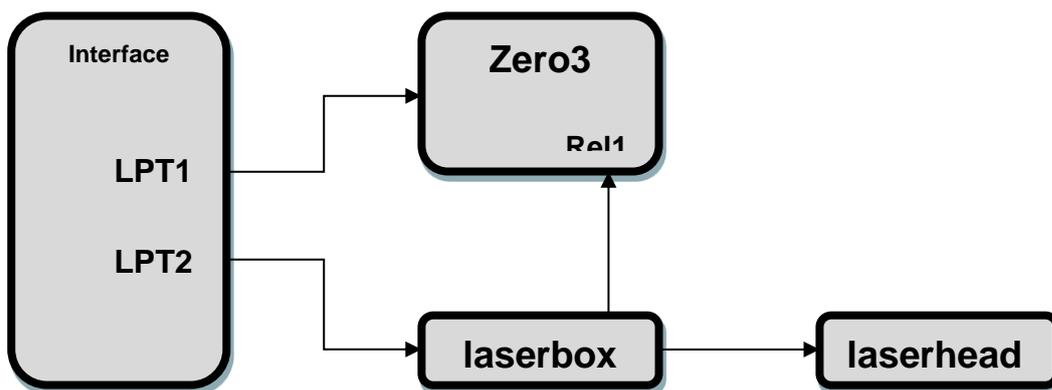
- The granting of occupational safety for the user and operating staff is listed in the accident prevention rules strictly according to GUV-V B2 such as GUV-I 832.

4 Startup

4.1 Installation/assemblage

The laserbox should be located such that the key holder on the front side is freely accessible at all time. Make sure that the ventilation slots are not covered to ensure sufficient ventilation. Furthermore the laserhead is rigidly to be fixed into designated 43mm EURO-mounting device (interface socket facing to the Z axis). The laser connecting hub connecting laserbox and laserhead has to be laid collision-free! Mechanical stresses on the connecting hub are to be avoided.

By means of appropriate measures (casing, protective barriers, suction...) must be assured, that laserbox and laserhead are free of chips, dust and liquids (oil, cooling water). Metal chips and cooling water can lead to short circuits. Dust can affect the ventilation and cause overheats. Both can lead to irreparable damages and fire hazards.



4.2 Power supply

The laserbox includes a universal power supply and can connect to line voltage in the range of 115 up to 240V alternating voltage, if there were no changes made to the mains voltage. The electricity supply of the laserbox is achieved by the back-side power supply socket Rel.1 by control Zero 3.

4.3 Assignment of connections



- By using non-compatible connections, parts of the control system can get damaged or destroyed.
- Furthermore the efficiency of the system can hereby be reduced and safety functions, the protection of life and limb, can be disabled.

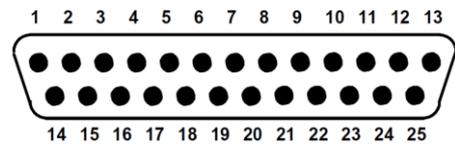
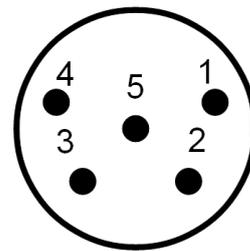


- Plug should only be disconnected or connected with switched off control system!



Mini XLR laserbox interface socket

| Pin No. | Signal |
|---------|----------------------|
| 1 | PWM |
| 2 | PWM GND |
| 3 | +12 VDC |
| 4 | Masse 12 VDC |
| 5 | N.C. (not connected) |



Laserbox LPT pin contact strip 25 pol. Sub-D

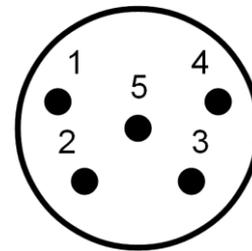
| Pin No. | Description | Pin No. | Description |
|---------|-------------|---------|------------------|
| 1 | N.C. | 14 | N.C. |
| 2 | N.C. | 15 | N.C. |
| 3 | N.C. | 16 | N.C. |
| 4 | N.C. | 17 | PWM Signal |
| 5 | N.C. | 18 | PWM Signalground |
| 6 | N.C. | 19 | |
| 7 | N.C. | 20 | |
| 8 | N.C. | 21 | |
| 9 | N.C. | 22 | |
| 10 | N.C. | 23 | |
| 11 | N.C. | 24 | |
| 12 | N.C. | 25 | |
| 13 | N.C. | | |

The connection of the computer is made by using a 25-pole SUBD-plug (LPT= parallel port) on the back-side of the laserbox. The laserbox connector is male this means, for connecting with the computer you will need a 1:1-extension-cable with male/female plug.



Mini XLR Laser head interfacial socket

| | Signal |
|---|---|
| 1 | PWM |
| 2 | - LED |
| 3 | +12 VDC Input/+12 VDC ventilator |
| 4 | Masse 12 VDC Input/ Masse 12 VDC ventilator |
| 5 | N.C. (not connected) |



The laser head is connected to the laserbox by using the provided laser power supply cord and is secured against unintentional release with a union nut. Regarding the laserbox, protection against dismantling is provided by a catch which only can be loosened by using the push-spring.



4.4 Startup

Before finally put into operation, again please check if all plugs are properly connected and if all locking screws are tightened. Also check the key holder, as well as the laser box power supply plug and make sure the power switch is switched to „OFF“ and the key holder to position „0“ (key is vertical in the lock). After that you can turn on your computer and install and start appropriate software.



- **Laser Radiation Warning - avoid irradiation of eyes and skin by direct and scattered radiation.** Use provided safety glasses to protect your eyes from scattered radiation caused by the laser.



- **Beware! Laser safety glasses don't protect from the direct effect of laser beams!**
- Setup the machine parameters using the software-supplement sheet.
- Before first commissioning, make sure that, there are no objects in the working area that are exposed directly to laser beams. Close the covers and make sure that nobody has entered the danger zone.
- Now switch the power switch to „On“and the key holder to 1 in order to deactivate the security Loc.
- In case something does not work as expected, the machine must be stopped immediately and the connections and software-settings should to be checked.



The machine is now ready for operation!

5 Cleaning and maintenance

In most cases all components work maintenance-free. For correct functioning and safe operation it is necessary to regularly check the cables for proper condition and the unobstructed air supply regarding the ventilation slots on the housing.

Procedure



- Turn the key switch of the laserbox to position “0” and the power supply to “Off”.
- Turn the controller off by turning the main power switch off and unplugging the power cord.
- Wait ca. 2 minutes in order to, allow excess energy stored in the capacitors to discharge.
- Also check the power supply cords external damage. Damaged or brittle lines have to be exchanged immediately.



- Check the ventilation slots of laserbox as well as the laser head. They have to be free of chips and dust. Hoover the ventilation slots if necessary. Regarding the laser head, please use dry, oil-free compressed air in order to get rid of stubborn deposits.
- Using compressed air could lead to dismantling small and cause damages. Please use a brush when getting rid of stubborn dirt.
- If necessary clean the housing outside with a slightly damp cloth. The use of the very aggressive detergents should be abandoned. If any liquid enters the equipment housing, please DO NOT start and operate the machine, rather get a specialist to check it.
- If cleaning with compressed air, please only use dry and oil-free air.

5.1 Works on the inside housing

In most cases you won't need any maintenance on the inside housing. Only the manufacturer or authorized workshops are allowed to carry out repairs.

Opening the casing is therefore prohibited.

6 Technical data

6.1 Limit values

Following parameters mustn't be exceeded in order to prevent damages on the:

| Parameter | min. | max. | Unit |
|----------------------|------|------|------|
| Mains voltage | - | 264 | Vac |
| Power consumption | - | 0,7 | Aac |
| Voltage on LPT Pin17 | -5 | +5,5 | V |
| Storage temperature | -40 | +85 | °C |

6.2 Electrical connection values

| Parameter | min. | max. | Unit |
|--|------|------|------|
| Mains voltage +10% -15% | 115 | 240 | Vac |
| mains frequency | 47 | 63 | Hz |
| Power consumption (with power supply, without ext. consumer) | 0,7 | 0,4 | Aac |
| Ambient temperature during operations | 0 | +40 | °C |
| Level logical 0 for LPT signal inputs and outputs | -0,5 | +0,8 | V |
| Level logical 1 for LPT signal inputs | +2,5 | +5 | V |
| Output voltage. XLR Pin3-Pin4 | 0 | 12 | V |
| Output current XLR Pin3-Pin4 | 0 | 2,1 | A |
| Level logical 0 for XLR Pin2 | -0,5 | +0,8 | V |
| Level logical 1 for XLR Pin1 | +2,5 | +5 | V |

6.3 Casing dimensions laserbox

| parameters | typ. | Unit |
|---|------|------|
| length(without plug connector und control elements) | 95 | mm |
| width | 105 | mm |
| height | 66 | mm |
| weight (without cable) | 0,72 | kg |

6.4 Casing dimensions laserhead

| parameters | typ. | Unit |
|---|------|------|
| length(without plug connector und control elements) | 80 | mm |
| width | 55 | mm |
| height ca. | 100 | mm |
| weight (without cable) | 0,26 | kg |

7 Delivery contents laser engraving device

- 1x plastic case
- 1x laserbox
- 1x laserhead
- 1x laser power supply cord Mini XLR ca.4,5m
- 1x standard LPT power supply cord ST-BU 1,8m
- 1x safety glasses Type Eagle Pair 190-540nm & 800-1700nm OD5+ incl. case

