Wattsan FL Compact
laser marker manual

Wattsan

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Dear customer!

Thank you for purchasing our equipment. We hope that his work will delight you for a long time.

The machines are manufactured in accordance with global standards. Each equipment undergoes pre-sale preparation.

First of all, we strongly recommend that this manual be read carefully and completely before using the equipment. Failure to comply with certain points of the Operating Manual may result in injury to personnel and/or damage to equipment!

Follow the instructions in this instruction. This will not only make the work easier, but also make the use of the equipment safe and long-term. Please follow these instructions carefully.

This document is intended to introduce the basic technical data and requirements for the use of Wattsan laser CNC machine.

In the event that the equipment is transferred to another customer, this document shall be transferred with it.

The manufacturer reserves the right to make changes and improvements to the design that do not impair the declared characteristics of the equipment.

Basic information about the equipment and its technical data:

Equipment name: _____

Serial Number: _____

Month and year of issue: _____

Information about signs and symbols

In this operating manual and on the equipment, the following designations, signs and symbols are used to transmit especially important information:

	This indicates a hazardous situation that could result in serious injury or death if the specified instructions are not strictly followed.
	Indicates a potential hazard that could result in minor injury or damage to the product.
	It contains important information about the safe and correct handling of the product.
	This component is energized by an electric current. In these places, strictly follow the safety rules when working with electricity.
	Caution: Laser beam hazard.

Read the instructions carefully before starting.

Note!

The equipment you directly purchased may differ from the equipment shown in the figures.

	Untrained personnel should not be allowed to work with this equipment and install it.
	The equipment complies with safety class 4. The use of this equipment may lead to the following consequences: • Ignition of nearby materials • Materials exposed to laser radiation can become sources of dangerous gases • Laser beams can cause direct harm to humans
MUST-DO	The location of the equipment must be equipped with fire extinguishing equipment. It is forbidden to store flammable and explosive substances near the device.
MUST-DO	The user must ensure that the material to be processed is suitable for laser processing in order to avoid risks to the life and operation of the equipment.
FORBIDDER	The operator must not leave the equipment unattended while it is in operation. The equipment must be turned off at the end of operation.
	The use of highly reflective materials is prohibited to avoid the reflection of the laser beam on a person.
	The equipment must be located in a dry, uncontaminated place. The temperature inside the room should be 15-35 C°. Humidity should be in the range of 5-70% (provided there is no condensation).
	The equipment operates from an alternating power supply of 220 / 380 V with a frequency of 50 / 60 Hz. It is forbidden to use the equipment without a voltage stabilizer.

Attention!

The seller is not responsible for the improper use of the equipment and if the user fails to take precautions.

Specifications

Model	FL Compact		
Emitter Manufacturer	JPT	Raycus	
Laser power, W	20/30/60	20/30	50
Laser frequency range, kHz	1-4000	30-60	50-100
Emitter type	MOPA	Q-Switch	
Wavelength	1066±5nm		
Working field, mm	75x75/110x110/200x200/300x300		
Emitter cooling method	Air		
Hardware Form Factor	Desktop		
Lifting device	Screw manual		
Swivel mechanism	Optional		
Scanner max height, mm	400		
Focus search system	Standard - Manual / Optional - Automatic		
Marking speed, mm/m	0... 7000		
Software	EzCad 2		
Supported formats	PLT, DXF, BMP, JPG, PNG, etc.		
Supported OS	Windows XP/7/8/10/11 (32/64)		
PC Connection Interface	USB		
Power supply, V	220		
Laser power, W	20	30	50/60
Power consumption, W	350	500	800
Ambient temperature range (°C)	+15...+35		
Ambient humidity value (%)	<70		
Dimensions of the machine without packaging, mm	600x350x900		
Dimensions of the machine with packaging, mm	840×480×940		
Classification of the laser system	Class 4		

Equipment

Name	Quantity
Laser emitter	1 pc
F-Theta Lens	1 pc
USB Flash Drive with Software	1 pc
Power Cable	1 pc
USB Cable	1 pc
Protective glasses in a case	1 pc
Pedal	1 pc
Allen key set	1 pc
Ruler	1 pc
Machine manual	1 pc

CHAPTER 1. INTRODUCTION

1.1 MAIN PURPOSE AND SCOPE OF THE EQUIPMENT

Wattsan laser marking machine is the most modern, high-tech and delicate way to perform the marking work of various surfaces. This equipment is designed for use in industry, manufacturing, scientific research, and other fields that require high accuracy, speed, and quality of marking.

1.2 BASIC OPERATING REQUIREMENTS

- Connected ground: Ground resistance <4 Ω.
- It is necessary to install a mains voltage stabilizer to stabilize the voltage of the machine.
- Good ventilation is required to prevent the accumulation of dust and combustion products.
- To cool the laser source and laser head, it is necessary to properly configure and control the operation of the chiller. It is a specialized equipment that cools and circulates water and requires the use of distilled water only.
- To prevent fire, the workplace must be equipped with a suitable fire extinguisher.
- There should be a free area around the machine of about 1 m on each side.

1.3 IMPACT ON THE ENVIRONMENT AND PEOPLE

The laser machine belongs to the IV class of laser equipment. Its laser beam and reflected light can cause damage to the human body (especially the eyes). The operator and operating personnel should pay attention to eye protection and use special goggles (with radiation protection with a wavelength range of 1064 nm).

CHAPTER 2. SAFETY

2.1 REVIEW

Before operating the machine and performing daily maintenance, the operator should read this chapter carefully, learn the safety precautions and requirements of the machine, and follow the appropriate precautions.

2.2 ENSURING THE SAFETY OF WORKING WITH EQUIPMENT

- It is necessary to appoint an industrial safety specialist for the operation of the equipment, determine the scope of his responsibilities and provide safety training for the machine operator.
- Specify the machine location area, set a warning card for entering and exiting the machine area, specifying: machine power, type of laser source, type of eye protection used, full name of the industrial safety specialist, etc.
- The machine operator must receive special training.

2.3 LASER SAFETY WARNING

⚠	Never point the laser beam at people or animals. High-power laser radiation can cause serious burns or damage to vision. Always keep an eye on the direction of the beam and control its movement.

2.3.1 EYE AND SKIN PROTECTION

Fiber-optic laser sources can damage the retina of the eye because the wavelength of the laser beam is visible to the human eye. Both types of lasers can cause cataracts of the eye and skin burns. Therefore, appropriate protective measures are applied when adjusting the laser. This machine is equipped with a fiber laser, so it is strictly necessary to wear special safety glasses (with radiation protection with a wavelength range of 1080 nm).

A combination of face shields, masks, filters, and/or goggles will provide better protection while the equipment is running. All personnel working near the laser marking area must also wear PPE.

Parts can be very hot even after the labeling process is complete. Take steps to prevent skin damage by wearing protective clothing such as flame retardant gloves, caps, leather apron, and other flame retardant clothing. Sleeves and collars should be buttoned.

2.3.2 FIRE PROTECTION

The use of oxygen, as well as sparks during operation, can easily cause a fire.

Therefore, there should be no flammable and explosive objects in the working area of the machine.

Fire extinguishers should be nearby and accessible, and staff should be trained in their use.

2.3.3 SECONDARY RADIATION HAZARDS

During laser marking, both visible and invisible light radiation is generated. The interaction between high-power laser light and the target materials being welded can create a plasma that produces UV radiation and "blue light" that can cause conjunctivitis, photochemical damage to the retina and/or a sunburn-like skin reaction. Welders who are exposed to invisible ultraviolet light without proper protection can sustain permanent eye damage. Even short-term exposure to invisible ultraviolet light during laser operation can cause blurred vision, burning, watery eyes, eye pain, and irritation (a feeling of sand in the eye).

To avoid the effects of radiation, it is necessary to wear special protective glasses.

2.3.4 SMOKE POISONING HAZARDS

The smoke emitted from the material during laser treatment can consist of very small particles and gases, the smoke and gas are formed from a mixture of fumes of the material being treated, paints, coatings, taking into account chemical reactions and air pollutants. Smoke can negatively affect the lungs, heart, kidneys and central nervous system.

When the laser interacts with materials such as plastics, metals, and composites, the material can start to evaporate. Often the fumes and mist are not visible, but they are highly toxic and pose a serious health risk.

Laser marking material in a poorly ventilated confined space is extremely dangerous. Dangerous concentrations of toxic fumes and gases can build up very quickly, causing loss of consciousness or death by suffocation.

Keep your head away from smoke while working. Always work in an area with adequate ventilation to ensure safe breathing air.

Hazardous vapors must be captured and pumped out. Use a fume extraction system to remove vapors, particles, and hazardous debris from the machine operating area.

Read and follow the safety guidelines and warning labels for all materials used.

In confined spaces and other circumstances, a respirator may also be required.

Regular air monitoring should be carried out to determine the levels of hazardous vapors in the area of operation.

2.4 ELECTRICAL SAFETY

- Make sure the installation is properly grounded.
- Make sure the correct AC supply voltage is used before applying power to the unit. Using the wrong voltage may damage the installation.
- Never use the device in a humid or wet environment. Do not touch electrical contacts and switches with wet hands to avoid electric shock.
- Do not open the machine body or change the machine parameters without consulting the manual. If you need to change something, then these changes must be approved with the equipment supplier. Before modifying, record the original values so that the machine can be restored to its original parameters if necessary.
- At the beginning of the work shift, it is necessary to remove the protective cover from the lens and check the condition of the optics. At the end of the shift, the cover must be put back on.
- Always turn off the device when not in use. Never leave the laser cleaner running unattended.

After turning off the power to the machine, you must wait at least 5 minutes, and only then you can touch the electrical circuit of the machine. For a period of time after the power is turned off, there may be a high voltage in the machine's electrical system, which can cause harm to people and equipment.

2.5 OBLIGATIONS OF THE OPERATOR

- The operator must undergo special training in order to start working on the machine.
- Follow the instructions for regular maintenance of the appliance to keep it operational and prevent accidents.

Each employee who is near the laser during its operation must wear appropriate laser safety goggles and protective clothing.

2.6 REQUIREMENTS FOR THE PREMISES

2.6.1 AMBIENT TEMPERATURE

When operating the machine, the ambient temperature should be between +15 °C and +35 °C. When the equipment is switched off, the ambient temperature should not be lower than + 4 °C. If the ambient temperature is above 40 °C, a device that lowers the temperature (e.g. air conditioner) must be installed in the room.

2.6.2 HUMIDITY

For the correct operation of the equipment, it is recommended to use it at a relative humidity of <70%. A wet room is not suitable for the operation of the machine, as it corrodes it, which leads to the failure of the electrical and mechanical systems of the machine

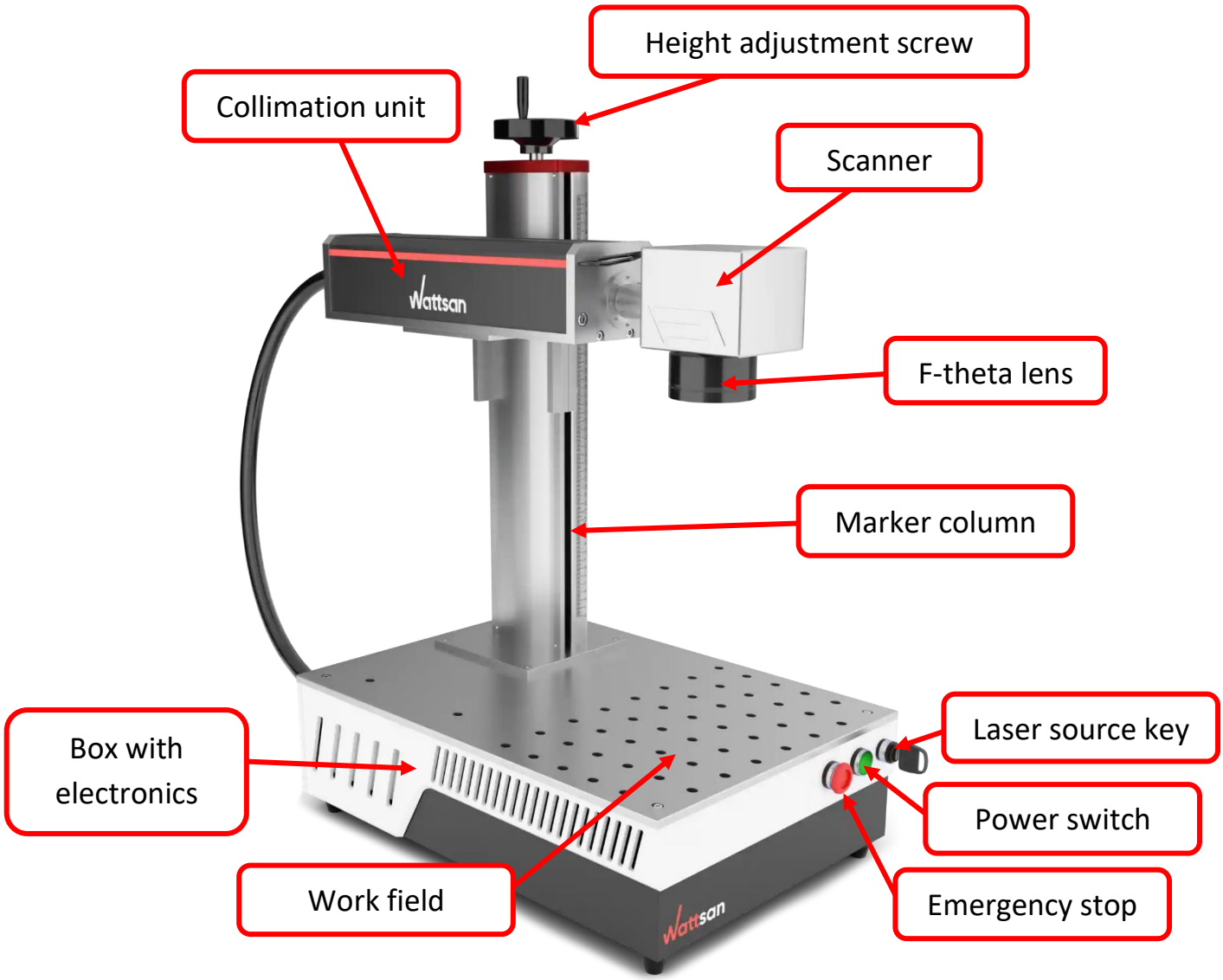
!	It is forbidden to use the equipment at a relative humidity of more than 70%.
	Do not use the equipment at temperatures below the dew point.

Temperature	Humidity															
	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%	70%	75%	80%	85%	90%	95%
16℃				0	2	4	5	7	8	9	10	11	12	13	14	15
18℃			1	3	4	6	8	9	11	12	13	14	15	16	17	18
21℃		1	3	5	7	9	11	12	13	14	16	17	18	18	19	21
27℃	2	5	8	10	12	13	16	17	18	19	21	22	23	24	25	26
29℃	4	7	10	12	14	16	18	19	21	22	23	24	26	27	28	28
32℃	7	10	12	15	17	19	21	22	23	25	26	27	28	29	31	31
35℃	9	12	15	17	19	21	23	24	26	27	29	30	31	32	33	34
38℃	11	14	17	20	22	24	26	27	29	30	31	33	34	35	36	37

2.6.3 EQUIPMENT COOLING

The equipment is cooled by air circulation inside the case. Therefore, it is important that the air filters are free of dust and dirt.

CHAPTER 3. APPEARANCE AND STRUCTURE



CHAPTER 4. UNLOADING AND UNPACKING EQUIPMENT

4.1 UNLOADING

The equipment is always packed in a plywood box, ensuring its safety during cargo transportation.

Before unloading the equipment, carefully inspect the cargo and packaging for damage, check the number of pieces declared in the bill of lading. In the presence of damage and/or the absence of cargo packages, we recommend that you draw up a commercial act, since without this document, the insurance company has the right to refuse to pay compensation.

When transferring ownership of equipment in a port or railway station, it is recommended to use the services of a transport company. Qualified employees will accept the equipment, organize loading and unloading operations and select the best method of delivery to the destination.

When ordering vehicles and planning unloading operations, pay attention to the weight and dimensions of the equipment.

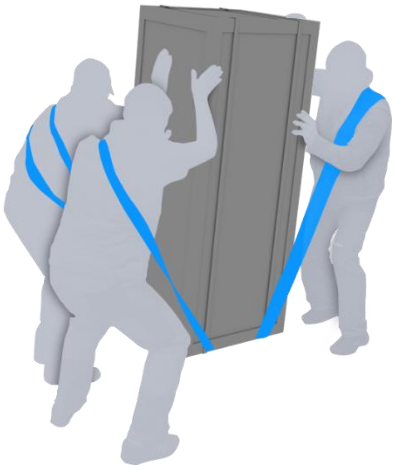
We strongly recommend that only specially trained personnel unload the machine.

1) Unloading equipment by forklift or stacker

When unloading equipment using this type of equipment, pay attention to the lifting capacity and length of the forks. Make sure the forks are the right length by referring to the dimensions of the equipment. If you unload from the side, focus on the width of the base of the box/bed. If unloading is carried out through the rear gate - by the length of the box/bed.

2) Rigging works

If the weight of the equipment does not exceed 400 kg, it is possible to unload manually using rigging straps. This method is recommended to be performed only with the involvement of qualified riggers, following safety rules. Without special knowledge and training, we do not recommend unloading the machine, as the risk of injury is high.



ATTENTION!

1. **Do not stand under a lifted and moving load. Be sure to use a hard hat.**
2. **Avoid sudden movements and jolts when raising and lowering equipment.**
3. **Do not tilt the equipment until the original packaging is removed.**

4.2 UNBOXING

The Wattsan laser marker is packed in a wooden box that houses the laser machine and its optional accessories. The following instructions will give you a general idea of how to unpack a laser marker. Please follow these instructions carefully.

Tips: Keep the packing box. You will need it in case of return. Dispose of all waste in accordance with current waste disposal legislation.

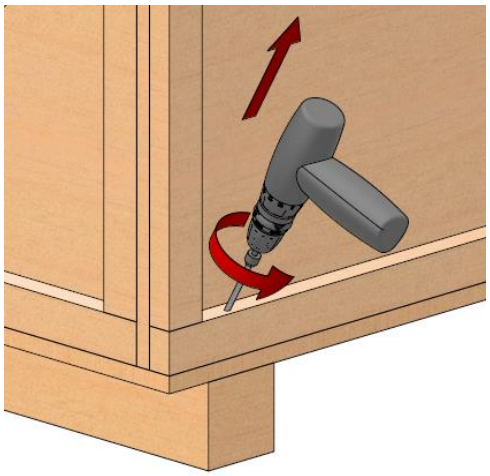
Check the machine box and all accessories outside the box (if any) for external damage when accepting the equipment from the carrier. If possible, unpack the boxes when accepting the equipment together with a representative of the cargo carrier.

If any damage to the equipment is found, it is necessary to draw up a commercial damage report with the carrier and send photos with a description of the damage to our mail help@wattsan.com.

Unboxing process:

1. Place the box with the equipment in a flat and spacious room for unpacking.

2. Remove the screws holding the top of the box to the base.



3. Lift the top of the box.

4. Remove the packaging film.

5. Pull out all accessories from the machine.

CHAPTER 5. INSTALLATION

5.1 PREPARATION OF THE ROOM FOR THE INSTALLATION OF LASER ENGRAVING EQUIPMENT

The premises must meet the workplace and safety requirements described above.

Choose a location within 4.50 m of the computer (maximum cable length to avoid interference).

Avoid areas where equipment may be subject to mechanical shock or vibration.

5.2. INSTALLATION STEPS

5.2.1 MACHINE INSTALLATION

1. Place the marker on a flat surface.
   If the marker will be placed on a table, make sure the table is not wobbly, is stable, and the marker is not pushing through the tabletop. If the marker is placed on a metal table, be sure to ground the table at the same ground point as the marker.
2. Connection of the ground cable.

On the control unit of the laser machine, there is a special connection point for the ground wire.

Unscrew the plastic washer, secure the cable to the metal screw, and screw the plastic washer back to secure the ground cable. Check that the wires are tight enough that it will not fall off or dangle.

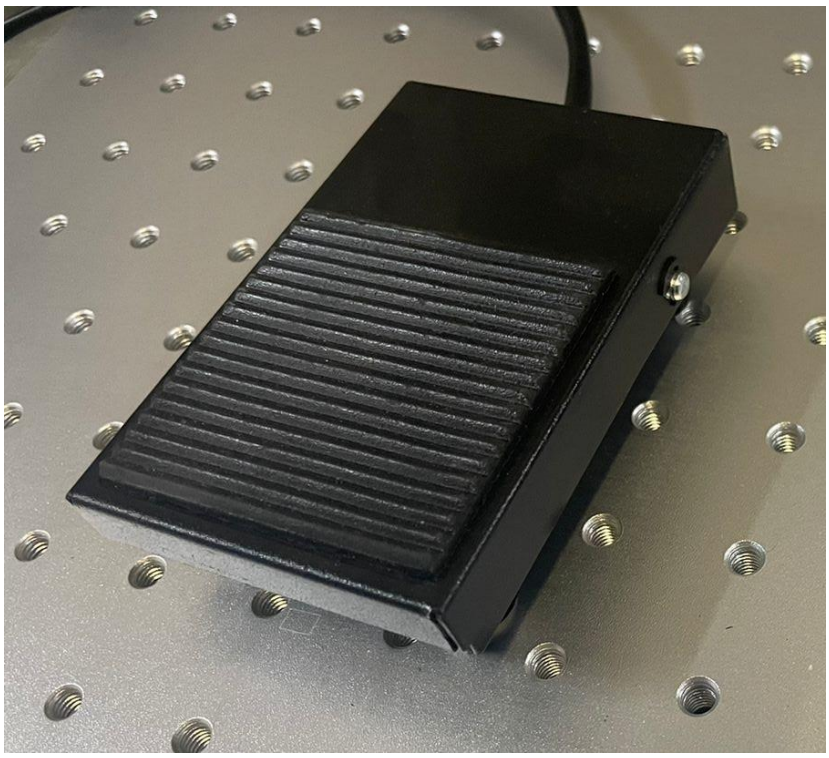
You need to connect the other end of the wire to the common ground point in your room.

Importantly:

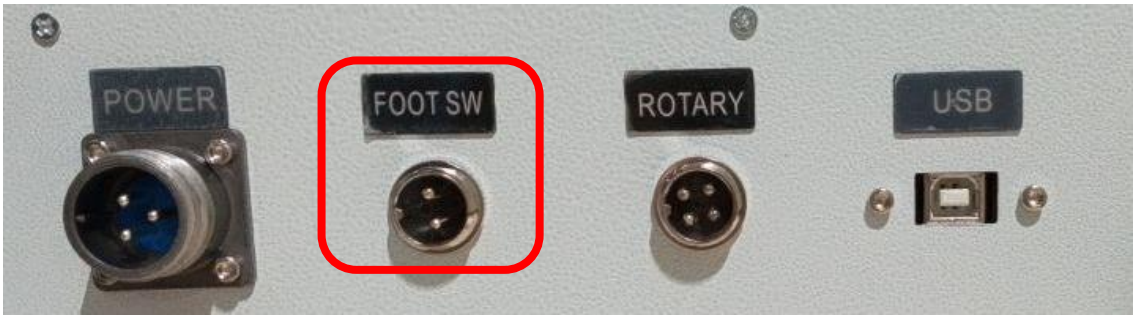
- Never use zeroing instead of grounding, as this can damage your equipment!
- Make sure that the equipment and all devices connected to it (peripheral equipment such as a PC, voltage regulator, etc.) are grounded and grounded to a single ground point!

5.2.2 CONNECTING THE MARKER PEDAL (OPTIONAL)

The marker pedal is designed to start the marking process quickly and conveniently. Each press of the marker pedal is similar to pressing the "Mark" (F1) button in the Ezcad program.



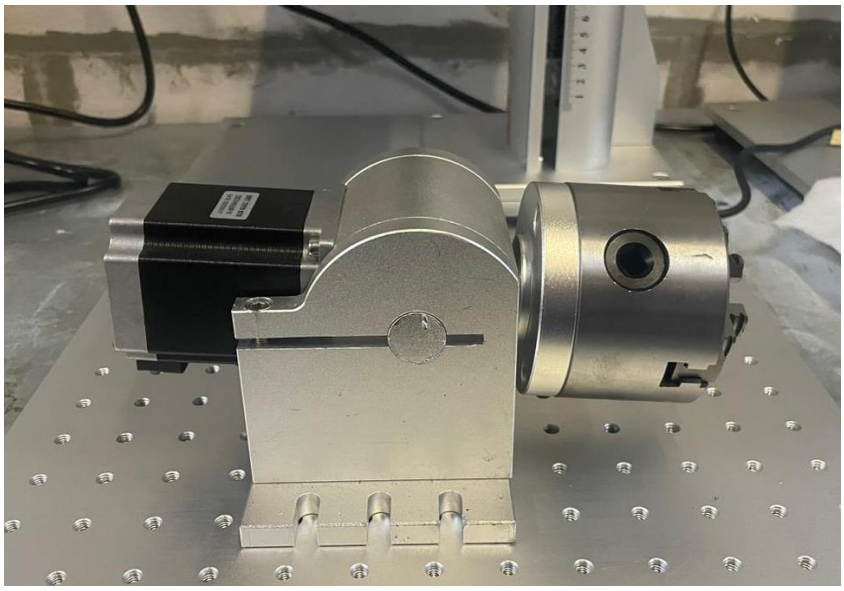
The pedal is connected to the "Foot SW" jack located at the back of the marker housing.



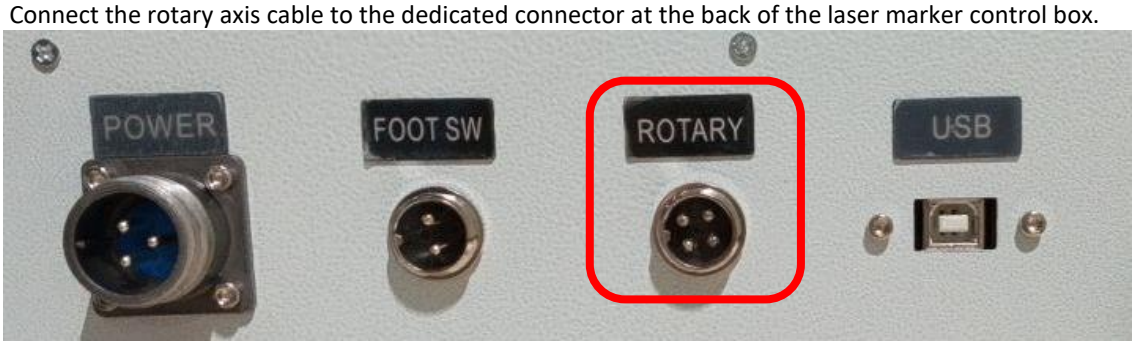
The length of the pedal cable is enough for a convenient position of the pedal, both on the table on which the marker is located to press the pedal with your hand, and under the table to press the pedal with your foot.

5.2.3 CONNECTING THE ROTARY AXIS (OPTIONAL)

1) Set the rotary axis on the laser marker worktable, under the lens.



2) Connect the rotary axis cable to the dedicated connector at the back of the laser marker control box.



3) Before placing the workpiece in the fastening of the rotary axis, measure the diameter of the workpiece at the marking point with a caliper or similar tool.

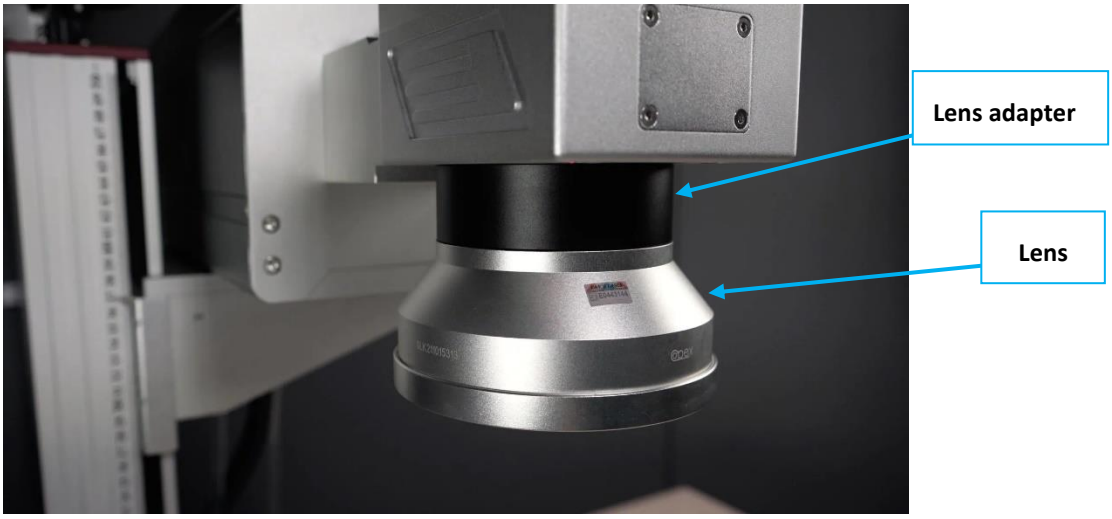
5.2.4 INSTALLATION OF THE VOLTAGE STABILIZER AND CONNECTION OF THE MACHINE.

To ensure the proper operation of your equipment, it and all peripherals must be connected through a voltage stabilizer.

1) Find the right voltage regulator for your equipment (including PCs and other peripherals).
2) Unpack, install and connect the voltage regulator to your power supply according to the instructions that came with it.
3) Remember to connect your gimbal to the ground.
4) Turn on the voltage regulator and check that it is working and converting the voltage correctly.
5) Connect the power cable to the marker. Screw the terminal as far as it will go clockwise.
6) Connect the plug of this cable to the voltage regulator.

CHAPTER 6. MACHINE SETTINGS AND ADJUSTMENTS

6.1 LENS INSTALLATION/REPLACEMENT



Before installing the lens, it is necessary to make sure that the optical system is not dirty.

1. Remove the lens from the packaging.
2. Insert the lens into the lens adapter by screwing clockwise.

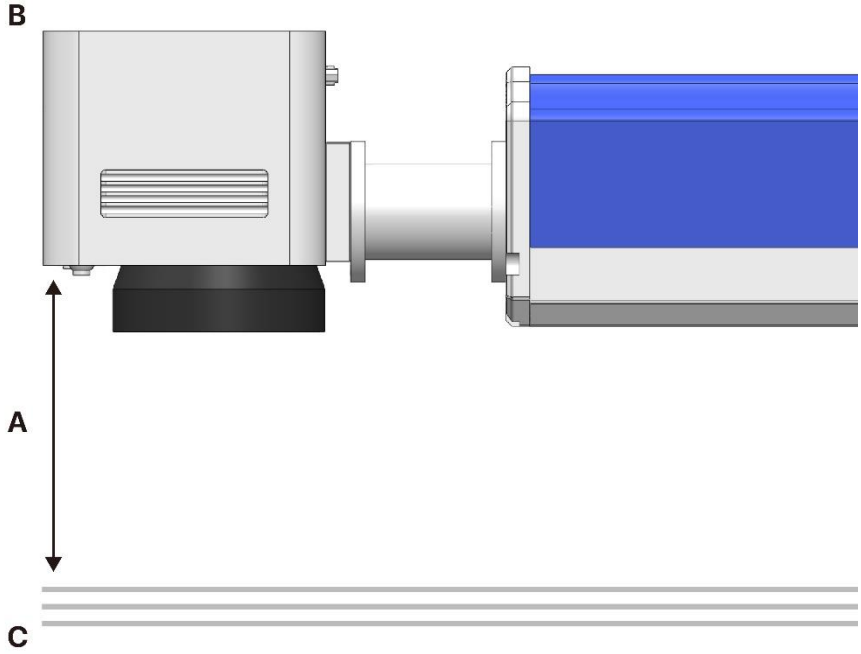
6.2 FOCAL LENGTH

This is the distance from the lens to the focus point at which the object to be marked should be located.

It is essential to maintain the correct focal length for each laser marking process. Only at focus does the laser beam achieve the power density required for constant and clear marking.

Therefore, the correct focal length between the marking head and the workpiece must be set before any marking. Incorrect focal length is the most common cause of poor or even indistinguishable markings.

The focal length (A) is measured between the lower edge of the scanner (B) and the upper surface of the workpiece (C). The correct focal length depends on the F-theta lens you are using.



Lens	Processing Field (mm)	Focal Length (A)
F100	75x75	153.5
F160	110x110	215
F290	200x200	336
F420	300x300	474

On markers with a scanner without automatic focal length search, use the manual Z-axis knob. If a scanner with automatic focal length search is installed on the marker, press the Auto button on the scanner to move the scanner to the correct position.

6.3 EZCAD SOFTWARE.

The software included in the equipment has the following functions:

- Creation and adjustment of layouts for processing.

- Support for TrueType, JSF, SHX, DMF, one-dimensional barcodes, and 2D barcodes.

- Support for common vector formats (ai, dxf, dst, plt, etc.).

- Support for common image formats (BMP, JPG, GIF, TGA, PNG, TIF, etc.).

- Flexible variable text processing, which allows you to modify text in real-time during processing, as well as read data from Excel spreadsheets.

- Support for up to 256 layers and the ability to set different processing parameters for different objects.

6.3.1 MINIMUM PC REQUIREMENTS

- Windows XP, 7, 10 (32-bit or 64-bit versions)
- Intel Celeron / Core i3/5/7 or AMD Ryzen 3/5/7/9/
- 2 GB RAM
- 2 GB of hard drive space
- Mouse, tablet, or multi-touch monitor
- Monitor resolution 1280 x 720 at 100% (96 dpi)
- Microsoft Internet Explorer 11 or higher
- USB 2.0 / 3.0
- The PC must also be grounded

If you did not find a USB drive in the set of your equipment, write to us at help@wattsan.com.

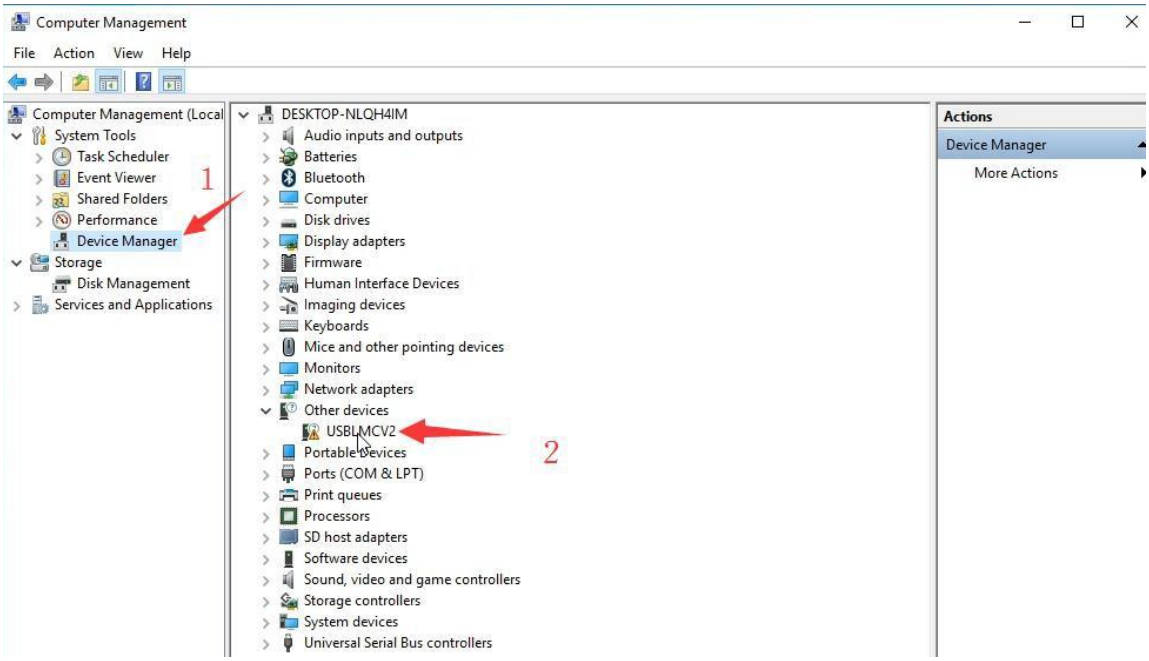
6.3.2 INSTALLING EZCAD

1. Insert the USB drive that came with the hardware into the USB port of your PC.

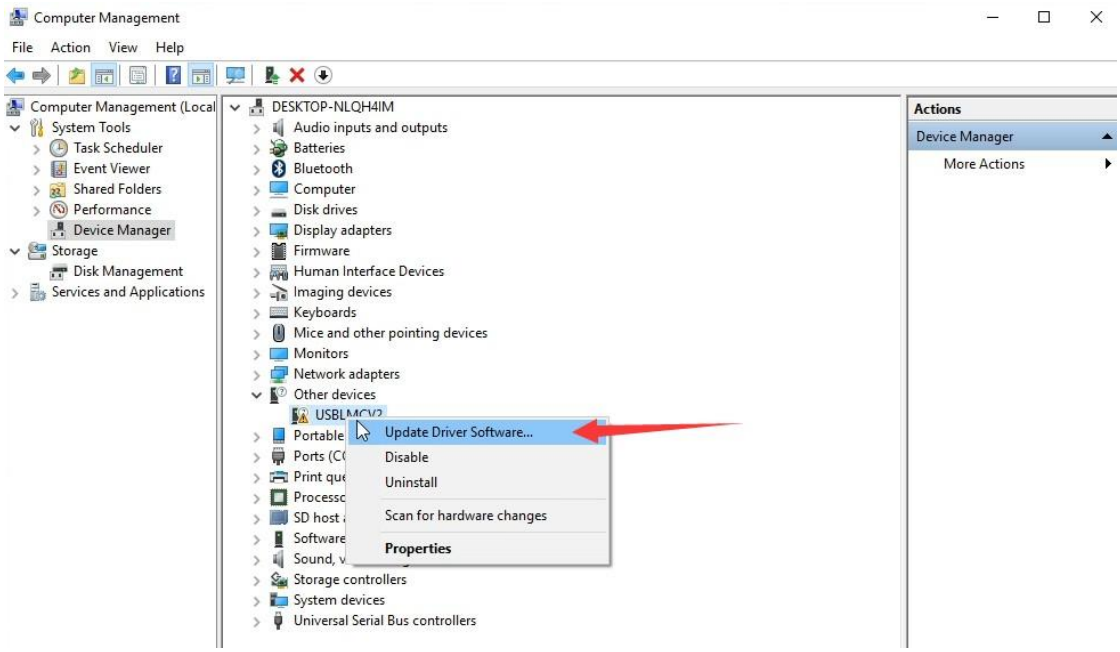
2. Copy the Ezcad folder from the USB drive to your PC's hard drive.

3. Insert the USB cable that came with the hardware with one end into the marker's USB port and the other end into your PC's USB port.

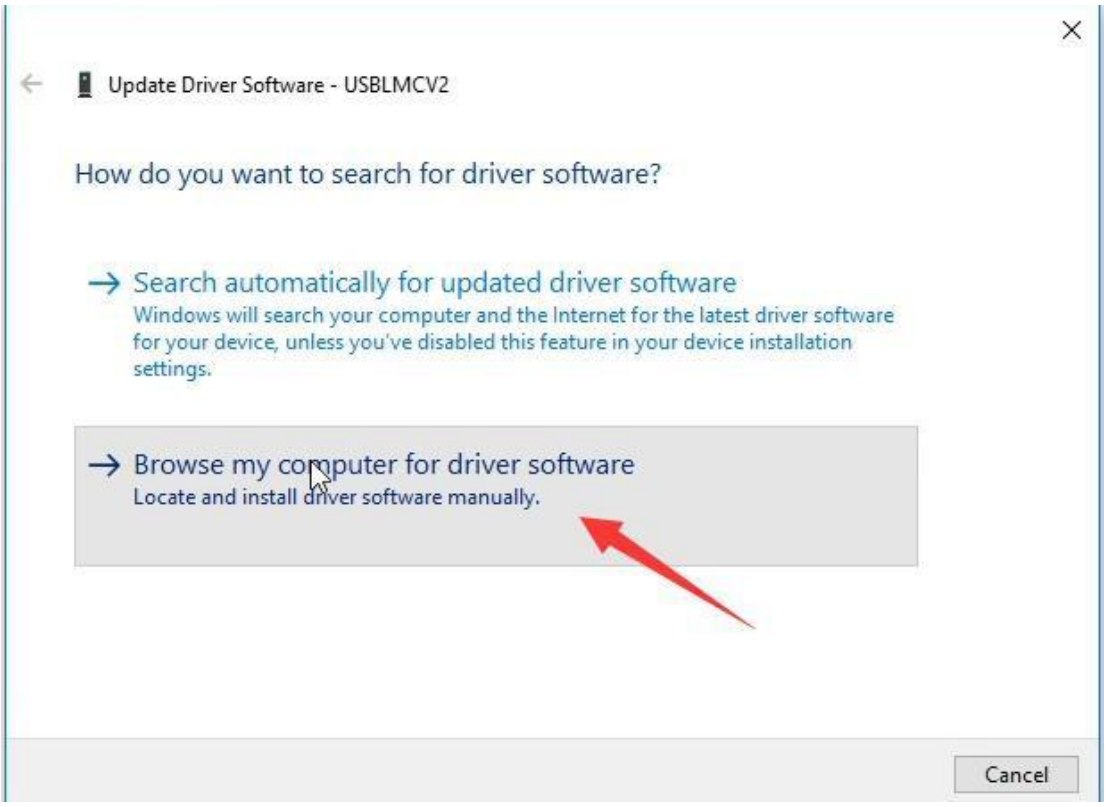
4. Go to the Windows Device Manager and look for USBLMCV2 in "Other devices":



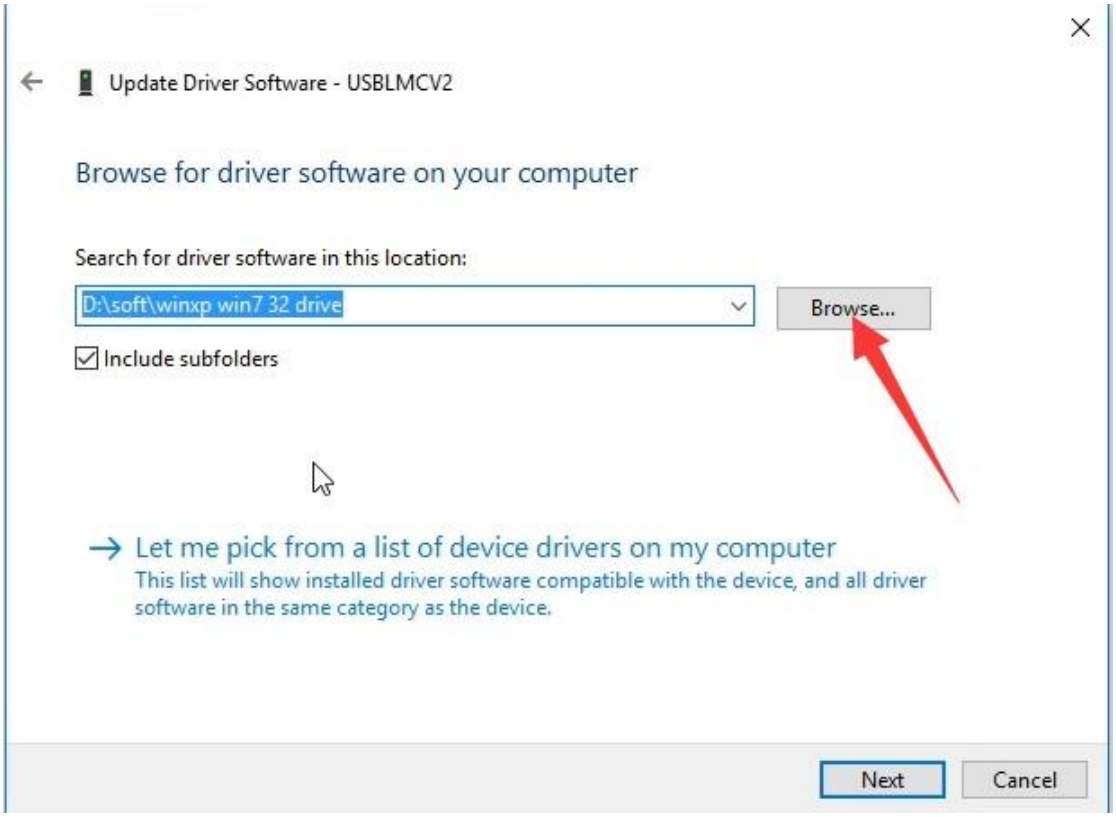
5. Right-click on it and select "Update driver software":



6. Select "Browse my computer for driver software":



7. Specify the path to the folder with Ezcad:



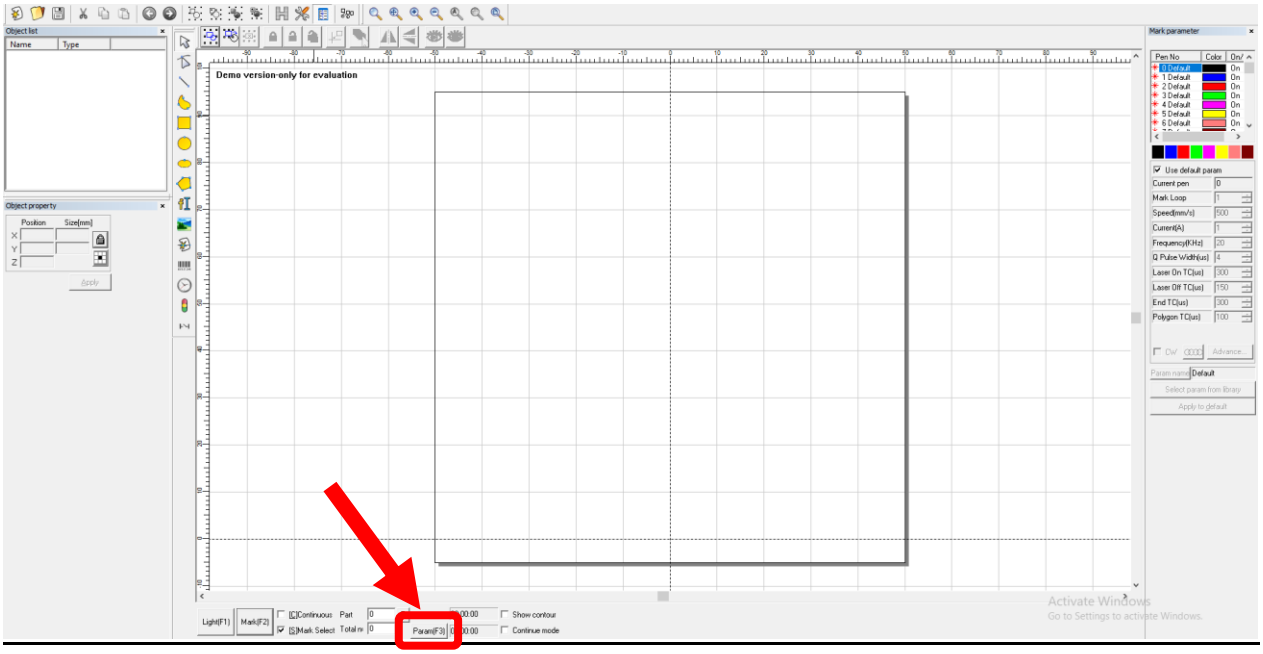
6.3.3 STARTING EZCAD

Open the Ezcad folder:

Run EzCad2.exe.

6.4 CONFIGURING EZCAD

1. Press the F3 button on your keyboard in EzCad, the options window will open:



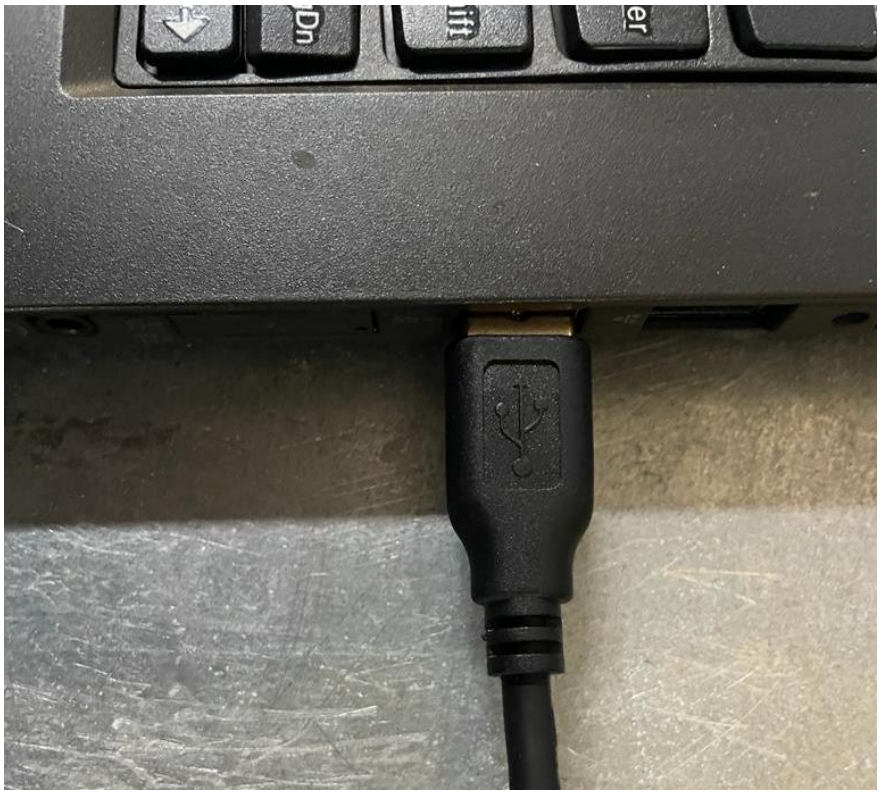
2. Find photos of EzCad settings for your equipment on the USB drive that came with your equipment and configure EzCad according to these photos.

Name	Date	Type	Size
driver	4/28/2025 1:50 PM	File folder	
Ezcad2.14.10(20180103)	4/28/2025 1:50 PM	File folder	
jsf font	4/28/2025 1:50 PM	File folder	
manuals	4/28/2025 1:50 PM	File folder	
Settings for 200x200 lens1.jpg	4/28/2025 2:17 PM	JPG File	70 KB
Settings for 200x200 lens2.jpg	4/28/2025 2:17 PM	JPG File	80 KB
Settings for 200x200 lens3.jpg	4/28/2025 2:17 PM	JPG File	69 KB
Settings for 200x200 lens4.jpg	4/28/2025 2:17 PM	JPG File	68 KB

6.5 FIRST START OF THE MACHINE

1. Insert the USB cable into the USB connector at the back of the machine.

2. Insert the other end of the cable into the computer that you will use to control the laser marker.

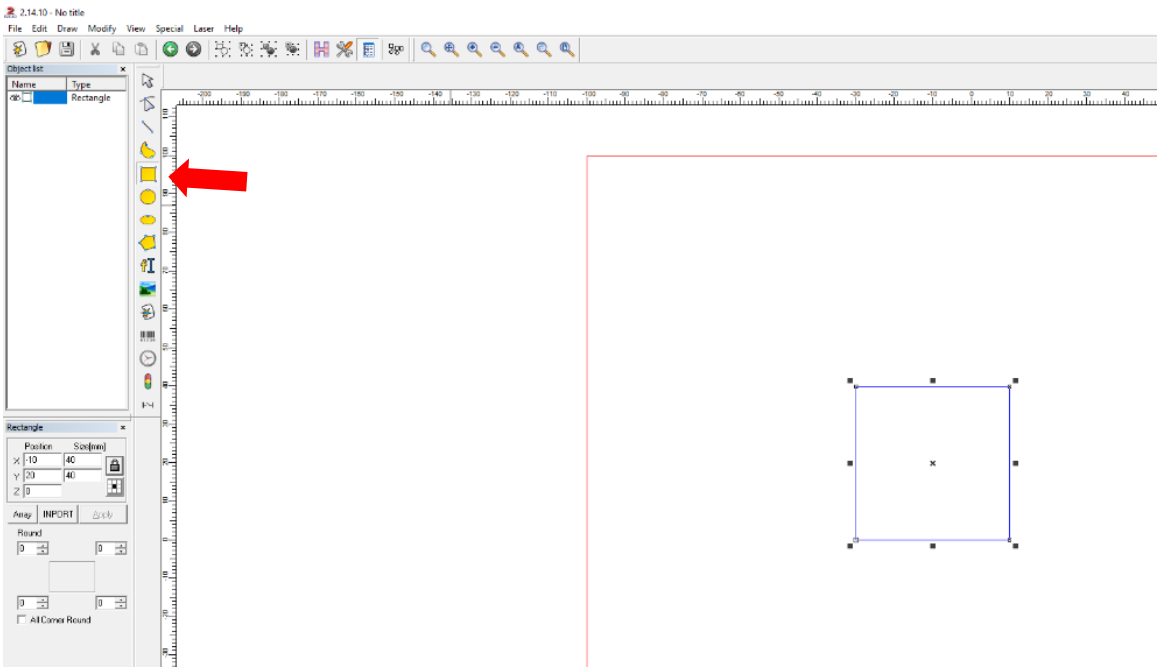


3. Insert the key into the lock, which is located at the top of the marker control box, and turn it clockwise.

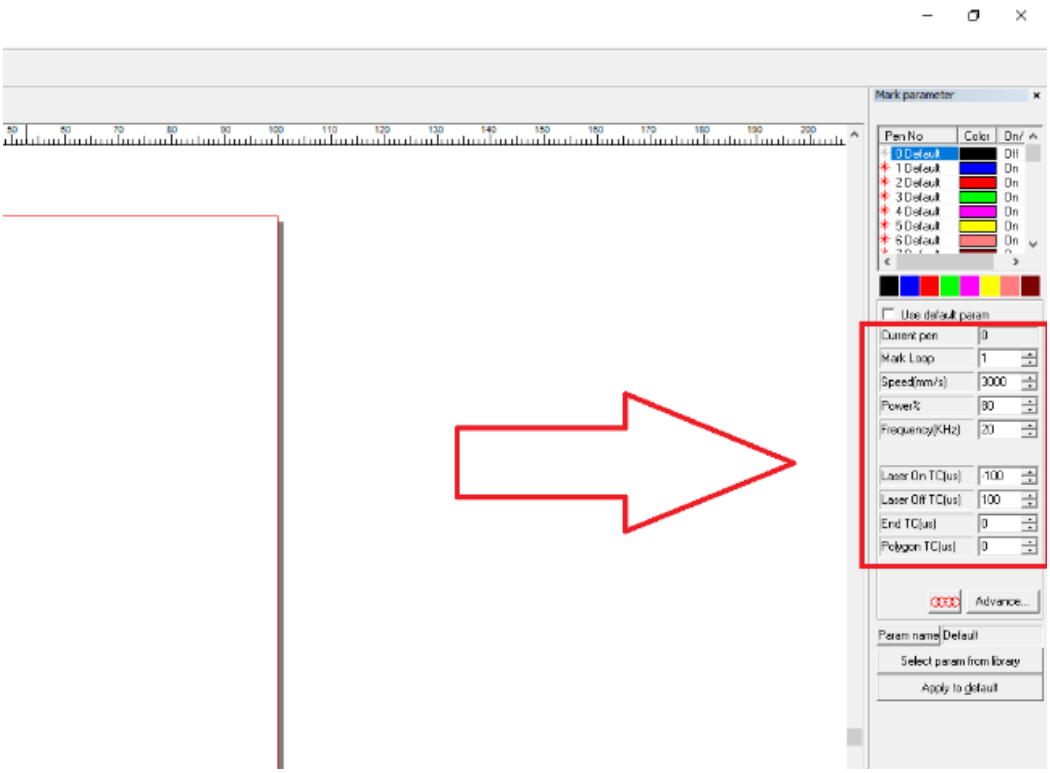
4. Press the green and red power buttons alternately.

6.6 ADJUSTING THE FOCAL LENGTH

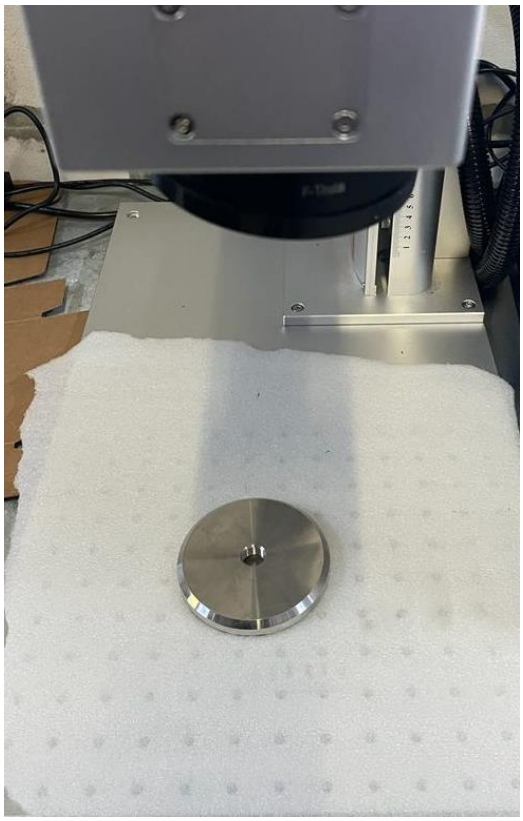
1. Create a square shape in EzCad.



2. Set the parameters of the power and speed of the marking and the frequency of the laser radiation according to the data from the instructions on the USB drive.

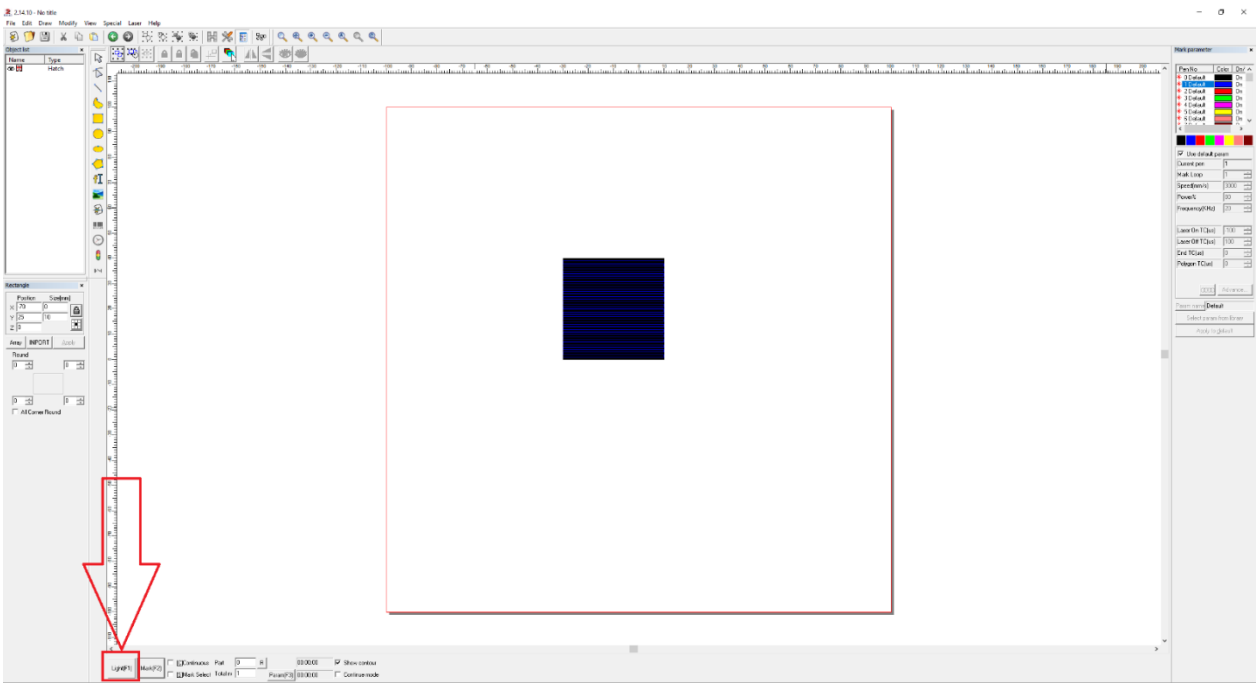


3. Position the marking material under the lens of your marker.

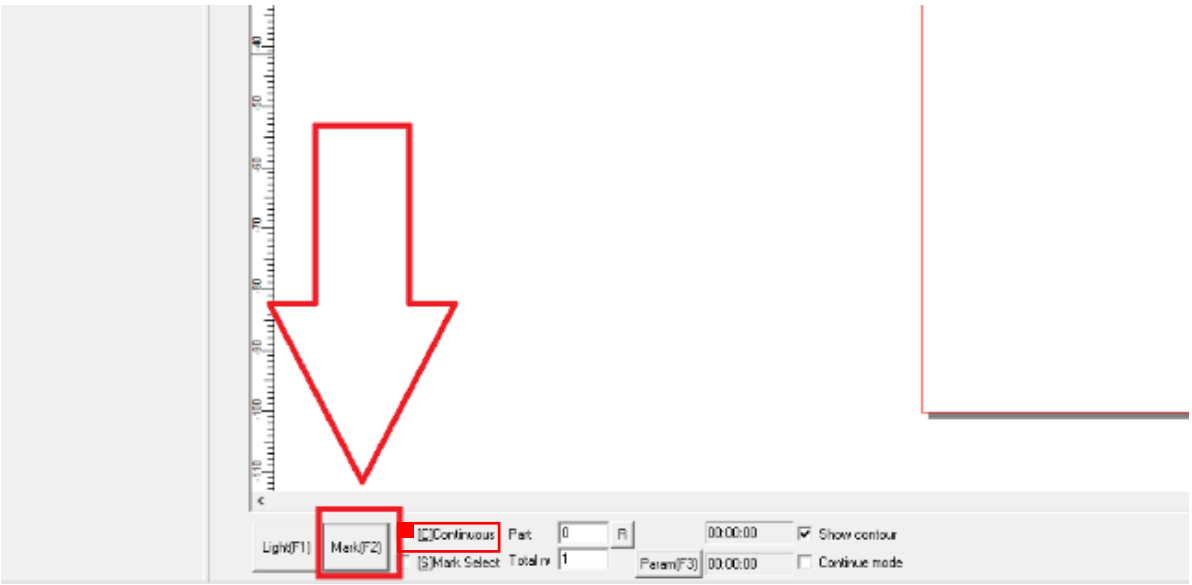


4. Remove the protective cover from the marker lens.

5. Press the Light(F1) button to see where your square will be marked on the workpiece.



6. Run the labeling. In continuous mode



7. Adjust the position of the scanner up and down by rotating the knob on the marker bed. When the sparks from the material in contact with the laser beam are the greatest, it will mean that you have found the focal length.

8. Precise focal length adjustment

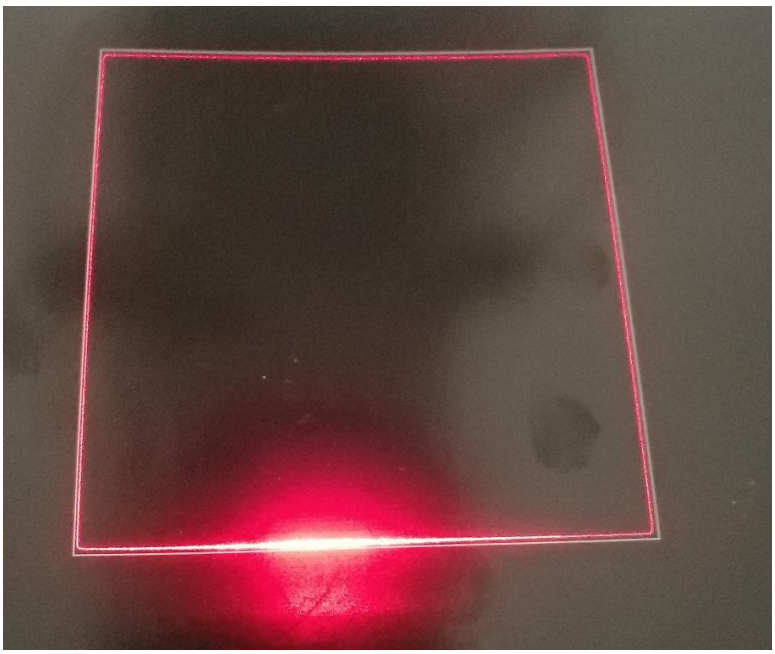
Fix the scanner at the found focal length. Turn off the marking mode.

6.7 ADJUSTING THE PREVIEW FRAME OF THE MARKING AREA

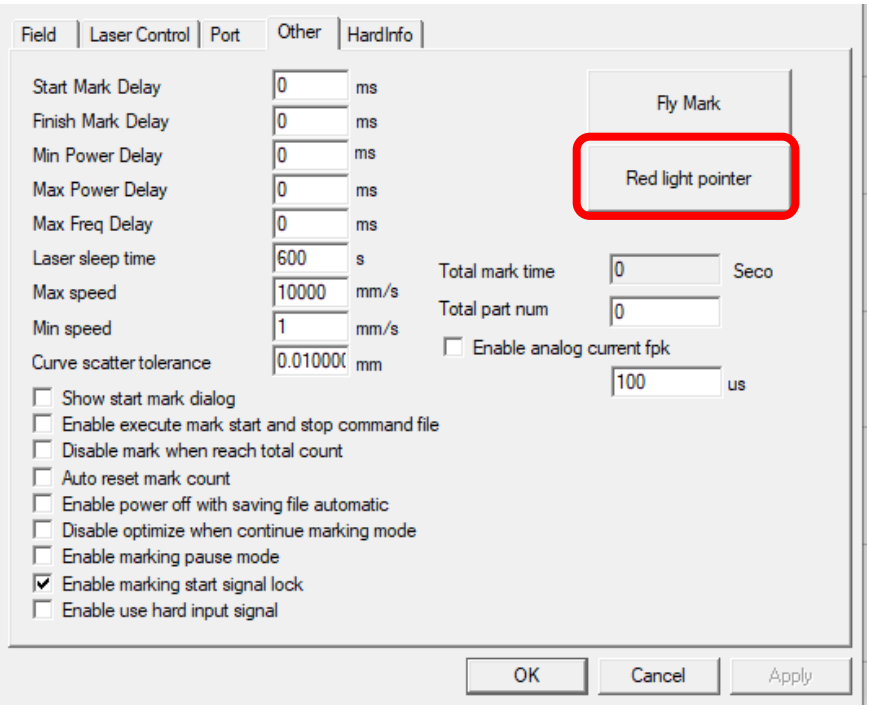
The first time you run the marker, the preview frame may be in the wrong position and not match the location of the marker, as well as show the incorrect size of the future marking field.

1. Adjust the size of the preview frame

Create a 100x100 mm square in Ezcad and start marking. Do not move the workpiece and press "Light" (F1).



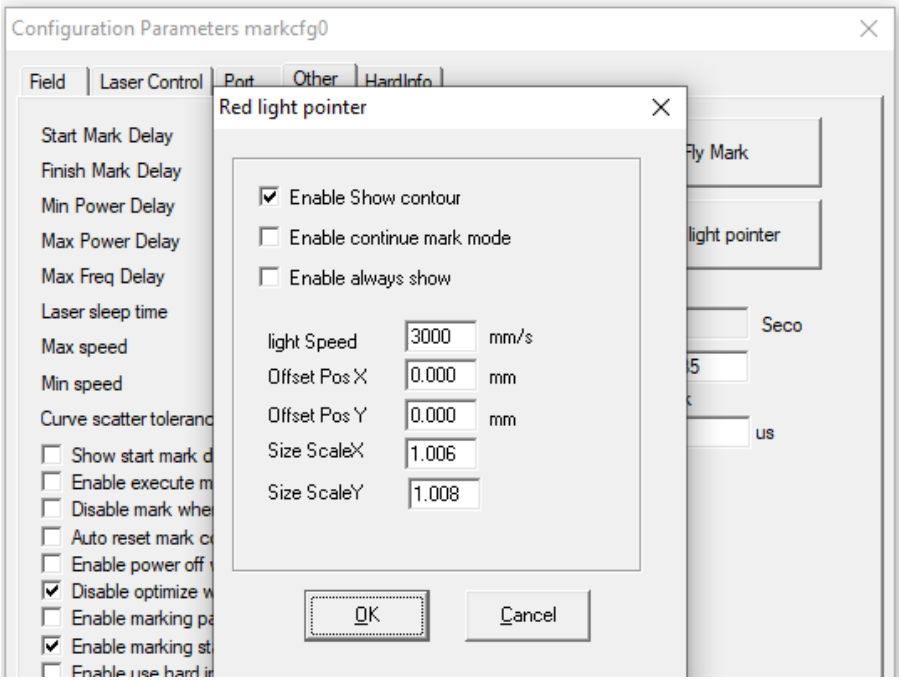
As you can see in the picture above, the square of the preview frame is smaller than the labeled object. To make adjustments, go to "Param" (F3) -> Other -> Red light pointer:



Adjust the "Size scaleX" and "Size scaleY" values. After that, restart the preview frame for verification.

2. Adjusting the position of the preview frame

If the preview frame is located in a different place relative to the marked object, go to "Param" (F3) -> Other -> Red light pointer:



Adjust the values of "Offset Pos X" and "Offset Pos Y".

+ 0, 1X	The frame will shift to the right by 0.1 mm
- 0,1X	The frame will shift to the left by 0.1 mm
+ 0, 1Y	The frame will move up by 0.1 mm
- 0,1Y	The frame will shift down by 0.1 mm

After that, restart the preview frame for verification.

6.8 ADJUSTING THE ACTUAL SIZE AND SHAPE OF THE DRAWING

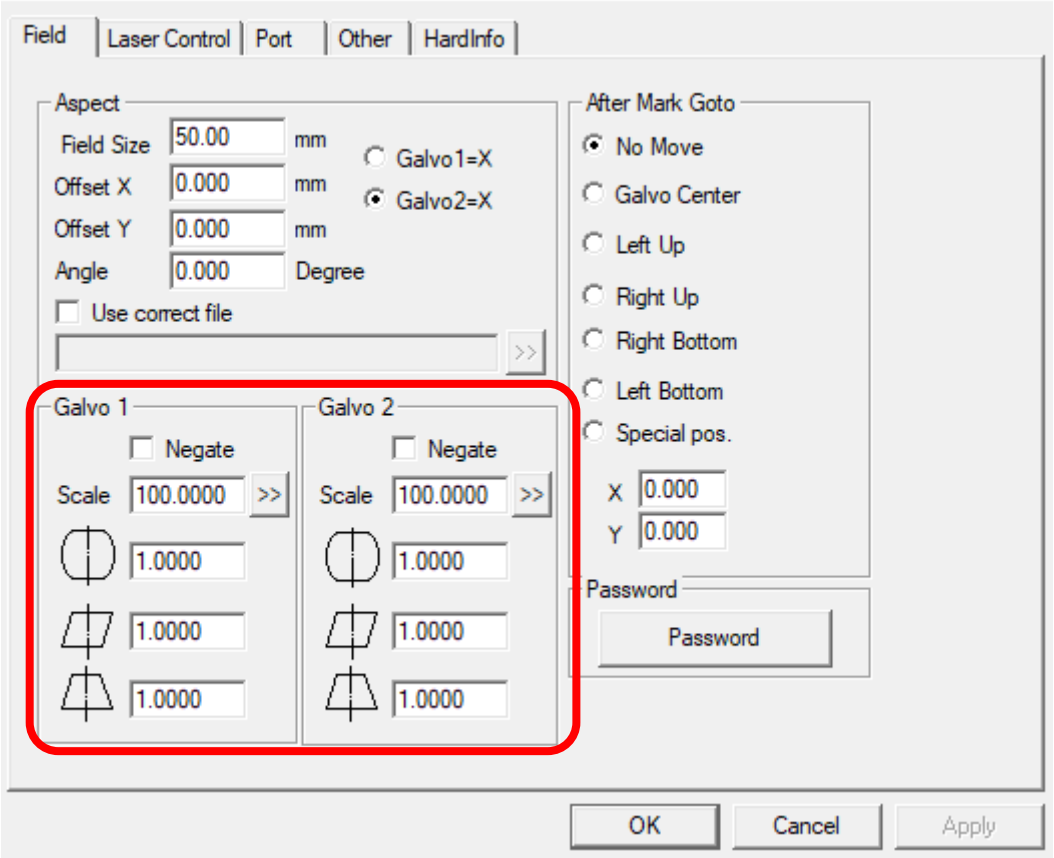
Precise adjustment and calibration of the machine is essential to achieve high marking quality.

6.8.1 ADJUSTING THE SHAPE OF THE PICTURE

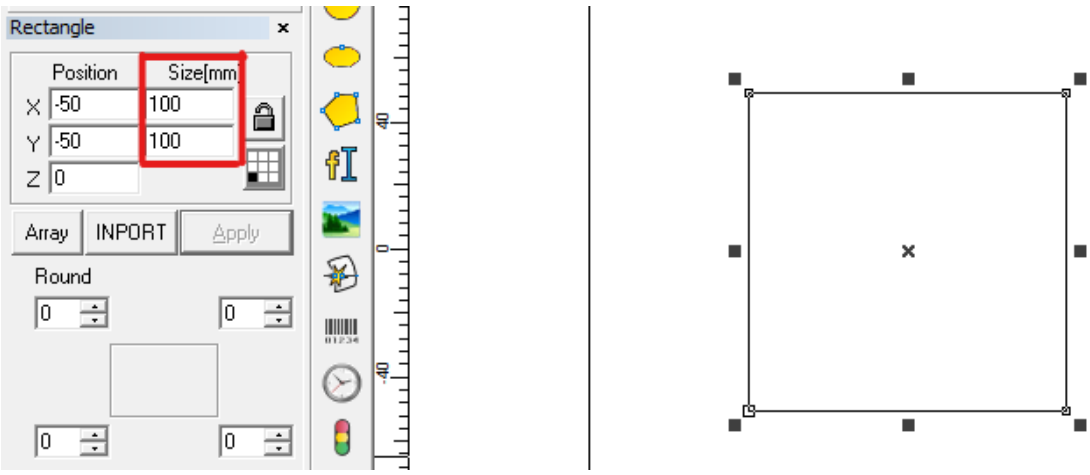
Option 1: Manual Adjustment

The first time you run the marker, the size of the tagged object may not match the size of the object created in EzCad.

In EzCad, in the "Param" tab (F3), there is a setting for 3 types of shape deviations for each axis.
Galvo1-> Y-axis; Galvo2-> X-axis



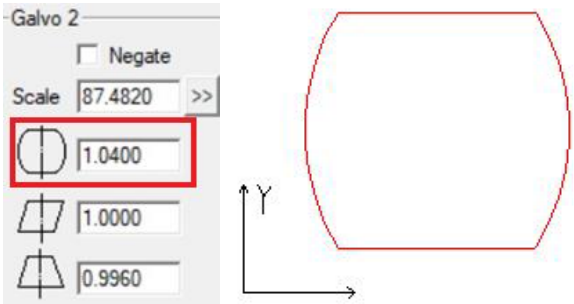
1. Create a 100x100 mm square in the program and start marking on a pre-prepared surface.



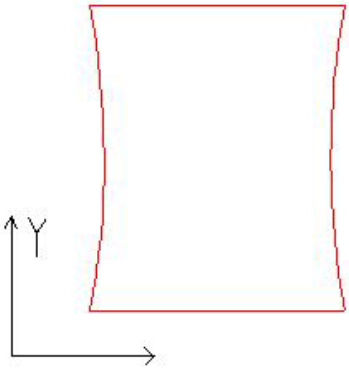
2. Use a square or other measuring tool to check for deviations in the shape of the object.

3. If the shape of the object deviates from the one specified in the program, adjust the required parameter.

For example: If a defect occurs in the X-axis when marking a square, you must **increase** the value in the adjustment field of this parameter for the X-axis.

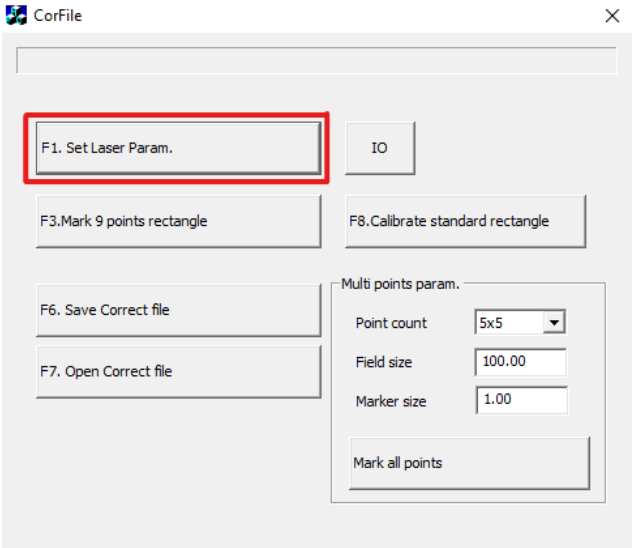


Or, on the contrary, if a reverse defect occurs along the X axis, it is necessary to **reduce** the value in the correction field of this parameter for the X axis.



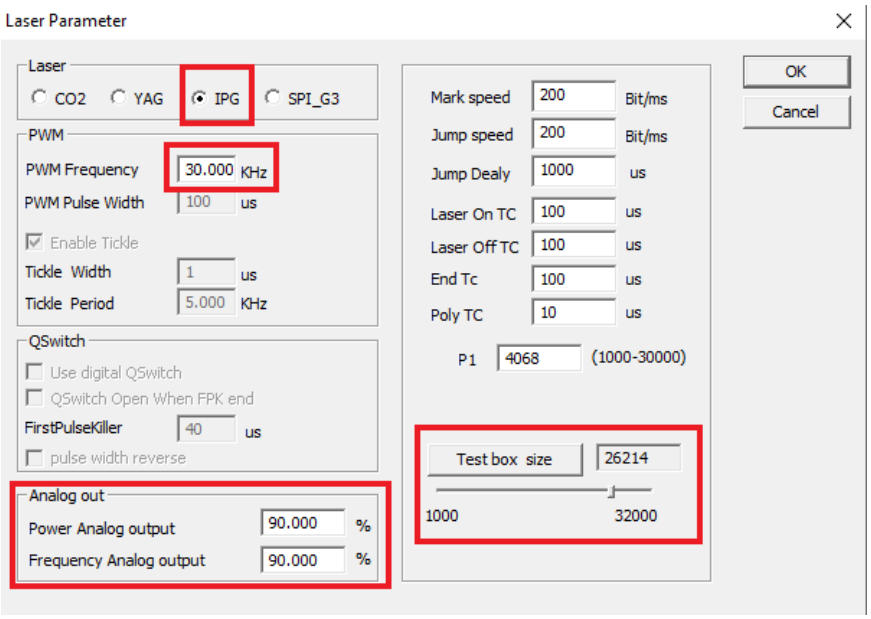
Option 2: Set up using a calibration file.

1. Prepare the surface on which the calibration figure will be marked. The surface should be no smaller than the working area of the lens.
2. Open the folder with the EzCad program. Run the "Corfile2" calibration software.
3. In the program window that appears, go to the F1 settings item. Set Laser Param.

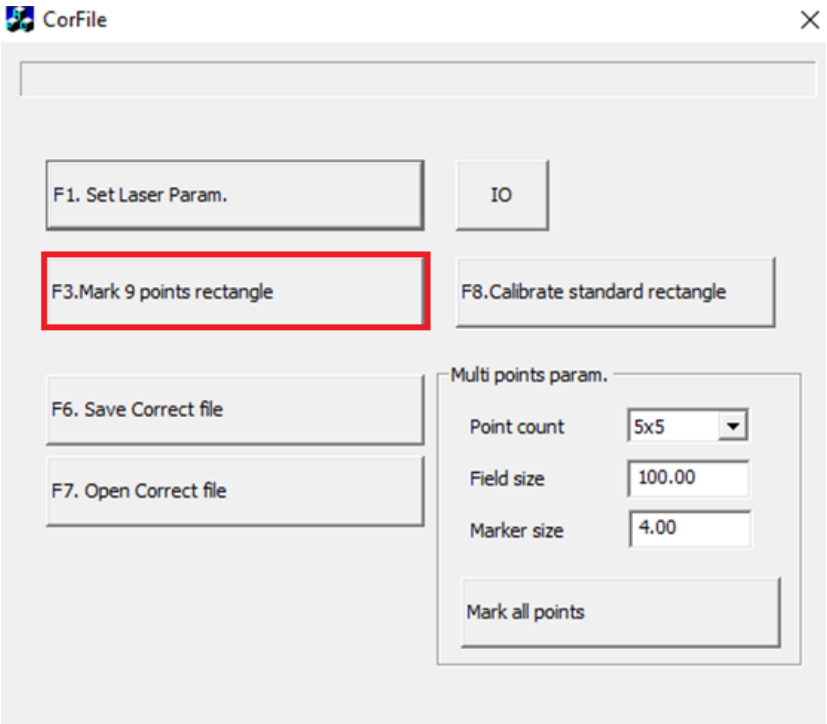


4. Settings:

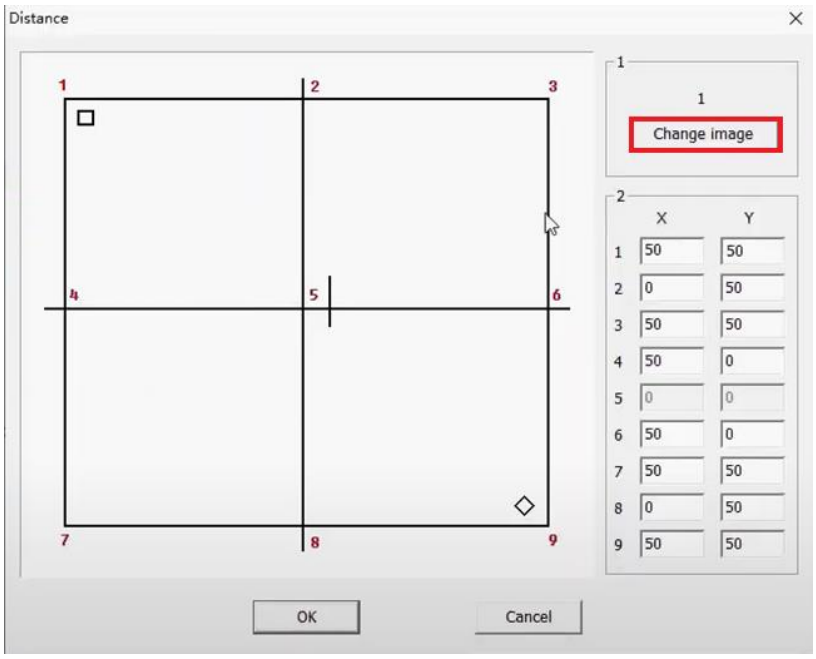
- Laser tab - set IPG or Fiber (depending on the software version)
- PWM tab – set the frequency value corresponding to the characteristics of the equipment
- Analog Out tab – select a value that is sufficient so that the shape is clearly visible on the surface after marking
- Test Box Size tab – you can reduce the value if the shape does not fit into the working field after marking.



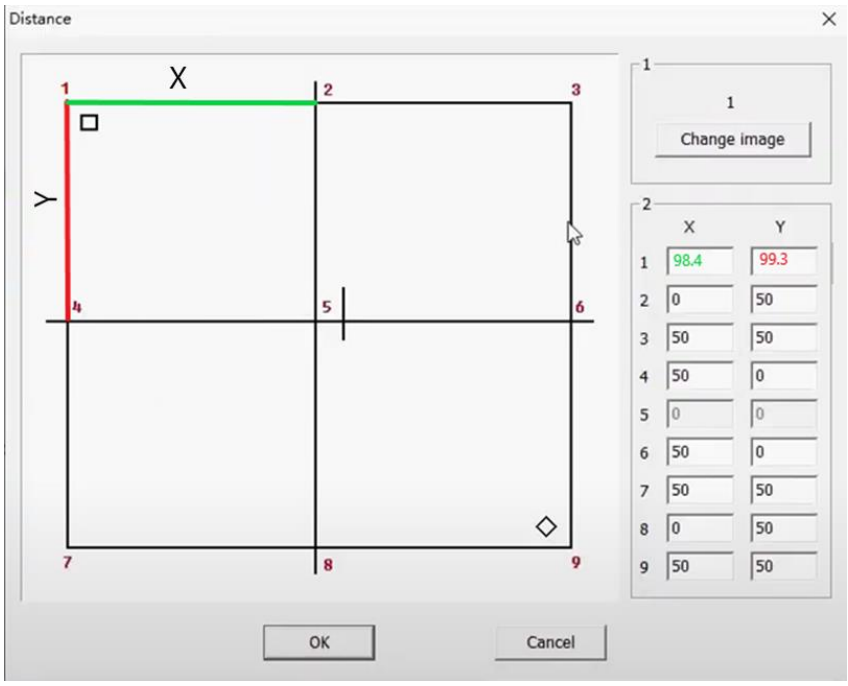
5. Close the options window with the OK button. From the main menu, select F3. Mark 9 Points rectangle. The labeling process will start. Check if the shape fits on the work surface, if not, then reduce the size of the shape using Test Box Size.



6. Check the position of the marked figure on the work surface with the shape on the screen, if there is a discrepancy, change the shape on the screen using the "Change image" button. Change the shape on the screen until it matches the result on the work surface.

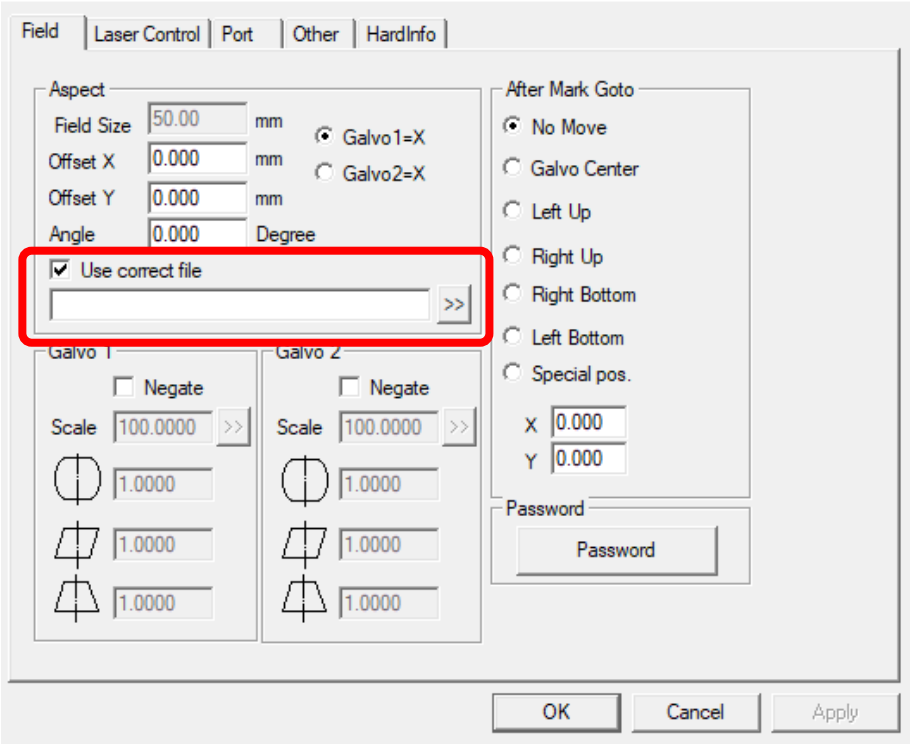


7. Once you've found the right image, match the 9 points marked in the image with the locations on the labeled shape. Next, you need to measure the distances of these points from the center of the figure (point 5) vertically (Y-axis) and horizontal (X-axis) and write down the actual values in the table{1}.



8. After filling in the table, click OK. From the main menu, select F6. Save correct file. Next, set the name and path of saving the file.

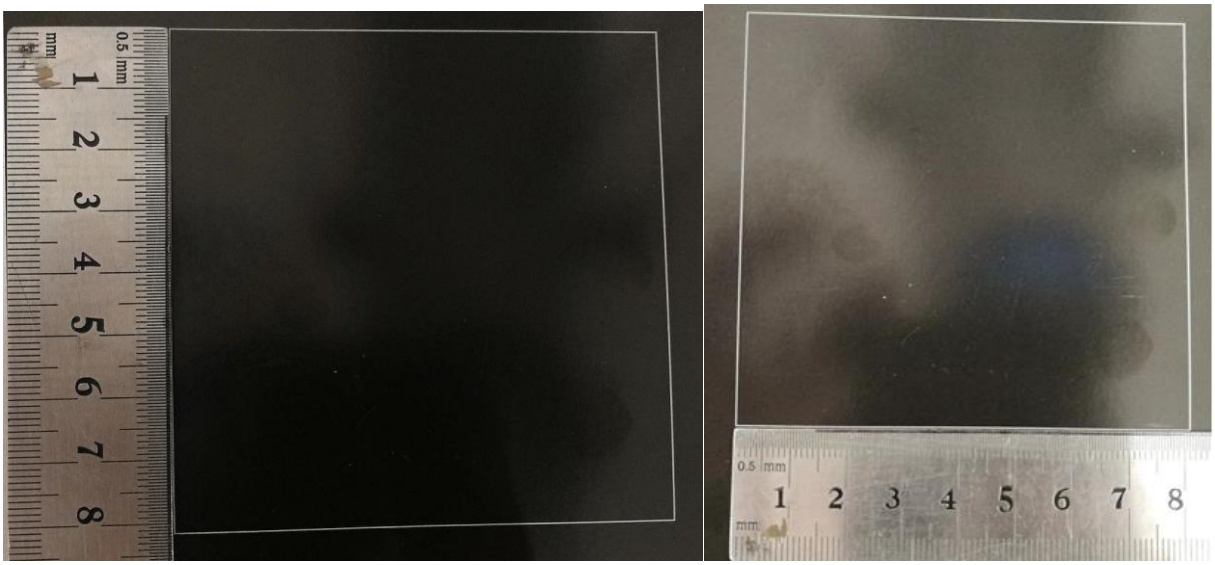
9. Close Corfile2 and start EzCad. Go to the "F3 Param" options. On the options screen, check the box next to "Use correct file" and specify the path to the saved file by pressing '>>.



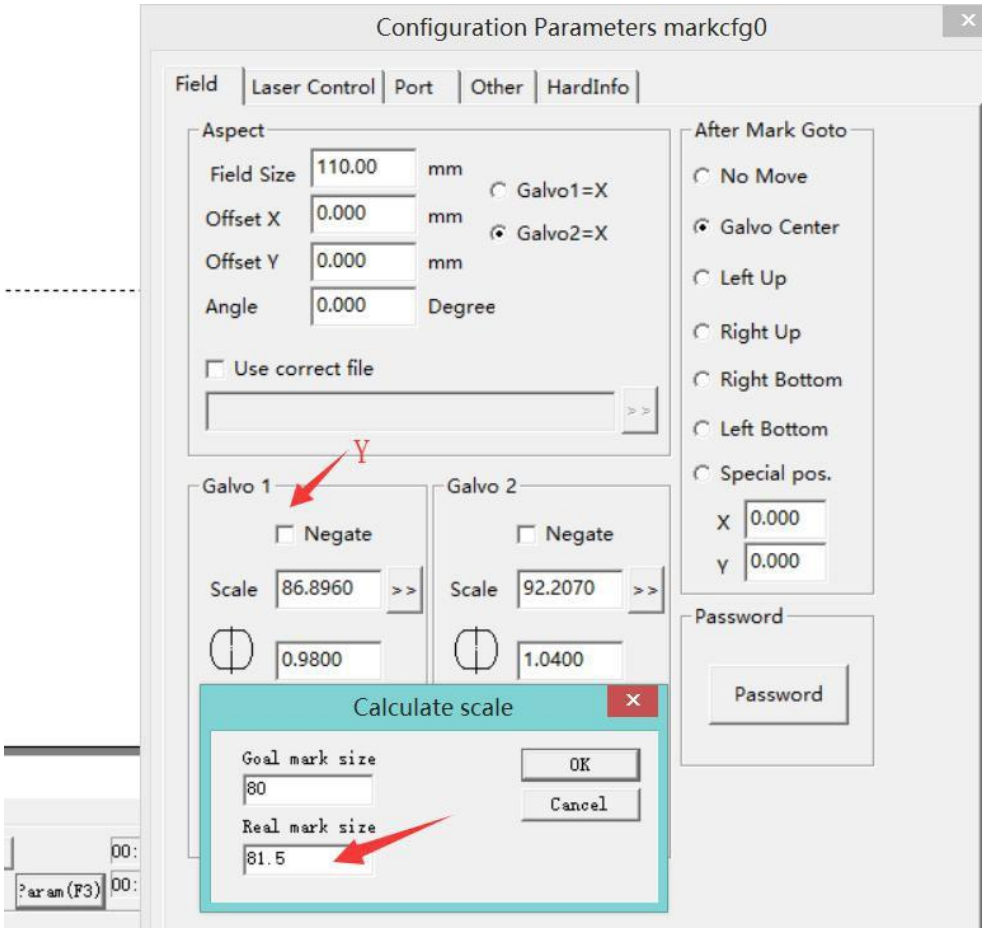
10. The settings from the calibration file will then be applied. Manual adjustment will not be available.

6.8.2 ADJUSTING THE SIZE OF THE DRAWING

1. Create a square in the program (for example, 80x80 mm) and run the marking on a pre-prepared surface.
2. Run the marking and measure the actual size of the resulting square along the X and Y axes:



3. If the actual size is different, go to "Param" (F3) -> Field. Next to the "Scale" value, click ">>":



Goal mark size	Size of the pattern along the axis in EzCad
Real mark size	Actual size of the rice

Galvo 1	Y-axis
Galvo 2	X-axis

4. Enter the desired values and click "Ok". Start the marking again and measure the size of the resulting square again.

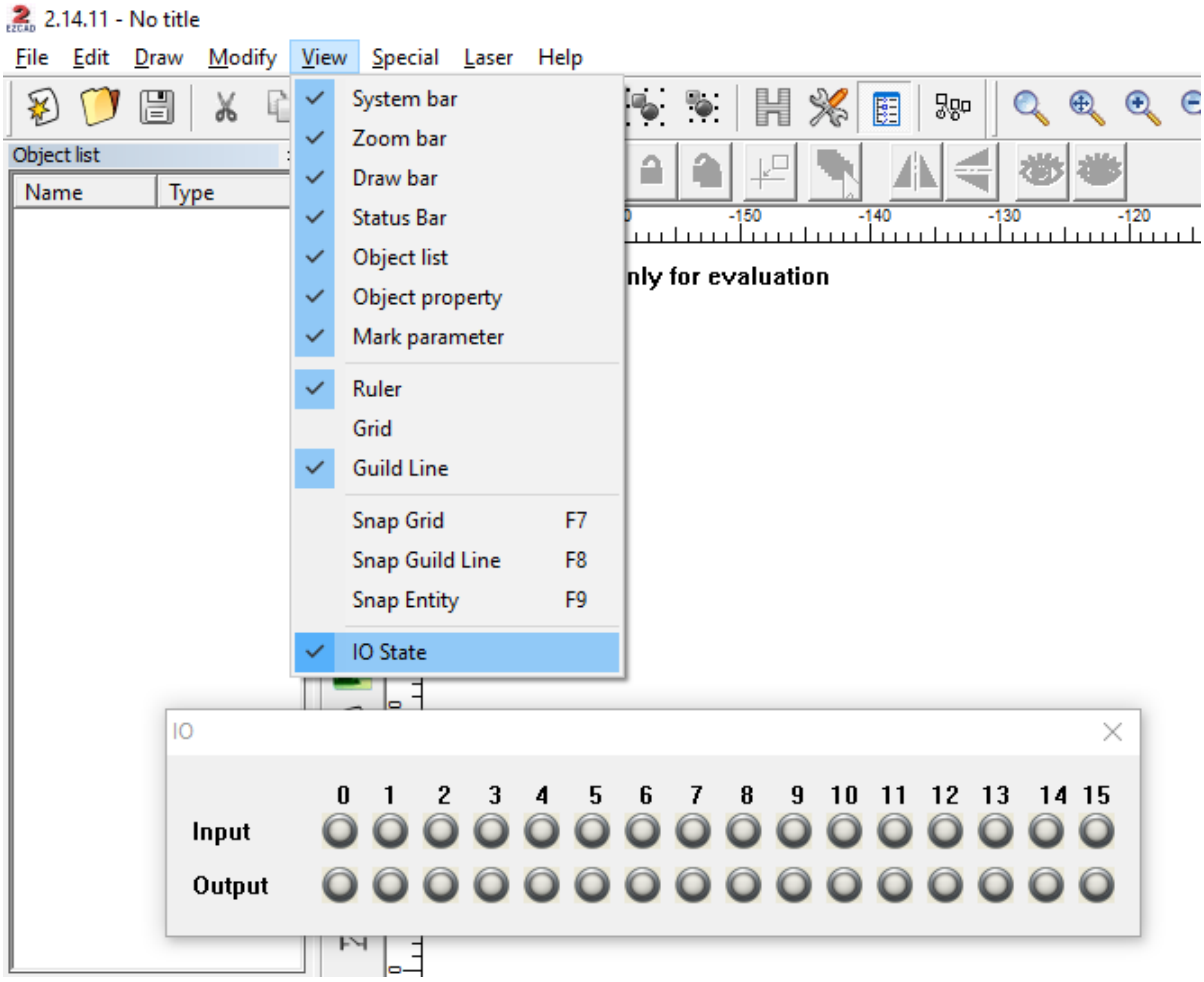
6.9 SETTING UP PEDAL OPERATION

1. Connect the pedal:

- Insert the pedal into the appropriate slot on the laser marker.

2. Open the EzCad app:

- Start **EzCad** and go to **View** -> **IO State**.



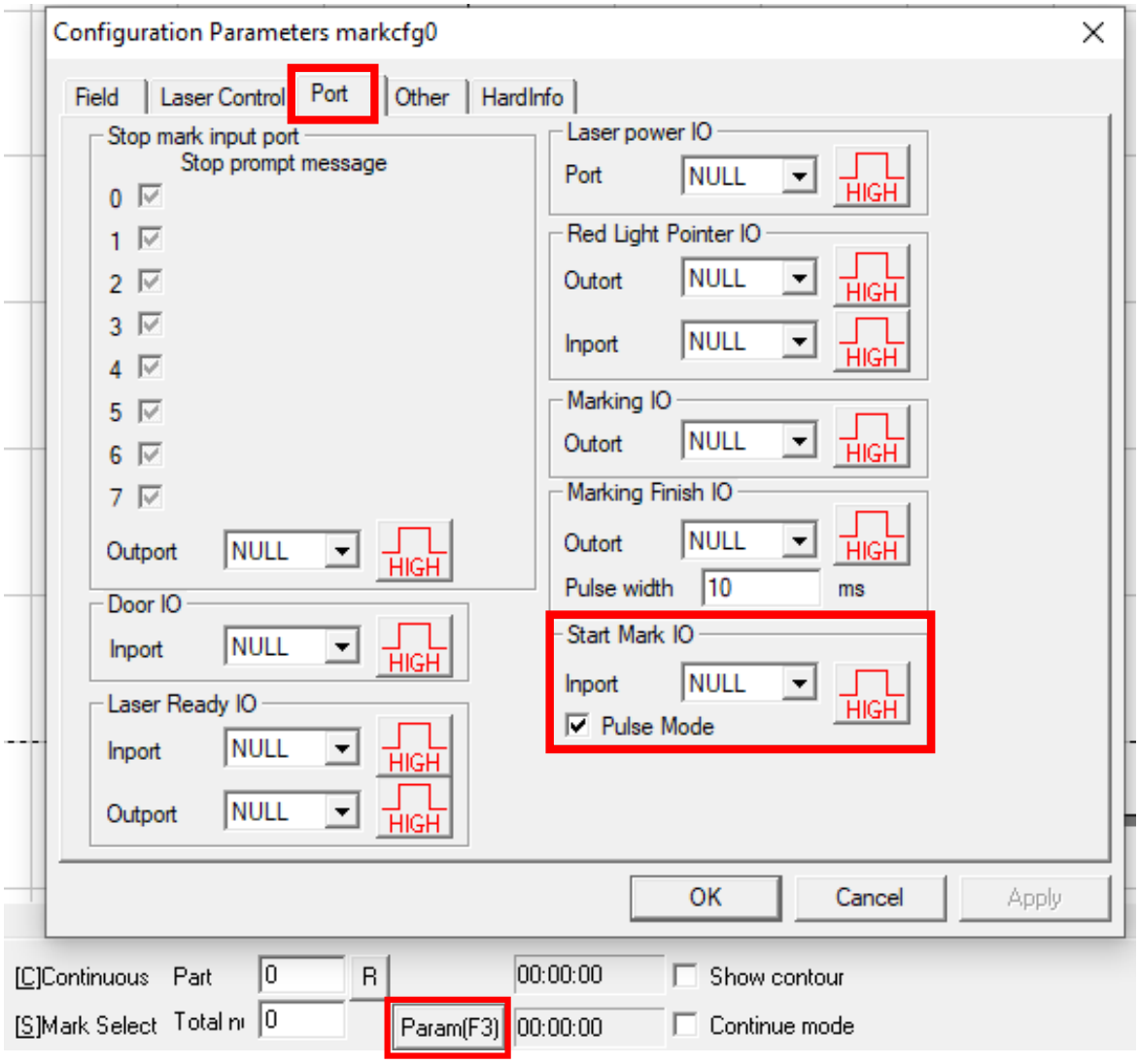
3. Identify the active port:

- In the **IO State** window , you will see a list of active ports that the device uses.
- Press the pedal to determine which port is activated.

4. Configure the port to start marking:

- Go to Param (press F3) -> Port.
- In the menu that appears, find Start Marking IO. This parameter is responsible for starting the marking process.

- Select the port number that was displayed earlier in the IO State window.



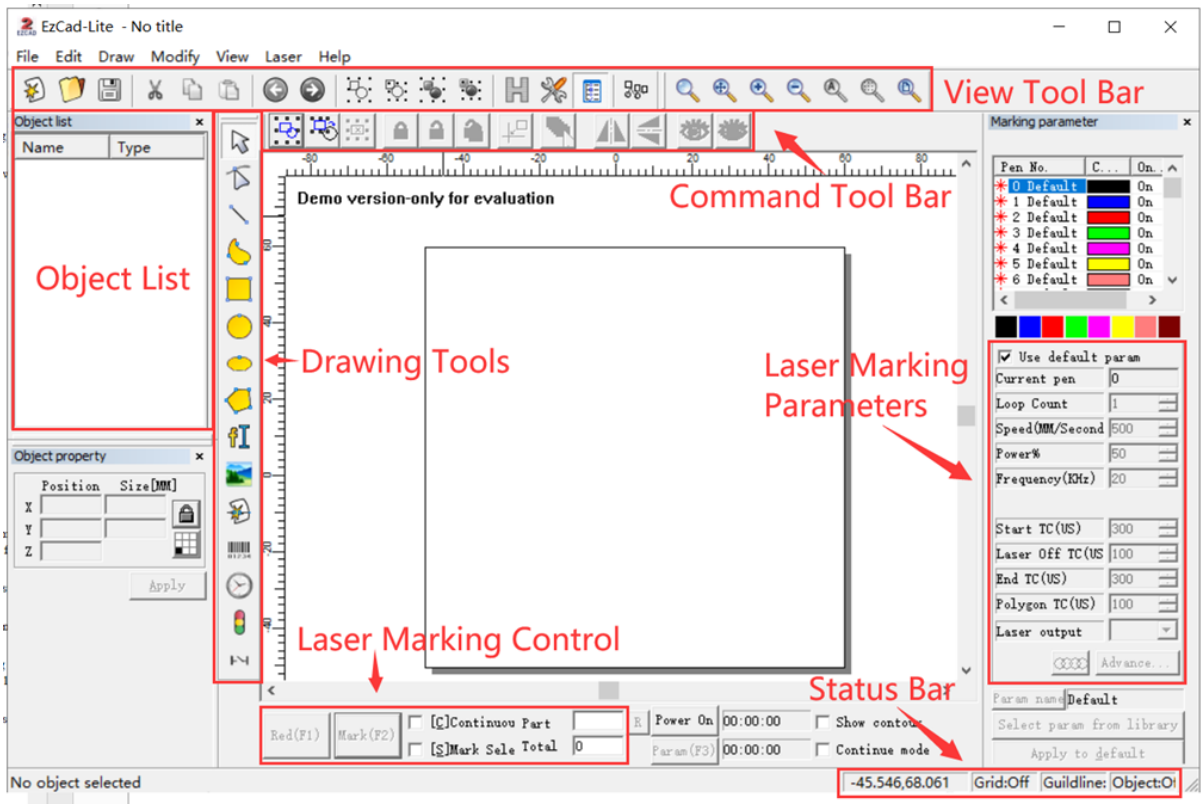
5. Save the settings:

- Click **OK** to save the settings.

CHAPTER 7. DESCRIPTION OF THE SOFTWARE, THE MAIN PARAMETERS OF THE PROGRAM

7.1 INTRODUCTION TO EZCAD.

7.1.1 BASIC VIEW OF THE EZCAD INTERFACE



View tool bar – view toolbar;

Command tool bar – command panel;

Object list – a list of objects to be marked;

Drawing tools – drawing panel;

Laser marking parameters – marking parameters;

Laser marking control – start marking;

Status bar- Status bar.

7.1.2 MARKING PARAMETER

• Loop Count — here you can specify the number of cycles of processing the object, you can specify a value greater than 1, then the marking will be repeated the specified number of times.

• Speed—Specifies the speed of the beam in millimeters per second.

• Power—Defines the % of the rated power of the laser source to be used.

• Frequency – Determines the laser frequency in kilohertz (kHz).

7.1.3 STARTING LABELING

• Red/Light (F1) – Triggers the display of a red frame that shows the intended location of the marking on the material so that the user can conveniently orient the workpiece.

• Mark (F2) — start marking.

• Continuous – if the checkbox is checked, the unit will be marked again until the user clicks Stop.

• Mark select – only selected objects will be marked.

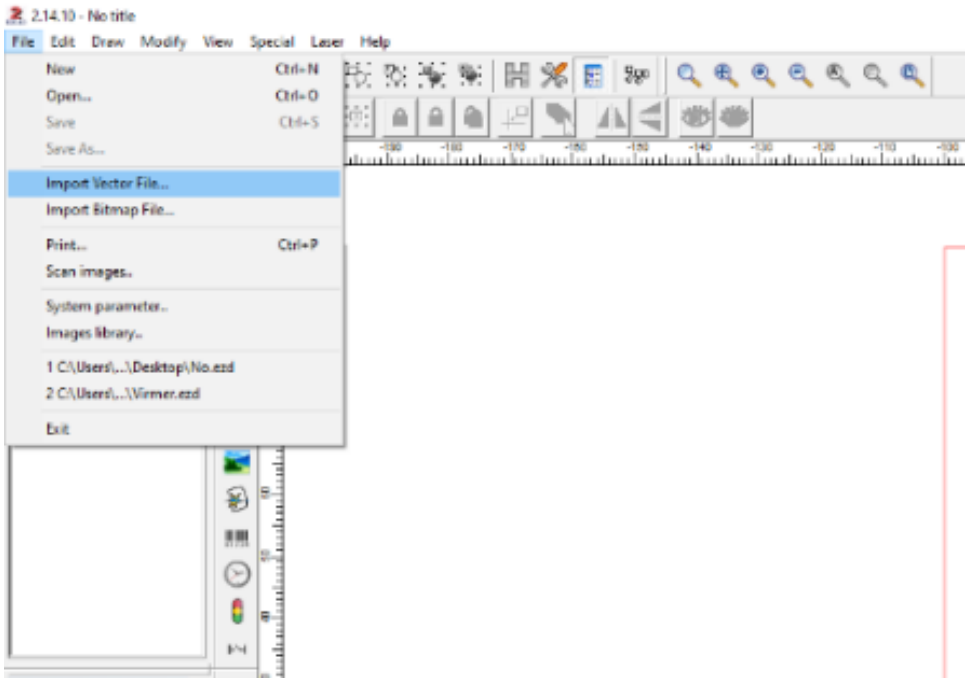
• Part - the total number of labeling cycles that have already been completed.

• Total - the total number of remaining marking cycles. The value will automatically decrease by 1 after each marking cycle.

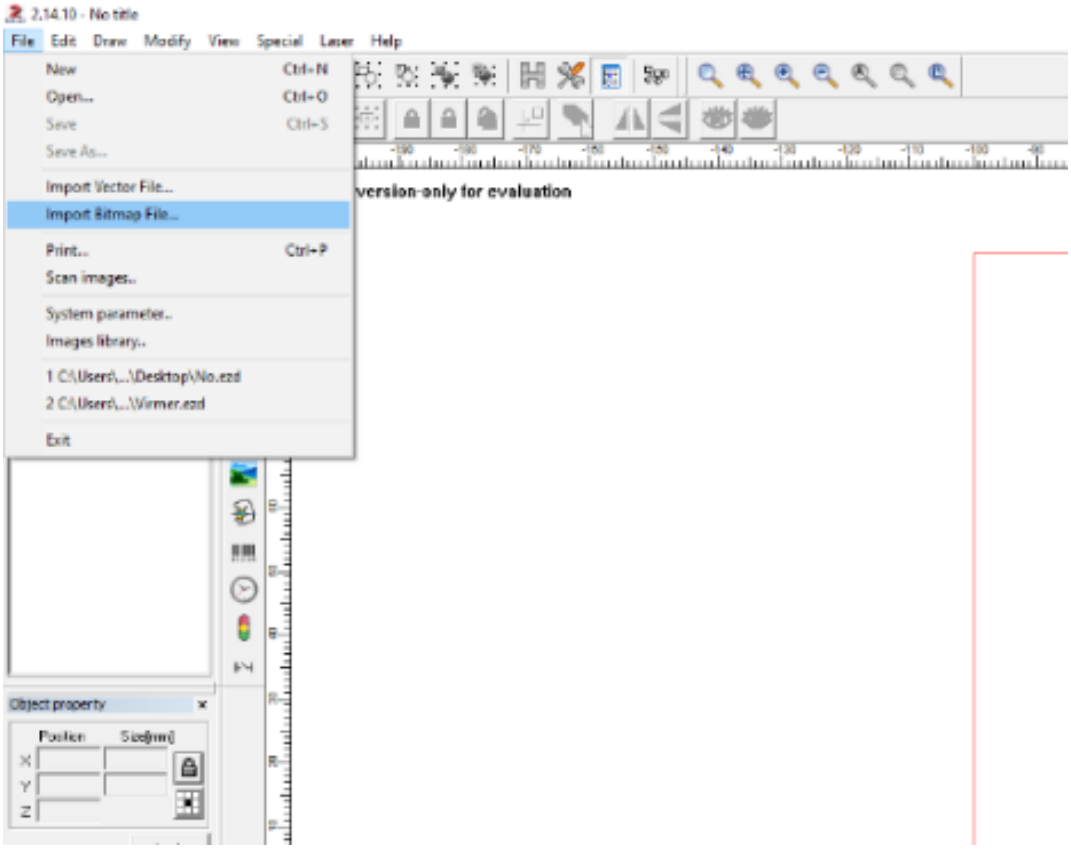
7.1.4 HOW TO UPLOAD A LAYOUT TO EZCAD

You can create a layout for marking directly in EzCad. Or in a third-party program, such as CorelDraw or Autocad to create a vector image, or Photoshop to create a raster image.

To upload a vector image, select File -> Import vector file at the top left:



To upload a bitmap image, select File -> Import bitmap file at the top left:



7.2 GENERAL RECOMMENDATIONS FOR LABELING

7.2.1 METALS

When marking metals, use maximum power, low frequency, and low or medium speed. Remember that some metals produce toxic dust. In addition to the risk to the user's skin and eyes, quite a lot of dust can be generated, so we recommend installing exhaust systems on the equipment. Similarly, operators and others in the work area may require personal respiratory protective equipment, such as masks and respirators.

Aluminum: Pure aluminum requires a slightly higher frequency than other metals, and there will never be a dark black hue like that created by marking steel. If darker markings are required, consider using anodized aluminum or creating deep markings that can be darkened with black epoxy resin or other filler. Anodized aluminum requires a little more speed but a very low frequency.

Powder-coated metals: Powder-coated metals usually require a very high frequency and, for best results, at least 3 passes to remove the coating and polish the bottom layer.

Precious metals: Gold, silver and similar soft metals should be marked at a lower power but at a medium speed to avoid strong reflection of the laser beam from the metal.

7.2.2 PLASTICS

When labeling plastic, low power and high speed are usually used. Marking with too much power or too low a speed can concentrate too much energy at the point of contact, causing the plastic to melt. Among other problems, this can lead to poor quality markings, poisonous gases, and even fire.

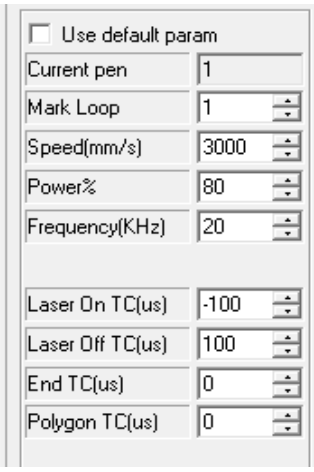
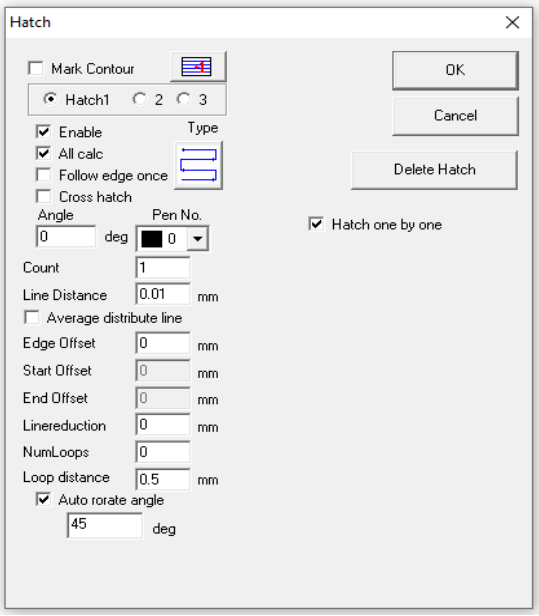
7.2.3 STONE

When marking different types of stone, use medium power and speed at a low frequency. As with ceramics and metals, be aware of the dust generated (especially during long marking cycles) and take similar measures to ensure the safety of users and others in the work area.

7.2.4 CONTRAST AND DEPTH OF MARKING

To darken the image, use a higher frequency. To lighten the marking, use a lower frequency. To increase the depth of marking, reduce the speed or increase the power of the laser or increase the number of processing cycles. Remember that marking too deep reduces image quality, especially for coated materials.

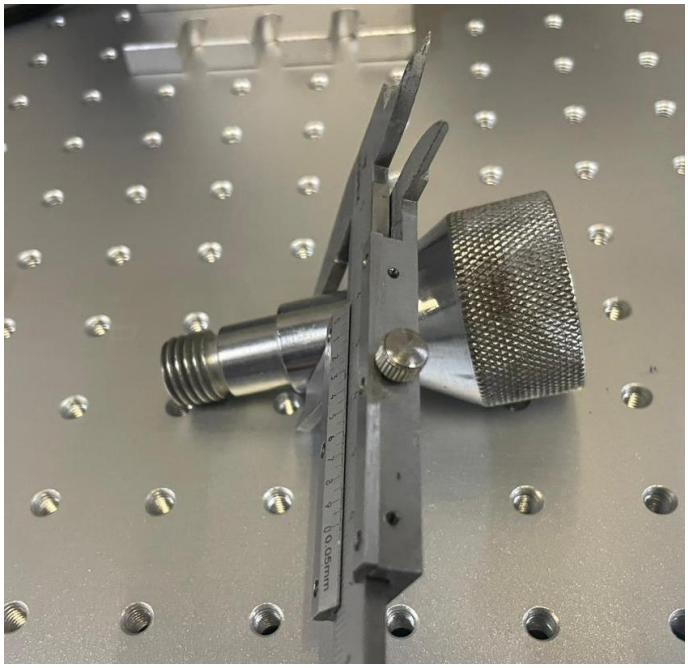
7.3 APPROXIMATE LABELING PARAMETERS

	**Power % -** Power (%) **Speed(mm/s) –** speed (mm/sec) **Frequency(KHz) –** laser frequency (KHz) **Mark Loop**
	**Hatch1 / 2 / 3 –** Number of hatches. For each hatch, select a different layer color in **Pen No.** **Angle –** Angle (Hatch) **Type –** Hatch type **Line distance –** the distance between hatch lines (Hatch)

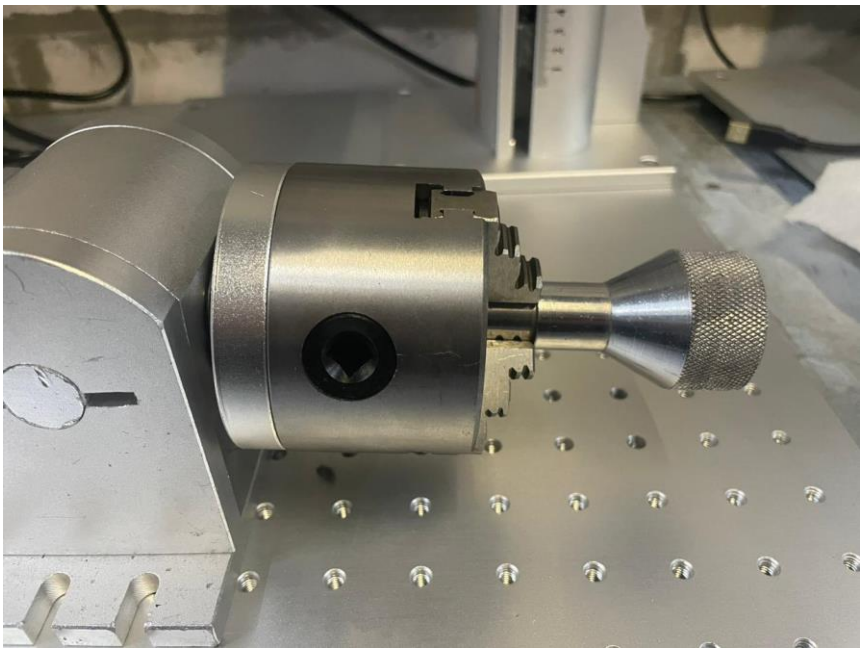
CHAPTER 8. SPECIAL FEATURES

8.1 SETTING THE ROTARY AXIS

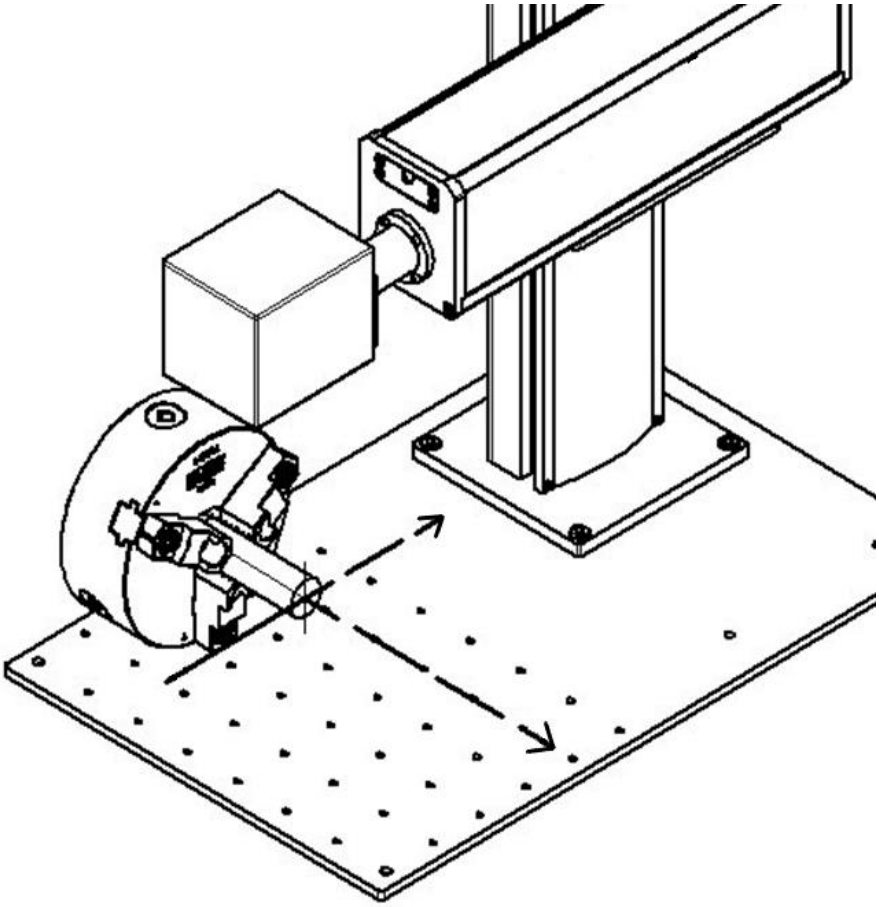
1. Measure the diameter of the workpiece.



2. Fix the workpiece in the rotary axis.



3. Set the workpiece in the rotary axis parallel to one of the scanner axes. The closer the workpiece is to the axis of the scanner, the better the quality of the marking will be.

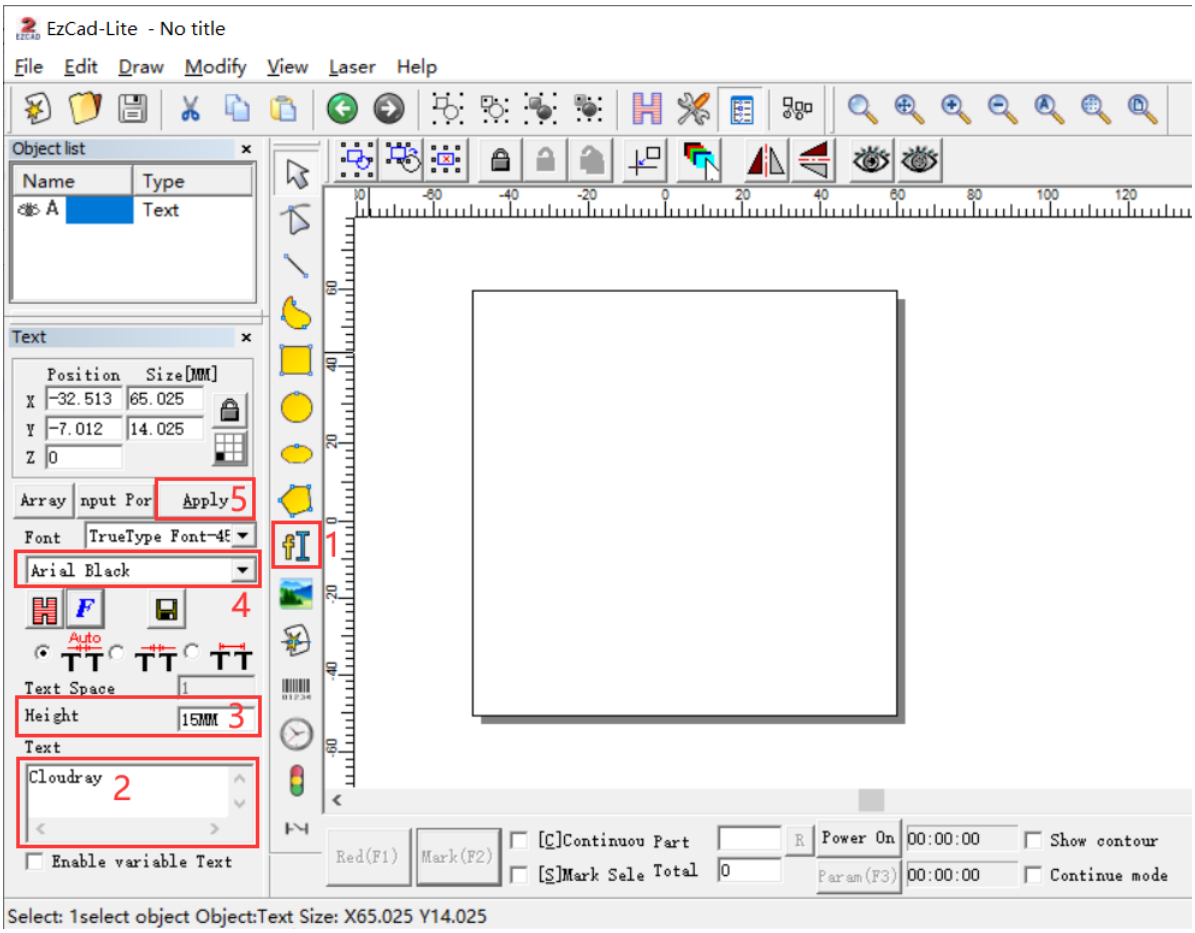


4. Adjust the focal length.

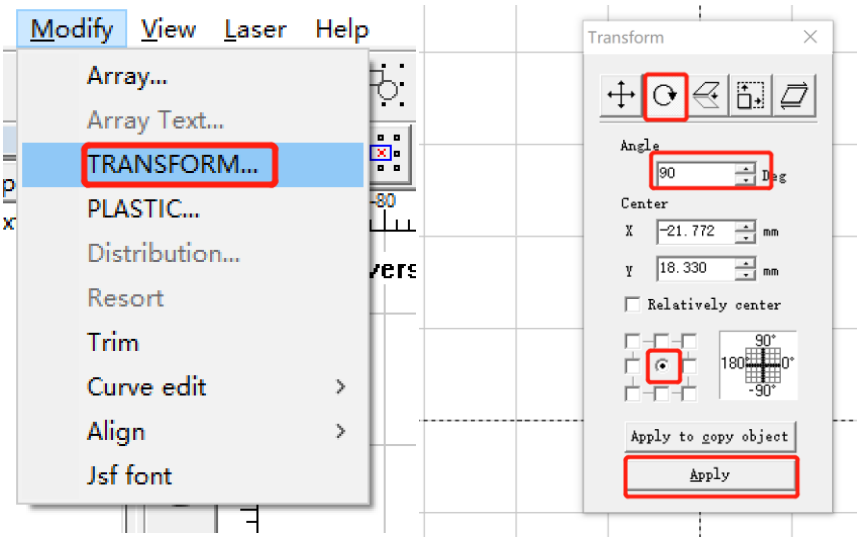
8.2 MARKING TEXT USING THE ROTARY AXIS

1. Create a new text.
2. Enter your text in the Test field.
3. Resize the text
4. Change the font.

5. Click the "Apply" button for the changes to take effect.



6. Adjust the direction of the text if necessary.



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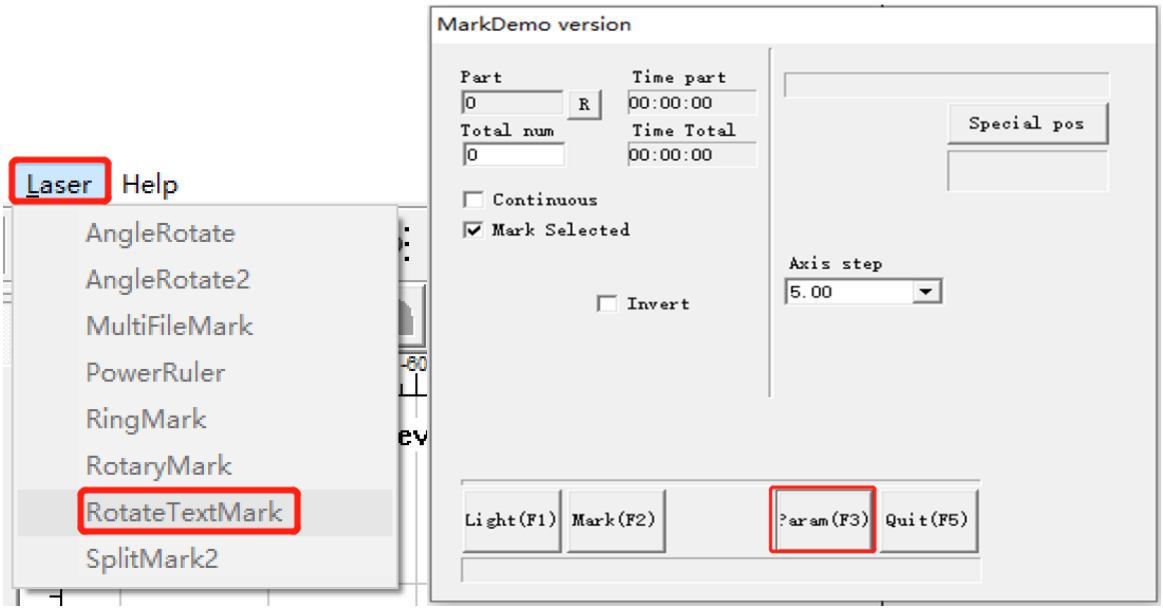
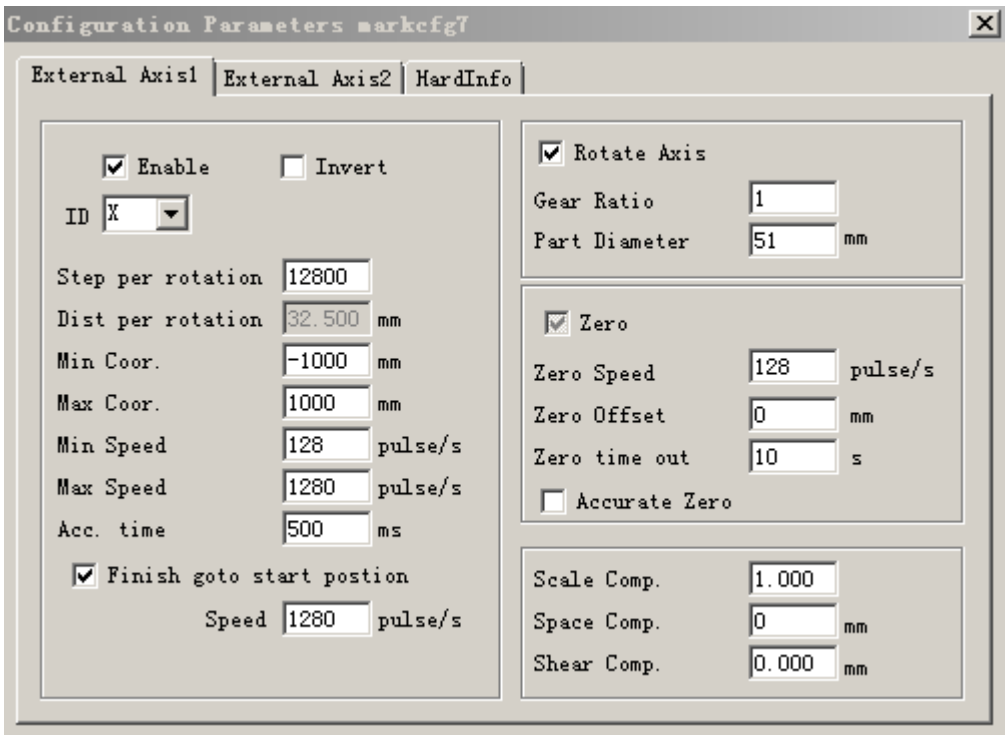
7. Go to Laser—> Rotate Text mark—> Param (F3)

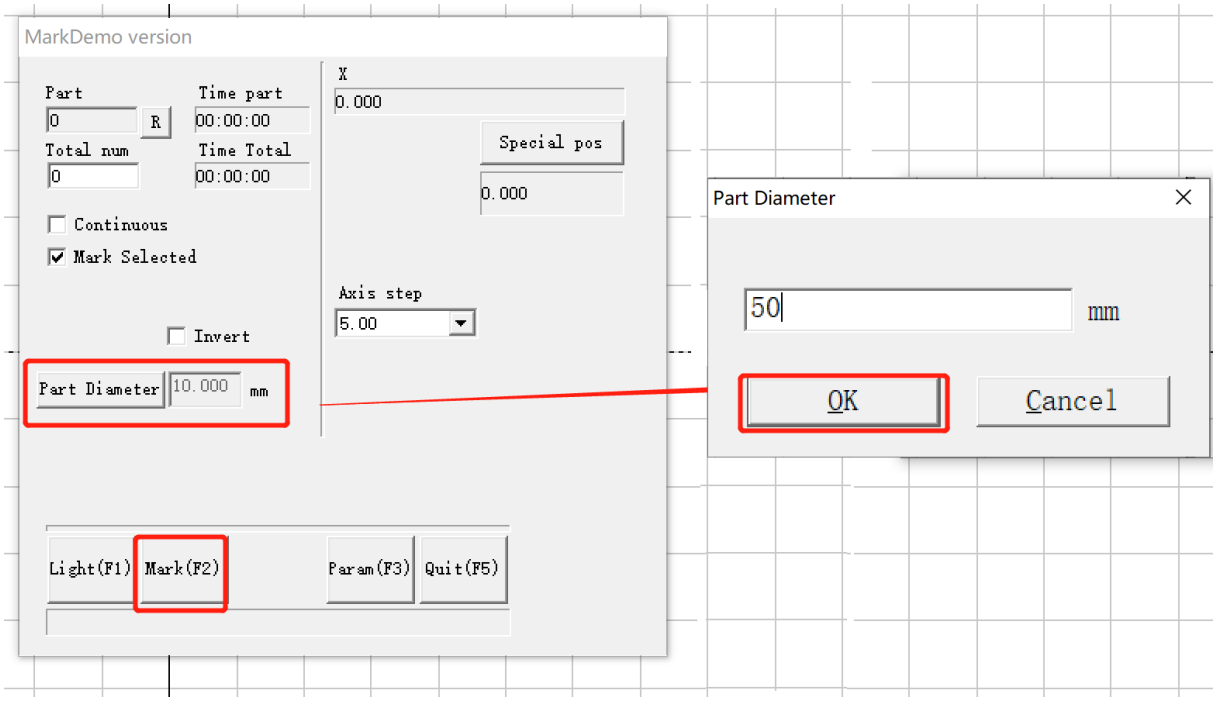


8. Set the parameters as in the photo below:



- ID: X/Y/Z – selection along which axis the marking will be split.
- Invert – Invert the marking direction

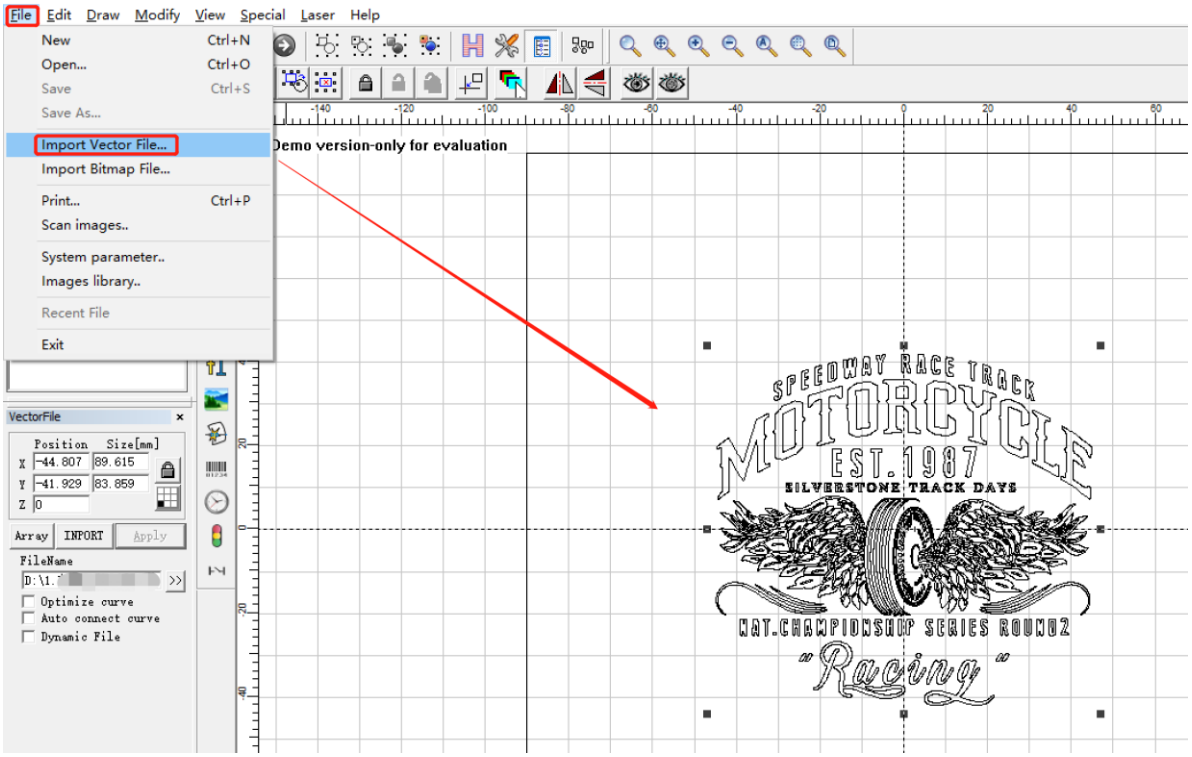
9. Enter the diameter of your workpiece.



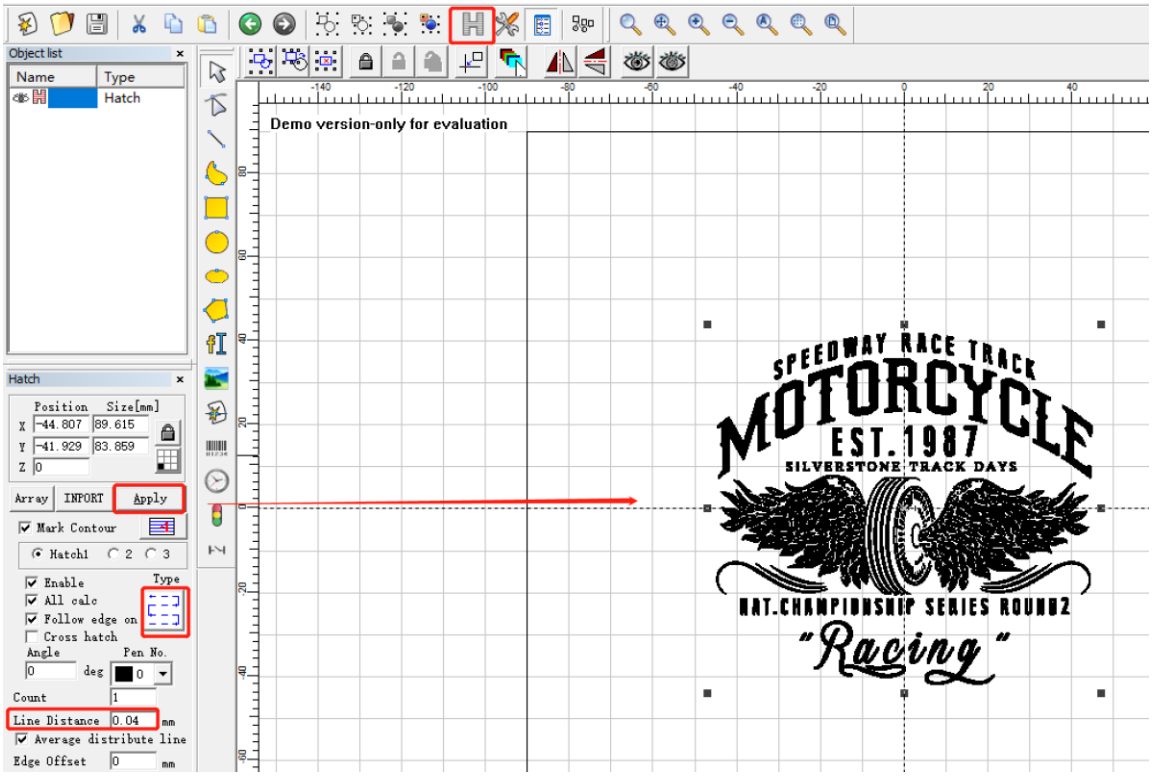
10. Press "Mark" (F2) to start marking.

8.3 MARKING A VECTOR FILE ON A ROTARY DEVICE

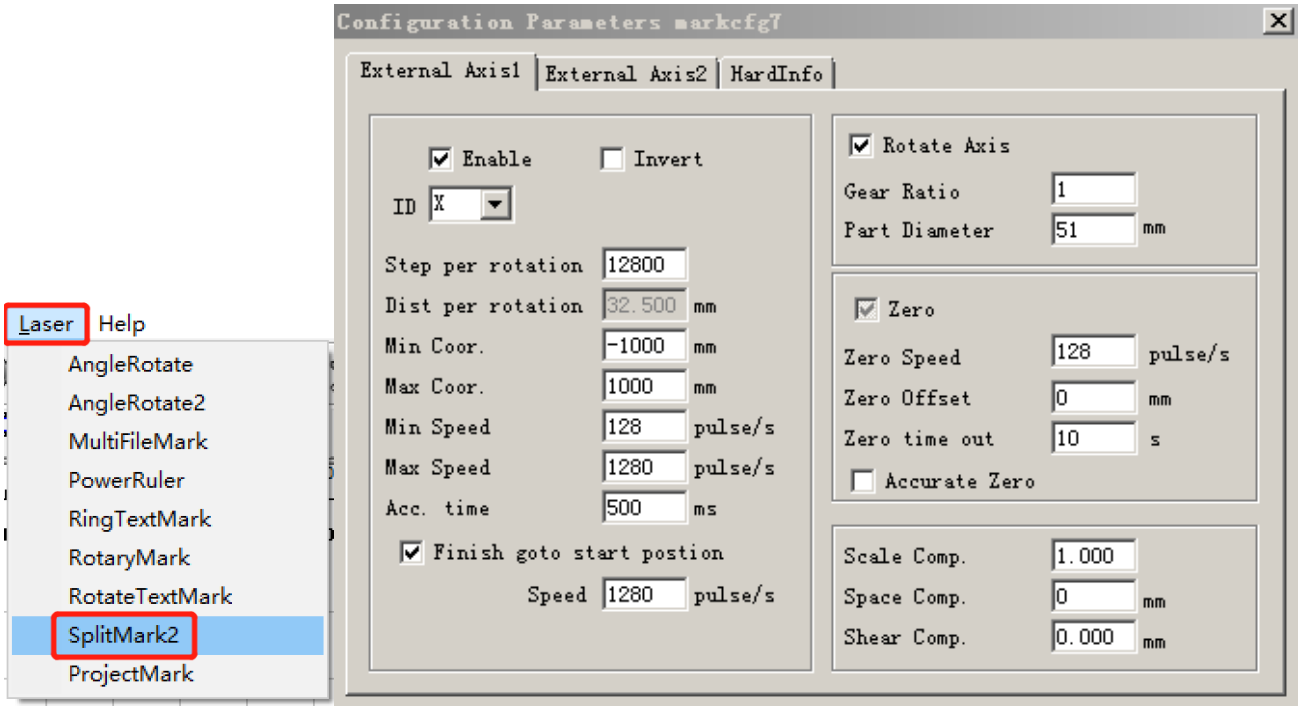
1. Import the vector file.



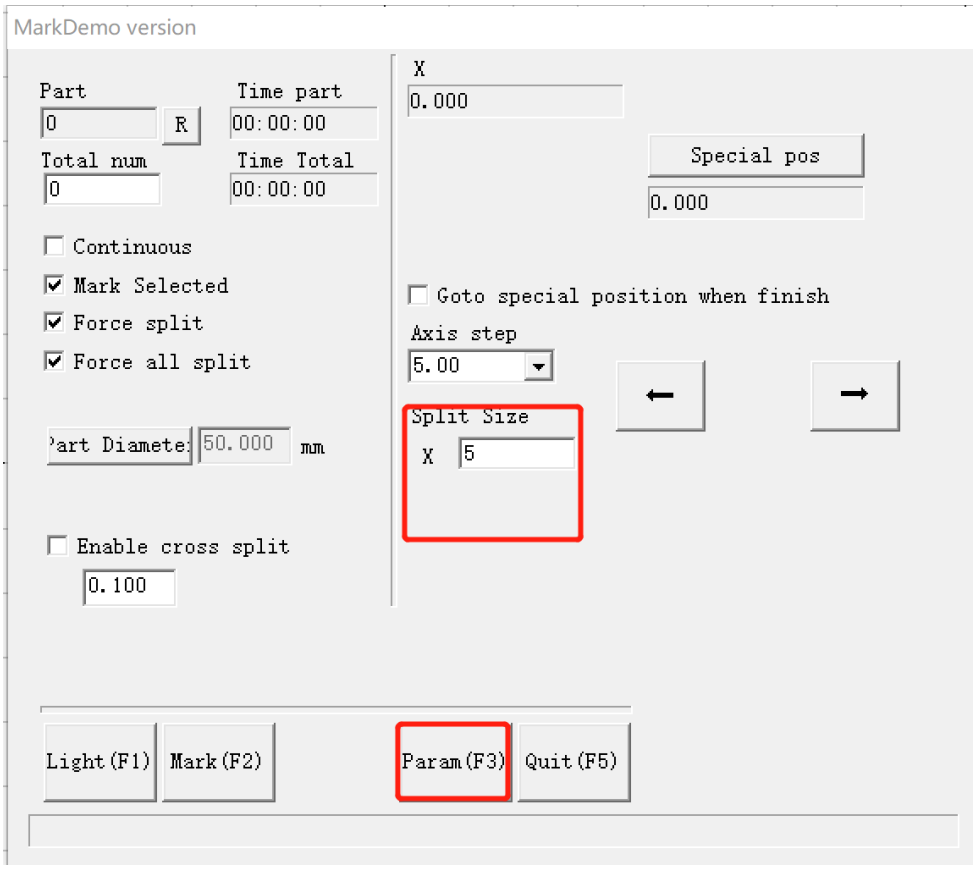
2. If necessary, set the necessary marking parameters.



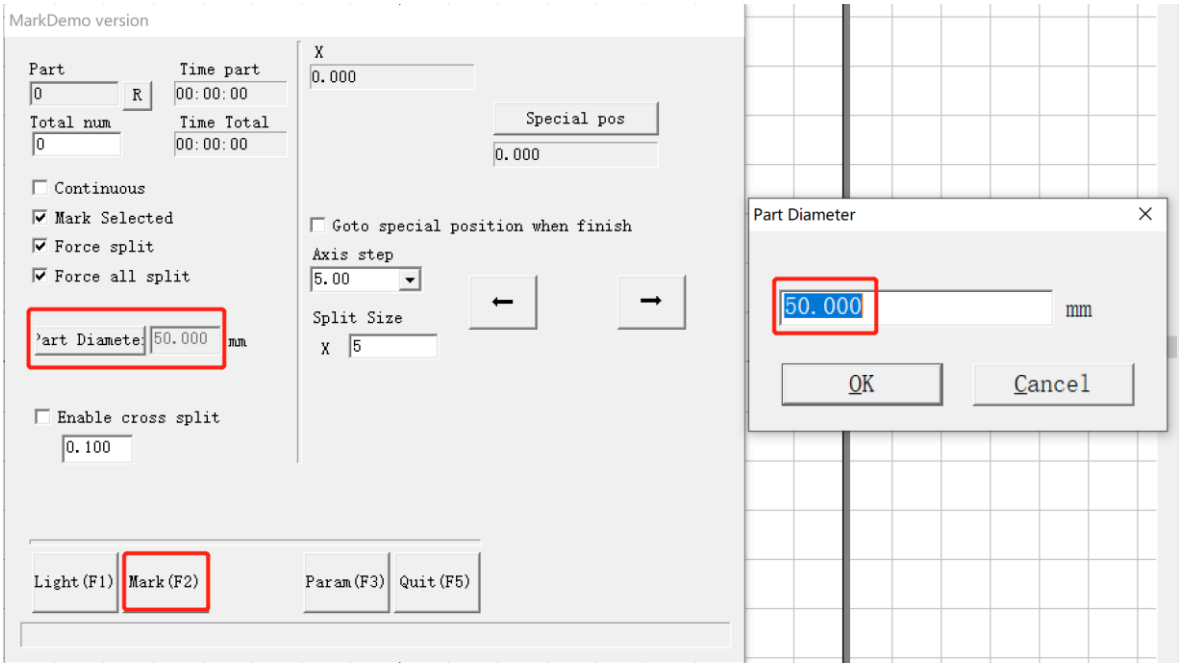
3. Go to the Laser-> Split mark 2-> Param (F3)



4. The smaller the Split size, the better the accuracy of the marking. Usually, the separation size is 1~5mm.



5. Enter the diameter of the workpiece.



6. Press "Mark" (F2) to start marking

CHAPTER 9. WARRANTY

9.1 DURING THE WARRANTY PERIOD

In case of equipment breakdown during its warranty period due to a defect caused by the manufacturer, repair is carried out by the supplier's company free of charge.

However, consumable parts such as optical parts (e.g., focusing lens) are not eligible for warranty service.

For free repair or replacement of accessories, the buyer bears the cost of delivering new components from the place of their storage to the buyer's address, and, if necessary, the buyer bears the cost of the specialist's visit to the place of work.

If the equipment failure is caused by a defective part or assembly of the equipment, this part or assembly is repaired or replaced free of charge.

Defective components and parts must be returned to the supplier.

If the malfunction is not caused by the quality of parts or components of the equipment, the buyer will have to pay the cost of repair as well.

Warranty service is also not subject to malfunctions due to improper use of equipment, non-compliance with maintenance rules, operating conditions, as well as warnings specified in manuals and on warning plates that have arisen during the warranty period.

It is also a prerequisite that your equipment and peripheral devices are grounded and operated through a voltage stabilizer.

9.2 OUTSIDE THE WARRANTY PERIOD

The buyer pays for the visit of a specialist, repair or replacement services for parts or assemblies and delivery of parts or assemblies back and forth.

9.3 SERVICE LIFE OF COMPONENTS AND COMPONENTS

In compliance with the rules of the current operational documentation, the service life of the main components of the equipment is 1 calendar year, except for consumable parts.

List of consumables:

	Consumables	Warranty period
1	Focusing lens	No warranty
2	Mirrors of the scanner.	No warranty

Also, the warranty does not apply to all other components if:

- the equipment was used and stored in conditions that led to the penetration of foreign objects and liquids into it;

- the equipment was used and stored in conditions that led to its mechanical damage;

- there was a use and storage of equipment in conditions under which insects, rodents, etc. had access to the goods;

- the repair was carried out by any person who is not authorized by the supplier of the equipment and does not have the appropriate certificate or authorization;

- there was damage to control labels and seals (if any).

Changes in resources, service life and storage, manufacturer's guarantees:

Basis for changing warranty obligations, name and number of documents	Date until which the warranty is extended	Title, Name and Signature	Note

The warranty period is not suspended and is extended except as provided for by applicable law.

9.4 CONSERVATION

To preserve the equipment, it is necessary to abundantly lubricate the lifting screw of the machine.

9.5 DISPOSAL DETAILS

The equipment does not contain materials that are dangerous to life, human health, and the environment. The procedure for disposal of the module after the end of its service life is determined by the consumer of the equipment.

CHAPTER 10. EQUIPMENT MAINTENANCE

10.1 GENERAL MAINTENANCE NOTES

1. The laser marker is mainly composed of electronic devices, precision elements and optical components, and requires high standards of service.

2. Before carrying out any work on the equipment, make sure that it is switched off and unplugged from the power supply.

3. Scheduled maintenance is necessary to maintain the maximum performance of the equipment.

4. All maintenance work must be carried out in accordance with safety regulations.

5. Always keep your workspace clean and dust-free.

6. Cover the lens with a protective cover when the laser marker is not in use.

10.2 CLEANING OPTICAL ELEMENTS

1. Be very careful when handling lenses, avoid touching them with your fingers and hard objects.

2. The material from which the lenses are made is extremely susceptible to water (and water vapor). Do not allow water compounds to come into contact with the lens.

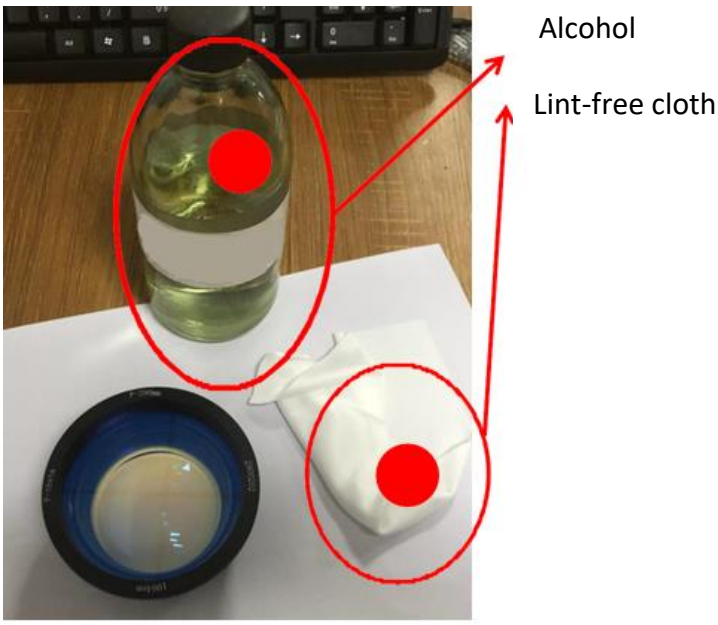
3. Try not to touch the optical components with your fingers! Oily or dirty hands can damage the surfaces of the optical elements.

4. Do not use tools or hard objects to clean the optics. Scratches on the optics are irreparable, if the optics are damaged, they will need to be replaced!

5. Do not press the optical element while cleaning it.

6. Do not wipe the optics with a dry cloth. Do not touch the back of the fabric. Dirt and sebum from the fingers can enter the surface of the optical element through the fabric and cause damage to it.

To clean the optical elements, you will need:



To start cleaning the optical elements, unplug your equipment from the power supply and gently unscrew the lens from the scanner.

Then soak the napkin in a small amount of alcohol.

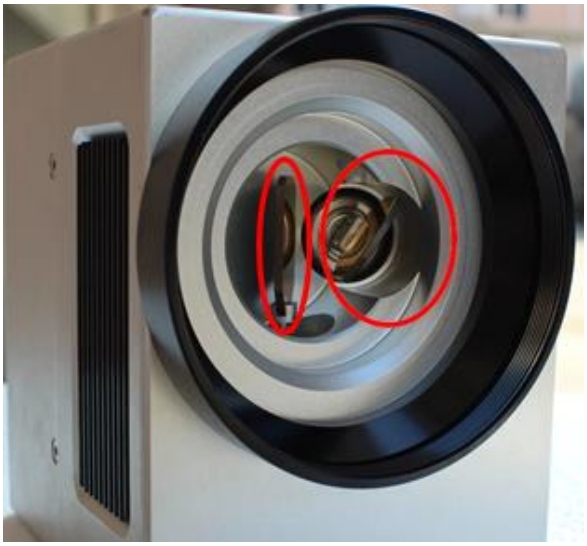
Remove the protective lens retainer (if a protective lens is fitted).

And remove the protective glass (if any).

Clean the protective glass and focusing lens with slow circular motions

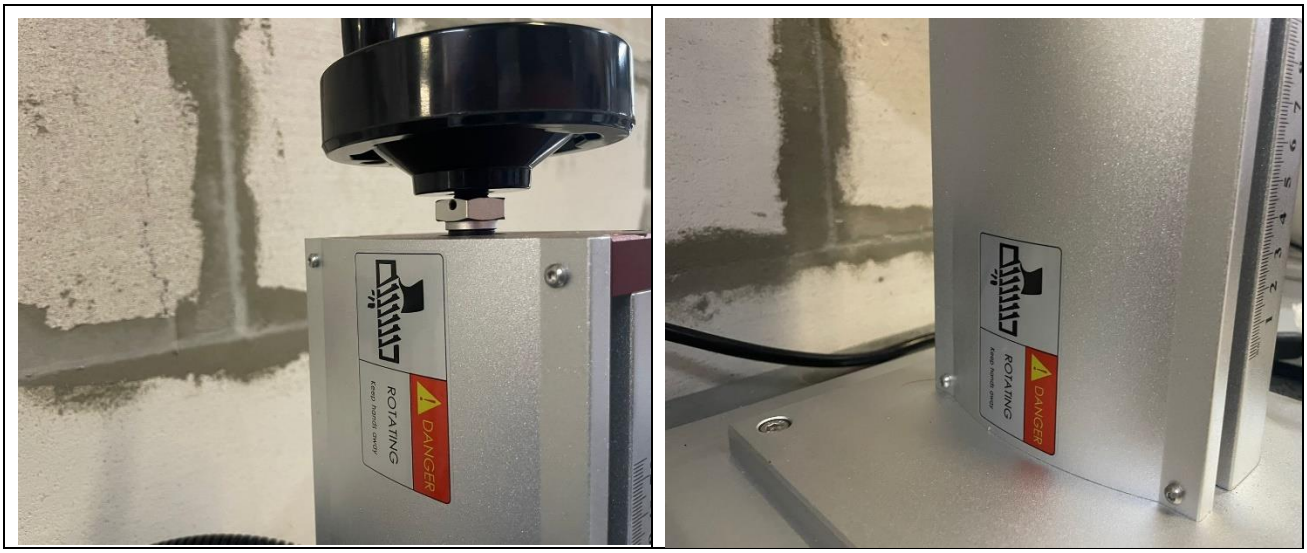
Do not forget to clean the lens on the back side.

Check the mirrors of the scanner as well. Peel them if necessary.

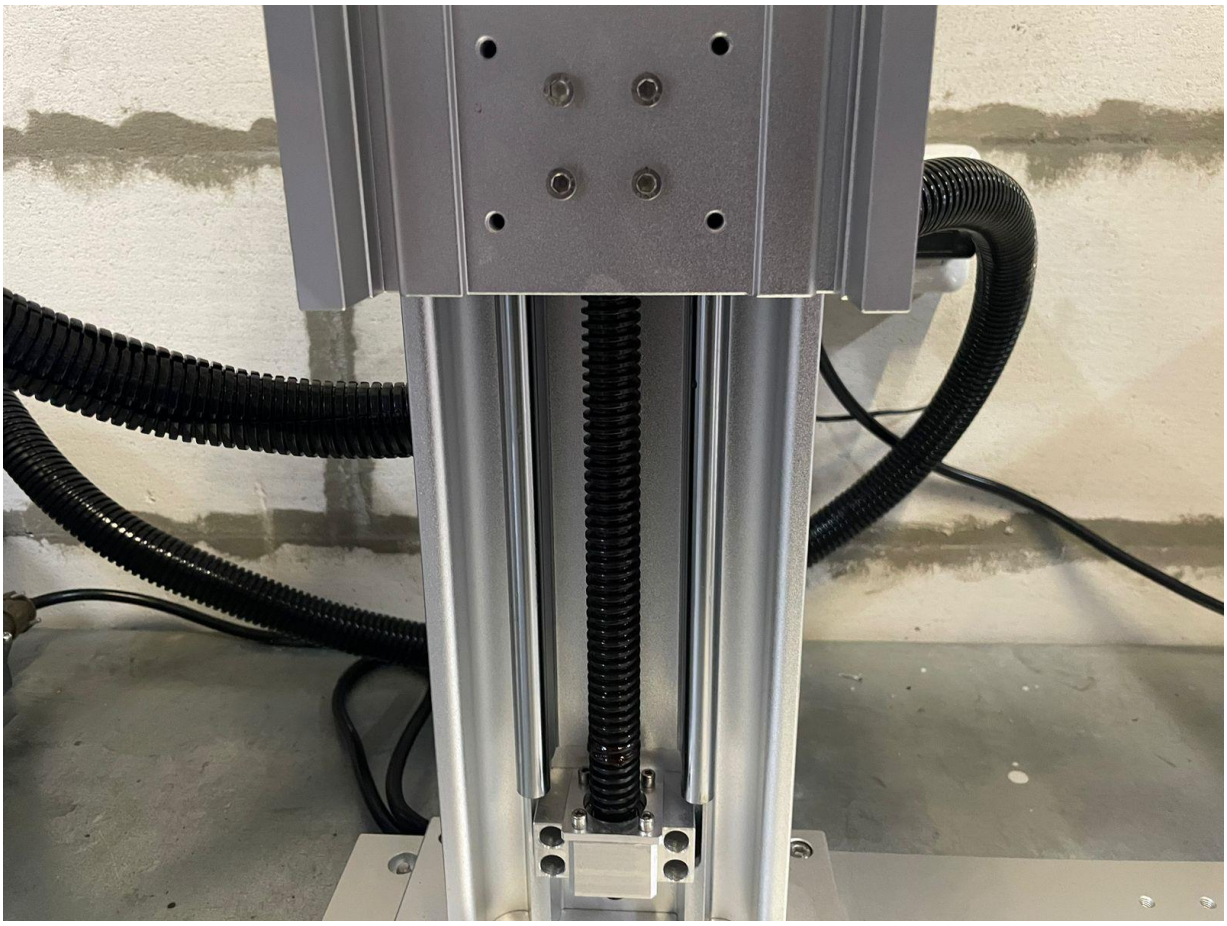


10.3 MAINTENANCE OF THE SKANATOR LIFT SCREW

In order to access the scanner lift screw, unscrew the 4 screws of the panel protecting the screw and remove it:



After that, apply oil to the screw.



It is recommended to add industrial oil to the screws at least once a year.

10.4 MAINTENANCE OF FANS IN THE CASE OF THE MARKER CONTROL UNIT

The laser emitter and electronic components are cooled by fans located at the back of the case. Fans need to be cleaned periodically.

When removing dust from the ventilation openings of the unit with a vacuum cleaner, use ONLY the lowest power setting to avoid damaging internal components.

10.5 SERVICE PLAN

Weekly	• Lens cleanliness control. • control of cleanliness of all cavities and panels. • Monitor cable fastening for damage or looseness. • Inspect the filters of the laser system for visible clogging.
Every three months	• Purging of air filters of the power element block.
After a year of operation and annually thereafter	• Checking the fixation of the system connectors. • Purging the internal space of the laser marker control unit. • Lubrication of the scanner lift screw.

CHAPTER 11. TYPICAL MALFUNCTIONS AND WAYS TO ELIMINATE THEM

Defect	Decision
No laser beam	Adjust the focal length
	Check the processing parameters (power and speed)
	Check the parameters in EzCad on the Ports tab
	Check the connection between the machine and your PC
	Check that all buttons on the laser machine control unit are turned on and the key is turned to the On position
No Laser Beam + Beep	Check the water temperature in the chiller
The buttons on the control unit are not lit	Check the functionality of the buttons
	Check that the equipment is connected to the power
Fiber laser error	Check that all buttons on the laser machine control unit are turned on and the key is turned to the On position
	Check the parameters in EzCad on the Ports tab
	Check that the equipment is connected to the power
	Contact the supplier for technical assistance
Low laser power	Check the processing parameters (power and speed)
	Adjust the focal length
	Contact the supplier for technical assistance