

Ruida UV Laser Marking Machine with CCD Visual Positioning System Manual



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1. Safety Instructions	2
1.1 The hazards of lasers and precautions	2
2. Reference standards	4
3. Machine introduction and connections	6
4. Packing list	7
5. Connections	7
6. Power on	9
7. Software installation (Installation Guide)	9
8. Card connection setting	12
9. System Settings	19
10. Load files to the software	22
11. 3 basic functions of the machine	27
12. Reference parameter	36
13. Care and maintenance	39
13.1 Regular cleaning	39
13.2 Cooling system inspection	39

1. Safety Instructions

1.1 The hazards of lasers and precautions

Please read this user manual carefully before using this product.

In this user manual, we provide you with important product safety operating procedures and other reference information. To ensure your personal safety when operating this product and to achieve the best performance of the product, please follow the following precautions and warnings as well as other relevant operating procedures in this manual during operation.

Laser marking machine is a Class 4 laser product with dangerous, **the NOHD distance is 20M**, invisible laser radiation. This product emits infrared laser radiation with a wavelength of 355nm, which can cause damage to eyes and skin directly or indirectly exposed to such light intensity. This infrared radiation is invisible, and the laser beam can cause irreversible damage to the retina or cornea. Before operating the laser marking machine, be sure to wear appropriate and certified 355nm near-infrared band laser protective glasses,**the glasses should conform to OD6+ standard**;
Important:

- ❖ Never look directly at the fiber output connector, and make sure to wear appropriate protective goggles when using the laser to avoid injury.
- ❖ Do not open the laser, because there are no product parts or accessories for users to use inside the laser.
- ❖ When using this product, please use a properly grounded power supply and normal voltage.
- ❖ Before starting the laser product, please ensure that the ambient temperature and humidity are within the specified range.
- ❖ Do not expose the product to an overly humid environment.
- ❖ The laser is cooled by air. Please ensure that the ambient air is dry and clean.
- ❖ Operations or adjustments beyond the scope specified in this manual may cause dangerous radiation damage.
- ❖ Keep the output galvanometer clean. After each use, please cover the protective cover. Do not touch the field lens with your hands, and do not use any solvent to clean the field lens. When necessary to clean and maintain the lens, be sure to use lens paper.

❖




Warning:

- ❖ Operations or adjustments beyond the scope specified in this manual may cause radiation damage.

wavelength (nm)	optical density
355	>6



As shown in the table below, all safety warning signs (not limited to those affixed to the body of the laser) during the operation of the laser marking machine are included:

		
Warning label – Hazard symbol	Explanatory label (Take 5W as example)	Alternative label for laser aperture

 <p>The image shows a rectangular label for a Class 4 laser. It features a yellow triangle with a black border and a black laser beam symbol. To the right of the triangle, the text reads 'DANGER LASER 4'. Below this, there are two circular prohibition symbols: one with a laser beam and the other with a person's head. At the bottom of the label, it says 'AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION'.</p>	 <p>The image shows a yellow triangle with a black border and a black symbol representing a ground connection: a vertical line with three horizontal bars of decreasing width at the bottom.</p>	 <p>The image shows a yellow triangle with a black border and a black lightning bolt symbol, indicating an electrical hazard.</p>
Alternative label for Class 4	Must be grounded	Electrical Hazard

2. Reference standards

1. IEC 60825-1:2014
- EN ISO 12100:2010; EN 60204-1:2018
- EN ISO 11553-1:2020+A11:2020
- EN ISO 12100:2010;
- EN ISO 11553-1:2020+A11:2020
- FDA number: 2320736-000

2. Caution – Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.
3. The laser safety classification of this product is based on EN 60825-1: 2014+A11: 2021.
4. The level of laser radiation emitted through the laser aperture exceeds Class 1.

Please note:

© According to EU and national standards and requirements, lasers must be classified according to their output power and laser wavelength. All high-power MFSC series laser products belong to Class 4 products (according to EN 60825-1, Chapter 8)

Product name: UV laser marking machine
 Manufacturer: Shenzhen Scotle Technology Group Ltd.
 Address: Y1-214, Bantian Creative Park, Longgang District,
 Shenzhen City, Guangdong Province



Company: E-CrossStu GmbH
 Address: Felix-Dahn-Str 4, 70597 Stuttgart
 Mail: E-CrossStu@web.de
 Phone: +49 69332967674



CHINACNCZONE	
Machine: UV Laser Machine	
Brand: CNCZONE	Model NO. : FL-5W
Rating Voltage: 220V-240V	Rating frequency: 50/60Hz
Rating power: 400W	Laser power: 5W
Class 4 laser	Weight: 38KG
Origin:China	Mfg. year: 2025.7
Address: 5th Floor, Building A, Tianhai Innovation Technology Park, Xihu Village Committee, Qiuchang Street, Huiyang District, Huizhou City, China	
TEL: +86 15013636546	

3. Machine introduction and connections



Two type of chiller



3W and 5W machine use 05 model chiller

10W and 15W machine use 10 model chiller

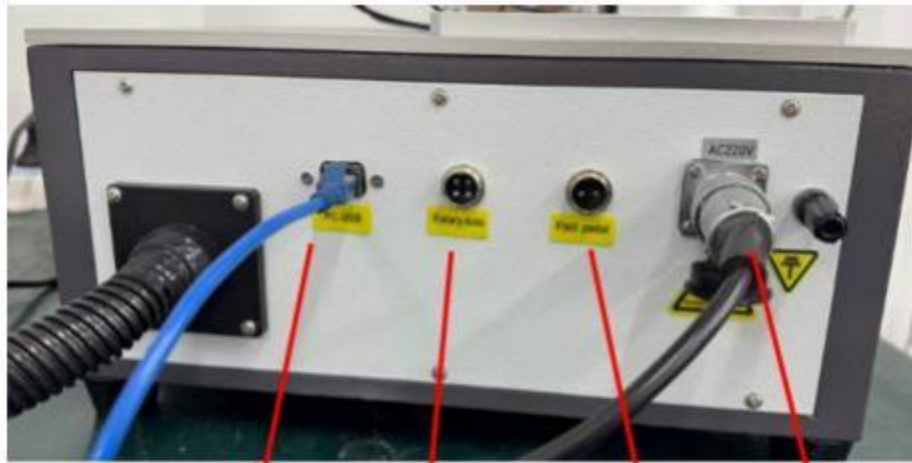
Note: TWO brand water chiller can be choosed, depend on yourself.

4. Packing list



5. Connections

You will get 4 cables as following picture, USB cable, power cable, the cable for foot pedal and rotary axis (optional):



Network cable



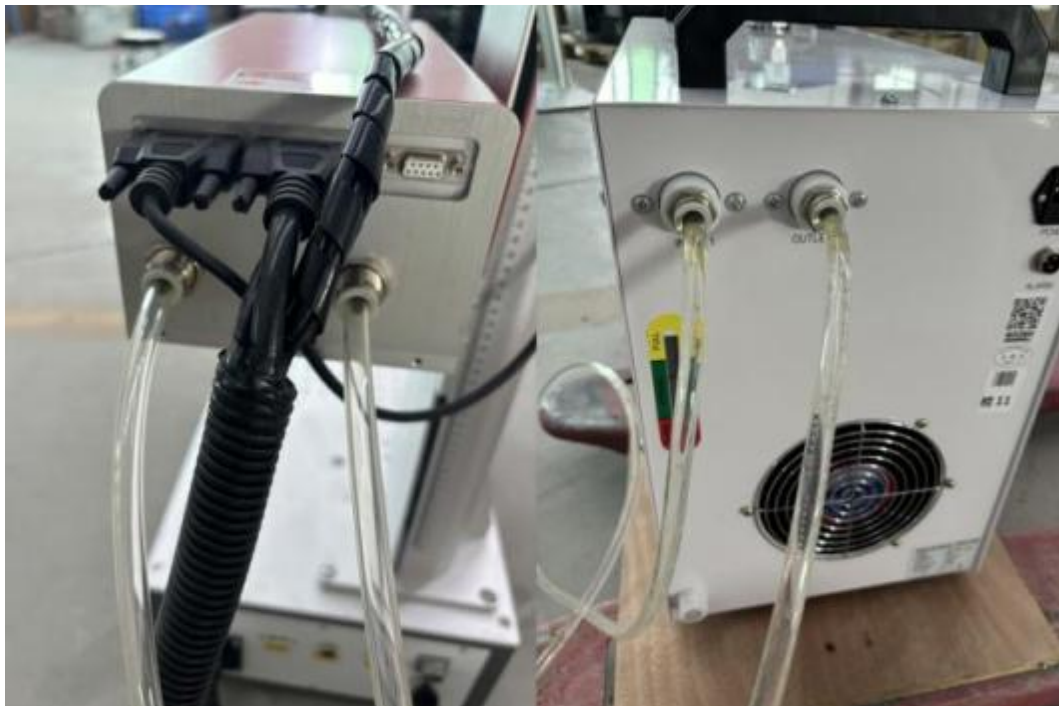
Conveyor belt



Foot pedal



Power cable



Connect the water pipe like above picture, not distinguishing between inlet and outlet. (Tips: If your UV laser is air cooling version, please ignore this step.)

6. Power on

Turn on the following three switches:Laser switch-->Power switch-->Emergency switch
(When the machine is in working, keep the emergency switch in the open position)



7. Software installation (Installation Guide)

Note: Turn off the anti-virus software(if there are any) and firewall before downloading and then install the software.



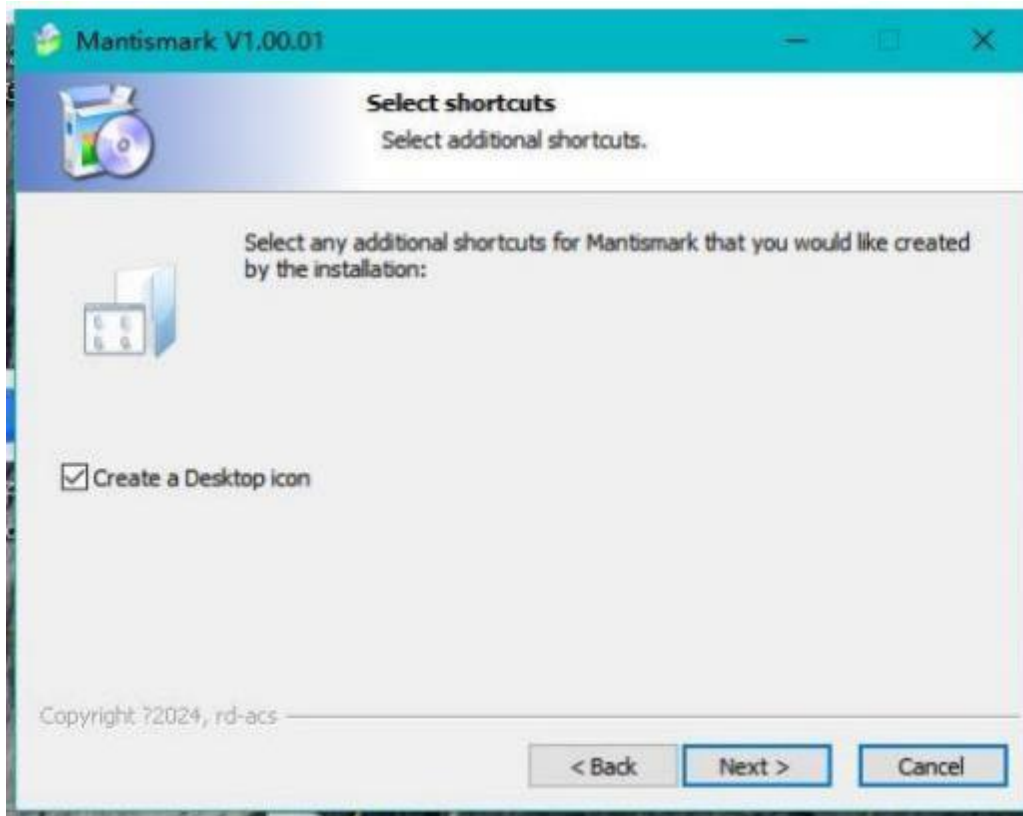
Double-click installation package to enter installation page.



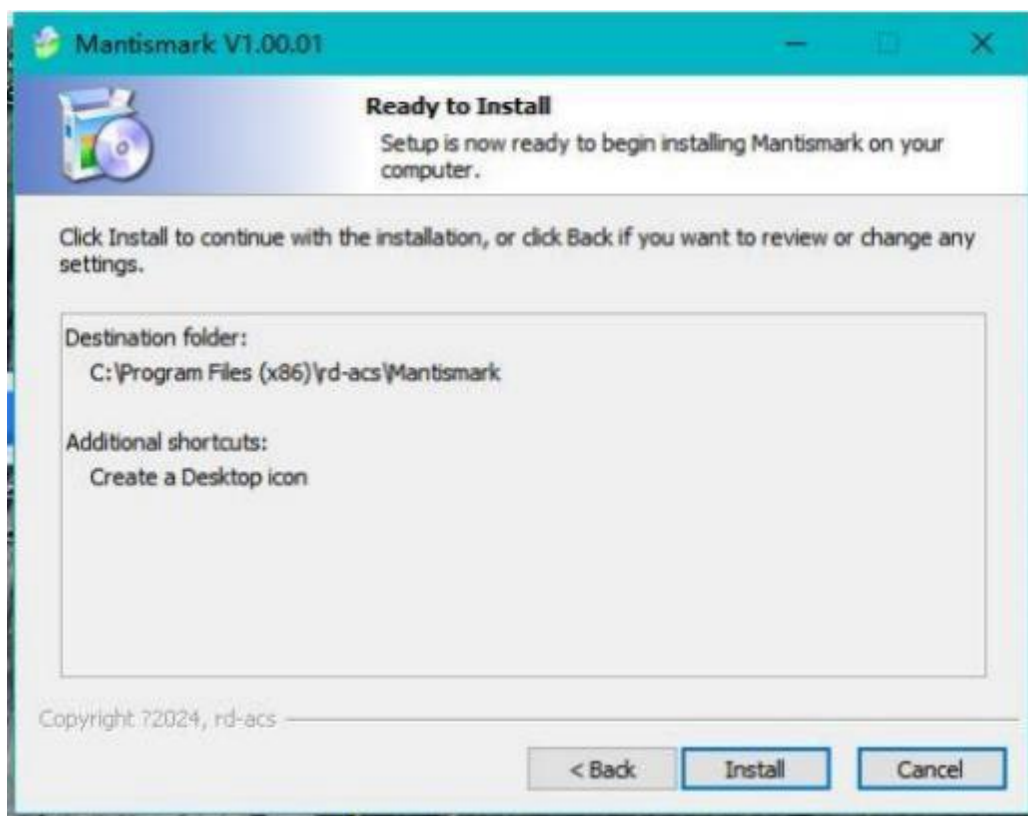
Next, set the installation directory.



Next, create desktop icon.



Next, install it.



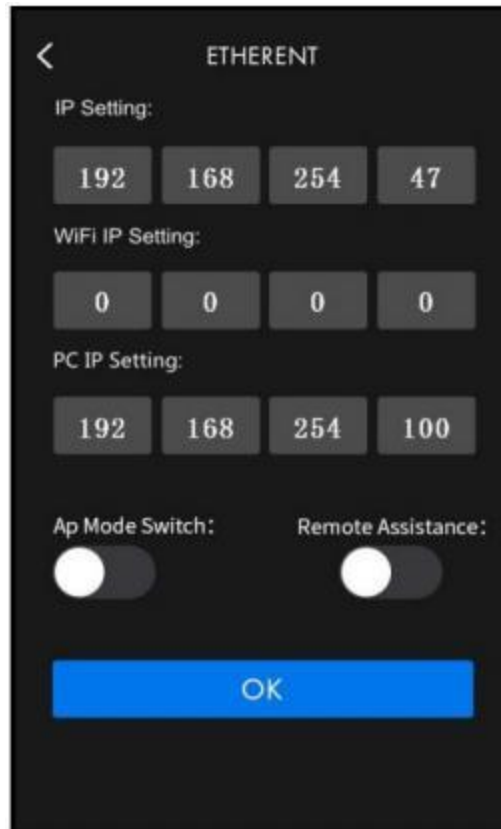
8. Card connection setting

Method 1: connect computer cable directly.

Set the IP address of the network port on the computer. It's recommended to set the default IP address to 192.168.254.100 and subnet mask to 255.255.255.0

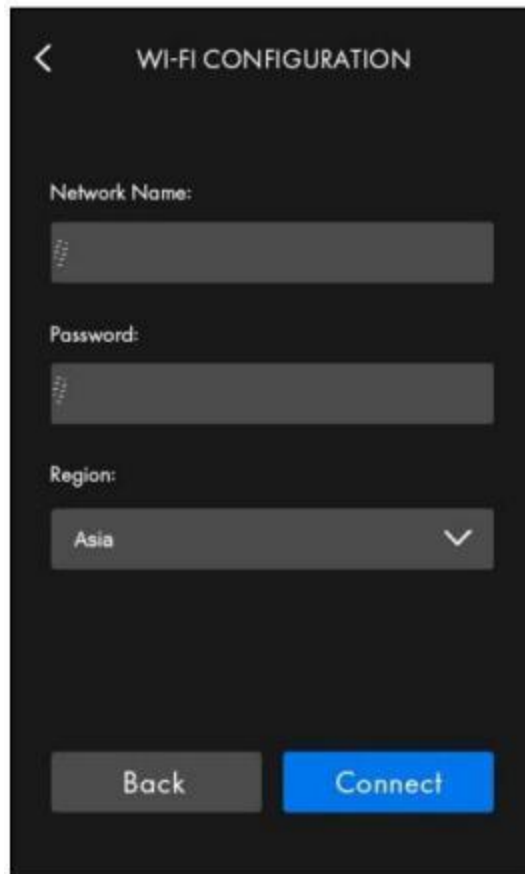


Set the IP address of the computer and the local on the panel. Note: The local IP and computer IP should remain on the same network segment and are not the same.



Method 2: WiFi Connection

Enter the name and password of WiFi, click Connect to connect the corresponding WiFi. There are prompts for connection success and failure



WI-FI CONFIGURATION

Network Name:

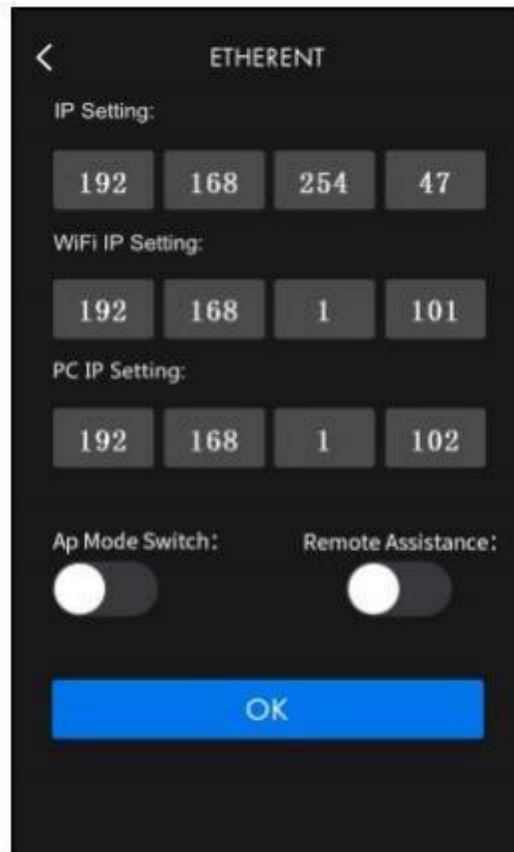
Password:

Region:

Asia

Back Connect

After successful connection, the WiFi IP address is automatically assigned, and the computer WiFi is connected to the same network. Check the IP address of the computer and enter the IP address of the computer manually in the panel. Note: The WiFi address IP and computer IP should remain on the same network segment and are not the same.



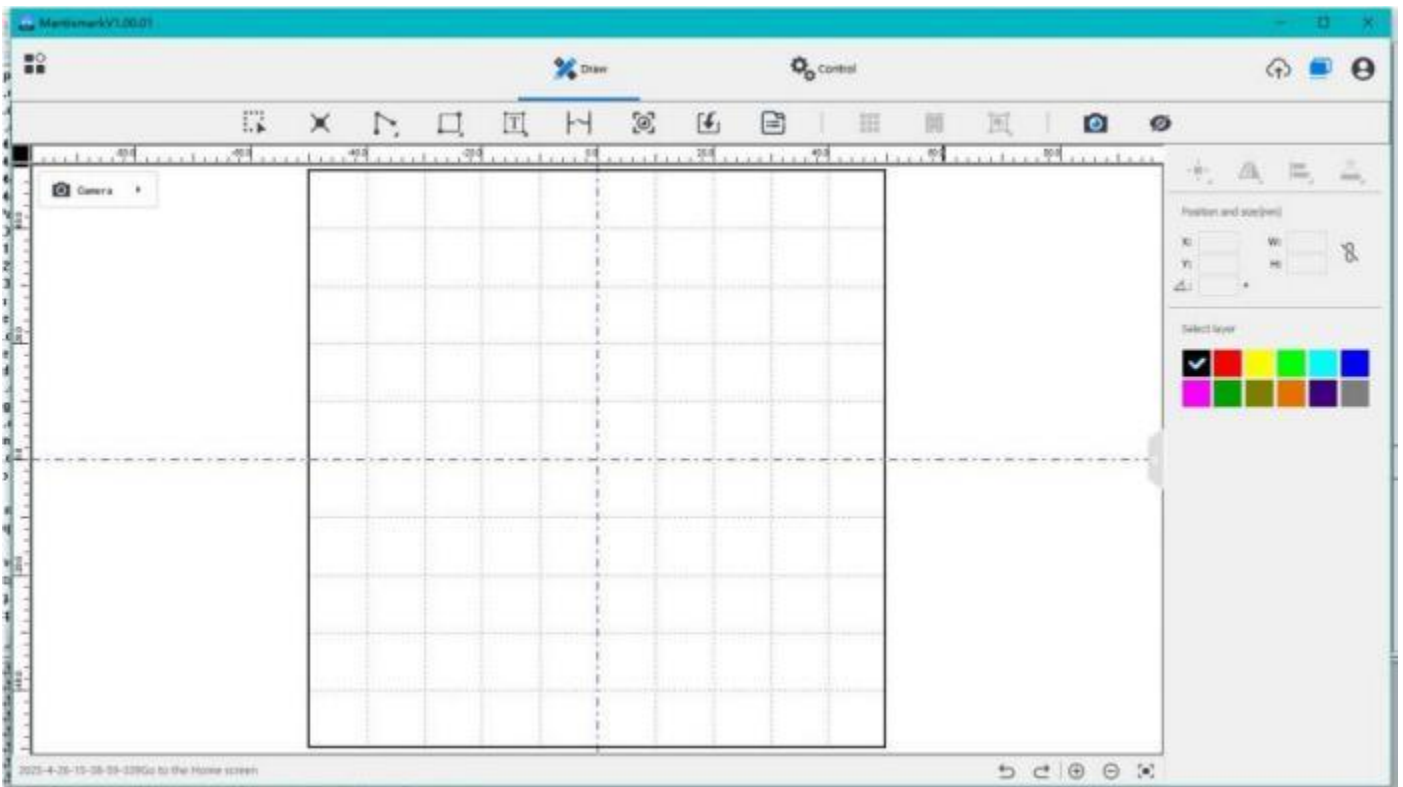
Note: The software runs on only one of the connection modes, and cannot be connected to multiple PCs at the same time.

Double-click the Mantismark icon on the desktop to launch the software.

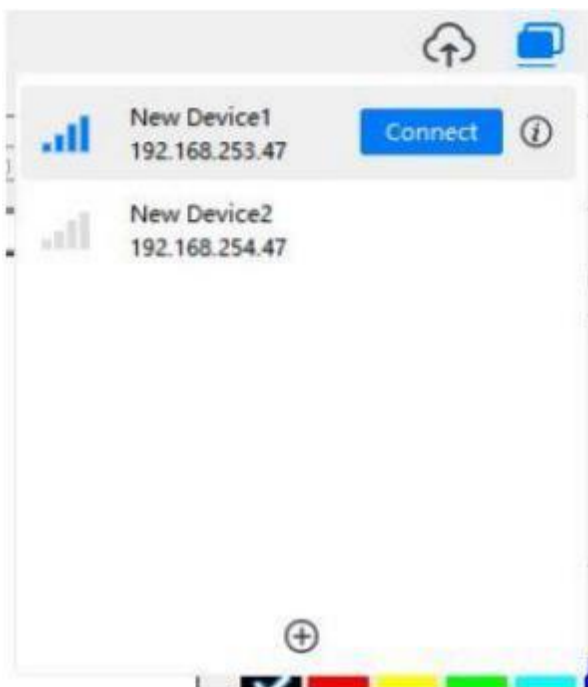


After opening the software, you can see the operating interface as shown below. Familiarity with this operating

interface will be the basis for using this software for laser processing



Device List : You can choose to connect to the local area network board.

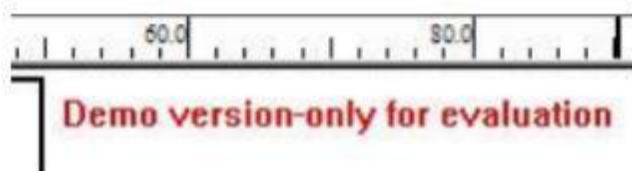


Troubleshooting the cause of the inability to find the device:

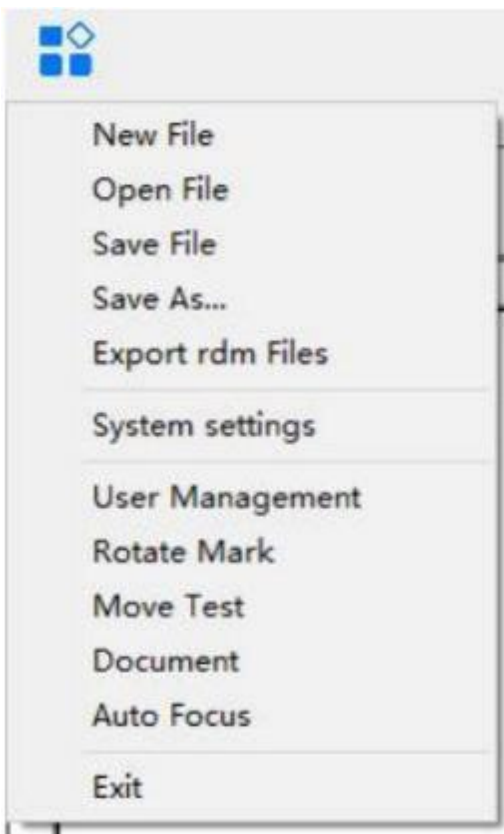
- ◆ Check whether the network port cable is properly connected and whether the network port indicator is on.

- ◆ Check if the firewall on the computer is turned off.
- ◆ Check whether the IP address set on the panel is the same as that on the PC.
- ◆ Check whether the local IP address is in the same network segment as the computer IP address.
- ◆ Check whether IP addresses conflict.

If the mainboard is not reliably connected to the computer, the software displays "Demo version-only for evaluation." In DEMO mode, only basic graphics operations are performed, and data processing function is not available.



- ◆ Menu bar: The main functions of this software can be accomplished by performing the command options in the menu bar. It is the most basic operation mode. The menu bar includes new file, open file, save files, save as, Export Offline Files, system parameter, red light indication, rotate marking, files reading, automatic focusing and function menu.



- ◆ Drawing toolbar: You can select the corresponding graphics to edit, including dot, vector, text, filling, vision, array, group and photograph.



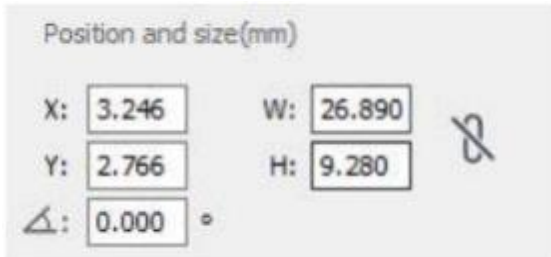
◆ Control operation bar: Processing control function, including start, pause, stop and download (download files to panel).



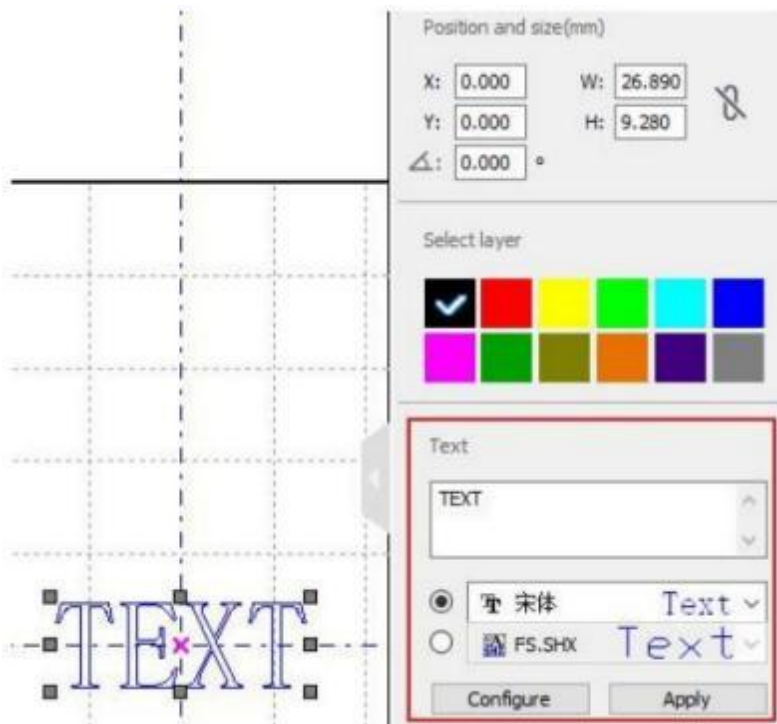
◆ Layout toolbar: Make multiple objects selected complete the layout of the page. Drop-down to select different types including alignment, mirroring, leveling and other typesetting features.



◆ Graphics general property bar: Graphics general property bar is to operate the basic properties of graphics, including graphics position, size, scaling, rotation and so on.



◆ Graphics-exclusive property bar: The graphics-exclusive property bar is used to modify the special properties of different types of primitives. When the current selected primitives change, the exclusive property bar will update the corresponding display.

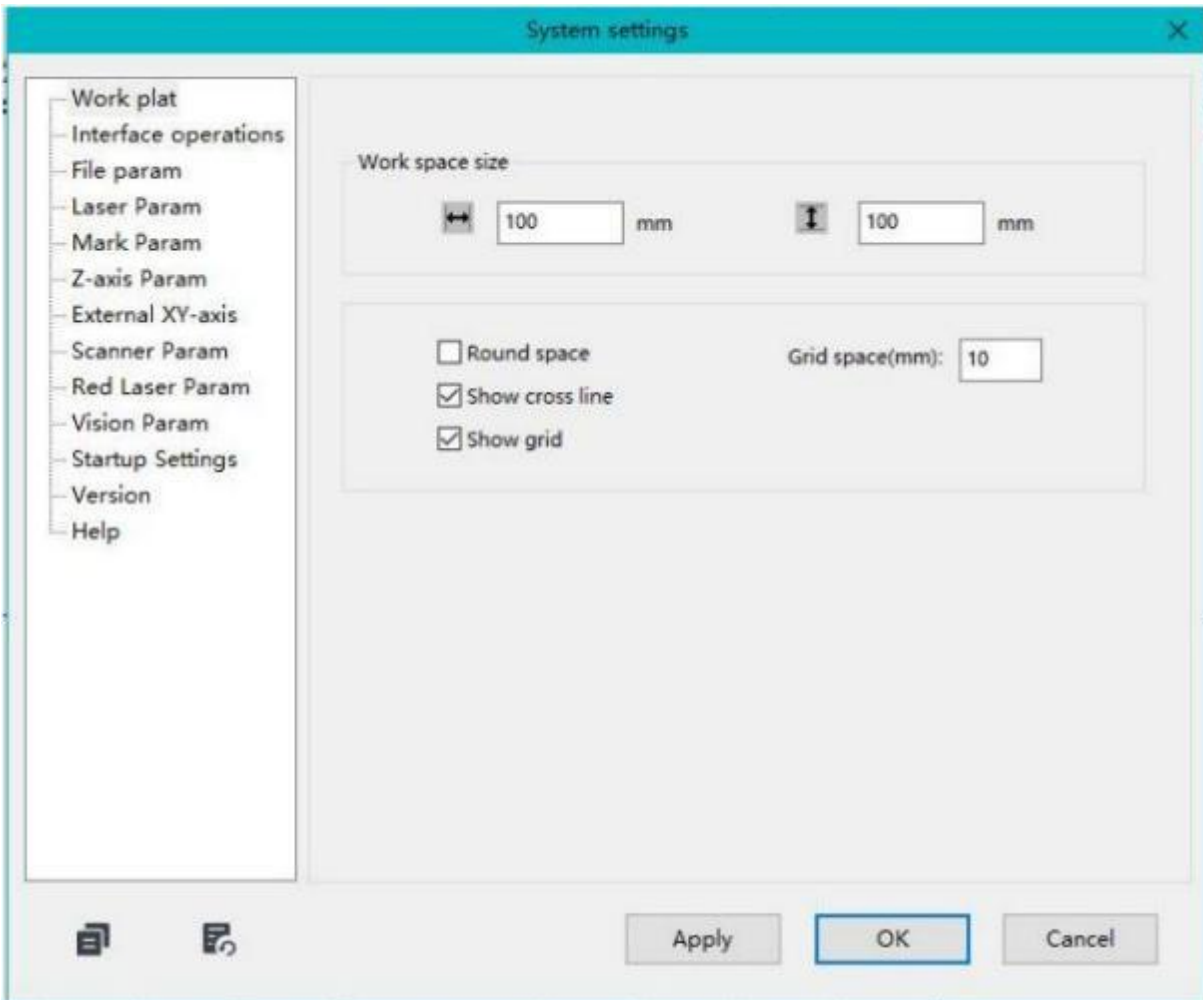



- ◆ Layer toolbar: Modify the color and processing parameters of the selected object.



9. System Settings

- 9.1 Click the “System Settings” in the menu to enter system parameter setting page.

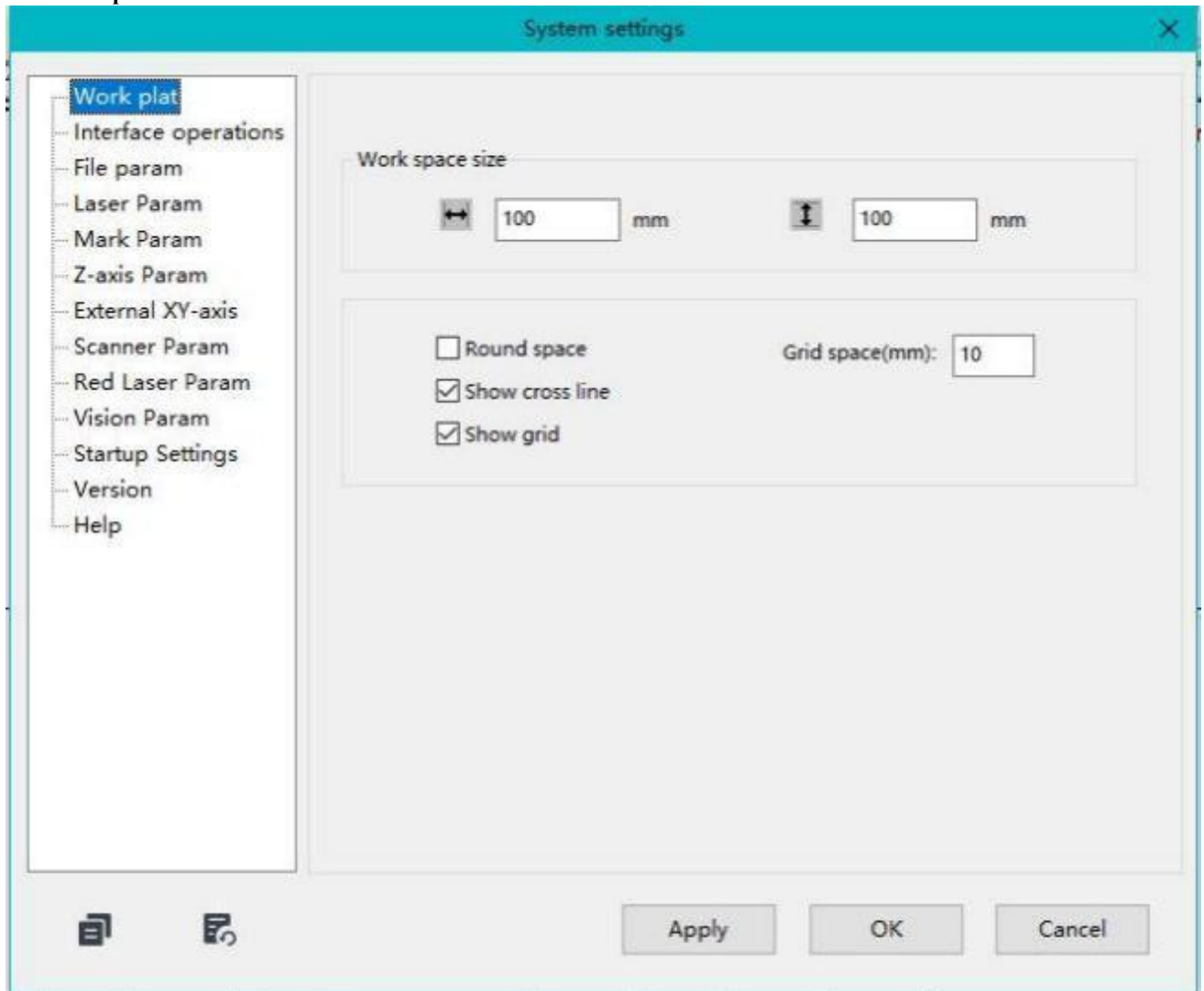


- : To save the current system parameters.



:To recover the backup parameters.

9.2 Work plat



Workspace is used to assign the size, shape and other information of the software drawing work area, that is, the display area.

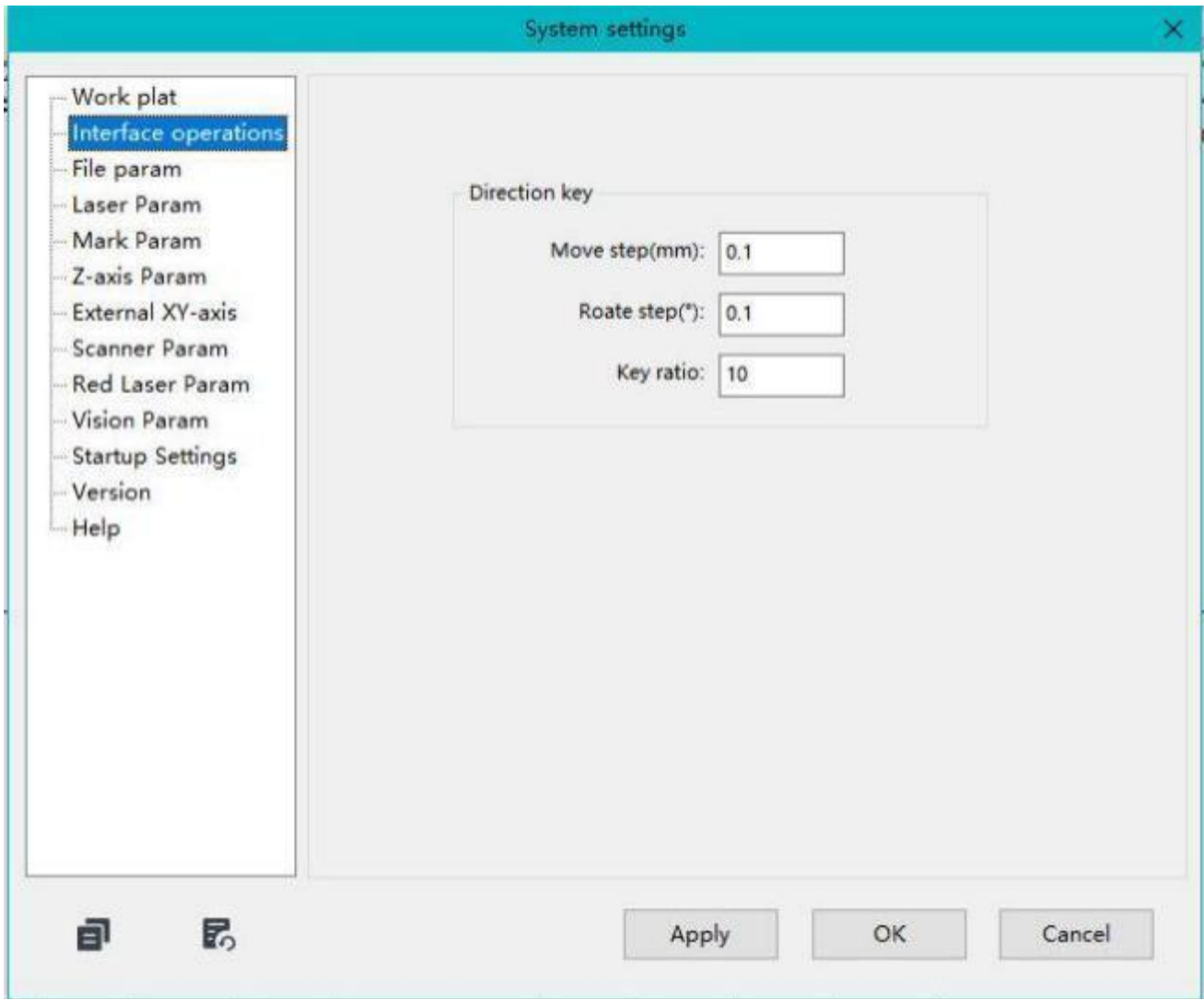
Work space Size: Refers to the width and height of workspace, in unit of millimeters.

Round space:The shape of the workspace can be switched between rectangle and circle, and the rectangle workspace is generally the default.

Show cross line: to specify the zero-point reference line to show or hide the workspace.

Show grid:The workspace grid helps designers intuitively lay out graphics in the workspace, or quickly measure the size of graphics. If the grid is not needed, the grid display can be hidden. The grid size can be appropriately adjusted according to the accuracy requirements of the actual marking work.

9.3 Interface Operations



Interface operation mainly sets the shortcut keys operation parameters. Users can directly control the transformation of the selected graph by using arrow keys and auxiliary keys.

Move step: Sets the graph translation distance with every arrow key click.

Roate step: Sets rotation angle of the graph each time. (Press on Ctrl key and arrow keys to realize graph rotation.)

Key ratio: Sets the adjustment ratio when the graph is panned or rotated.

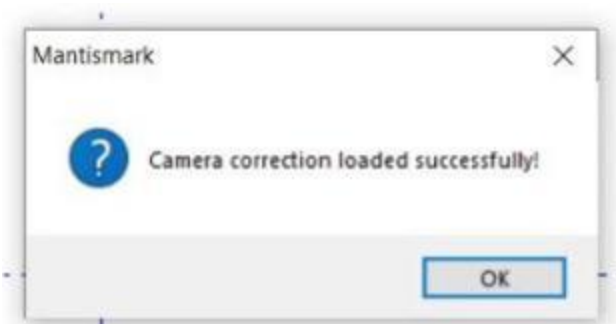
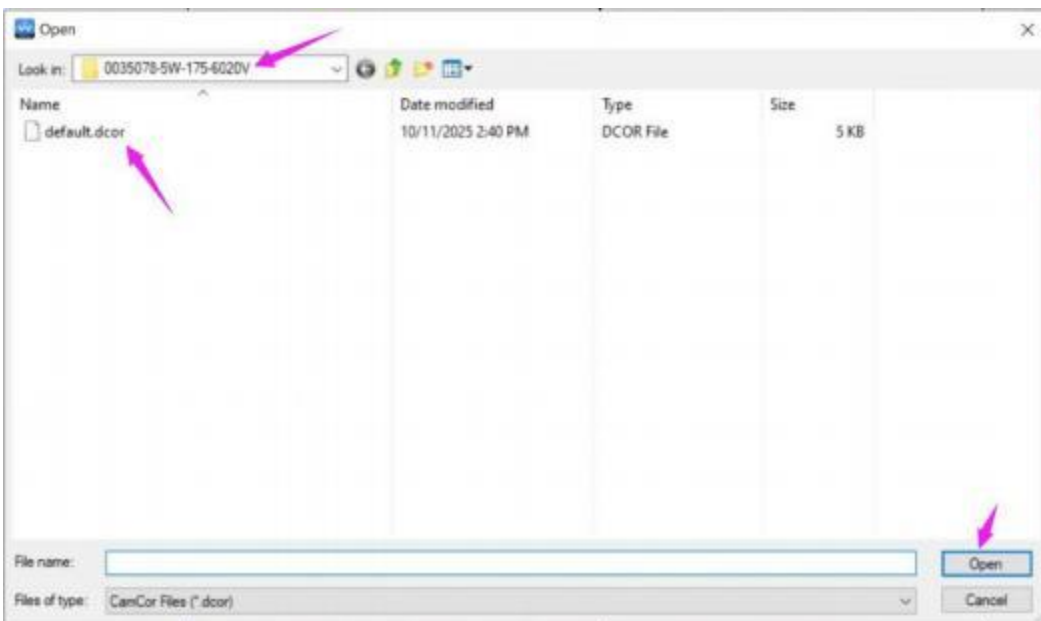
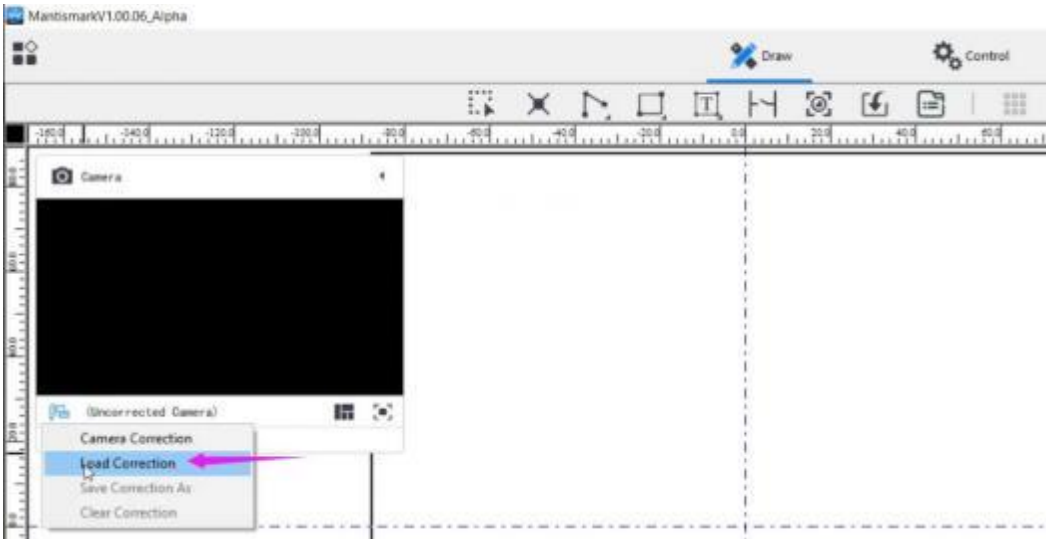
Press on Shift key and click arrow keys to realize fast movement, and it moves according to the distance of **Translation Step** and **Large Ratio Adjustment**.

Press on Shift plus Ctrl keys and press arrow keys to realize fast rotation, and it moves according to the angle of **Rotation Angle** and **Large Ratio Adjustment**.

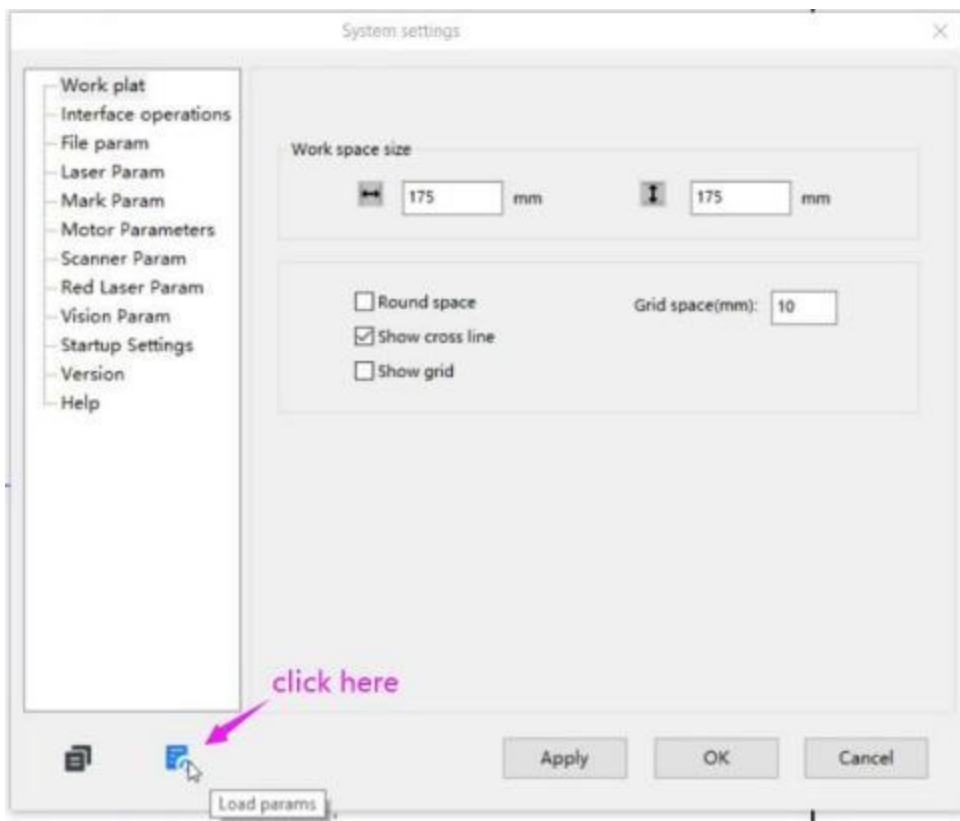
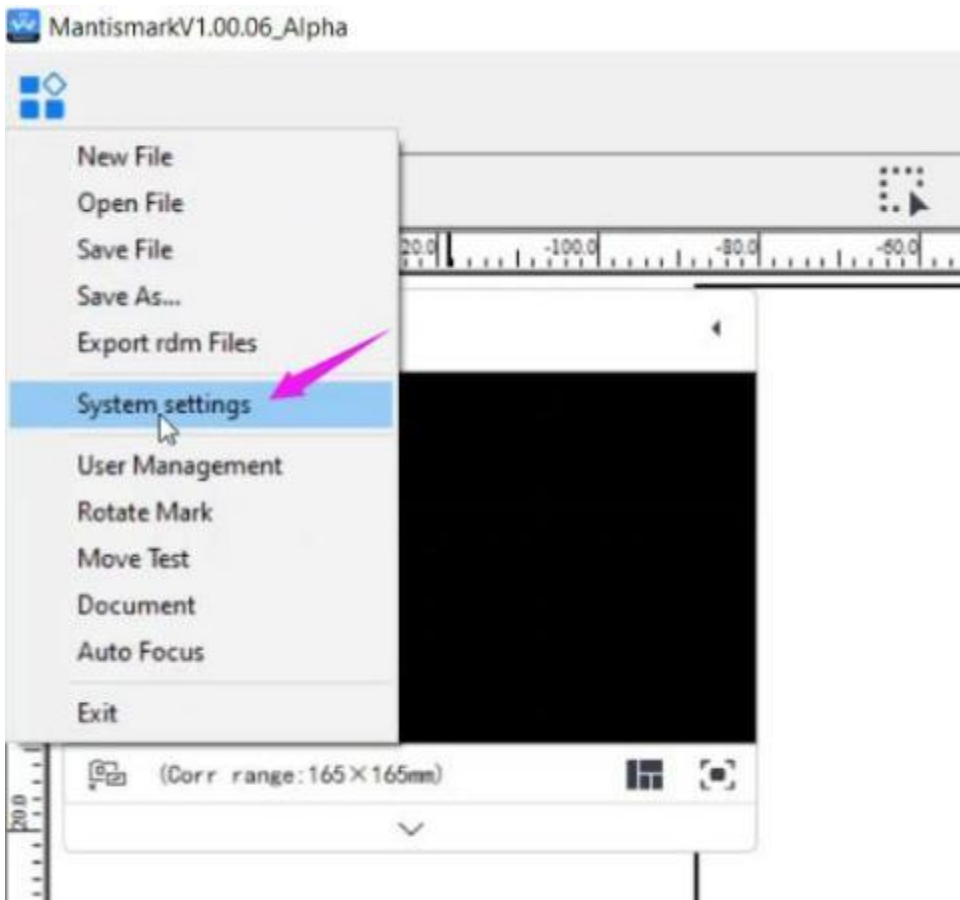
Please note: to refer more every button system setting, you can contact us to send the original file [[RDM6020V software instruction manual](#)]

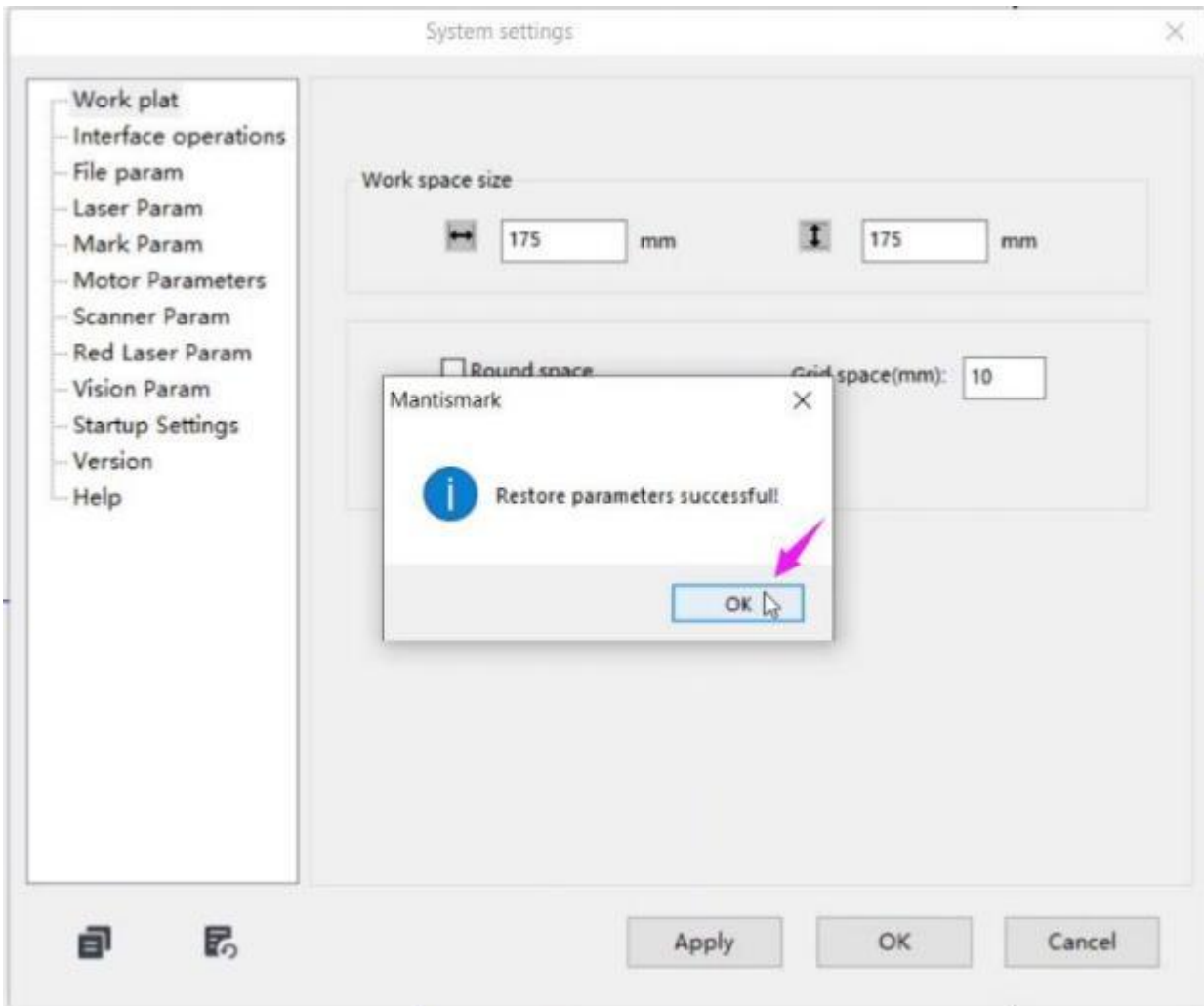
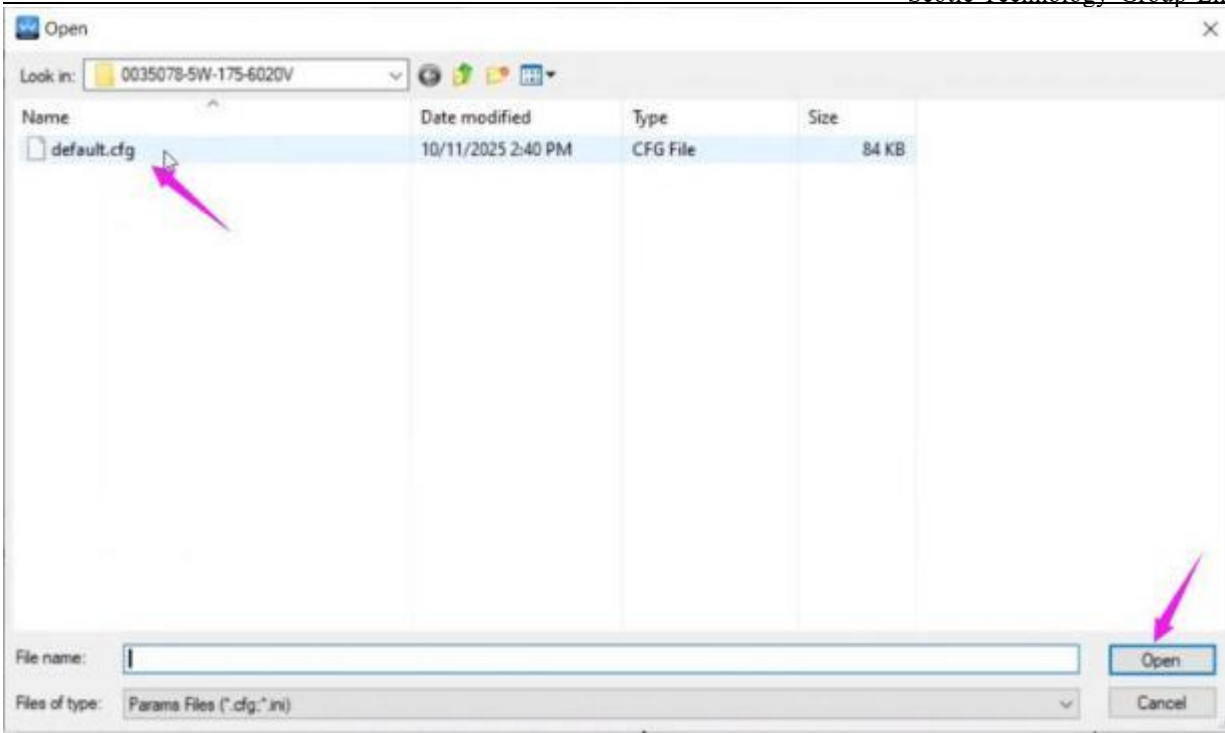
10. Load files to the software

10.1 load correction files, choose from files: 0035078-5W-175-6020V

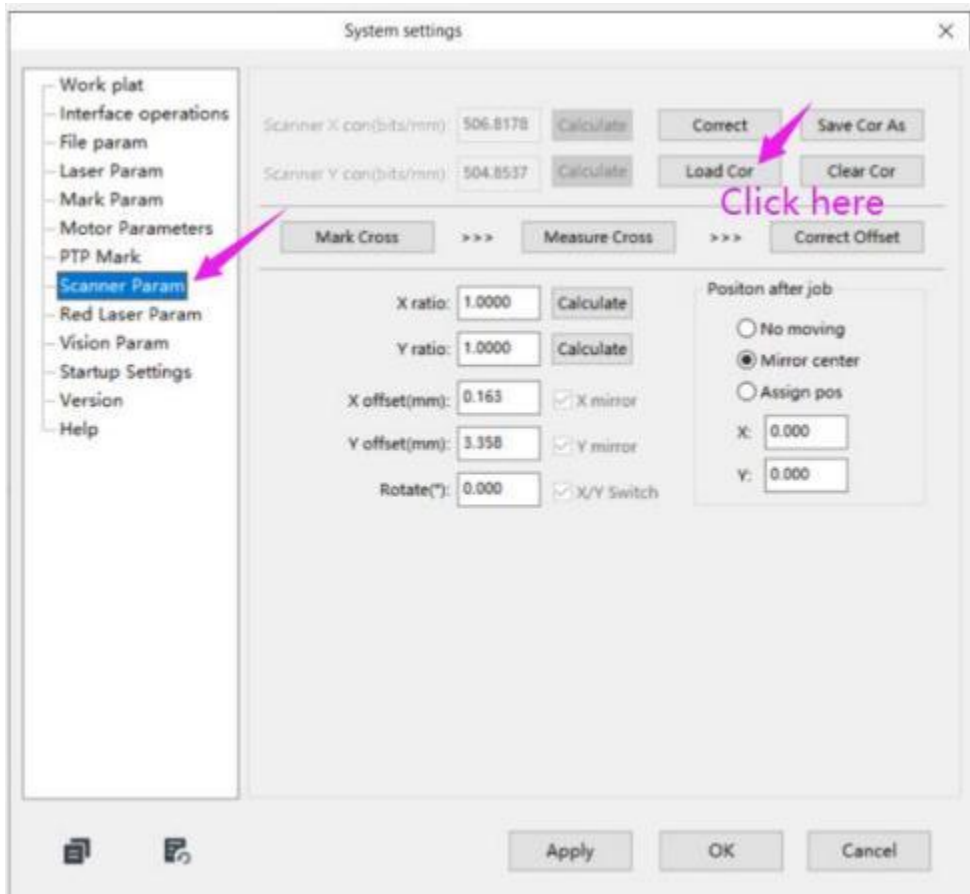
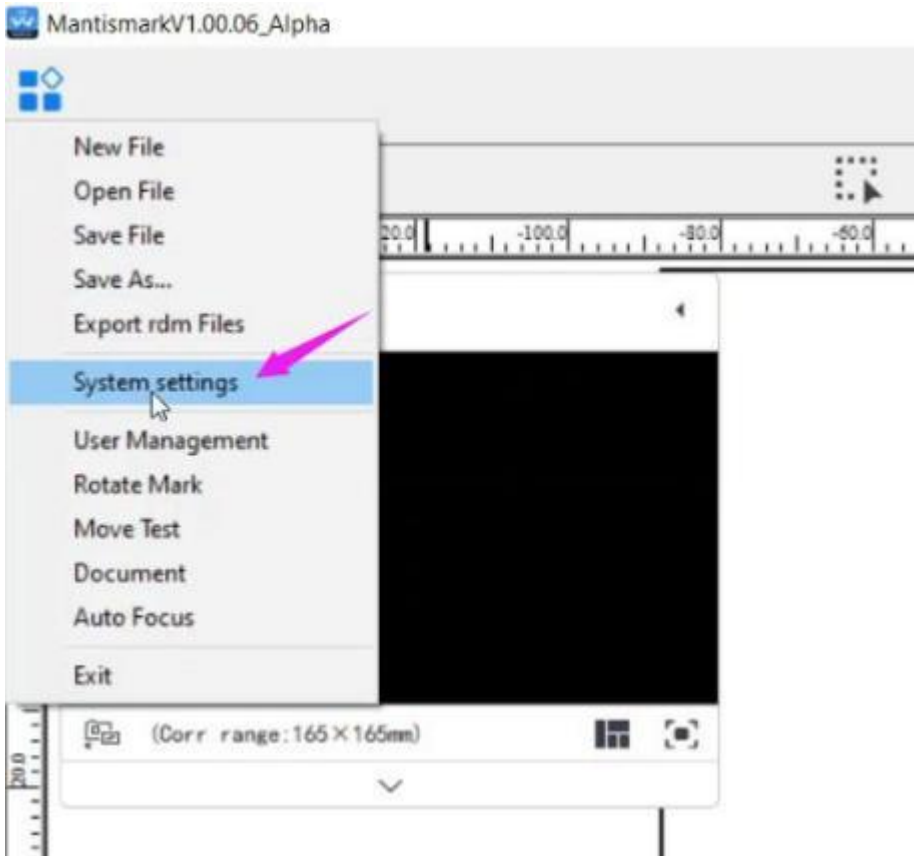


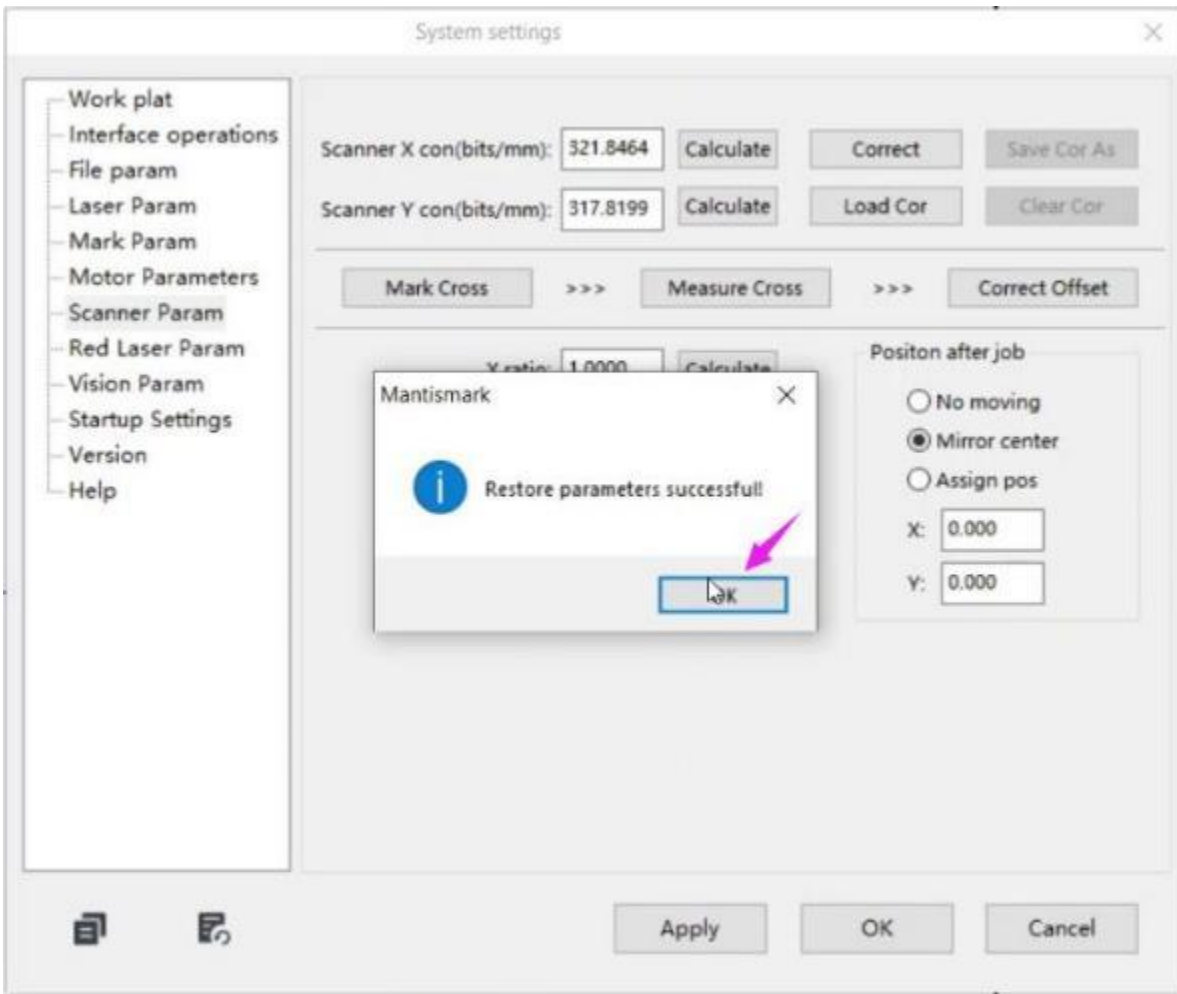
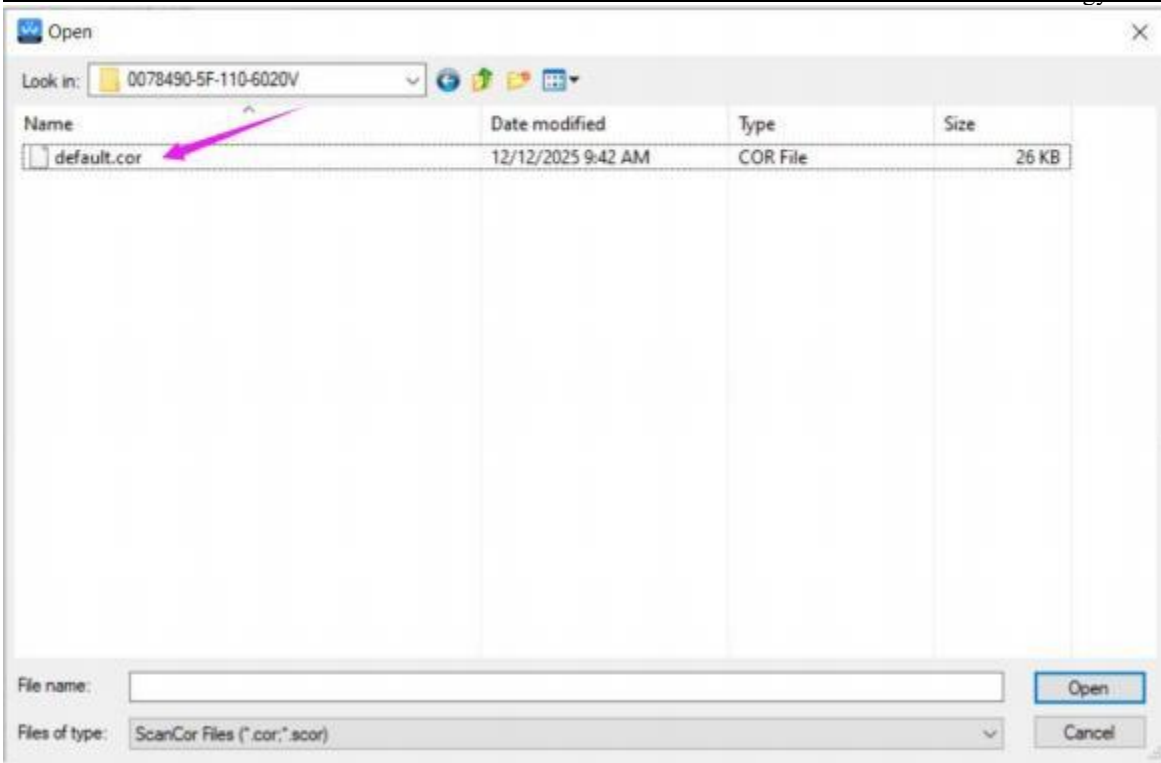
10.2 Load system setting





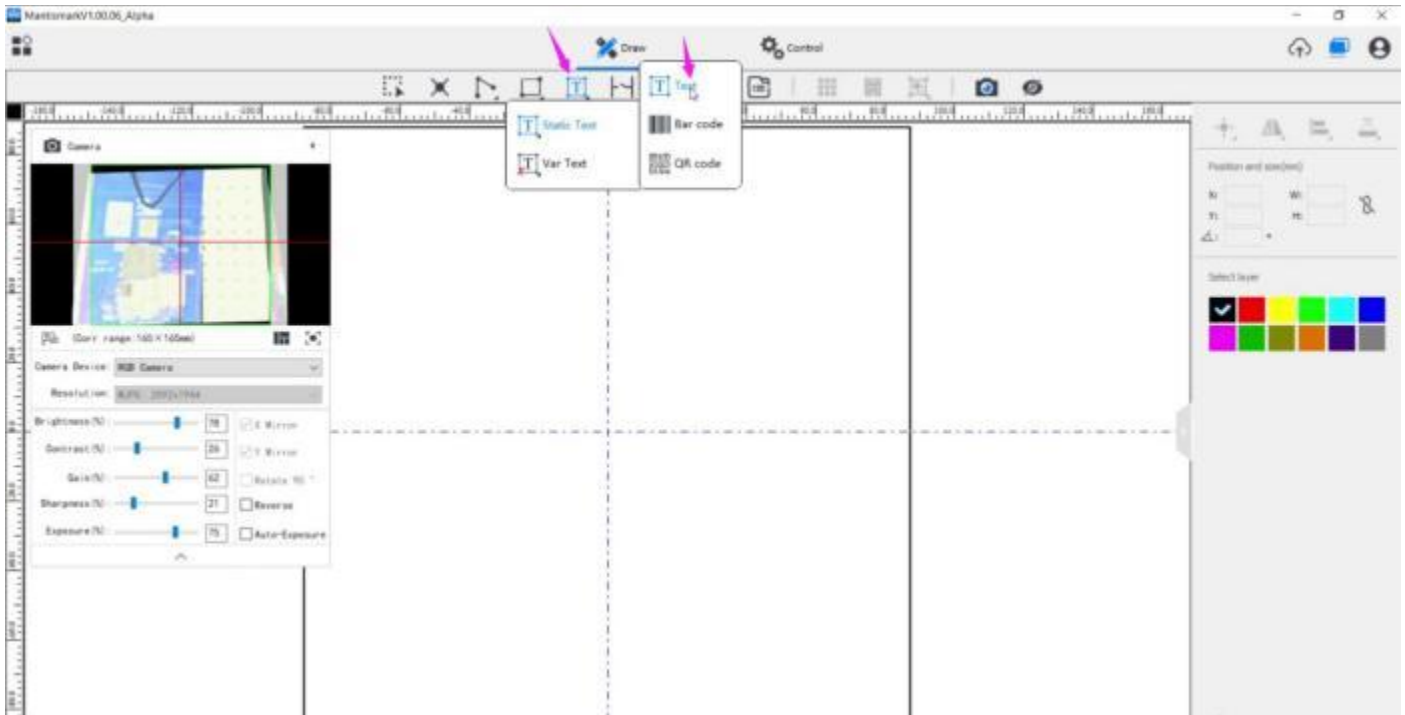
10.3 Load Scanner parameter

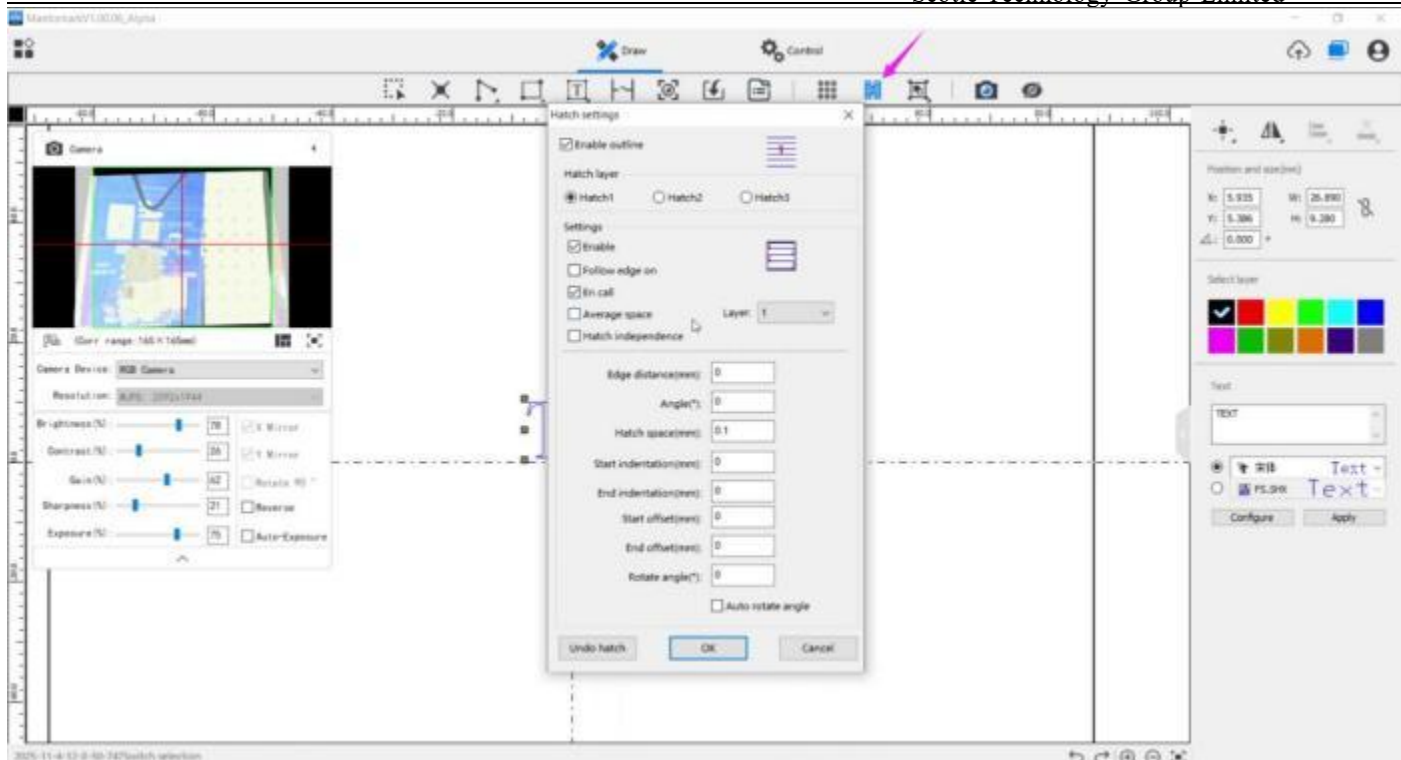




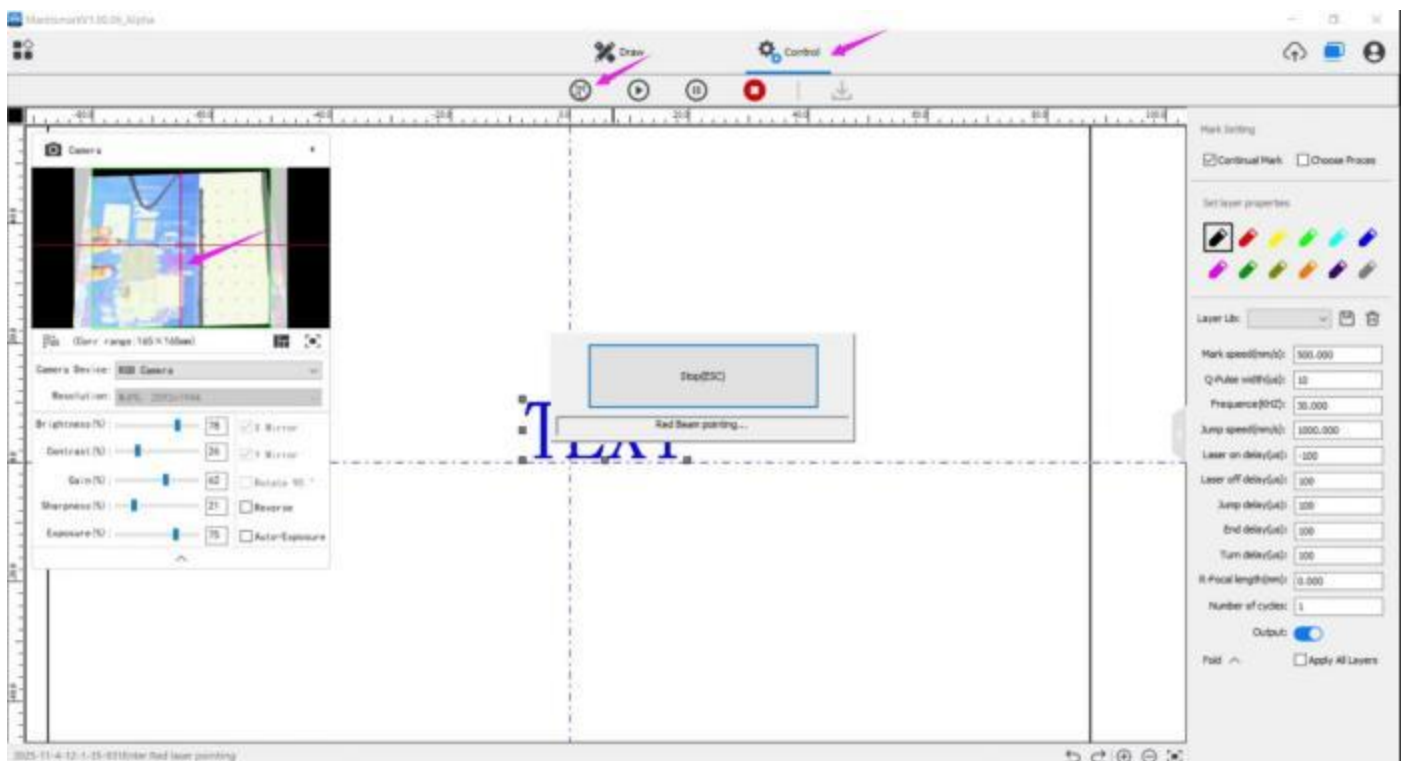
11.3 basic functions of the machine

11.1 Ordinary marking

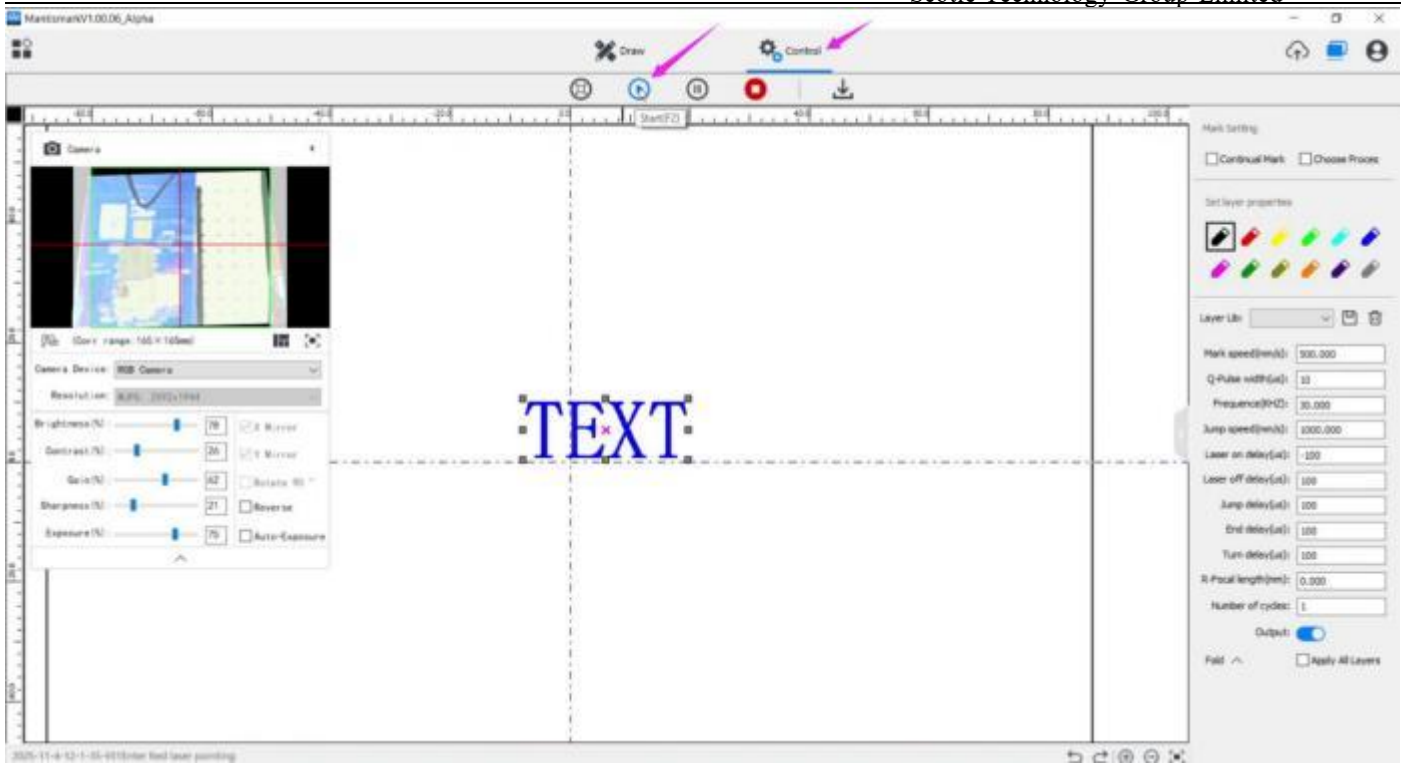





Click here to preview the location you want to mark.




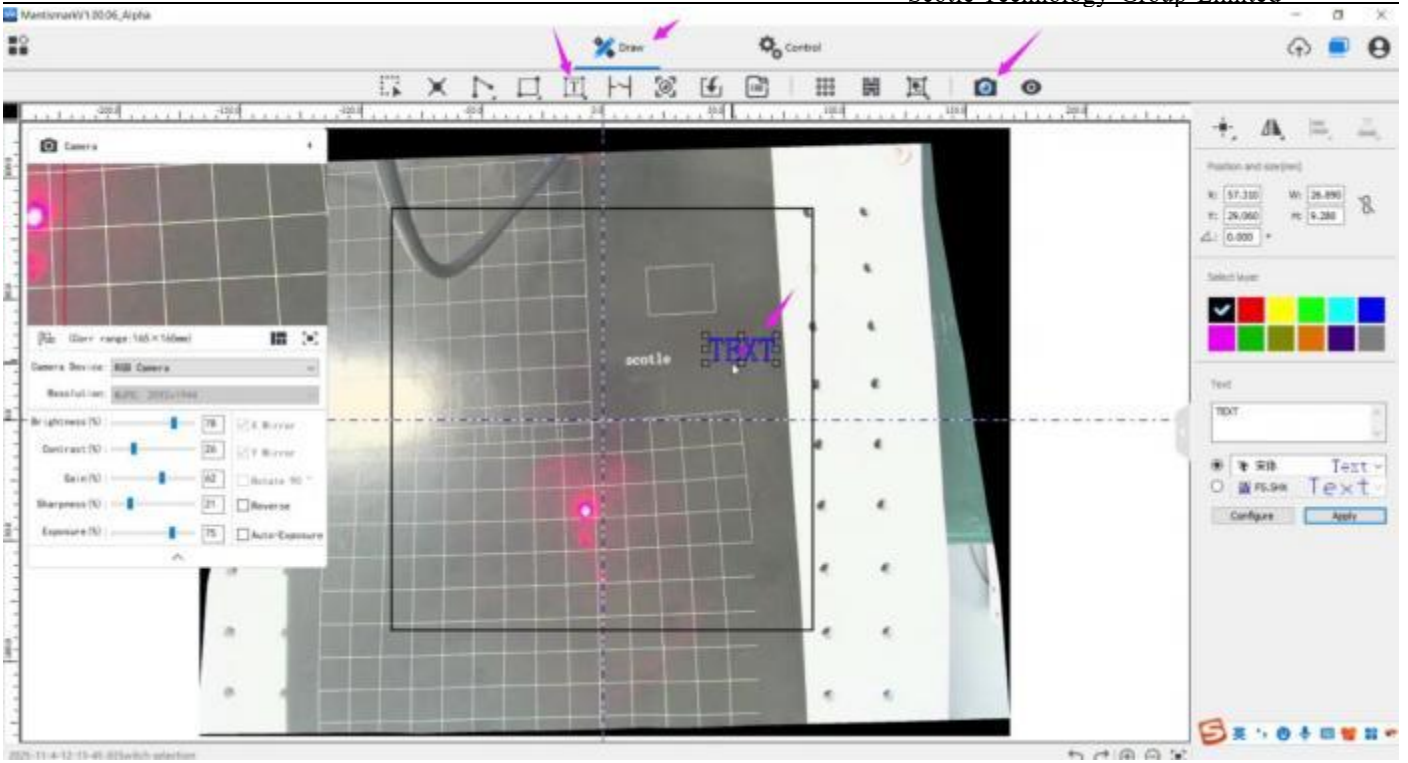
Click here to start your marking.



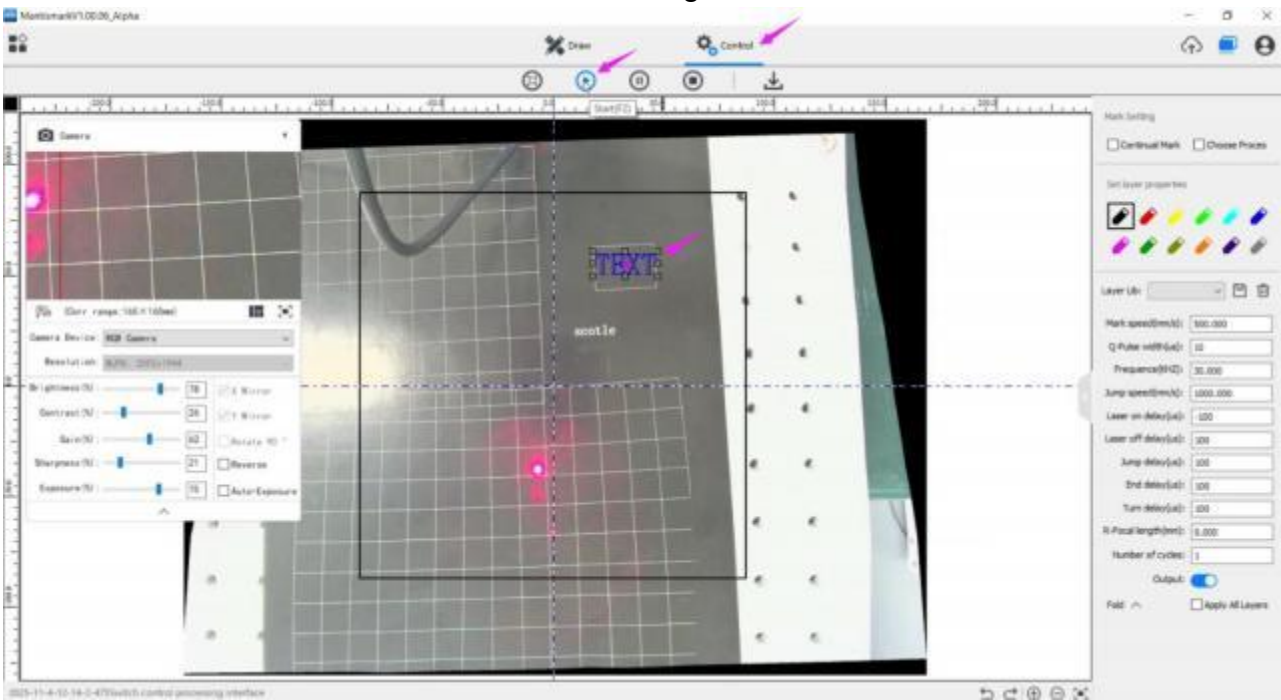
11.2 Canvas Function Introduction

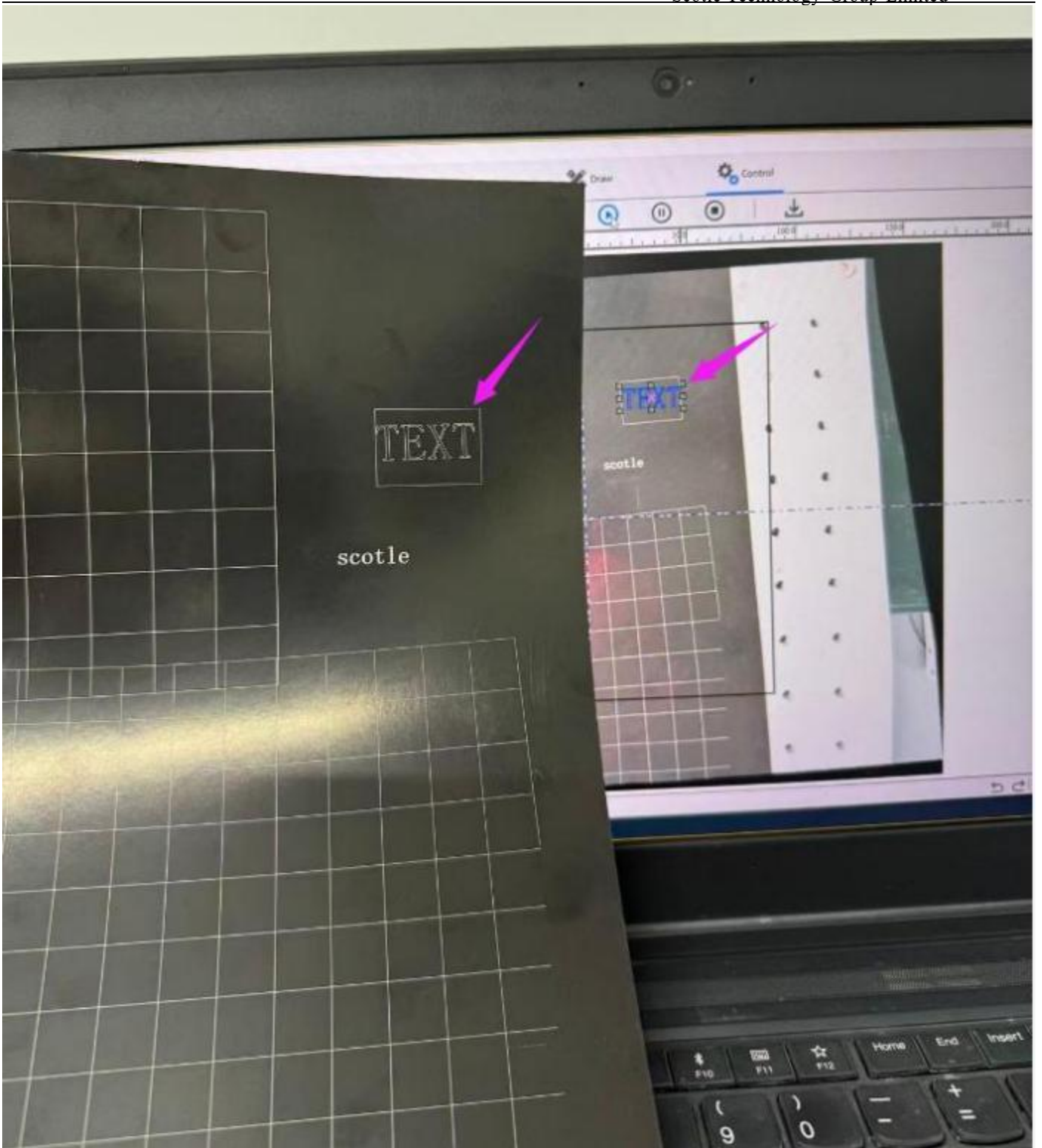
Click “camera”  sign, you will get a picture from working table

Click  sign to write what you want to make on the table
 You can move the “TEXT” to any position you want.



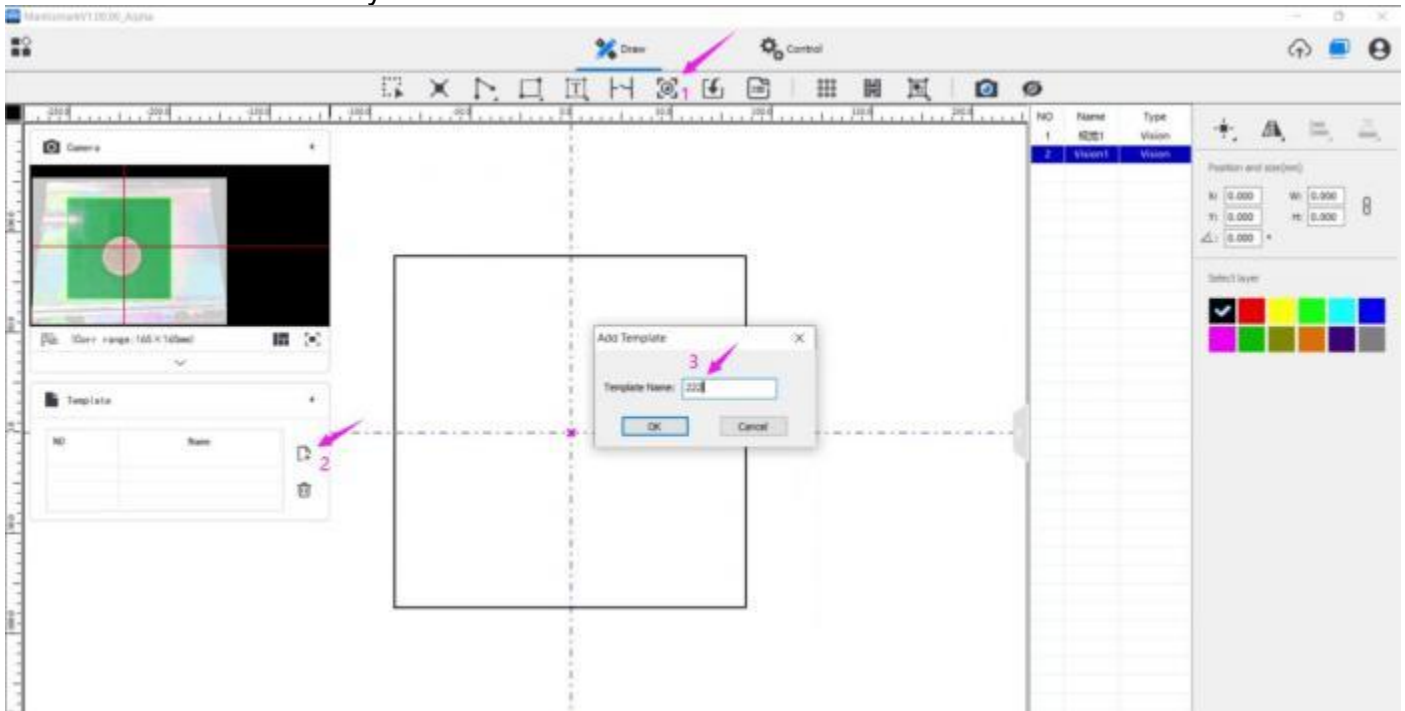
Then click "Control" to make mark on the working table.





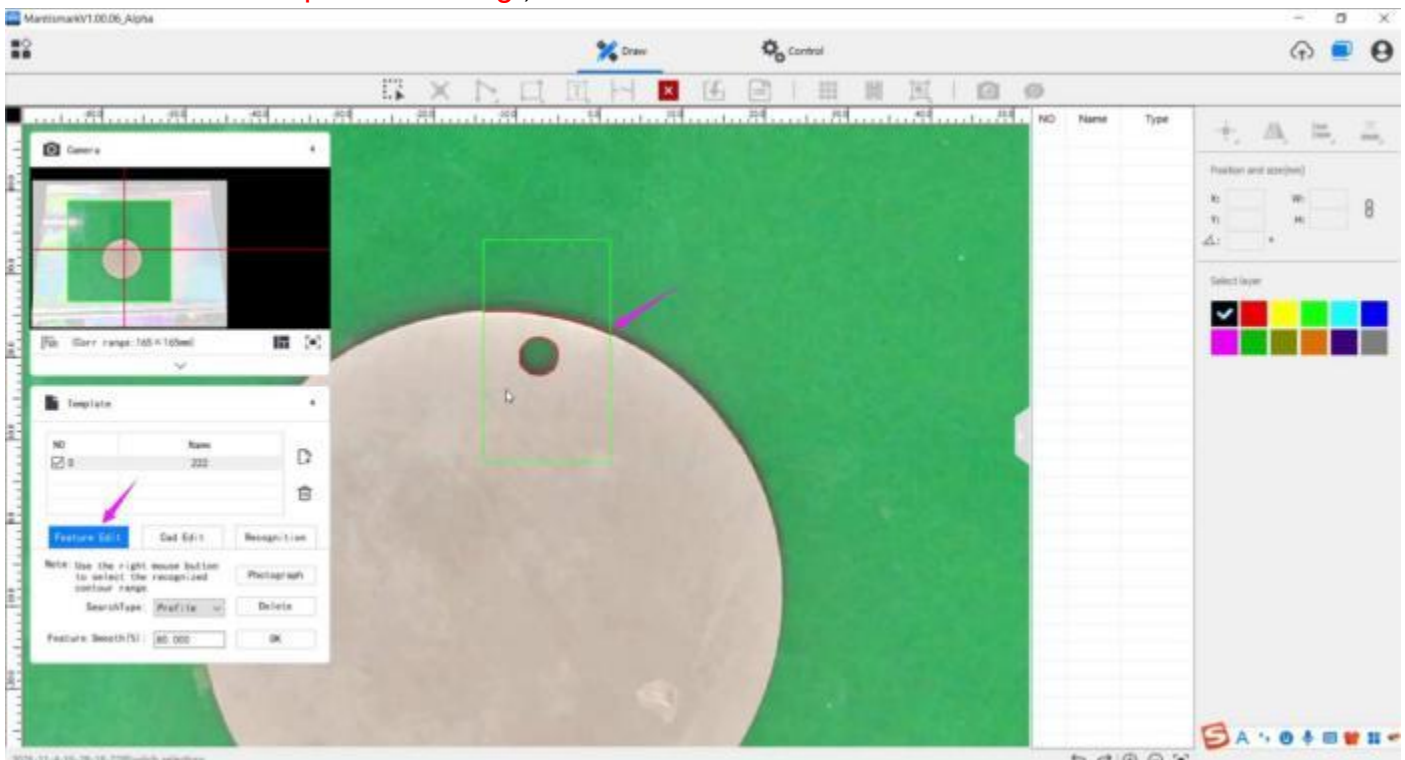
11.3 How to use a conveyor belt

Click here to create a file you want.

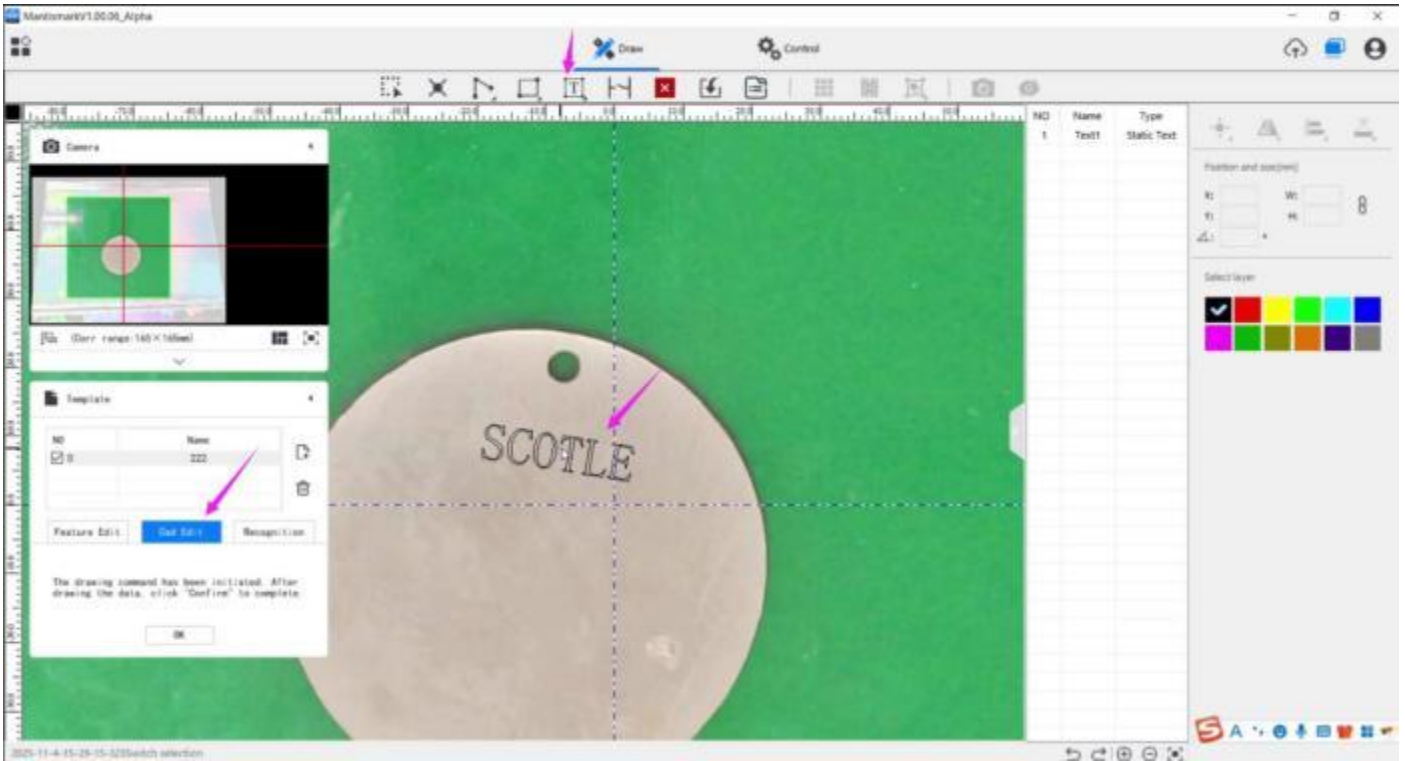


Click here, and build a feature you want on the item, Let the camera identify the location features of the item you want to hit. And click "OK"

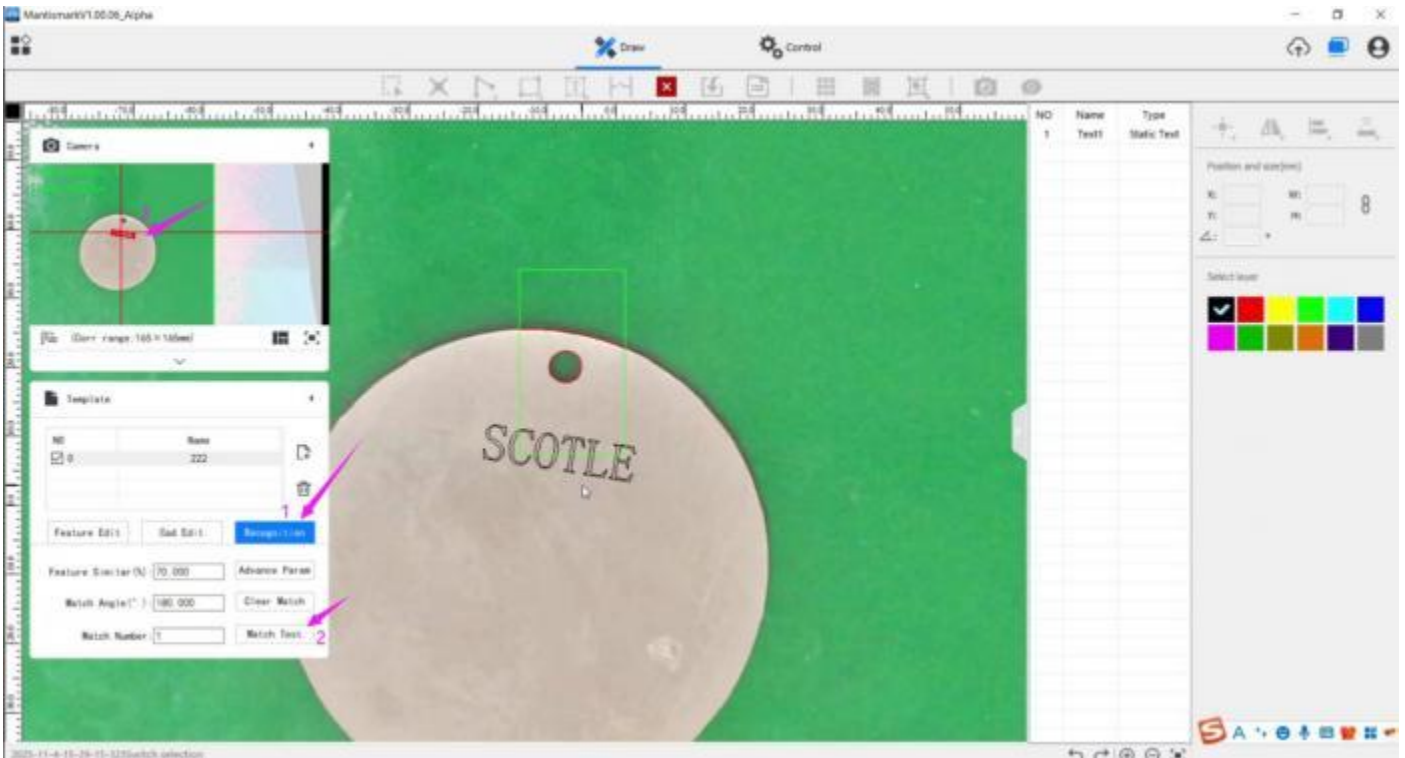
(note: Right-clicking and selecting the area (red indicates the template capture portion), then left-clicking and selecting the area to delete unwanted parts, allows for faster, smoother, and more accurate camera template matching.)



Click “CAD Edit”, to write what you want to make and position, click “OK”

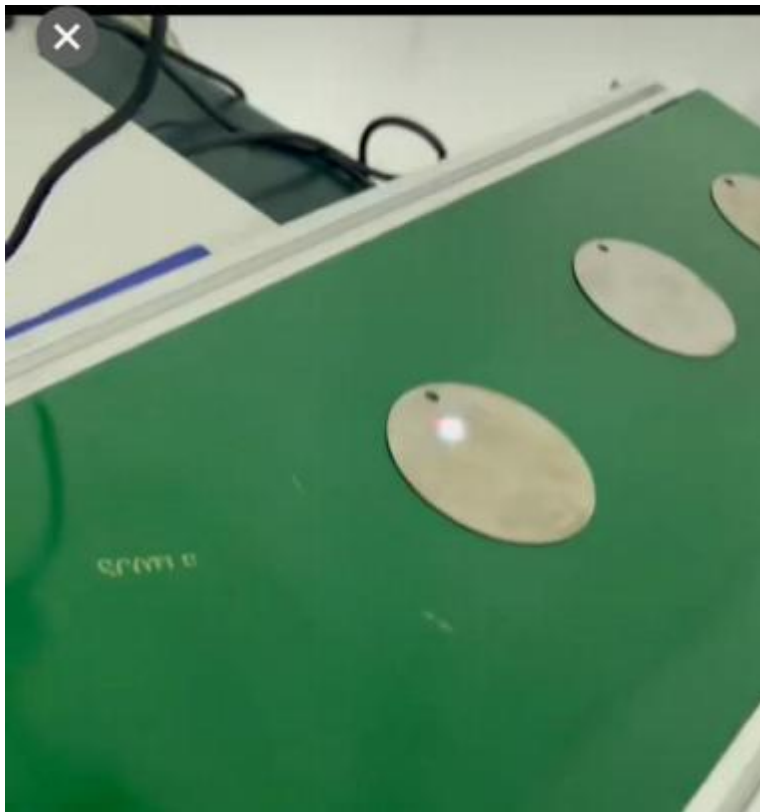
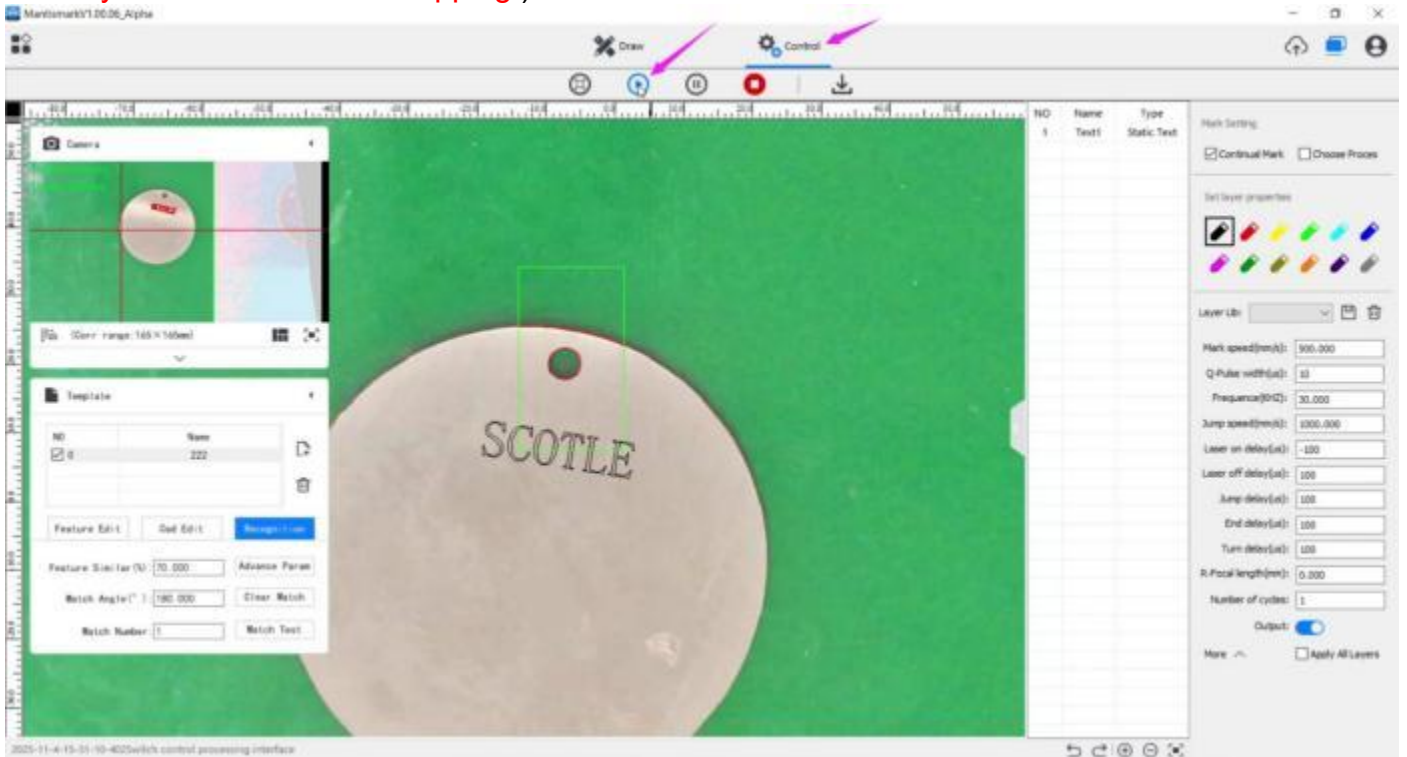


Click “Recognition”, and click “Match Test” on the first one thing.



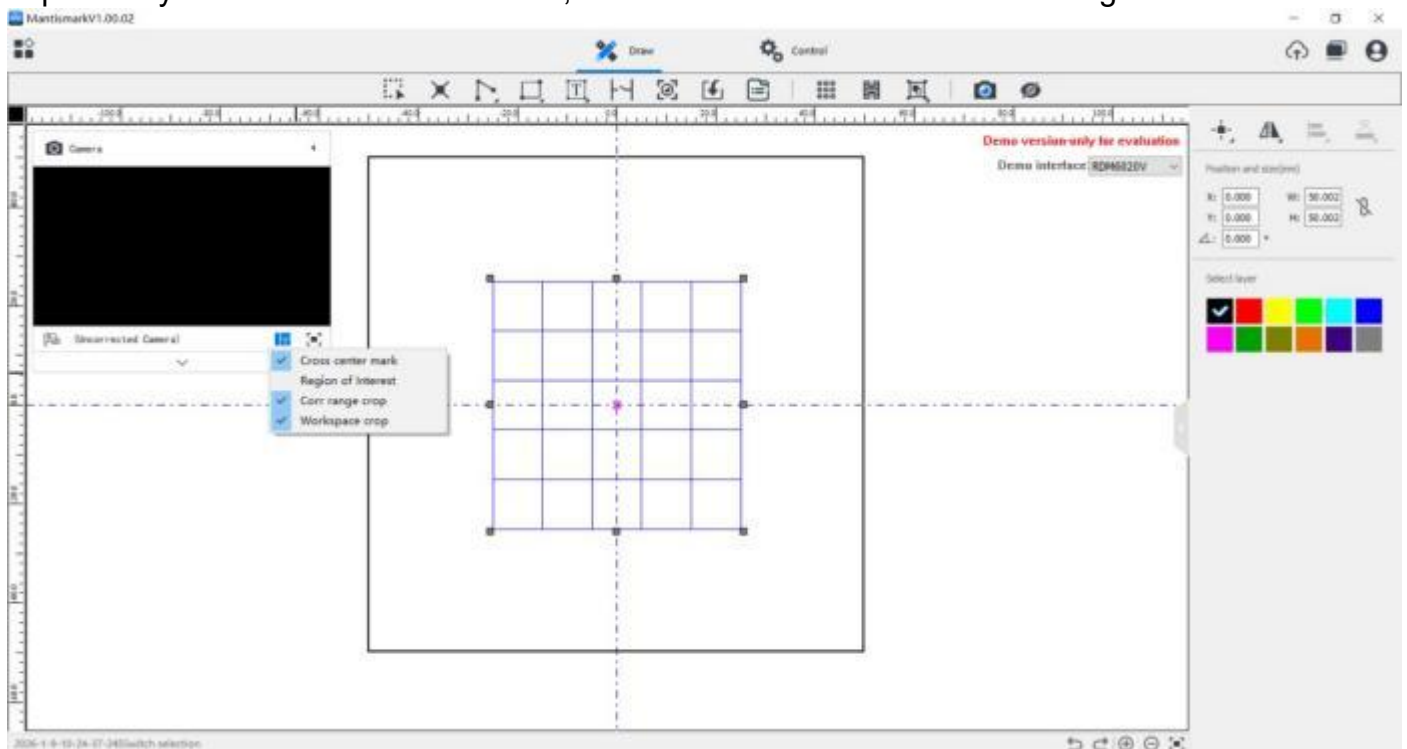
Now you can put multiple identical items on to the conveyor belt, and each one will have the same marking position.

(Note: The continuous processing button at this location must be checked; otherwise, the machine will only move once before stopping.)




Some suggestions for working:

1. Our production line extension shaft is 200mm wide, so the workpiece must be placed in the middle of the conveyor belt during processing.
2. After assembling the machine and importing the backup parameters, check if the calibration is misaligned and make appropriate compensation. Check for offsets periodically afterward. This allows for more accurate camera marking and visual positioning, eliminating the need for manual measurement and compensation.
3. When testing the machine using visual primitives, delete all fonts and imported graphics on the right side except for the primitive template. If not deleted during testing, they will be marked along with the production line, thus marking the production line or products.
4. The camera's effective recognition area can be set to not recognize areas outside the designated area. The working area and correction area can be checked, meaning that only areas captured by the camera can be marked, while areas outside the field lens range cannot.




12. Reference parameter

Note: These are just some sample data references. For specific products and effects, you need to adjust the parameters yourself



Laser source type	Filed lens	Beam expansion	Fill Density	Pulse width	Frequency	Speed
5W UV LASER Paint Stripping	F=160mm	10X	0.01mm/s	1μs	150KHz	1000mm/s
Cutting			0.01mm/s	1μs	140KHz	120mm/s

Process analysis: Fiber laser stripping will cause oxidation, and will lead to plastic melting affect the subsequent soldering process, UV light source stripping plastic heat-affected zone, cutting copper wire burr small




Laser source type	Filed lens	Beam expansion	Fill Density	Pulse width	Frequency	Speed
5W UV LASER	F=254mm	10X	0.04MM	8μs	45-60 KHz	2000mm/s

Process analysis: The individual pulses of energy are more moderate so that they damage the substrate as little as possible, and the material removes more cleanly with UV stripping.



Laser source type	Filed lens	Beam expansion	Fill Density	Pulse width	Frequency	Speed
5W UV Laser	F=170mm	10X	0.02mm	1μs	80-100KHz	20mm/s



Laser source type	Filed lens	Beam expansion	Fill Density	Pulse width	Frequency	Speed
10W UV LASER	F=100mm	10X	/	1μs	120-150 KHz	/



Laser source type	Filed lens	Beam expansion	Fill Density	Pulse width	Frequency	Speed
5W UV LASER	F=254mm	10X	0.04mm	4μs	80-100KHz	2000mm/s



Laser source type	Filed lens	Beam expansion	Fill Density	Pulse width	Frequency	Speed
5W UV LASER	F=170mm	10X	/	1μs	30-40KHz	10mm/s

Process analysis: The ceramic surface is a highly reflective material that requires a high energy density for marking, otherwise it is prone to instability or light color.



Laser source type	Filed lens	Beam expansion	Fill Density	Pulse width	Frequency	Speed
5W UV Laser	F=254mm	10X	/	8-12μs	45-60KHz	2000mm/s

Process analysis: Narrow pulse width version of the laser, the peak power is higher in the marking can be done without feeling the effect.



Laser source type	Filed lens	Beam expansion	Fill Density	Pulse width	Frequency	Speed
5W UV LASER	F=254mm	10X	0.08mm	1-2μs	30-40KHz	2500mm/s



Ceramic marking

Laser source type	Filed lens	Beam expansion	Fill Density	Pulse width	Frequency	Speed
5W UV LASER	F=163mm	10X	0.03mm	1-3 μ s	30-40KHz	1000mm/s



Plastic shell marking

Laser source type	Filed lens	Beam expansion	Fill Density	Pulse width	Frequency	Speed
5W UV LASER	F=254mm	10X	0.03mm 0°+90KHz	6 μ s	80-90KHz	1000~1200 mm/s

Process analysis: As the surface layer of plastic is not broken, but is presented as a plastic heated blistering effect. Therefore, in the use of high-frequency relatively more heat for debugging.



Mulch cutting

Laser source type	Filed lens	Beam expansion	Fill Density	Pulse width	Frequency	Speed
10W UV LASER	F=100mm	10X	/	1 μ s	70KHz	1000mm/s

Process analysis: Higher energy is required to cut the mulch film, and the fewer cuts you make the less carbonization will occur.



Copper Foil Cutting

Laser source type	Filed lens	Beam expansion	Fill Density	Pulse width	Frequency	Speed
10W UV LASER	F=100mm	10X	/	1 μ s	120-150 KHz	150-200 mm/s

Process analysis: <0.1mm copper foil cutting with UV can get a better edge effect, while the blackening brought about by the thermal effect is more slight.



Glass Cutting

Laser source type	Filed lens	Beam expansion	Fill Density	Pulse width	Frequency	Speed
10W UV LASER	F=100mm	10X	/	1 μ s	120-150 KHz	/

13. Care and maintenance

13.1 Regular cleaning

Keep the surface of the equipment clean to prevent dust accumulation

13.2 Cooling system inspection

- Regularly check the coolant level and the operation of the cooling system
- Cooling system water temperature setting:
- Water cooler 25 ± 1 °C (no need to change in summer)
- Coolant requirements:
- Purified water is used as cooling water, and it is recommended to use purified drinking water and replaced every month.
- To prevent mold growth in the water in the chiller from causing pipe blockage, it is recommended to add ethanol with a volume ratio of 10% when adding purified water.
- When the ambient temperature of the equipment is between - 10 °C and 0 °C, the ethanol solution with a volume ratio of 30% must be used and replaced every two months.
- When the ambient temperature of the equipment is lower than - 10 °C, the dual-system (with heating function at the same time) water chiller must be used, and the uninterrupted operation of the cooling system must be guaranteed.
- Other requirements for the cooling system:
- When starting the cooling system for the first time, check the entire water system and connections for water leaks. The external water pipes must be installed and connected according to the water inlet (IN) and water outlet (OUT) marked by the laser. Otherwise, the laser may not work properly.
- If the laser is not used for a long time, the cooling water inside the cooling system and the laser should be drained, otherwise the laser will be irrecoverable damaged.