

Please read this manual carefully before using the software to
control the device.

LaserMaker V2

Laser Cutting System Software Manual

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- Damage caused by natural forces may make the machine in motion dangerous. The user is responsible for designing effective error handling and safety protection mechanisms in the machine. Thunder Laser has no obligation or responsibility for incidental or consequential losses caused thereby.

Safety Information

To ensure operational safety and stable operation of the system, please be sure to follow the operating specifications in this manual. The following illustrations and prompts are used to alert users to potential dangers and important operating precautions. Please pay special attention.

**Notice:**

There is a risk of electrical shock. This device can only be maintained by professionals.

**Notice:**

Be careful not to drop your feet. This object is not hinged, so be sure to hold it securely when unlocking it to prevent it from accidentally falling!

**Notice:**

There are high voltage and capacitor banks inside. Before repairing or maintaining the device, please disconnect the main input power and wait for at least ten minutes for the device to discharge.

**Notice:**

Unplug all power cords before cleaning, maintaining, or repairing the device.

**Notice:**

This equipment may produce toxic exhaust fumes or particulates.

**Notice:**

Wear protective glasses when operating the equipment.

**Notice:**

Please read the instruction manual carefully before operating, cleaning and maintaining the equipment.

**Notice:**

This device emits laser radiation to alert users that the device is or may generate laser radiation. When operating the device, avoid direct exposure of the laser to eyes or skin. Always follow safe operating procedures to prevent personal injury or damage to the device.

Receiving inspection

The device is packaged in a cardboard box and a wooden crate to prevent damage to the electrical components during transportation. The entire device is wrapped in foam to ensure safe transportation.

After receiving the device, please be sure to check it according to the following steps:

- **Check the outer packaging**

First, confirm that the outer packaging is intact. If any obvious deformation, damage, or moisture is found, immediately inspect the device for damage and notify the carrier and logistics company in writing, explaining the damage.

- **Unpacking inspection**

Carefully remove the outer packaging to avoid accidentally damaging the device with tools, remove all devices and accessories from the packaging, and properly store the packaging materials and the included wiring accessories.

- **Check the parts list**

After unpacking, please check the received product against the packing list to ensure that all parts are present and in good condition. If any parts are missing, damaged, or abnormal, please contact Thunder Laser Customer Service immediately and do not install or activate the equipment.

Note: If the equipment has any obvious damage, it is strictly prohibited to continue to install, debug or use the equipment to avoid causing greater damage or safety hazards.

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Chapter 1 Overview

Main contents of this chapter:

- Software Scope
- File formats supported by the software
- Software requirements for operating system

1.1 Scope of Software Application

LaserMaker is a laser equipment-specific software developed by Thunder Laser. It integrates graphic element design and equipment control. It has a wide range of applications, mainly covering the following fields: education, industrial manufacturing, cultural creativity and art, commercial production, etc. It is suitable for beginners and professional designers.

LaserMaker can control laser cutting machines from multiple brands including Thunder Laser, OneLaser, APLaser, Taizhi Laser, Junsen Laser, Kuke Laser, etc., and is compatible with general DSP devices and general GRBL devices in terms of motherboard type.

1.2 File formats supported by the software

Source file: LCPX, LCP

Vector files: AI, PLT, DXF, DST, SVG, PDF, XLSX

Bitmap files: BMP, JPG, JPEG, PNG

1.3 Software Requirements for Operating Systems

1. Windows platform
 - compatible 32-bit (x86) and 64-bit (x64) Windows operating systems
2. macOS platform
 - Supports macOS 12 and above

Chapter 2 Software Licensing

Main contents of this chapter:

- License function
- License type
- License trial
- License purchase
- License activation

2.1 License Function

The License unlocks two features in LaserMakerControl: equipment processing capabilities and unlimited export of common format files (such as .dxf/.plt). Once unlocked, both features are permanently available in any software version released before the License expires—users can utilize equipment processing and export these files without limits.

After the License expires, it remains valid for all versions released prior to its expiration. However, if a mandatory software update is enforced, users will lose device processing control in subsequent versions. Additionally, the unlimited file export capability will be restricted to five exports per day for common formats.

2.2 License Type

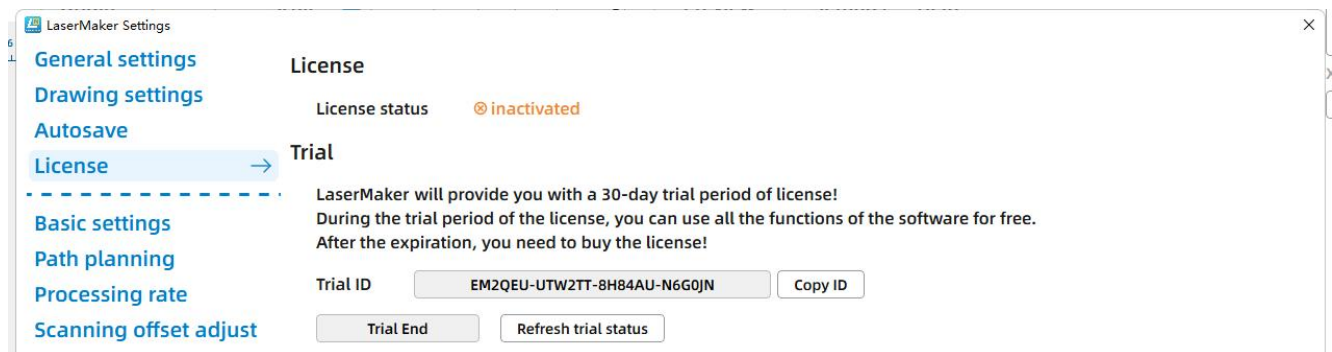
The License is divided into G-Code Edition and DSP Edition. The type of License you need depends on the controller used in your laser.

- The G-Code Version supports controllers based on GRBL firmware.
- The DSP Version supports the Ruida universal board, Thunder customized board, Taizhi universal board, and controllers with GRBL firmware.

2.3 License Trial

A trial License for LaserMaker is provided for each computer, valid for 30 days from the date of first activation (when you click "Start Trial").

The trial License has the same functionality as the full License. However, once the 30-day period expires, users will lose control of equipment processing, and the unlimited export function for common format files will be restricted to five exports per day.



2.4 License Purchase

The license for the international version can be obtained by contacting our sales team at sales@thunderlaser.com.

- After purchasing, you will receive an License and can use it after entering the software activation;
- You will not receive a new License after renewal. If the License has expired when the user renews, the calculation will start from the renewal date; if the License has not expired when the user renews, the calculation will start from the expiration date of the License.

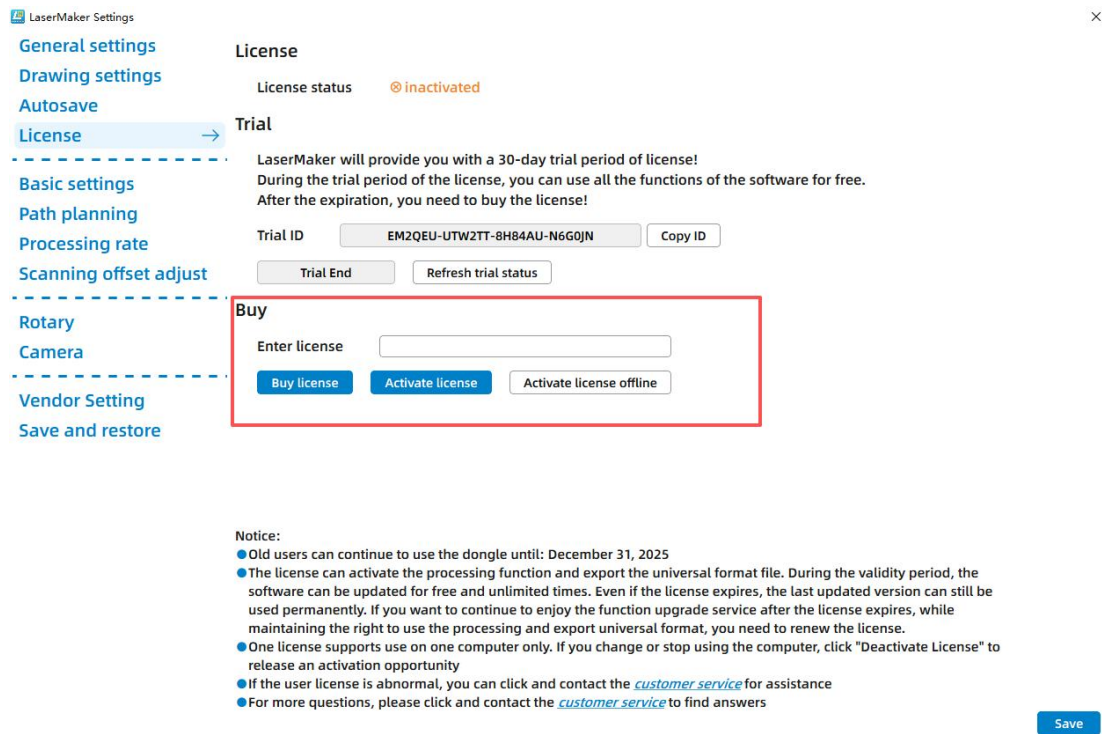
The License is not tied to a specific operating system and can be activated on either Windows or macOS.

2.5 License Activation

The activation path of the License in the software is: "Settings" - "License" - "Activate License".

The License is valid for one year, starting from the first activation (click "Activate License"). Each License can only be used on one computer. If you change or stop using that computer, click "Disable License" to release the activation opportunity before you can use the same License on another computer.

If your computer does not support Internet access, please click "Activate license offline" and follow the prompts to complete offline activation.



LaserMaker Settings

License

License status: ⊗ inactivated

Trial

LaserMaker will provide you with a 30-day trial period of license!
During the trial period of the license, you can use all the functions of the software for free.
After the expiration, you need to buy the license!

Trial ID:

Buy

Enter license:

Notice:

- Old users can continue to use the dongle until: December 31, 2025
- The license can activate the processing function and export the universal format file. During the validity period, the software can be updated for free and unlimited times. Even if the license expires, the last updated version can still be used permanently. If you want to continue to enjoy the function upgrade service after the license expires, while maintaining the right to use the processing and export universal format, you need to renew the license.
- One license supports use on one computer only. If you change or stop using the computer, click "Deactivate License" to release an activation opportunity
- If the user license is abnormal, you can click and contact the [customer service](#) for assistance
- For more questions, please click and contact the [customer service](#) to find answers

Chapter 3 Basic Software Operations

Main contents of this chapter:

- Software Basic Settings
- Home page features
- Operation page function distribution
- Opening and saving files
- Basic drawing functions
- Advanced editing features
- Features
- help

3.1 Basic Software Settings

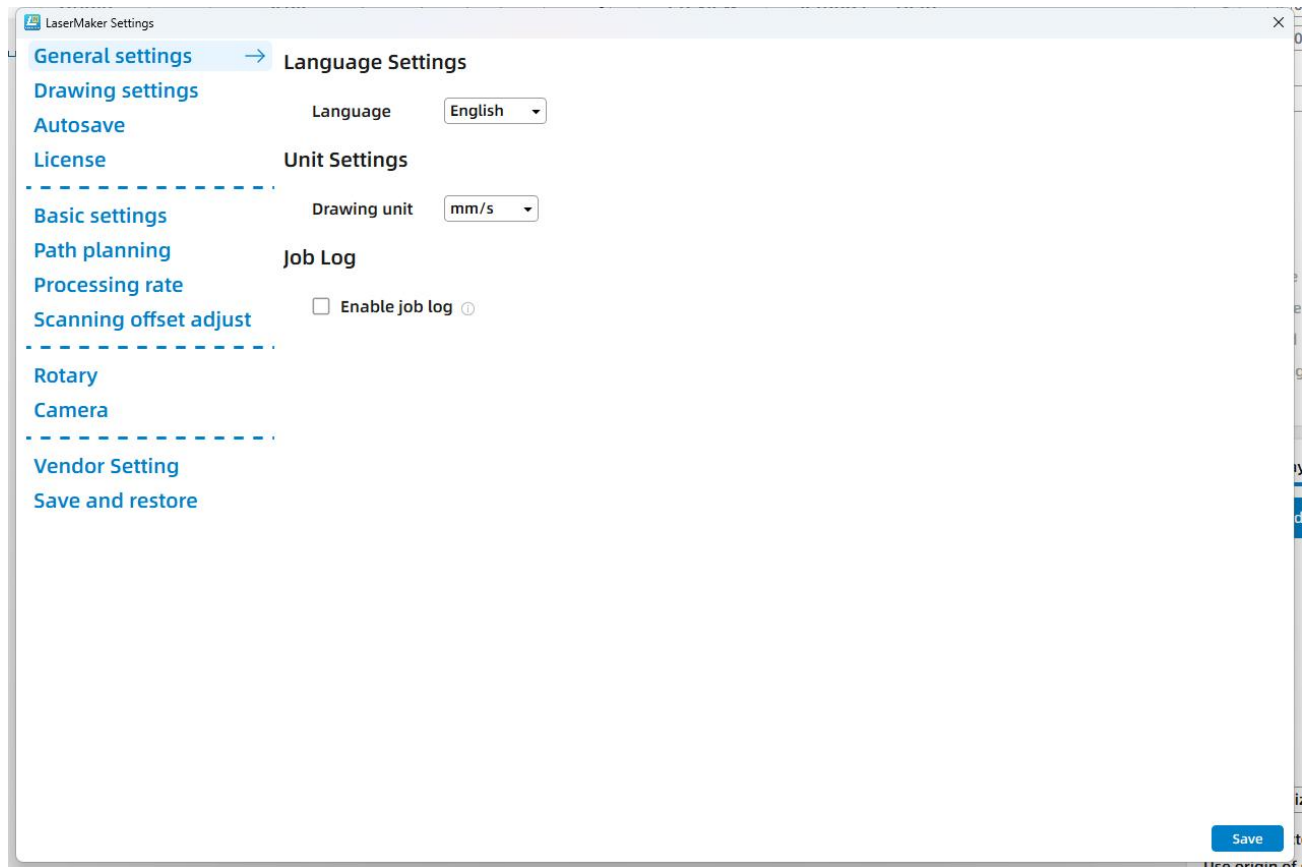
The basic software settings include "General settings", "Drawing settings", "Autosave", and "License", which are not related to device parameters. After changing the parameters, the user can simply click "Save" in the lower right corner.

3.1.1 General Settings

Language settings

Language

The software language will automatically switch according to the computer's system language. You can also switch the language during software use through "Settings" - "General Settings" - "Language Settings". Languages: Czech, English, Italian, Japanese, Polish, Portuguese, Spanish, Simplified Chinese, Traditional Chinese.



Unit Settings

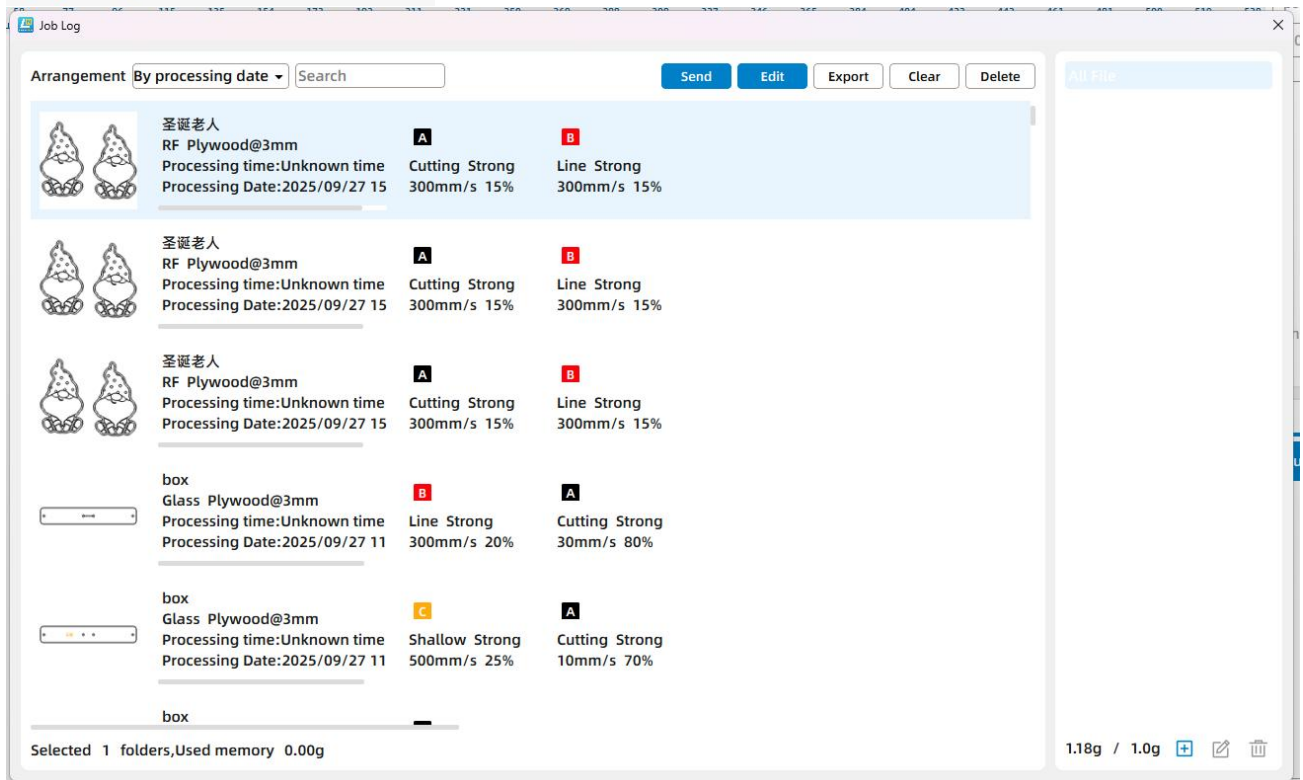
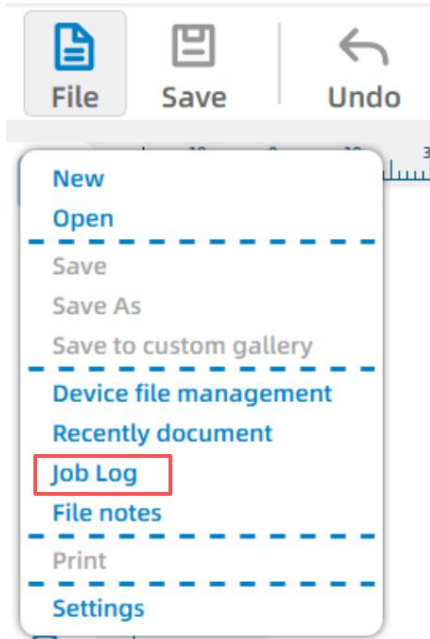
Drawing unit

Switching units affects not only drawing in the canvas, but also the speed and acceleration of the device's laser head.

Job log

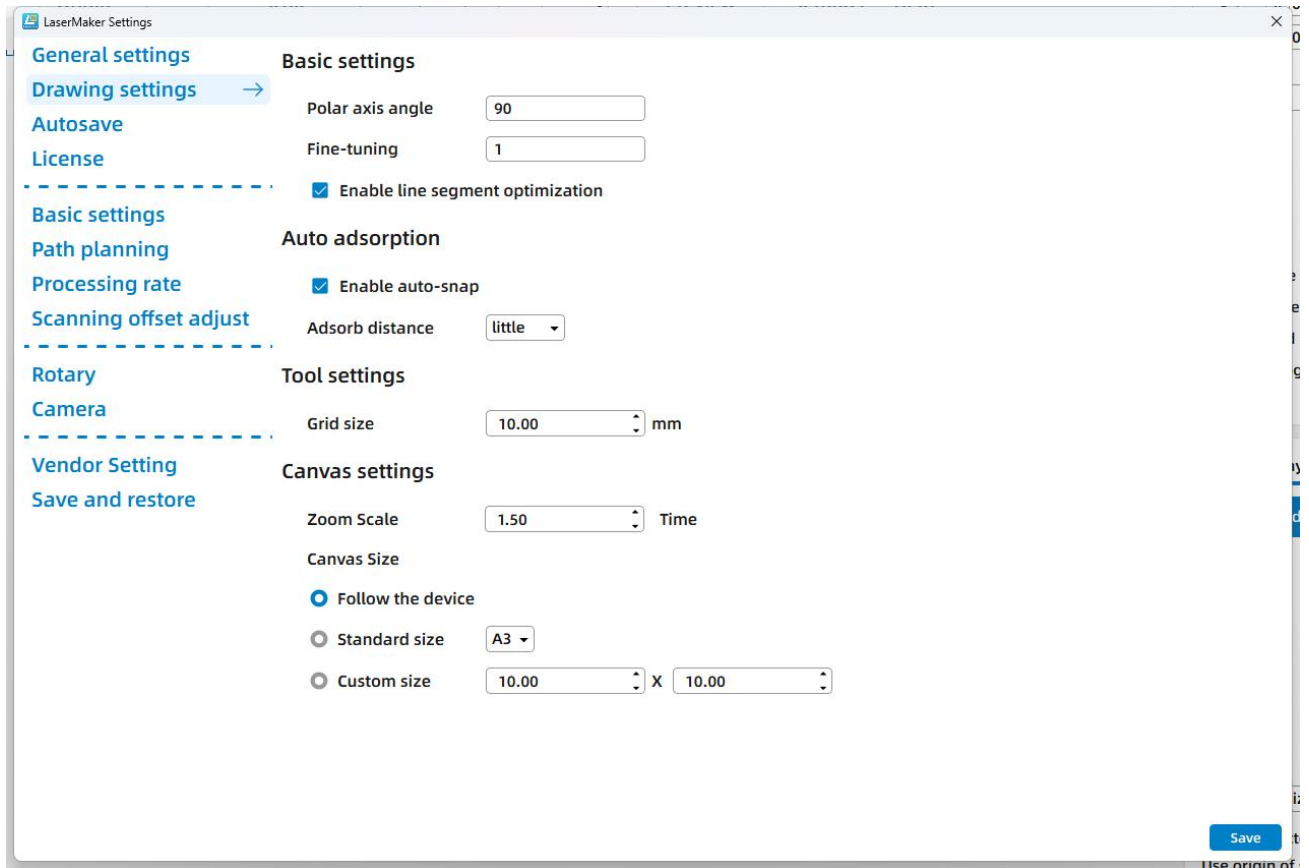
Enable job log

After enabling the processing log, all files sent or directly processed in the current software can be saved in the processing log and viewed from "File" - "Job Log".



3.1.2 Drawing Settings

Basic Settings



Polar axis angle

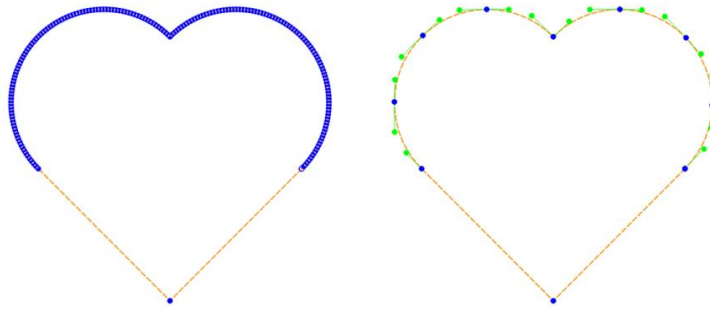
When mechanical problems cause way not vertical, the “Polar axis angle” is used to correct the direction deviation of the primitive during the actual processing (for example, the vertical line will appear tilted during processing). The default value is 90, usually no adjustment is required.

Fine-tuning

Used to set the elements in the canvas through the keyboard arrow keys (↑ ↓ ← →). The unit step length when moving, the software value defaults to 1, that is, each movement will offset one unit. The adjustment range is 0.01-100. If you need higher precision/faster movement, you can set it to be less than/greater than 1. The numerical value of .

Enable line segment optimization

The function is enabled by default, and the software will automatically optimize the path of the elements to simplify the path structure. The following figure shows the comparison of the effects before and after enabling it. .ai/.dxf/.svg This feature can be temporarily disabled when editing critical graphics files, especially when complex graphics are included in the file format, or when a large number of dense nodes appear after editing the graphics. If you require extremely high node position accuracy, you can temporarily disable this feature when editing key graphics files.



Auto adsorption

Enable auto - snap

Automatically align or move closer to key points or lines (such as endpoints, midpoints, grids, and intersections) of existing entities while drawing or editing them, avoiding errors caused by manual alignment. This function is the same as the Snap Tool in the Canvas Tools, and is switched on and off simultaneously.

Adsorb distance

Set the "sensing range" for automatic adsorption. That is, the automatic adsorption function will be triggered only when the distance between the currently operated element and the target element reaches this range.

Tool Settings

Grid size

Used to set the size of each grid in the auxiliary grid lines on the canvas. You can use the grid tool switch at the bottom of the operation page to provide visual reference lines for drawing.

Canvas Settings

Used to define the width and height of the software canvas, providing users with three flexible canvas size options to meet the needs of different devices and application scenarios. It is important to note that the canvas size only affects the software drawing area and does not limit the processing range of the actual device; actual processing still depends on the device's working format.

Zoom scale

You can adjust the zoom scale value to control how much the canvas is zoomed.

Follow the device

When switching between different laser devices, the canvas size automatically remains consistent with the working format of the currently connected laser device. This type is suitable for scenarios where you need to design and layout directly within the actual processing area of the device.

Standard size

The standard size category provides users with six common paper sizes: A3/4/5, B3/4/5, users can quickly select the desired standard specification as the canvas size. This type is suitable for scenarios where you need to draw or design documents in a standard format.

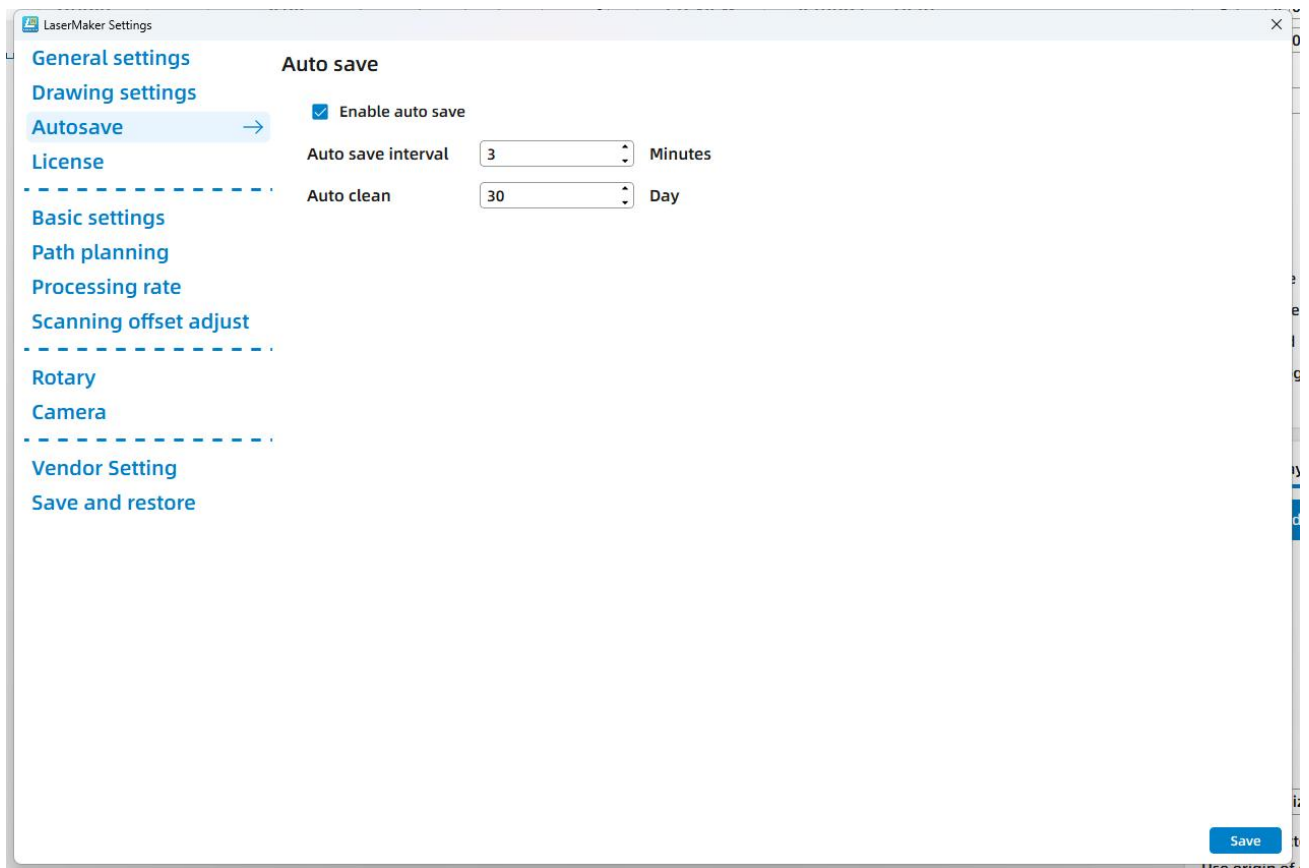
Custom size

The user manually enters the canvas width and height based on actual needs. This type is suitable for scenes with special size layouts or scenes that require precise size control.

3.1.3 Autosave

Auto save

When the software crashes, the drawing file is automatically saved. After the software restarts, the previously saved data can be opened and cleared after a period of time. Users can modify the default parameters of the auto-save function as needed.

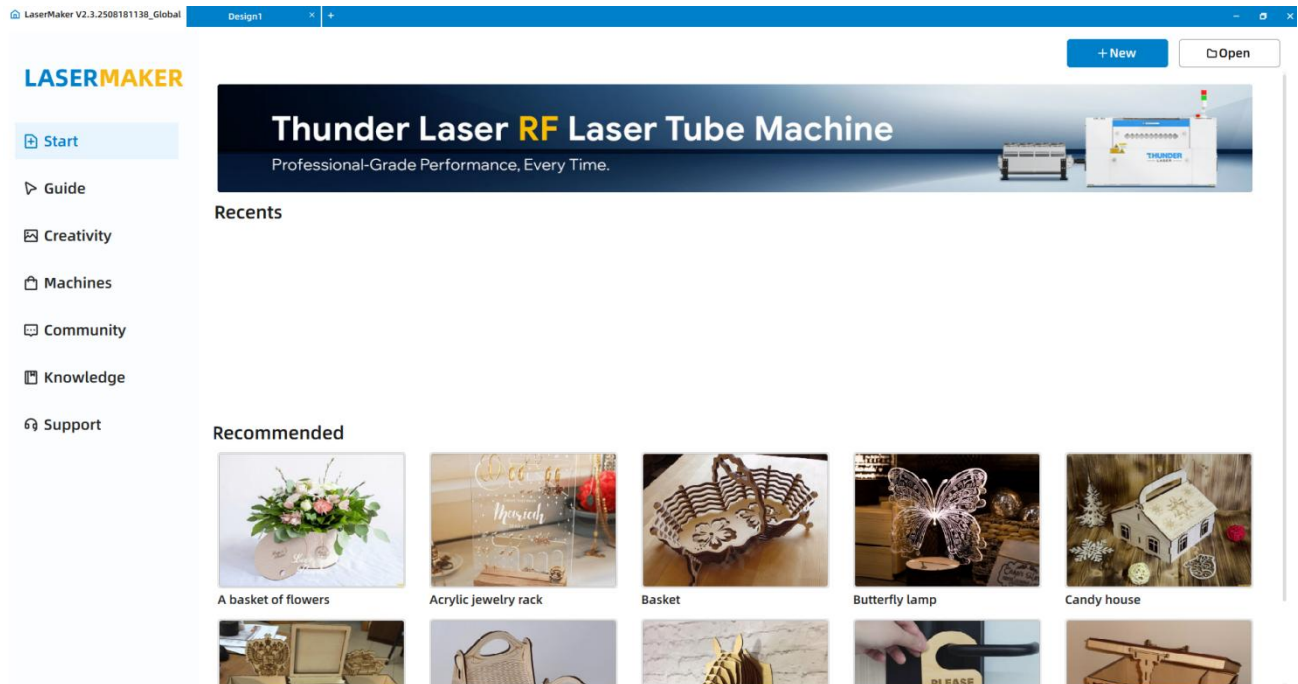


3.2 Home Page Function

The homepage includes: “Start”, “Guide”, “Creativity”, “Machines”, “Community”, “Knowledge” and “Support”, each of which plays an important role.

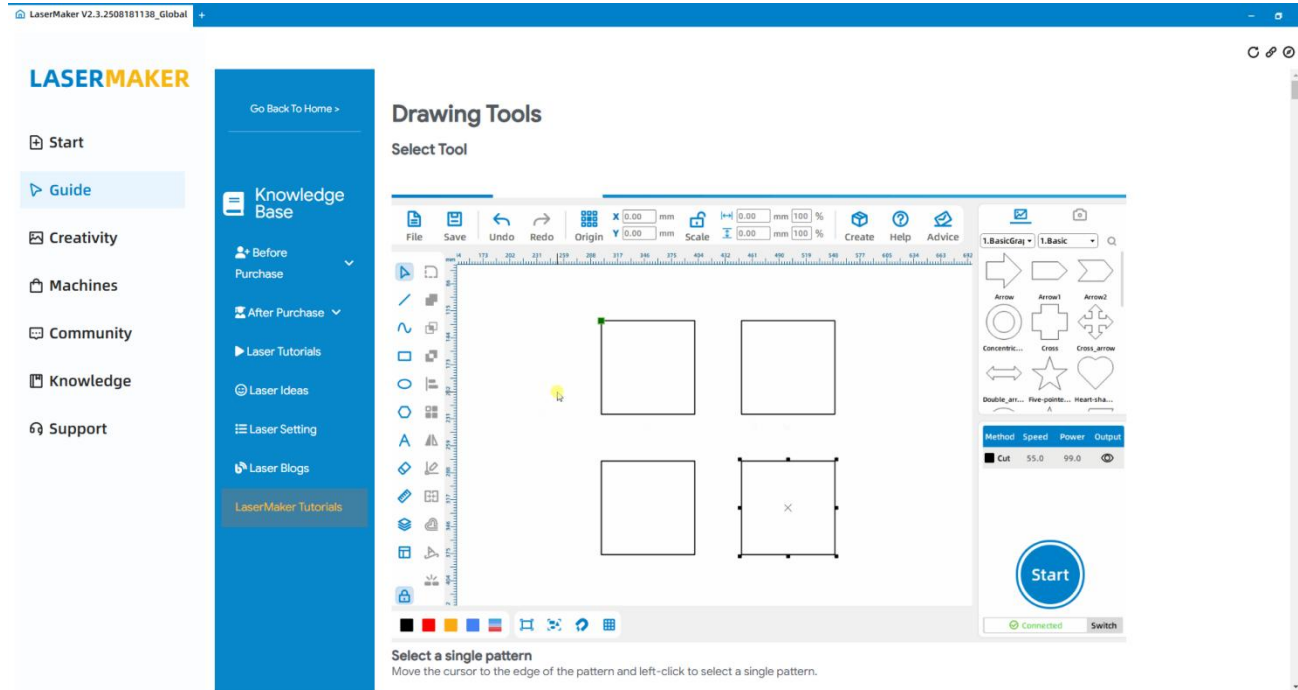
3.2.1 Getting Started

“Start” interface is the first page every time you enter the software. Click "New" to create a blank drawing file and enter the operation page. Click "Open" to open a file previously stored in the computer. Supported file formats include:.lcp/.lcp/.ai/.dxf/.plt/.dst/.svg/.pdf/.xlsx/.bmp/.jpg/.png/.jpegwait.



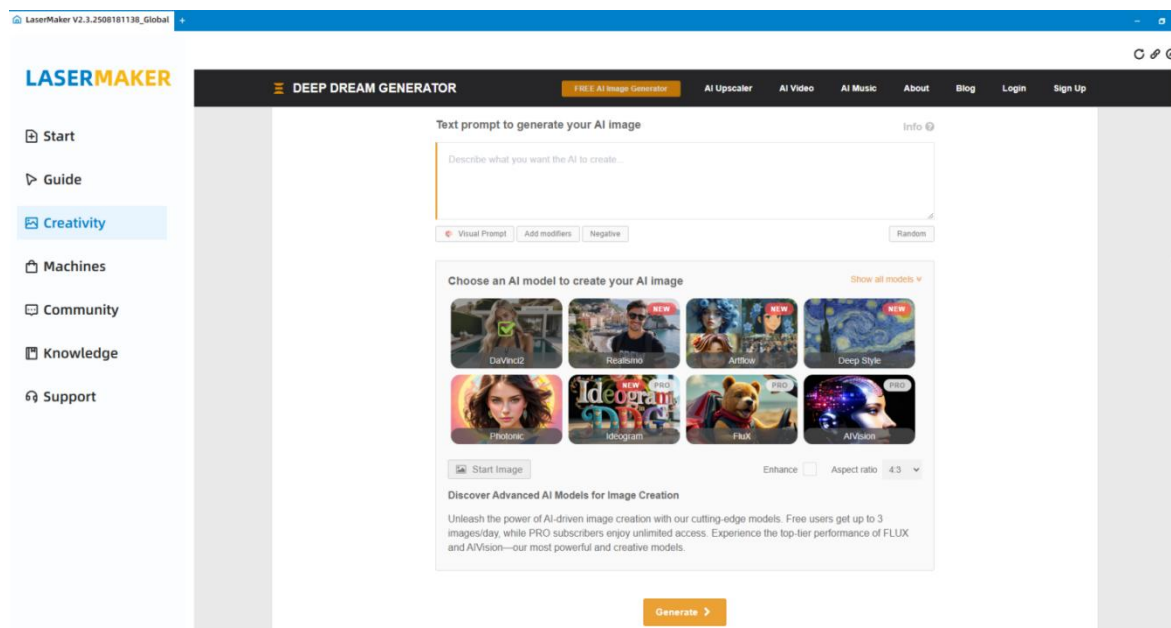
3.2.2 Guide

This is the "Guide" interface of LaserMaker. On the left, there's a navigation panel. The main area features "Drawing Tools" with various drawing options and a canvas for creating shapes. There's also a "Knowledge Base" section with resources like tutorials and ideas to assist users.



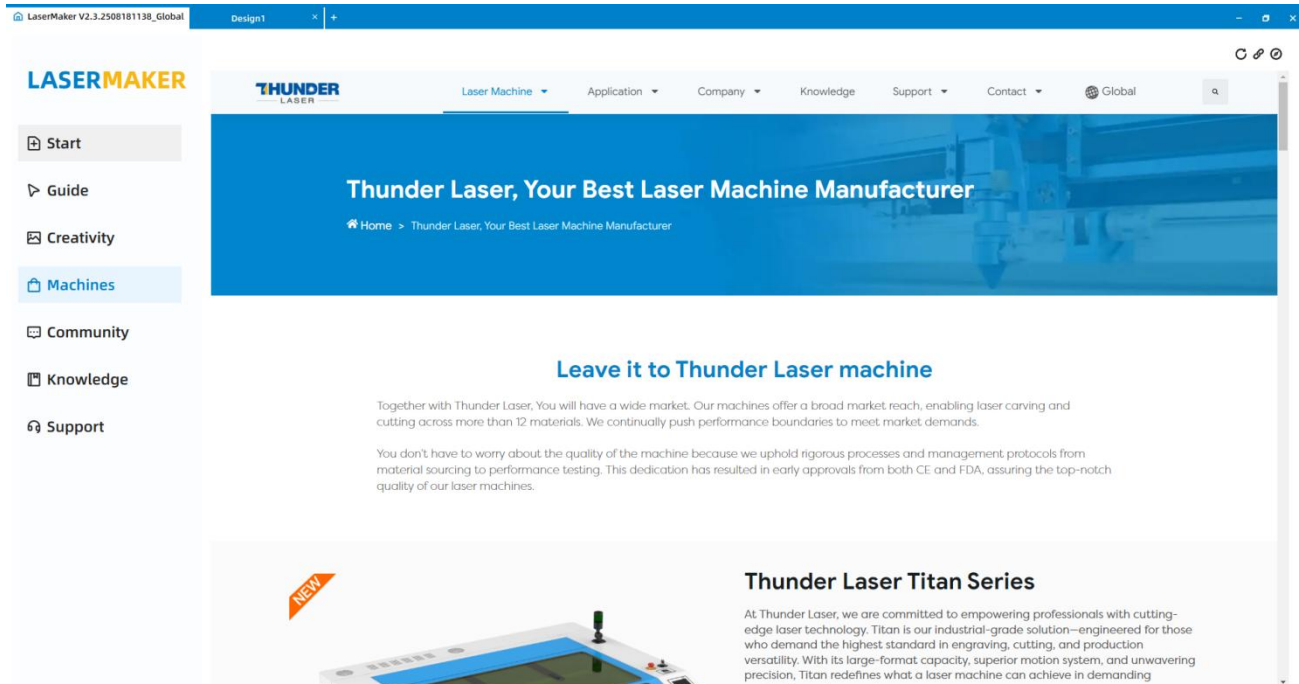
3.2.3 Creativity

This is the "Creativity" interface of LaserMaker. It integrates the "Deep Dream Generator" tool. Users can enter text prompts to describe the AI - generated image they want. There are also options to choose AI models, and after setting, click "Generate" to create AI images.



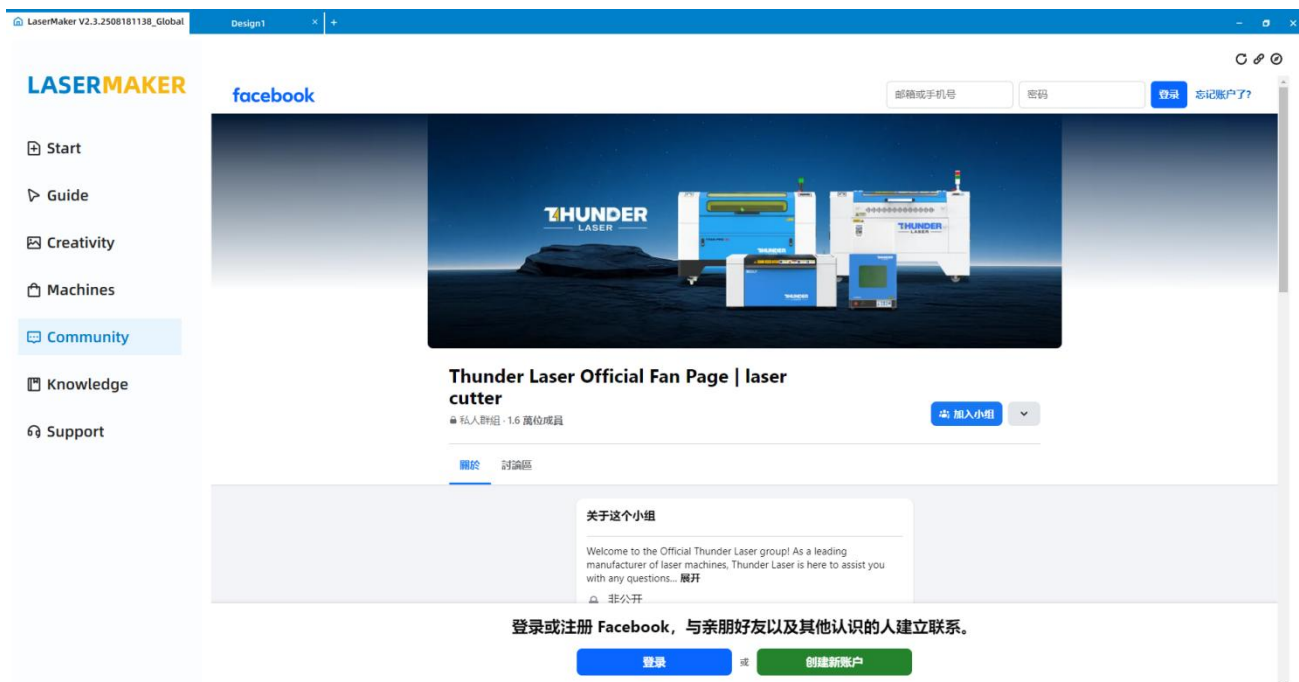
3.2.4 Machines

This is the "Machines" section on Thunder Laser's official website.



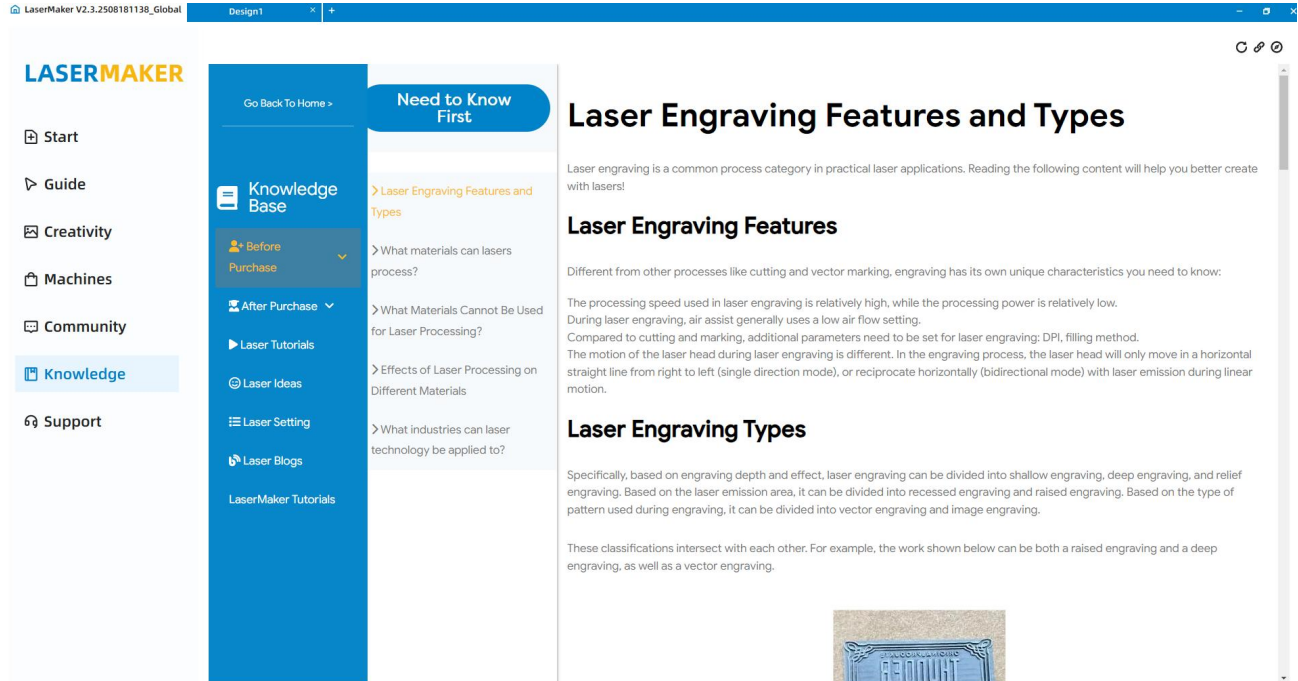
3.2.5 Community

This is the "Community" interface of LaserMaker. It links to Thunder Laser's official Facebook fan page, where users can connect with others, get updates about laser cutters, and engage with the community.



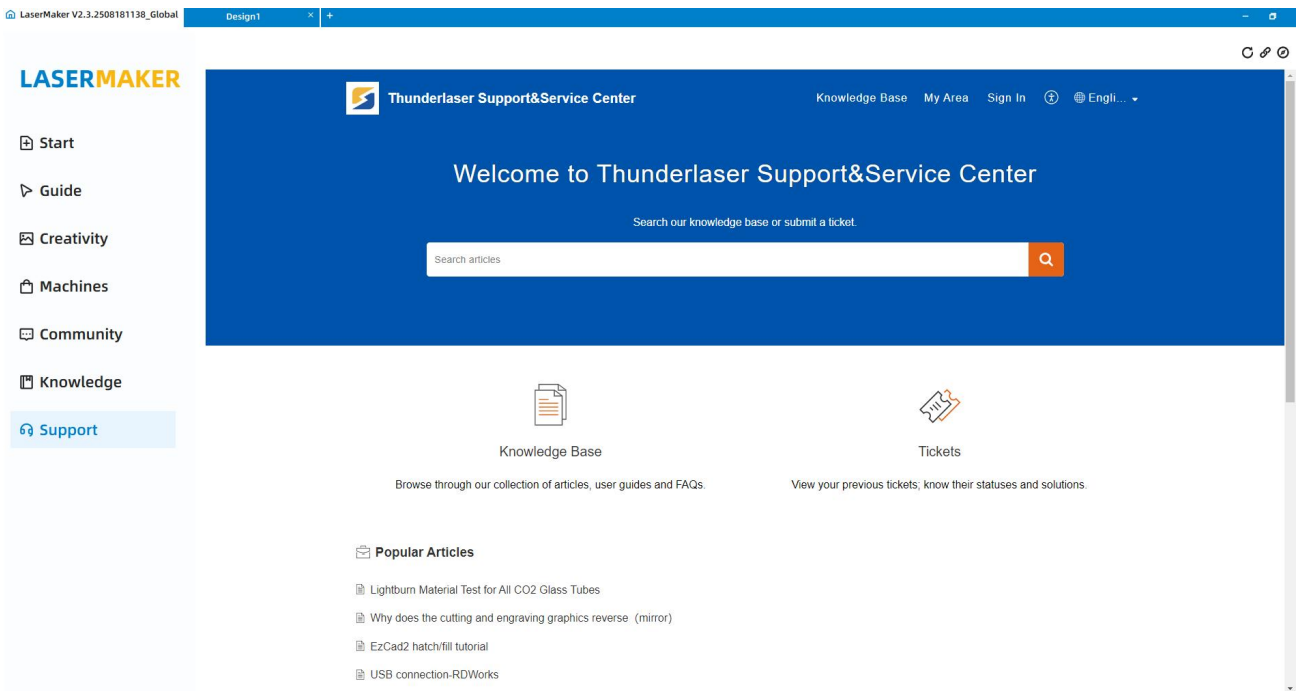
3.2.6 Knowledge

This is the "Knowledge" interface of LaserMaker. It serves as a knowledge base, featuring content like "Laser Engraving Features and Types" to help users understand laser engraving better, including its unique characteristics and different types.

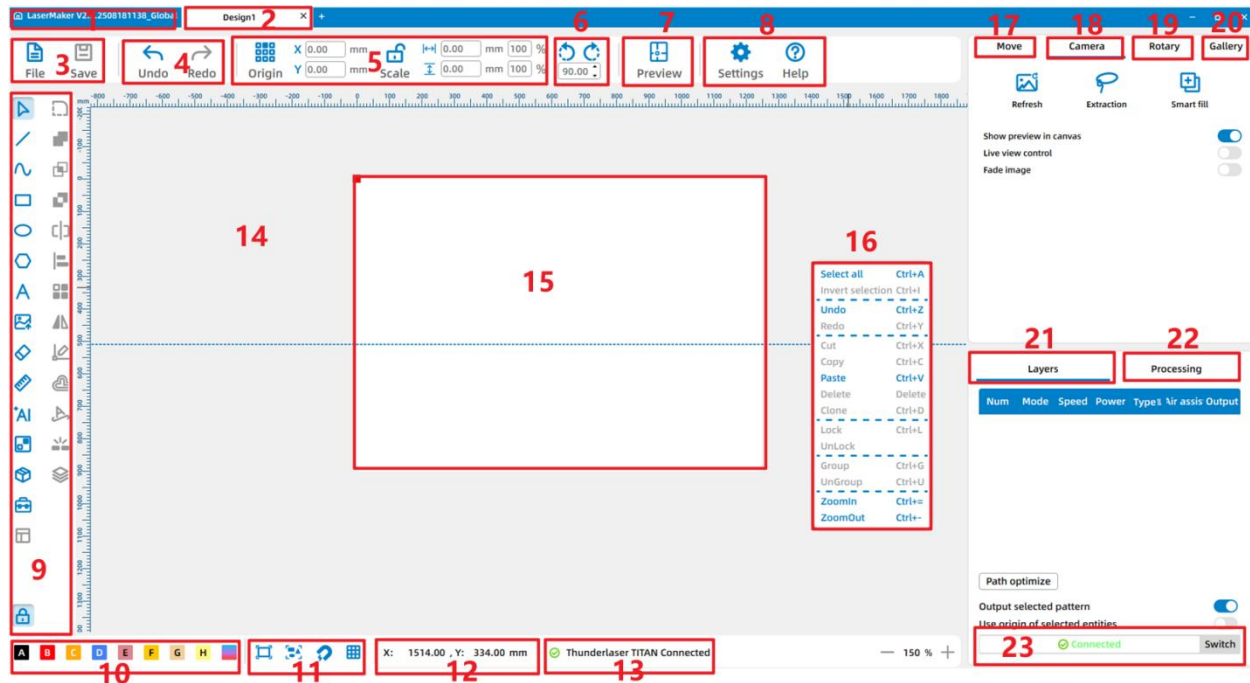


3.2.7 Support

This is the "Support" interface of LaserMaker. It helps users quickly troubleshoot some faults.



3.3 Operation page function distribution



1: Click to switch to the home page and drawing files are not affected.

2: Drawing tab bar. Newly created or opened drawing files will be displayed in the tab bar, with a maximum of 19 drawing files displayed.

3 and 8: System toolbar. Contains "File", "Save", "Settings", and "Help". It mainly carries basic software functions and settings. "Settings" also involves device settings.

4: Undo and Redo toolbar. "Undo" and "Redo" can roll back or reapply the user's changes, and there is no limit to the number of times you can use them in this session. The saved operations will only be reset when you reopen the software.

5 and 6: Element Properties. Contains "Origin Control", "X/Y Coordinates", "Lock", "Width/Height", Scale, and "Rotate" tools, and supports input of arithmetic operations.

7: Preview toolbar. Prior to commencing actual laser processing operations, the processing sequence and approximate outcome of the graphic to be processed are simulated and displayed within the software interface.

9: Basic drawing toolbar. Contains tools for creating basic geometric shapes, lines, text, etc.

10: Layer Toolbar. You can set layers for elements in the canvas. Elements of the same color are in the same layer. You can view the detailed properties of the layer in 17: Layer Parameters.

11: Canvas toolbar. Contains functions for setting canvas view, snapping, and grid.

12: Coordinate display toolbar. Displays X/Y coordinates to show position for precise graphic placement.

13: Device connection status toolbar. Shows if the laser device is connected, vital for processing.

14: Ruler and auxiliary lines. Help users confirm the position of graphics elements, draw graphics elements, etc.

15: Workspace/Canvas. Press and hold the right mouse button and drag the canvas. Use the mouse wheel to resize the canvas view (the actual size of the canvas remains unchanged).

16: Right-click menu bar. Open it by right-clicking the mouse within the workspace to provide more auxiliary functions when drawing elements.

17: Mobile panel. Provides users with the function of controlling the movement of the laser head. Both DSP and GRBL devices can be controlled through the mobile panel.

18: Camera panel. Can be used with the camera on the device.

19: Rotary axis panel. When users need to use the rotary axis when processing circular axis objects, they can use it in conjunction with the functions in the rotary axis panel.

20: Gallery panel. The software has a built-in gallery containing six categories of basic drawing elements, which reduces the drawing difficulty for novice users.

21: Layer parameter panel. Used to set the processing parameters of the element, including processing materials, thickness, process and detailed parameters.

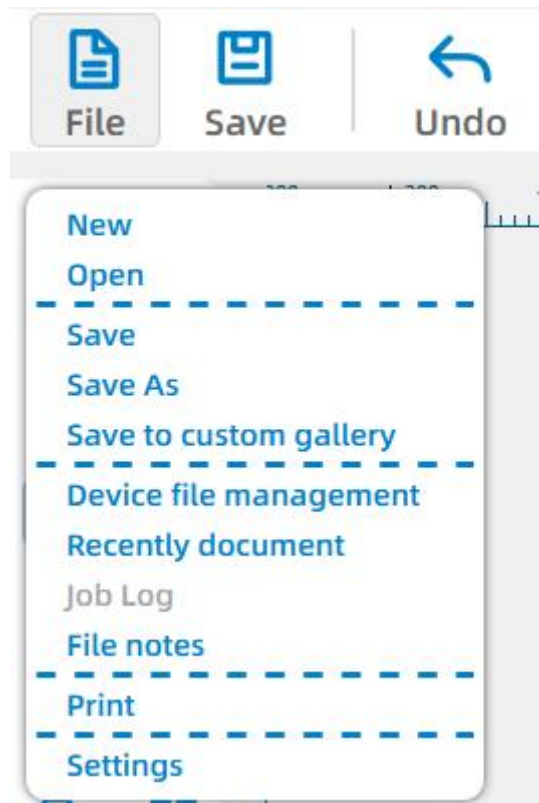
22: Processing panel. Provides users with the functions of positioning the laser head, sending drawing files, and controlling the equipment to start processing. Both DSP and GRBL devices can be controlled through the mobile panel.

23: Device connection bar. Used to create, search, and manage devices. You need to connect to a device to modify device-related settings and use related functions in the software

3.4 Opening and saving files

New

Clicking "New" will add a blank drawing file to the drawing tab bar. The first file name defaults to "Design 1". Each new drawing file will default to "Design X" in sequence. A maximum of nineteen drawing files can be added.



You can also create a new drawing file by clicking the plus icon in the drawing tab bar. These two methods are the same as the "New" function in 3.2.1 above.

The newly created drawing file will be affected by the settings of the last saved drawing file.



Open

The software supports the following file formats: .lcp, .lcp, .ai, .dxf, .plt, .dst, .svg, .pdf, .xlsx, .bmp, .jpg, .png, .jpeg, etc. It can open a maximum of 19 files, and this opening method functions the same as the "Open" function described in 3.2.1.

Save

Save(Ctrl+S)

The drawing file formats that can be saved are: .lcp/.dxf/.tl/.plt.

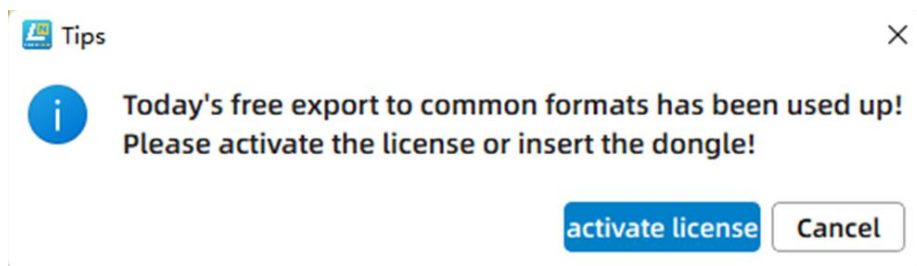
If the drawing file is a local file (that is, a file that has been saved before), the user clicks "Save" to overwrite the existing version with the new changes; if the drawing file has not been saved, the user clicks "Save" and a pop-up window appears, requiring the user to complete the file naming and select the save location.

Save as

The drawing file formats that can be saved are: .lcp/.dxf/.tl/.plt.

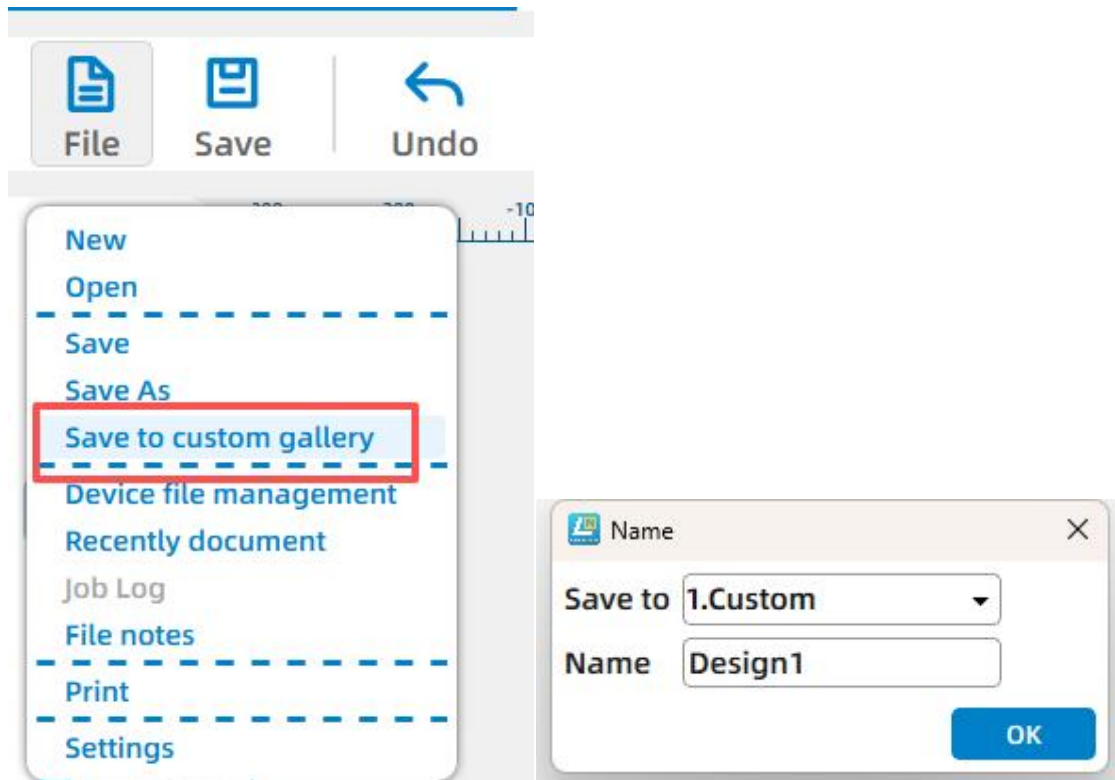
Regardless of whether the drawing file has been saved before, a pop-up window will pop up when the user clicks "Save As", requiring the user to complete the file naming and select the save location.

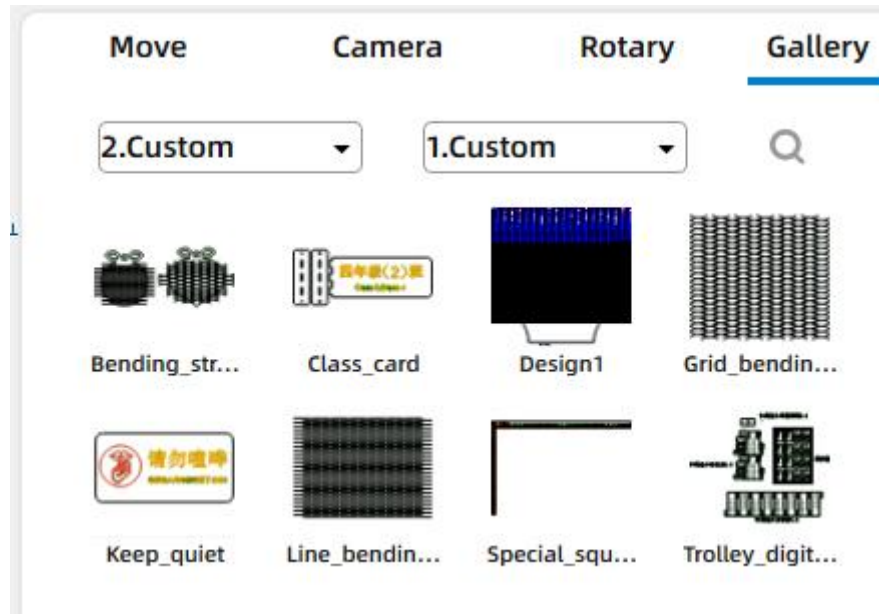
"Save" and "Save As" will be affected by the License: when the License expires, drawing files in common formats can only be exported five times a day. When the free times are used up, a pop-up window will pop up to remind the user.



Save to custom gallery

After clicking, the user needs to select the save location and complete the element name. After "OK", it will be saved to the gallery.





Device file management

After connecting to a laser device (with storage function), the software can read the existing drawing files in the device and arrange them in order from old to new, making it easier for users to view and manage them.

Click "Update" to refresh the current file list to ensure that the latest file status in the device is displayed.

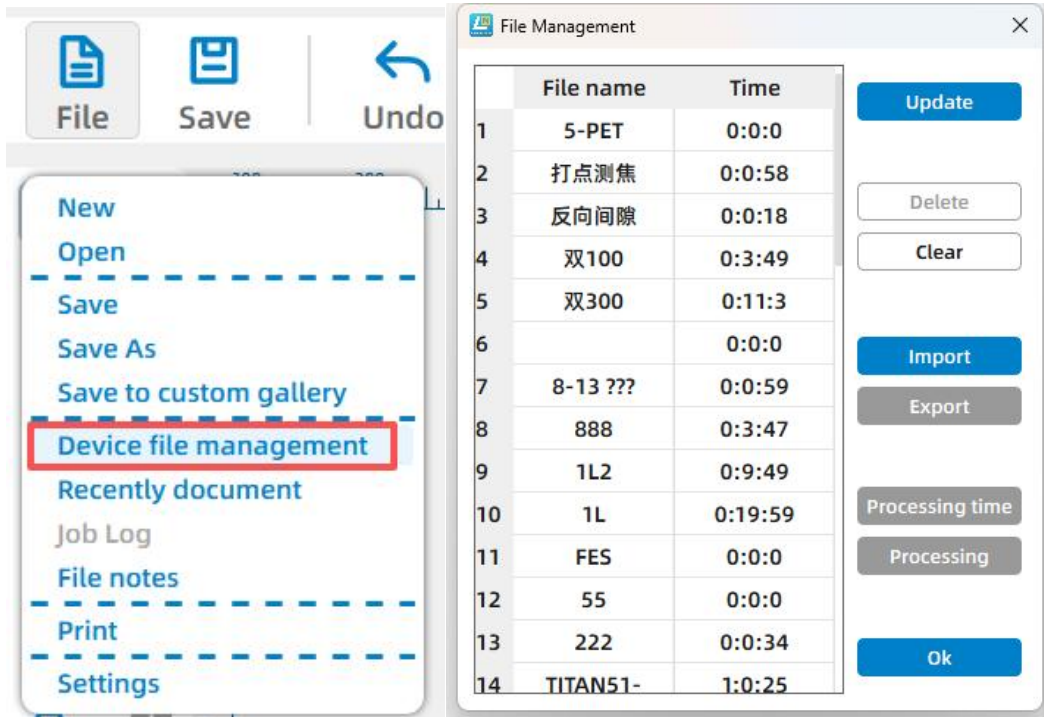
"Delete" is used to remove the selected files; "Clear" can clear the file list at once, please operate with caution.

Click "Import" to bring up a file selection window; this function only supports importing drawing files in the .tl format.

After selecting a file, you can click "Export" to save it locally, and this export function also only supports files in the .tl format.

After selecting the file, click "Processing time" to recalculate the processing time of the drawing; click "Processing" to control the equipment to process the drawing.

After the operation is completed, click "OK" to exit the pop-up window and return to the operation page.



Recently documents

Click "Recently documents" to display a sub-level drop-down bar containing a list of drawing files recently saved by the user. Click a drawing file to open it.

Job log

Used to record and manage drawing files sent from the computer to the laser machine, making it easy for users to trace processing history and repeat calls. The system provides 1GB of local storage space by default.

Users can classify drawing files through the folders on the right, which supports "Create", "Edit", and "Delete" functions to facilitate the structured organization of drawing records.

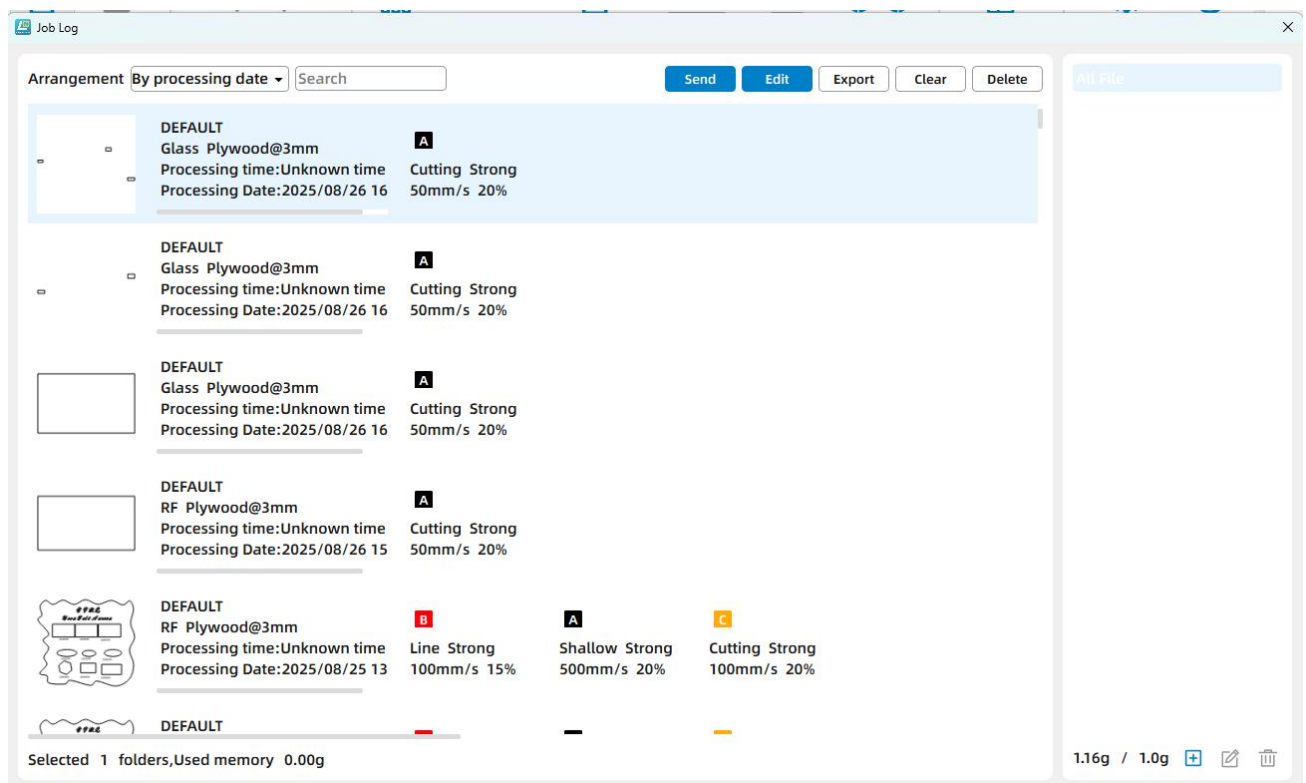
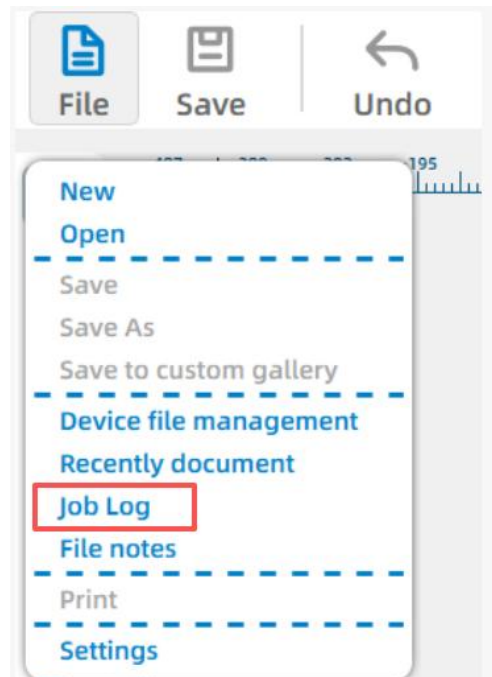
The left side shows detailed information of the drawing, including: drawing name, laser tube type used, processing material, processing parameters, etc. The drawing list can be sorted by processing date (from new to old), by file name, and supports search function.

After selecting the file, click "Send" to send the drawing to the laser device for processing again.

Click "Edit" to exit the pop-up window and enter the operation page, where you can modify the drawing content and parameters.

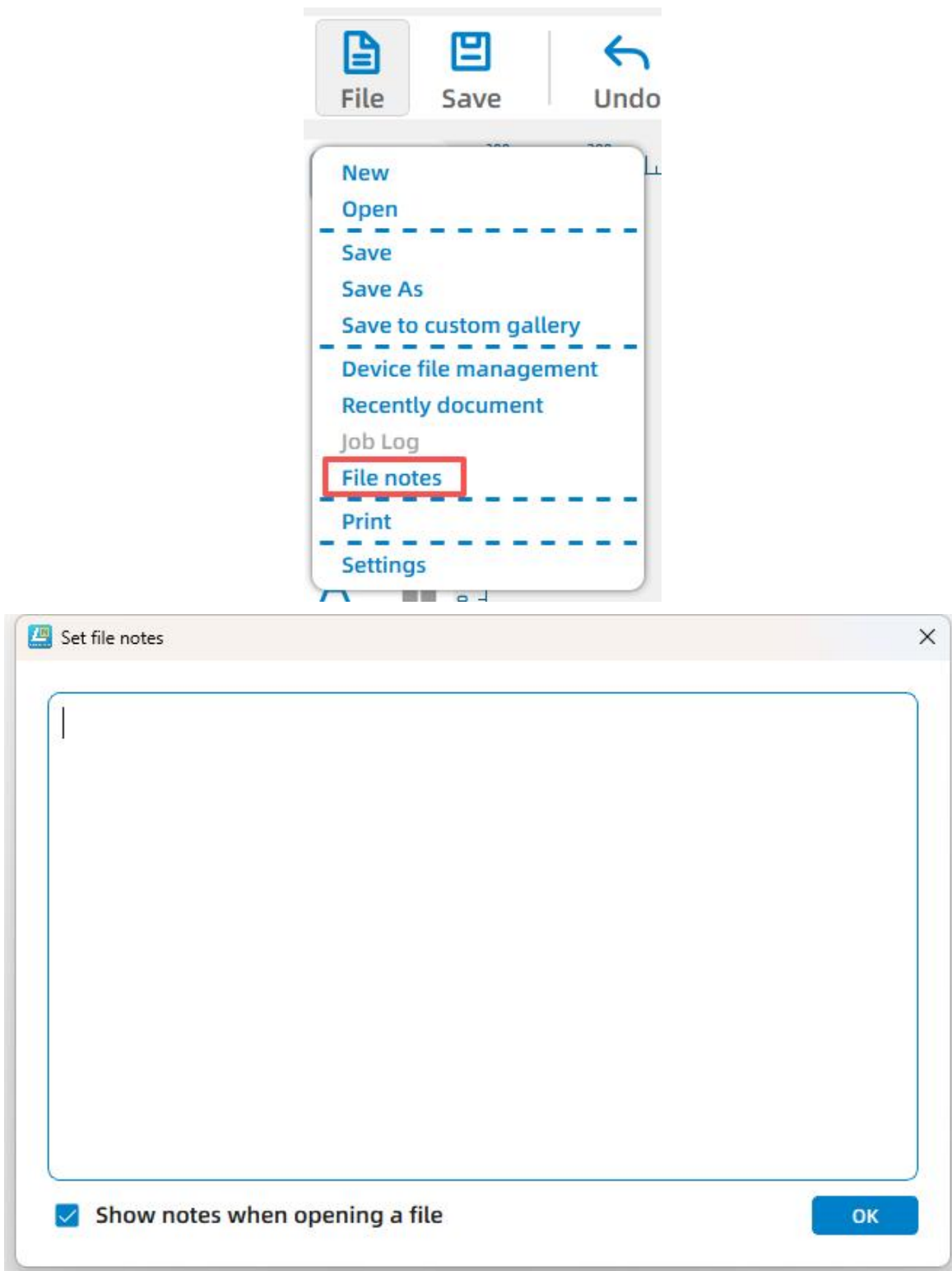
Click "Export" and a file pop-up window will pop up to select the save file location. Only .csv format files are supported for export.

"Delete" is used to remove the selected files; "Clear" can clear the file list at once, please operate with caution.



File Notes

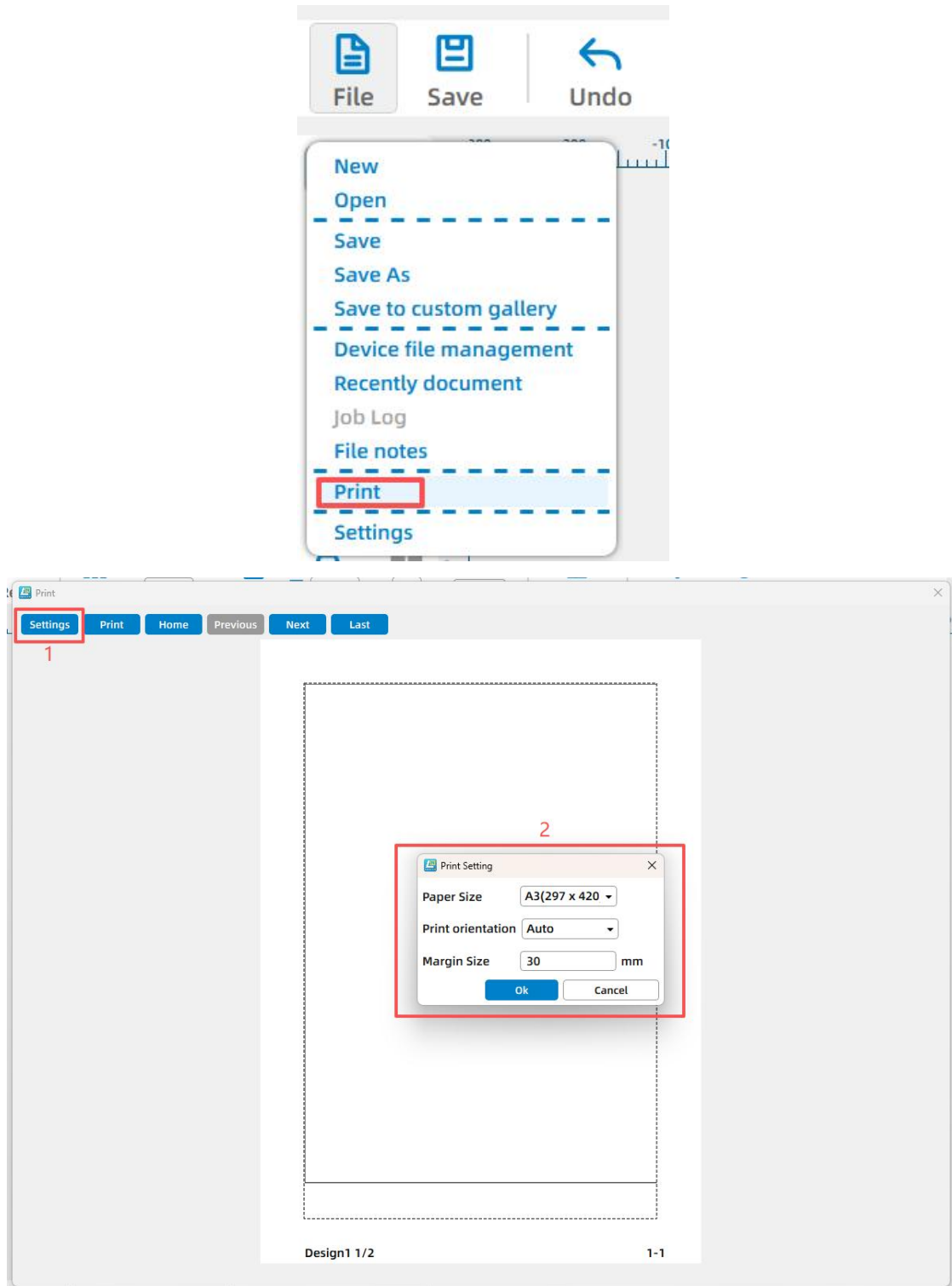
Users can add notes in the Notes pop-up window to share drawings with others or store important information. After entering the content, enable "Set file notes" to display the notes in the Notes pop-up window every time the user opens the drawing file.



Print

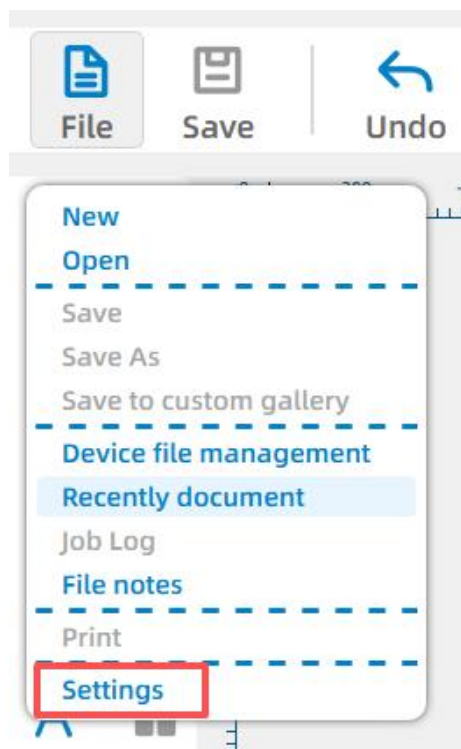
Click "Print" to start printing. The drawing will be divided into several equal parts according to the actual size and printed. The elements and spacing in the drawing will be printed at a 1:1 ratio. The number of pages will be displayed at the bottom of the preview. "Home", "Previous", "Next", and "Last" are used to switch the print preview.

Click "Settings" to modify the paper size, print orientation, and margin size parameters. Available paper sizes are: A3/4/5, B4/5.



Settings

Click "Settings" to open the software settings window. Users can adjust software and device parameters through this window. For detailed instructions, please refer to 3.1 Basic Software Settings and Chapter 5 Device Parameter Settings.



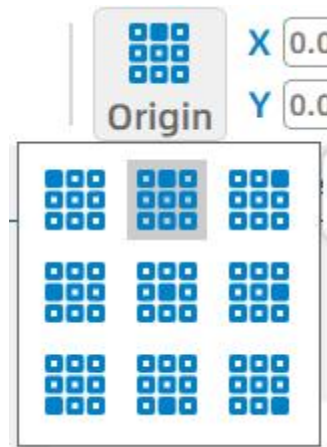
3.5 Basic drawing functions

3.5.1 Element Properties Bar



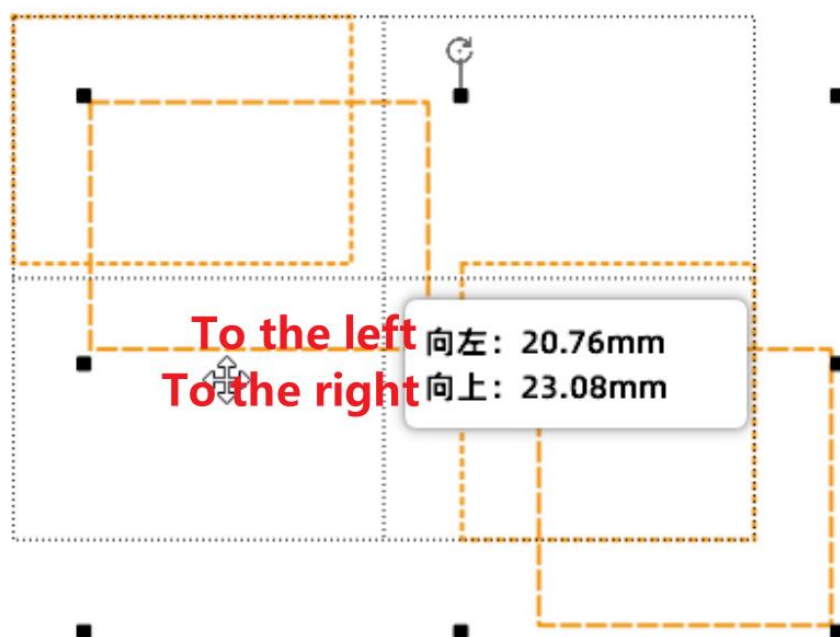
Origin

Used to set the reference point when scaling or rotating the element. The reference point can be selected from the eight anchor points or the center point of the circumscribed rectangle.



X/Y Location

The X/Y coordinates are canvas coordinates, with the canvas zero point at (0, 0). This means that the coordinates within the canvas are positive values. These are used to display or adjust the X/Y position of a primitive. The origin position affects the X/Y coordinate values. Arithmetic operations can be entered in the input box.



You can also drag the element on the canvas by holding down the left mouse button. The direction and distance of the movement will be displayed as you drag. This method is only suitable for rough movement.

Proportional

Click the "Proportional" icon to switch the status.

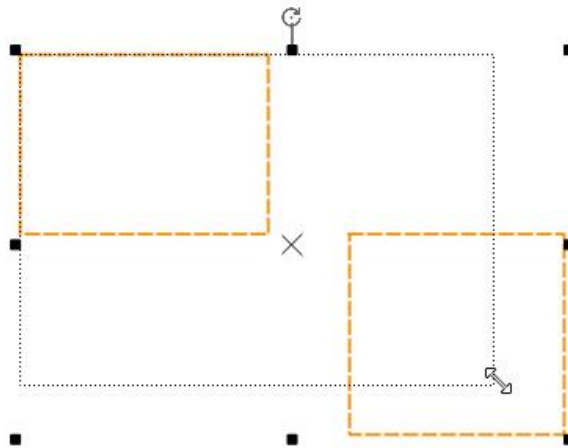
- When in the locked state, the aspect ratio of the element remains unchanged. Whether you drag the circumscribed rectangle anchor point with the mouse or modify the value in the input box, the ratio of the element's width to height remains unchanged;



- When in unlocked state, the width and height of the element will change independently.



You can also resize the element using the anchor points of the bounding rectangle, preserving its aspect ratio. This method is only useful for rough resizing.



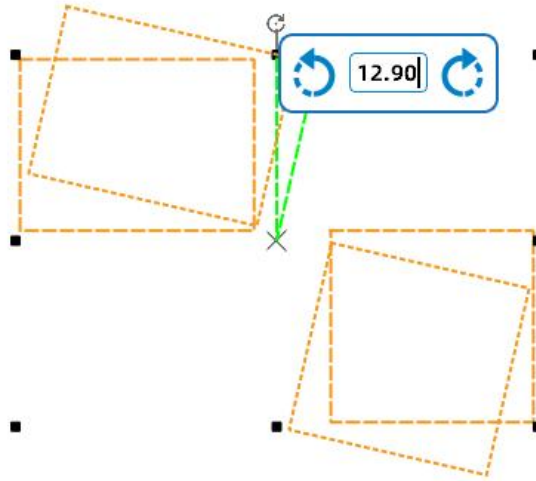
Width/Height/Percentage

After selecting an element, its width and height are displayed in the input box. Users can modify the size of any dimension in the input box, or change the size of any dimension by percentage. The width and height input boxes allow you to enter arithmetic expressions.

Rotation

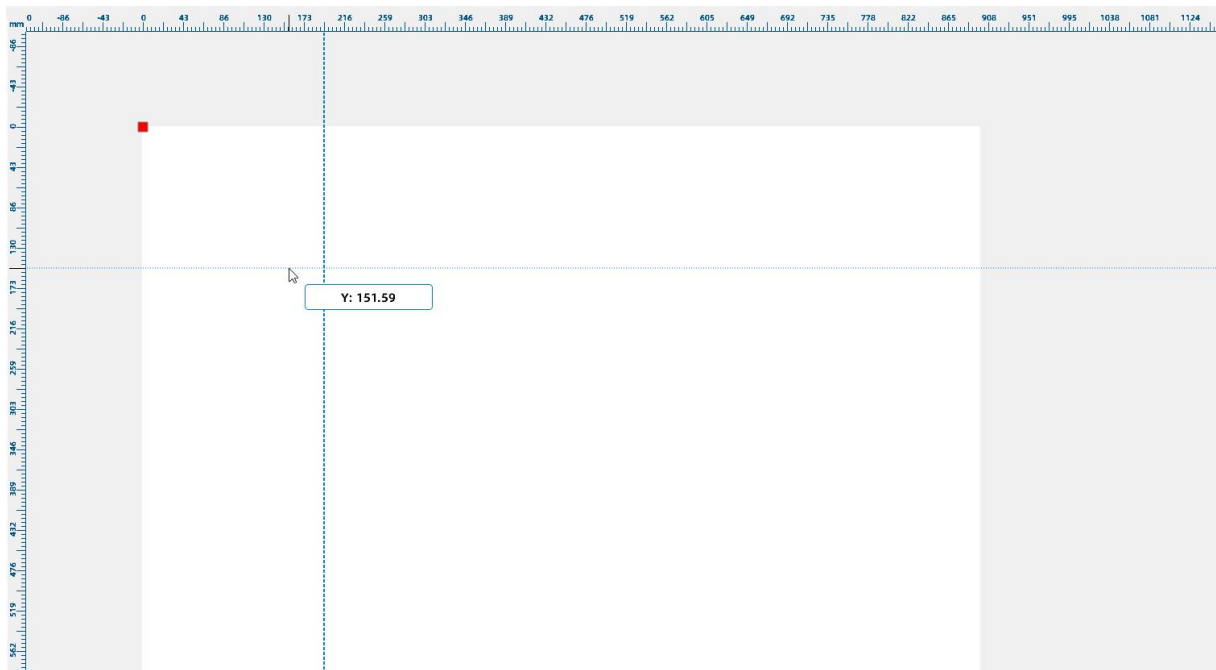
Entering a value in the Rotation input box will rotate the element to a precise angle. Positive values rotate clockwise, and negative values rotate counterclockwise. The origin position will affect the rotation result.

You can also long-press and drag the rotation icon of the bounding rectangle to adjust the rotation angle of the element. This method can only be used for rough adjustments.



3.5.2 Rulers and Auxiliary Lines

Rulers are used to help determine the size and position of elements. Hold down the left mouse button and drag to draw horizontal or vertical guide lines. Once the guide line is positioned appropriately, release the mouse button. Guide lines can be used to help align, position, or divide elements, improving the accuracy and efficiency of drawing and editing.



3.5.3 Select

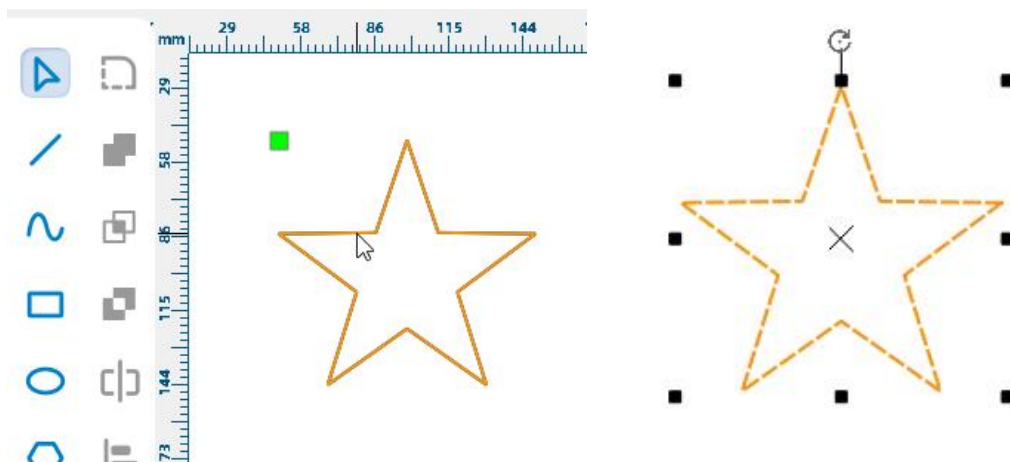


Click Select Method

After clicking the selection tool, move the cursor to the edge of the element and click the left mouse button to select a single element. The selected element will be highlighted and a "x" control point, and "■" control points appear around it.

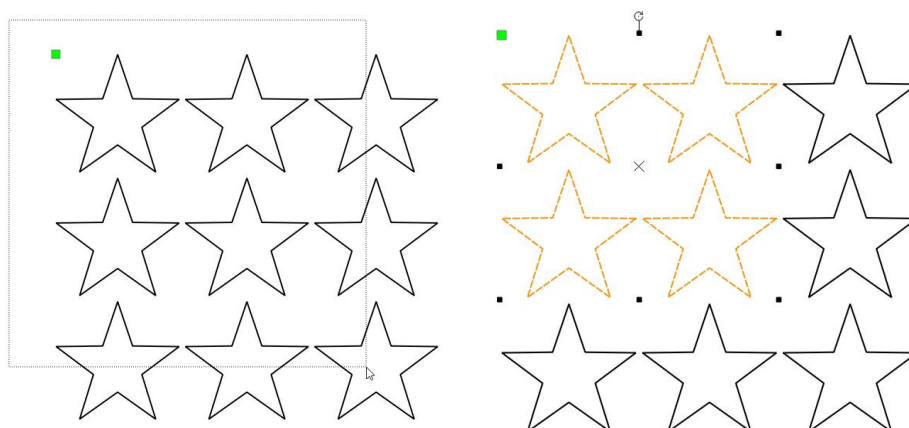
Press and hold "Ctrl" key to continue selecting other elements to achieve the function of selecting multiple elements at the same time.

Use the shortcut keys "Ctrl+A" can select all the elements in the canvas.

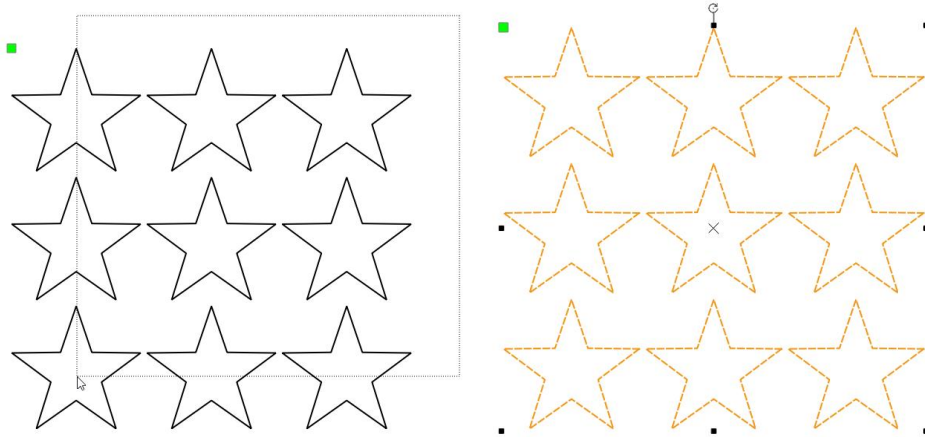


Frame selection method

Press and hold the left button of the mouse and drag from left to right. A black selection box will be created during the dragging process. Release the left button to select all the elements completely contained in the black selection box.

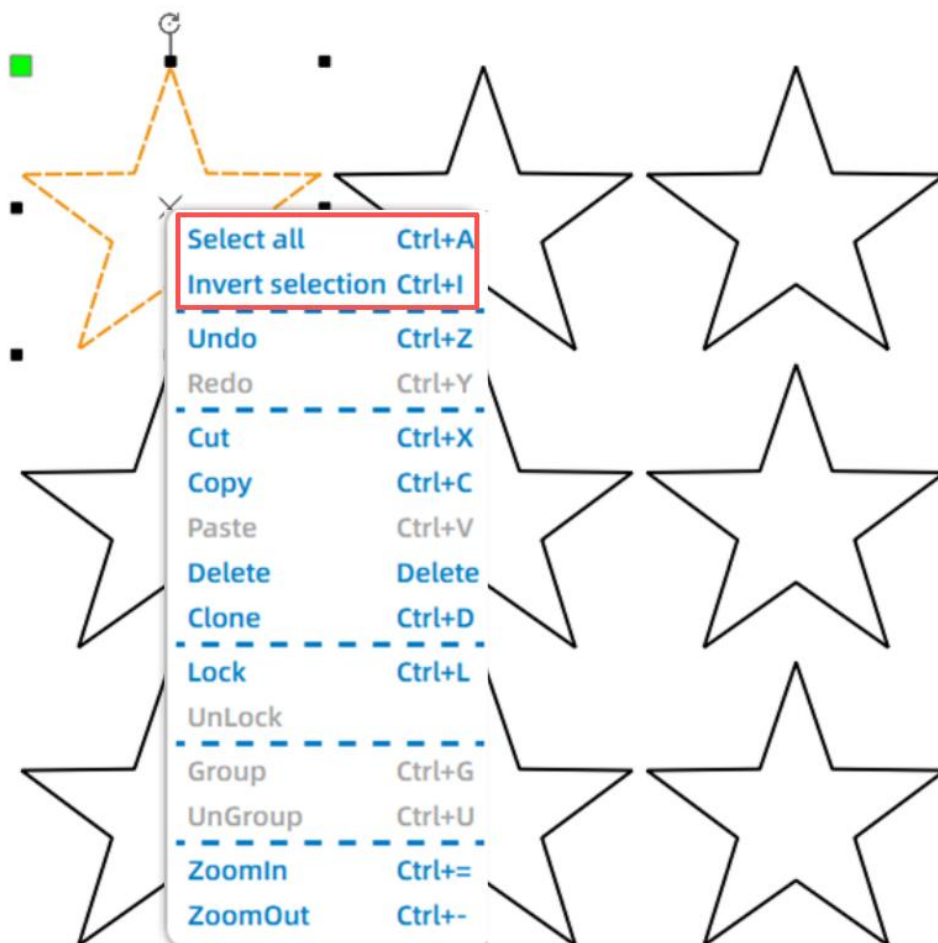


Press and hold the left button of the mouse and drag from right to left. A black selection box will be created during the dragging process. As long as part of the element intersects with the black selection box, it will be selected when you release the left button.



Right-click selection

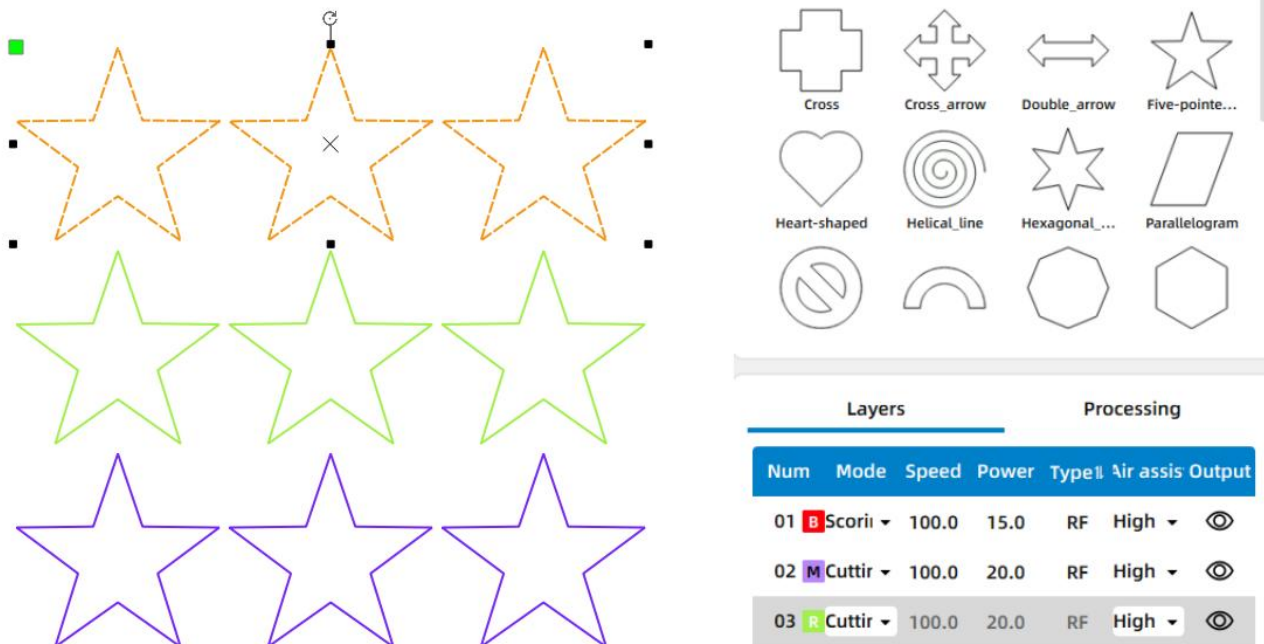
Right-click a blank area of the canvas to bring up a shortcut menu. Click "Select all" to select all elements on the canvas at once. After selecting any element, right-click and click "Invert selection" in the pop-up menu to deselect all currently unselected elements, enabling quick switching.



By layer selection

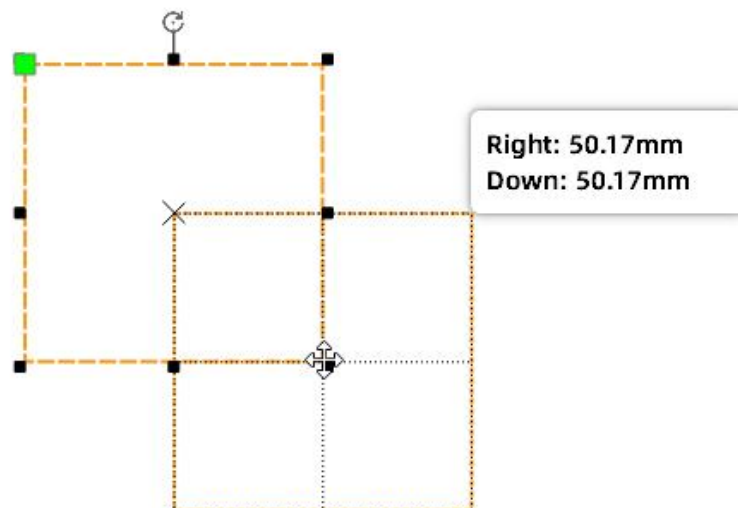
Right-click the mouse on the corresponding layer to select all the elements under that layer.

Elements in hidden layers cannot be selected using the above methods.

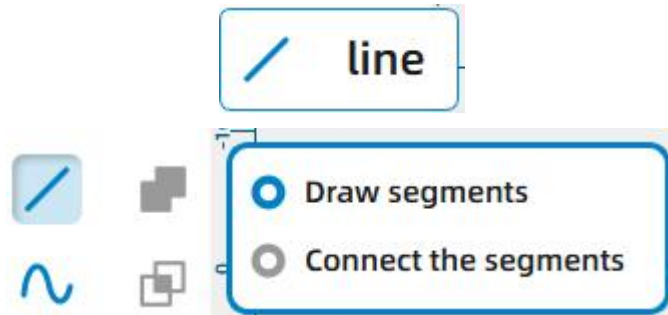


Select and move the element

When an element is selected, long press the left button of the mouse to move the element. The moving direction and distance will be displayed during the process.

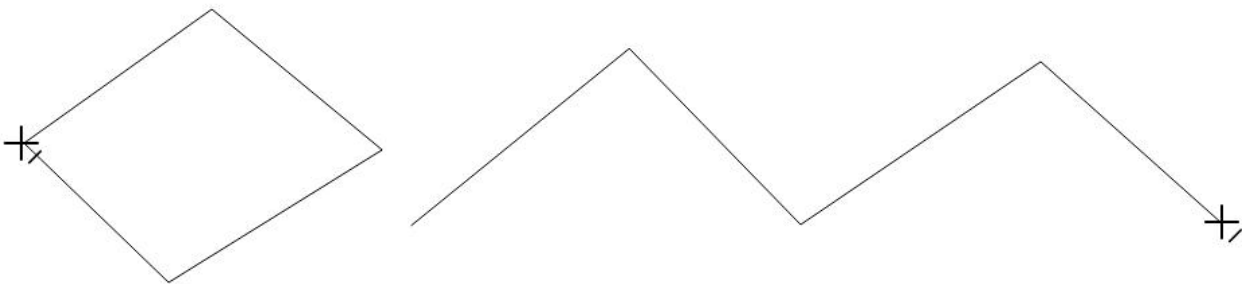


3.5.4 Line

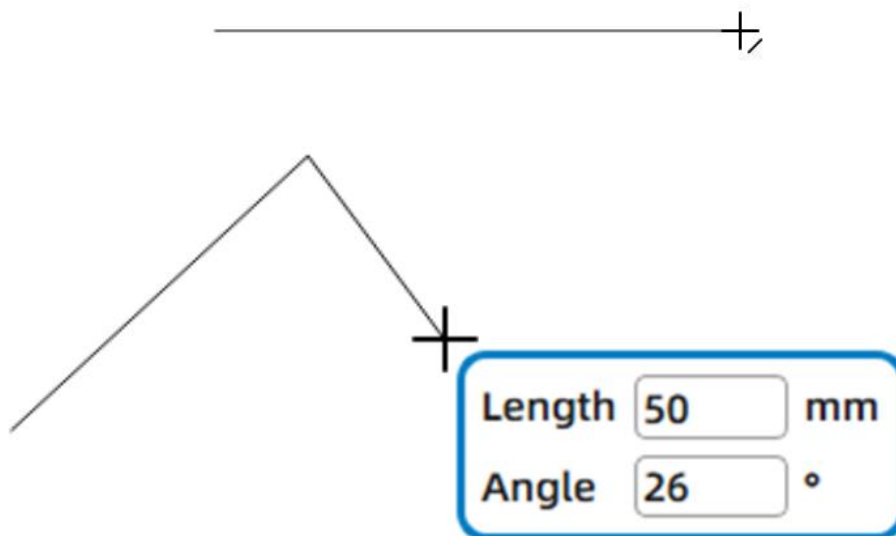


Draw a line segment

Click "Draw segment" to draw a line segment or multiple polylines on the canvas using the "left button" of the mouse until the user returns to the starting point and clicks again to form a closed element, or clicks the "right button" of the mouse anywhere to end the drawing. Press "Esc" key will exit the Line Tool and return to the Selection Tool.

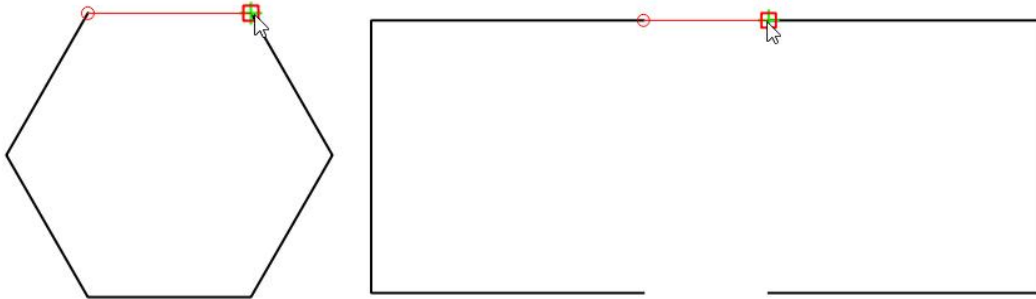


Press and hold "Ctrl" key to draw a horizontal or vertical line segment; during the drawing process, press "Tab" key to draw a line segment of a specified length and angle at a node.



Connect line segments

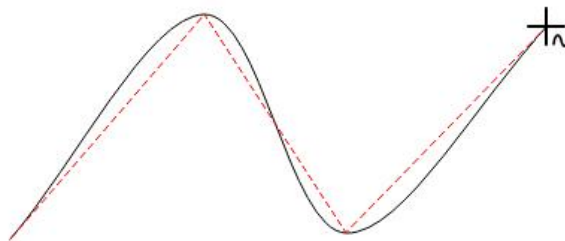
Used to connect open entities. Clicking the start or end point of an open entity with the left mouse button will turn it into a closed entity. Clicking the start or end point of two open entities will automatically connect them into one entity.



3.5.5 Curve



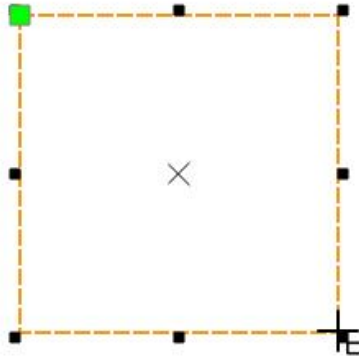
Use the left mouse button to draw the curve control points, and change the curve curvature by determining the position of the control points; use the right mouse button to end the drawing.



3.5.6 Rectangle



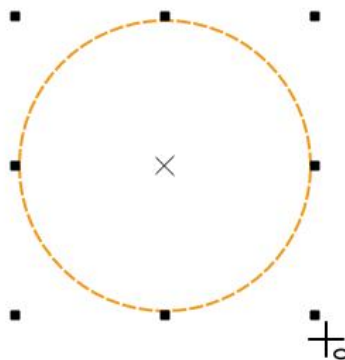
Long press the left mouse button and drag in a direction to draw a rectangle; hold down the "Ctrl" key to draw a square. Press the right mouse button or the "Esc" key to exit the rectangle tool.



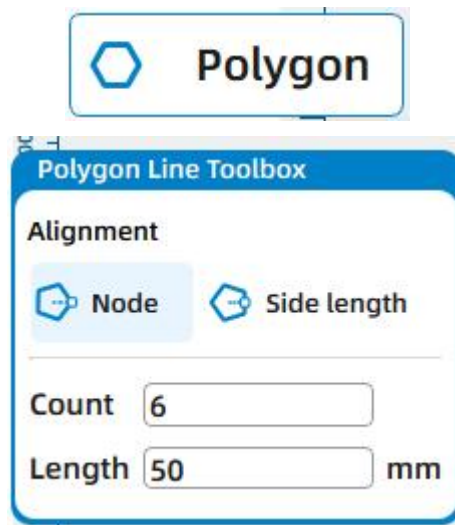
3.5.7 Circle



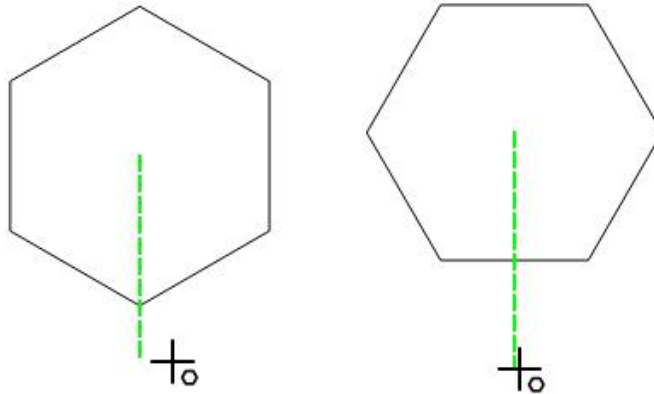
Long press the left mouse button and drag in a direction to draw an ellipse; hold down the "Ctrl" key to draw a perfect circle. Press the right mouse button or the "Esc" key to exit the circle tool.



3.5.8 Polygon



Long press the left mouse button and drag in a direction to draw a regular polygon. Set the alignment, side length, and number of sides in the polygon toolbox. When "Node" mode is selected for alignment, a node of the primitive will align with the mouse and rotate as the mouse moves; when "Side Length" mode is selected, a side of the primitive will align with the mouse and rotate as the mouse moves. Hold down the "Ctrl" key to keep the drawn polygon in a horizontal or vertical position. Press the right mouse button or the "Esc" key to exit the polygon tool.

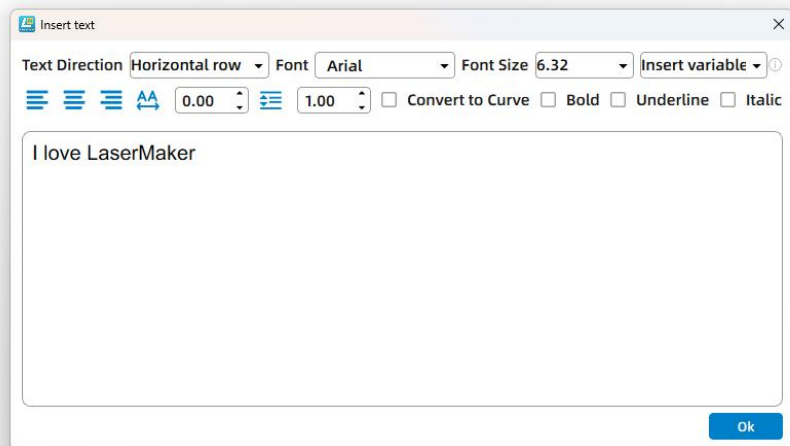


3.5.9 Text



After selecting the "Text" tool, you can create text by clicking anywhere on the canvas with the left button of your mouse. You can set the text direction, font, font size, alignment, character spacing, line spacing, and typeface.

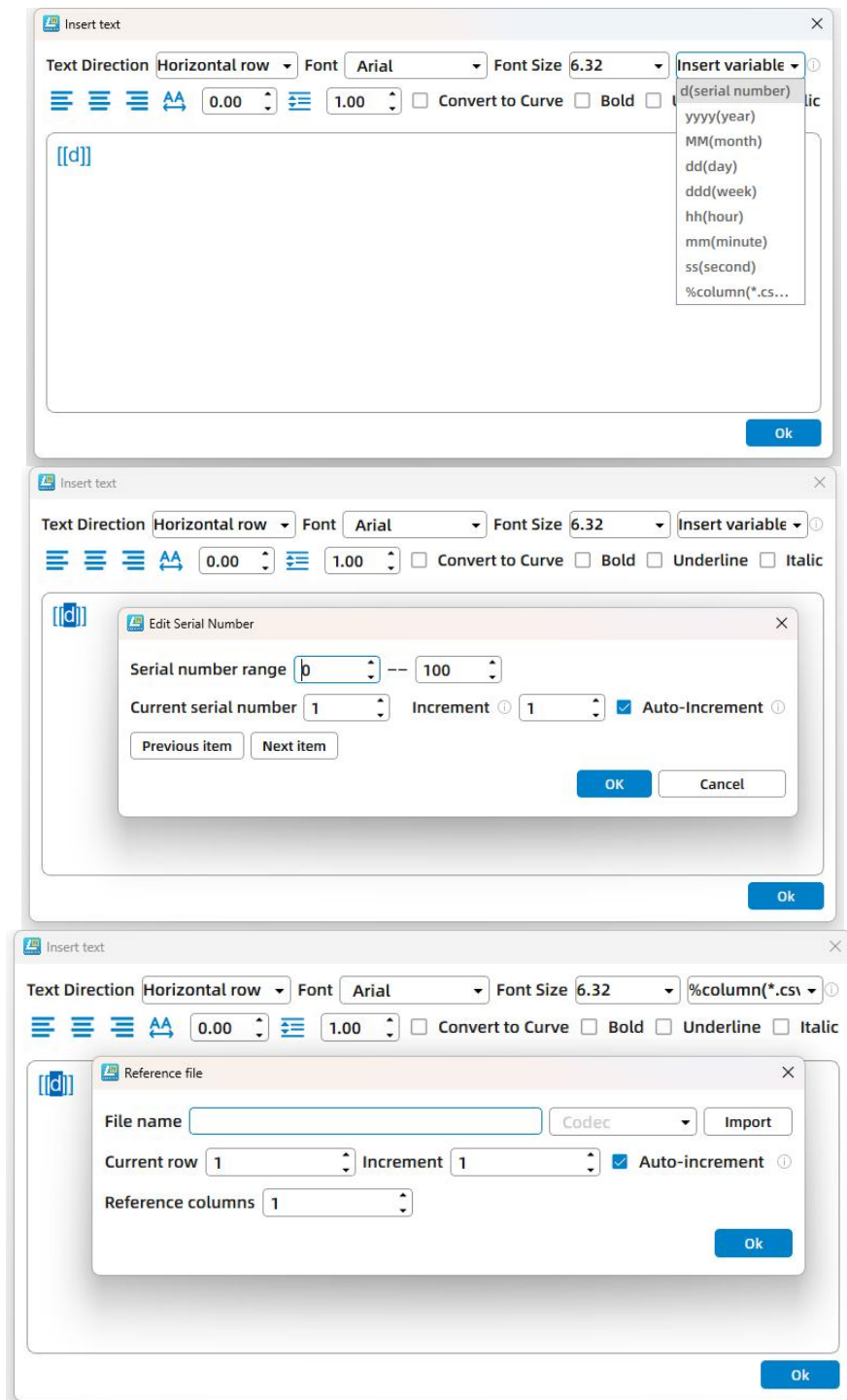
I love LaserMaker



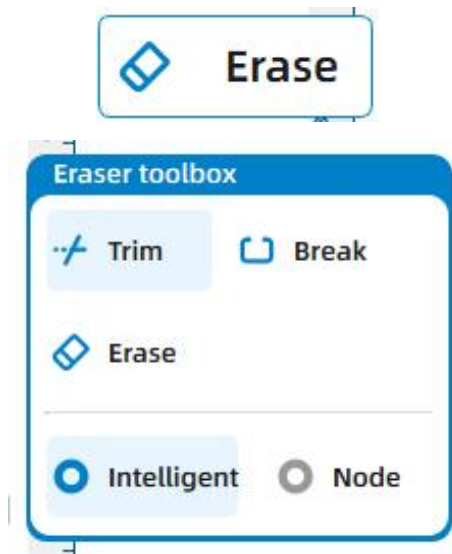
After creating text, you can re-enter edit mode to modify the text either by double-clicking it with the left mouse button or by selecting the "Text" tool and then clicking the text. If "Convert to Curve" is checked during creation, the text will be converted to a path and you will no longer be able to enter edit mode.

"Insert Variable" allows users to select and add desired variables to the text.

- Insert serial number: Double-click [[d]] in the input box to edit the serial number, and set rules such as serial number range, starting number, and increment value.
- Insert column data: The software supports inserting .csv/.txt files and directly referencing data from the files. After importing the variable file, the software will automatically select the file's encoding method, and users can also change it manually.

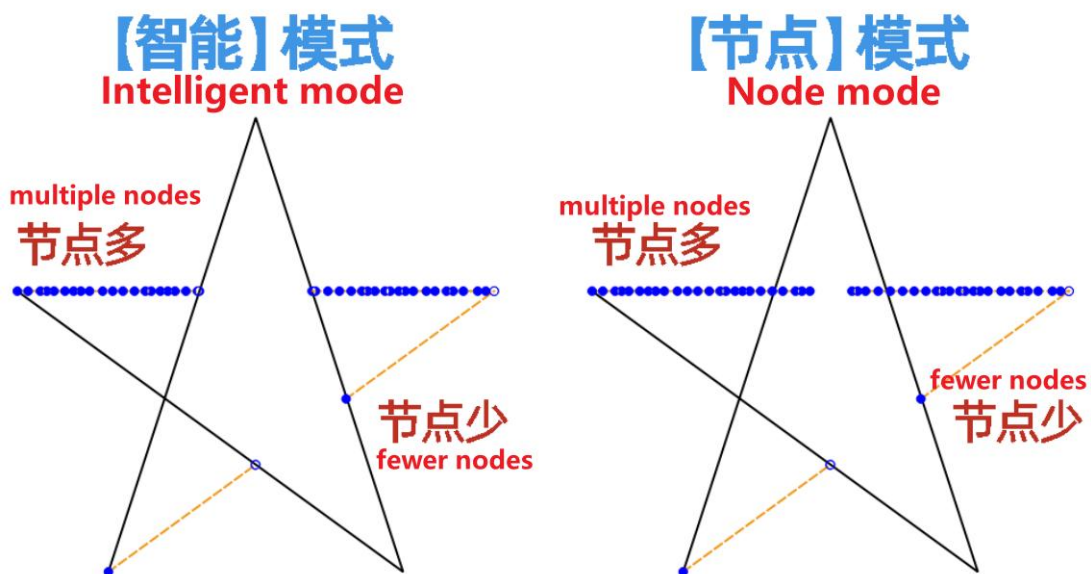


3.5.10 Erase



Trim

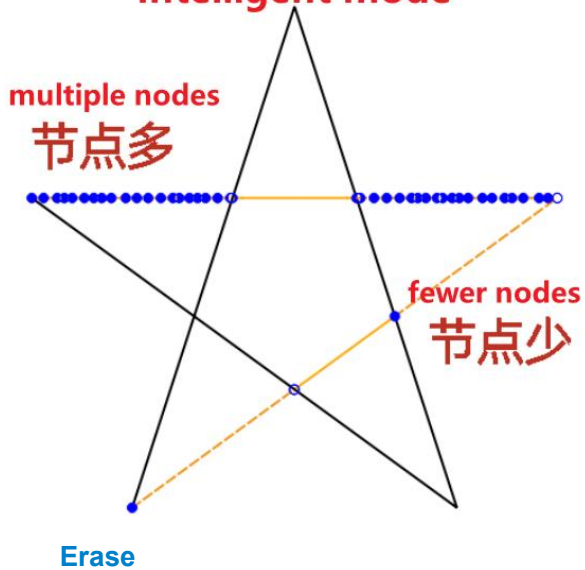
Left click the line segment to be trimmed with the mouse, and the trimmed part will be deleted automatically. When the "Intelligent" mode is selected, line segments with many nodes are trimmed according to intersection points, and line segments with few nodes are trimmed according to nodes. When the "Node" mode is selected, all line segments are trimmed according to nodes regardless of the number of nodes.



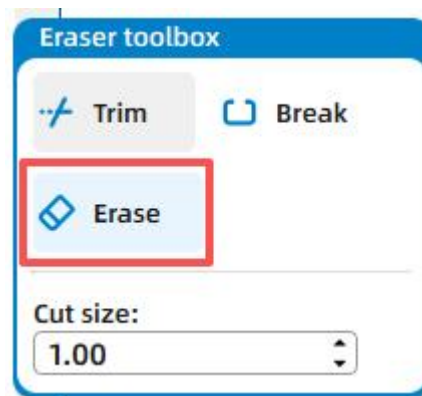
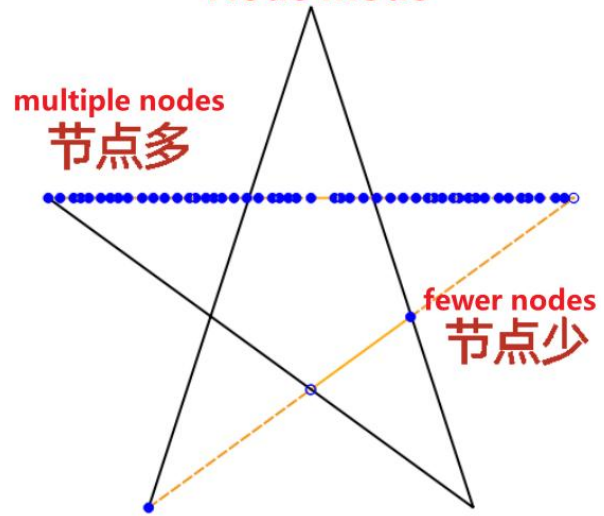
Break

Left click the line segment to be broken with the mouse, and the broken part will not be deleted. When the "Intelligent" mode is selected, line segments with many nodes are broken according to intersection points, and line segments with few nodes are broken according to nodes. When the "Node" mode is selected, all line segments are broken according to nodes regardless of the number of nodes.

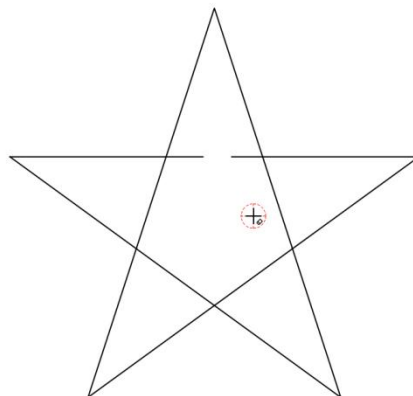
【智能】模式 Intelligent mode



【节点】模式 Node mode



After setting the erase size, click the left button of the mouse on the part of the line segment that needs to be erased.



3.5.11 Canvas Tools



Full view canvas

Click "Full view canvas" to zoom the window to display the entire canvas area.

Full view pattern

Click "Full view pattern" to zoom the window to display all element areas (including elements outside the canvas).

Adsorption tool

With the "Adsorption tool" enabled, you can automatically align or move closer to key points or lines (such as endpoints, midpoints, grid points, and intersections) of existing entities while drawing or editing them, avoiding errors caused by manual alignment. This feature is the same as the auto adsorption feature in Settings, and is turned on and off simultaneously.

Grid tool

After turning on the "Grid tool", a grid appears on the canvas, providing a visual guide for drawing or editing elements. You can set the grid size in the drawing Settings under Settings.

3.5.12 Right-click menu

Select all	Ctrl+A
Invert selection	Ctrl+I
Undo	Ctrl+Z
Redo	Ctrl+Y
Cut	Ctrl+X
Copy	Ctrl+C
Paste	Ctrl+V
Delete	Delete
Clone	Ctrl+D
Lock	Ctrl+L
UnLock	
Group	Ctrl+G
UnGroup	Ctrl+U
ZoomIn	Ctrl+=
ZoomOut	Ctrl+-

Select all (Ctrl+A)/Invert selection (Ctrl+I)

Click "Select all" to select all elements in the canvas (including locked elements).

After selecting one or more elements, right-click the mouse and select "Invert selection" from the menu. The software will automatically select the elements in the canvas that were originally unselected (including locked elements) and deselect the currently selected elements.

Undo (Ctrl+Z)/Redo (Ctrl+Y)

It has the same function as the "Undo" and "Redo" toolbars at the top of the software. "Undo" and "Redo" can revert or reapply users' changes, and there is no limit to the number of times within this opening. Only when the software is reopened will the operations stored by "Undo" and "Redo" be reset.

Cut (Ctrl+X)/Copy (Ctrl+C)/Paste (Ctrl+V)/Delete (Ctrl+D)

Clicking "Cut" will save a copy of the selected element in the clipboard and delete the element from the canvas.

Clicking "Copy" will save a copy of the selected element in the clipboard, but will not delete the element from the canvas.

Clicking "Paste" will paste the element you cut or copied to the clipboard into the canvas. This operation can be repeated or across files.

Click "Delete" to implement the copy and paste operation in one step, but it cannot be performed across files.

Lock (Ctrl+L)/Unlock

After the element is locked, it cannot be moved, scaled, rotated, etc. to prevent accidental operations; unlocking it will restore it to normal state.

Group (Ctrl+G)/UnGroup (Ctrl+U)

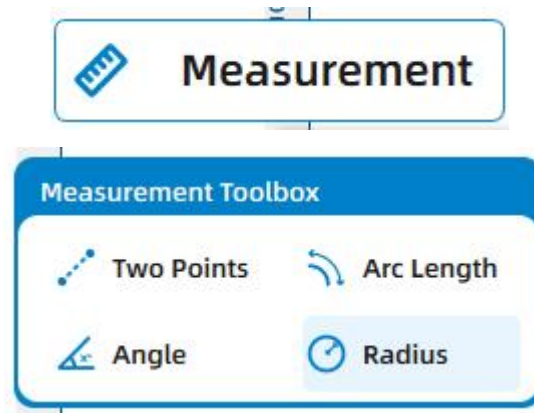
After "Group", the selected elements will be grouped together, which is convenient to keep the relative position and size when moving; after "Ungroup", individual elements will be restored, and their properties can be adjusted separately.

ZoomIn (Ctrl+ =)/ZoomOut (Ctrl+ -)

"ZoomIn" and "ZoomOut" are used to adjust the canvas view, and the actual canvas size remains unchanged. In addition, you can also adjust the canvas view through the mouse wheel, canvas tools such as "Overview Canvas" and "Overview Pattern".

3.6 Advanced Editing Functions

3.6.1 Measurement



Two points

Click any two points with the left mouse button to measure the distance between them.

Arc length

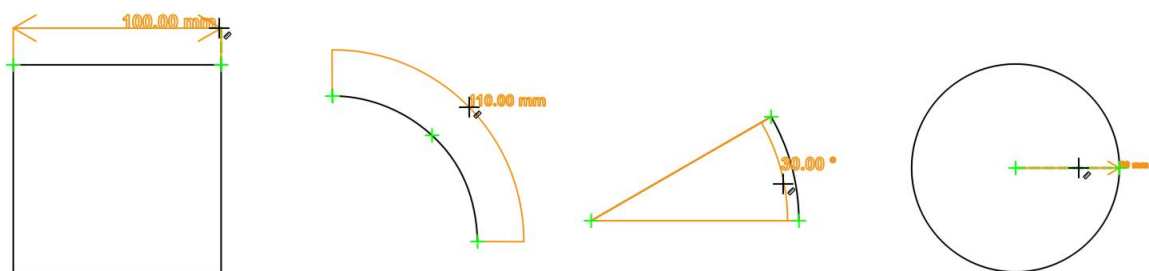
Use the left mouse button to click the starting point, end point, and midpoint in order to measure the arc length.

Angle

Use the left mouse button to click in the order of edge point-vertex-edge point to measure the angle.

Radius

Click the center of the circle with the left mouse button and then click any point on the arc to measure the radius.



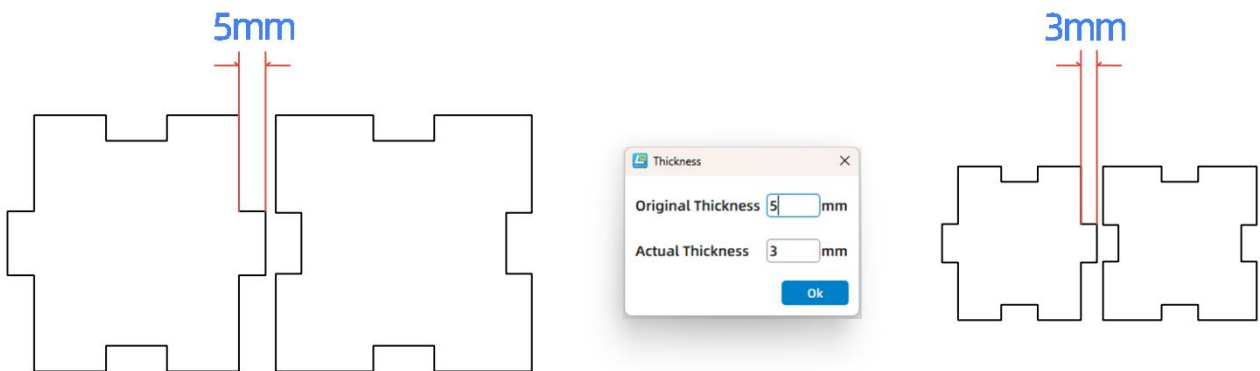
3.6.2 Thickness



When the design dimensions of the drawing are inconsistent with the actual thickness of the processed material, users can use the "Thickness" tool to automatically adjust the drawing to ensure smooth assembly after processing.

In the "Thickness" pop-up window, enter:

- Original drawing thickness: the design thickness of the current drawing;
- Actual Thickness: The true thickness of the material used.



The Thickness feature is particularly useful for drawing models with interlocking structures (such as snaps and mortise and tenon joints). The system automatically adjusts the dimensions of the relevant slots in the drawing based on the input data to ensure that the slots match the material thickness, avoiding assembly failures due to dimensional deviations.

It is recommended to use the "Thickness" tool to check the plug structure before processing.

3.6.3 Smart Layout



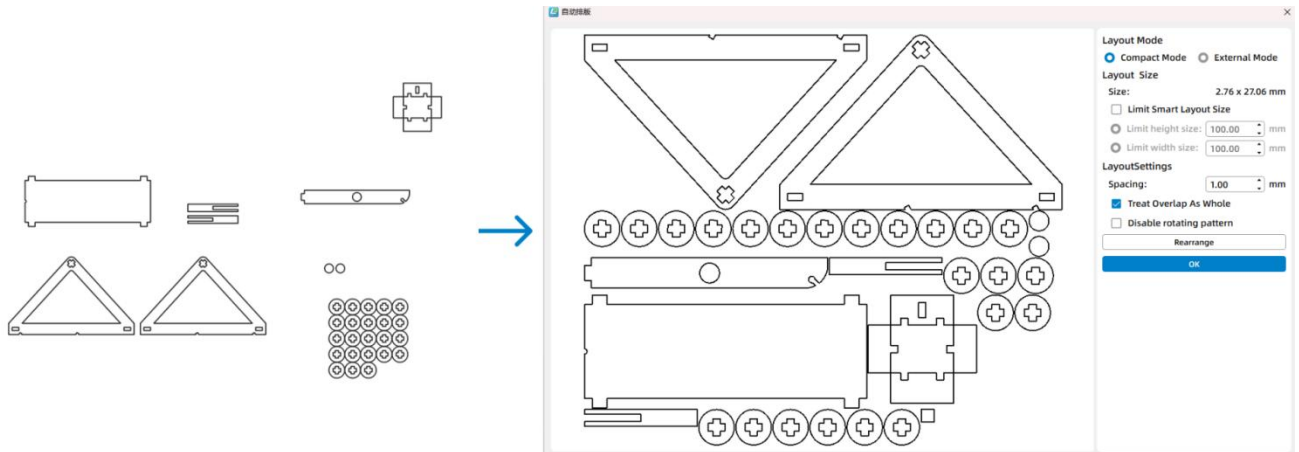
After the user completes the drawing design, the elements may be distributed all over the canvas. If they are processed directly, it will lead to material waste. The "Smart Layout" tool can be used to intelligently rearrange the elements, effectively reducing the occupied area and improving material utilization.

Users can set the following options in the layout pop-up window:

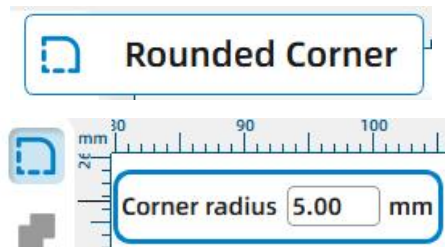
- Limit smart layout size: After enabling, you can limit the width or height to adapt to specific material sizes;
- Set pattern spacing: specify the minimum distance between graphics elements to avoid processing overlap;

- Layout mode: Check "Treat overlap as whole", and the software will maintain the combination relationship of the elements. Check "Disable rotating pattern", and the elements will maintain their original orientation when participating in the layout;
- Click "Rearrange" to refresh the layout results;
- Click "OK" to apply the layout result, and the elements will be arranged in the preview layout on the canvas.

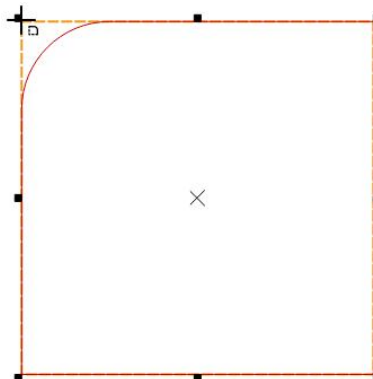
It is recommended to use the "Auto Layout" tool before processing to ensure reasonable layout and save materials to the greatest extent.



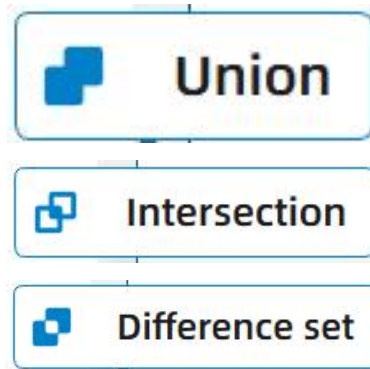
3.6.4 Rounded Corner



The "Rounded Corner" tool can turn sharp corners into rounded corners. After setting the "Corner radius", move it to the sharp corner position of the primitive. Ensure that the lines forming the sharp corner can accommodate the size of the rounded corner. If a red preview line appears, it indicates that this place can be turned into a rounded corner, and then click.



3.6.5 Boolean Operations



Union tool (Alt+ +)

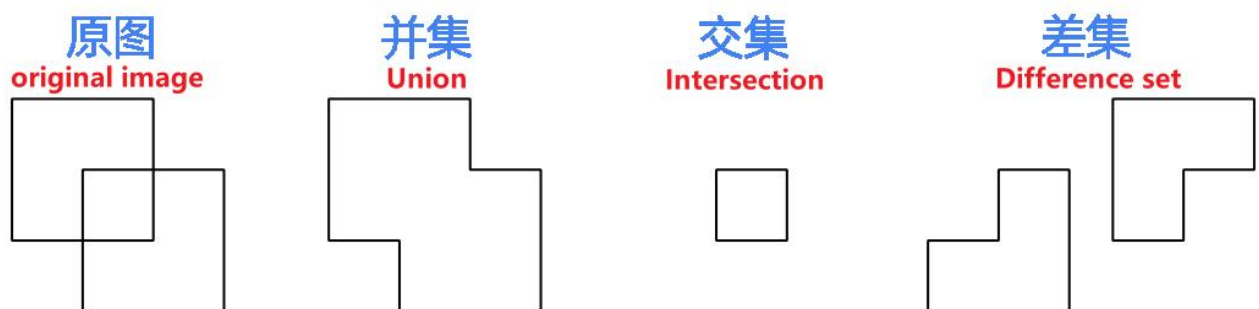
Select two or more overlapping elements and click "Union" to merge them into a single complex element. It is only applicable to individual vector elements. If the elements selected by the user include grouped vector elements, images, or text, the "Union" tool is unavailable.

Intersection tool (Alt+ *)

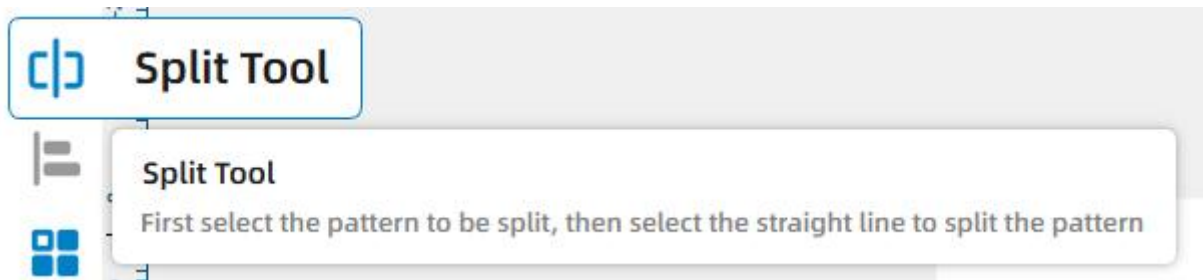
Select two or more overlapping elements (when there are more than two elements, each element must have a simultaneously overlapping part), and click "Intersection" to subtract all non - overlapping parts, leaving only the overlapping part of all elements. It is only applicable to individual vector elements. If the elements selected by the user include grouped vector elements, images, or text, the "Intersection" tool is unavailable.

Difference set tool (Alt+ -)

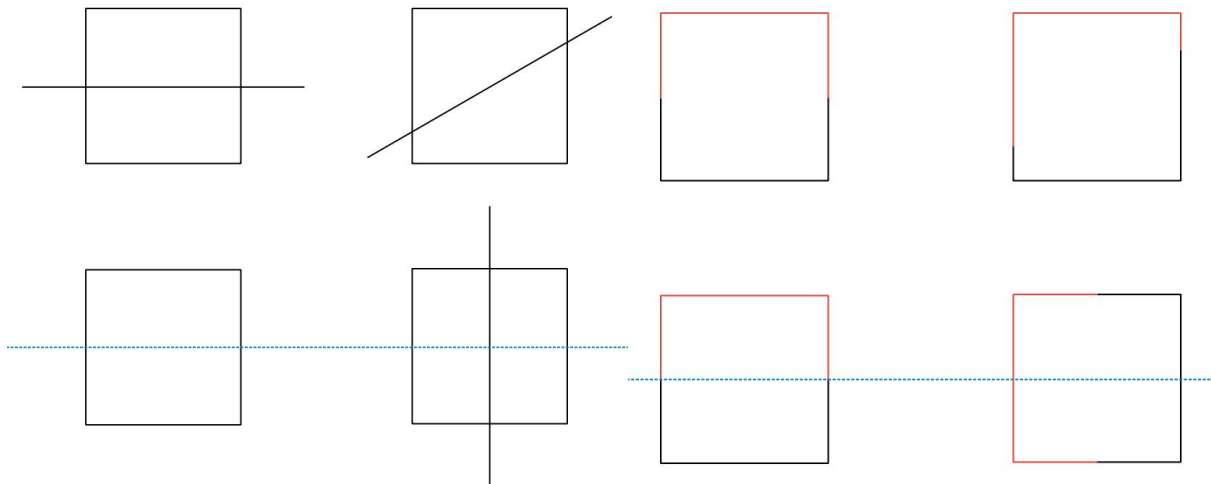
Select one of the overlapping elements and click "Difference set" to subtract the selected element and the intersecting part. It is only applicable to individual vector elements. If the elements selected by the user include grouped vector elements, images, or text, the "Difference set" tool is unavailable.



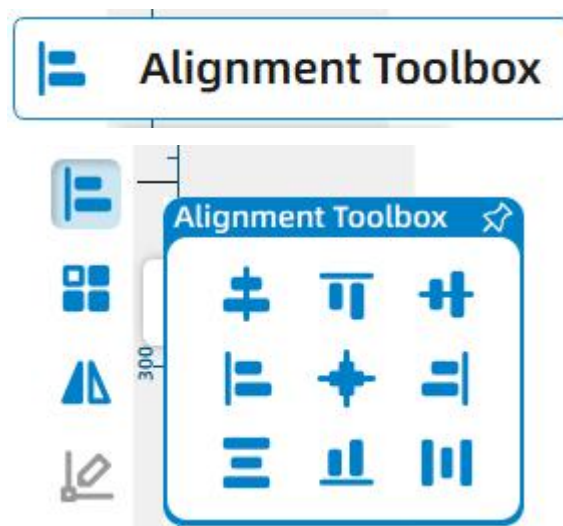
3.6.6 Split Tool



Left click the mouse to select an element, hold down the “Ctrl” key and then select the straight line used for splitting (the straight line cannot be in a group), and click "Split Tool" to do so. The straight line will be deleted after splitting. The guide lines that appear when dragging from the ruler can also be used to split elements. After left - clicking the mouse to select an element, click "Split Tool" to split. Please note that locked elements cannot be split.



3.6.7 Alignment Toolbox



When selecting elements one by one, the last selected element (referred to as Element X in the following description) will serve as the alignment reference for other selected elements. When selecting elements by dragging a selection box, the largest element (referred to as Element X in the following description) will act as the alignment reference. The origin position of an element does not affect the alignment function. The explanation is given in the order from left to right and top to bottom in the toolbox:

- Align V-center: align the horizontal center of the selected element with the horizontal center of element X;
- Align Top: Align the top edge of the selected element with the top edge of element X;
- Align H-Center: align the vertical center of the selected element with the vertical center of element X;
- Align Left: Align the left edge of the selected element with the left edge of element X;
- Align Center: Align the center point of the selected element with the center point of element X;
- Align right: Align the right edge of the selected element with the right edge of element X;
- Distribute vertically: adjust the vertical spacing of all selected elements to be consistent;
- Align Bottom: Align the bottom edge of the selected element with the bottom edge of element X;
- Distribute horizontally: adjust the horizontal spacing of all selected elements to be consistent.

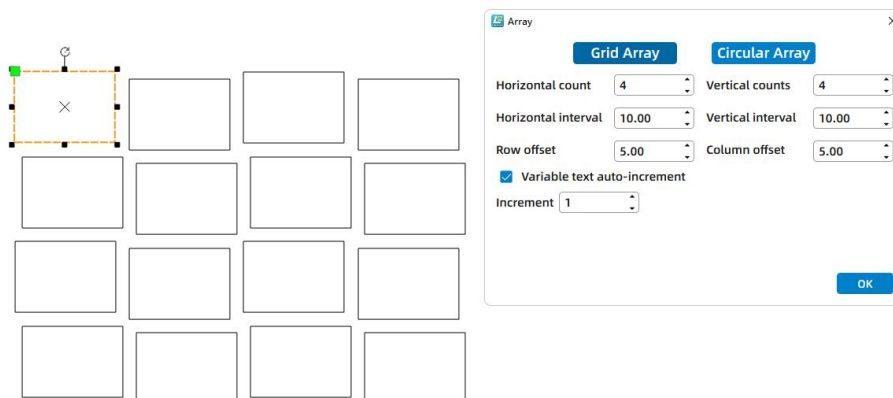
3.6.8 Arrays



Rectangular array

After selecting an element, open the array settings window and configure values such as quantity, spacing, and offset. The canvas will synchronously display a preview of the array effect.

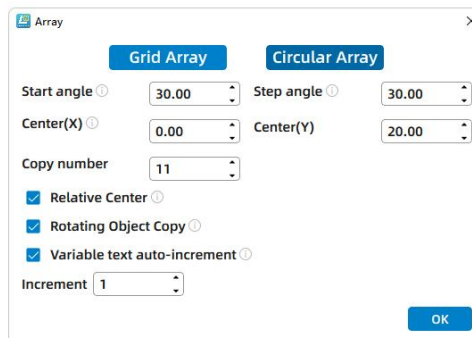
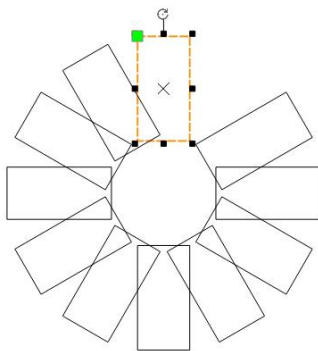
Additionally, you can set the array variable text to increment, which is ideal for scenarios requiring mass processing with sequential number marking.



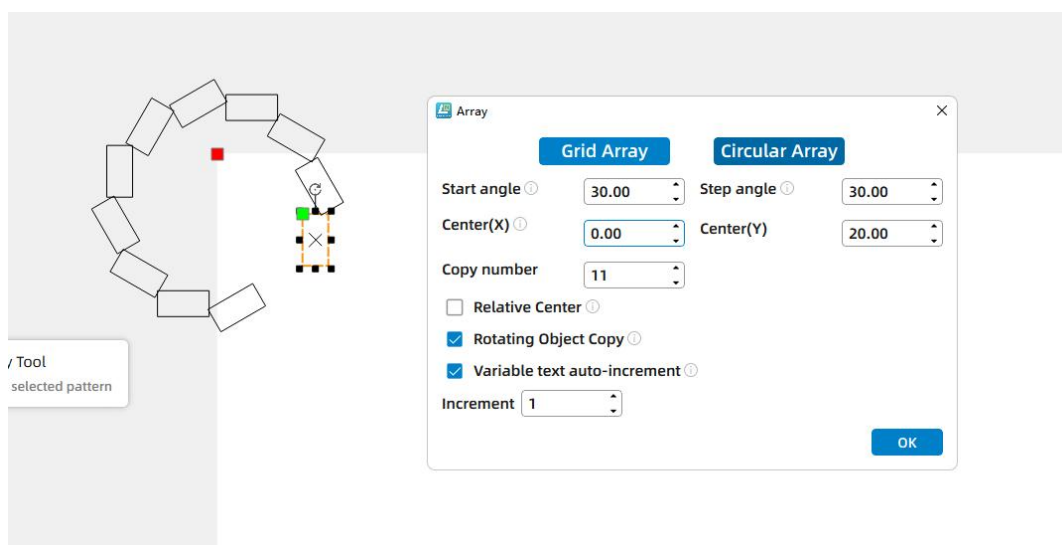
Ring Array

After selecting an element, enter the array pop-up window and set values such as the start angle, step angle, center coordinates, and number of copies. The array preview effect will be displayed on the canvas simultaneously.

- **Start Angle:** The angle of the distance between the original element and the first copied element. The starting angle does not need to be added between the copied elements.
- **Step angle:** the angle of spacing between all elements in the array;
- **Center (X) and Center (Y):** Combined with the "Relative Center" option, the center around which the original primitive array is ultimately formed is composed of the "Relative Center" and "Center X, Y";
- **Number of copies:** the number of all elements in the array, including the original element;
- **Relative center:**



When "Relative Center" is checked, the relative reference system is the center of the original element, and the center around which the rotation is made=Original element center+Enter the center coordinates in the pop-up window;



When "Relative Center" is not checked, The relative reference system is the canvas zero point, and the center of rotation is=Zero point coordinate+Enter the center coordinates in the pop-up window;

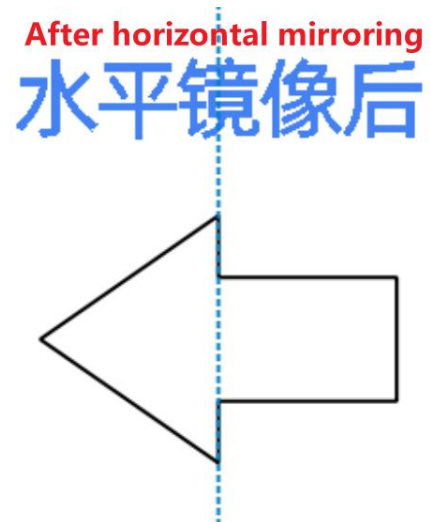
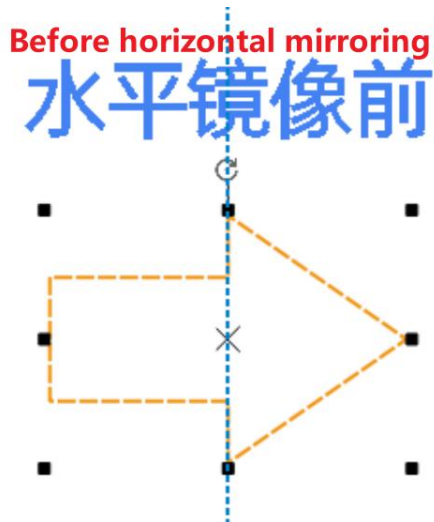
- Rotate the copy object: When checked, the copied element will be rotated at the array angle. When not checked, the direction of the copied element remains unchanged with the original element;
- Array variable text can also be set to increments, which is suitable for scenarios where large quantities need to be processed and sequential numbers need to be marked.

3.6.9 Mirror



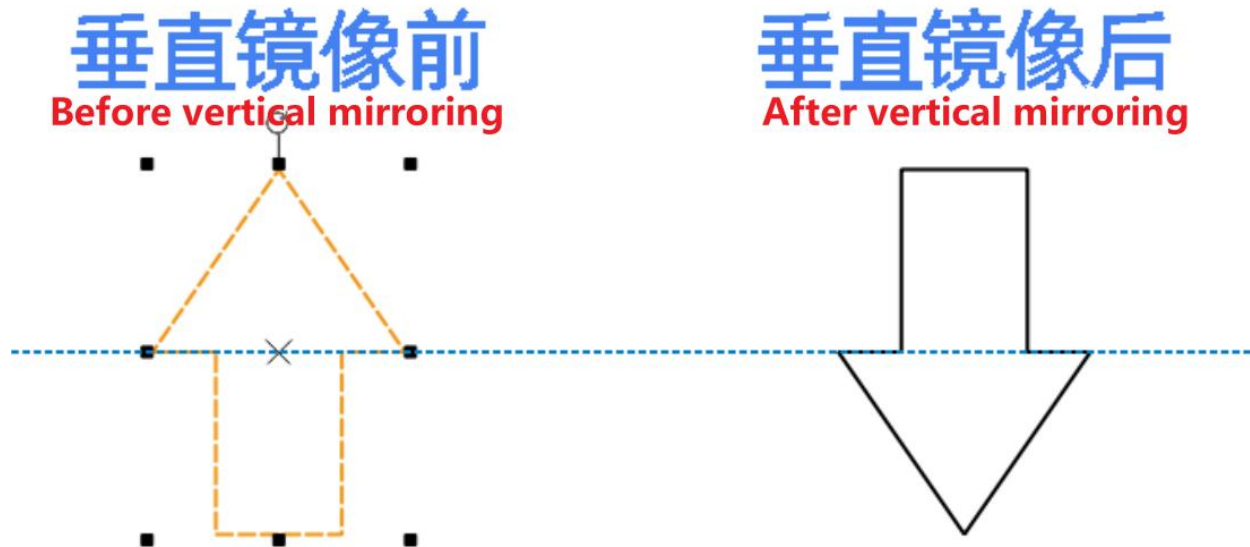
Horizontal Mirroring

Select all the elements that need to be mirrored, click "Horizontal Mirroring", and all the selected elements will be horizontally mirrored according to the center point of the entire outer contour rectangle.



Vertical Mirroring

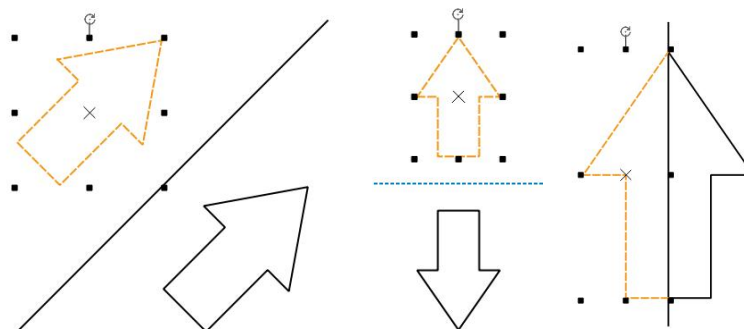
Select all the elements that need to be mirrored, click "Vertical Mirroring", and all selected elements will be vertically mirrored according to the center point of the entire outer contour rectangle.



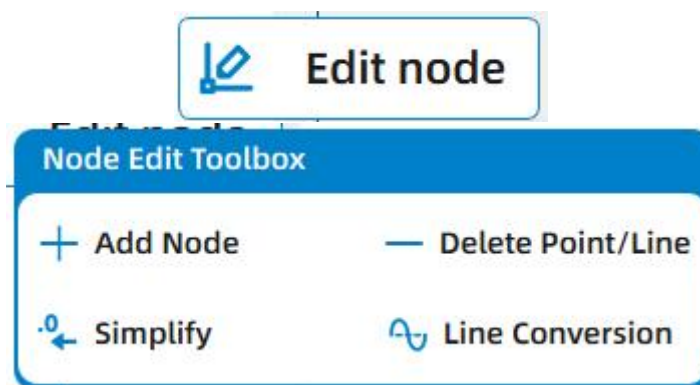
Axis Mirroring

Select an element and click "Axis Mirroring". You can select an existing straight line or guide line as the mirror axis; or hold down the "Ctrl" key and click two points in sequence, and the software will use the straight line formed by connecting the two points as the mirror axis. It is suitable for scenarios where symmetric graphics need to be generated.

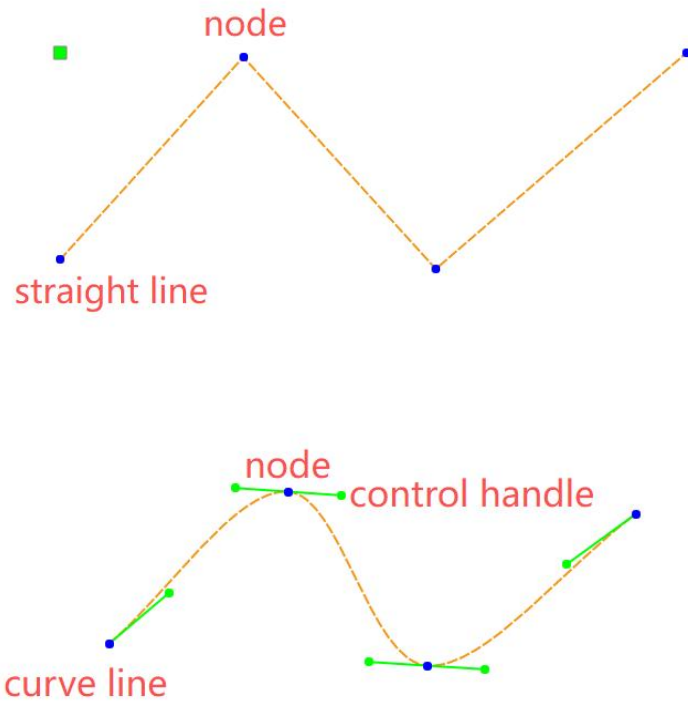
Locked elements cannot use the "Mirror" tool.



3.6.10 Edit node

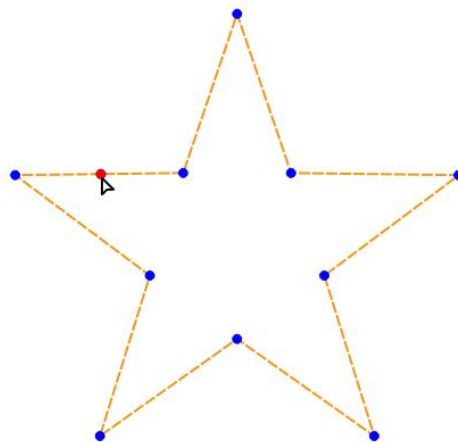


After selecting an element, click the "Edit node" tool to display the nodes on the element. Users can directly drag the nodes to adjust the shape of the element; dragging a straight line will automatically convert it to a curve.



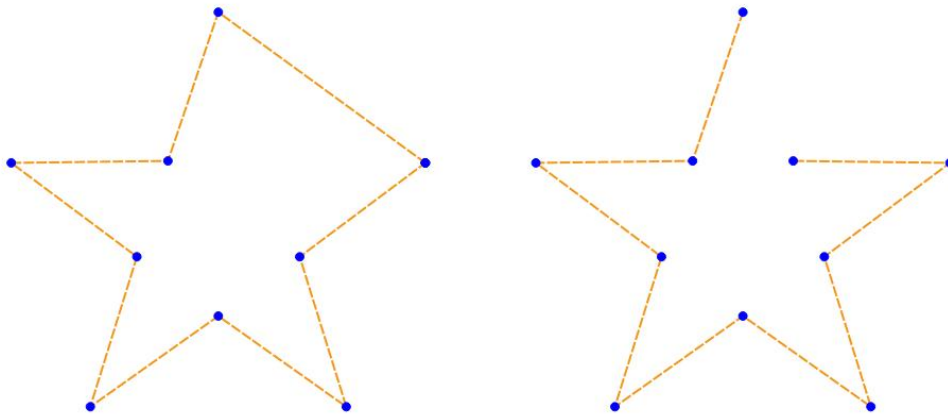
Add Node

Select "Add Node" to add a new node at any position of the element, making it convenient to adjust the element in detail.

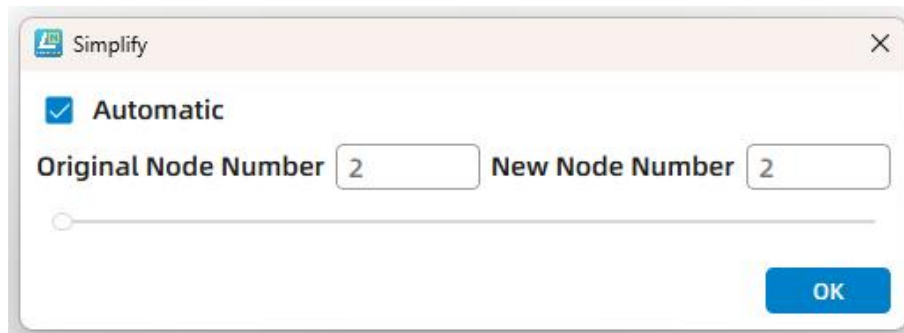


Delete Point/Line

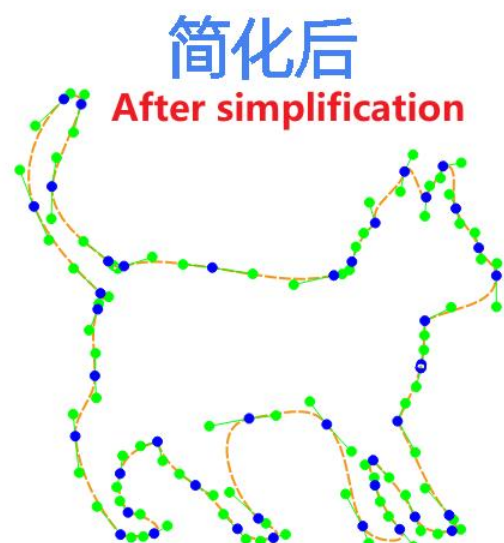
Select "Delete Point/Line". Clicking a node will delete the node, and the adjacent nodes on the left and right will be automatically connected to form a closed element. Clicking a line segment will delete the line segment, and the adjacent points on the left and right will not be connected to form an open element.



Simplify



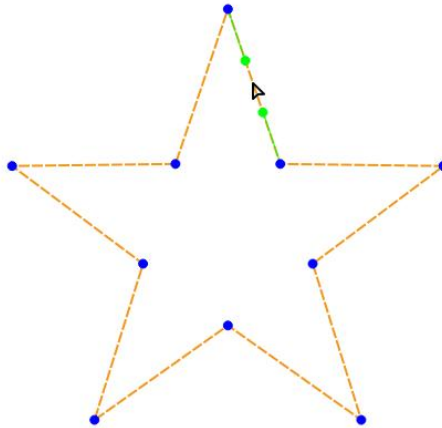
Click "Simplify" to automatically or manually reduce the number of nodes on the primitive through the pop-up window. Too few new nodes may cause graphic distortion, so please operate with caution.



Line Conversion

Click "Line Conversion" to convert straight segments into curve segments, or convert curves into straight segments, allowing you to flexibly adjust graphic elements.

The Node Editing tool cannot be used on groups, text that has not been converted to curves, and bitmaps.

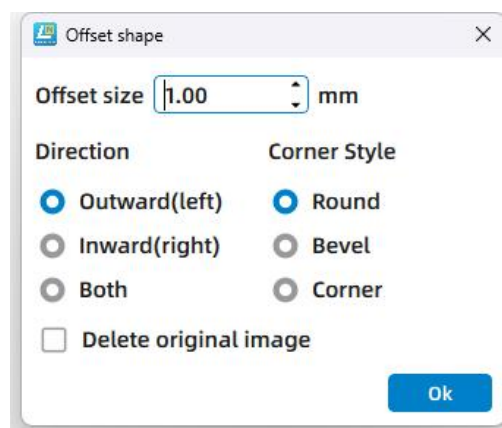


3.6.11 Offset shape



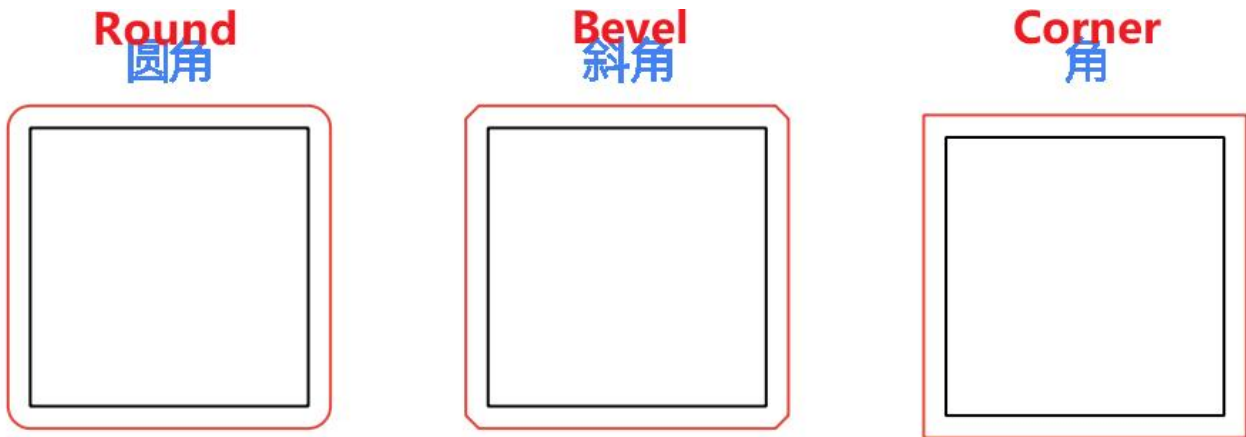
Generates a new offset outline to the outside, inside, or both sides of an element based on the user-defined offset size. This tool supports offsetting individual elements, groups of elements, and text, but not bitmap objects. As you adjust parameters, the offset effect is previewed on the canvas in real time.

- Offset size: the distance between the newly generated offset contour and the original primitive;
- Direction: Divided into "lateral", "medial" and "bilateral".
 - **Outward(left)**: The outline is offset in the direction away from the original element;
 - **Inward(right)**: The outline is offset toward the center of the original element;
 - **Both**: Generate an offset contour on both the outer and inner sides at the same time;



- Corner type: divided into "Rounded Corner", "Bevel Corner" and "Corner".

- **Round:** Generate smooth arc at the corner;
- **Bevel:** Generate bevel effect at the corner;
- **Corner:** Keep the sharp shape of the corner;



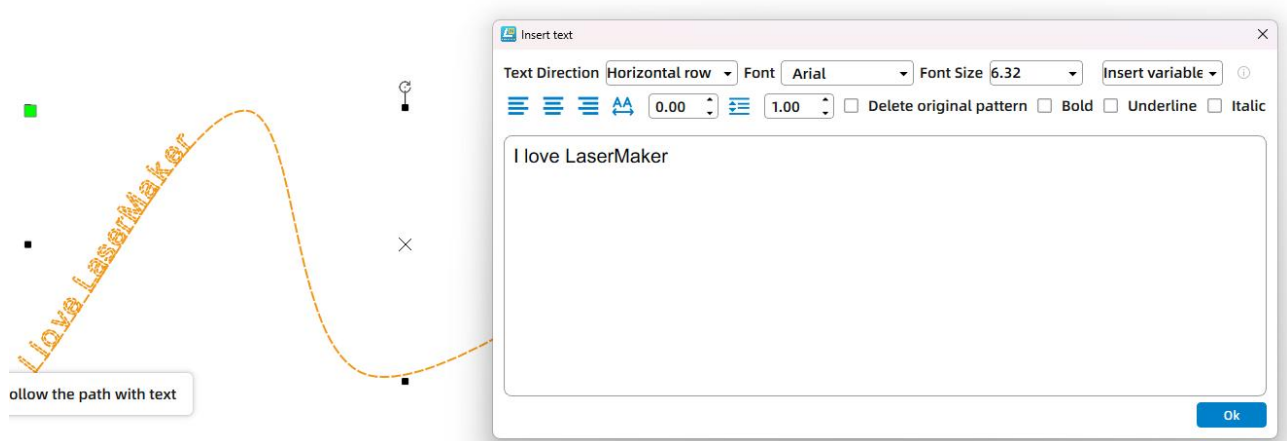
- **Delete original image:** Check this option to delete the original image and only keep the offset outline.

3.6.12 Text Path



Use the "Text Path" tool to arrange the input text along the outline of the selected vector element, creating a path text effect. This function only works on individual vector elements and cannot be applied to groups or bitmaps.

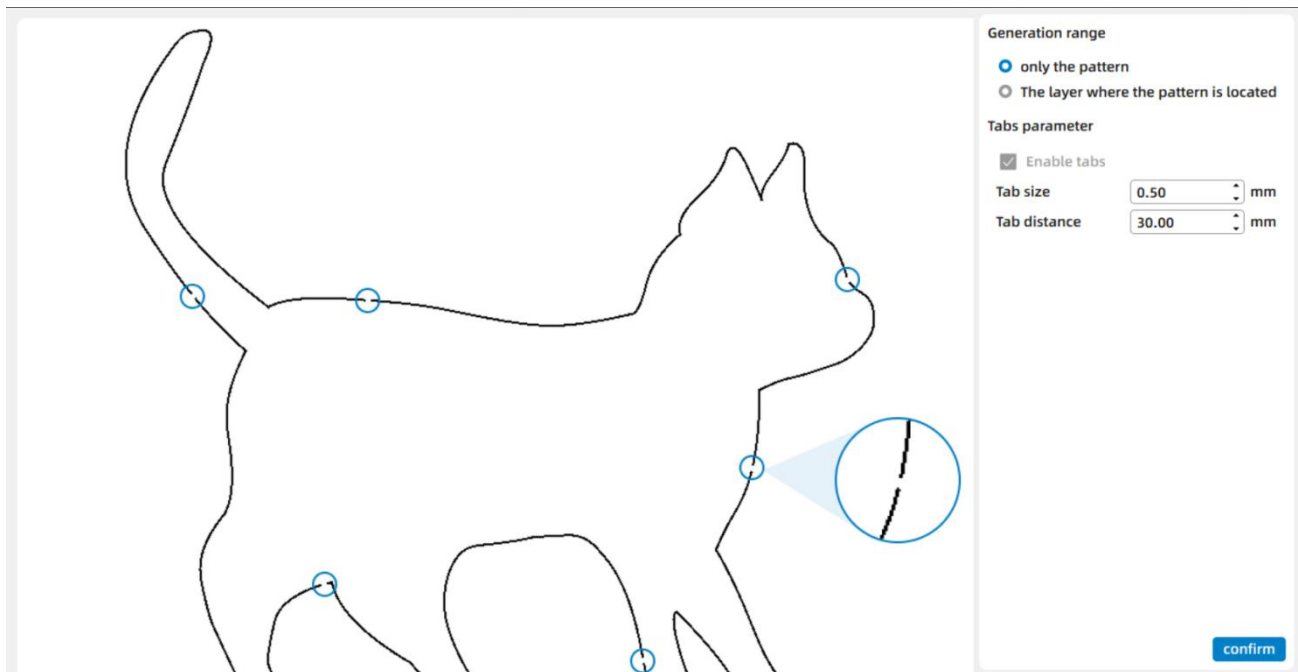
Select a vector element and click the "Text Path" tool. In the "Insert text" pop-up window, set the text direction, font, font size, alignment, character spacing, line spacing, typeface, etc. Click "OK" to generate the text converted to a path. This text cannot be re-entered into editing mode by double-clicking it. Checking "Delete original pattern" will delete the original element, leaving only the path text.



3.6.13 Smart adding



The "Smart adding" tool is primarily used in machining scenarios. The generation range and nozzle parameters can be set in a pop-up window. After adding a nozzle, the machine will skip the nozzle location during machining, ensuring that small parts in the cutting drawing do not fall through the gaps between the support bars or honeycomb panels. After cutting, the entire piece of workpiece can be removed and the parts can be removed.



The tabs can also be set in the "Tabs parameter" pop-up window. Double-click the layer in the "Layer parameters" panel to pop up the "Tabs parameter" pop-up window. Under the parameter module, check "Enable tabs" to set the tab size and distance.

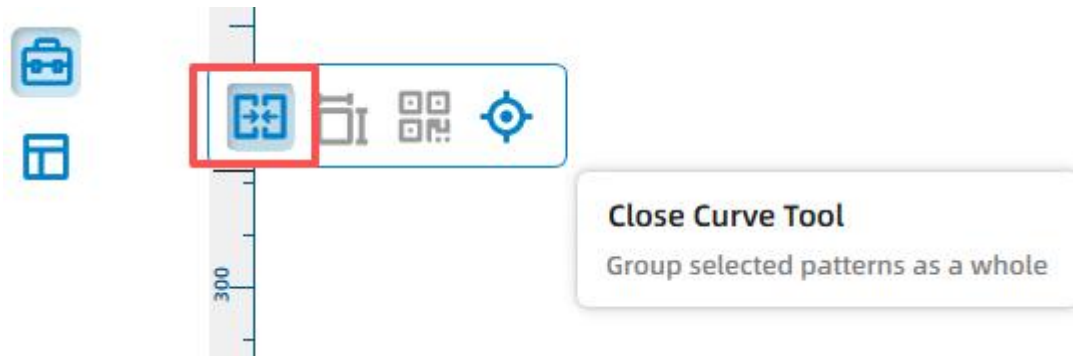
Tabs parameter

☒ Enable tabs

Tab size mm

Tab distance mm

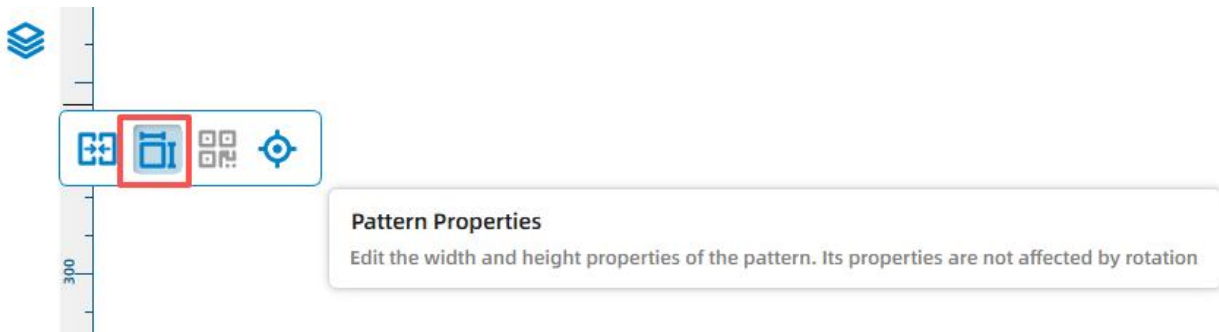
3.6.14 Close Curve Tool



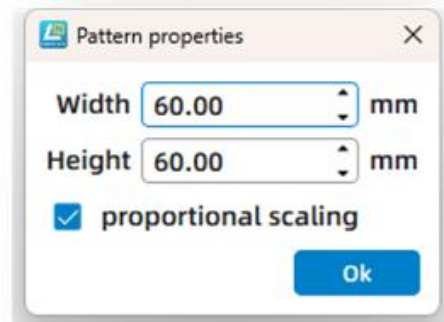
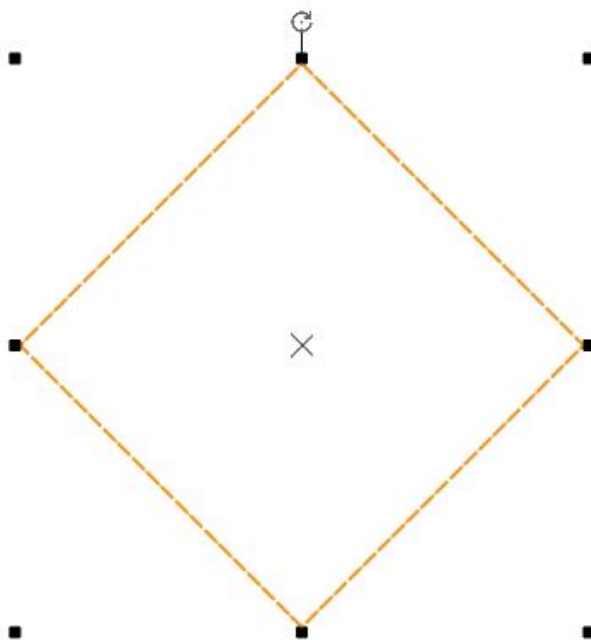
After selecting two or more open entities, click "Close Curve Tool", enter the "Distance" value in the pop-up window, and click "OK". The software will combine and connect the endpoints within the tolerance based on the distance to form a new entity.



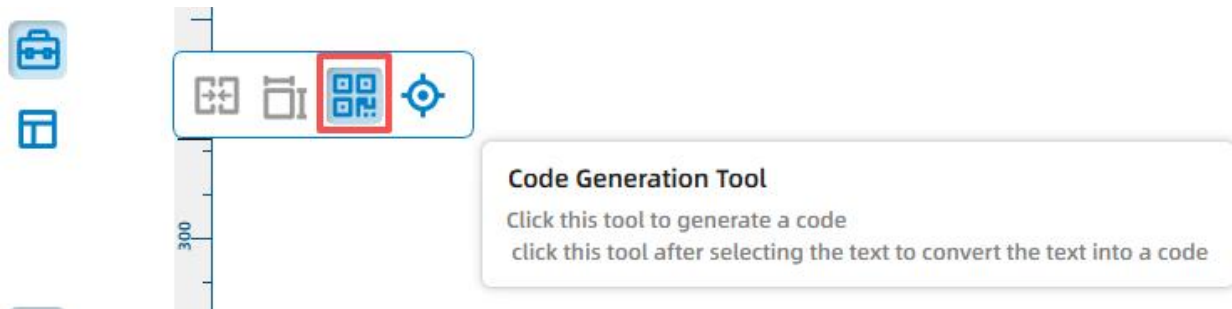
3.6.15 Pattern Properties



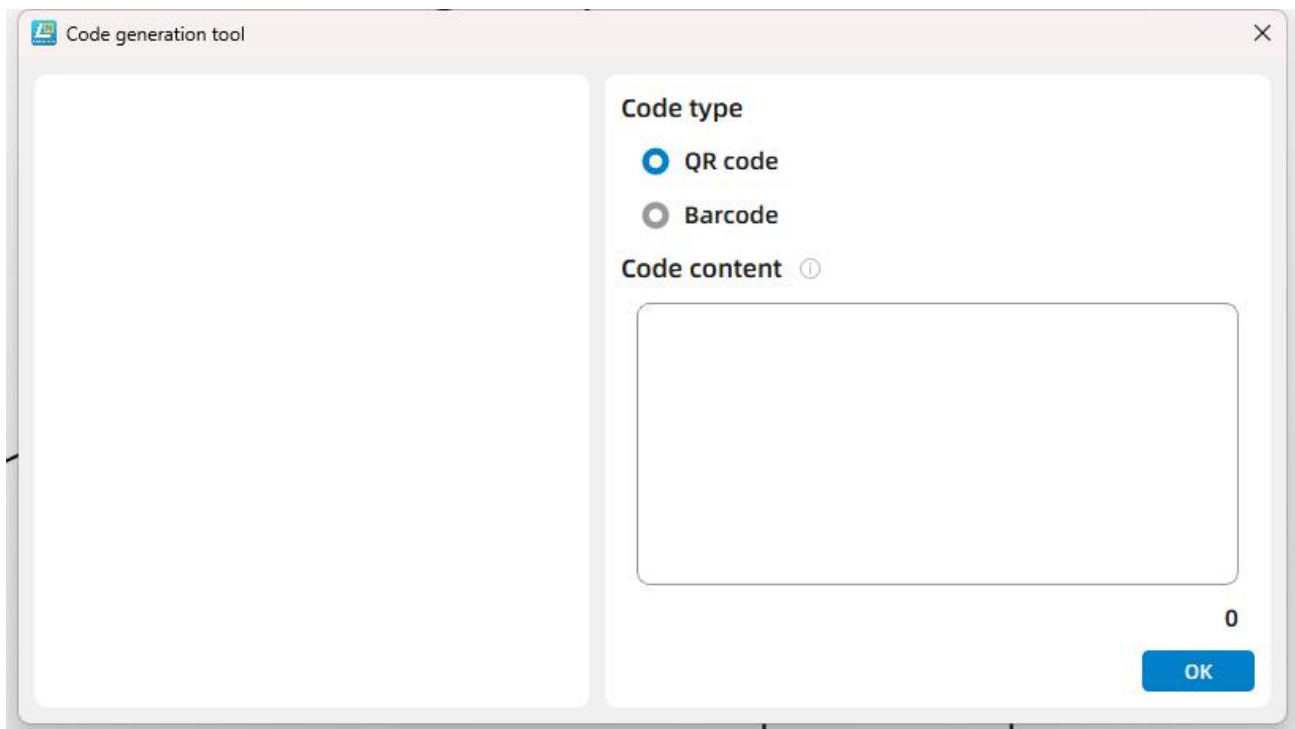
After the element is rotated, the values displayed in the element properties bar at the top are the width and height of the element's bounding rectangle. The width and height properties of the element itself need to be modified through "Pattern Properties".



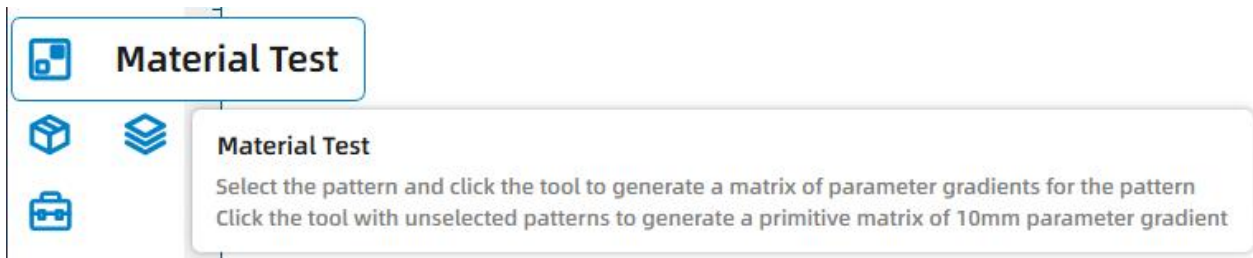
3.6.16 Code Generation



Users can use the "Code Generation" tool to generate a QR code or barcode as needed. Simply enter the barcode content (barcodes only support English or numbers, QR codes are not limited to this). Select existing text in the canvas and click the "Code Generation" tool to automatically fill the barcode with that text. Double-clicking the generated barcode in the canvas will open a pop-up window to re-edit the barcode content.



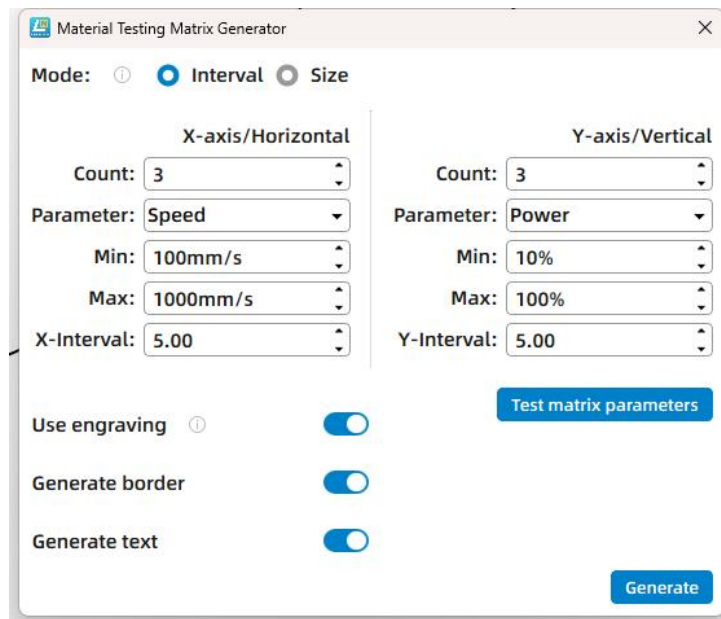
3.6.17 Material Test

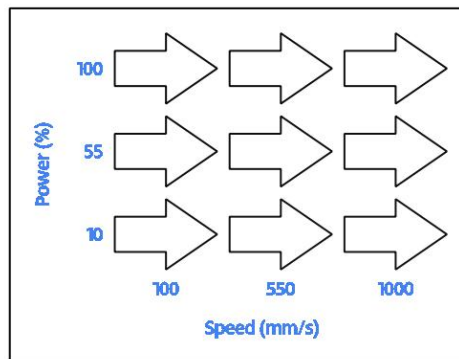
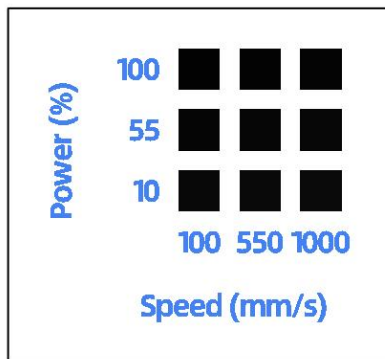
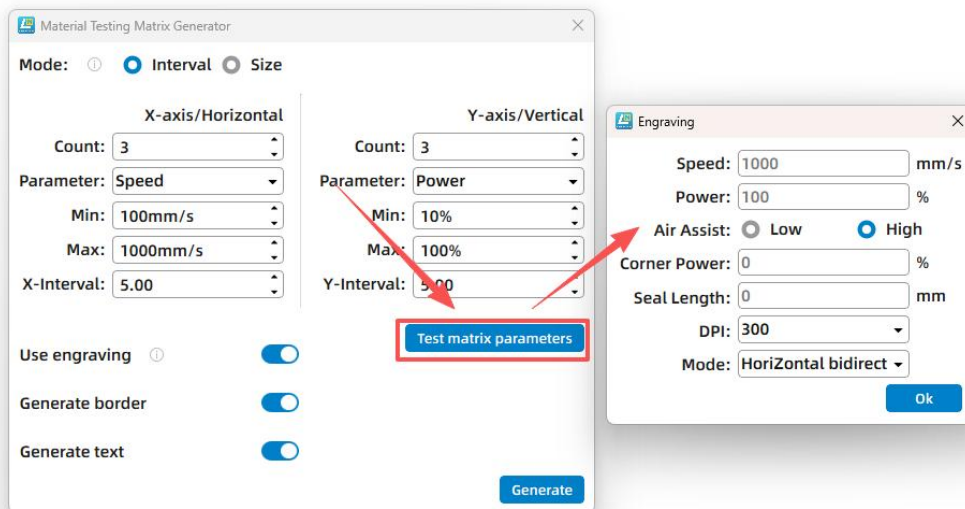


The “Material Test” tool helps users test the processing effects under different power and speed combinations, and quickly find the optimal parameter settings for laser equipment processing various materials.

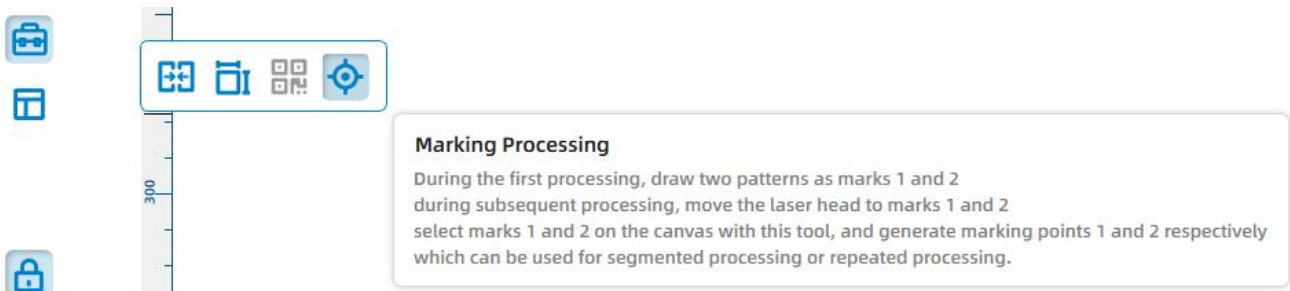
- Click "Material Test" to open the generator window. A 3×3 matrix is generated by default. Users can adjust the number of rows and columns, parameter ranges, element spacing, process settings, etc. as needed.
- Users can also select an existing element and click "Material Test" to generate a corresponding test matrix based on the element.

After the test matrix is generated, it can be directly used in actual processing to facilitate comparison of the processing effects of various parameter combinations.





3.6.18 Marking Processing



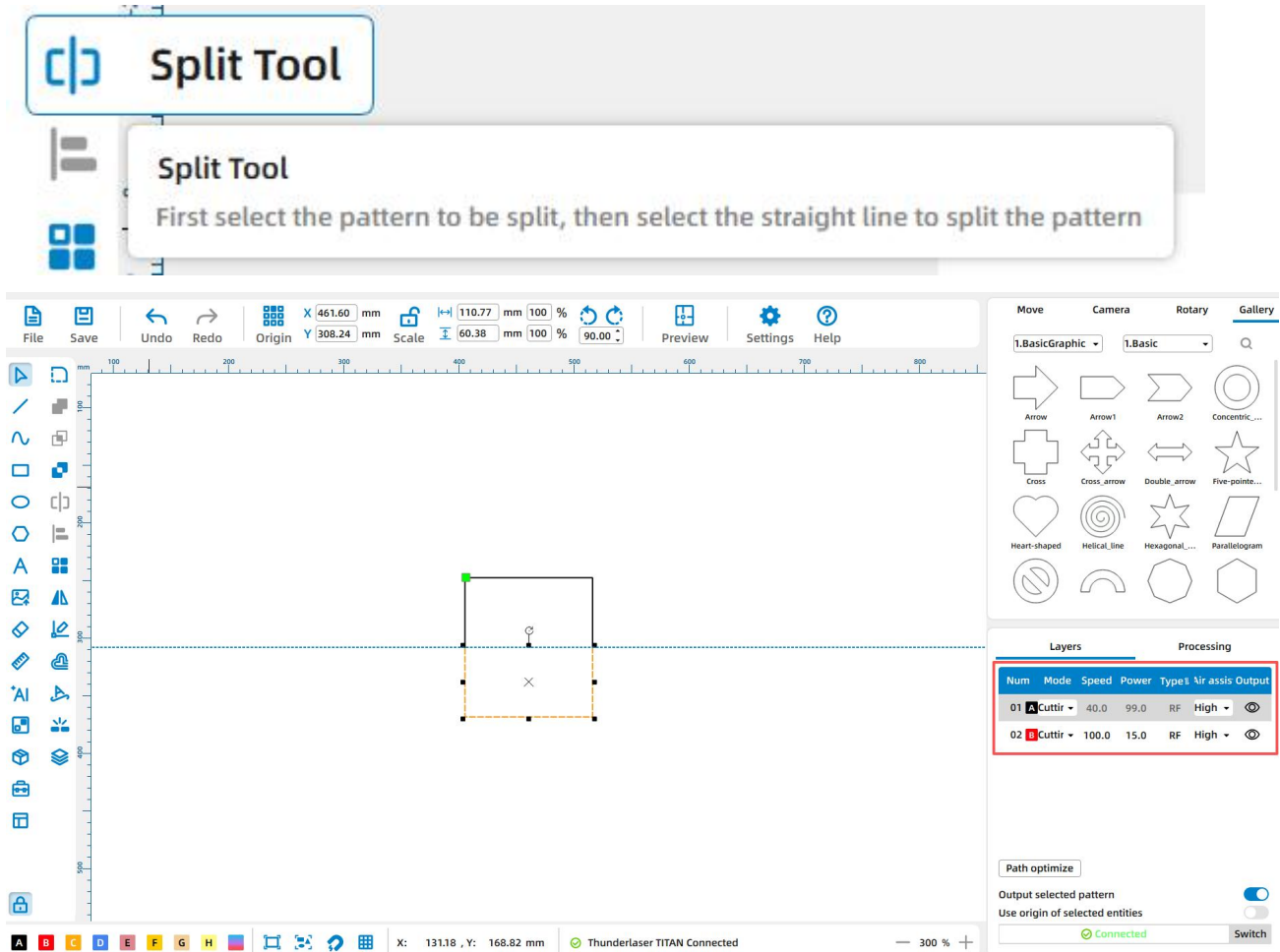
The "Marking Processing" tool is suitable for the following typical scenarios:

- Processing of extra-long materials: When the length of the material exceeds the standard working area of the laser equipment, the pass-through door allows the material to enter from one end of the equipment and extend out from the other end, realizing continuous cutting or engraving of extra-long works through segmented processing.
- Repeated positioning processing: used to reposition processing on moved materials to ensure that the positions of graphics elements are accurately overlapped.

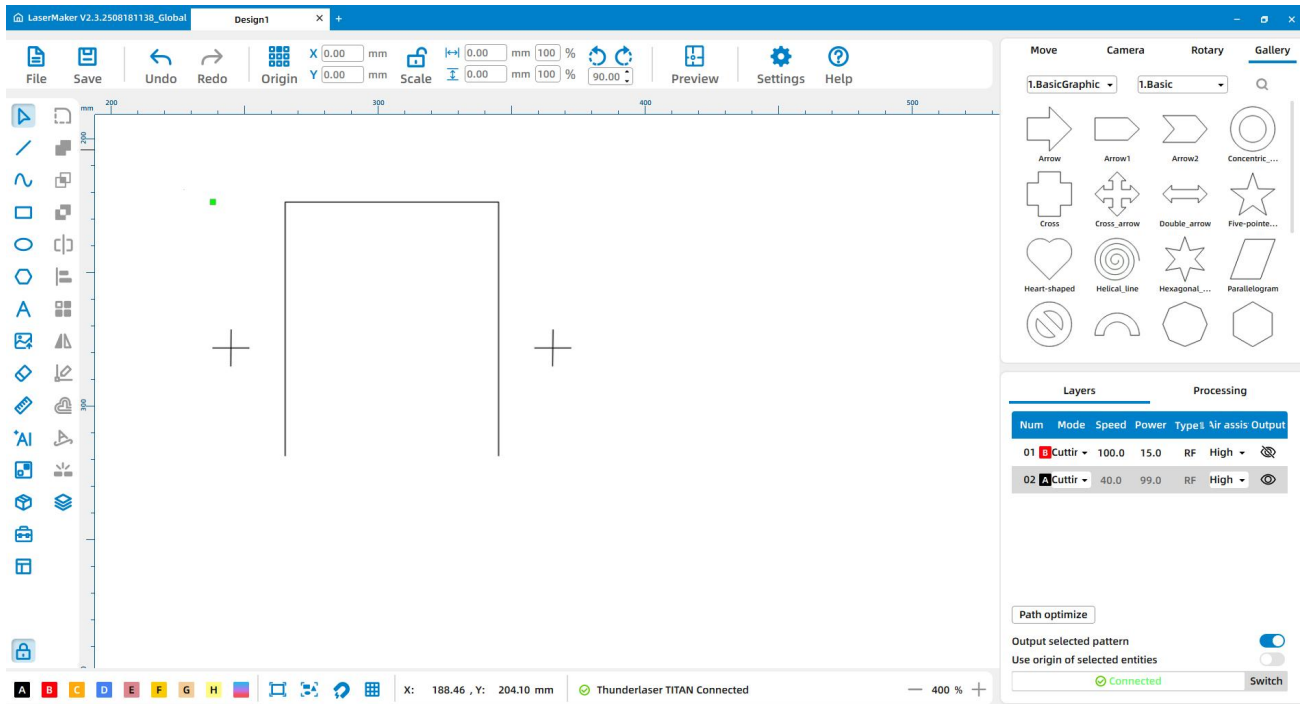
- Precise processing without visual positioning assistance: Even without cameras, precise positioning can be achieved through marking.

The following uses the example of using a through-door to process a long splicing drawing to explain the steps of using "Mark Processing":

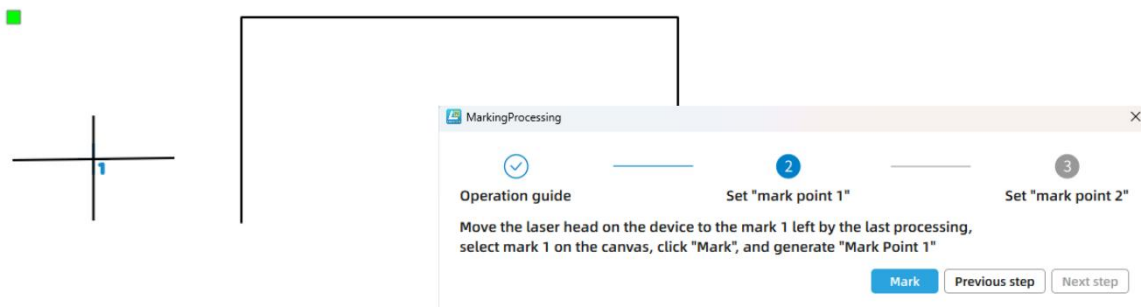
- Use the "Split Tool" to split the entire drawing into several sections, each section corresponds to one processing;

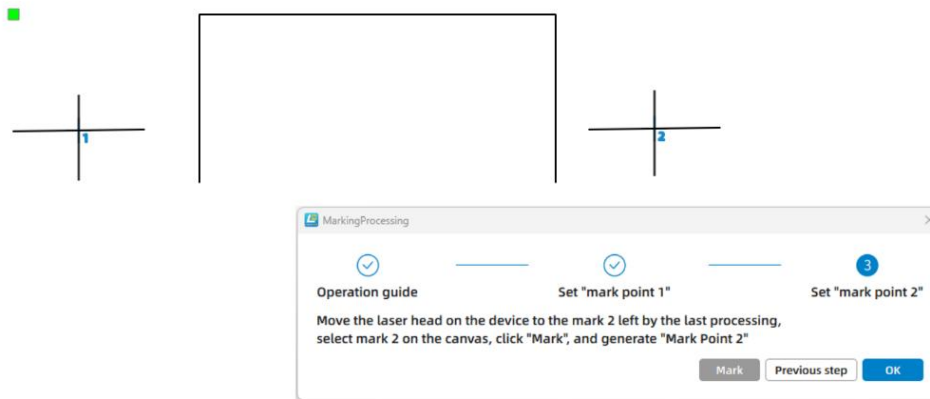


- Before processing the first section of the drawing, draw two marking elements on the canvas (for positioning), hide the drawings of other sections, and then perform the first section processing;



- Before processing the next drawing, click "Mark for Processing" and follow the pop-up window instructions:
 - Move the laser head to the first marking point on the actual material, select the corresponding marking element in the canvas, and click "Mark" to generate "Mark Point 1";
 - Similarly, generate "mark point 2";
 - Draw two new marker elements as "Marker 3, 4" for positioning the next segment;
 - Follow the above steps to process each section of the drawing in turn until it is completed.





Note: Every two marked graphics form a group, and their relative positions must remain unchanged during each processing process. The relative positions between the marks and the graphics must also remain unchanged to ensure accurate splicing.

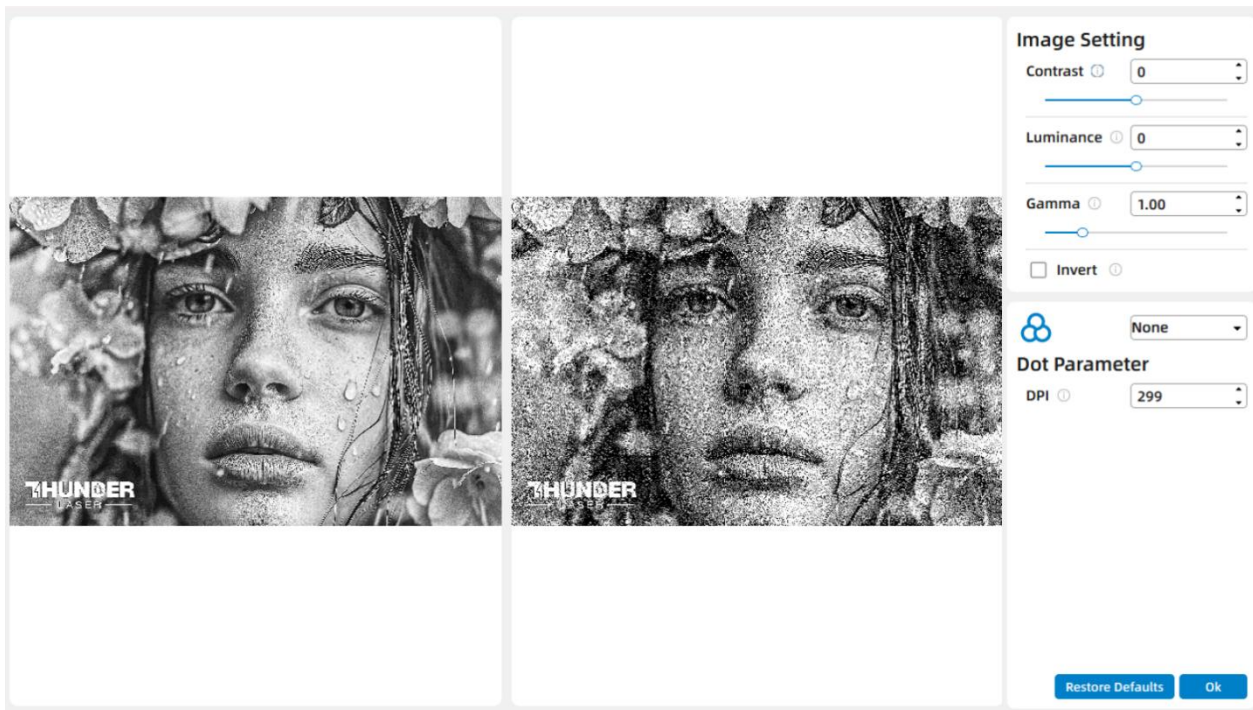
3.6.19 Image Operation



Use the "Image Operation" tool to pre-process imported images and improve their performance during laser processing. Click an image and then click "Image Operation" on the right to access a pop-up window. This window allows you to adjust image parameters such as contrast, luminance, and gamma, enable inverted colors, or convert the image to a bitmap and set the relevant parameters. A real-time preview of the image will be displayed during the process, allowing you to adjust it based on your processing needs.

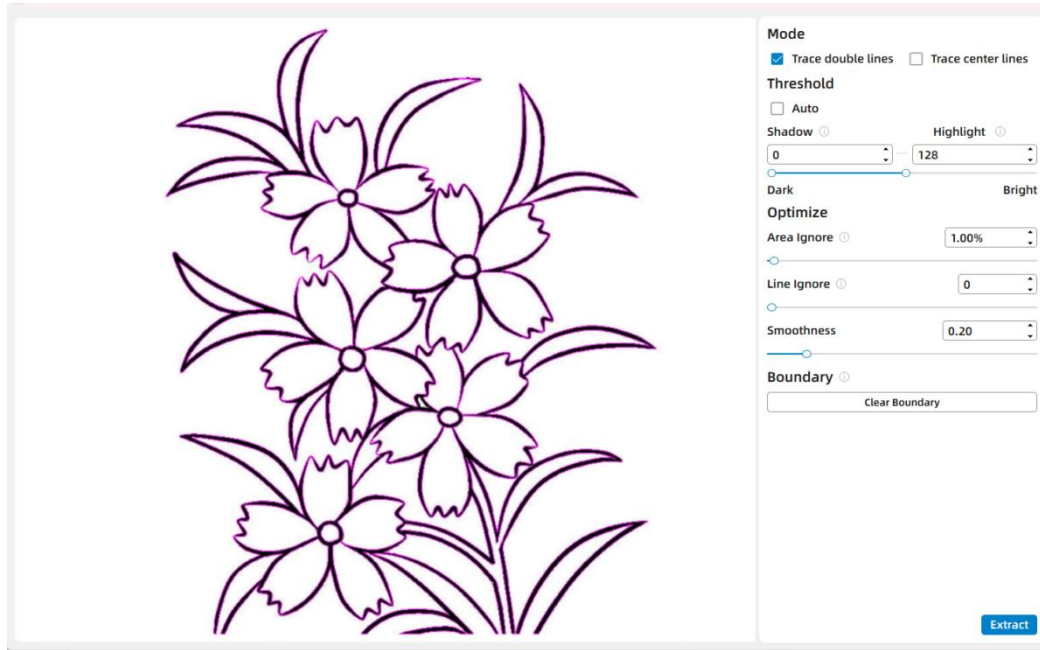
- Contrast: Adjust the difference between the brightest and darkest parts of the image to enhance the sense of depth;
- Luminance: controls the overall brightness of the image. The higher the value, the brighter the image.

- Gamma: adjusts the brightness of pixels;
- Invert: convert the color value in each color channel into its complementary color, such as black to white and white to black;
- Dot parameter: provides two modes: random dot matrix and ordered dot matrix, which are used for image dot matrix processing;
- Dot parameter DPI: Indicates the number of dots per inch of the image. The higher the value, the clearer the image, which is suitable for fine engraving.



3.6.20 Image Extraction





“Image Extraction” is ideal for tracing line drawings or extracting vector outlines from images. Users can adjust thresholds and optimize parameters to convert qualified pixels in an image into editable vector paths.

- Shadow: The larger the dark limit, the fewer dark pixels there are. The default range of dark and bright areas is 0-128, which means the software will track all pixels within the brightness range of 0-128 and exclude pixels within the range of 129-255.
- Highlight: The larger the brightness limit, the more bright pixels there are;
- Area ignore: Within the valid threshold range, the software ignores areas where the number of tracking pixels is less than X%. The default value is 1%. That is, in the pixel area within the brightness range of 0-128, the area where the number of pixels is less than 1% will be excluded.
- Line ignore: "Line Ignore" is used to set the length threshold for lines to be ignored during the extraction process. Lines shorter than this threshold won't be extracted.
- Smoothness: controls the smoothness of the contour line. The larger the smoothness value, the softer the contour line and the rounder the corners.
- Boundary: You can select a specific area of the image on the left for local tracing by using the mouse to frame the area;
- Clear Boundary: reset the selected area and restore to the full image tracing state.

3.6.21 Image Crop



After selecting an image, click "Image Crop" on the right to enter cropping mode. Adjust the cropping area and click a blank area outside the image to complete the cropping. Press the (Esc) key to exit cropping mode.

3.7 Special Features

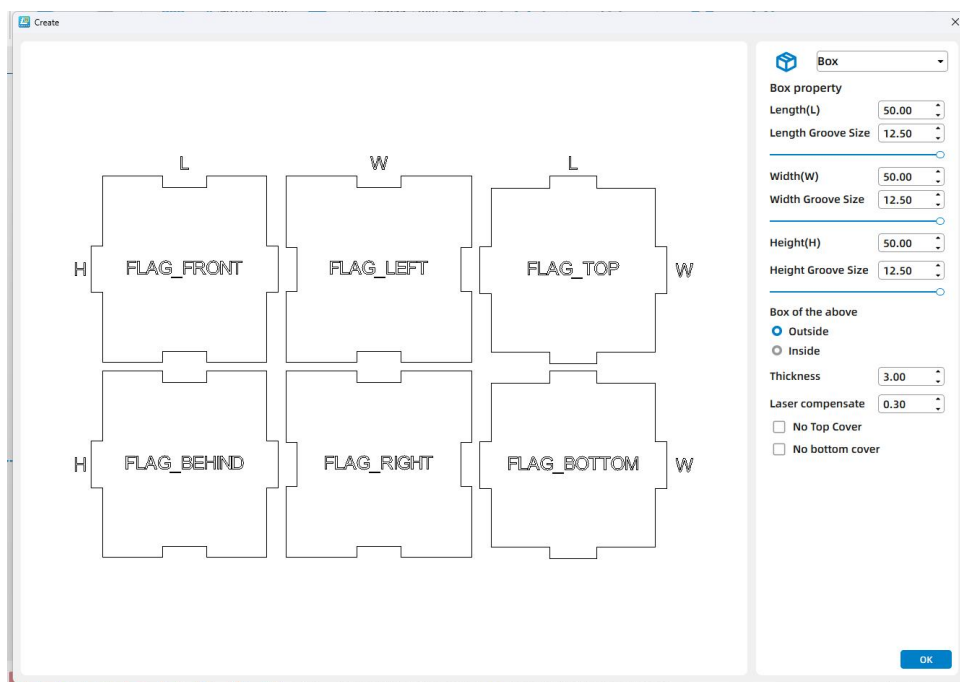
3.7.1 One-click creation



The "Create" feature allows users to quickly design and generate four models: a rectangular box, a rounded box, a modular gear, and a badge/seal. The pop-up window is divided into two parts: the left side is a preview area, and the right side is a parameter adjustment area. It automatically updates based on the input parameters, providing users with intuitive feedback on the adaptation effect, greatly simplifying the creation process. Specific instructions are as follows:

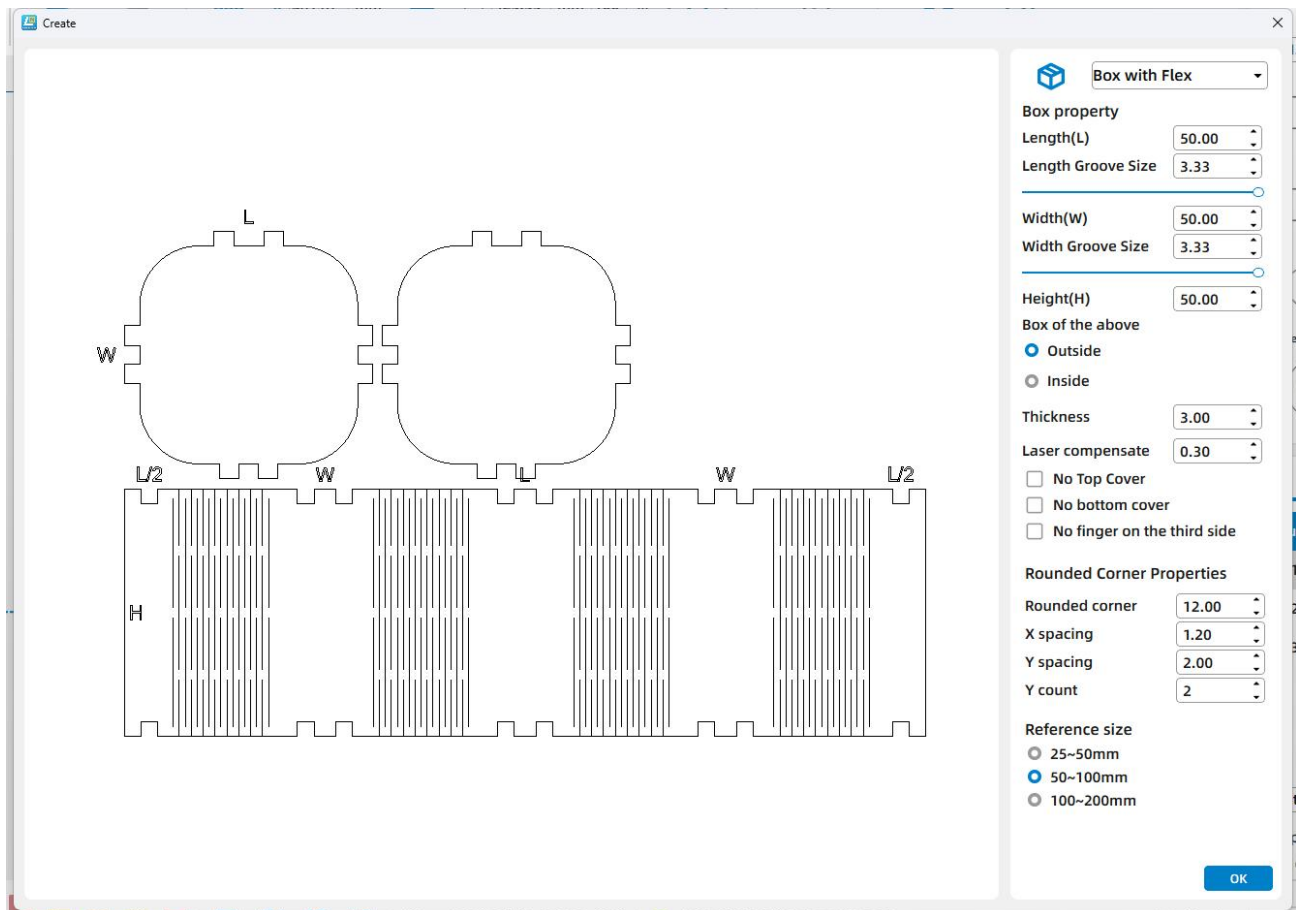
Box

- Length (L) / Width (W) / Height (H): define the outer size / inner size of the box;
- Length Groove Size: controls the depth of the groove at the joint of the box body;
- Thickness: Set the thickness of the box body, which will affect the calculation of the internal space;
- Laser compensation: Adjust the compensation value according to the cutting process to avoid dimensional deviation caused by laser ablation and ensure assembly accuracy;
- Top cover and bottom cover: Check "No top cover" or "No bottom cover" to generate an open box to meet diverse needs.



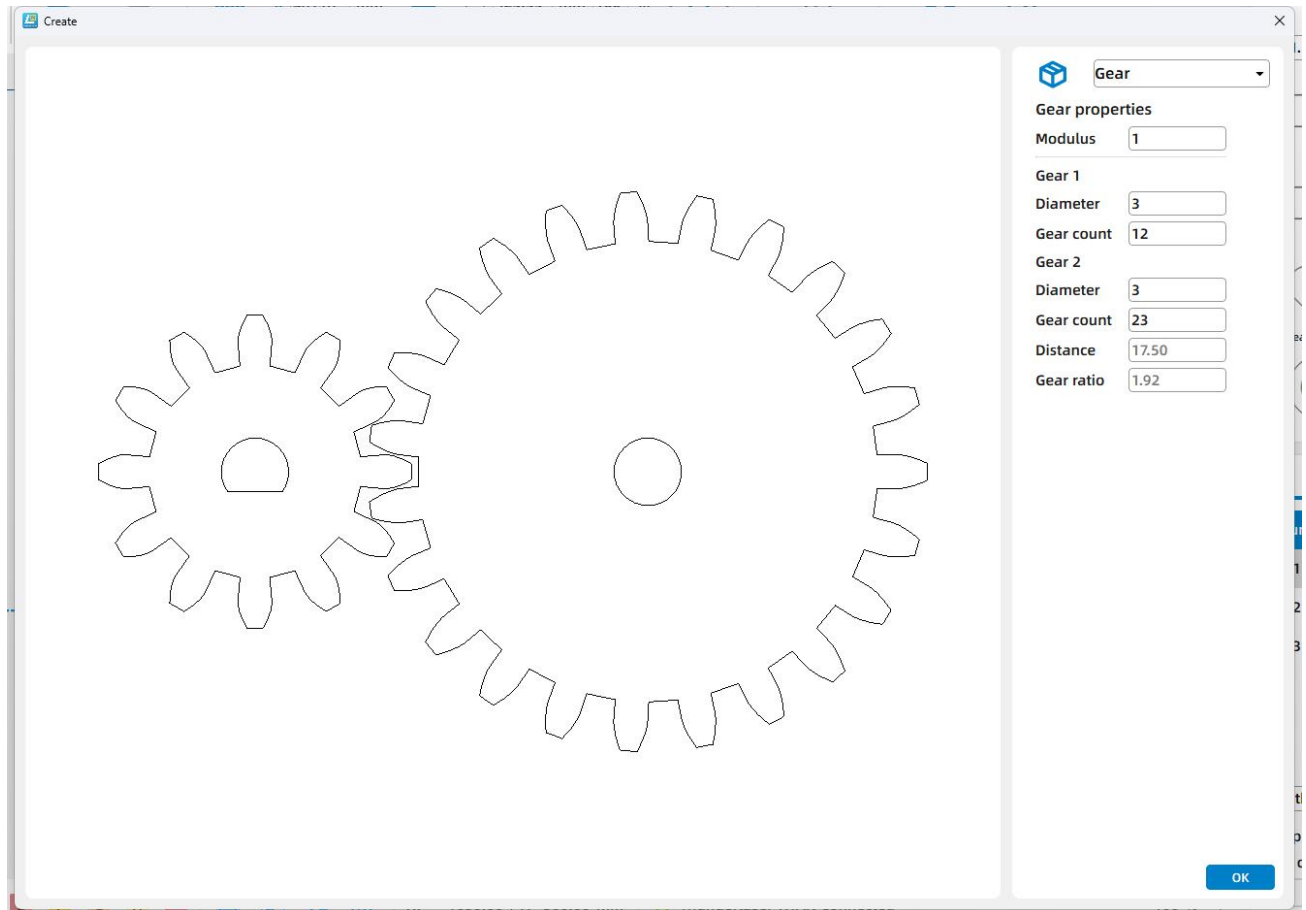
Box with Flex

- Length (L) / Width (W) / Height (H): define the outer size / inner size of the box;
- Length Groove Size: controls the depth of the groove at the joint of the box body;
- Thickness: Set the thickness of the box body, which will affect the calculation of the internal space;
- Laser compensation: Adjust the compensation value according to the cutting process to avoid dimensional deviation caused by laser ablation and ensure assembly accuracy;
- Top cover and bottom cover: Check "No top cover" or "No bottom cover" to generate an open box to meet diverse needs;
- No finger on the third side: After checking this option, the groove on the third side of the box is disabled to meet the design requirements of special scenarios;
- Rounded corners Properties: adjust the radius of the corners of the box;
- X/Y spacing: adjust the spacing parameters of the bending part to make the plate less likely to break;



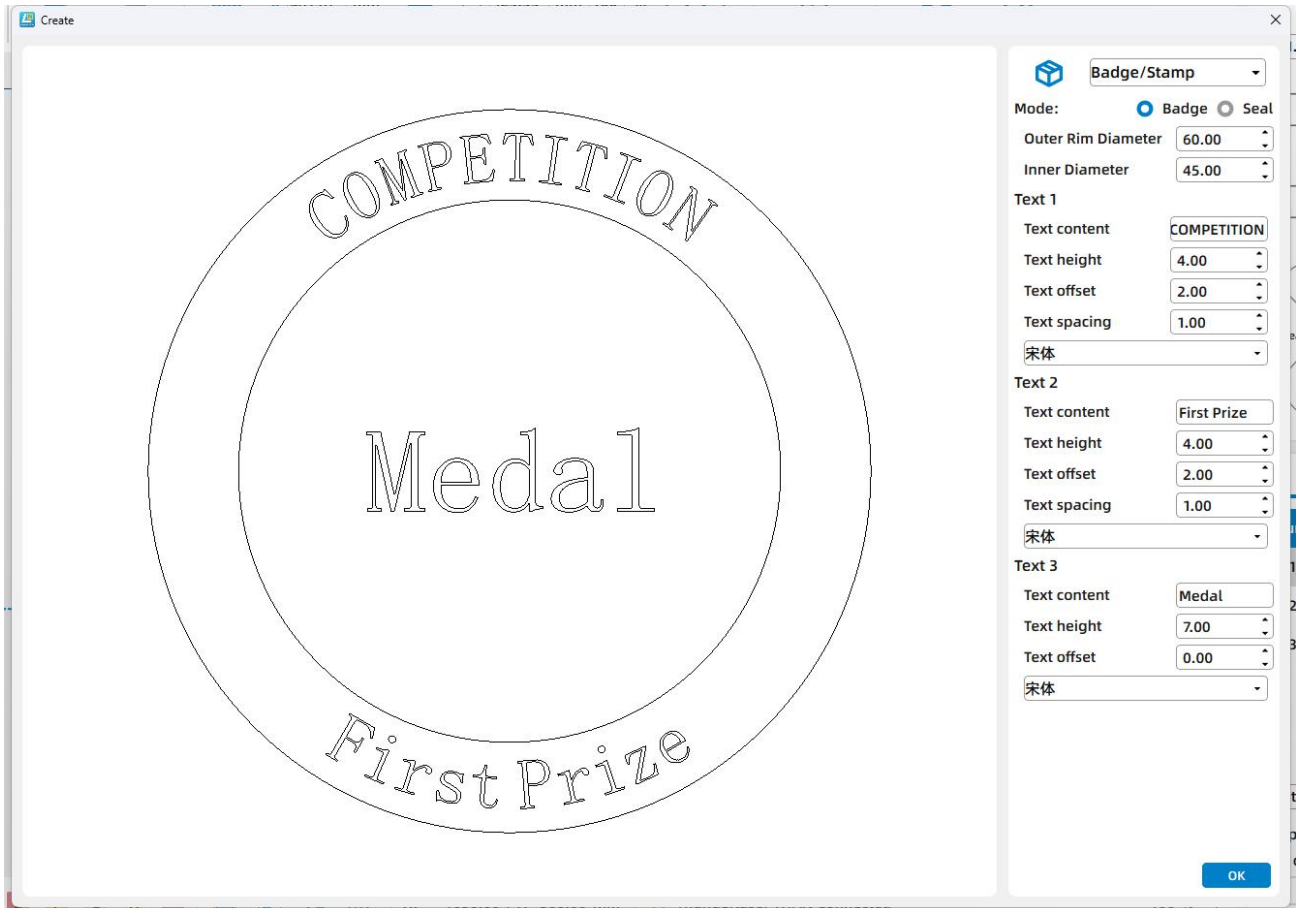
Gear

- Modulus: The core parameter that defines the size of the gear tooth profile. The larger the module, the larger the tooth height and tooth thickness.
- Diameter: bearing diameter;
- Gear count: the number of teeth on the gear;
- Distance: the distance between the two gear axes, no user input is required;
- Gear ratio: Defines the speed ratio or tooth ratio of two gears, without user input.



Badge/Stamp

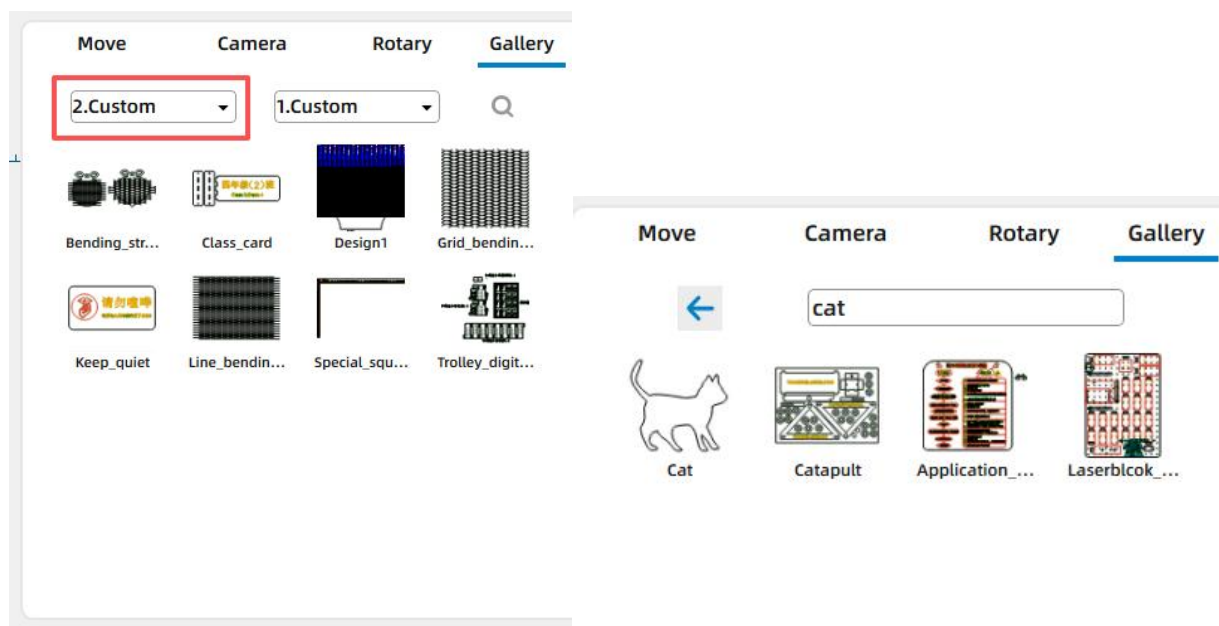
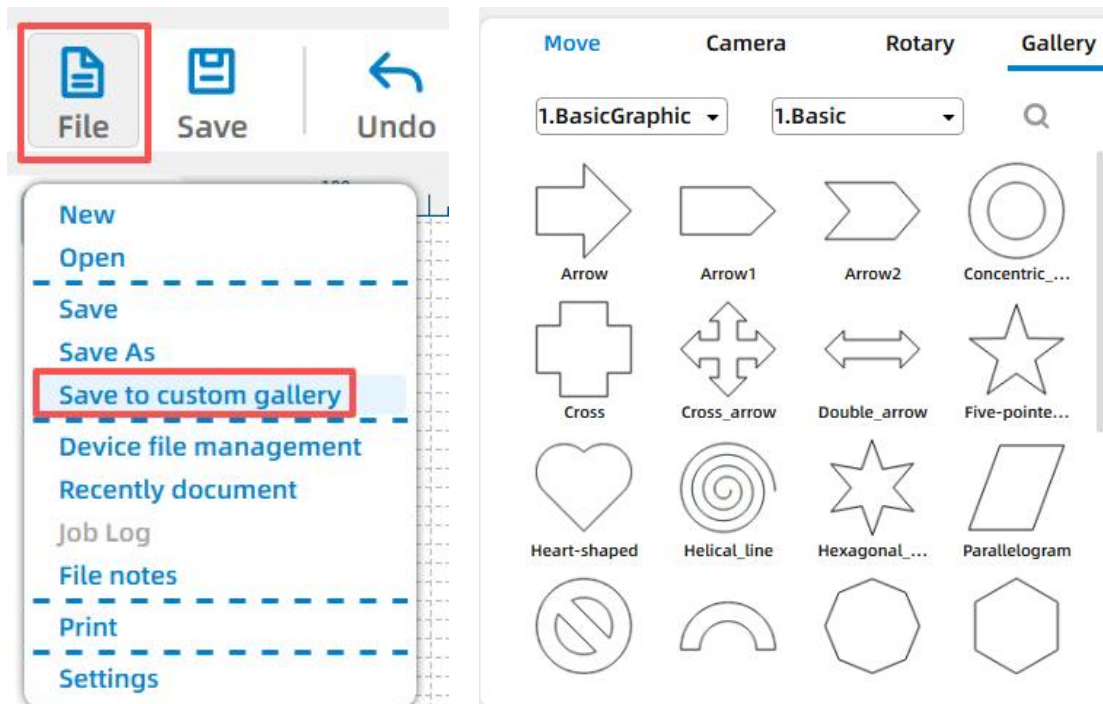
- Mode: Select "Badge" or "Seal". Due to the engraving characteristics, the preview image will be flipped horizontally when "Seal" is selected;
- Outer/Inner Rim Diameter: Set the size of the inner and outer circles of the badge/seal;
- Text Content/Height/Offset/Spacing/Font Size: Set the styles of the three texts in the badge/seal.



3.7.2 Gallery

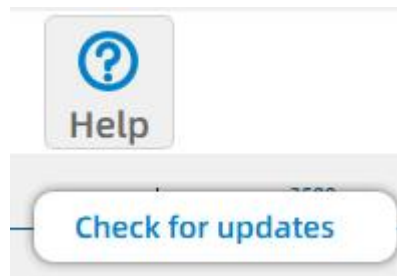
Novice users who lack design inspiration can quickly improve their creative efficiency through the "Gallery". By calling preset element resources or saving custom elements, the design process can be simplified:

- After selecting the target element in the gallery, press and hold the left button of the mouse, drag it to the canvas area, and release it to complete the addition;
- After completing your design on the canvas, click "Save to custom gallery" in "File" and enter a name for the element to save. You can later find the saved element under "2. Custom" in the "Gallery".

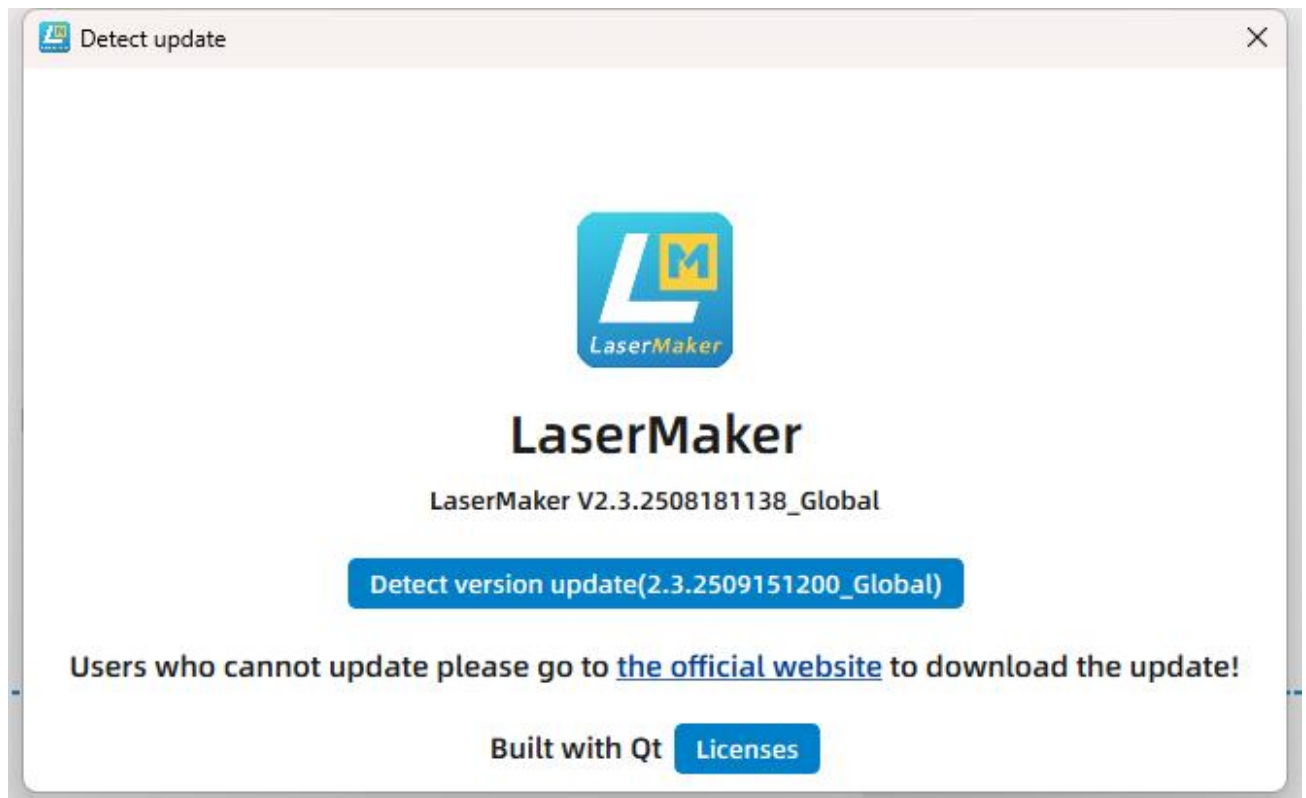


3.8 Help

3.8.1 Software Update



Click "Check for Updates" to open a version detection window. If the latest version is currently available, the interface will prompt "Updated to Latest Version." If the latest version is detected, click "Check for Updates" to view the update information and click "Start Update" in the pop-up update window to upgrade. If the detection fails, please check your network and License, or contact the software customer service for a solution.



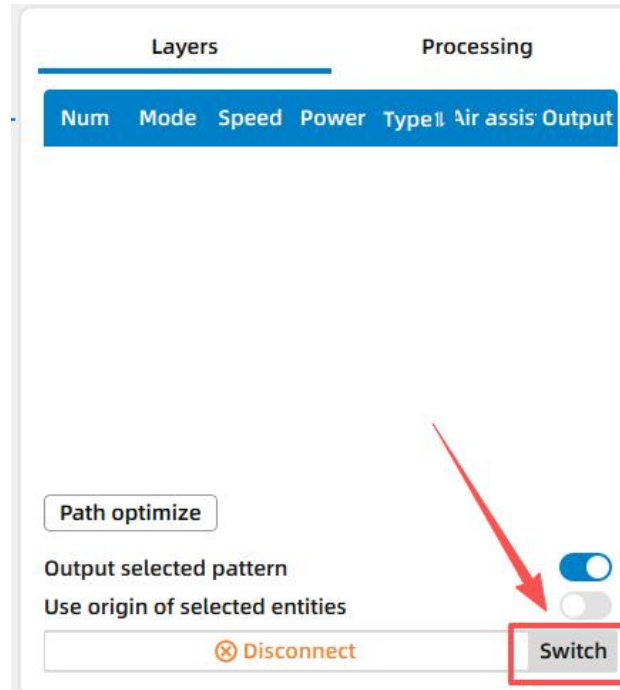
Chapter 4 Processing Output

Main contents of this chapter:

- Connecting devices
- Set processing parameters
- Control device movement
- Control equipment processing
- Order
- Control accessories

4.1 Connecting Devices

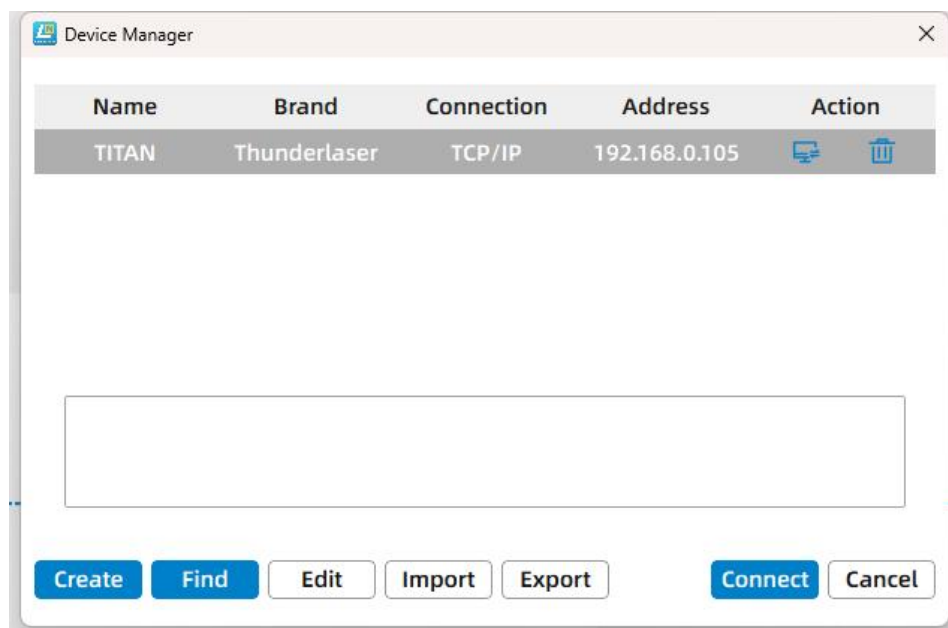
Before connecting the device, make sure it is powered on. Click "Switch" in the lower right corner of the software to enter the device management pop-up window.



4.1.1 USB connection

Before connecting the device via USB, make sure the device is connected to the computer successfully.

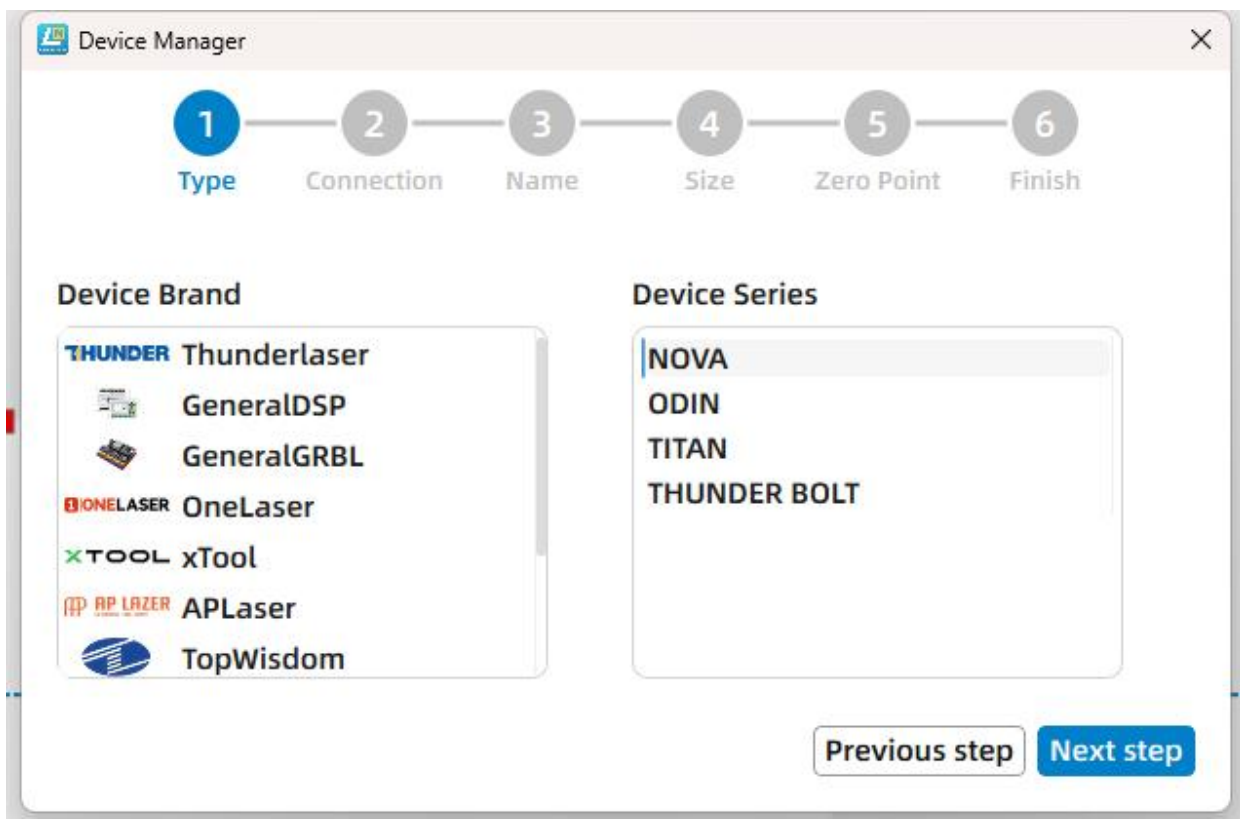
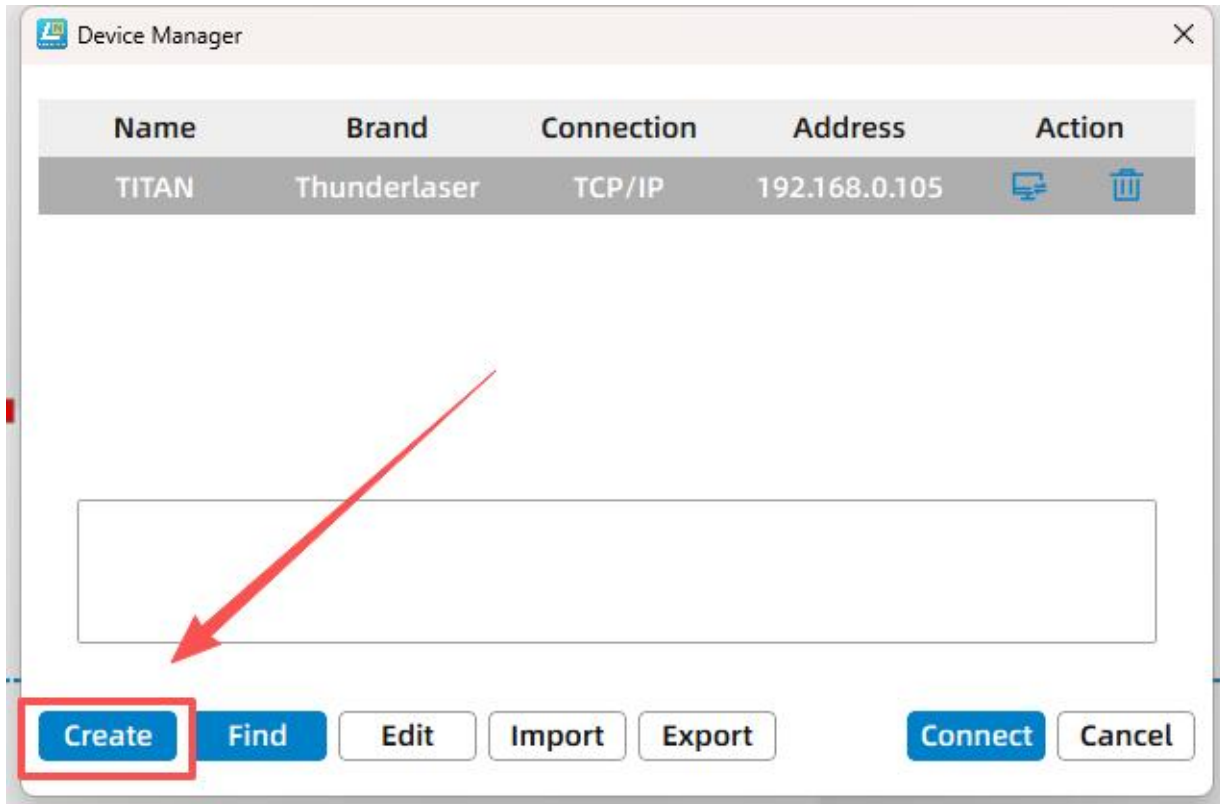
USB connection devices are divided into creating devices and searching devices. If it is a Thunder laser brand device, there is no need to create or search the device. Select the device with the device address as "Auto" on the device management page to automatically connect to the Thunder device.



If it is a device of other brands, you need to find or create the device:

Create a device

Click "Create", select the device brand, device series or controller type, and click "Next"



Select "USB port number" and click "Next";

Device Manager

1 — 2 — 3 — 4 — 5 — 6
Type Connection Name Size Zero Point Finish

Device Brand

- THUNDER** Thunderlaser
- GeneralDSP
- GeneralGRBL
- ONELASER OneLaser
- xTOOL xTool
- AP LASER APLaser
- TopWisdom

Device Series

- NOVA
- ODIN
- TITAN
- THUNDER BOLT**

Previous step Next step

Device Manager

1 — 2 — 3 — 4 — 5 — 6
Type Connection Name Size Zero Point Finish

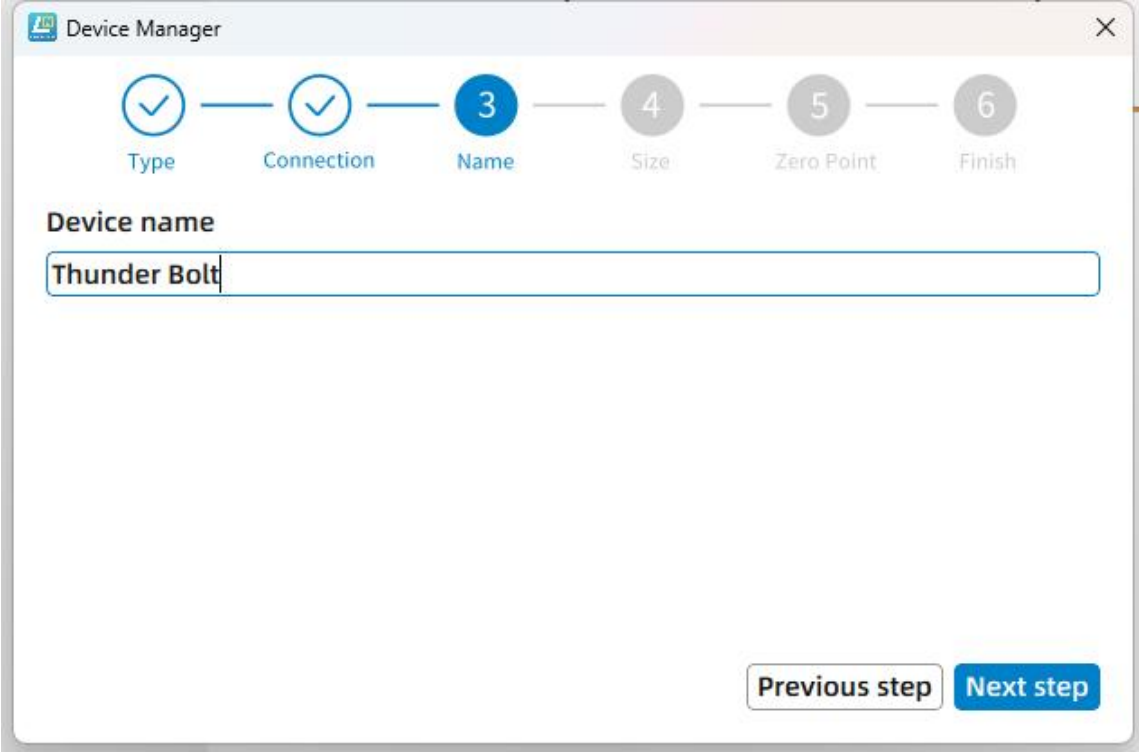
Connection

☒ USB Serial COM4

☐ TCP/IP Ethernet ⓘ 192.168.1__100 Test

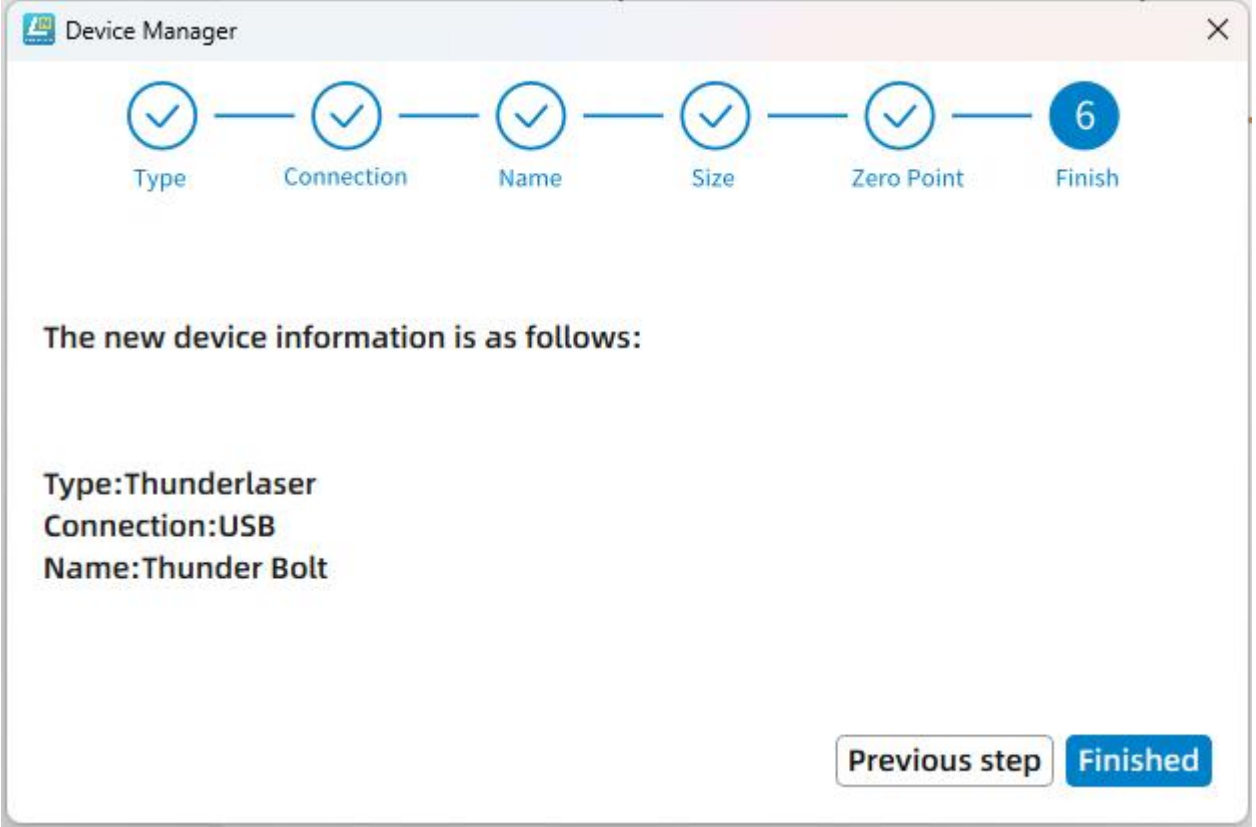
Previous step Next step

Enter a custom device name and click "Next".



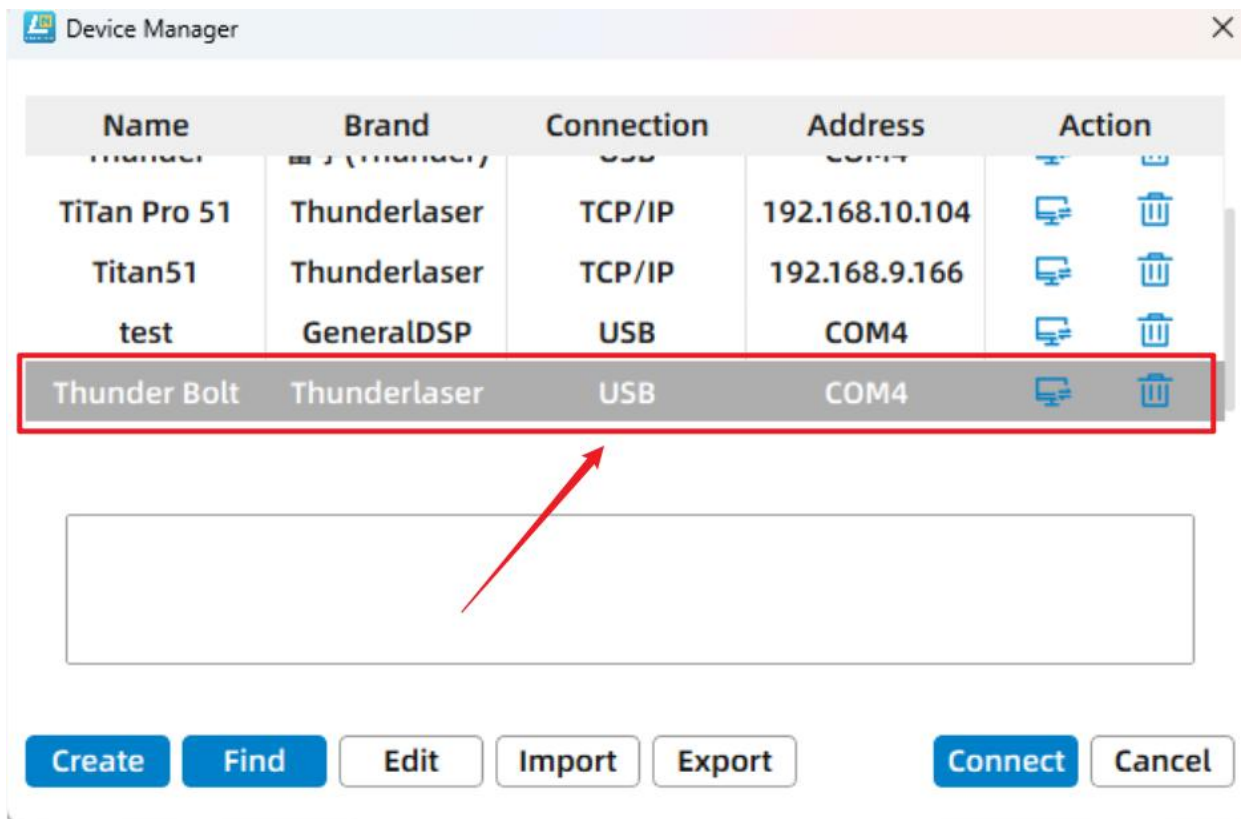
The screenshot shows the 'Device Manager' window with a progress bar at the top. The progress bar has six steps: 'Type' (checked), 'Connection' (checked), 'Name' (active, highlighted with a blue circle and number 3), 'Size' (grey circle with number 4), 'Zero Point' (grey circle with number 5), and 'Finish' (grey circle with number 6). Below the progress bar, the text 'Device name' is followed by a text input field containing 'Thunder Bolt'. At the bottom right, there are two buttons: 'Previous step' and 'Next step'.

Click Finish to successfully create the device. Note that if it is a Thunder device, you do not need to set the size and zero point.



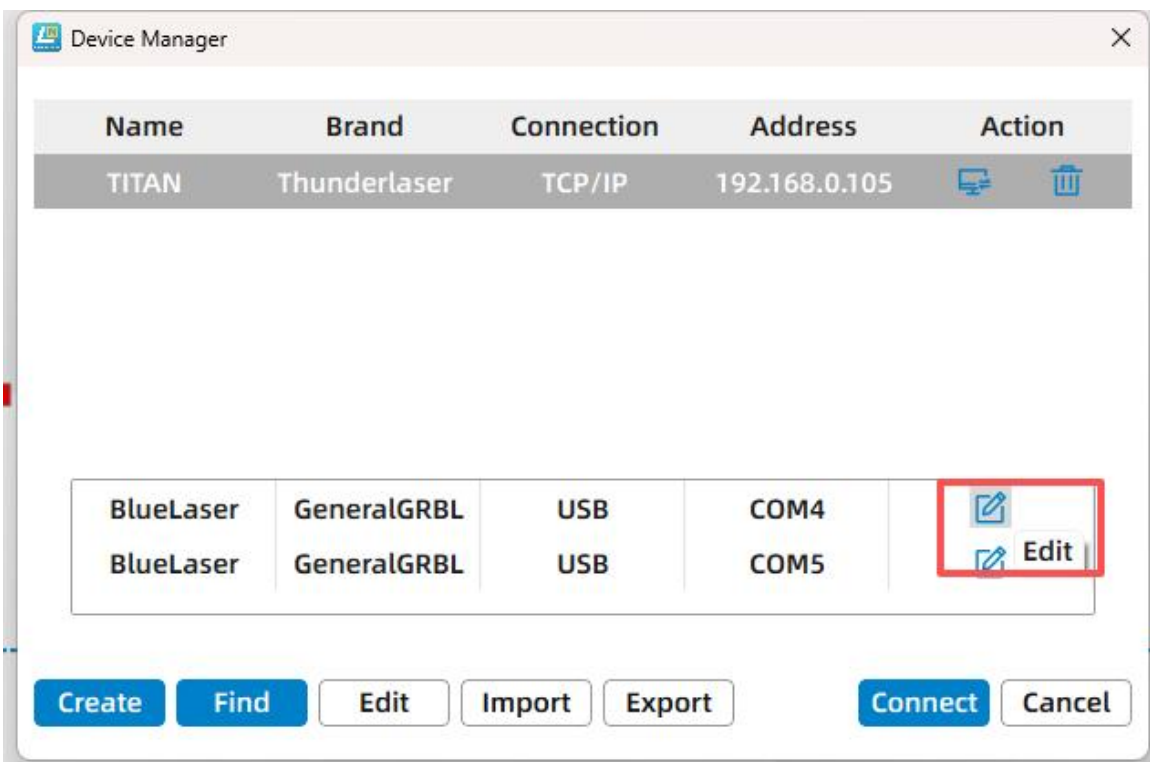
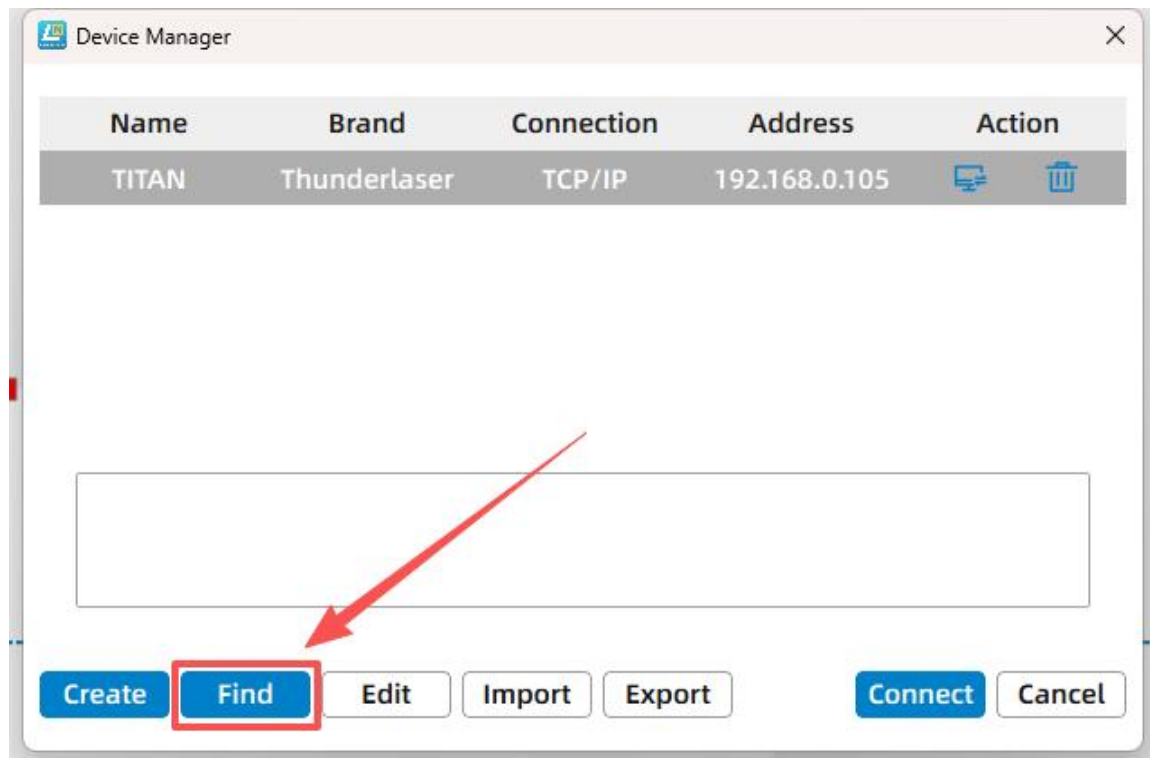
The screenshot shows the 'Device Manager' window with the progress bar updated. The first five steps ('Type', 'Connection', 'Name', 'Size', 'Zero Point') are now completed and marked with checkmarks. The 'Finish' step is now active, highlighted with a blue circle and number 6. Below the progress bar, the text 'The new device information is as follows:' is followed by the following details:
Type:Thunderlaser
Connection:USB
Name:Thunder Bolt
At the bottom right, the buttons are now 'Previous step' and 'Finished'.

Select the device and click "Connect" to connect the device.

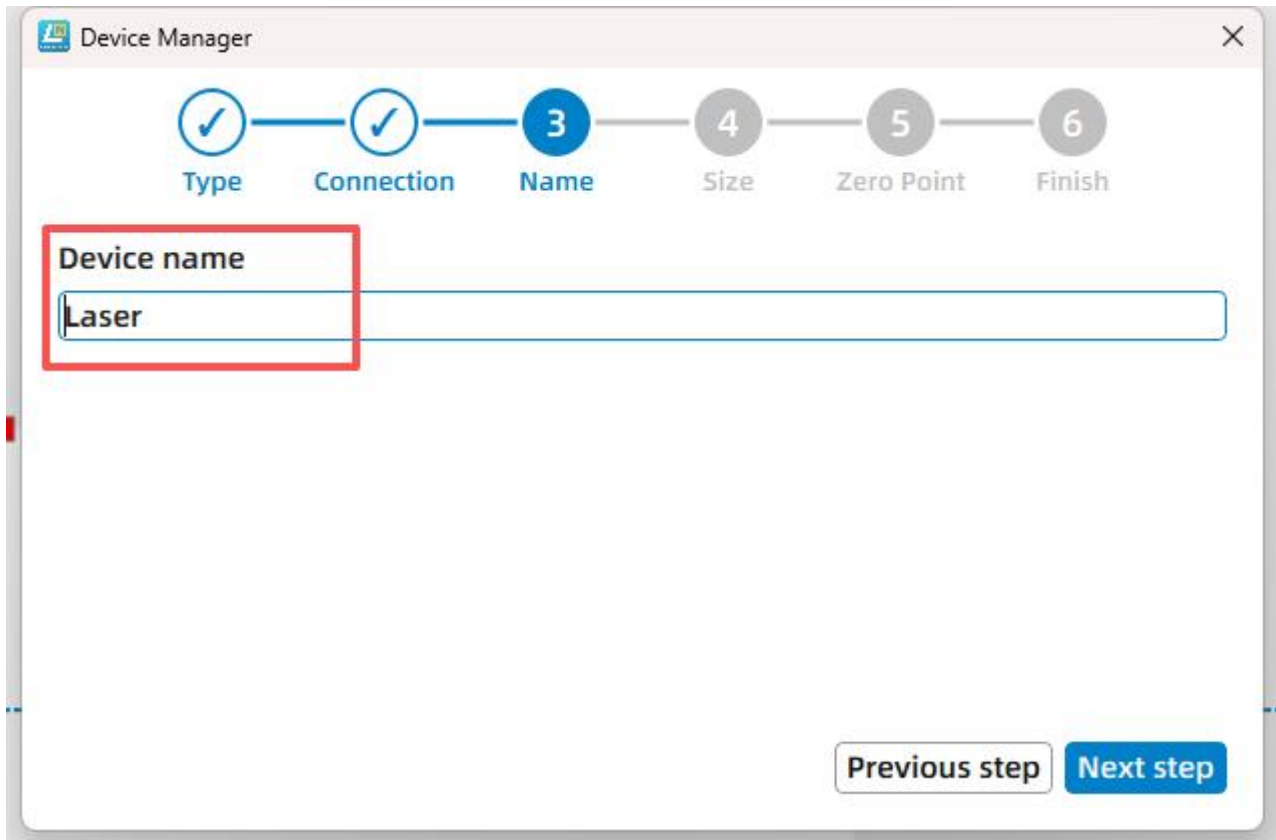


Find Device

Click "Find", and you can view the devices that the current computer is connected to in the square box below the device management page; select the device to be connected in the square box, and click the "Edit" icon of the device to enter the third step of editing the device;



Enter a custom device name and click "Next".



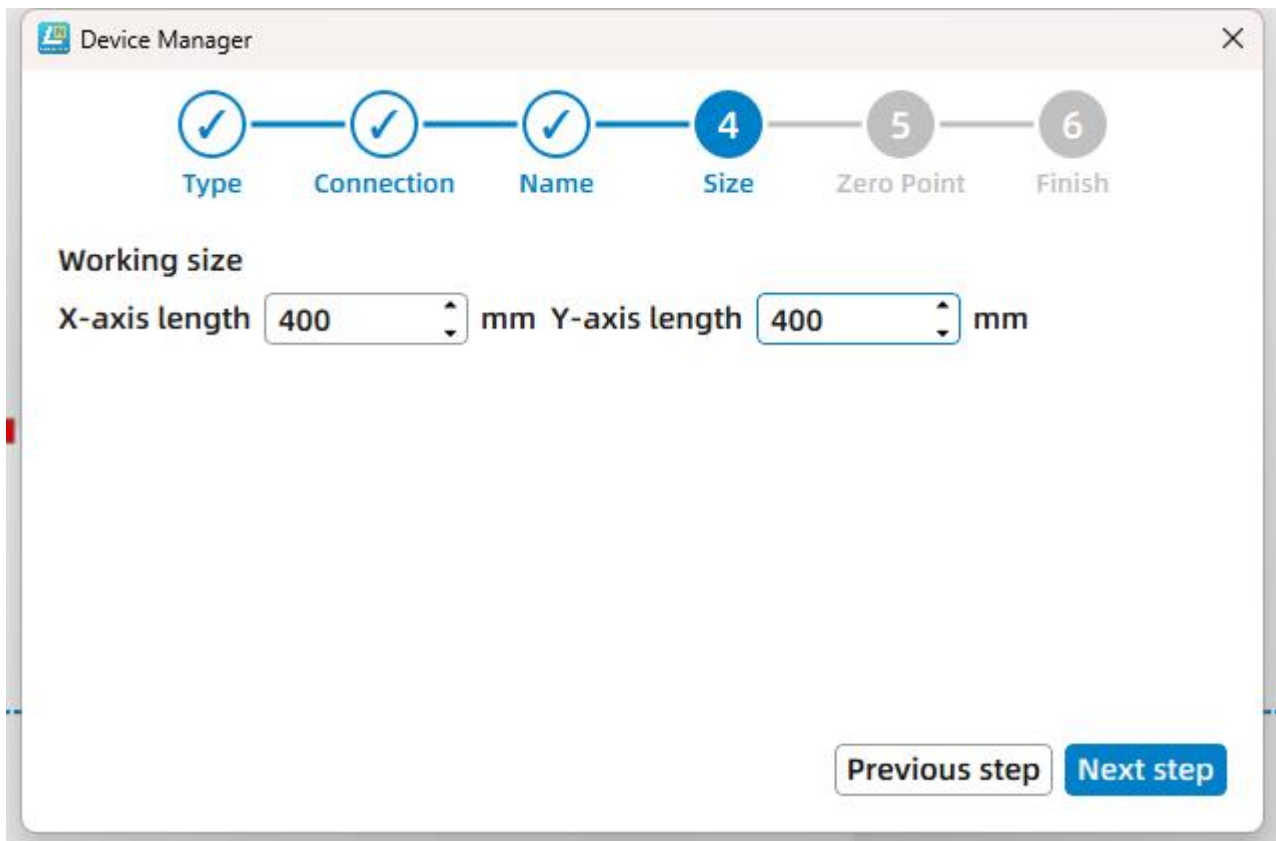
Device Manager

Progress bar: 1 (Type) ✓, 2 (Connection) ✓, 3 (Name), 4 (Size), 5 (Zero Point), 6 (Finish)

Device name:

Buttons: Previous step, Next step

Enter the size of the processing platform and click "Next";



Device Manager

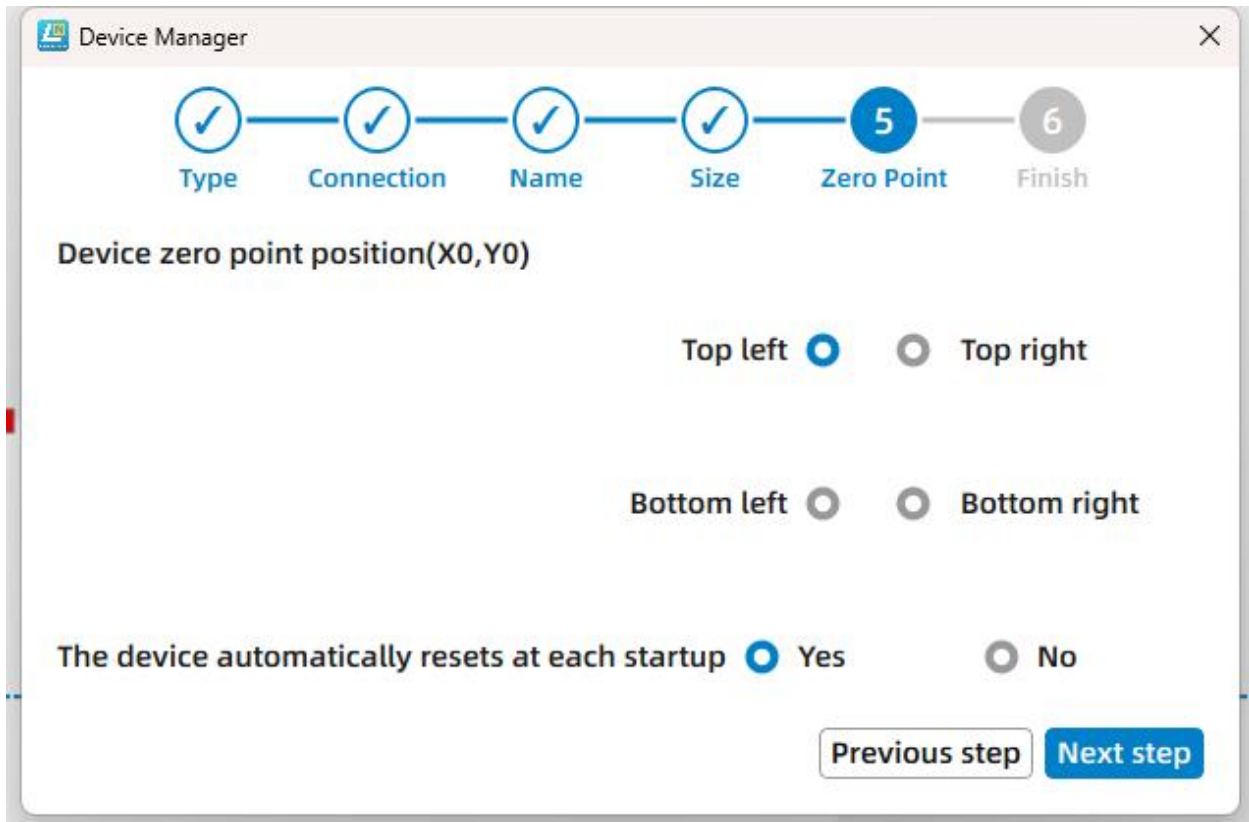
Progress bar: 1 (Type) ✓, 2 (Connection) ✓, 3 (Name) ✓, 4 (Size), 5 (Zero Point), 6 (Finish)

Working size

X-axis length: mm Y-axis length: mm

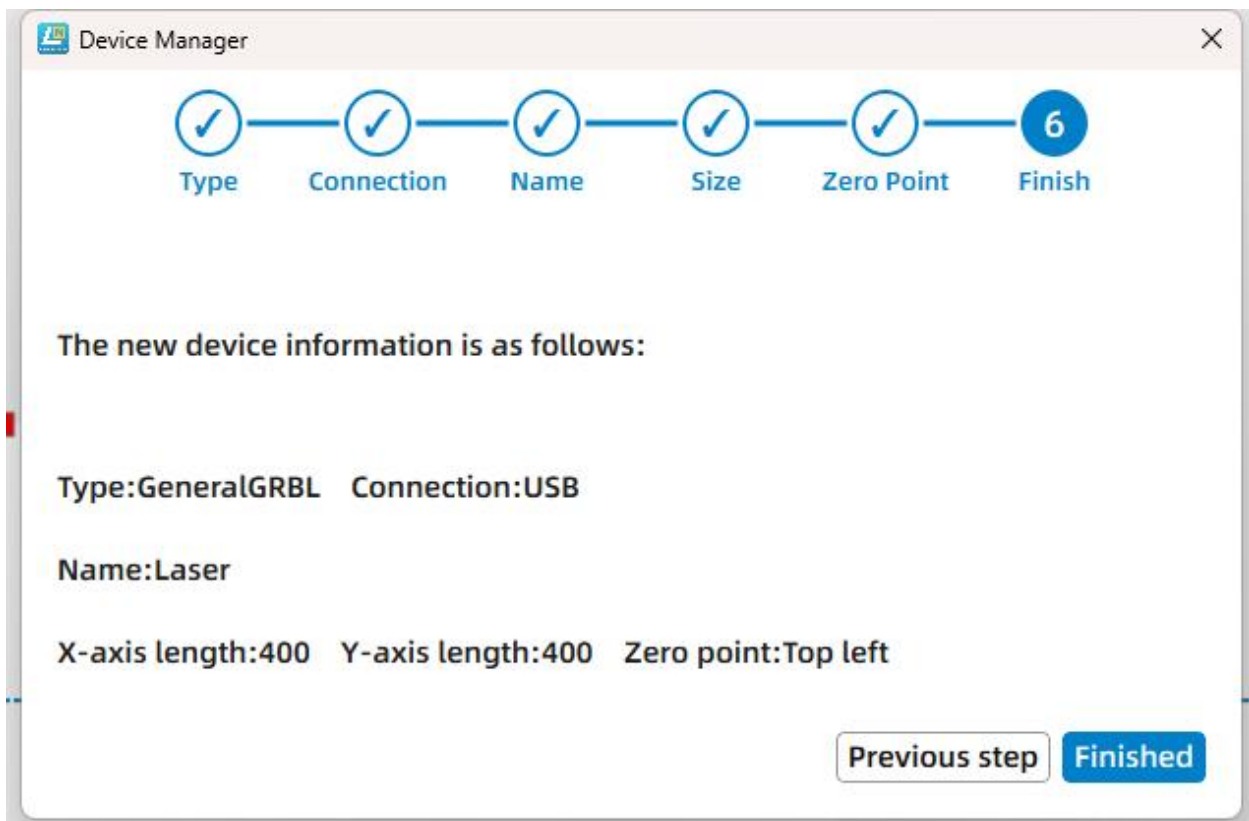
Buttons: Previous step, Next step

Set the device zero point information and click "Next";



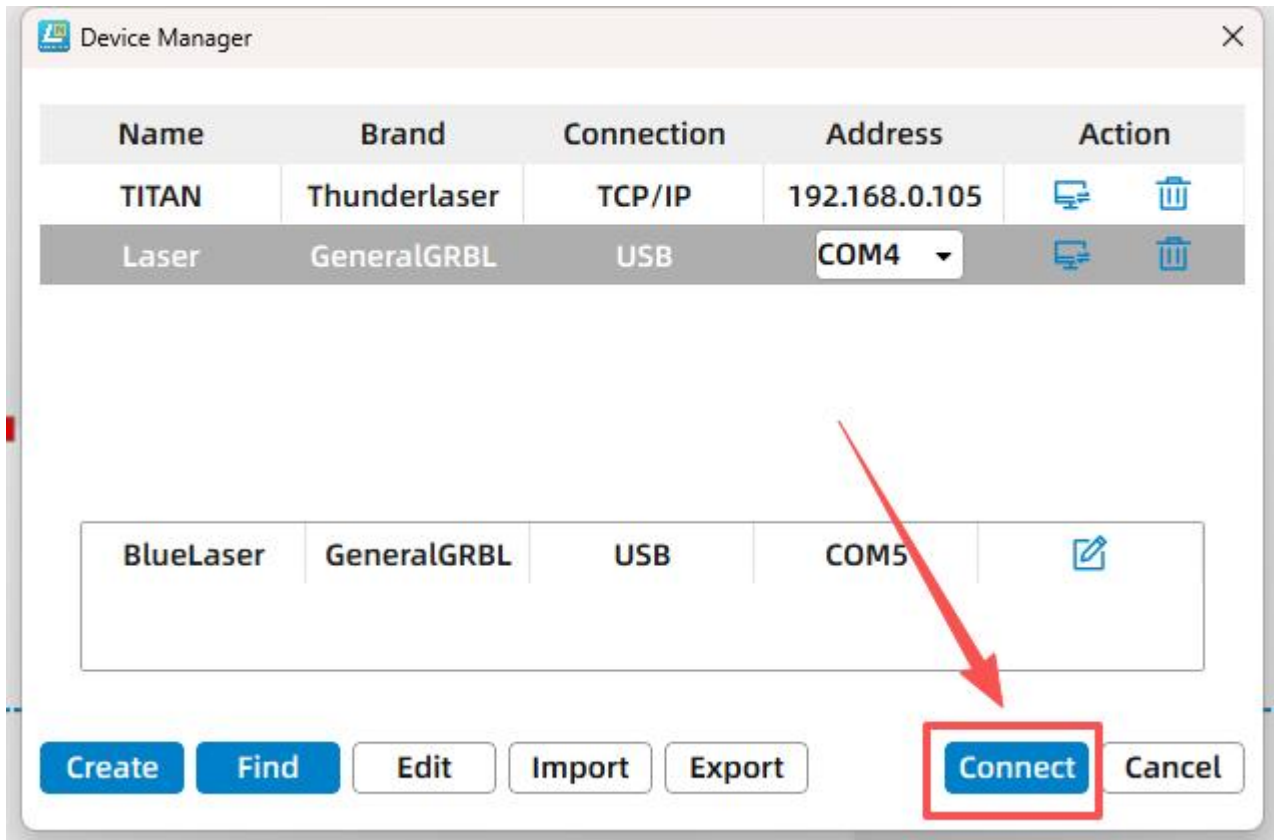
The screenshot shows the 'Device Manager' window with a progress bar at the top. The progress bar has six steps: Type, Connection, Name, Size, Zero Point, and Finish. Steps 1 through 4 are marked with checkmarks, and Step 5 is highlighted with a blue circle. Step 6 is a grey circle. Below the progress bar, the text 'Device zero point position(X0,Y0)' is displayed. There are four radio button options: 'Top left' (selected), 'Top right', 'Bottom left', and 'Bottom right'. Below these, there is a question 'The device automatically resets at each startup' with 'Yes' (selected) and 'No' radio buttons. At the bottom right, there are two buttons: 'Previous step' and 'Next step'.

Click Finish to successfully create the device. Note that if it is a Thunder device, you do not need to set the size and zero point.



The screenshot shows the 'Device Manager' window with the progress bar now showing Step 6, 'Finish', as the final step with a blue circle. Below the progress bar, the text 'The new device information is as follows:' is displayed. The device information is listed as follows: 'Type:GeneralGRBL Connection:USB', 'Name:Laser', and 'X-axis length:400 Y-axis length:400 Zero point:Top left'. At the bottom right, there are two buttons: 'Previous step' and 'Finished'.

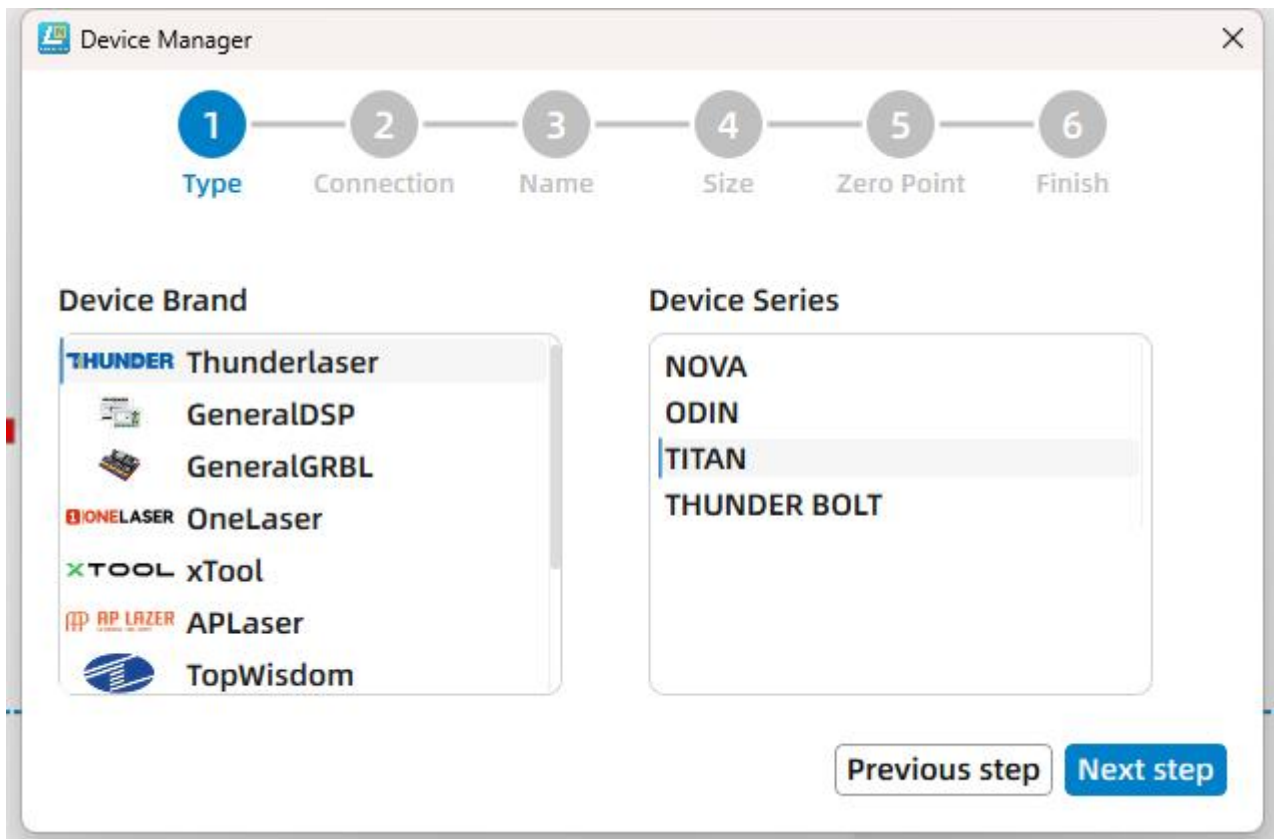
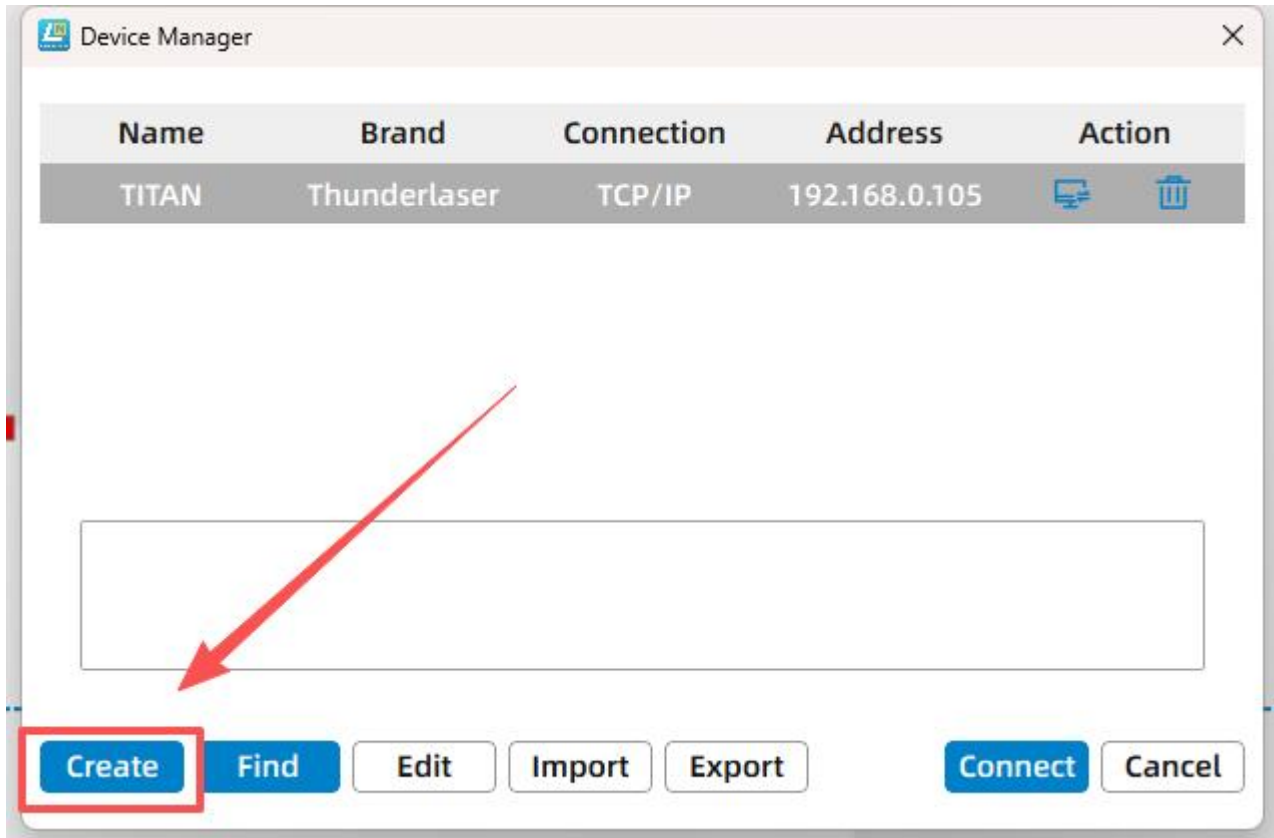
Select the device and click "Connect" to connect the device.



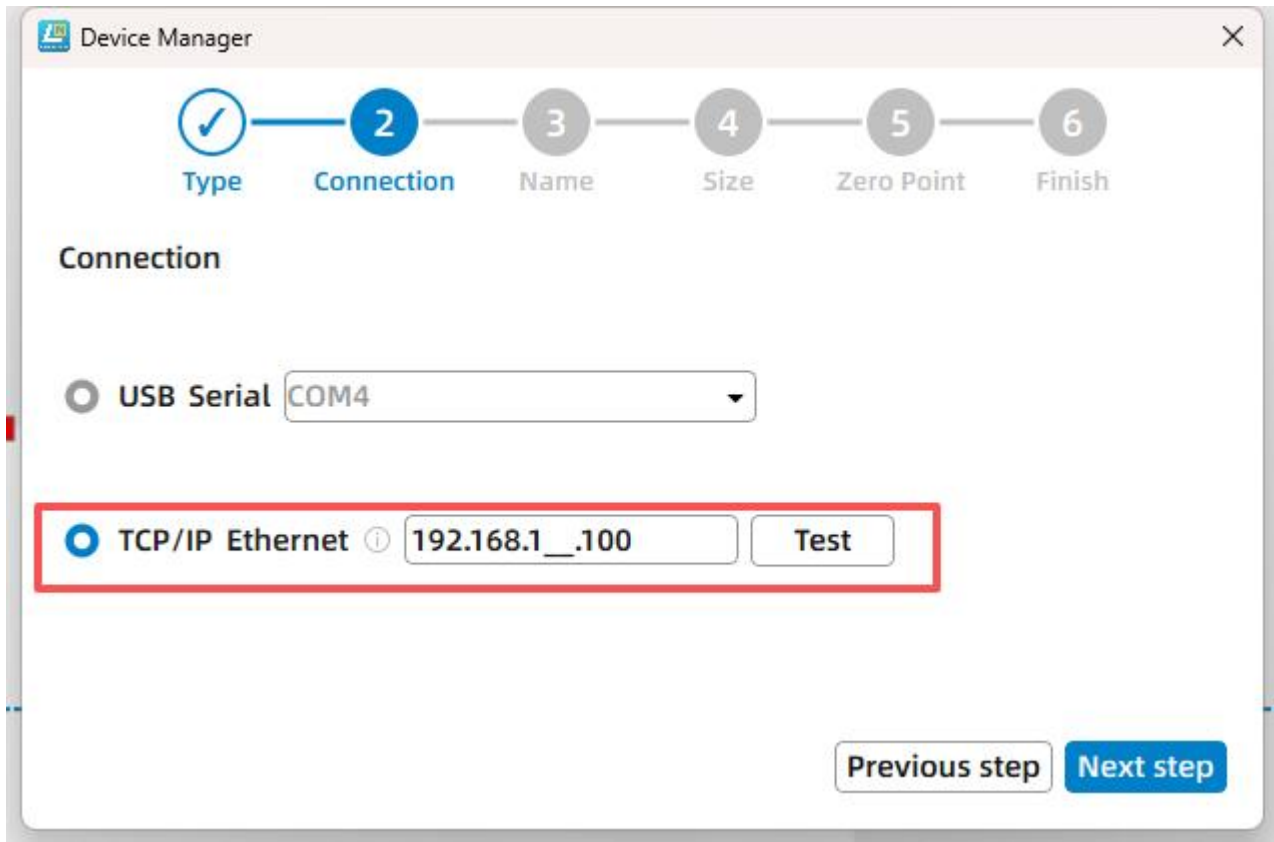
4.1.2 TCP/IP Connection

Before connecting the device via TCP/IP, you need to ensure that the device and the computer are in the same network segment.

Click "Create", select the device brand, device series or controller type, and click "Next";



Enter the TCP/IP address of the device, and click "Test" to check whether the IP address exists. After confirming that it is correct, click "Next";



Device Manager

1 2 3 4 5 6
Type Connection Name Size Zero Point Finish

Connection

☐ USB Serial COM4

☒ TCP/IP Ethernet ⓘ 192.168.1__.100 Test

Previous step Next step

Enter a custom device name and click "Next".

Device Manager

1 2 3 4 5 6
Type Connection Name Size Zero Point Finish

Device name

TITAN Pro

Previous step Next step

Click Next to complete the creation of the device.

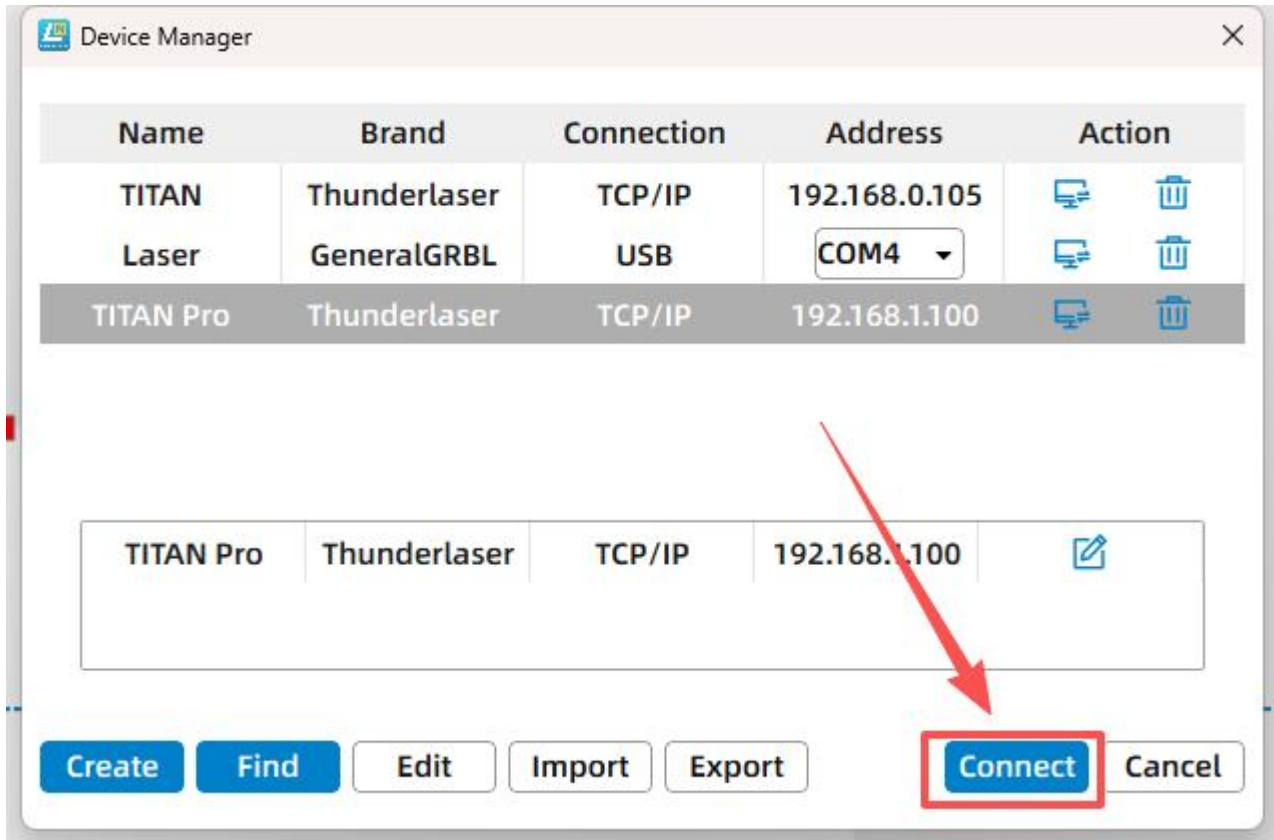
Device Manager

1 2 3 4 5 6
Type Connection Name Size Zero Point Finish

The new device information is as follows:

Type: Thunderlaser
Connection: TCP/IP
Name: TITAN Pro

Previous step Finished



4.2 Processing parameter settings

4.2.1 Setting Layers

A color block panel is provided in the lower left corner. One color block represents one layer, and 32 color block layers are provided. After selecting an element, click a different color block to switch the element to another layer; or click a layer/color block and draw an element, and the new element will be in that color block layer.

By default, the black block A is the “General cut”, the red block B is the “General line”, the yellow block C is the “General mark”, and the blue block D is the “General engrave”. The blocks E-J in the composite block are cut by default, and users can adjust according to actual needs.



4.2.2 Layers Panel

In the layer panel, you can view the color block number, processing technology, speed, power, and output of each layer.

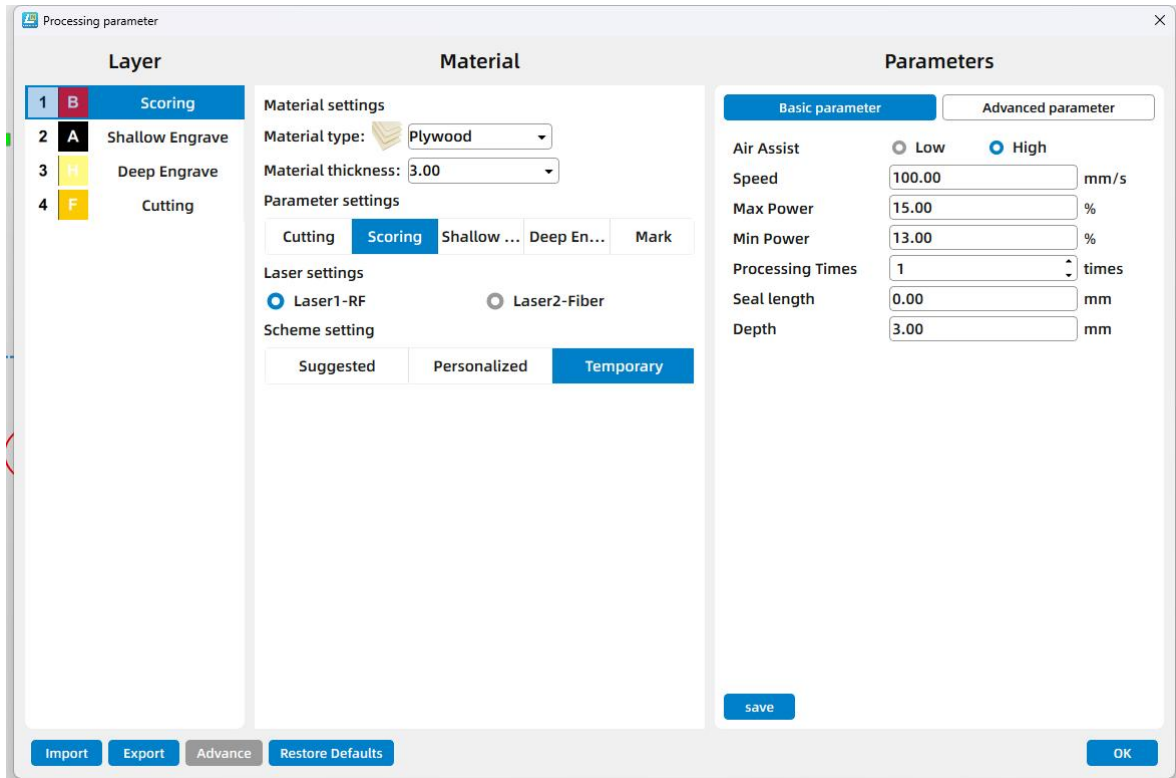
Left-click to switch the selected layer, right-click to select all elements in the current layer, double-click to enter the parameter panel of the layer to modify the parameters, press and hold the left button to change the layer order.

By default, the layers are arranged from top to bottom in the order of **scoring- shallow engraving - deep engraving - cutting**. Newly added layers are arranged at the top of the process module according to the process.

Layers				Processing		
Num	Mode	Speed	Power	Type	Air assis	Output
01	B Scori	100.0	15.0	RF	High	👁
02	A Shall	500.0	20.0	RF	High	👁
03	H Deep	1.0	0.0	RF	High	👁
04	F Cuttir	1.0	0.0	RF	High	👁

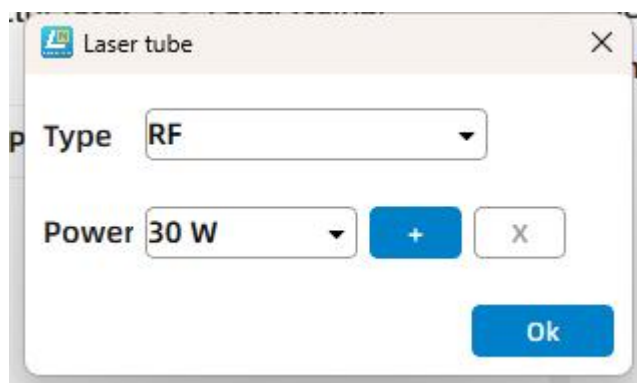
4.2.3 Processing parameters

LaserMaker is equipped with a recommended parameter library. When you first install the software, the default recommended parameter is "Glass Tube-80W". After connecting the device, it will automatically read the laser tube and power of the connected device and recommend suitable parameters based on the current device.



Double-click any layer to enter the layer panel to modify the parameters of the current layer. After gradually selecting the material type, material thickness, and processing technology, LaserMaker's recommended parameters will appear in the parameter panel. Users can also adjust the parameters to suit their own needs based on actual processing conditions.

"Import" is used to import a third-party parameter library; "Export" is used to export the current parameter library; "Advanced" is used to modify the laser type and power. After modification, the recommended parameters will be updated, as shown in the figure below; "Restore Defaults" is used to undo all modified parameter values and use the parameters recommended by LaserMaker.



LaserMaker currently has five processing technologies. Conventional technologies include cutting, tracing, shallow engraving, and deep engraving. Marking is a special technology that is used as a mark point in actual processing without setting processing parameters.

Basic parameters

Air Assist

During the laser cutting process, high-pressure gas is sprayed into the cutting area through a nozzle. Strong or weak blowing needs to be selected according to the processing speed and power.

Speed

The linear speed at which the laser head moves along the cutting path, measured in meters per minute (m/min) or millimeters per second (mm/s).

Max/Min Power

The average energy intensity of the laser output, usually measured in watts (W).

Processing Times

The number of times the elements in the layer need to be cut repeatedly.

Seal length

When laser cutting, the cutting distance is overlapped at the start and end of the cutting path.

Thickness

"Thickness" sets the material's thickness to optimize laser processing.

Advance parameters

Use Tabs

When cutting materials, a distance is reserved without processing, which is called the nozzle. The nozzle length and nozzle distance can be set.

Using Cutting Leads

A short straight line or curve extending from the outside or inside of the actual cutting workpiece to the actual cutting starting point, so that defects only appear in the waste area, ensuring a smooth edge of the workpiece. External and internal leads, lead-in lines and lead-out lines can be set.

Enable Dynamic Focus

Enables dynamic focus, allowing the laser to automatically adjust the focus during processing to meet different requirements.

Use Laser compensation

Enables laser compensation to adjust deviations during laser processing and optimize machining accuracy.

Marker layer

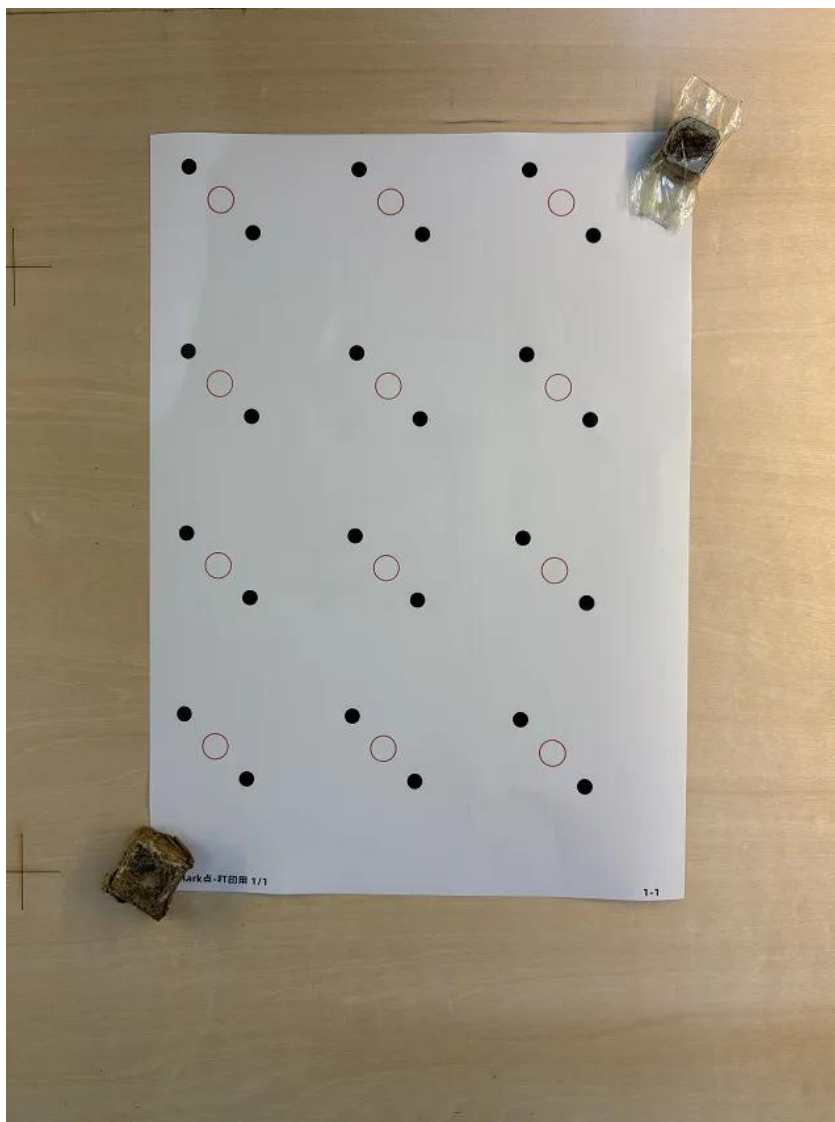
The marking process is used to process and cut printed graphics such as paper, film, acrylic resin, wood, and cardboard. Import the design drawing into LaserMaker, place the printed material according to the design drawing on the processing platform, click "Send" or "Process", set the marking parameters, and then you can accurately cut the printed material.

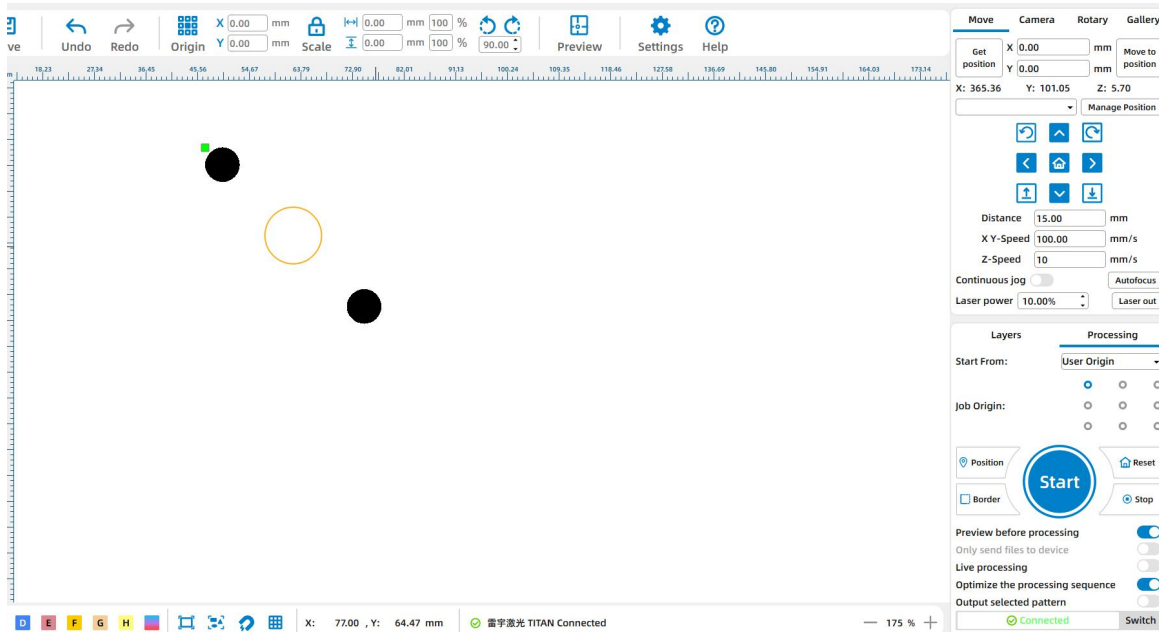
1. Camera Calibration and File Preparation.

First and foremost, it is essential to ensure that your camera is either calibrated or that the calibration file has been successfully imported. This step is fundamental to the accuracy of subsequent operations.

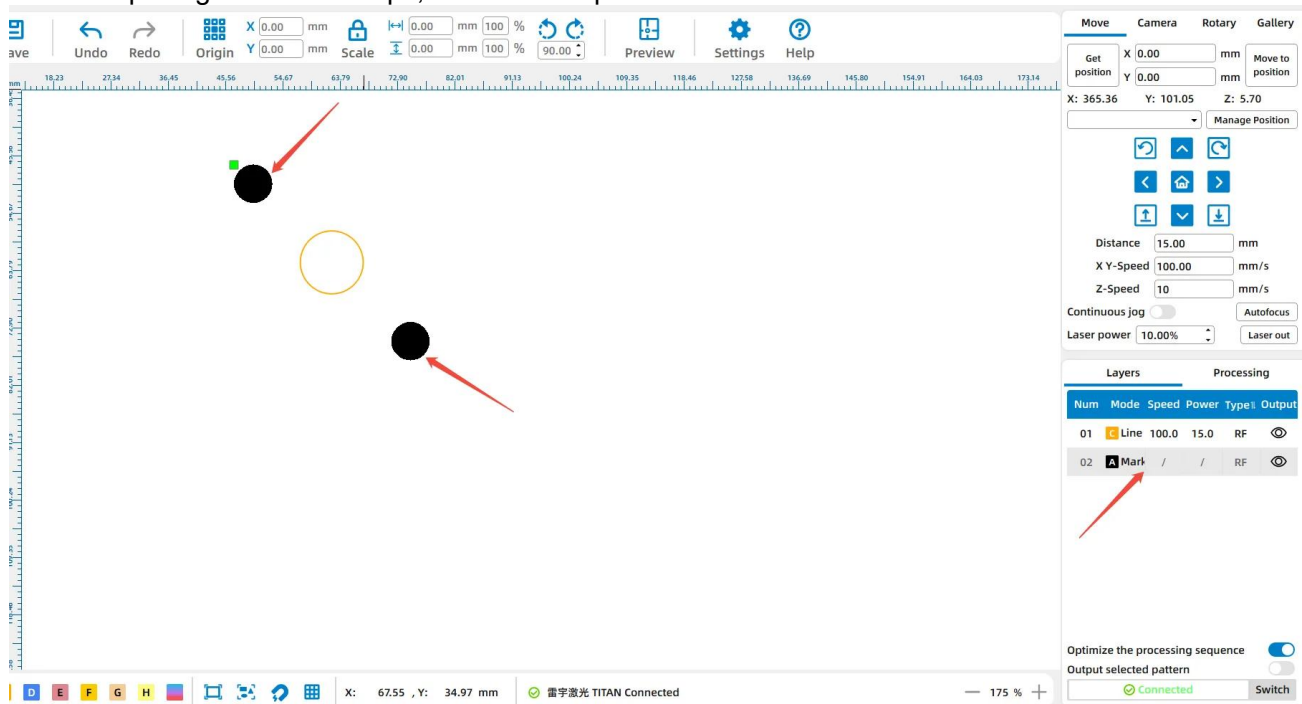
2. Pattern Placement and File Import.

Next, carefully place the target pattern on the work platform. Following this, import the corresponding file into the software.



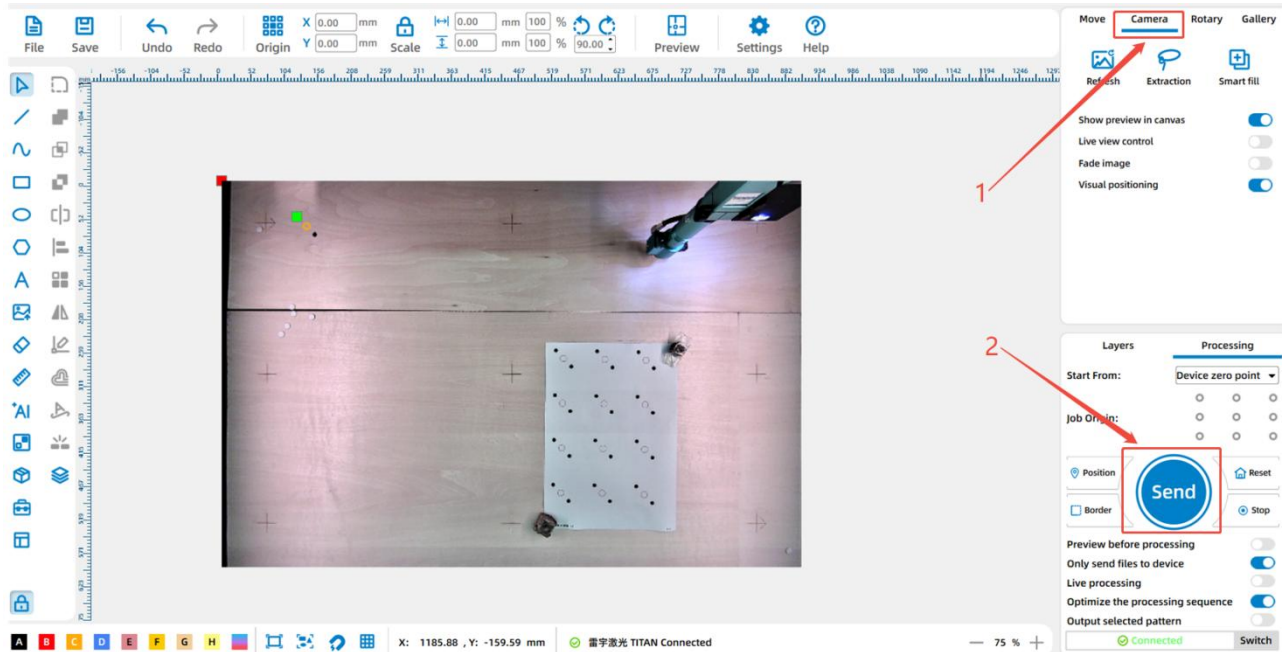


After completing the above steps, set the mark point.



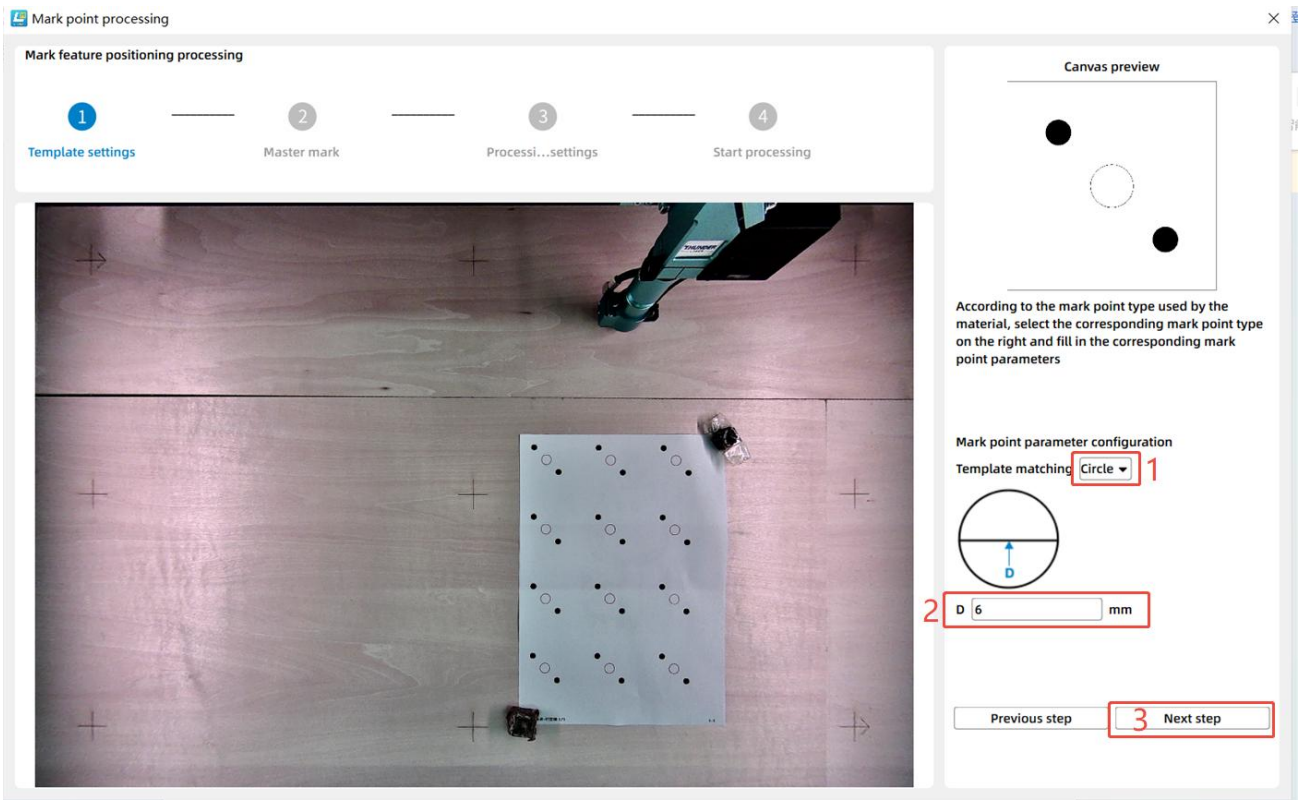
3. Real-Time Image Acquisition.

After completing the aforementioned steps, click on the 'Camera' option to obtain real-time images. Subsequently, click the 'Send' button to transmit the relevant data.



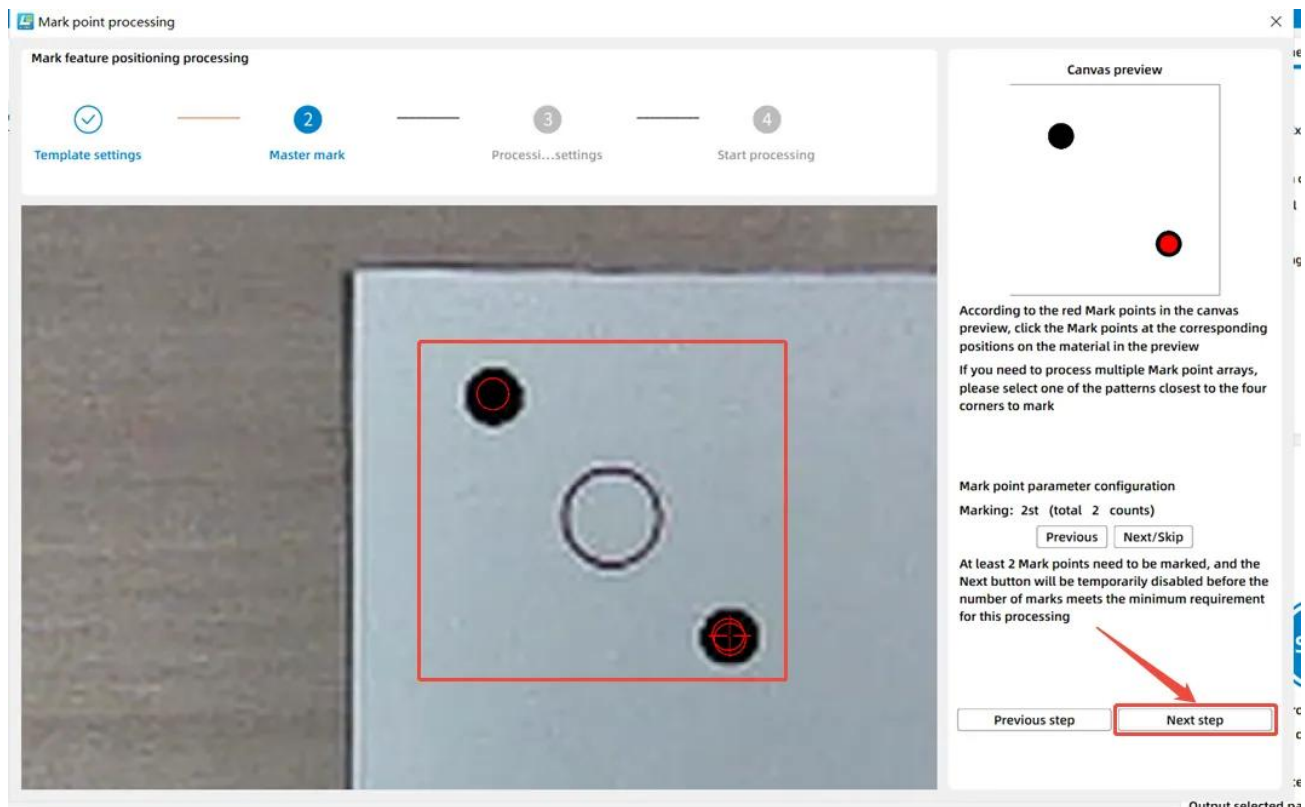
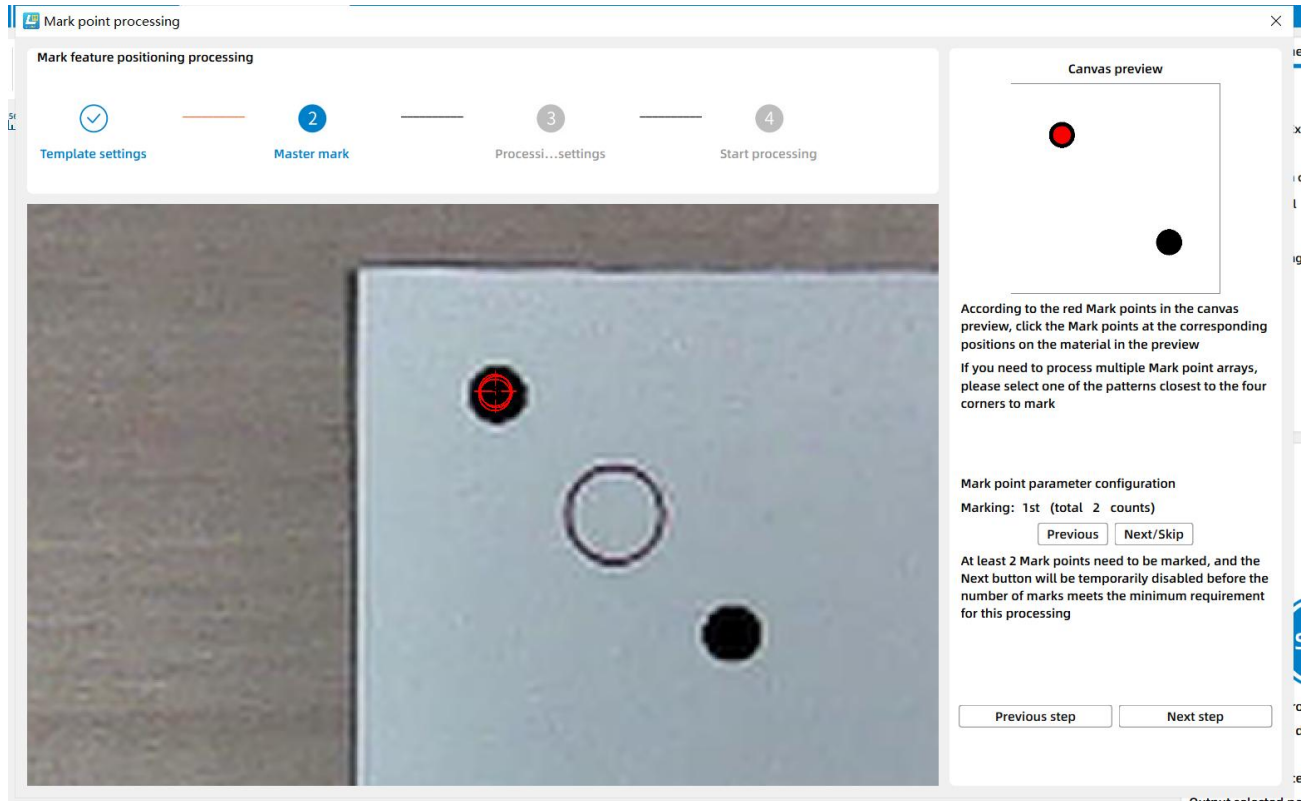
4. Template Settings in Mark Point Processing.

In the template settings step of mark point processing, first, select the corresponding type in 'Template matching' of 'Mark point parameter configuration' on the right according to the mark point type of the material, set the mark point size, and finally click 'Next step'.



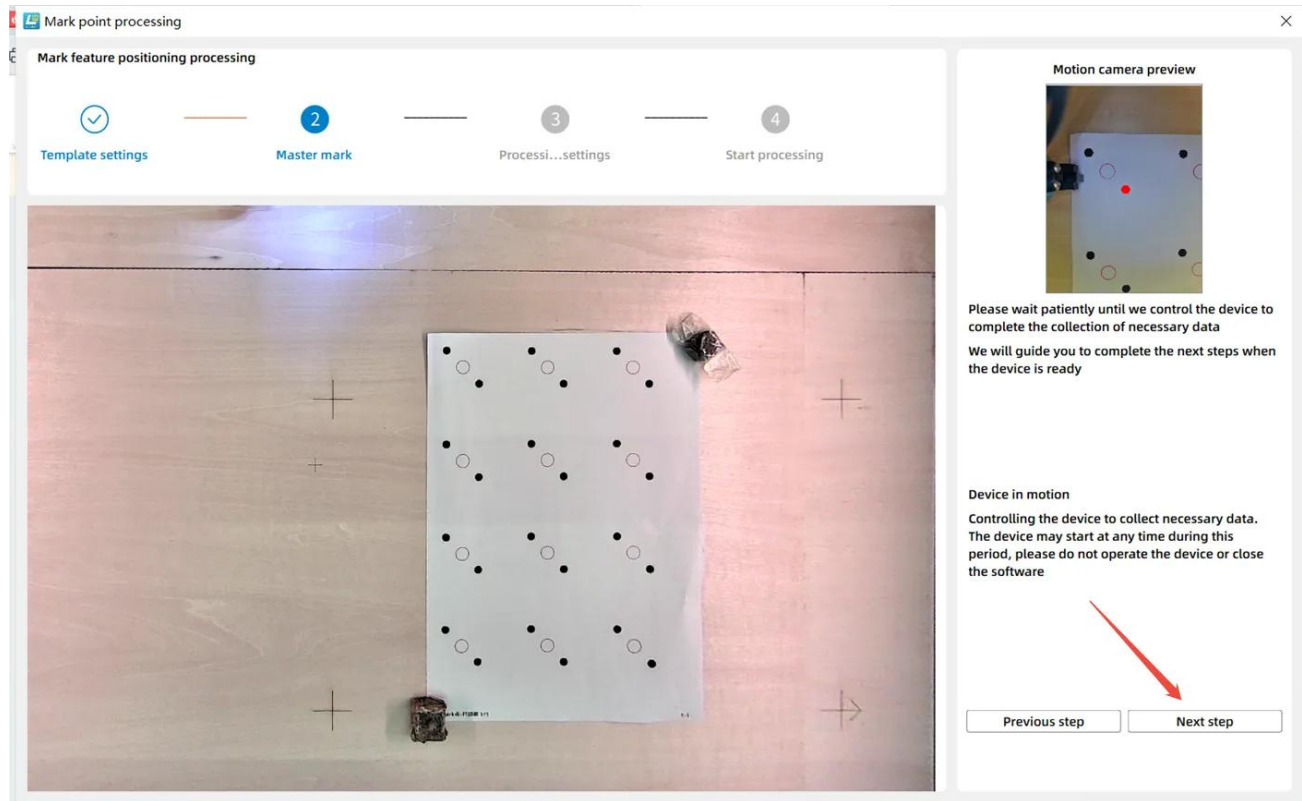
5. Master Marking Process.

In the master mark step, click mark points on the material as per red points in canvas preview. For multiple arrays, choose patterns near four corners. Mark at least 2 points and click 'Next step' when qualified.



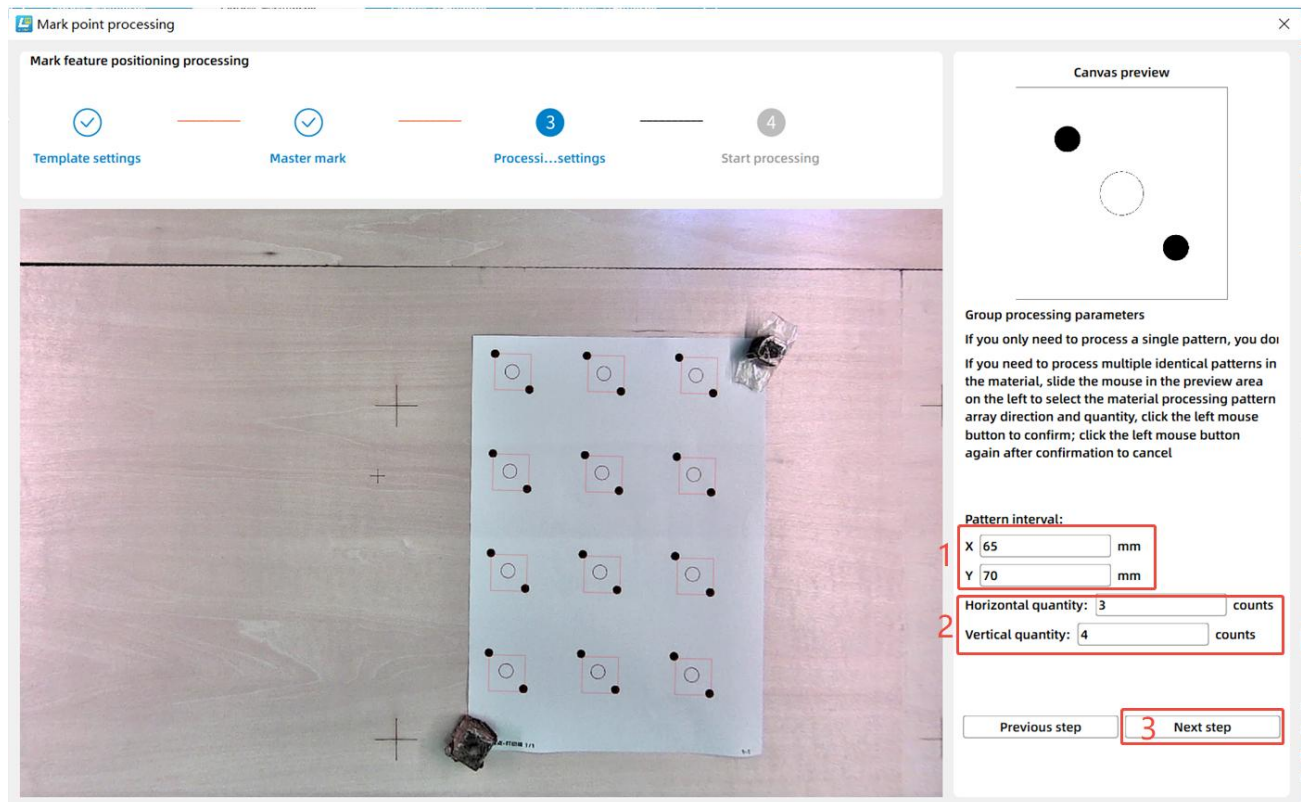
6. Automatic Data Collection.

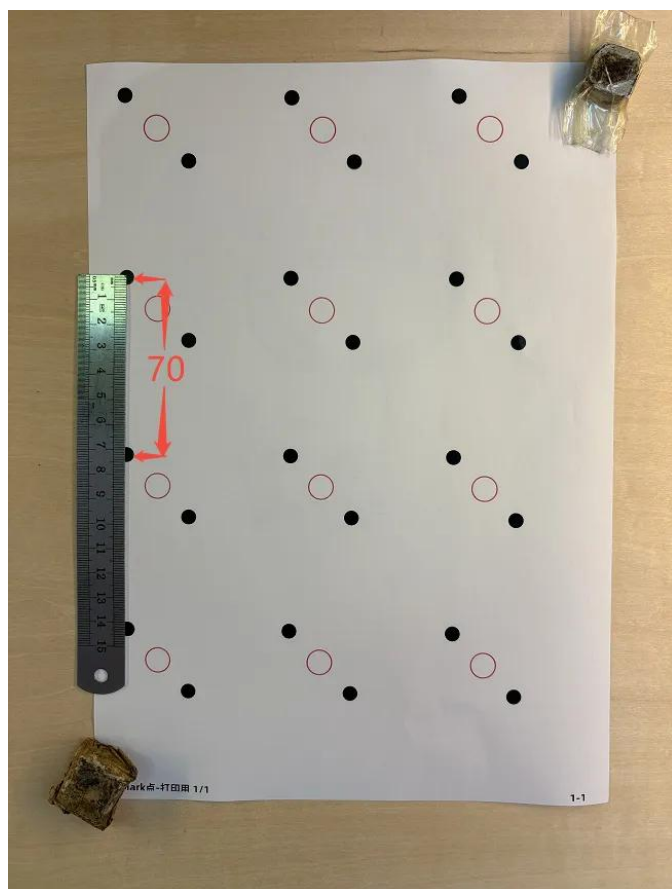
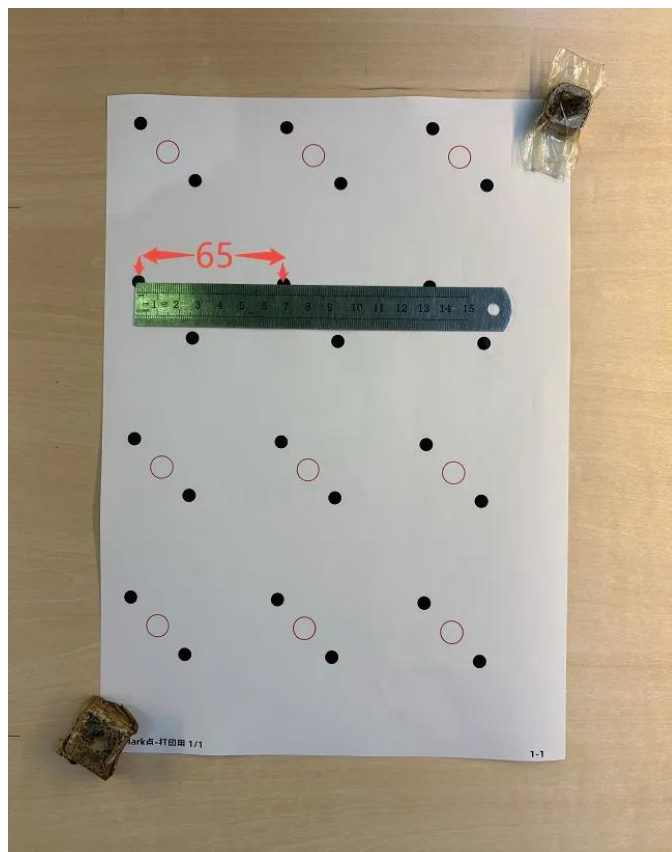
At this point, the device will initiate the automatic collection of data. During this period, it is crucial not to operate the device or close the software. Once the data collection is completed, click 'Next step' to proceed.



7. Processing Settings Configuration.

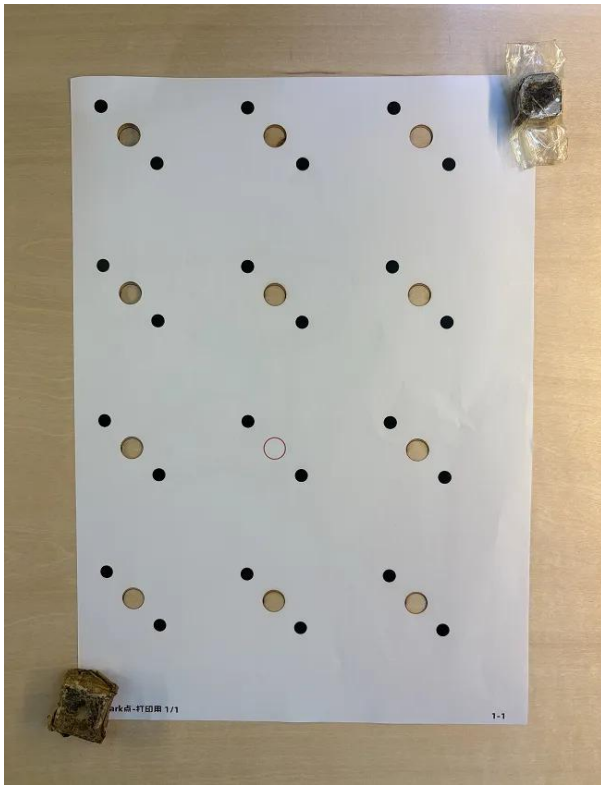
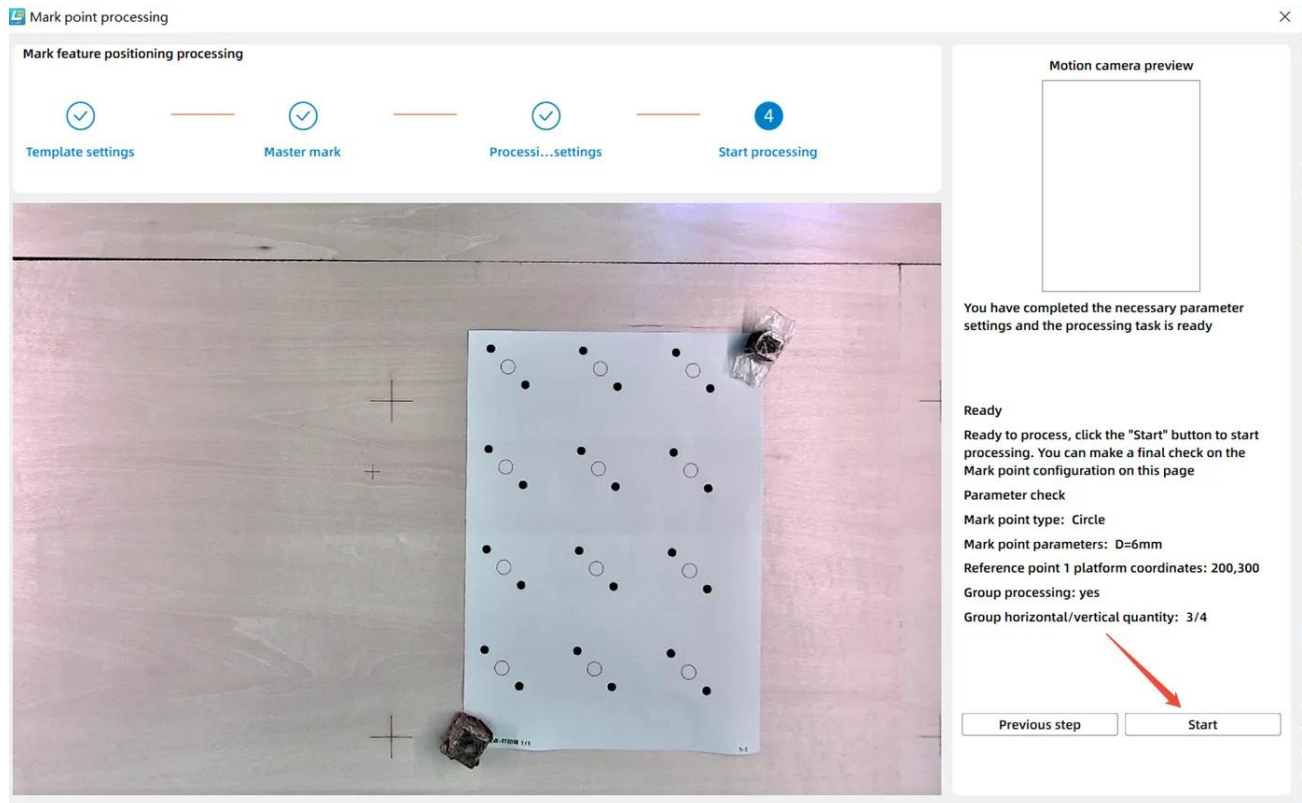
In the processing settings step, configure the pattern interval (X, Y) as well as the number of rows and columns according to your specific needs. After making these adjustments, click 'Next step'.





8. Initiating the Processing.

When parameters are set, click 'Start' to begin processing.



4.3 Controlling device movement

In the "Move" panel in the upper right corner of the operation page, you can control the movement of the device.

Click "Get Position" to display the current laser head position in the XY input box;

Enter the XY coordinates in the XY input box and click "Move to position" to move the laser head to that position;

The XYZ at the bottom can display the position of the laser head in real time. When the equipment is processing, the position of the laser head before processing is displayed until the processing is completed, and the position of the laser head after processing is displayed.

X: 271.00 Y: 542.00 Z: 3000.00

"Manage Position" is for managing the location of the positioning points. Click Manage Location and a small pop-up window will appear (no one is selected by default). The Delete button and the editable content on the right will be grayed out. Click any positioning point on the left to edit the information of the

current positioning point on the right. When you click "New", the positioning point name is "Default", and "XYZ" automatically reads the current information of the device and is arranged at the bottom left. Click the drop-down selection box (the most recently added is at the bottom) to display the previously saved locations. Select one and the location information of the positioning point will be automatically read and filled into the input box after obtaining the location. Although the Z axis is not displayed, the device will automatically move to the location when you click the arrival position.

Manage Position

Manage Position Points

✕

Name	Coordinates		
Default	X:314.09	Y:238.00	Z:5.70

Edit Position Points

Name

X mm

Y mm

Z mm

New
Delete
Ok

Click left, right, down, or up to move the laser head. You can set the "Distance" and "Speed" for each click.

↺

↑

↻

←

⌂

→

↑

↓

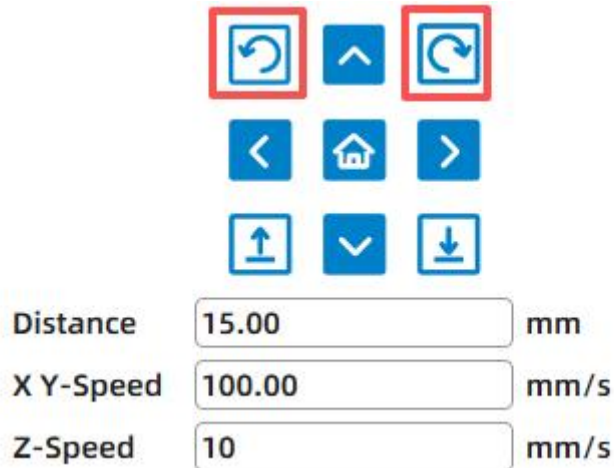
↓

Distance mm

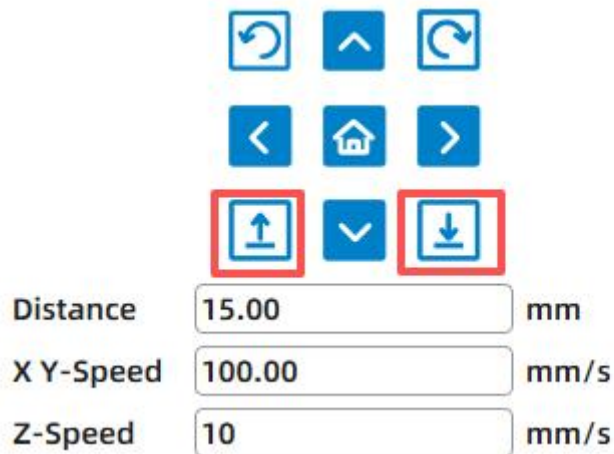
X Y-Speed mm/s

Z-Speed mm/s

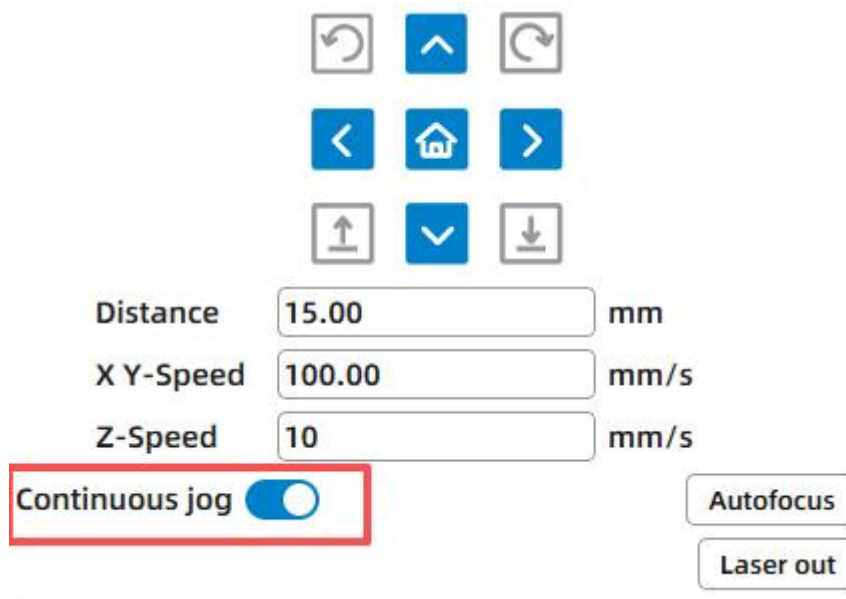
Click counterclockwise or clockwise to control the rotation of the axis, and set the "distance" and "speed" of movement per click;



Click up or down to control the movement of the processing platform or laser head (depending on the device). You can set the "Distance" and "Speed" of movement per click.

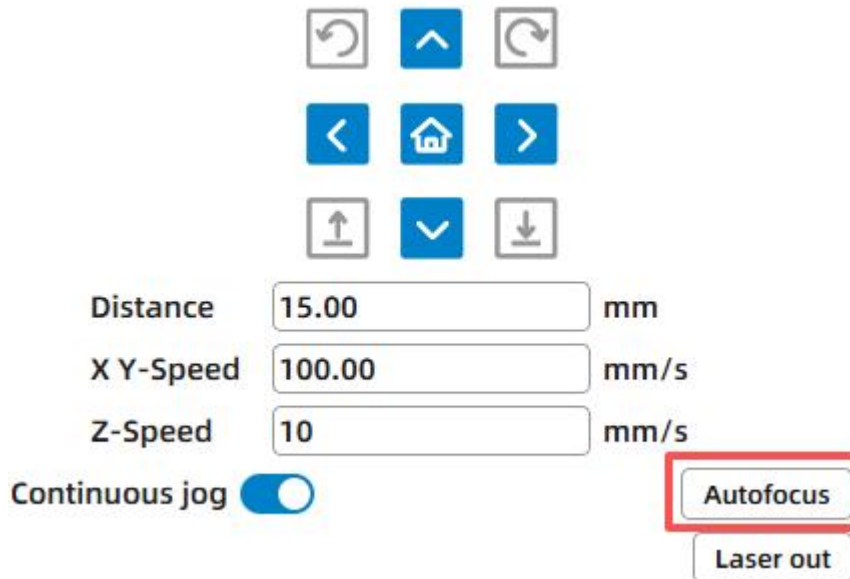


After turning on "Continuous job", long press left, right, down, and up to continuously move the laser head position;

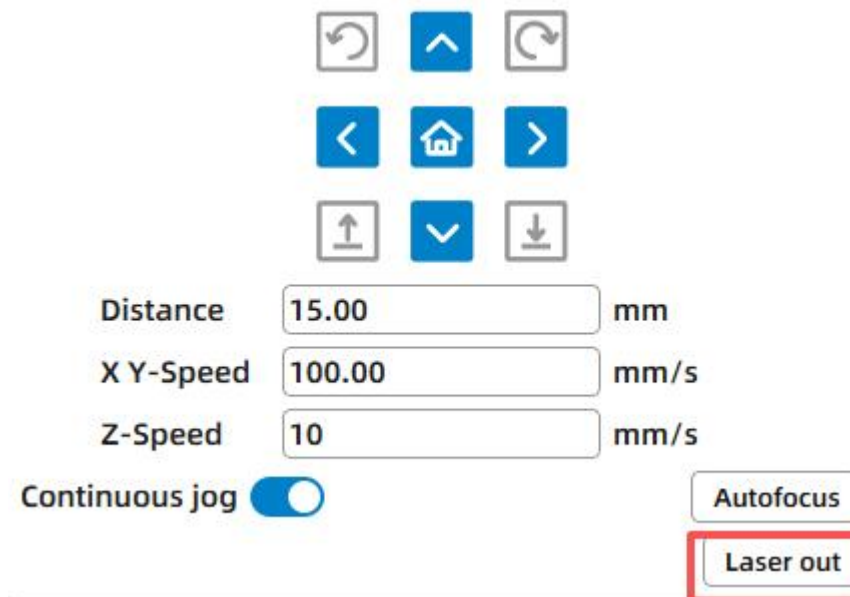


After it is turned on, you can control the laser head to fire, which is a unique function of GRBL equipment.

Click the Autofocus button to enable the laser equipment to automatically adjust its focus.

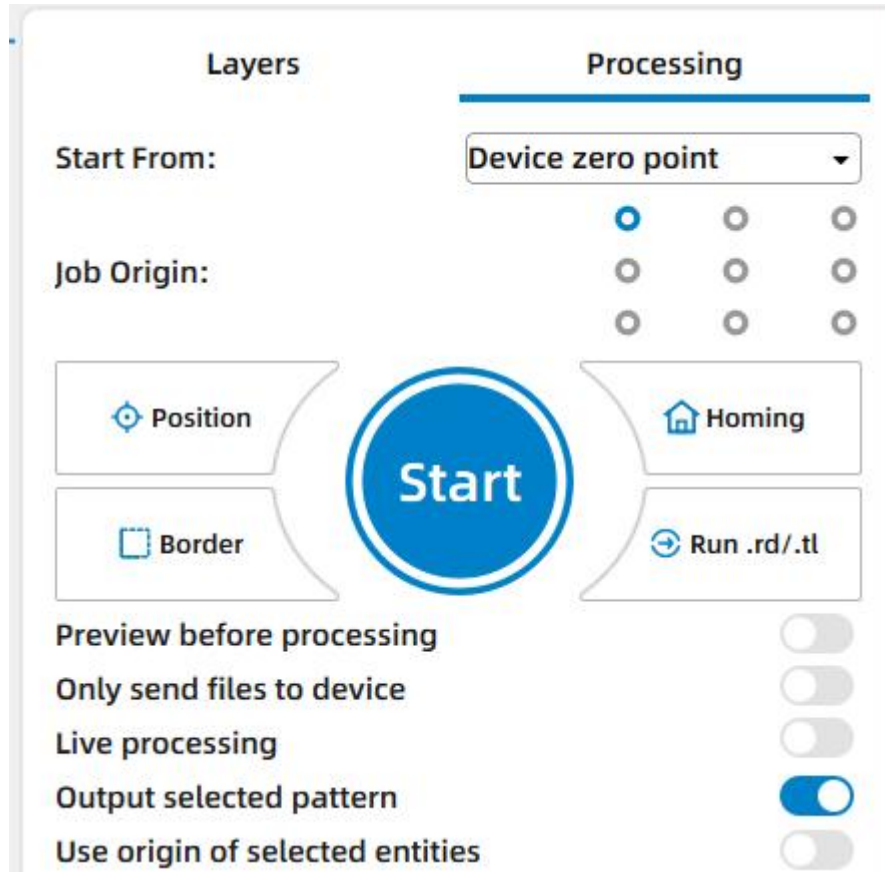


Click the Laser out button to control the laser's emission status, a key operational option.



4.4 Control equipment processing

In the Processing panel in the lower right corner of the operation page, you can control the equipment processing.



Start From

They are device zero point, user origin, and absolute coords.



Job origin

The positions of the laser head relative to the graphics element are shown in the nine points in the figure below.



Position

Set the current position of the laser head as the positioning point, and the drawing will be processed from the positioning point during processing.

Homing

A standard operation that restores the device's motion control system to a preset initial state, with the X and Y axes returning to the device's origin.

Border

By controlling the laser head to run empty along the designed path (without emitting laser), the actual cutting/engraving contour can be previewed on the material surface. commences directly.

Run .rd/.tl

Can run files in .rd or .rtl format.



Preview before processing

Click this button that you can preview real processing.

Only send files to device

When enabled, files are transferred to the device without immediately initiating processing; when disabled, the processing workflow.

Live processing

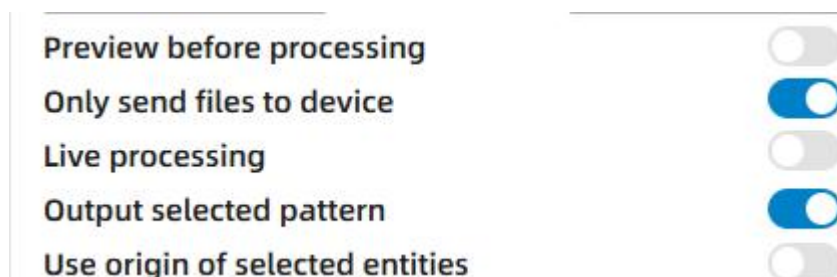
Once activated, the machining process is visualised in real time, facilitating the monitoring of progress and results.

Output selected pattern

Enable this function to process and output only the selected graphic elements, allowing precise handling of specific graphics.

Use origin of selected entities

When enabled, the machining reference origin shall be the origin of the selected graphic element itself.



Start

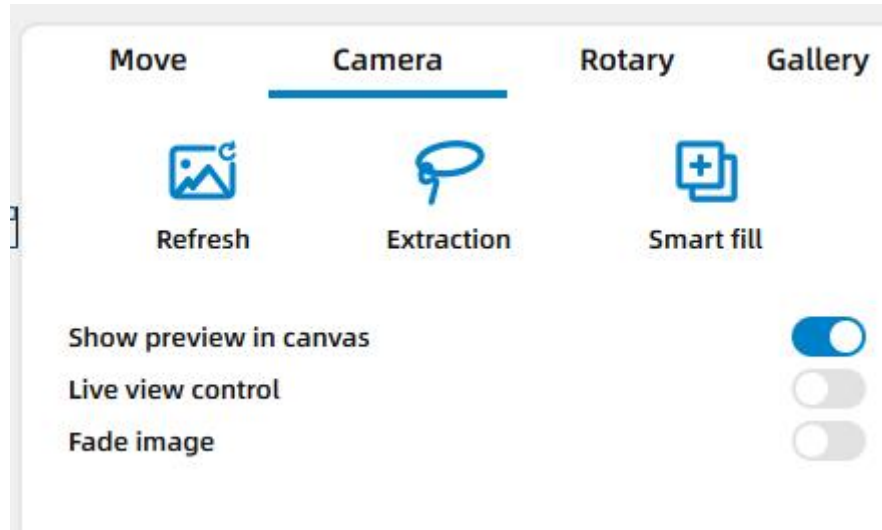
Click "Start" to start processing the drawing on the canvas. The "Start" button will display the current processing progress. Click it to "Pause" or "Continue" the processing.



4.5 Control accessories

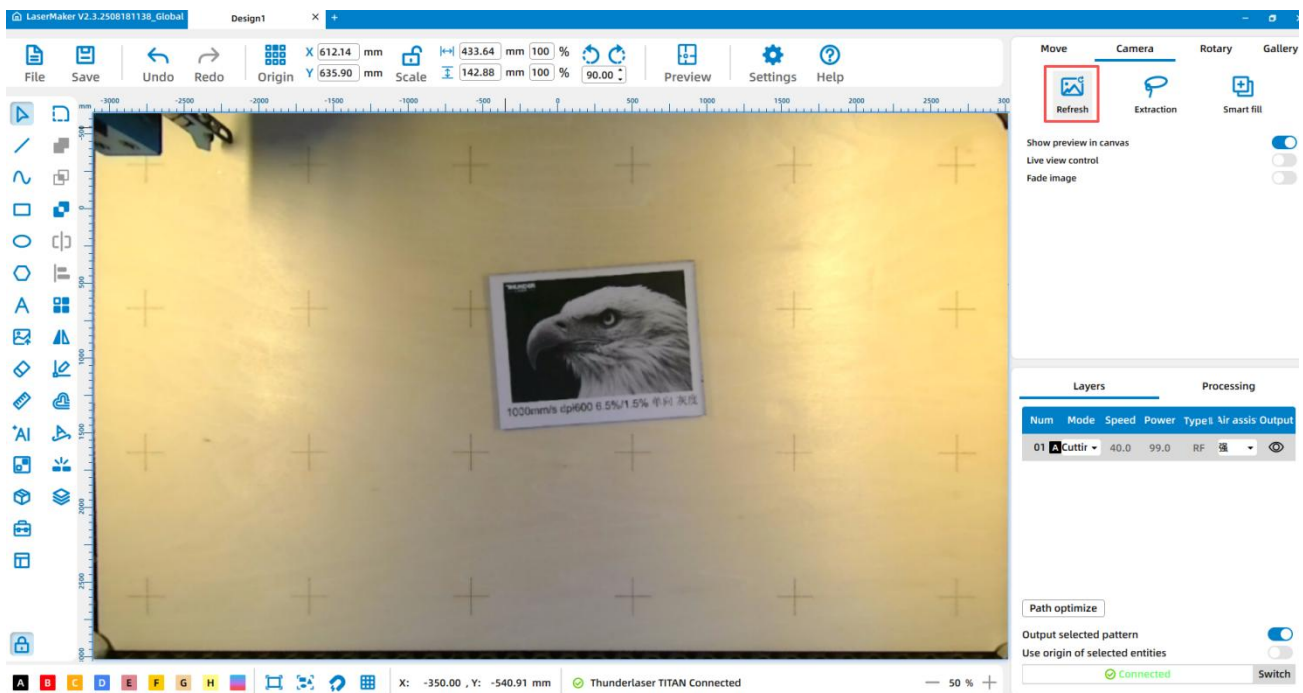
4.5.1 Camera

In the upper right corner of the operation page, you can control the use of the camera. Before using the camera, you need to calibrate the camera in "Settings" - "Camera".



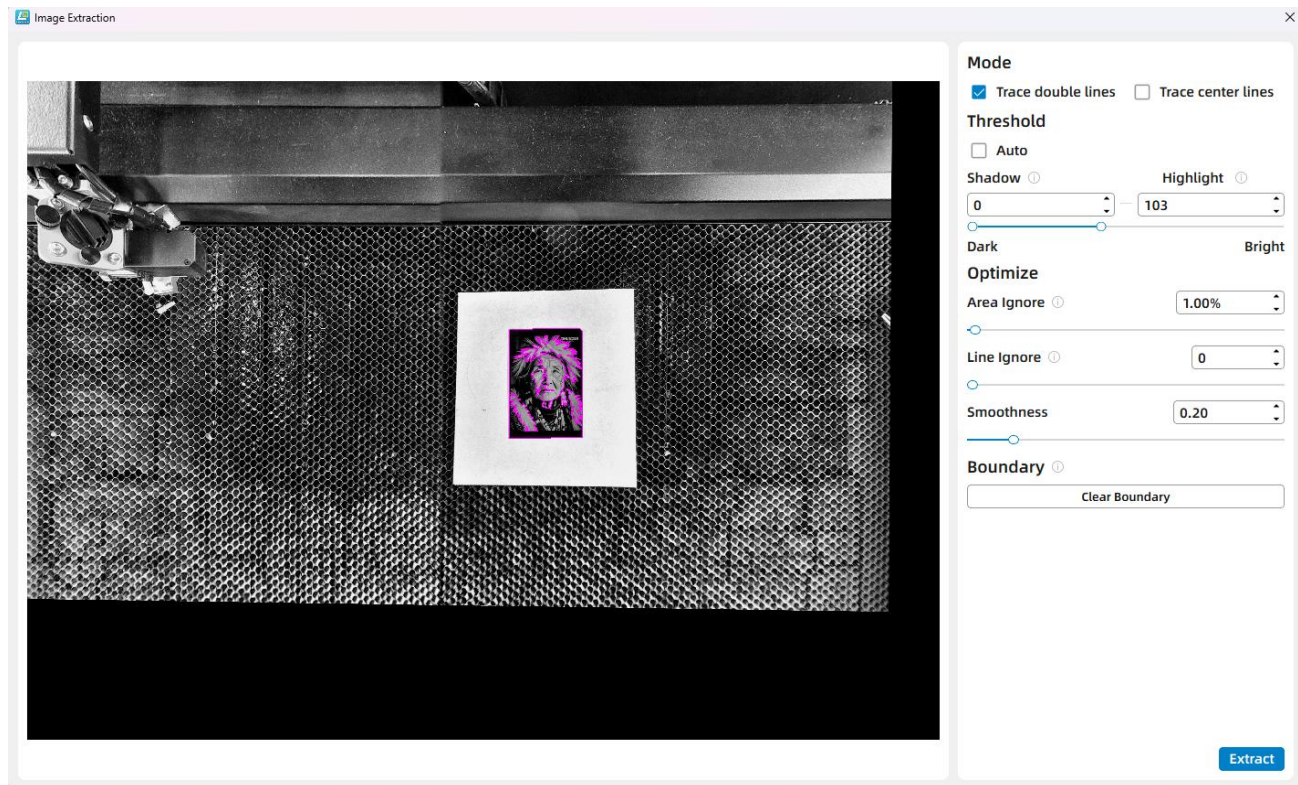
Refresh

Click to refresh the processing platform screen.



Extraction

Click to enter the "Extraction" page on the processing platform screen. By adjusting the threshold and optimizing parameters, the pixels that meet the conditions in the image can be converted into editable vector paths.

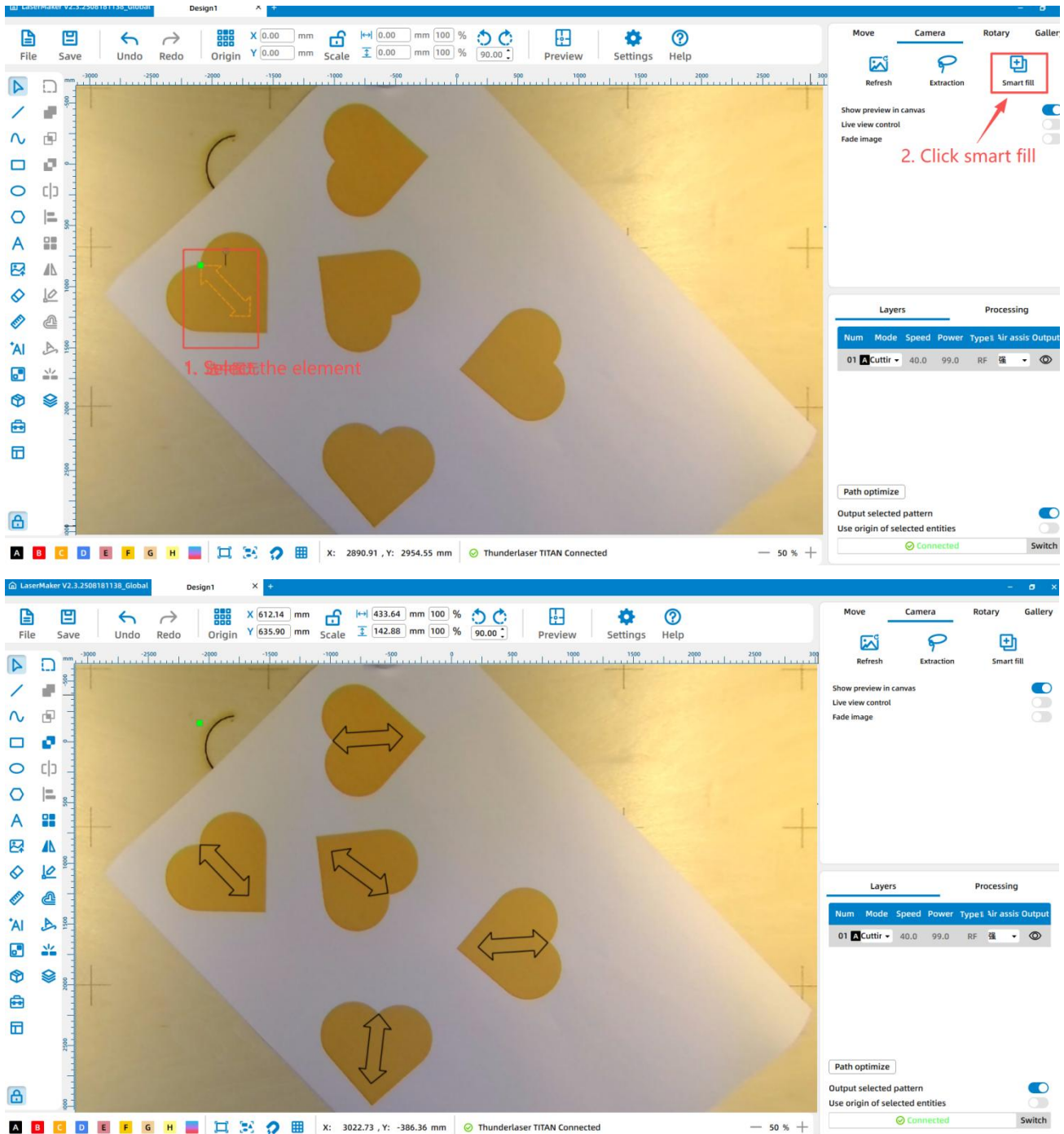


- Shadow: The larger the dark limit, the fewer dark pixels there are. The default range of dark and bright areas is 0-128, which means the software will track all pixels within the brightness range of 0-128 and exclude pixels within the range of 129-255.
- Highlight: The larger the brightness limit, the more bright pixels there are;
- Area ignore: Within the valid threshold range, the software ignores areas where the number of tracking pixels is less than X%. The default value is 1%. That is, in the pixel area within the brightness range of 0-128, the area where the number of pixels is less than 1% will be excluded.
- Line ignore: "Line Ignore" is used to set the length threshold for lines to be ignored during the extraction process. Lines shorter than this threshold won't be extracted.
- Smoothness: controls the smoothness of the contour line. The larger the smoothness value, the softer the contour line and the rounder the corners.
- Boundary: You can select a specific area of the image on the left for local tracing by using the mouse to frame the area;
- Clear Boundary: reset the selected area and restore to the full image tracing state.

Smart Fill

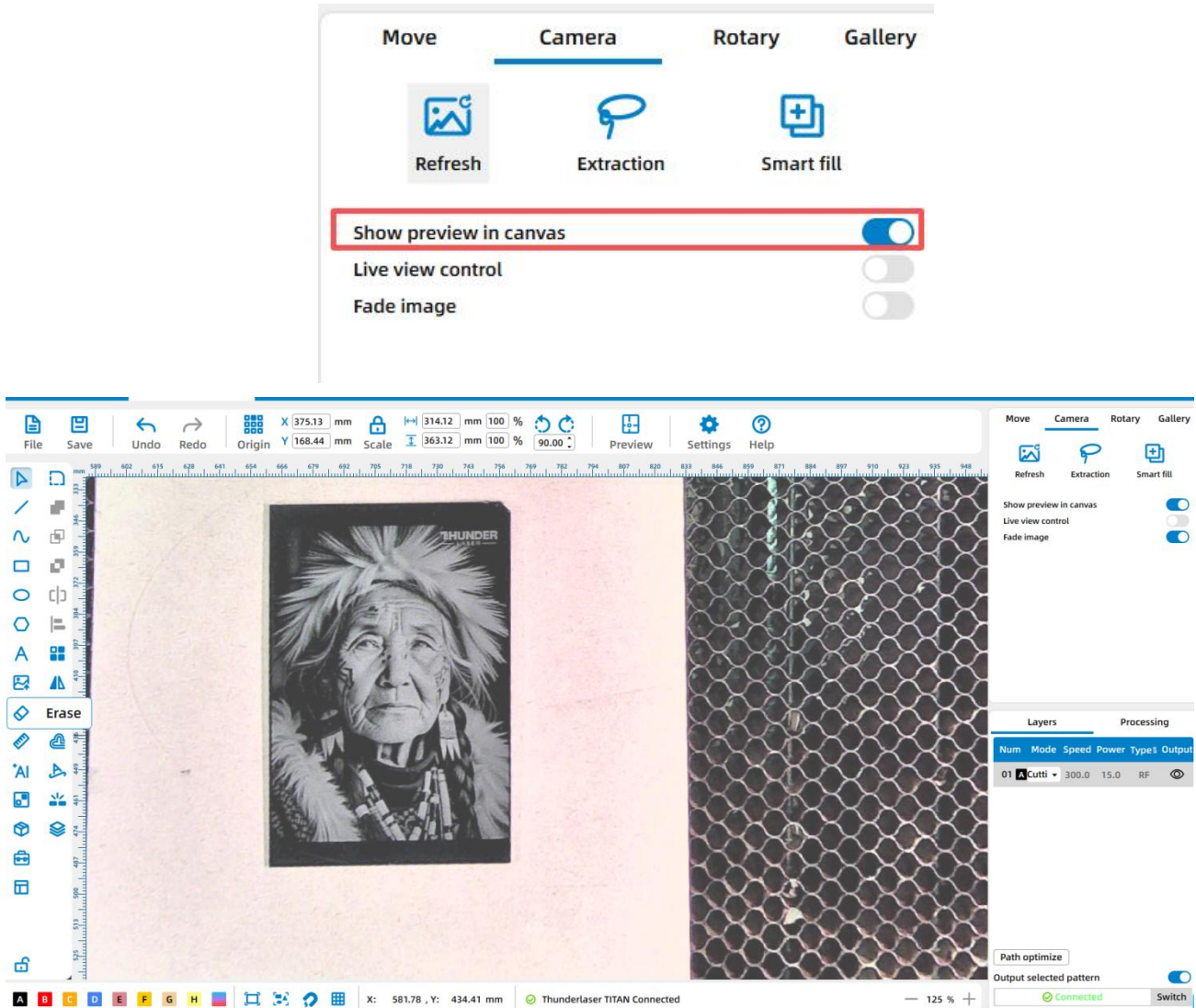
Ideal for batch processing scenarios. Place multiple objects to be processed on the processing platform and use the camera to refresh the platform preview image. Simply draw a design and align it

with one of the objects. Click "Smart Fill" and the software will automatically identify all identical objects on the platform and fill the corresponding positions with the same design, achieving fast matching and efficient processing.



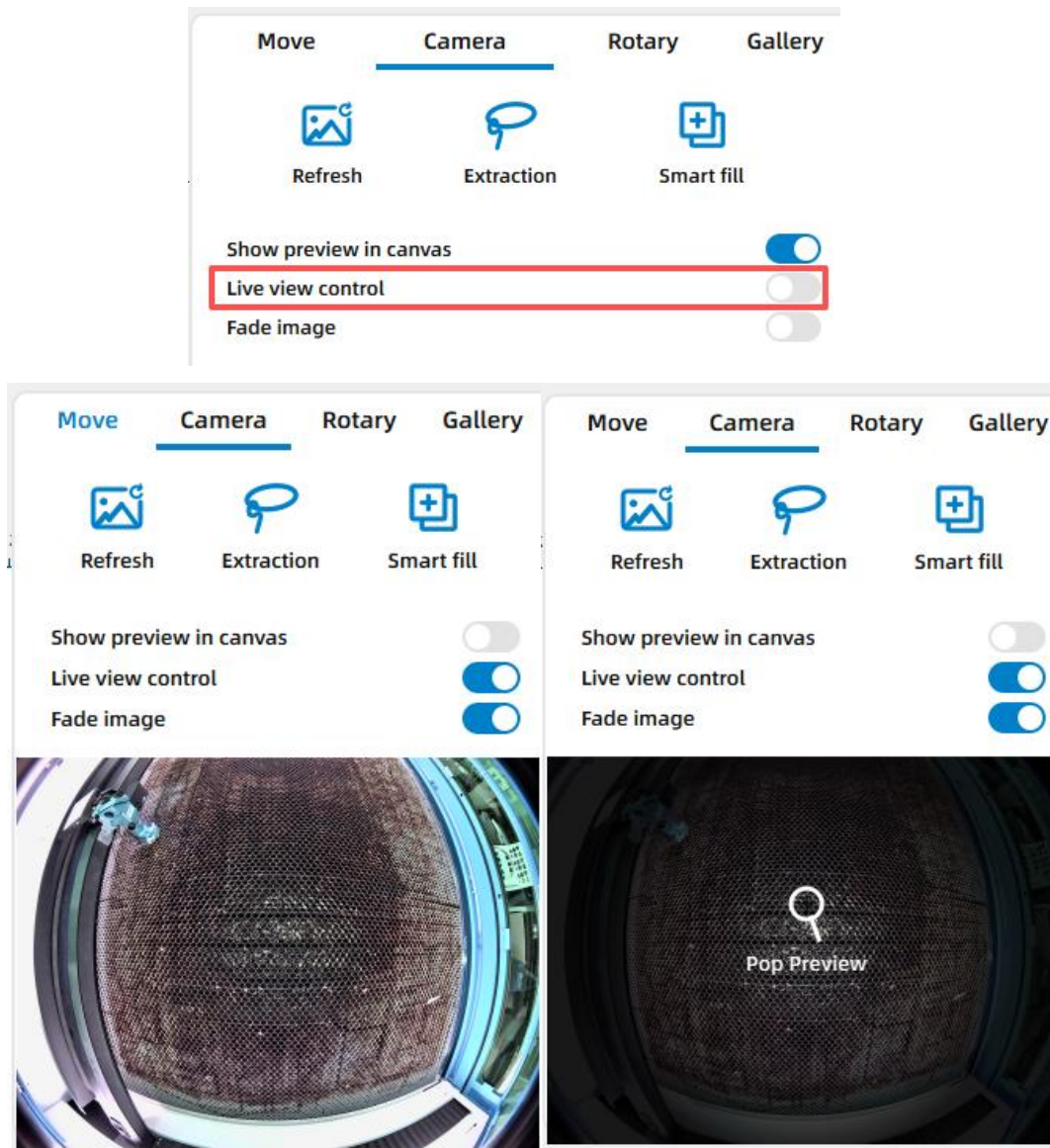
Show preview in canvas

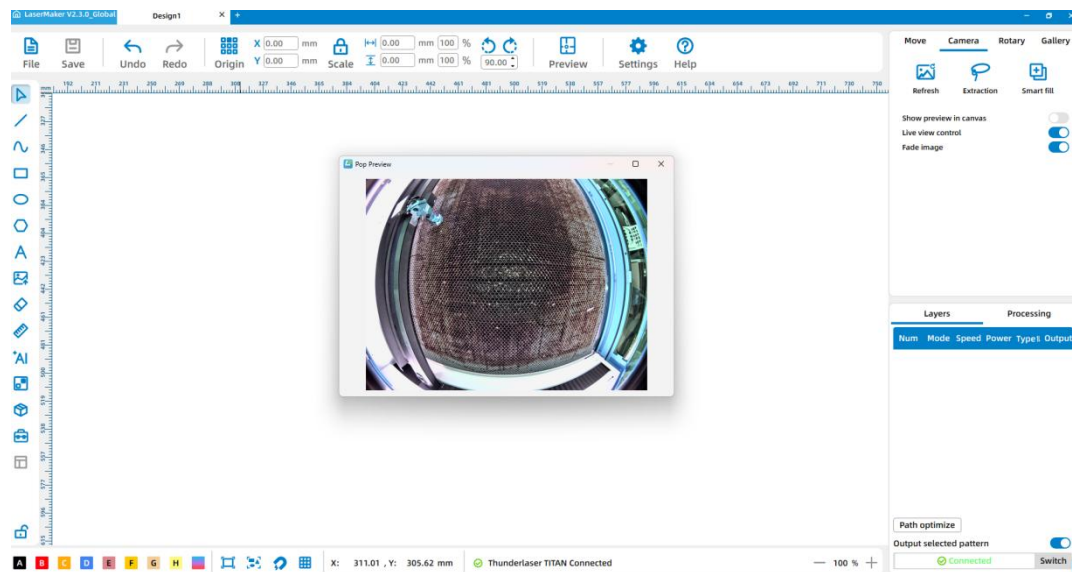
Once enabled, a preview of the processing platform will be displayed on the canvas. Draw any element on the canvas and see its exact location on the processing platform. Select the "Processing Platform" as the processing starting point to accurately confirm the actual processing position of the element on the processing platform.



Live view control

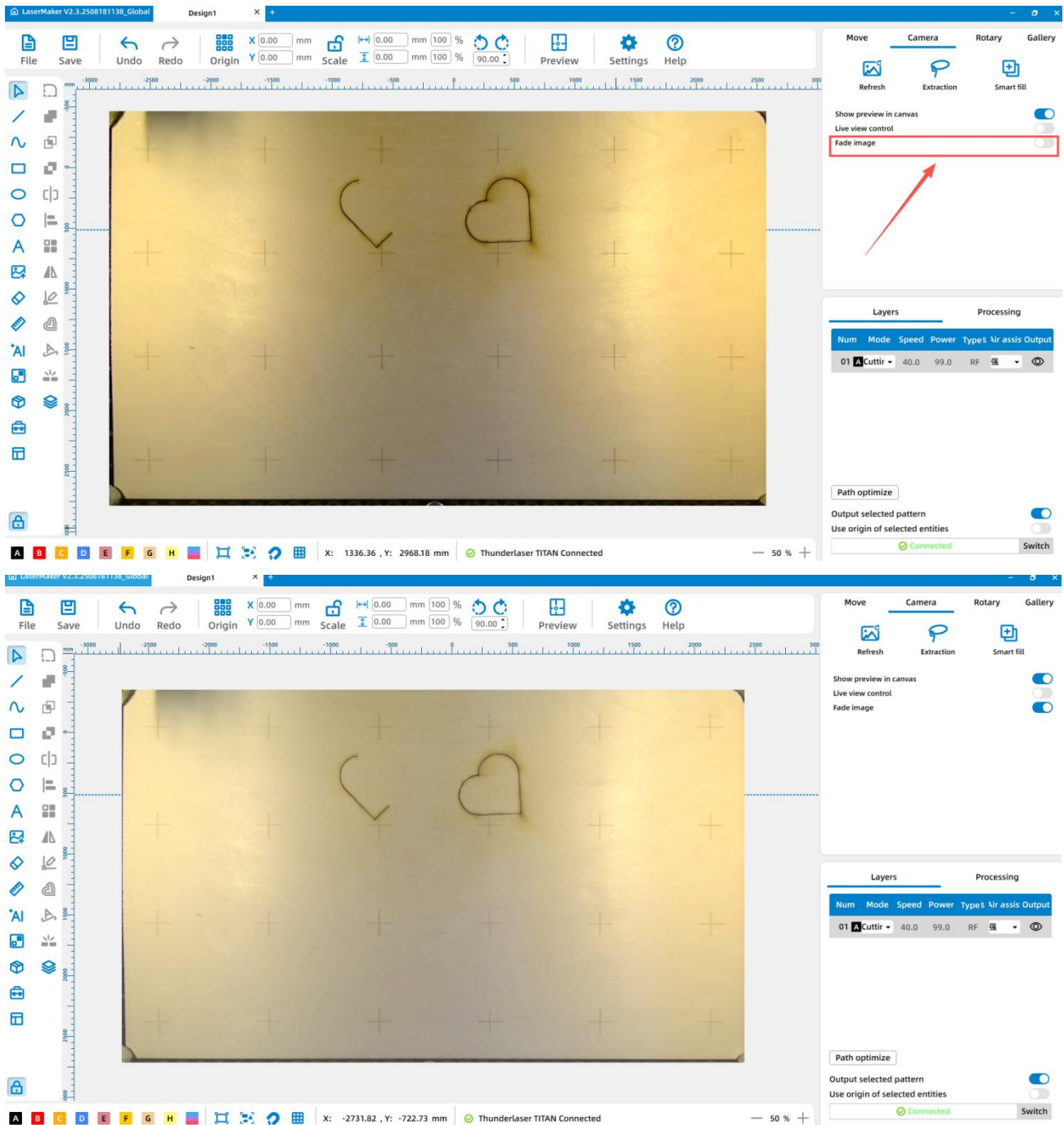
That is the remote monitoring function. When it is turned on, it can display the real-time picture of the processing platform. Click the picture to pop up a window to display the monitoring content.





Fade image

When enabled, the transparency of the preview image on the canvas is reduced, reducing the interference of the preview image on the drawing elements.



4.5.2 Rotary

The "Rotary" panel in the upper right corner of the operation page has the same parameter value as "Settings" - "Rotary", and the parameters on both sides are automatically synchronized.

When processing circular workpieces, you need to use a rotary axis accessory. At this time, you need to check "Enable rotary axis" in the rotary axis panel and set the pulse width and diameter according to the actual situation of the equipment.

- Cycle pulse: the number of motor pulses corresponding to one revolution of the workpiece;
- Diameter: The diameter of the chuck-type rotating shaft is the diameter of the workpiece; the diameter of the roller-type rotating shaft is the diameter of the roller.

Move
Camera
Rotary
Gallery

☒ Enable Rotary

Cycle Pulse

Diameter ⓘ mm

Read Upload

Save

Chapter 5 Equipment Parameter Settings

Main contents of this chapter:

- Basic Settings
- Path Planning
- Processing rate
- Engraving parameters
- Rotation axis
- Camera
- Manufacturer parameters
- Firmware parameters
- Save and restore

5.1 Basic Settings

Positioning

Return Position

The position where the laser head stops after processing is divided into the equipment zero point and the positioning point.

Frame Mode

Whether the laser head emits light when moving along the frame is divided into light off and light on.

Focus Parameter

Laser1-RF

Set the focusing distance for Laser1 - RF.

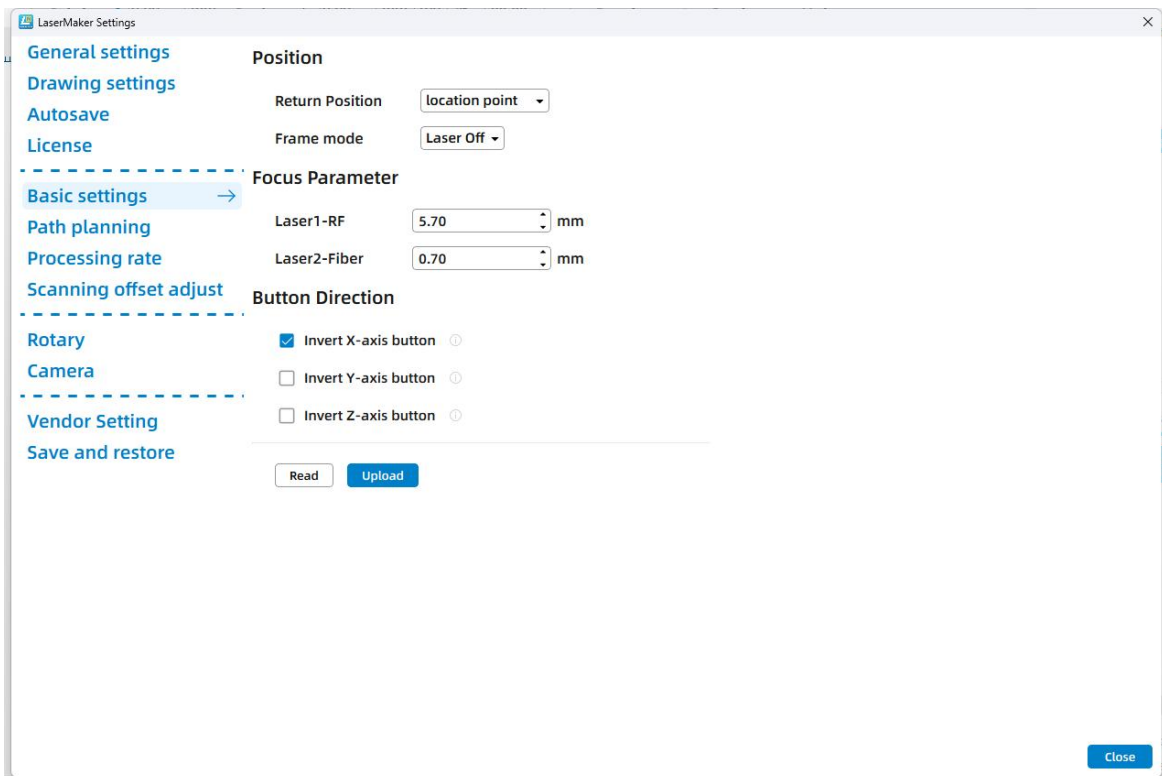
Laser2-Fiber

Set the focusing distance for Laser2 - Fiber.

Button Direction

Invert X/Y/Z-axis button

By checking the “Invert X/Y/Z - axis button” option, you can reverse the control direction of the X, Y, and Z axis buttons.



5.2 Path Planning

Path Planning

Reduce Laser Head Direction Changes

Minimize changes in laser head orientation, optimize machining paths, and enhance processing efficiency.

Process by Element Distribution Order

Processing shall be carried out in the order of element distribution, with the laser processing path arranged according to the distribution of the elements being processed.

Process in order of operations

Process in the specified sequence to ensure an orderly workflow.

Process by Laser tube type

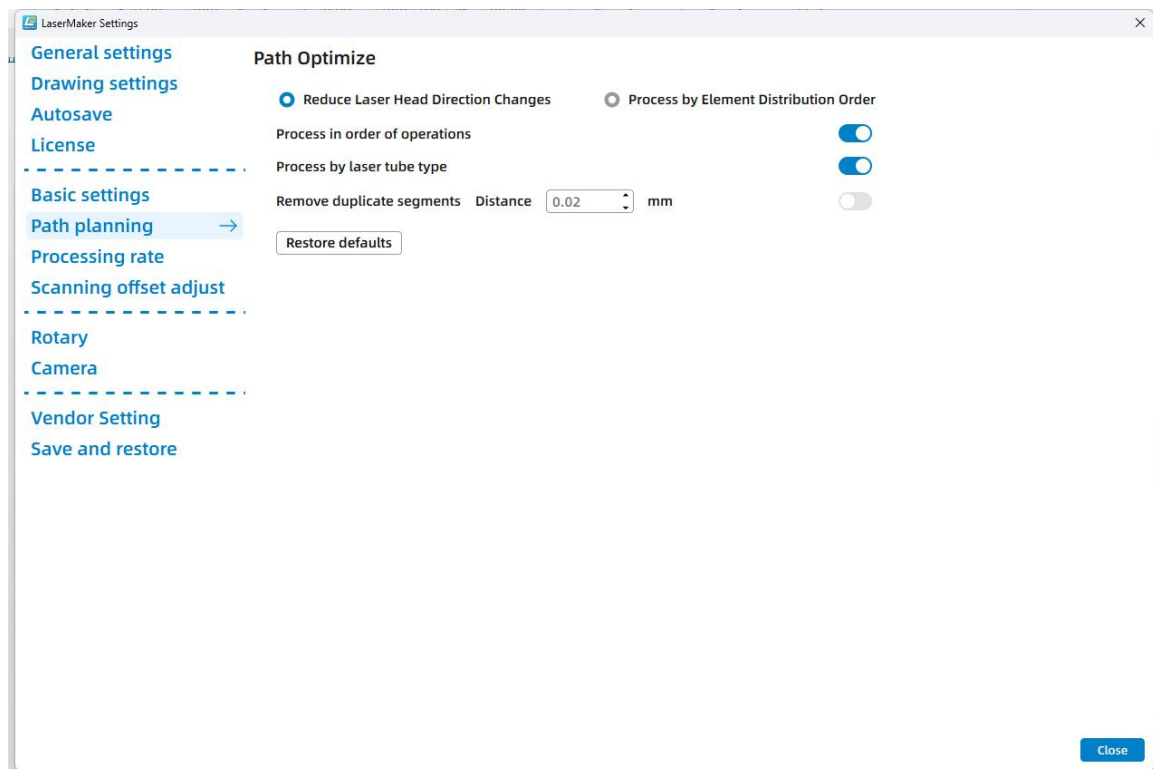
Processing according to laser tube type, adapted to the characteristics of different laser tubes.

Remove duplicate segments

Remove duplicate line segments. When Distance is set to 0.02mm, duplicate path segments within 0.02mm of each other will be cleared.

Restore defaults

Restore default settings.



5.3 Processing rate

Cutting rate

The coefficient corresponding to the cutting speed, the larger the magnification, the faster the cutting speed.

Turning rate

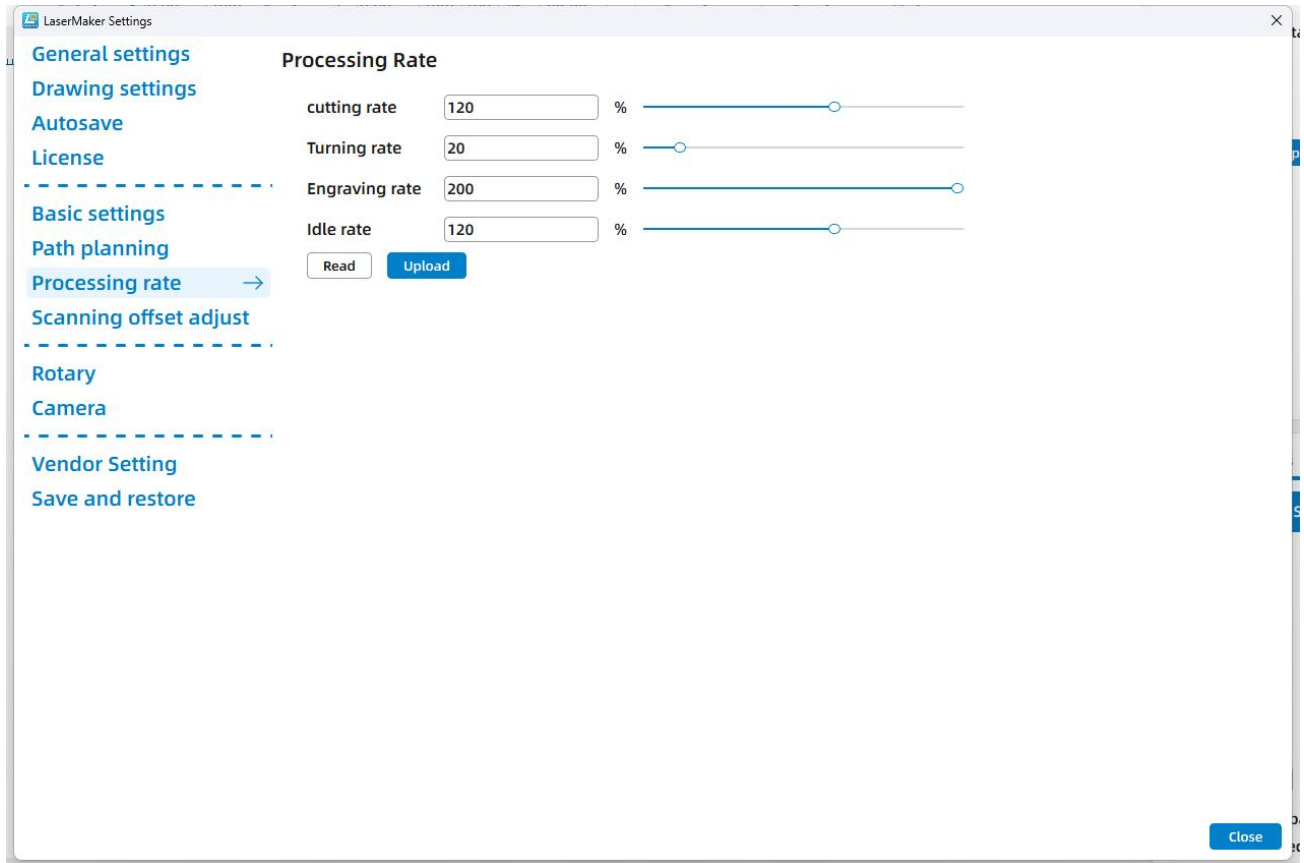
The larger the angular velocity multiplier, the greater the angular velocity.

Engraving speed

The coefficient corresponding to the engraving speed. The larger the magnification, the faster the engraving speed.

Idle speed

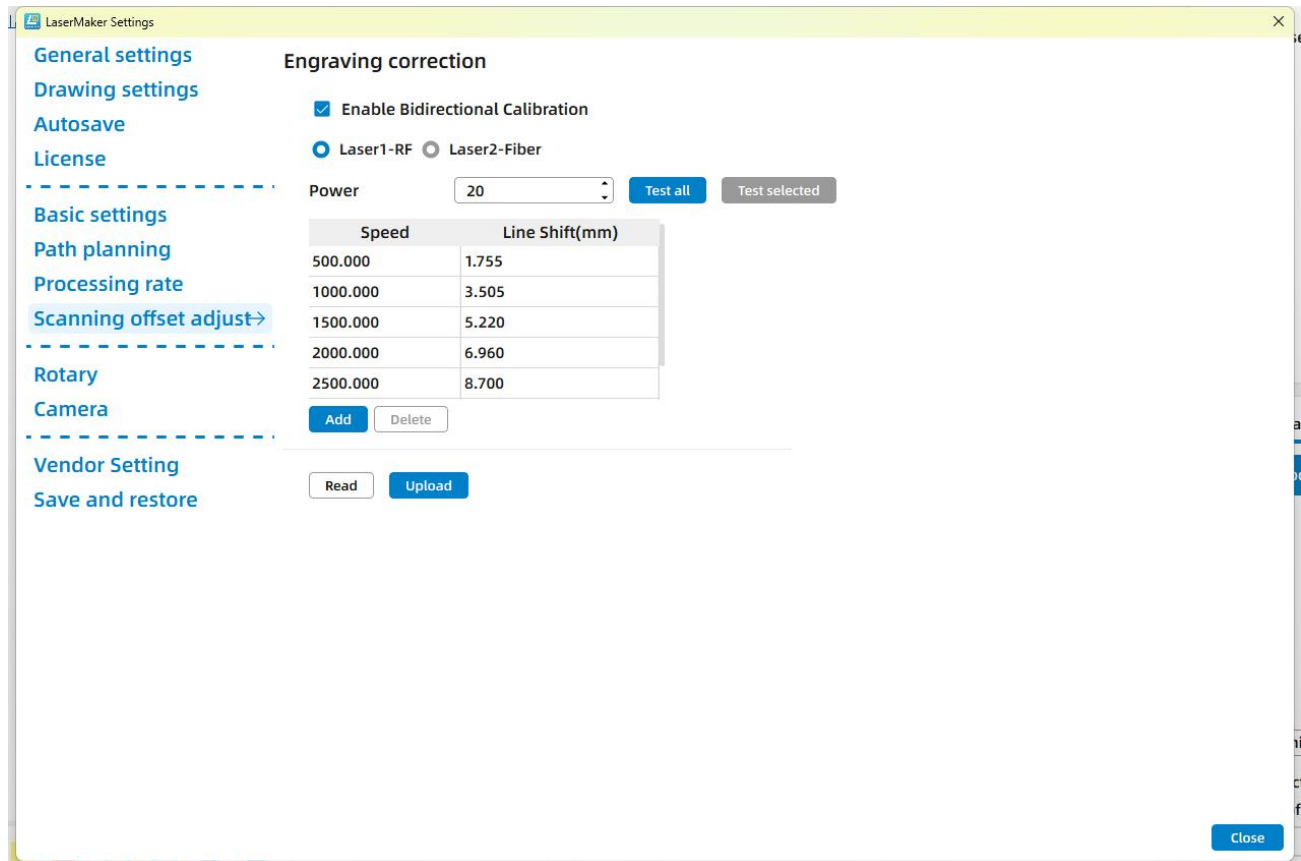
Corresponding to the speed during idling, the larger the magnification, the greater the idling speed.



5.4 Engraving Parameters

During the process, when set to horizontal bidirectional engraving mode, the high-speed bidirectional movement of the laser head will cause the belt to pull slightly, eventually resulting in jagged edges or ghosting. To address this, it is necessary to add different bidirectional offset compensation amounts according to different engraving speeds to ensure smooth edges of the engraved elements and prevent ghosting.

Double-click the data in the table to modify the speed and bidirectional offset to be tested. Click "Add" or "Delete" to add or delete bidirectional offset compensation values for different speeds. Select any entry in the table, set the calibration power, and click "Test all" to send the file to the device for processing and testing the current bidirectional offset. Fine-tune the offset compensation based on the measurement results to determine the bidirectional offset compensation value that best suits the current speed.



5.5 Rotary

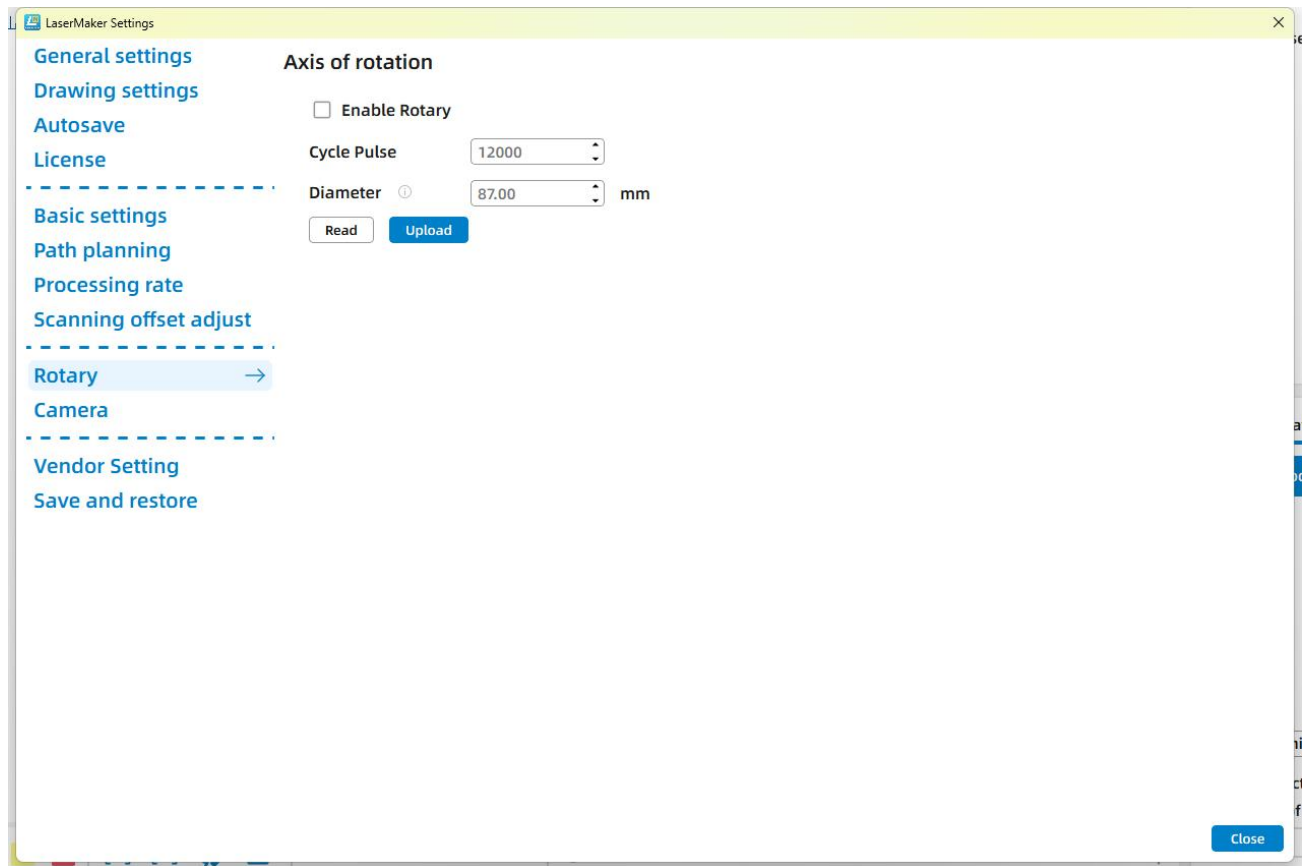
When processing circular workpieces, you need to use a rotary axis accessory. At this time, you need to check "Enable Rotary" in the rotary axis panel and set the cycle pulse and diameter according to the actual situation of the equipment.

Cycle Pulse

The number of motor pulses corresponding to one rotation of the workpiece.

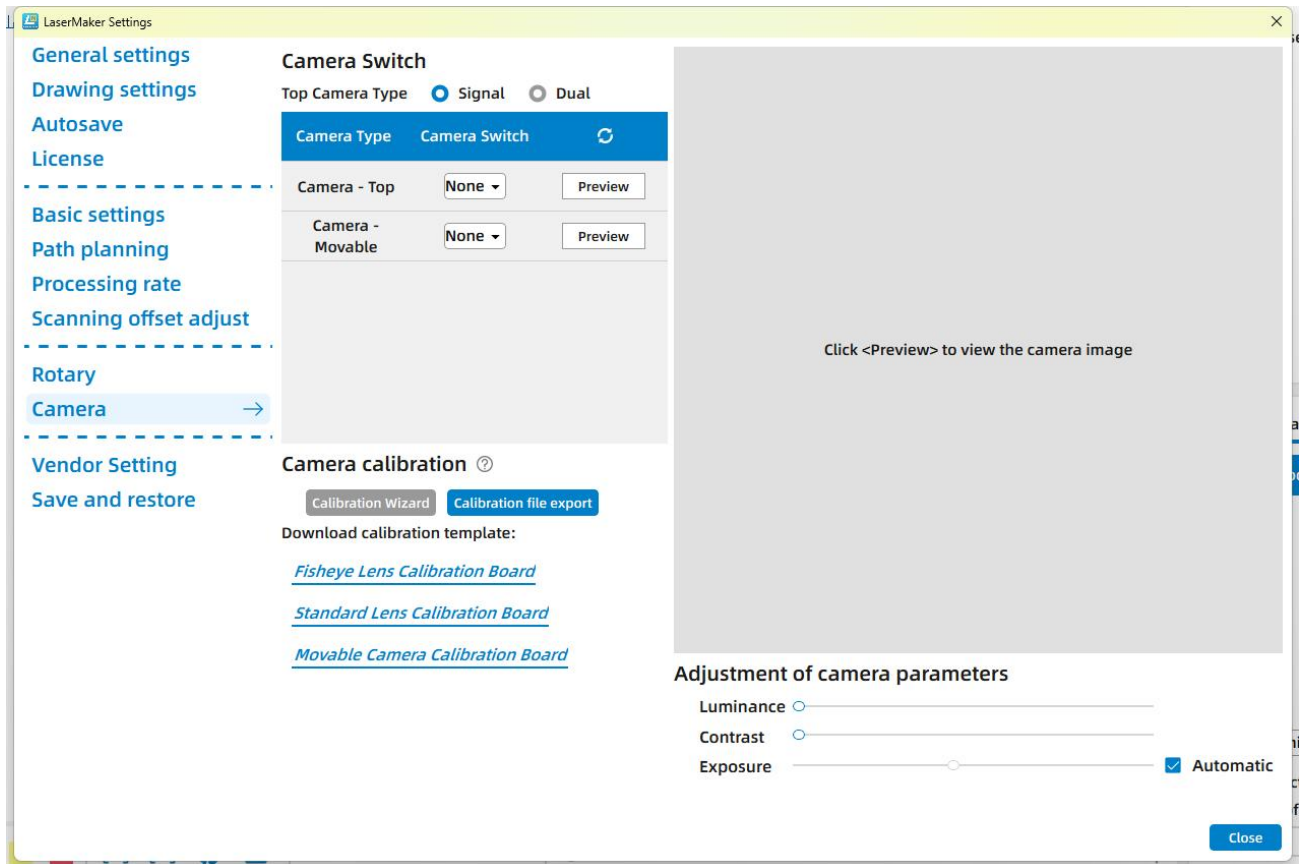
Diameter

The diameter of the chuck-type rotating axis is the diameter of the workpiece being processed; the diameter of the roller-type rotating axis is the diameter of the roller.



5.6 Camera

Before using the "Camera" function, you need to calibrate the camera first.



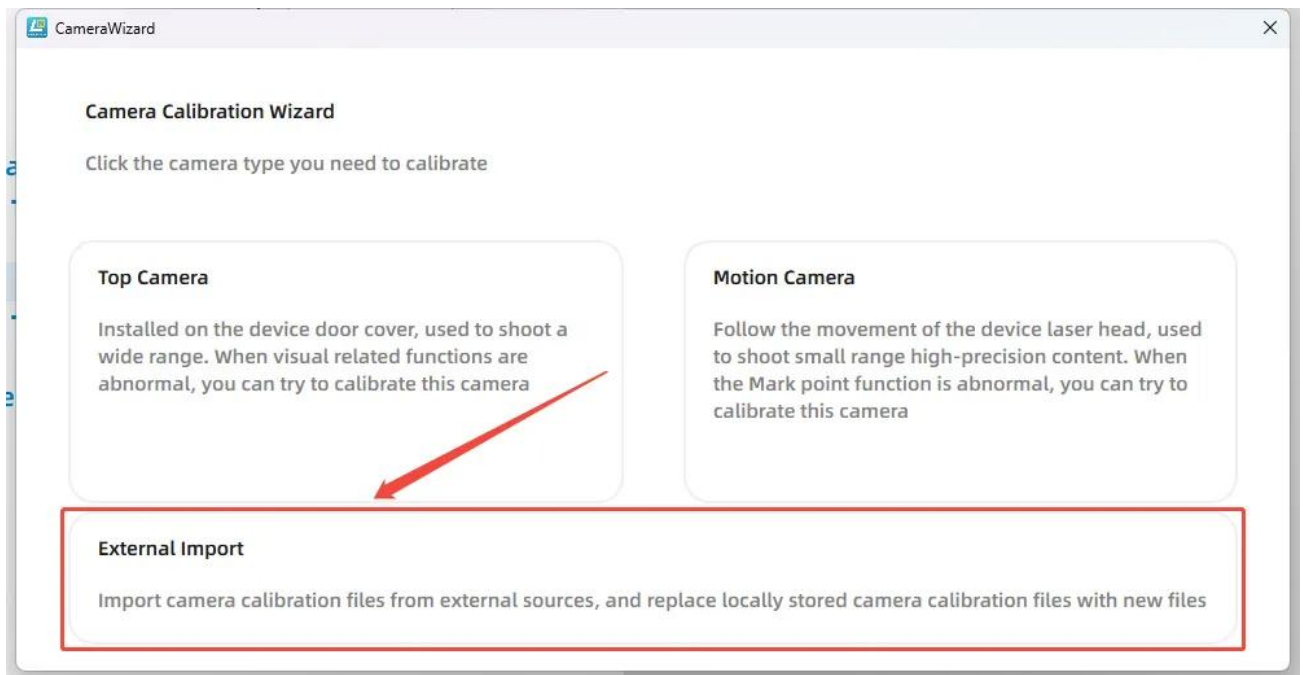
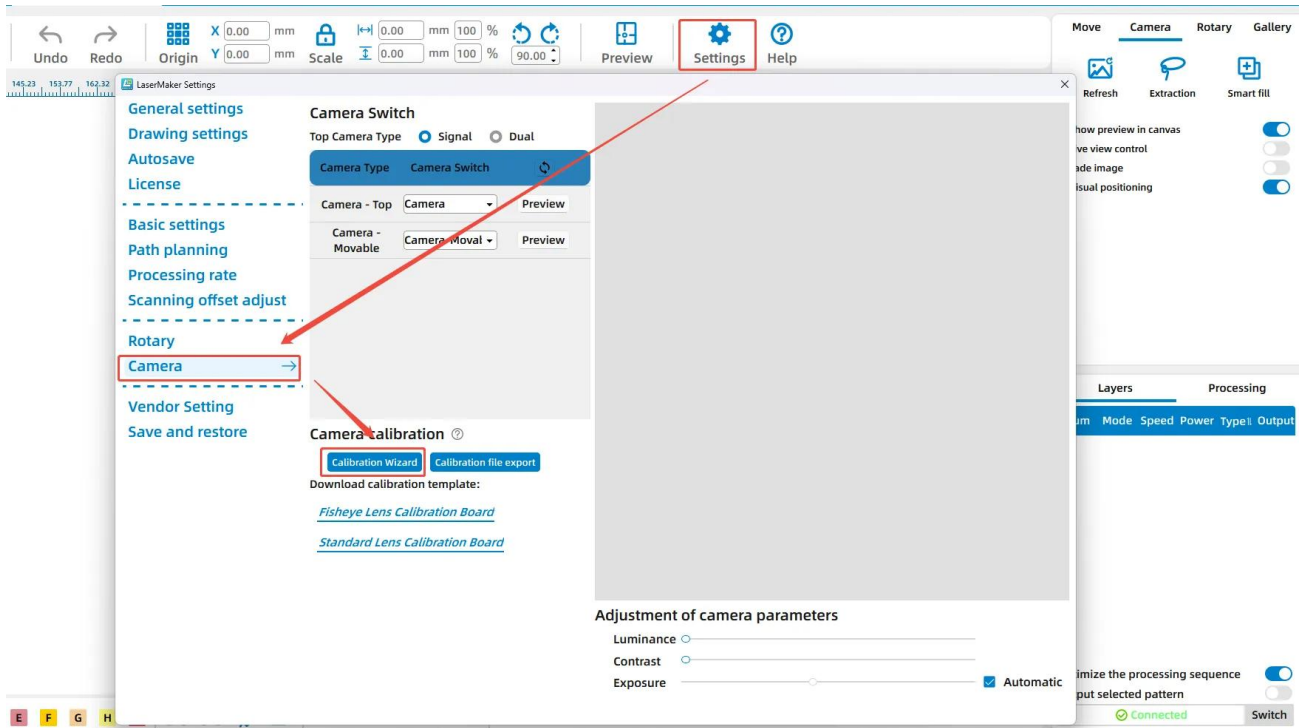
Camera Calibration

Calibration Wizard

The camera calibration portal allows you to calibrate the top camera, action camera, or external camera as needed. Both single and dual cameras are top cameras, while the camera next to the laser head is an action camera.

Before calibrating the action camera, you must first calibrate the top cover camera.

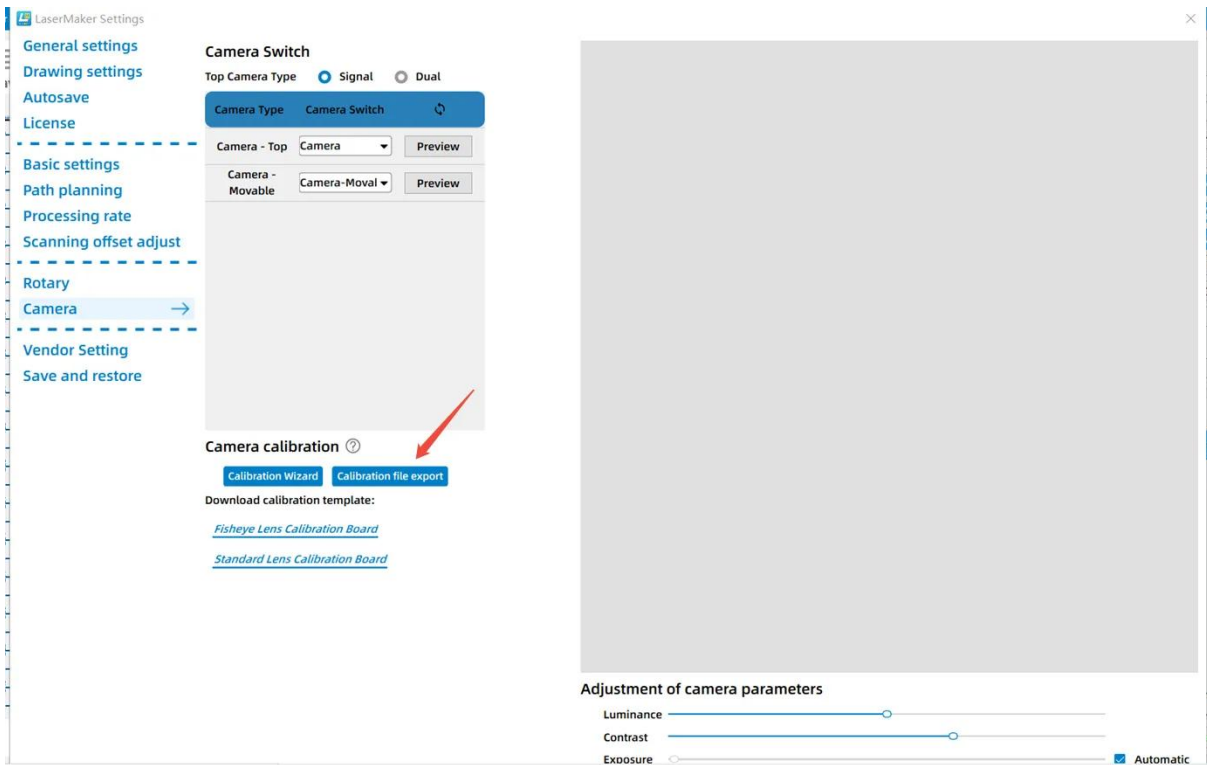
You can import calibration files from any camera, but the file must have been generated using the same device and camera connected to the current computer. This means that calibration files from the same device and camera can be reused on any computer. Calibration files for top-mounted cameras and action cameras are imported through the same import entry, but they won't interfere with each other. The software automatically distinguishes them, and the most recently imported calibration file for the same camera automatically overwrites the older one.



Calibration file export

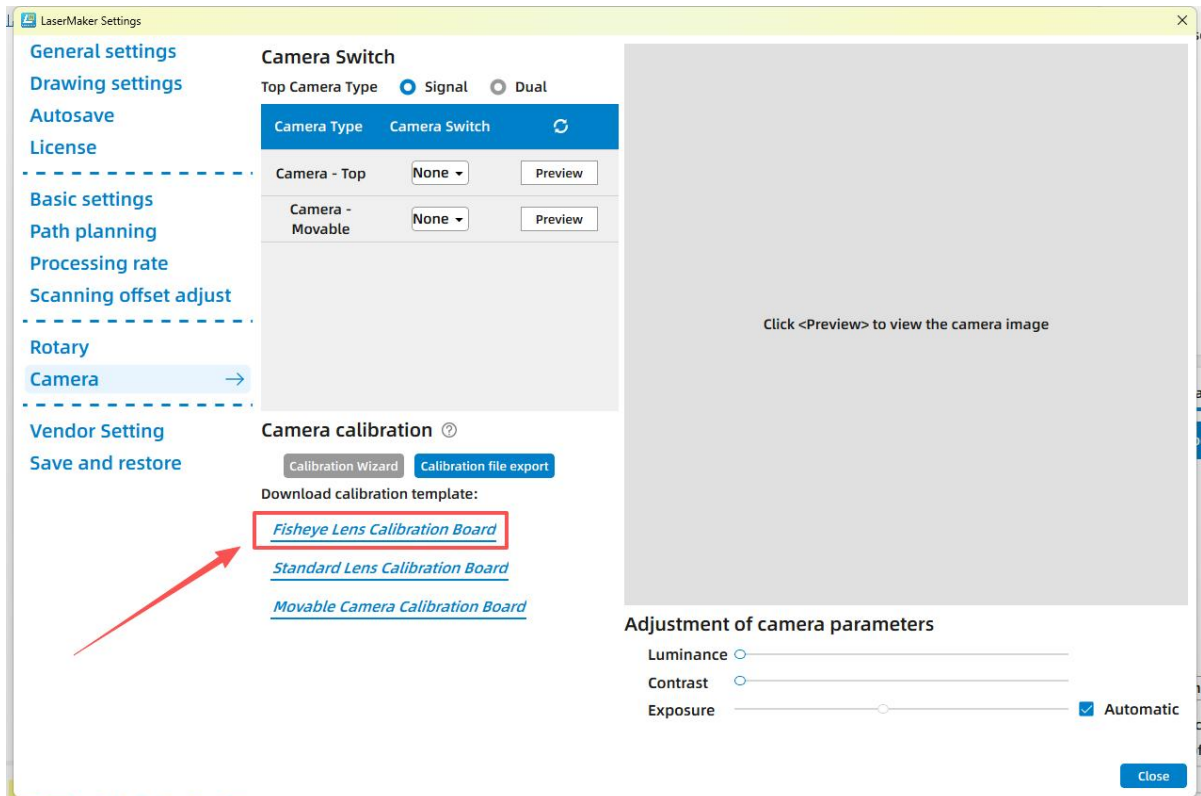
Click "Export Calibration File" to export the calibration files of all cameras in the current software.

Importing this file into other computers allows you to directly use the same camera on the same device.



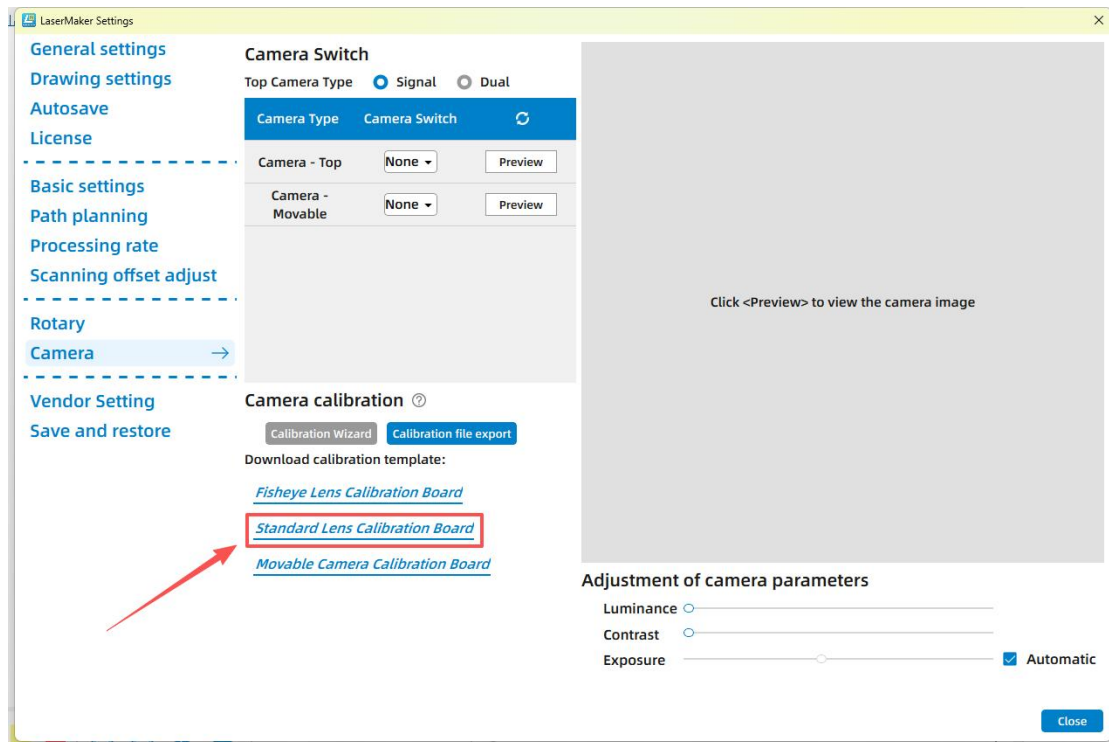
Fisheye Lens Calibration board

If the camera uses a fisheye lens, use a fisheye lens calibration board when calibrating the camera.



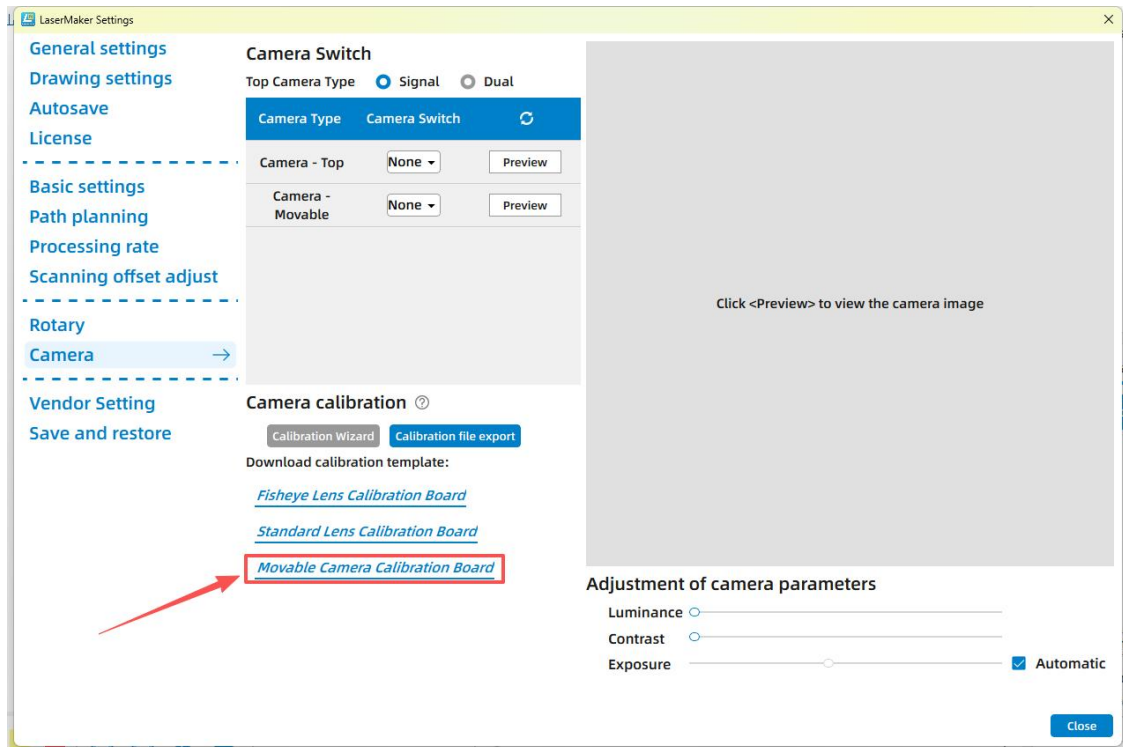
Standard Lens Calibration Board

If the camera uses a standard lens, use the standard lens calibration board when calibrating the camera.



Movable Camera Calibration Board

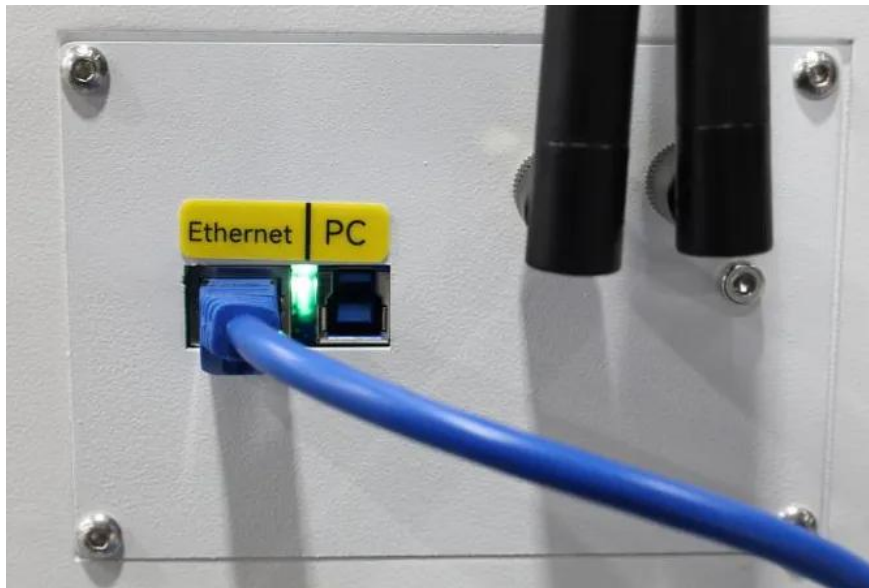
If the camera is movable camera, use a movable camera calibration board when calibrating the camera.



Calibrate the top cover camera

1. Connect the machine.

Use the Ethernet cable to connect the machine and the computer.



2. Please place the plywood on the platform and secure it with magnets. Then, move the laser head to the machine zero. You can refer to this picture for the positions of the plywood and the laser head.



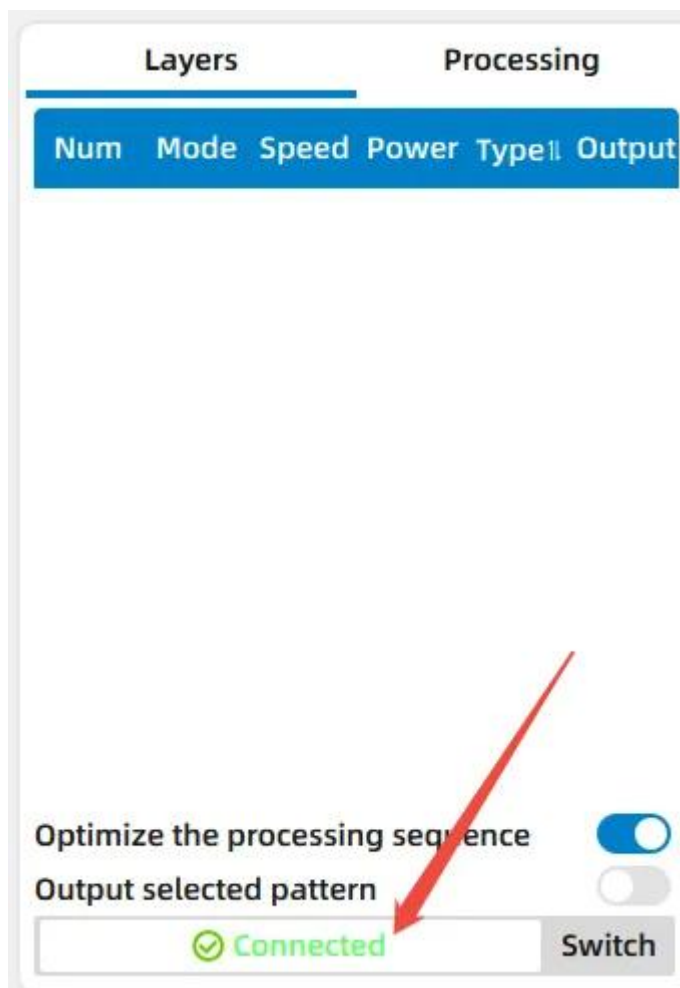
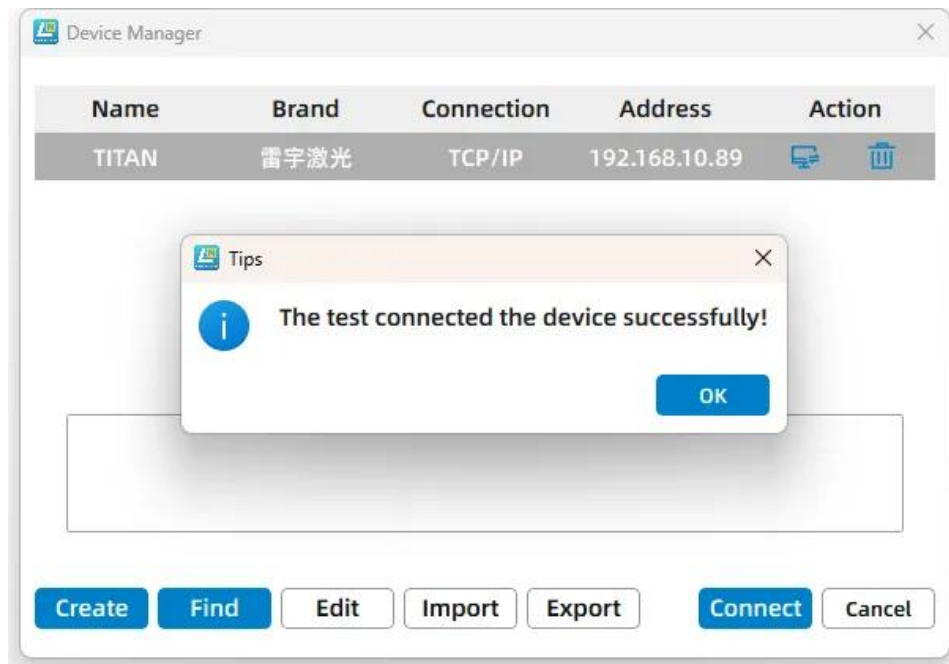
3. After moving the laser head to the position of the picture above, please click the Origin button on the touch panel.



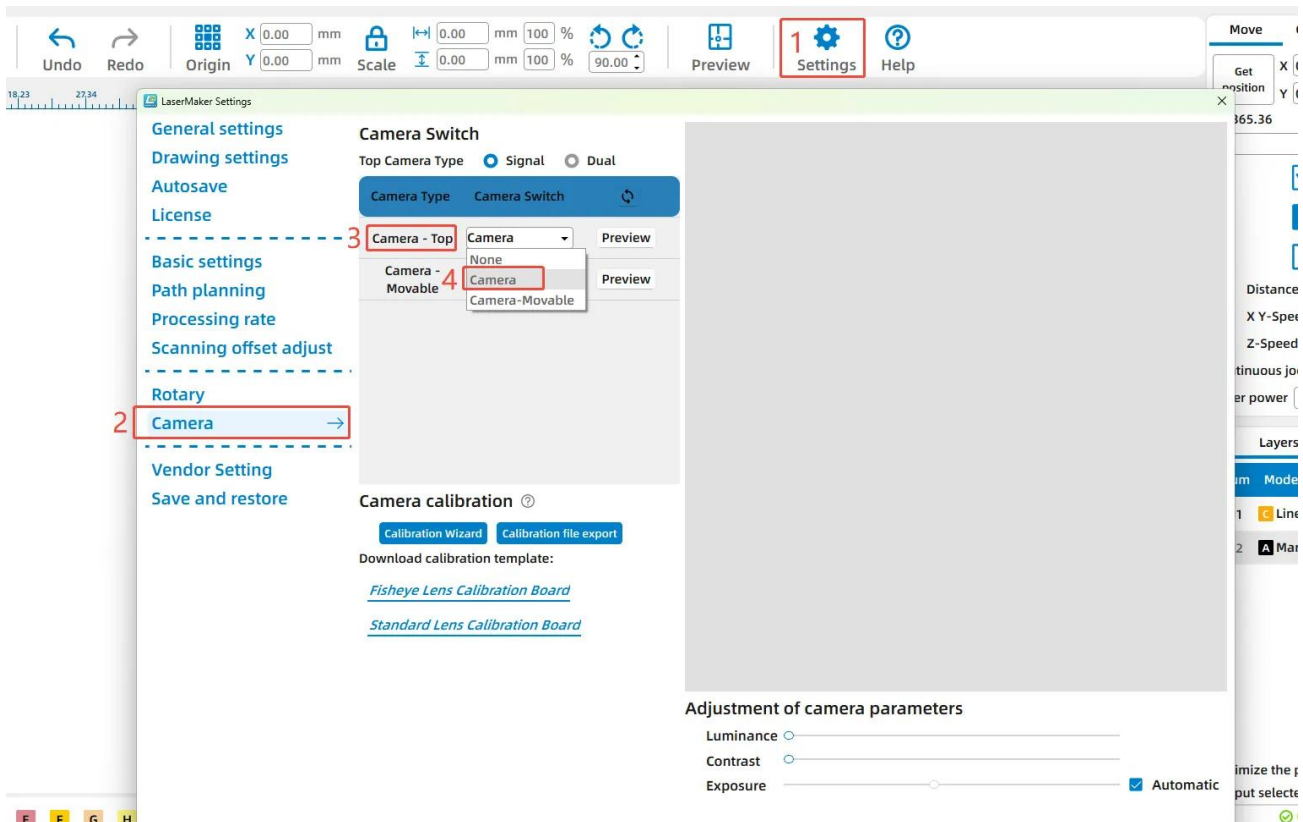
4. Use the auto focus function on the touch panel to focus.



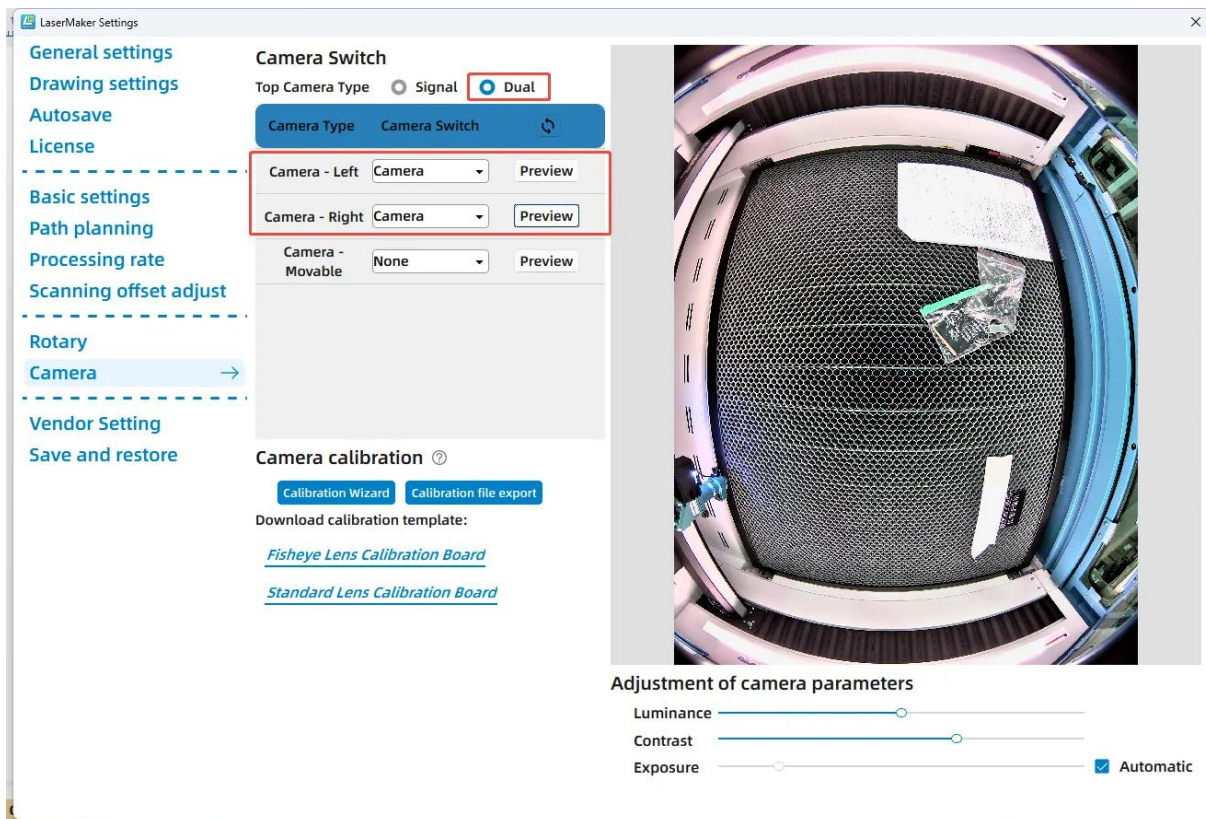
5. Before performing this step, make sure that your machine is successfully connected to your computer.



6. Next, go to Settings >> Camera >> Camera-Top.

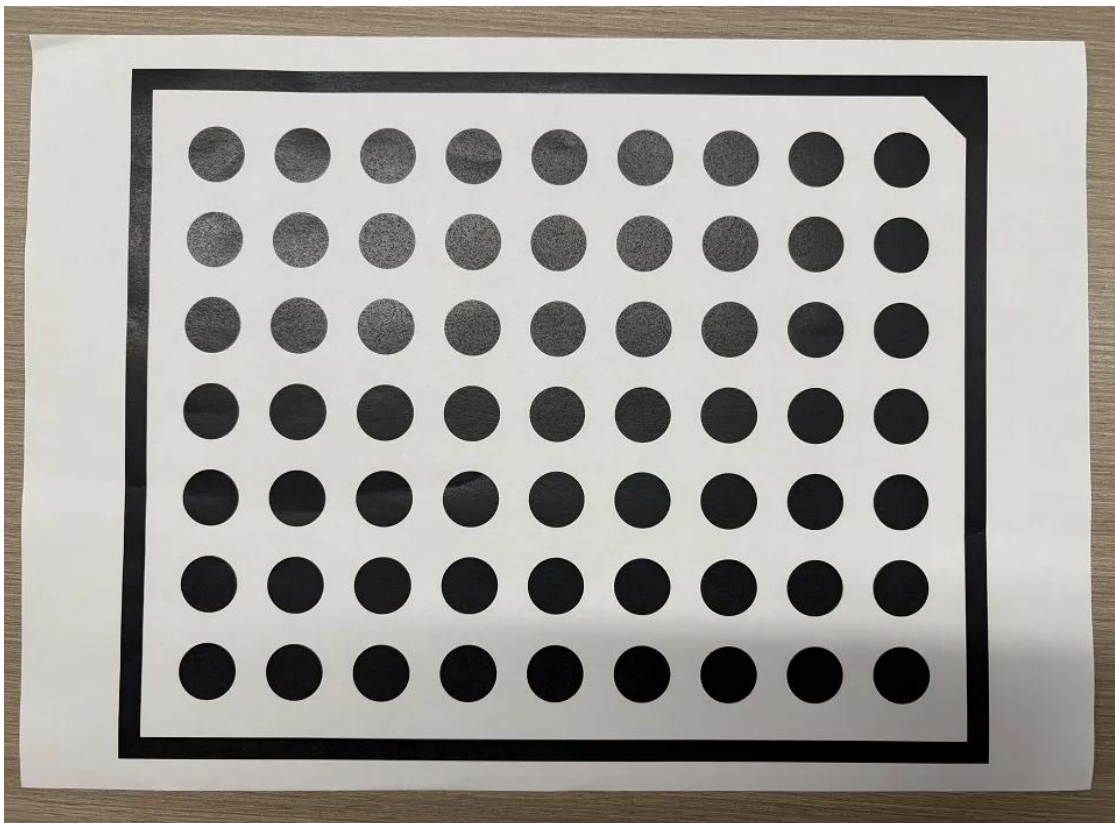
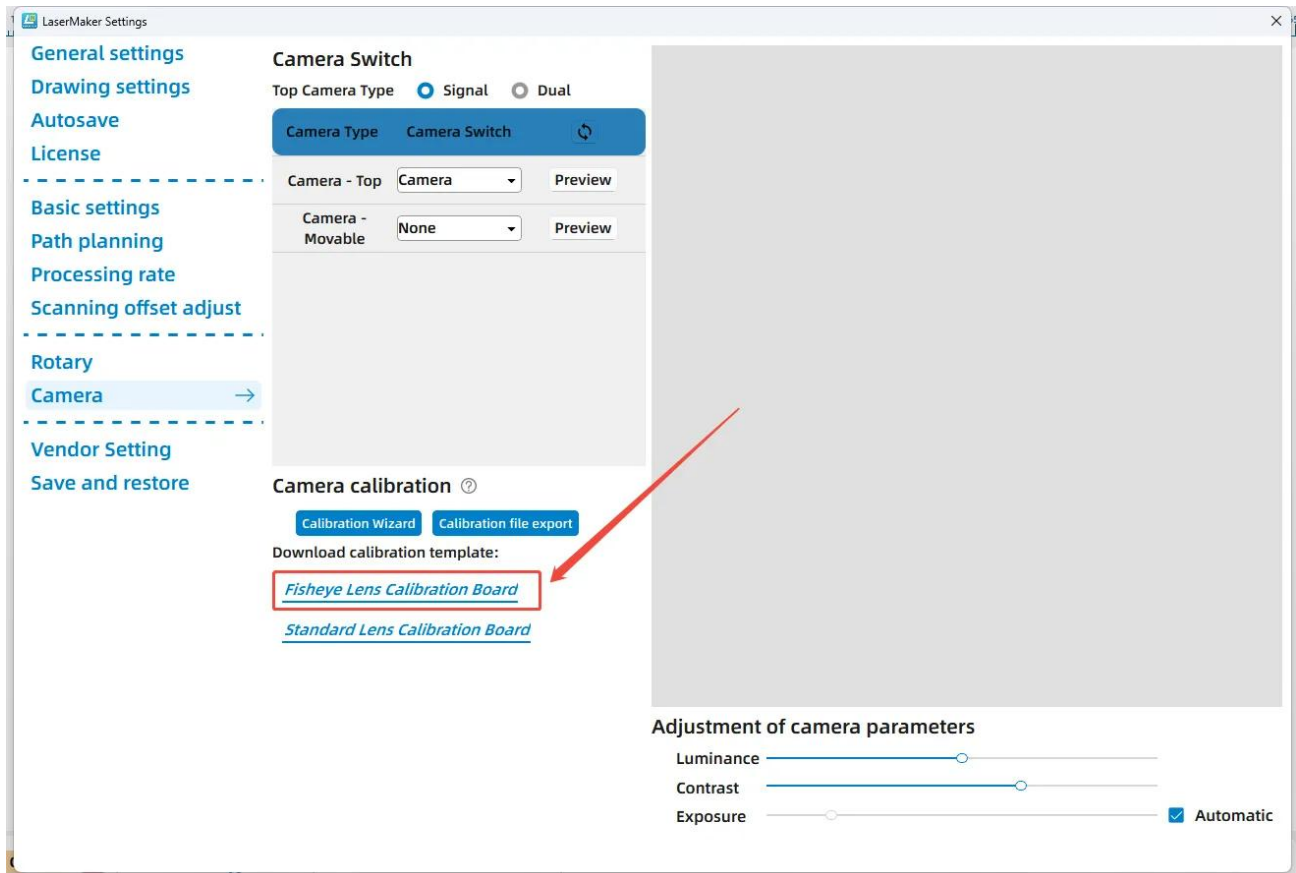


Note: If your device has dual cameras, select the 'Dual' option. The calibration method is the same as for a single camera, but each camera must be calibrated individually.

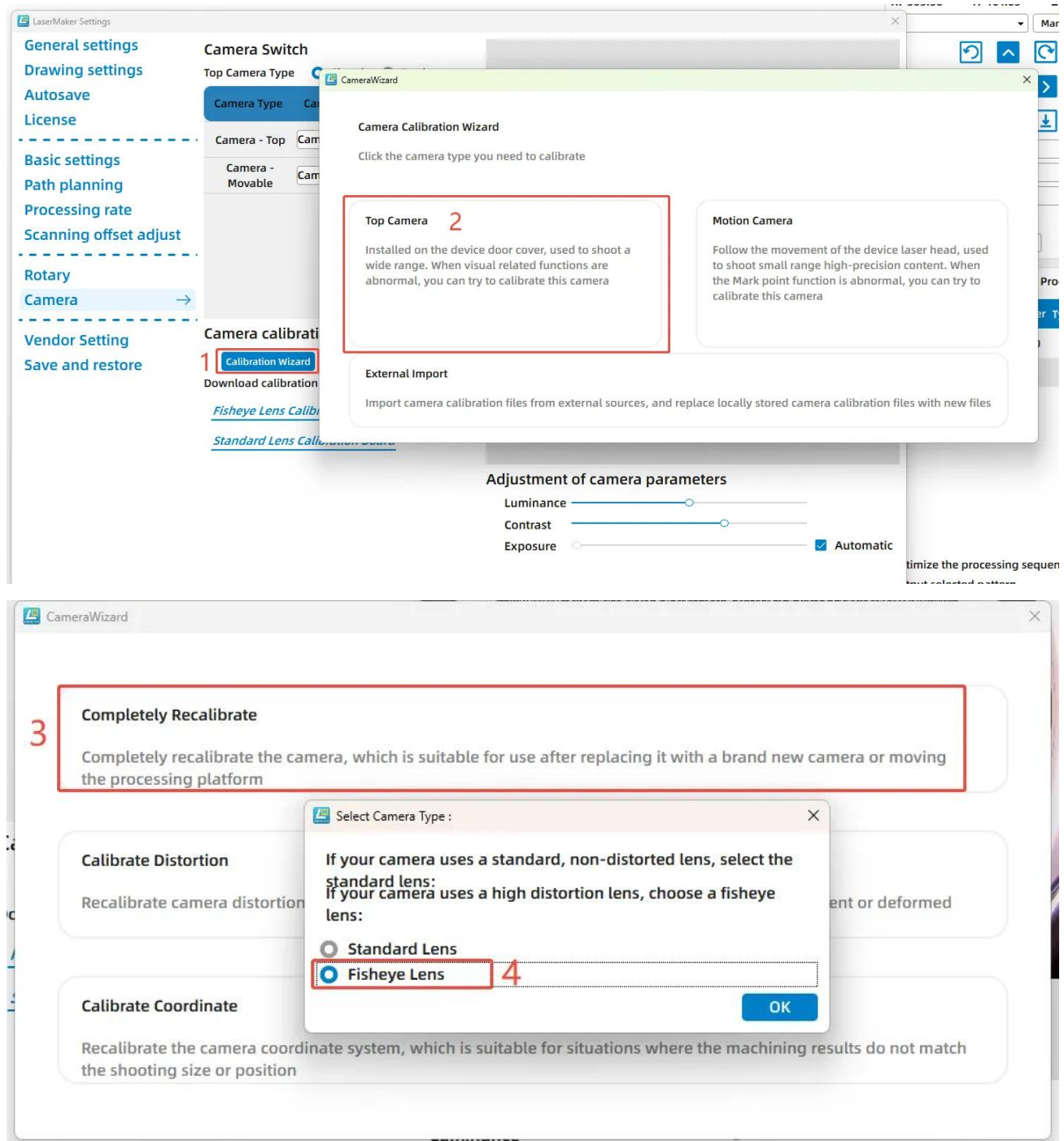


7. Then, select the corresponding calibration board to download for subsequent camera calibration.

Note: Here we take the example of the Fisheye Lens Calibration Board.



8. After that, click the 'Calibration Wizard' button to start the camera calibration process. In the pop-up 'Camera Calibration Wizard' window, select 'Top Camera', then choose 'Completely Recalibrate'. Finally, in the Select Camera Type dialog box, pick 'Fisheye Lens' and click 'OK'.



9. Once in the calibration process, first hold the calibration board with its pattern facing the camera and the surface flat. Position the board as instructed in the live capture screen, then click 'Take a picture'. After shooting, click 'Next picture' and repeat until all required angles are covered.

Note: Please note that the score should be kept below 0.3 as much as possible, and there should be at least 10 valid pictures.

Camera Calibration

Distortion calibration

The minimum number of photos required for distortion calibration has been reached. Click the <Calibrate> button to the next step. You can freely choose whether to take supplementary pictures - more complete coverage and rich postures help improve calibration accuracy.

Notes on taking pictures

When taking pictures, you can freely adjust the distance, position and angle of the calibration plate to supplement previously uncovered areas. Keep the paper flat without obvious bends, and the number of valid pictures should be controlled at 10 to 16. The calibration pattern in the picture should be clear,

Camera view

Number of valid pictures: 10

Take a picture

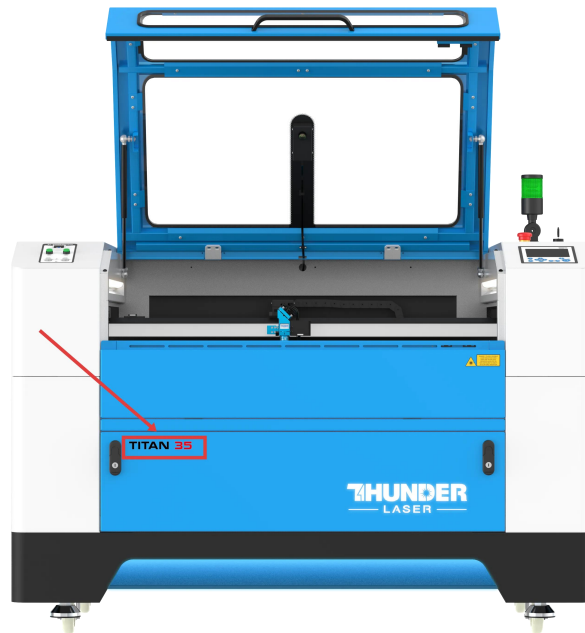
pictures(error: 0.0467181)

Score

Calibration board position

Calibrate Previous picture Next picture Cancel

10. Once calibration is complete, select your device type and click 'Upload'. Adjust data and re-upload if needed, then click 'OK'.



Camera Calibration

Coordinate calibration

- 1.Place the engraving material in the center of the machine's working area.
- 2.Refer to the diagram on the left, measure the corresponding dimensional data and input the data below.

☒ Working Format
 ☐ Material Size

Device Type

TITAN

TITAN 35

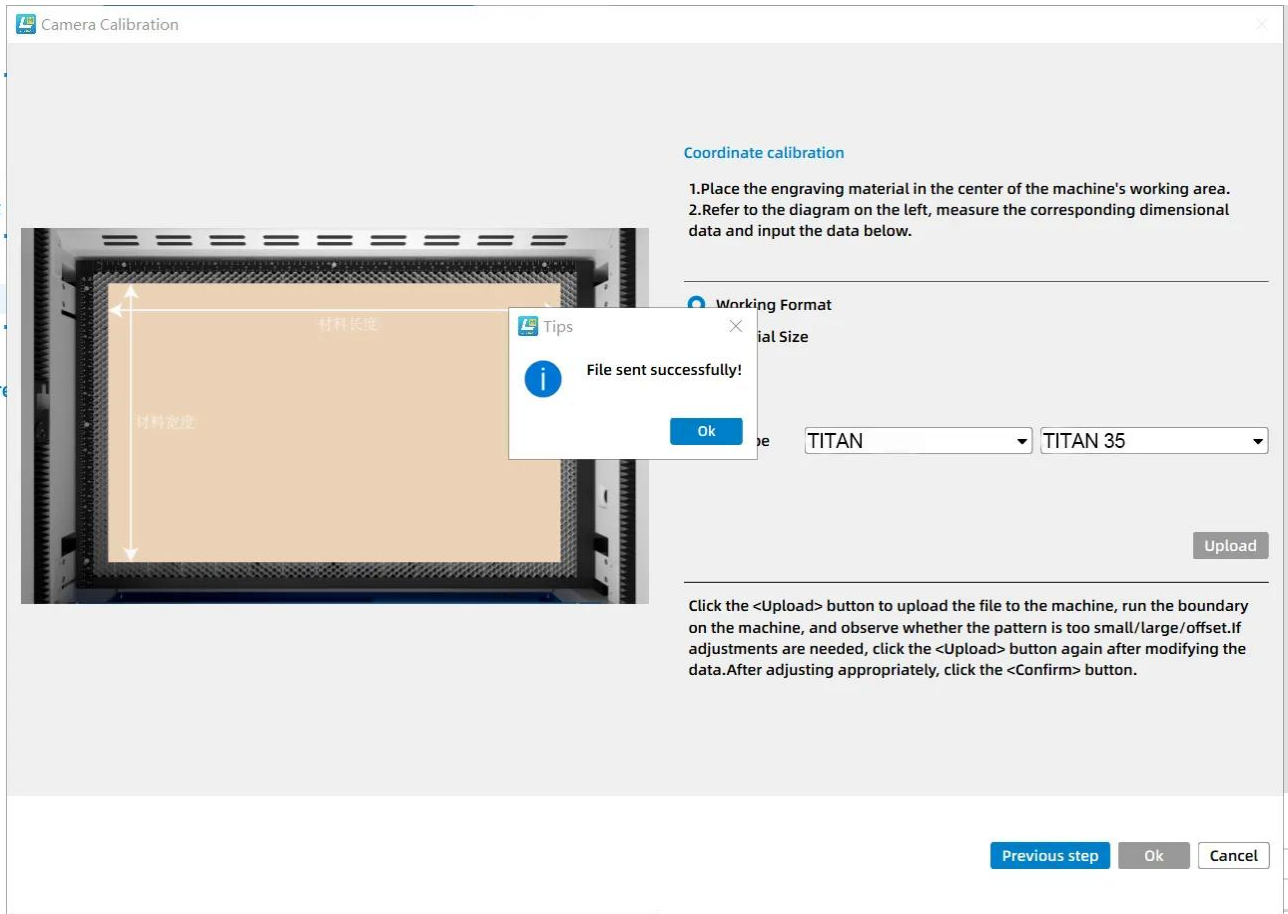
Upload

Click the <Upload> button to upload the file to the machine, run the boundary on the machine, and observe whether the pattern is too small/large/offset.If adjustments are needed, click the <Upload> button again after modifying the data.After adjusting appropriately, click the <Confirm> button.

Previous step

Ok

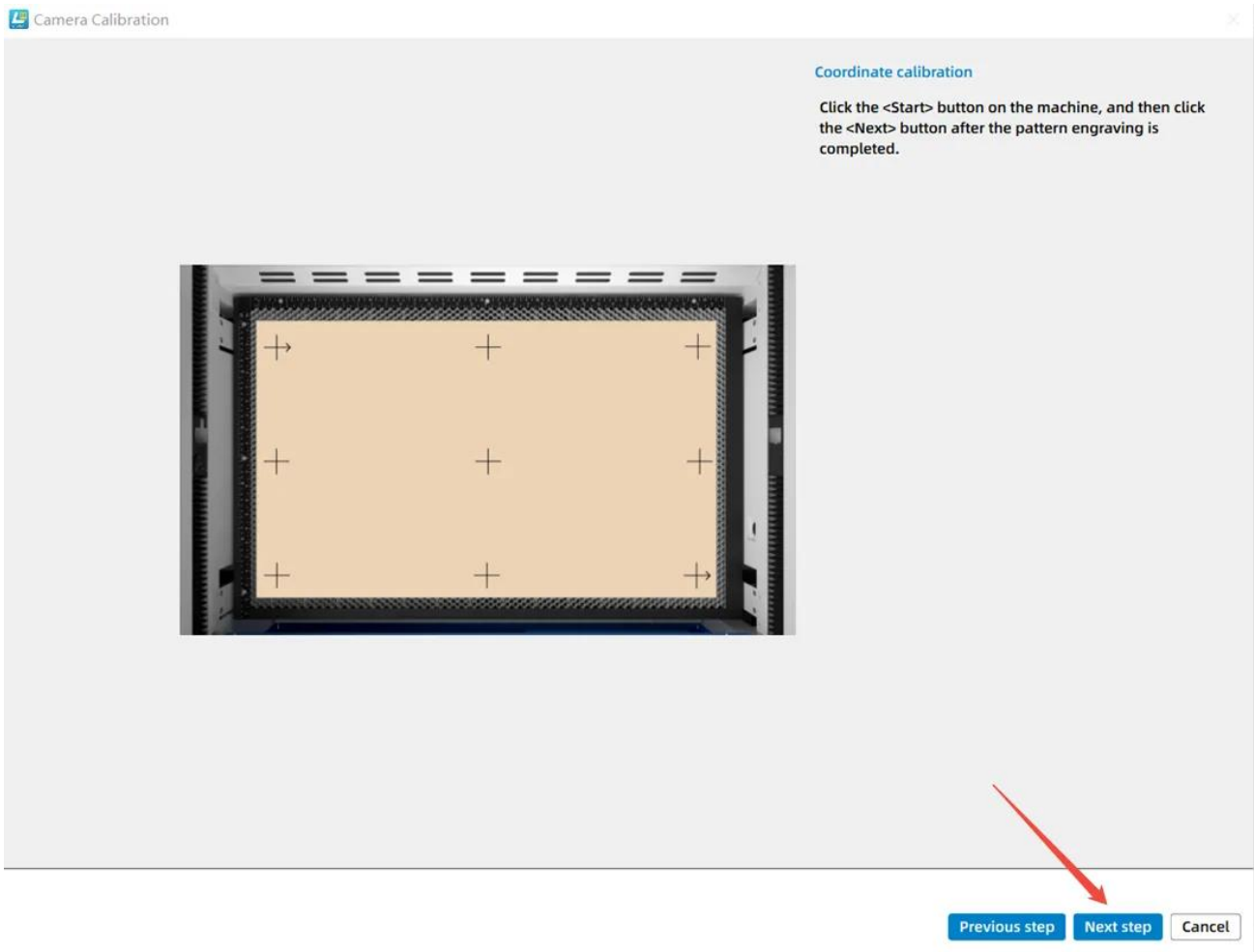
Cancel



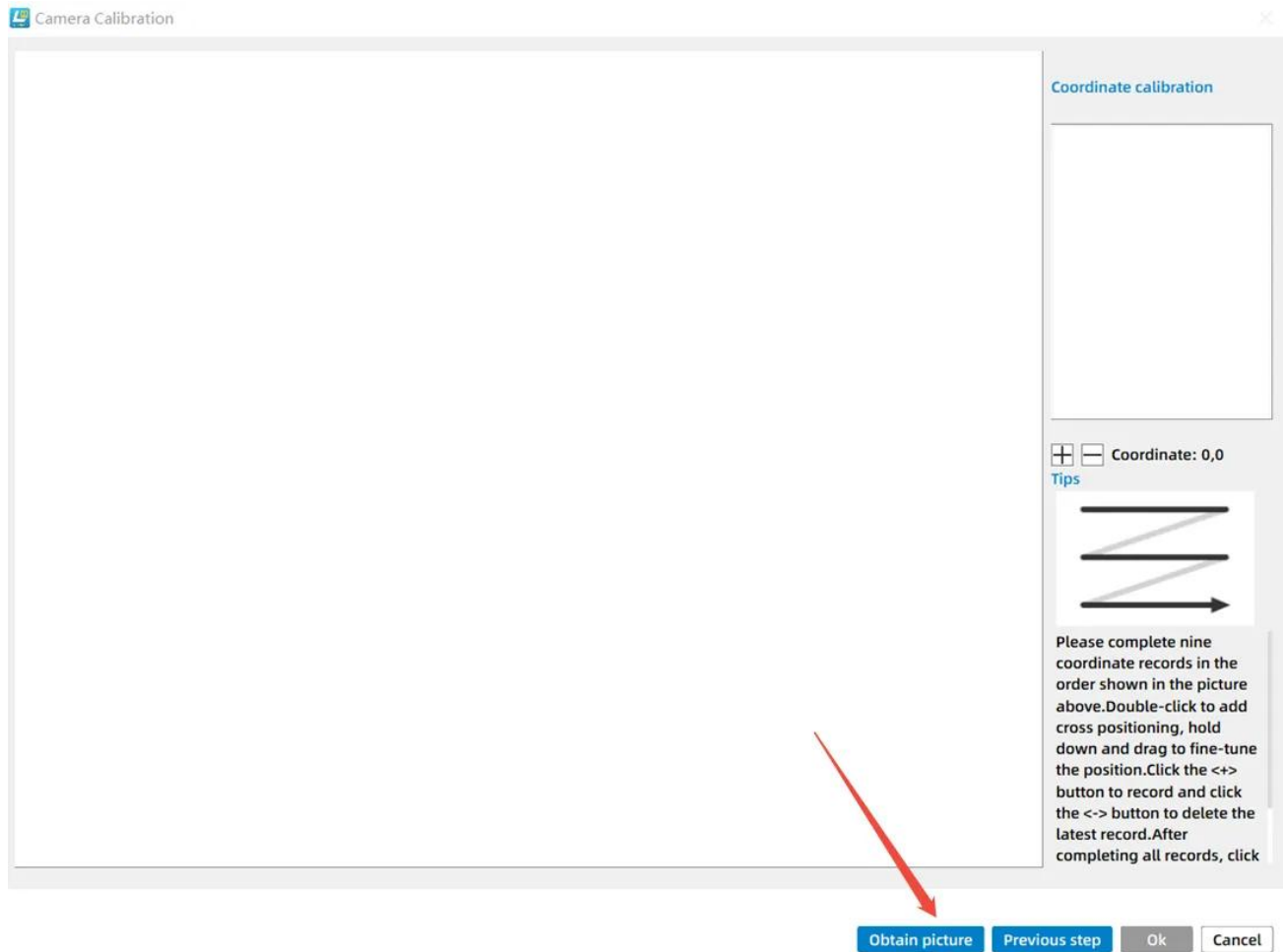
11. Next, click the 'Frame' button on the machine to check that the border is within the working area and there's no collision risk. Then press the 'Start' button on the control panel to begin processing.

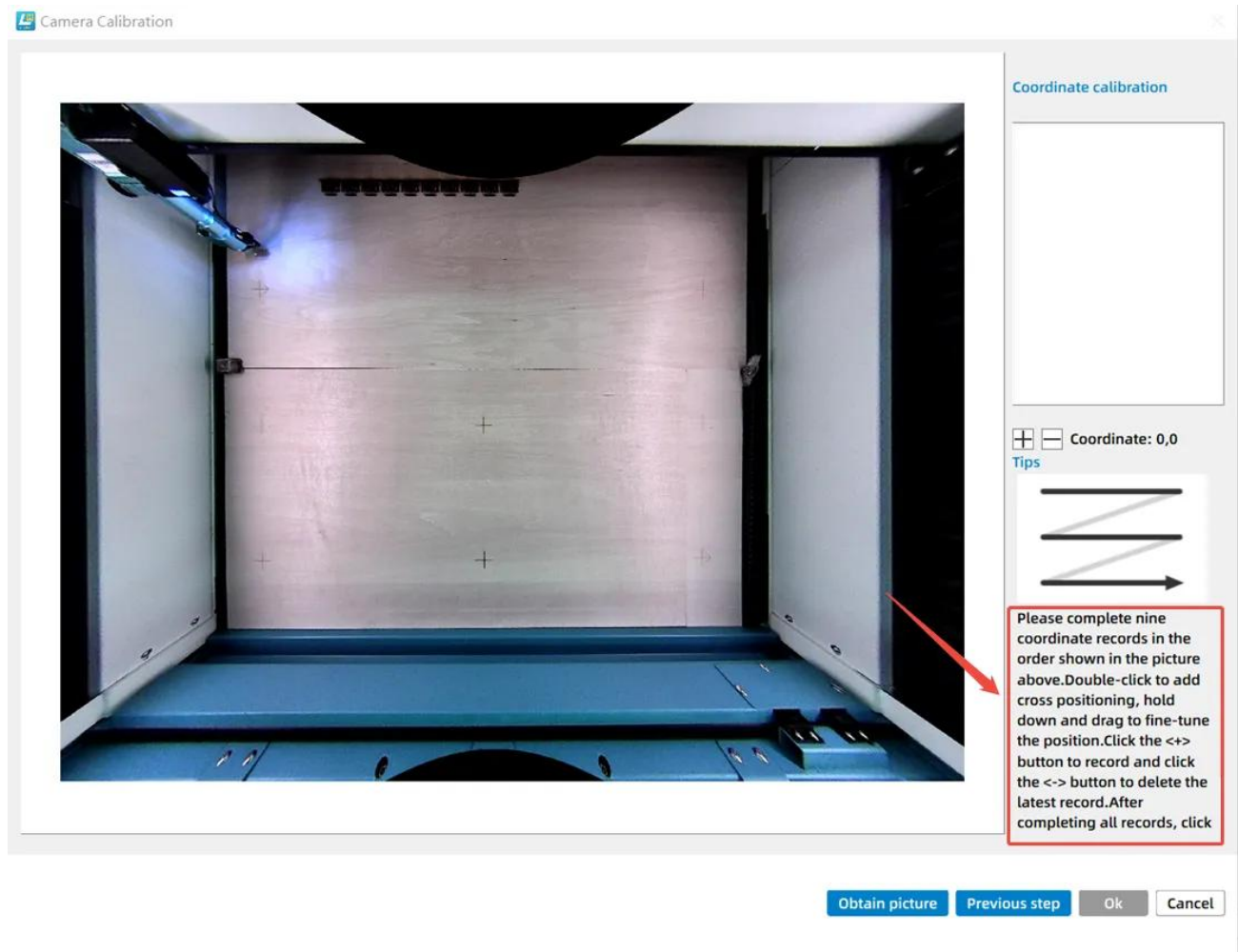


After processing finishes, move the laser head to the upper left corner and click "Next Step".

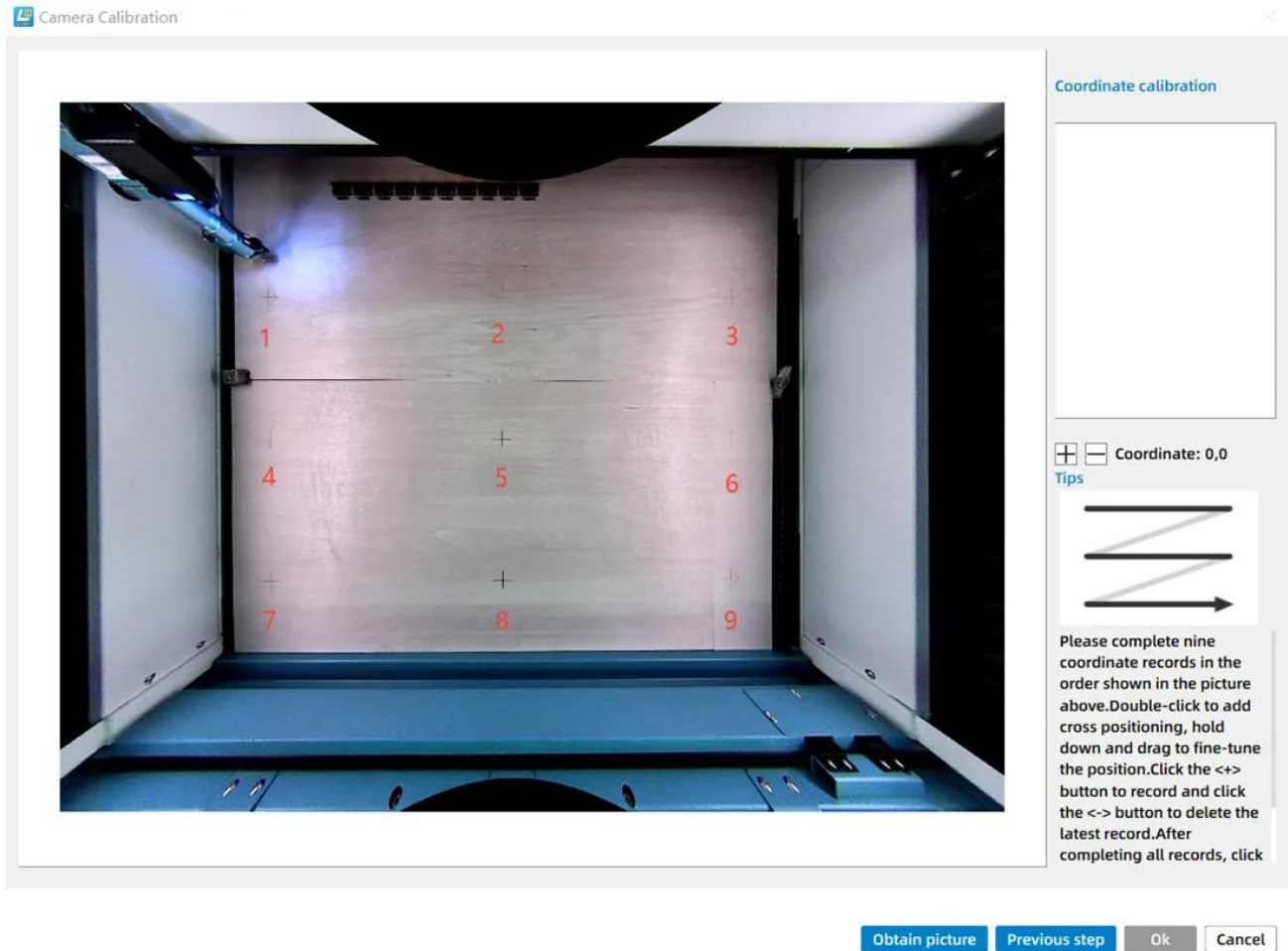


12. Then, click 'Obtain pictures' and follow the instructions on the right to add coordinates for each point.





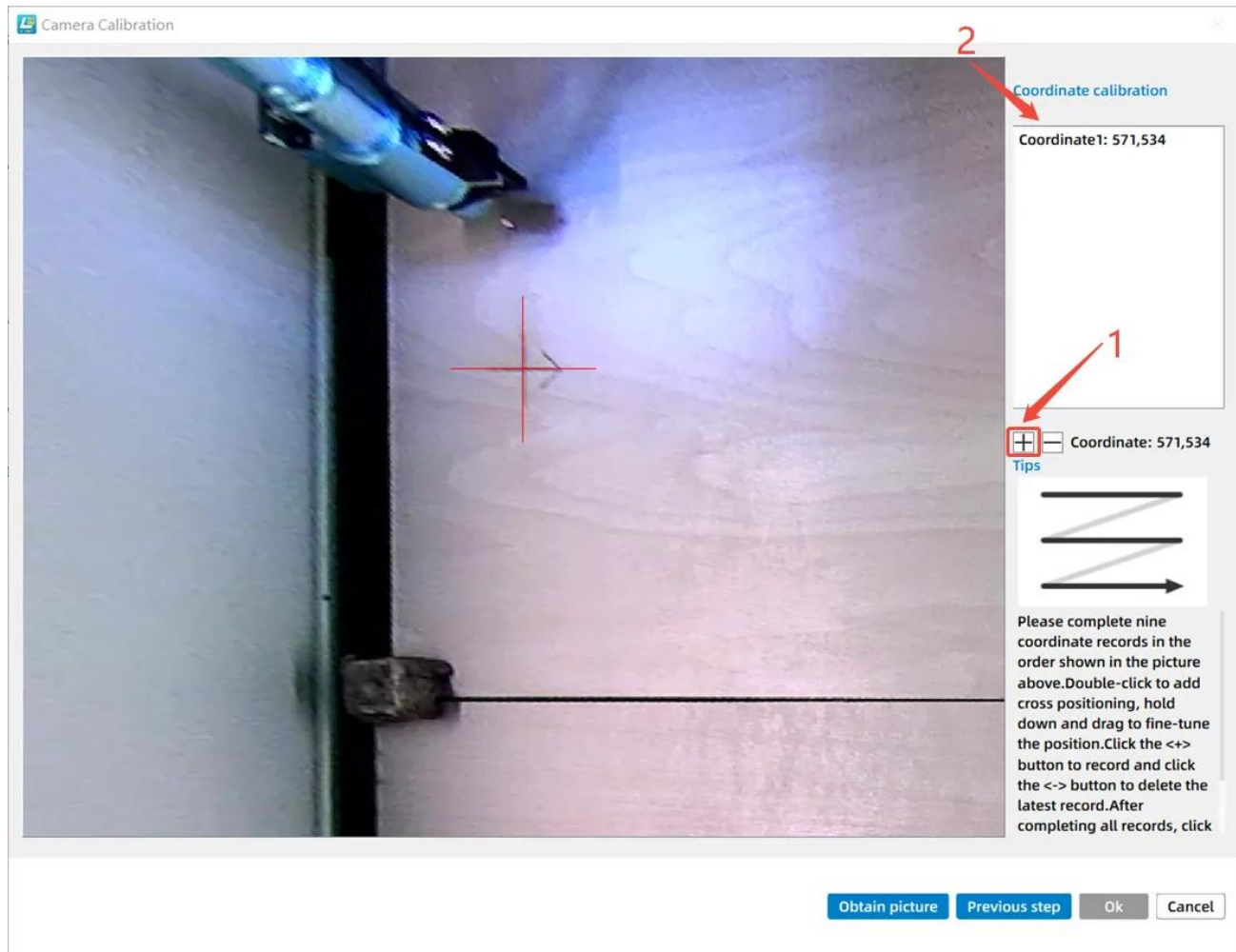
You can also follow the order of the red numbers in the picture.



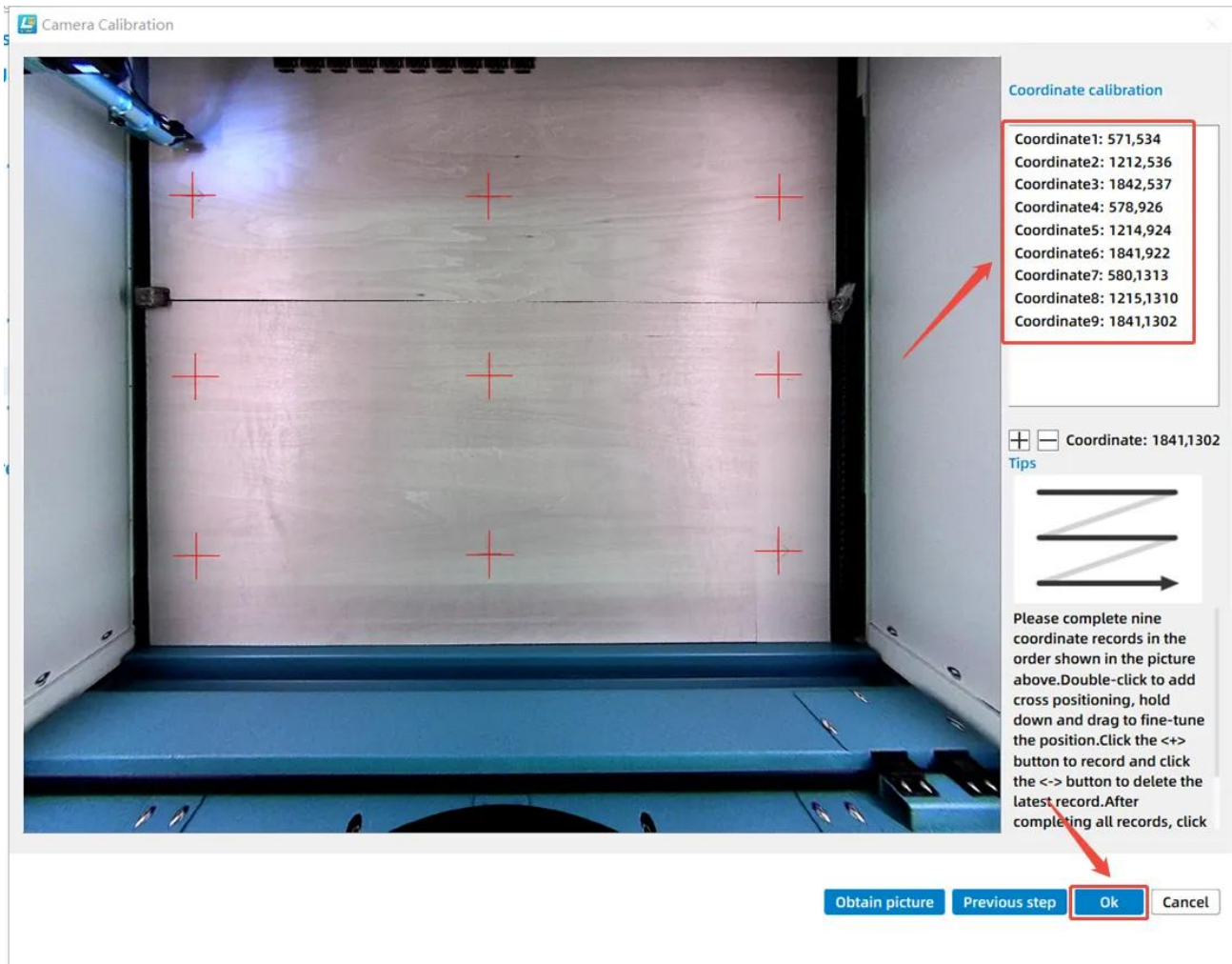
13. In sequence, enlarge the corresponding cross, double-click the left mouse button to add a red cross, and press the left mouse button to change the position of the red cross.

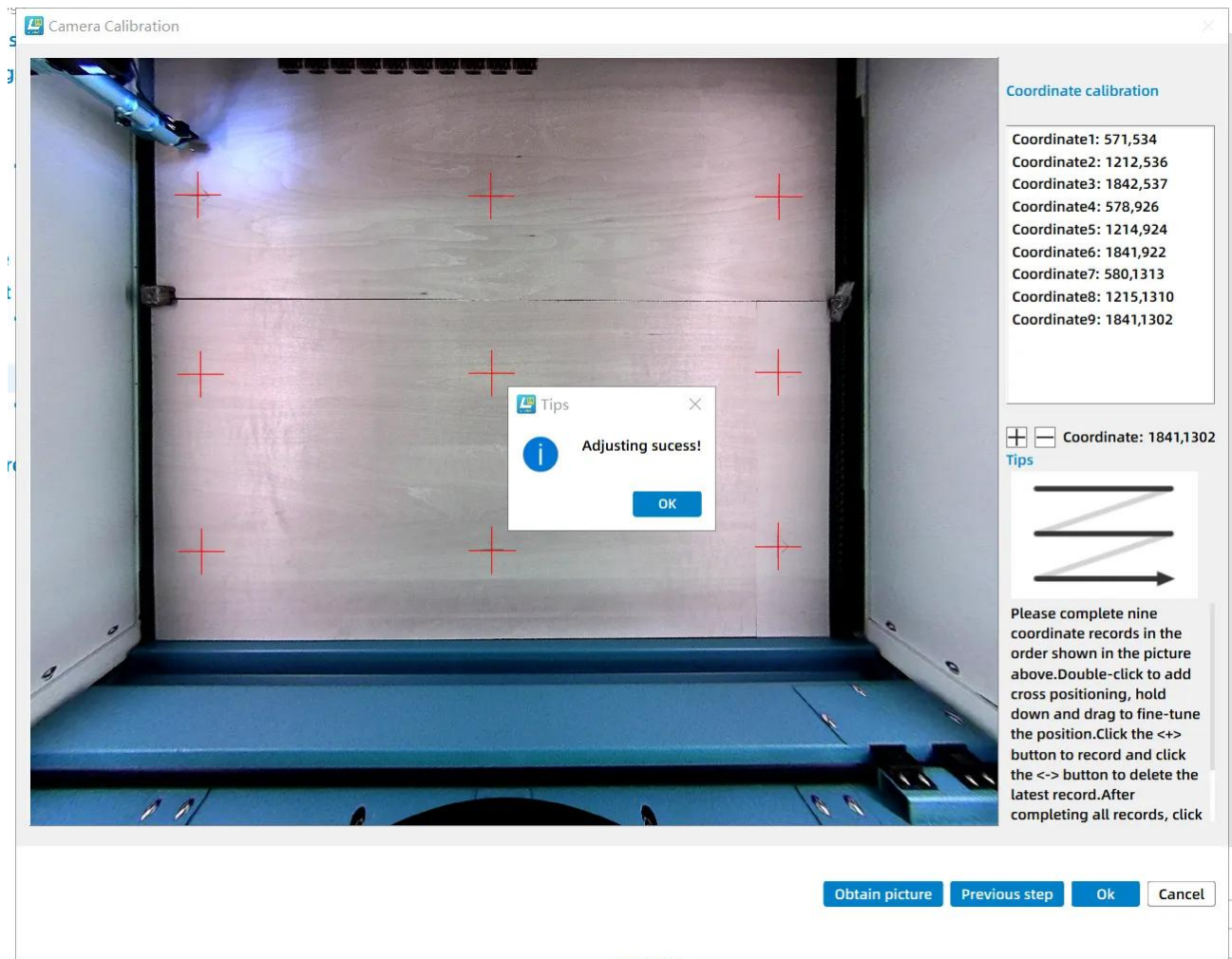
After adding each coordinate, click the '+' button to add the next one until all coordinates are added.

Note: Ensure the center of the red cross aligns with the cross center on the plywood before adding the next coordinate.

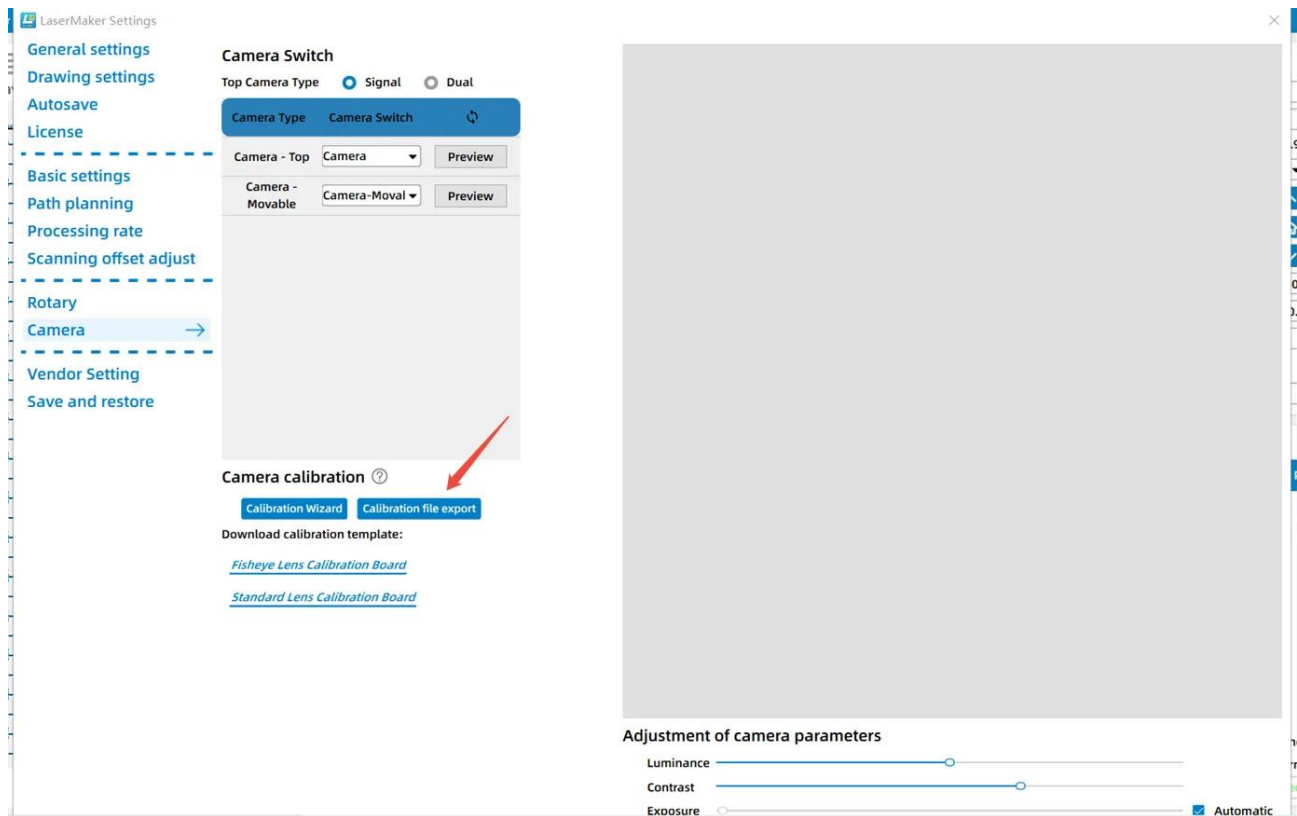


After all coordinates are added, click 'OK' to finish camera calibration.



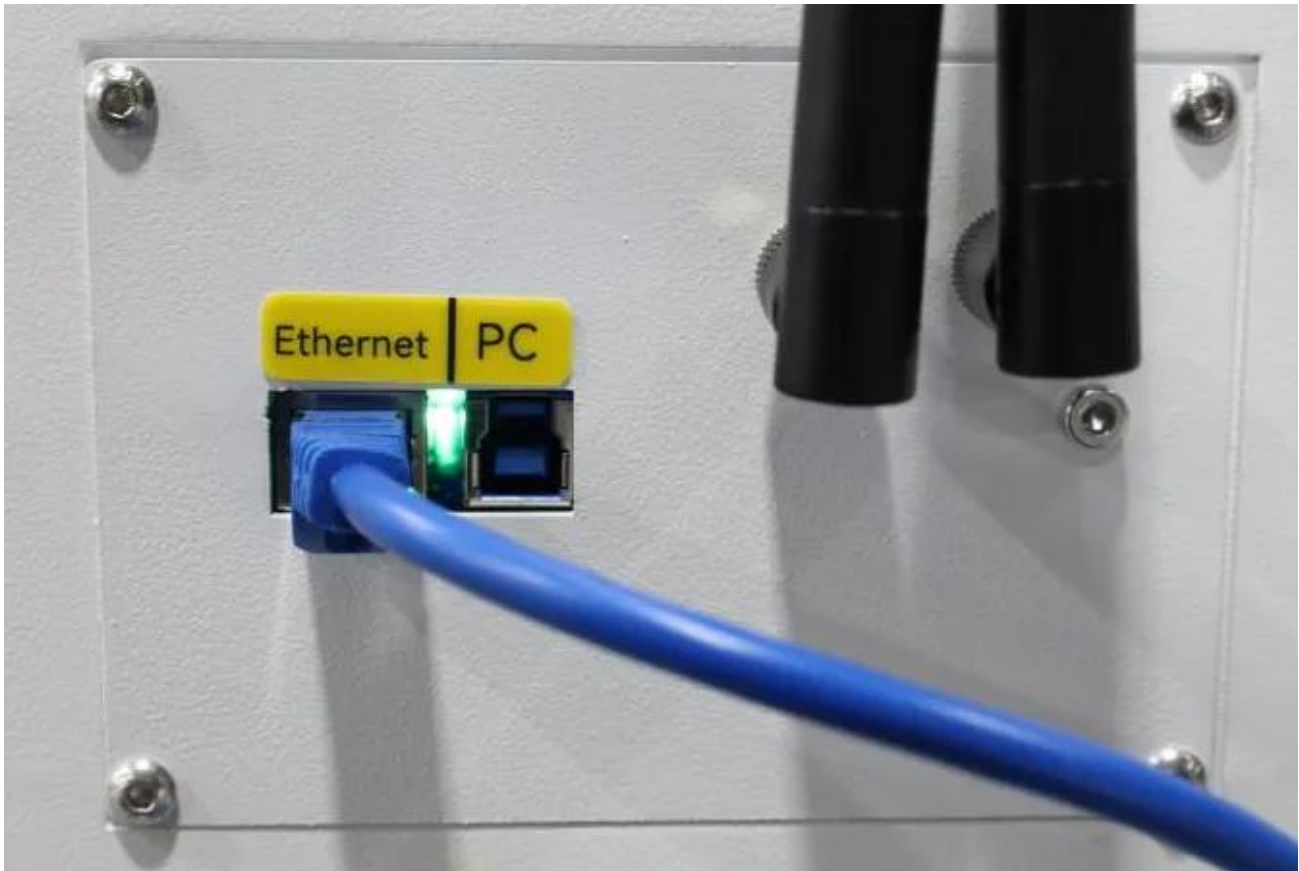


14. Finally, export the corrected calibration file for backup.



Calibrate action camera

1. Connect the machine.



2. Place the plywood on the platform and secure it with magnets. Please refer to this picture for the plywood and laser head positions.



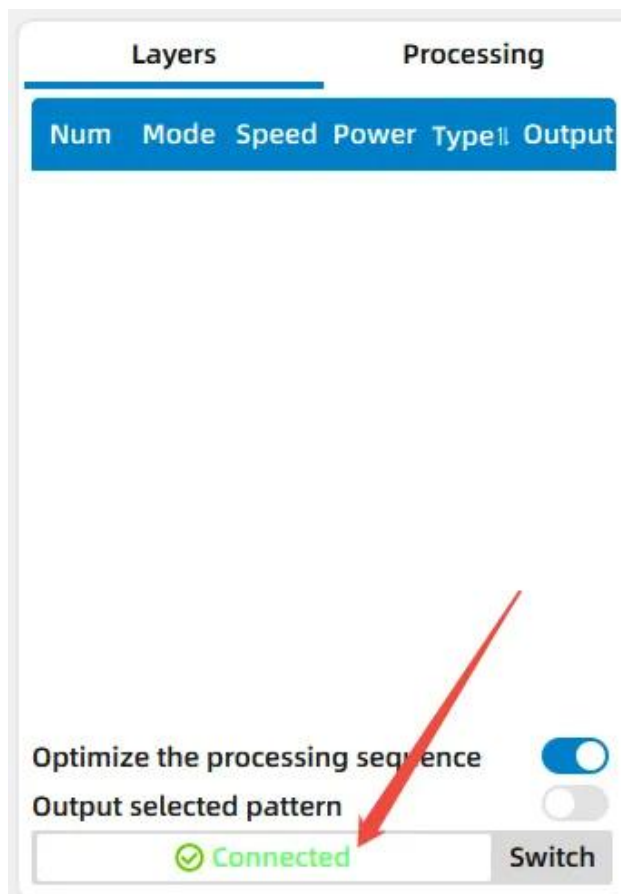
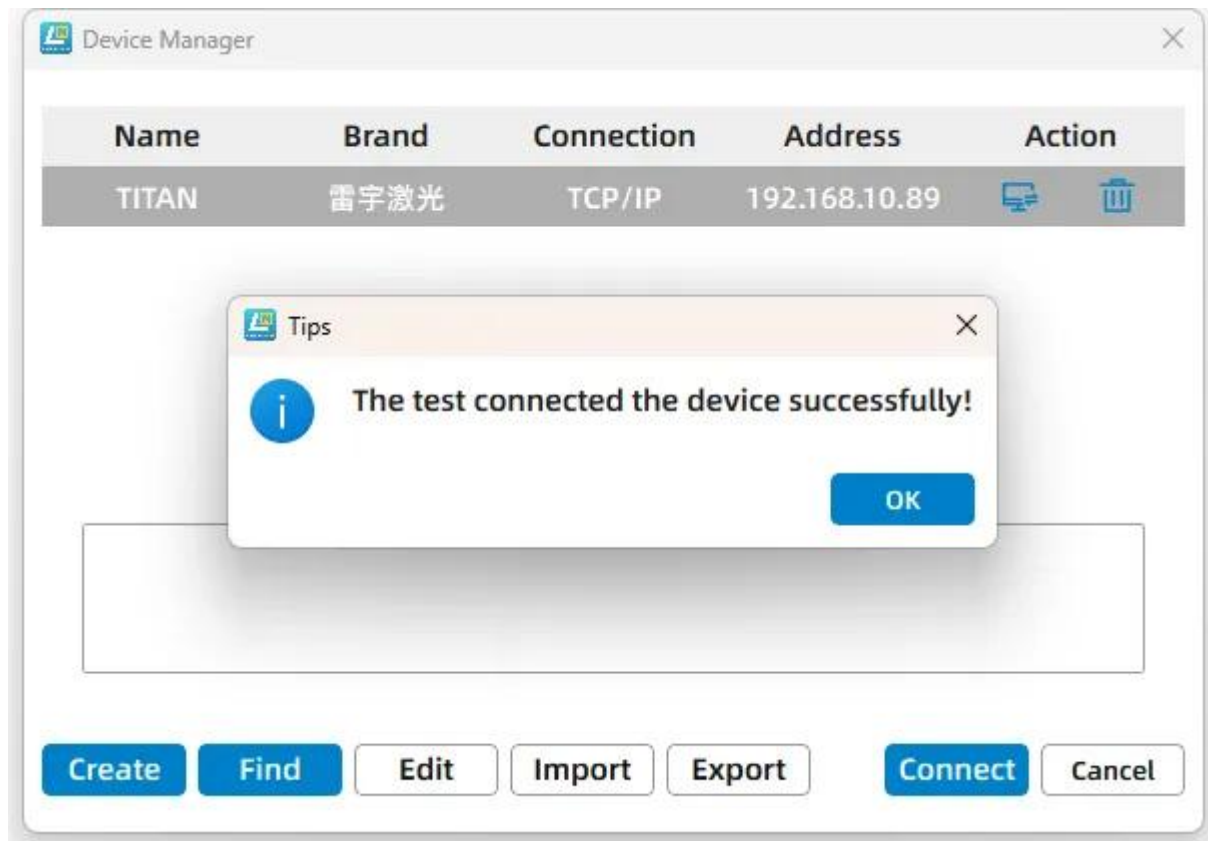
3. After moving the laser head to the position of the picture above, please click the Origin button on the touch panel.



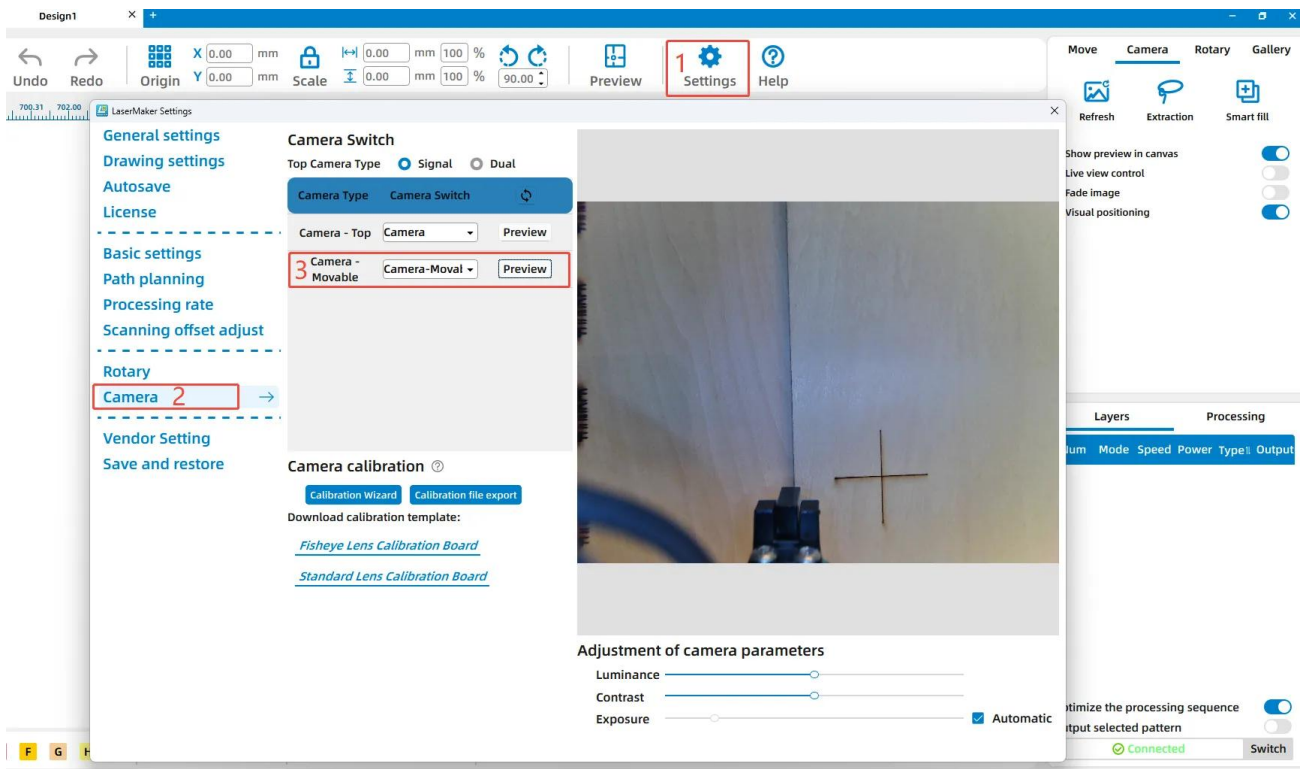
4. Use the auto focus function on the touch panel to focus.



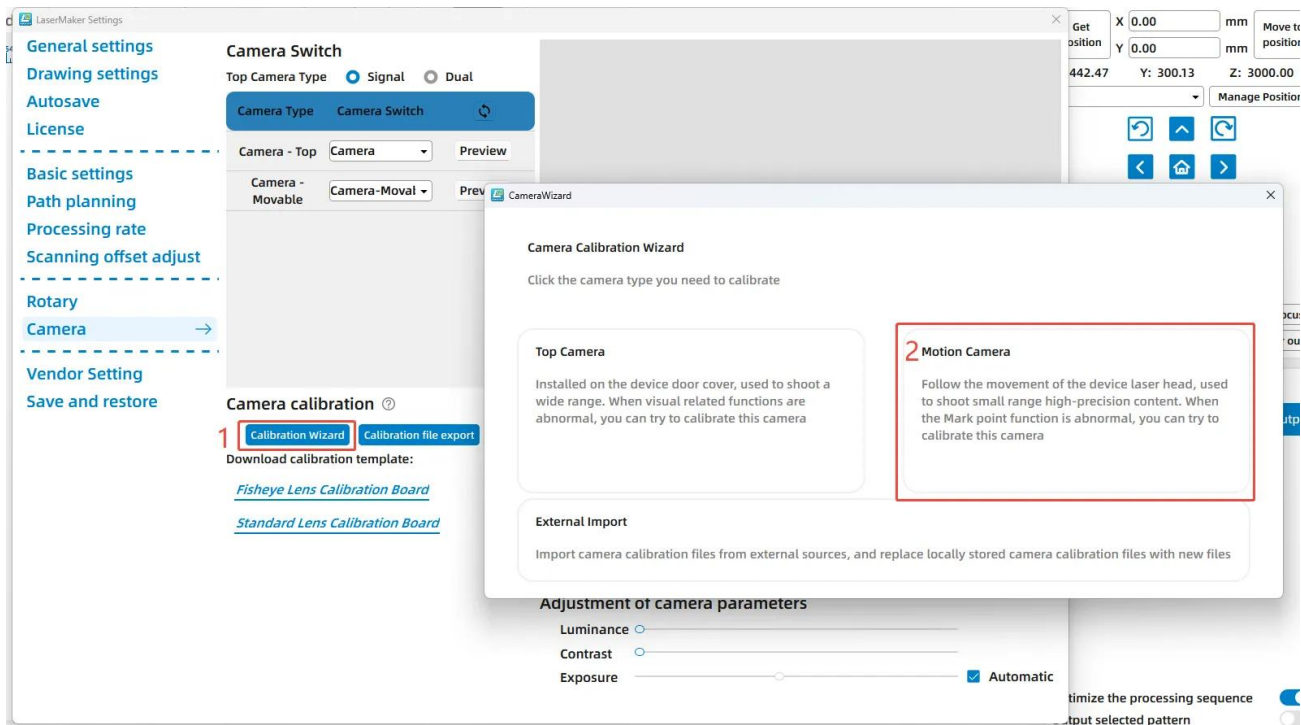
5. Before performing this step, make sure that your machine is successfully connected to your computer.

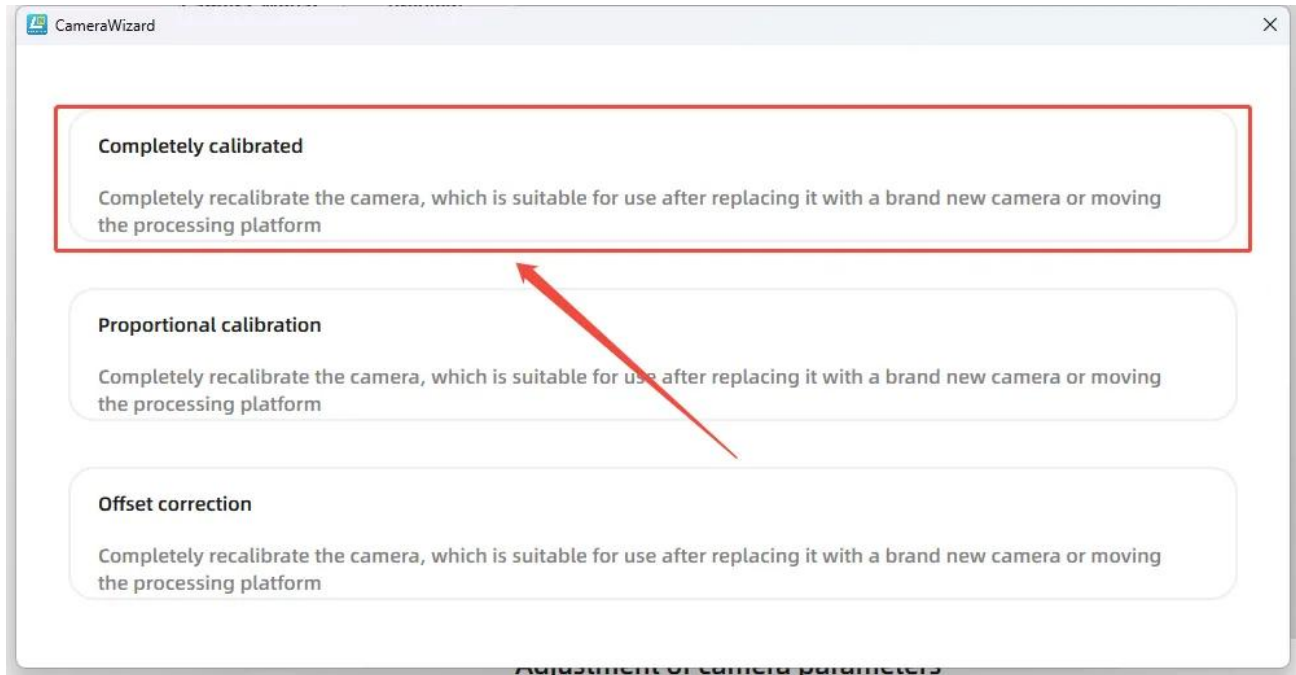


6. Next, go to Settings >> Camera >> Camera-Top >> Preview.

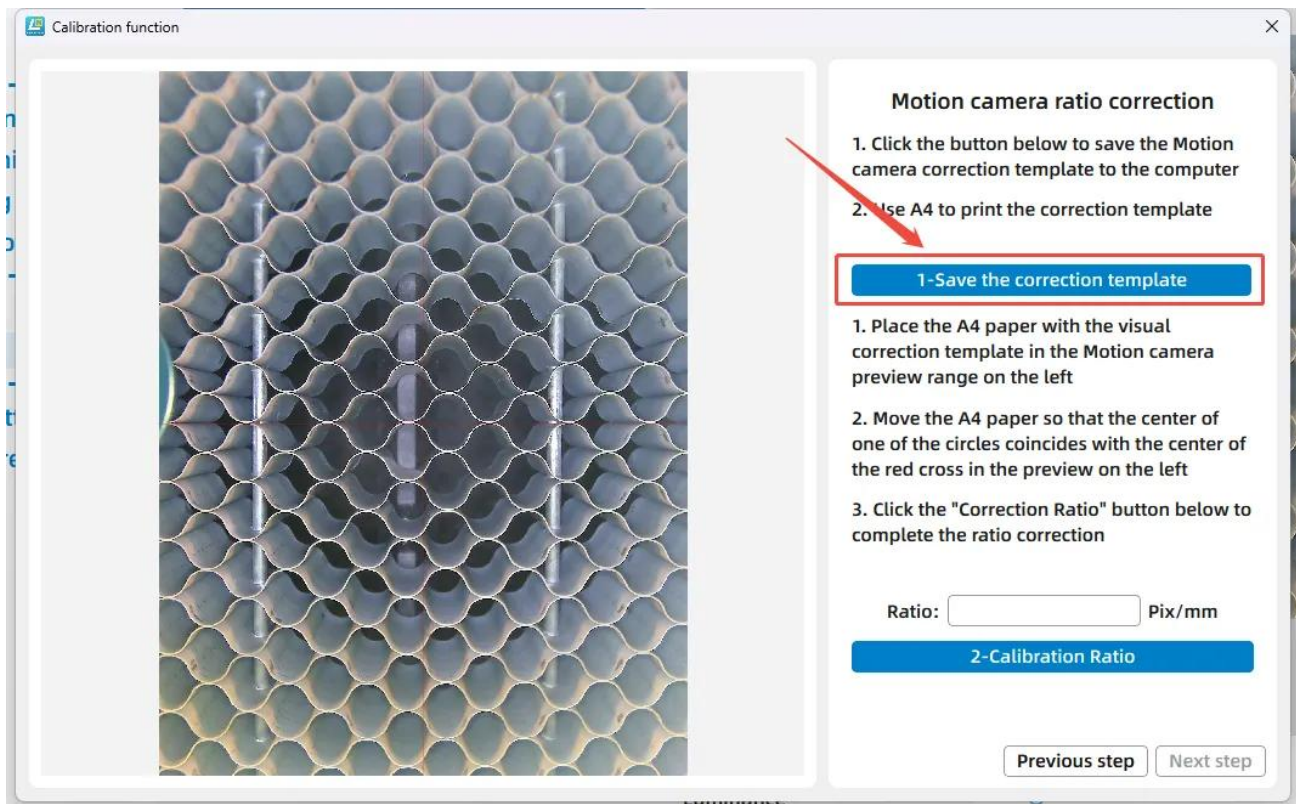


7. After that, click the 'Calibration Wizard' button to start the camera calibration process. In the pop-up 'Camera Calibration Wizard' window, select 'Motion Camera', then choose 'Completely Recalibrate'.

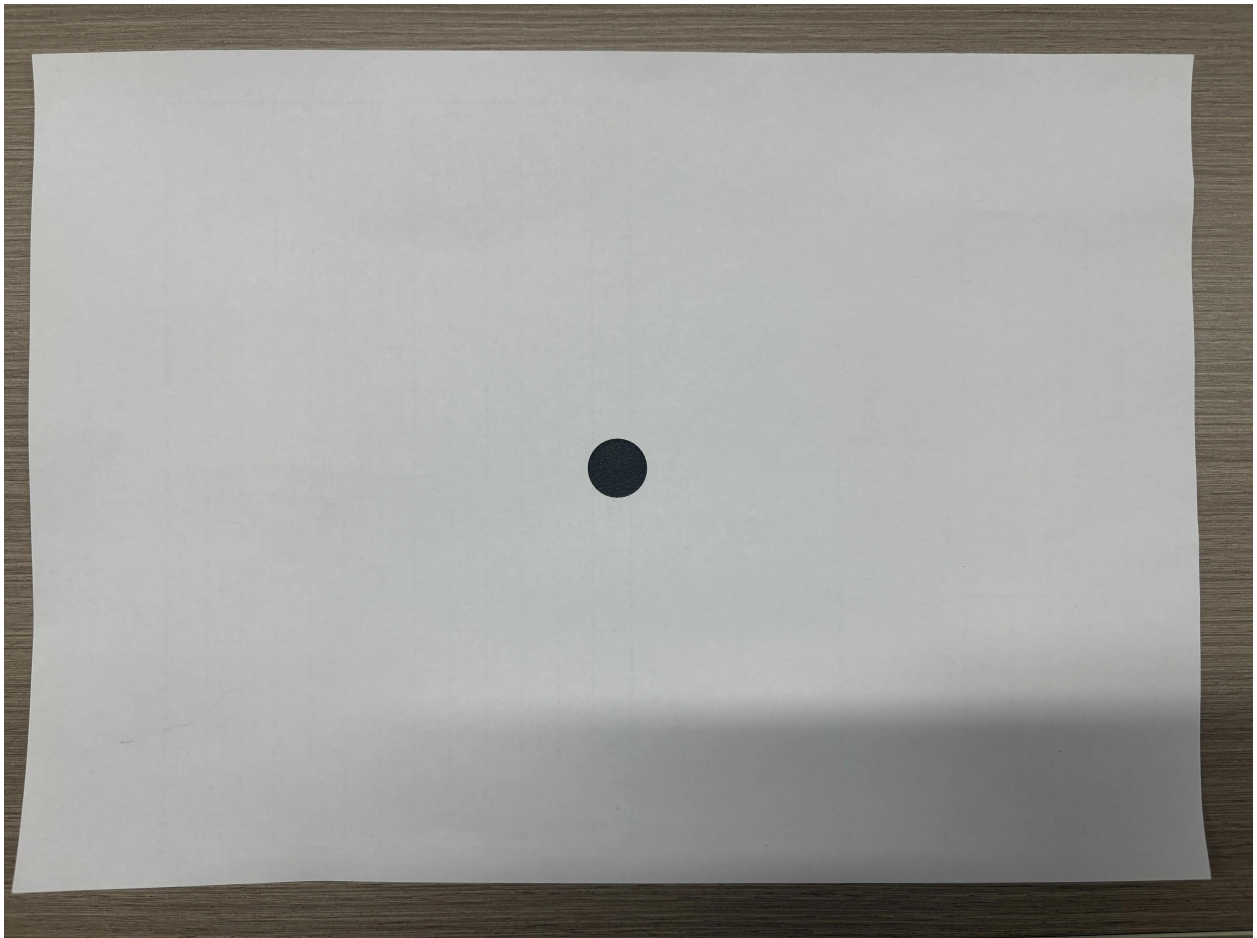
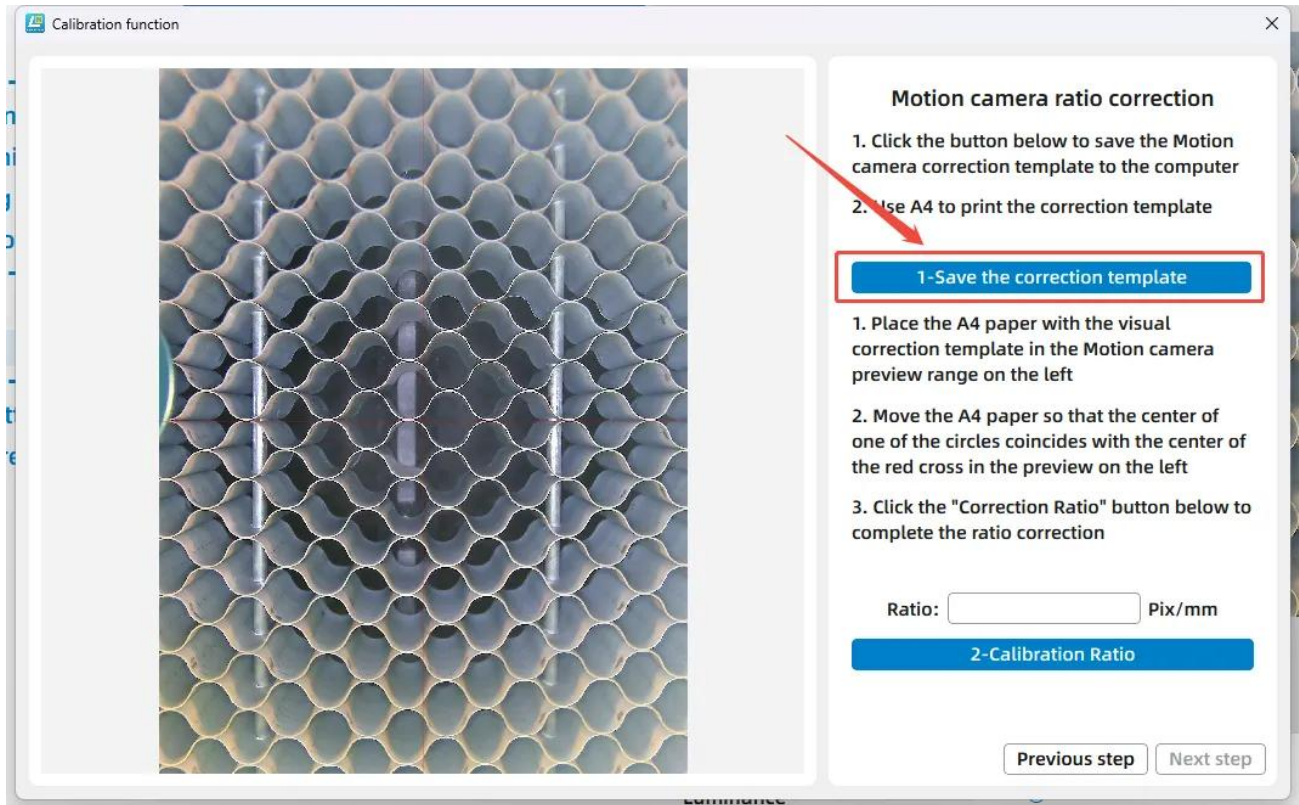




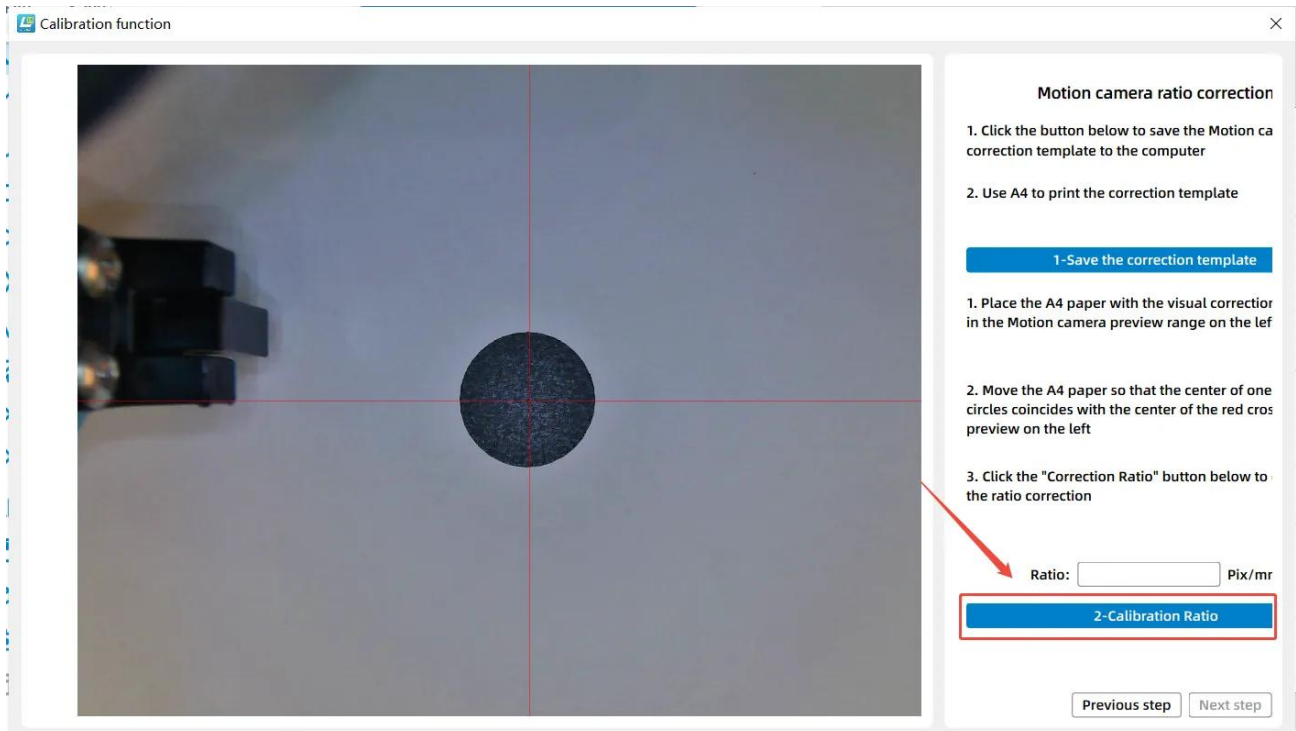
8. Then, click the 'Save the Calibration Template' button and print the template on A4 paper.



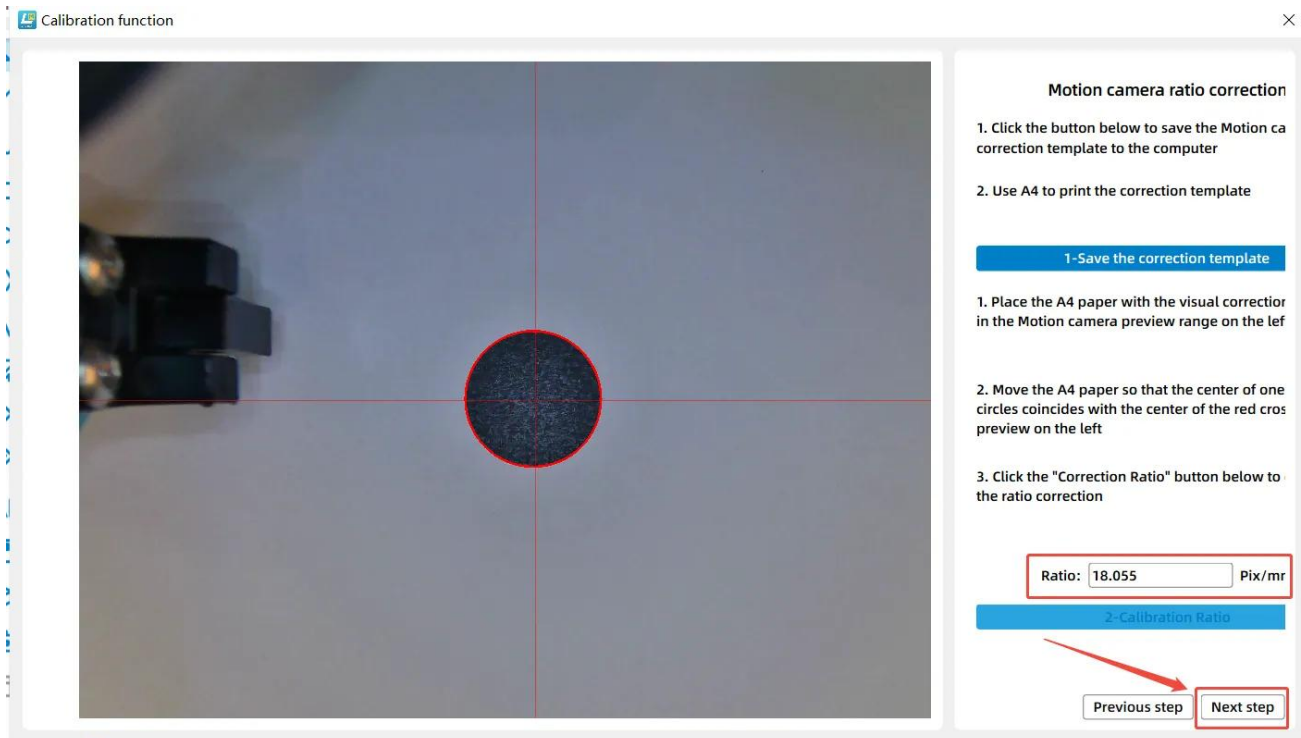
After ensuring that the USB connection method is selected, closing the window will automatically connect the device.



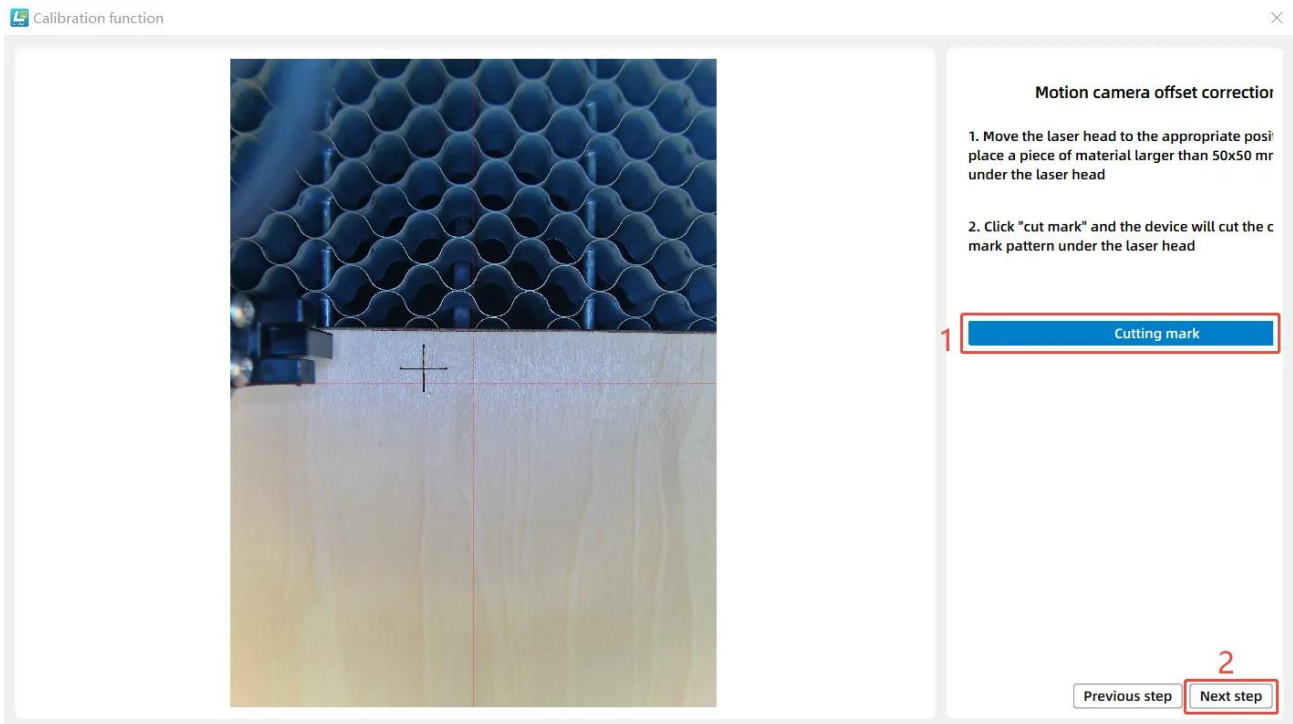
9. Place the printed A4 paper within the camera's preview range, align it with the center point, and then click 'Calibration Ratio' to finish the calibration.



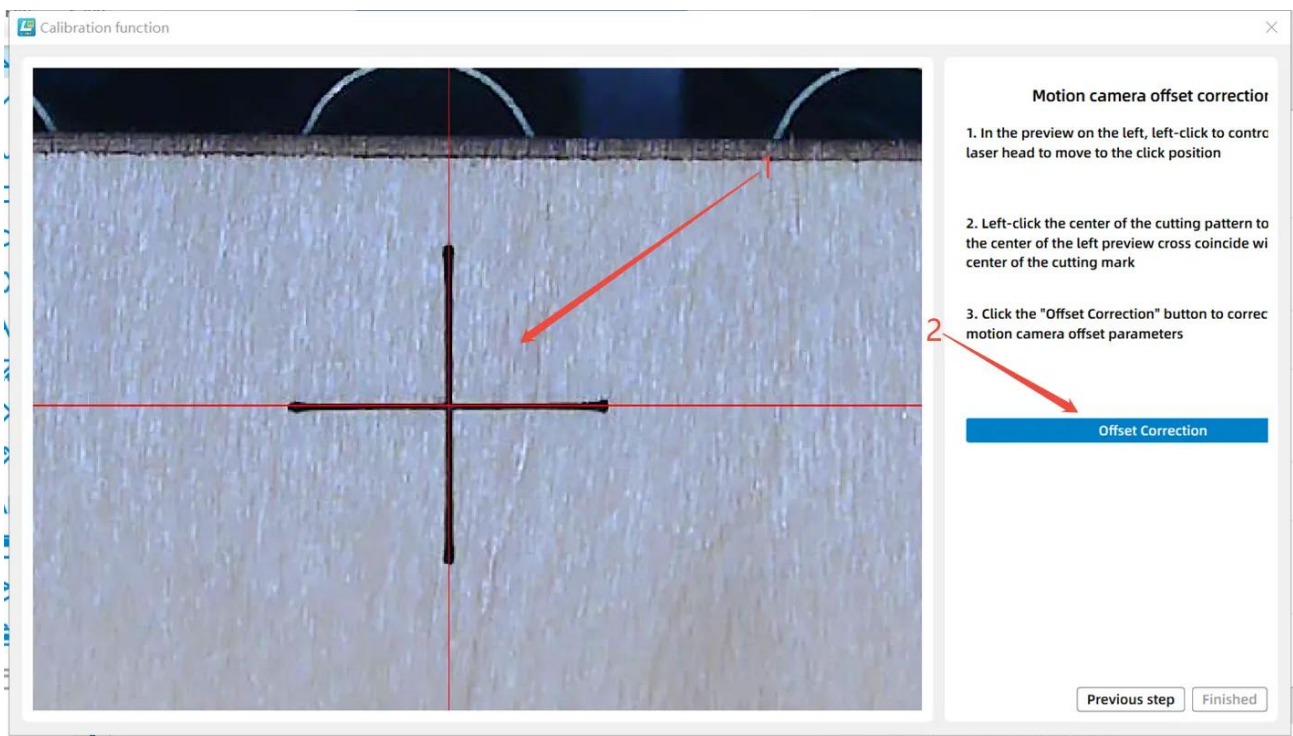
Note: Ensure that the detected circle is correct and that the proportion edit box has a value, then click 'Next step' .

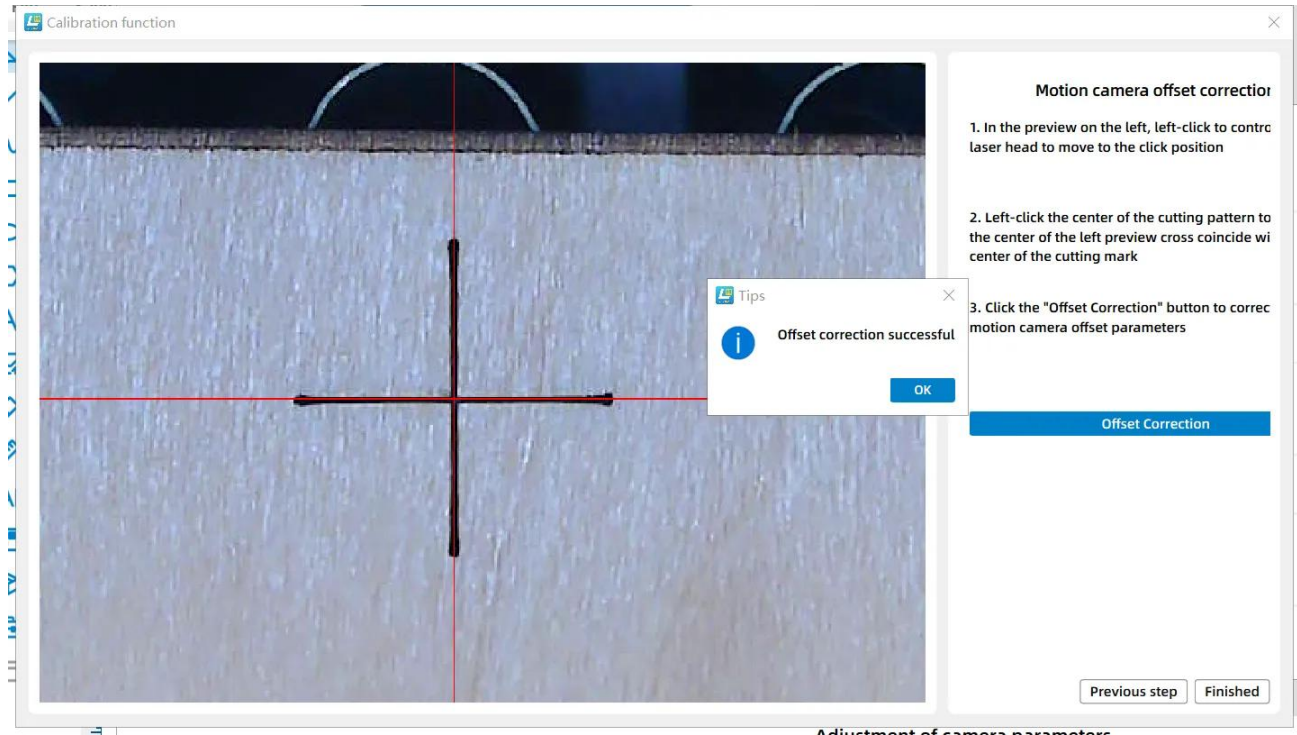


10. Remove the A4 paper you just printed, then click the 'Cutting mark' button and mark the corresponding cross. Once marking is complete, you can move on to the next step.



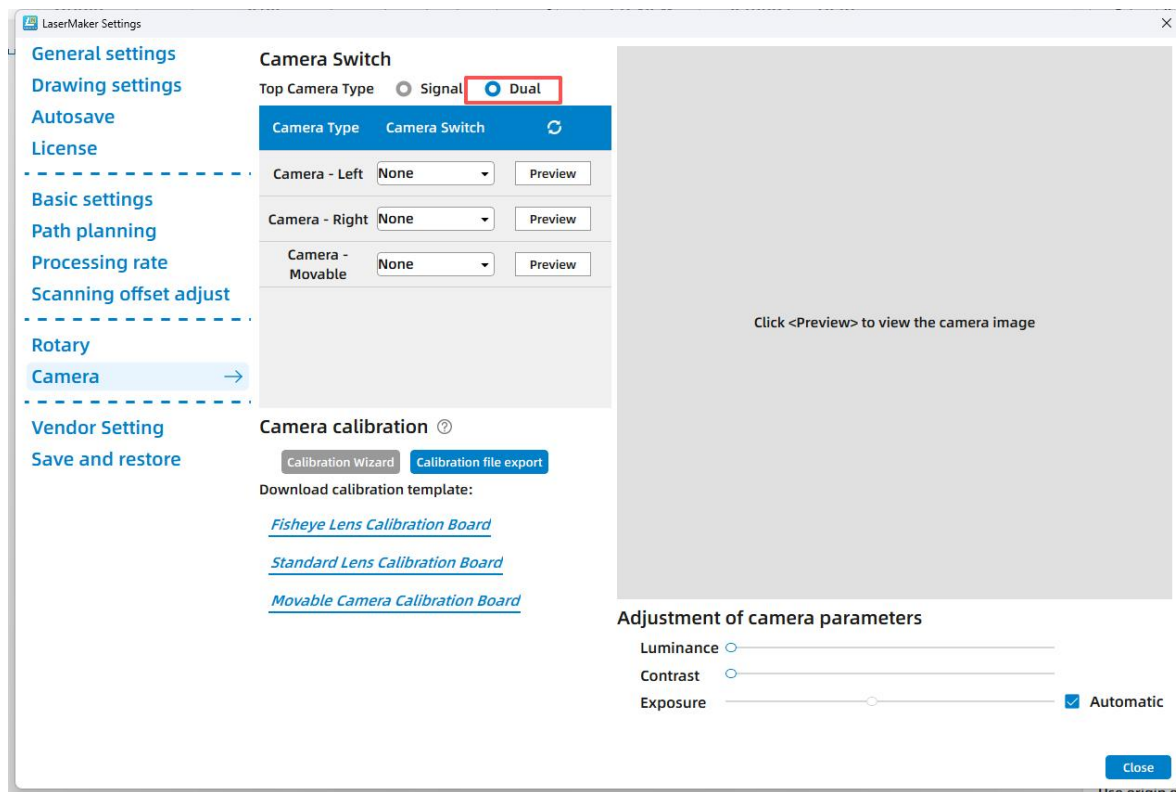
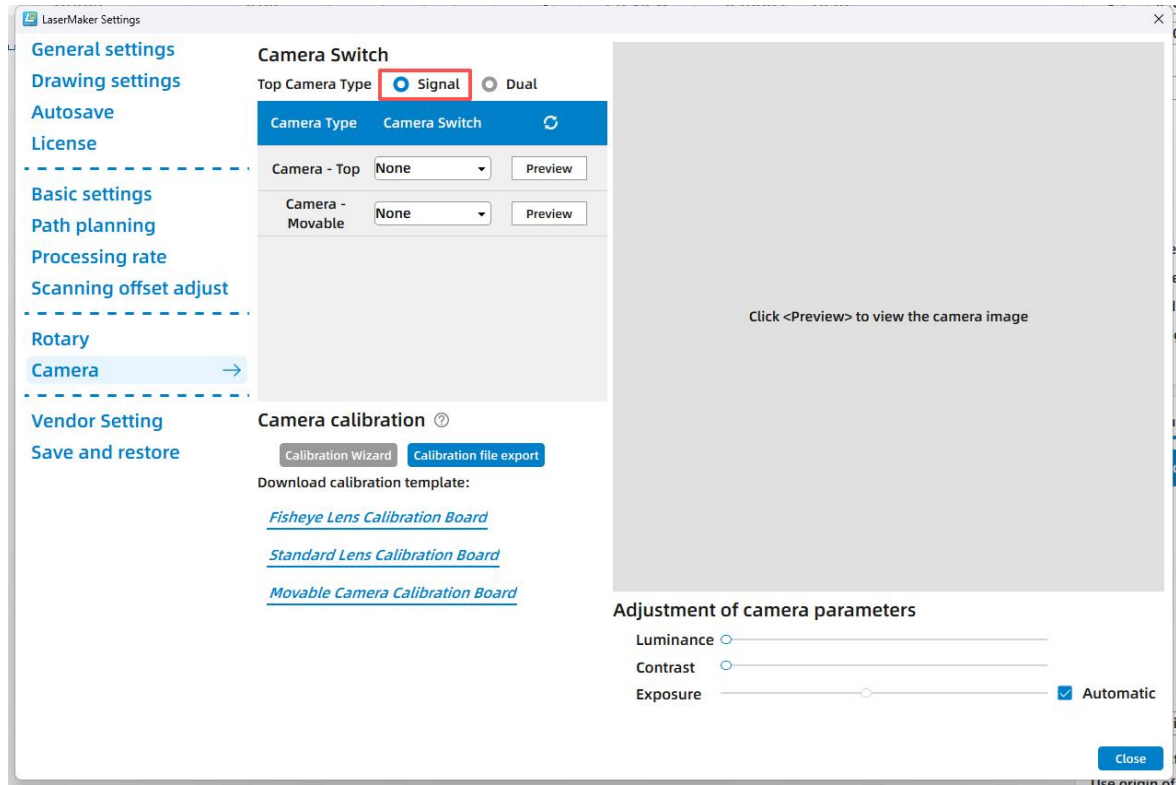
11. In the preview screen, move the laser head to the marked position, then left-click to align the center of the cutting pattern with the corresponding cross in the preview on the left. Next, click the 'Offset Correction' button to complete the correction.





Camera Switch

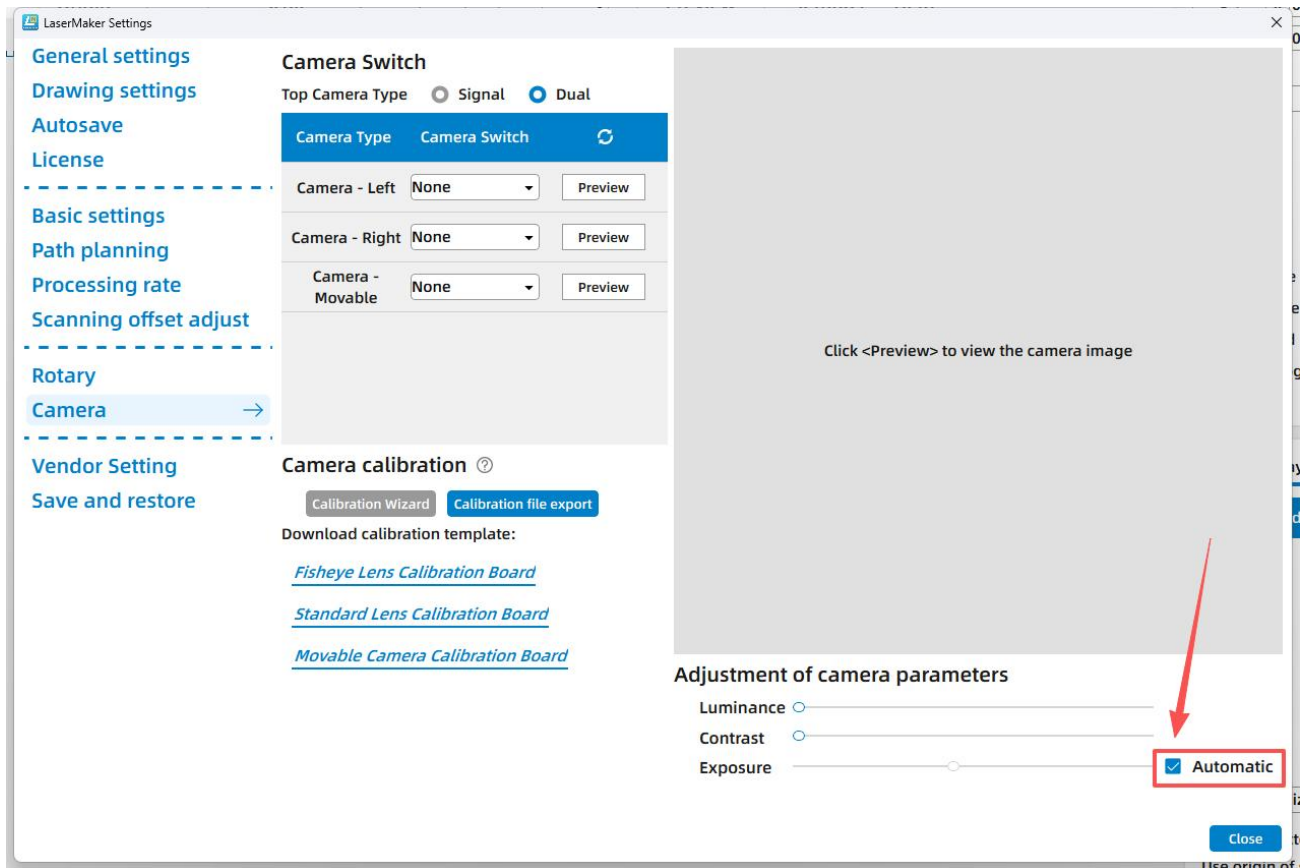
Select "Single" or "Dual" mode based on the device's top camera. Select the appropriate camera according to the instructions in the table. If the camera captures the content normally in the right view, the current camera is able to perform calibration normally.



Camera parameter adjustment

If you check "Automatic", the software will automatically adjust luminance, contrast and exposure based on the image captured by the camera;

If "Automatic" is not checked, users need to manually adjust the luminance, contrast and exposure of the camera image.



5.7 Manufacturer Parameters

5.7.1 Motor parameters

Set the motor parameters of the device.

Property	X	Y	Z	U
Direction of Polarity	Positive	Negative	Negative	Positive
Control Mode	Pulse+Direction	Pulse+Direction	Pulse+Direction	Pulse+Direction
PWM Edge Valid	Descending Edge	Descending Edge	Descending Edge	Descending Edge
Keypad Direction	Negative	Positive	Positive	Negative
Enable home	Yes	Yes	No	No
Step length(p/um)	10.51	4.20	0.80	7.89
Move Distance(mm)	1250.00	900.00	230.00	900.00
Home Offset(mm)	3.00	3.00	3.00	0.00
Motor Speed Limit				
Ini Speed(mm/s)	10.00	5.00	5.00	6.00
Max Speed(mm/s)	3000.00	300.00	8.00	100.00
Max Acc(mm/s ²)	80000.00	3000.00	1000.00	1000.00
E-stop acc(mm/s ²)	50000.00	10000.00	2000.00	2000.00
Button Acc(mm/s ²)	2500.00	2500.00	1000.00	100.00
Keypad Speed(mm/s)	5.00	5.00	2.00	5.00

Calibrate XY step Read Upload

Directional of polarity

Modifying the direction polarity can make the button direction and the motor direction move in opposite directions.

Control mode

The control method is determined by the type of motor driver actually configured in the machine. In the machine, the controller controls the motor driver, and the motor driver controls the motor.

PWM edge valid

Used to set the pulse signal of the motor driver to be effective on the rising edge or falling edge. Falling edge effective means that a pulse is triggered once when the high level changes to a low level, and rising edge effective means that a pulse is triggered once when the low level changes to a high level.

Keypad direction

The trigger (high/low) level of the limit, that is, whether to trigger when the button is pressed or not pressed.

Enable home

After the device is powered on, it is reset to the mechanical zero point.

Step length

The motor's pulse equivalent. When a pulse is sent to the motor, the corresponding absolute distance traveled by the motion axis is the same. This value is determined by calibration, meaning that each motor step corresponds to the distance the laser head moves.

Move distance

The maximum range of motion of the motor on the device. The maximum operating range of the motor determines the maximum operating range of the device.

Home offset

The distance the device moves after reset is the origin offset distance, that is, the distance the laser head moves after the beeping sound after the device resets.

Motor speed limit

Not currently supported.

Ini speed

The starting speed of the motor.

Max speed

The maximum speed that the motor can withstand. This parameter is related to the motor's driving ability, the inertia of the moving axis, and the transmission ratio.

Max acc

The maximum acceleration value of the motion axis during acceleration and deceleration. If the acceleration is set too high, the motor may lose steps, vibrate, or even produce noise; if it is set too low, the acceleration will be slow and the speed of the entire graph will be reduced.

E-stop acc

When the motor reaches the limit position, or the emergency brake button is manually pressed, the axis will be decelerated and stopped at the emergency stop acceleration. The higher the acceleration value, the shorter the emergency stop time.

Button acc

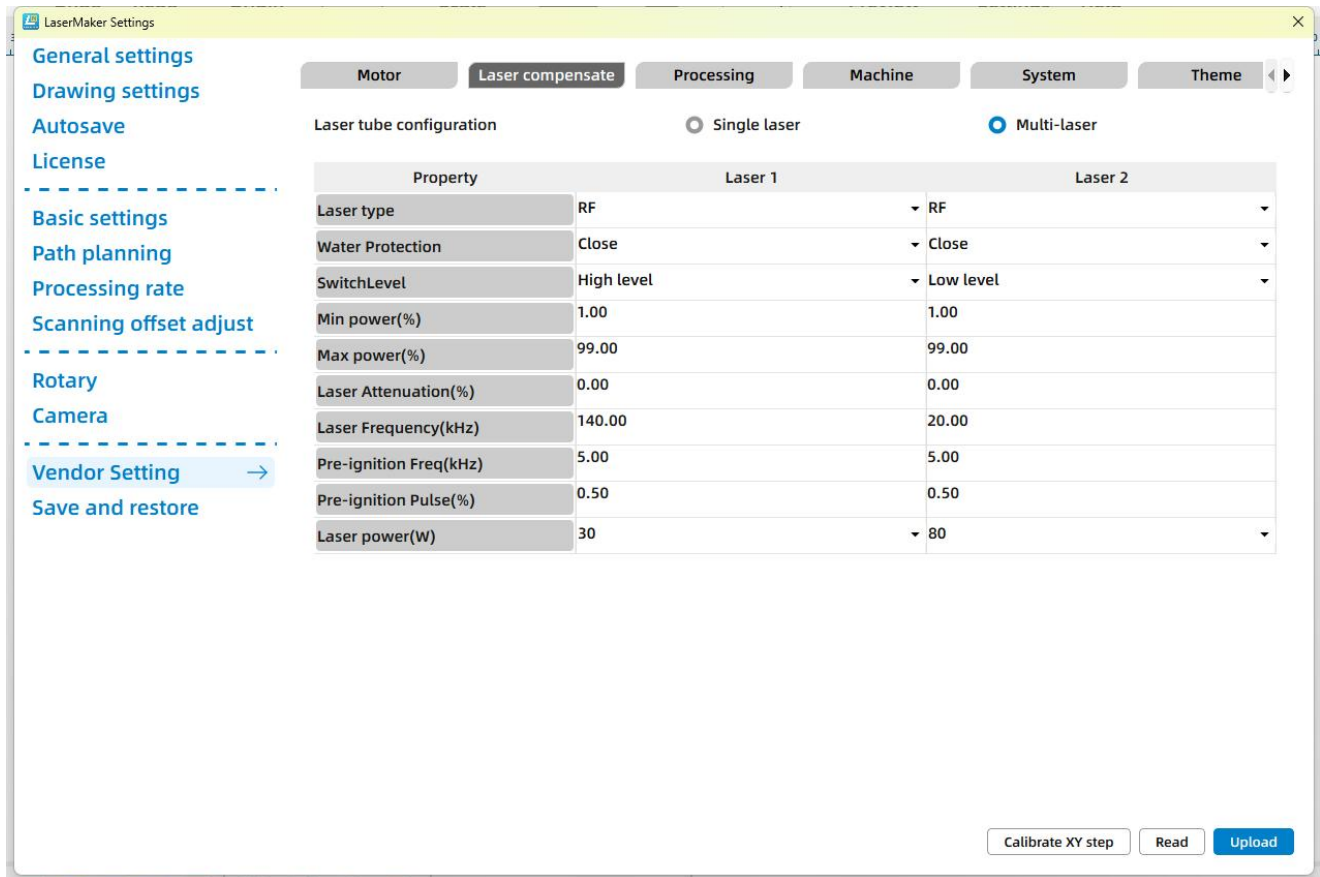
During the key press, the motor movement speed will accelerate to reach the maximum speed of the motor.

Keypad speed

The initial acceleration of the laser head movement after a key is pressed on the panel.

5.7.2 Laser parameters

Set the laser parameters of the device.



Laser tube configuration

Single light source, dual light source, that is, the number of lasers the device has.

Laser type

Laser type refers to the type of laser tube. The laser tube is the core component of laser engraving and cutting machines and laser marking machines. The type and quality of the laser tube directly determine the quality of the processing technology.

Water protection

The water protection switch is used to protect the laser tube when the machine is working. If the water used to cool the laser tube stops flowing or the water pressure becomes abnormal, the water protection switch will sound an alarm and stop the laser cutting machine to ensure the safety of the laser tube. The water error warning will be displayed on the control panel.

Switch Level

Whether the laser switch enable signal is high or low.

Min power(%)

It is used to set the limit power value of the laser, indicating the minimum output power of the laser. The minimum power value set by the user cannot be lower than the minimum power value set here.

Max power(%)

It is used to set the maximum power value of the laser, which indicates the maximum output power of the laser. That is, during operation, the maximum power set by the user cannot be higher than the maximum power value set here.

Laser attenuation(%)

Laser power will decay as the laser is used.

Laser frequency(kHz)

Used to set the pulse frequency of the control signal used by the laser. Glass tubes are generally set to around 20KHZ, and RF tubes are generally set to around 5KHZ.

Pre-ignition freq(kHz)

When a RF laser is used and a simmer pulse is required, the characteristics of the simmer pulse can be configured by the simmer frequency and simmer pulse width.

Pre-ignition pulse(%)

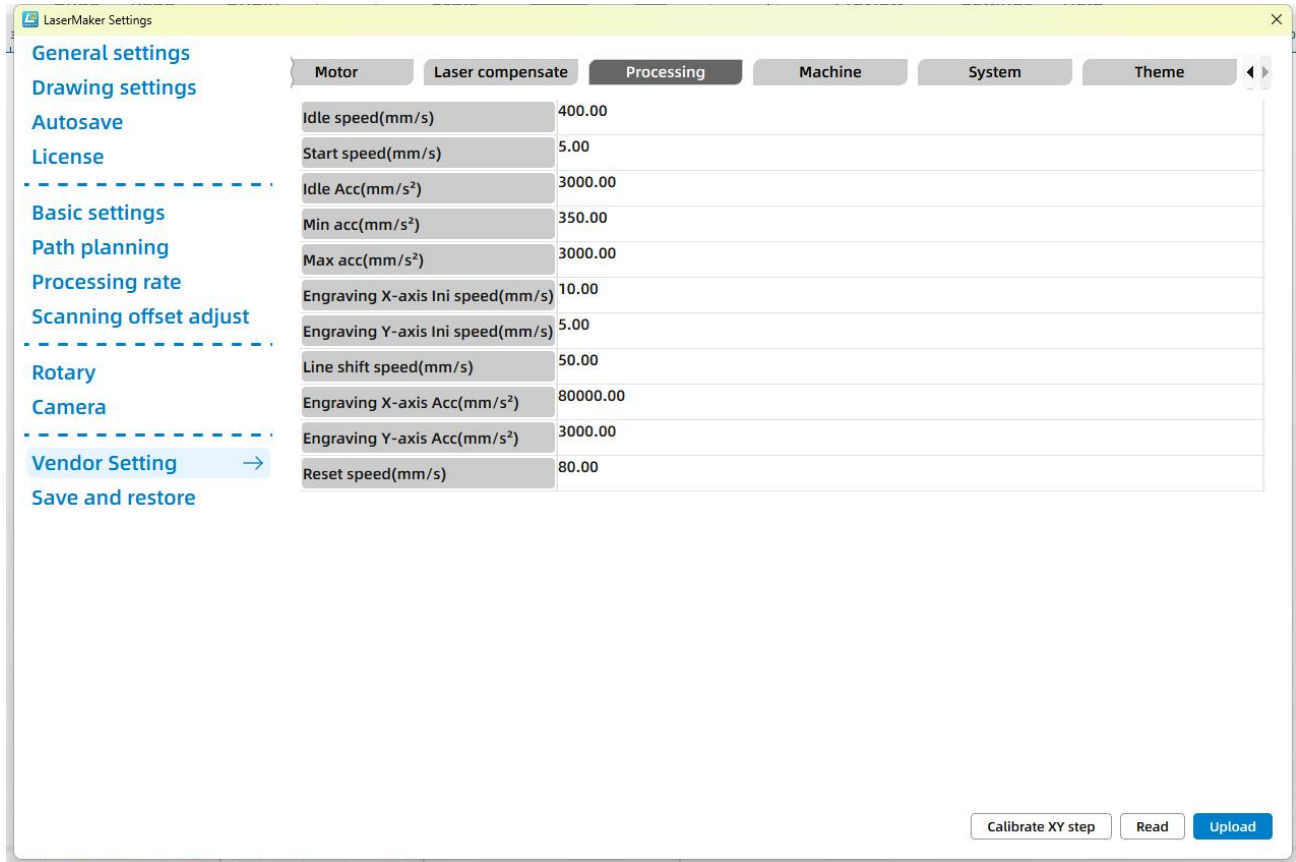
When a RF laser is used and a simmer pulse is required, the characteristics of the simmer pulse can be configured by the simmer frequency and simmer pulse width.

Laser power(W)

Laser output power is the output energy of the laser system, the ability of the laser beam to melt the material per unit time.

5.7.3 Processing parameters

Set the processing parameters of the equipment.



Idle speed(mm/s)

It determines the moving speed of the laser head when it is not emitting light during the processing.

Start speed(mm/s)

The speed at the sharp corner during cutting is also the lowest speed during the entire cutting process.

Idle acc(mm/s²)

The acceleration of the laser head when no light is emitted.

Min acc(mm/s²)

The acceleration value at the sharp corner during cutting.

Max acc(mm/s²)

The acceleration of linear movement during cutting.

Engraving X-axis ini speed(mm/s)

Used to set the starting speed of the X axis during engraving.

Engraving Y-axis ini speed(mm/s)

Used to set the starting speed of the Y axis during engraving.

Line shift speed(mm/s)

Used to control the maximum speed of vertical movement from the previous line to the next line during the engraving process.

Engraving X-axis acc(mm/s²)

Used to set the acceleration of the X axis during engraving.

Engraving Y-axis acc(mm/s²)

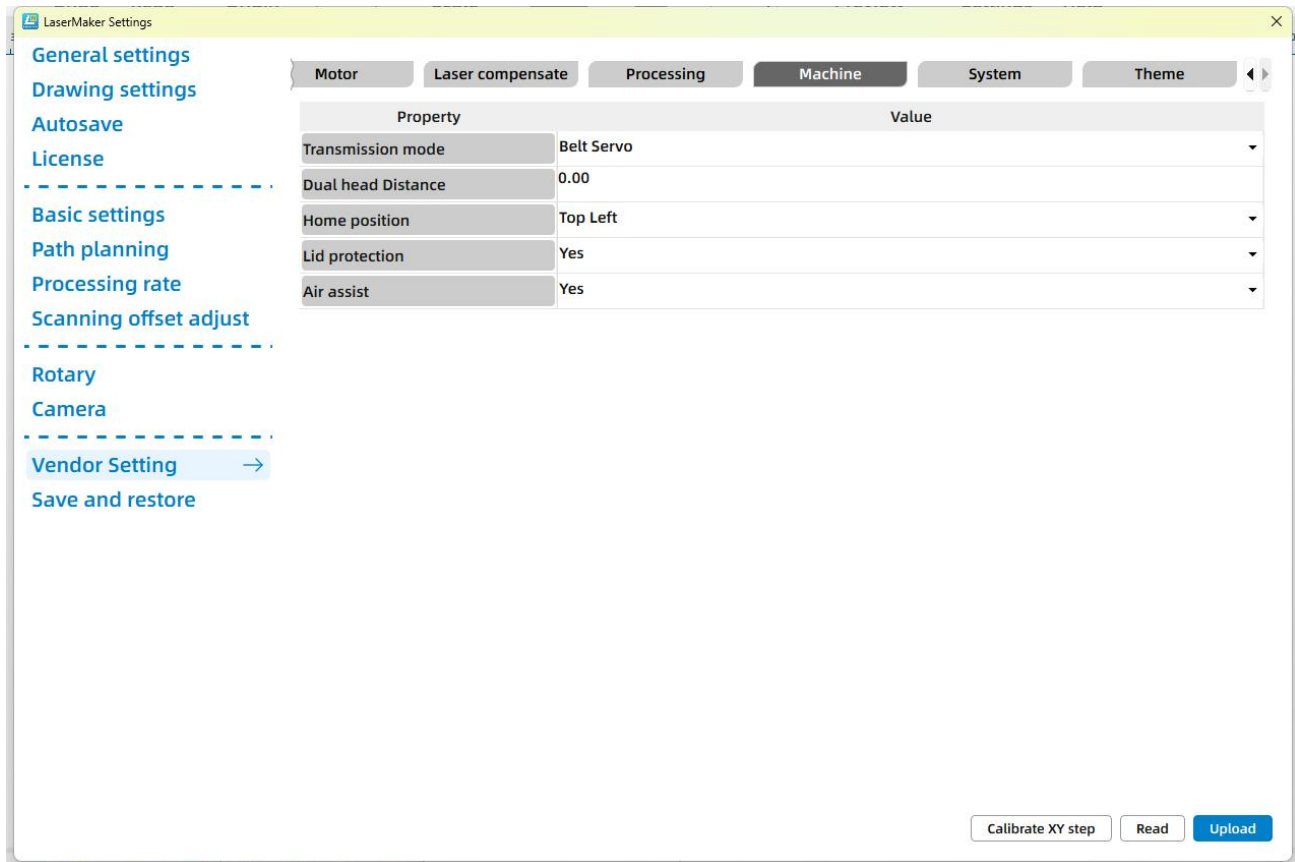
Used to set the Y-axis acceleration during engraving.

Reset speed(mm/s)

The speed at which the X/Y axis linkage returns to the machine origin.

5.7.4 Machine Parameters

Set the machine parameters of the device.



Transmission mode

They are categorized as belt steppers, belt servos, lead screw steppers, and lead screw servos. Steppers and servos are two types of machine control systems. Belts and lead screws are the materials used for the two types of motion devices. A stepper motor is an open-loop control element that converts electrical pulse signals into angular or linear displacement. Servo motors primarily rely on pulses for positioning. When a servo motor receives a pulse, it rotates by the angle corresponding to the pulse, thereby achieving displacement.

Dual head distance

When using dual laser heads, the safety distance between them is 0.00 when reading with a single head device.

Home position

When the machine zero point changes, there will be problems such as mirroring during processing.

Lid protection

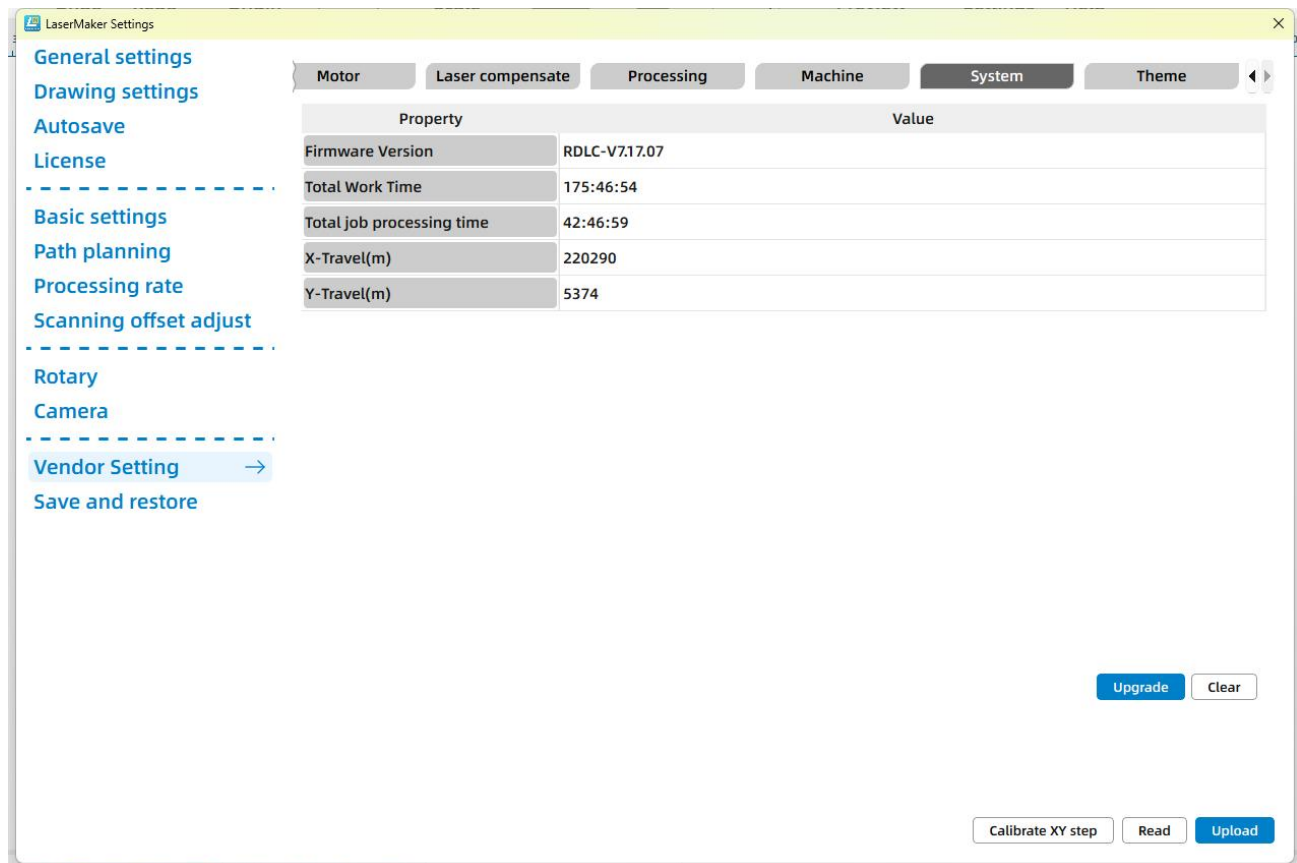
You can set whether to enable or disable the cover-open protection function. If enabled, the machine will not start working unless all covers are closed. If disabled, the machine can work even when the cover is open.

Air Assist

The Air Assist function prevents certain materials from being burned when cutting by blowing air. Turning off the Air Assist function does not mean that there is no air blowing, but rather that the air blow is strong or weak. You can also change the air blow strength in the processing parameters.

5.7.5 System Parameters

Set the device's system parameters.



Firmware version

Version number of the device motherboard.

Total work time

The cumulative processing time of the equipment will change as the processing time increases.

Total job processing time

When the device is processing files, the cumulative time of the laser head's light output will change as the light output time increases.

X-Travel(m)

When the device is working, the accumulated travel of the laser head on the X-axis will change as the travel of the file processing increases.

Y-Travel(m)

When the device is working, the cumulative travel of the laser head on the Y axis will change as the travel distance during the processing of the file increases.

Update

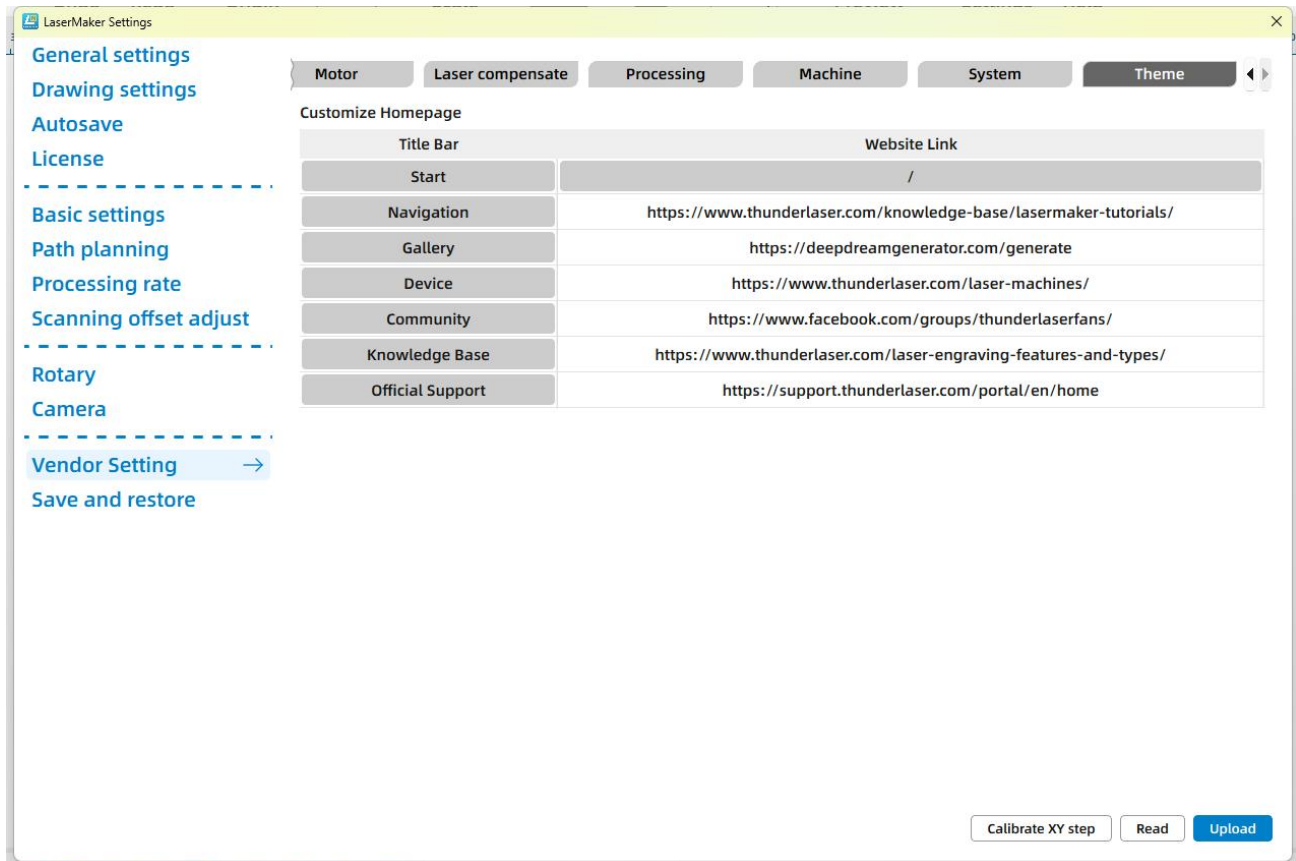
Update the firmware version number.

Clear

Clear the current firmware information.

5.7.6 Theme Parameters

Quickly access resources such as official tutorials, device introductions, and community forums.



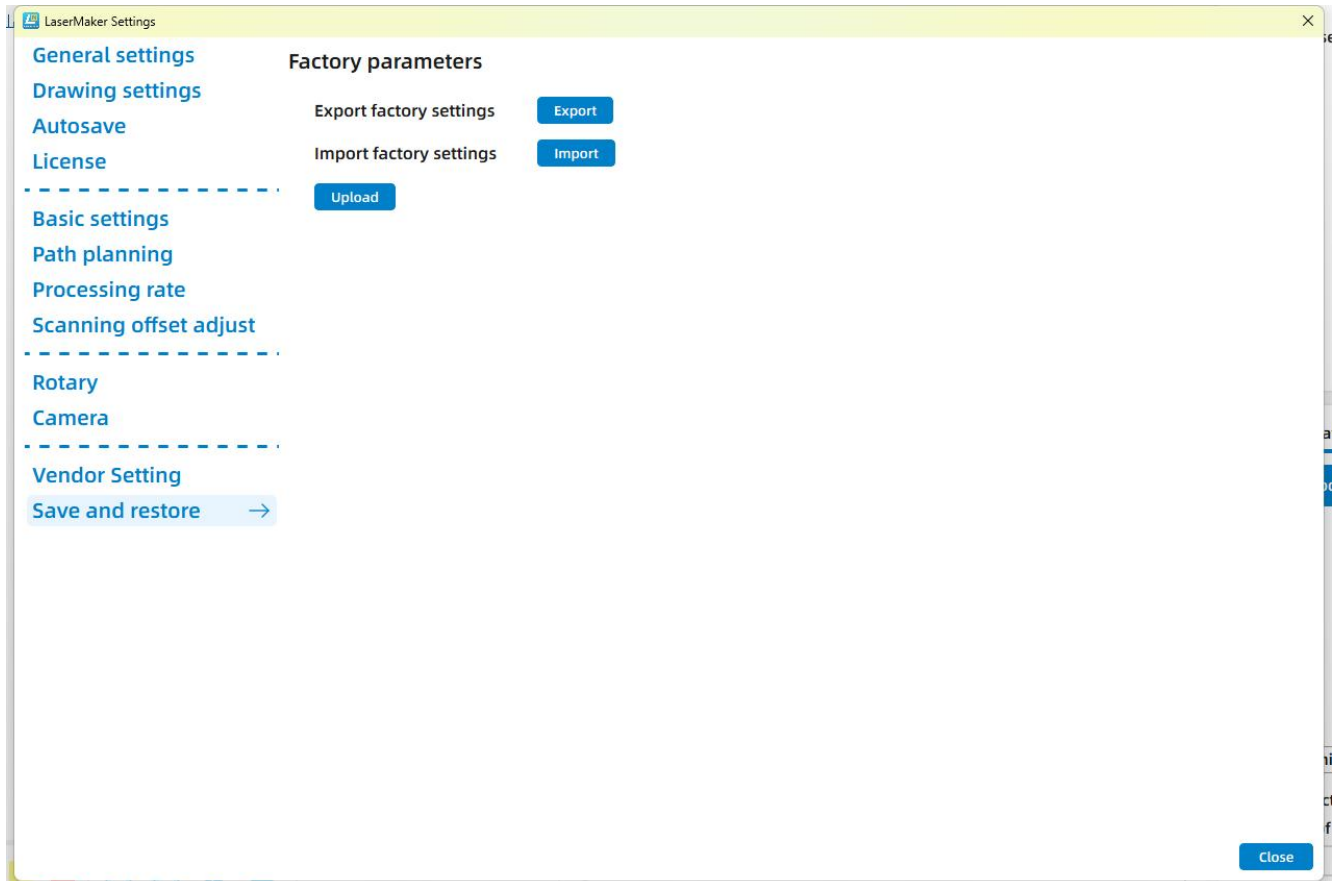
5.8 Save and Restore

Export factory settings

Export the current device's "Factory Parameters" to a file.

Import factory settings

Import and use the "Factory Parameters" files exported from other computers.



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