

Work Example — Making Wooden Tags (Adobe Illustrator)

RSD-SUNMAX Series
SUNMAX LASER

About this document: This is an English translation of the Japanese original prepared by SUNMAX LASER for reference purposes. In case of any discrepancy, the Japanese original shall prevail. Specifications are subject to change without notice.

Work Example Collection — Making Wooden Tags (Adobe Illustrator)

- This document assumes that the laser machine has been set up correctly.
- This document assumes that RDWorksV8, the control software for the RSD-SUNMAX series, has been installed correctly.
- This document uses Adobe Illustrator CS6.

— The image below shows the finished product created by following this document. —



1. About Wooden Tags

Ready-made wooden tag blanks are available in several types, differing in size and material. Instead of using ready-made blanks, you can also cut wooden boards to produce tags in any shape and size you like. Engraving may be done on both faces or on one face only.

Note the following points when making wooden tags.

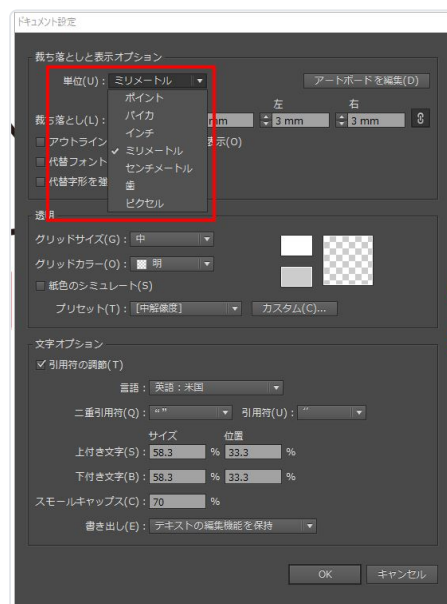
- The workpiece must be positioned precisely. Even a slight tilt or offset in position markedly degrades the quality of the product and makes it unacceptable as merchandise. For this reason, a positioning jig must be installed on the work table. Make the positioning jig to suit the shape being processed. Note that when you do not use a ready-made blank but cut the tag out of a large wooden board, and

engrave one face only, the outline and the internal design are processed at the same time, so strict alignment is not required.

- Laser processing works by burning the material with heat. Therefore, depending on the laser power setting, light-colored materials will take on a scorched tone. To avoid this, cover the material with paper moistened with water before engraving; this reduces scorch discoloration.
- When you do not use a ready-made blank but cut the tag out of a large wooden board, the outline is cut at high power, so the cut edge will be scorched. If the scorched color is a problem, sand and polish the edge with sandpaper.

2. Precautions

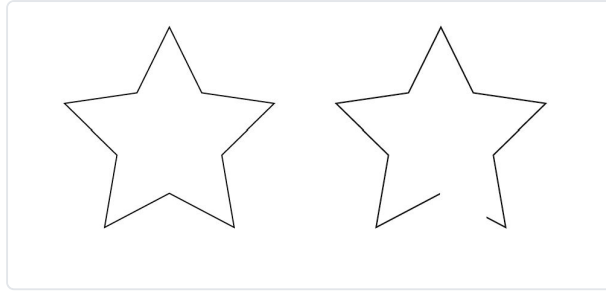
- When creating engraving data with Adobe Illustrator, there are two methods, depending on the data format used when importing into RDWorksV8:
 - a) Save as an Adobe Illustrator (*.AI) file
 - b) Export the data as a monochrome bitmap file
- Always create the data in millimeters in Adobe Illustrator.
RDWorks imports using [mm] as its unit. Data created in units other than millimeters may not be read at actual size. The units in Illustrator are set under "Document Setup".



2.1 When the Data Is Created as an Adobe Illustrator (*.AI) File

In RDWorksV8 the data is handled as outline data, so you can perform a wide range of editing in RDWorksV8: editing outline nodes, smooth scaling, changing the angle, changing the layer of individual parts of the data, and so on. However, there are points to be careful of when creating the data. Once these points are cleared, data saved using method "a) Save as an Adobe Illustrator (*.AI) file" can be used.

Always close the outline paths



Path closed (○) / Path not closed (×)

Do not leave hidden path data underneath filled areas

RDWorksV8 does not recognize fill data, so any outline lines hidden by a fill become processing targets as they are. RDWorksV8 also treats paths as the boundaries between raised and recessed areas, and determines black/white automatically. To hide the fill display and show only the outline lines, press Ctrl+Y in Illustrator.

Points to note when creating data to be saved as an "Adobe Illustrator (*.AI) file"

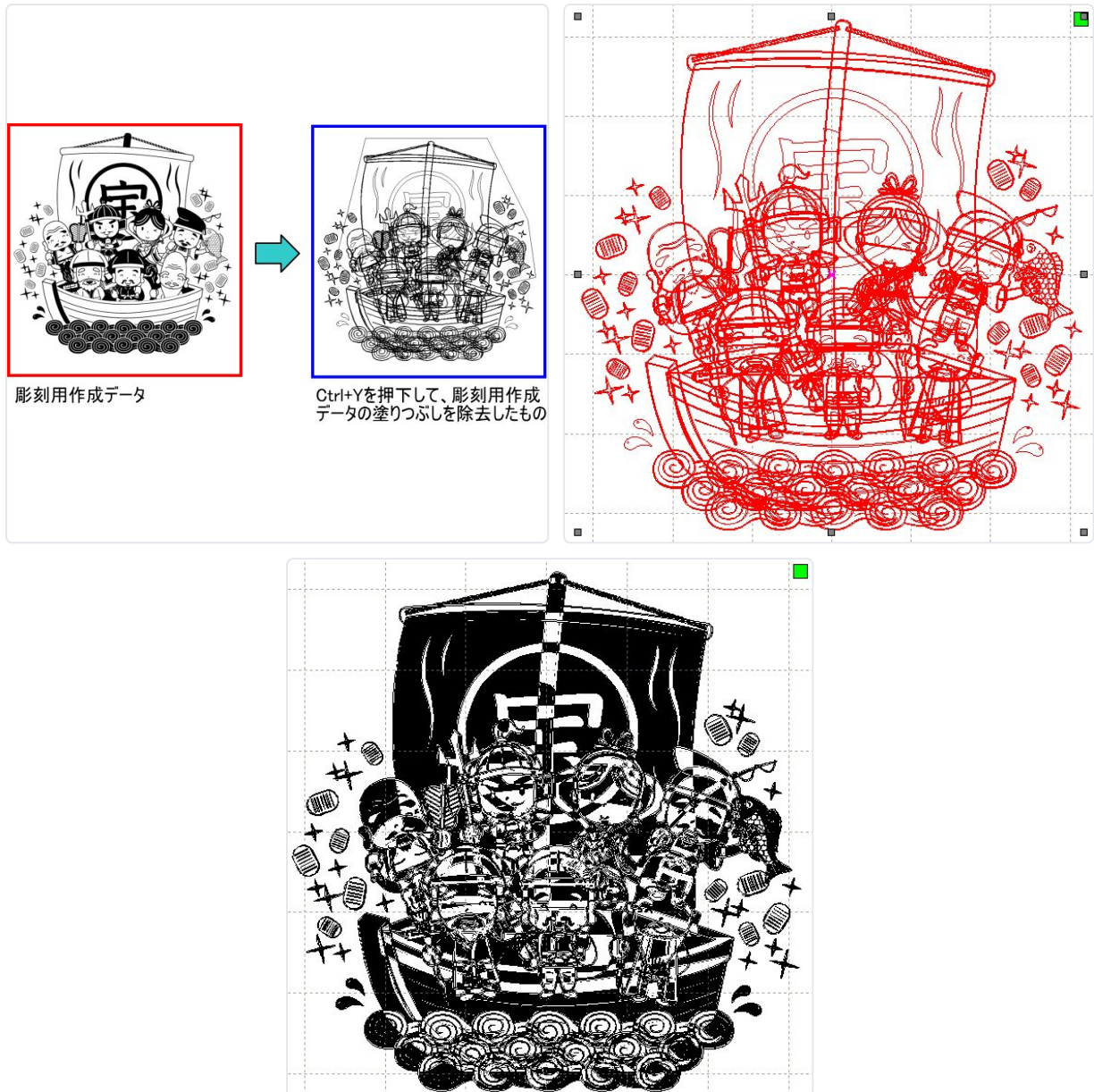
- Only path data can be used in RDWorksV8.
- Image data pasted into Adobe Illustrator, linked images, and the like are invalid.
- Delete clipping masks.
- Release compound paths.
- Delete guides.
- Delete trim marks.
- Ungroup all groups.
- Do not include image data.
- Convert text strings to outlines.
- In the "Illustrator Options" dialog that appears when saving the data in Adobe Illustrator, change "Version" to CS6 or earlier.

The outline lines that were hidden by the fill are now displayed. RDWorksV8 handles the data as shown in the figure on the right above.

Import the created engraving data into RDWorksV8.

If "Hatching" is checked under the RDWorksV8 menu "Config" – "Hatching", objects whose processing mode is "Engrave" are shown with the engraved area filled in, so you can check the processing result.

"Hatching" unchecked "Hatching" checked



You can see that, because of the hidden outline lines, the processing differs from the filled areas of the data created for processing.

2.2 Exporting the Data as a Monochrome Bitmap File

If you import data exported from Illustrator as a monochrome bitmap, it is not affected by hidden outline lines and is processed exactly as displayed.

Imported monochrome bitmap data



Basically, when making wooden tags (when engraving), the data can be processed exactly as displayed in Illustrator, so it is simpler to create the data at actual size, export it as a monochrome bitmap, and import that data into RDWorksV8.

However, if you want to create a single set of data and use the layer function of RDWorksV8 to vary the engraving depth, this cannot be done with monochrome bitmap data; in that case, import a properly created ai or dxf file.

Also, when a BMP layer is loaded into RDWorksV8, it is loaded as an engraving layer (fixed). If you want to create cutting data in Illustrator as well and process it, you must save the file as an AI file and import it.

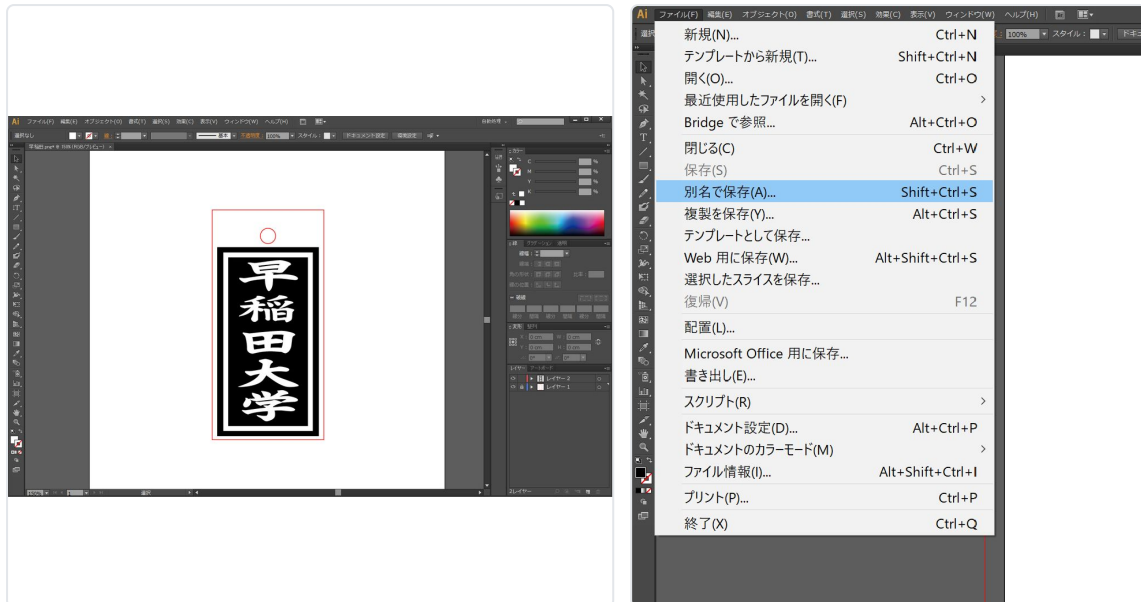
3. Creating the Illustrator Data

Now create the processing data using Illustrator.

3.1 When Saving as an AI File

Create the data. As a rule, make the areas to be engraved black and the areas not to be engraved white.

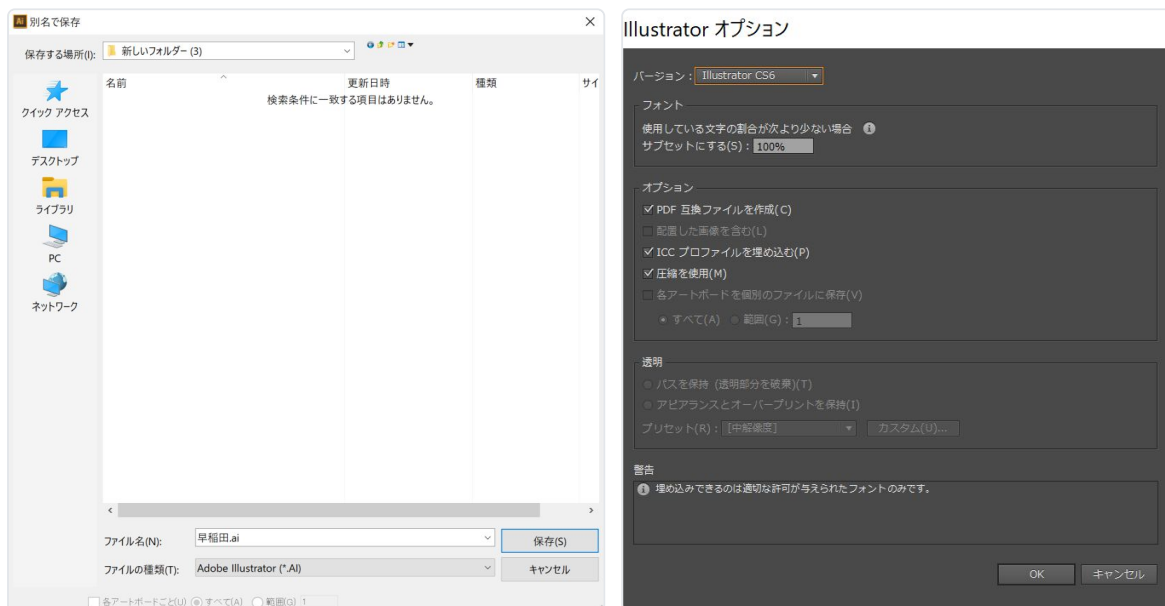
Convert all text strings to outlines. The red frame is the design for cutting. In this exercise, cutting is included in the processing.



From the File menu, click "Save As".

The "Save As" dialog appears. Set the file type to "Adobe Illustrator (*.AI)". Specify any file name and click the "Save" button.

The Options dialog appears.



Use a version earlier than CS6 for the version setting.

3.2 When Exporting as a Monochrome Bitmap File

For a monochrome bitmap, create only the design for the engraving data.

When bitmap data is loaded into RDWorksV8, it is all loaded as engraving design data.

A design that includes cutting cannot be exported as a bitmap.

* The dashed line is originally the design for cutting; remove it from the BMP design.

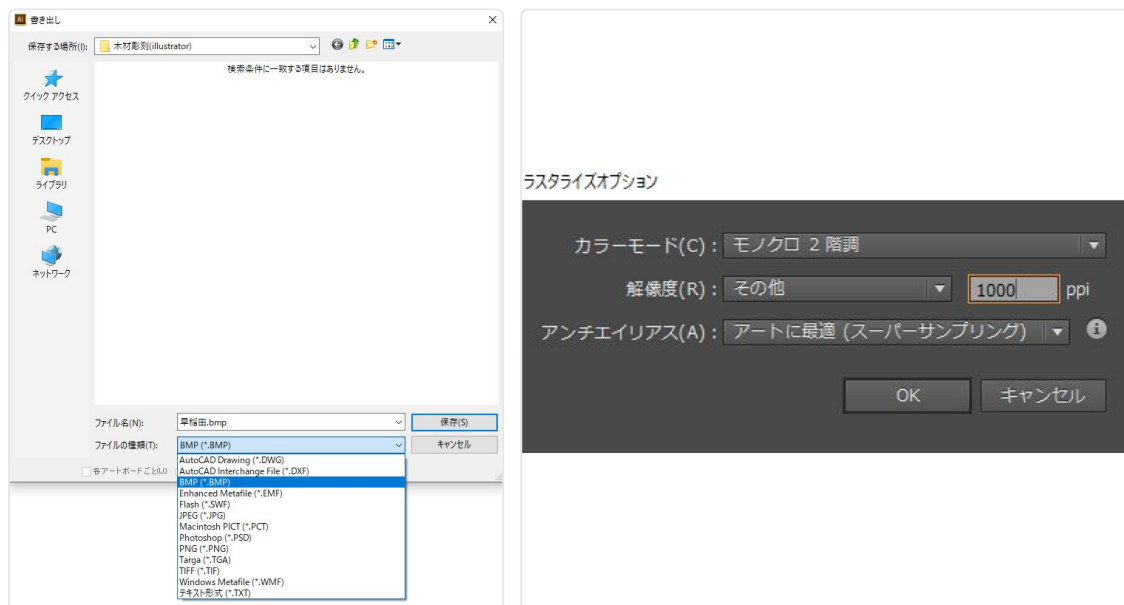


Click the menu "File – Export".

* Always save the data before exporting it.

The "Export" dialog appears. Set the file type to "BMP (*.BMP)".

Enter any file name you like and click the "Save" button.



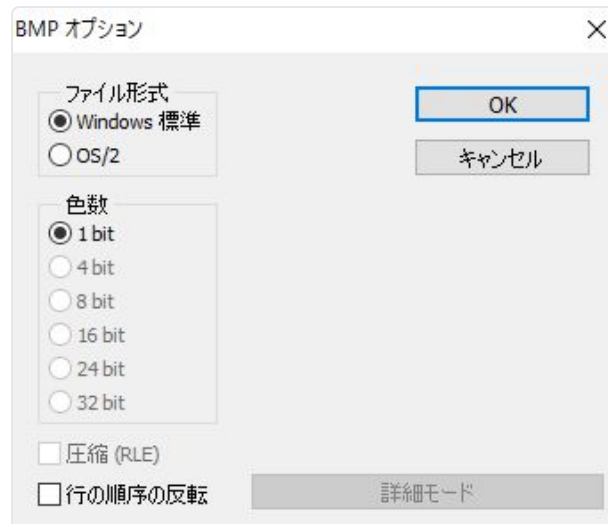
The "Rasterize Options" dialog appears.

1. Set the color model to "Bitmap" (monochrome, 2-level).
2. Set the resolution to Other, and enter 1016 or 1000 ppi.

Caution: Depending on the size of the image, exporting the data may fail. In that case, lower the resolution value. Also note that a clipping mask or similar may make the image size larger than

necessary, or unnecessary data may be included, which increases the file size. The lower the resolution value, the rougher the outlines of the exported data become. Lowering the resolution setting to suit the workpiece material or the data content is not a problem.

The "BMP Options" dialog appears. Click the OK button.



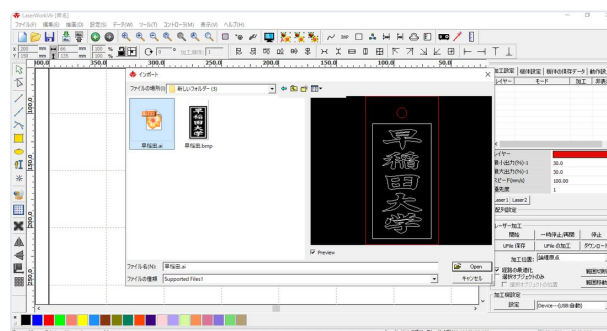
When you press the OK button, a monochrome bitmap file is created in the folder you specified.

4. Importing the Data File

Click the "Import" button on the system toolbar of RDWorksV8.

The Open File dialog appears. Select the AI file created in Adobe Illustrator, or the monochrome bitmap file.

In this job, engraving is combined with cutting, so an AI file is imported and processed.



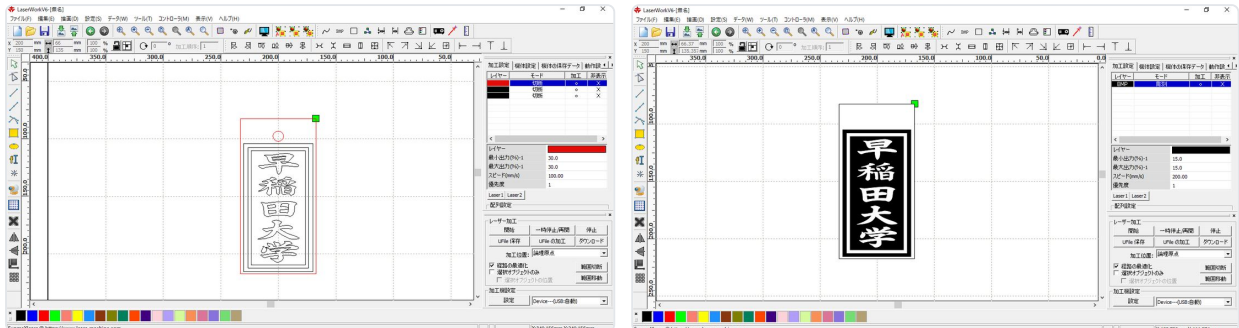
Preview check box

Preview screen ... When you select a file, its contents are displayed.

5. Displaying the Data

The data created in Illustrator is displayed.

- For an AI file -



- For a monochrome bitmap file -

Note: With a bitmap, all of the data is treated as engraving data.

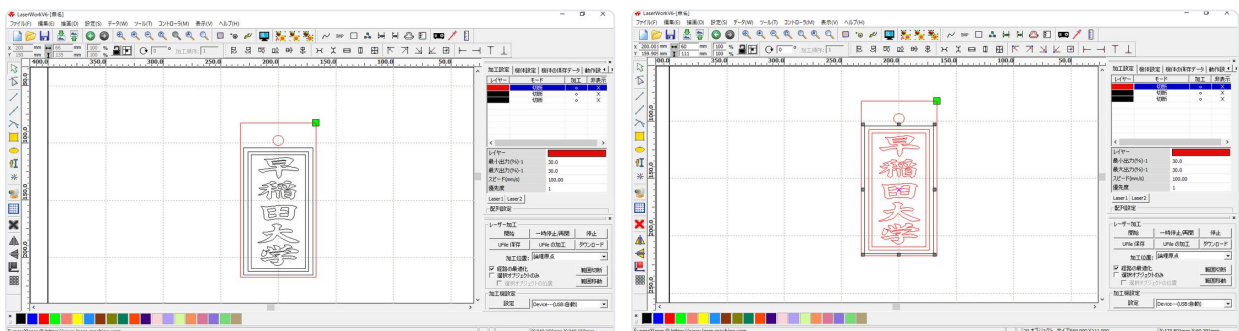
6. Selecting and Configuring the Processing Mode

Once the AI file has been imported, proceed with the processing settings.

6.1 Creating the Layer

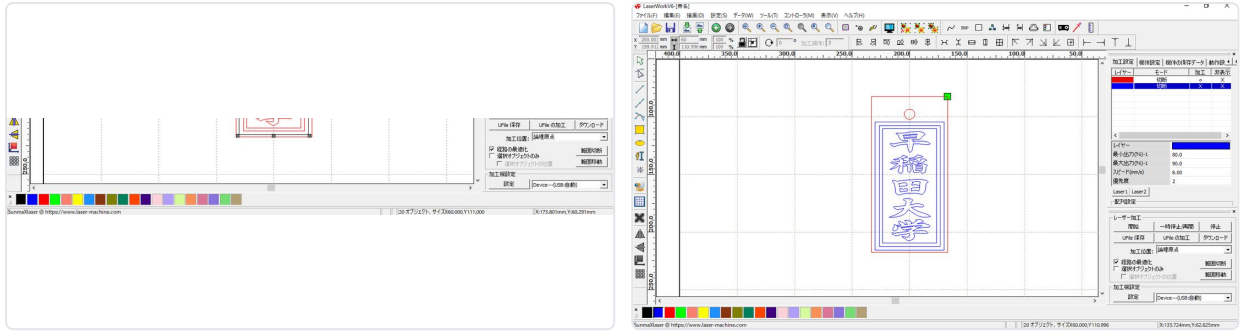
At this stage there are two engraving layers (black). Combine the engraving layers into one.

Use "Select" to select the engraving design (black).



Click to select (to select more than one, hold down the Shift key).

Once they are selected, choose any color other than red from the "layer toolbar" at the bottom of the screen.



The engraving layers are now combined into one. Blue has been added to the processing settings.

6.2 Processing Settings for the Cutting Layer

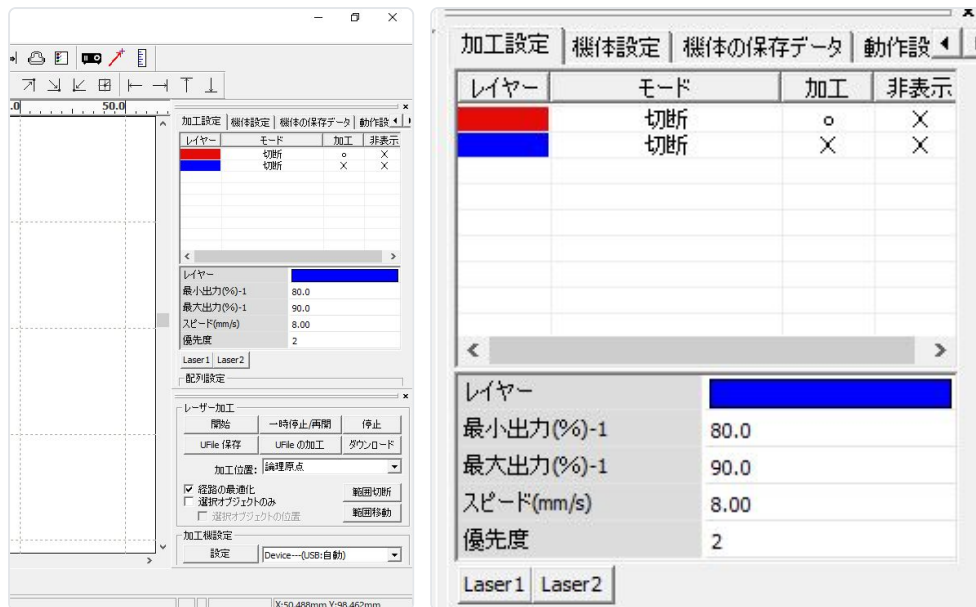
Now that the cutting layer has been added, continue with the processing settings. Double-click the cutting layer in the processing settings to display the processing dialog.

Note: The "Mode" column shows Cut in the figure below, but depending on the state of RDWorksV8 another mode name may be displayed.

Note: The settings for each mode are remembered, so the settings you made last are displayed as the defaults the next time you create a job.

Note: The settings are the same for a monochrome bitmap file.

The layer dialog appears. Change the processing mode to "Cut", or confirm that it is already set to Cut.



Double-click here.

Make the "cut settings" as shown in the figure below.



Speed: Sets the cutting speed. The unit is [mm/s]. Generally, a value of about 20 or less is used for cutting. Increasing the value makes the laser head move faster and shortens the processing time, but reduces the thickness of material that can be cut.

Air: Not supported on the RSD-SUNMAX series.

Min Power: Sets the weaker laser output. Set it to a value at or below the Max Power setting. Normally there is no problem setting it to the same value as Max Power. The unit is %, and values from 0 to 100 can

be set.

Max Power: Sets the laser output value for normal operation. The unit is %, and values from 0 to 100 can be set.

Overlap: If a closed design cannot be cut properly (the piece does not drop out) because of the characteristics of the workpiece material or mechanical error, enter a correction value here. Normally a value of about 0.1 [mm] is set.

Open Delay: Sets the delay time for turning the laser output ON when laser emission starts (at the start of processing, or when emission restarts after moving between objects). Normally set to zero.

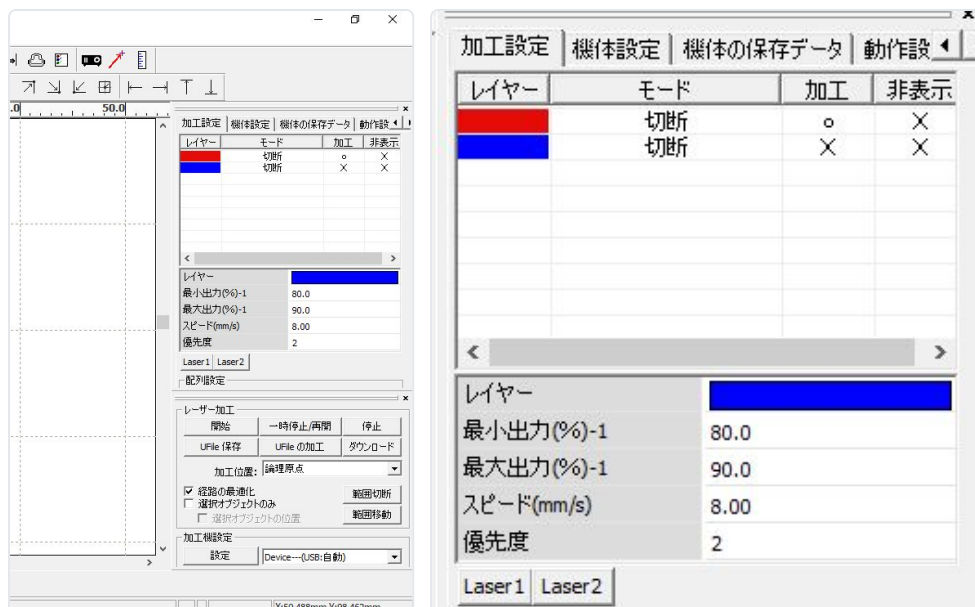
Close Delay: Sets the delay time for turning the laser output OFF when laser emission ends (at the end of processing, or before movement between objects begins). Normally set to zero.

Laser Through Mode: When Laser Through Mode is checked, the laser head stops while the laser output ON/OFF is in the delayed state defined by the Open Delay and Close Delay settings.

Advanced: Clicking "Advanced" displays the "Cut Advanced Settings" dialog, where seam correction can be set. For details, refer to the cut settings section of the RDWorksV8 user manual.

6.3 Processing Settings for the Engraving Layer

Now that the settings for the cutting layer are complete, continue with the processing settings for the engraving layer. Double-click the engraving layer in the processing settings to display the processing dialog.



The layer dialog appears. Change the processing mode to "Engrave", or confirm that it is already set to Engrave.

Configure the settings as shown below.

Speed: Sets the processing speed. The unit is [mm/s]. For engraving, set the processing speed (mm/s). The appropriate value varies with the job, the material, and the processing mode. Generally, use up to approximately 600 for engraving. A larger value moves the laser head faster and shortens the processing time, but the engraving becomes shallower.

Max Power: Sets the maximum laser power. The unit is [%]. The setting range is 0 to 100. Decimal values can also be entered. A larger value increases the laser output and deepens the engraving. To limit the load on the laser tube, the setting is generally kept to about 90 [%] at most.

Scanning Interval: Specifies the scanning interval used during engraving. The unit is [mm]. The minimum value is 0.025 [mm], and the setting is basically made in increments of 0.025. In general, the smaller the value, the higher the mechanical processing accuracy; however, depending on the material and the data, making it too fine has no benefit. The larger the value, the shorter the processing time.

If a coarser finish is acceptable and you want to increase production speed, raising this value shortens the production time. For example, if artwork engraved at 0.05 is re-engraved with the setting changed to 0.1, the production time is halved.

Scan Mode: Select horizontal bidirectional. The laser fires on both the forward and return strokes of the scan. If bidirectional is not selected, the laser fires in one direction only. Horizontal unidirectional scanning can improve processing quality in some cases, but it doubles the processing time.

Air: Not supported on the RSD-SUNMAX series.

Advanced: Normally not used. For details on this function, refer to the cutting settings section of the RDWorksV8 user manual.

How to Determine the Setting Values

The "engraving settings" must be changed according to the material, the depth, and the required quality. The setting values cannot be fixed uniformly for every material. For example, even when engraved with the same settings, cedar and ebony finish at completely different depths because of the difference in the hardness of the wood itself. Basically, you need to engrave repeatedly while checking the finish, changing the conditions each time, until you find the settings that match the required quality.

When making wooden tags, use the following settings as a reference for your adjustments.

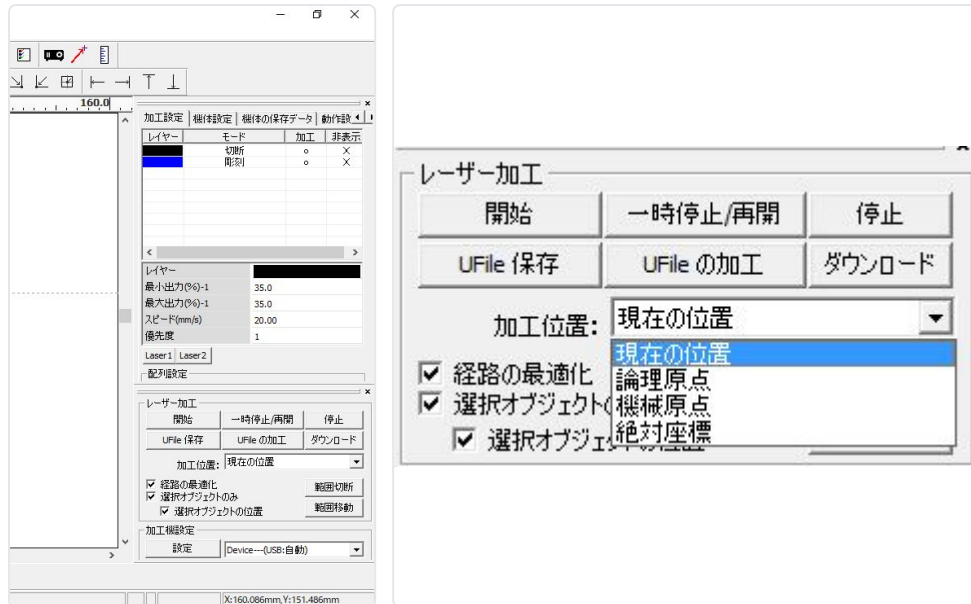
Engraving speed	400
Max power	80
Scanning interval	0.05 (0.025 for fine patterns)

7. About the Origin

Before starting a job, you must check and set the processing start position.

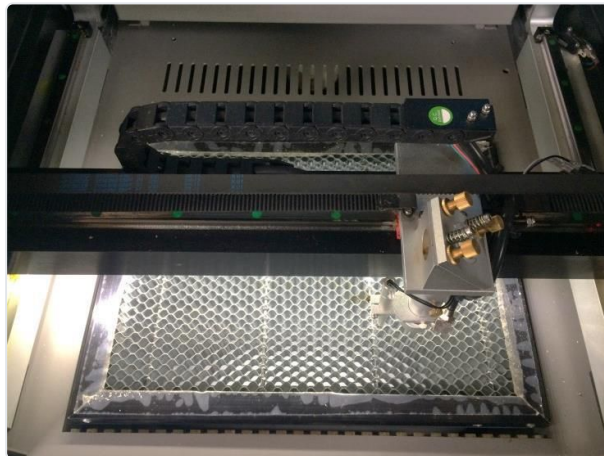
When you start a job from the operation panel, the logical origin is always the processing start position. Refer to "Machine Operation Panel" - "About the Logical Origin" in the separate RDWorksV8 user manual.

When you start a job from RDWorksV8, you can select from four origins depending on the setting.



8.1 Current Position

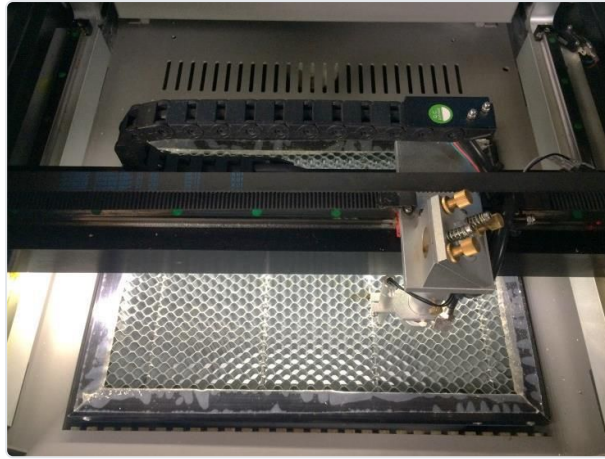
When "Current Position" is selected, clicking the "Start" button in RDWorksV8 to run the job uses the current position of the laser head as the position of the data origin.



Processing origin

8.2 Logical Origin

When "Logical Origin" is selected, clicking the "Start" button in RDWorksV8 to run the job uses the logical origin position set with the "Origin" button on the laser machine as the position of the data origin.



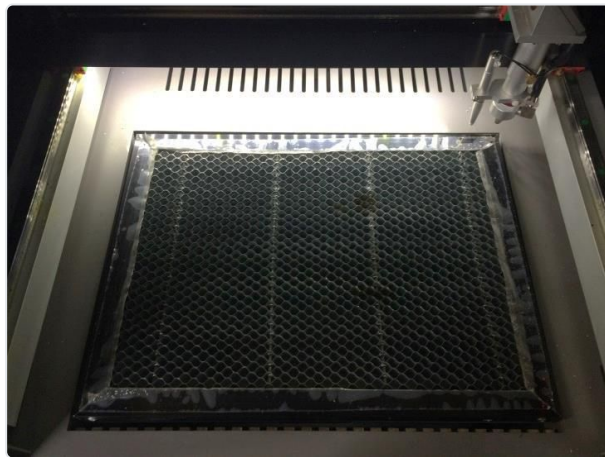
Even if the laser head is moved, pressing the "Origin" button on the machine operation panel sets the logical origin.

When processing starts, the laser head moves to the logical origin and begins the job.

8.3 Machine Origin

When "Machine Origin" is selected, clicking the "Start" button in RDWorksV8 to run the job uses the machine origin position of the laser machine (rear right: the position to which the machine homes when it starts up) as the position of the data origin.

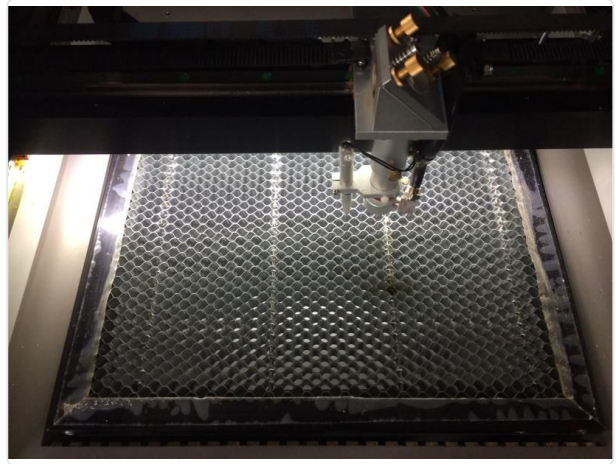
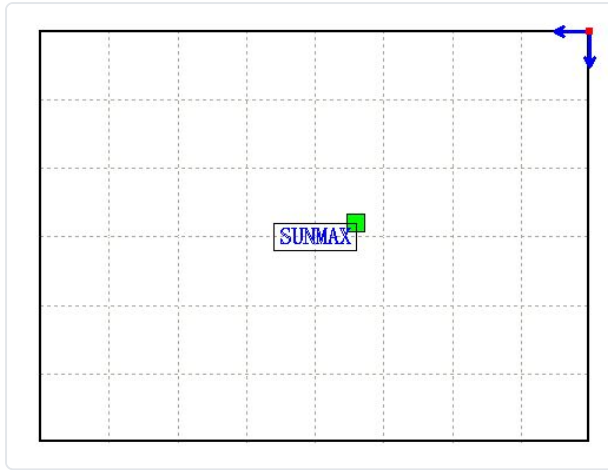
When processing from the machine origin, only cutting is possible.



When processing starts, the laser head moves to the machine origin and begins the job.

8.4 Absolute Origin

When "Absolute Origin" is checked, the logical origin set with the "Origin" button on the operation panel and the processing position settings used when running a job from RDWorksV8 become invalid, and the job is processed at the position shown on the RDWorksV8 design screen.



Place the objects in RDWorksV8.

When processing starts, the laser head moves to the same coordinates as on the RDWorksV8 design screen and begins the job.

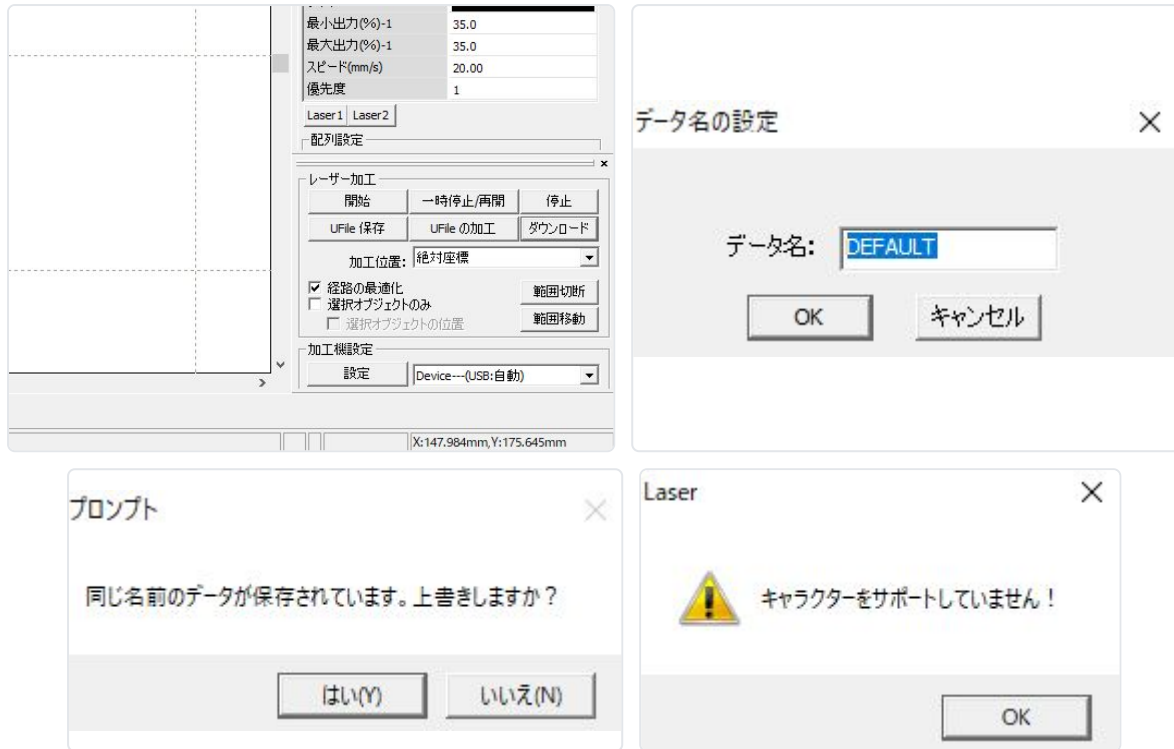
8. Downloading the Data

Once the processing settings and the processing position have been set, send the job data to the laser machine.

When you download the data and run the job, the job is started from the operation panel, so the processing start position is always the logical origin position.

* When you run a job from "Start" in the "Laser Machine Control Pane" of RDWorksV8, the data is not downloaded.

At the bottom right of the screen, click Download in the laser processing section.



When you click the Download button, the "Set Data Name" dialog appears. Enter any name you like.

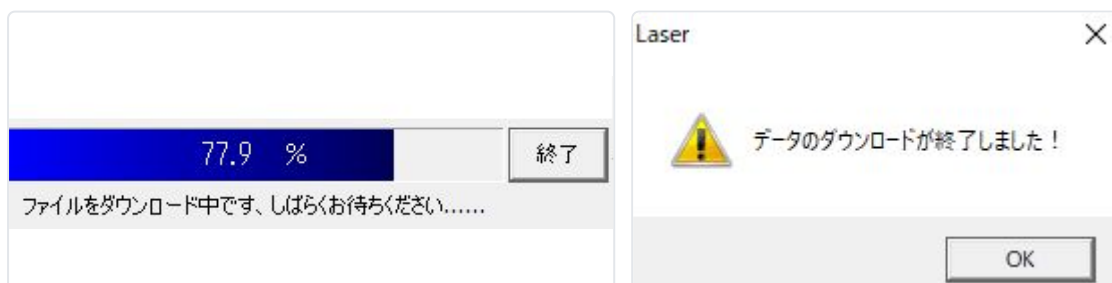
* If a file with the same name already exists on the laser machine, a dialog asking "Overwrite?" is displayed.

* Only single-byte alphanumeric characters can be used. Entering Japanese text causes an error to be displayed.

Starting the Download

Clicking it starts the data download. The download is finished when the download progress bar reaches 100%.

* If you have created a large data file, this step may take some time.



Download Complete

When it reaches 100%, the download complete dialog appears.

Click the OK button.

9. Processing

The processing data has been saved to the laser machine, so you can now run the job. Follow the steps below to start processing.

9.1 Setting Up the Table

The RSD-SUNMAX series can be used with three different processing tables.

Engraving Table

With the engraving table, no attachment is used; the material is placed directly on the lift table of the laser machine for processing.

- As a rule, this table is used only for engraving. It is not used for cutting. When cutting, the laser beam must pass through the bottom face of the material, but because the engraving table is a flat plate, the beam cannot pass through. It is therefore used for engraving.
- Cutting with the engraving table becomes possible if you place some kind of spacer between the table and the material to create a gap. Generally, a gap of about 2 to 5 mm is required between the table and the material.
- The engraving table is suited to holding and processing thick materials.



Honeycomb Table

The honeycomb table is used by placing it on top of the lift table. Both engraving and cutting can be performed. In addition, by connecting an exhaust blower to the honeycomb table box, the material is drawn down from underneath, so even light materials such as cloth or paper can be held in place.

Cutting Table

In addition to the honeycomb table, the RSD-SUNMAX series comes with a table for cutting.

By installing the supplied cutting table parts on the table, you obtain a cutting table that produces less scorching and melting on the back of the material from laser reflection than the honeycomb table. When the cutting table is installed, autofocus cannot be used. Focusing is instead adjusted using the cylinder of the laser head.



For this job, we will use the honeycomb table.

For how to install and remove each table, refer to the machine's instruction manual.

9.2 Focusing

The distance to the laser head differs depending on the workpiece.

You can either set the focus using autofocus, or adjust the height manually using the focus gauge.

Caution:

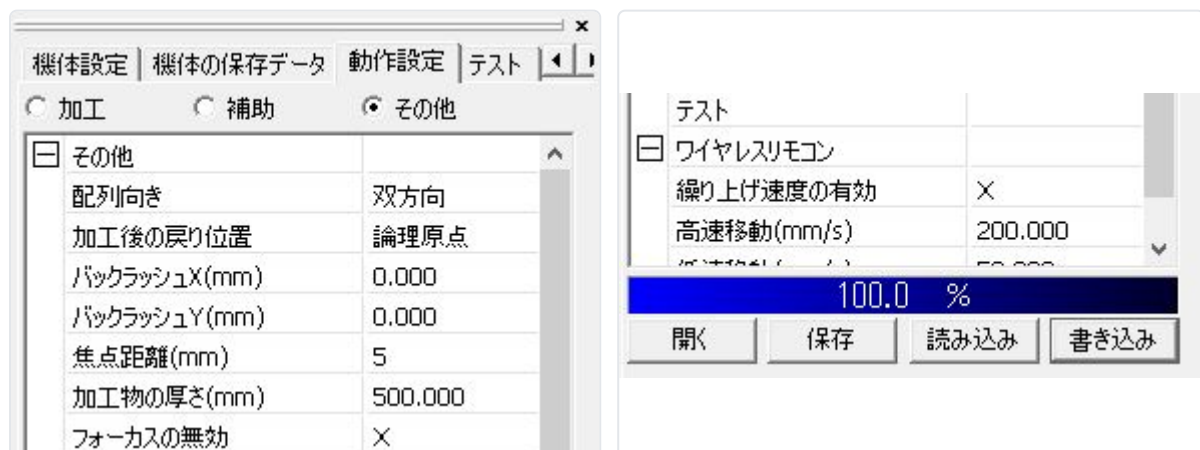
- Always perform focusing whenever the height of the workpiece changes.
- When using the cutting table, autofocus cannot be used. Set the focus manually.

Using Autofocus

With autofocus, a sensor mounted on the machine automatically adjusts the focal distance.

<Adjustment procedure>

When "Current Position" is set, clicking the "Start" button in RDWorksV8 to run the job uses the current position of the laser head as the data origin for processing.



After entering the setting values, write the data to the machine.

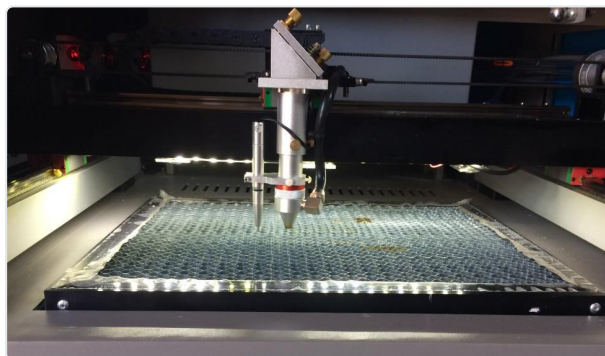
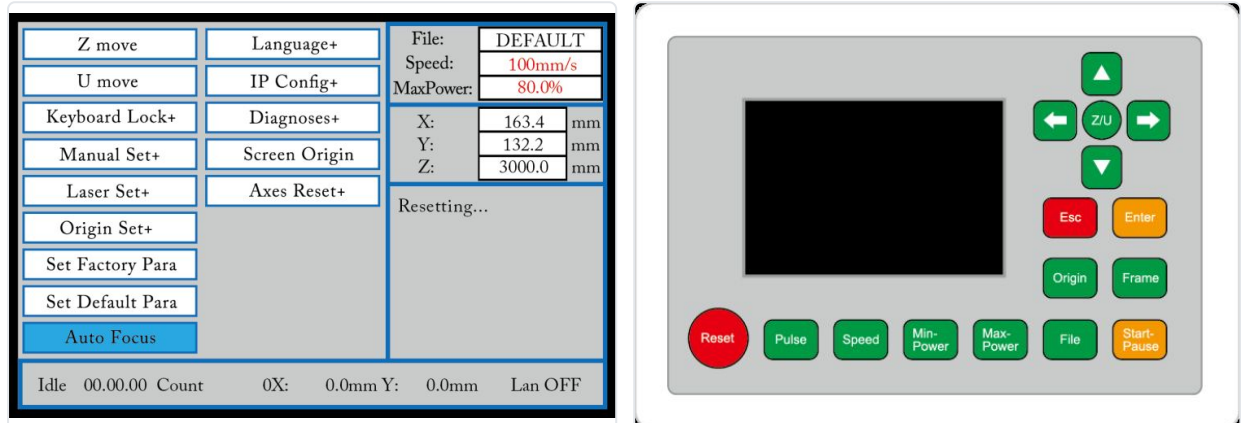
Press the "Z/U button" on the machine's operation panel to display the option screen.

-Operation panel-

Press

Use the arrow keys to select "Auto Focus" and press "Enter."

-Operation panel screen-



The lift table rises until it contacts the autofocus switch, and the machine automatically sets the focal distance to the value you specified.

(1) Select

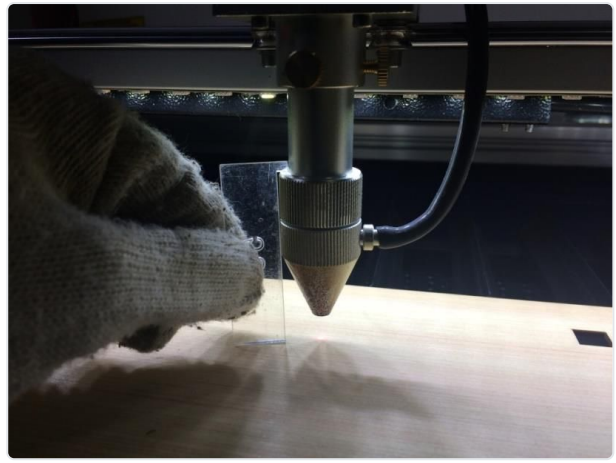
(2) Press

Manual Focusing (Focus Gauge)

The manual method is to operate the lift table by hand and set the focus using the focus gauge.

This allows the focus to be set more accurately than with autofocus.

-Focus gauge-



<Adjustment procedure>

Insert the focus gauge between the laser head and the workpiece.

Insert the focus gauge

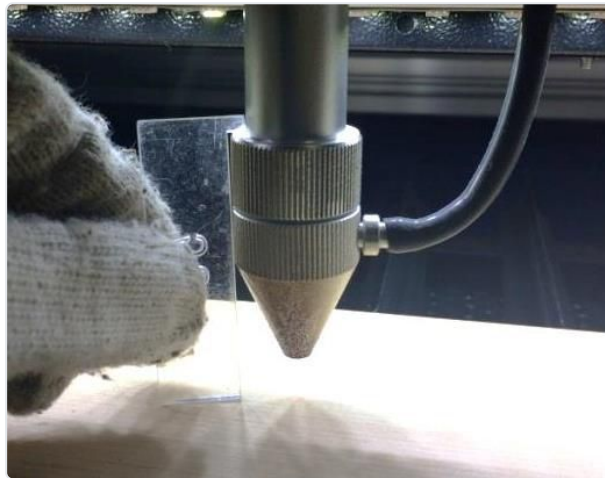
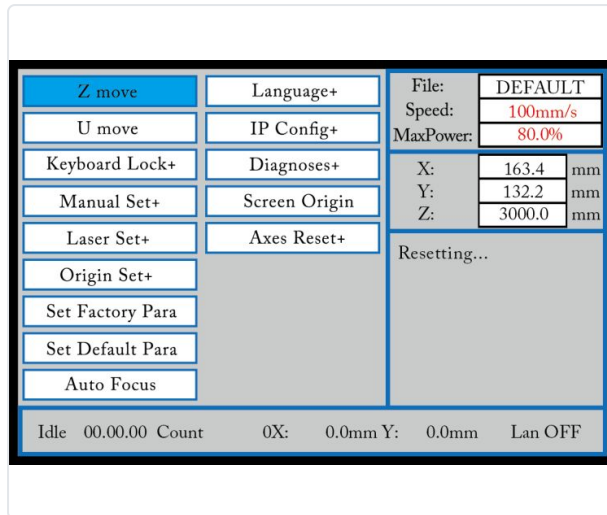
Press the "Z/U" button on the operation panel to display the option screen.

-Operation panel-

Press

With "Z move" selected, press the left or right "arrow key" on the operation panel to move the lift table up and down.

-Operation panel screen-



Adjust until the focus gauge just brushes against the workpiece.

Up

Down

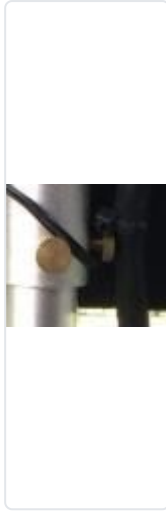
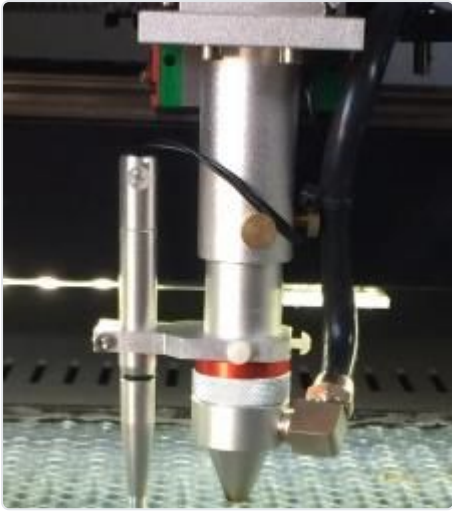
Until the gauge just brushes the surface

When Using the Cutting Table

When the cutting table is used, the lift table cannot be raised or lowered. The focus must be set manually (the procedure differs from the normal manual adjustment).

<Adjustment procedure>

Loosening the screws on the laser head allows the length of the head to be adjusted. (There are two screws.)



After loosening the screws, insert the focus gauge in between, adjust the height until the gauge just brushes the surface, and then tighten the screws.

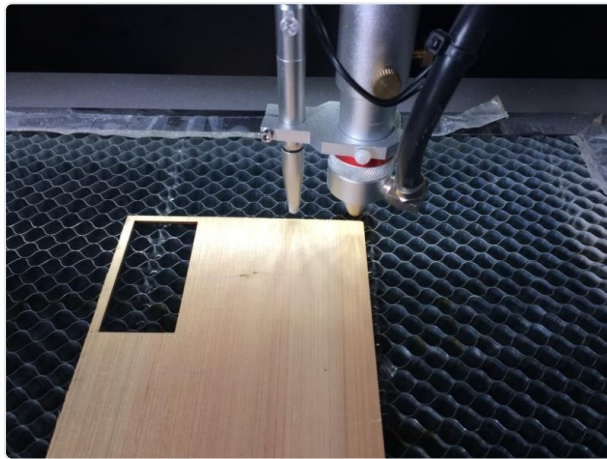
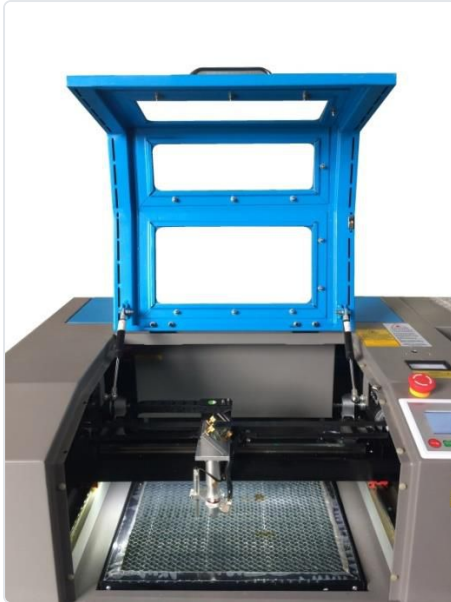
Turn counterclockwise to loosen, clockwise to tighten.

Once the height is set with the focus gauge, tighten the screws.

9.3 Cover

When everything is ready, lower the top door.

* The laser will not fire while the top door is open.



9.4 Power for External Equipment

Check that the automatic water chiller, air compressor, and exhaust blower are all powered ON.

9.5 Starting the Job

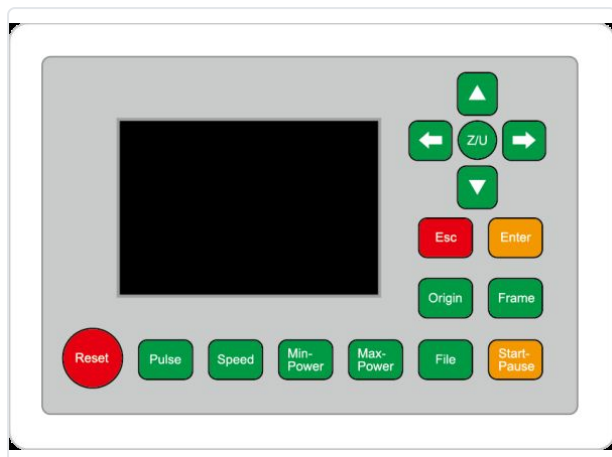
Now that preparations are complete, start processing. For this job, we will use the "Logical Origin" processing method.

Move the laser head to the position where you want to process, and set the processing origin with "Origin."

Move the laser head with the arrow keys

Set the origin with "Origin"

Press "Start" on the operation panel to begin processing.



When processing is finished, the laser machine emits a beep.

Open the cover and remove the processed material.

This completes the job.

10. Other

[When you want to produce several copies of the same engraving]

Click "Array Copy" on the drawing toolbar of RDWorksV8 and configure the settings, or configure the settings with "Array Output".



Array Copy duplicates the selected object according to the rows and columns you specify. Because the objects are actual copies, after the array has been created you can move or edit each individual object.

Array Output outputs the selected object according to the rows and columns you specify. Since the objects are not copies, you cannot move or edit the individual objects after array output. However, it allows flexible automatic placement — for example, you can specify an offset between rows and columns.

* For details, refer to "Difference between Array Copy and Array Output" in the RDWorks User Manual.