

Work Example — Engraving (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 — Engraving (Adobe Illustrator)

- This document assumes that the laser machine has been set up correctly.
- This document assumes that LaserWorkV6 (hereinafter "LaserWork"), the control software for the RSD-SUNMAX series, has been installed correctly.
- This document uses Adobe Illustrator CS6.

① Creating the Data

When creating engraving data with Adobe Illustrator, there are two methods, depending on the data format used when importing into LaserWork:

- a) Save the data as outline data (an *.ai file).
- b) Export the data as image data (a monochrome bitmap file).

1.1 Outline Data

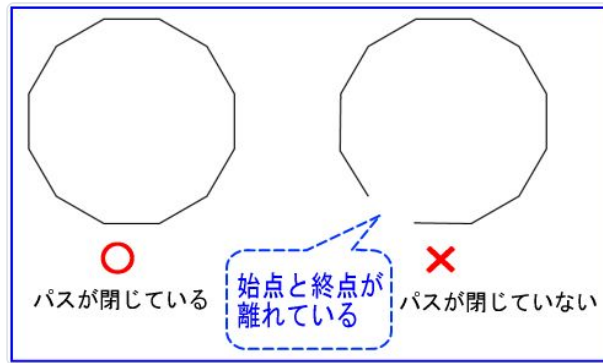
Because the data is handled as outline data in LaserWork, you can perform a wide range of editing in LaserWork, such as editing outline nodes, smooth scaling, rotating, and assigning different parts of the data to different layers.

However, there are points to note when creating the data. As long as these points are satisfied, outline data can be used.

① Always close every outline path.

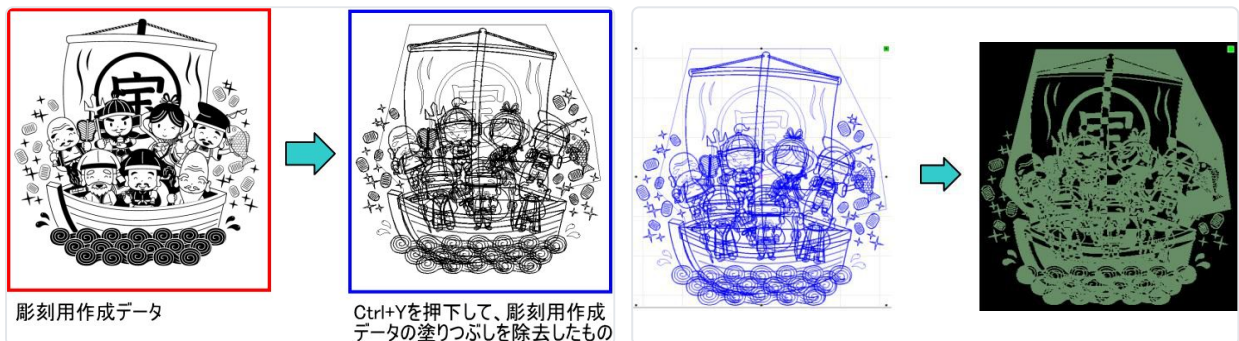
Notes on creating data to be saved as *.ai:

- Only path data can be used in LaserWork.
- Image data pasted into Adobe Illustrator, linked images, and the like are ignored.



② Do not leave path data hidden behind filled areas.

LaserWork does not recognize fill data, so any outline path data hidden by fills will be processed as-is. Paths are treated as the boundaries between raised and recessed areas, and LaserWork determines black and white automatically. To hide the fills and display only the outline path data, press Ctrl+Y in Illustrator.



The outline paths that were hidden by the fills are now displayed. LaserWork handles the data as shown in the figure on the upper right.

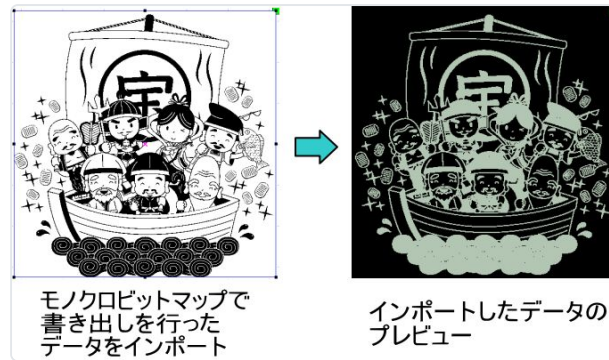
When you import the engraving data created earlier into LaserWork, the lines hidden by the fills are imported as well.

When you run "Preview" in LaserWork, the areas to be engraved are shown in green. You can see that the processing differs from the filled areas of the data created with fills in Illustrator.

Note: The preview is executed by clicking the corresponding button on the LaserWork system toolbar.

1.2 Image Data

The data is imported with the same black-and-white content as displayed in Illustrator, and it can be processed. However, the data content cannot be edited in LaserWork.

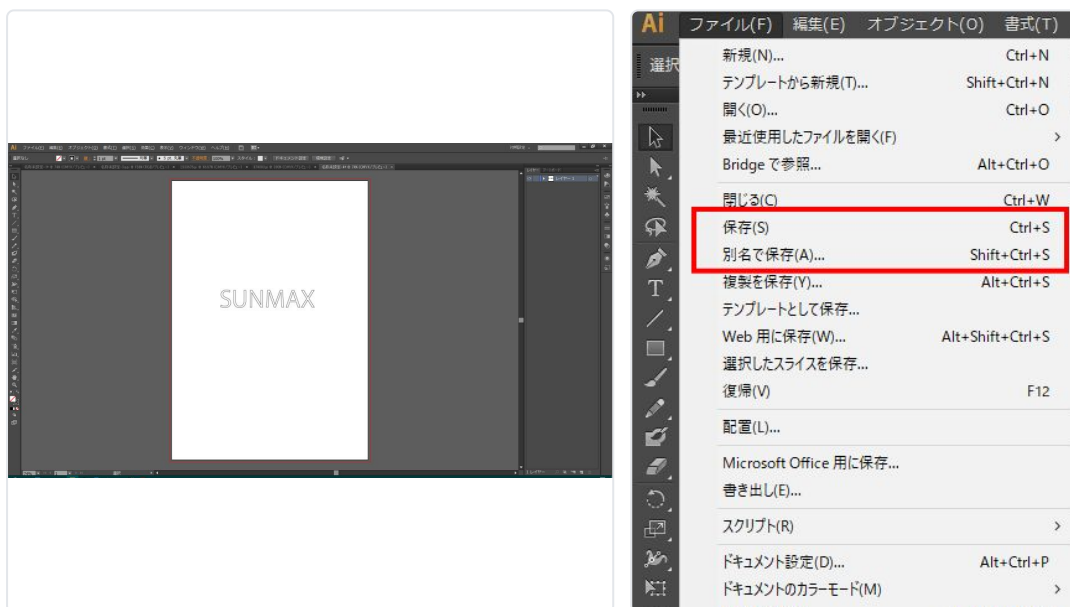


In general, for engraving, it is simpler to export the data from Illustrator as a monochrome bitmap and import it into LaserWork.

However, for applications where you create a single data file and use the layer function in LaserWork to vary the engraving depth, this cannot be done with monochrome bitmap data; in that case, import a properly prepared ai file.

1.3 Saving an AI File

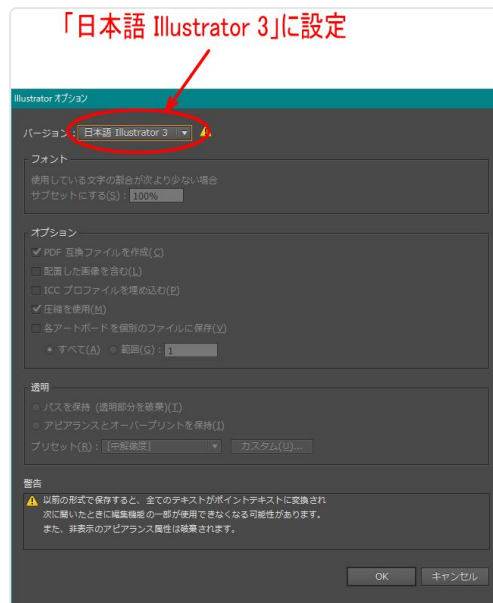
Create the data. Convert all text and similar objects to outlines.



From the menu, click "File" > "Save" or "Save As".

Caution: Always create the data in millimeters.

The "Illustrator Options" dialog appears. Set the version to "Japanese Illustrator 3".

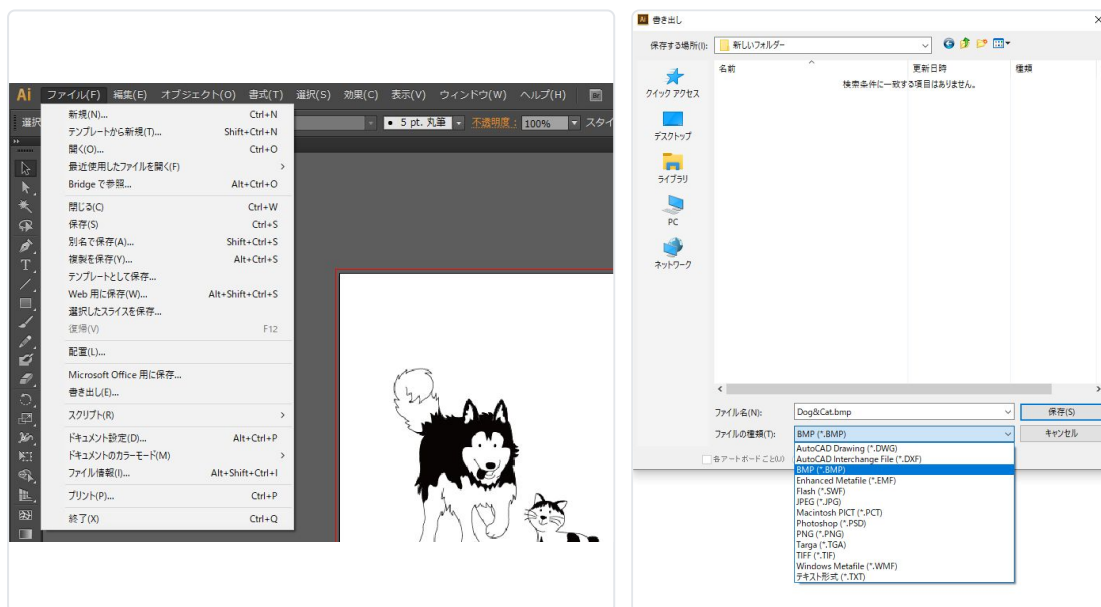


Click OK, and the ai file is created.

1.4 Exporting as a Monochrome Bitmap File

From the menu, click "File" > "Export".

Caution: Always save the data before exporting.
Always create the data in millimeters.



The "Export" dialog appears. Select "BMP (*.BMP)" as the file type.

Specify a file name of your choice and click the "Save" button.

The "Rasterize Options" dialog appears.

- ① Set the color mode to "Bitmap" (monochrome, 2 levels).
- ② For the resolution, select Other and set it to "1000" ppi or "1016".



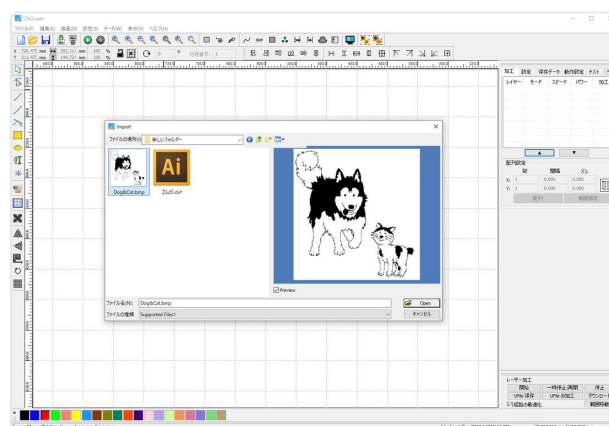
Caution: Depending on the size of the image, a dialog may appear and the data export may fail. In such cases, set the resolution to a smaller value. Also note that clipping masks and similar elements can make the image size larger than necessary, and unnecessary data included in the file can also increase its size. The smaller the resolution value, the coarser the outlines of the exported data will be. It is acceptable to lower the resolution setting to suit the workpiece material and the data content.

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

When you click OK, a monochrome bitmap file is generated in the specified folder.

② Importing the Data File

Click the "Import" button on the LaserWork system toolbar.



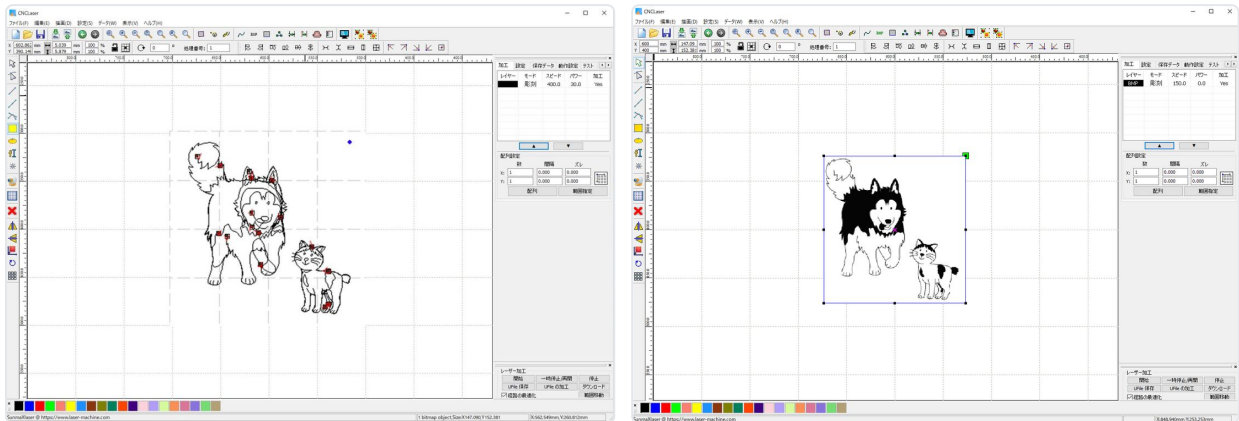
Preview checkbox

Preview pane: when you select a file, its data content is displayed.

③ Displaying the Data

The data created in Illustrator is displayed.

Shown below: the case of an ai file, and the case of a monochrome bitmap file.

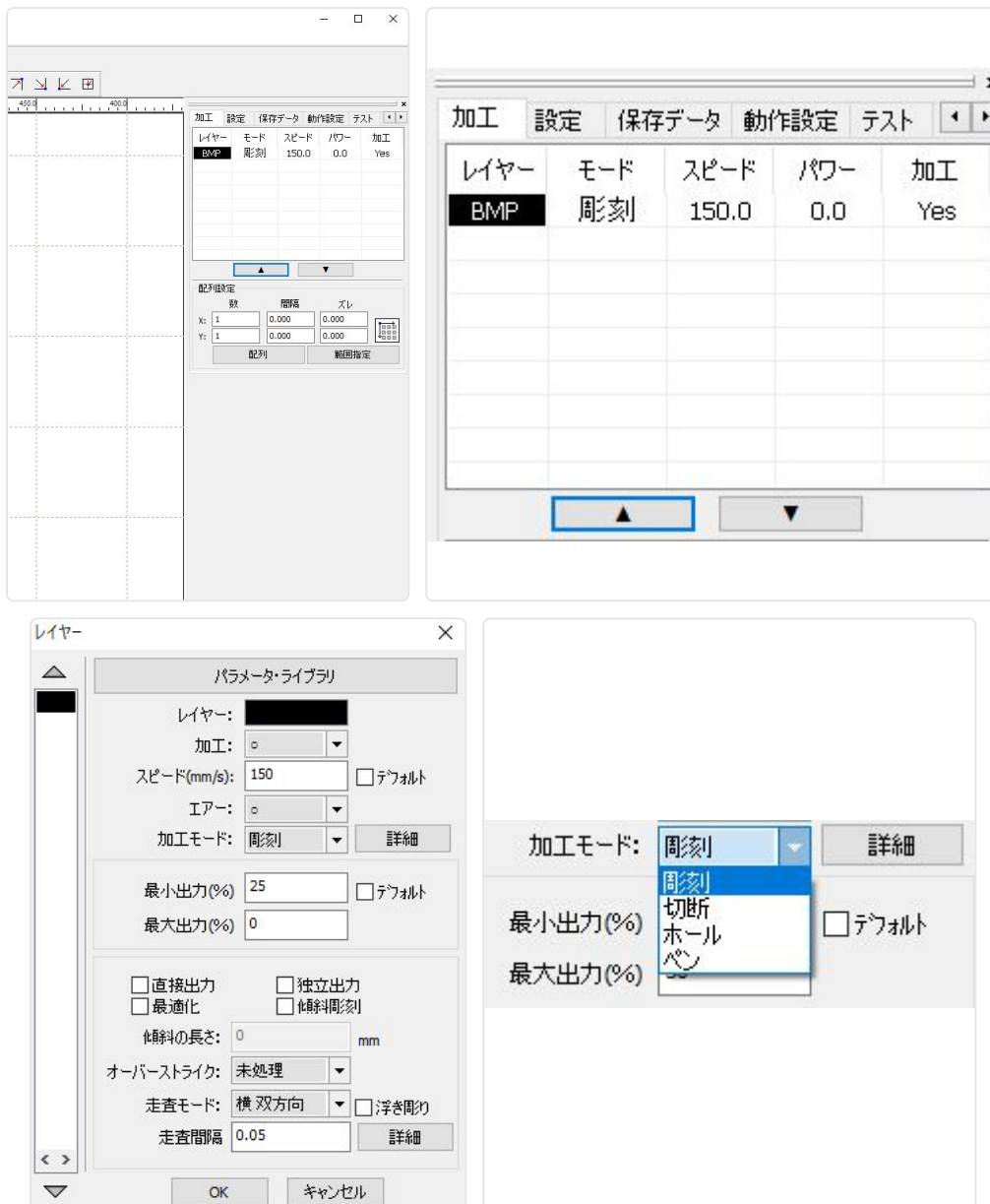


④ Selecting and Configuring the Processing Mode

Select and configure the processing mode for engraving. The processing mode is selected and configured in the pane shown below.

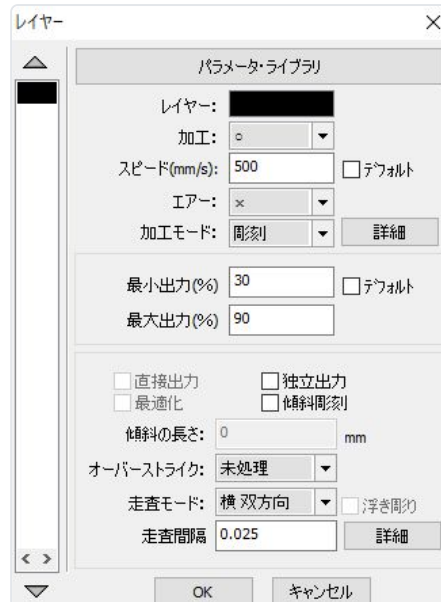
- Note: Depending on the state of LaserWork, other mode names may be displayed.
- Note: The settings for each mode are stored, so the values you set last will appear as the defaults the next time you create a job.
- Note: The illustrations below show the case where a monochrome bitmap file has been imported. The settings are the same for .ai files.

Set the mode to "Scan" (engraving).



Double-click the mode field. A list of modes appears; left-click "Scan" (engraving) to select it.

Detailed processing parameters can be set in the "Layer" dialog (the initial settings will differ from those shown below).



Speed: Sets the processing speed. The unit is [mm/s]. For engraving, this value is the processing speed (mm/s). The appropriate value varies with the job, the material, the processing mode, and so on. For engraving, up to about 600 is typical. Increasing the value makes the laser head move faster and shortens the processing time, but the engraving becomes shallower.

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

Interval (scan interval): Specifies the scan interval for engraving. The unit is [mm]. The minimum value is 0.025[mm], and settings are normally made in steps of 0.025. In general, smaller values improve the mechanical processing accuracy, but depending on the material and the data, making the interval too fine may bring no benefit. Larger values shorten the processing time. If you want to speed up production even at the cost of a coarser finish, raising this value reduces the production time. For example, if a job engraved at 0.05 is changed to 0.1 and engraved again, the production time is halved.

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

Air: Not supported on the RSD-SUNMAX series.

Advanced: Not normally used. For details of this function, refer to the CNCLaser User Manual, Section 5.3, Engraving Settings.

⑤ How to Determine the Settings

The engraving settings must be adjusted according to the material, the depth, and the required quality. No single set of values works for every material. For example, even when engraved with identical settings, cedar and ebony produce completely different depths because of the difference in the hardness of the

wood. The depth also varies for rubber and glass depending on their composition. For materials that melt (soften under laser irradiation and harden again as they cool), such as plastics, the finish depends on the balance between engraving speed, maximum power, and scan interval. Basically, you need to engrave repeatedly while checking the finish, changing the conditions each time, until you find settings that meet the required quality.

An efficient way to find the settings is as follows.

Easily combustible materials include wood, rubber, paper, leather, plastics, and fabric.

Materials that do not burn easily include stone, glass, ceramics, and metals.

For easily combustible materials, it is efficient to start with a high engraving speed and low maximum power, gradually raise the maximum power, and then lower the engraving speed while checking the finish until the settings are right.

For materials that do not burn easily, it is efficient to start with a low engraving speed and high maximum power, gradually raise the engraving speed, and then lower the maximum power while checking the finish until the settings are right.

⑥ Setting the Origin

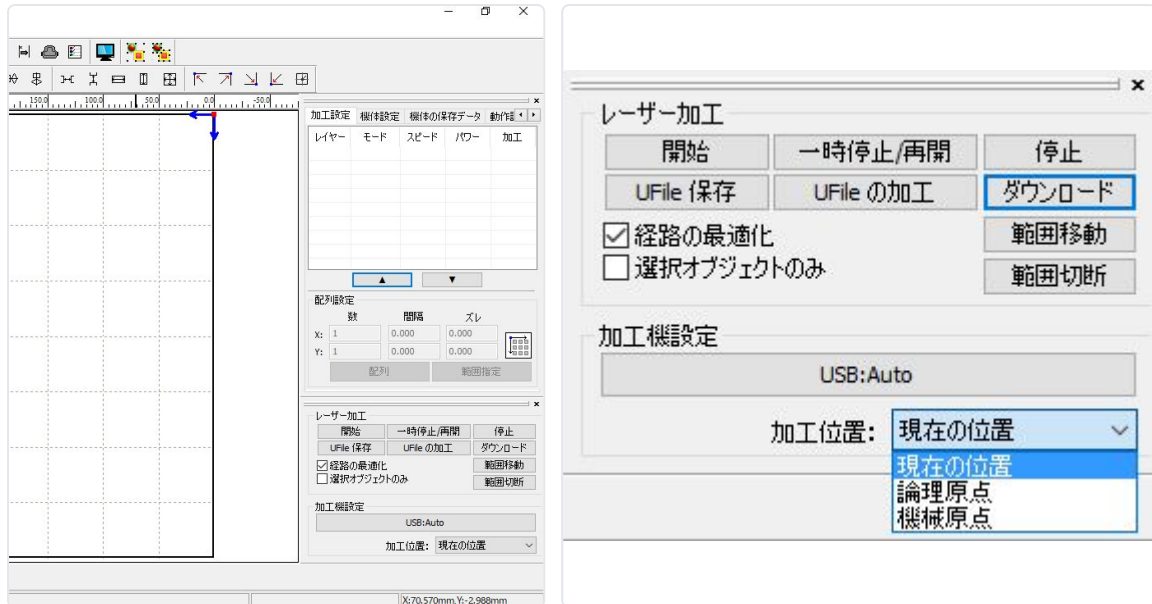
Before starting processing, you must check and set the processing origin.

When you start processing from the laser machine's control panel, the "logical origin" set with the control panel's "Origin" button is used as the origin position for processing.

When you run the job from the LaserWork machine control pane, the origin position for processing changes depending on settings such as the "Position" setting described below.

6.1 Processing Position

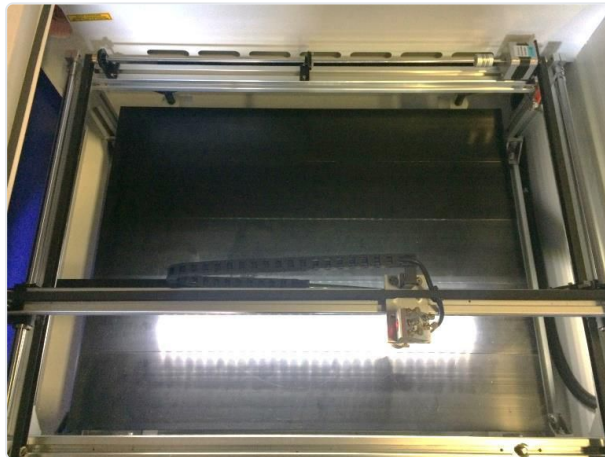
The processing start position differs depending on the Position setting. It can be selected from the Position field shown in the Laser work area at the lower right of the screen.



Three position options are available.

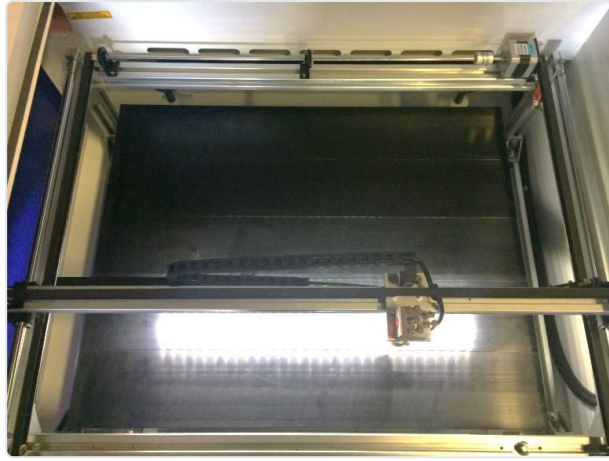
Current Position

When "Current position" is selected, clicking "Start" runs the job using the current position of the laser head as the data origin.



Logical Origin

When "Logical origin" is selected, clicking "Start" runs the job using the logical origin — the processing origin set by pressing the "Origin" button on the machine's control panel — as the data origin.

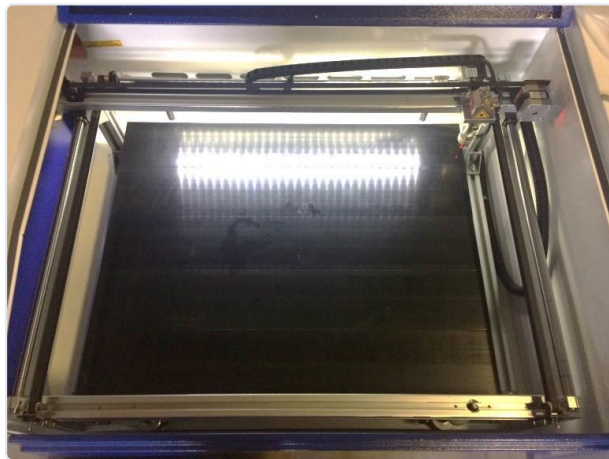


Even if the laser head has been moved, when you click "Start" the laser head moves to the logical origin and begins processing.

Machine Origin

When "Machine origin" is selected, clicking "Start" runs the job using the machine origin of the laser machine (rear right: the position to which the machine homes when it starts up) as the data origin.

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



When you click the "Start" button, the laser head moves to the machine origin and begins processing.

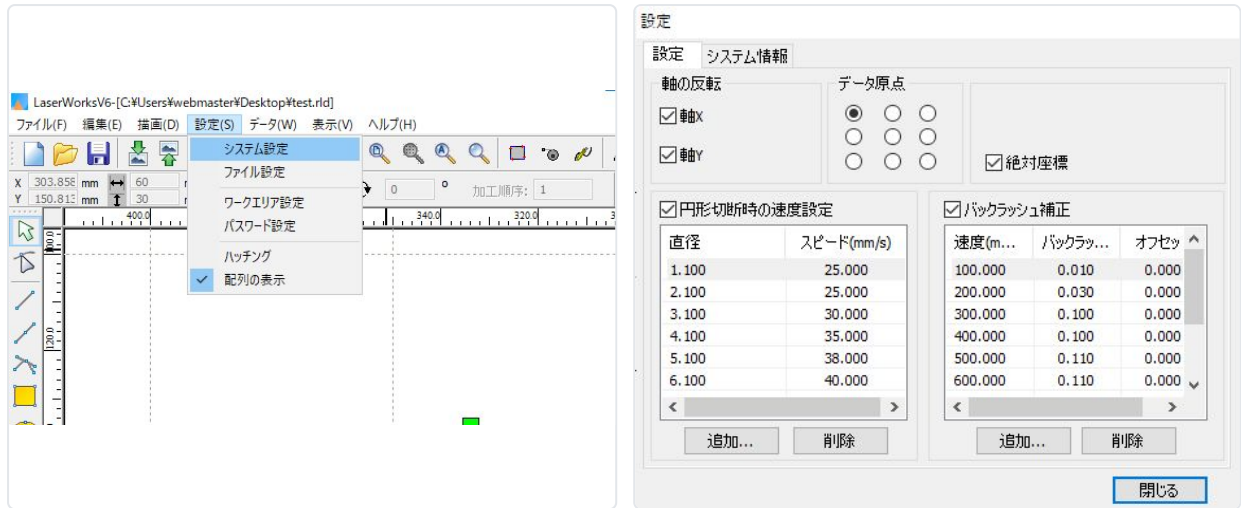
6.2 Absolute Coordinates

When "Absolute coordinates" is checked, the logical origin set with the control panel's "Origin" button and the "Position" setting used when processing from LaserWork are both disabled, and the job is processed at the position of the objects on the design screen.

Use this setting when you want to process at a specific position.

Setting method

From the menu tabs at the top of the screen, open "Config" → "System Setting".



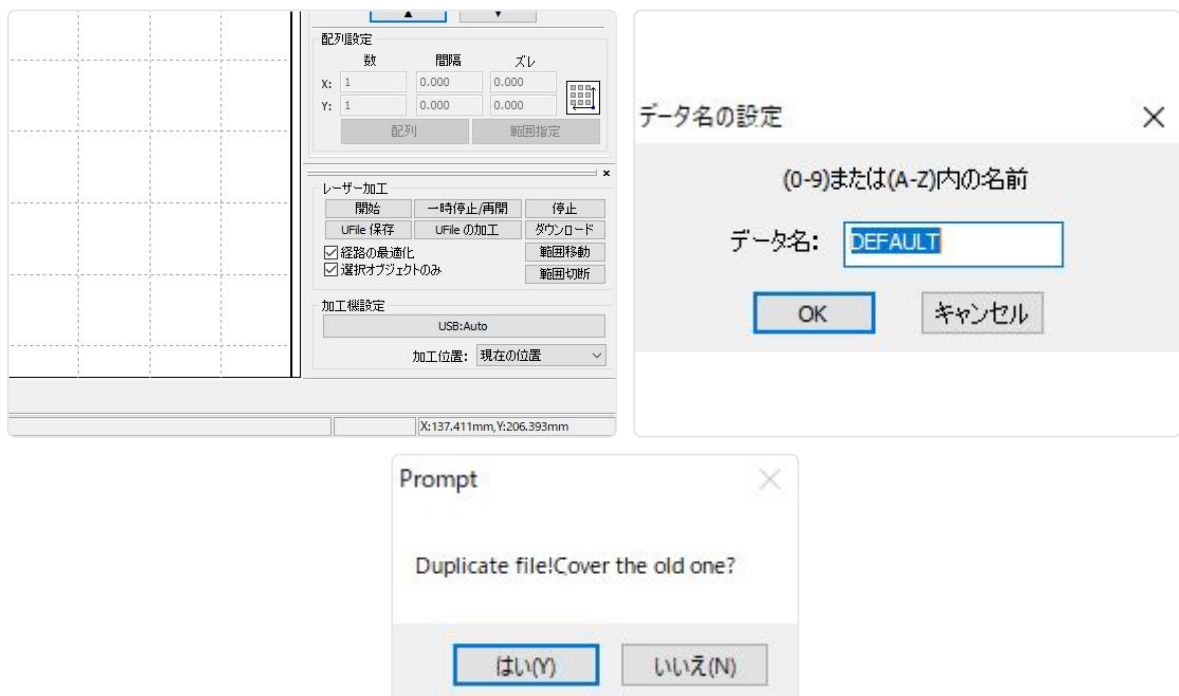
The settings screen appears. Check the "Absolute coordinates" checkbox to enable it.

⑦ Downloading the Data

After configuring the processing settings and the processing position, load the data into the laser machine.

Note: Downloading the data is required when you start processing from the laser machine's control panel. It is not necessary when running the job from the LaserWork machine control pane.

- ① In the Laser work area at the lower right of the screen, click "Download".



- ② When you click the Download button, the "Set data name" dialog appears. Enter a name of your choice.

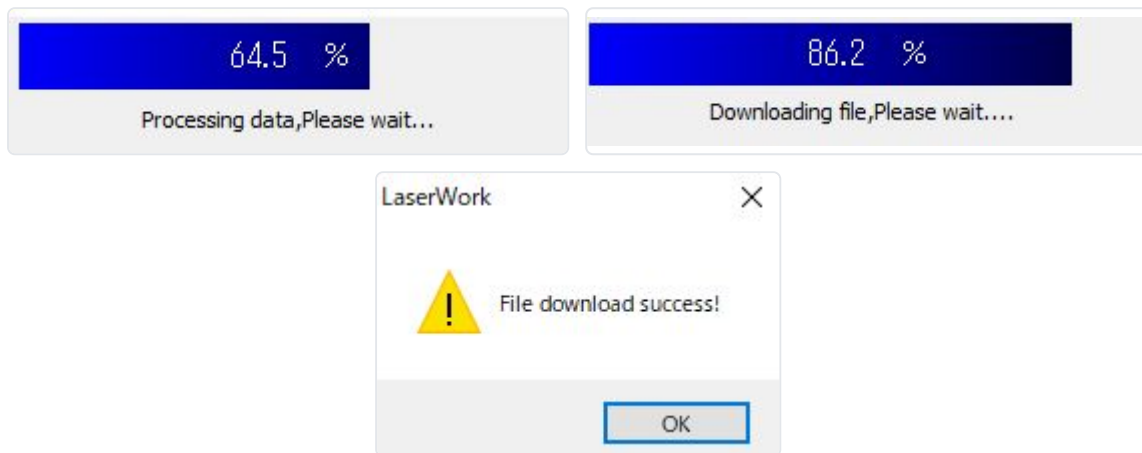
Note: If a file with the same name already exists on the laser machine, a dialog asking whether to overwrite it appears.

Note: Only single-byte (half-width) alphanumeric characters can be used.

③ Starting the download

Clicking the button starts the data download.

First, the design data is converted into a format the machine can control. If you have created a large data file, this step may take some time.



Once conversion reaches 100%, the download begins.

When the download progress bar reaches 100%, the data download is complete.

④ When the progress reaches 100%, a download-complete dialog is displayed.

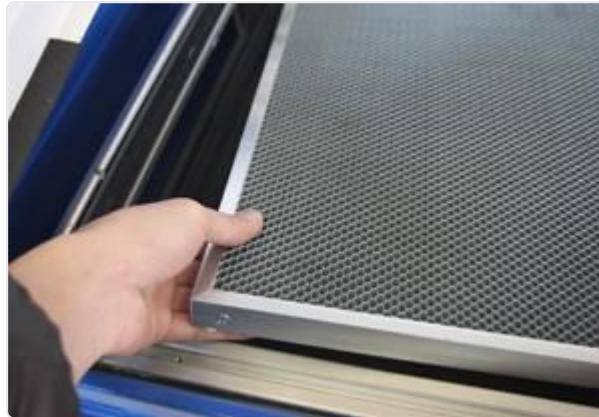
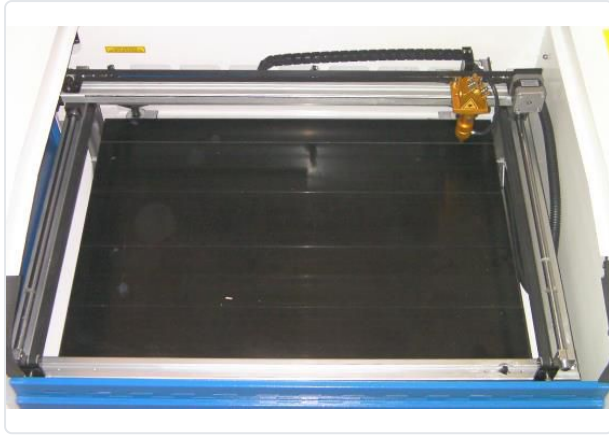
Click the OK button to finish.

⑧ Processing

The processing data has now been saved to the laser machine, so it is time to run the job. Start processing by following the steps below.

8.1 Installing the Honeycomb Table

— Attaching the honeycomb table —



If the cutting table is installed, remove it so that the machine is in its engraving-table configuration.

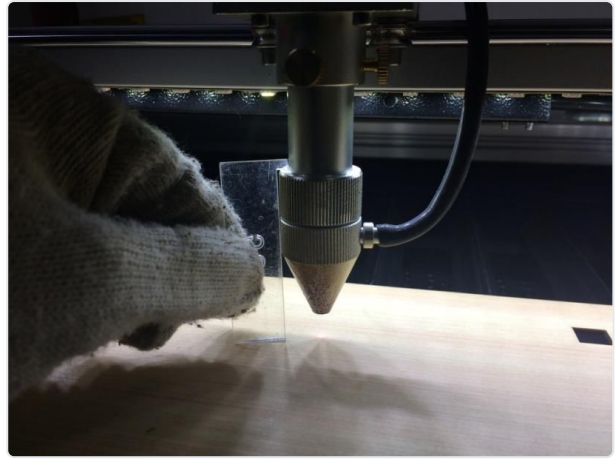
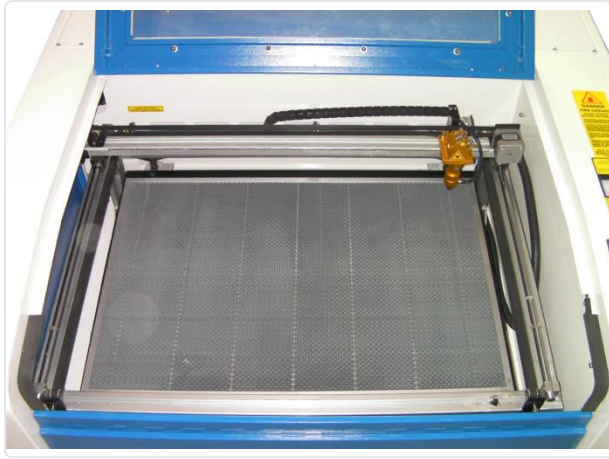
Carefully place the honeycomb table on top of the engraving table.

Use the table elevation handle to create enough space to install the honeycomb table. Turn the handle counterclockwise to lower the Z-axis.

8.2 Focusing

Adjust the focus.

Use the supplied focus gauge to check whether the table height is appropriate.



Using the table elevation handle, adjust the height until the bottom surface of the focus gauge lightly grazes the workpiece.

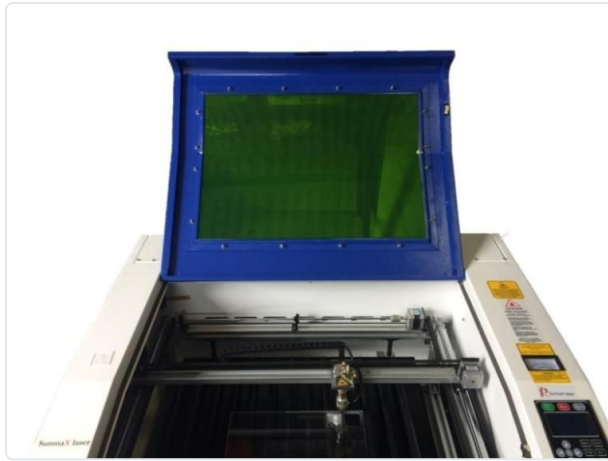
(Turning the handle clockwise raises the table; turning it counterclockwise lowers the table.)

Make sure the honeycomb table is installed in the correct position.

8.3 Starting the Job

Now that preparation is complete, start processing. In this example, the job is started from the control panel.

- ① Move the laser head to the position where you want to process, and set the processing origin with "Origin".



② Close the top door.

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

③ After closing the top door, turn on the power of each external device (blower, water chiller, and compressor).

④ Press "Start/Pause" on the control panel to begin processing.



⑤ When processing is finished, the laser machine emits a beep. Open the top door and take out the processed material.

This completes the processing procedure.

⑨ Other

[To make multiple copies of the same engraving]

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

配列出力

	数	間隔	ズレ
X:	3	20.000	0.000
Y:	2	30.000	0.000



Array Copy copies the selected object according to the specified row and column settings. Therefore, after an array copy, you can reposition or process each copied object individually.

Array Output outputs the selected object according to the specified row and column settings. Because it does not create copies, you cannot reposition or process the individual objects after an array output. However, it allows flexible automatic placement, such as specifying offsets between rows and columns.

* For details, see "Difference between Array Copy and Array Output" in Section 4.1.2 of the UserManual LaserWorkV6.