

Work Example — Engraving a Photo on an Acrylic Plate

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 — Engraving a Photo on an Acrylic Plate

(Adobe Photoshop Edition)

- This document assumes that the laser machine has been set up correctly.
- This document assumes that the honeycomb table is installed.
- This document assumes that RDWorksV8, the control software for the RSD-SUNMAX series, has been installed correctly.

Below is an image of the finished product created based on this document.



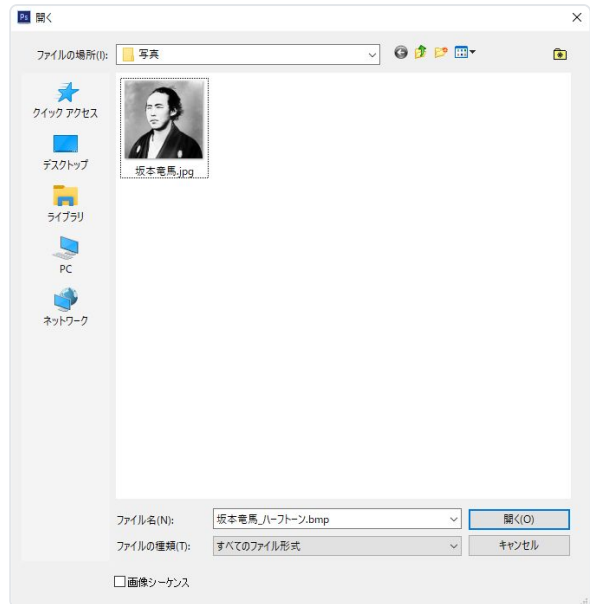
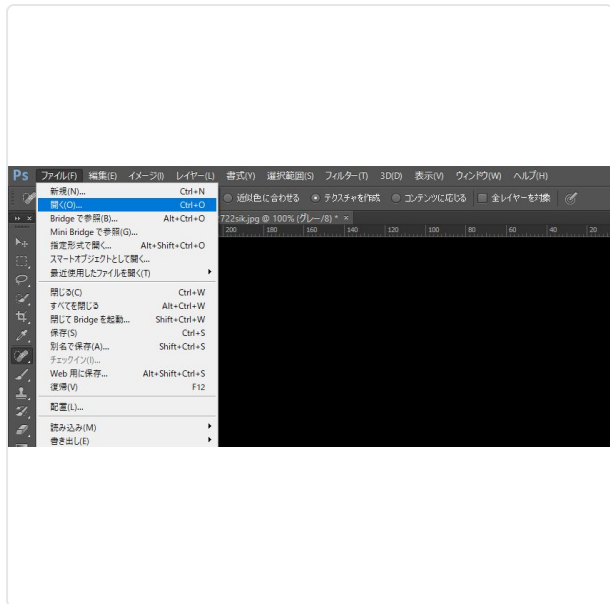
1. Creating the Design in Photoshop

Create the engraving data using Adobe Photoshop.

Prepare the machining data in BMP (bitmap) format, which the laser machine can read.

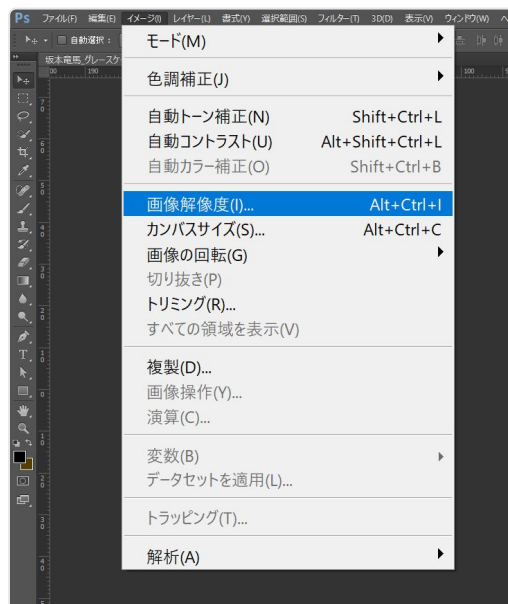
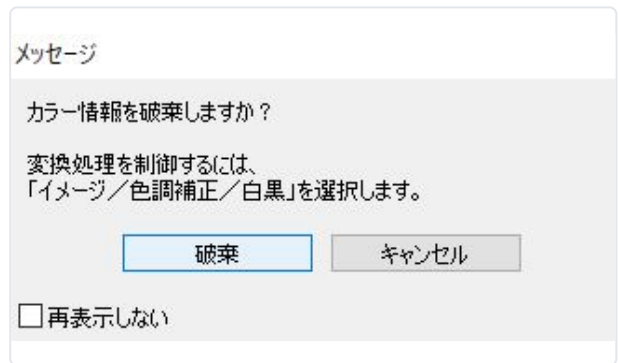
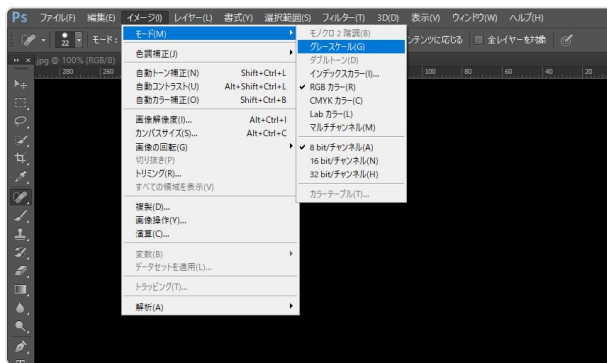
In this example, the design is created using a halftone (dot-screen) pattern.

Open the "File" menu and click "Open."



The "Open" dialog appears. Select the file and click "Open."

Open the "Image" menu and hover the mouse cursor over "Mode" to open the submenu, then click "Grayscale."

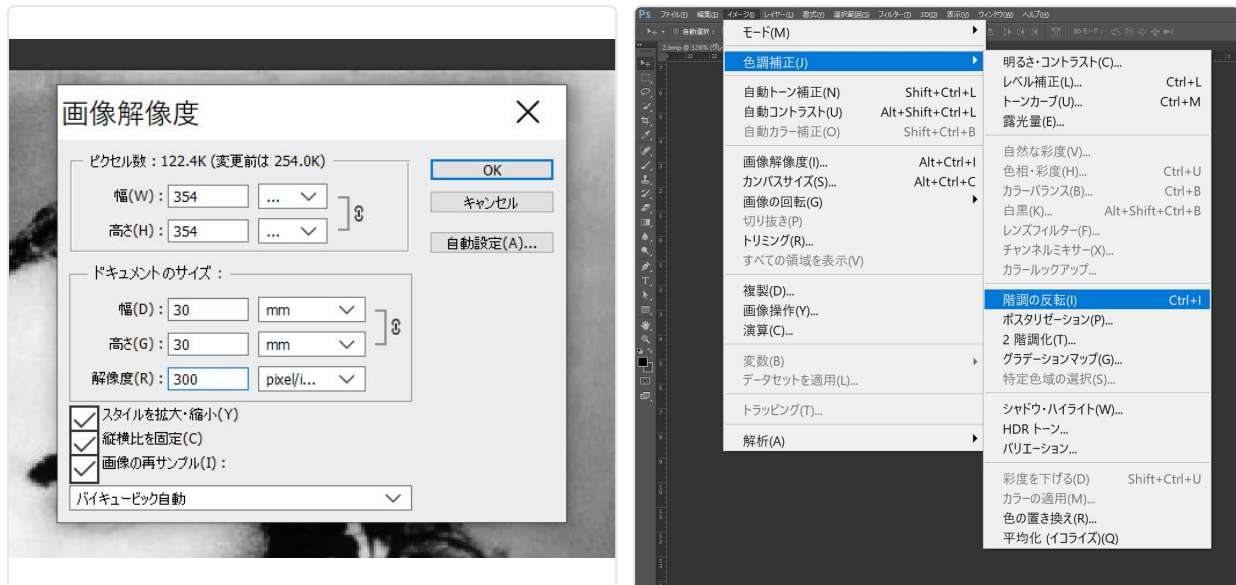


If a confirmation dialog asking "Discard color information?" appears, click "Discard."

Scale the image up or down to the size to be machined. Once the image is loaded, click "Image" > "Image Size" from the menu.

The Image Size dialog appears. Enter the desired size (width and height) and the resolution.

Note: Enter a resolution of approximately 300 to 350 as a guideline.

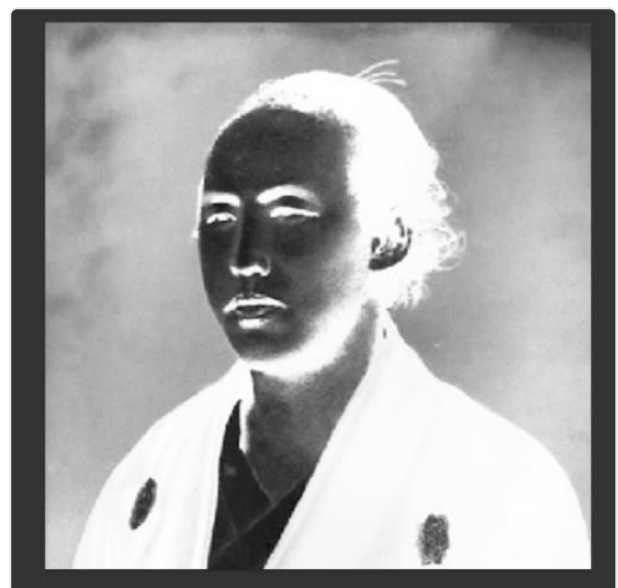
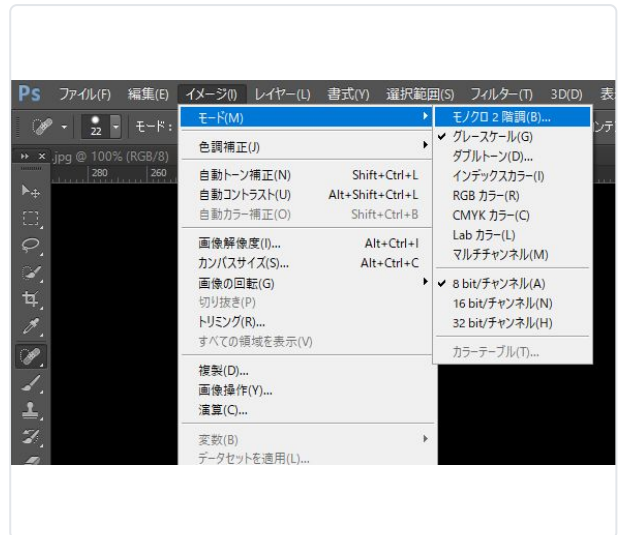
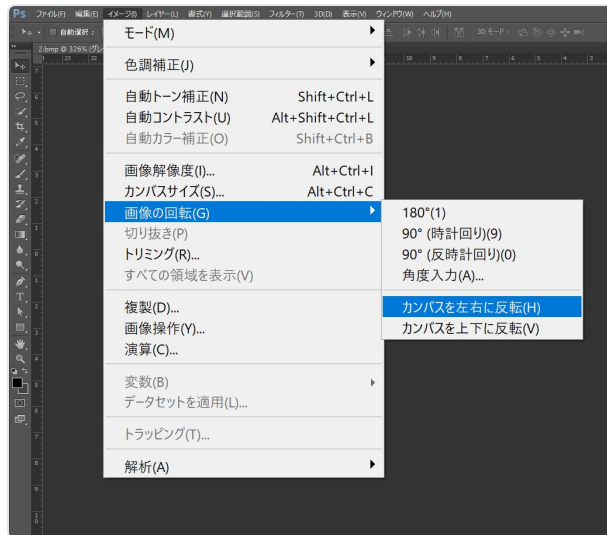


Open "Image" > "Adjustments" from the menu and click "Invert."

Note: This cannot be done unless the image has been converted to grayscale (monochrome).

— With the tones inverted —

Open "Image" > "Image Rotation" from the menu and click "Flip Canvas Horizontal."



Hover the mouse cursor over "Image" > "Mode" in the menu; "Bitmap" becomes selectable in the submenu, so click it.

The settings dialog appears. Configure it as shown in the figure below and click "OK."

Guideline:

Output	1000 pixels/inch
Use	Halftone Screen

— Flipped horizontally —

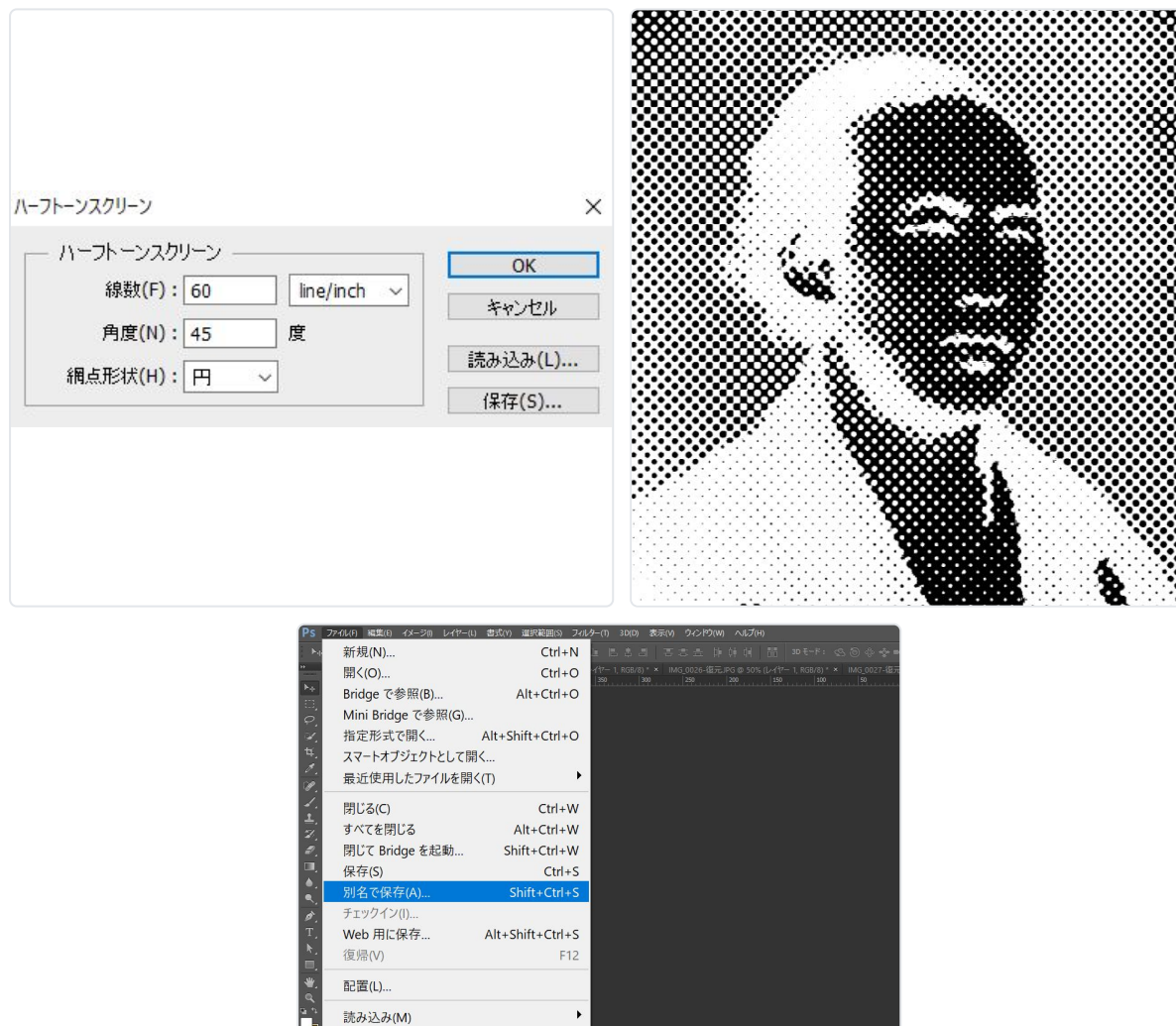
The "Halftone Screen" dialog appears. Configure the settings and click "OK."

In this work example, the settings below were used.

Guideline:

Frequency	50 to 90
Angle	45 degrees
Shape	Round

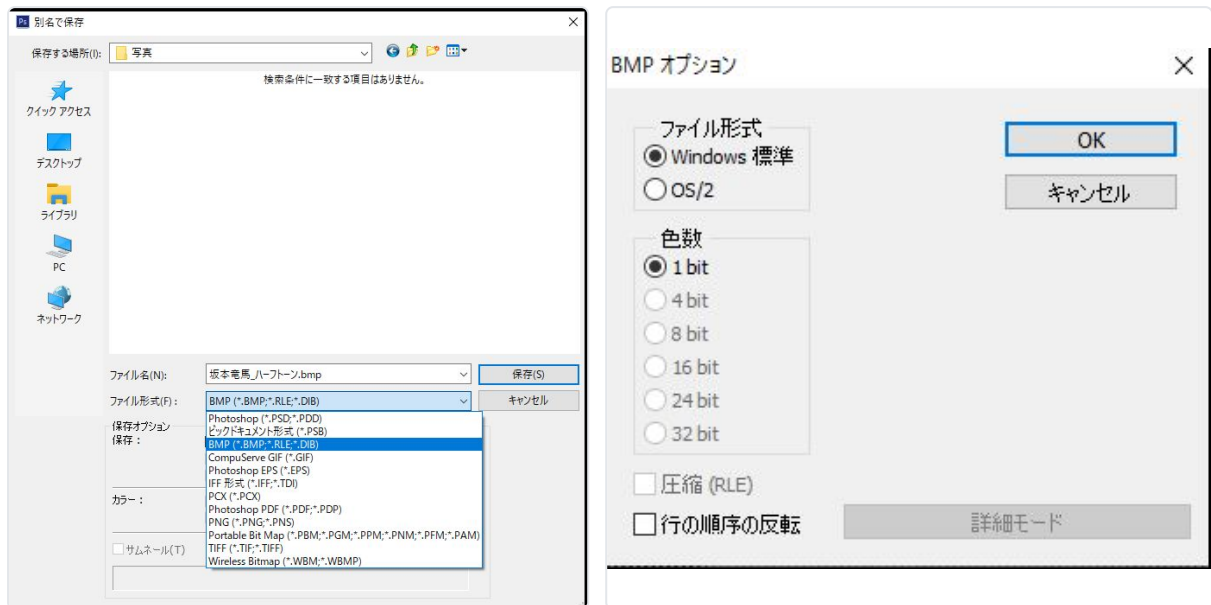
Note: The settings above are only a guideline. You will need to run trials and adjust the settings while checking the finished result.



Use the Zoom tool to magnify the image and confirm that it has been converted into halftone dots.

Save the data you created, just as with the grayscale version. Open the "File" menu and click "Save As."

The save dialog appears. Select "BMP (*.BMP;*.REL;*.DIB)" as the file format.



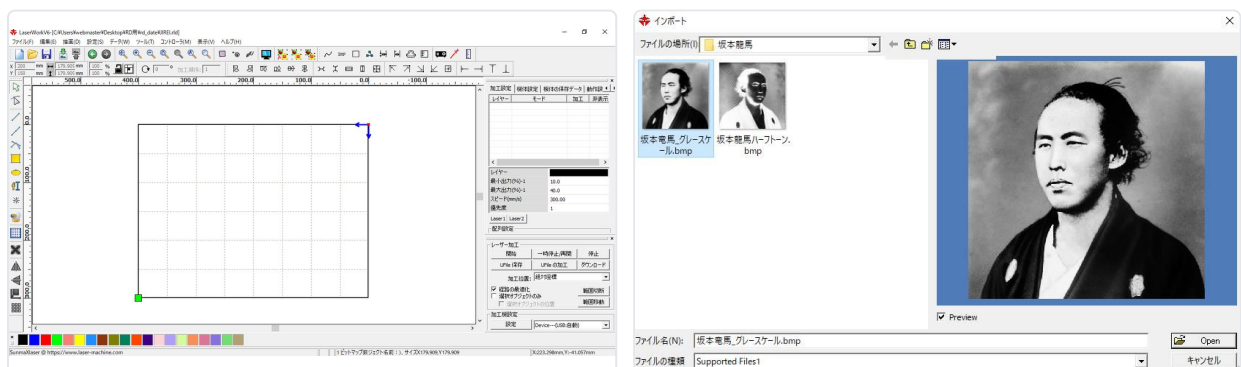
Enter a file name and click the "Save" button. The "BMP Options" dialog appears; set the file format to Windows standard and the depth to 1 bit, then click the "OK" button.

Caution: Do not edit this image data from this point on. If you scale it up or down or make similar changes, it cannot be machined properly.

2. Editing the Data in RDWorksV8

2.1 Importing the Data

Start RDWorksV8 and click "Import" on the system toolbar.

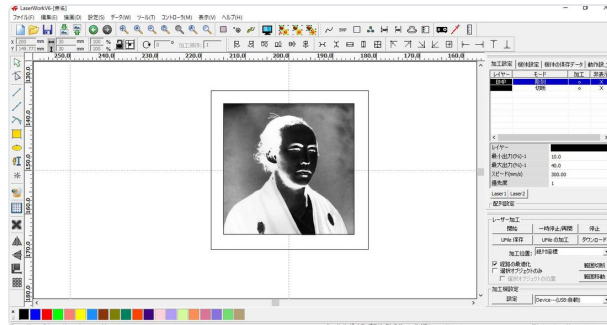


The file-open dialog appears. Select the file you prepared in Photoshop and click "Open."

Confirm that the image has been imported.

2.2 Cutting Design

Select (left-click) the "Rectangle" drawing object, which is used to cut the material.

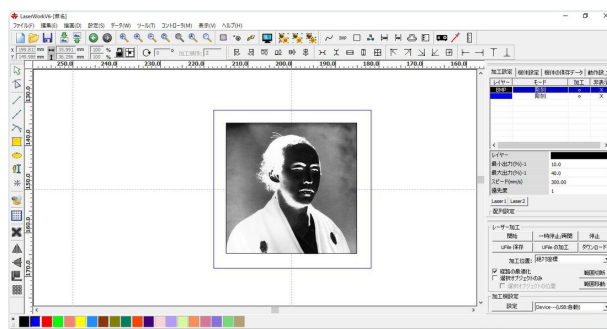


The mouse cursor changes to rectangle-drawing mode. Click two points to draw the rectangle.

To create the cutting rectangle on a new layer, select a layer different from the image layer (here, blue) on the layer toolbar.

Drag to create the rectangle.

Confirm that the rectangle has been created on a new layer.



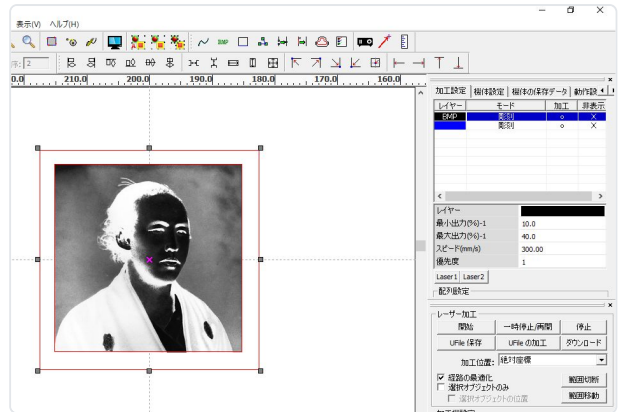
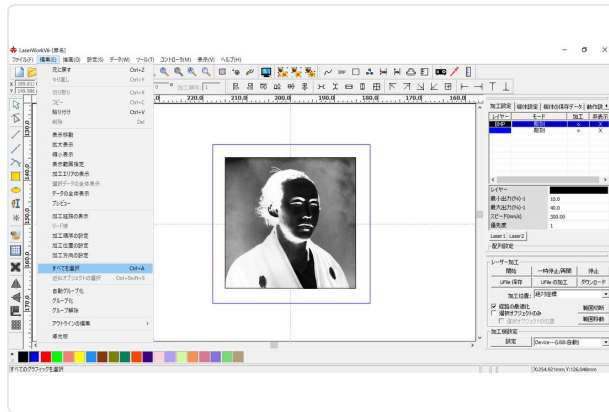
Adjust the size of the rectangle object in the same way as you did for the image. Change the size with "Length in X direction" and "Length in Y direction" on the properties toolbar. Here it is set to 35 mm both vertically and horizontally.

Note: The size cannot be changed unless the layer you want to modify is selected.

Adjust the positions of the two objects, and the design is complete.

From the "Edit" menu, choose "Select All" (Ctrl+A) to select both objects.

Note: When the objects are on separate layers, you cannot select both unless you use "Select All" (Ctrl+A).



Click "Center" on the align toolbar.

Confirm that the centers of the rectangle and the image have been aligned and that the objects are centered on each other.

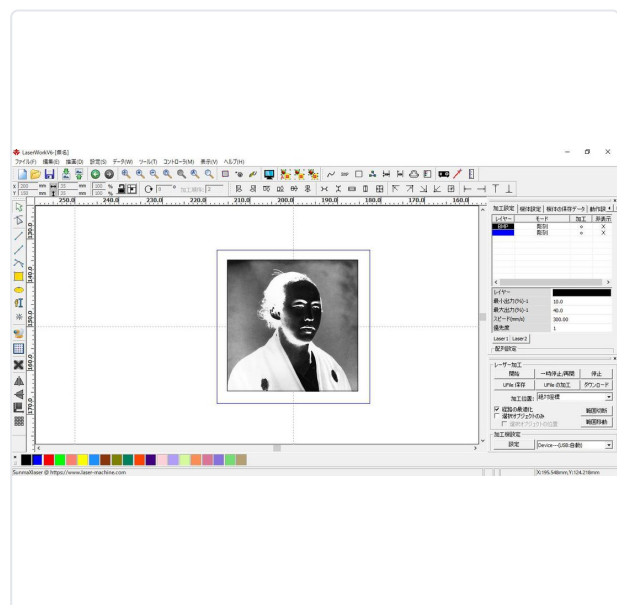
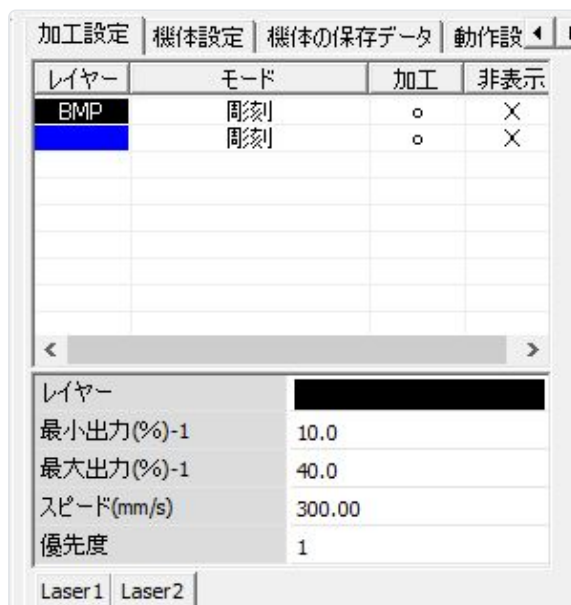
3. Processing Settings

Configure the settings for engraving and for cutting.

Note: The content of the engraving settings differs between grayscale and halftone.

3.1 Engraving Settings

Double-click the BMP layer to display the processing dialog.



Double-click.

The layer dialog appears; configure it for engraving.

Note: BMP (bitmap) data is fixed to engraving, so it cannot be converted to another processing mode.

Note: The settings of each mode are memorized, so the values you set last are shown as the defaults the next time you create a job.



Set "Engraving Speed", "Max Power", and "Scan Interval" to suit the coating thickness of the material to be marked and the required quality.

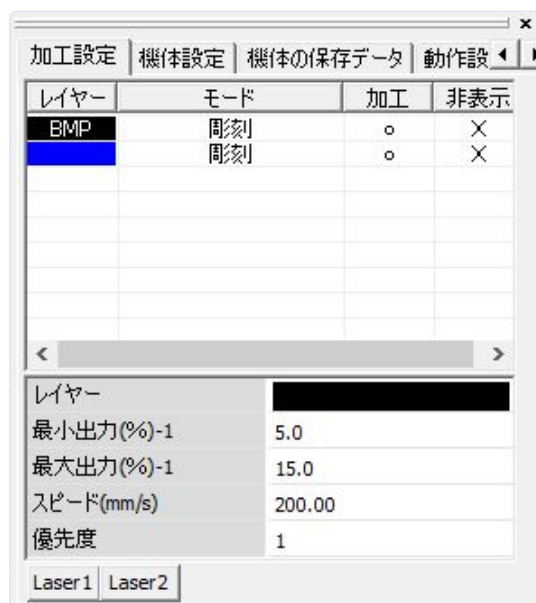
The "Advanced Engraving Settings" displayed by clicking the button normally do not need to be changed. For details, refer to the RDWorksV8 User Manual, "Processing Settings (Layer Settings)" — "Engraving Settings".

Click the "OK" button to complete the settings.

Select the "Optimize" check box. This function automatically optimizes the scan interval setting to match the content of the image. For example, when halftoned image data is scaled down, the laser output is switched ON/OFF in rapid succession, which can cause moiré in the processing result; turning Optimize ON reduces such moiré.

3.2 Cutting Settings

Double-click the layer you want to cut to display the layer dialog.



The "Layer Settings" dialog shown below appears; change the processing mode.

Double-click.

The mode list is displayed; click "Cut".

The layer dialog appears; configure it for cutting.



Set the values of "Speed", "Max Power", and "Min Power" to suit the thickness of the acrylic and the required quality.

As a rule, when cutting acrylic, make the adjustment by varying the speed.

Air control is not supported on the RSD-SUNMAX series, so no setting is required.

The "Advanced Cutting Settings" displayed by clicking the button normally do not need to be changed. For details, refer to the RDWorksV8 User Manual, "Processing Settings (Layer Settings)" — "Cutting Settings".

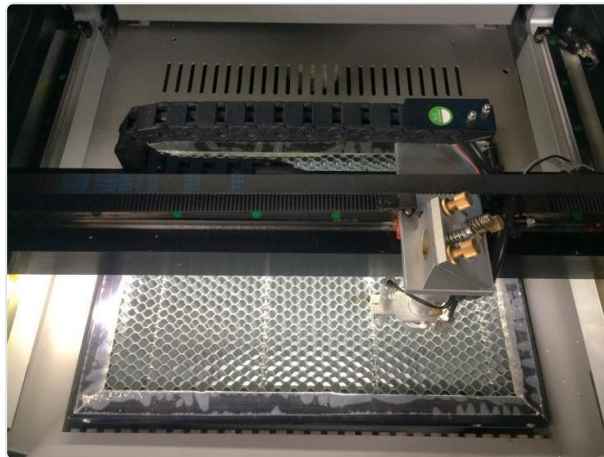
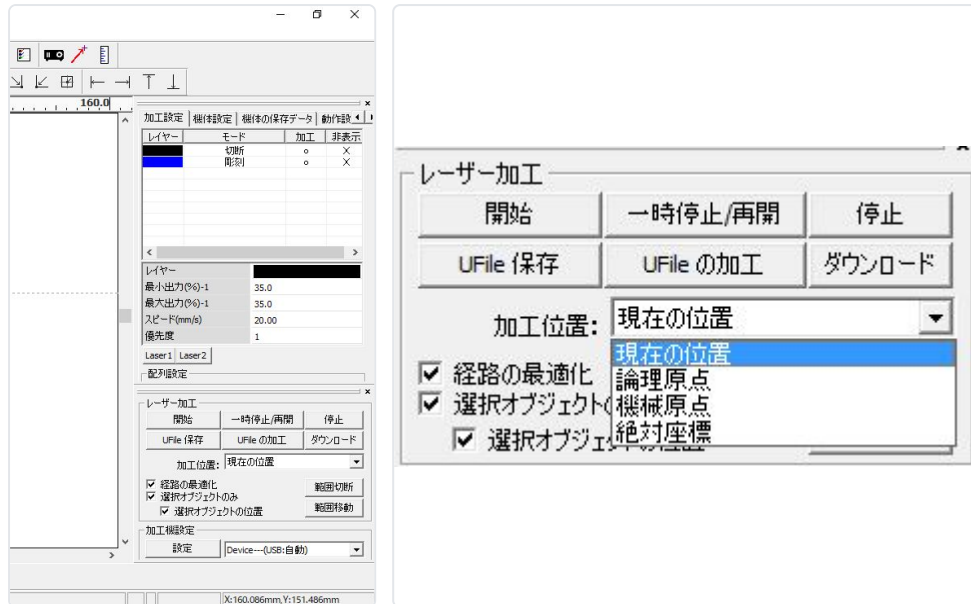
Click the OK button to complete the settings.

4. About the Origin

Before starting the job, you need to check and set the processing start position.

When the job is started 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 the job is started from RDWorksV8, you can select from four origins depending on the setting.



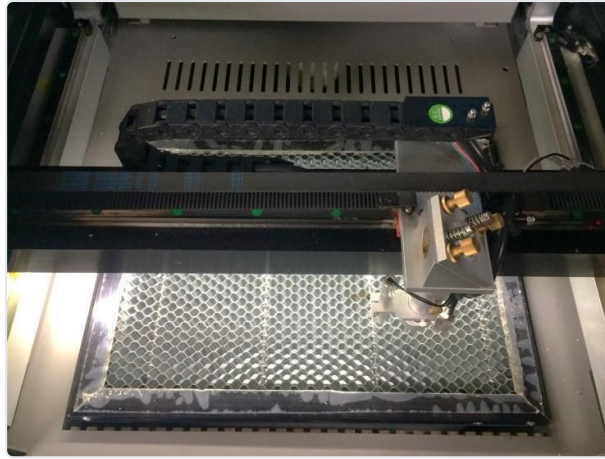
4.1 Current Position

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

Processing origin

4.2 Logical Origin

When "Logical Origin" is selected, clicking the "Start" button in RDWorksV8 runs the job using the logical origin — the position set with the "Origin" button on the laser machine — as the data origin.



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

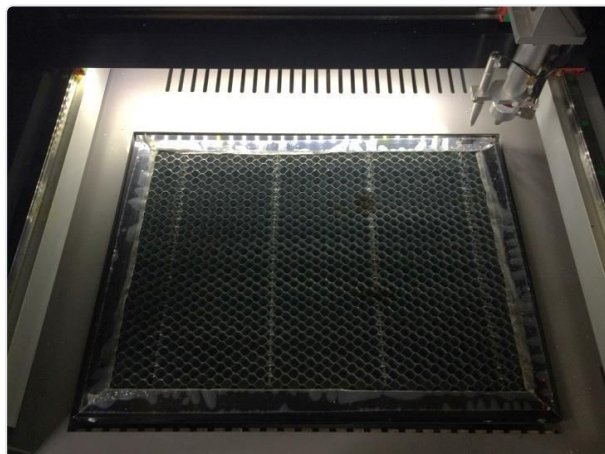
Even after the laser head has been moved, press the "Origin" button on the machine operation panel.

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

4.3 Machine Origin

When "Machine Origin" is selected, clicking the "Start" button in RDWorksV8 runs the job using the machine origin position of the laser machine (rear right: the position the machine homes to when the laser machine is started) as the data origin.

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

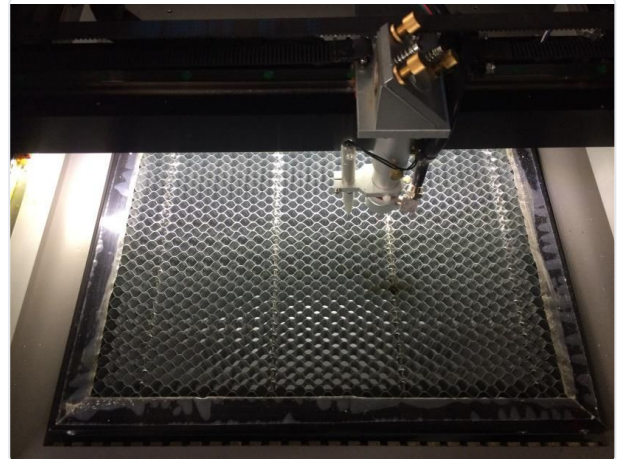
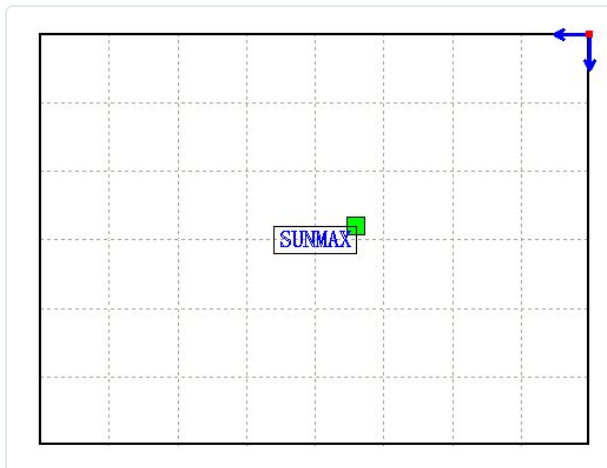


4.4 Absolute Origin

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 are disabled, and the job is processed at the position shown on the RDWorksV8 design screen.

Lay out the objects in RDWorksV8.

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



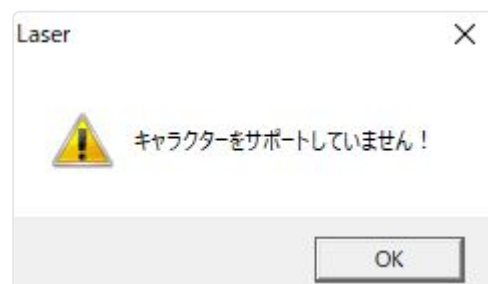
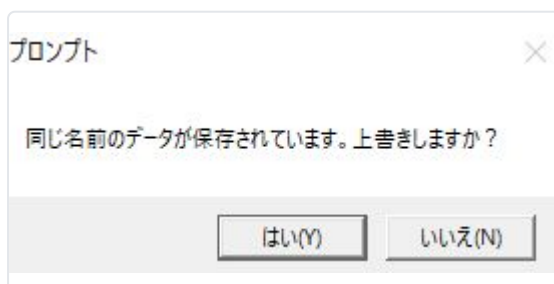
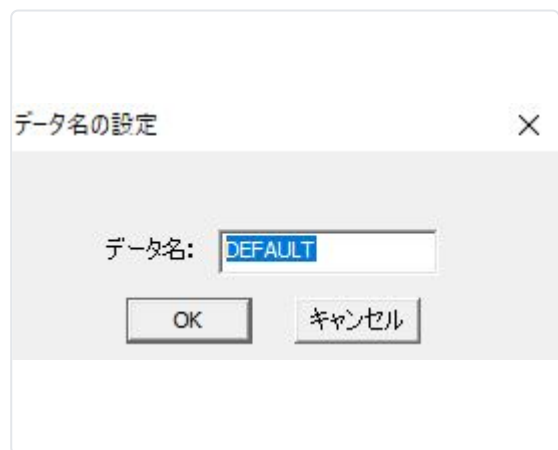
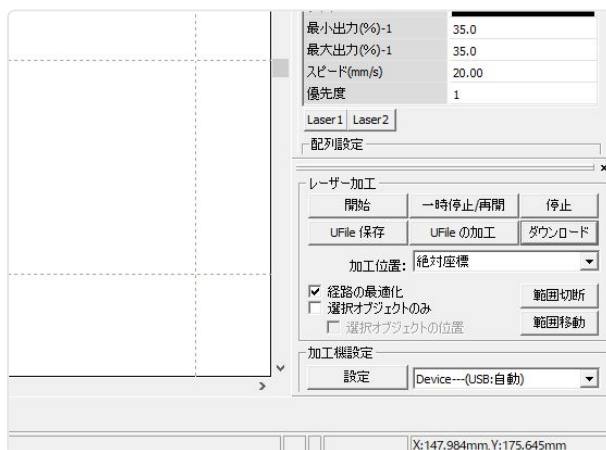
5. Downloading the Data

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

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

Note: If you run the job with "Start" in the machine-control (Laser work) pane of RDWorksV8, the data is not downloaded.

In the Laser work pane at the bottom right of the screen, click "Download".



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

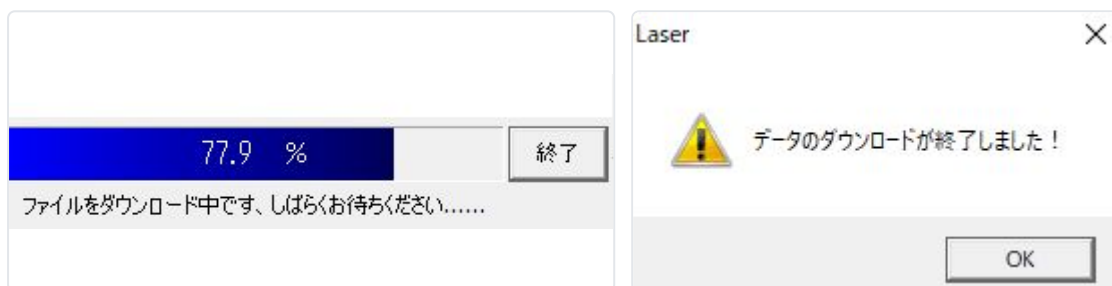
Note: If a file with the same name already exists on the laser machine, a dialog asking whether to overwrite it is displayed.

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

Starting the Download

Click to start downloading the data. The download is finished when the download progress bar reaches 100%.

Note: If the data you created is large, this step may take some time.



Download Complete

When the progress reaches 100%, the download-complete dialog appears.

Click the OK button.

6. Processing

The job data is now stored on the laser machine, so you can run the job. Follow the steps below.

6.1 Setting Up the Table

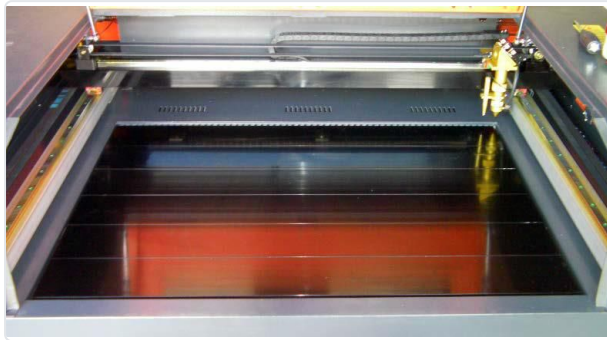
The RSD-SUNMAX series can be used with three different types of processing tables.

Engraving Table

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

- As a rule, it is used for engraving only. It is not used for cutting. During 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. It is therefore used for engraving.

- Cutting on the engraving table becomes possible if you place spacers between the table and the material to create a gap. In general, a gap of about 2 to 5 mm is required between the table and the material.
- The engraving table is well suited to holding and processing thick materials.



Honeycomb Table

The honeycomb table is used by placing it on the elevator table. Both engraving and cutting are possible. In addition, by connecting an exhaust blower to the honeycomb table box, the material is held by suction from underneath, so even lightweight materials such as cloth and paper can be fixed in place.

Cutting Table

In addition to the honeycomb table, the RSD-SUNMAX series comes with a cutting table. By installing the supplied cutting-table parts on the table, you obtain a cutting table that produces less scorching and melting on the back face of the material from laser reflection than the honeycomb table does. When the cutting table is installed, autofocus cannot be used. Focusing is done by adjusting the cylinder of the laser head.



In this example, we will process the work using the honeycomb table.

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

6.2 Focusing

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

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

Caution: Always perform focusing whenever the height of the workpiece changes.

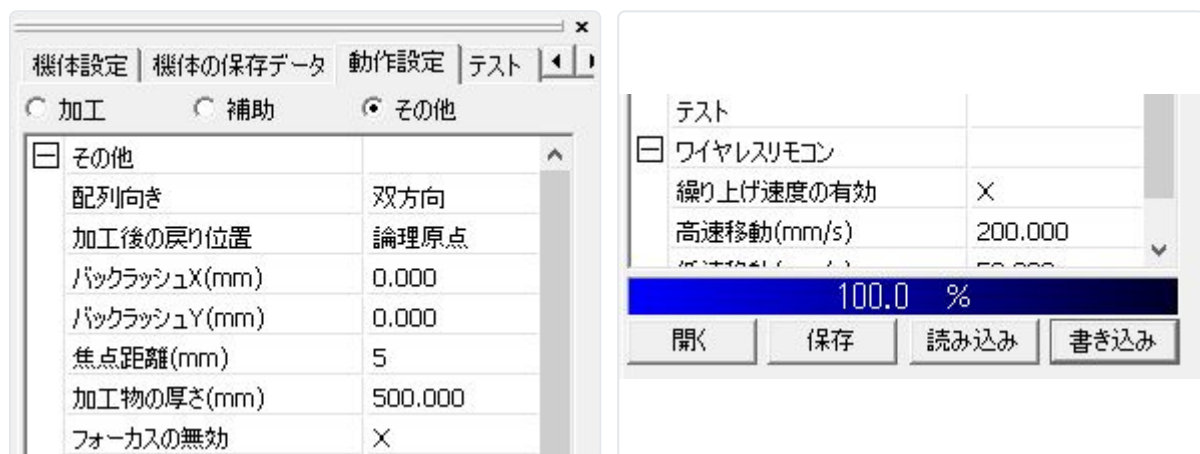
Caution: Autofocus cannot be used when the cutting table is in use. Set the focus manually.

Using Autofocus

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

<Adjustment method>

The autofocus focal distance is set by entering a value for "Focus Distance" under "Operation Settings" → "Other" in RDWorksV8; this sets the return amount of the autofocus. Adjust the setting value, using the focus gauge, so that the correct position is obtained.



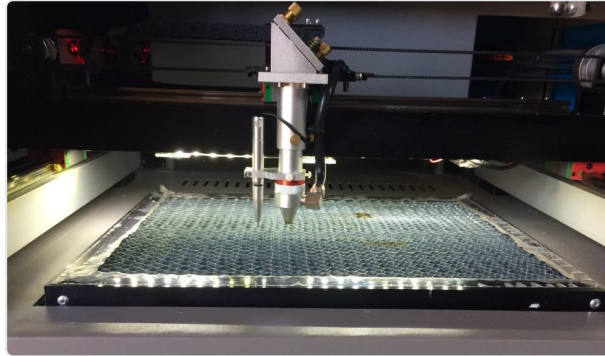
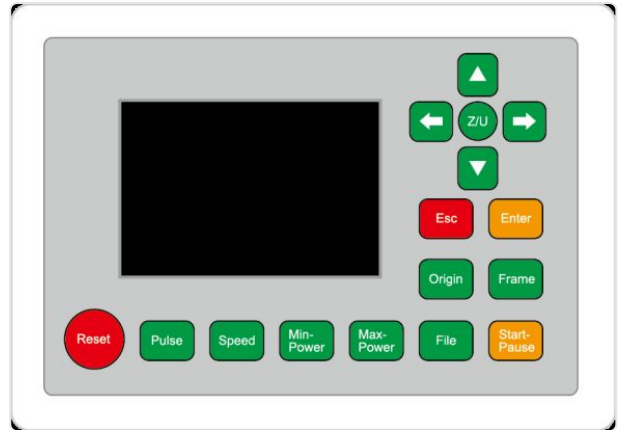
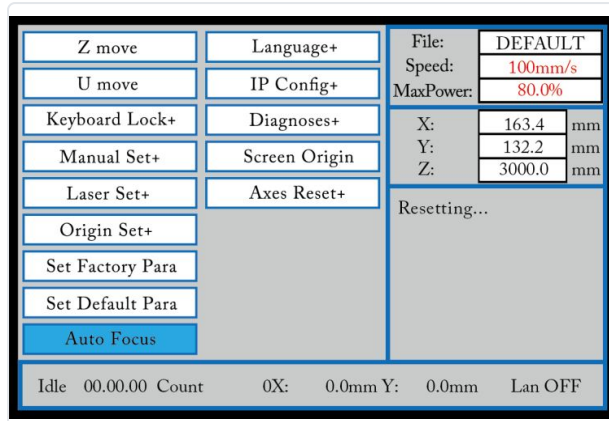
After entering the setting value, write the data to the machine.

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

- Operation panel - (Press)

Select "Auto Focus" with the arrow keys and press "Enter".

- Operation panel screen - (① Select ② Press)



The elevator table rises until it touches the autofocus switch, and the focus is then set automatically to the focal-distance value you configured.

Manual Method (Focus Gauge)

In the manual method, you operate the elevator table by hand and set the focus using the focus gauge.

This allows you to focus more accurately than with autofocus.



- Focus gauge -

<Adjustment method>

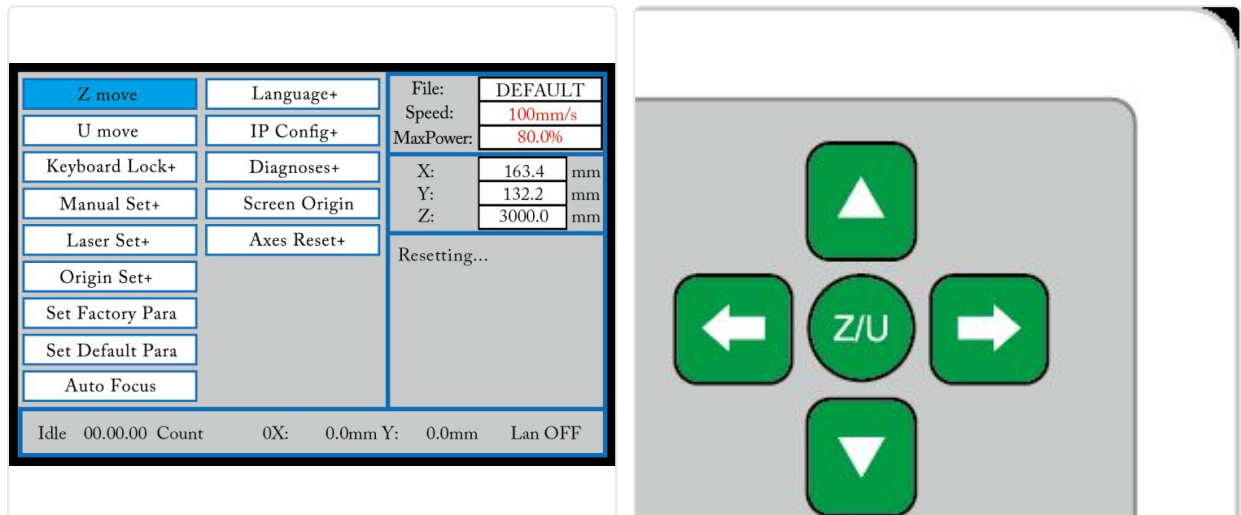
Insert the focus gauge between the laser head and the workpiece.

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

- Operation panel - (Insert the focus gauge / Press)

Select "Z move" and press the left/right arrow keys on the operation panel; the elevator table moves up and down.

- Operation panel screen - (Up / Down)



Adjust until the focus gauge just grazes the workpiece (until the gauge just brushes against it).

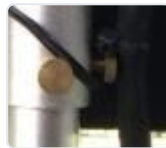
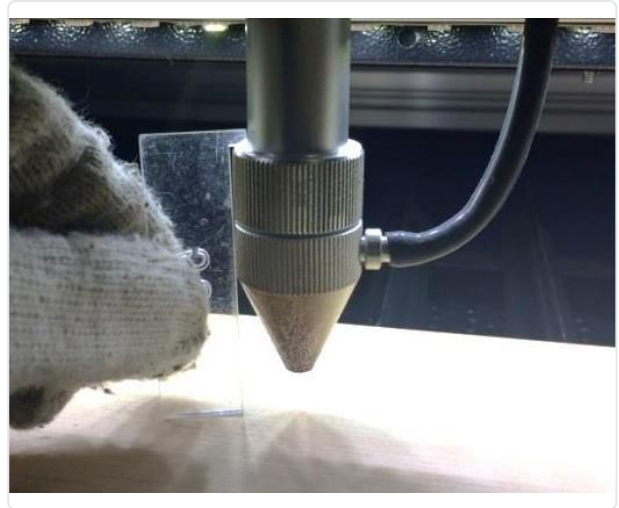
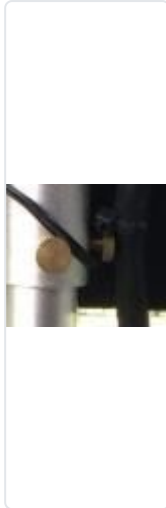
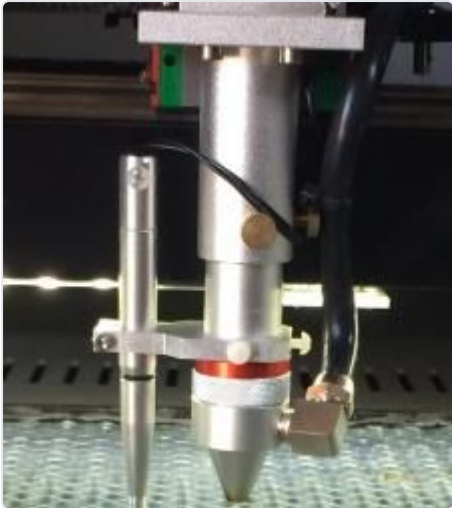
When Using the Cutting Table

When the cutting table is in use, the elevator table cannot be raised or lowered. You must set the focus manually (this differs from the normal manual adjustment method).

<Adjustment method>

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

Turn counterclockwise to loosen, clockwise to tighten.



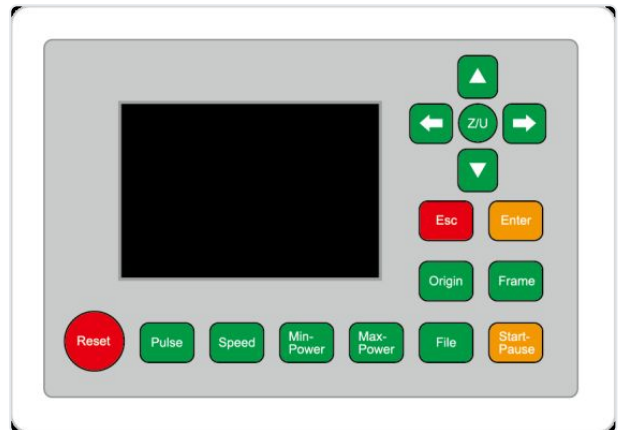
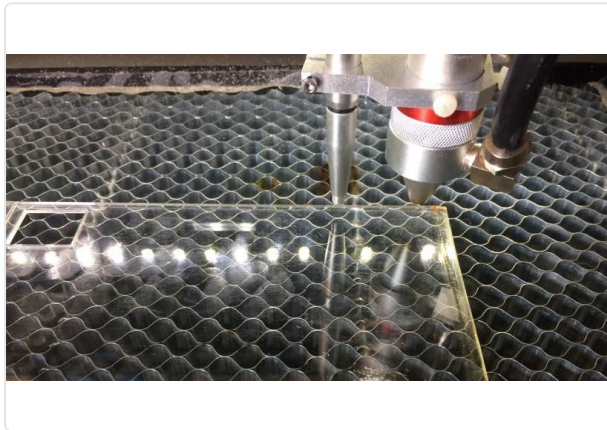
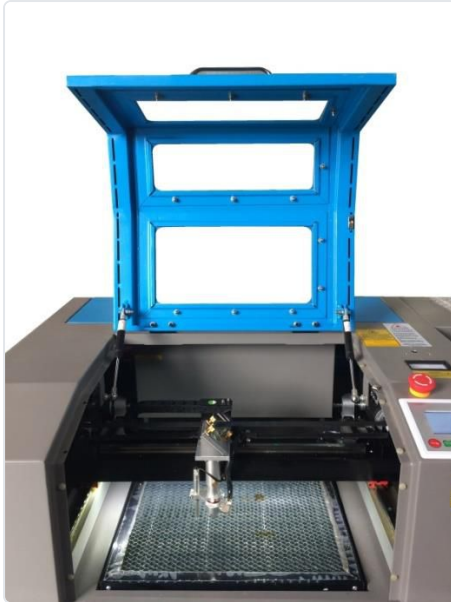
After loosening the screws, insert the focus gauge in the gap, adjust the height until the gauge just lightly rubs, and then tighten the screws.

Once the height has been set with the focus gauge, tighten the screws.

6.3 Cover

Once the preparations are complete, close the top lid.

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



6.4 Power for External Equipment

Confirm that the automatic water chiller, air compressor, and exhaust blower are all switched ON.

6.5 Starting the Job

With the preparations complete, start processing. In this example we will process using the "logical origin" method.

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

Move the laser head with the arrow keys, then press "Origin" to set the origin.

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



When the job is finished, the laser machine emits a beep. Open the cover and remove the processed material.

6.6 Processing Result

The processing result is shown below.



Processing time	5:41
Speed	200
Max. power	15
Min. power	15
Scan interval	0.025
Scan mode	Horizontal bidirectional

7. Processing Precautions

Warning: When processing at high laser power and very low speed — for example, when cutting thick acrylic — the acrylic material may catch fire. Always keep the job under constant observation while working, and watch out for fire.

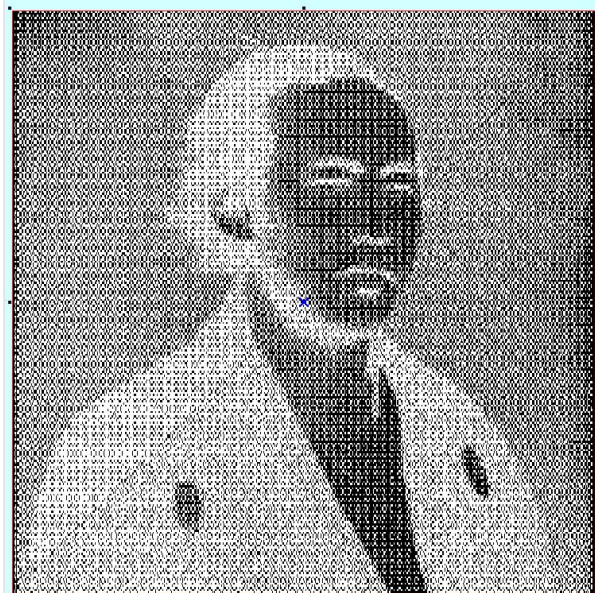
8. Other Notes

In this work example, Adobe Photoshop was used for halftoning (dithering) the image.

Image halftoning is also possible in RDWorksV8, but the processing quality may be lower than with Photoshop, so we recommend performing the image processing in Photoshop.

For reference, the image-processing results and engraving results obtained with Photoshop and with RDWorksV8 are shown below.

(Reference) Image-Processing Results and Engraving Results with Photoshop and RDWorksV8



Adobe Photoshop

Image processing: Halftone Screen	
Frequency	60 lines/inch
Angle	45 degrees
Shape	Round

Engraving settings	
Speed	200
Power	15%
Scan interval	0.025
Bidirectional engraving	Yes

RDWorksV8

Image processing: Image halftoning	
Size	1
Scan interval	0.1

Engraving settings (same as above)	
Speed	200
Power	15%
Scan interval	0.025
Bidirectional engraving	Yes