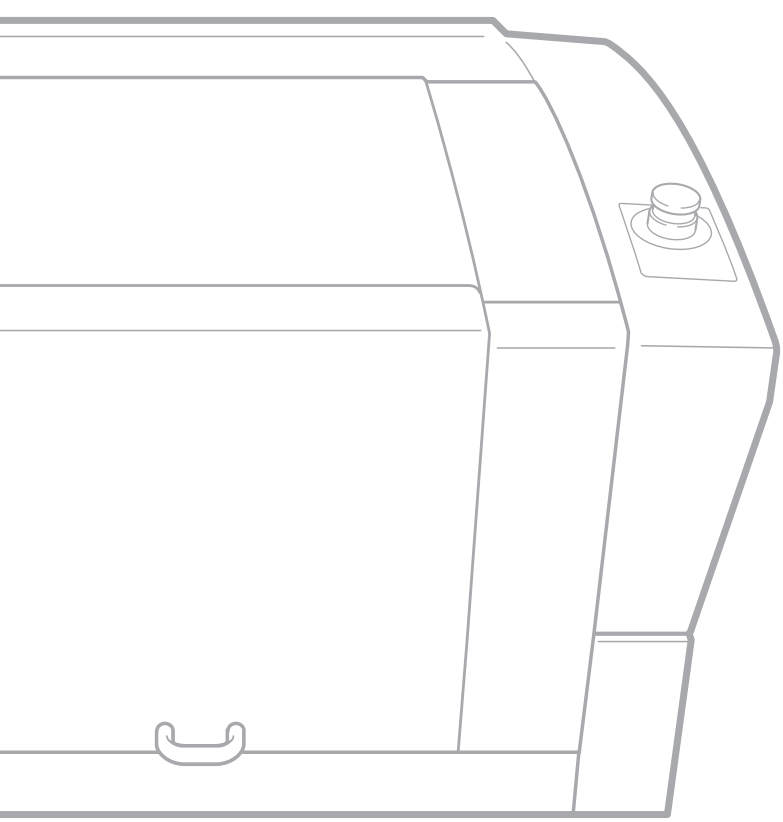
DGSHAPE

DE-3

DGSHAPE ENGRAVER

User's Manual



For the latest information regarding this machine (including manuals), see the DGSHAPE Corporation website (http://www.dgshape.com/).

- To ensure safe use with a full understanding of this machine's performance, please be sure to read through this manual completely.
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Contents

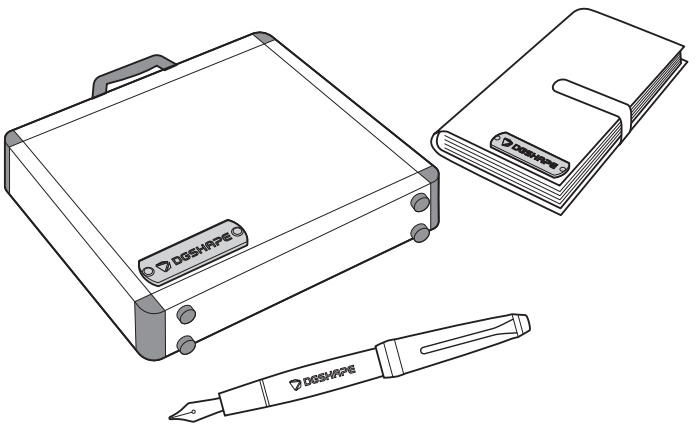
http://www.dgshape.com/

Chapter 1 Getting Started

About This Machine

Features of This Machine

This machine is a desktop engraving machine. It can be used in a variety of applications such as making personalized gifts and accessories by engraving names and creating signboards and industrial products.



- **Accommodates various engraving methods**

  This machine achieves expressive, high-quality engraving of a wide range of types, from contouring and fill, to hollowing and scribing.

- **Outstanding basic performance**

  The spacious operating area measuring 305 × 230 × 40 mm (W × D × H; 12.0 × 9.1 × 1.6 in.) and the high-speed spindle that turns at up to 20,000 rpm make for rapid engraving.

- **Preview function for preventing failures**

  You can confirm the engraving area in advance using the laser pointer. By confirming which area of the workpiece will actually be engraved in advance, you can perform engraving on any location you want.

- **Designed for ease of use**

  You control machine operation using a handy panel that is separate from the machine. This lets you control the machine from a location affording a clear view of the workpiece and tool. You can also make settings for the machine simply and easily while viewing the display screen on the handy panel.

- **Automatic Z control feature**

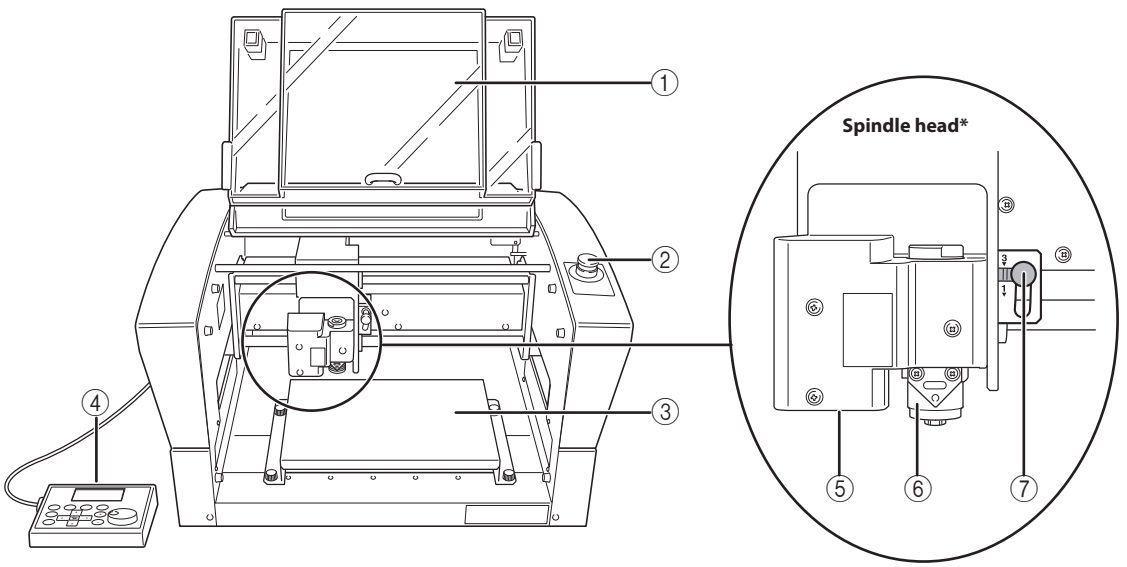
  The machine offers an automatic Z control feature that makes possible engraving at a uniform depth, even on workpieces with wavy surfaces.
  (Trackable undulation height: gentle undulations of about 1 mm (0.04 in.))

- **High levels of safety**

  A front cover and an emergency stop button are standard features of the machine.

Part Names and Functions

Front and Interior

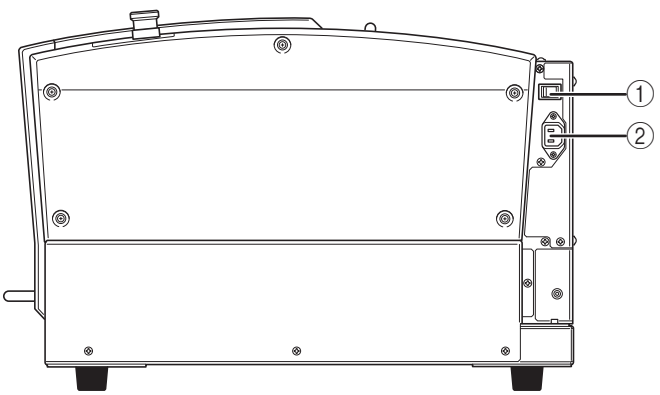


* In this document, the mechanisms around the spindle unit, including the spindle motor, are called the "spindle head." Also, the rotary-axis area inside the spindle unit is called the "spindle."

No.	Part	Overview
①	Front cover	To ensure safety, opening this during engraving or spindle rotation causes an emergency stop to occur.
②	Emergency stop button	Press this in an emergency to interrupt this machine's power supply. ☞ P. 13 "Emergency Stop to Ensure Safety"
③	Workpiece table	The workpiece to be engraved is mounted on this table.
④	Handy Panel	This is used to perform tool movement and other machine operations, and to make various settings. ☞ P.8 "Handy Panel"
⑤	Laser pointer	Laser irradiation is applied from here.
⑥	Spindle unit	Install the tool here.
⑦	Lock lever	This locks or unlocks the spindle head. ☞ P. 62 "Setting the Lock Lever"

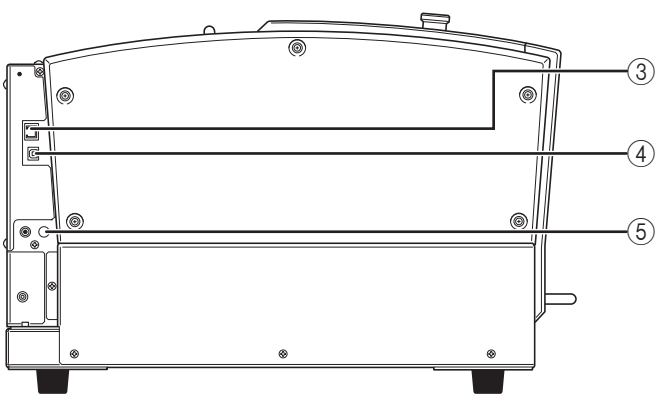
Side

Right Side



No.	Part	Overview
①	Power switch	This switches this machine's power on or off. ☞ P.16 “Switching the Power On or Off”
②	Power cord connector	This is for connecting a power cord.

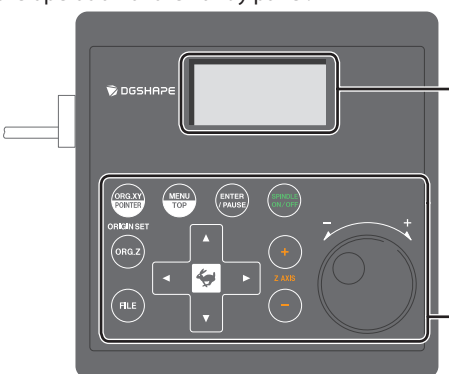
Left Side



No.	Part	Overview
③	LAN connector	This is for connecting a LAN cable. ☞ Setup Guide "Connecting the LAN Cable"
④	USB connector	This is for connecting a USB cable. ☞ Setup Guide "Connecting the USB Cable"
⑤	Expansion port	This is a connector for external equipment. ☞ P. 152 “Expansion Port”

Handy Panel

This is used to perform tool movement and other machine operations, and to make various settings. Close the front cover, then perform the operation of the handy panel.



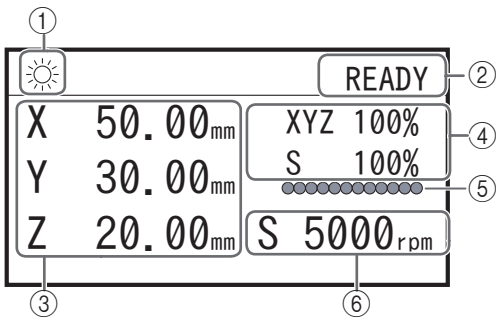
Display screen
Menus, messages, etc. are displayed here.
☞ P.9 “Viewing the Handy Panel Screen”

Operation button
For details, see table below.

Operation button		Functional overview	Notation used in this document
MENU TOP	**Menu/Top**	Pressing this changes the menu screen. Hold down [🐇] and press this button to return to the main screen.	[MENU/TOP]
ENTER / PAUSE	**Enter/Pause**	This executes a selected on-screen item or confirms a selected item or value. Pressing this during engraving pauses operation and displays the PAUSE menu.	[ENTER/PAUSE]
SPINDLE ON/OFF	**Spindle**	Holding this down for one second or longer while the spindle is stopped makes spindle rotation start. Pressing this during spindle rotation stops rotation.	[SPINDLE]
ORG.XY POINTER	**X/Y-axis Origin Setting/Laser Pointer**	This sets the reference point for the engraving position. Hold down [🐇] and press this button to switch on and off the irradiation from the laser pointer.	[ORG.XY/POINTER]
ORG.Z	**Z-axis Origin Setting**	This sets the reference point for the engraving position.	[ORG.Z]
FILE	**File**	Operates the data in the memory of this machine.	[FILE]
▲ ◄ ► ▼	**Move**	These move the tool forward and backward, and to the left and right.	[▲] [▼] [◄] [►]
+ Z AXIS −	**Z-axis Movement**	These move the tool up and down.	[+Z] [-Z]
🐇	**Feed/Shift**	Pressing a Movement or Z-axis Movement button while holding down this button makes the tool move rapidly. This is also used as a shift key by pressing it at the same time as other buttons.	🐇
− +	**Dial**	This adjusts the movement of the tool and the number of rotations of the spindle. You use this to select items and change settings on the menu screen.	[Dial]

Viewing the Handy Panel Screen

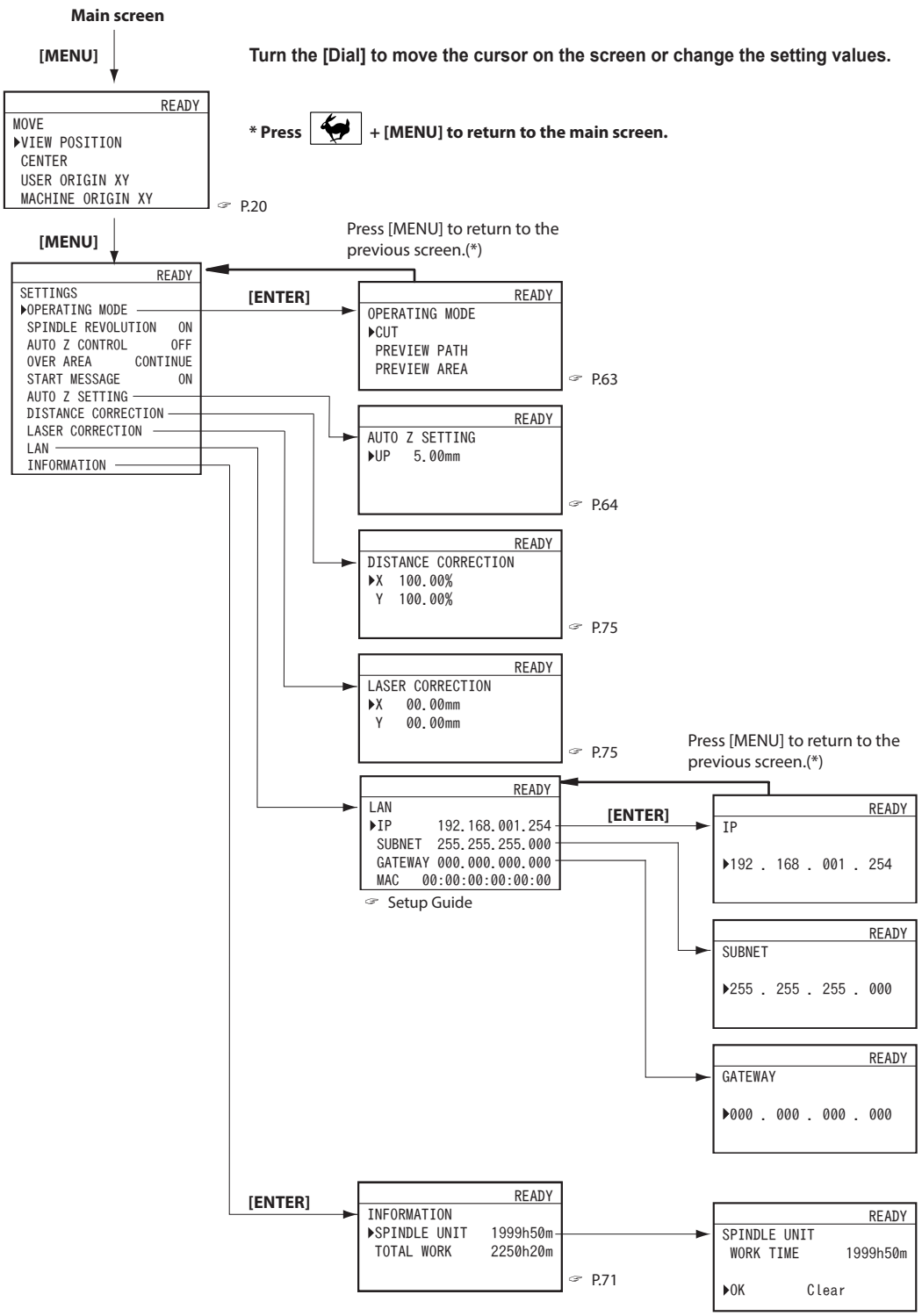
(Main screen)



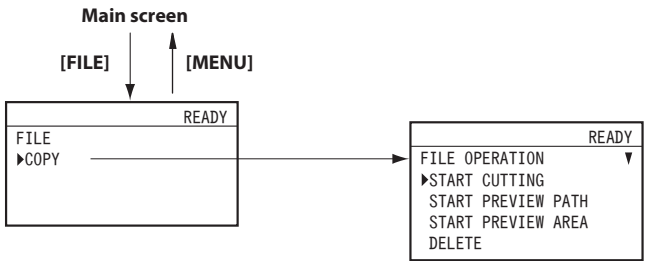
No.	Part	Overview
①	**Laser pointer on/off**	When the laser pointer function is turned on, this icon appears. When the laser pointer function is turned on, the current values of the laser pointer are displayed on the handy panel.
②	**Status display**	Displays the status of the machine such as [READY], [BUSY], and [PAUSE].
③	**Current values of the tool/laser pointer**	When the laser pointer function is off, this displays the current values of the tool seen from the user origin. When the laser pointer function is on, this displays the current values of the laser pointer seen from the user origin. ☞ P. 39 "Step 2: Setting the XY Origin"
④	**Override**	Displays the ratio of change (unit: %) relative to the present feeding speed (XYZ) and the spindle rotating speed (S). The override setting is only displayed during engraving.
⑤	**Spindle load**	Indicates the increase in load as the gauge increases to the right.
⑥	**Number of rotations of the spindle**	Displays the number of spindle rotations per minute.

Menu List

Main Menu

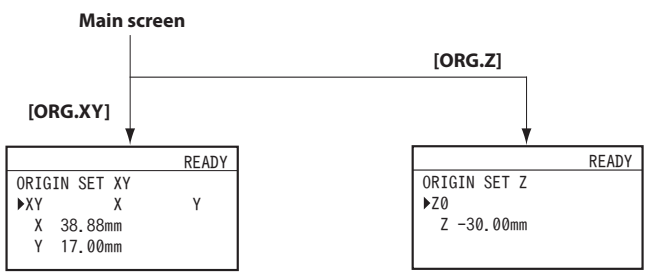


File Menu



☞ P.123

Origin-setting Menu



☞ P.39
☞ P.100
☞ P.108

- **Turn the [Dial] to move the cursor on the screen.**
- **Use [▲], [▼], [◄], [►], [+Z], and [–Z] to change the settings.**
- **Press [MENU] to return to the main screen.**

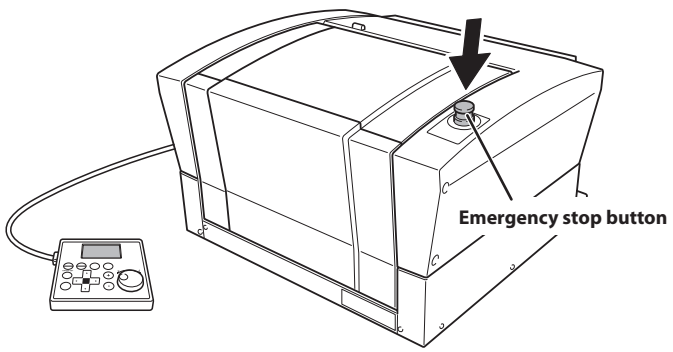
Chapter 2 Basic Operation

Emergency Stop to Ensure Safety

How to Perform an Emergency Stop

Procedure

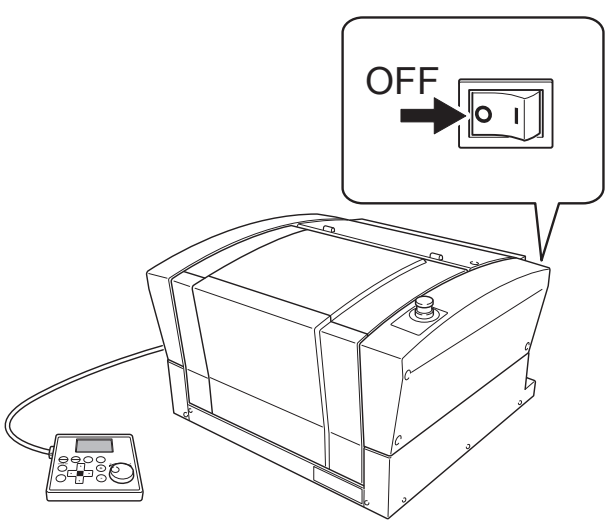
Press the emergency stop button.
Operation stops immediately.



Canceling an Emergency Stop

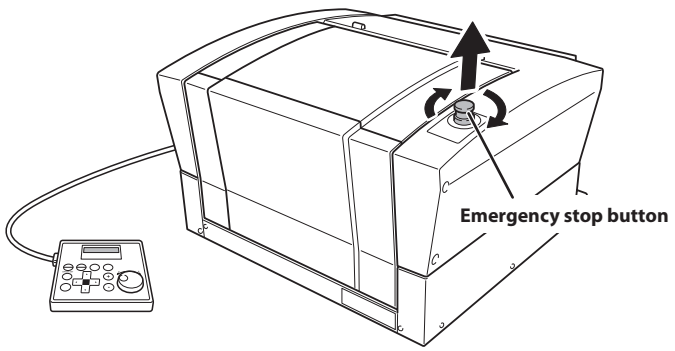
Procedure

1 **Switch off the power switch.**

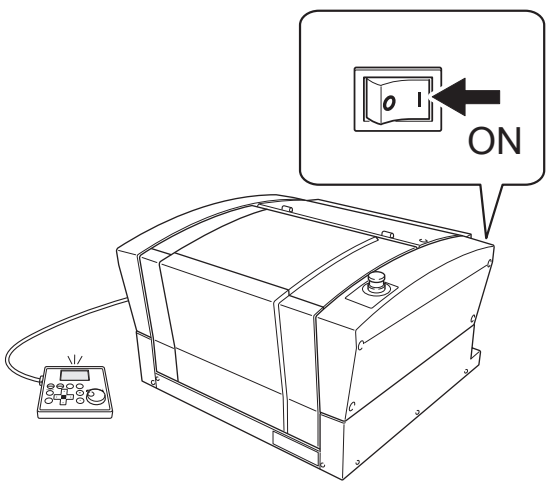


2 **Turn the button in the direction of the arrows.**

The button goes up, and the emergency stop is canceled.

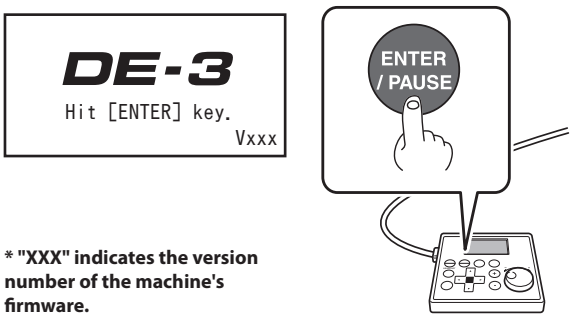


3 **Switch on the power switch.**



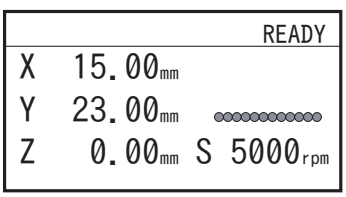
4 When the screen shown below appears after approximately three seconds, press [ENTER/ PAUSE].

The spindle head moves to the left of the back of this machine (this movement at the machine's startup is called the "initial operation").



*** "XXX" indicates the version number of the machine's firmware.**

When the initial operation is complete, the main screen appears.



Switching the Power On or Off

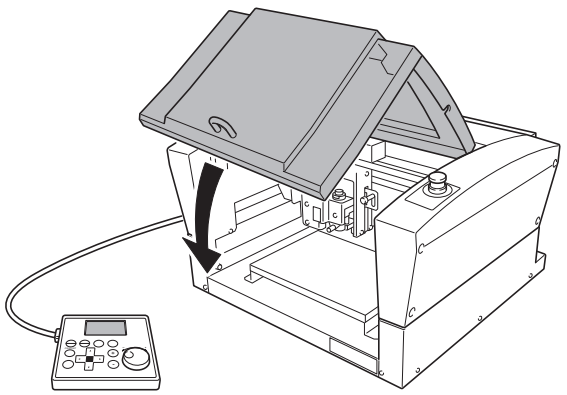
Switching the Power On

When the machine is connected to a computer, install the driver, and then turn on the power.

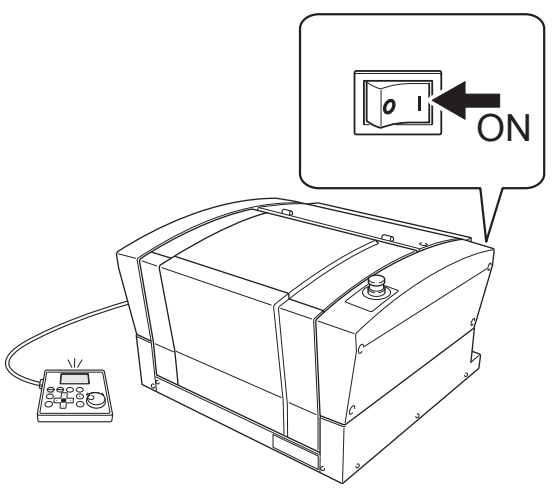
☞ Setup Guide "Installing the Software"

Procedure

1 **Close the front cover.**



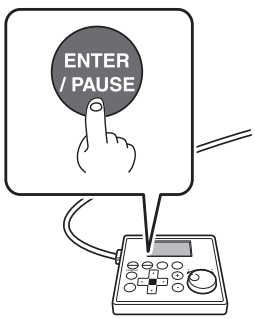
2 **Switch on the power switch.**



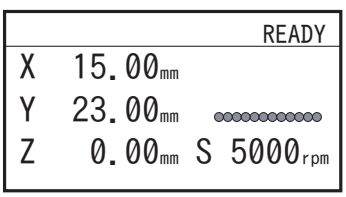
3 When the screen shown below appears after approximately three seconds, press [ENTER/PAUSE].

The spindle head moves to the left of the back of this machine (this movement at the machine's startup is called the "initial operation").

*** "XXX" indicates the version number of the machine's firmware.**



When the initial operation is complete, the following screen appears.



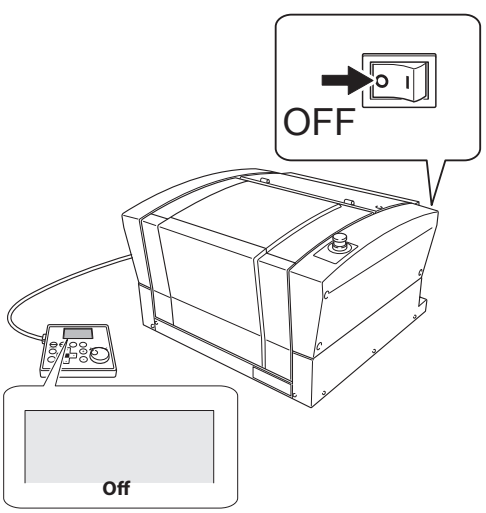
MEMO

The factory default setting for the language used for on-screen display is English. For the method to change the display language to Japanese, see the Setup Guide.

Switching the Power Off

Procedure

Make sure the machine is not in operation, then turn off the power switch.
The display screen on the handy panel goes dark.

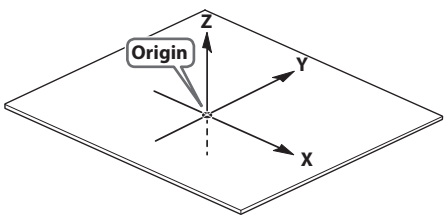


Moving the Tool

Terms of Tool Position

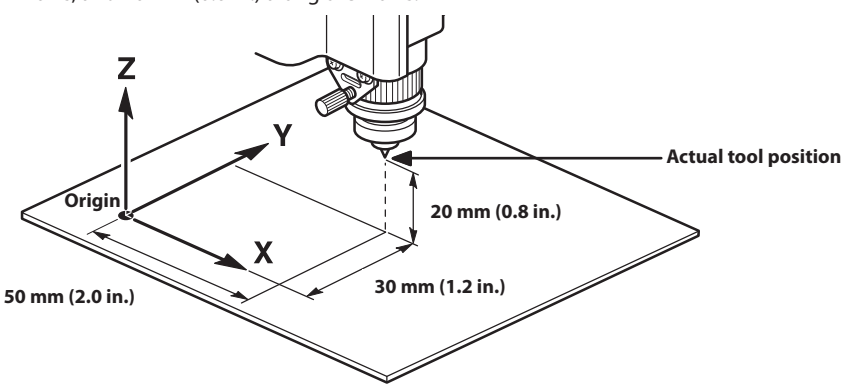
This manual uses the following terms to indicate the position of the tool.

Terms	Overview
Coordinates	These refer to the numerical values that indicate the position of the tool on each of the X/Y/Z axis. They are represented along with the axis, and the values are represented as positive or negative numbers. (Representation) X 35.00mm Axis: X Distance from the origin: 35.00mm The following are the two types of coordinates. • "Machine coordinates": Coordinates whose origin is a machine-specific origin (machine origin) that cannot be changed. • "User coordinates": Coordinates whose origin is an origin that can be changed by the user (user origin).
Origin	This refers to the origin ("0" position) of coordinates.
X-axis coordinate	This refers to the distance from the origin of the X axis direction (horizontal direction when the table is seen from directly above).
Y-axis coordinate	This refers to the distance from the origin of the Y axis direction (vertical direction when the table is seen from directly above).
Z-axis coordinate	This refers to the distance from the origin of the Z axis direction (height direction).

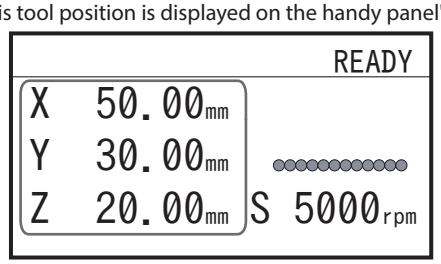


Display Example of Tool Position

➢ When the tool has moved from the origin by 50 mm (2.0 in.) along the X axis, 30 mm (1.2 in.) along the Y axis, and 20 mm (0.8 in.) along the Z axis.



This tool position is displayed on the handy panel's main screen as shown below.

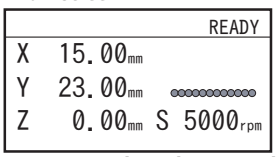


Moving to the Desired Position

When the screens shown below are displayed on the handy panel, you can move the tool manually using the [Dial] or the Movement buttons.

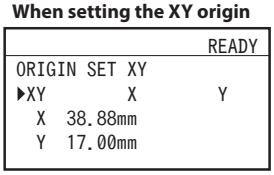
Screens on the handy panel

Main screen



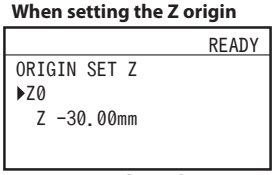
Movement along the X, Y, and Z axes with the [Dial] or Movement buttons

When setting the XY origin



Movement along the X and Y axes only with the Movement buttons

When setting the Z origin



Movement along the Z axis only with the Movement buttons

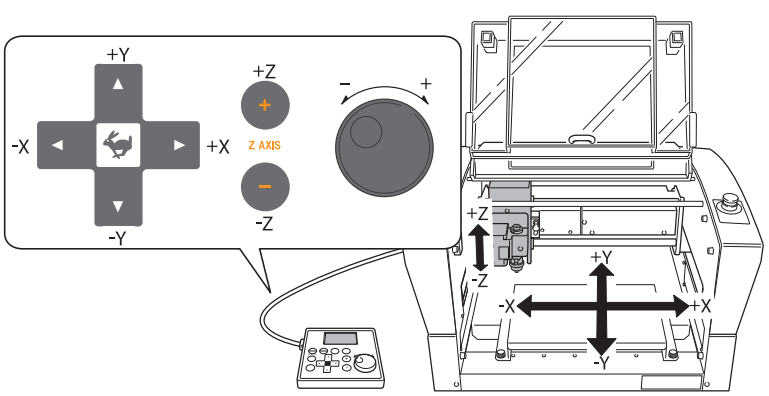
Procedure

1 Close the front cover and press [ENTER/PAUSE].

2 Press the Movement buttons or turn the [Dial].

- Each single press of [◄], [►], [▲], [▼], [+Z], or [-Z] performs movement by 0.01 mm (0.0004 in.).
- Holding down [◄], [►], [▲], [▼], [+Z], or [-Z] performs slow continuous movement.
- Holding down [🐇] while pressing and holding [◄], [►], [▲], [▼], [+Z], or [-Z] performs rapid continuous movement.
- Turning the [Dial] performs movement by 0.01 mm (0.0004 in.) at a time.
  The cursor moves to a different axis on the screen on the handy panel. You can change the axis to move by pressing the Movement buttons in advance.

Axis to move	Movement buttons
X	[◄] [►]
Y	[▲] [▼]
Z	[+Z] [−Z]



MEMO

This operation cannot be performed while the front cover is open.

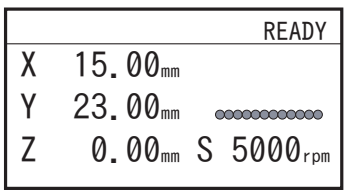
Moving to the Specified Position

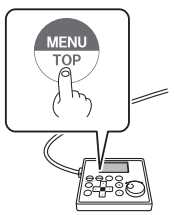
The spindle head automatically moves to the predetermined position through the operation of the handy panel.

Procedure

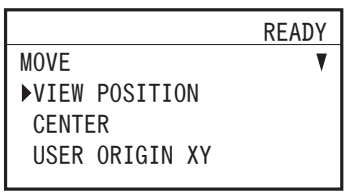
1 **Close the front cover and press [ENTER/PAUSE].**

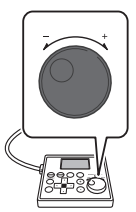
2 **On the main screen, press [MENU/TOP].**





3 **Turn the [Dial] and select the movement destination.**





MENU	Movement position explanation	Target for moving to a specified location	
		LP OFF	LP ON
VIEW POSITION	This is the left-back position on the workpiece table. You use it in situations such as when mounting or removing a workpiece, or when checking the state of the workpiece. In this manual, this position is called the "view position."	Tool tip	Tool tip
CENTER	This is the center position on the workpiece table. Use this function when replacing the tool, cleaning the spindle unit, etc.		LP
USER ORIGIN XY	This is the location where the X- and Y-axis coordinates are "0" in the user coordinates. This XY origin point can be changed. ☞ P. 39 "Setting the XY Origin"		LP
MACHINE ORIGN XY	This is the location where the X- and Y-axis coordinates are both "0" in machine coordinate. This XY origin point is fixed for this machine and cannot be changed.		LP

* LP: Laser pointer

4 **Press [ENTER/PAUSE].**

When movement by this operation is performed, to avoid contact with the workpiece, the tool or laser pointer first rises to the highest point along the Z axis, and then moves to the selected position.

5 **Press [MENU/TOP] several times to return to the main screen.**

Pausing and Aborting

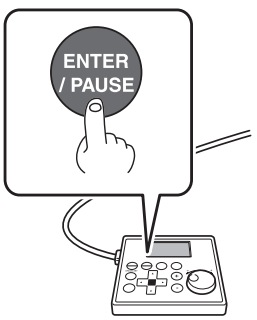
Pausing and Resuming Engraving

This pauses engraving through operation using the handy panel. This also makes it possible to resume engraving at the paused position after an operation such as moving the tool to check the status of the workpiece.

Procedure

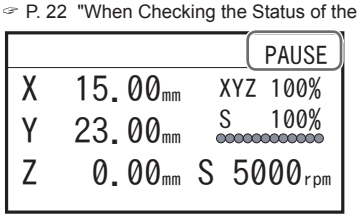
1 While operation is in progress, press [ENTER/PAUSE].

The tool moves to the upper limit of the Z axis, and then rotation stops.



The following window is displayed.

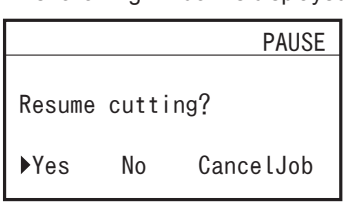
☞ P. 22 "When Checking the Status of the Workpiece by Moving the Tool"



2 If the front cover is open, close it, and then press [ENTER/PAUSE].

3 Press [ENTER/PAUSE].

The following window is displayed.



4 Turn the [Dial] and select [Yes].

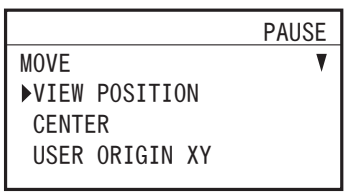
5 Press [ENTER/PAUSE] to confirm.

The main screen appears again and engraving resumes.

When Checking the Status of the Workpiece by Moving the Tool

Procedure

1 **Press [MENU/TOP] several times to display the following screen.**



2 **Select [VIEW POSITION] using the [Dial].**

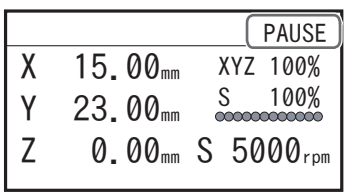
3 **Press [ENTER/PAUSE] to confirm.**

The tool moves to the view position at the left side of the back.

☞ P. 20 "Moving to the Specified Position"

4 **Press [MENU/TOP] several times to return to the main screen.**

The main screen in the paused state appears again.

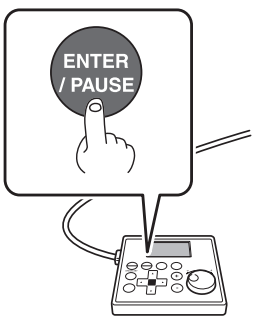


Aborting Engraving

Procedure

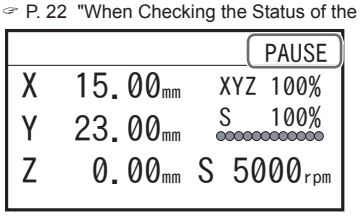
1 While operation is in progress, press [ENTER/PAUSE].

The tool moves to the upper limit of the Z axis, and then rotation stops.



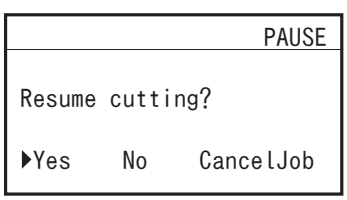
The following window is displayed.

☞ P. 22 "When Checking the Status of the Workpiece by Moving the Tool"



2 Press [ENTER/PAUSE].

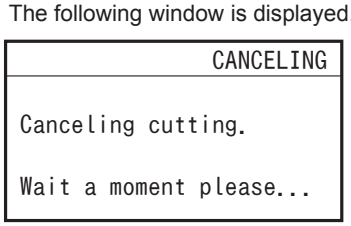
The following window is displayed.



3 Turn the [Dial] and select [CancelJob].

4 Press [ENTER/PAUSE] to confirm.

The following window is displayed.



Chapter 3 Basic Engraving Methods

Checks and Preparation before Engraving

Checking the Flow of Engraving Operation

P. 25 "Checks and Preparation before Engraving"

Check the conditions, material and tool required to start engraving.

P. 26 "Checking Engravable Workpieces"

P. 27 "Determining the Item to Create and Required Material and Tool"

↓

P. 28 "Creating Engraving Data"

Create engraving data using Dr. Engrave Plus.

Determine the design and draw

P. 35 "Setting the Engraving Parameters"

↓

P. 38 "Starting Engraving"

Set the workpiece and tool, and send the engraving data to this machine.

P. 38 "Step 1: Setting the Workpiece"

P. 39 "Step 2: Setting the XY Origin"

P. 41 "Step 3: Installing a Character Cutter/Parallel Cutter"

P. 51 "Step 4: Checking the Engraving Parameters"

P. 54 "Step 5: Starting Engraving"

Checking Engravable Workpieces

Material

- Acrylic
- Modeling wax
- Aluminum
- Brass
- Wood
- Chemical wood

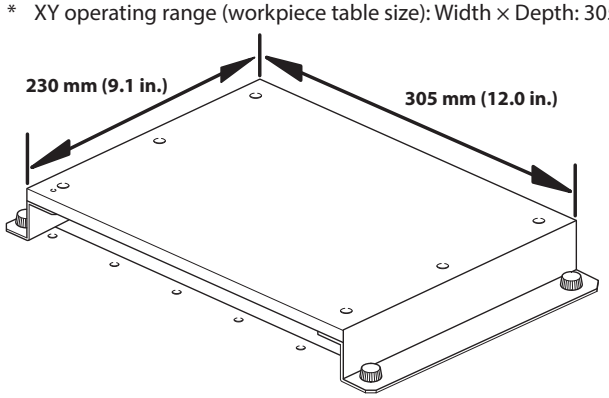
etc.

Size

Size that can be stably fixed in place.

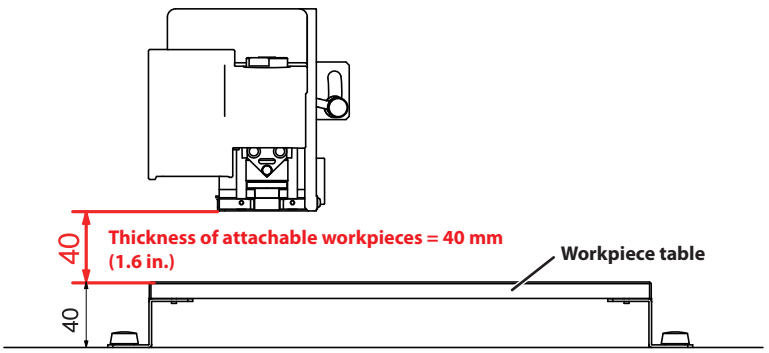
On this machine, an adhesive sheet is used to fix the workpiece in place. The workpiece can be large and can stick out of the workpiece table, but you must be able to stably fix it in place.

* XY operating range (workpiece table size): Width × Depth: 305 × 230 mm (12.0 × 9.1 in.)



Thickness

The thickness must be 40 mm (1.6 in.) or less whereby the height for the tool to avoid the workpiece can be maintained during engraving.



* The thickness of workpiece that can actually be engraved is restricted by the length of the installed tool, the location where the nose unit is installed and the cut-out amount, and is smaller than the range indicated above.
* When nose unit is used: The maximum distance between the workpiece table and the tip of the nose unit is 38 mm (1.5 in.).

Shape

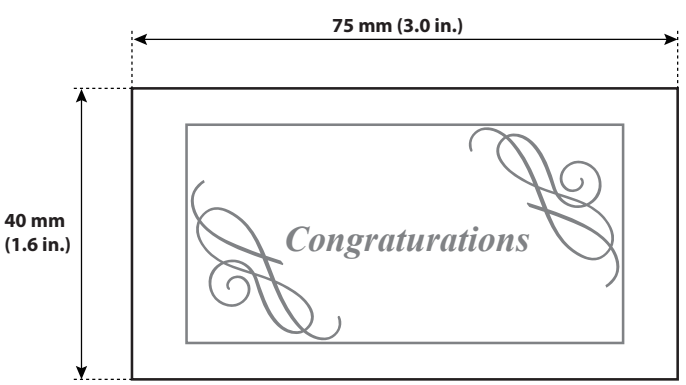
The surface to be engraved is level.

* When nose unit is used: Gentle undulations of less than 1 mm (0.04 in.) (trackable undulation height).

Determining the Item to Create and Required Material and Tool

In this example, you will create a celebration gift using the following material and tool.

- Material (workpiece): Wood
- Tool: Character cutter ø3.175 (ZEC-A2025)



Creating Engraving Data

Step 1: Starting Dr. Engrave Plus

Procedure

Windows 10

1. **Click the [Start] button.**
2. **Click the [Dr. Engrave Plus] icon under [DGSHAPE Dr. Engrave Plus].**

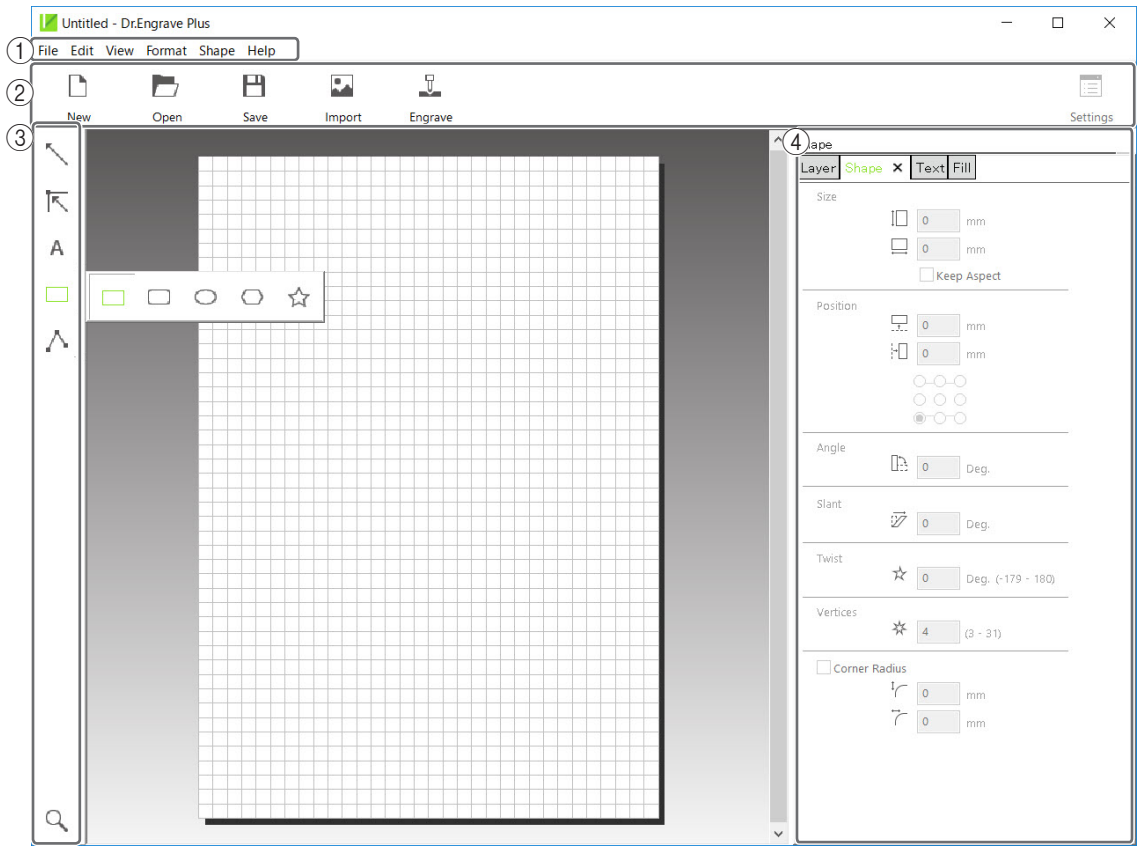
Windows 8.1

1. **Click the [Start] screen.**
2. **On the [Apps] screen, click [Dr. Engrave Plus].**

Windows 7

1. **Click the [Start] button.**
2. **Click the [All Programs] (or [Programs]).**
3. **Click the [Dr. Engrave Plus] icon under [DGSHAPE Dr. Engrave Plus].**

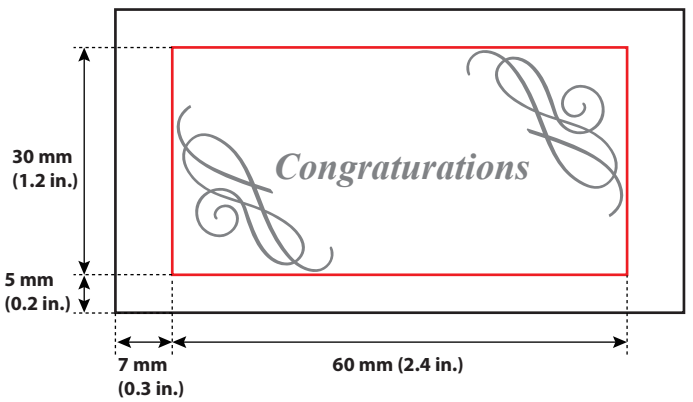
Dr. Engrave Plus Screen



No.	Name	Functional overview
①	Menu Bar	This runs the various functions for Dr. Engrave Plus.
②	Standard tool bar	Displays frequently used functions among the functions on the menu bar.
③	Shape tool bar	Displays functions related to drawing and editing of shapes.
④	Docking panel (operation panel)	This is used to configure mainly shape settings. You can integrate this into the main screen or separate it. You can also combine panels to create tabbed panels.

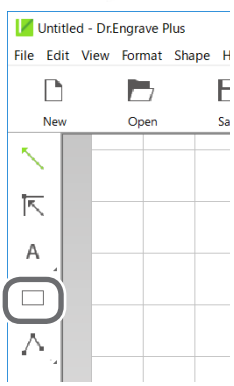
Step 2: Creating a Shape

Draw a rectangle.

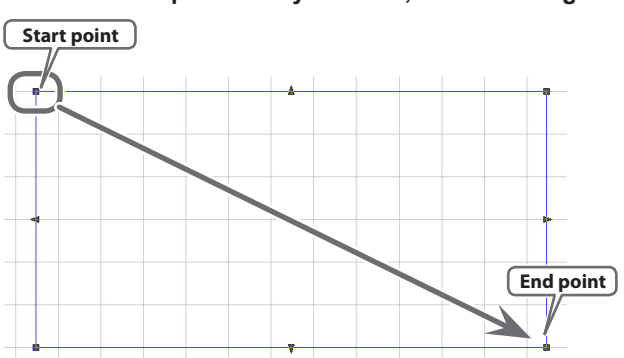


Procedure

1. Click .

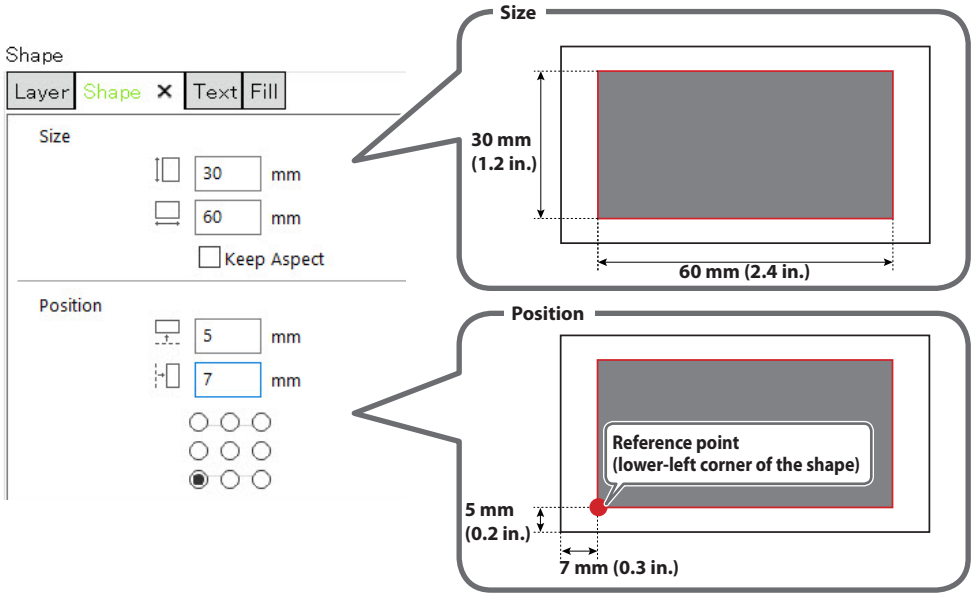


2. Click the start point at any location, and then drag it to the end point.



3 **Enter the [Size] and [Position] in the [Shape] panel.**

Enter the following values.



You can change or move the shape you drew to any size and position.

Step 3: Loading an Image

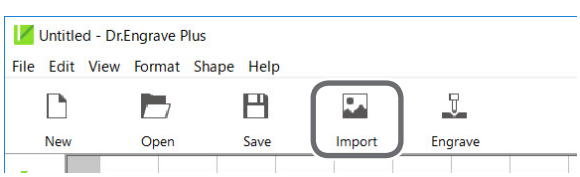
You can load the image you have prepared in advance, extract its contour and convert it into a line segment. For example, you can import logo data of a company or an organization, or illustration data for engraving. As an example, the procedure for loading an Adobe Illustrator file is explained in this section.

Data Formats That Can Be Imported (Extension)

- Adobe Illustrator version 7/8 files (ai/eps format)
  - * There are multiple limitations on Adobe Illustrator files. For details, see the Dr. Engrave Plus help.
    - ☞ Dr. Engrave Plus help ("Creating Objects" - "Importing an Existing Image File")
- Other image files (bmp/jpg/png format)

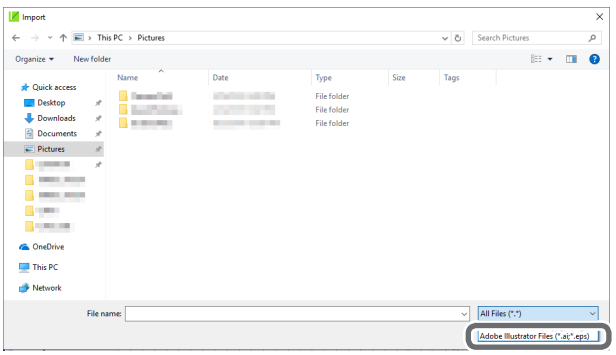
1. Select the image file.

1 **Click [Import].**



The [Import] window is displayed.

2 **From [File Type], select "Adobe Illustrator Files."**

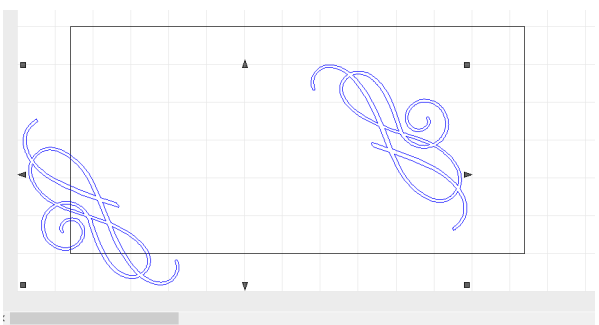


3 **Open [the drive on which Dr. Engrave Plus is installed]* - [ProgramData] - [DGSHAPE Corporation] - [Dr. Engrave Plus] - [Sample] and select "Gift_DE3.ai."**

* This is most commonly the [C drive] or [D drive].

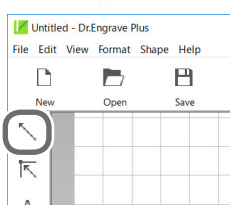
4 **Click [Open].**

The selected image is placed on the screen.



2. Position an image file.

1 **Click**  **.**

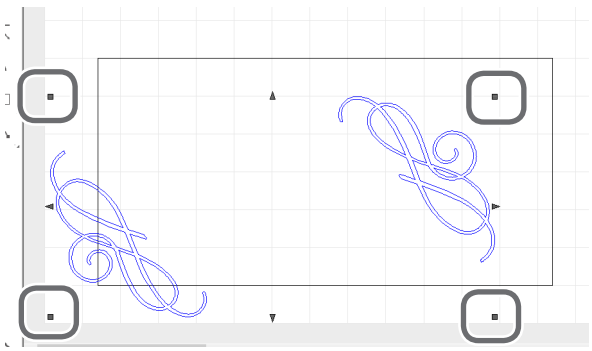


2 **Click the image you have imported.**

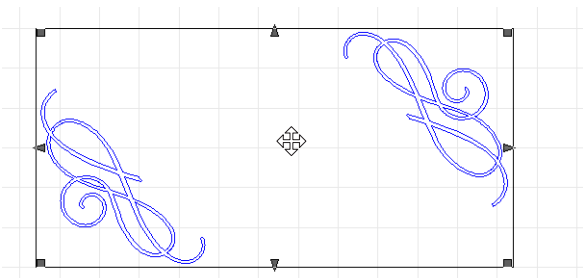
■ appears on the four corners of the image.

3 **Drag ■ to adjust the size.**

To enlarge/reduce the size with the aspect ratio fixed, hold down the [Shift] key as you drag it.



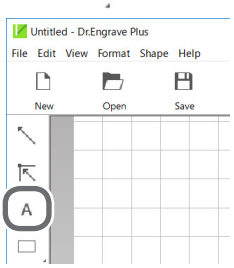
4 **Drag the image to move it to the target position.**



Step 4: Entering Text

1. Enter text and determine its font, etc.

1 **Click A.**

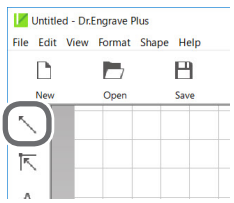


2 **Click any position on the screen.**

You will change the position later on. At this point, click a position you want.

3 **Enter text, such as name, using the keyboard.**

4 **Click** .

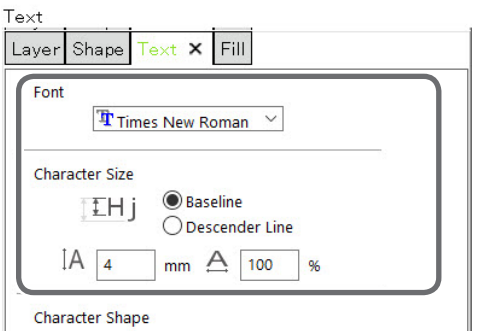


5 **Click the text that you entered.**

■ appears on the four corners of the image.

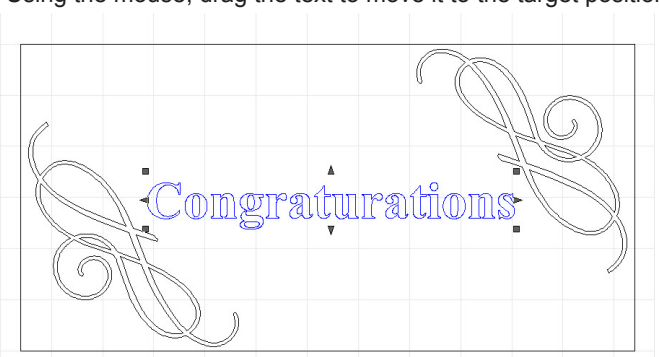
6 **Set the font, text size, etc. on the [Text] panel.**

Enter as follows:



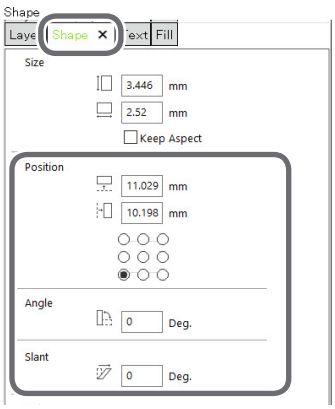
2. Position the text.

Using the mouse, drag the text to move it to the target position.



MEMO

You can set the text's position and slant in the [Shape] panel.

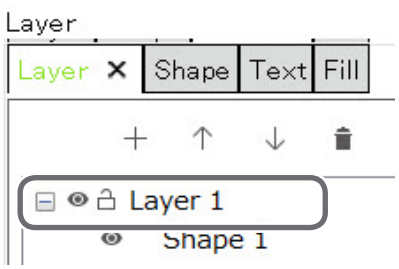


Step 5: Setting the Engraving Parameters

Set parameters such as the material to engrave, the tool, and the depth.

Procedure

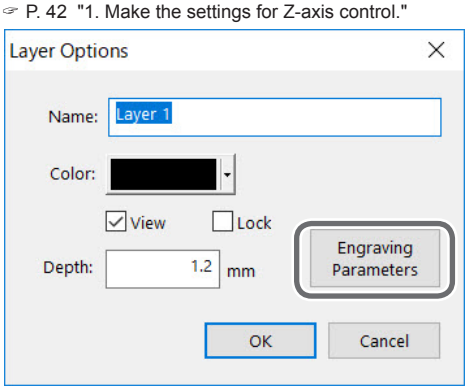
1. **Click the shape you are going to engrave.**
2. **Double-click the layer on which the shape to engrave is drawn on the [Layer] panel.**



3. **Click [Engraving Parameters].**

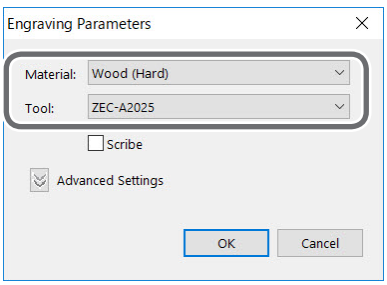
   Because the automatic Z control feature is used, there is no need to set the [Depth].

☞ P. 42 "1. Make the settings for Z-axis control."



4 **Select the [Material] and [Tool].**

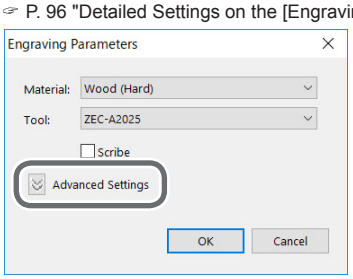
- **Material: Wood (Hard)**
- **Tool: ZEC-A2025**



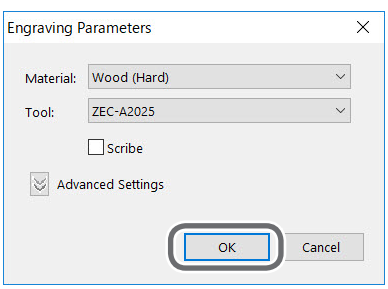
MEMO

The engraving parameters are set automatically according to the selected [Material] and [Tool].
To change the engraving parameters, click [Advanced Settings] and change the settings.

☞ P. 96 "Detailed Settings on the [Engraving Parameters] Screen"

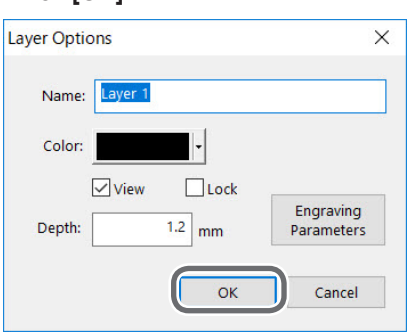


5 **Click [OK].**



The [Engraving Parameters] screen closes.

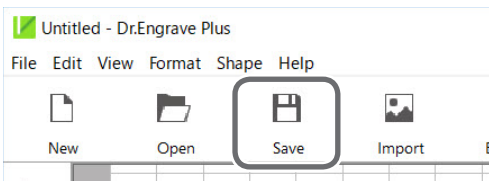
6 **Click [OK].**



Step 6: Saving Engraving Data

Procedure

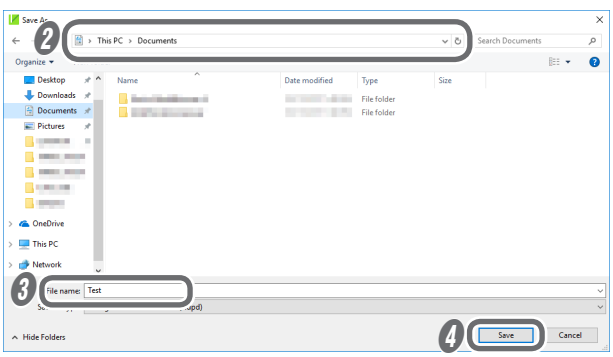
1. **Click [Save].**



2. **Specify where to save the file.**

3. **Enter the file name.**

4. **Click [Save].**



A file with the extension *.dpd is saved.

Starting Engraving

⚠WARNING **Keep open flame away from the work area.**
Cutting waste may ignite. Powdered material is extremely flammable, and even metal material may catch fire.

Step 1: Setting the Workpiece

⚠WARNING **Never inadvertently touch the computer or handy panel while performing this task.**
Unintended operation of the machine may lead to you being caught in the machine.

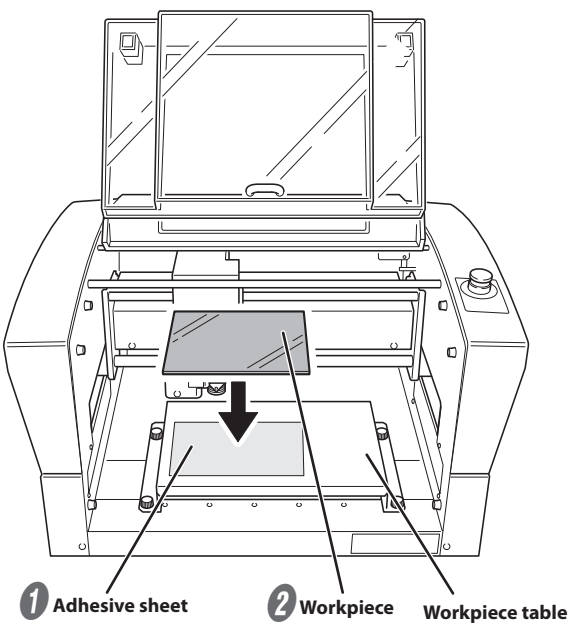
Procedure

1 **Set the adhesive sheet.**

Affix the adhesive sheet to the workpiece table.

2 **Set the workpiece.**

Place the workpiece on the adhesive sheet and press down on it from above.



MEMO

On this machine, you can use the optional center vise and T-slot table to secure the workpiece in place. For details on these optional items, contact your authorized DGSHAPE Corporation dealer or access our website (http://www.dgshape.com/).

Step 2: Setting the XY Origin

Set the X- and Y-axis coordinates, which will be the origin point of engraving. This position is called the "XY origin." On this machine, you can set the XY origin in any position within the operating range. Set this to match the engraving data and workpiece mounting position.

Procedure

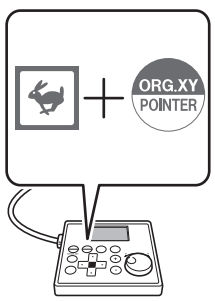
1 Close the front cover.

2 Press [ENTER/PAUSE].

When the initial operation is complete, the main screen appears.

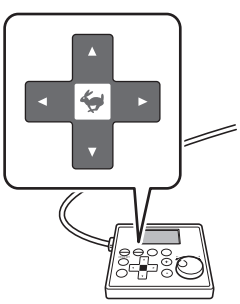
3 Hold down [🐇] and press [ORG.XY/POINTER].

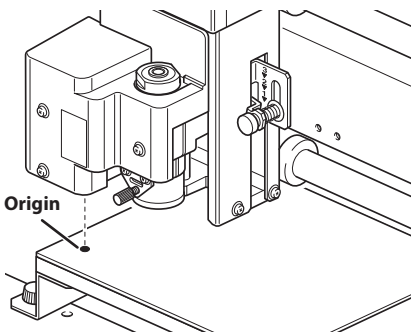
The laser pointer turns on.



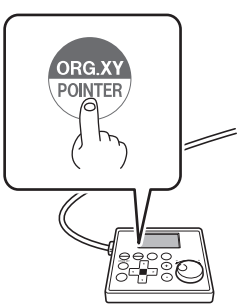
4 Press [◄], [►], [▲], and [▼] to move the laser pointer to the position you want to set as the XY origin.

☞ P. 19 "Moving to the Desired Position"

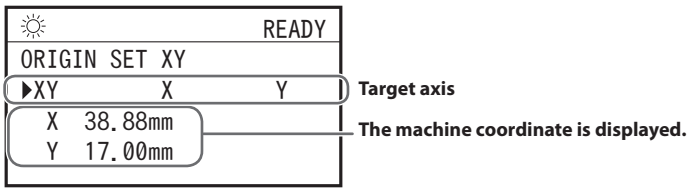




5 Press [ORG.XY/POINTER].



6 **Using the [Dial], select [XY] for the target axis.**

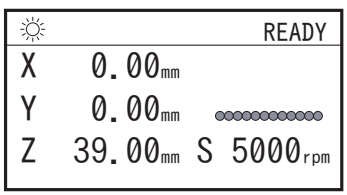


MEMO

You can set the origins of the X and Y axes separately by selecting [X] or [Y] for the target axis.

7 **Press [ENTER/PAUSE].**

The current value is set as the origin point, and you are returned to the main screen.



8 **Hold down**  **and press [ORG.XY/POINTER].**

The laser pointer turns off.

Step 3: Installing a Character Cutter/Parallel Cutter

Use the nose unit when engraving using a character cutter or parallel cutter.

☞ P. 83 "Nose Unit Overview and Precautions"

⚠WARNING **Never inadvertently touch the computer or handy panel while performing this task.**
Unintended operation of the machine may lead to you being caught in the machine.

⚠WARNING **Securely fasten the cutting tool and workpiece in place. After securing in place, make sure no spanners or other articles have been left behind inadvertently.**
Otherwise, such articles may be thrown from the machine with force, posing a risk of injury.

⚠CAUTION **Be careful around the cutting tool.**
The cutting tool is sharp. Broken cutting tools are also dangerous. To avoid injury, exercise caution.

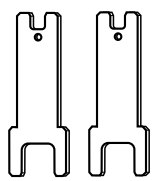
⚠CAUTION **The machine contains blades and other sharp components.**
Be careful not to touch the tool tip or any other sharp edges. Doing so may cause injury.

Items used in this procedure

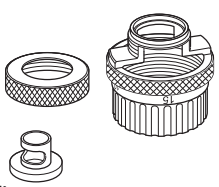
Character cutter
or
parallel cutter

Solid collet*1

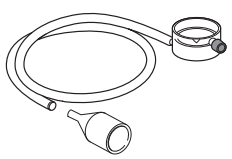
Hexagonal
screwdriver



Wrenches (2)



Nose unit*2



Vacuum adapter

*1 There are two types of solid collets. Use a solid collet that fits the diameter of the cutter that will be used. Collet for ø4.36 cutters is an optional item.

*2 Use a resin or metal nose cone. To use it selectively, refer to P. 44 "Assemble the nose unit." in the procedure.

Settings for this machine	
Automatic Z control	ON
Spindle rotation	ON
Lock lever position	1 or 2

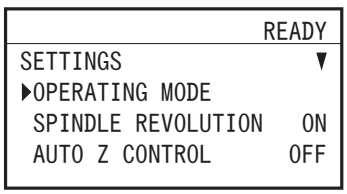
1. Make the settings for Z-axis control.

1 **If the front cover is open, close it.**

2 **Press [ENTER/PAUSE].**

When the initial operation is complete, the main screen appears.

3 **Press [MENU] several times to display the following screen.**



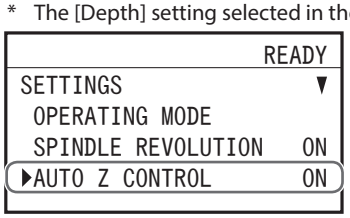
4 **Turn the [Dial] and select [AUTO Z CONTROL].**

5 **Press [ENTER/PAUSE].**

6 **Turn the [Dial] and select [ON].**

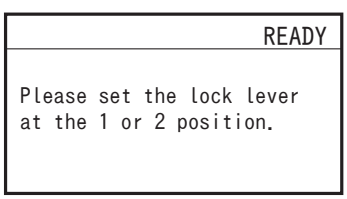
The machine automatically sets the Z-axis origin during engraving according to the height of the workpiece.

* The [Depth] setting selected in the software is disabled.



7 **Press [ENTER/PAUSE] to confirm.**

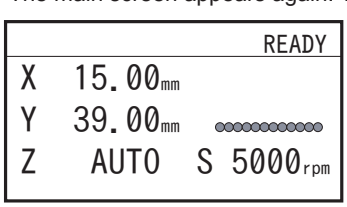
After the following message is displayed for three seconds, the previous screen appears again.



Important: Accurately perform P. 45 "3. Set the lock lever." later in this procedure.

8 **Press [MENU/TOP].**

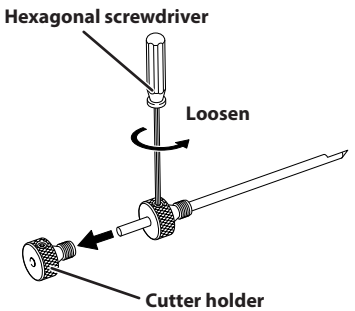
The main screen appears again. The Z-axis coordinate display changes to [AUTO].



2. Install the cutter holder, solid collet, and nose unit.

1 **Open the front cover.**

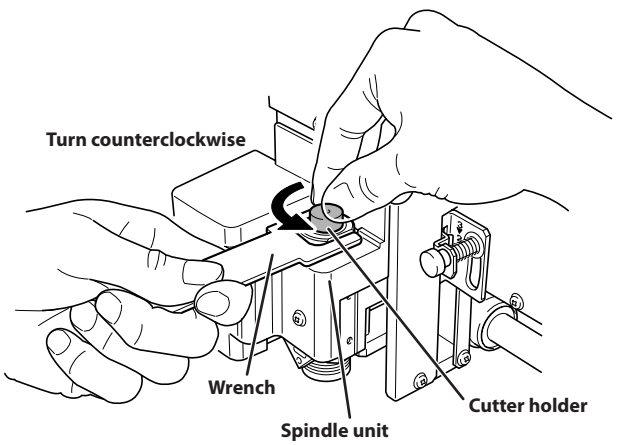
2 **Detach the cutter holder from the cutter.**



3 **Install the cutter holder on the spindle unit.**

While holding the spindle unit immobile with a wrench, tighten the cutter holder.

The cutter holder is reverse-threaded (that is, you turn it counterclockwise to tighten it). Be careful to turn it in the correct direction.



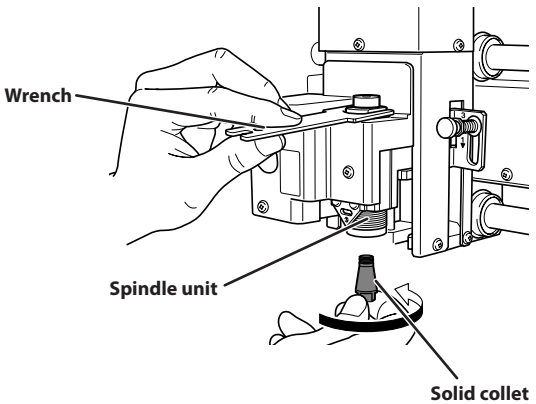
4 **Attach a solid collet that fits the diameter of the cutter.**

There are two types of solid collets. Use a solid collet that fits the diameter of the cutter.

For ø3.175 mm (0.125 in.)	For ø4.36 mm (0.17 in.) (Optional item)
	

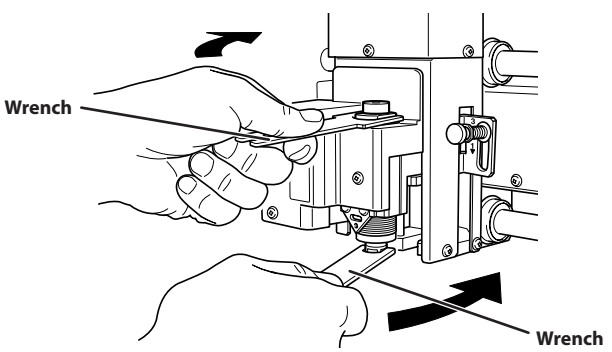
① **Temporarily tighten the solid collet.**

Insert the solid collet into the spindle unit from below while holding the spindle unit immobile with a wrench, and tighten temporarily.



② **Fully tighten the solid collet.**

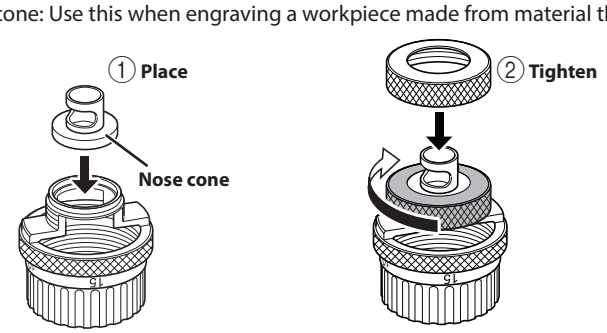
Using two wrenches, fully tighten the solid collet.



5 Assemble the nose unit.

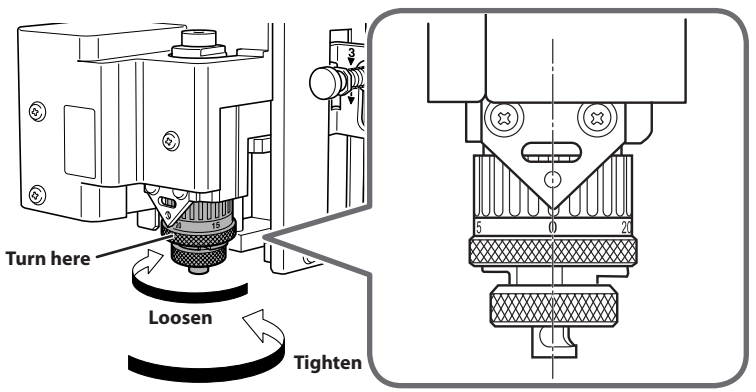
There is a resin nose cone and a metal one. Select one and assemble.

- Resin nose cone: Use this when engraving a workpiece made from material that easily scratches.
- Metal nose cone: Use this when engraving a workpiece made from material that hardly scratches.



6 **Attach the nose unit to this machine.**

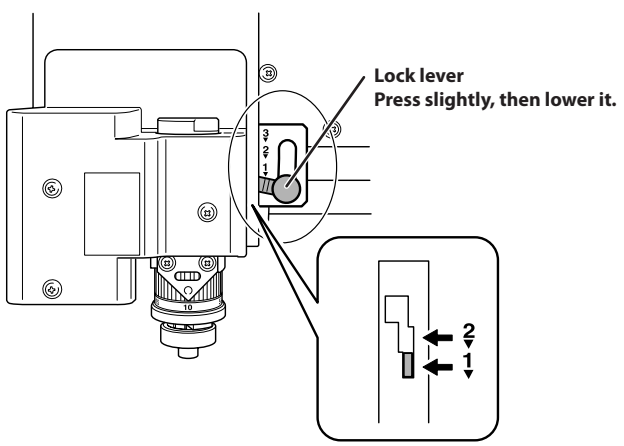
Tighten until it does not move, and then loosen about two rotations and set the scale to "0."



3. Set the lock lever.

Set the lock lever at 1 or 2 position.

For details on the setting position of the lock lever, see P. 62 "Setting the Lock Lever".



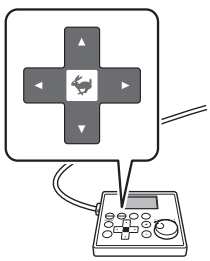
4. Install the cutter and set the engraving depth.

1 **Close the front cover.**

2 **Press [ENTER/PAUSE].**

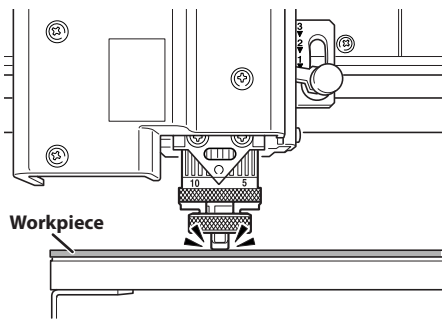
When the initial operation is complete, the main screen appears.

3 **Press [◄], [►], [▲], and [▼] to move the spindle head to the area above the workpiece.**



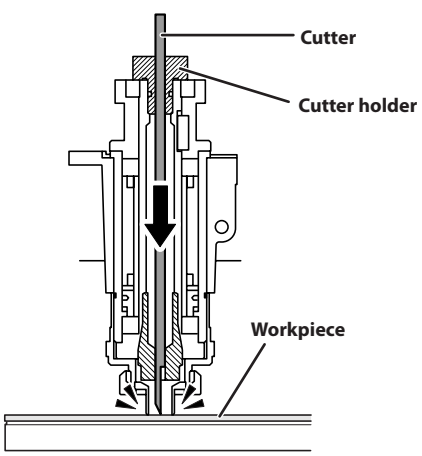
4 **Press [-Z] to lower the spindle head.**

When the tip of the nose unit touches the workpiece, descent automatically stops.



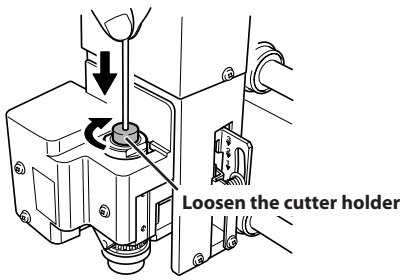
5 **Open the front cover.**

6 **Insert the cutter into the cutter holder and bring the tip of the cutter into contact with the workpiece.**



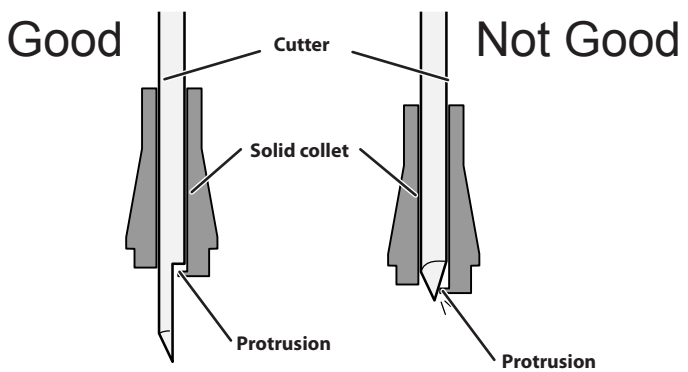
Point: If cutter insertion is difficult

If the cutter catches on the solid collet and is difficult to insert, loosening the cutter holder makes insertion easier. Note that inserting it forcibly may result in damage to the workpiece. After inserting the cutter, tighten the cutter holder again.



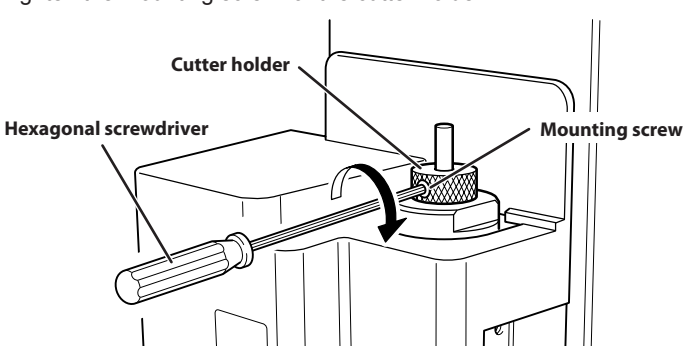
MEMO: When using a ø4.36 mm (0.17 in.) solid collet

Be careful to orient the cutter correctly. If insertion is difficult, try turning the cutter until it is smoothly inserted.



7 Secure the cutter in place.

Tighten the mounting screw for the cutter holder.



8 **Set the engraving depth.**

Adjust the amount of extension of the cutter after raising the cutter to prevent the workpiece from being scratched.

① **Close the front cover and press [ENTER/PAUSE].**

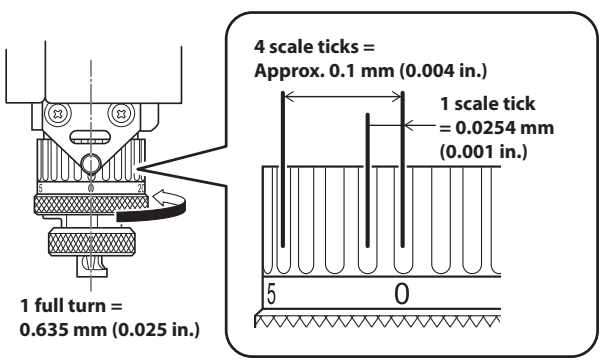
② **Press [+Z] to move the cutter to the upper limit of the z-axis.**

③ **Open the front cover.**

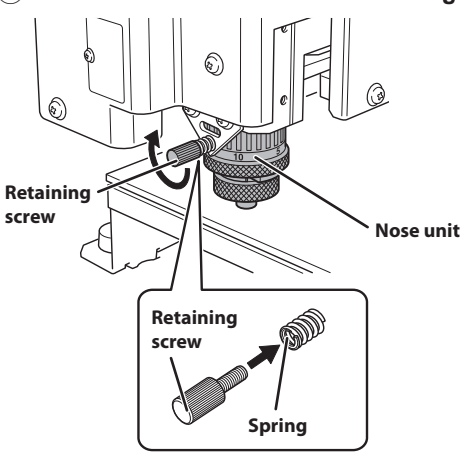
④ **Turn the scale of the nose unit to match the desired engraving depth.**

The amount of extension of the cutter is the engraving depth.

* The [Depth] setting selected in the software is disabled.



⑤ **Secure the nose unit with a retaining screw.**



9 **Close the front cover.**

10 **Press [ENTER/PAUSE].**

5. Attach the vacuum adapter.

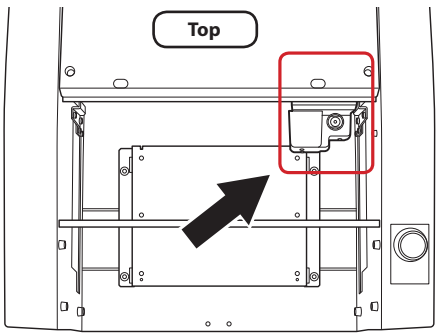
For precautions regarding attaching the vacuum adapter, see P. 58 "Attaching the Vacuum Adapter".

1 **Turn off this machine.**

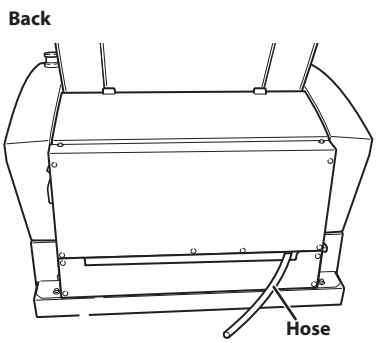
2 **Open the front cover.**

3 **Slowly move the spindle head by hand to the back of the workpiece table on the right side.**

Be careful not to apply strong impact.

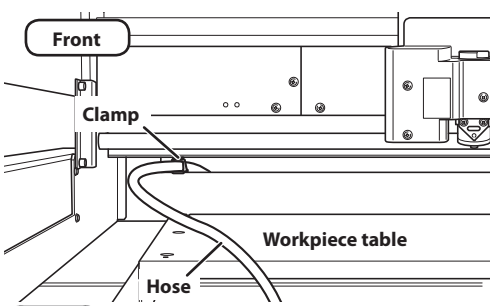


4 **Pass the end of the dust collection hose ("hose") from the front to the back of this machine.**

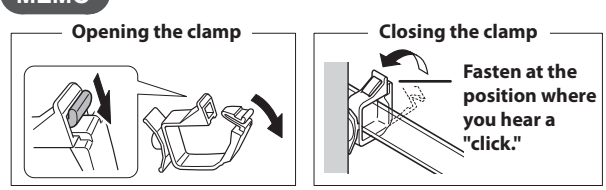


5 **Fasten the hose with the clamp close to the back of this machine.**

Fasten at the position of the retaining band on the hose.

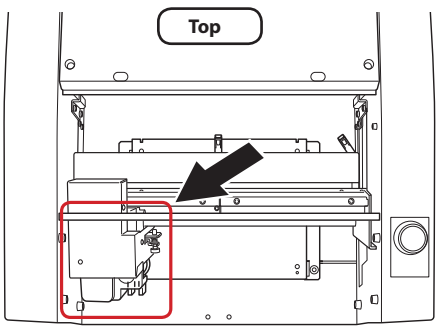


MEMO

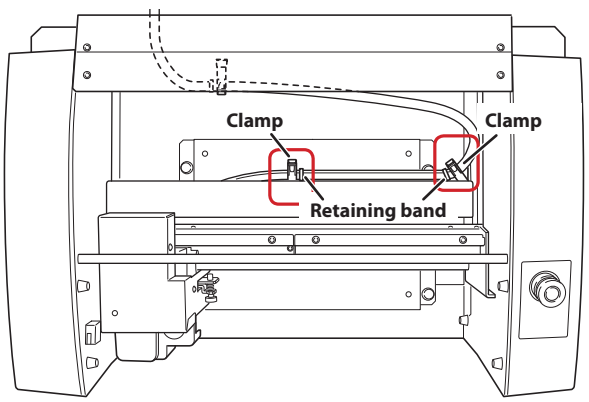


6 **Slowly move the spindle head by hand to the front left.**

Be careful not to apply strong impact.

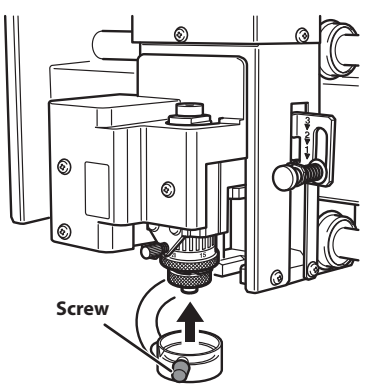


7 **Fasten the hose with the (two) clamps in the center of this machine.**



8 **Attach the vacuum adapter to the nose unit.**

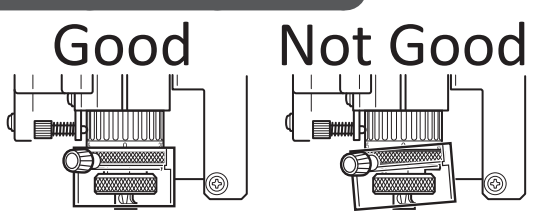
Secure the vacuum adapter while pressing it against the top.



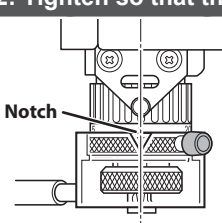
① Attach from below

② Tighten the screw

Point 1: Attach it so that it is level.

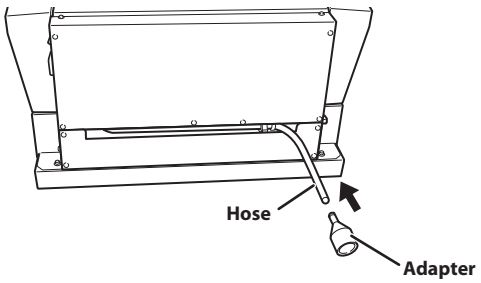


Point 2: Tighten so that the notch is on the front.



Failing to do so may lead to the hose bending during operation, disabling the suction of the cutting waste.

9 **Attach the adapter to the hose on the back of this machine.**



10 **Attach a vacuum cleaner to the end of the adapter on the back.**

11 **Close the front cover.**

12 **Press [ENTER/PAUSE].**

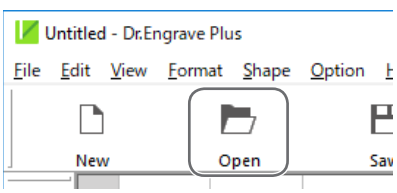
☞ P. 58 "Before using the vacuum adapter, be sure to verify the following points"

Step 4: Checking the Engraving Parameters

1 **Start Dr. Engrave Plus.**

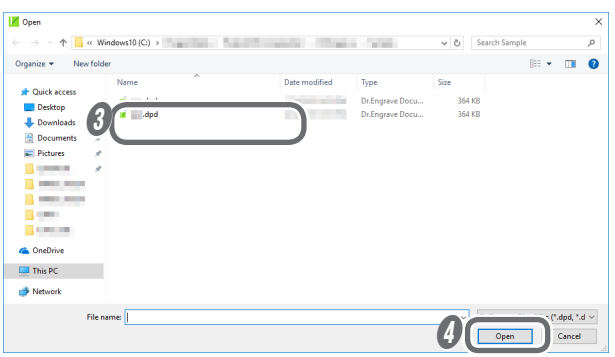
If engraving data is already opened, proceed to step **5**.

2 **Click [Open].**



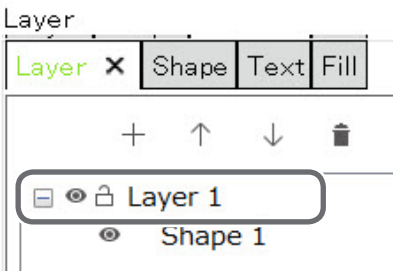
3 **Select the data to engrave.**

4 **Click [Open].**



5 **Click the shape you want to check the engraving parameters for.**

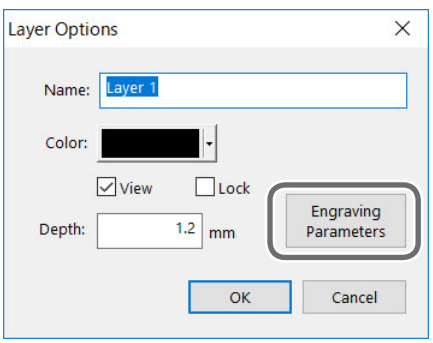
6 **Double-click the layer on which the shape to engrave is drawn on the [Layer] panel.**



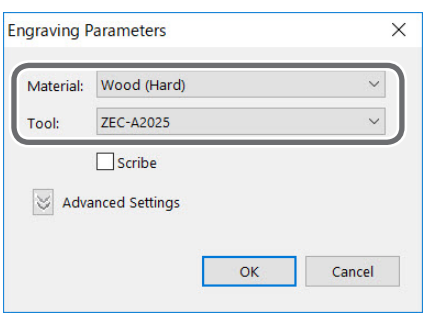
7 **Check the engraving parameters.**

① **Click [Engraving Parameters].**

* Because the automatic Z control feature is used, there is no need to set the [Depth].



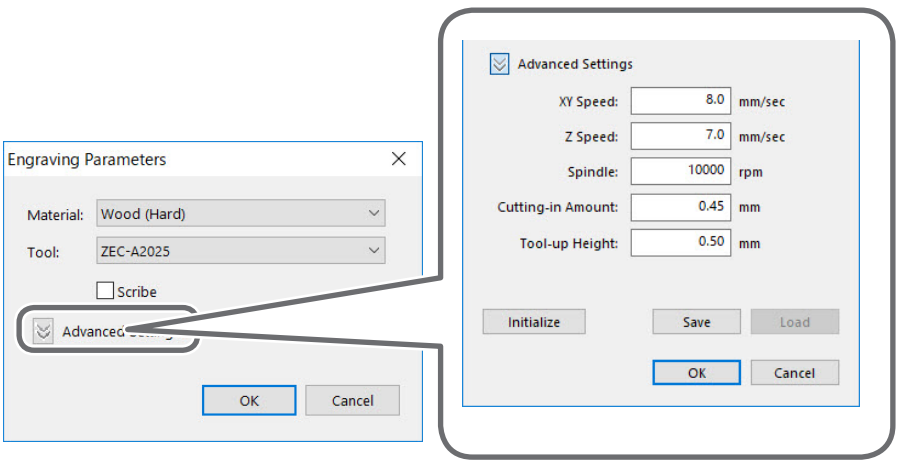
② **Check the [Material] and [Tool] that have been set.**



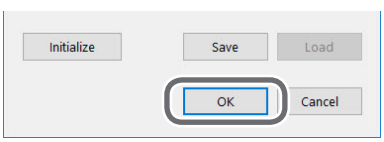
③ **Click [Advanced Settings] and check the settings.**

Set the items as required.

☞ P. 96 "Detailed Settings on the [Engraving Parameters] Screen"

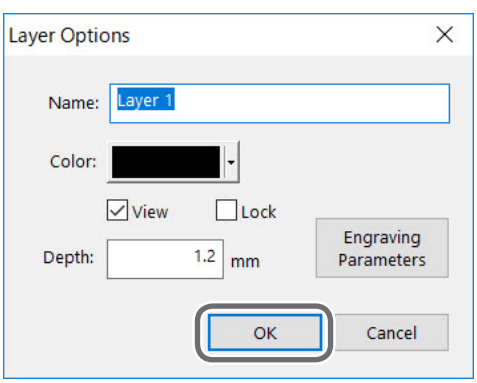


④ **Click [OK].**



The [Engraving Parameters] screen closes.

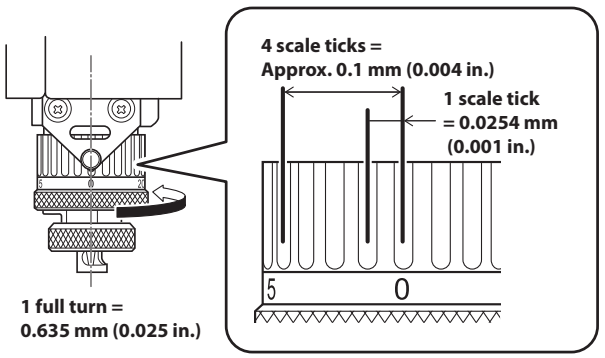
⑤ **Click [OK].**



8 Open the front cover.

9 **Check the scale of the nose unit.**

Confirm that the scale of the nose unit is set to the desired engraving depth. The amount of extension of the cutter is the engraving depth.



If you have changed the settings, save the engraving data.

☞ P. 37 "Step 6: Saving Engraving Data"

Step 5: Starting Engraving

Make sure the following tasks have all been completed, then sent the engraving data from the computer.

- **Mounting the workpiece**

☞ P. 38 "Step 1: Setting the Workpiece"

- **Setting the XY origin**

☞ P. 39 "Step 2: Setting the XY Origin"

- **Installing a tool**

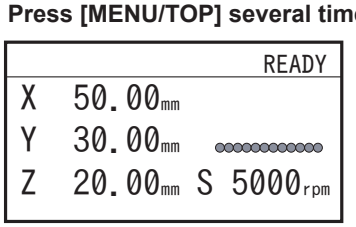
☞ P. 41 "Step 3: Installing a Character Cutter/Parallel Cutter"
☞ P. 88 "Using a Diamond Scraper"
☞ P. 97 "Using an End Mill"

⚠CAUTION **This procedure makes this machine operate.**
Before you perform this procedure, check to make sure that operation of this machine will not create any hazard or danger.

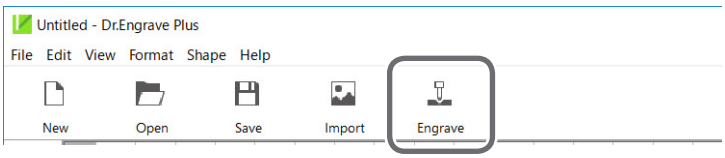
Procedure

1 **If the front cover is open, close it, and then press [ENTER/PAUSE].**

2 **Press [MENU/TOP] several times to display the main screen.**



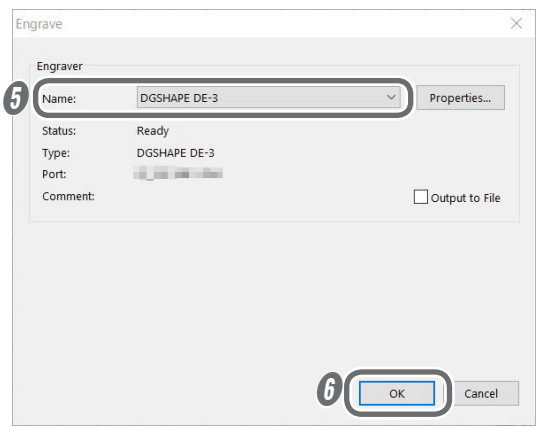
3 **Click [Engrave].**



The [Engrave] screen appears.

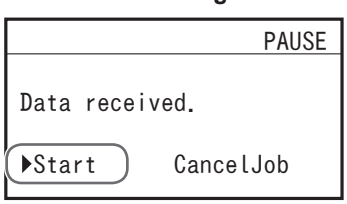
4 **Select [DGSHAPE DE-3] for the [Printer Name].**

5 **Click [OK].**



The engraving data is sent to the machine.

6 **When the following screen is displayed on the panel of this machine, select [Start].**



7 **Press [ENTER/PAUSE].**

Engraving starts.

Important: When connected to multiple machines with LAN cables

Output data from the computer to one machine at a time. Simultaneous output to multiple machines is not supported. After the data output to one machine is finished, output data to the next machine.

Important: Do not open the front cover during operation.

Opening the front cover during engraving or while the spindle is rotating may affect the engraving quality. If you want to open the front cover during operation, press [ENTER/PAUSE] to pause the operations, wait for the operations to stop, and then open the front cover.

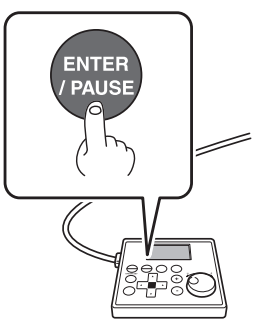
☞ P. 21 "Pausing and Resuming Engraving"

Adjusting the Tool Feeding Speed and the Number of Rotations during Engraving (Override)

You adjust the engraving parameters by specifying the ratio of change relative to the present feeding speed and spindle rotating speed. This feature is called "override."
An override is possible only within the range of this machine's settable feeding speed and spindle rotating speed. If a feeding speed that falls outside the settable range is set by an override, the actual feeding speed is limited to the maximum or minimum value.

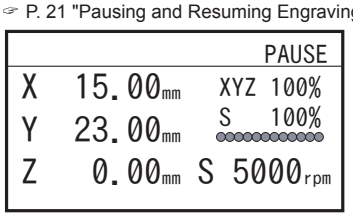
Procedure

1 **While engraving is in progress, press [ENTER/PAUSE].**



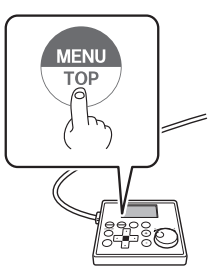
Engraving pauses.

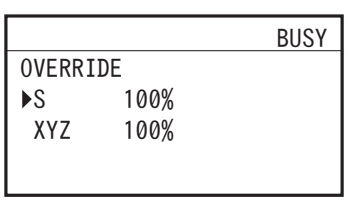
☞ P. 21 "Pausing and Resuming Engraving"



2 **Set the ratios of change.**

① **Press [MENU/TOP] twice to display the following screen.**



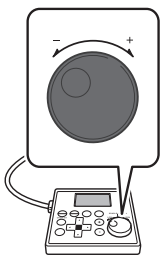


② **Select the targets for the setting using the [Dial].**

S : Set the change ratio of spindle rotating speed.
XYZ : Set the change ratios of the feeding speed of the tool for X, Y, and Z axes.

③ **Press [ENTER/PAUSE].**

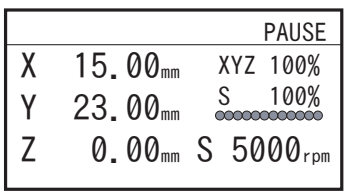
④ **Select the change ratios using the [Dial].**



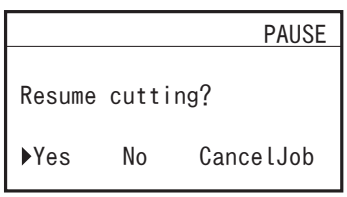
⑤ **Press [ENTER/PAUSE] to confirm.**

3 **Press [MENU/TOP].**

The main screen in the paused state appears again.



4 **Press [ENTER/PAUSE].**



5 **Select [Yes] using the [Dial].**

6 **Press [ENTER/PAUSE].**

Engraving resumes.

Settable Change Ratios

10 to 200% (in steps of 1%)

Attaching the Vacuum Adapter

This lets you perform engraving while taking up cutting waste using a vacuum cleaner with the vacuum adapter attached. This can minimize scattering of cutting waste.

⚠WARNING **When using a vacuum cleaner to take up cutting waste, exercise caution to prevent fire or dust explosion.**
Picking up fine cuttings using an ordinary vacuum cleaner may result in fire or explosion. Check with the manufacturer of the vacuum cleaner. When the safety of use cannot be determined, clean the machine using a brush or the like, without using a vacuum cleaner.

⚠CAUTION **The machine contains blades and other sharp components.**
Be careful not to touch the tool tip or any other sharp edges. Doing so may cause injury.

⚠CAUTION **Do not touch the spindle unit immediately after engraving has ended.**
Doing so may result in burns.

Before using the vacuum adapter, be sure to verify the following points

- **Use a vacuum cleaner that allows adjustment of the suction force and is equipped with an overload protector.**

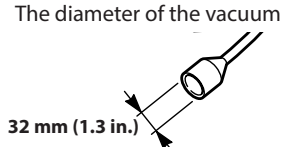
  To prevent fire or explosion, carefully check the specifications of your vacuum cleaner before use, including contacting the manufacturer if necessary.
- **Be sure to use the nose unit.**

  The vacuum adapter cannot be attached unless the nose unit is installed.

☞ P. 43 "2. Install the cutter holder, solid collet, and nose unit."

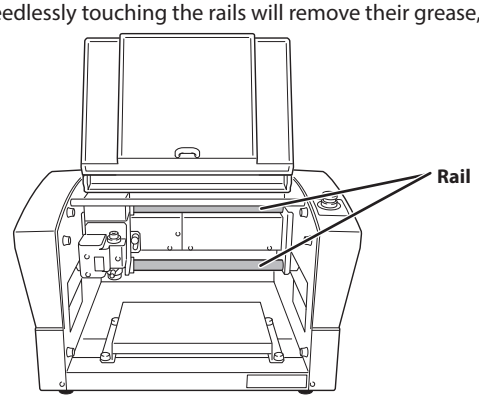
- **Be sure to use a vacuum cleaner hose having a diameter that allows connection with the vacuum adapter hose.**

  The diameter of the vacuum adapter hose is 32 mm (1.3 in.).



Avoid touching the rails while performing work

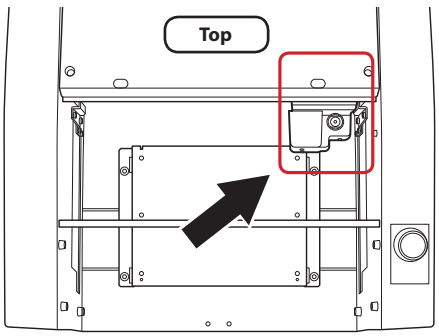
Needlessly touching the rails will remove their grease, leading to the rails rusting.



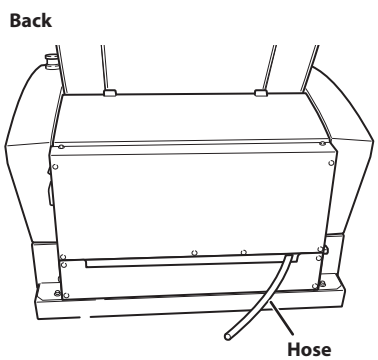
Procedure

1. **Turn off this machine.**
2. **Open the front cover.**
3. **Slowly move the spindle head by hand to the back of the workpiece table on the right side.**

   Be careful not to apply strong impact.

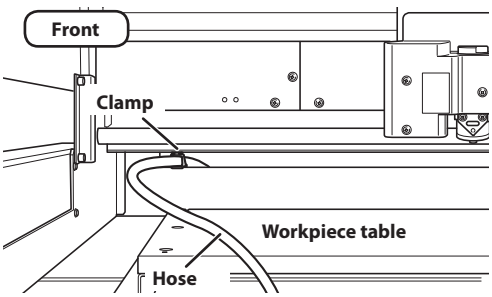


4. **Pass the end of the dust collection hose ("hose") from the front to the back of this machine.**

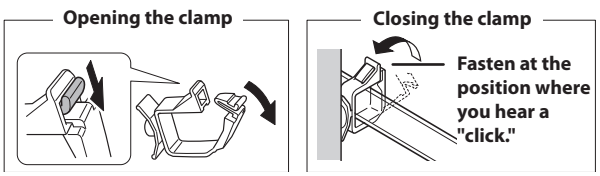


5 **Fasten the hose with the clamp close to the back of this machine.**

Fasten at the position of the retaining band on the hose.

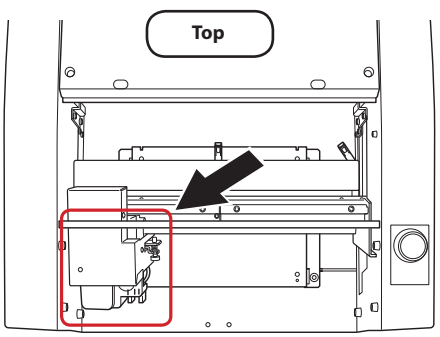


MEMO

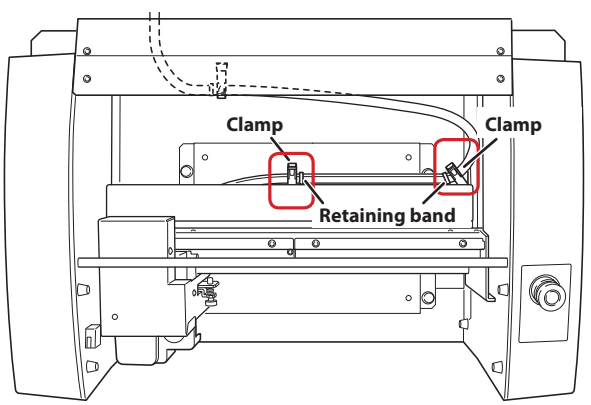


6 **Slowly move the spindle head by hand to the front left.**

Be careful not to apply strong impact.

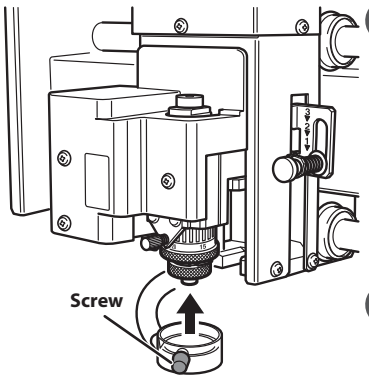


7 **Fasten the hose with the (two) clamps in the center of this machine.**

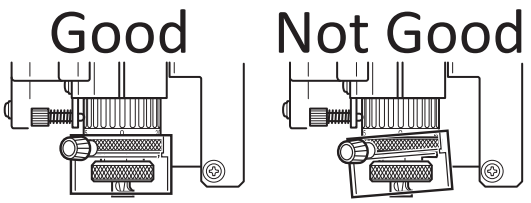


8 **Attach the vacuum adapter to the nose unit.**

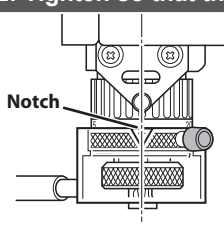
Secure the vacuum adapter while pressing it against the top.



Point 1: Attach it so that it is level.

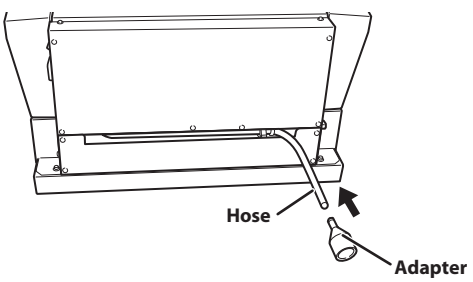


Point 2: Tighten so that the notch is on the front.



Failing to do so may lead to the hose bending during operation, disabling the suction of the cutting waste.

9 **Attach the adapter to the hose on the back of this machine.**



10 **Attach a vacuum cleaner to the end of the adapter on the back.**

11 **Close the front cover.**

Setting the Lock Lever

You change the position at which the lock lever is set to match the setting for automatic Z control.

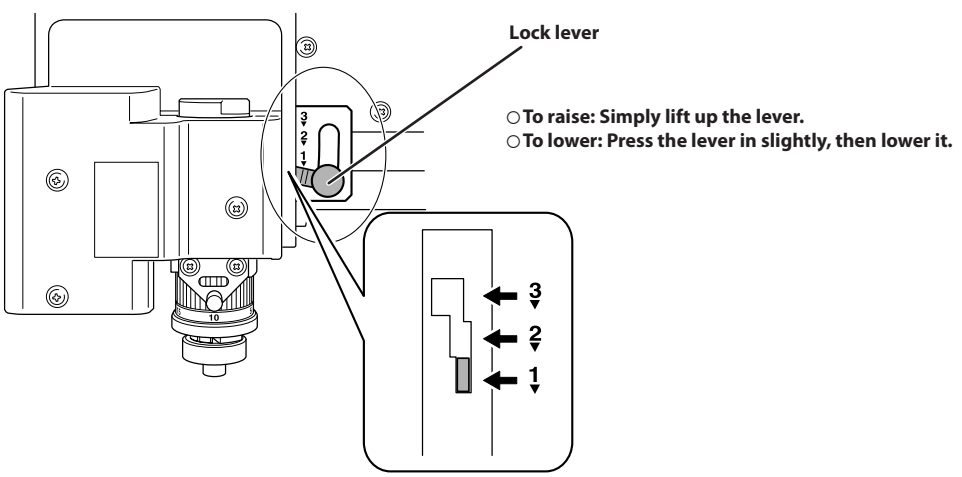
- 1 or 2

  When [AUTO Z CONTROL] is set to [ON], you set the lock lever at one of these positions. The spindle head is put into a floating state, and the Z-axis origin point is determined by the height of the workpiece surface. The 1 setting applies greater pressure to the workpiece than 2.

- 3

  When [AUTO Z CONTROL] is set to [OFF], you set the lock lever at this position. The spindle head is locked, and so the setting for the Z-axis origin point must be made via the menu items. Setting the lock lever at this position when [AUTO Z CONTROL] is set to [ON] causes errors when setting the origin point or engraving, resulting in an emergency stop of this machine.

☞ P. 144 "Responding to an Error Message"



Changing the Operation Mode

This selects the operation when engraving data is sent from the computer.

Procedure

1. **If the front cover is open, close it.**
2. **Press [ENTER/PAUSE].**
3. **Press [MENU] several times to display the following screen.**

```
                    READY
SETTINGS                ▼
▶OPERATING MODE
 SPINDLE REVOLUTION   ON
 AUTO Z CONTROL      OFF
```

4. **Press [ENTER/PAUSE].**
5. **Turn the [Dial] and select the operation.**

```
                    READY
OPERATING MODE
▶CUT
 PREVIEW PATH
 PREVIEW AREA
```

CUT : The engraving starts.
PREVIEW PATH : The laser pointer traces the path of the tool during engraving.
PREVIEW AREA : The laser pointer pauses at the four corners of the engraving area to indicate the area.

6. **Press [ENTER/PAUSE] to confirm.**

The main screen appears again.

```
                    READY
X  15.00mm
Y  23.00mm  ●●●●●●●●●●●●
Z   0.00mm S 5000rpm
```

Important

If the operating mode is set to [PREVIEW PATH] or [PREVIEW AREA], this setting returns to [CUT] after engraving data is output once. If you want to perform a preview when outputting the engraving data the second time as well, set the operating mode again prior to output or select [Engraving Preview] from the menu in Dr. Engrave Plus.

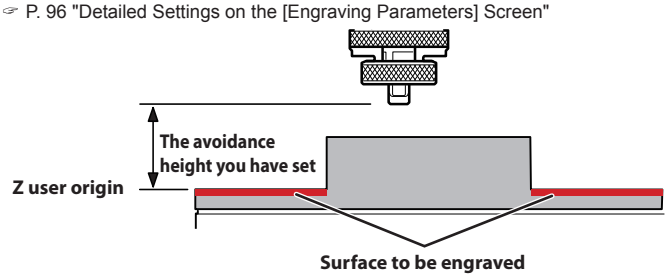
☞ P. 118 "Previewing before Engraving"

Setting the Avoidance Height of the Tool to Match the Workpiece Shape

When moving to another engraving area, the tool first avoids the workpiece in the upward direction, and then moves along the X and Y axes. Make the setting for this avoidance height.

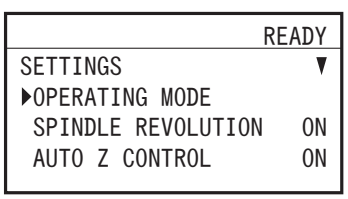
* This setting is enabled when [AUTO Z CONTROL] is set to [ON].
* With the engraving data created using Dr. Engrave Plus, the setting for the [Tool-up Height] within the software is ignored.

☞ P. 96 "Detailed Settings on the [Engraving Parameters] Screen"

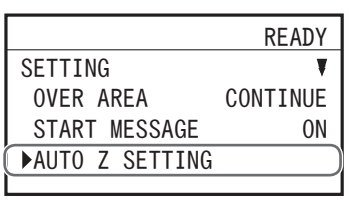


Procedure

1. **If the front cover is open, close it.**
2. **Press [ENTER/PAUSE].**
3. **Press [MENU] several times to display the following screen.**



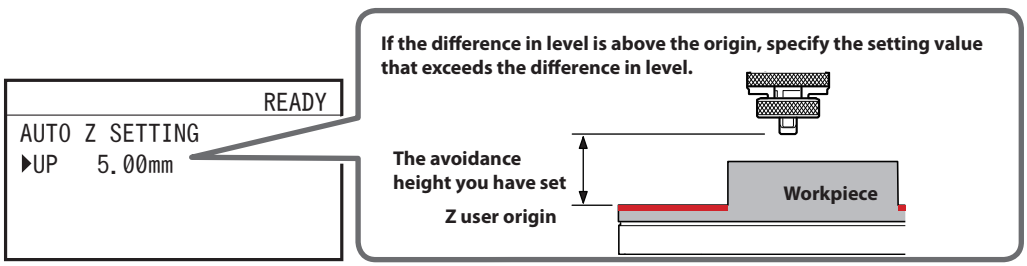
4. **Turn the [Dial] and select [AUTO Z SETTING].**



5. **Press [ENTER/PAUSE] twice.**

6 **Turn the [Dial] and set the avoidance height.**

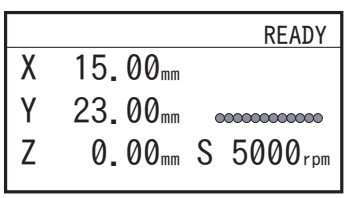
For the setting value, set the distance from Z user origin.



7 **Press [ENTER/PAUSE] to confirm.**

8 **Hold down** [🐇] **and press [MENU/TOP].**

The main screen appears again.



Setting Range

0 mm to 40 mm (1.6 in.) (in 0.1 mm [3.9 mil] steps)

Chapter 4 Maintenance

Maintenance Precautions

⚠WARNING **Perform this task with all power switches left switched off.**
Otherwise sudden movement of the machine may cause injury.

⚠WARNING **Never use a pneumatic blower.**
This machine is not compatible with a pneumatic blower. Cutting waste may get inside the machine and cause fire or electrical shock.

⚠WARNING **Never use a solvent such as gasoline, alcohol, or thinner to perform cleaning.**
Doing so may cause a fire.

⚠WARNING **When using a vacuum cleaner to take up cutting waste, exercise caution to prevent fire or dust explosion.**
Picking up fine cuttings using an ordinary vacuum cleaner may result in fire or explosion. Check with the manufacturer of the vacuum cleaner. When the safety of use cannot be determined, clean the machine using a brush or the like, without using a vacuum cleaner.

⚠WARNING **Be sure to perform operations as specified by these instructions, and never touch any area not specified in the instructions.**
The machine may move in an unexpected way, resulting in injury or burns.

⚠CAUTION **Do not touch the spindle unit immediately after engraving has ended.**
Doing so may result in burns.

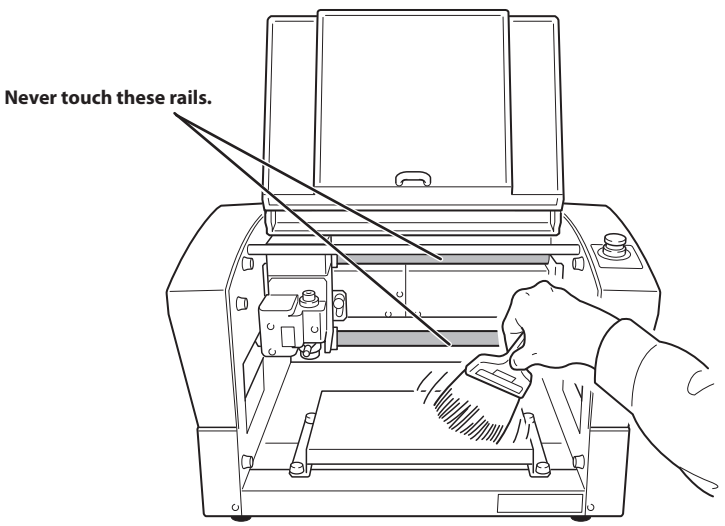
⚠CAUTION **Remove the cutting tool before performing maintenance.**
Contact with the blade may result in injury.

- Carefully clean away cutting waste. Operating the machine with a large amount of cutting waste present may cause malfunctions.
- Never apply lubrication.
- Never apply silicone substances (oil, grease, spray, etc.) to the machine. Doing so may cause poor switch contact.

Cleaning after Engraving Finishes

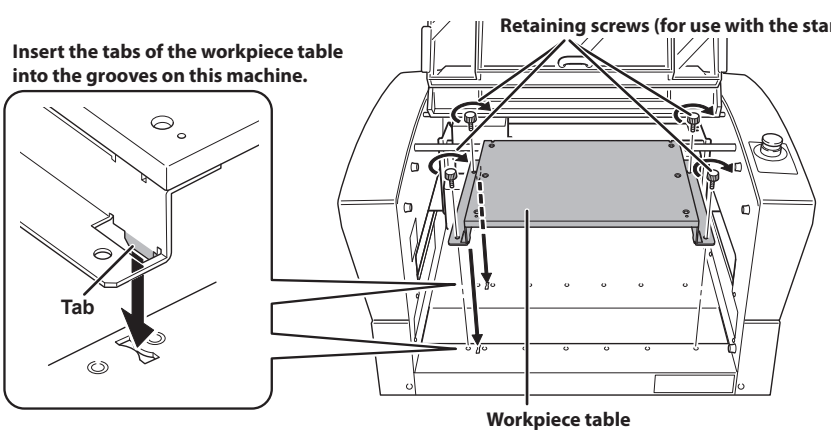
Cleaning Inside the Front Cover

Open the front cover and clean away any buildup of cutting waste inside.



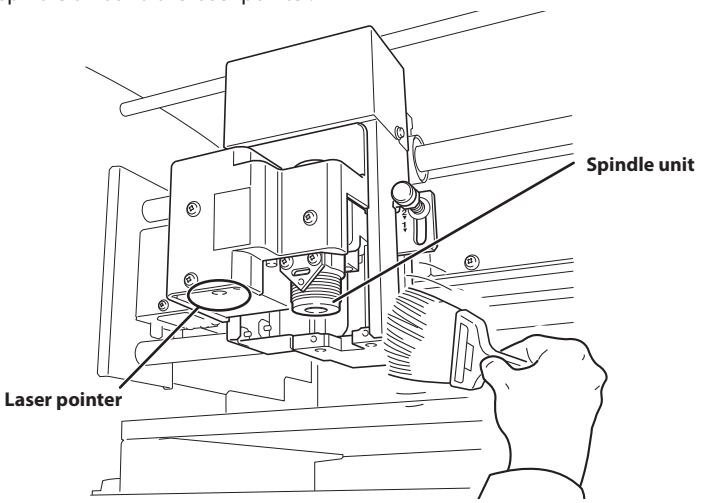
Attaching the Workpiece Table

After removing the workpiece table and cleaning it, exercise caution regarding the positions of the tabs, orienting them as shown in the figure when attaching the workpiece table. .



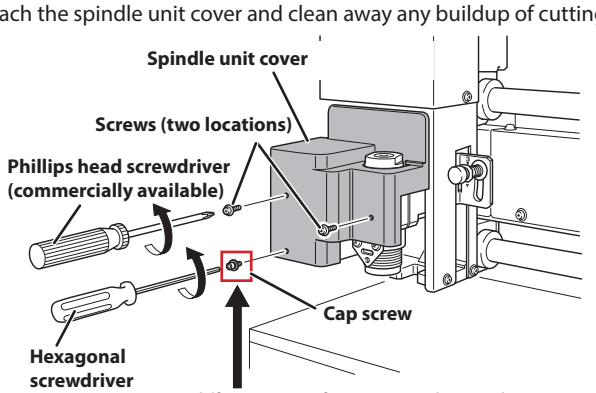
Cleaning Near the Spindle Head

Uninstall the nose unit, collet, and tool, and remove any cutting waste that has collected in areas such as the tip of the spindle unit and the laser pointer.

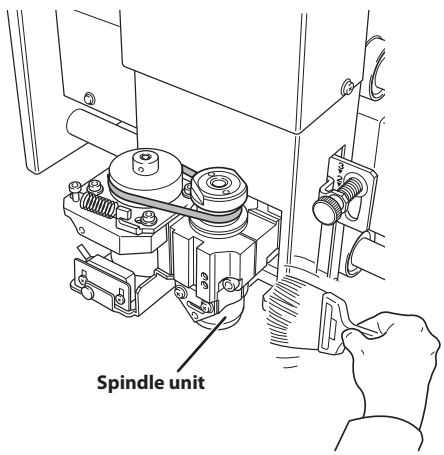


Cleaning Inside the Spindle Unit Cover

Detach the spindle unit cover and clean away any buildup of cutting waste inside.



* A different type of screw is used in one location.
Exercise caution when attaching the screws.



MEMO

Engraving while sucking up cutting waste using a vacuum cleaner by attaching the vacuum adapter can minimize scattering of cutting waste only when the nose unit is used.

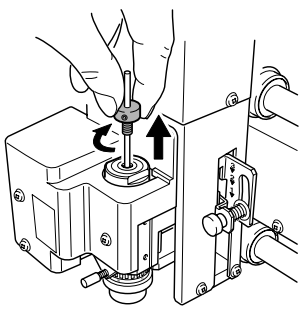
☞ P. 58 "Attaching the Vacuum Adapter"

Storing the Cutter

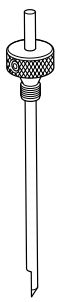
For repeated use while keeping the amount of extension of the cutter tip constant, we recommend that you remove the cutter holder and cutter from the spindle unit without separating them from one another once you have determined the amount of extension. Storing the assembly without changing the position of the cutter holder eliminates the need to determine the amount of cutter extension each time you use it.

* This method cannot be used with the ø4.36 mm (0.17 in.) solid collet and end mill.

Storage Methods for ø3.175 mm (0.125 in.) Character Cutter/Parallel Cutter

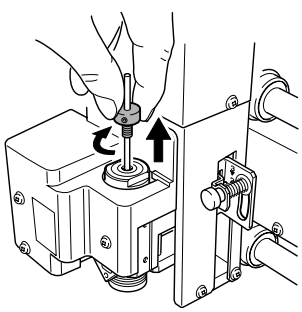


Remove the cutter from the spindle unit together with the cutter holder.

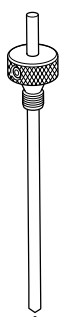


Store without changing the position of the cutter holder.

Storage Method for the Diamond Scraper



Remove the entire diamond scraper from the spindle unit.



Store without changing the position of the cutter holder.

Replacing Consumable Parts

⚠CAUTION **Remove the cutting tool before performing replacement work.**
Contact with the blade may result in injury.

Replacing the Spindle Unit

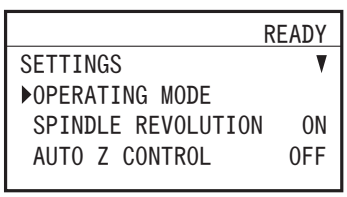
The spindle unit and the belt are consumable parts. For information on how to perform replacement, refer to the documentation included with the ZS-35S replacement spindle unit.

Checking the Replacement Time of the Spindle Unit

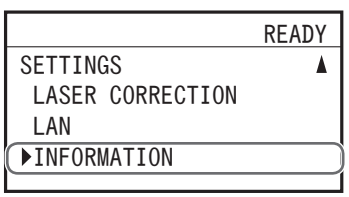
This machine is provided with a feature for displaying the total working time of the spindle unit. Refer to this to determine when replacement is needed. The replacement cycle varies according to usage conditions, but as a general guide, you should replace it after every 2,000 hours of use.

Procedure

1 **Press [MENU/TOP] several times to display the following menu.**



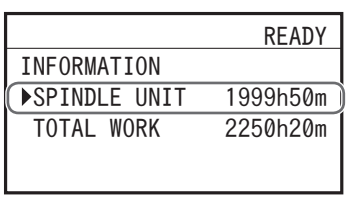
2 **Turn the [Dial] and select [INFORMATION].**



3 **Press [ENTER/PAUSE].**

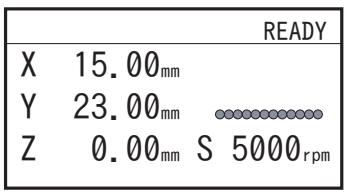
4 **Check the [SPINDLE UNIT] time.**

The working time of the spindle motor is displayed.



5 **Hold down [rabbit] and press [MENU/TOP].**

The main screen appears again.

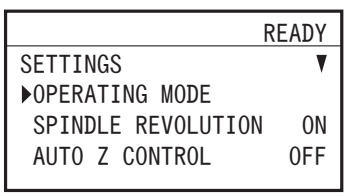


Resetting the Working Time after Replacing the Spindle

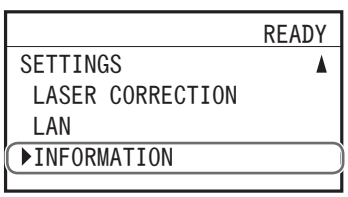
After replacing the spindle, reset the working time.

Procedure

1 **Press [MENU/TOP] several times to display the following menu.**

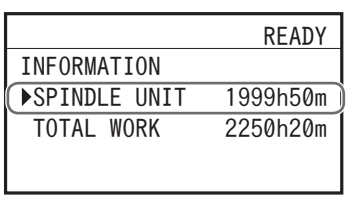


2 **Turn the [Dial] and select [INFORMATION].**

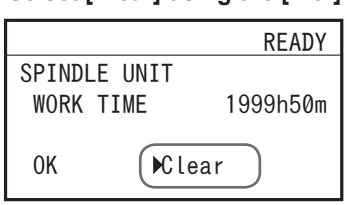


3 **Press [ENTER/PAUSE].**

4 **With [SPINDLE UNIT] selected, press [ENTER/PAUSE].**



5 **Select [Clear] using the [Dial].**

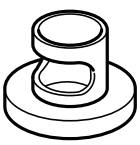


6 **Press [ENTER/PAUSE].**

The working time of the spindle is reset.

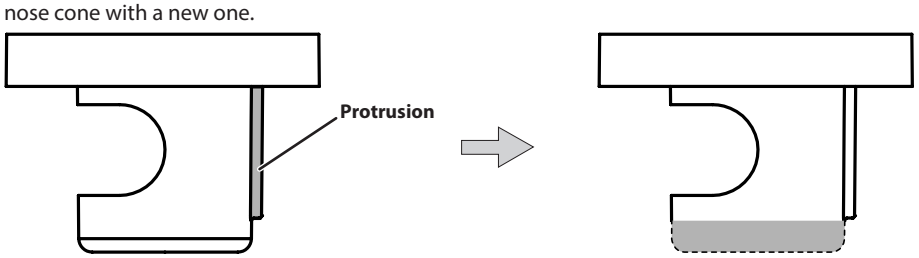
Replacing the Resin Nose Cone

The resin nose cone is a consumable part. It wears out as you continue to perform engraving. Replace it at the appropriate time.



Checking the Replacement Time

The resin nose cone should be replaced when it becomes worn to the protrusion as shown in the figure. Replace the nose cone with a new one.

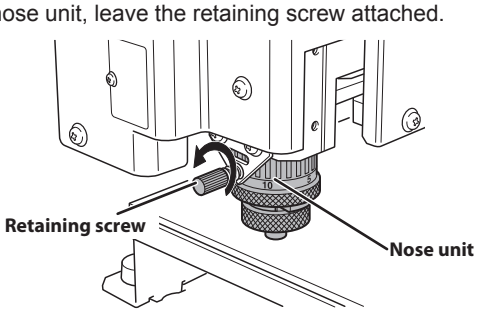


Replacement

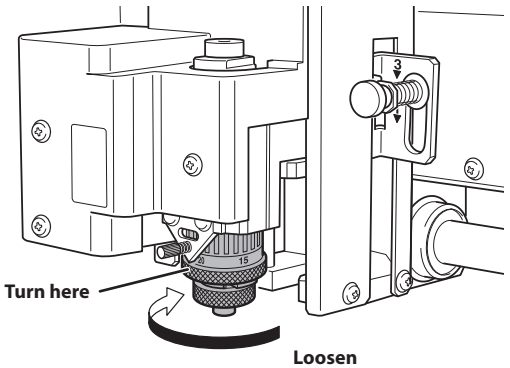
Procedure

1 **Loosen the retaining screw.**

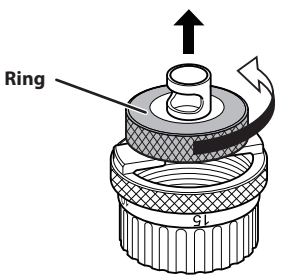
To prevent the retaining screw from being lost, just loosen the retaining screw enough to remove the nose unit, leave the retaining screw attached.



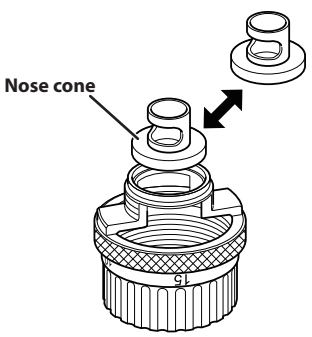
2 **Remove the nose unit from this machine.**



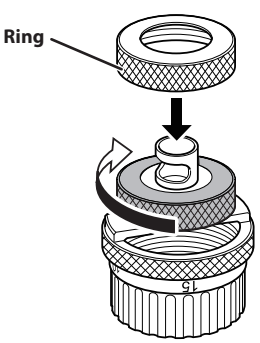
3 **Loosen and remove the ring.**



4 **Replace the nose cone with a new one.**



5 **Tighten the ring.**



Correction

Distance Correction

Important

These settings affect the engraving accuracy. Set these values with great care. We do not recommend the operation if you are not confident about the settings.

The distance correction for the X-axis and Y-axis can be set.

```
                    READY
DISTANCE CORRECTION
▶X  100.00%
 Y  100.00%
```

Setting Range

99.5% to 100.5%

Laser Correction

If the previewed engraving position differs from the actual engraving position, correct the irradiation position of the laser pointer.

Important

- **Perform laser correction with the distance correction set to "100%."**

  When distance correction has been set to a value other than "100%," temporarily set the distance correction to "100%" and perform laser correction. After laser correction finishes, return the distance correction to its previously set value.

☞ P. 75 "Distance Correction"

Items Used in This Procedure

- Workpiece: Scrap board
- Tool: Character cutter
- Implements required for installing the tool

☞ P. 104 "Using a Character Cutter/Parallel Cutter (without Nose Unit)"

1. Mark the workpiece.

❶ Set the workpiece and tool.

☞ P. 38 "Step 1: Setting the Workpiece"

☞ P. 104 "Using a Character Cutter/Parallel Cutter (without Nose Unit)"

2 **Close the front cover.**

3 **Press [ENTER/PAUSE].**

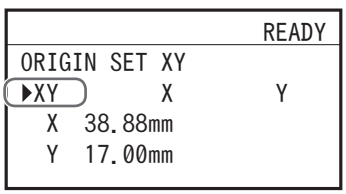
The main screen is displayed.

4 **Press [+Z] to raise the tool.**

5 **Press [◄], [►], [▲], and [▼] to move the tool to a position on the workpiece.**

6 **Press [ORG.XY/POINTER].**

7 **Using the [Dial], select [XY] for the target axis.**

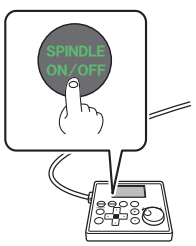


8 **Press [ENTER/PAUSE].**

The current value is set as the origin point, and you are returned to the main screen.

9 **Hold down [SPINDLE] for one second or longer.**

The spindle rotates.



10 **Press [-Z] to lower the tool until it cuts the workpiece.**

The workpiece is marked.

11 **Press [+Z] to raise the tool.**

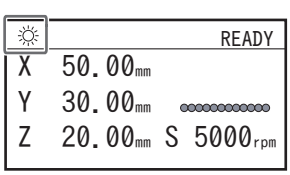
12 **Press [SPINDLE].**

Rotation of the spindle stops.

2. Examine the laser pointer correction values.

1 **Hold down**  **and press [ORG.XY/POINTER].**

The laser pointer turns on, and the current values of the laser pointer are displayed on the main screen.

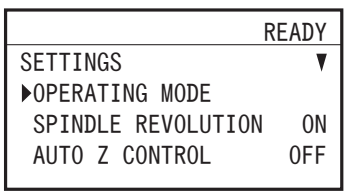


❷ **Press [◄], [►], [▲], and [▼] to move the laser pointer to the position marked in step *1* - ❾.**

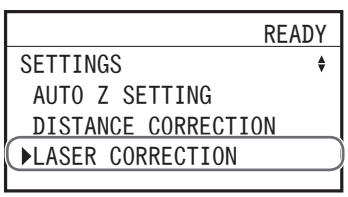
❸ **Write down the XY coordinates displayed on the main screen.**

3. Set the correction values.

❶ **Press [MENU/TOP] several times to display the following menu.**

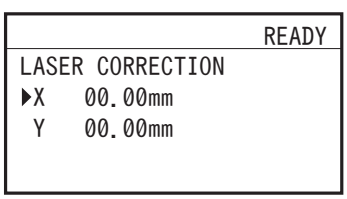


❷ **Turn the [Dial] and select [LASER CORRECTION].**



❸ **Press [ENTER/PAUSE].**

The following window is displayed.



❹ **Press [ENTER/PAUSE].**

You can now change the settings.

❺ **Use the [Dial] to set the X value written down in step *2* - ❸.**

❻ **Press [ENTER/PAUSE].**

The X value is set.

❼ **Select [Y] using the [Dial].**

❽ **Repeat steps ❹ to ❻ to set the Y value as well.**

Setting Range

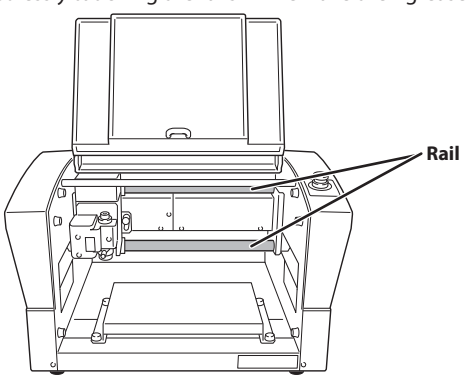
–3 mm to +3 mm (–0.1 in. to +0.1 in.)

When Moving the Machine

When moving the machine, attach the retainers to protect it from impact during movement.

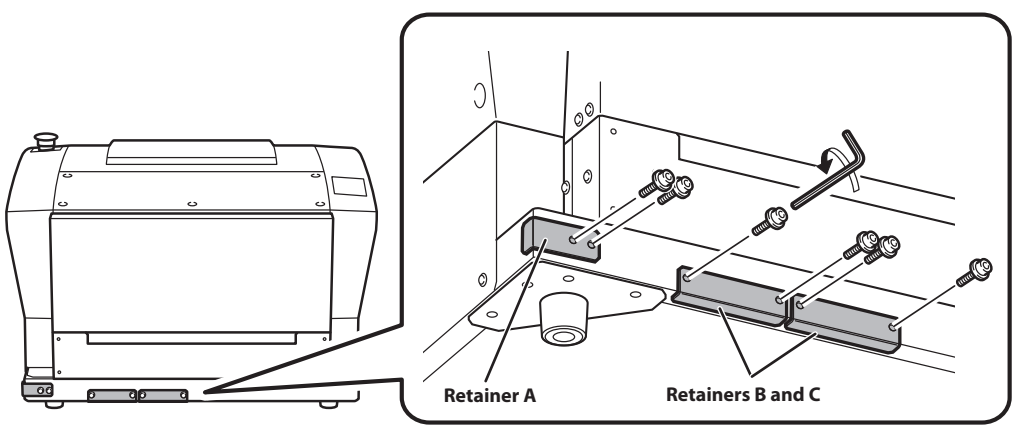
Avoid touching the rails while performing work

Needlessly touching the rails will remove their grease, leading to the rails rusting.



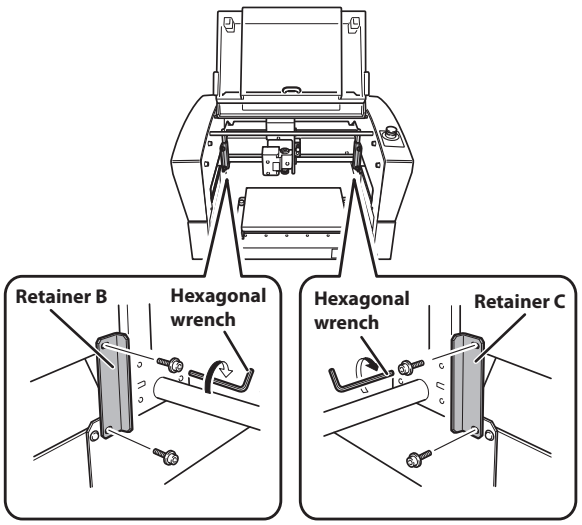
Procedure

1. **Make sure the machine is not in operation, then turn off the power switch.**
   The display screen on the handy panel goes dark.
2. **Unplug all cables, such as power cord.**
3. **Remove retainers A, B, and C from the back of this machine.**



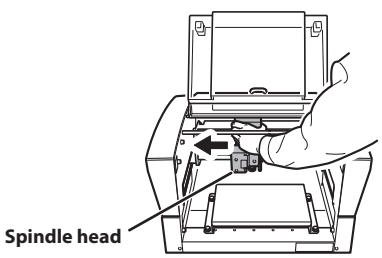
4. **Slowly move the spindle head to the back.**

5 **Attach retainers B and C.**

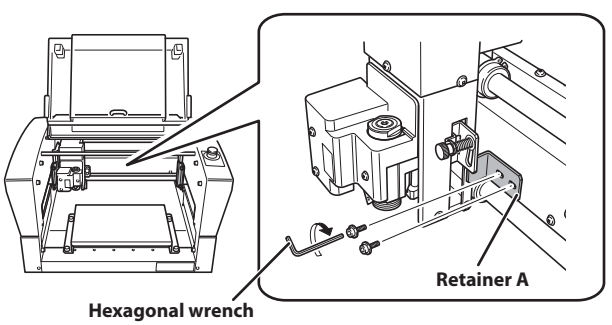


6 **Slowly move the spindle head to the left.**

Be careful not to apply strong impact.



7 **Attach retainer A.**

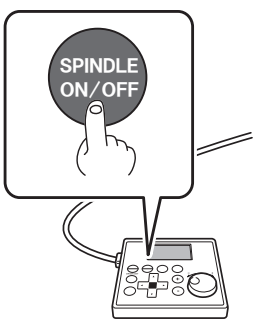


Spindle Run-in (Warm-up)

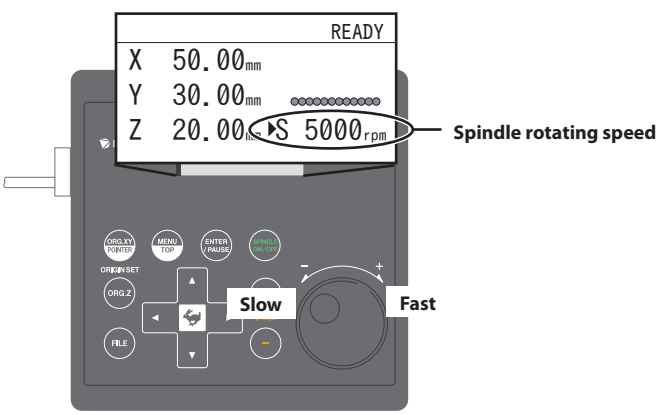
Perform spindle run-in (warm-up) to stabilize the rotation of the spindle.

Procedure

1. **Close the front cover.**
2. **Press [ENTER/PAUSE].**
3. **On the main screen, press [SPINDLE].**
   The cursor moves to [S], and the spindle rotating speed can be changed.

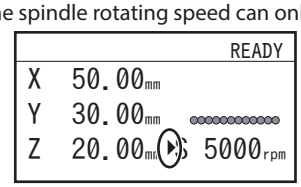


4. **Turn the [Dial] on the handy panel until the spindle rotating speed reaches "5000 rpm."**



CAUTION

The spindle rotating speed can only be changed while the cursor is displayed at the [S] position.



If no operations are performed for a certain amount of time and the cursor disappears, press [SPINDLE] several times to move the cursor to [S], and then operate the [Dial].

5 **Hold down [SPINDLE] for one second or longer.**

The spindle begins to rotate.

6 **Leave the spindle rotating for 15 minutes.**

7 **Press [SPINDLE].**

Rotation of the spindle stops.

8 **Repeat steps 3 to 7 under the following conditions:**

	Number of rotations	Working time
Second time	10,000 rpm	10 minutes
Third time	15,000 rpm	10 minutes
Fourth time	20,000 rpm	15 minutes

Important: This operation cannot be performed in the following situations.

- When the machine is performing some operation
- When the front cover is open

Chapter 5 Various Engraving Methods

Nose Unit Overview and Precautions

The Role of the Nose Unit

Attaching the nose unit and setting [AUTO Z CONTROL] to [ON] enables automatic detection of the Z origin as the position where the tip of the nose unit touches the surface of the workpiece. This makes it possible to perform engraving on a workpiece of uneven surface height at a uniform depth. It also eliminates the need to set the Z origin each time you engrave more than one different workpiece.

Nose Unit Limitations

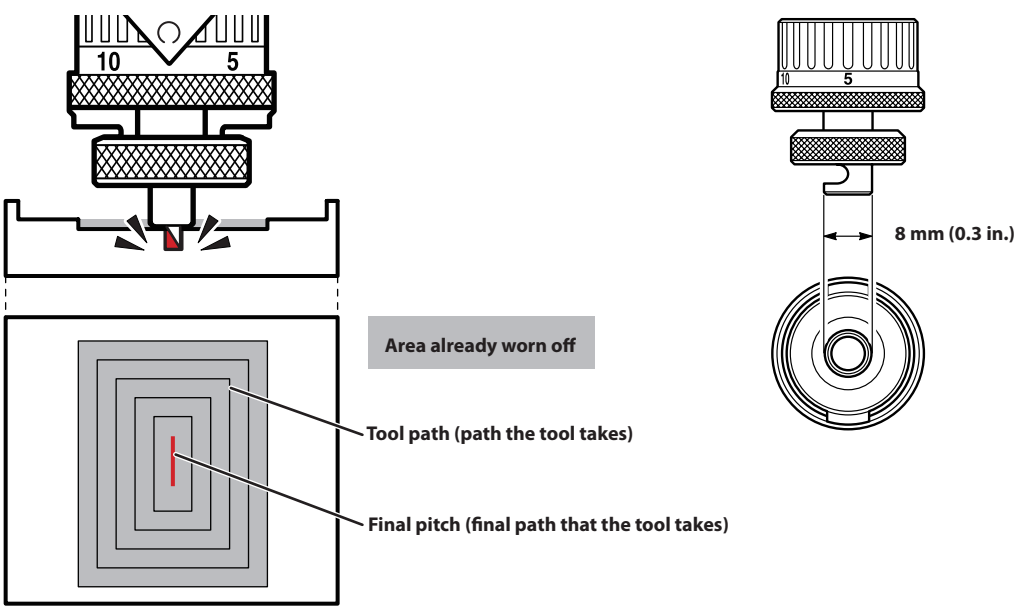
Trackable height displacement

When [AUTO Z CONTROL] is set to [ON], then as long as the tip of the nose unit is in contact with the surface of the workpiece, the engraving depth can be kept uniform even if the height of the workpiece changes. However, there is an upper limit to the amount of height displacement that can be tracked. Before you do the actual engraving, carry out an engraving test to make sure the desired engraving can be accomplished.

- Trackable undulation height: Gentle undulations of about 1 mm (0.04 in.)

Fill range

The nose unit cannot be used with fill engraving over a wider range than the 8 mm (0.3 in.) diameter of the tip of the nose unit. Using the nose unit may lead to engraving deeper than an already engraved surface with the final pitch.



Other Cases Where the Nose Unit Is Unsuitable

- **When using a diamond scraper**
- **When using an end mill**
- **When you do not want to attach the vacuum adapter**

  Using the nose unit without attaching the vacuum adapter may lead to unintended engraving results.
- **When hollowing**

  The nose unit interferes with the hollowing of the workpiece.

When Using Nose Unit

Use the Vacuum Adapter.

- **To prevent damage to workpieces**

  Removing cutting waste around the cutter can prevent the workpiece from damage due to cutting waste.
- **To ensure quality (precise engraving depth)**

  Engraving while taking up cutting waste enables tracking while the nose unit completely touches the surface of the workpiece. As a result, you can engrave the workpiece to the intended depth, creating an item with better quality.

Use resin and metal nose cones separately.

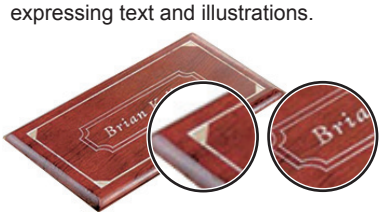
There is a resin nose cone and a metal one. Use them separately according to the workpiece material.

Material of nose cone	Features
Resin 	**Use this when engraving a workpiece made from material that easily scratches.** With this nose cone, the workpiece can be engraved with less scratching compared to the metal nose cone. However, the resin nose cone wears out as you continue to perform engraving. Replace it at the appropriate time. ☞ P. 73 "Replacing the Resin Nose Cone"
Metal 	**Use this when engraving a workpiece made from material that hardly scratches.** This nose cone has a tendency to scratch the workpiece more easily than the resin nose cone. However, the metal nose cone does not wear out and can be used for a longer time.

Determining the Item to Create and Required Material and Tool

Procedure

1 Check the engraving method for the item you want to create.

Item to create	Material	Engraving method	Explanation
• Industrial label • Nameplate • Name engraving (personalized item) • Trophy • Photo frame • Dog tag etc.	Resin-based material Light metals Wood	Cutting engraving	This method performs engraving while rotating the tool. Use this method to draw characters and illustrations with a line, or fill the inside of a shape. As you can adjust the engraving depth, it is suited for clearly expressing text and illustrations. 
• Name engraving on light metals • Trophy tag • Dog tag • etc.	Light metals	Scribing	Engraving is performed by pressing the cutter against the text and illustration lines. Engraving without rotating the cutter provides finish with stable quality. 
• Dog tag • Signboard etc.	Resin-based material Wood	Hollowing	This method enables you to engrave and hollow out text and shapes from a workpiece. 

2 Select the tool based on the material and engraving method.

Select a tool suitable for the material to engrave and the engraving method from the table below.

		Engraving method		
		Cutting engraving	**Scribing**	**Hollowing**
Material	**Resin-based material** **• Acrylic** **• Modeling wax, etc.**	Character cutter or parallel cutter		Character cutter or end mill
	Light metals **• Aluminum** **• Brass, etc.**	Character cutter	Diamond scraper	
	Wood **• Wood** **• Chemical wood, etc.**	Character cutter or parallel cutter		Character cutter or end mill

* Optional parts may need to be purchased depending on the type and diameter of the tool. Contact your authorized DGSHAPE Corporation dealer or access our website (http://www.dgshape.com/) to purchase the optional tool or dedicated collet.

3 Check the tool installation method.

For the installation procedure for each tool, see the following pages.

Tool Installation Procedures (Four Patterns)

Tool type	Tool installation procedure
Character cutter/Parallel cutter (with nose unit)	**P. 41 "Step 3: Installing a Character Cutter/Parallel Cutter"**
Character cutter/Parallel cutter (without nose unit)	**P. 104 "Using a Character Cutter/Parallel Cutter (without Nose Unit)"**
Diamond scraper	**P. 88 "Using a Diamond Scraper"**
End mill	**P. 97 "Using an End Mill"**

Considering Engraving Parameters

This machine lets you perform engraving using a wide variety of workpiece materials and tools. However, the optimal engraving conditions that yield the desired engraving results for these combinations vary.

Typical Setting by Material

The table below shows suggested tools and engraving parameters suited to various types of workpieces. Refer to these when selecting the engraving conditions. Before you perform the actual engraving, carry out an engraving test and adjust each condition.

Workpiece material	Tool type	Spindle rotating speed (RPM)	Cutting-in amount (mm)	Feeding speed	
				XY speed (mm/sec.)	Z speed (mm/sec.)
Acrylic	ZEC-A2025	15000	0.2	15	5
	ZEC-A2320	15000	0.2	15	5
Aluminum	ZEC-A2025-BAL	15000	0.1	5	1
	ZDC-A2000	No rotation	-	10	1
Brass	ZEC-A2025-BAL	15000	0.1	5	1
	ZDC-A2000	No rotation	-	10	1
Chemical wood	ZEC-A2025	15000	0.45	8	7
	ZEC-A2320	15000	0.45	8	4
Modeling wax	ZEC-A2025	15000	0.5	30	10
	ZEC-A2320	15000	0.2	30	5

Important

Never use a ø4.36 mm (0.17 in.) tool at a spindle rotating speed higher than 15,000 rpm. Doing so may lead to spindle unit damage due to vibrations.

Tips for Fine-tuning

The optimal conditions are determined by the balance between factors such as the workpiece hardness, the feeding speed, the spindle rotating speed, the cutting-in amount, and the capability of the tool. Refer to the following tips and try fine-tuning the conditions.

Spindle rotating speed	In general, faster rotation provides increased engraving capacity. However, a feeding speed that is too slow with respect to the number of rotations may lead to melting of the workpiece due to heat or to increased burring or roughness. Roughness may also occur at some places because tool feeding stops momentarily at places where the direction of engraving changes (that is, at corners). In this case, lower the number of rotations. It may also be a good idea to use faster settings for narrower tools and slower settings for wider tools.
Feeding speed	Faster speeds result in shorter engraving times, but the load also increases accordingly. The load may overcome the strength with which the workpiece is secured in place, resulting in crooked lines or a non-uniform engraving depth. Also, a feeding speed that is too fast for the spindle rotating speed may result in roughness or a raised nap. In such cases, lower the feeding speed.
Cutting-in amount	Deeper cutting-in amount results in a greater load, and roughness becomes more likely to occur. When you make the cutting-in amount deeper, it is a good idea to raise the spindle rotating speed and lower the feeding speed accordingly. Note, however, that there is a limit to the maximum cutting-in amount. When deep engraving is required, it is a good idea to perform double engraving and reduce the amount of engraving per pass.

Using a Diamond Scraper

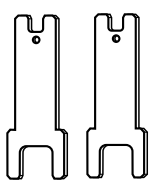
This performs "Scribing" using a diamond scraper. With "Scribing," cutting is carried out by scraping the workpiece without rotating the spindle. Because automatic Z control is set to [ON], the cutting-in depth of the workpiece is determined by the pressure of the cutter.

⚠WARNING **Never inadvertently touch the computer or handy panel while performing this task.**
Unintended operation of the machine may lead to you being caught in the machine.

⚠WARNING **Securely fasten the cutting tool and workpiece in place. After securing in place, make sure no spanners or other articles have been left behind inadvertently.**
Otherwise, such articles may be thrown from the machine with force, posing a risk of injury.

⚠CAUTION **Be careful around the cutting tool.**
The cutting tool is sharp. Broken cutting tools are also dangerous. To avoid injury, exercise caution.

⚠CAUTION **The machine contains blades and other sharp components.**
Be careful not to touch the tool tip or any other sharp edges. Doing so may cause injury.

Items used in this procedure			
			
Diamond scraper*	Solid collet*	Hexagonal screwdriver	Wrenches (2)

* Optional item
** ø3.175 mm (0.125 in.) diamond scrapers can be used with the included solid collet.
** For ø4.36 mm (0.17 in.) diamond scrapers, use an optionally available dedicated diamond-scraper collet.

Settings for this machine	
Automatic Z control	ON
Spindle rotation	OFF
Lock lever position	1 or 2

Before performing the procedure in this section, complete the following operations.

☞ P. 38 "Setting the Workpiece"
☞ P. 39 "Step 2: Setting the XY Origin"

1. Make the settings for spindle rotation and Z-axis control.

1 **If the front cover is open, close it.**

2 **Press [ENTER/PAUSE].**

3 **Set the spindle rotation to "OFF."**

① **Press [MENU/TOP] several times to display the following menu.**

```
                    READY
SETTINGS                ▼
▶OPERATING MODE
 SPINDLE REVOLUTION   ON
 AUTO Z CONTROL      OFF
```

② **Turn the [Dial] and select [SPINDLE REVOLUTION].**

③ **Press [ENTER/PAUSE].**

④ **Turn the [Dial] and select [OFF].**

```
                    READY
SETTINGS                ▼
 OPERATING MODE
▶SPINDLE REVOLUTION  OFF
 AUTO Z CONTROL      OFF
```

⑤ **Press [ENTER/PAUSE] to confirm.**

4 **Set the automatic Z control to [ON].**

① **Turn the [Dial] and select [AUTO Z CONTROL].**

② **Press [ENTER/PAUSE].**

③ **Turn the [Dial] and select [ON].**

* **The [Depth] setting selected in the software is disabled.**

```
                    READY
SETTINGS                ▼
 OPERATING MODE
 SPINDLE REVOLUTION  OFF
▶AUTO Z CONTROL       ON
```

④ **Press [ENTER/PAUSE] to confirm.**

After the following message is displayed for three seconds, the previous screen appears again.

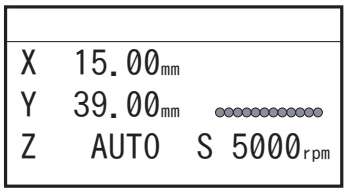
```
                    READY

Please set the lock lever
at the 1 or 2 position.
```

Important: Accurately perform P. 92 "3. Set the lock lever." later in this procedure.

5 **Press [MENU/TOP].**

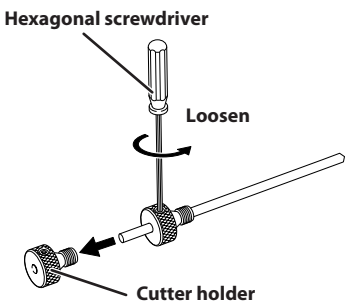
The main screen appears again. The Z-axis coordinate display changes to [AUTO], and the spindle rotating speed display changes to [OFF].



2. Install the cutter holder and solid collet.

1 **Open the front cover.**

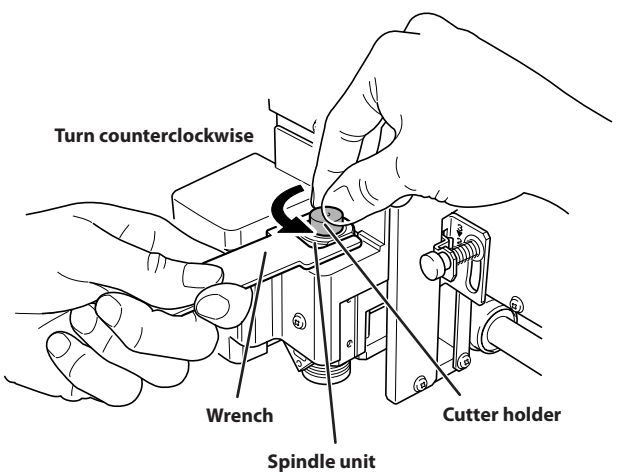
2 **Detach the cutter holder from the cutter.**



3 **Install the cutter holder.**

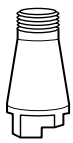
While holding the spindle unit immobile with a wrench, tighten the cutter holder.

The cutter holder is reverse-threaded (that is, you turn it counterclockwise to tighten it). Be careful to turn it in the correct direction.



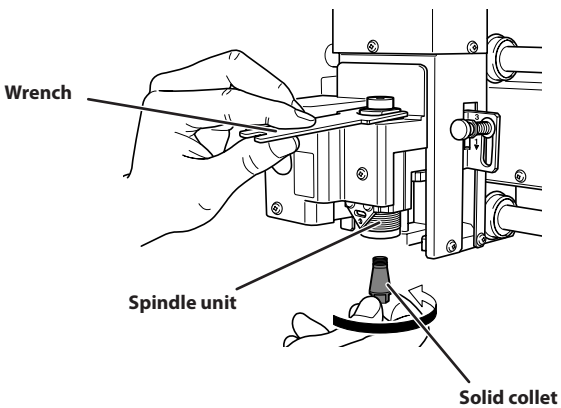
4 Attach a solid collet that fits the diameter of the cutter.

There are two types of solid collets. For ø4.36 mm (0.17 in.) diamond scrapers, use an optionally available dedicated diamond-scraper collet.

For ø3.175 mm (0.125 in.)	Dedicated for ø4.36 mm (0.17 in.) diamond scraper (Optional item)
	

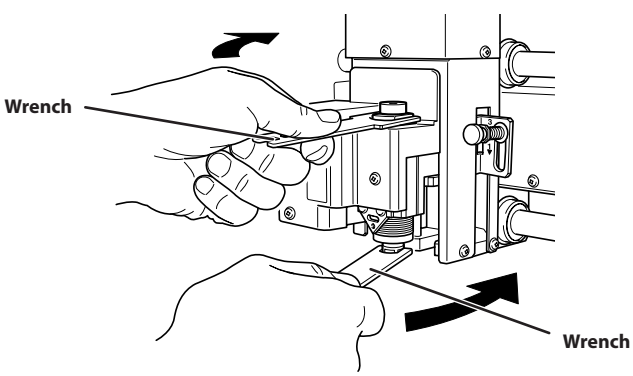
① **Temporarily tighten the solid collet.**

Insert the solid collet into the spindle unit from below, then, while holding the spindle unit immobile with a wrench, tighten temporarily.



② **Fully tighten the solid collet.**

Using two wrenches, fully tighten the solid collet.

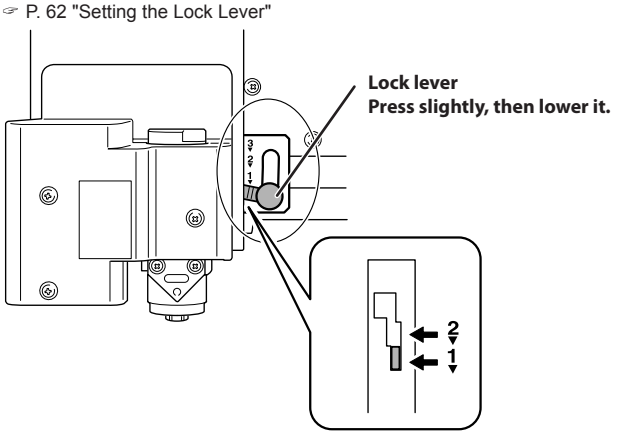


3. Set the lock lever.

Set the lock lever at 1 or 2 position.

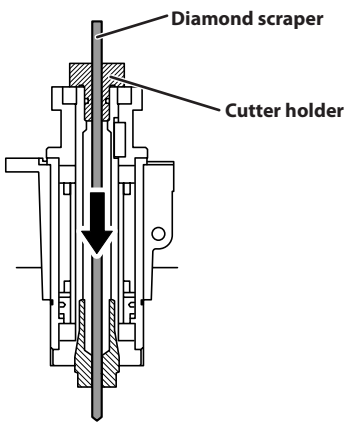
For details on the setting position of the lock lever, see the following page.

☞ P. 62 "Setting the Lock Lever"



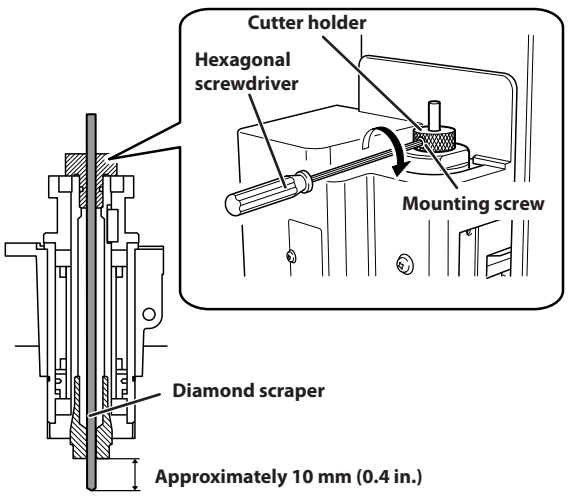
4. Install the diamond scraper and determine the amount of extension.

1 Insert the diamond scraper into the cutter holder.



2 Secure the diamond scraper in place where the tip is extended by about 10 mm (0.4 in.).

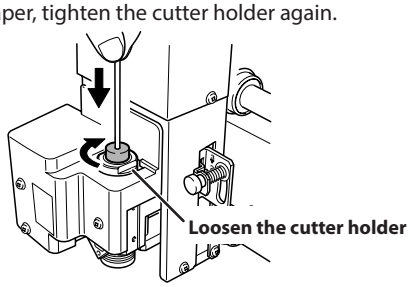
Tighten the mounting screw for the cutter holder.



This completes the installation of the diamond scraper.

Point: If diamond scraper insertion is difficult

If the diamond scraper catches on the solid collet and is difficult to insert, loosening the cutter holder makes insertion of the diamond scraper easier. Note that inserting it forcibly may result in damage to the workpiece. After inserting the diamond scraper, tighten the cutter holder again.

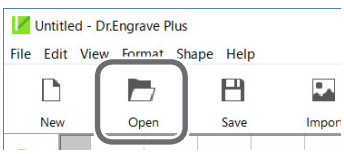


Setting the Engraving Parameters

Procedure

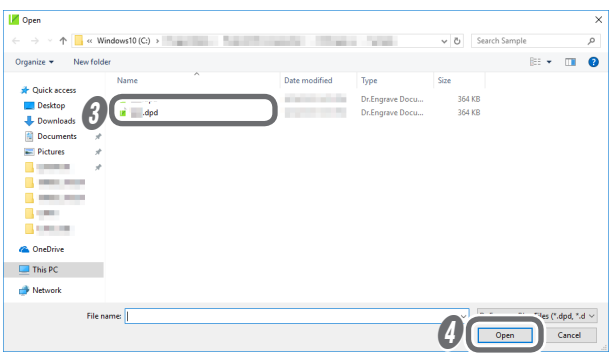
1. **Start Dr. Engrave Plus.**
   If engraving data is already opened, proceed to step 5.

2. **Click [Open].**



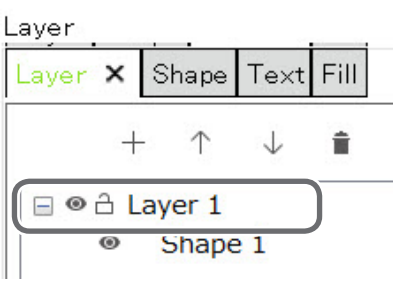
3. **Select the data to engrave.**

4. **Click [Open].**



5. **Click the shape you are going to engrave.**

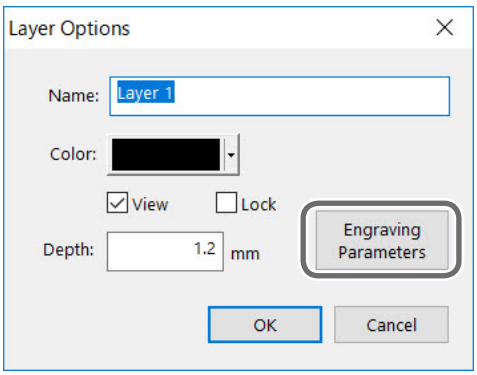
6. **Double-click the layer on which the shape to engrave is drawn on the [Layer] panel.**



7 Set each condition.

① Click [Engraving Parameters].

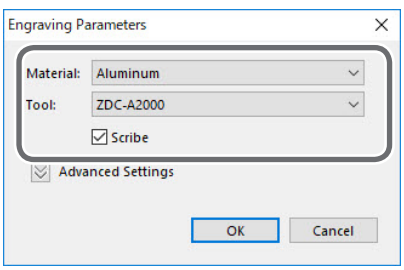
* Because the automatic Z control feature is used, there is no need to set the [Depth].



② Set the [Material] and [Tool].

When you select a diamond scraper (ZDC-A2000 or ZDC-A4000), the [Scribe] check box is selected.

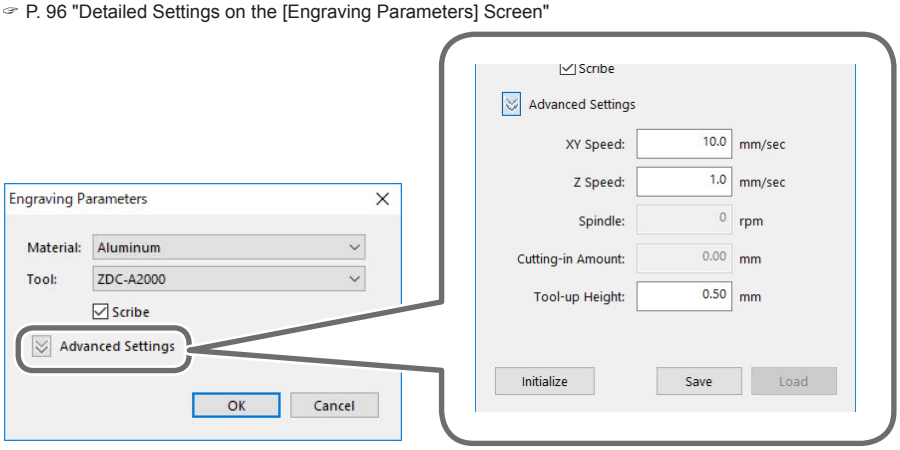
Selecting the [Scribe] check box stops the spindle when engraving.



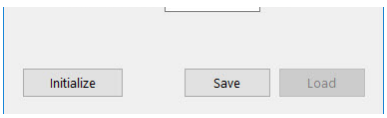
③ Click [Advanced Settings].

④ Set each item according to the engraving conditions.

☞ P. 96 "Detailed Settings on the [Engraving Parameters] Screen"

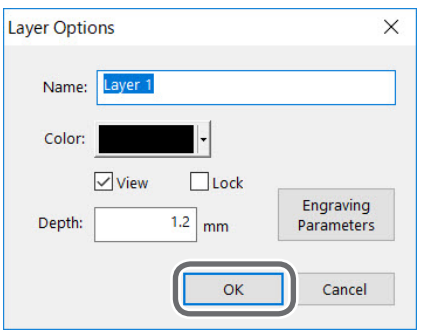


⑤ **Click [OK].**



The [Engraving Parameters] screen closes.

8 **Click [OK].**



☞ P. 54 "Step 5: Starting Engraving"

Detailed Settings on the [Engraving Parameters] Screen

Detailed settings	Explanation
XY Speed	This sets the speed at which the tool moves along X/Y axis during engraving. Unit: mm/sec. (distance moved per second)
Z Speed	This sets the speed at which the tool moves along Z axis during engraving. Unit: mm/sec. (distance moved per second)
Spindle	This sets the number of rotations of the spindle. This setting is disabled when [Scribe] check box is selected. Unit: rpm (number of rotations per minute)
Cutting-in Amount	This sets the cutting-in depth per time. Unit: mm or inch* This setting is disabled when [Scribe] check box is selected. The cutting-in amount is limited by the material of the workpiece. For the depth that you cannot engrave at one time, perform cutting-in a few times to prevent the cutting-in amount from exceeding its limit.
Tool-up Height	This sets the height at which the tool escapes along the Z-axis during engraving. This setting is ignored when [AUTO Z CONTROL] on the handy panel is set to [ON], and the height set with [SETTINGS] > [AUTO Z SETTING] on the handy panel is enabled. Unit: mm or inch*
Initialize	Initializes all the settings configured under [Advanced Settings].
Save	This saves the current setting values.
Load	This loads the saved setting values.

* To switch between mm and inch units, click [File] - [Preferences].

Using an End Mill

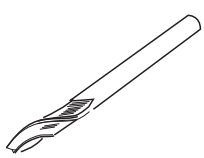
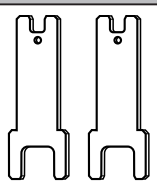
This performs engraving using an end mill.

⚠WARNING **Never inadvertently touch the computer or handy panel while performing this task.**
Unintended operation of the machine may lead to you being caught in the machine.

⚠WARNING **Securely fasten the cutting tool and workpiece in place. After securing in place, make sure no spanners or other articles have been left behind inadvertently.**
Otherwise, such articles may be thrown from the machine with force, posing a risk of injury.

⚠CAUTION **Be careful around the cutting tool.**
The cutting tool is sharp. Broken cutting tools are also dangerous. To avoid injury, exercise caution.

⚠CAUTION **The machine contains blades and other sharp components.**
Be careful not to touch the tool tip or any other sharp edges. Doing so may cause injury.

Items used in this procedure		
		
End mill*	Collet for end mill*	Wrenches (2)

* Optional item

Settings for this machine	
Automatic Z control	OFF
Spindle rotation	ON
Lock lever position	3 ▼

Before performing the procedure in this section, complete the following operations.

☞ P. 38 "Setting the Workpiece"
☞ P. 39 "Step 2: Setting the XY Origin"

1. Make the settings for Z-axis control.

1 **If the front cover is open, close it.**

2 **Press [ENTER/PAUSE].**

3 **Press [MENU] several times to display the following screen.**

```
                    READY
SETTINGS                ▼
▶OPERATING MODE
 SPINDLE REVOLUTION   ON
 AUTO Z CONTROL      OFF
```

4 **Turn the [Dial] and select [AUTO Z CONTROL].**

5 **Press [ENTER/PAUSE].**

6 **Turn the [Dial] and select [OFF].**

* The engraving depth varies according to the engraving data created using Dr. Engrave Plus.

```
                        READY
SETTINGS                 ▼
 OPERATING MODE
 SPINDLE REVOLUTION     ON
▶AUTO Z CONTROL         OFF
```

7 **Press [ENTER/PAUSE] to confirm.**

After the following message is displayed for three seconds, the previous screen appears again.

```
                        READY

Please set the lock lever
at the 3 position.
```

Important: Accurately perform P. 99 "3. Set the lock lever." later in this procedure.

8 **Press [MENU/TOP].**

The main screen appears again.

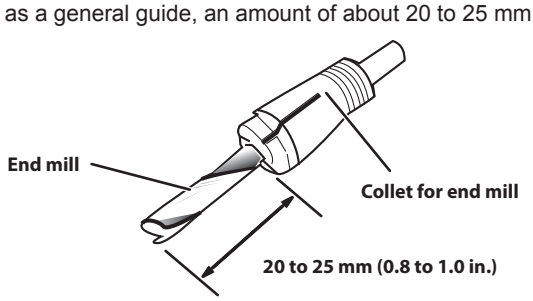
```
                        READY
X   15.00mm
Y   23.00mm
Z    0.00mm S 5000rpm
```

2. Install the end mill.

1 **Open the front cover.**

2 **Insert the end mill into the collet for end mill.**

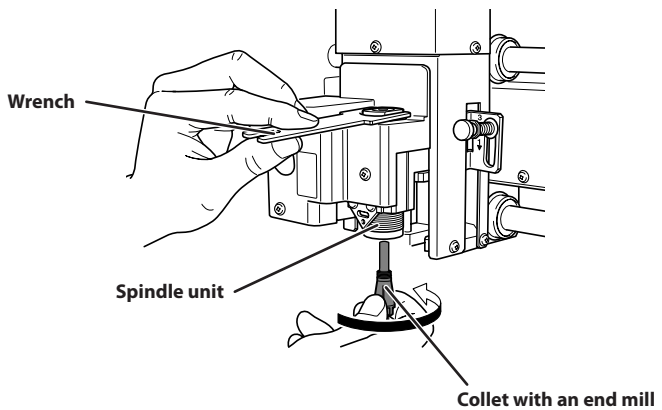
The amount of extension of the end-mill tip differs according to the end mill and the workpiece type, but as a general guide, an amount of about 20 to 25 mm (0.8 to 1.0 in.) may work well.



3 **Install the collet with the attached end mill.**

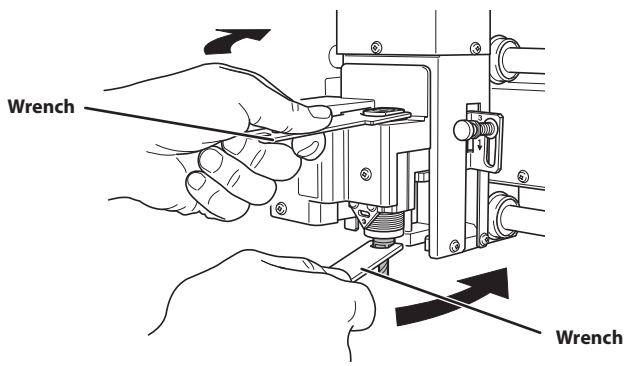
① **Temporarily tighten the collet with end mill.**

Insert the collet with end mill into the spindle unit from below, then, while holding the spindle unit immobile with a wrench, tighten temporarily.



② **Fully tighten the collet with end mill.**

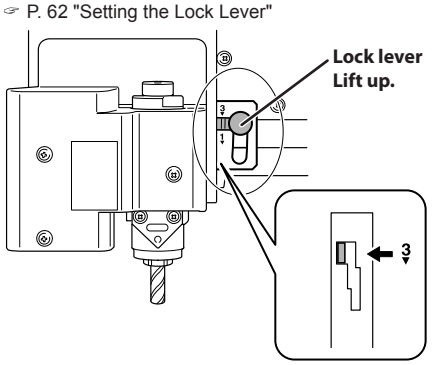
Using two wrenches, fully tighten the collet with end mill.



3. Set the lock lever.

Set the lock lever at 3 position.
The spindle head is secured in place.

☞ P. 62 "Setting the Lock Lever"



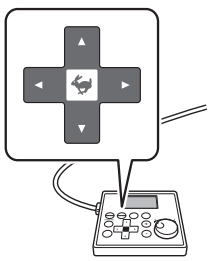
4. Set the Z origin.

1. **Close the front cover.**

2. **Press [ENTER/PAUSE].**

3. **Press [◄], [►], [▲], and [▼] to move the end mill to the area above the workpiece.**

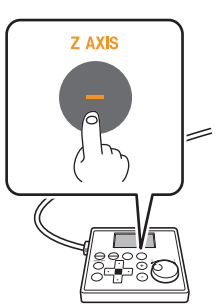
   Next, perform a small amount of cutting into the workpiece. Move to a location where cutting will not cause any problems.

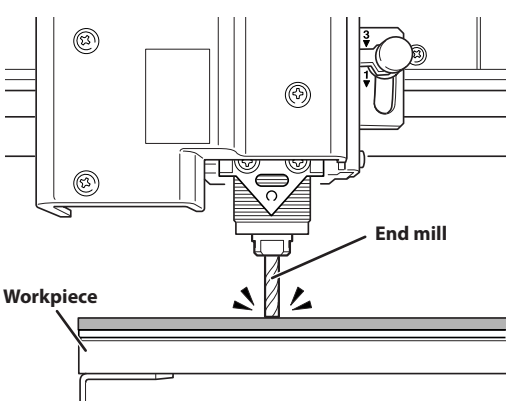


4. **Hold down [SPINDLE] for one second or longer.**

   The spindle rotates.

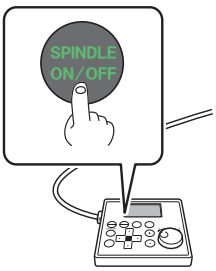
5. **Press [-Z] to lower the end mill to a location where the workpiece is cut by a slight amount.**





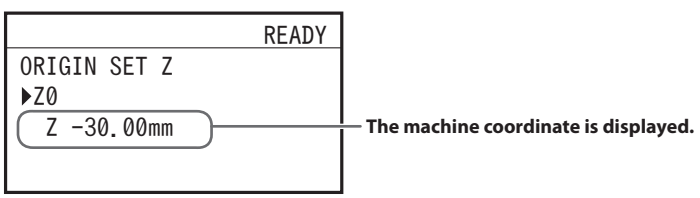
6 **Press [SPINDLE].**

The spindle stops.

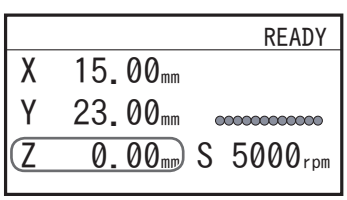


7 **Press [ORG.Z].**

8 **Press [ENTER/PAUSE].**



The main screen appears again. The coordinate value for Z-axis is set to "0," and the current value is set to Z0.



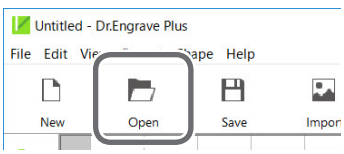
This completes the installation of the end mill.

Setting the Engraving Parameters

Procedure

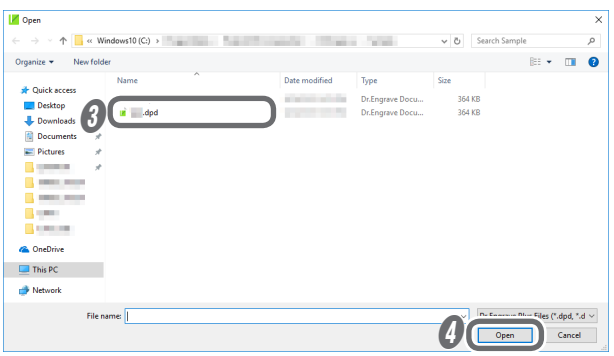
1. **Start Dr. Engrave Plus.**
   If engraving data is already opened, proceed to step 5.

2. **Click [Open].**



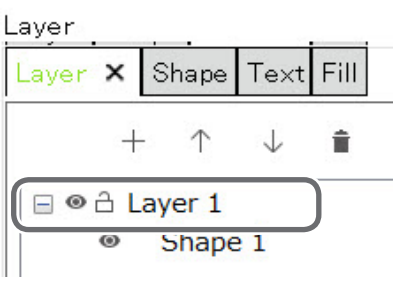
3. **Select the data to engrave.**

4. **Click [Open].**



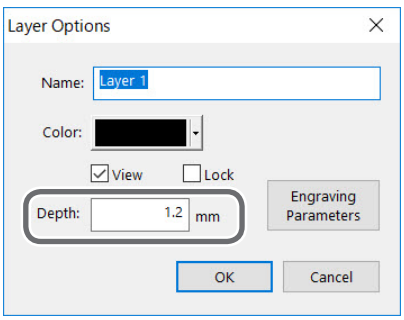
5. **Click the shape you are going to engrave.**

6. **Double-click the layer on which the shape to engrave is drawn on the [Layer] panel.**

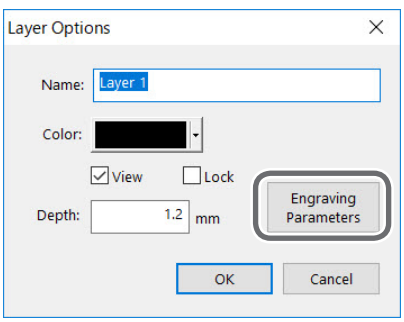


7 Set each condition.

① Set the [Depth].

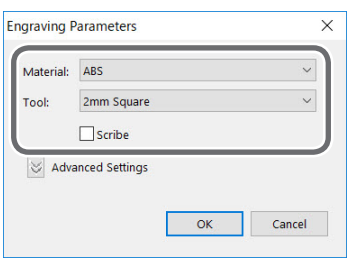


② Click [Engraving Parameters].



③ Set the [Material] and [Tool].

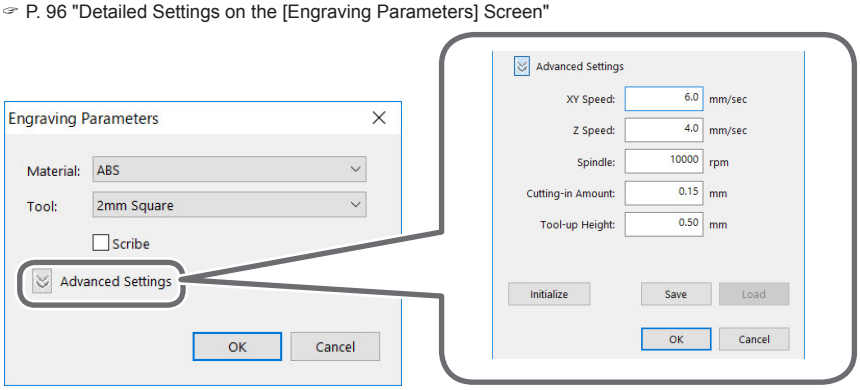
Confirm that the [Scribe] check box is cleared.



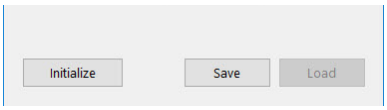
④ Click [Advanced Settings].

⑤ Set each item according to the engraving conditions.

☞ P. 96 "Detailed Settings on the [Engraving Parameters] Screen"

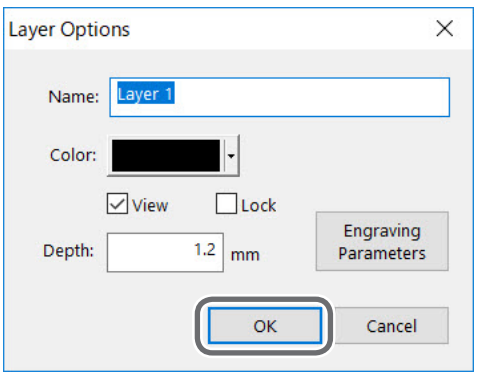


⑥ **Click [OK].**



The [Engraving Parameters] screen closes.

8 **Click [OK].**



☞ P. 54 "Step 5: Starting Engraving"

Using a Character Cutter/Parallel Cutter (without Nose Unit)

Perform engraving without using the nose unit in the following situations:

- When you do not want to attach the vacuum adapter
- When hollowing

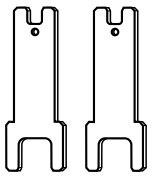
However, the Z-axis origin is fixed, so to engrave at a uniform engraving depth, the engraving surface must be level.

⚠WARNING **Never inadvertently touch the computer or handy panel while performing this task.**
Unintended operation of the machine may lead to you being caught in the machine.

⚠WARNING **Securely fasten the cutting tool and workpiece in place. After securing in place, make sure no spanners or other articles have been left behind inadvertently.**
Otherwise, such articles may be thrown from the machine with force, posing a risk of injury.

⚠CAUTION **Be careful around the cutting tool.**
The cutting tool is sharp. Broken cutting tools are also dangerous. To avoid injury, exercise caution.

⚠CAUTION **The machine contains blades and other sharp components.**
Be careful not to touch the tool tip or any other sharp edges. Doing so may cause injury.

Items used in this procedure			
			
Character cutter or parallel cutter*	Solid collet*	Hexagonal screwdriver	Wrenches (2)

* Optional item

** There are two types of solid collets. Use a solid collet that fits the diameter of the cutter that will be used. The collet for ø4.36 cutters is an optional item.

Settings for this machine	
Automatic Z control	OFF
Spindle rotation	ON
Lock lever position	3 ▼

Before performing the procedure in this section, complete the following operations.

☞ P. 38 "Setting the Workpiece"

☞ P. 39 "Step 2: Setting the XY Origin"

1. Make the settings for Z-axis control.

1 If the front cover is open, close it.

2 Press [ENTER/PAUSE].

3 Press [MENU] several times to display the following screen.

```
                    READY
SETTINGS                ▼
▶OPERATING MODE
 SPINDLE REVOLUTION   ON
 AUTO Z CONTROL      OFF
```

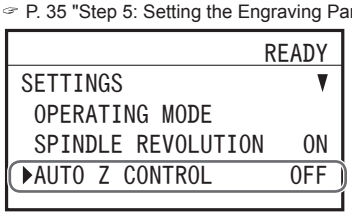
4 Turn the [Dial] and select [AUTO Z CONTROL].

5 **Press [ENTER/PAUSE].**

6 **Turn the [Dial] and select [OFF].**

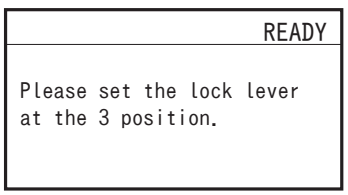
* The engraving depth varies according to the engraving data created using Dr. Engrave Plus.

☞ P. 35 "Step 5: Setting the Engraving Parameters"



7 **Press [ENTER/PAUSE] to confirm.**

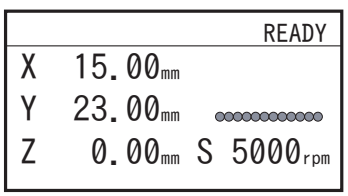
After the following message is displayed for three seconds, the previous screen appears again.



Important: Accurately perform P. 108 "3. Set the lock lever." later in this procedure.

8 **Press [MENU/TOP].**

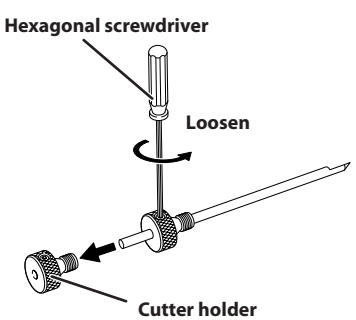
The main screen appears again.



2. Install the cutter holder and solid collet.

1 **Open the front cover.**

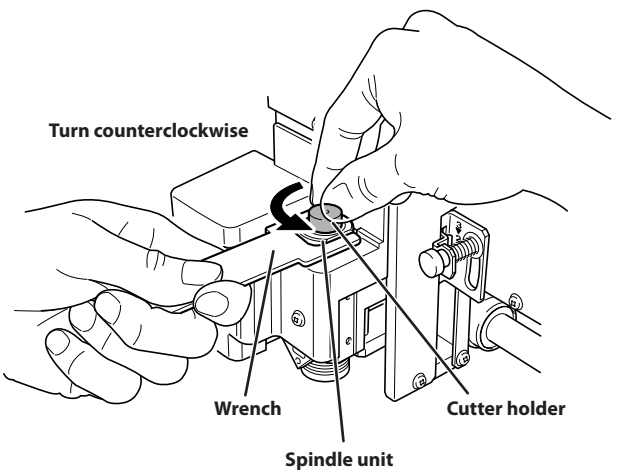
2 **Detach the cutter holder from the cutter.**



3 Install the cutter holder.

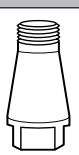
While holding the spindle unit immobile with a wrench, tighten the cutter holder.

The cutter holder is reverse-threaded (that is, you turn it counterclockwise to tighten it). Be careful to turn it in the correct direction.



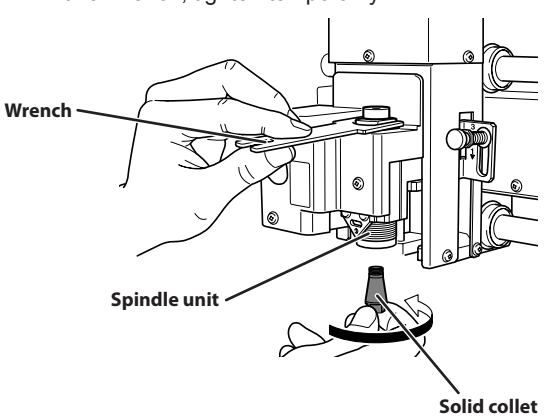
4 Attach a solid collet that fits the diameter of the cutter.

There are two types of solid collets. Use a solid collet that fits the diameter of the cutter.

For ø3.175 mm (0.125 in.)	For ø4.36 mm (0.17 in.) (Optional item)
	

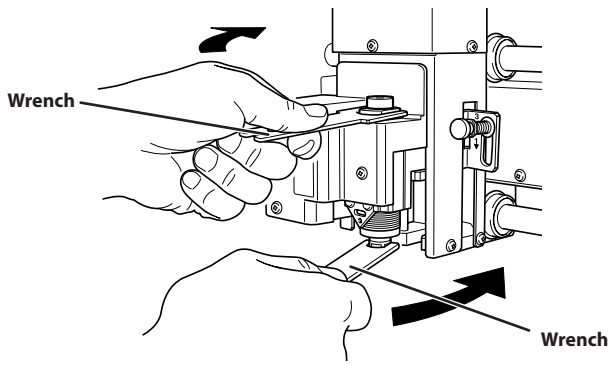
① **Temporarily tighten the solid collet.**

Insert the solid collet into the spindle unit from below, then, while holding the spindle unit immobile with a wrench, tighten temporarily.



② **Fully tighten the solid collet.**

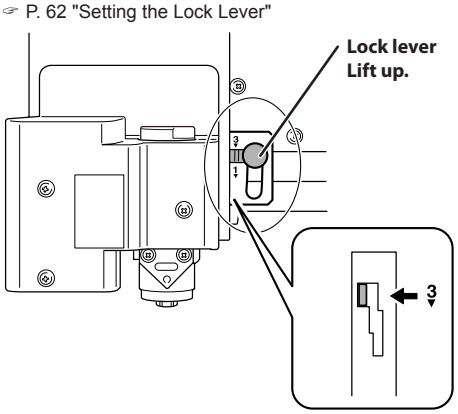
Using two wrenches, fully tighten the solid collet.



3. Set the lock lever.

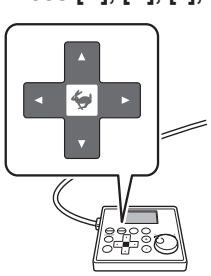
Set the lock lever at 3 position.
The spindle head is secured in place.

☞ P. 62 "Setting the Lock Lever"



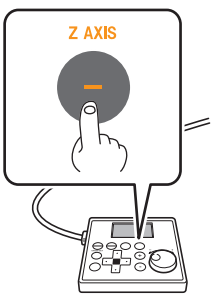
4. Install the cutter and set the Z origin point.

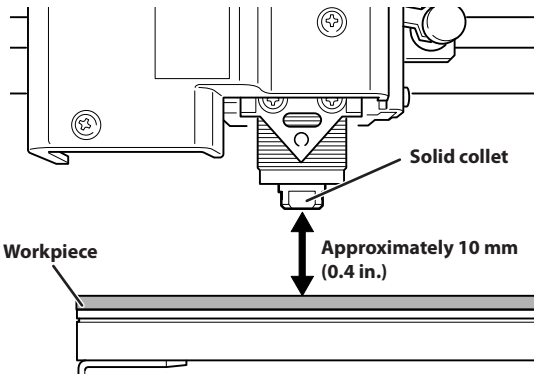
1. **Close the front cover.**
2. **Press [ENTER/PAUSE].**
3. **Press [◄], [►], [▲], and [▼] to move the spindle head to the area above the workpiece.**



4 **Press [-Z] to lower the spindle head.**

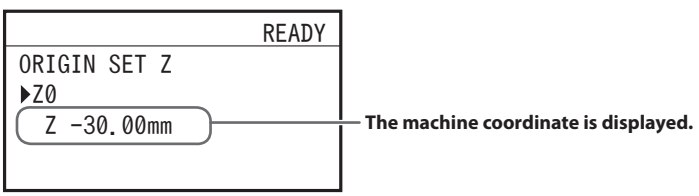
Stop at a position where the tip of the solid collet is approximately 10 mm (0.4 in.) away from the surface of the workpiece.



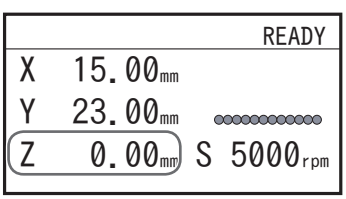


5 **Press [ORG.Z].**

6 **Press [ENTER/PAUSE].**



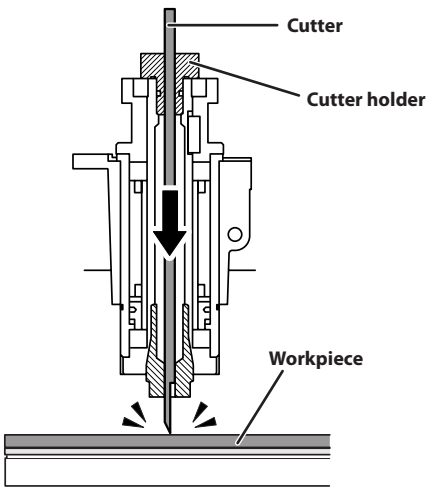
The main screen appears again. The coordinate value for Z-axis is set to "0," and the current value is set to Z0.



7 **Open the front cover.**

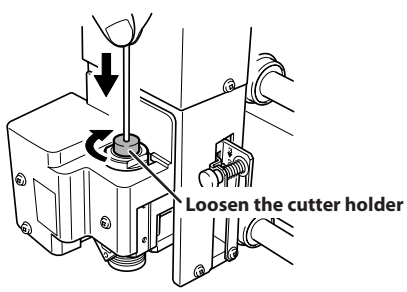
8 Insert the cutter into the cutter holder and bring the tip of the cutter into contact with the surface of the workpiece.

Placing a thin sheet of paper on the workpiece can prevent damage to the workpiece when the cutter touches it. However, take the thickness of the paper into account when you set the Z-axis origin.



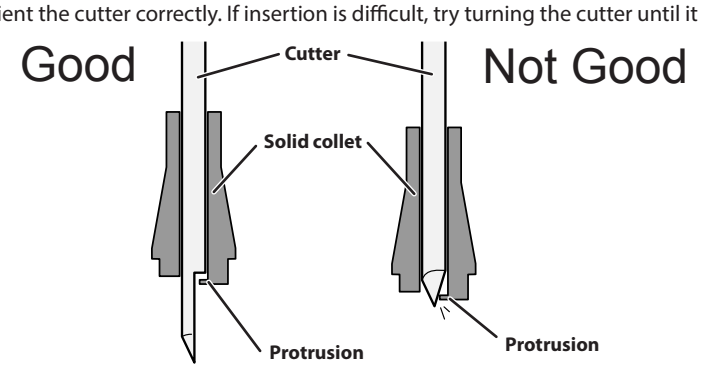
Point: If cutter insertion is difficult

If the cutter catches on the solid collet and is difficult to insert, loosening the cutter holder makes insertion easier. Note that inserting it forcibly may result in damage to the workpiece. After inserting the cutter, tighten the cutter holder again.



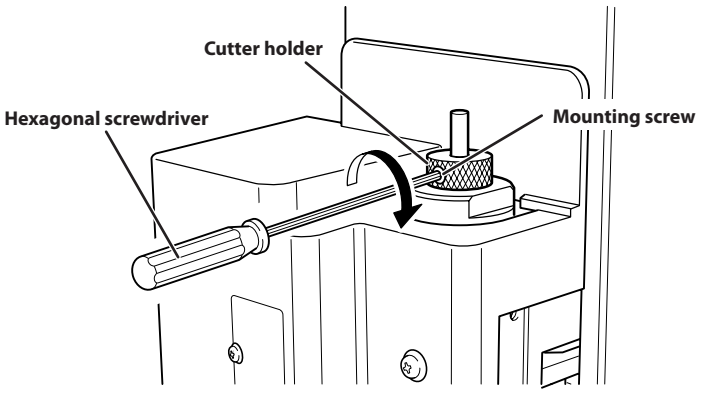
MEMO: When using a ø4.36 mm (0.17 in.) solid collet

Be careful to orient the cutter correctly. If insertion is difficult, try turning the cutter until it is smoothly inserted.



9 **Secure the cutter in place.**

Tighten the mounting screw for the cutter holder.



10 **Close the front cover.**

11 **Press [ENTER/PAUSE].**

This completes the installation of the cutter.

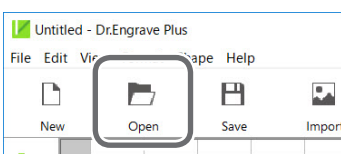
Setting the Engraving Parameters

Procedure

1 **Start Dr. Engrave Plus.**

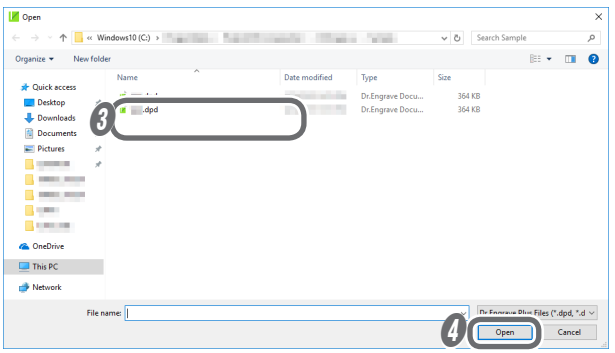
If engraving data is already opened, proceed to step **5**.

2 **Click [Open].**



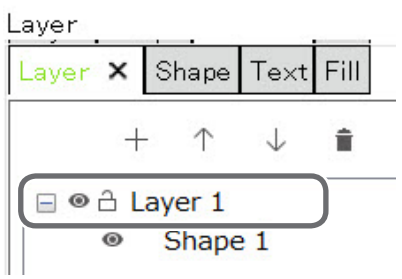
3 **Select the data to engrave.**

4 **Click [Open].**



5 **Click the shape you are going to engrave.**

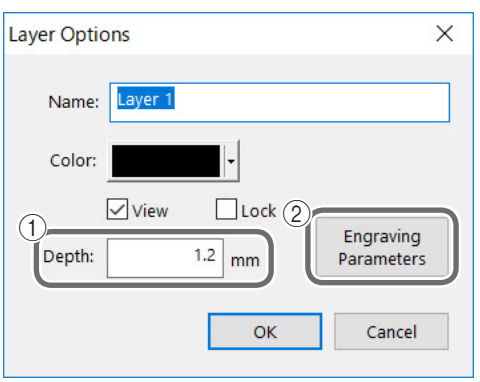
6 **Double-click the layer on which the shape to engrave is drawn on the [Layer] panel.**



7 **Set each condition.**

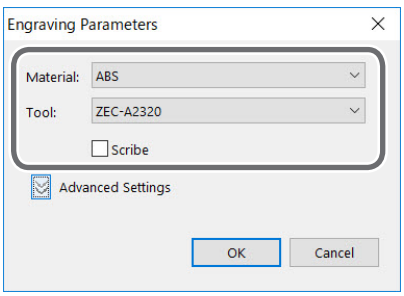
① **Enter the [Depth].**

② **Click [Engraving Parameters].**



③ **Set the [Material] and [Tool].**

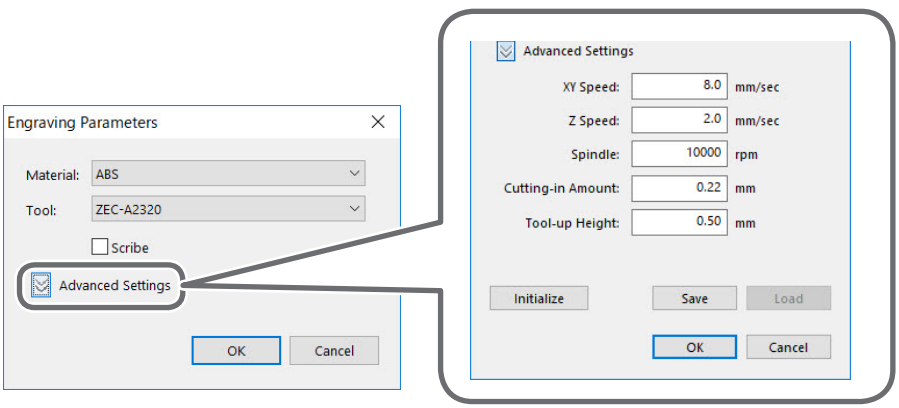
Confirm that the [Scribe] check box is cleared.



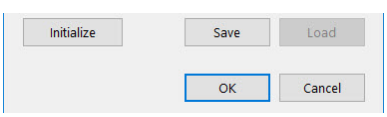
④ **Click [Advanced Settings].**

⑤ **Set each item according to the engraving conditions.**

☞ P. 96 "Detailed Settings on the [Engraving Parameters] Screen"

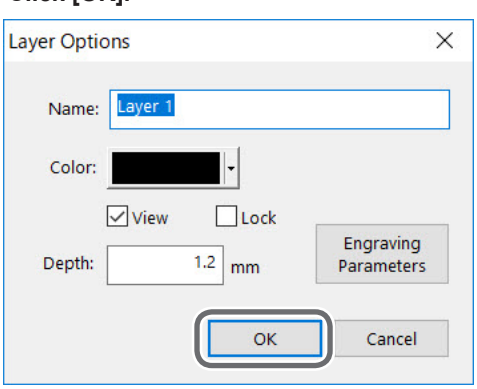


⑥ **Click [OK].**



The [Engraving Parameters] screen closes.

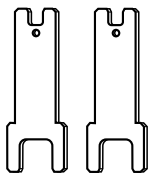
8 **Click [OK].**



☞ P. 54 "Step 5: Starting Engraving"

Surface Leveling of the Workpiece Table

Products can be finished with higher quality by obtaining flatness by cutting the workpiece table surface to a uniform depth. This operation of obtaining flatness is called "surface leveling." It is performed when rigorously precise flatness is required, such as for plate engraving, which is performed without using the nose unit.
Use the surface leveling data that is installed together with the software. It takes approximately 2 hours to perform one surface leveling operation with the surface leveling data.

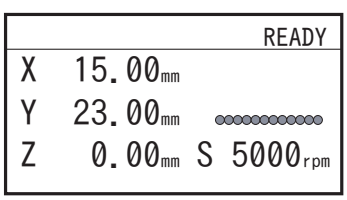
Items used in this procedure			
			
Parallel cutter*	Solid collet*	Hexagonal screwdriver	Wrenches (2)

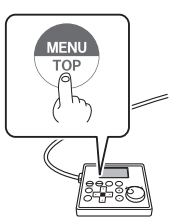
* Optional item (ZEC-A2320)
** There are two types of solid collets. Use a solid collet that fits the diameter of the cutter that will be used. Collet for ø4.36 cutters is an optional item.

Settings for this machine	
Automatic Z control	OFF
Spindle rotation	ON
Lock lever position	3 ▼

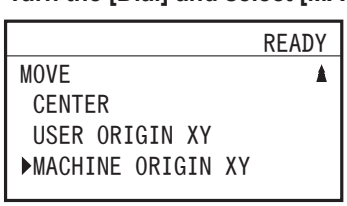
1. Set the XY origin.

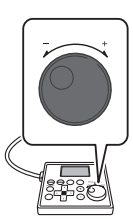
1 **On the main screen, press [MENU/TOP].**





2 **Turn the [Dial] and select [MACHINE ORIGN XY].**

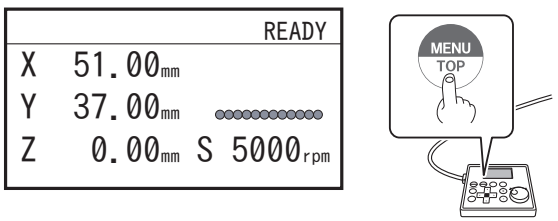




3 **Press [ENTER/PAUSE].**

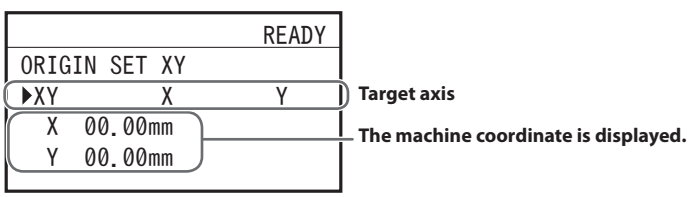
The spindle head moves to the machine origin.

4 **Press [MENU/TOP] several times to display the main screen.**



5 **Press [ORG.XY/POINTER].**

6 **Using the [Dial], select [XY] for the target axis.**



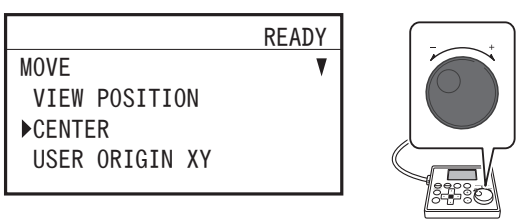
7 **Press [ENTER/PAUSE].**

The machine origin is set to the user origin, and you are returned to the main screen.

2. Install the parallel cutter and set the Z origin.

1 **Press [MENU/TOP].**

2 **Turn the [Dial] and select [CENTER].**



3 **Press [ENTER/PAUSE].**

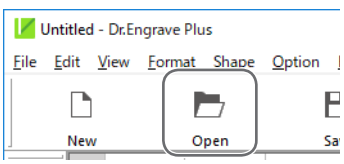
The spindle head moves to the center of the workpiece table.

4 **Perform steps 1 to 4 in P. 104 "Using a Character Cutter/Parallel Cutter (without Nose Unit)".**

3. Execute the engraving data for surface leveling.

1 **Start Dr. Engrave Plus.**

2 **Click [Open].**



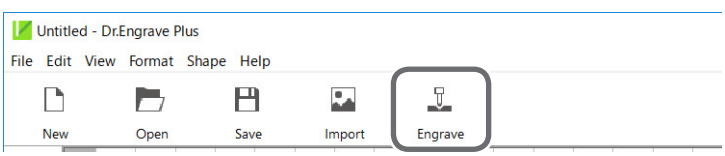
3 **Open [the drive on which Dr. Engrave Plus is installed]* - [ProgramData] - [DGSHAPE Corporation] - [Dr. Engrave Plus] - [Sample].**

* This is most commonly the [C drive] or [D drive].

4 **Select "Surfacing.dpd," the surface leveling file.**

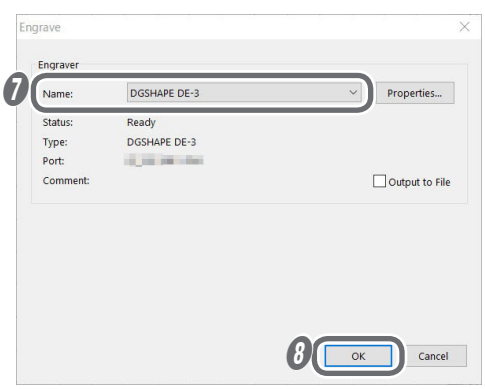
5 **Click [Open].**

6 **Click [Engrave].**



7 **Select [DGSHAPE DE-3] for the [Printer Name].**

8 **Click [OK].**



The surface leveling starts. Change the number of rotations and feeding speed as necessary during surface leveling.

☞ P. 56 "Adjusting the Tool Feeding Speed and the Number of Rotations during Engraving (Override)"

9 Check visually to ensure that no uncut areas remain.

If any parts have not been cut, redo the operation from P. 115 "2. Install the parallel cutter and set the Z origin.".

MEMO

The initial values for the engraving parameters in the surface leveling data are shown below. Generally, we recommend that you do not change these settings.

Engraving parameters in the surface leveling data			
Depth	0.3 mm (11.8 mil)	**Spindle**	20000 rpm
XY Speed	15.0 mm/sec (0.6 in./sec)	**Cutting-in Amount**	0.15 mm (5.9 mil)
Z Speed	5.0 mm/sec (0.2 in./sec)	**Tool-up Height**	0.5 mm (19.7 mil)

Previewing before Engraving

Preview using the laser pointer.

☞ P. 155 "Laser Pointer Irradiation Area"

Checking the Cutting Path of the Tool (Path Preview)

The laser pointer traces the path that the tool takes to engrave the shape. Verify that the laser pointer passes through the intended area of the loaded workpiece.

Previewing Engraving Data Created Using Dr. Engrave Plus

Procedure

1 **Set the workpiece.**

☞ P. 38 "Setting the Workpiece"

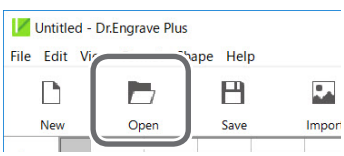
2 **Close the front cover.**

3 **Press [ENTER/PAUSE].**

4 **Start Dr. Engrave Plus.**

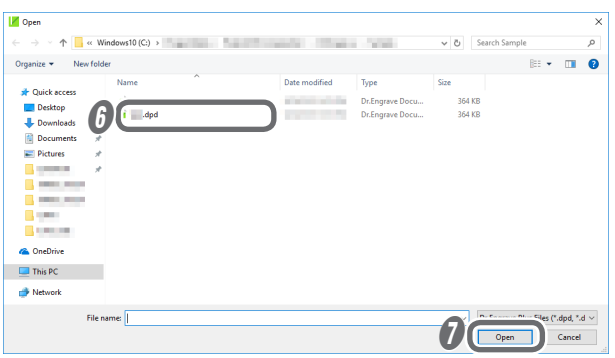
If engraving data is already open, proceed to step **8**.

5 **Click [Open].**

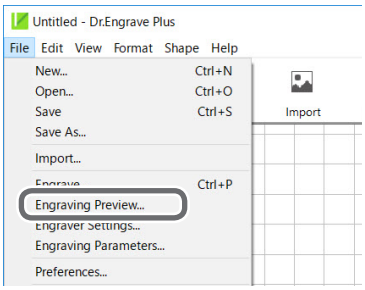


6 **Select the data to engrave.**

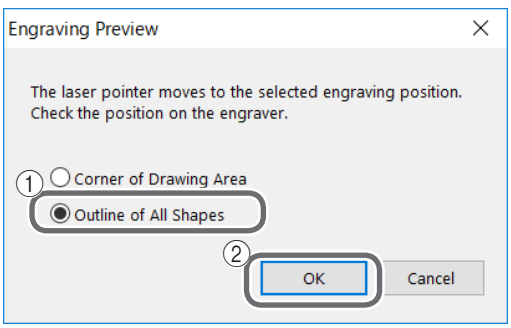
7 **Click [Open].**



8 **Click [File] - [Engraving Preview].**



9 **On the [Engraving Preview] screen, select [Outline of All Shapes].**



This starts the path preview.

Checking the Four Corners of the Engraving Area (Area Preview)

The laser pointer pauses at the points of four corners of the engraving area to indicate the area. Verify that the laser pointer stops within the intended area of the loaded workpiece.

Previewing Engraving Data Created Using Dr. Engrave Plus

Procedure

1 **Set the workpiece.**

☞ P. 38 "Setting the Workpiece"

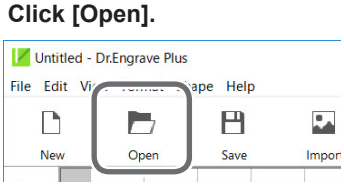
2 **Close the front cover.**

3 **Press [ENTER/PAUSE].**

4 **Start Dr. Engrave Plus.**

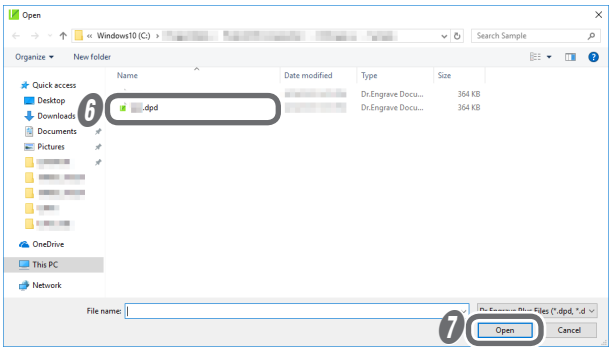
If engraving data is already open, proceed to step **8**.

5 **Click [Open].**

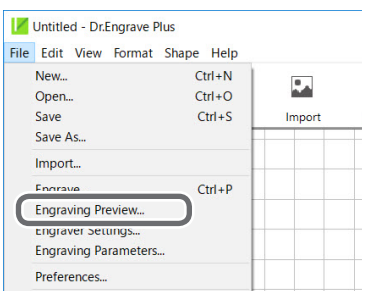


6 **Select the data to engrave.**

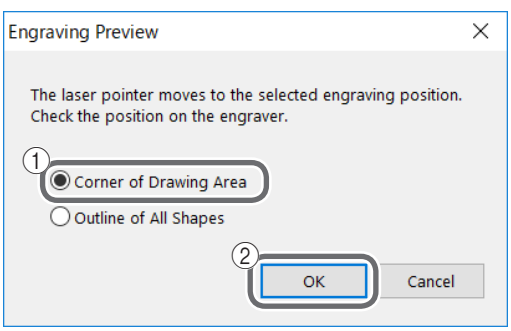
7 **Click [Open].**



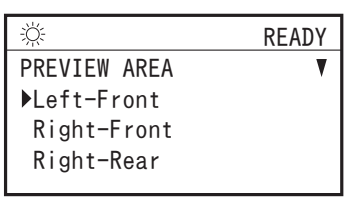
8 **Click [File] - [Engraving Preview].**



9 **On the [Engraving Preview] screen, select [Corner of Drawing Area].**



10 **Turn the [Dial] and select the corner to preview.**



11 **Press [ENTER/PAUSE].**

The laser pointer moves to the specified corner.

Checking Any Point on Engraving Data Using a Workpiece (Point Preview)

Procedure

1 **Set the workpiece.**

☞ P. 38 "Setting the Workpiece"

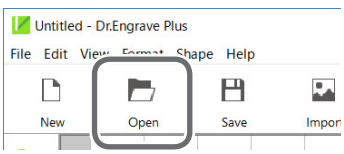
2 **Close the front cover.**

3 **Press [ENTER/PAUSE].**

4 **Start Dr. Engrave Plus.**

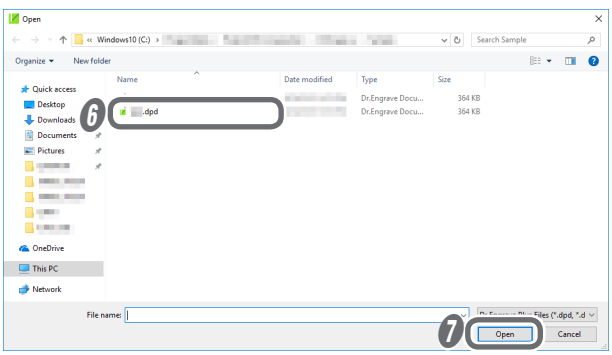
If engraving data is already open, proceed to step **8**.

5 **Click [Open].**



6 **Select the data to engrave.**

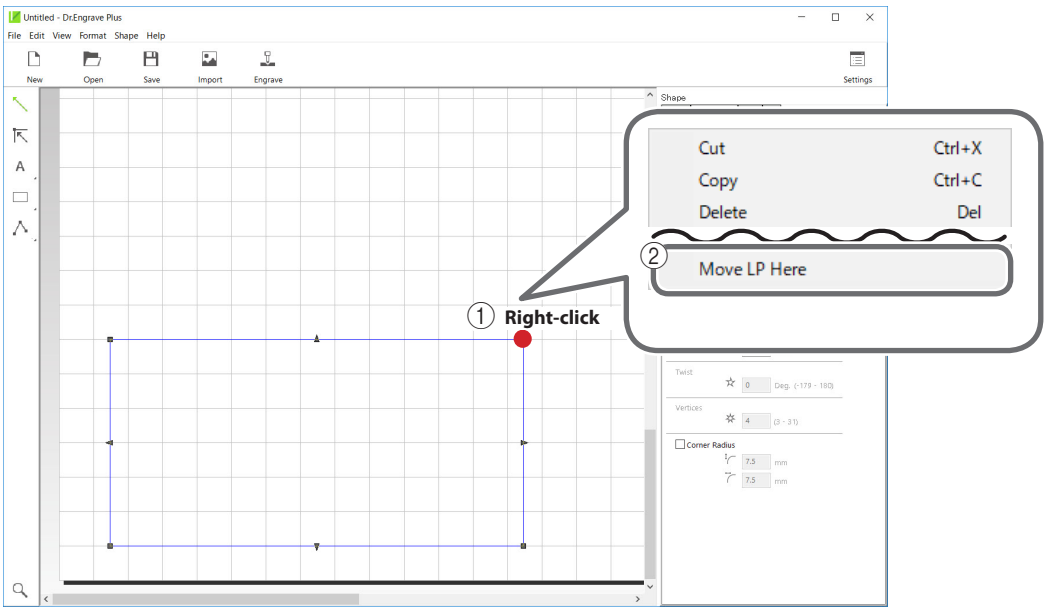
7 **Click [Open].**



8 **Move the laser pointer to any position.**

① **Right-click any point on the main screen.**

② **Click [Move LP Here].**



The laser pointer turns on and moves to the position you have clicked on the screen.

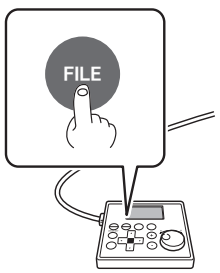
Repeating the Same Engraving

The data sent from the computer is saved in this machine's memory. You can repeatedly perform the same engraving just by using this data and performing operations from this machine.

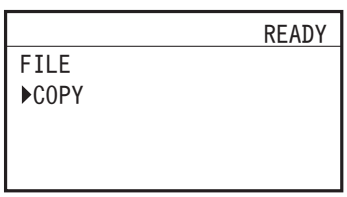
Procedure

1. **Send engraving data from the computer, and perform engraving.**
2. **Replace the workpiece.**

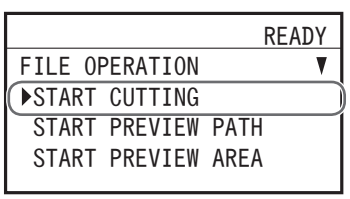
   ☞ P. 38 "Setting the Workpiece"
3. **Close the front cover.**
4. **Press [ENTER/PAUSE].**
5. **Press [FILE].**



The following window is displayed.



6. **Press [ENTER/PAUSE].**
7. **Select [START CUTTING] using the [Dial].**

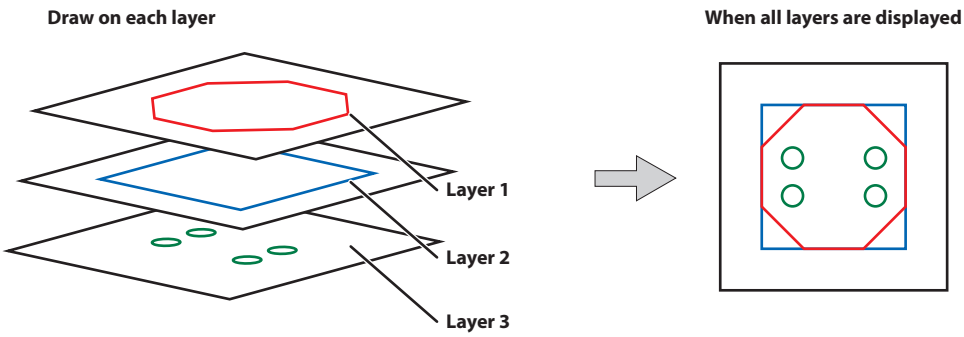


8. **Press [ENTER/PAUSE] to confirm.**

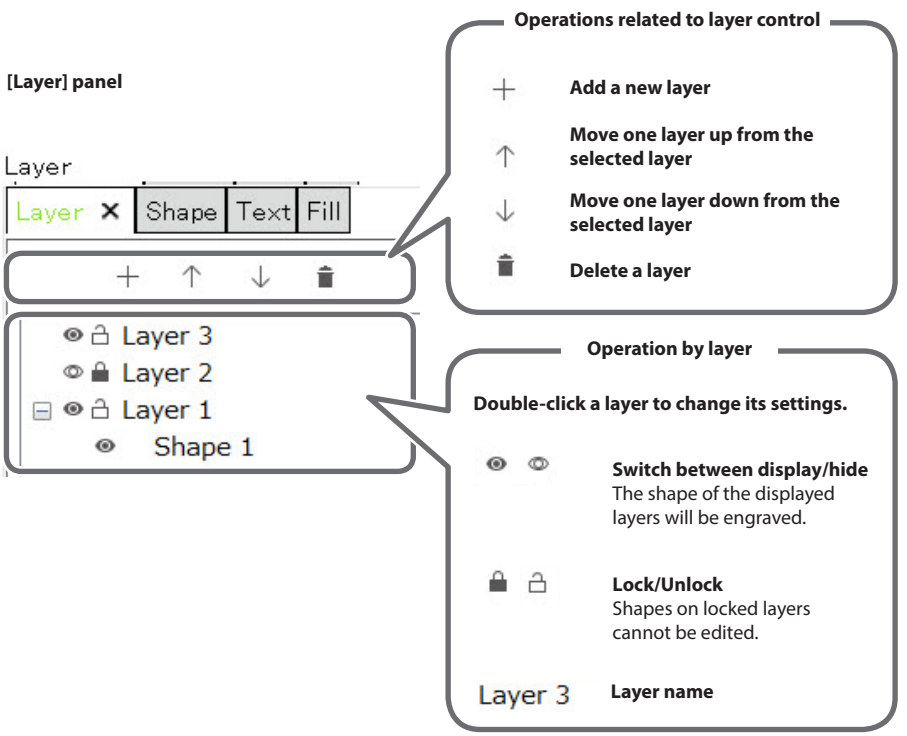
   The same engraving will be performed based on the previously performed engraving data.

Making Use of Layers

Just like a celluloid picture, different shapes can be created on each layer. These multiple shapes can then be overlaid and certain shapes can be hidden to create an overall design.



With Dr. Engrave Plus, you can select to engrave/not engrave shapes by drawing them on different layers and showing/hiding the layers. You can also change the engraving depth for each layer.



Chapter 6 Appendix

Troubleshooting (Machine Problems)

The Power Does Not Turn On

Check	Action
Has the emergency stop button been pressed?	Pressing the emergency stop button automatically turns off the power. Release the emergency stop button. ☞ P. 13 "Canceling an Emergency Stop"

Initial Operations Are Not Performed or Fail

Check	Action
Is the cover open?	Keep the cover closed during startup. If the cover is open, this machine stops the initial operation on the way.
Is anything caught on the spindle head or XYZ axes?	Check whether an obstruction has become caught and is impeding the initial operation. If so, remove it and resume the operation.

The Operation Button Does Not Respond When Pushed

Check	Action
Are cables connected?	Securely connect the power cord and the USB or LAN cable connecting the computer and this machine. ☞ Setup Guide
Is operation paused?	When the machine is paused, engraving stops and some operations are restricted. Cancel the paused state. ☞ P. 21 "Pausing and Resuming Engraving"
Is a large amount of cutting waste present?	Clean away any cutting waste. Clean the area around the spindle unit especially carefully. ☞ P. 68 "Cleaning after Engraving Finishes"
Is the driver installed correctly?	Install the driver with the correct procedure, and then connect the cable. ☞ Setup Guide
Isn't an error message displayed in the display screen?	Perform the operation after responding to the error message. ☞ P. 144 "Responding to an Error Message"

The USB Cable/LAN Cable Has Come Loose during Engraving

Check	Action
Was the data engraved until the end? (If the machine did not receive all the engraving data, engraving is carried out for the portion received.)	The message "A wrong command is detected." may be displayed at this time. If this happens, switch the power off and back on, then redo the operation from the start. Press [SPINDLE] to stop the spindle if it is rotating, and then open the front cover and check the engraving status. ☞ P. 16 "Switching the Power On or Off" ☞ P. 147 ""1025-0000" (RML-1) A wrong command is detected."

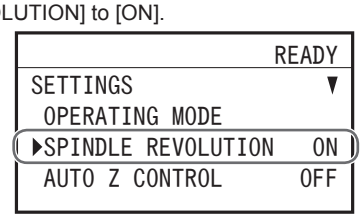
The Machine Does Not Move When Engraving Data Is Sent

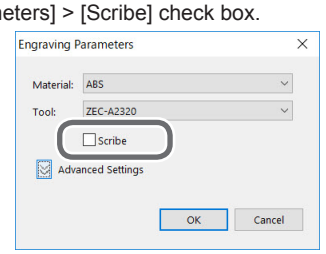
Check	Action
Is the cable connecting the computer and this machine connected?	Connect the cable securely. ☞ Setup Guide
Is the front cover open?	Close the front cover, and then press [ENTER/PAUSE].
Is operation paused?	When the machine is paused, engraving stops and some operations are restricted. Cancel the paused state. ☞ P. 21 "Pausing and Resuming Engraving"
Is the driver installed correctly?	Install the driver with the correct procedure, and then connect the cable. ☞ Setup Guide
When using a LAN connection, are the settings for the machine and computer correctly configured?	Check that the IP address, etc. have been set correctly. ☞ Setup Guide
Isn't an error message displayed in the display screen?	Perform the operation after responding to the error message. ☞ P. 144 "Responding to an Error Message"
Was the engraving data sent after the main screen of the handy panel was displayed?	When sending engraving data from a computer, configure settings and complete other handy panel operations, display the main screen, and then send the engraving data. ☞ P. 54 "Step 5: Starting Engraving"

The Spindle rotates but Does Not Move From Its Position When Engraving Data Is Sent

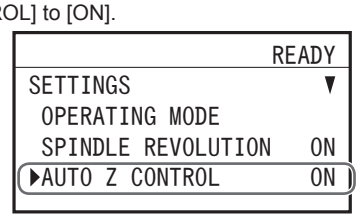
Check	Action
Have the origins been set at correct positions?	If the origin positions are incorrect, the range over which to perform engraving may be outside of the operating range. In this situation, the spindle will rotate but will not move, and operation will stop. Check whether the origins have been set to correct positions. ☞ P. 39 "Step 2: Setting the XY Origin" ☞ P. 108 "4. Install the cutter and set the Z origin point."

The Spindle Does Not Rotate

Check	Action
Is [SPINDLE REVOLUTION] under [SETTINGS] set to [ON]?	If it is set to [OFF]: Use the handy panel and go to the [SETTINGS] menu, and then set [SPINDLE REVOLUTION] to [ON].  ☞ P. 10 "Main Menu"

Check	Action
Has the [ZDC-A2000] or [ZDC-A4000] diamond scraper been selected for [Tool] on the [Engraving Parameters] screen in Dr. Engrave Plus? Alternatively, is the [Scribe] check box selected?	When you select a diamond scraper, the [Scribe] check box is selected automatically, and the spindle does not rotate so as to perform scribing for the engraving. Select a different tool or clear the [File] > [Engraving Parameters] > [Scribe] check box. 

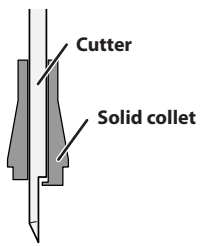
Descent Does Not Stop

Check	Action
Is [AUTO Z CONTROL] under [SETTINGS] set to [ON]?	If it is set to [OFF]: Use the handy panel and go to the [SETTINGS] menu, and then set [AUTO Z CONTROL] to [ON].  ☞ P. 10 "Main Menu"
Is the lock lever set at 1 or 2 position?	Set the lock lever at the 1 or 2 position. ☞ P. 62 "Setting the Lock Lever"

If the Problem Still Exists

Turn off the power and contact your authorized Roland DG Corporation dealer.

Loud Noise or Unpleasant Noise during Engraving

Check	Action
The load applied to the tool may be too large.	Make adjustments, such as reducing the feeding speed or engraving depth. ☞ P. 96 "Detailed Settings on the [Engraving Parameters] Screen" ☞ P. 87 "Typical Setting by Material" ☞ P. 87 "Tips for Fine-tuning"
When nose unit is not used, is the tool tip sufficiently protruded from the collet?	If the tool tip is not protruded to the position where the collet can adequately hold the tool, the tool may wobble during engraving, resulting in an unpleasant sound. Install the tool again using the correct procedure. Good  ☞ P. 104 "Using a Character Cutter/Parallel Cutter (without Nose Unit)" ☞ P. 88 "Using a Diamond Scraper" ☞ P. 97 "Using an End Mill"

Troubleshooting (Engraving Quality Problems)

Engraving Is Not Performed on the Expected Position

You can use the preview function to check the engraving position in advance.

☞ P. 118 "Previewing before Engraving"

Check	Action
Have the origins been set at correct positions?	Check that the origins have been set correctly. If the origin locations are not correct, engraving at an unintended location may occur. ☞ P. 39 "Step 2: Setting the XY Origin"

Cutting-in Depth Is Not Uniform (When Nose Unit Is Used)

Check	Action
Is the cutter installed according to the correct procedure for when the nose unit is used?	Install the cutter according to the correct procedure. ☞ P. 41 "Step 3: Installing a Character Cutter/Parallel Cutter"
Is the cutter holder, the cutter holder mounting screw, or the collet loose?	Tighten the parts around the cutter again. ☞ P. 41 "Step 3: Installing a Character Cutter/Parallel Cutter"
Is the X- and Y-axis feeding speed too fast for the workpiece, or is the spindle rotating speed too slow for it?	Adjust the XY axes feeding speed and the spindle rotating speed. ☞ P. 56 "Adjusting the Tool Feeding Speed and the Number of Rotations during Engraving (Override)"
Is the cutter worn?	Replace the cutter.
Is there cutting waste around the engraving area? (When the cutting-in depth is extremely shallow, the effects of cutting waste can become large.)	Try using a cutter with a narrow tip width, along with increasing the cutting-in depth. Alternatively, use the vacuum adapter for chip cleaning. • Adjusting the cutting-in depth ☞ P. 35 "Step 5: Setting the Engraving Parameters" • Attaching the Vacuum Adapter ☞ P. 58 "Attaching the Vacuum Adapter"

Cutting-in Depth Is Not Uniform (When Nose Unit Is Not Used)

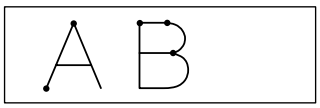
Using the nose unit enables you to perform engraving while keeping the cutting-in depth uniform. Basically, we recommend that you use the nose unit.

☞ P. 83 "Nose Unit Overview and Precautions"

If you do not want to use the nose unit or cannot use it, try taking following actions.

Check	Action
Is the surface of the workpiece level?	Revise the mounting method, etc. and mount the workpiece so that its surface is level. Also, if the flatness or levelness of the workpiece table is an issue, perform surface leveling of the workpiece table.
Is the tool installed according to the correct procedure for when the nose unit is not used?	Install the cutter according to the correct procedure. ☞ P. 104 "Using a Character Cutter/Parallel Cutter (without Nose Unit)"
Is the cutter holder, the cutter holder mounting screw, or the collet loose?	Tighten the parts around the cutter again. ☞ P. 104 "Using a Character Cutter/Parallel Cutter (without Nose Unit)"

The Tool Leaves Tracks at Places Where Cutting-in Starts or Where Lines Change Direction

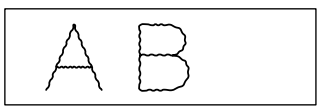


Check	Action
Is the spindle rotating speed too fast for the feeding speed?	Try reducing the spindle rotating speed. ☞ P. 56 "Adjusting the Tool Feeding Speed and the Number of Rotations during Engraving (Override)"
Is the tool worn?	Replace the Tool.

An Engraved Bottom Surface Is Rough or Burring Remains

Check	Action
Is the spindle rotating speed too slow for the feeding speed?	Try increasing the spindle rotating speed or reducing the feeding speed. ☞ P. 56 "Adjusting the Tool Feeding Speed and the Number of Rotations during Engraving (Override)"
Is the workpiece firmly secured in place?	Reload the workpiece so that it does not come loose or slip. ☞ P. 38 "Step 1: Setting the Workpiece"
Is cutting-in performed only once?	Try performing engraving a second time to finish the bottom surface and remove any burring. Making the cutting-in depth about 0.02 to 0.05 mm (0.0008 to 0.002 in.) deeper for the second pass may yield better results.
Is the tool worn?	Replace the Tool.
Does the tool diameter match the collet diameter?	If the collet diameter is too large for the tool diameter, engraving will be performed without the tool firmly secured in place. Use a collet that fits the diameter of the tool. ☞ P. 41 "Step 3: Installing a Character Cutter/Parallel Cutter" ☞ P. 104 "Using a Character Cutter/Parallel Cutter (without Nose Unit)" ☞ P. 88 "Using a Diamond Scraper" ☞ P. 97 "Using an End Mill"

Engraved Lines Are Uneven or Wavy



Check	Action
Is the cutter holder, the cutter holder mounting screw, or the collet loose?	If the parts around the tool are loose, the tool goes out of control. Tighten securely. ☞ P. 41 "Step 3: Installing a Character Cutter/Parallel Cutter" ☞ P. 104 "Using a Character Cutter/Parallel Cutter (without Nose Unit)" ☞ P. 88 "Using a Diamond Scraper" ☞ P. 97 "Using an End Mill"
Is the workpiece firmly secured in place?	Reload the workpiece so that it does not come loose or slip. ☞ P. 38 "Step 1: Setting the Workpiece"
Does the tool diameter match the collet diameter?	If the collet diameter is too large for the tool diameter, engraving will be performed without the tool firmly secured in place. Use a collet that fits the diameter of the tool. ☞ P. 41 "Step 3: Installing a Character Cutter/Parallel Cutter" ☞ P. 104 "Using a Character Cutter/Parallel Cutter (without Nose Unit)" ☞ P. 88 "Using a Diamond Scraper" ☞ P. 97 "Using an End Mill"

Troubleshooting (Installation)

Driver Installation Is Impossible

If installation quits partway through or if the wizard does not appear when connecting with a USB cable, Engraver Driver may not have been installed correctly. In such cases, perform the following procedures. (If procedure A does not solve your problem, perform procedure B.)

Windows 10 (Procedure A)

Procedure

1. **Connect the machine to the computer using the USB cable.**
2. **Turn on the machine.**
3. **Click [Desktop].**
4. **On the [Start] menu, click [Settings].**
5. **Click [Devices].**
6. **Click [Devices and printers] under [Related settings] on the right side of the screen.**
7. **Check that the model you are using is displayed under [Unspecified].**
8. **Right-click the icon of the model you are using, and then click [Remove device].**
9. **When the message "Are you sure you want to remove this device?" is displayed, click [Yes].**
10. **Check that the icon for the model you are using is no longer displayed under "Unspecified."**
11. **Temporarily disconnect the USB cable connecting the machine to the computer, and then reconnect these devices.**

    If the printer icon for the machine you are using is displayed under "Printers," Engraver Driver has been successfully installed.

    If you could not solve your problem by following this procedure, perform the procedure under "Windows 10 (Procedure B)."

Windows 10 (Procedure B)

Procedure

1. **Connect the machine to the computer using the USB cable.**
2. **Turn on the machine.**
3. **If [Found New Hardware] appears, click [Cancel] to close it.**
4. **If any printers other than the machine are connected to the computer, disconnect their USB cables.**
5. **Click [Desktop].**
6. **Right-click the [Start] button, and then click [Device Manager].**

7. **If the [User Account Control] window appears, click [Continue].**
   [Device Manager] appears.
8. **From the [View] menu, click [Show hidden devices].**
9. **In the list, find and double-click [Printers] or [Other devices].**
10. **The name of your machine or [Unknown device] appears below the selected item. Click the name to select it.**
11. **From the [Action] menu, click [Uninstall device].**
12. **In the [Confirm Device Uninstall] window, click [OK].**
    Close [Device Manager].
13. **Remove the USB cable from the computer.**
14. **Restart Windows.**
15. **Uninstall Engraver Driver.**
    Follow the procedure under P. 137 "Windows 10" to uninstall the driver.
16. **Reinstall the driver according to the procedure in the "Setup Guide" ("Installing the Software") or under** P. 140 "Installing the Driver Separately"**.**

Windows 8.1 (Procedure A)

Procedure

1. **Connect the machine and the computer with a USB cable.**
2. **Turn on the machine.**
3. **Click [Desktop].**
4. **Right-click the [Start] button, and then click [Control Panel].**
5. **Click [Devices and Printers].**
6. **Check that the model you are using is displayed under [Unspecified].**
7. **Right-click the icon of the model you are using, and then click [Remove device].**
8. **When the message "Are you sure you want to remove this device?" is displayed, click [Yes].**
9. **Check that the icon for the model you are using is no longer displayed under "Unspecified."**
10. **Temporarily disconnect the USB cable connecting the machine to the computer, and then reconnect these devices.**
    If the printer icon for the machine you are using is displayed under "Printers," Engraver Driver has been successfully installed.
    If you could not solve your problem by following this procedure, perform the procedure under "Windows 8.1 (Procedure B)."

Windows 8.1 (Procedure B)

Procedure

1. **Connect the machine to the computer using the USB cable.**
2. **Turn on the machine.**
3. **If [Found New Hardware] appears, click [Cancel].**
4. **If any printers other than the machine are connected to the computer, disconnect their USB cables.**
5. **Click [Desktop].**
6. **Right-click the [Start] button, and then click [Device Manager].**
7. **If the [User Account Control] window appears, click [Continue].**
   [Device Manager] appears.
8. **From the [View] menu, click [Show hidden devices].**
9. **In the list, find and double-click [Printers] or [Other devices].**
10. **The name of your machine or [Unknown device] appears below the selected item. Click the name to select it.**
11. **From the [Action] menu, click [Uninstall].**
12. **In the [Confirm Device Uninstall] window, click [OK].**
13. **Close [Device Manager].**
14. **Disconnect the USB cable that connects the machine and the computer.**
15. **Restart Windows.**
16. **Uninstall Engraver Driver.**
    Follow the procedure under P. 138 "Windows 8.1" to uninstall the driver.
17. **Reinstall the driver according to the procedure in the "Setup Guide" ("Installing the Software") or under** P. 140 "Installing the Driver Separately"**.**

Windows 7 (Procedure A)

Procedure

1. **Connect the machine and the computer with a USB cable.**
2. **Turn on the machine.**
3. **Click the [Start] menu, and then click [Devices and Printers].**

4. **Check that the model you are using is displayed under "Unspecified."**
5. **Right-click the icon of the model you are using, and then click [Troubleshoot].**
6. **When a window is displayed with the message [Install a driver for this device], click [Apply this fix].**
7. **If a message is displayed asking you to [Set as default printer], click [Skip this fix].**
8. **If the message [Troubleshooting has completed] is displayed, click [Close the troubleshooter].**
   If the printer icon for the machine you are using is displayed under "Printers," Engraver Driver has been successfully installed. If you could not solve your problem by following this procedure, perform the procedure under "Windows 7 (Procedure B)."

Windows 7 (Procedure B)

Procedure

1. **If [Found New Hardware] appears, click [Cancel] to close it.**
2. **Click the [Start] menu, and then right-click [Computer].**
3. **Click [Properties].**
4. **Click [Device Manager].**
   If the [User Account Control] window appears, click [Continue].
   [Device Manager] appears.
5. **From the [View] menu, click [Show hidden devices].**
6. **In the list, find [Other devices], and then double-click it.**
7. **The name of your machine or "Unknown device" appears below the selected item. Click the name to select it.**
8. **From the [Action] menu, click [Uninstall].**
9. **In the "Confirm Device Uninstall" window, select the "Delete the driver software for this device." check box, and then click [OK].**
10. **Close [Device Manager].**
11. **Disconnect the USB cable that connects the machine and the computer.**
12. **Restart Windows.**
13. **Uninstall Engraver Driver.**
    Follow the procedure under P. 139 "Windows 7" to uninstall the driver.
14. **Reinstall the driver according to the procedure in the "Setup Guide" ("Installing the Software") or under** P. 140 "Installing the Driver Separately"**.**

Uninstalling the Driver

To uninstall Engraver Driver, follow the procedure below.

Important

When you uninstall the driver, the driver for the USB connection and the driver for the LAN connection will both be deleted regardless of which connection method you are using.

Windows 10

* If you uninstall the driver without following the procedure given below, you may not be able to reinstall the driver.

Procedure

1. **Switch off the machine, and then disconnect the connector cable between the computer and the machine.**
2. **Log on to Windows as the computer's administrator.**
3. **Click [Desktop].**
4. **Open Explorer and open the drive and folder containing Engraver Driver. (*Note)**
5. **Double-click [SETUP64.EXE] (64-bit version) or [SETUP.EXE] (32-bit version).**
   If the [User Account Control] window appears, click [Yes].
   The setup program for Engraver Driver starts.
6. **Select [Uninstall].**
7. **Select the machine to remove.**
8. **Click [Start].**
9. **If a window prompting you to restart the computer appears, click [Yes].**
10. **After the computer has restarted, click [Settings] on the [Start] menu.**
11. **Click [Devices].**
12. **Click [Devices and printers] under [Related settings] on the right side of the screen.**
13. **If you can see the icon of the machine to remove, right-click it and click [Remove device].**

(*Note)
When using the CD-ROM, specify the folder as shown below. (This is assuming your CD-ROM drive is the D drive.)
D: \Drivers\WINX64 (64-bit versions)
D: \Drivers\WINX86 (32-bit versions)
If you're not using the DGSHAPE Software Package CD, go to the DGSHAPE Corporation website (http://www.dgshape.com/) and download Engraver Driver for the machine you want to remove, and then specify the folder where the downloaded file has been extracted.

Windows 8.1

* If you uninstall the driver without following the procedure given below, you may not be able to reinstall the driver.

Procedure

1. **Turn off the machine and remove the cable connecting the machine to the computer.**
2. **Log on to Windows as the computer's administrator.**
3. **Open Explorer and open the drive and folder containing Engraver Driver. (*Note)**
4. **Double-click [SETUP64.EXE] (64-bit version) or [SETUP.EXE] (32-bit version).**
   If the [User Account Control] window appears, click [Allow].
   The setup program for Engraver Driver starts.
5. **Click [Uninstall].**
6. **Select the machine you want to remove, and then click [Start].**
7. **If a window prompting you to restart the computer appears, click [Yes].**
8. **After the computer has restarted, click [Desktop].**
9. **Right-click the [Start] button, and then click [Control Panel].**
10. **Click [Devices and Printers].**
11. **If you can see the icon of the machine to remove, right-click it and click [Remove device].**
    (*Note)
    When using the CD-ROM, specify the folder as shown below. (This is assuming your CD-ROM drive is the D drive.)
    D: \Drivers\WINX64 (64-bit versions)
    D: \Drivers\WINX86 (32-bit versions)
    If you're not using the DGSHAPE Software Package CD, go to the DGSHAPE Corporation website (http://www.dgshape.com/) and download Engraver Driver for the machine you want to remove, and then specify the folder where the downloaded file has been extracted.

Windows 7

* If you uninstall the driver without following the procedure given below, you may not be able to reinstall the driver.

Procedure

1. **Disconnect the USB cable that connects the machine and the computer.**
2. **Log on to Windows as the computer's administrator.**
3. **Open Explorer and select the name of the drive or folder containing Engraver Driver. (*Note)**
4. **Select [SETUP64.EXE] (64-bit version) or [SETUP.EXE] (32-bit version), and then click [Open].**
5. **Click [OK].**
   If the [User Account Control] window appears, click [Allow].
   The setup program for Engraver Driver starts.
6. **Select [Uninstall].**
7. **Select the machine to remove.**
8. **Click [Start].**
9. **If a window prompting you to restart the computer appears, click [Yes].**
   The uninstallation will be finished after the computer restarts.

(*Note)
When using the CD-ROM, specify the folder as shown below. (This is assuming your CD-ROM drive is the D drive.)
D: \Drivers\WINX64 (64-bit versions)
D: \Drivers\WINX86 (32-bit versions)
If you're not using the DGSHAPE Software Package CD, go to the DGSHAPE Corporation website (http://www.dgshape.com/) and download Engraver Driver for the machine you want to remove, and then specify the folder where the downloaded file has been extracted.

Installing the Driver Separately

On this machine, you can install Engraver Driver and software all at once. For the method to install all at once, see the Setup Guide.

Procedure

1 Log on to Windows as the computer's administrator (or as an "Administrators" account).

2 Insert the DGSHAPE Software Package CD into the CD-ROM drive of the computer.

When the automatic playback window appears, click [Run menu.exe]. The setup menu appears automatically.

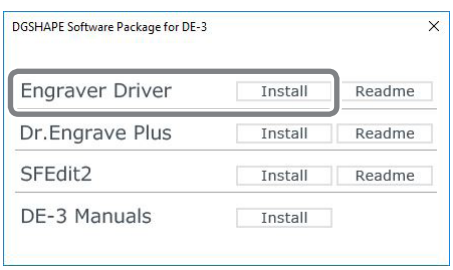
3 If Engraver Driver is already installed, uninstall it.

☞ P. 137 "Uninstalling the Driver"

If the driver is not installed or if it has been uninstalled, go to step 4.

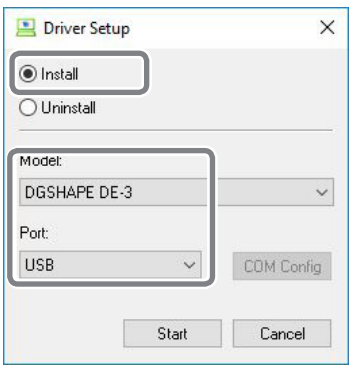
4 Click [Custom Install].

5 Click [Install] for Engraver Driver.



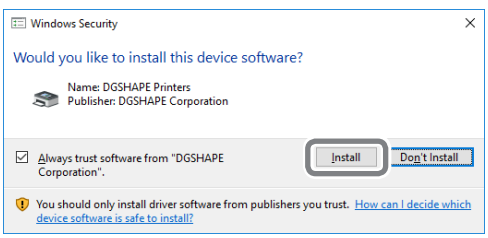
6 Select [Install], [DGSHAPE DE-3] for the model name, the port, and then click [Start].

Select the [Port] according to the method for connecting this machine and the computer.

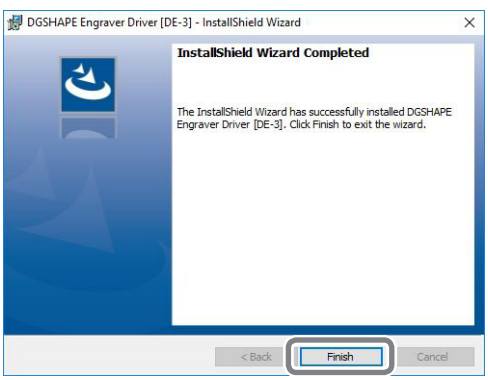


Engraver Driver installation begins. Follow the on-screen explanations to proceed with the installation.

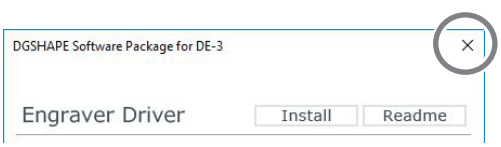
If the following window appears during installation, click [Install].



7 When the window shown in the figure appears, click [Finish].



8 Click × on the setup menu screen.



9 **Remove the CD from the CD-ROM drive.**

10 **Connect this machine and the computer with a USB cable or a LAN cable.**

Engraver Driver will be installed automatically.

* Use the included USB cable. Never use a USB hub.
* When using a USB connection, connect the computer and the machine directly. Simultaneous connections to multiple machines are not supported.
* Do not connect a LAN cable and a USB cable to the machine at the same time.
* When connected to multiple machines with LAN connections, simultaneous output to multiple machines is not supported.

Installing the Software and the Electronic-format Manual Separately

Procedure

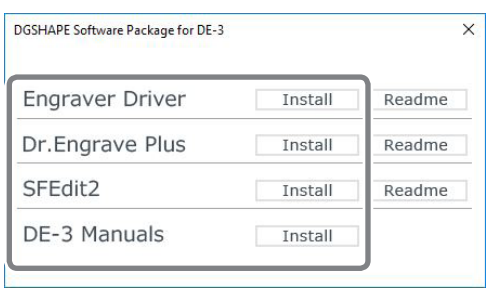
1 **Log on to Windows as the computer's administrator (or as an "Administrators" account).**

2 **Insert the DGSHAPE Software Package CD into the CD-ROM drive of the computer.**

When the automatic playback window appears, click [Run menu.exe]. The setup menu appears automatically.

3 **Click [Custom Install].**

4 **Click [Install] for the software or electronic-format manual that you want to install.**

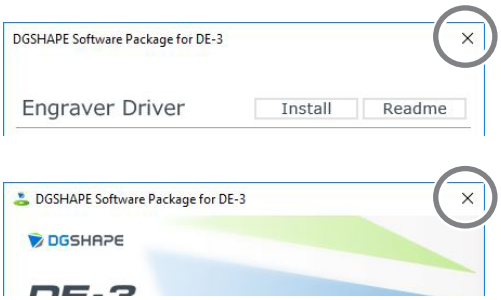


For installation of Engraver Driver, refer to P. 140 "Installing the Driver Separately".

5 **Follow the on-screen instructions to proceed with the installation.**

If the [User Account Control] window appears, click [Allow], and then continue with the installation.

6 **When the installation finishes, click × on the setup menu.**



7 **Remove the CD from the CD-ROM drive.**

Responding to an Error Message

This section describes the error messages that may appear on the handy panel screen of this machine, and how to take action to remedy the problem. If the action described here does not correct the problem or if an error message not described here appears, contact your authorized Roland DG Corporation dealer.

Error number	Message	Action	Error level
1000-000*	The % limit switch was not found.	P. 145	Level 3
1017-0000	The cover was opened during the spindle rotating.	P. 145	Level 1
1023-0000	(RML-1) The number of parameters is incorrect.	P. 146	Level 1
1024-0000	(RML-1) The parameter is out of range.	P. 146	Level 1
1025-0000	(RML-1) A wrong command is detected.	P. 147	Level 1
1029-0000	The spindle experienced an overload.	P. 147	Level 2
102A-000*	The spindle experienced overcurrent.	P. 148	Level 2
102B-0000	The spindle motor temperature is too high.	P. 149	Level 2
102D-0000	The spindle cannot be turned.	P. 150	Level 3
1044-0000	The automatic Z0 setting failed.	P. 150	Level 2

Error level

Level 1 — This is an error that is not very serious. After the cause of the error is eliminated, cutting can resume from the point where it stopped.

Level 2 — This is an error that is moderately serous. After the cause of the error is eliminated, cutting can be restarted from the beginning. It is not possible to resume cutting from the point where it stopped.

Level 3 — This is an error that is very serious. Before eliminating the cause of the error, it is necessary to turn the power off.

"1000-000*" The % limit switch was not found.

* The name of the axis (X, Y, Z, or a combination of these axes) is displayed for %.

Level 3

- 1000-0001: X axis
- 1000-0002: Y axis
- 1000-0004: Z axis

Error Situation/Cause

Operation is inhibited by cutting waste or an obstruction.

Action

Procedure

1. **Turn off the power.**
2. **Remove any objects blocking operation of the machine and any accumulated cutting waste.**

☞ P. 68 "Cleaning after Engraving Finishes"

3. **Turn on the power, and then press [ENTER/PAUSE].**

Resume operation.

"1017-0000" The cover was opened during the spindle rotating.

Level 1

Error Situation/Cause

The front cover was opened while the spindle was rotating, and so the motion of the spindle was stopped to ensure safety.

Action

* Do not open the front cover while the spindle is rotating. Doing so may affect the engraving results.

Procedure

1. **Close the front cover.**
2. **Turn the [Dial] and select [Continue] or [CancelJob].**
3. **Press [ENTER/PAUSE].**

"1023-0000" (RML-1) The number of the parameters is incorrect.

Level 1

Error Situation/Cause

- There is a problem with the engraving data received from the computer.
- The data transfer has failed due to the computer being under a high load.

Action

Procedure

1. **Turn the [Dial] and select [Continue] or [CancelJob].**
2. **Press [ENTER/PAUSE].**
3. **Send the engraving data to this machine again.**

☞ P. 54 "Step 5: Starting Engraving"

When Using Software Other Than Dr. Engrave Plus

Contact the software manufacturer to check whether the software is compatible with this machine.

"1024-0000" (RML-1) The parameter is out of range.

Level 1

Error Situation/Cause

- There is a problem with the engraving data received from the computer.
- The data transfer has failed due to the computer being under a high load.

Action

Procedure

1. **Turn the [Dial] and select [Continue] or [CancelJob].**
2. **Press [ENTER/PAUSE].**
3. **Send the engraving data to this machine again.**

☞ P. 54 "Step 5: Starting Engraving"

When Using Software Other Than Dr. Engrave Plus

Contact the software manufacturer to check whether the software is compatible with this machine.

"1025-0000" (RML-1) A wrong command is detected.

Level 1

Error Situation/Cause

- There is a problem with the engraving data.
- The data transfer has failed due to the computer being under a high load.

Action

Procedure

1. **Turn the [Dial] and select [Continue] or [CancelJob].**
2. **Press [ENTER/PAUSE].**
3. **Send the engraving data to this machine again.**

☞ P. 54 "Step 5: Starting Engraving"

When Using Software Other Than Dr. Engrave Plus

Contact the software manufacturer to check whether the software is compatible with this machine.

"1029-0000" The spindle experienced an overload.

Level 2

Error Situation/Cause

- The tool is worn.
- A workpiece that cannot be engraved by this machine is being used.
- The engraving parameters are too strict.
- The Z origin has been set incorrectly.

Action

Procedure

1. **Turn off the power.**
2. **Turn on the power.**
3. **Press [ENTER/PAUSE].**
4. **Review the tool, workpiece, or engraving parameters.**

☞ P. 87 "Considering Engraving Parameters"

5. **Set the Z origin.**

☞ P. 108 "4. Install the cutter and set the Z origin point."

If the Error Occurs Again

There is a possibility that the spindle unit is defective. To replace the spindle unit, contact your authorized Roland DG Corporation dealer.

"102A-000*" The spindle experienced overcurrent.

Level 2

Error Situation/Cause

- The tool is worn.
- A workpiece that cannot be engraved by this machine is being used.
- The engraving parameters are too strict.
- The Z origin has been set incorrectly.

Action

Procedure

1. **Turn off the power.**
2. **Turn on the power.**
3. **Press [ENTER/PAUSE].**
4. **Review the tool, workpiece, or engraving parameters.**

☞ P. 87 "Considering Engraving Parameters"

5. **Set the Z origin.**

☞ P. 108 "4. Install the cutter and set the Z origin point."

If the Error Occurs Again

There is a possibility that the spindle unit is defective. To replace the spindle unit, contact your authorized Roland DG Corporation dealer.

"102B-0000" The spindle motor temperature is too high.

Level 2

Error Situation/Cause

- The tool is worn.
- A workpiece that cannot be engraved by this machine is being used.
- The engraving parameters are too strict.
- The Z origin has been set incorrectly.

Action

Procedure

1. **Turn off the power.**
2. **Turn on the power.**
3. **Press [ENTER/PAUSE].**
4. **Review the tool, workpiece, or engraving parameters.**

☞ P. 87 "Considering Engraving Parameters"

5. **Set the Z origin.**

☞ P. 108 "4. Install the cutter and set the Z origin point."

If the Error Occurs Again

There is a possibility that the spindle unit is defective. To replace the spindle unit, contact your authorized Roland DG Corporation dealer.

"102D-0000" The spindle cannot be turned.

Level 3

Error Situation/Cause

The spindle failed to reach the specified number of rotations.

Action

Procedure

1. **Turn off the power.**
2. **Turn on the power.**
3. **Press [ENTER/PAUSE].**
   Resume operation.

If the Error Occurs Again

There is a possibility that the spindle unit is defective. To replace the spindle unit, contact your authorized Roland DG Corporation dealer.

"1044-0000" The automatic Z0 setting failed.

Level 2

Error Situation/Cause

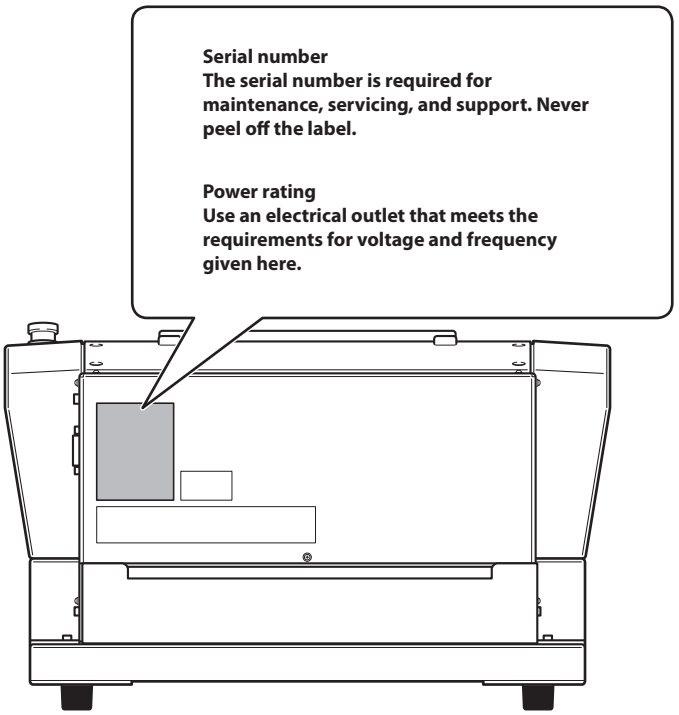
The spindle head was locked with [AUTO Z CONTROL] set to [ON].

Action

Procedure

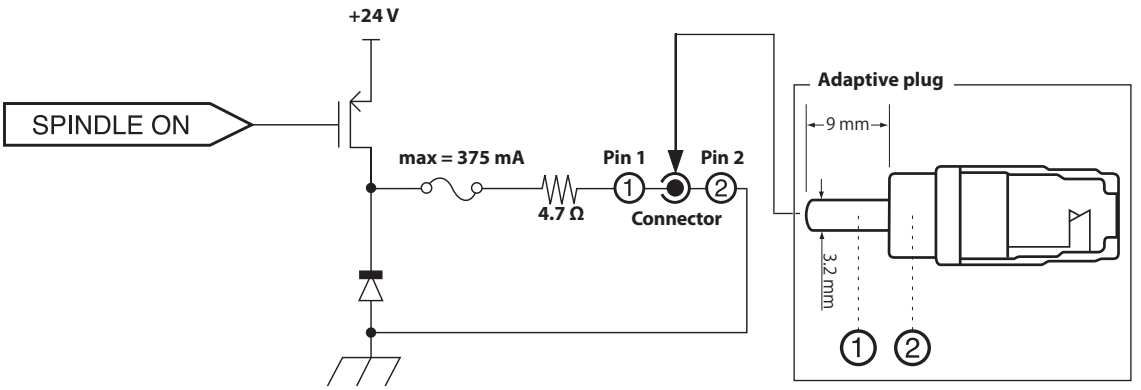
1. **Turn off the power.**
2. **Set the lock lever to the 1 or 2 position.**
   ☞ P. 62 "Setting the Lock Lever"
3. **Close the front cover.**
4. **Turn on the power.**
5. **Press [ENTER/PAUSE].**

Locations of the Power Rating and Serial Number Labels



Connector Specifications

Expansion Port



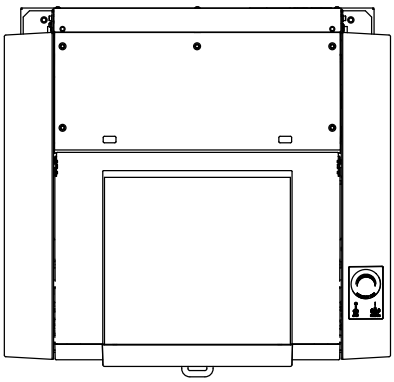
This circuit works during spindle motor rotation.

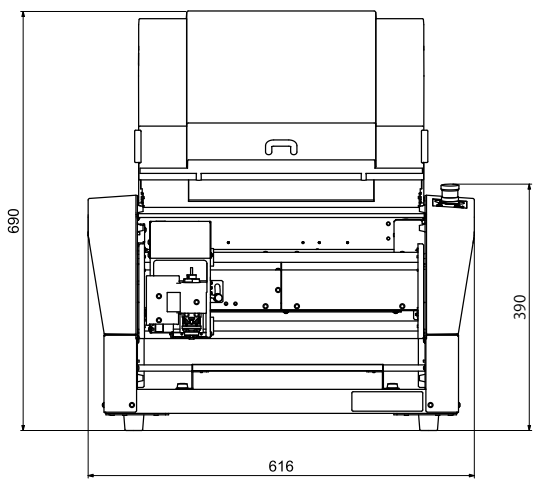
* We are not responsible for machines connected to this port.

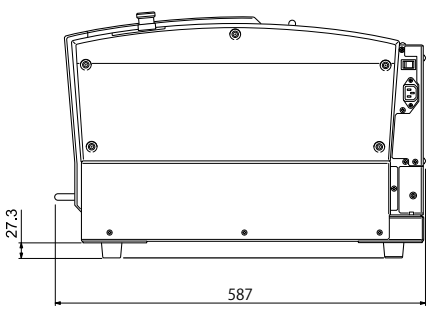
Important

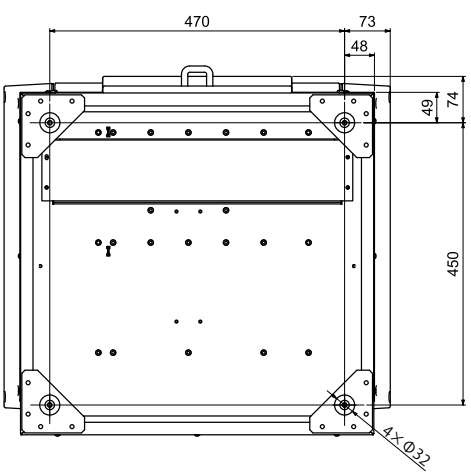
- Be sure to use the connector within the rated range shown above.
- Do not apply an additional voltage to the connector.
- Do not short-circuit the connector to ground.

External View





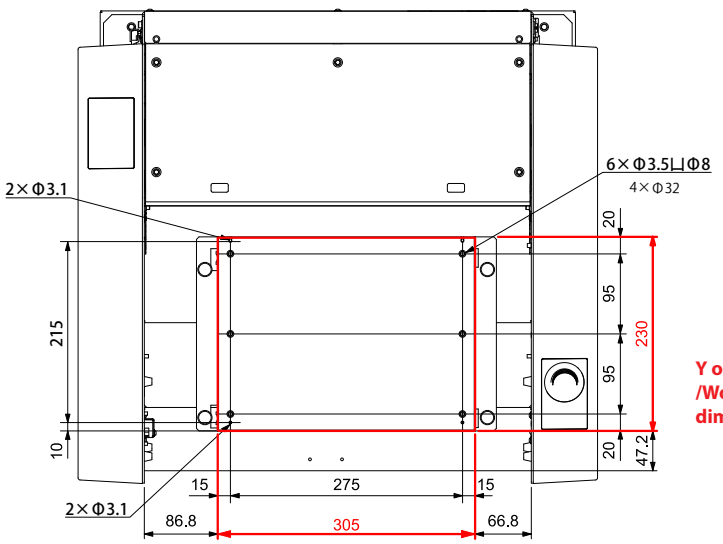




Unit: mm

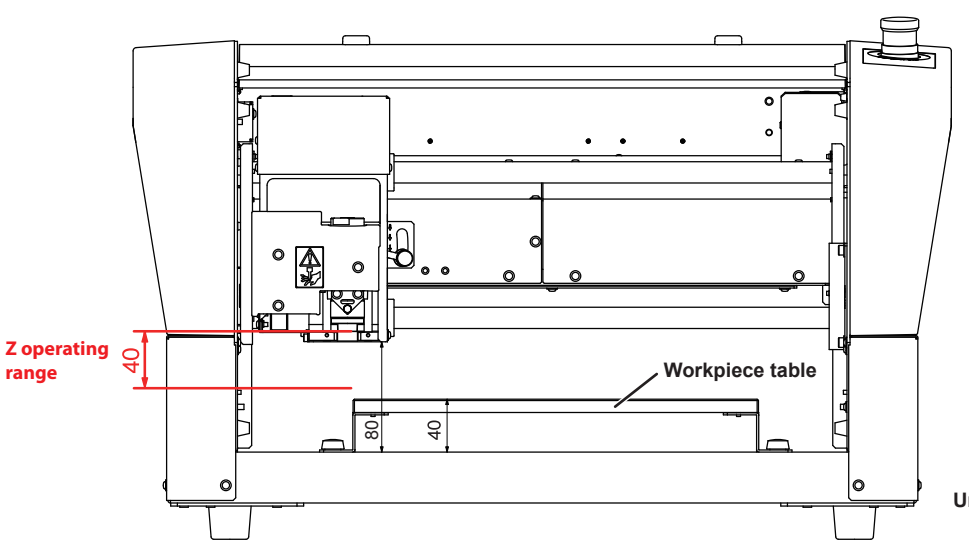
Work Area

XY Operating Range



Unit: mm

Z Operating Range

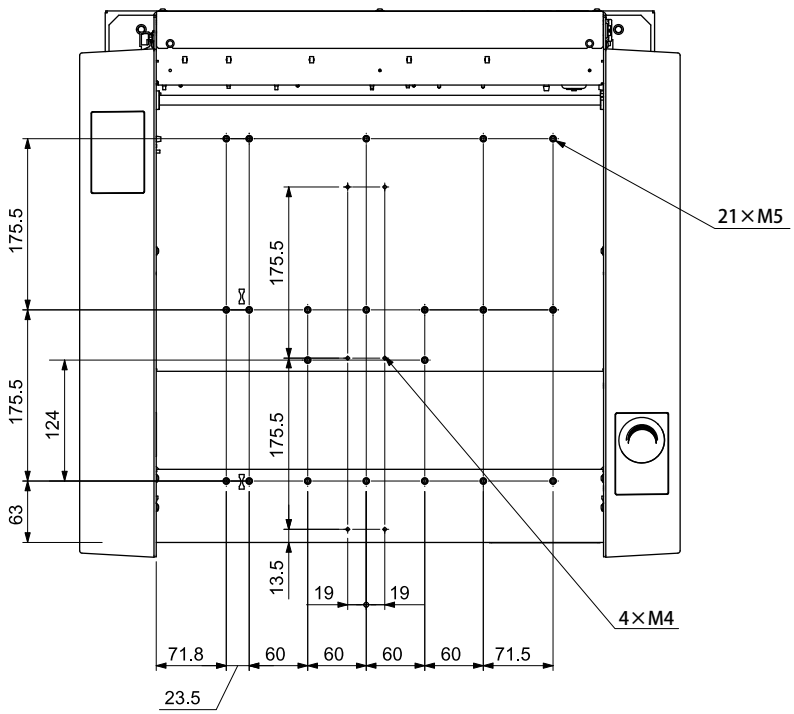


Unit: mm

* The thickness of workpiece that can actually be engraved is restricted by the length of the installed tool, the location where the nose unit is installed and the cut-out amount, and is smaller than the range indicated above.

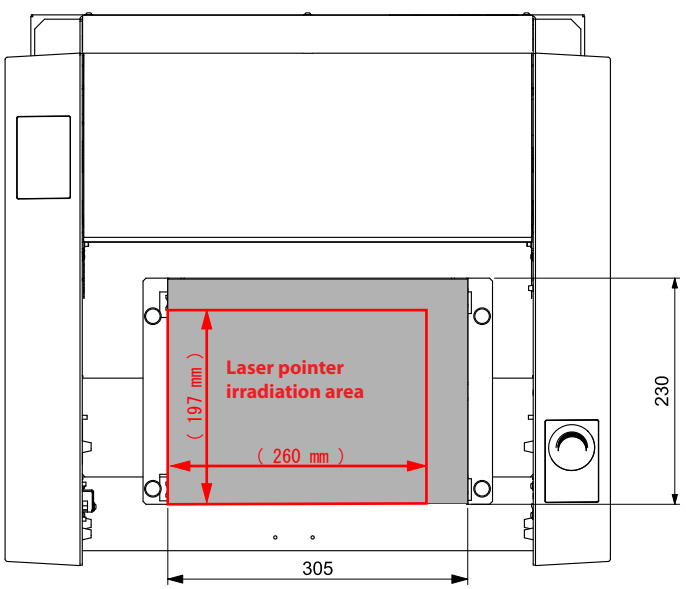
* When nose unit is used: The maximum distance between the workpiece table and the tip of the nose unit is 38 mm (1.5 in.).

Workpiece Table Installation Area Dimensional Drawing



Unit: mm

Laser Pointer Irradiation Area



Y operating range /Workpiece table dimensions

X operating range/Workpiece table dimensions

Unit: mm

Main Specifications

		DE-3
Workpiece table size		Width × Depth: 305 × 230 mm (12.0 × 9.1 in.)
X, Y, and Z operation strokes		X, Y, Z: 305 × 230 × 40 mm (12.0 × 9.1 × 1.6 in.)
X-, Y-, and Z-axis drive system		Stepping motor, 3-axis simultaneous control
Operating speed		X and Y axes: 0.1 to 60 mm/sec. (0.004 to 2.4 in./sec.) Z axis: 0.1 to 30 mm/sec. (0.004 to 1.2 in./sec.)
Software resolution		0.01 mm/step (0.00039 in./step)
Spindle motor		Brushless DC motor
Spindle rotating speed		5,000 to 20,000 rpm
Tool chuck		Cutter holder, collet method
Loadable workpiece thickness		Maximum 40 mm (1.6 in.) (38 mm (1.5 in.) when nose unit is used)
Interface		USB
		Ethernet (10BASE-T/100BASE-TX, automatic switching)
Control command sets		RML-1
Power supply	**Voltage and frequency**	100 VAC ± 10%, 50/60 Hz (overvoltage category: II, IEC 60664-1)
	Current rating	1.0 A
Power consumption		80 W
Operating noise		During operation: 63 dB (A) or less (when not cutting), during standby: 40 dB (A) or less
External dimensions		Width × Depth × Height: 616 × 587 × 390 mm (24.3 × 23.1 × 15.4 in.)
Weight		35 kg (77.2 lb.)
Installation environment		Indoor use at altitudes up to 2,000 m (6,562 feet) or less Temperature: 5 to 40°C (41 to 104°F), Humidity: 35 to 80% (no condensation) Ambient pollution degree: 2 (as specified by IEC 60664-1)
Included items		Power cord, power plug adapter, USB cable, nose unit (nose cone resin/metal), nose unit retainer (retaining screw, spring), spare tool retaining screw (for the cutter holder), character cutter (ø3.175 mm (0.125 in.)), solid collet (ø3.175 mm (0.125 in.)), wrench, hexagonal wrench, hexagonal screwdriver, adhesive sheet, vacuum adapter, DGSHAPE Software Package CD, and Setup Guide


DGSHAPE