



R&D by REDT

<http://www.redt-magic-engraver.com>

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Cautions for Use

Please be sure to read and follow the instructions below for safety use.

- The instructions below are intended to prevent personal injury and property damages.
- Please read carefully and use the machine properly.



If you don't follow these instructions, injury or property damage may occur.



If you don't follow these instructions, users may be seriously injured.

■ Cautions related to power



Do not use damaged cord or loosened outlet.

- It may cause electric shock or fire.



Do not pull a plug by the cord. Do not touch a power plug with wet hands.



If smoke comes out from the engraver during use, turn off the engraver immediately and call the sales agency or our service center.



Do not put multiple power plugs into one outlet simultaneously. It may cause fire due to overheated outlet.



If you are not going use this product for a long time, pull out the power plug.

■ Cautions related to use



Do not use this machine in a place with oil, smoke, humidity, dust or water.

- It may cause electric shock or fire.



Be sure to use the engraver body only on a stable level surface.

- The engraver weights about 28kg, and it vibrates left and right during operation. Therefore, if you use this machine on an uneven surface, it may cause damage to the surface and products, and injury to users.



Do not put a candle or cigarette butt on the engraver. Avoid any heating apparatus like heater when using this machine.

- It may cause failure or fire due to overheating.

■ Cautions related to use



Do not allow any part of body or other objects onto the engraver.

- The cutter of engraver may cause serious injury during its operation.



Do not put water or small metal materials on the engraver.

- Due to negligence or vibration of the engraver, the materials may fall and cause injury, fire or failure by overheating or short circuiting.
- If water gets into the product, it may cause electric shock or fire.



Be sure not to be caught or jammed between the paths of each axis of the engraver, or scratched by the engraving cutter.

- It may cause serious injury, or damage or failure of the engraver.



Laser Radiation

Avoid eye or skin exposure to direct or scattered radiation.

Class 1 laser product.



■ Other cautions



Do not disassemble or modify the engraver.

- It may cause fire, electric shock or failure. Please contact the sales agency or our service center for inspection, calibration and repair.



Be sure to keep out of the reach of toddlers and children. Their curiosity or carelessness may cause injury.









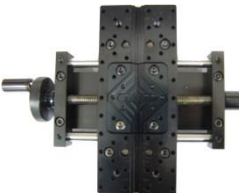







During winter, when temperature are fall below the freezing point, the product may not be normally perform. In this case, please keep the temperature in the place where you use this engraver for normal operation. Please make sure the temperature in the place where you use the engraver does not fall below the freezing point.

Product Parts and Installation

1) Parts and Accessories

MAGIC-70 product box includes the engraver and following accessories.

Accessories	Photos	Qty	Purpose
Diamond tip (4Φ)		1EA	Tool for engraving. And ring outer diameter engraving. (Spindle)
Diamond tip (3.175Φ)		1EA	Tool for engraving. And ring inner diameter engraving. (L-Tool)
Endmill cutter (4Φ 0.6)		2EA	Tool for cutting. (Spindle)
1.5mm wrench		1EA	For changing tools.
2mm T-wrench		1EA	For changing tools.
Spindle belt (60Φ)		3EA	Silicon belt for transferring DC motor's rotation power to spindle.
Pin		6EA	For holding of irregular shaped material.
Auxiliary jig		1SET	For holding thick engraving materials
Multi-performance clamp		1EA	For holding materials in place.
Cutting clamp		1SET	For holding materials in place. (Including Bakelite plate)
Pen clamp		1EA	For holding pen.
Tool top loading adapter		2EA	
Finger skin		1SET	For protect chuck fingers.
Pen finger		3EA	For holding pen.

Flat chuck finger		3EA	Jig for holding rings when engraving ring's outer diameter or inner diameter of flat rings.
Round chuck finger (Wide width)		3EA	Jig for holding rings when engraving ring's inner diameter.
Round chuck finger (Narrow width)		3EA	Jig for holding rings when engraving ring's inner diameter.
Bangle adapter		3EA	Jig for holding fingers when engraving materials (Bracelets) of a large diameter.
Chuck handle		2EA	Rotation clamp tightening handle.
Finger spanner		1EA	Tool for tightening fingers.
Nose (6Φ)		1EA	For depth regulating.
Tools holder		1EA	Storage for tools.
WD-40		1EA	Cutting oils for cutting metal materials.
Power adapter		1EA	DC 24V power supply (24V, 2.5A)
USB cable		1EA	For connecting to PCs.
Program CD		1EA	MagicArt, Design and engraving S/W.
User's manual		1EA	User's Manual.

※Optional(Separately purchased)

Flat clamp		1EA	For holding material in place.
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2) Specifications

Power supply	100~220V
Consumption voltage	60W
Operating range	Flat : 140mm(X) x 100 mm(Y) x 38.5mm(Z) Rotary: (X) Cylinder outside diameter: Max.93mm Cylinder inside diameter: Min.13mm~Max.93mm
Resolution	0.005mm (X,Y), 0.00125(Z)
Weight	31.15Kg
RPM	9,000~15,000 RPM
Transfer speed	1 – 36mm/sec (X,Y), 1 – 18mm/sec (Z)
Temperature	5 – 40 °C
Humidity	10 - 90 %
Purposes	Metal engraving, Ring inner diameter, Ring outer diameter engraving, Character cutting.

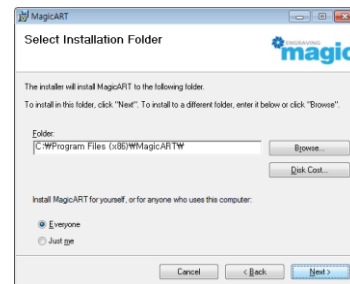
3) MagicArt S/W Program Installation

Place the CD in your computer's CD driver, Follow the below instructions to install the S/W. Install program will be automatically executed and program installation will be progressed in the following order. If Install program is not automatically executed after CD is entered, execute Install program on My Computer's CD drive.

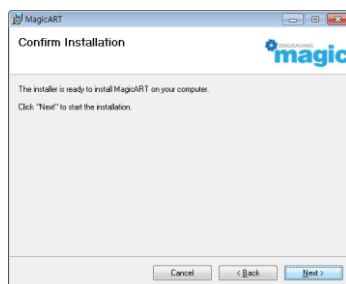
1. Setup wizard



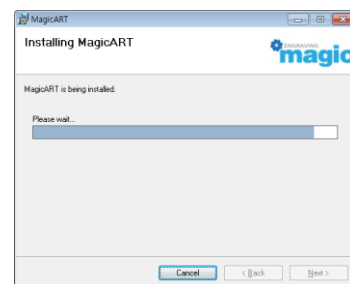
2. Select installation folder



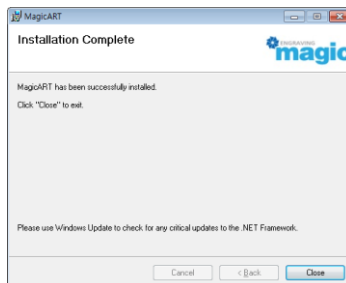
3. Confirm installation



4. The file is copied onto the hard disk.



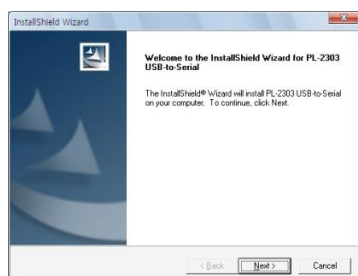
5. Click "Close" button to complete program installation.



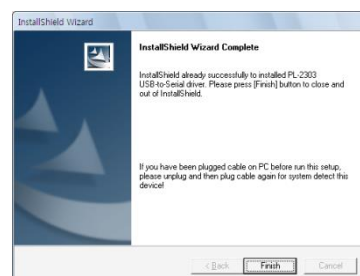
6. Once program installation is completed, USB driver Install window appears. Click "Yes" button after taking out USB cable.



7. Click "Next" button.




8. Click "Finish" button to complete installation and re-boot the computer.



◆ Program description

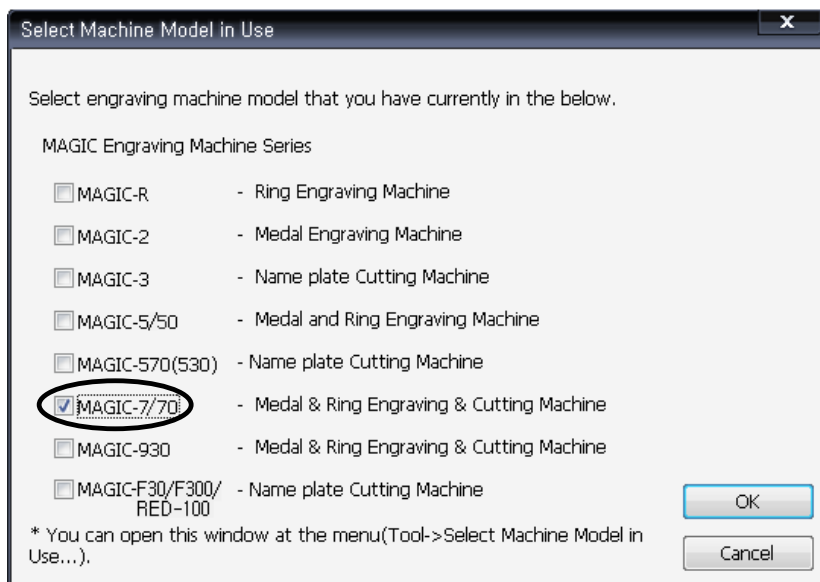
Once the program is installed, the icon below will be created on the desktop. The description of the icon is as follows.

	This is software for design and engraving with features like engraving contents design, tool path creating and tool path data transfer.
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◆ Select engraver

After installing the program, run the magic art program. Then, the engraver selection window appears as below. (When running the program for the first time after installation)

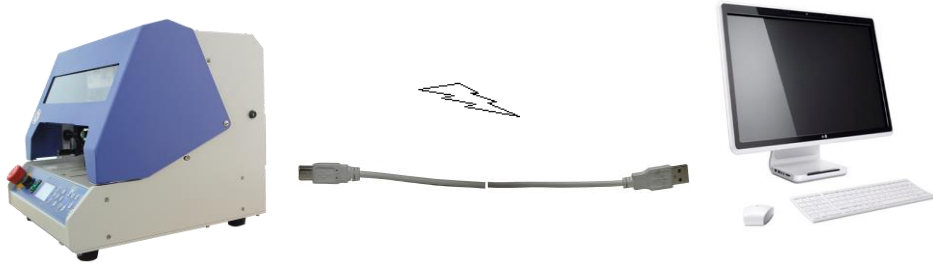
Select the "MAGIC-70", and click "OK" button. (Multiple selection available)



The engraver selection window can be opened any time through "Tools→ Select engraver in use..." from the menu. If necessary, multiple selections with other engravers will be allowed.

4) MAGIC-70 Installation

MAGIC-70 is a desktop CNC(Computerized Numerical Control) engraver. This engraver cannot be operated independently. You need your machine to be connected to a PC and run with a provided program, in order to reform engraving work as you want.



Insert the provided USB cable into the port on the rear side of the engraver and the USB port of your computer respectively.



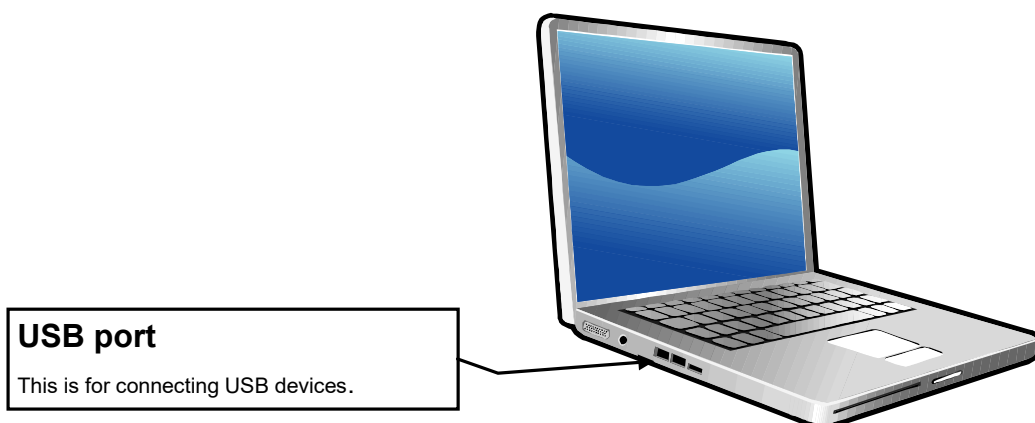
[USB cable]



Connect to the engraver machine



Connect to a PC



5) Description of MAGIC-70

◆ Parts
















◆ Description of each part

A	Spindle	Tightens an engraving tool.
B	Probe	Measures a height of engraving material.
C	Tool Length Sensor	Measures the height of tool.
D	Pen Clamp Adapter	Inserts and holds a pen clamp.
E	Multi performance Clamp	Fix the material in place.
F	Clamp Fastening Lever	Loosens or fastens the clamp.
G	Emergency Switch	Conduct emergency stop.
H	RPM Adjustment Knob	Adjusts RPM of engraving tool (9,000~15,000 RPM).
I	Power Switch	Turns ON/OFF the machine.
J	L-Tool	Tightens the tip used for rings or bangles.
K	Pressure Adjuster	Adjusts the pressure of the engraving tool.
L	L-Tool Lock	Tightens or adjusts the L-tool.
M	Rotation clamp (Rotary chuck)	Tightens a cylinder the materials such as rings.
N	Clamp tightening handle	Loosens or tighten the materials
O	Operation key	Operates the engraver's various functions.
P	5V Port	Supplies 5V to the engraver by connecting to power adapter.
Q	Power Port	Supplies 24V to the engraver by connecting to power adapter.

R	Communication port	Connects USB cable to the computer.
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◆ Description on Keys

	STOP	Once this button is pressed during engraving, all operations in progress will stop.
	WISE	If you press and hold the button, it enters into tool settings mode. If you lightly press the button, the clamp moves back and forth.
	ROUND CHUCK FINGER	If the button is lightly pressed, the laser point is moved to round chuck finger Origin point. If the button is pressed and held for more than one second after the round chuck finger Origin point is changed, then the changed Origin point will be saved.
	FLAT CHUCK FINGER	If the button is lightly pressed, the laser point will be moved to flat chuck finger Origin point. If the button is pressed and held for more than one second after the flat chuck finger Origin point is changed, then the changed Origin point will be saved.
	DIRECTION KEY(A)	Make rotation clamp rotate. ※During the rotation, it stops when it reaches 0°, 90°, 180° or 270° location.
	DIRECTION KEY(Z)	Move Z axis to up and down
	POINTER	Turns laser pointer ON/OFF.
	START	If this button is pressed and held for more than one second after engraving, then the data is sent and the area is designated, engraving will start.
	SAVE	If the button is pressed and held for more than one second after the tool setting is changed, then the changed setting value will be saved.
	MENU	Enter the menu. ※ Please consult with engineers before to use this function.
	DIRECTION(X, Y)	It moves the tool or laser pointer. During engraving, press  button to raise the speed by one level, and press  button to slow down.

	CLAMP	Moves the Multi-performance clamp.
	RING OUTER DIAMETER	Moves the ring outer diameter engraving position of the rotating clamp.
	RING INNER DIAMETER	Moves the ring inner diameter engraving position of rotating clamp

◆ Engraver movement

When the engraver is turned on, the engraver begins the self-test in the following order, and it enters into waiting mode with confirmation sound if there is no problem.



(1) The order of self-test when the machine is turned on

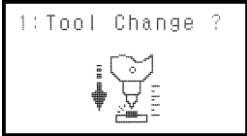
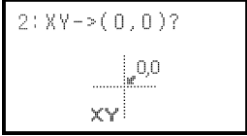
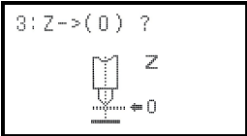
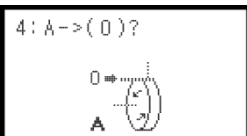
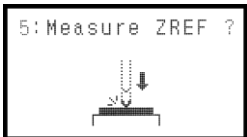
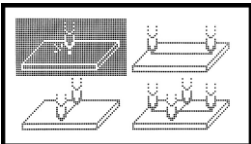





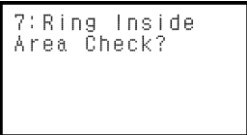
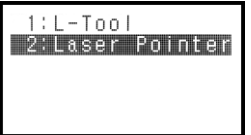

- 1) If a certain axis is detected by the sensor, move to leave from the detected area.
- 2) Check probe sensor and return to the Origin point
- 3) Check Z-axis sensor and return to the Origin point
- 4) Check X-axis sensor and return to the Origin point
- 5) Check Y-axis sensor and return to the Origin point
- 6) Wait for confirmation sound


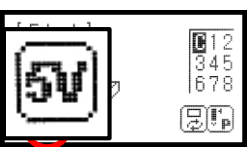



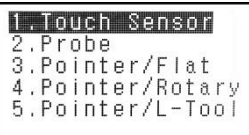


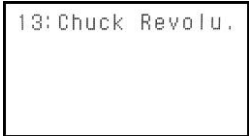
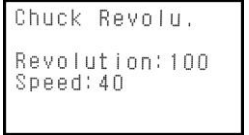
(2) The sequence of instruction for engraving set up

- 1) Turn on the engraver.
- 2) Place to secure the materials to be engraved on the clamp of the engraver.
- 3) Run the design software (provided with the product).
- 4) Prepare the contents of engraving.
- 5) Press the engraving button on the program to transfer intended data to the machine.
- 6) Press the start button on the machine to begin the engraving process.

◆ Description on Menu

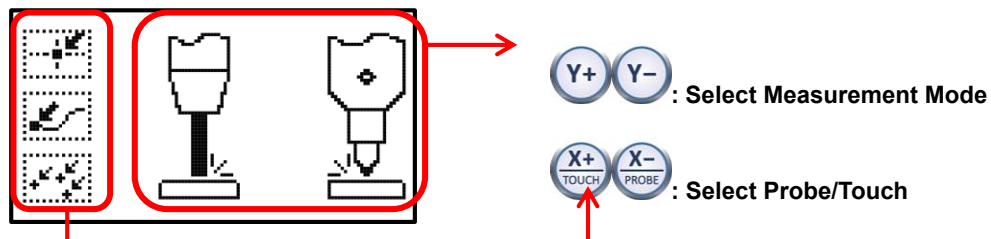
If press the  button, entering to the menu mode. It is same function of operation keys. Press and hold the  button for more than 3 seconds to enter each menu.

	<p>Exchange the tools.</p>
	<p>Check XY coordinate. ※If the machine is restarted, set value is reset.</p>
	<p>Check Z coordinate. ※If the machine is restarted, set value is reset.</p>
	<p>Check A coordinate. ※If the machine is restarted, set value is reset.</p>
	<div data-bbox="671 1137 922 1279">  </div> <p>Select the measurement option the material's height. Surface Height/ Horizontal, Shape Verticality, Shape/ Surface Slope</p>
	<div data-bbox="671 1346 922 1480">  </div> <p>When repetitive work, Select the measurement option of material height and engraving area.</p> <div data-bbox="692 1518 1126 1659">  1. Skip the all measurements.  2. Measure the height.  3. Check the all measurements. </div>
	<div data-bbox="671 1682 922 1816">  </div> <p>Select how to check the engraving area before starting to engrave ring inner diameter.</p>
	<p>Spindle test is running.</p>

		<p>ON 5V output of the machine.</p> <p>※ The port on the backside of machine can output 5V. It can control the power of buzzer, vacuum device, etc.</p>
		<p>Select the language.</p>
		<p>Select the calibration mode.</p>
		<p>1. Origin No: 0(Center)~8 User can set and save your own origin.</p> <p>2. Clamp No: 1~10 For each clamp, you can select 0 ~ 8 origins. 10 clamps can be saved at the maximum.</p> <p>※The menu cannot be shown in the ring inner/outer diameter mode. You can use it in flat mode.</p>
		<p>Set revolution and speed to spin the rotary chuck.</p> <p>※ Millgrain tool cab engrave repeated patterns on the ring outer diameter.</p> <p>※Millgrain tool is not included. You can purchase at store.</p>

◆ Measurement Select

User can select measurement mode within two seconds before measurement begins, after transferring tool path (engraving data) from MagicArt to the machine.



	Measure the origin of engraving area.
	Measure the beginning point.
	Measure whenever tool moves and meet the material. ※ "Z Clearance" should be set enough large value when setting the tool path to avoid damage material.
	Measurement Method Select. If you select probe, "Measure the origin of engraving area" mode is automatically selected and the others cannot be selected.

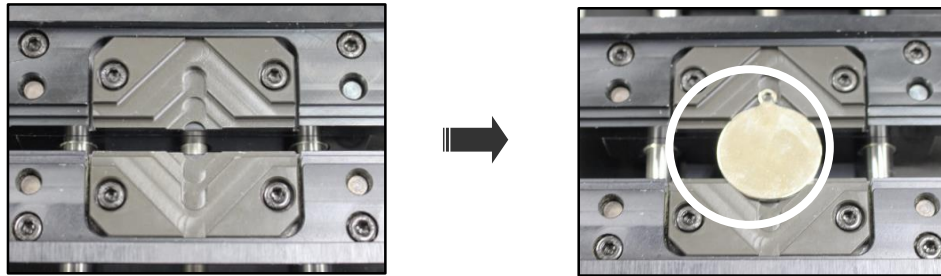
6) How to Use the Clamp

◆ Multi performance Clamp

The holding part of clamp is step type, so set the clamp to the step to match the size and thickness are matched. If you turn the clamp handle to the left, then the clamp will be loosed and turn it to the right, then the clamp will be tightened.

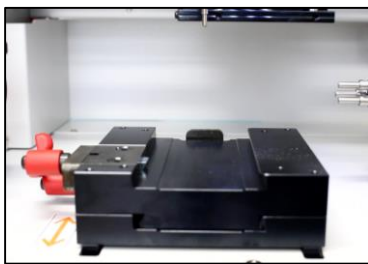


When holding the materials by turning the clamp tightening handle, a mark may be left on the materials.

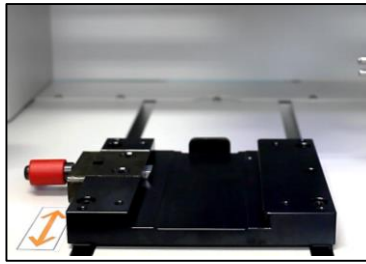


◆ Adjusting the Height of the Clamp

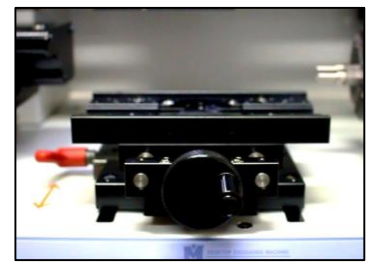
The height of the clamp can be adjusted depending on the thickness of the materials or the type of clamps.



Turn the clamp knob upward to pull out the spacer block.



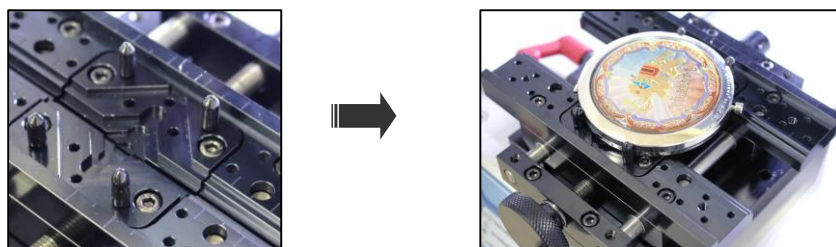
Remove the spacer block.



Insert the clamp.

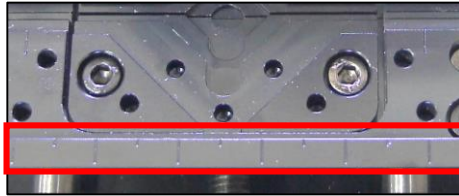
◆ How to use the pin

Pin holes on the clamp ensures easier holding of irregular shaped material.



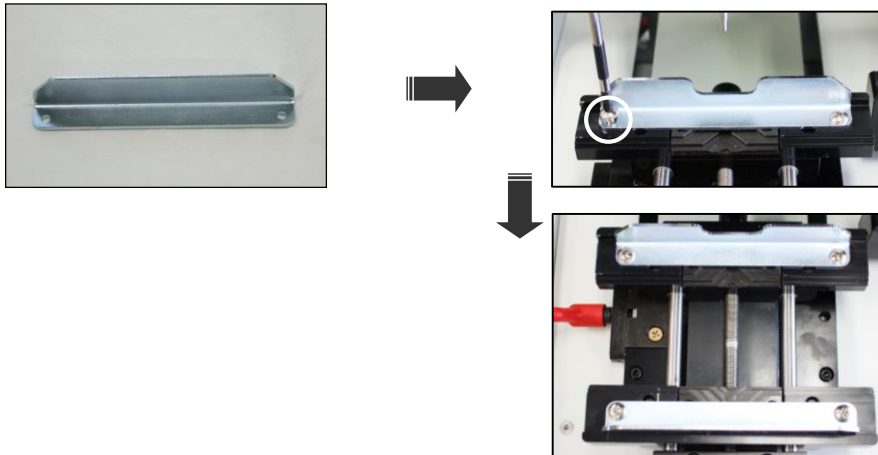
◆ How to use the gradation on the clamp

Gradation on the clamp also helps easier positioning of material on the clamp.



◆ How to attach the auxiliary jig

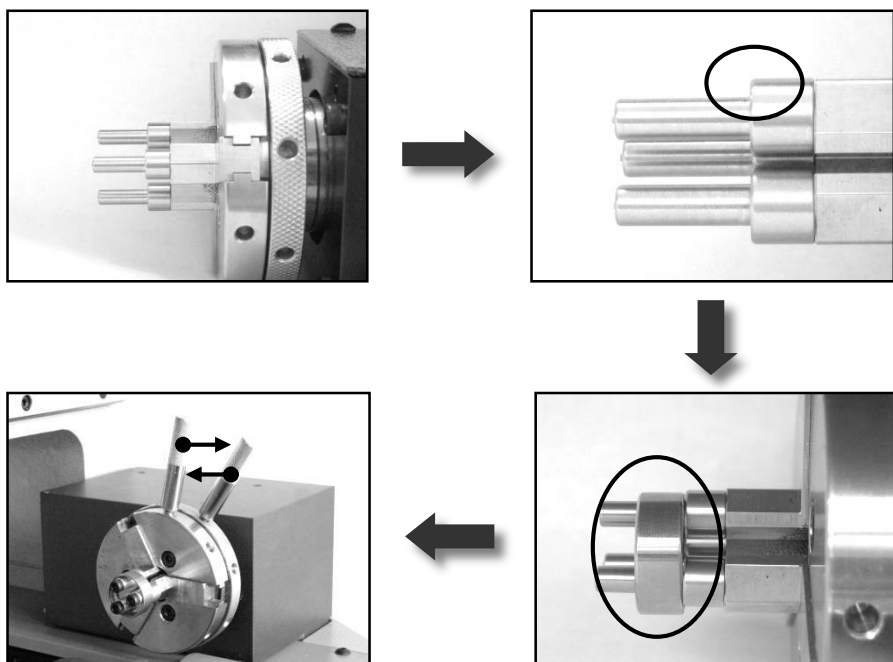
The auxiliary jig helps to hold thick materials like a beer bottle. As a pair, the Auxiliary jigs are holed by bolts on each hole.



◆ Rotation Clamp(Chuck)

-Holding method for outer diameter engraving

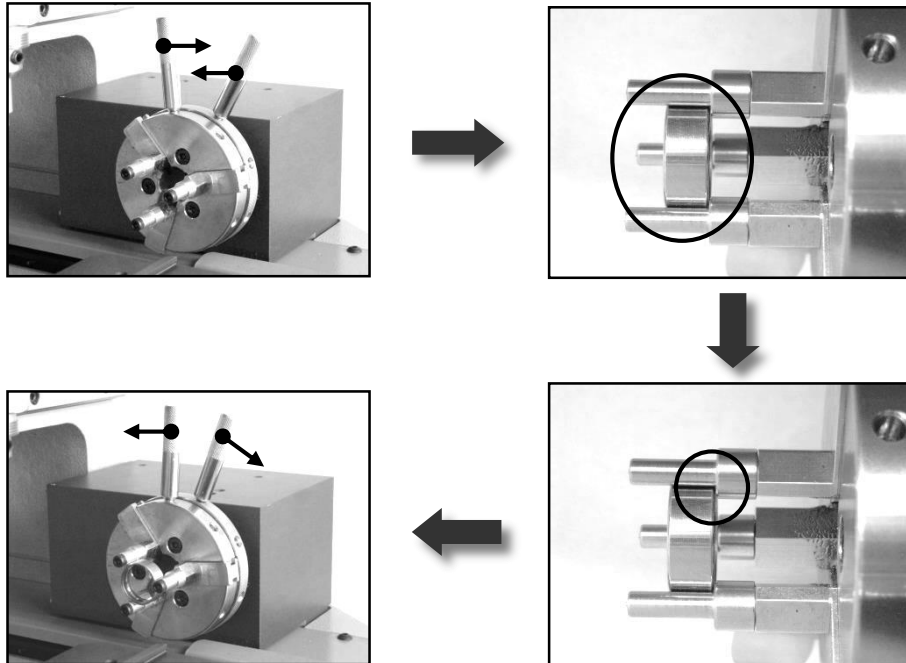
Insert the ring until it clicks into the flat chuck finger and turn the chuck handle to hold the ring and not to allow it come out or spin.



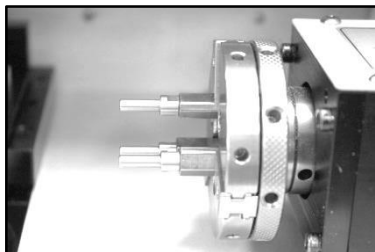
-Holding method for ring inner diameter engraving

Open the chuck finger of the rotation clamp and insert the ring, and use the chuck handle to hold it not to allow it to come out or slip.

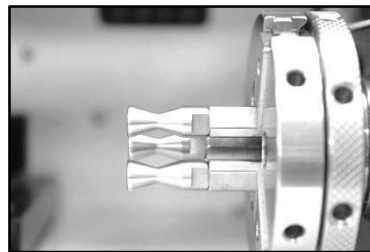
Ex) Flat chuck finger



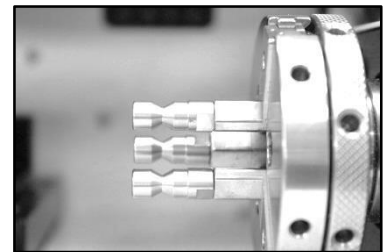
There are three types of chuck fingers. According to the shape of ring, use chuck finger appropriately to hold the ring and not allow it to become loose or fall.



Flat chuck finger



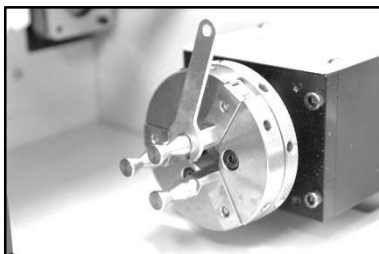
Round chuck finger (wide width)

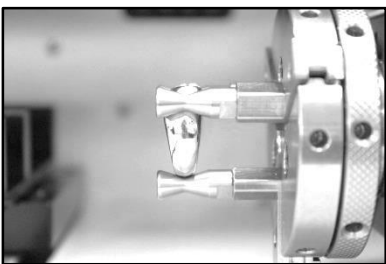


Round chuck finger (narrow width)

- Chuck finger changing method

Use the chuck finger spanner provided along with the product to release or tighten the chuck finger.



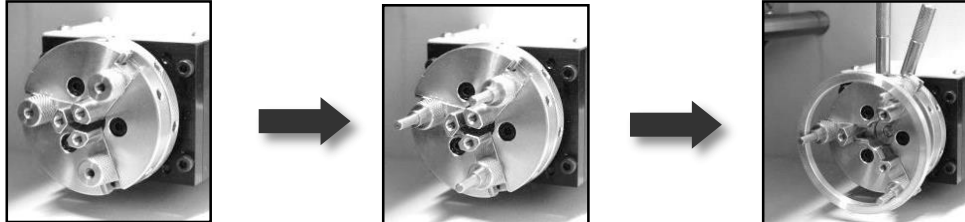
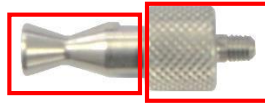


If the thickness of ring is not even, mix different sized chuck fingers to hold it.

- Materials holding methods for engraving bracelets

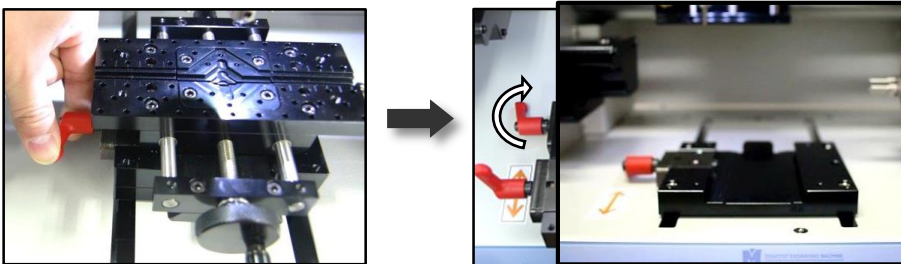
Place three bangle adapters in the rotation clamp, and tighten the chuck finger in front of the bangle adapters. Open the rotation clamp to match it to the bracelet size, and insert the bracelet until it clicks into the chuck finger. Use the chuck handle not to make bracelet come out or spin.

Chuck Finger Bangle Adapter

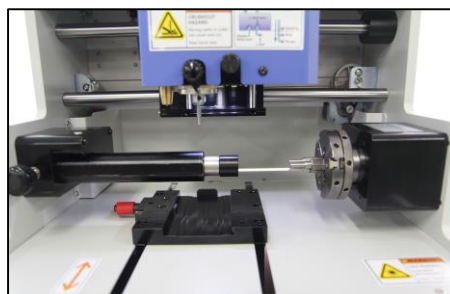
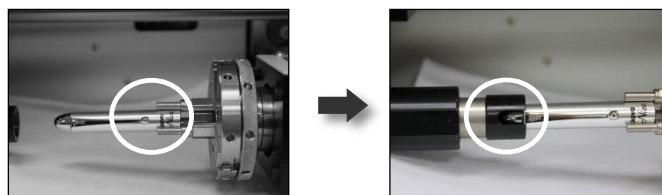


◆ Pen Clamp

1. Turn the clamp knob on the left side of the clamp and pull the clamp and spacer block to take it out.



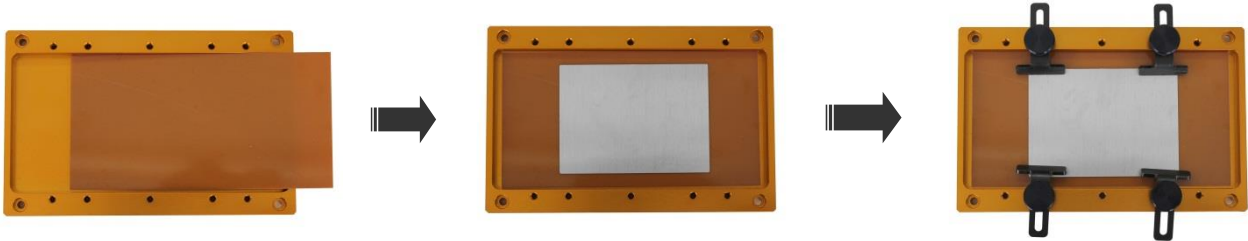
2. Place the pen in the flat chuck finger of the rotation clamp, and insert the pen clamp into the pen clamp adapter. Push the clamp until it touches the pen fixed in the chuck finger. Tighten the bolt on the pen clamp adapter not the pen clamp to be pushed, and tighten the bolt of the pen clamp to securely hold the pen.



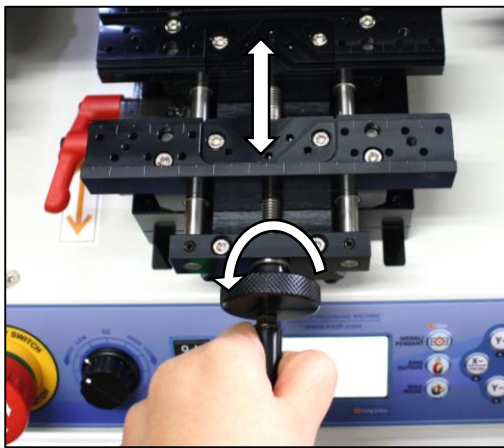
◆ Cutting Clamp

Release four tightening bolts on the cutting clamp, and insert the Bakelite plate. Put materials on the Bakelite plate and tighten with bolts. Open the clamp wide at the maximum, and put the clamp dedicated to cutting on it, and tighten it.

[Cutting exclusive clamp]



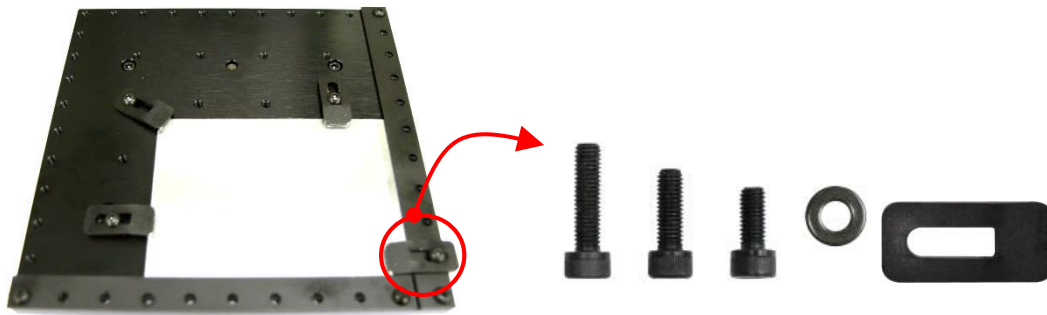
1. Turn the clamp knob on the left side of the clamp. Turn the clamp tightening handle for widen the gap of clamp.



2. Insert the cutting clamp, and tighten the clamp by turn the clamp tightening handle.

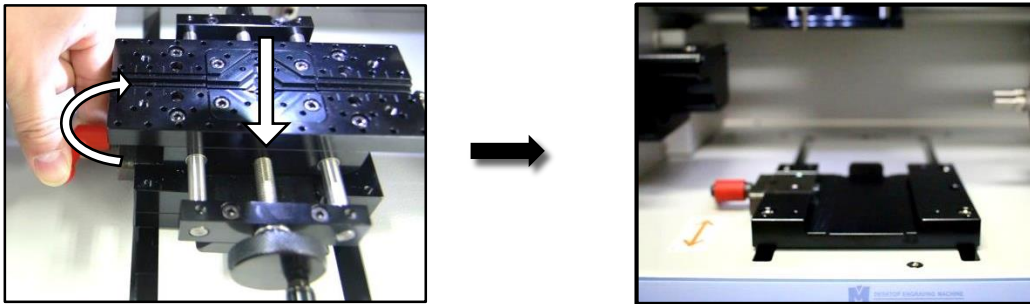


◆ Flat Clamp (Separately purchased)

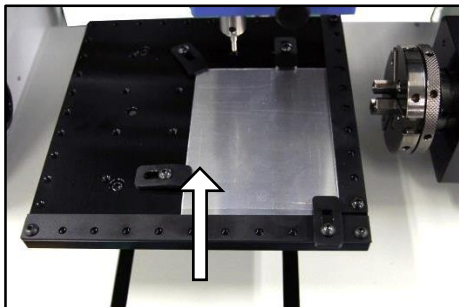


※ Is secured on the base table by using 4 bolts at each corner of the clamp.

1. Turn the clamp knob on the left side of the clamp and pull the clamp and spacer block to take it out.




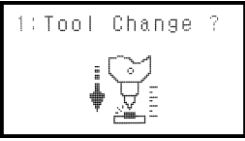



2. Insert the flat clamp, and tighten the clamp by turn the clamp knob.

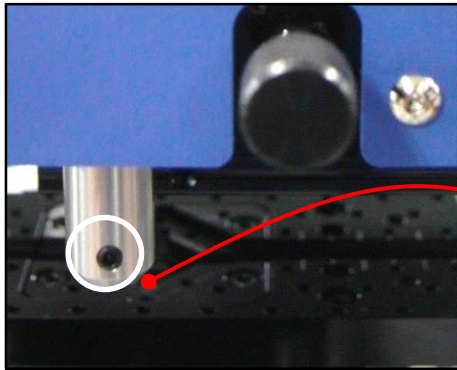


7) Changing Tools


◆ Spindle

1. Press  button and go to the menu mode.
2. Press   button, and when  menu appears on the LCD window, then press and hold  button until it beeps (more than 3 seconds) to run the menu.

3. Just like the below figure, insert it to 1mm wrench on tool fixing bolt. Turn wrench to the left and loosen bolt. Grab tool by hands in advance in order that tool is not fallen on the bottom and pull out tool downward by pushing tool from the top. After changing tool, tighten it by using wrench bolt and fix it



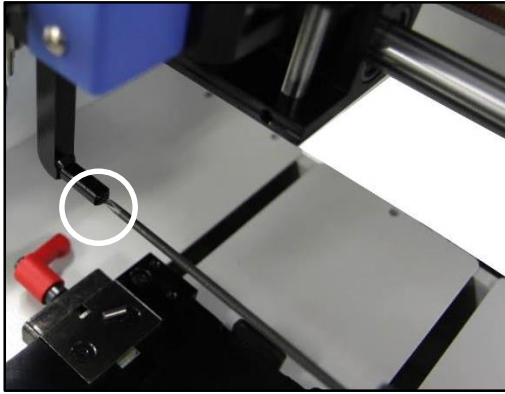
When loosening tool fixing bolts, hold the tool with your hands and loose the bolts to avoid dropping the tool on the floor and causing damage to it.

4. Press the  button until it beeps (more than 3 seconds) to measure tool's length automatically.

◆ L-Tool

Just like the below figure, insert it to 1mm wrench on tool fixing bolt. Turn wrench to the left and loosen bolt. Grab tool by hands in advance in order that tool is not fallen on the bottom and pull out tool downward by pushing tool from the top. After changing tool, tighten it by using wrench bolt and fix it.





8) Replacing the Spindle Belt



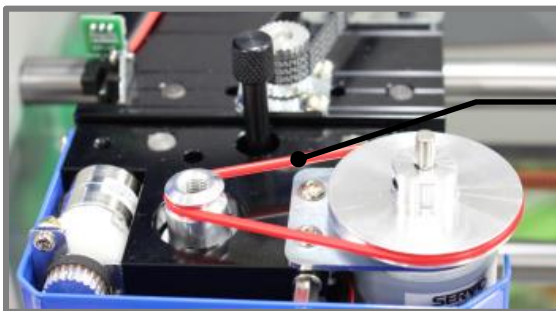
The spindle belt transfers the rotation power of the spindle motor to the spindle to turn the engraving blade. If the spindle belt is worn, the surface is cracked and slippery. So it cannot deliver the power of the spindle motor properly. In this case, the number of rotation decreases, or it causes poor engraving quality.

Replacement Cycle:

The lifespan of the spindle belt varies depending on usage and conditions. Generally, it should be changed every 2-3 months.

Spindle Belt Replacement Method

There is a red rubber belt on the front head of the engraver. Replace this belt with new belt.



Spindle belt

9) Tension

◆ Setting Engraver Pressure Lock

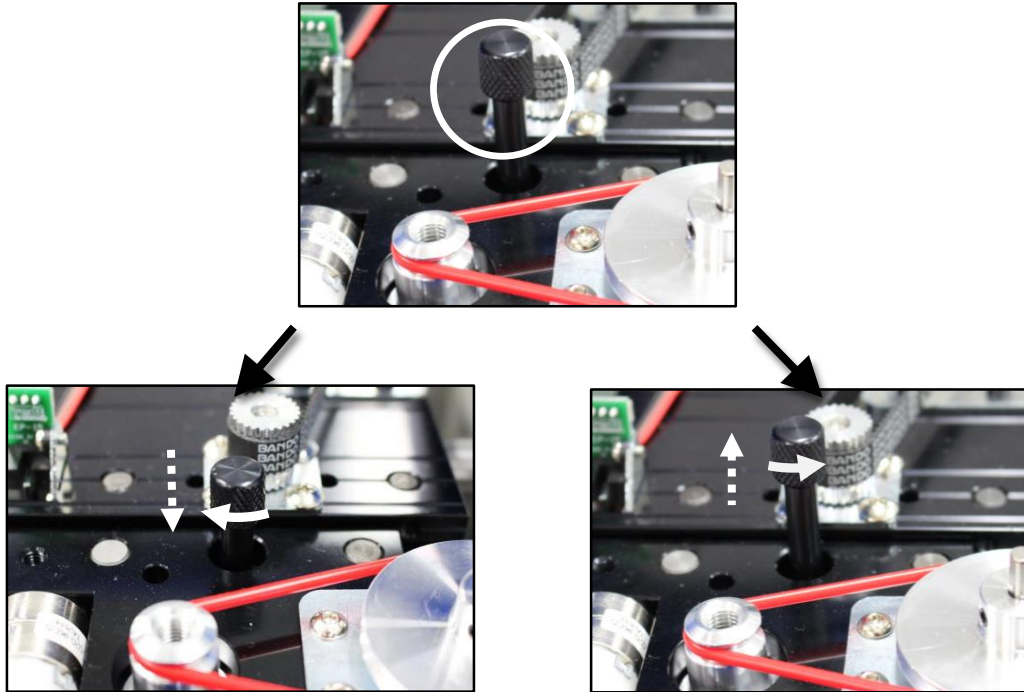
When cutting materials or engraving materials with a V cutter, set the head and remove the pressure lock. Then, vibration during engraving will be reduced and it will improve the quality of engraving or cutting and extends the life cycle of the tool. Release the bolts as shown in the picture below and insert the hole in the back and turn it to tighten.



After that, when engraving with the Carbide tip tool, it needs more pressure. So this bolt should be released and moved to the left hole.

◆ Pressure Adjuster

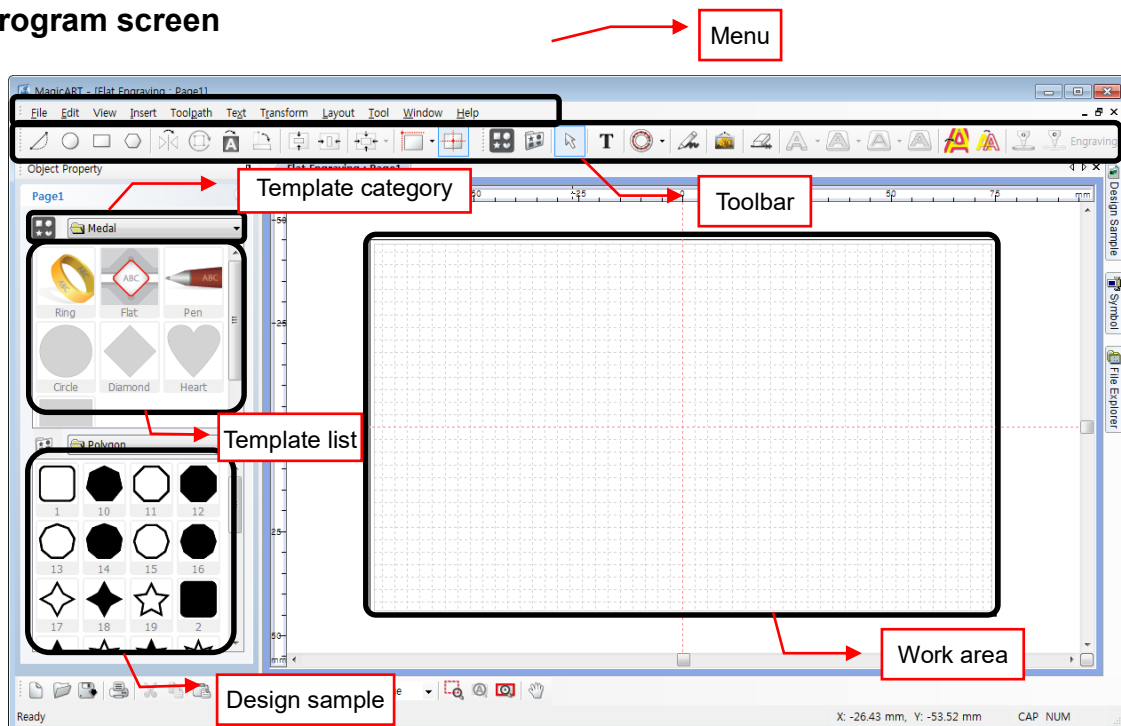
When engraving with a Carbide tip, the engraving depth is adjusted with pressure. This is the using same as the engraving depth selection when creating the tool path. If you turn the tension adjustment knob to the right, the pressure increases stronger, and turning it to the left, decreases the pressure.



Program Usage Description

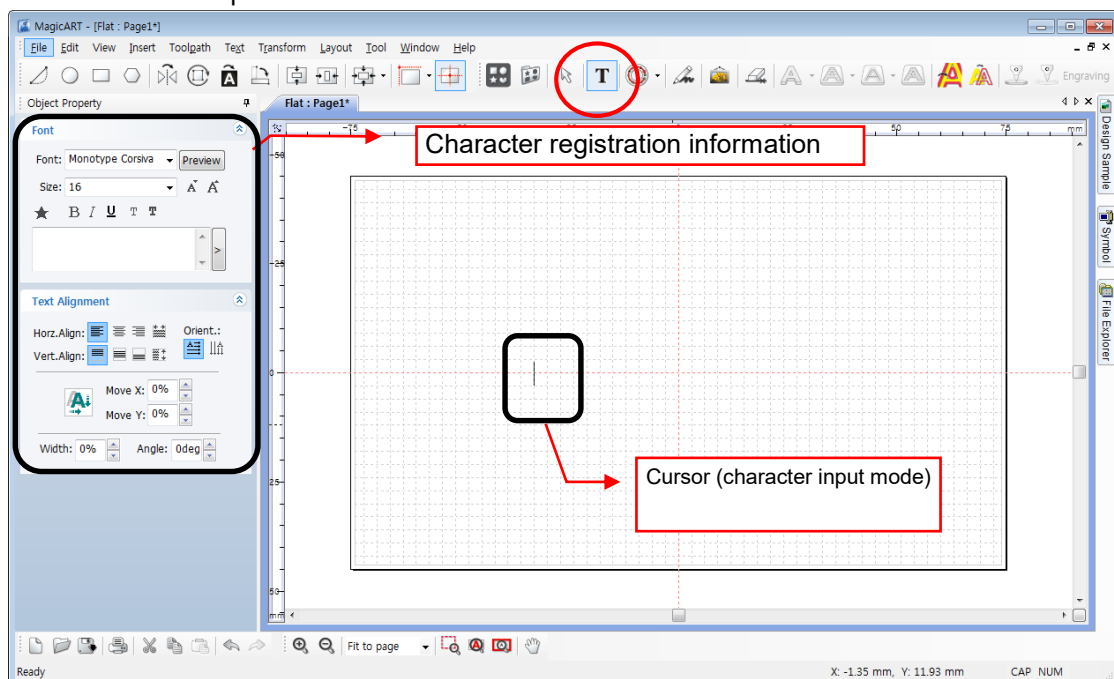
Run the program, then a window show up as below. The program window is different between when an object is selected and not selected. The names of parts for each case are as follows.

◆ Program screen




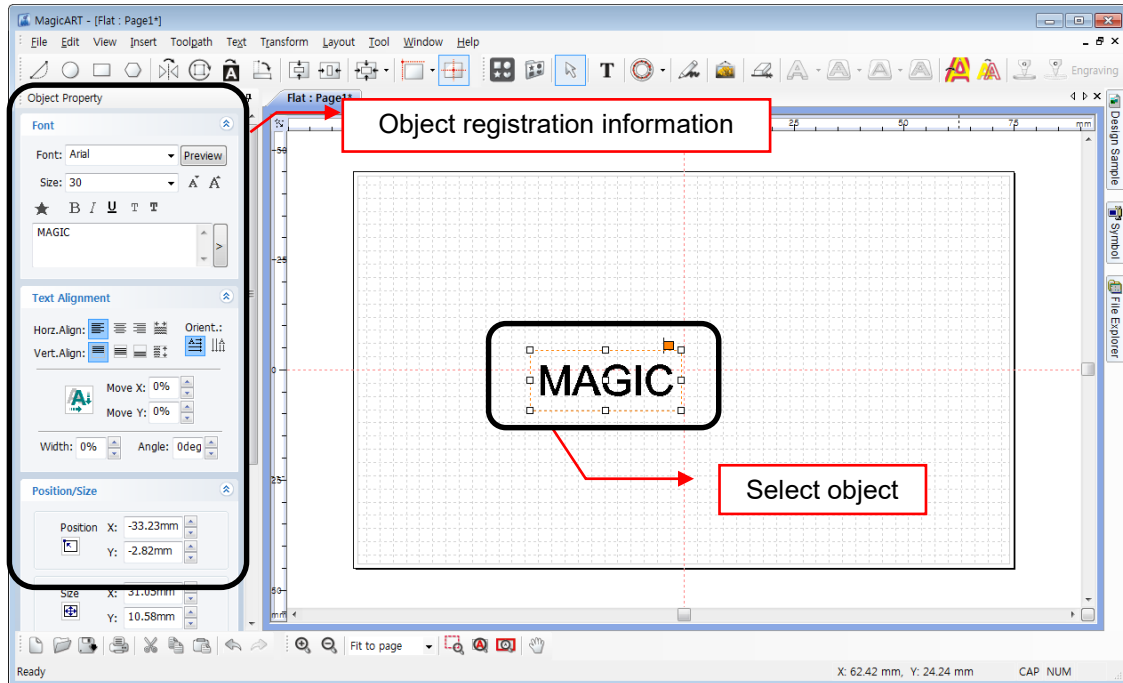
◆ Character input mode

Press **T** [Text Input] button and click the screen or double click mouse left button on the selection mode to switch to character input mode.



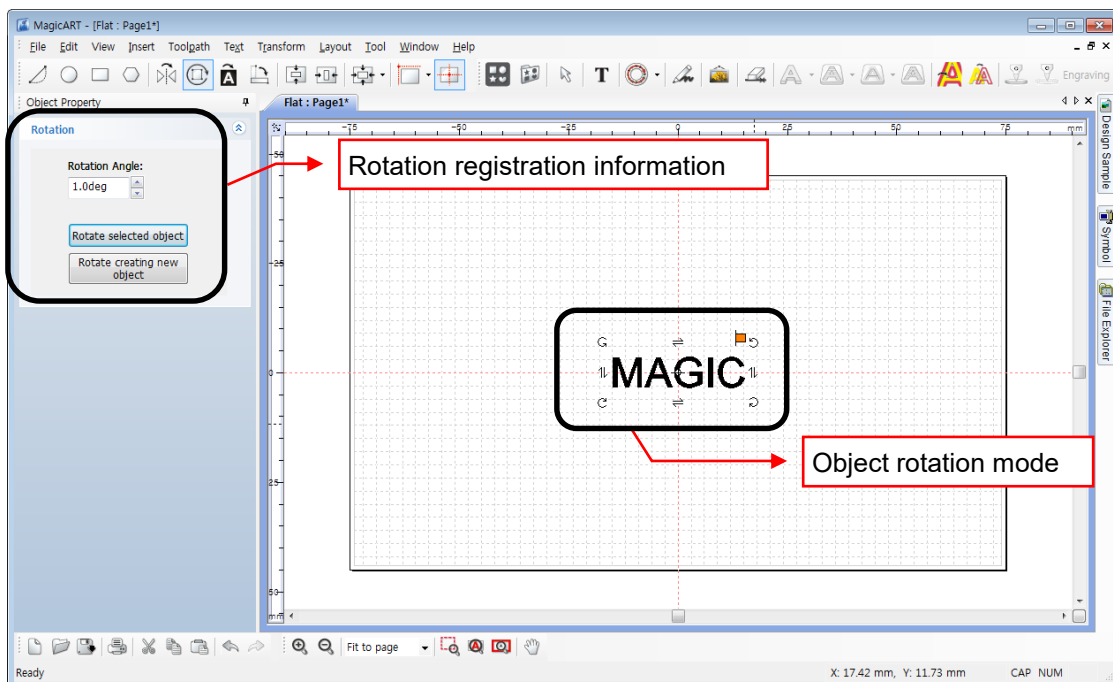
◆ Object selection mode

After entering texts, click  [Selection] button with a mouse or click the work area with mouse right button. Then, the entered character object is selected and it turns into selection mode. Double click mouse left button in the selection mode to convert it into character entering mode.



◆ Object rotation mode

If the selected object is clicked once more with the mouse, the mode will be converted to the object rotation mode.



1) Toolbar

◆ Alignment tools







[Line/Curve]

	<p>Click a certain point with the mouse and move it to make a dot line appear. Designate the distance and click with the mouse and then press the right button on the mouse to create a straight line. At this time, press "Ctrl" key on the keyboard and move the mouse to create a horizontal line or a vertical line.</p>
	<p>Click on a certain point with the mouse and designate a distance. Drag while clicking and holding the mouse to make a curve appear. Press the right button on the mouse to create the curve.</p>



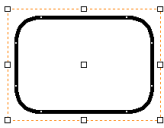
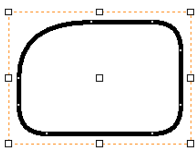
[Circle/Ellipse/Pie]

	<p>Click and hold the work area with the mouse and drag it to designate the size of a circle. At this time, press "Shift" key and drag it to create a perfect circle.</p>
	<p>Click  Arc button on the circle object registration information to transform into an arc. The starting/ending degree can be designated and those degrees can be adjusted by dragging The starting/ending degree of the arc with the mouse. At this time, click  CW/CCW button to create a reversed image.</p>
	<p>Click  Pie button on the circle object registration information to transform into a pie (a filled arc). The starting/ending degree can be designated and those degrees can be adjusted by dragging The starting/ending degree of the pie with the mouse. At this time, click  CW/CCW button to create a reversed image.</p>



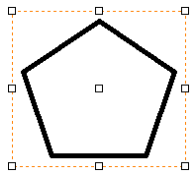
[Adds a rectangle]

	<p>Click and hold the work area with the mouse and drag it to designate the size of a rectangular. At this time, press "Shift" key and drag it to create a square.</p>
--	--

	<p>Determine the curvature of each edge on the rectangular object registration information or drag the rectangular edge with the mouse to transform it into a round rectangle with round corners.</p>
	<p>Click <input checked="" type="checkbox"/> Independent Corner button on the rectangular object registration information and adjust the curvature of each corner individually.</p>

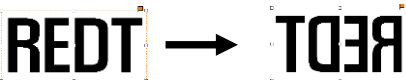


[Polygon]

	<p>Click and hold the work area with the mouse and drag it to designate the size of a polygon. At this time, specify the number of vertical on the polygon object registration information to change it.</p>
---	--

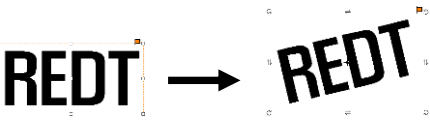


[Mirror]

	<p>Left/right reverse the selected object.</p>
--	--

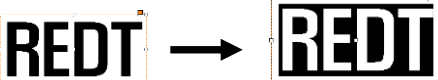


[Rotation]

	<p>If the selected object is clicked once more with the mouse, it will convert to the object rotation mode. Then, rotate the object by dragging it with the mouse or arrow keys on the keyboard.</p>
---	--

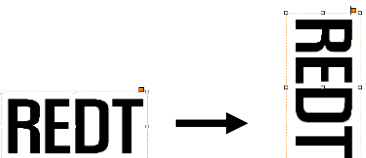


[Invert color]

	<p>Reverse the color of the selected object.</p>
---	--

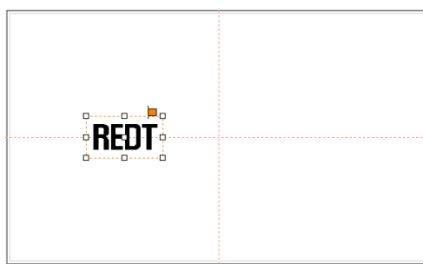
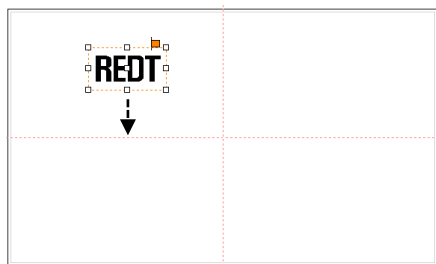


[90° CW]

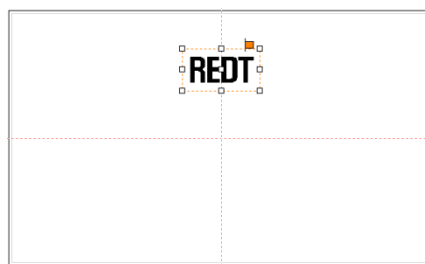
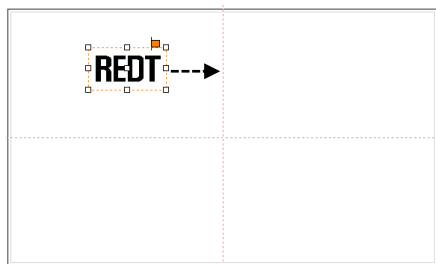
	<p>Rotate the selected object by 90°.</p>
---	---



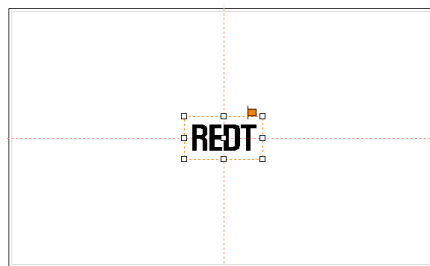
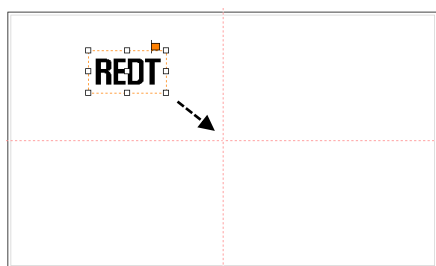
[Vertical center in page]



[Horizontal center in page]



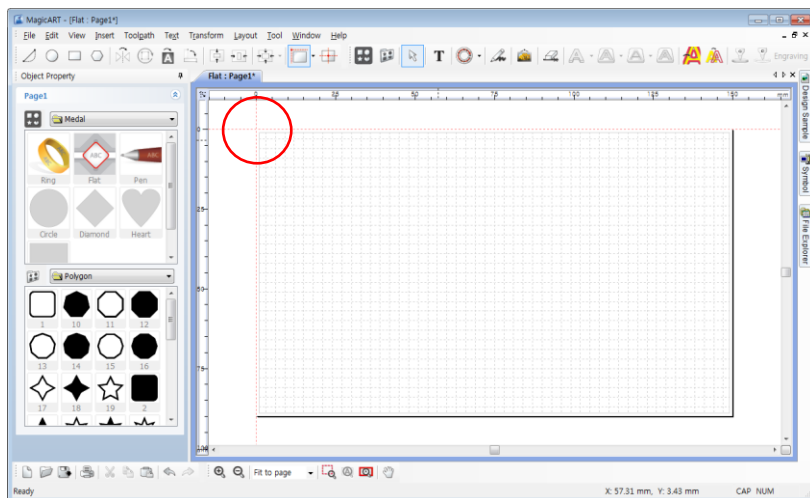
[Center in page]



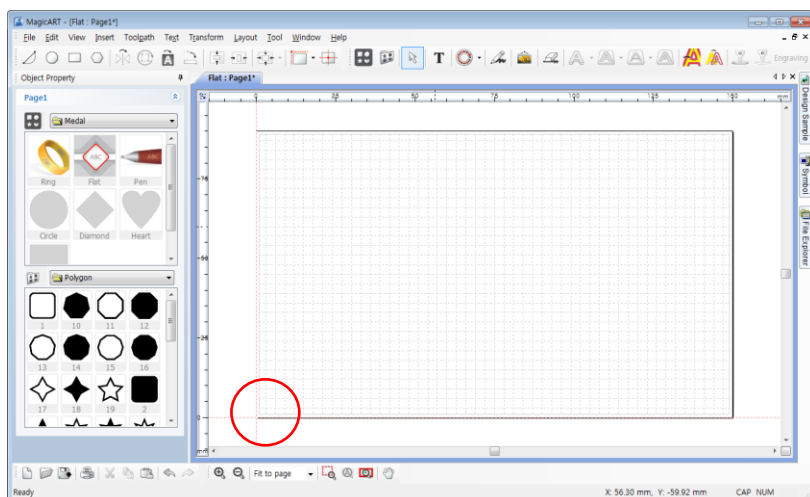
Alignment		Align to the left of base object
		Align to the center of base object
		Align to the right of base object
		Align to the top of base object
		Align to the center of base object
		Align to the bottom of base object
Adjust horizontal gap		Distribute horizontal gap
Adjust vertical gap		Distribute vertical gap
Same size		Distribute width
		Distribute height
		Make same size
Order		Bring to front
		Send to back



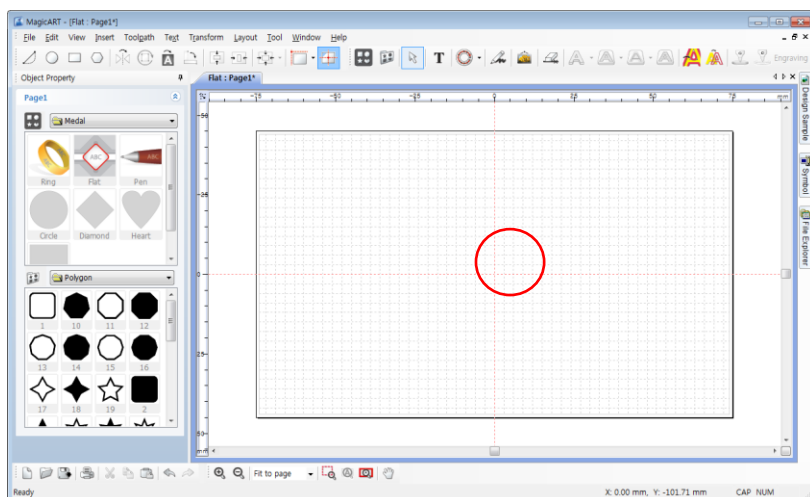
[Left top Origin point]



[Left bottom Origin point]



[Center Origin point]

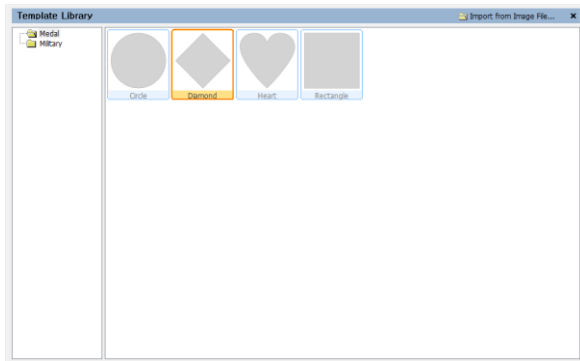


◆ Object tools



[Template]

Either import a template or save the currently selected object as a template.



What is a template?

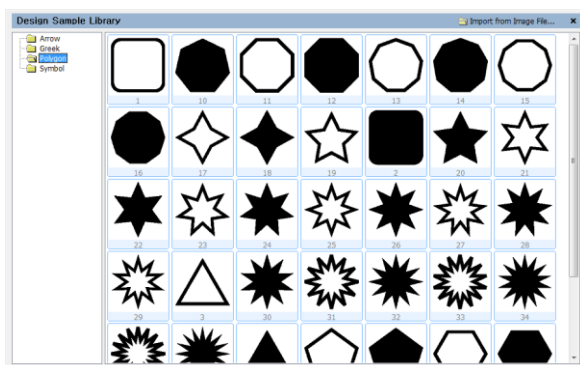
Template is an image of materials to be engraved. The engraving is actually done as same as the design on the template.

Template is not selectable by mouse, but you can select it by dragging it while pressing “Shift” key on a keyboard.



[Design sample]

Import design sample or save current object as design sample.



What is a design sample?

It means design objects saved in the design sample library. The design sample can be always easily and quickly imported from the design sample library and freely edited.



[Selection]

It is available either to select the object created in the work area to adjust its size and location or to change the object's property. Only the selected objects are subject to changing their location/size/size and engraving. In the character input mode, converting to any selection mode easily by pressing the right button of the mouse.



[Select object]

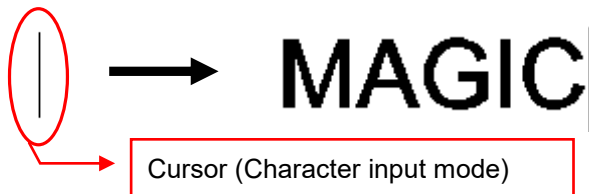
MAGIC

[Select no object]



[Text input]

If **T** button is pressed and then the work area is clicked with the mouse, characters can be entered. Double clicking the left button of the mouse in the selection mode is an easier way to convert into the character input mode.



Press **T** button and drag a character to be edited with the mouse for partly selection. Then, adjust its font and size.

MAGIC

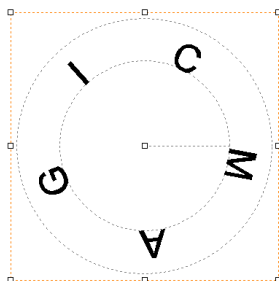


--> [Mouse drag]



[Circular text]

Create character objects along a circle.

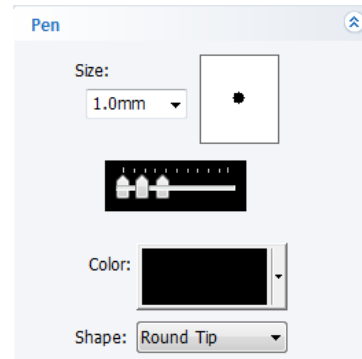
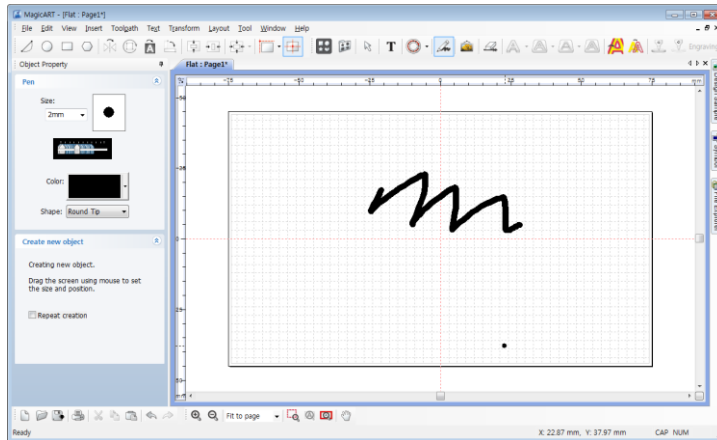




[Drawing pen]

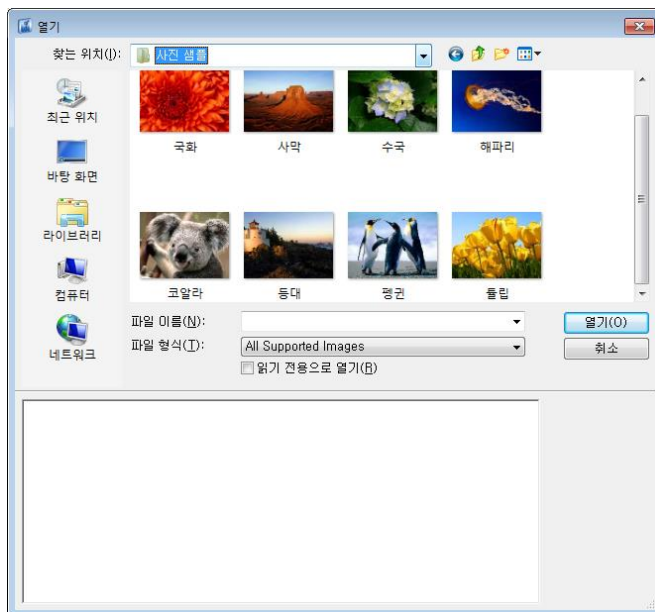
You can draw by dragging the mouse.

The thickness of drawing line can be adjusted in the drawing object information window.



[Image]

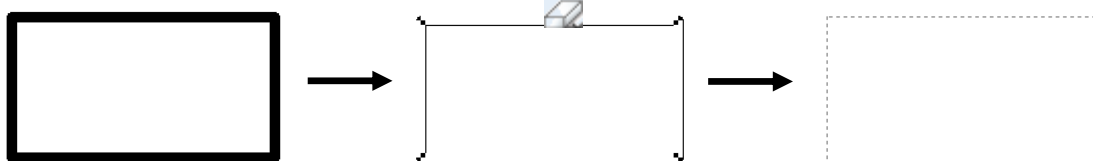
Import image (bmp, jpeg, gif, png ... etc.)



[Line eraser]

Clear the line of object.

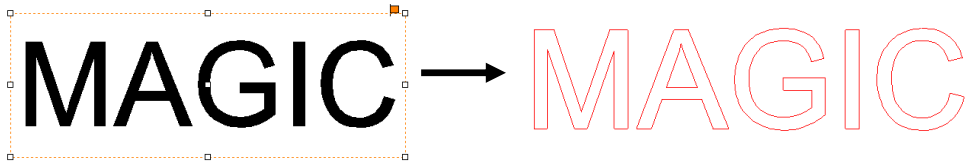
Move the mouse over the line of object. The line will be removed (Some objects cannot be removed with the Clear line tool)





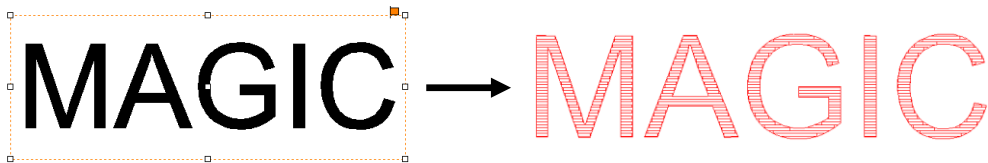
[Cutting tool path]

Create a tool path that will engrave the selected object's border.



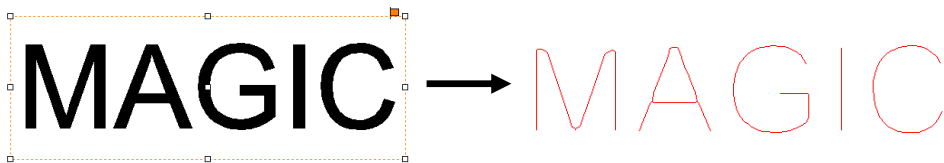
[Hatching tool path]

Create a tool path that will engrave the inside of the selected object.



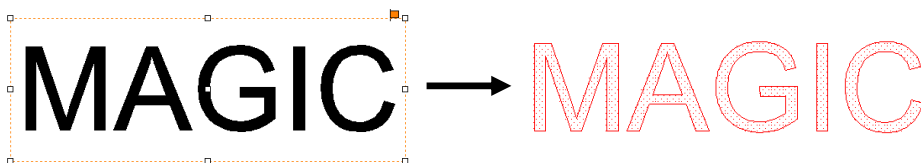
[Single line tool path]

Create a tool path that will engrave the center line of the selected object.



[Text input engraving tool path]

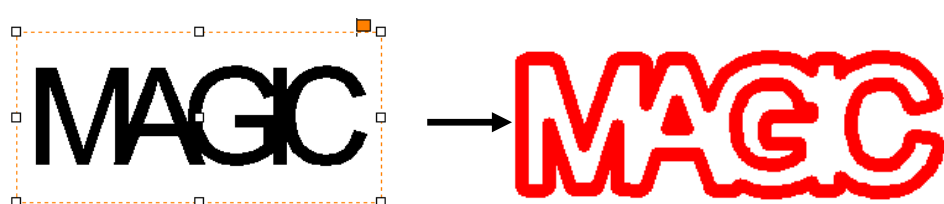
Create a tool path that will engrave the inside of the selected object with dots.



[Simulate tool path cut]

The prospected image of the result of tool path processing done by the selected tool is shown.

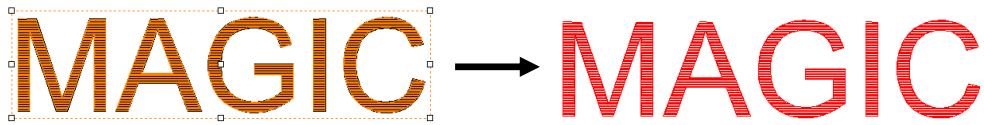
The following is an example of the cutting tool path that uses 0.6mm End mill.





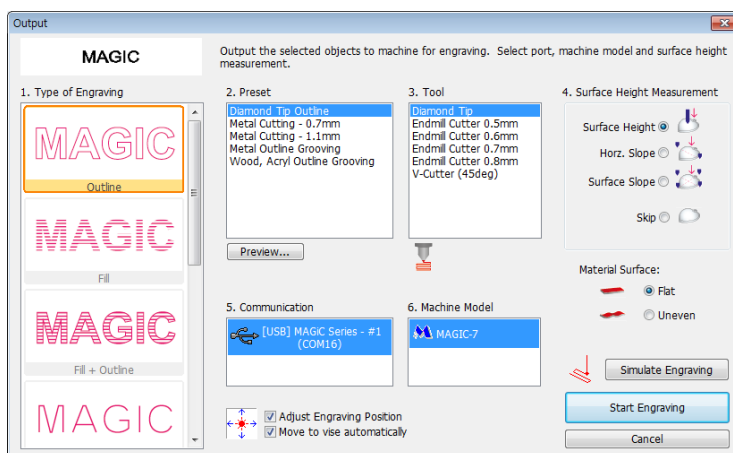
[Show tool path only]

Only tool path is shown on the screen with temporarily masking all of other objects. If this button is pressed once again, all objects will be seen again.



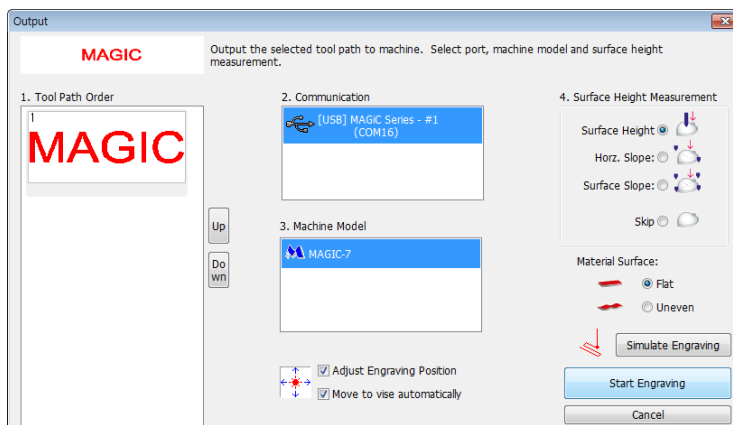
[Instant engraving]

Immediately engrave the selected object without creating a tool path. Select an engraving method from the engraving selection list on the Engrave window and select engraving options and measuring methods before clicking “Start Engraving” button.



[Engrave]

Engrave the selected tool path.

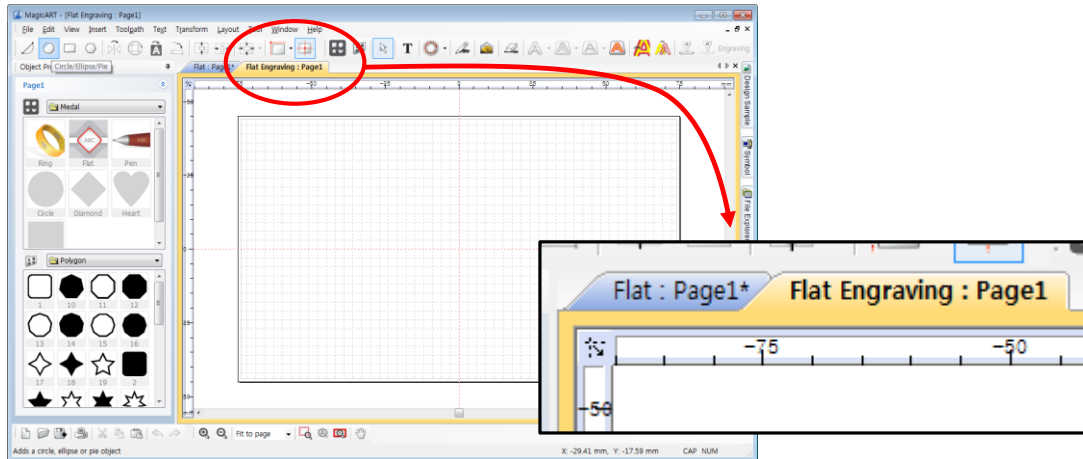


◆ Basic tools



[New document]

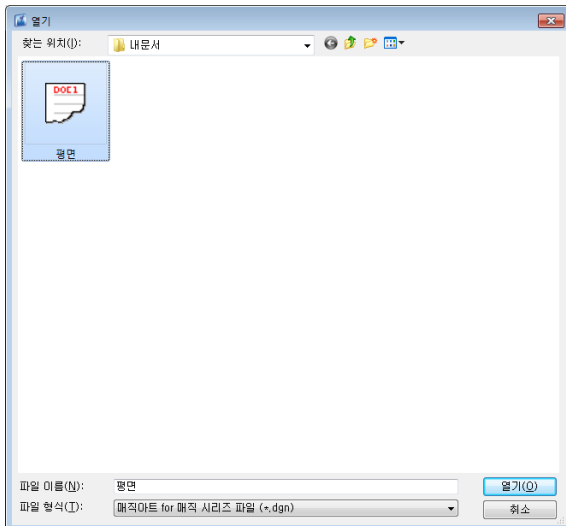
Open a new file



[Open]

Import a file save in *.dgn.

Select a file on the "Open" window and click "Open" button.

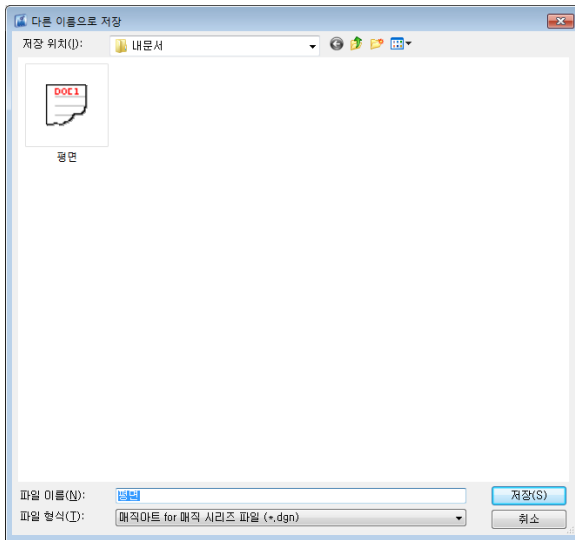




[Save document]

Save the design drawn on program by ” *.dgn.”

Chose the location (folder) in which the file will be saved and enter the file name before clicking “Save” button.



[Print]

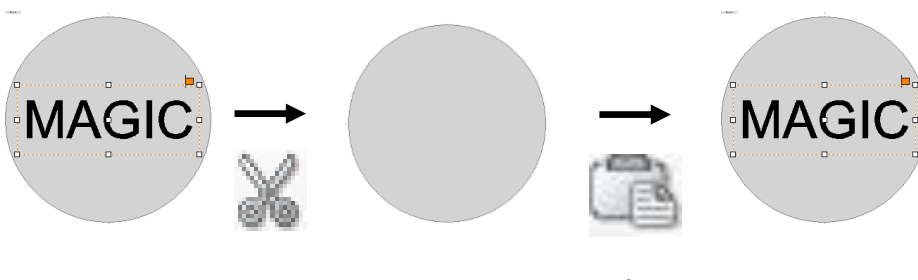
Print the design drawn on program.



[Cut]

Cut the selected object.

If Ctrl+X is pressed on the keyboard, the same function will be executed.

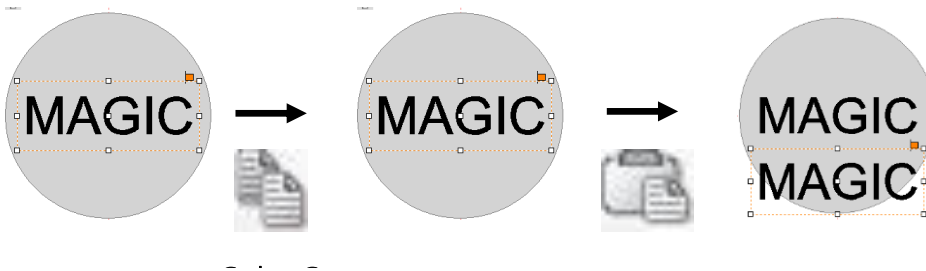




[Copy]

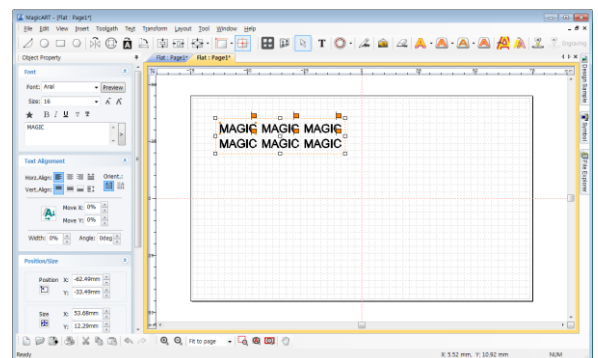
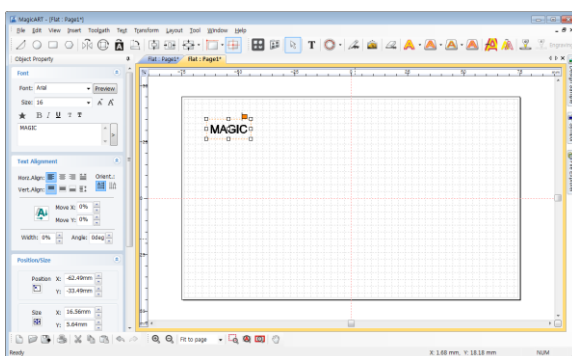
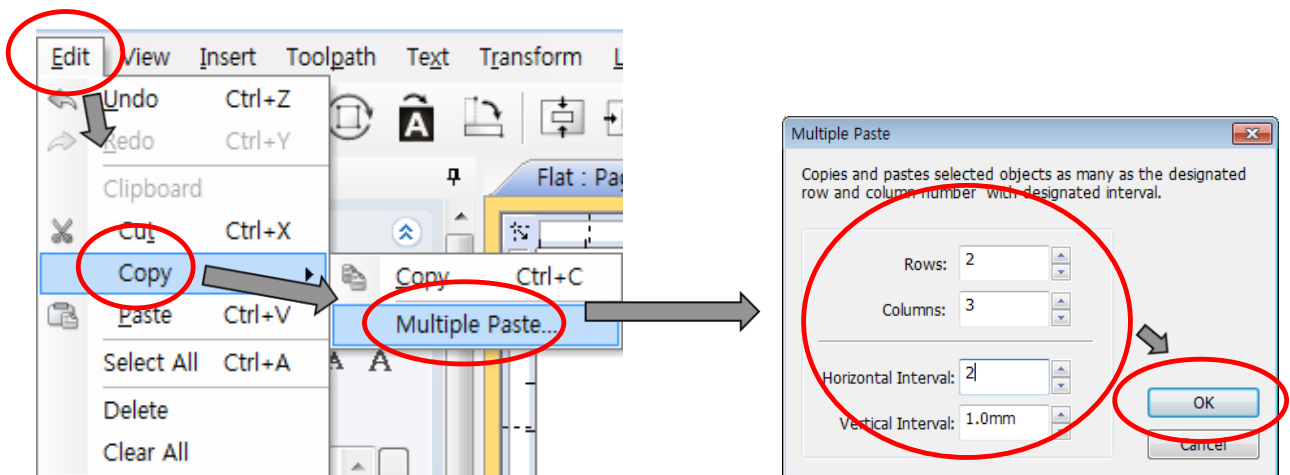
Copy the selected object.

If Ctrl+C is pressed on the keyboard, the same function will be executed.



[Multiple paste]

If more than one of the same object is needed, multi-copy the object in several constant gaps by clicking Edit menu → Copy → Multiple Paste....



[Paste]

Paste the cut or copied object.

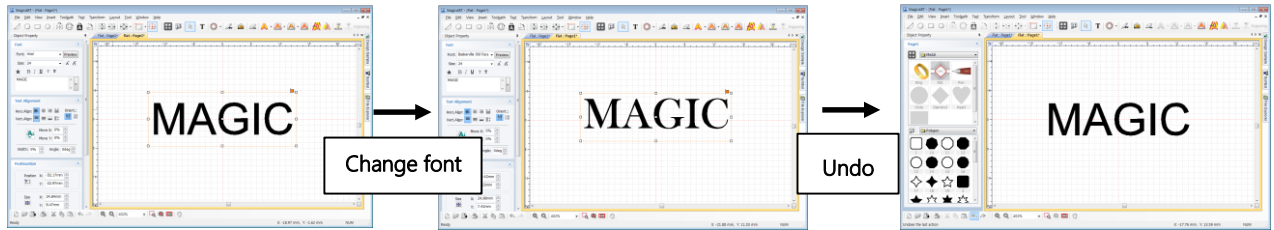
If Ctrl+V is pressed on the keyboard, the same function will be executed.



[Undo]

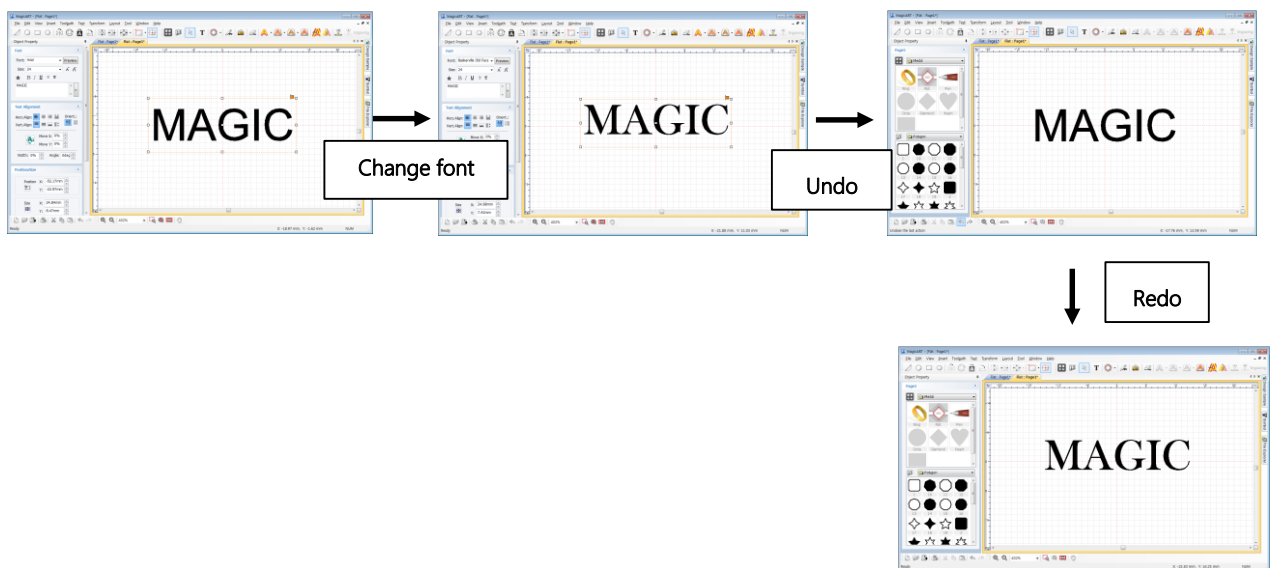
Return the work recently done to its previous state.

The number of undo stage can be adjusted with Tools → Option → General.



[Redo]

Re-execute the undone work.

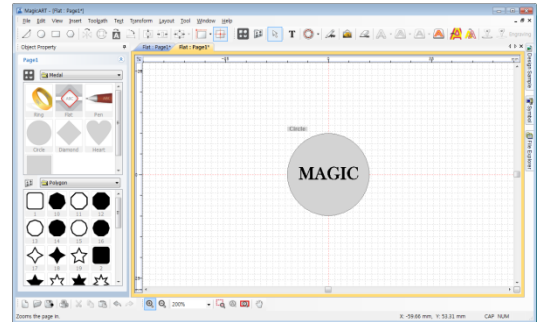
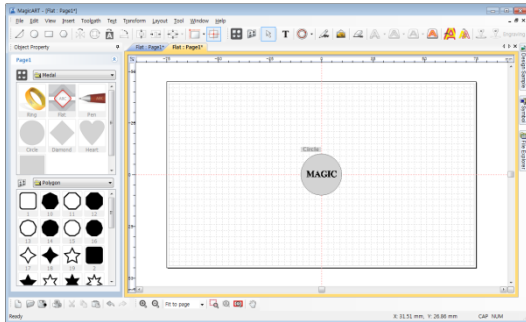


◆ Screen Zoom In/Out/Move Tools



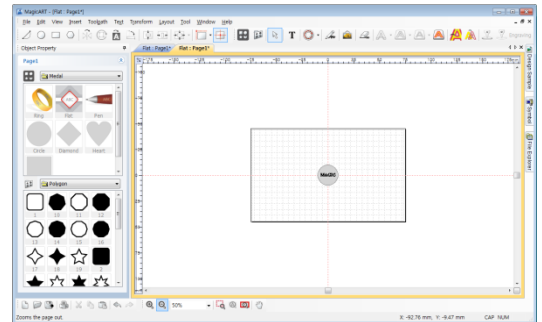
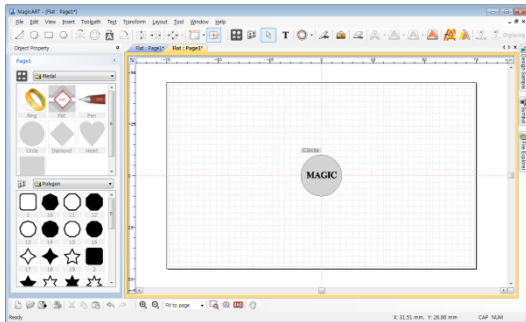
[Zoom in]

The screen is zoomed in by one level.



[Zoom out]

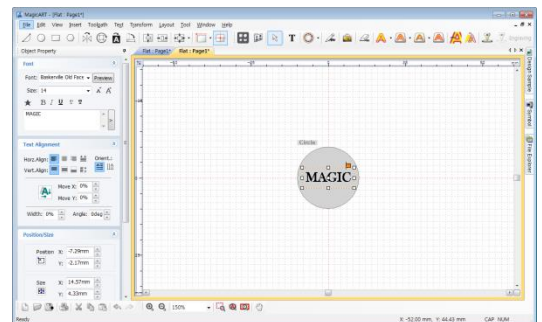
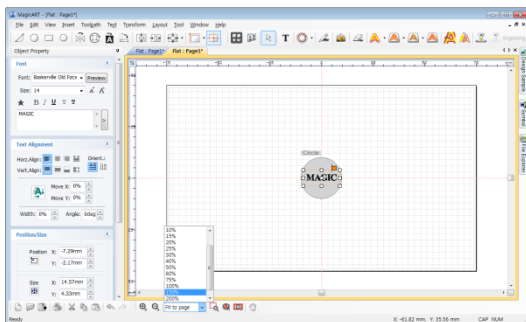
The screen is zoomed out by one level.



Fit to page

[Zoom in/Out ratio]

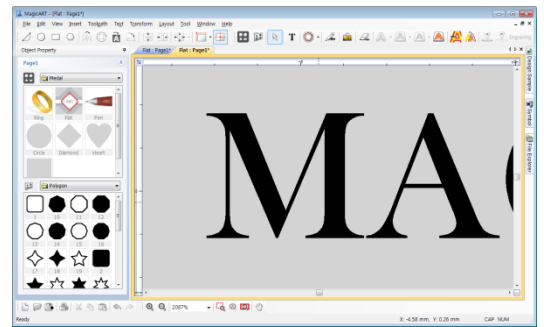
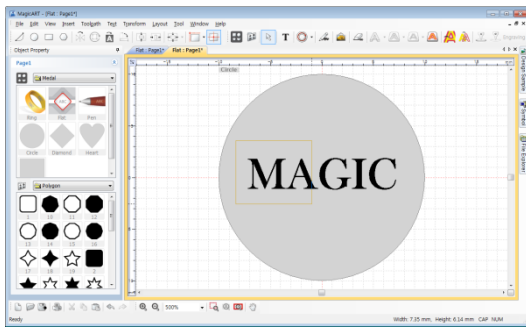
If any screen ratio is selected, the screen in the size of the selected ratio will be seen.





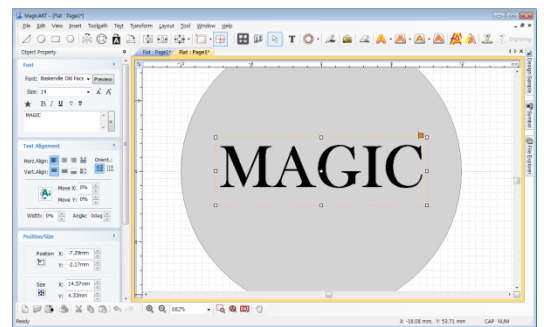
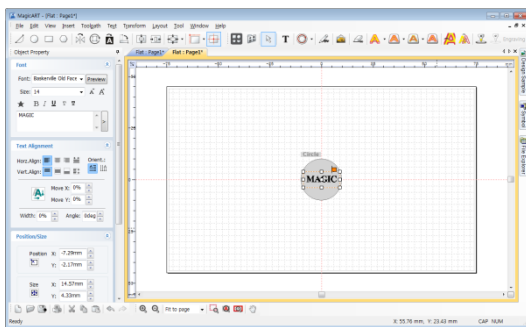
[Magnifier]

Drag a certain spot with the mouse to enlarge it.



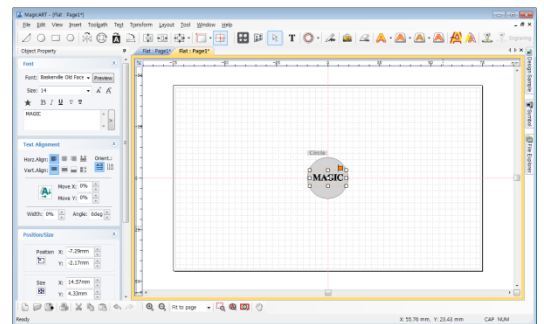
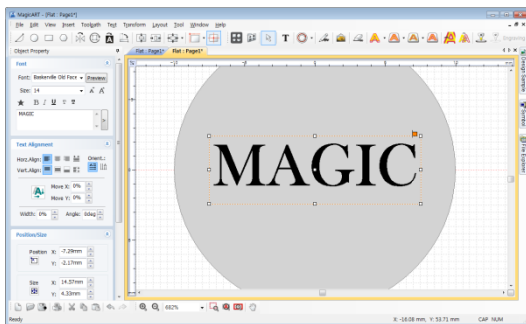
[Fit to object]

Enlarge the selected object to make it filled with the screen.



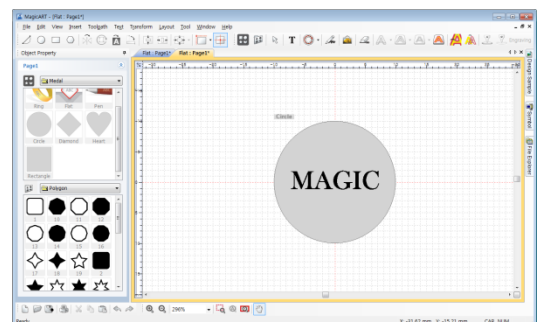
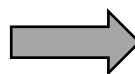
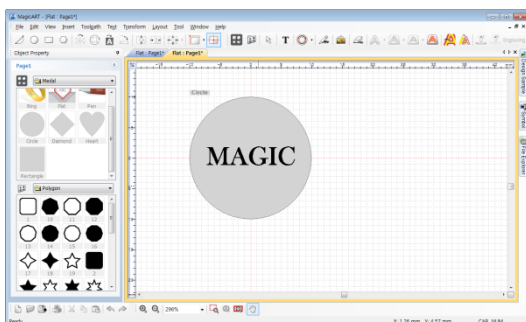
[Fit to page]

Adjust the page size to see the whole work area.



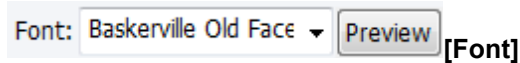
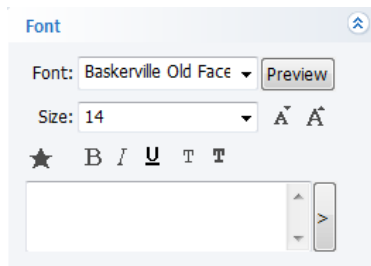
[Panning]

Drag the screen with the mouse to move it.



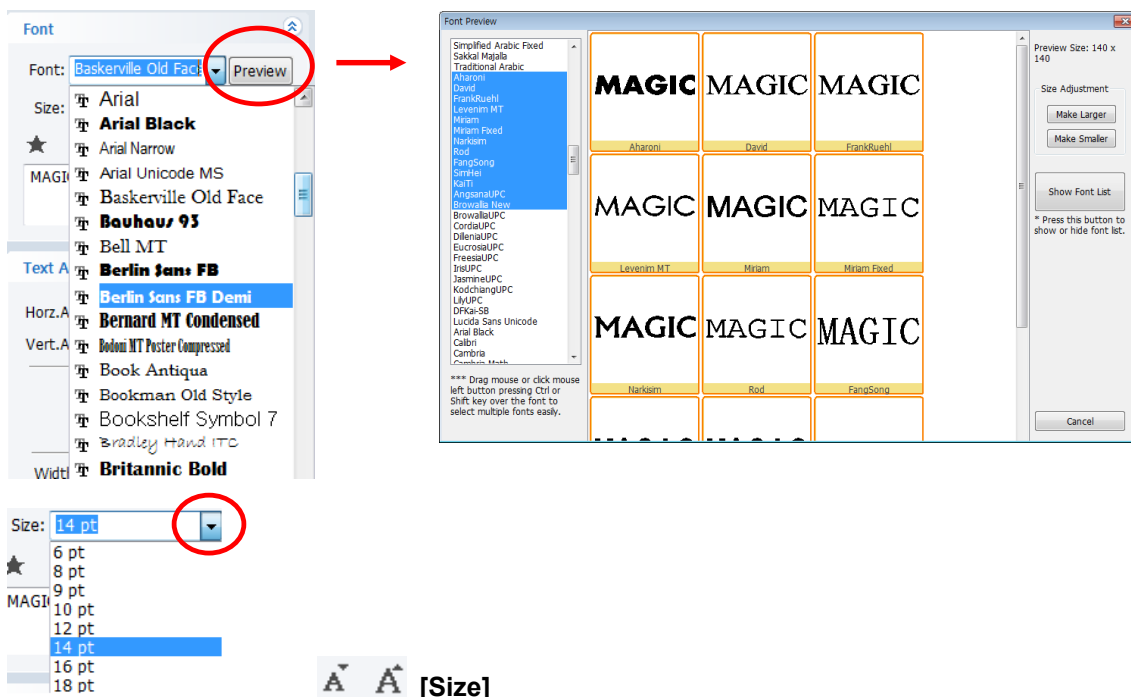
2) Registration Information of Character Object

If any character object is selected, the registration information of character object will appear in the left of the screen.

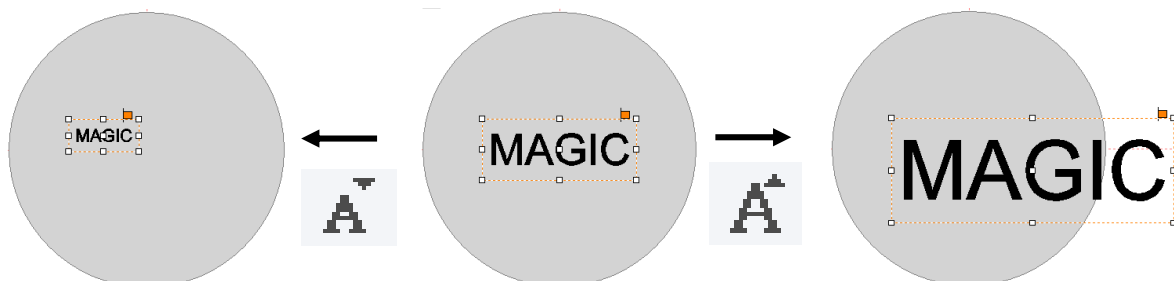


Designate font.

Either click the font's arrow or click Preview button to designate font.



Adjust the size of the selected character size. Either press the size arrow button to select or press [size] button to adjust the size by one level.

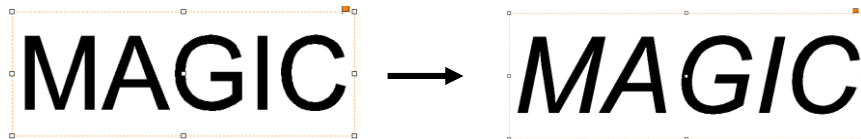




Change character style to bold.



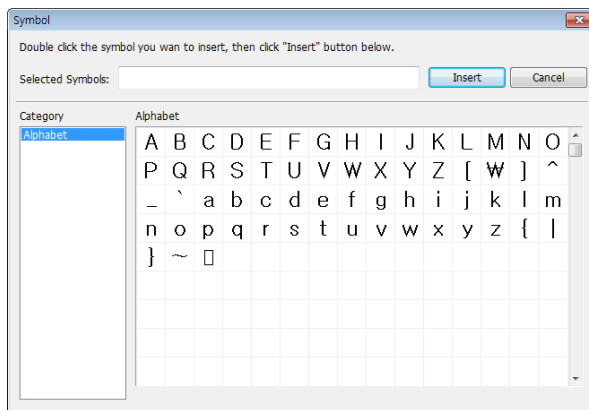
Change the character style to italic.




Adjust the weight of font.

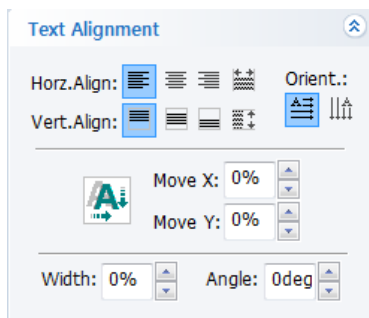









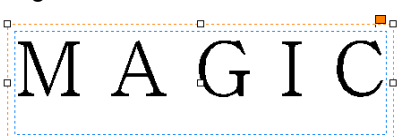
Insert symbols.



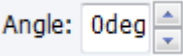



The entered text of the selected object can be displayed and changed. Press  button to change the text more easily.



 [Align to left]	Align characters to the left in the text box. 
 [Align to center]	Align characters to the center in the text box. 
 [Align to right]	Align characters to the right in the text box. 
 [Both]	Align characters to the both direction evenly in the text box. 

 [Align to top]	<p>Align characters to the top in the text box.</p> 
 [Align to center]	<p>Align characters to the center in the text box.</p> 
 [Align to bottom]	<p>Align characters to the bottom in the text box.</p> 
 [Horizontal text]	<p>Arrange characters horizontally.</p> 
 [Vertical text]	<p>Arrange characters vertically.</p> 
 Move X: 0%	<p>Move the selected character horizontally (left, right).</p> 
 Move Y: 0%	<p>Move the selected character vertically (up, down).</p> 
 Width: 0%	<p>Adjust the width of the selected character.</p> 

	Rotate the selected character. 
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Position/Size

Position X: -7.29mm
Y: -2.17mm

Size X: 14.57mm
Y: 4.33mm

X: -23.82mm Y: -7.41mm	Location of the selected object
X: 24.23mm Y: 14.75mm	Size of the selected object

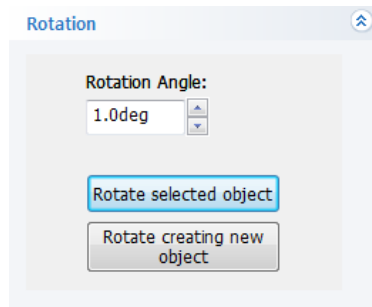
Line and Fill Shape


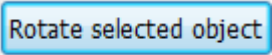
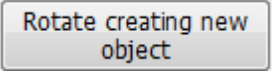
Line Thick: 0.002mm
Line Shape:
Line Color: Black

Fill Shape:
Fill Color: Black

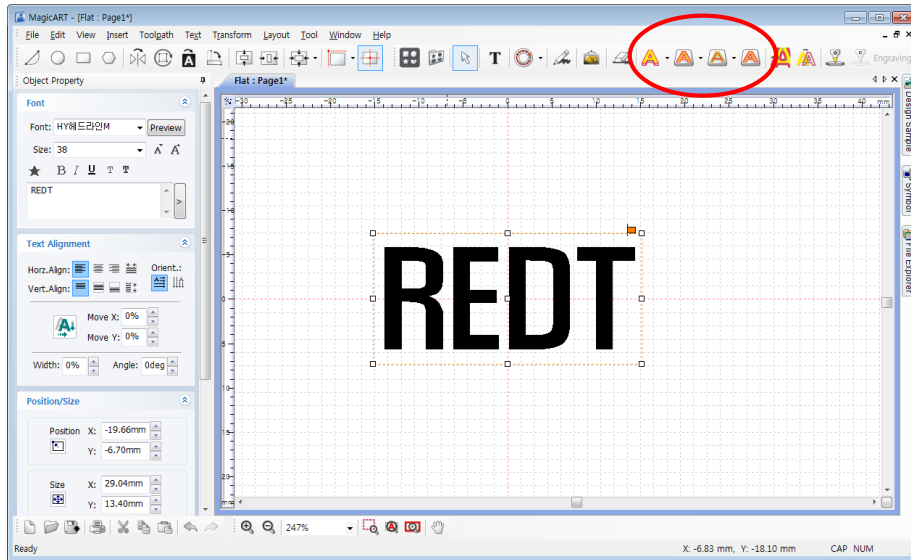
0.002mm	Line thickness of the selected object
	Line type of the selected object
Black	Line color of the selected object
	Color filled inside of the selected object
Black	Type of filled inside of the selected object

3) Registration Information of Rotation


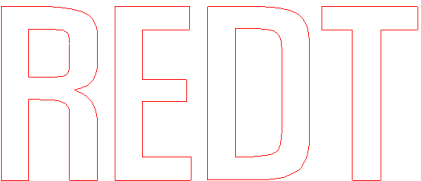

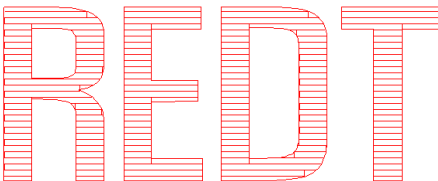

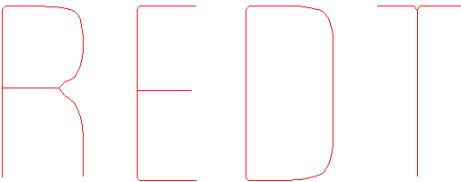




	Rotate the selected object by one degree. Enter the desired angle of rotation, and press button, then the object is rotated by the angle you enter.
	Rotate the selected object at the same degree as entered.
	Rotate and add a new object at the same degree as entered

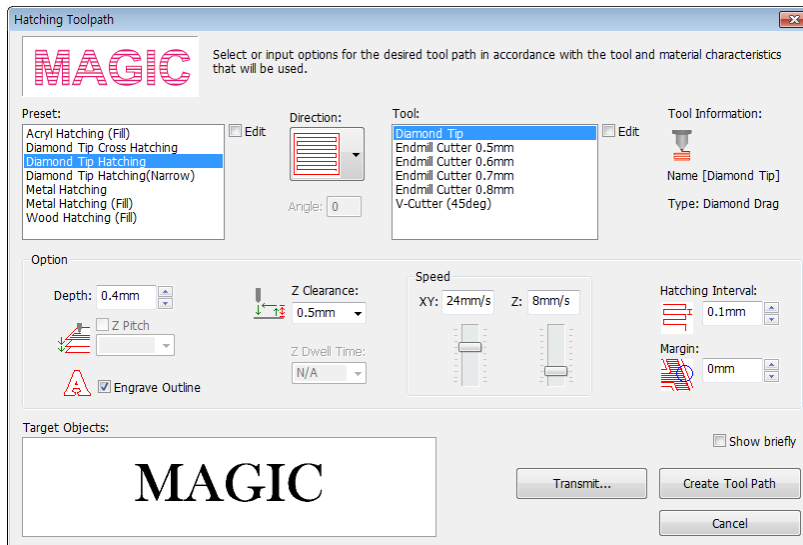
4) How to Engrave for Each Tool Path







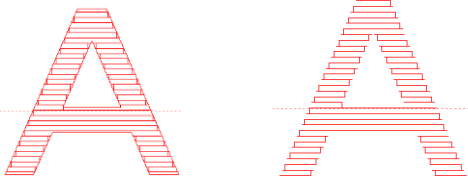
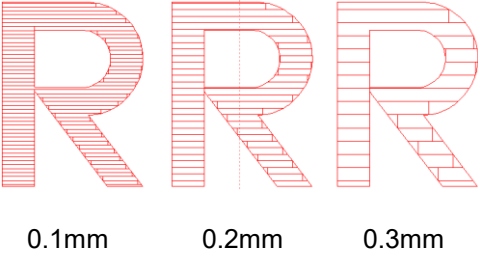
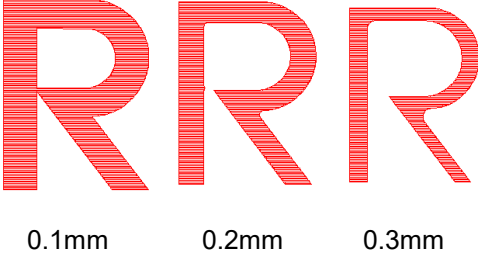
REDT [Content]

 Cutting	Engrave the border of characters. 	 Hatching	Engrave the inside of characters. 
 Single line	Engrave the center of characters. 	 	Engrave the surface of characters character with dots. 

5) Create Tool Path

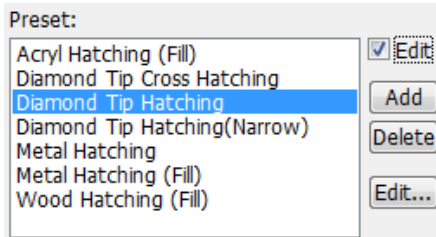


Preset	Hatching gap, depth, engraving speed and others are pre-set for each engraving option. Therefore, it is not necessary to designate hatching gap, depth, engraving speed and others every time and they will be automatically set with their pre-set values. Each engraving option value can be changed by pressing Edit or Add button on the Set engraving option window.
Tool	Designate a tool to be used for engraving. Each tool setting value can be changed by pressing Edit or Add button on the Set tool window.
Direction	<p>The followings are shown only on hatching tool path.</p> <p>A tool path is created in the horizontal direction. </p> <p>A tool path is created in the left diagonal direction </p> <p>A tool path is created in the right diagonal direction </p> <p>A tool path is created in the cross hatched direction </p>
Depth	<p>Engraving: It does not mean the actual engraving depth but refers to “Applied pressure” and the higher depth value is, the bigger the applied pressure is.</p> <p>Cutting: Designate an engraving depth actually used for using rotation tools.</p>

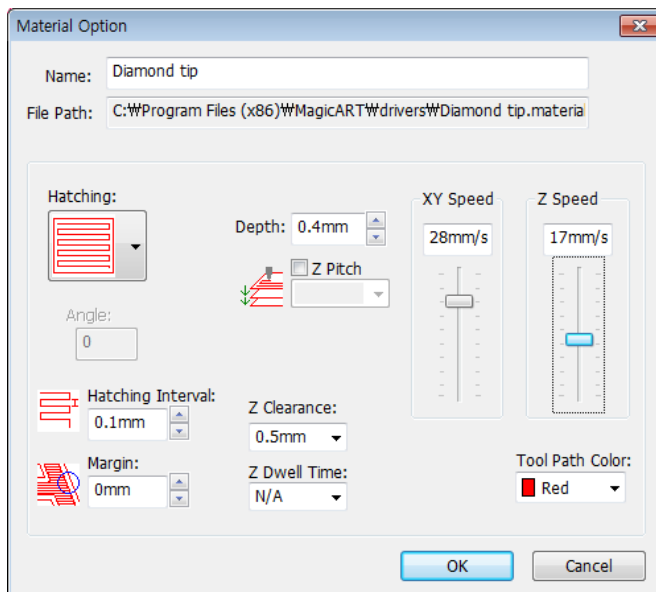
Engrave outline	<p>If engrave border is cancelled, a tool path will engrave only the inside of the character created.</p> 
Z Clearance	<p>When moving to another engraving location, it is necessary to lift Z axis to prevent the tool from contacting with the material surface before moving. For this, designate the height to be applied at this time.</p>
XY axis speed	<p>Designate a speed at which XY axis will move during the engraving.</p>
Z axis speed	<p>Designate a speed at which Z axis will move during the engraving.</p>
Hatching interval	<p>Designate hatching gap.</p> 
Margin	<p>Designate a margin between object outline and tool path.</p> 
Show briefly	<p>Only engraving option, direction and tool of the tool path are shown.</p>
Transmit	<p>Transfer tool path window is displayed</p>

5-1) Engraving Option: Add/Delete/Edit

If Select engraving option is checked, Add/Delete/Edit buttons will appear.



Enter a name to the engraving option setting window and designate hatching gap, engraving depth and speed before clicking “OK” button. They will be added to the engraving option selection list.

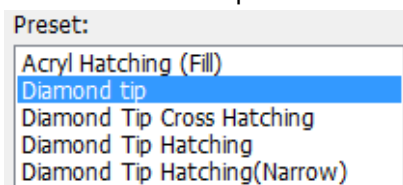


Preset:

- Acryl Hatching (Fill)
- Diamond tip
- Diamond Tip Cross Hatching
- Diamond Tip Hatching
- Diamond Tip Hatching(Narrow)



Select an option to be deleted and click “Delete” button to delete the option from the list.

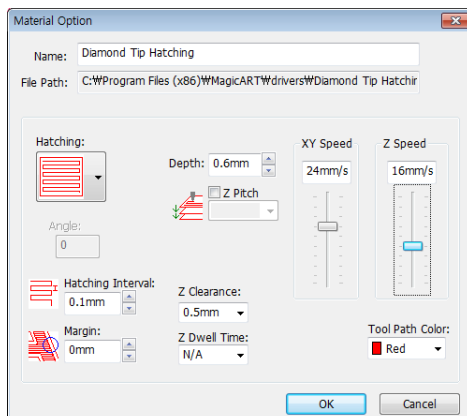


Preset:

- Acryl Hatching (Fill)
- Diamond Tip Cross Hatching
- Diamond Tip Hatching
- Diamond Tip Hatching(Narrow)

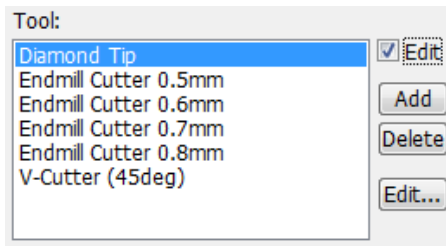


Select an option to be modified and click “Edit” button. If “OK” button is clicked after a setting value is modified on the option setting window, the modified setting value will be saved.

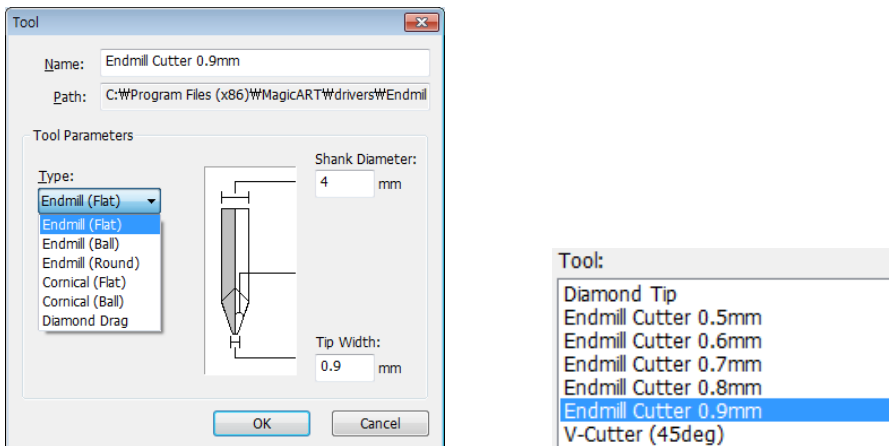


5-2) Add/Delete/ Edit Tool

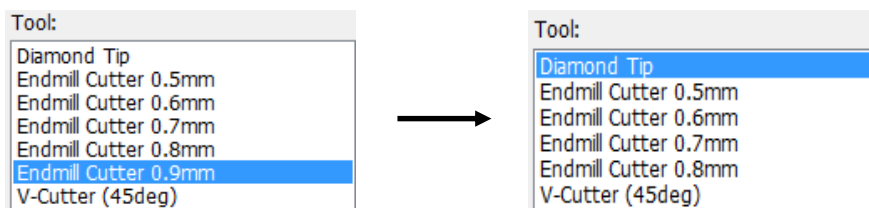
If “Edit” button is checked, Add/Delete/Edit button will appear.



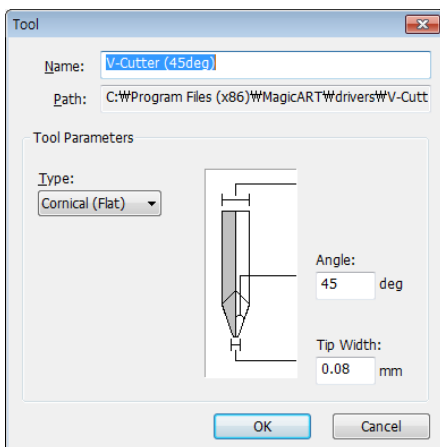
Add Designate the name of a tool to be added along with its type, end width and click “OK” button. The tool will be added to the tool selection list.



Delete Select a tool from the list and click “Delete” button to delete the selected tool from the list.

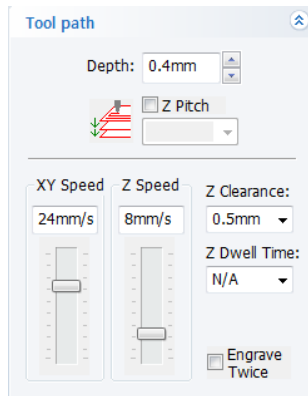


Edit... Select a tool to be modified and click “Edit” button. If “OK” button is clicked after a setting value such as edge width is modified, the modified setting value will be saved.

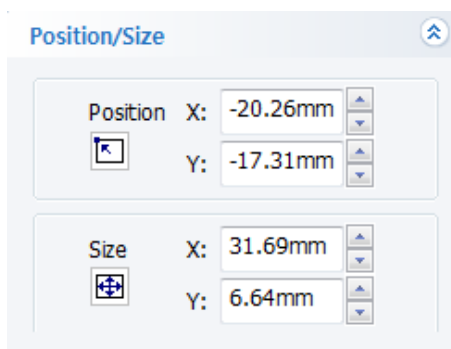


6) Registration Information of Tool path

If tool path object is selected, the registration information of tool path window will appears in the left of the screen to allow the user to adjust its depth and speed once again.




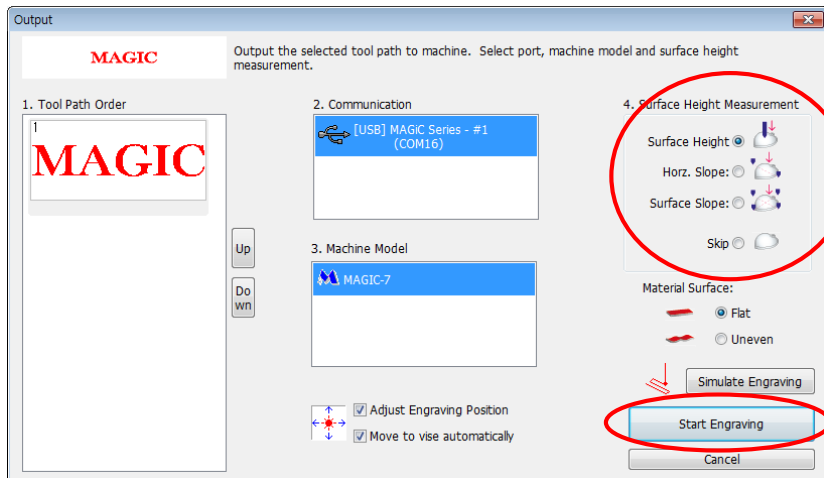
Depth	Engraving: It does not mean the actual engraving depth but refers to “Applied pressure” and the higher depth value is, the bigger the applied pressure is. Cutting: Designate an engraving depth actually used for using rotation tools.
XY speed	Designate a speed at which XY axis will move during the engraving.
Z speed	Designate a speed at which Z axis will move during the engraving.
Z Clearance	When moving to another engraving location, It is necessary to lift Z axis to prevent the tool from contacting with the material surface before moving. For this, designate the height to be applied at this time.
Z Dwell Time	Designate time gap before Z axis touches the material and it is moved.
Engrave twice	Engrave the design twice.

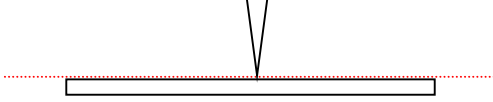
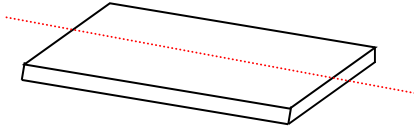
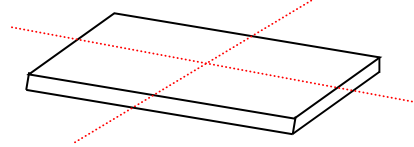


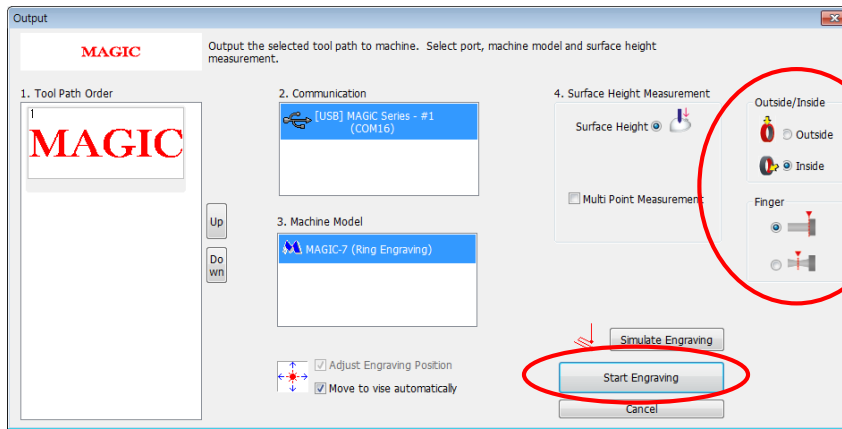
X: -20.26mm Y: -17.31mm	The location of the selected tool path appears. Click the arrow button to move the location.
X: 31.69mm Y: 6.64mm	The overall size of the selected tool path appears. Click the arrow button to change the size.

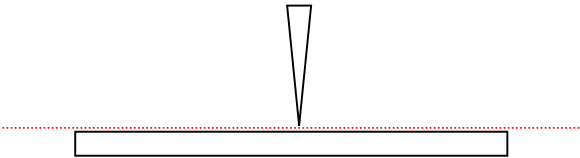


7) Transfer NC data

Transfer the selected tool path to the engraver. Select a tool path object and click  **Engraving** button to make the transfer NC data window appear. Select a measuring method and click “Start engraving” button.



Surface height	<p>Measure material height only.</p> 
Horz. slope	<p>Measure material's horizontal gradient.</p> 
Surface slope	<p>Measure material's top, bottom, left and right gradient.</p> 
Skip	<p>Do not measure its height. In this case, the height previously measured can be used. If the material is not removed from the clamp during the previous engraving work, the measuring time can be saved with this option.</p>
Adjust engraving Position	<p>Designate whether to re-adjust the engraving location. If this option is selected, the laser pointer will be turned on to allow the user to adjust the engraving location before engraving. If this option is not used, engraving will begin immediately.</p>



Surface height	Measure material height. 
Multi point measurement	Measure material height by dividing the whole material into several parts(up to 5 times)
Outside	Engrave on the ring's outer diameter.
Inside	Engrave on the ring's inner diameter.
	Place the material to the flat chuck finger.
	Place the material to the round chuck finger.

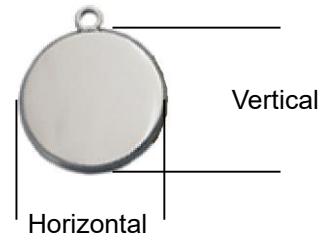
Engraving Process



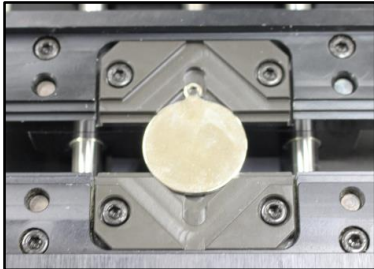
Tool: Tip

Clamp: Multi performance clamp

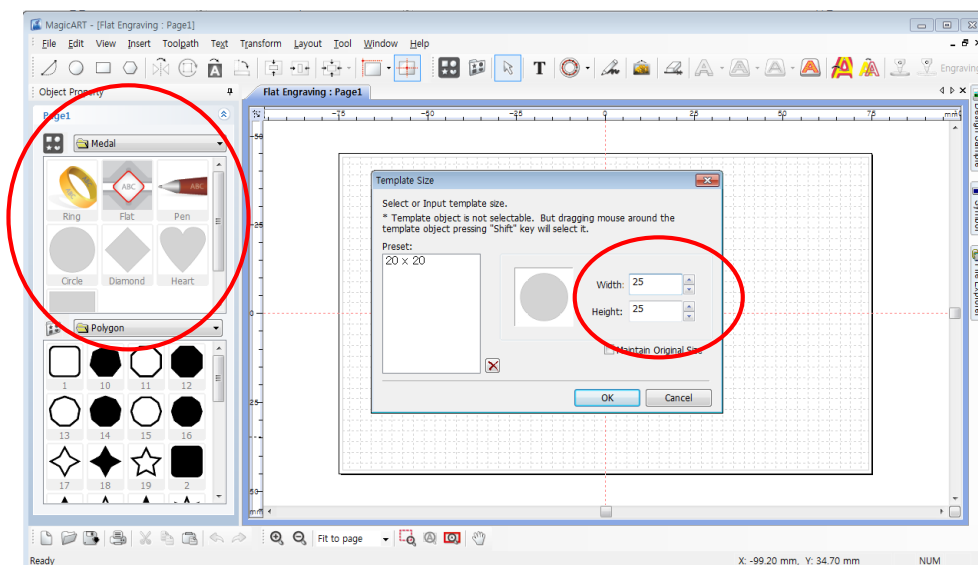
1. Measure material to be engraved.




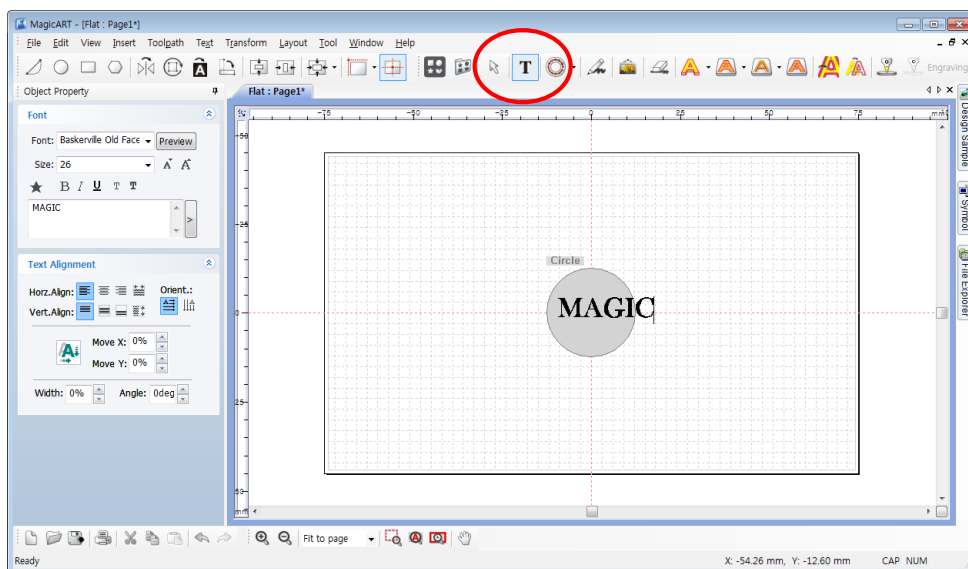
2. Fix a material to be engraved to the center of clamp.





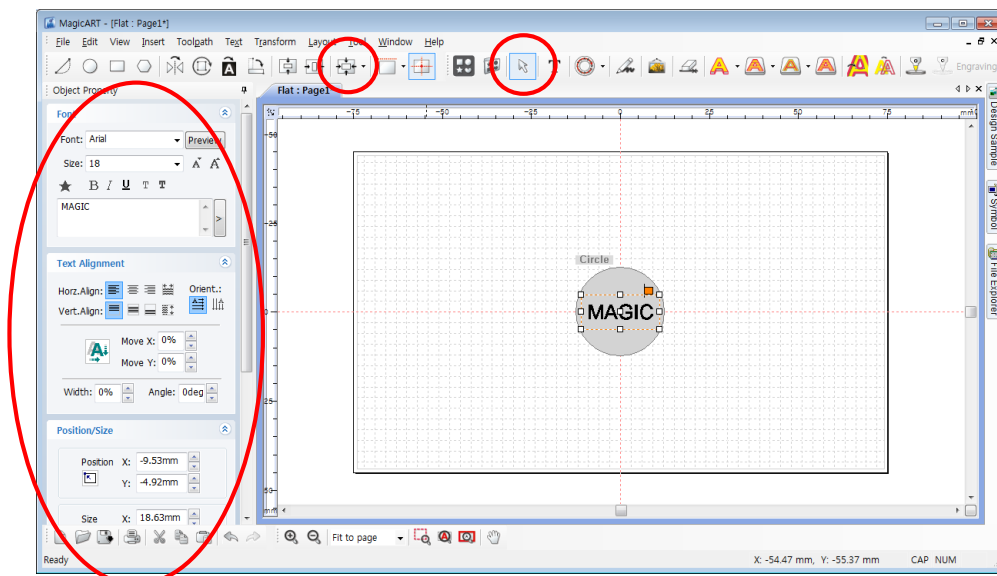
3. Select the template the most similar to the material to be engraved from the template category and enter the size of the material before clicking "OK" button.




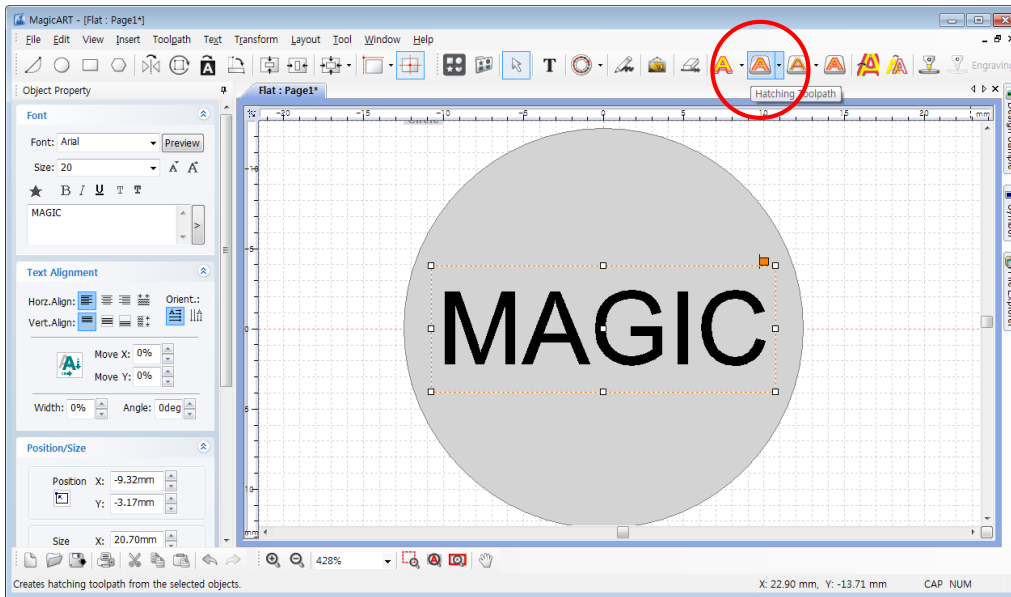
4. Once the template appears, press  [Text input] and click any wanted location with the mouse to enter characters.



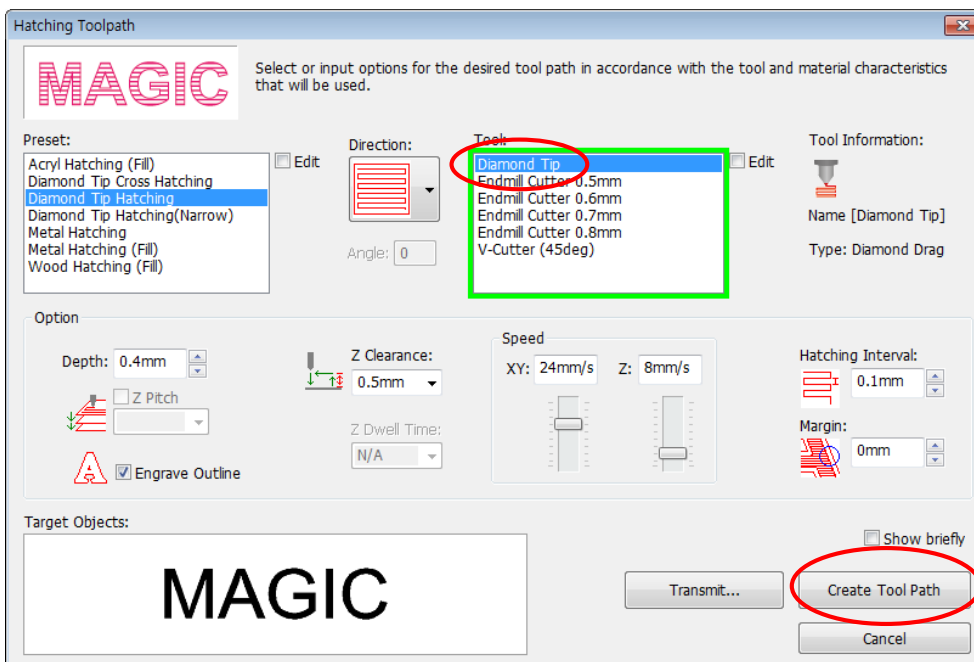
5. Once entering characters is completed, press toolbar's  [Selection] and go to the select object mode to select the entered characters. Then, edit the size, font and thickness of the object. If you want to allocate the object at the center of the work area, click  [Center in page] button.



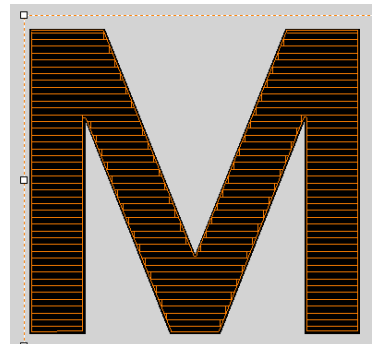
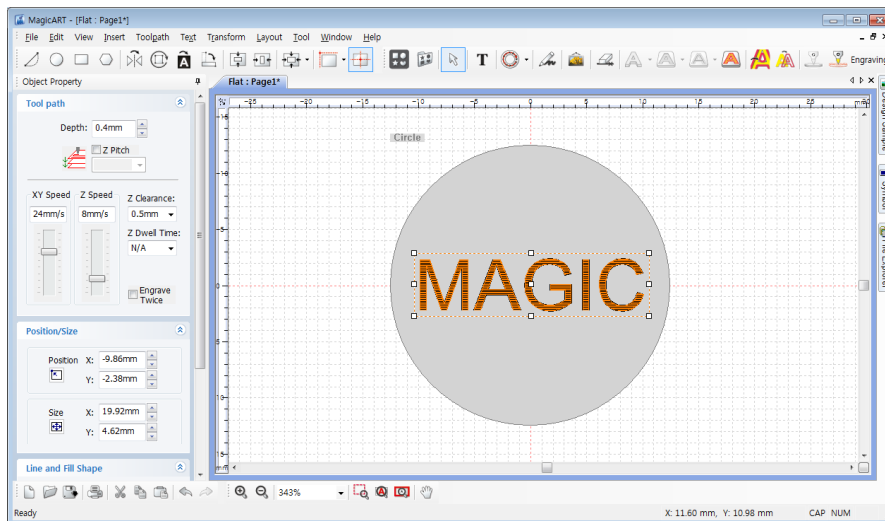
6. Once the design is completed, click  [Hatching tool path]. A tool path means a route along which a tool is moved for engraving.



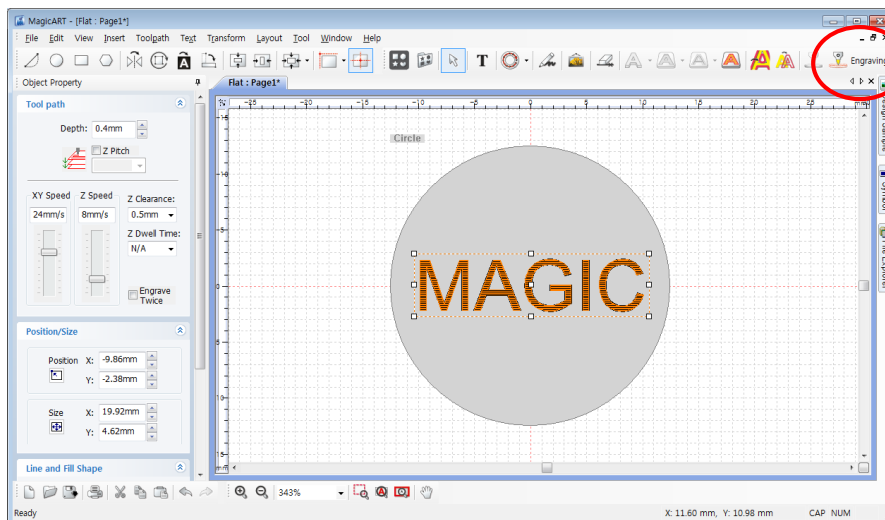
7. Select an engraving option and tool from “Hatching tool path” window and if necessary, designate gap and depth before clicking “Create tool path” button.



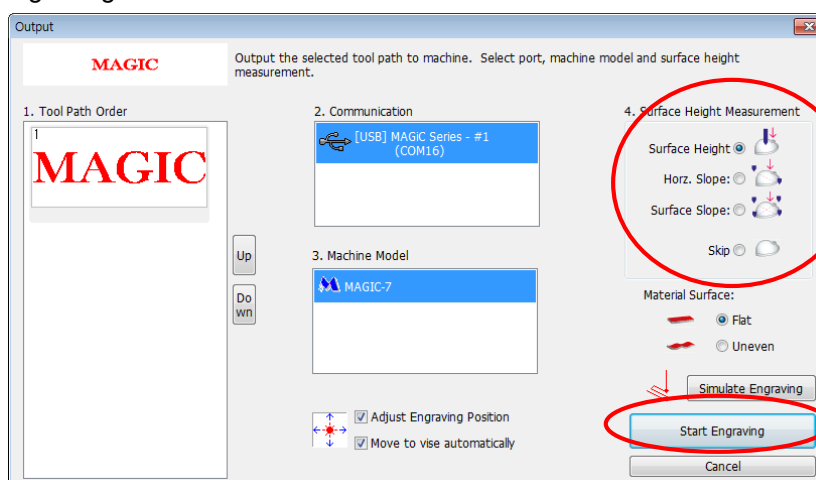
8. "Tool path" object is created.





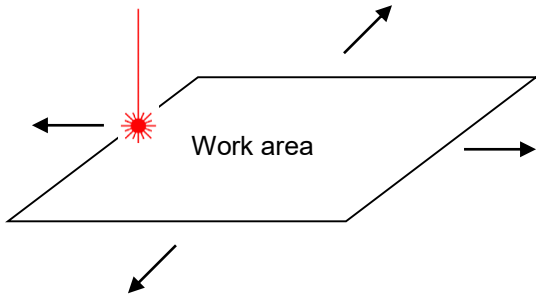
9. Click  [Engraving] button.




10. Once "Output" window appears, specify how to measure the engraving materials. And then, click "Start engraving" button.

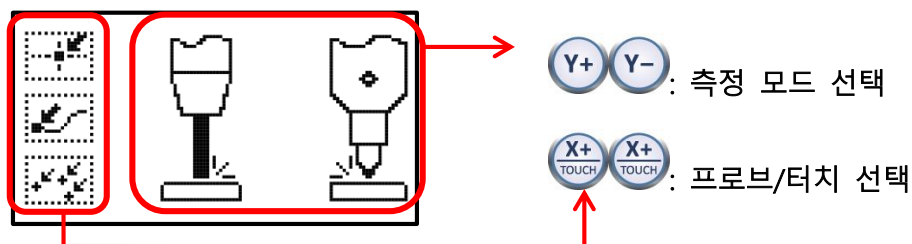


11. Once the tool is moved to the center of the material and stopped, the engraving area can be verified and adjusted by using the direction key button. At this time, check the laser pointer while moving it for easier measurement and adjustment.


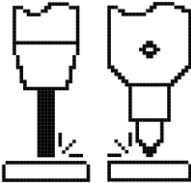

	<p>Whenever the direction key is pressed, move the laser pointer to the left, top, right and bottom of the engraving area to show the area to be engraved. Check whether the area to be engraved is outside of the materials surface. If so, adjust the location by using the direction key.</p>
	<p>The laser pointer moves the area to be engraved to the left, top, right or bottom according to current location. If the current location of the laser pointer is left, then, press  key to move the area to the left.</p> 

12. After the location of engraving is decided, press and hold  button until it beeps (more than 3 seconds) to start the engraving.

13. User can select measurement mode within two seconds before measurement begins, after transferring tool path (engraving data) from MagicArt to the machine.



	<p>Measure the origin of engraving area.</p>		<p>Measurement Method Select.</p>
---	--	--	--

	<p>Measure the beginning point.</p>		<p>If you select probe, “Measure the origin of engraving area” mode is automatically selected and the others cannot be selected.</p>
	<p>Measure whenever tool moves and meet the material.</p> <p>※ “Z Clearance” should be set enough large value when setting the tool path to avoid damage material.</p>		

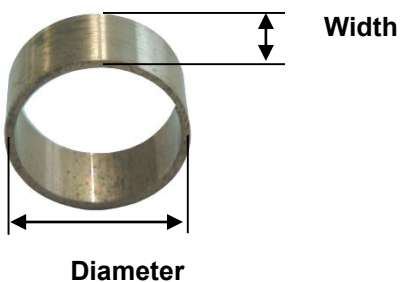
Engraving Process of Ring inner/outer Diameter



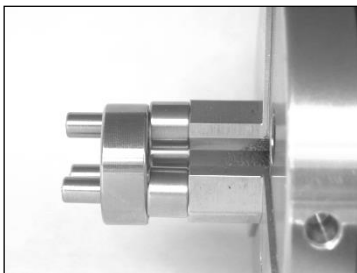
Tool: Tip

Clamp: Rotation clamp

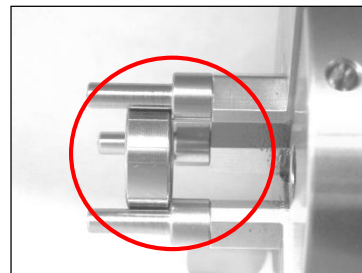
1. Measuring the width and diameter of a ring to be engraved.



2. Insert the ring into the chuck finger as below, and tighten the rotation clamp to set it.



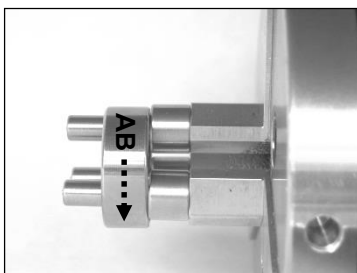
Outer diameter




Inner diameter



Since the character engraving direction is as shown in the picture below, check out the direction of the materials and set it.



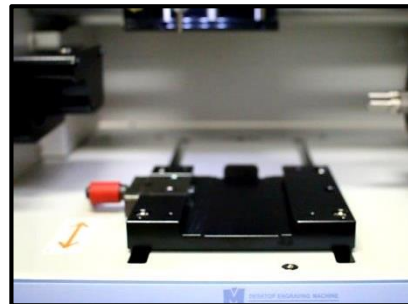
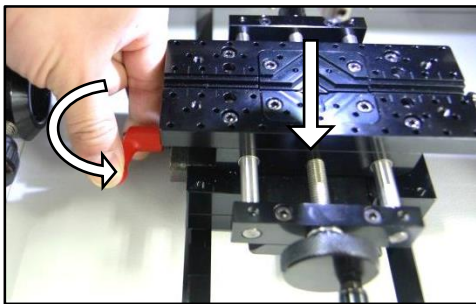
◆ Ring (Bangle) Outer Diameter


1. Press  button on the engraver. A message requiring removal of the clamp appears on the screen.

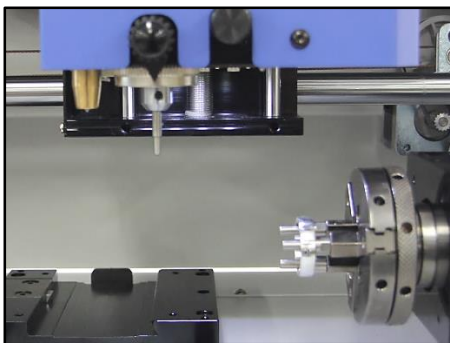


※ Proceeding without removing the clamp, a damage may occur in the clamp and other tools.

2. Remove the clamp by loosening the clamp tightening lever.



3. Press  button after removing the clamp. A message shown below appears on the screen.




[Ring Outer Diameter]



[Bangle Outer Diameter]

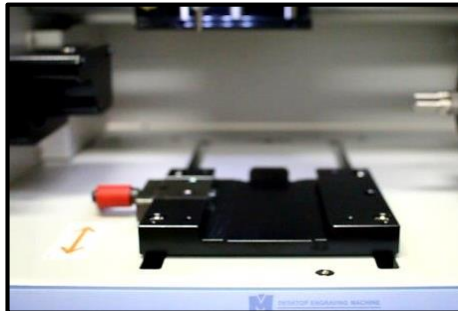
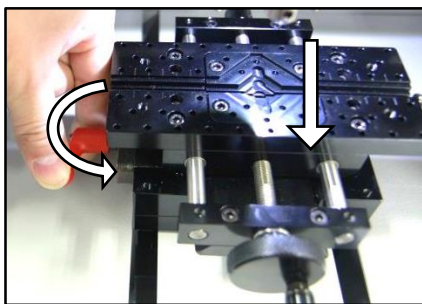
◆ Ring (Bangle) Inner Diameter


Use an L-tool to engrave ring or bangle inner diameter.

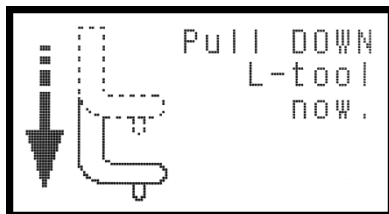
1. Press  button on the engraver. A message requiring removal of the clamp appears on the screen.



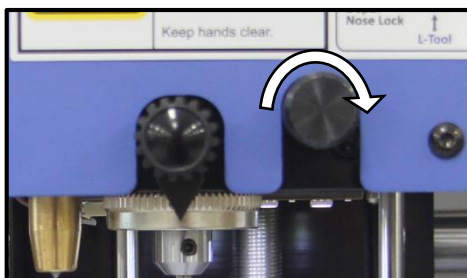
2. Remove the pendant clamp by loosening the clamp tightening lever.



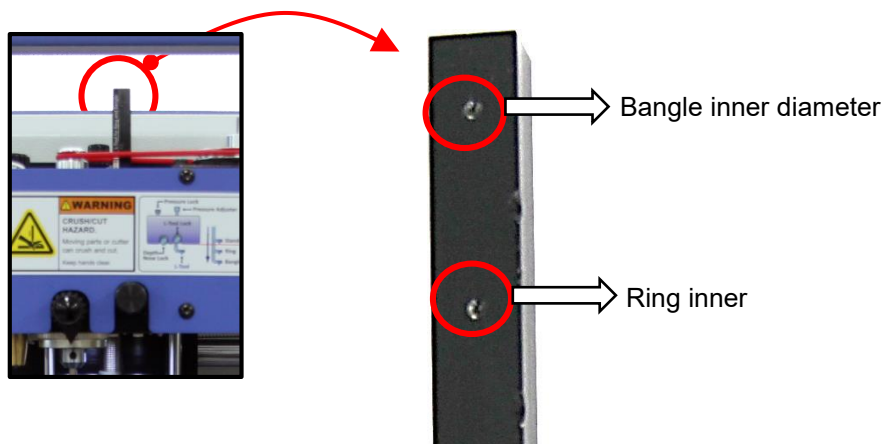
3. Press  button after removing the clamp. A message shown below appears on the screen.



4. Loosen the L-tool tightening bolt by turning it in the direction shown in the following picture.



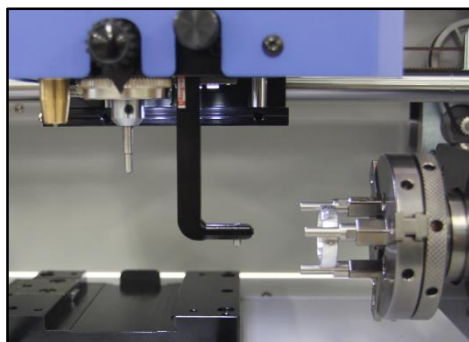
5. Adjust the height of L-tool to get a proper height for the engraving. With the L-tool at a proper height, fix it with the L-tool tightening bolts.



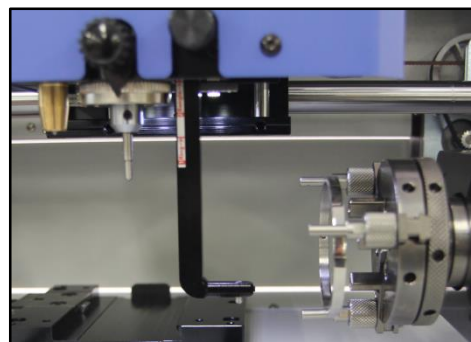
The length of the L-tool fixture should be flexible to meet the shape of the bangle. Please fix L-tool properly to the shape of the bangle.



6. Press button, a message shown below appears on the screen. Now all is done to start the work.



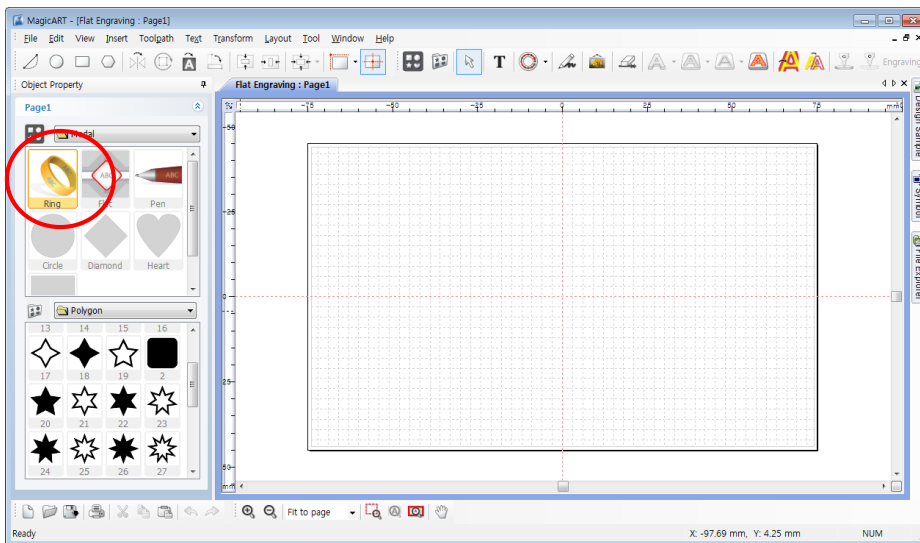
[Ring Inner Diameter]



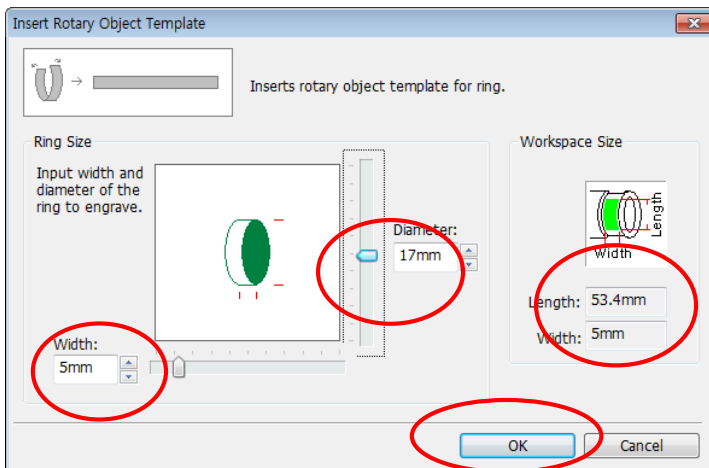
[Bangle Inner Diameter]

◆ Program Process

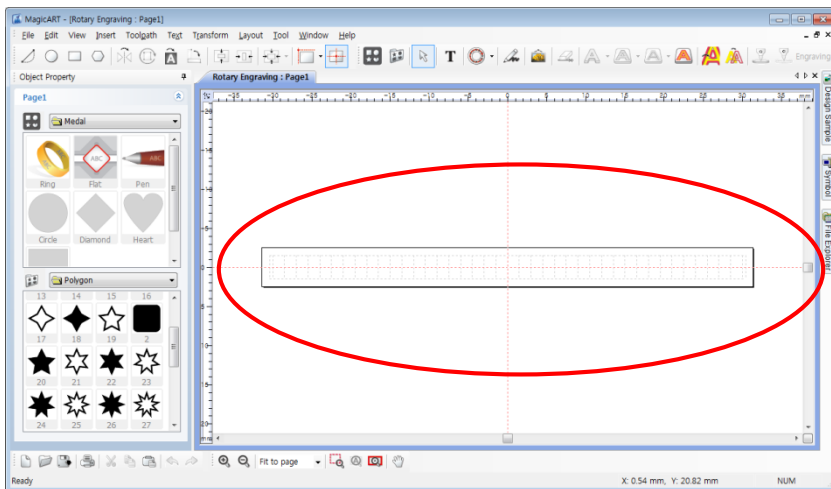
1. Double click “Ring” template in the object registration information.



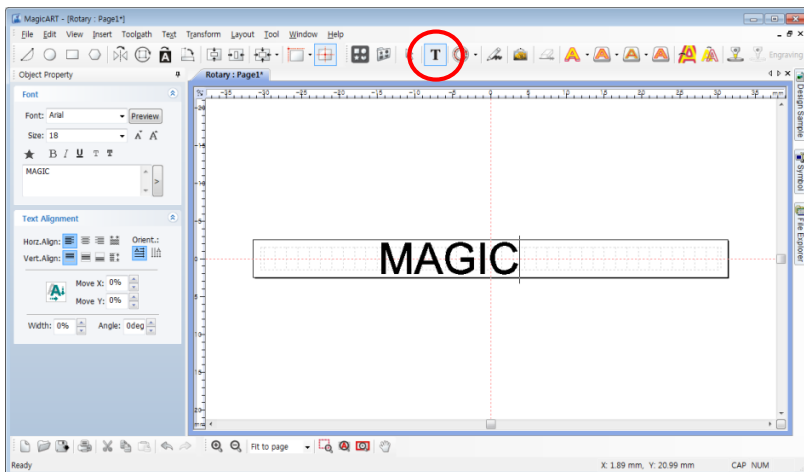
2. When “Insert Rotary Object Template” window appears, enter the width and diameter of the ring measured and click “OK.”





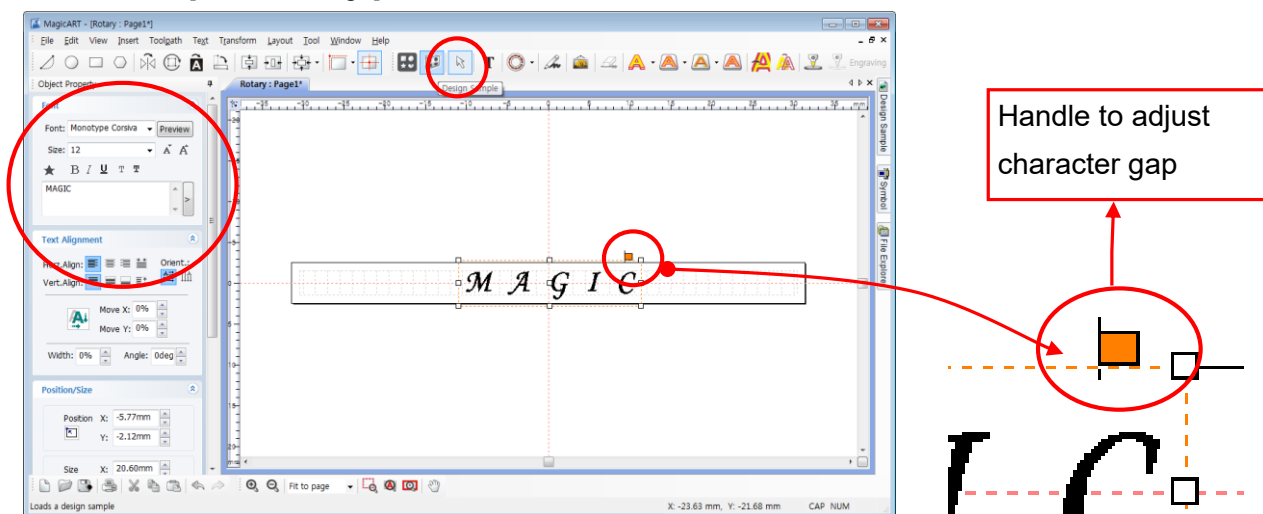
3. The template appears at the center of the screen.



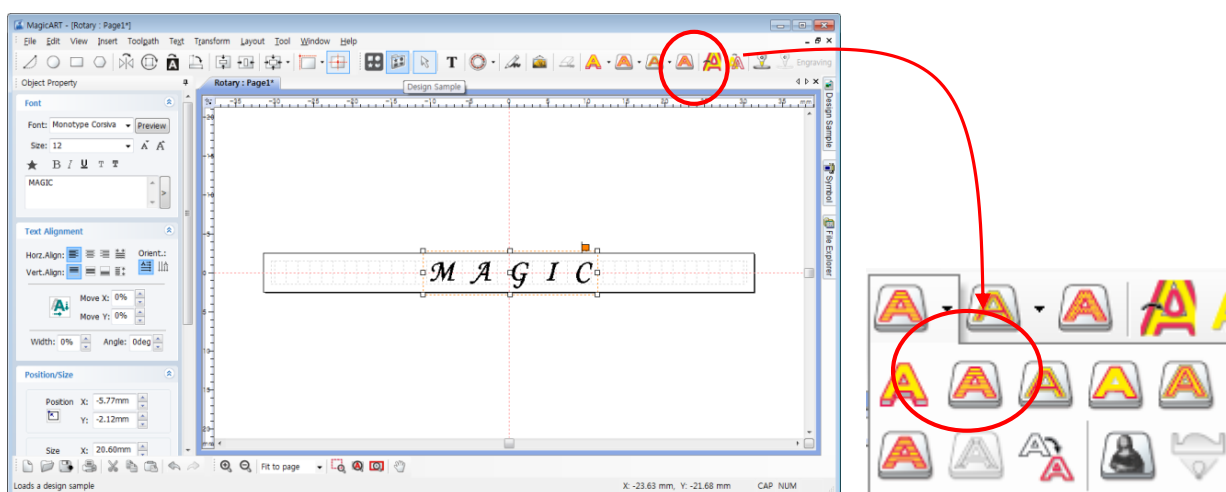
4. Select **T** [Text Input] from the menu, and click the work area using mouse and enter the **characters** to be engraved.



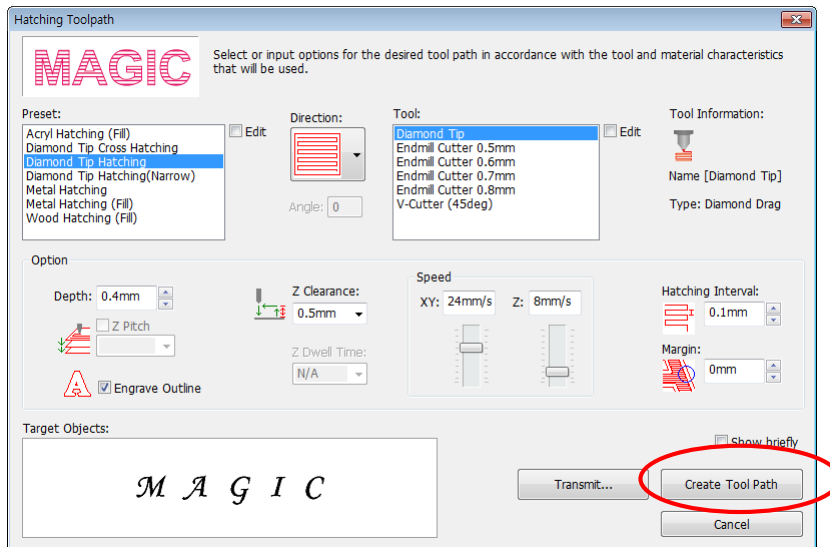
5. After entering characters, press  [Selection] in the toolbar to enter the object selection mode. Select the character string, and **edit the size and font** of the object. If you want to place the object at the center of the work area, click  [Center in Page] button.



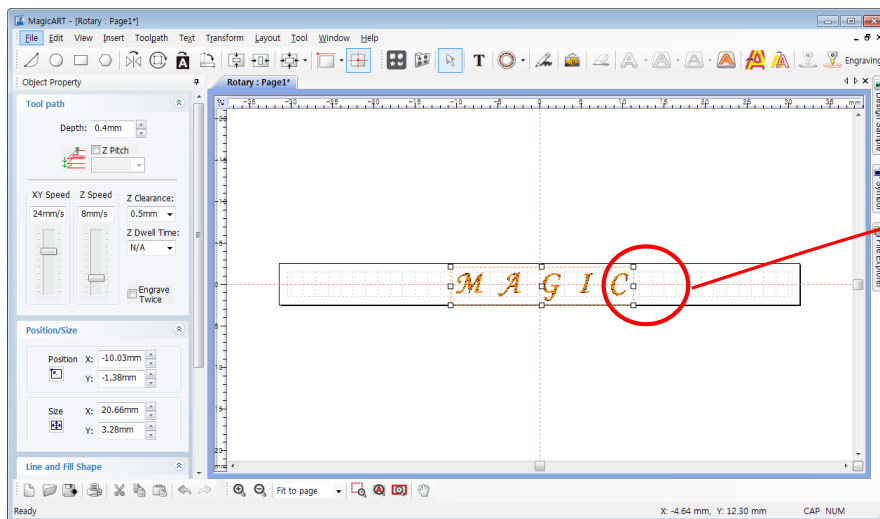
6. Once design is completed, click  [Hatching Tool path] button.



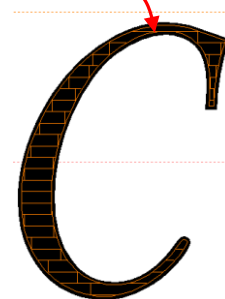
7. Once “Hatching Tool path” window appears as shown in the picture below, select tool, tool path gap and depth, and click “Create Tool Path” button.




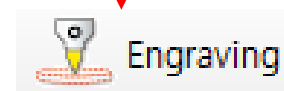
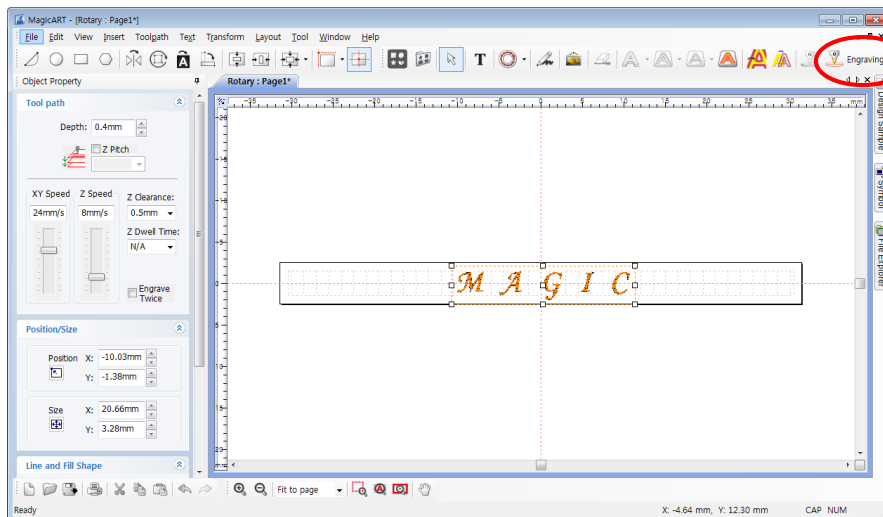
8. The “Tool path” object is created as below and marked with red line on the screen. Turn the mouse wheel to enlarge the tool path object, and if it is not the tool path you want, delete the tool path and extract it again by adjusting the extraction option.



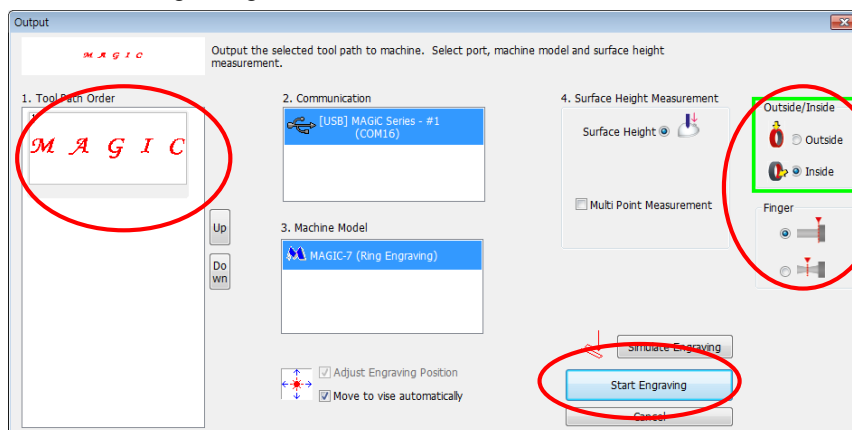
[Extract tool path]

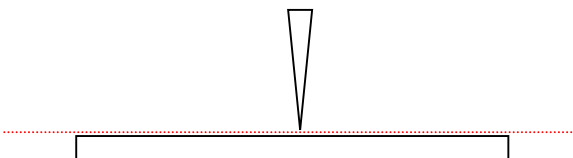




9. After selecting a tool path, click  Engraving.



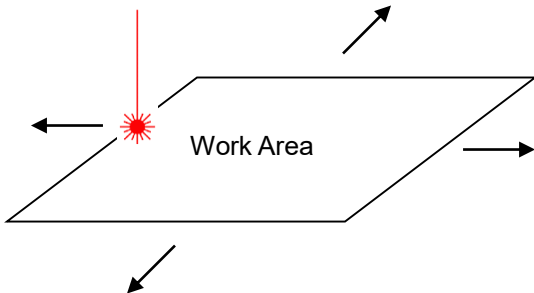



10. Once “Transfer NC data” window appears, specify Communication port and rotation clamp option. And then, click “Start Engraving” button.



Surface Height	<p>Measure material height.</p> 
Multi point Measurement	Measure material height by dividing the whole material into several parts(up to 5 times)
Outside	Engrave on the ring's outer diameter.
Inside	Engrave on the ring's inner diameter.
	Set the material to the flat chuck finger.
	Set the material to the round chuck finger.

11. Once the tool is moved to the center of the materials and stopped, the engraving area can be verified and adjusted by using the direction key button. At this time, check the laser pointer while moving it for easier measurement and adjustment.

	<p>Whenever the direction key is pressed, move the laser pointer to the left, top, right and bottom of the area to show the area to be engraved. Check out whether the area to be engraved is out of the materials surface. If so, adjust the location by using the direction key.</p>
	<p>The laser pointer moves the area to be engraved to the left, top, right or bottom according to current location. If the current location of the laser pointer is left, then, press  key to move the area to the left.</p> 

14. After location of engraving is decided, press and hold  button until it beeps (more than 3 seconds) to start the engraving.

15. Close the engraver cover.

Character Cutting Process



Tool: Endmill Cutter

Clamp: Cutting clamp

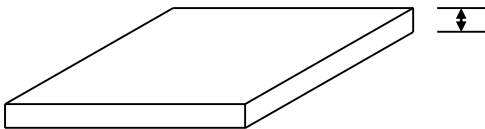
Other: Apply cutting oil on the surface of materials to improve engraving quality and extend the lifespan of Cutter



Replace the tool with a cutting tool, and press the tool exchange button to measure the tool depth. Also, be sure to set the head by tightening the engraver pressure lock. If you do not fix the head, it may cause uneven engraving depth or damage to the tool.



1. Measure the thickness of a material to be cut.

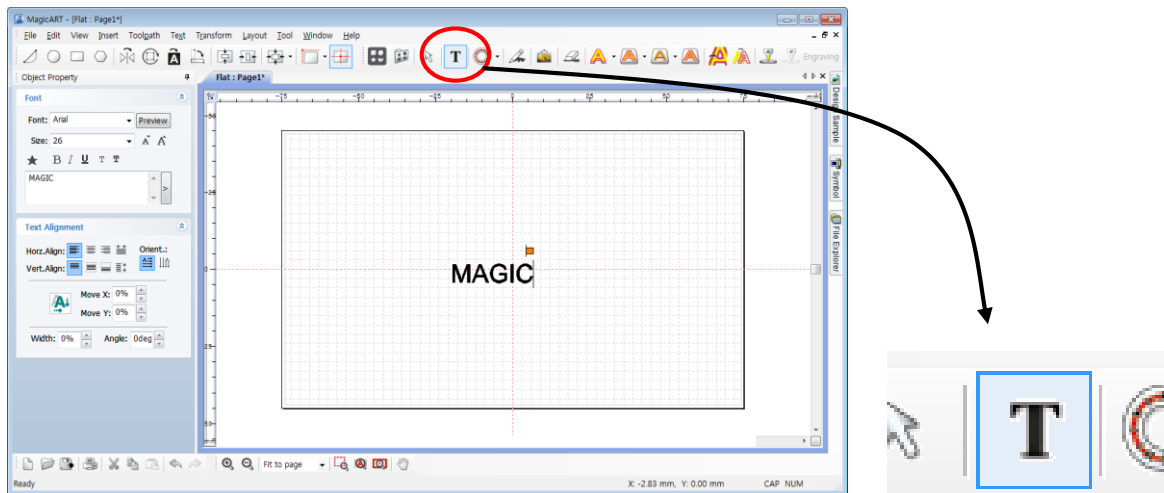



2. Place and fix a material to be cut on the cutting clamp and place and tighten it on the clamp.

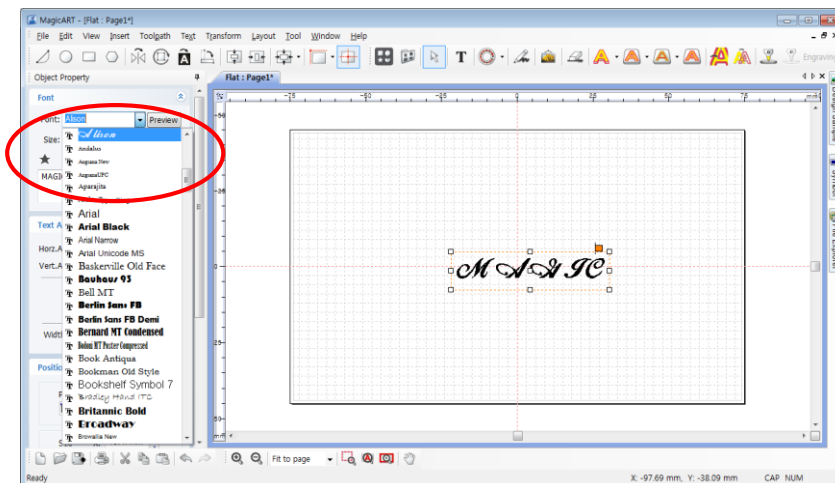


3. Press **T** [Text Input] in the toolbar to enter the character input mode, and click the position of the work area you

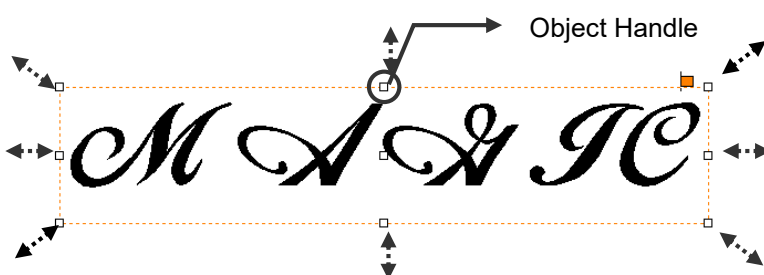
want and enter the characters.



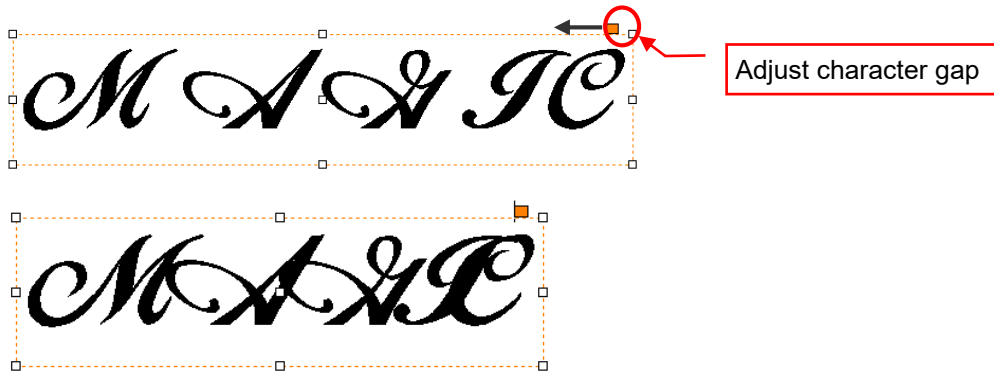
4. After entering characters, press  [Selection] in the toolbar to select character string and designate the font.



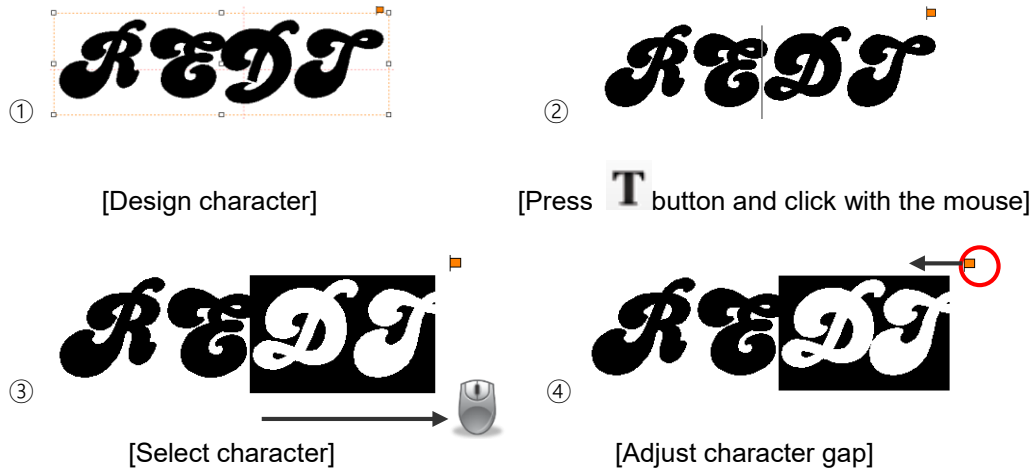
Adjust the character to the size you want. Adjust the size by using an object handle as below, or adjust the size from the left object registration information window.



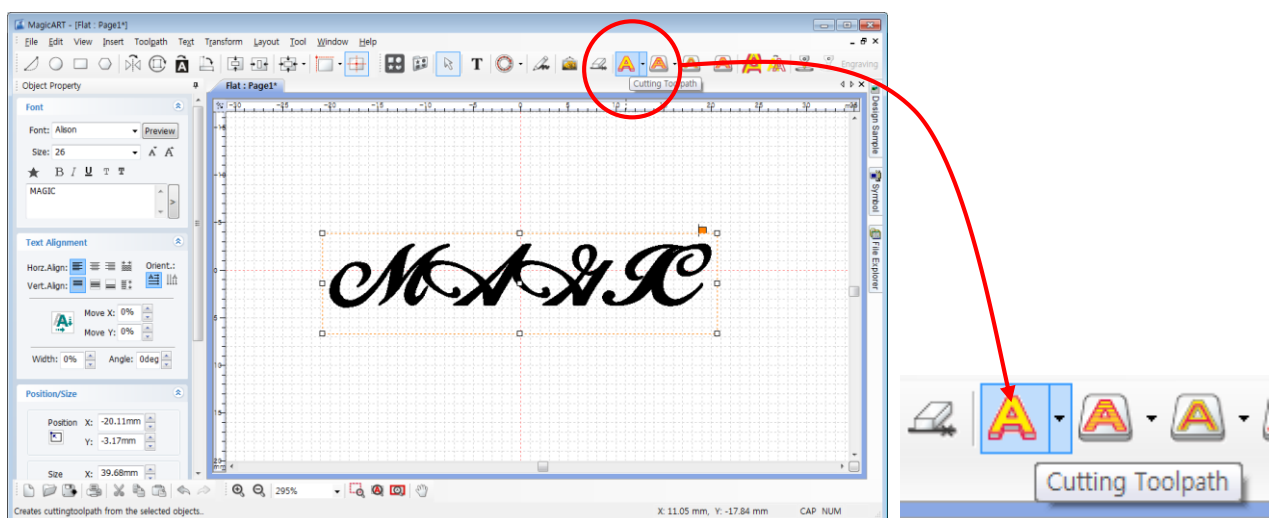
5. Drag the character gap adjustment handle (a square in the picture below) with the mouse to narrow the gap between the characters.



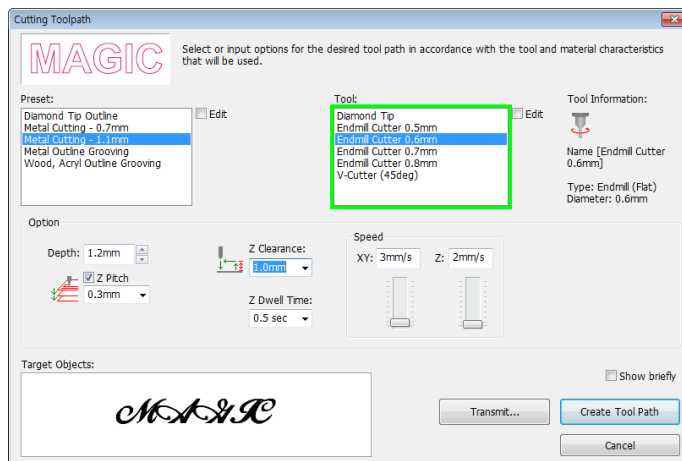
If the gap of some characters is partially adjusted, press **T** [Text Input] button and drag the mouse to select what you want. Drag a character gap adjustment handle by the mouse and adjust the character gap.



6. Once design is completed, click **A** [Cutting Tool path]. A tool path means a route along which a tool is moved for engraving.

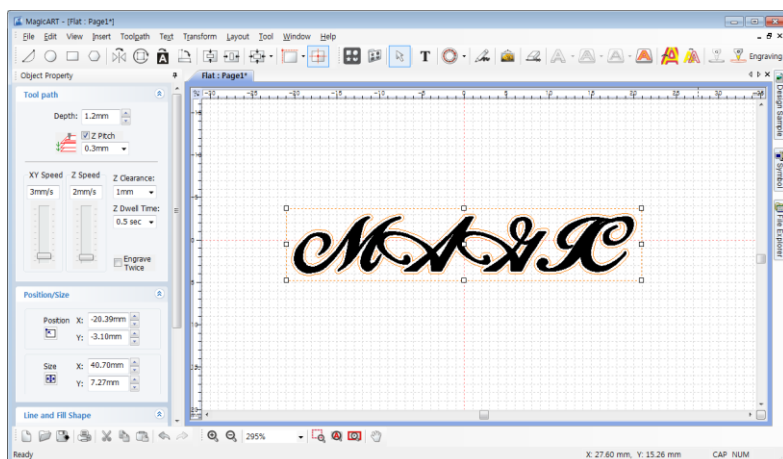



7. Once the “Cutting Tool path” window appears as seen in the figure below, select cutting depth (material thickness + 0.1~0.2mm) and tool diameter and click “Create tool path.”

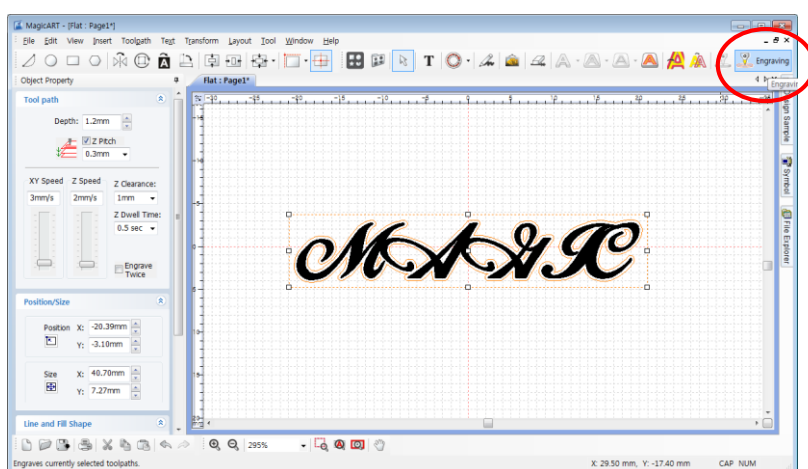


Depth	Designate the thickness for cutting. Since material may be bent or slanted, the depth should be 0.1-0.2 mm deeper than the thickness for perfect cutting.
Z Pitch	When cutting the engraving depth little by little, designate the depth. When cutting thick materials with a thin tool, it is useful.
XY axis speed	Designate a cutting speed.
Z axis speed	Designate a speed at which the tool punches and penetrates the material and descends during the engraving.
Z Clearance	When moving to another engraving location, it is necessary to lift Z axis to prevent the tool from contacting with the material surface before moving. To do this, designate the height to be applied.
Z Dwell Time	If the tool touches materials, the rotation speed will be slower. If moved quickly at this time, the tool may be damaged. In particular, in case of metal materials, wait until the spindle rotation speed is restored to prevent damage to the tool. Enter the delay time.
Transmit	“Transfer tool path” window is displayed.

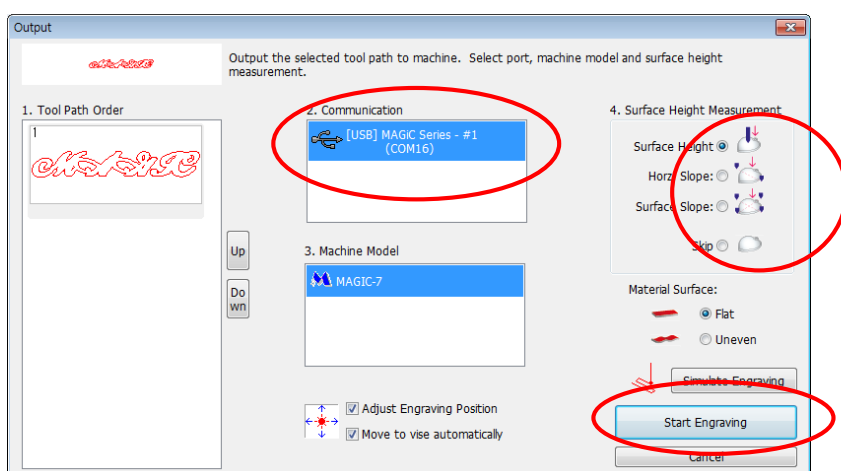
8. "Tool path" is created.



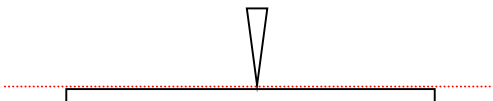
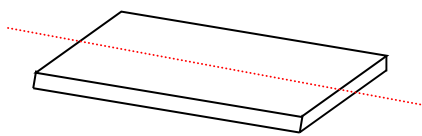
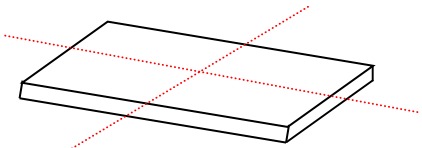
9. Click  Engraving button.





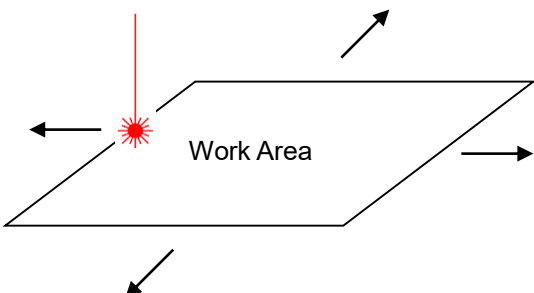
10. Once "Output" window appears as seen in the figure below, specify how to measure Communication port and material. And then, click "Start engraving" button.




How to measure a material

Surface Height	<p>Measure material height only.</p> 
Horz. Slope	<p>Measure material's horizontal gradient.</p> 
Surface Slope	<p>Measure material's top, bottom, left and right gradient.</p> 
Skip	<p>Do not measure its height. In this case, the height previously measures can be used. If the material is not removed from the clamp during the previous engraving work, the measuring time can be saved with this option.</p>
Adjust Engraving Position	<p>Designate whether to re-adjust the engraving location. If this option is selected, the laser pointer will be turned on to allow the user to adjust the engraving location before engraving. If this option is not used, engraving will begin immediately.</p>

11. If the tool is moved to the center of the material and stopped, the engraving area can be verified and adjusted by using the direction key button. At this time, check the laser pointer while moving it for easier measurement and adjustment.

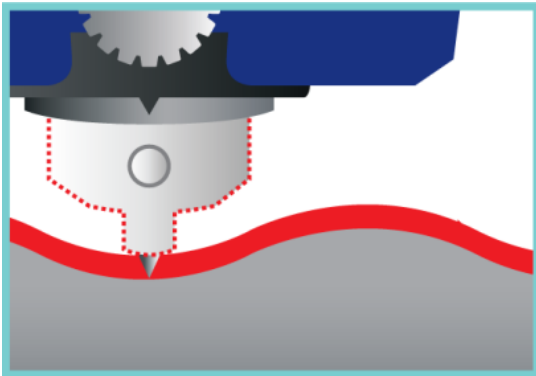
	<p>Whenever the direction key is pressed, move the laser pointer to the left, top, right and bottom of the area to show the area to be engraved. Check whether the area to be engraved is outside of the materials surface. If so, adjust the location by using the direction key.</p>
	<p>The laser pointer moves the area to be engraved to the left, top, right or bottom according to current location. If the current location of the laser pointer is left, then, press  key to move the area to the left.</p> 

12. After location of engraving is decided, press and hold  button until it beeps (more than 3 seconds) to start the engraving.

13. Close the engraver cover.

Engraving by Using Nose

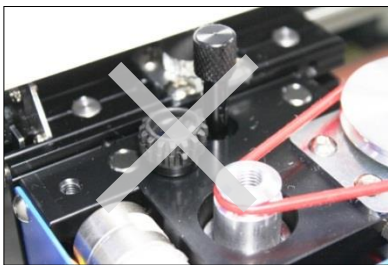
Nose is a sub-component to support engraving along with the curved surface of material. Therefore, it is possible to engrave on the curved surface of material with consistent depth by using the nose.



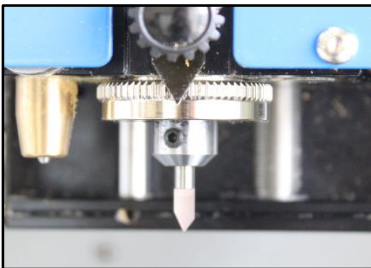
n clamp



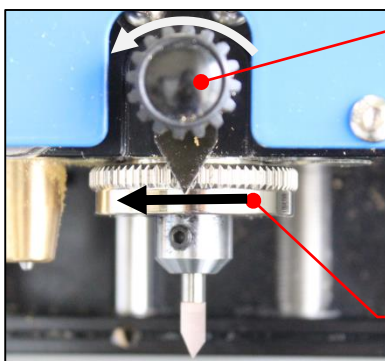
Be sure to release the engraver pressure lock. If you engrave with fixing head, the nose, tool and materials may be damaged.



1. Replace the tool with V cut tool and conduct automatic measurement of tool length.



2. Turn the depth nose lock to left and loosen the bolt. Turn the nose height adjustment screw the left and lower it down about 1~2mm.

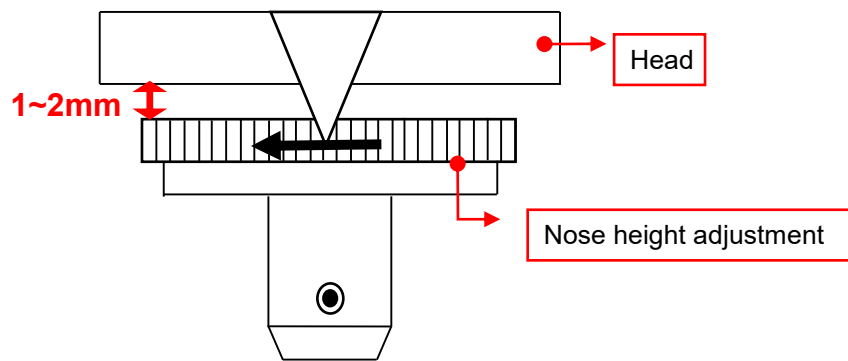


Depth nose lock

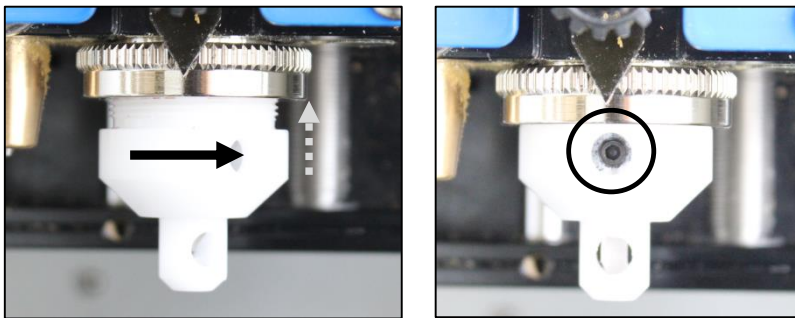
Nose height adjustment screw



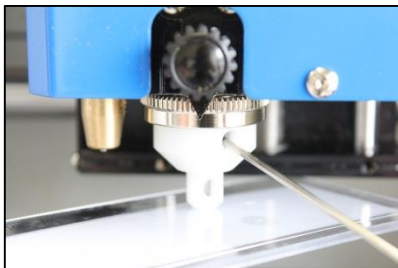
It might be difficult to adjust the tool length if the nose height adjustment screw set to the top, so separate it about 1~2mm from the head.



3. Assemble the nose height adjustment screw with the nose and turn the assembly to the right to make the nose's tool hole locate before the tool tighten bolt.

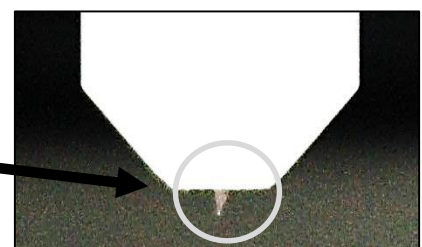
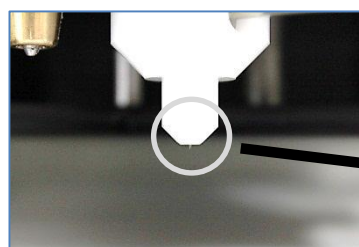
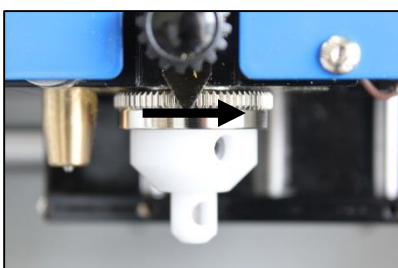


4. Put a flat plate (Ex: ruler) under the nose as shown in the picture below and release the tool fixing screw with 2mm wrench. Lower the tool until it touches the plate, and tightens the tool in place.



5. If the nose height adjustment bolt is rotated to the right, the nose will face to the top and the tool will be able to be seen. At this time, the engraving depth is same as the height of the exposed tool. Adjust the length of the tool to desired depth. (One revolution of the screw moves the tool 1mm up or down)

* If the engraving depth is 1mm on the tool path, and the tool length is by 0.3mm, then the actual engraving depth will be 0.3mm.



6. Rotate and tighten the depth nose lock to the right not to make the nose height adjustment screw loosened.



If the depth nose lock is not fixed, the nose height adjustment screw might be loosened to change the engraving depth or cause damage to the material, tool or nose.



7. Measure the length of tool at **7) Changing Tools** (p.22 Spindle).

Drilling

What is Drilling?

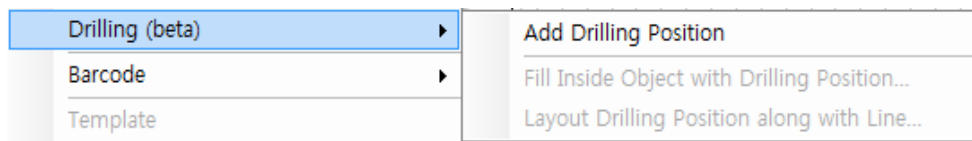
It drills a hole with certain depth and diameter on materials by using endmill or V-cut tool. Depending on the tool thickness, the whole size becomes different sizes.



Be sure to fix the engraver pressure lock. If the head is not fixed, the drilling may not be the designated depth.

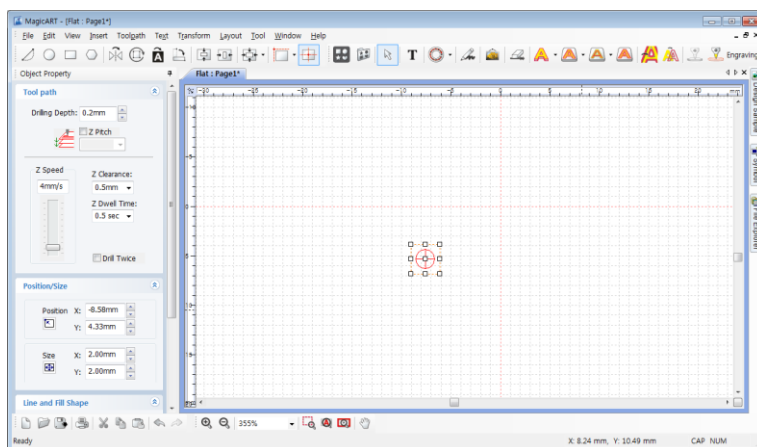


Insert

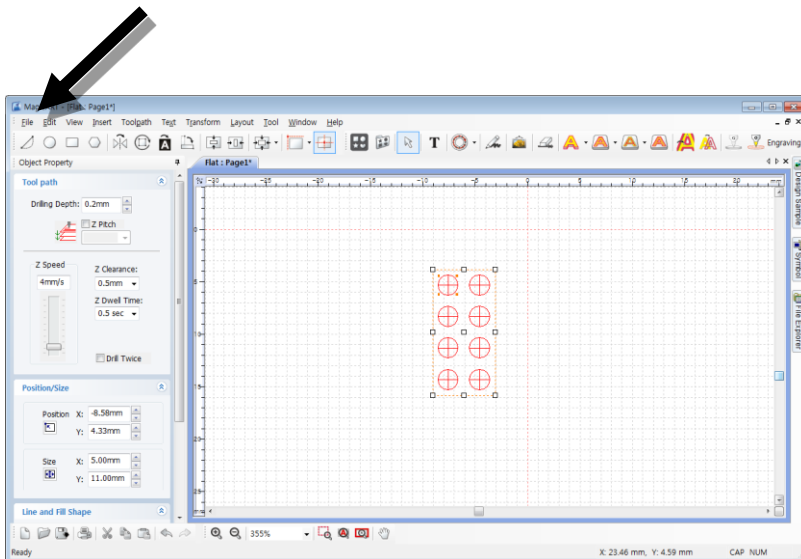
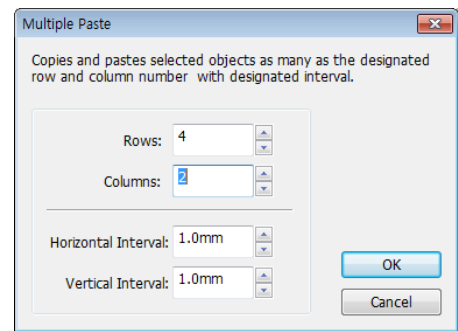
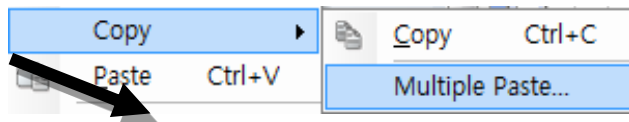


◆ Add drilling object

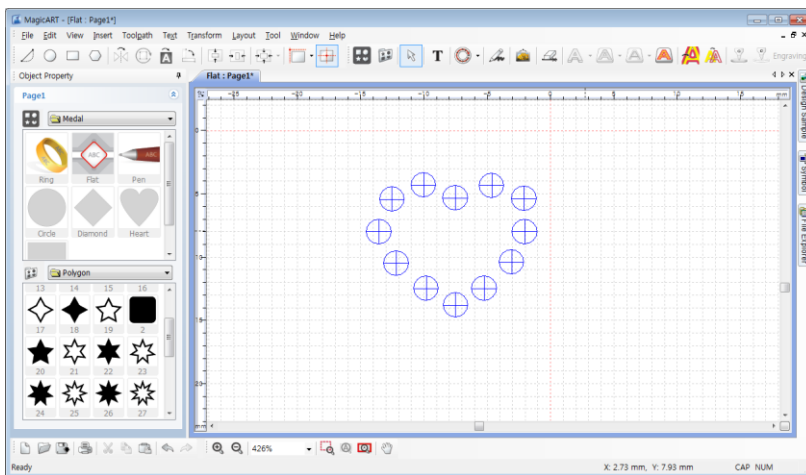
If a drilling object is added and the screen is clicked with the mouse, a drilling object will be created. Drilling options of the created object such as drilling depth and speed can be changed on the object registration information window on the left of the screen.



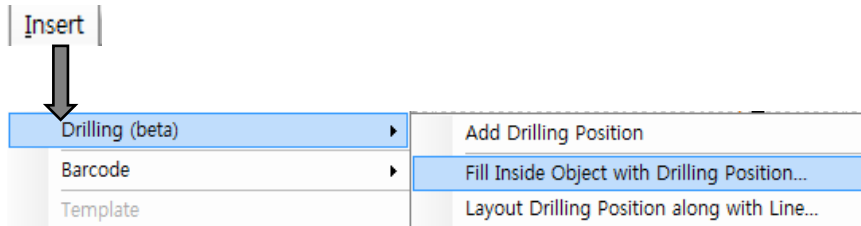
The drilling tool path object can be copied and used in several constant gaps by using Edit menu → Copy → Multiple-copy.



Drag and move a drilling object with the mouse to drill it into various shapes.

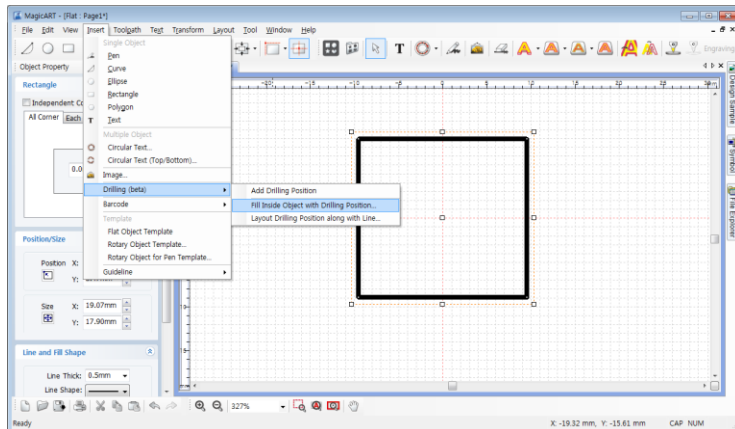


◆ Fill Inside Object with Drilling Position

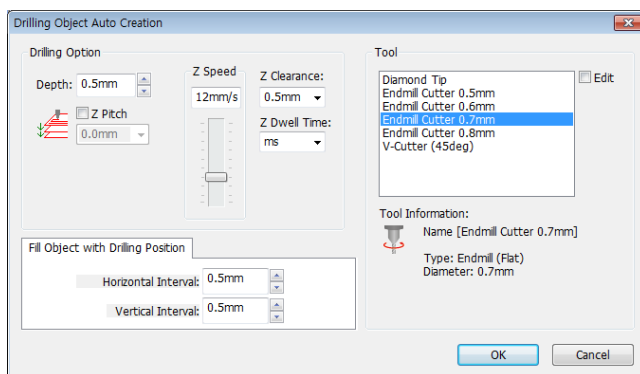


Select a shape to be filled with the drilled object. Click “Insert → Drill → Fill Inside Object with Drilling Position

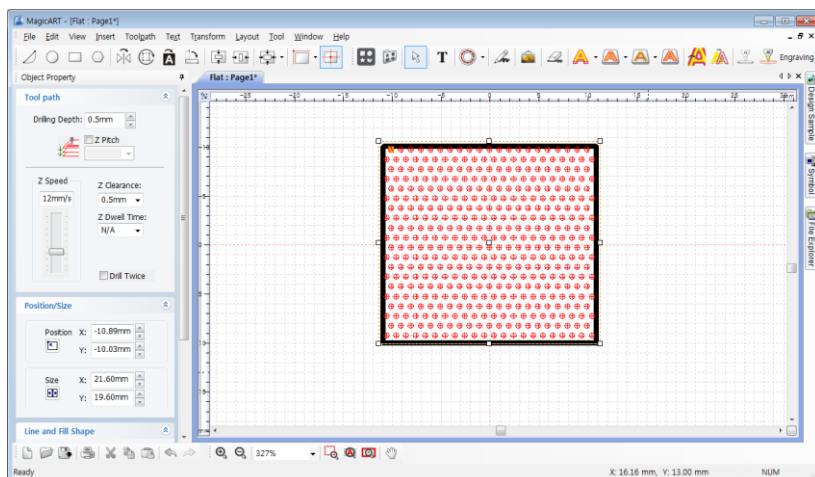
...”



Select a tool to be used on the Auto create drilled object window and adjust options such as depth, speed, gap etc.

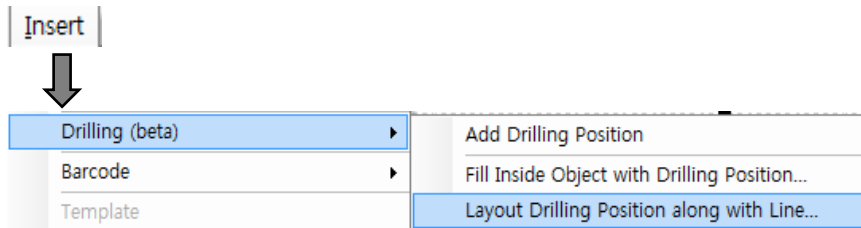


The drilled object is automatically created inside of the selected object in a designated gap.

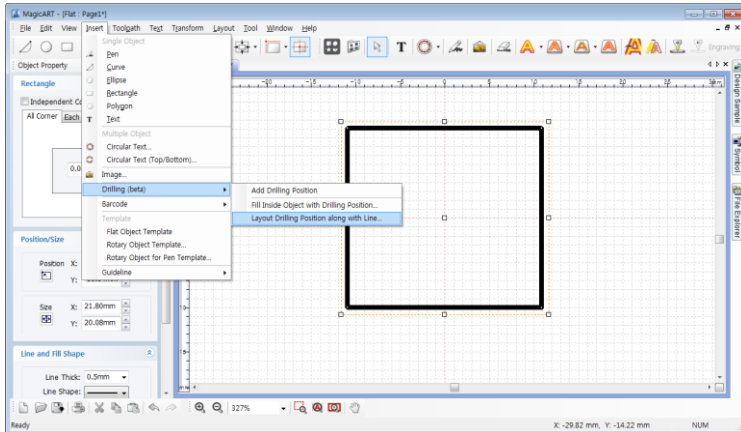


◆ Layout Drilling Position along Line

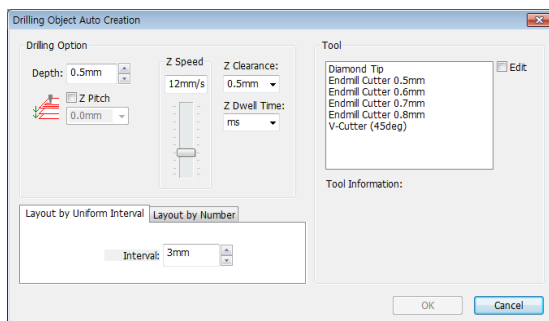
The drilled object along can be allocated along the outline of the selected the object.



Select a line on which the drilled object is automatically allocated. Click Insert → Drilling (beta) → Layout Drilling Position along with Line...



Select a tool to be used on the Auto create drilled object window and adjust options such as depth, speed, gap and etc.



The drilled object is automatically created along the outline of the selected object in a designated gap.

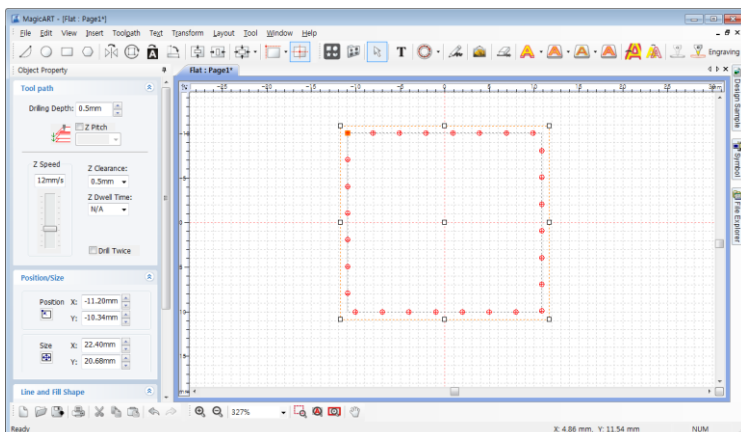


Image Engraving


What is image engraving?

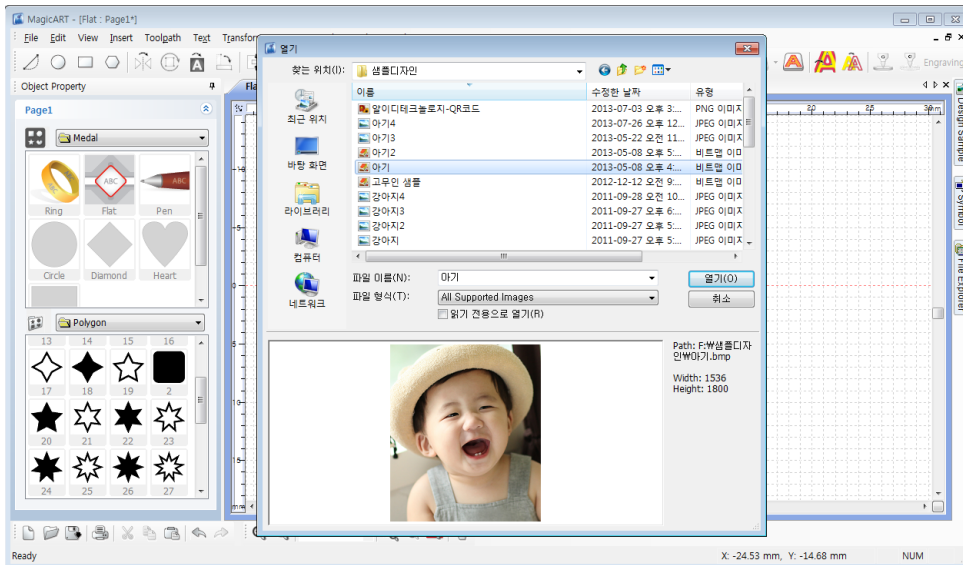
This is an engraving method to express the shade of image with dots.

Tool: Tip

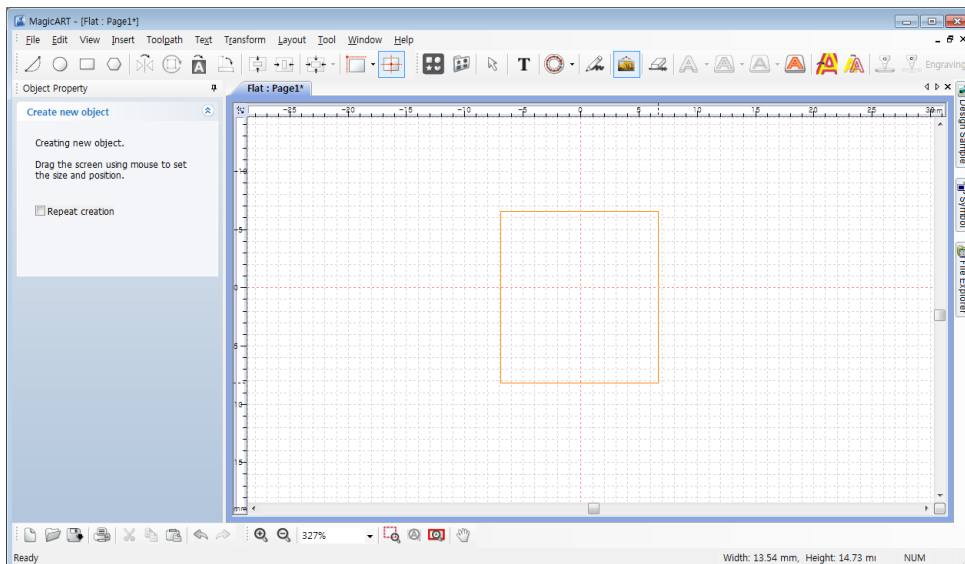
Clamp: Multi performance clamp


1. Attach a material to be engraved to the clamp.

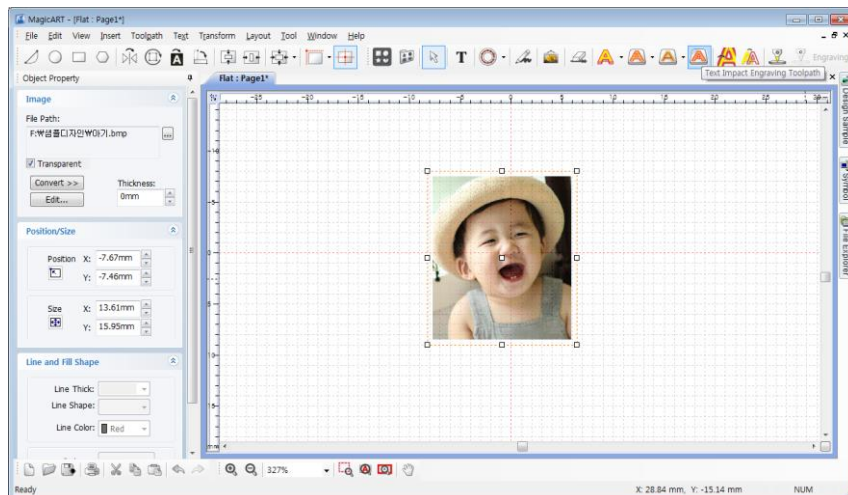
2. If  [Image] button is clicked, open window will appear. Import the image to be engraved.



3. Adjust the size and location of the image.



4. Click  [Text Impact Engraving Tool path] button.

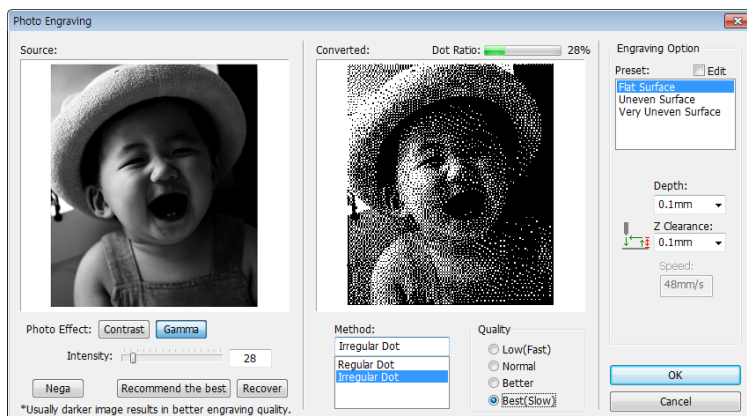


5. Adjust image engraving option in punching option window.

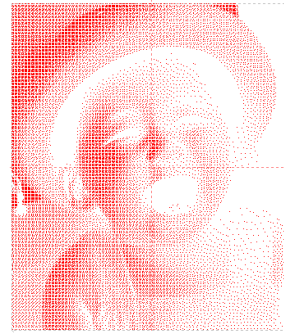
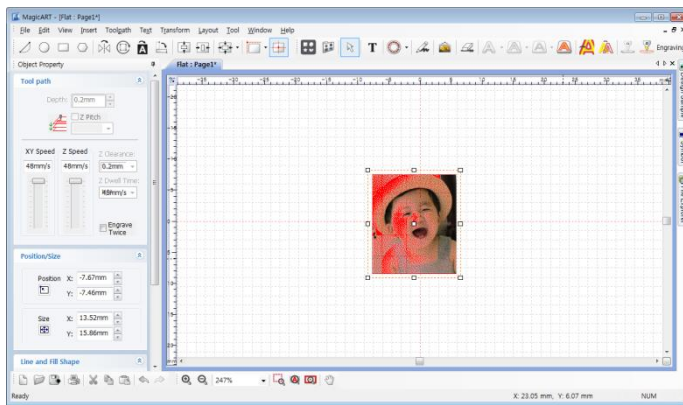


When engraving an image, bright part (white area) of image can be expressed by punching. Since darker image shows higher quality, adjust the brightness to dark. Normally, dot ratio 10-20% shows the best engraving quality for a portrait. According to the brightness and background of the image, the optimal image conditions are different. Properly adjust it while checking the image preview for engraving.


If you are not familiar with the image adjustment, click “Recommend the best” button to automatically adjust the image.

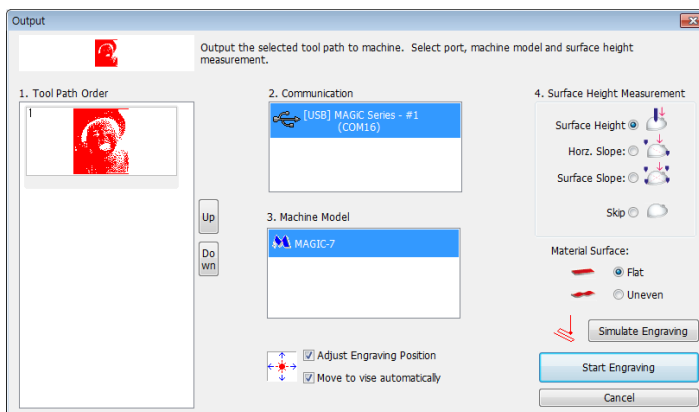


6. Click “OK” button to create tool path for image engraving. After checking the tool path, click “Engraving” button.



When engraving an image, white area of image is punched. So the result of the tool path is shown as negative image.

7. Click “Start engraving” button and designate the engraving location. And then, press and hold  button until it beeps (more than 3 seconds) to start the engraving.



Pen Engraving Process

Tool: Tip

Clamp: Pen clamp, Rotation clamp

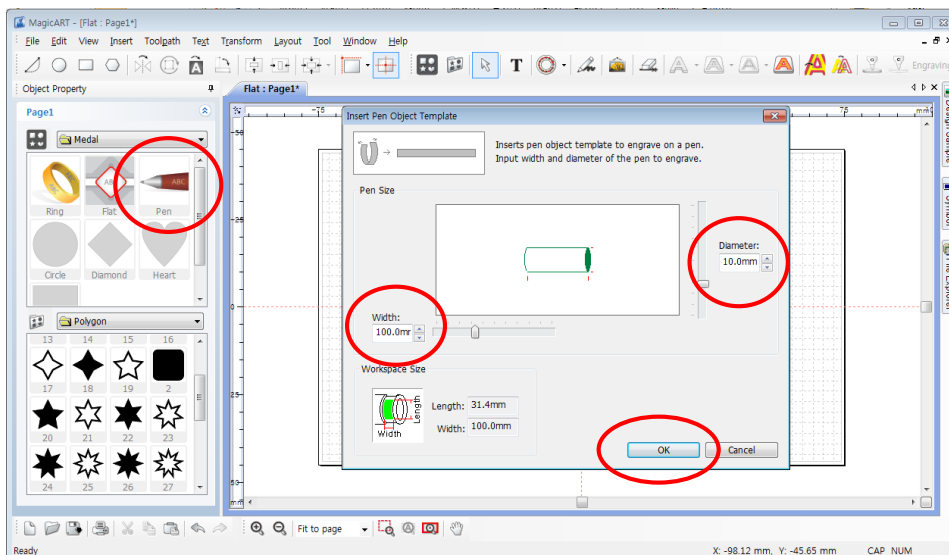
1. Measure the width and diameter of the pen to be engraved.



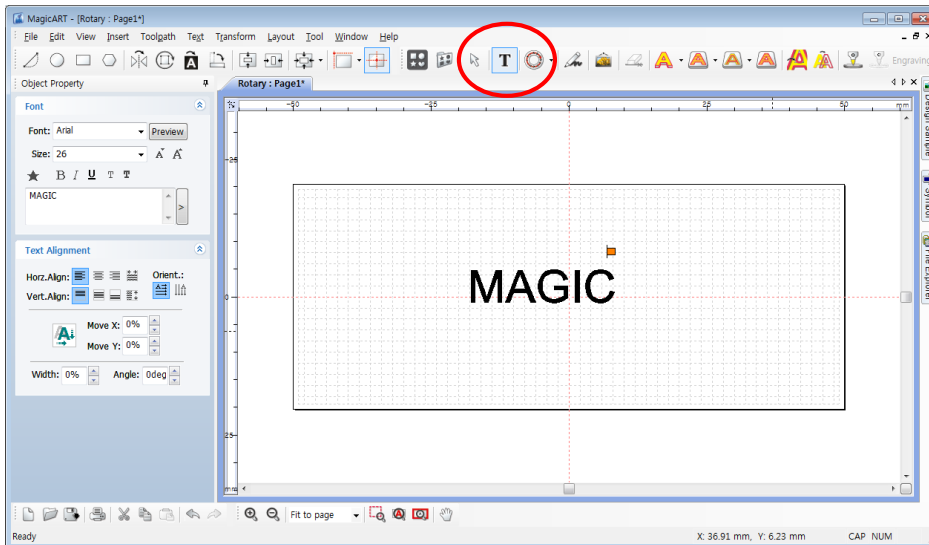
2. Set the pen in the engraver by using a pen clamp.





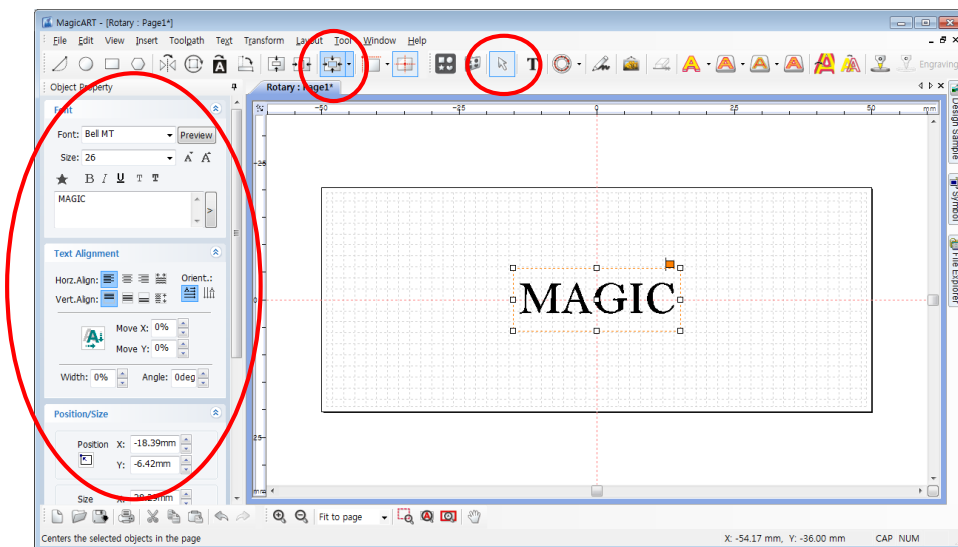
3. Select pen template in the object registration information, and enter the width and diameter of the pen, and click "OK" button.




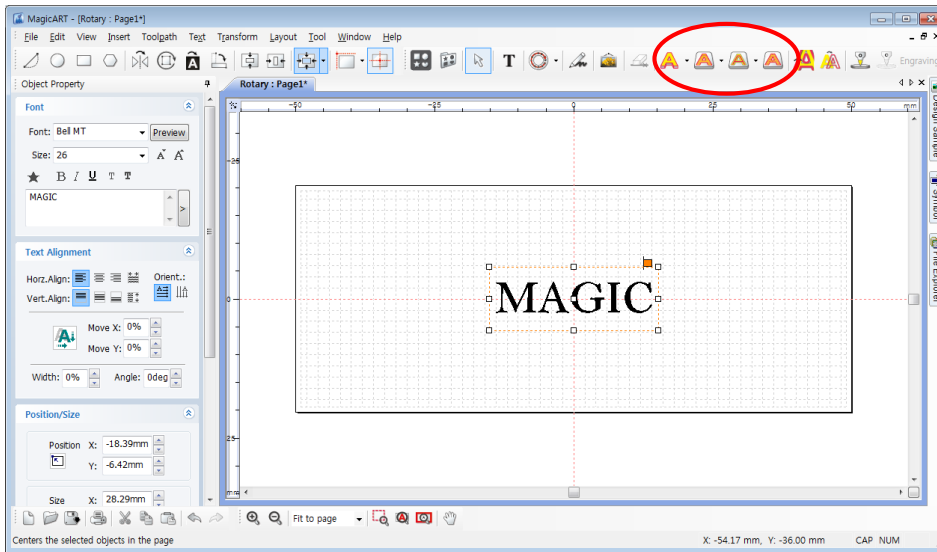
4. Once the template appears, press **T** [Text Input] on the toolbar. Click the work area with the mouse and enter texts.



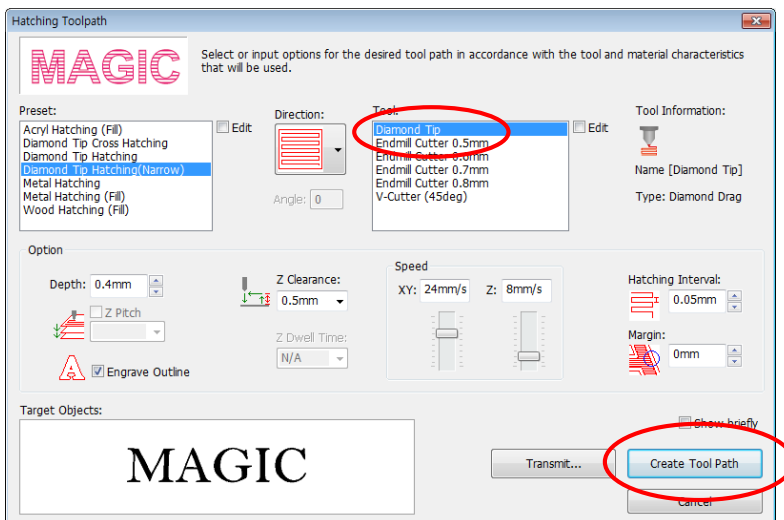
5. After texts are entered, press  [Selection] on the toolbar to enter object selection mode. After selecting entered character string, **adjust the size and font** of the object. If you want to place the object at the center of the work area, click  [Center in Page] button.



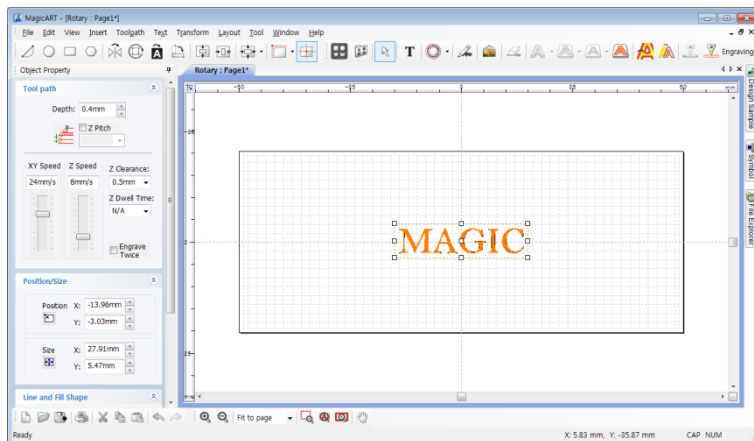
6. Once the design is completed, click  [Hatching Tool path]. A tool path means a route along which a tool is moved for engraving.




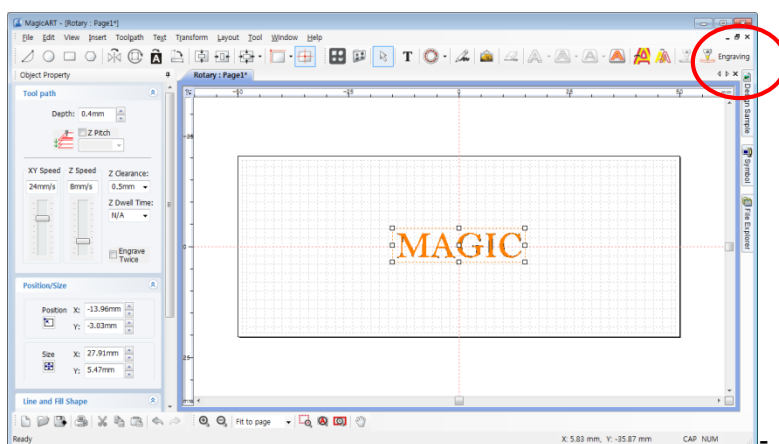
7. Select engraving option and tool from the “hatching tool path” window, and designate hatching gap and depth when necessary and click “Create tool path” button.



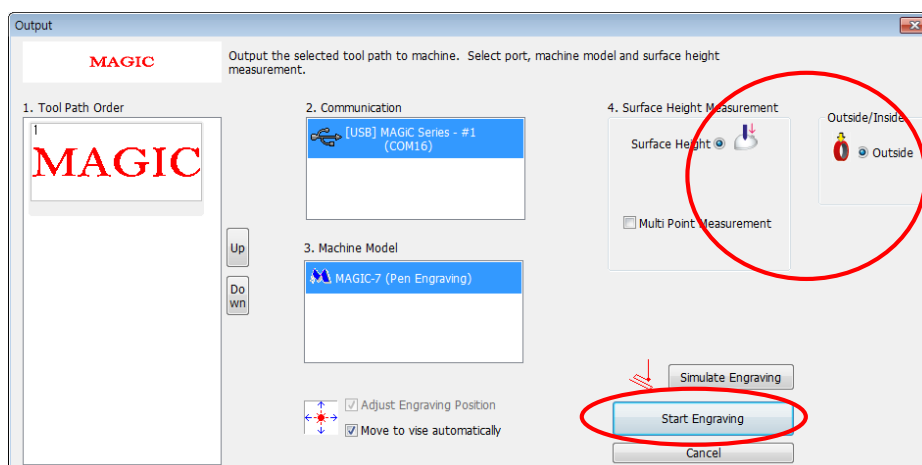
8. "Tool path" object is created.




9.  Engraving Click button.



10. Once "Output" window appears, specify how to measure engraving material. And then, click "Start engraving" button.



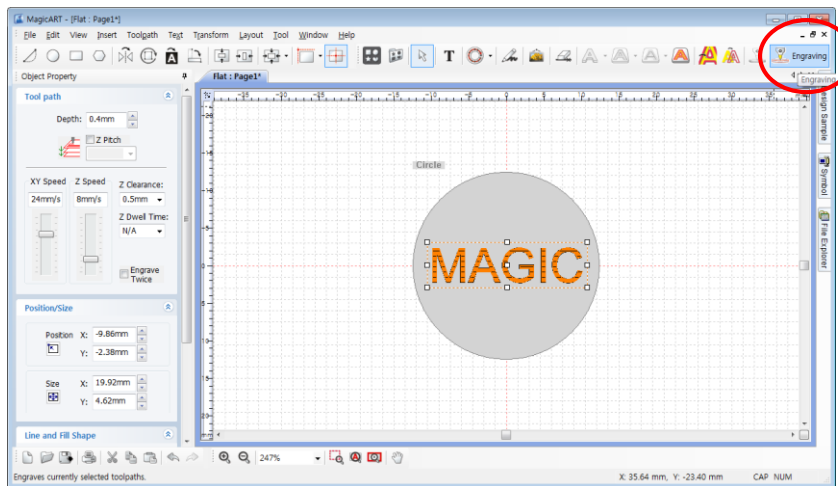
11. Designate the location for engraving then press and hold  button until it beeps (more than 3 seconds) to start the engraving.

Curved Materials Engraving

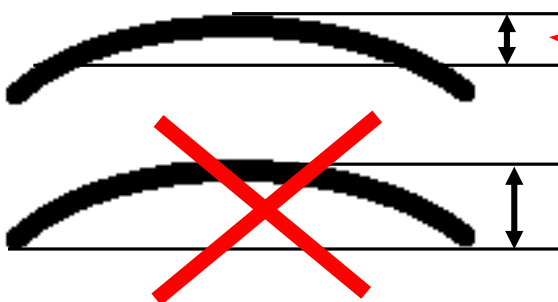
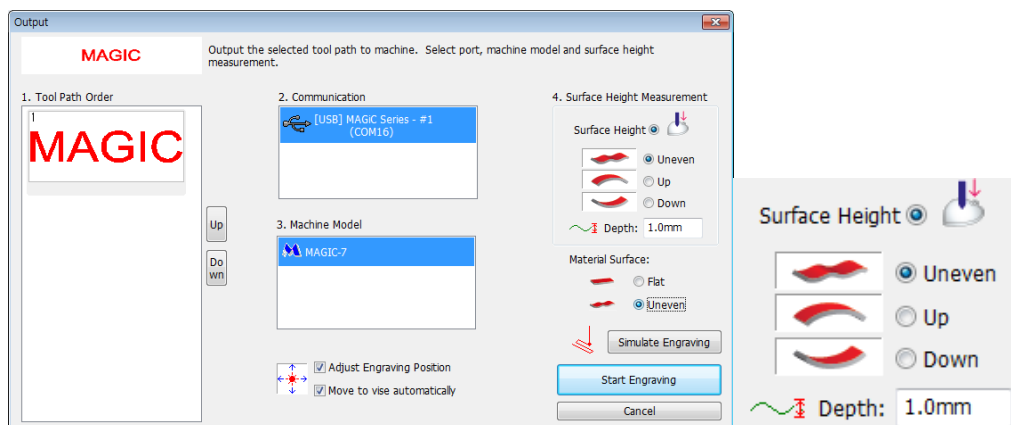
In case of bent materials, it may scratch the surface of materials after engraving lower part.

1. Enter the thickness of curved surface to be engraved to automatically set up the Z moving height. Create a

tool path and  Click [Engraving] button.



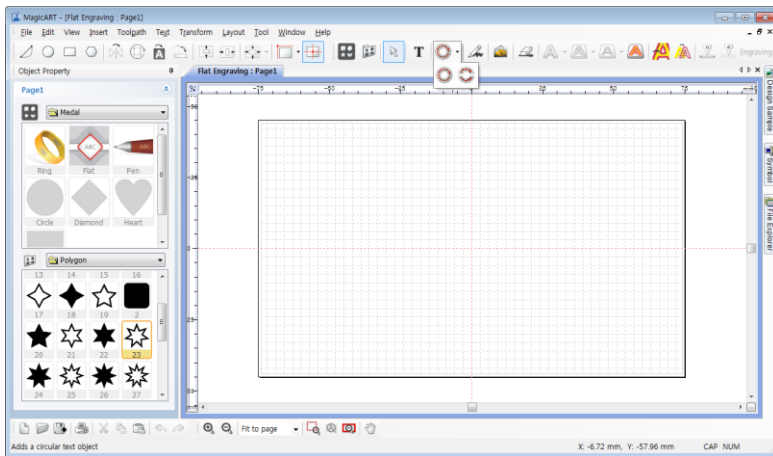
2. Once “Output” window appears, click a bent part of the material flatness to show various kinds of the bent material. Select a shape the most similar to that of the material to be used and enter the thickness (thickness of the area to which the engraving is applied) of the material’s round part before clicking “Start engraving” button.




Enter the thickness of the part to be engraved.

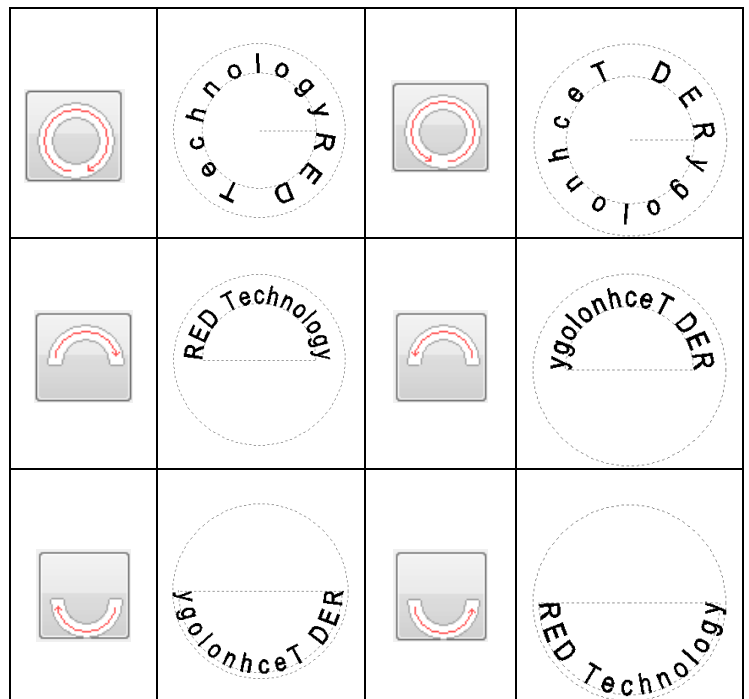
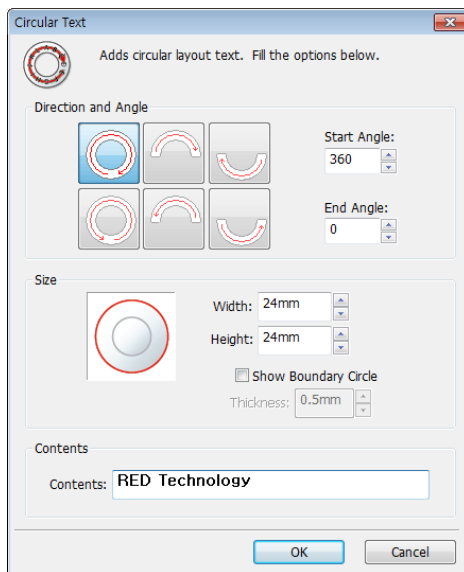
Entering Characters placed in a Circle

You can engrave by placing characters in a circle on round shape materials. There are two types – circular placed characters and roundly placed characters in double layer. You can choose either one.



[Circular Text]


Click  button to display the characters to be placed in a circle window. Use “Direction and angle” button to select placement angle, and enter size, height and texts, and click “OK” button.

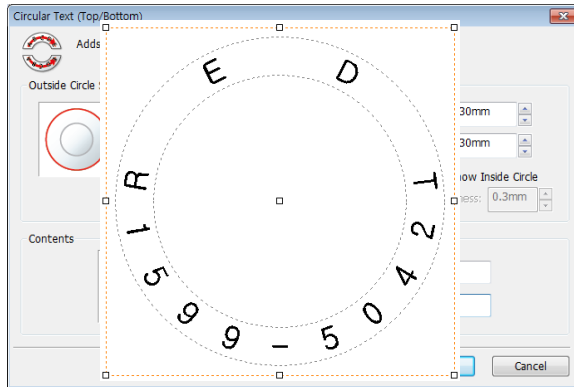




[Circular Text(Top/Bottom)]

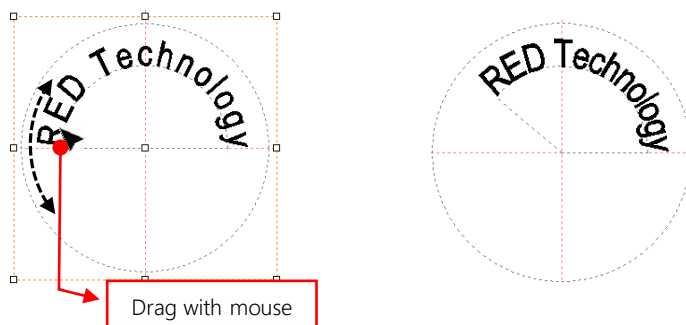


Click  button, then characters placed in a circle window appears. Enter the size of outer line and inner line, and texts, and click “OK” button.

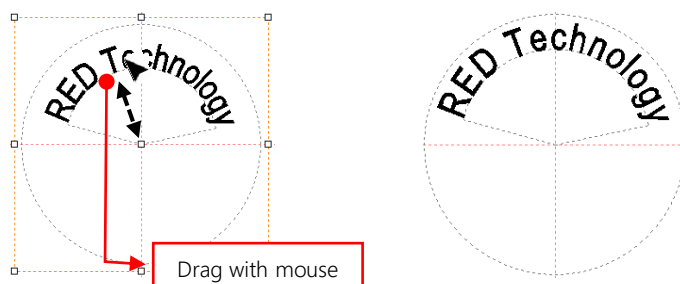


Adjust character angle


Drag the first character [R] or last character [y] in the character string to adjust the angle of character string.

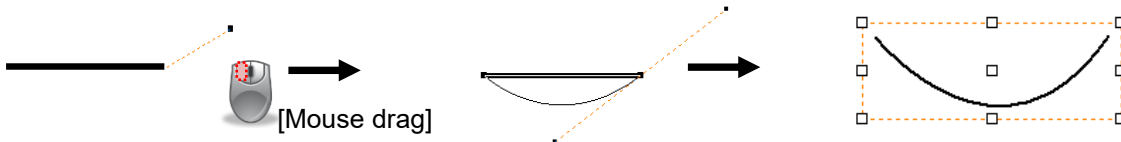


Drag other characters with mouse to adjust the distance to the center of character string.

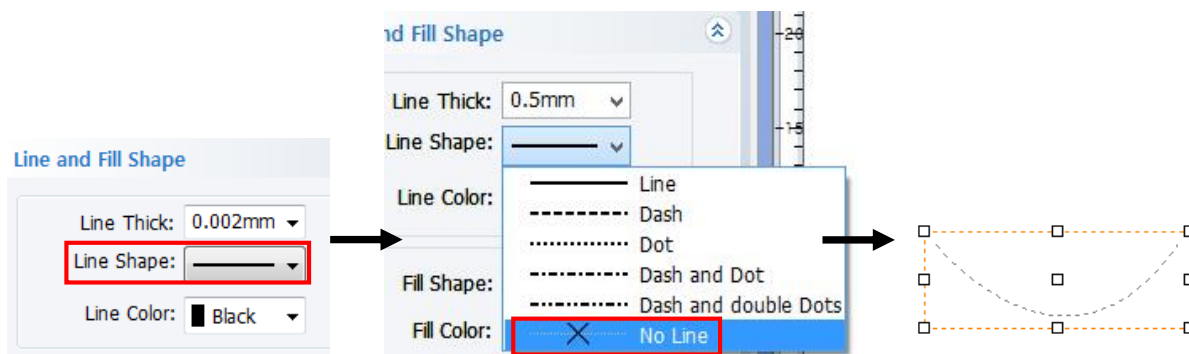



Entering Characters in a Curve

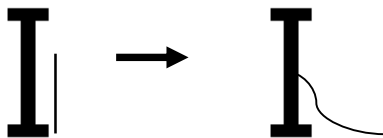
1. Click the  [Line/Curve] button.
2. Click on a certain point with the mouse and designate a distance. Drag while clicking and holding the mouse to make a curve appear. Press the right button on the mouse to create the curve.



3. In the line shape box place the selected object in "NO line".



4. Click a  [Text Input] button, and move the mouse cursor to the curve line. The cursor shape will change like below.



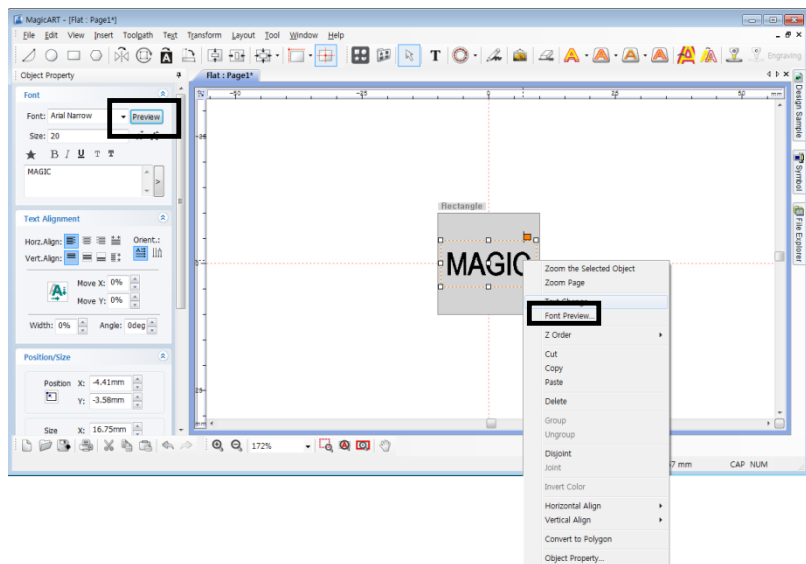
5. In state of the changed cursor shape, click the left button of the mouse to the character input mode.



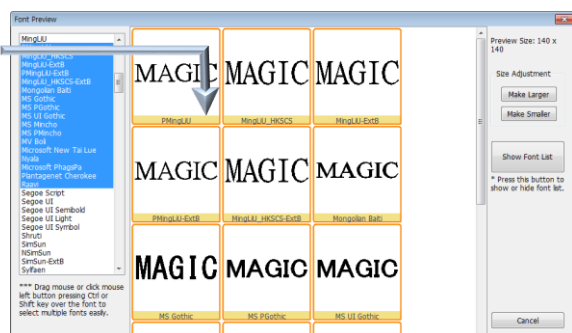
Preview Font

Apply the fonts installed on the computer to the character string and preview the shape to select the font you will use.

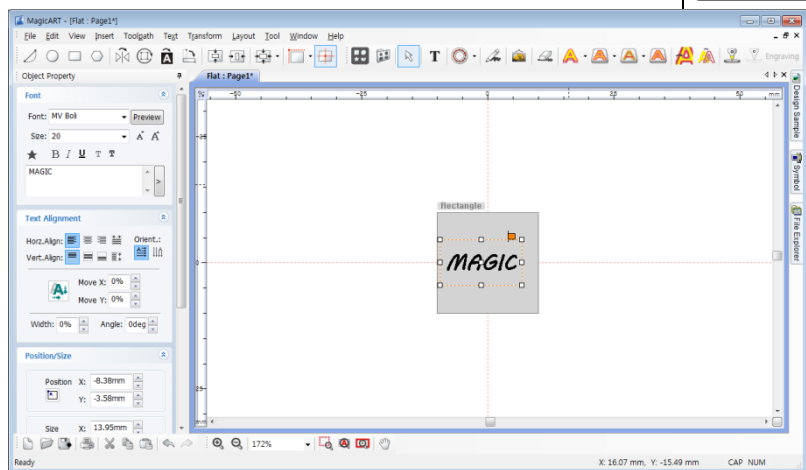
After entering characters, click “Preview” button in the object registration information window or click mouse right button, and click “Font preview.” Then, “Font preview” window will appear.



If you drag the font list in the font preview window, or click a font while pressing “Ctrl” or “Shift” key, then the preview of the selected font appears automatically. Double click the preview image of font to select it.




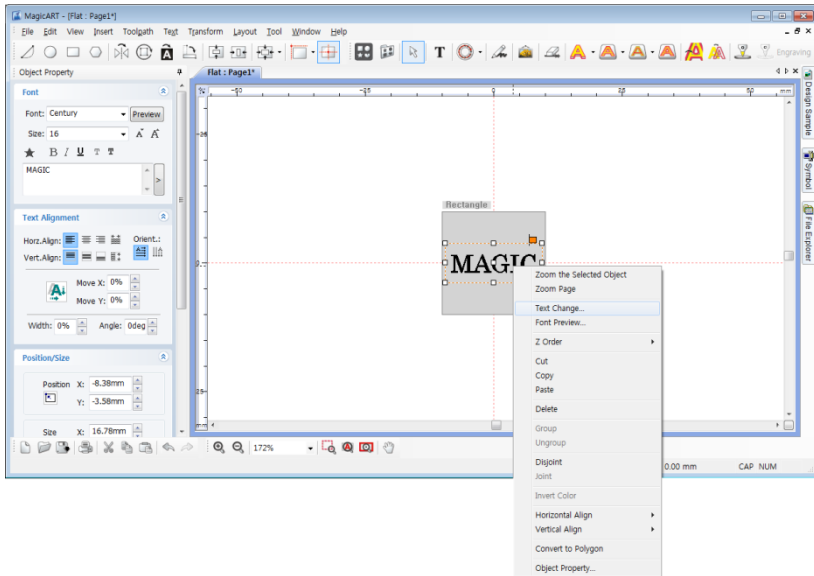
Make Larger	Preview image size will be larger.
Make Smaller	Preview image size will be smaller.
Show Font List	Show the list of Installed fonts.



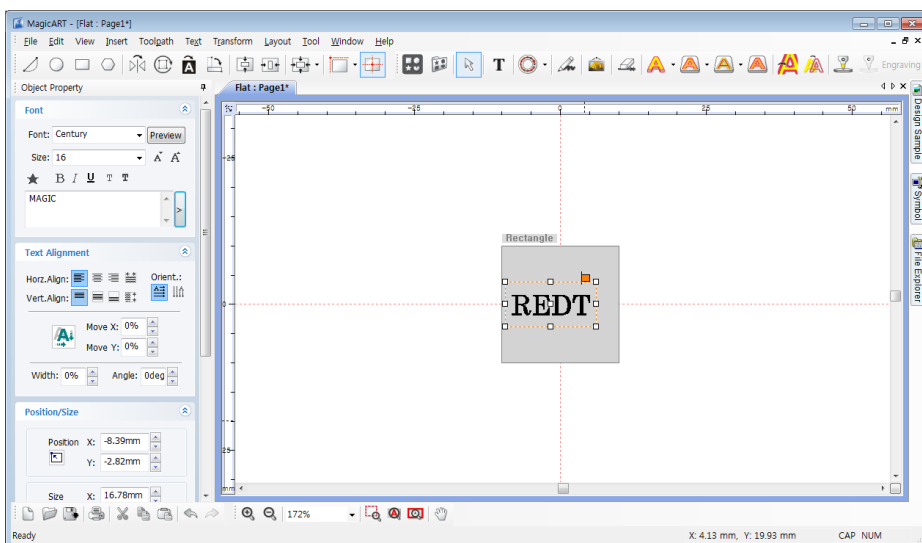
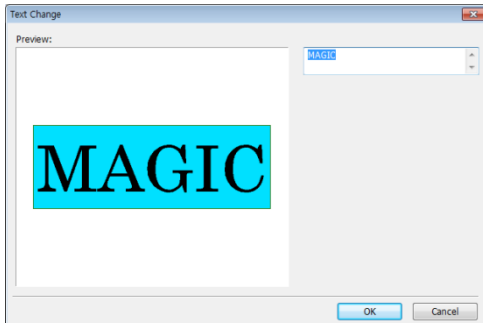
Change Texts

You can change the contents of design sample you frequently use.

Import a saved design sample or file, or select an object designed on the screen. Click  [Text change] button or click mouse right button to click “Text change”.



Change contents in the “Text change” window, and click “OK” button. The changed texts will be shown on the screen.




Create Template

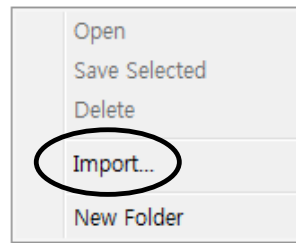
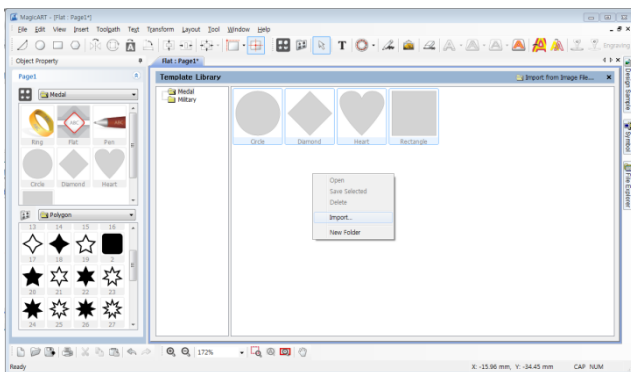


Template is an image corresponding to the materials to be engraved by 1:1 ratio. Load a template most similar to the materials to be engraved, and enter the texts to be engraved. This way allows you to create the location of engraving and the size of texts to be engraved more easily and conveniently.

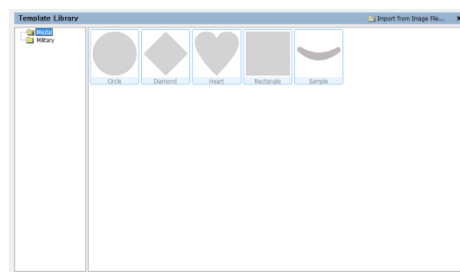
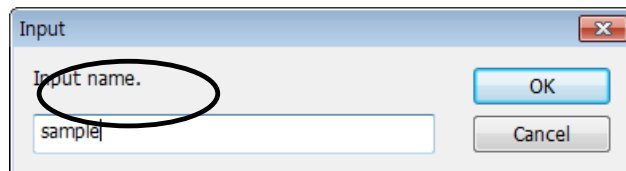
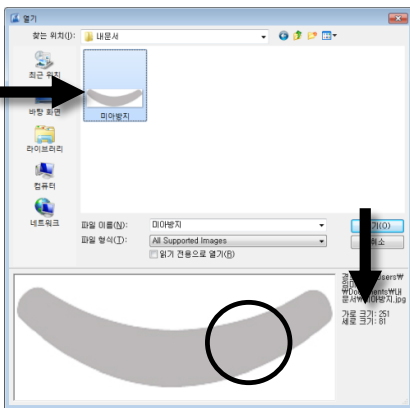
Circle, heart, square and diamond templates are initially provided by the program and users can freely add more templates. The shape of a template can be designed by graphic program (Illustrator, Photoshop, CorelDraw, etc.) or a scan file of materials can be saved as jpeg, bmp, png, srg file types to use.

[Add template1]

1. Click  [Template] button, then "Template Library" window appears as below. Click the template list window with mouse right button and click Import button, then "Open" window will appear.




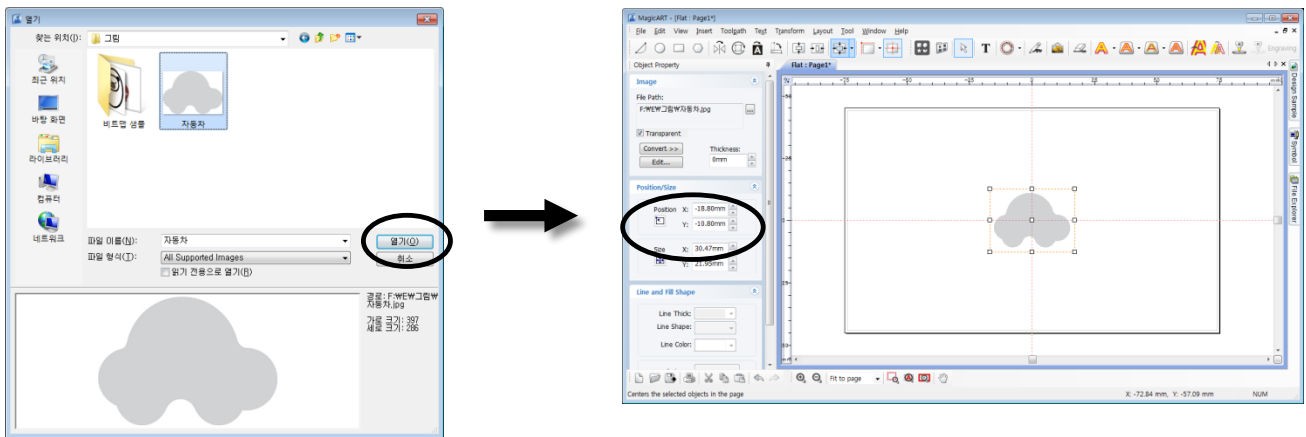
2. Select picture files (jpeg, bmp, png, etc.) from the "Open" window, and click "Open" button, then a window for naming appears. Enter a name for new template, and click "OK" button to add the template to the library.




Click mouse right button in the template category window to add or delete a folder. Click the mouse right button in a template list window to delete template list.

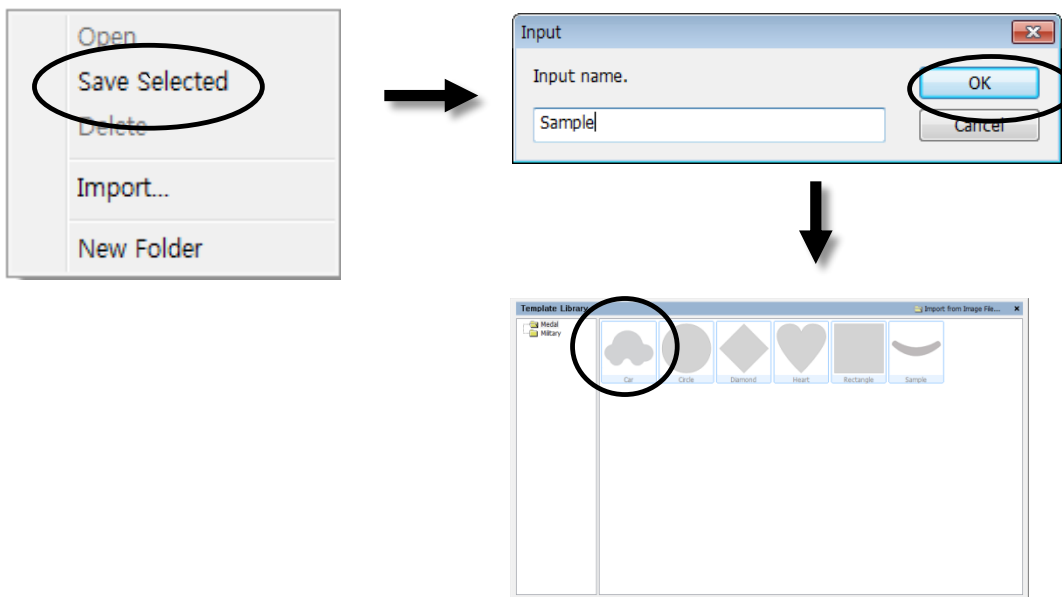
[Add template2]

1. Press  [Image] button to import a picture file and save the size of image.

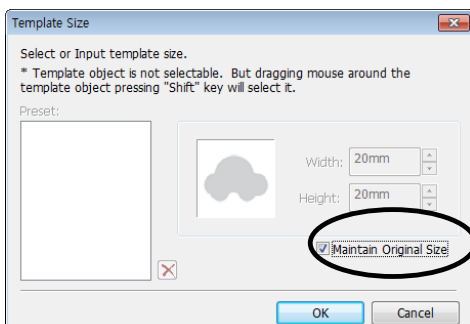


2. Click  [Template] button to show "Template Library" window.

Click the template list window with mouse right button, and click "Save Selected" button. Enter new template name, and click "OK" button to add the template to the library.



The template saved in the "Save Selected" menu is saved as designated size to the screen. When designating template size, check "Maintain Original Size" and click OK button, then the template will be loaded with the size designated when saving the template.

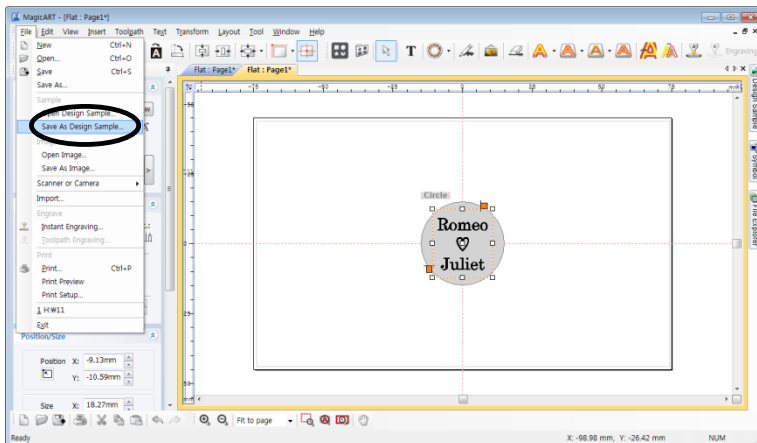


Saving as Design Sample

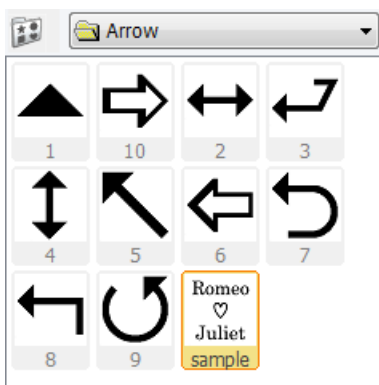
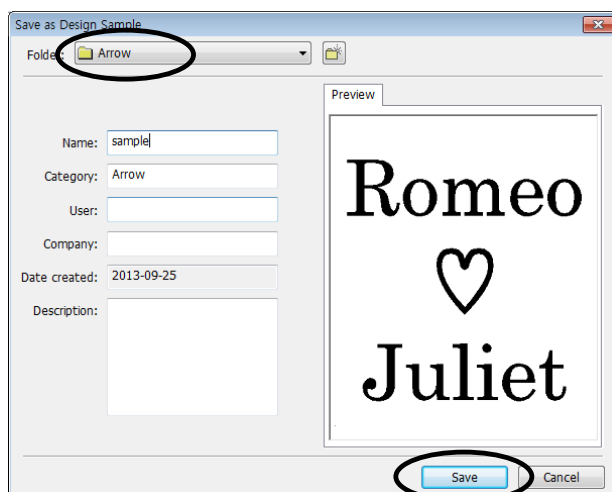
Save the edited contents in Magic Art as design sample. You can use this whenever necessary.

[Save 1]


1. Enter the contents, and adjust the font and size as desired. Select the object and click “save” from “file → Save As Design Sample”.

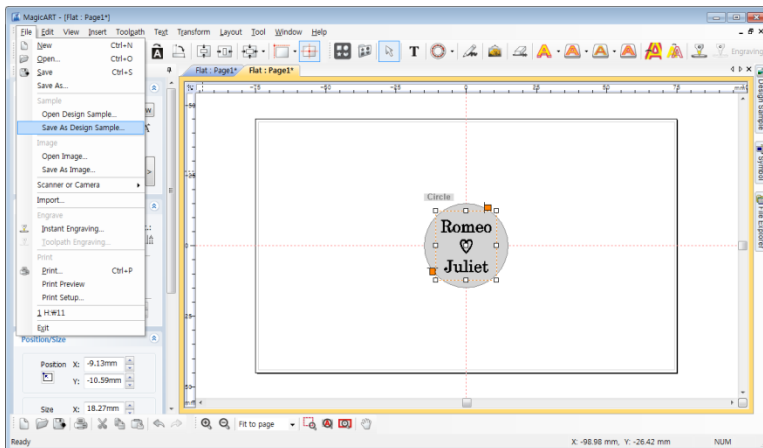


2. Designate a folder or create new folder. Enter the name and click “OK” button to add it to the design sample.

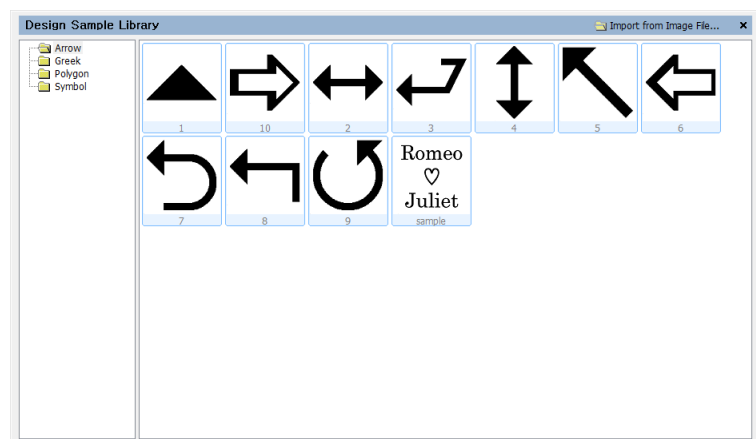
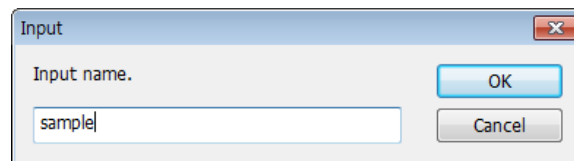
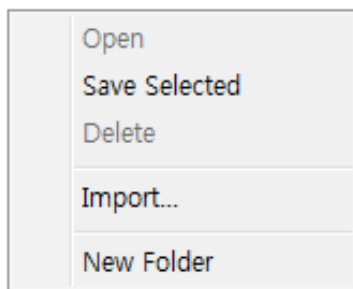


[Save 2]

1. Select a designed object, and click  [Design Sample] button.



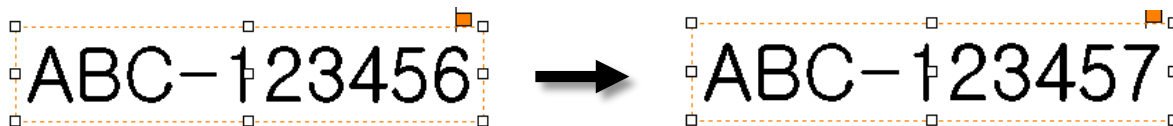
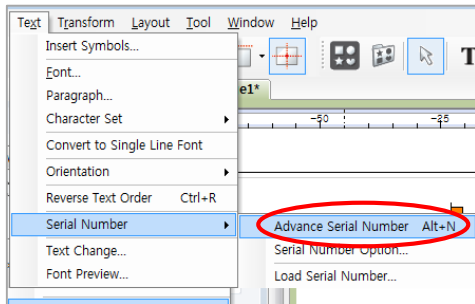
2. Select the folder where the object is saved from the design sample library window. Click the mouse right button, and click "Save selected" button. Enter the name to be saved, and click "OK" button to save it in the design sample library.



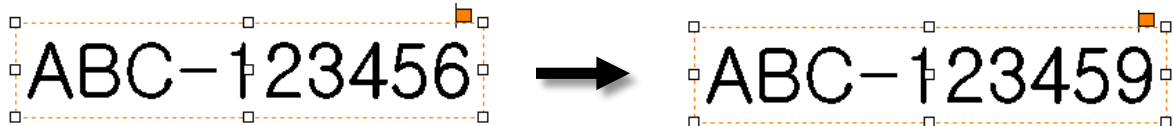
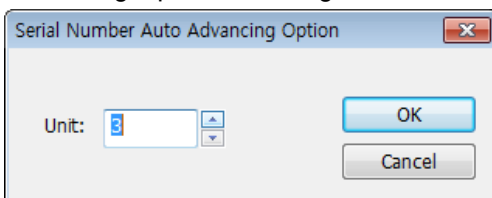
Auto Change of Serial Number

Use this function when you change numbers by certain unit.

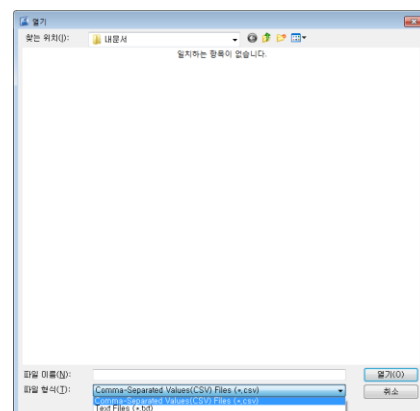
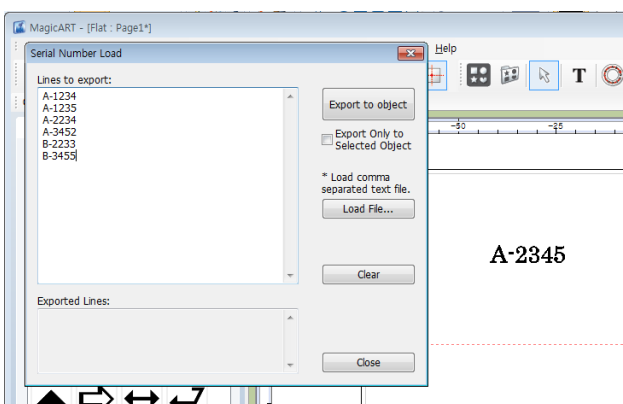
Edit the font and size of character, and press “Alt+N” key on a keyboard, or click “Text → serial number → Advance Serial Number” to change the number automatically.

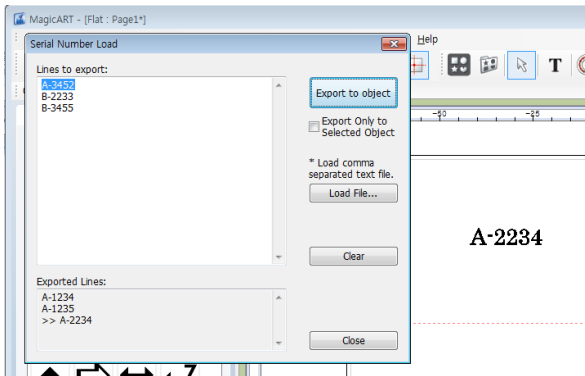


Click “Text → serial number → Serial Number option” and designate a unit from the “Serial Number Auto Advancing Option” to change the serial number by the designated unit automatically.

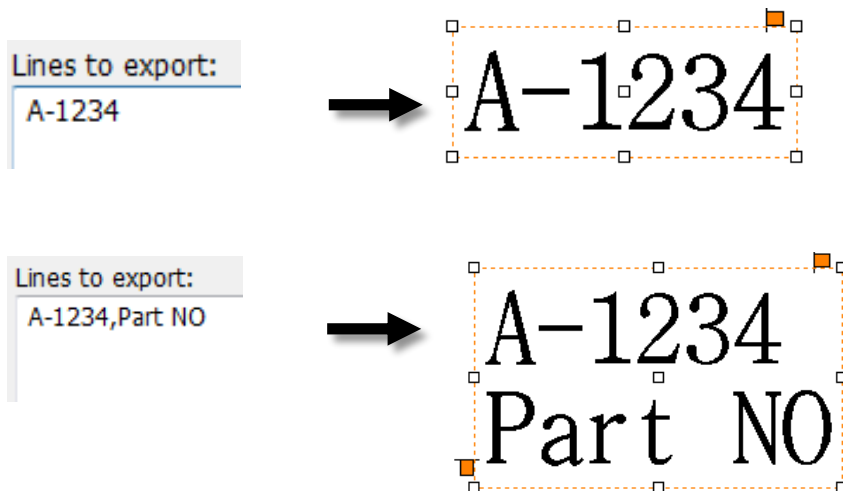


If the serial number is not regular, then click “Text → Serial Number → Load Serial Number” in the menu. Enter serial number in the “Load File...” field or click import. Import the serial number and click “Export to object” button. The screen texts are automatically changed, and the serial number will be deleted from the list. The deleted numbers will be shown in the “Exported Lines”.





Import serial number function can only import file separated by comma (.csv) or text file (.txt). Each row of the file will be recognized as one serial number, and the contents of each row separated by comma will be shown with linebreaks.




Add and Edit Picture

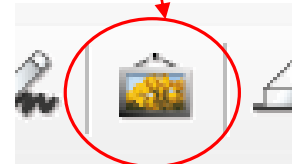
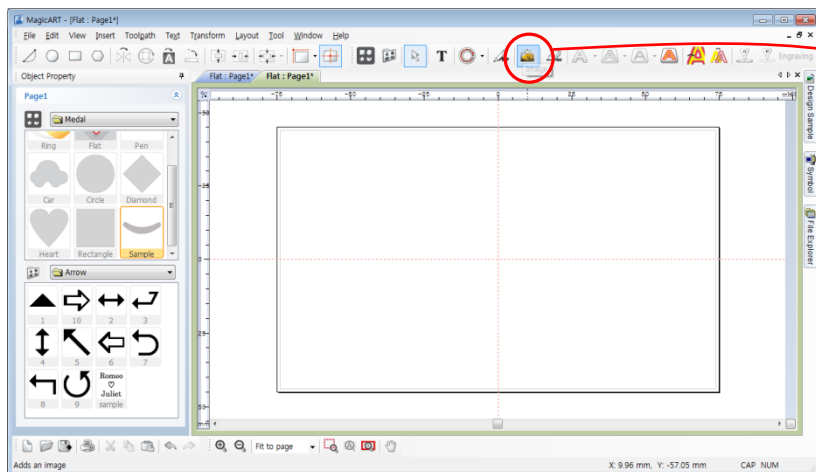
1) Add picture

This program provides a function to edit various types of picture files. Supported picture file types are as follows.

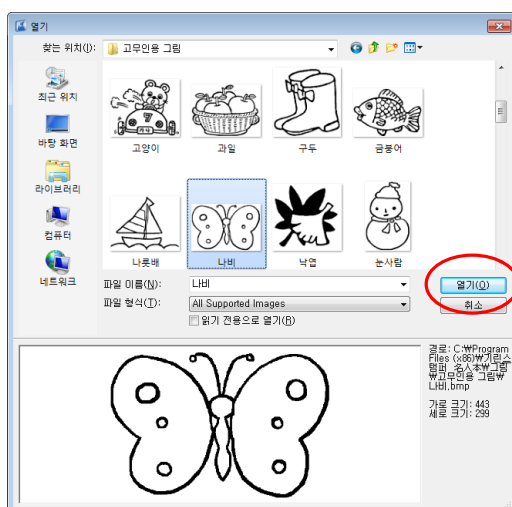
BMP	Windows or OS/2's bitmap graphic file
GIF	CompuServe graphic file
JPG/JPEG	JPEG bitmap graphic file
PNG	Portable Network Graphics bitmap graphic file
PCX	Z Soft PC paintbrush bitmap file
TIF/TIFF	Tag Image File Format bitmap file
WMF	Windows meta file

Picture file can be added by following methods.

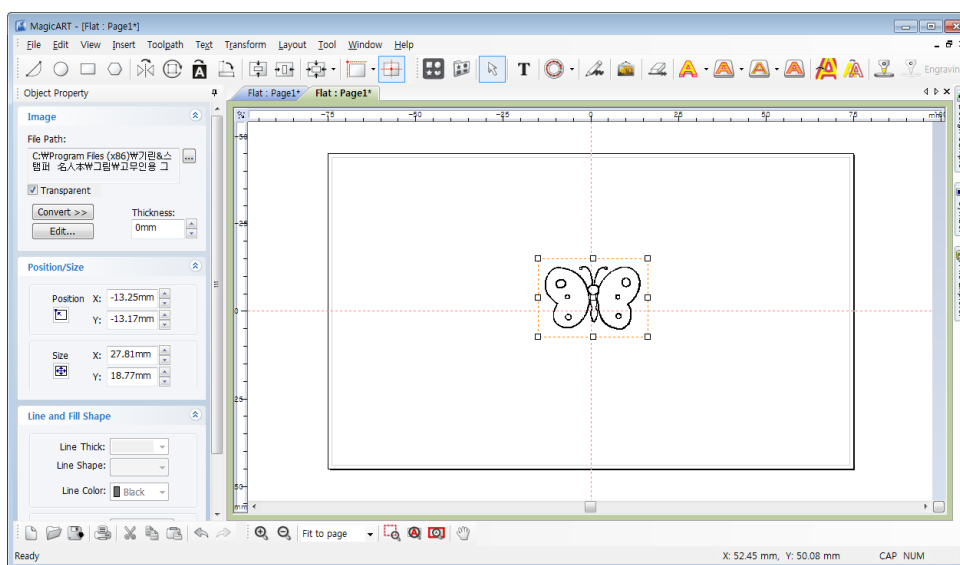
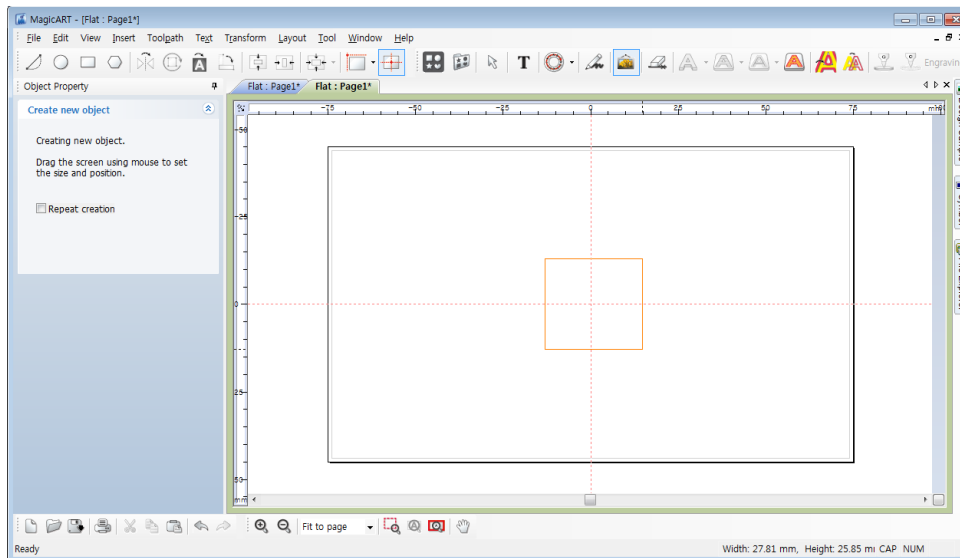
1. Select  [Image] from the toolbar or "Insert → Image..." from the menu.



2. If "Open" window shows up as the picture below, select the picture to be added, and click "Open" button.



3. Drag the work area by the mouse and decide picture size to load the picture.

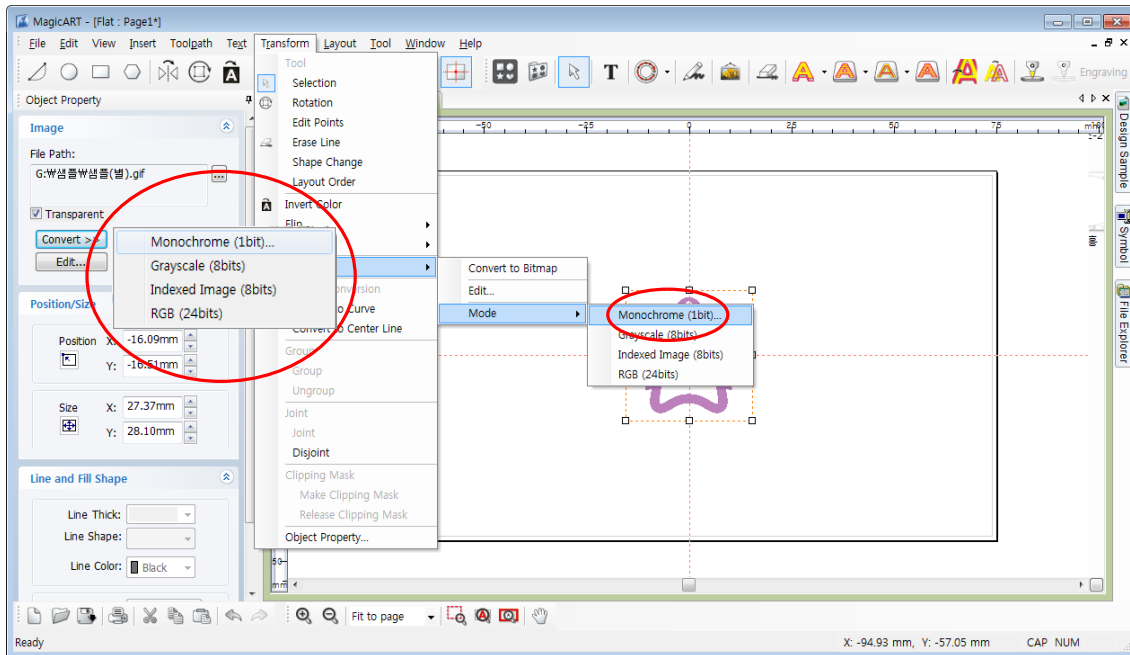


2) Convert and edit picture file

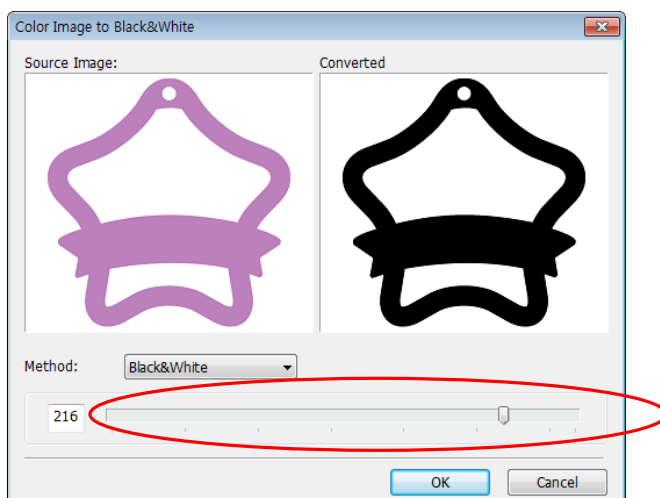
Only **single color image** can be engraved. Since color image cannot be engraved by this engraver, it should be converted to single color (1 bit) image.

[Convert single color image]

1. Select the image object you want to convert using mouse, and click “Transform” → “Bitmap” → “Mode” → “Monochrome (1bit)...” or “Convert” button in the image object registration information window to select “Monochrome (1bit).”

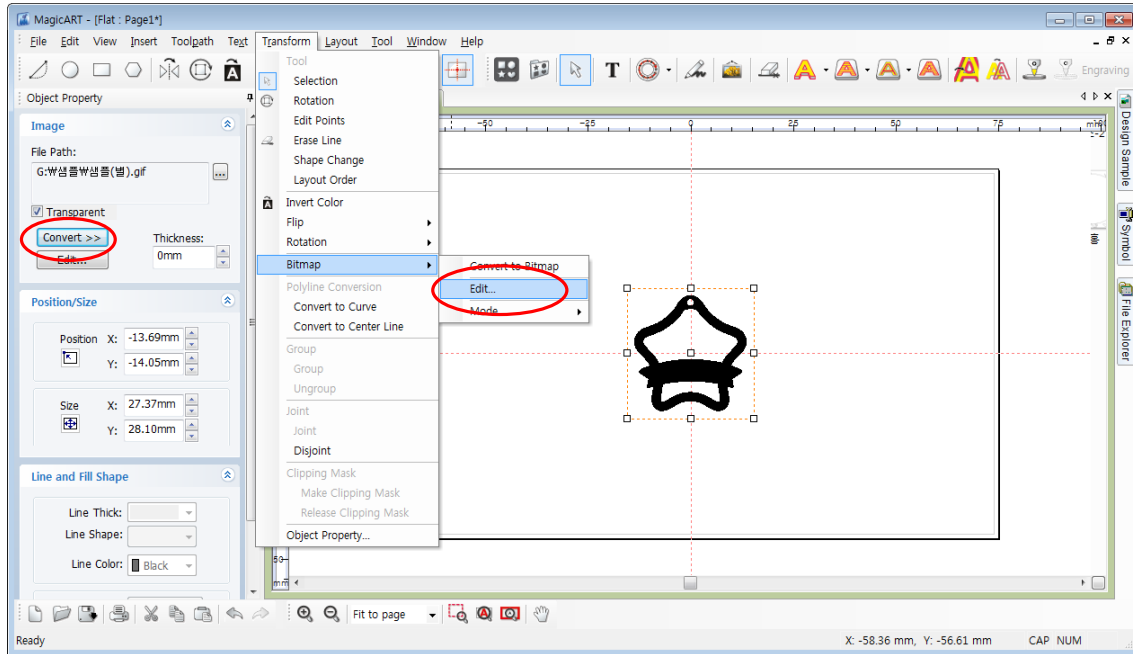


2. The window to convert it to single color image appears as below. Adjust the slider to change it to the single color you want, and click “OK” button.



[Edit image]

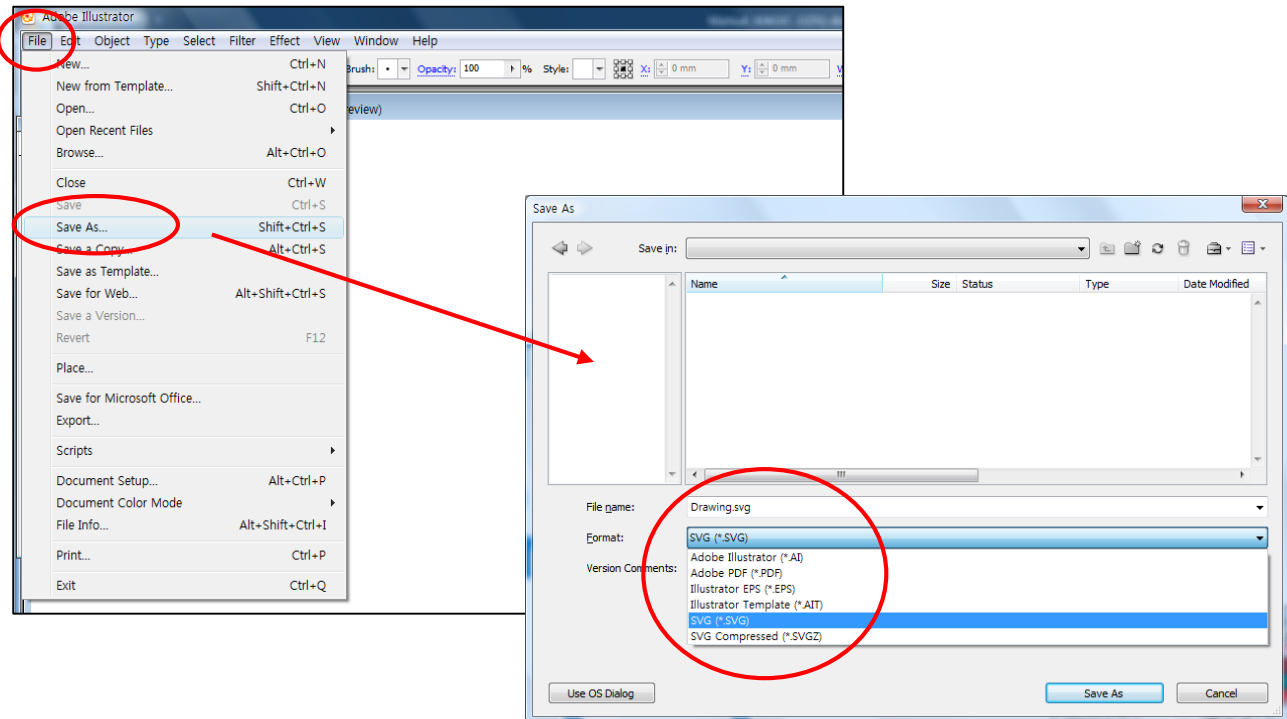
Loaded image can be edited by third party program (picture edition). Select the image to be edited, and click mouse right button. Click "Edit" button or select "Bitmap" → "Edit..." from "Transform." Then, third party program (Paint) shows the image. After editing it, press "Save" from the file menu, and close the third party program (Paint) to apply the edition.



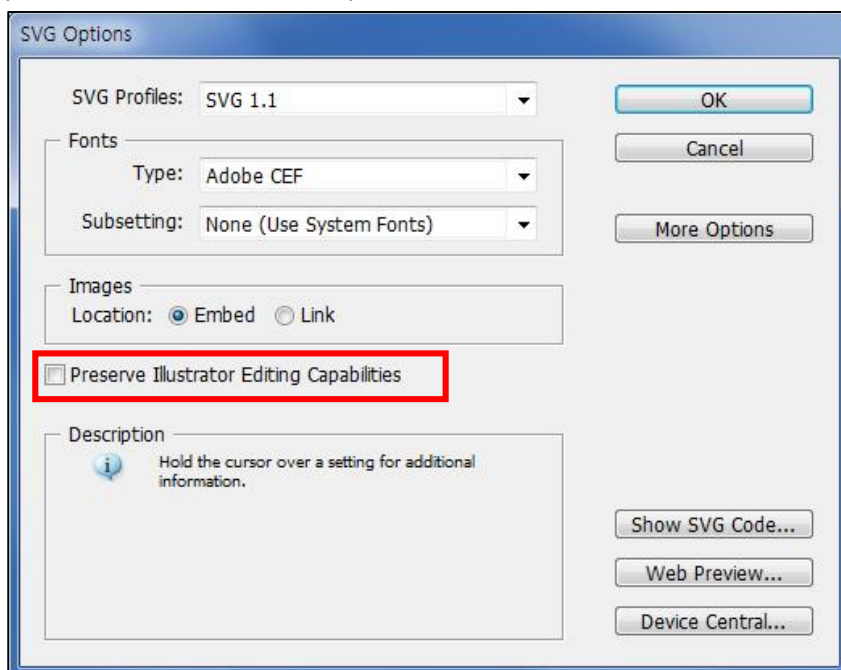
Import a File in SVG Type

Magic Art supports vector graphic (SVG) files. So files saved as SVG type can be imported. If you save a design as SVG type from design program Illustrator or CorelDraw, you can import the file to the Magic Art.

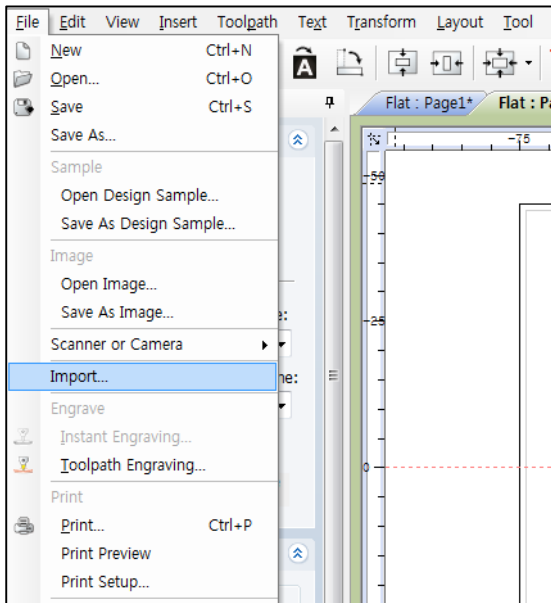
1. Click “File” → “Save As” button from Illustrator program menu to save a file in SVG type.



2. SVG option window appears; uncheck the checkbox next to “Preserve Illustrator Editing Capabilities”. Then press the “OK” button to complete the save.



3. Click “File” → “Import” button from the Magic Art menu to import a file.



Origin Point Calibration

※ The machine is initially set up at factory. Please contact reseller before changing the machine settings.


※ Calibrate the machine by using tip(Carbide, Diamond). The machine cannot be calibrated by using endmill, cutter, etc.


※ Calibrate the machine while Engraver pressure lock is not fixed. The nose, tool, and material can be damaged if you calibrate the machine while the head is fixed.





1) Tool Calibration (touch)

1. Fix a material of flat surface on the clamp.

2. Fix the tool short enough.

3. Press  button to move the tool to the clamp.

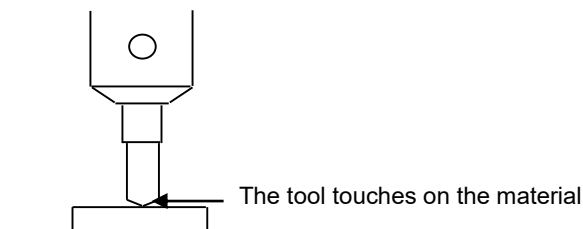
4. Press  button and go to the menu mode.


5. Press   button, and when  menu appears on the LCD window, then press and hold  button until it beeps (more than 3 seconds) to run the menu.

6. Select the “**1.Touch Sensor**” then press and hold  button until it beeps (more than 3 seconds) to run the menu.

7. The tool will be lowered down to the material hold in the center of the clamp.


8. Lower the tool manually by loosening the fixing bolt of the tool with a wrench, or raise the materials you're your hands to make the tool and materials touch as shown in the picture below.








9. Press and hold  button until it beeps (more than 3 seconds) to confirm that the setting is saved, then the tool will measure the material's height.

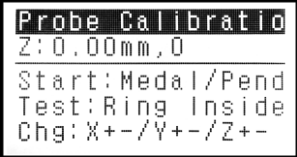

2) Probe Calibration




1. Fix a material of flat surface on the clamp.


2. Press the  button and go to the expert menu mode.

3. Press   button, and when  menu appears on the LCD window, then press  button and hold for more than 3 second until it beeps (more than 3 seconds) to run the menu.



4. Select the **"2.Probe"** then press and hold  button until it beeps (more than 3 seconds) to run the menu.

5. When  appears on the LCD window, press  button to appear

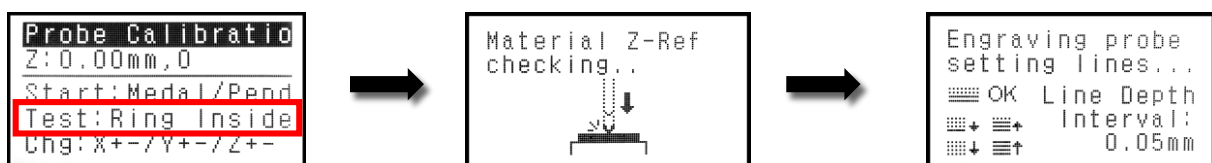
 on the LCD window, then press Z axis   button to lower the tool to make it close to the materials, and release the tool by using a wrench until the tool touches the materials. Then tighten the tool.

6. Press and hold  button until it beeps (more than 3 seconds), then the probe measures the height of the materials and the length of the tool before the settings is saved.



7. Press and hold  button until it beeps (more than 3 seconds) to begin a test run. At this time, the tool draws four lines on the materials. If two lines out of four lines are seen on the materials, then it is appropriate. If three lines are seen on the materials, then press  button to raise it by 0.05mm,

and one line is seen, then press Z axis  button to lower it down by 0.05mm





※0.05mm per line .





3) Laser Pointer Calibration


◆ Spindle

1. Fix a material of flat surface on the clamp.






2. Press  button to move the tool to the clamp.

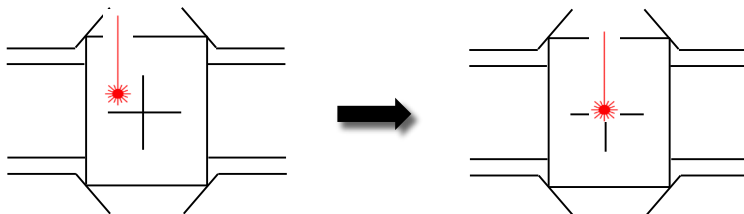
3. Press  button and go to the expert menu mode.

4. Press   button, and when  menu appears on the LCD window, then press  button and hold it until it beeps (more than 3 seconds) to run the menu.






5. Select the **"3. Pointer/Flat"** then press and hold  button until it beeps (more than 3 seconds) to run the menu.

6. The tool draws cross (+) lines on the materials and the laser pointer is turned on.

7. Move the laser pointer to the center of the cross by using the     direction key. Then press and hold  button.

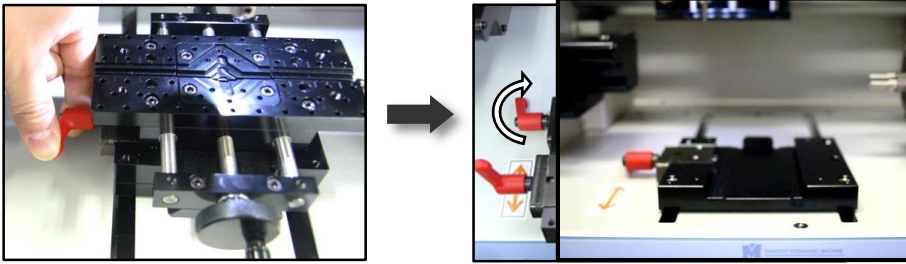


8. Laser pointer moves closer to the material to accurately calibrate the laser pointer's origin.

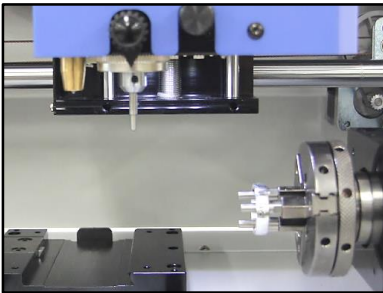
Move the laser pointer to the center of the cross by using the     direction key on engraver, and press and hold the  button until it beeps (more than 3 seconds) to confirm that the setting is saved.


◆ Rotation clamp





1. Turn the clamp knob on the left side of the clamp and pull the clamp and spacer block to take it out.



2. Fix a ring on flat surface of the rotation clamp. (Ring Outer Diameter Max.18mm)








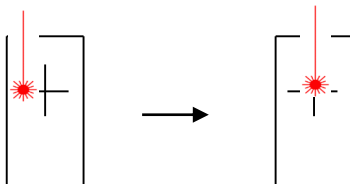
3. Press the  button and go to the expert menu mode.

4. Press   button, and when  menu appears on the LCD window, then press  and hold button until it beeps (more than 3 seconds) to run the menu.






5. Select the **"4.Pointer/Rotary"** then press and hold  button until it beeps (more than 3 seconds) to run the menu.

6. The tool draws cross (+) on the materials, and the laser pointer is turned on.

7. Use the     direction key to move the laser pointer to the center of the cross, and press  and hold button for more than 2 seconds to save the settings.

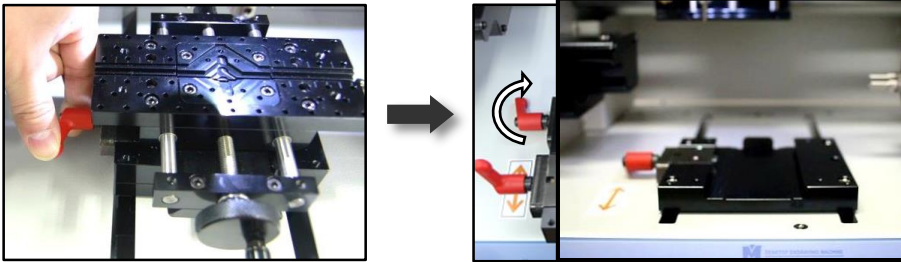


8. Laser pointer moves closer to the material to accurately calibrate the laser pointer's origin.

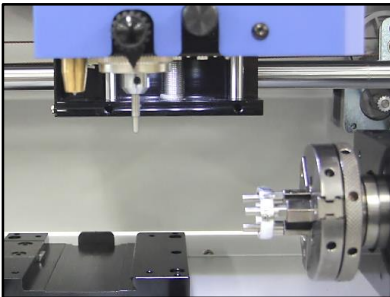
Move the laser pointer to the center of the cross by using the     direction key on engraver, and press and hold the  button until it beeps (more than 3 seconds) to confirm that the setting is saved.


◆ L-Tool





1. Turn the clamp knob on the left side of the clamp and pull the clamp and spacer block to take it out.




2. Fix a ring on flat surface of the rotation clamp. (Ring Outer Diameter Max.18mm)

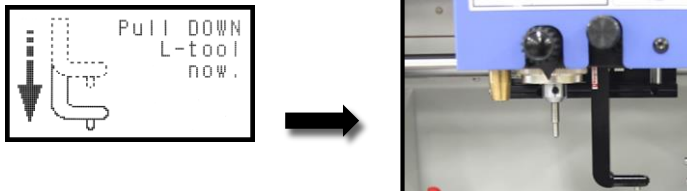


3. Press the  button and go to the expert menu mode.

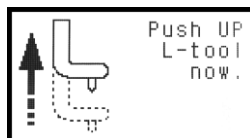
4. Press   button, and when  menu appears on the LCD window, then press  button and hold it until it beeps (more than 3 seconds) to run the menu.

5. Select the **"5.Pointer/L-Tool"** then press and hold  button until it beeps (more than 3 seconds) to run the menu.






6. When message appears on the LCD window like below, pull the L-Tool down by L-Tool line 1. Then press  button.

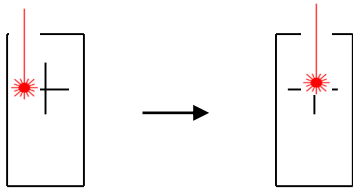


7. The tool draws cross (+) lines on the materials.








8. When message appears on the LCD window, pull up the L-Tool. And the laser pointer is turned on

9. Move the laser pointer to the center of the cross by using the     direction key, and press and hold the  button until it beeps (more than 3 seconds) to confirm that the setting is saved.

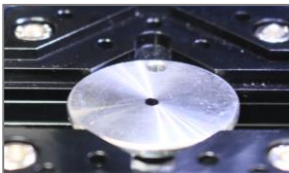



10. Laser pointer moves closer to the material to accurately calibrate the laser pointer's origin.

Move the laser pointer to the center of the cross by using the     direction key on engraver, and press and hold the  button until it beeps (more than 3 seconds) to confirm that the setting is saved.


4) Saving Multi-performance Clamp Origin Position





1. Put a dot on the center of the material with the marker, and fix it at the center of the clamp.











2. Press  button to move to flat mode.


※Menu will be changed if you enter ring inner/outer diameter mode menu.





3. Press  button and go to the menu mode.

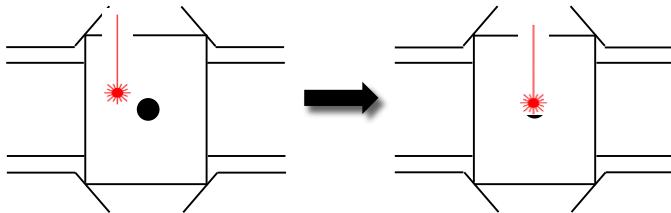
4. Press   button, and when  menu appears on the LCD window, then press and hold  button until it beeps (more than 3 seconds) to run the menu.


5.  Select an "Origin No" and press and hold  button to enter the



-  . And select the "CENTER" by using the     direction key, then press and hold  button until it beeps (more than 3 seconds) to move to the origin.

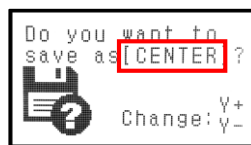
6. Press  button to turn on the laser pointer on the clamp.


7. Move the laser pointer to the center of the dot by using the     direction key.



8. Press and hold the  button until it beeps (more than 3 seconds) to confirm that the setting is saved.


9. When menu appears on the LCD window like below, select the "CENTER" by using the   buttons.




10. Press and hold the  button until it beeps (more than 3 seconds) to confirm that the setting is saved.




11. Tool will be moved to the position stored in the button.


5) Saving New Clamp Origin Position

1. Press  button to move to flat mode.





※Menu will be changed if you enter ring inner/outer diameter mode menu.


2. Press  button and go to the expert menu mode.


3. Press   button, and when  menu appears on the LCD window, then press





and hold  button until it beeps (more than 3 seconds) to run the menu.





4. Select a "Clamp" and "Origin" what you want by using the    

direction key, then press and hold  button until it beeps (more than 3 seconds) to move to the origin.

5. Press  button to turn on the laser pointer on the clamp.

6. Move the laser pointer to the point what you want by using the     direction key, and

press and hold the  button until it beeps (more than 3 seconds) to confirm that the setting is saved.

7. When menu appears on the LCD window like below, select the "Origin" what you want by using the  buttons.



buttons.

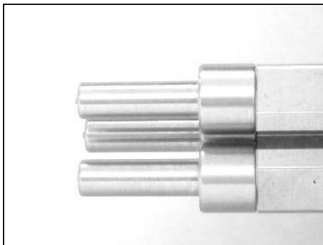


8. Press and hold the  button until it beeps (more than 3 seconds) to confirm that the setting is saved.

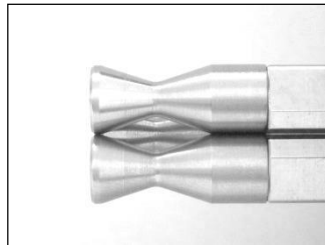
9. Tool will be moved to the position stored in the button.

6) Chuck Finger Origin point



1. Set the chuck finger to the rotation clamp of the engraver.



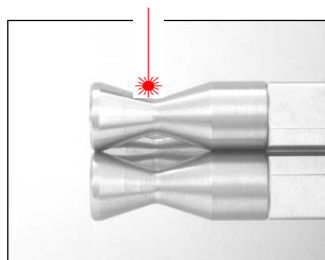
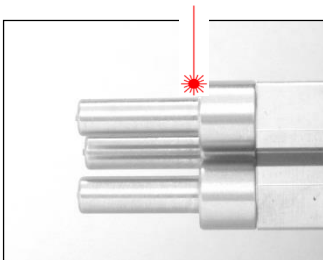
Flat chuck finger





Round chuck finger

2. Press  or  button to turn on the laser pointer at the Origin of the chuck finger.

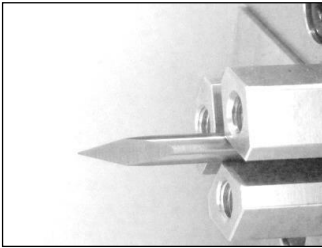
3. Use the direction key of the engraver to match the laser pointer to the base point of each chuck finger as below.




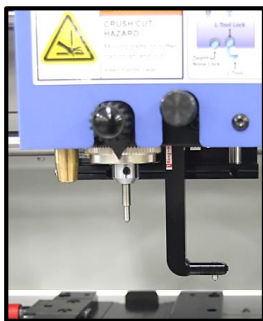
4. Press and hold  or  button until it beeps (more than 3 seconds) to confirm that the setting is saved.




7) Rotation Clamp Origin point (Z axis)

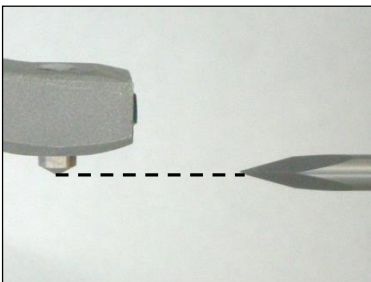
1. Set the sharp tool into the rotation chuck of the engraver as shown in the picture below.





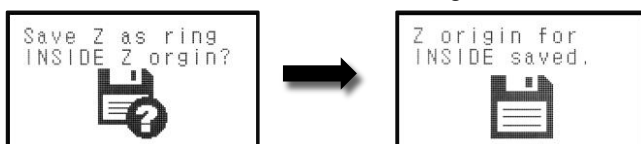
2. Press  button on the engraver to move the tool to the center of rotation clamp.
3. Pull the L-Tool down by L-Tool line 1.



4. Use   buttons to align the end $\Rightarrow \Rightarrow$ of the ring inner diameter engraving tool and tip of the sharp tool on the same horizontal line. If the distance between the tool and the sharp tool is too far, then bring them closer by using  button.



5. Press  button for more than 2 seconds, then the message below will appear. Press  button for more than 2 seconds to save the setting.



6. Pull up the L-Tool.