Best Built

Computerized Engraving System

UT – 50 Multi Engraver

Instruction Manual

Flat , curved, inside and outside ring engraving

BEST BUILT
Jewelry Equipment

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Guide to the manual

This manual has been produced to serve as a guide for users of the UT-50.
Read it carefully; it is essential if you wish to operate your machine safely and efficiently

The contents of the manual are divided into sections relation to:

- **Safety Instructions**
- **UT-50 Specifications**
- **UT-50 accessories provided**
- **UT-50 basic**
- **Using vise**
- **Exchanging tool**
- **Installation**
- **Flat surface engraving**
- **Outside/inside ring engraving**
- **Engraving images**
- **Engraver Settings**
- **Supported G-Code**

Safety Instructions

- **Make sure that all tools and work holding equipment are tight before running the spindle or moving the slides**
- **All maintenance and repair work should be done with the power off. If any work requires power ON, extreme care should be taken.**
- **Keep the machine always clean and keep away the tools from getting damaged.**
- **Avoid direct eye exposure to laser beam when laser pointer is on and never stare into the beam for long time.**

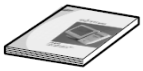
UT-50 Specifications

Power Input	100V ~ 240V
Power Consumption	48W
External Dimension	380mm(W) × 290mm(H) × 260mm(D)
Maximum Engraving Area	Flat: 123mm(X) x 100 mm(Y) x 30mm(Z) Rotary: 40mm(X) Cylinder Outside Diameter: 33mm Cylinder Inside Diameter: 14~33mm
Weight	24.6Kg
Mechanical Resolution	0.005mm (X,Y) 0.00125mm (Z)
Feedrate	1 – 36mm/sec (XY) 1 – 18mm/sec (Z)
Interface	USB (Full compliance with the USB Specification v1.1)
Instructions	HPGL / G-Code
Operation Temperature	4 - 40 ºC
Operation Humidity	30 - 85 %
Accessory	Laser Pointer (Red, Maximum 5mW, 650~670nm Class IIIa Type)
Usage	Engraving on metal surface

✓ Product specifications are subject to change without notice.

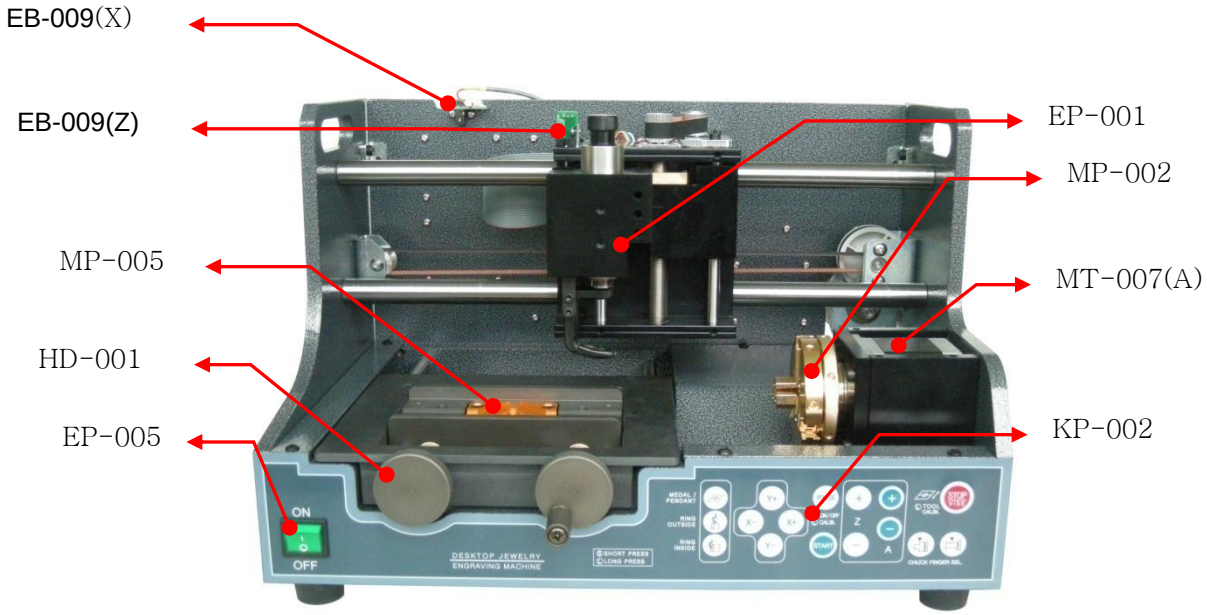
UT-50 Accessories Provided

To ensure trouble-free working with UT-50, it is advisable to always have certain spare parts on hand. UT-50 is supplied with a full range of accessories.
The accessories provided are all that is necessary to carry out the operations for which the machine is designed.

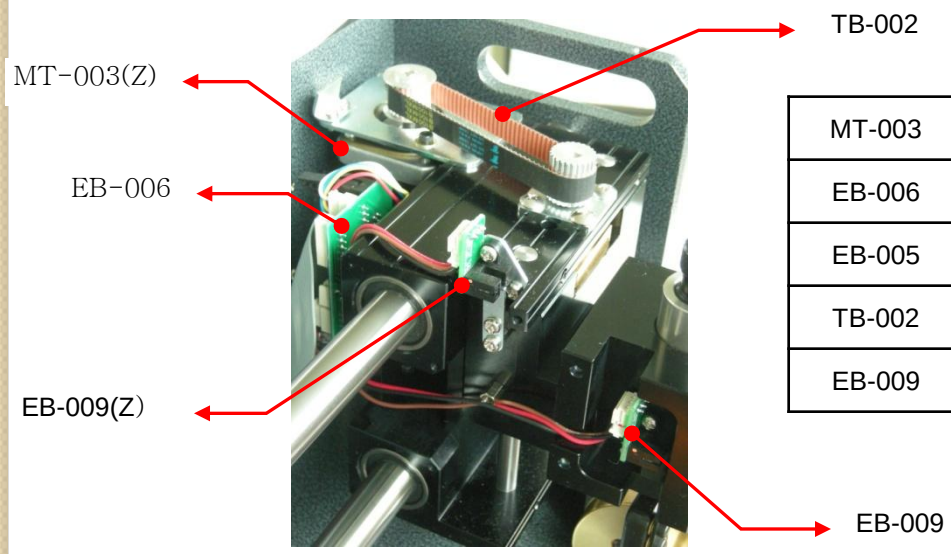
Figure	Name	Code	Qty.	
	Engraving Tool		1EA	
	Wrench		1EA	1.5mm To exchange tool
	Auxiliary Jig		1SET	To hold large material
	Chuck Finger (Flat)		3EA	To hold ring to engrave outside
	Chuck Finger (Round)		3EA	To hold a ring that is round on its outside for inside engraving
	Chuck Finger (Round)		3EA	
	Chuck Handle		2EA	
	AC Adapter		1 EA	DC24V / 2A 5.5x2.1mm
	USB Cable		1 EA	
	S/W CD		1 EA	
	Instruction Manual		1 EA	

✓ Accessory items are subject to change without notice.

UT-50 Basic

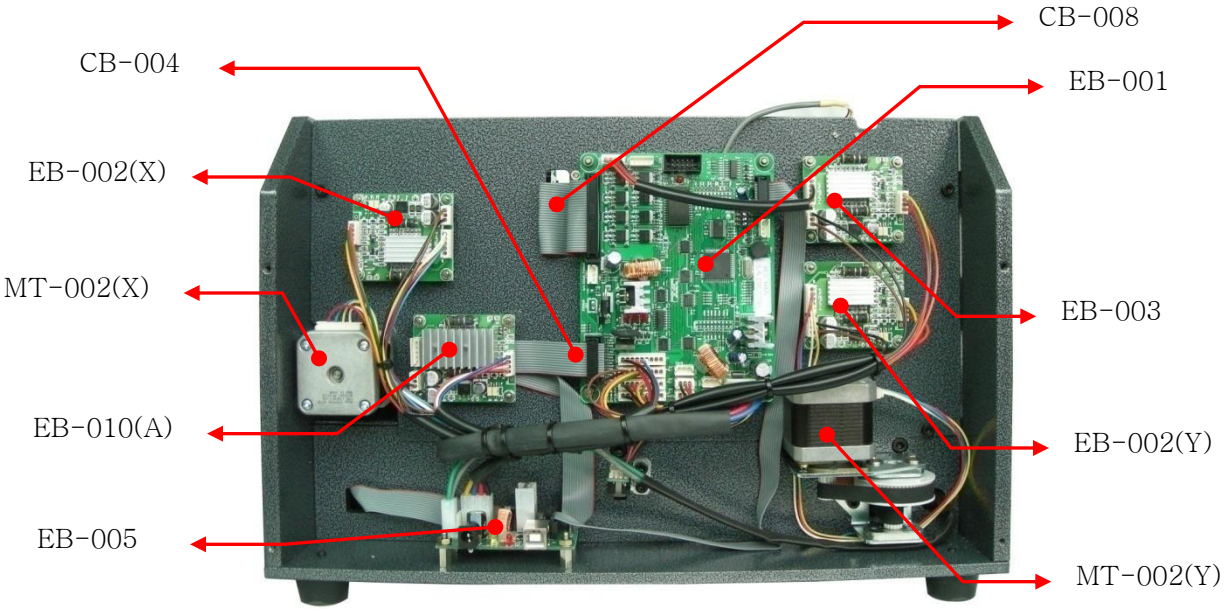


EB-009	Photo Sensor with PCB
MP-005	Multi Purpose Jaw
HD-001	Vise Handle
EP-005	Power Switch
EP-001	Laser Pointer
MP-002	Chuck
MT-007	Step Motor (A)
KP-002	key panel

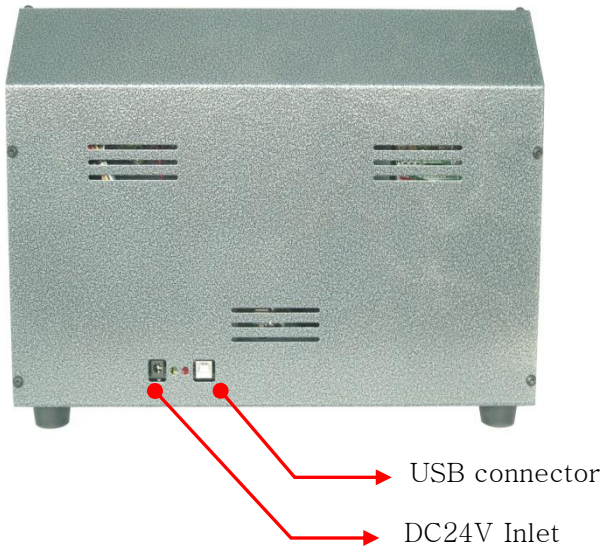


MT-003	Step Motor (Z)
EB-006	Head Board
EB-005	Photo Sensor with PCB
TB-002	Timing Belt(Z)
EB-009	Photo Sensor with PCB

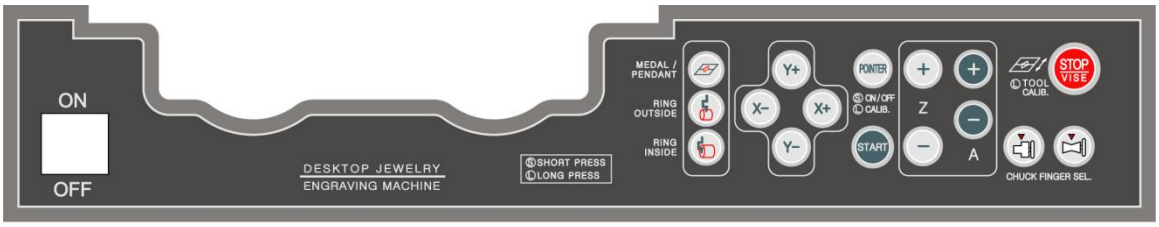
UT-50 Basic

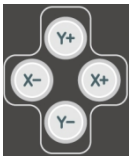


CB-004	10P Flat Cable(USB)
EB-002	Step Motor Driver(X, Y)
MT-002	Step Motor (X,Y)
EB-010	Step Motor Driver(A)
EB-005	Interface Board
CB-008	30P Head Cable
EB-001	Main Board
EB-003	Step Motor Driver(Z)



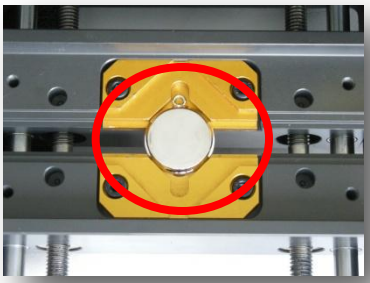
UT-50 Basic



	STOP	On engraving: First press – pause engraving, Second press – stop engraving
	VISE	On stand-by: pull vise in/out
	Medal / Pendant	Moves tool to flat vise and stand-by
	Ring Outside	Moves tool to rotary vise and stand-by ring outside engraving.
	Ring Inside	Moves tool to rotary vise and stand-by ring inside engraving.
	Pointer	Shows laser pointer
	Start	On engraving: Long press – starts engraving
	Save	On setting: Long press – save current set
	Flat Chuck finger	Enable flat chuck finger setting origin as in the picture
	Round Chuck finger	Enable round chuck finger setting origin as in the picture
		Moves Z axis up and down
		Moves A axis cw and ccw
		Moves X and Y axis.

Using Vise

To use the standard vise, turn the knob counter clockwise to open the vise up. Place the object in the center. Turn clockwise to close the vise . It is not necessary to place the object in the center of the vise. User can center the engraving by using the laser pointer.



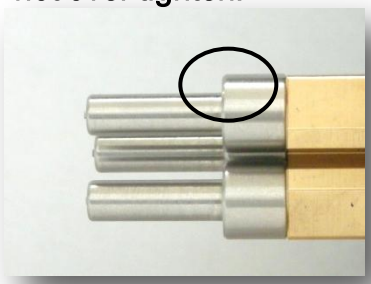
Using Auxiliary Jig

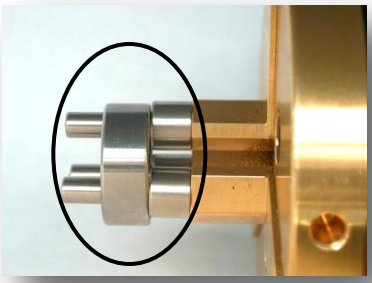
The auxiliary jig is used for objects that are thick or does not fit firmly on the standard vise. Use a philips head screwdriver to attach the jig.

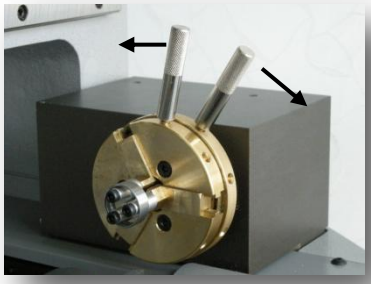
Using Vise

Using Chuck

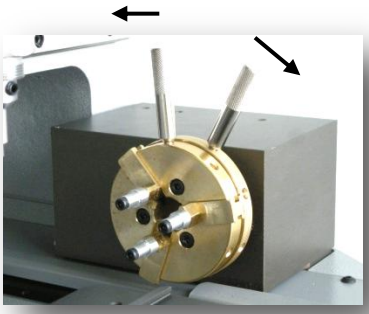
◈ Use the flat finger chucks to hold your rings. Flat chucks are mainly used for outside ring engraving. Place the ring against the first notch to set at default position. Use the levers provided to hold securely. Do not over tighten.

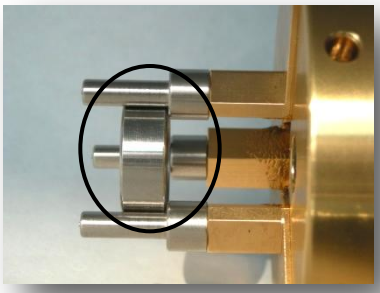


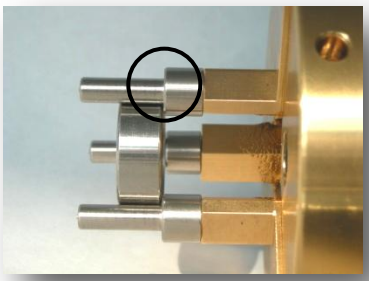


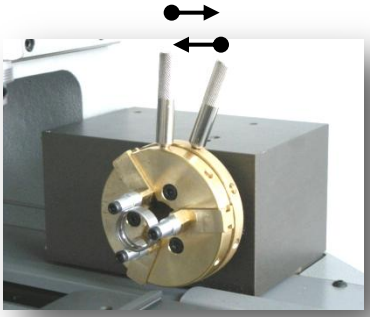


Use the curved finger chucks for inside ring engraving. Place the ring in the center of the chuck and use the levers provided to hold securely.







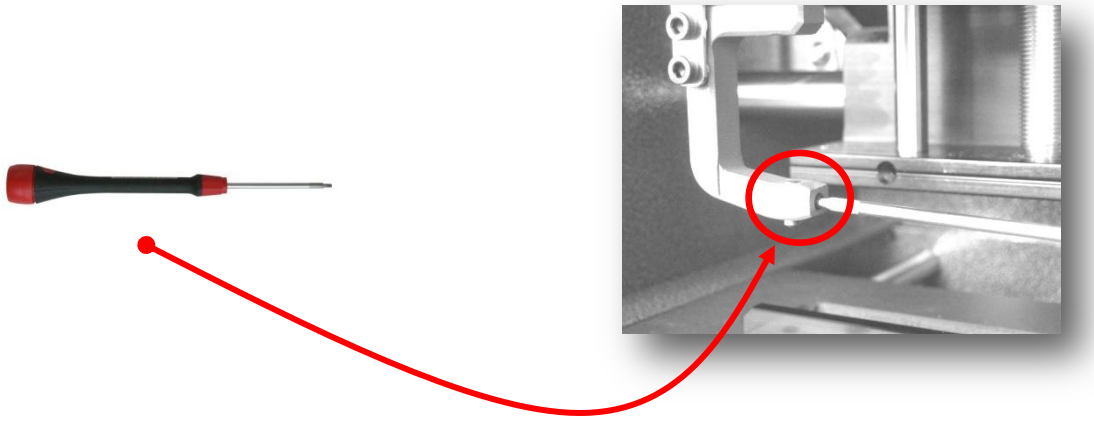


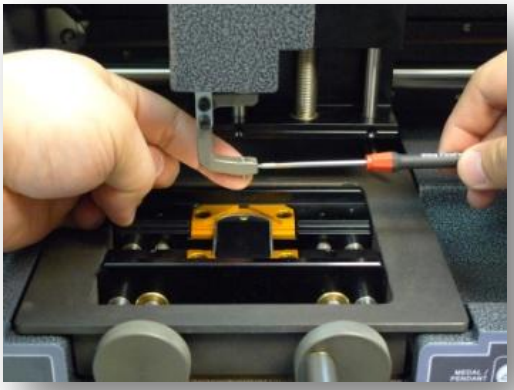
Exchanging Tool

◈ Installing or Replacing the engraving tip.

Use the provided Star shaped screwdriver to loosen or tighten the tip. To remove the tip, turn the **power off** first, then place your finger under the tip. Insert the screwdriver as shown below and turn counter clockwise. One to two turn should be enough to loosen the tip and the tip will slide down easily.

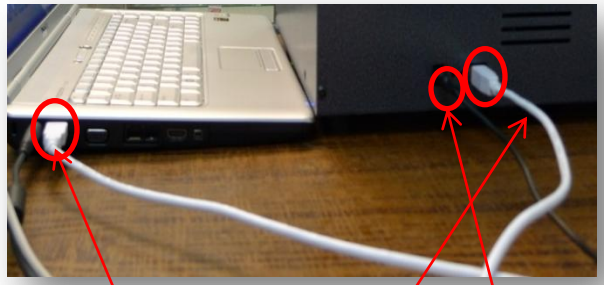
Insert the new tip by sliding it from the below and tighten by turning the screwdriver clockwise. Make sure the tip sticks our about 4-5 mm below the base of the holder.



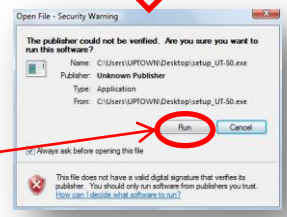


Installation :
Cables and Program

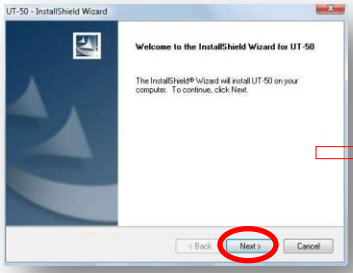
1) The USB cable connection is located behind the engraver and also the power connection. Plug the other end of the USB cable to your PC and the power adapter to your wall outlet. Make sure to use a surge protector in case of electrical surge.

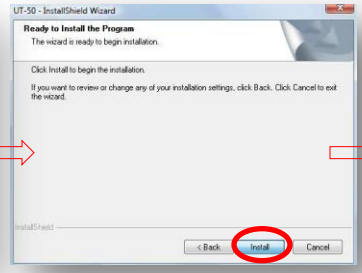


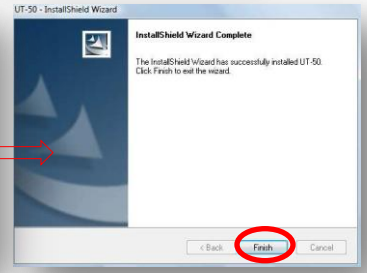
2) Insert the program CD in your disk drive. Installation should start automatically. If it does not, double click on the CD drive icon and look for (SET UP.EXE) file. Double click on the SET UP.EXE and installation setup should begin.



Select Run to proceed to next step.







Flat Surface Engraving:

1) Measure the work area of the object being engraved.

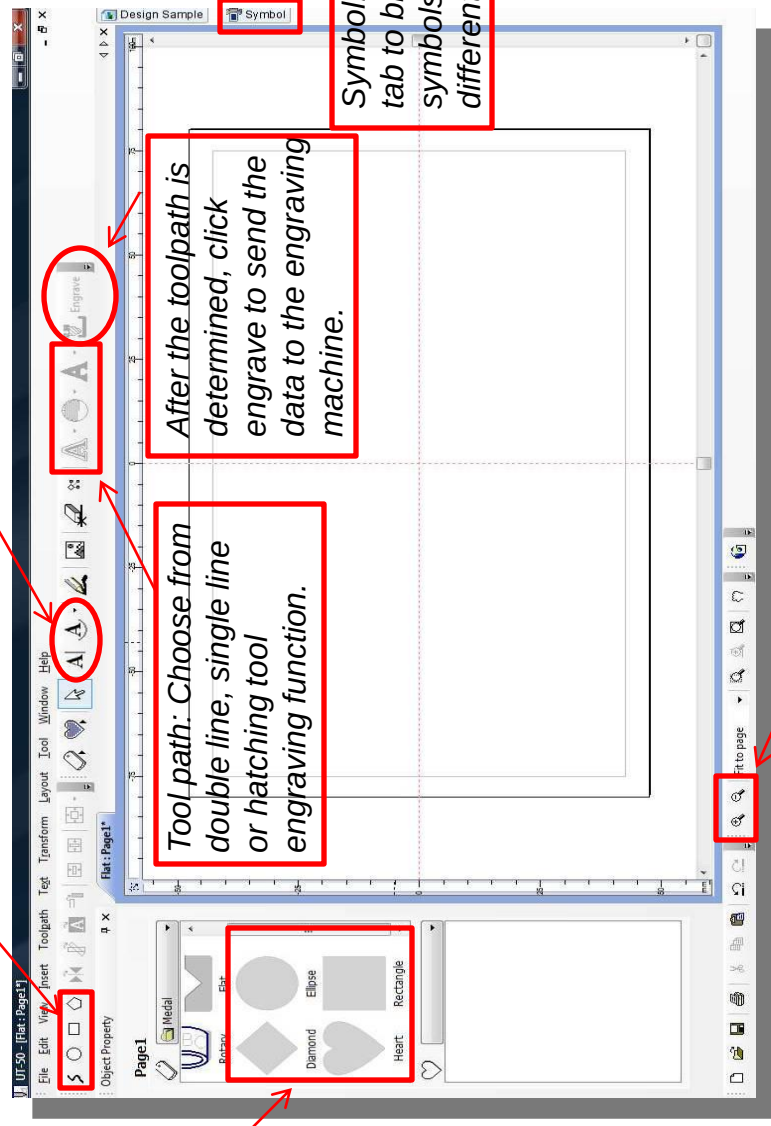
2) Place the object on the vise and turn the knob clockwise to tighten.

Turn clockwise to tighten

3) Press the engraving orientation button (pendant / medal) to move the engraving head to proper position.

4) Double click on UT-50 engraving icon on your desktop to open up the program.

Flat Surface Engraving: Basic layout information



Text entering mode. Click on either standard text or circular text. Then left click anywhere on the screen and type your message.

Shape tools : Use for drawing shapes

Click on the object shape of the work area.

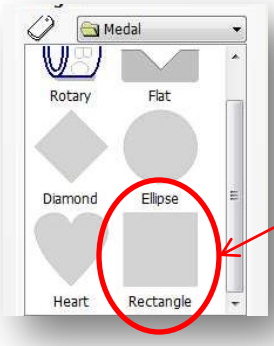
Tool path: Choose from double line, single line or hatching tool engraving function.

After the toolpath is determined, click engrave to send the data to the engraving machine.

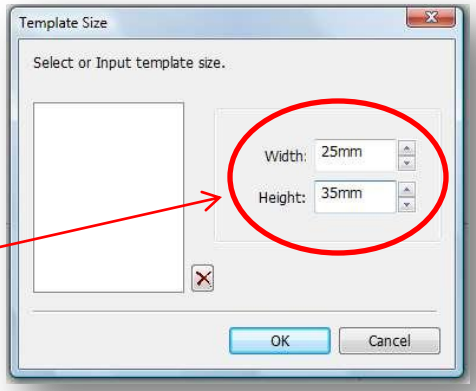
Symbol: Click this tab to bring up symbols from different fonts.

Magnification tools: Use for zooming in and out. Also, mouse with scrolling wheels will also function the same way.

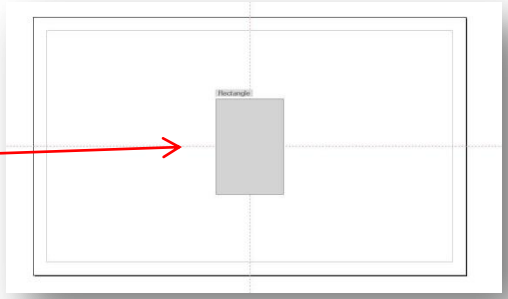
Flat Surface Engraving: Basic layout information



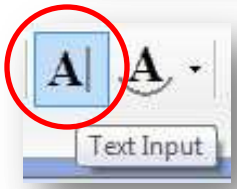
1) Click on the shape best resembling the work area.

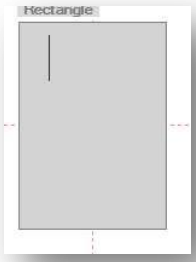


2) Enter the size of the work area in millimeter only.



3) Once the size is entered, the work area will be shown. All text or drawings must be placed within the work area.

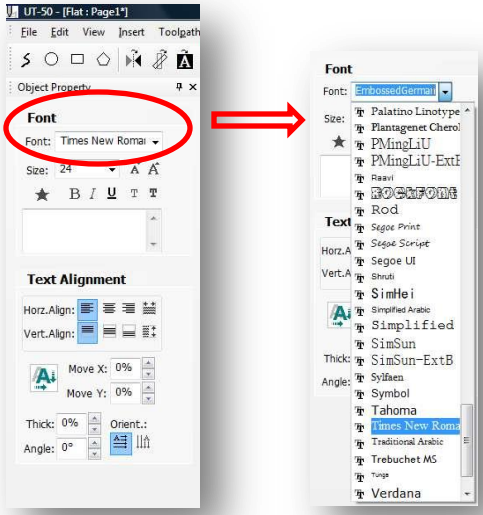




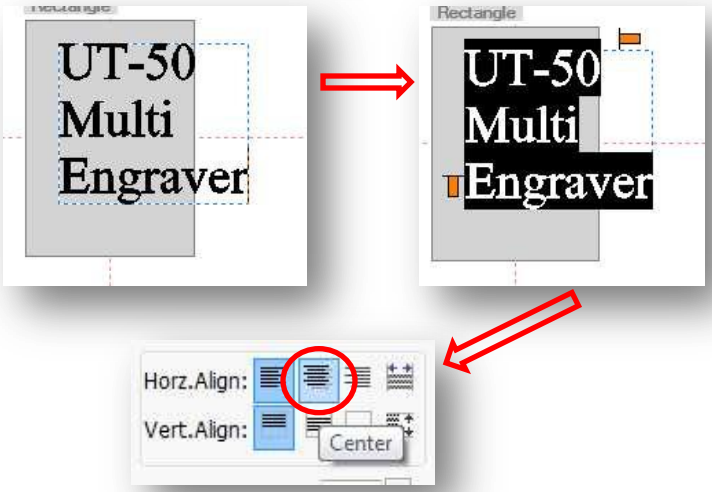
4) Select the text input icon, move the mouse pointer anywhere on the work surface. Then left click and enter your text.

Flat Surface Engraving: Basic layout information

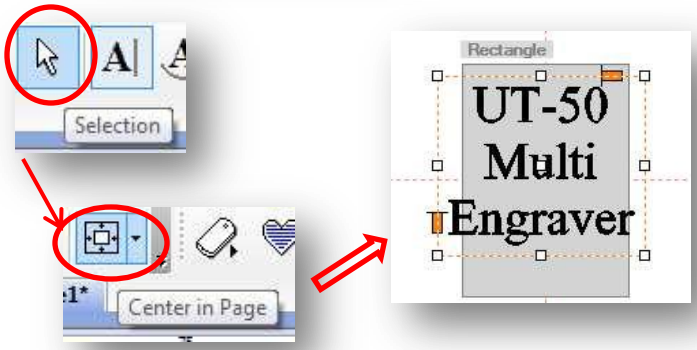
5) Click on the font tab and choose the desire font . ** *Additional fonts can be added by downloading (True type fonts) from independent websites for free and copying it to your fonts folder in the control panel.*



6) Enter the text and click on the center justification tool to align if necessary. The text must be highlighted before alignment.

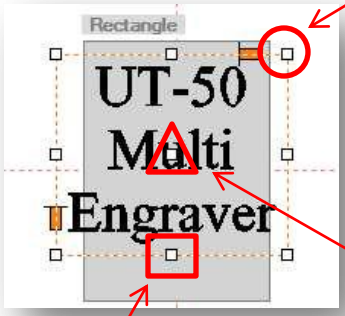


7) Click on the selection icon to select the message. Then click on the center to page tool to center the message.



Flat Surface Engraving: Basic layout information

8) The message and the sizing nods must fit inside the work area. Right click on the corner nods and drag towards the center to shrink the message. Then click the **center to page tool again** to re-center the message. Repeat steps until desired outcome is achieved.



Right click on the corner nod and dragging it in or out will change the size proportionally.

Right click and hold to move the object freely.

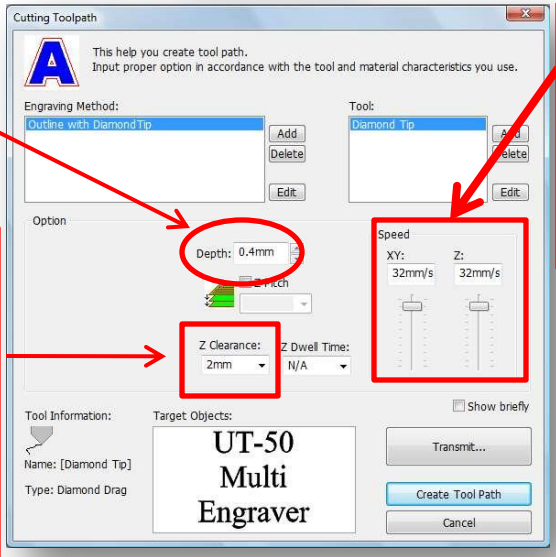
Right click on the nod and dragging it in or out will change the size one way.

9) Once the object is sized and placed within the work area, choose from one of three type of engraving styles.

Double line engraving

Depth: Controls how hard to press down to engraver. Recommended 0.4mm

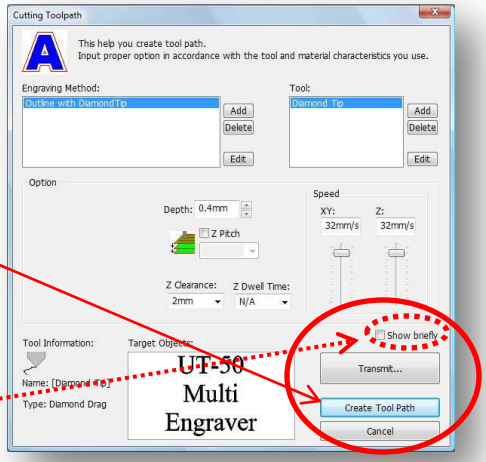
Z- Clearance: Used when engraving object has a slight curved surface or uneven surface. Recommended 0.5mm for flat and 3.0 – 5.0 for curved.



XY- Speed setting controls the side to side movement speed. Recommended 20-24 mm. Z-Speed is the up and down speed. 15-20 mm.

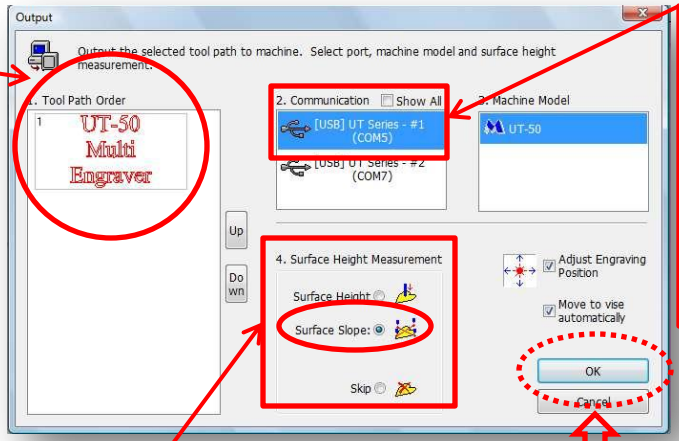
Flat Surface Engraving: Basic layout information

10) Click Create Tool Path to open up the output menu.



** If the menu is in abbreviated mode, click on show briefly to expand the menu options.

Make sure this window displays the selected work to be engraved.



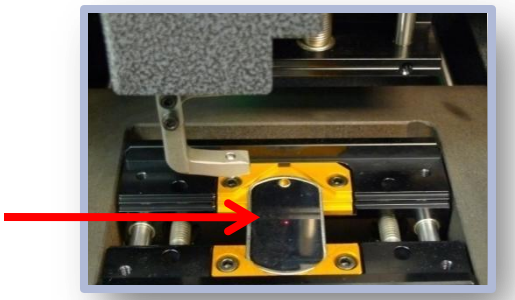
Shows the connection status between your PC and the Engraver. If it's blank, please make sure the USB cable is connected on both ends.

Surface height measurement: measures the slope of the plate. Improves the accuracy of the engraving on uneven surfaces.

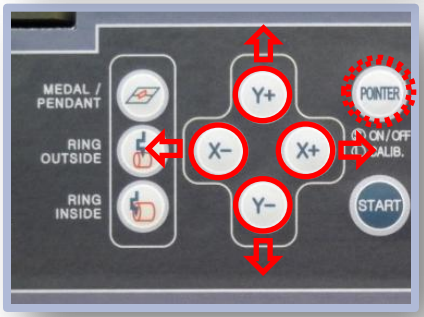
11) Click (OK) to transmit the data and start engraving.

Flat Surface Engraving: Basic layout information

12) Once the data is transmitted to the engraver, the engraver will move over the engraving object. A short beep will sound and a laser guide will turn on. The red point indicates the center of the design.



13) Before engraving any designs, you can view the area to make sure it fits correctly on the engraving object. Make sure to view all 4 sides of the area.



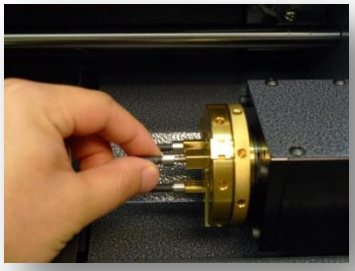
14) ** (OPTIONAL) Using the directional keys, you can manually move the work area. First, press one of the four directional key, then press (Pointer). Press the directional key again to move. If you moved more than you need, press the opposite directional key. Finally, press (Pointer) to view the area.

Press and ***hold down*** the directional key to move fast. ***Press and release*** to move in short bursts.

15) Press and hold START for 3 seconds or until a long beep then let go start engravings.

Outside /Inside Ring Engraving: Basic layout information

1) Screw on either the flat or curved ring holders to the attachment. Make sure to tighten by hand.

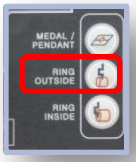


2) Measure the width and the diameter in millimeter.

Width

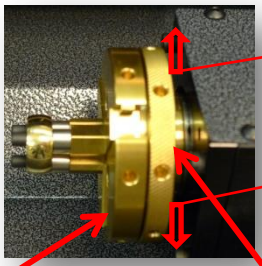
Diameter

3) Press the orientation button and choose (Ring Outside) to move the engraver into position.



4) To place the ring in the vise, hold the outer ring and turn the inner ring away from you. Slide the ring over the chucks and turn the inner ring towards you. Use the (2) steel pins provided to tighten the ring. ***Do not over tighten***, it will alter the diameter of the ring or damage the ring.

Outside ring setup



Moves the chucks in.

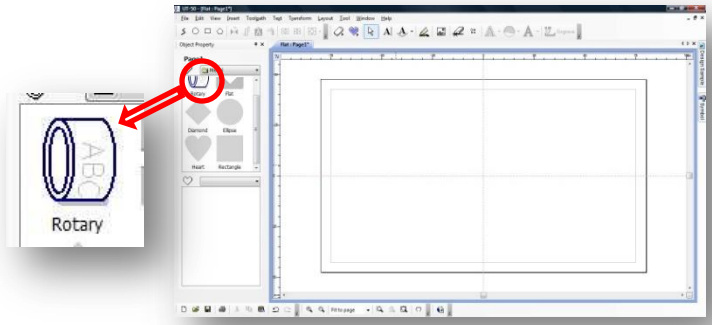
Moves the chucks out.

Outer Ring

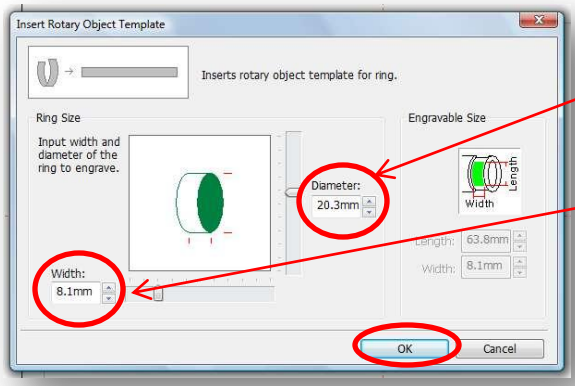
Inner Ring

Outside /Inside Ring Engraving: Basic layout information

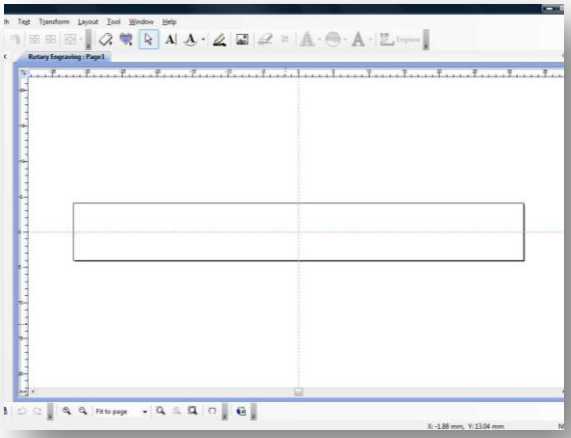
1) To engrave inside or outside the ring, choose the rotary function on the upper left hand corner.



*** To engrave the inside, measure the inside diameter and the width. All steps leading to the output menu is the same as outside ring engraving.*



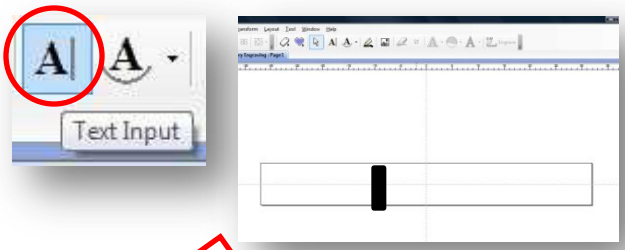
By entering the width and diameter, a template will be drawn according to the measurement.

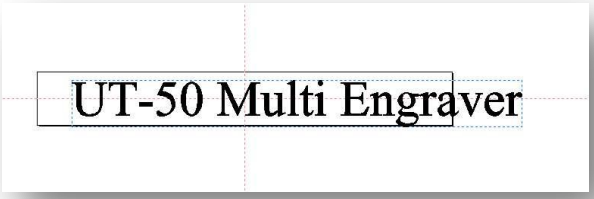


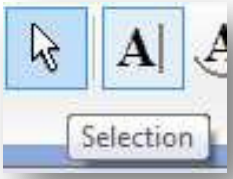
Click (OK) to proceed to next phase.

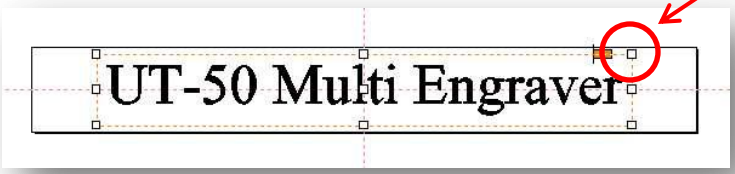
Outside /Inside Ring Engraving: Basic layout information

2) Click on Text input icon, right click anywhere on the screen and enter your message or insert drawings.









3) Click on the selection tool and then click the corner nod to resize your message. Your message must fit inside the work area.

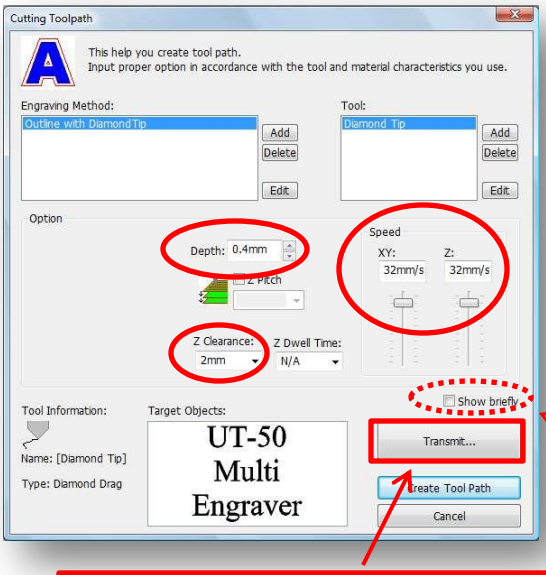
4) After resizing your message, you can center it by clicking Center to page icon. Then choose from one of three engraving options.

Double line

Hatching Fill

Single line

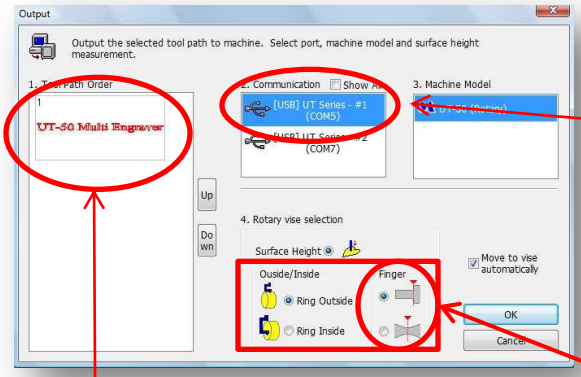
Outside / Inside Ring Engraving:
Basic layout information



Z Clearance: For uneven surfaces, set the clearance to 4mm or higher.

*** If the menu is in abbreviated mode, click on show briefly to expand the menu options.*

Click Transmit to send data over to the output options.



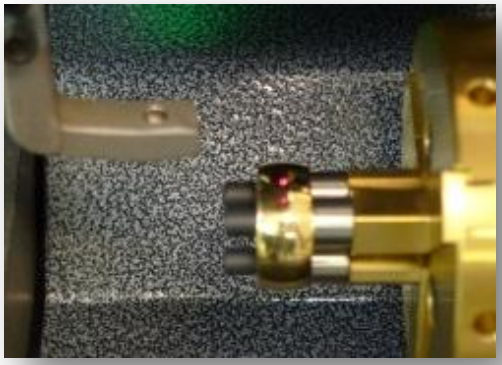
Indicates your PC is properly connected to the engraver via USB cable.

Display should show the message to be engraved.

Choose the ring outside engraving and select the type of holder being used. Selecting the wrong holder will off center the engraving.

Outside / Inside Ring Engraving:
Basic layout information

As the data is being transmitted, the engraver will move into position. A laser beam will cast over the engraving object.



Note: Positioning laser is used only for outer surface engraving. It will not turn on for inside ring engraving.

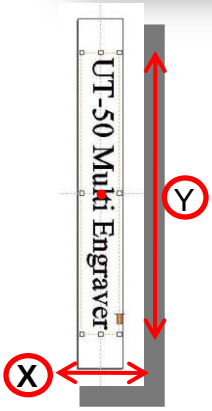
The laser indicates the center of the design. Press X- or X + to view the width of the design. Y- or Y+ to view the length of the design.

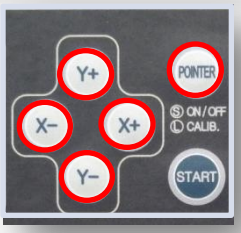
X- moves to left and

X+ moves to the right.

Y- moves to left and

Y+ moves to the right.





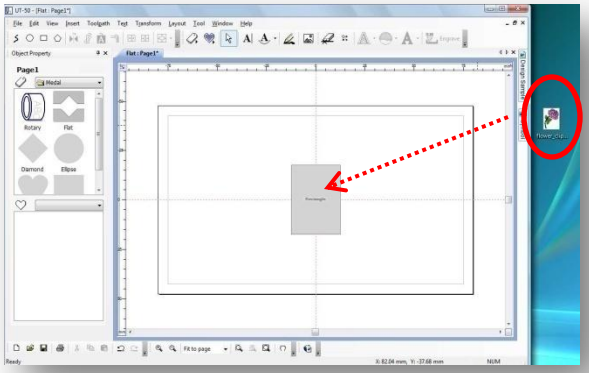
In case of misalignment, press (Pointer) then press (X- or X +) to move the work area into the correct position. Press (Pointer) once more to view the work area.

5) Press and hold the start button for 3 seconds or until a long beep sounds.

Engraving Images: Basic layout information

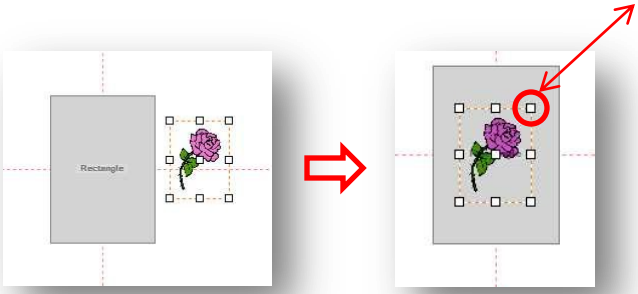
1) Please refer to page No.3 for measuring and preparing for flat engraving.

2) Secure your engraving object on the vise. Then choose the image to be engraved. We recommend clip arts, bmp or jpg images with white background. Photo images can be engraved, but results may vary and ***not recommended.***

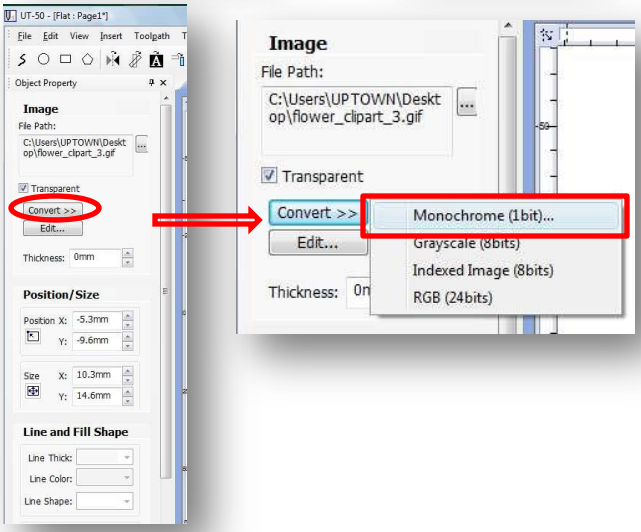


3) Images can be simply dragged on to the screen or copied and pasted.

4) Place the image to desire location and then resize it if necessary by moving the corner nods in and out.

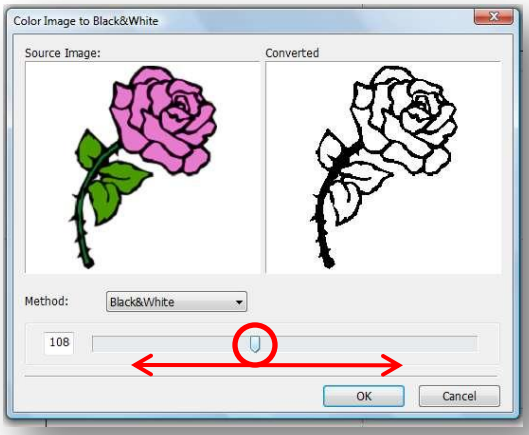


5) All images must be converted to black and white before engraving. Select the image if not selected, then click (Convert) tab on the left hand side of the screen. Then select Monochrome color which will bring up the contract tool.

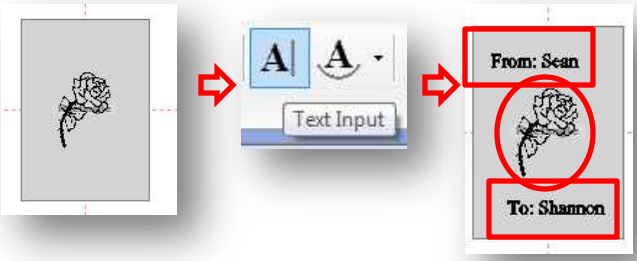


Engraving Images: Basic layout information

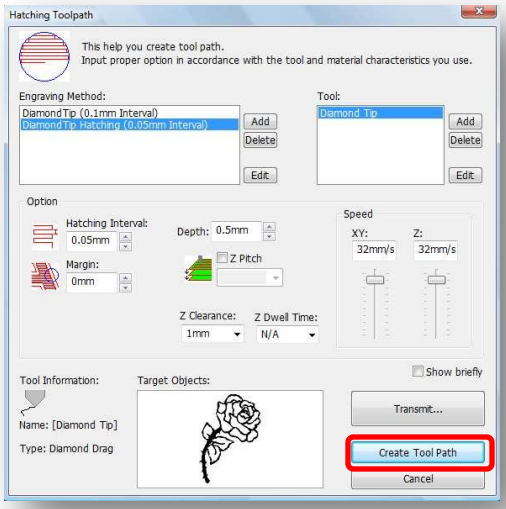
6) Slide the bar left or right until the image is adjusted to your preference. ***** Note : Only the black outline will be engraved. Black dots or spots will also be engraved. It might be necessary to use additional software to touch up the image.***



7) Once the image is converted, additional images or text can be added.



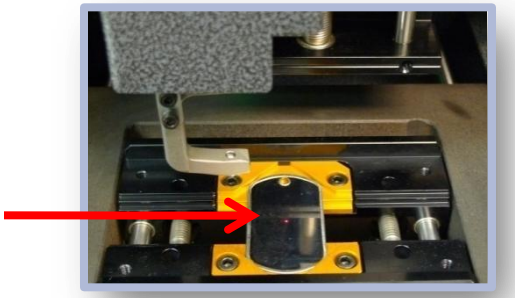
8) Depending on the number of components in the design, each design can be assigned a different tool path.



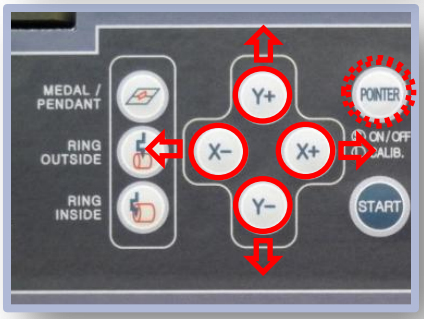
Rose will be engraved with the hatching tool path.
****** Click (Create Tool path) to add additional designs for engraving.***

Engraving Images: Basic layout information

9) Once the data is transmitted to the engraver, the engraver will move over the engraving object. A short beep will sound and a laser guide will turn on. The red point indicates the center of the design.



10) Before engraving any designs, you can view the area to make sure it fits correctly on the engraving object. Make sure to view all 4 sides of the area.



11) ** (OPTIONAL) Using the directional keys, you can manually move the work area. First, press one of the four directional key, then press (Pointer). Press the directional key again to move. If you moved more than you need, press the opposite directional key. Finally, press (Pointer) to view the area.

Press and ***hold down*** the directional key to move fast. ***Press and release*** to move in short bursts.

12) Press and hold START for 3 seconds or until a long beep then let go start engravings.

Engraver Settings:

UT-50 positioning and origin setup. Use the tool setting only if the default positing has been changed.

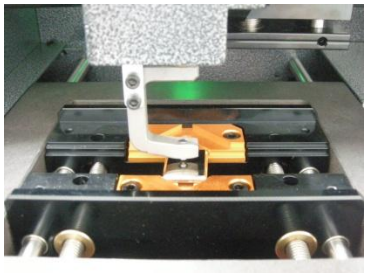
- Tool Setting
- Laser Pointer Setting
- Flat Vise Center
- Rotary Vise Center
- Rotary Center Setting (Z Axis)
- Chuck Finger Origin

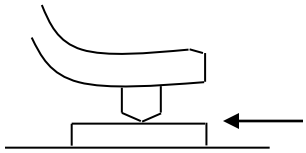
◈ Tool Setting (Flat vise setup)

1. Place a flat pendant or medallion in the center vise.

2.

Press and hold the (Stop /Vise) button until a long beep occurs and moves over the pendant.





The setup is to place the engraving tip slightly touching the surface of the pendant.

3. There are two ways to adjust the leveling the tip. You can manually loosen the tip using the star wrench. Or press the (+/-) button shown on the left. The tip does not have to be pressed firmly on the surface of the pendant. But the tip should be touching the surface.

4. Once the tip is correctly positioned. Press and hold the start button (2 secs) or a long beep to initialize the set the new Z position. Accurate Z position will provide a even engraving output.

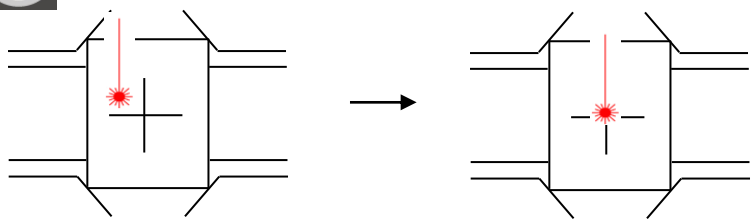
◈ Laser Pointer Setting

- Flat vise

1. Place a flat pendant or medallion in the center vise. Make sure to mark the center of the pendant.

2.

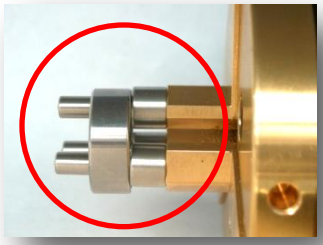
Press and hold the (Pointer) button until a long beep occurs.



3. A laser marking will appear. Using the directional buttons, move the laser directly over the center marking. Once centered, press and hold the start button for 2 secs to initialize the settings.

- Rotary Vise Laser positioning settings

1. Place a sample ring on the rotary vise as shown in the right.



2. Press the outside ring engraver button to position the engraver.

3.

Press and hold the (Pointer) button until a long beep occurs.

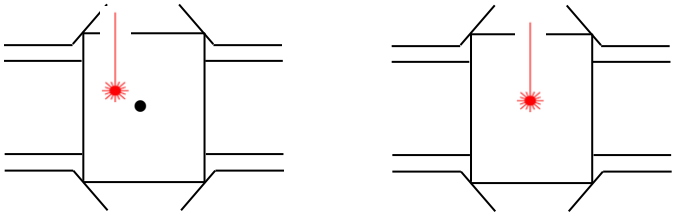
4. Mark center of the ring. Move the laser point over the center of the mark using the directional key pad. Once the pointer is in place, press and hold the start button for 2 secs or a long beep to set as default position.

◈ Medal/Pendant vise origin setting

1. Place a pendant on the flat vise and make a small mark at the center. This function will set the center position for the engraving tip.
2. Press the flat engraver positioning button..
3.

Press the pointer button to turn the laser pointer on and position over the pendant.

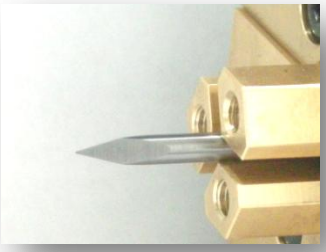
4. Use the directional key buttons to center the pointer over the center mark.



5. Press and hold the flat vise button for 2 secs or until a long beep to set the position as default origin.

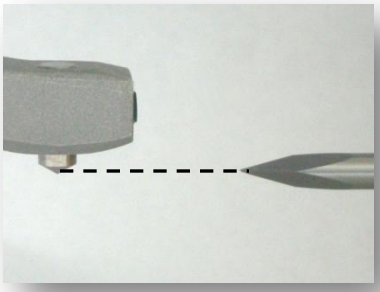
◈ Rotary Center Setting (Z Axis)

1. Place a cylindrical object with a center point and place it on the vise as shown on the left.



2. Press the outside engrave button once to move the engraver into position.

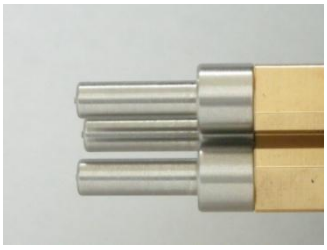
3. Use the Z axis buttons to adjust the height of the engraving tip to the point of the object. The engraving tip and the point on the centering object should line up as close as possible as illustrated on the left.



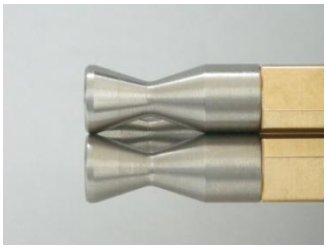
4. Press and hold the start button for 2 secs or a long beep to set the position.

◈ Ring chuck origin settings

1. Place the chuck finger to the ring vise.



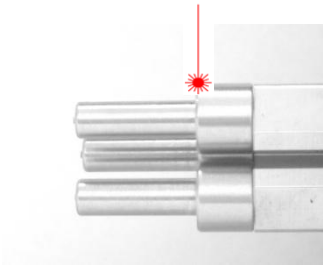
[Default outside ring]

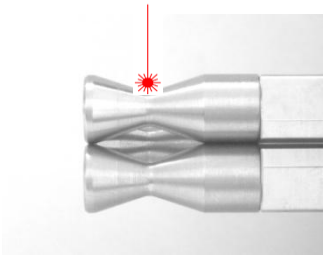


[Default inside ring]

2. Press the correct corresponding chuck finger button to turn on the laser pointer.

3. Use the directional keys to move the beam to the correct position. The illustration below shows the correct position for each chucks.





4. Press the correct chuck key button and hold for 2 secs or a long beep to set the position.

Supported G-Code

Code	Meanings	Examples
A	A axis coordinate	A360 (360degree)
X	X axis coordinate	X10 (10mm or 10inch)
Y	Y axis coordinate	Y10 (10mm or 10inch)
Z	Z axis coordinate	Z10 (10mm or 10inch)
I	X distance to center from current position in G02,G03	I10 (10mm distance from current position)
J	Y distance to center from current position in G02,G03	J10 (10mm distance from current position)
F	Feeding Speed in mm/min	F1800 (1800mm/min)
D	Diameter to calculate Feeding Speed of rotary axis(A axis)	D25.5
G00	Rapid Positioning	G00 X100.0 Y100.0 Z100.0
G01	Linear Cut	G01 X10.0 Y10.0 Z10.0 A360
G02	Arc in CW direction	G02 X10 Y10 I-5 J5
G03	Arc in CCW direction	G03 X10 Y10 I-5 J5
G04	Dwell	G04 X1
G20	Inch system selection	G20
G21	Millimeter system selection (Default).	G21
G28	Move to absolute position (in machine coordinate)	G28Z0.
G90	Absolute Coordinate to the machine origin (Default)	G90
G91	Relative Coordinate to the previous position	G91
M02 M30	Quit engraving and pull the vise out	M30
M03 M04	Spindle Rotation	M03
M05	Spindle Off	M05

Code Examples for Ring Engraving with Rotary axis

```
M03
G00 X0.00  Z15.95  A0.00
F1800 G01 X0.00  Z7.96  A0.00
G01 X0.00  Z7.96  A14.18 F1200
G01 X0.00  Z8.00  A14.31
G01 X0.00  Z8.03  A14.44
G01 X0.00  Z8.07  A14.57
G01 X0.00  Z8.10  A14.70
G01 X0.00  Z8.14  A14.83
……..
G01 X0.00  Z0.00  A0.00
M30
```

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