

# SUNMAX 40H

## Laser Engrave Machine

Operating manual  
Ver1.4E



**Automatic translation by Excite**

<http://www.excite.co.jp>

R S D co.,ltd.

# To use it safely

- Please read this book to use this product safely before using the product.
- Please put on hand to solve an uncertain point of the product at any time and use it in this product.
- In this book, to prevent the violation to harm and the property to the customer and other people beforehand, the alarm display of risky operation and handling is done by the following sign.

Please read the text in understanding the content well.



## Warning

It is written for the possibility that the user owes the death or the serious illness never to be assumed when handling is mistaken, and to have never to go.



## Attention

It is written for the occurrence only of be not assumed danger to which the user owes the trouble when handling is mistaken, not going, and the physical loss or damage to be assumed, and to have never to go.

### ■About the picture display

It divides by the following picture sign, and it explains the kind of the guarded content. Please read the text after understanding the content well.



This sign shows the act of not doing .  
(prohibition act)



This sign shows the prohibition in water the product getting wet.



This sign shows the resolution prohibition.



This sign shows the prohibition of touch to the product by a wet hand.



This sign shows that it is likely to explode.



This sign shows "There should be doing".



This sign shows that the power plug is pulled out from the outlet.

## ■Attention in installation



# Attention

Please set up this product in the following places.

- The horizontal, steady place
- Airy place
- Place of temperature 0~35°C and humidity 40~90%  
When there is no dew.

This product is made from a precise machine and electronic parts. °  
It causes the defective operation and the breakdown when setting it up in the following places, and avoid it absolutely, please. °

- Place where direct sunshine strikes
- Place where a lot of dust and dust exist
- Place where temperature change is extreme
- Place where humidity change is extreme
- Place with fire
- Place wet because of water easily
- Place with volatility material
- Place near air conditioning machine and tool
- Place with shake

• Please prevent static electricity being generated by using the electrostatic prevention mat etc. when using it in the place where static electricity is generated easily.

• Please do not set it up on a stand that is smaller than the bottom of this product. Impossible power is applied to an internal mechanism when putting it on a stand that is smaller than this machine bottom, and operation is influenced harmfully. Please set it up on in flat respect that is wider than the main body.



## Warning

Smoke doesn't rise, and a strange smell and the sound use it the abnormal do remainder.  
It causes the electric shock and a fire. Please cut the power on/off switch, pull out the power plug from the outlet at once, and consult the shop.  
It is not dangerous and never repair by the customer, please.



(other than being directed with manual) Please do not resolve and do not remodel it.  
It causes the injury and the electric shock and a fire.



Please use displayed power supply (AC100V).  
When power supplies other than 100V are used, this machine breaks down, and it causes a fire and the electric shock.



It is neither a wet hand nor a pulling out difference lion as for the power plug.  
It causes the electric shock.



Please do not use the damaged power supply code. .  
It causes the electric shock and a fire. The power supply code is not processed. The heavy one is not put in the power supply code. It doesn't torture, it twists, and it pulls it. It doesn't wire near the heat apparatus. Please defend the above. .



Please do not wire for the octopus foot of the power supply code.  
Heat is generated, and it causes a fire. Please take the power supply directly from domestic power supply outlet (AC100V).



Please note the handling of the power plug.  
When handling is mistaken, it causes a fire. Please defend the insertion of neither handling of the power plug nor the power plug with the foreign body such as dust adheres and the power plug more than surely inserting it up to the root of the blade. .



Please never open the protecting cover while sculpturing.  
The injury might be owed, and, in the worst case, it lose one's sight when the laser light beam strikes the skin and the eyeball. Please very note that handling is noted very, and not touched by the child etc. , and manage.



Please do not use it as it is when the liquids such as the foreign body and water enter the inside.  
It causes the electric shock and a fire. Please cut the power on/off switch, pull out the power plug from the outlet at once, and consult the shop.



Please do not use the metals such as clocks and rings acquiring it.  
It is likely to be radiated in the direction that reflects the laser light that hits the metal and is not intended.





## ■Attention on safety



# Attention

**Please let me circulate absolutely cooling water while sculpturing.**  
The laser tube might be damaged by the rise of the temperature. Moreover, please note that the water temperature doesn't rise when working continuously for a long time, and exchange cooling water when becoming a high temperature.



**Please carry carefully, and avoid vibrating when you transport this product.**  
Parts damaged easily are used. Please transport it carefully might influence the optical path system etc.



**Please clean this product regularly.**  
Please clean the worktable, the reflector, and the focus lens rail bearing regularly to obtain a steady performance.



**It is not a pulling out difference lion with there a power supply as for the power plug.**  
It causes the breakdown.



**Please do not set it up in an unstable place (shaking stand and inclining place).**  
It breaks down and it is likely to injure by falling, and falling.



**Please do not put it on the place where a lot of moistures and Cori exist.**  
The performance of this machine might not only decrease but also there is fear of the electric shock and a fire.



**Please do not close the airflow orifice of this product.**  
Heat shuts oneself up internally when the airflow orifice is closed, and there is fear of a fire.



**Please cut the power on/off switch for safety, and pull out the power plug from the outlet when you do not use it for a long term.**



**Please go after cutting the power on/off switch for safety when the customer exchanges the consumable parts etc. , and pulling out the power plug from the outlet.**  
We will recommend the exchange to be requested to the shop.



# 1 Overview

## ■ SUNMAX Laser Engrave machine



"SUNMAX" is a laser engrave machine that concentrates high technology over wide ranges such as a computer laser auto control systems and precision instruments and was manufactured. The sculpture of various designs can be given to various materials such as acrylic fiber ceramics plastics and woods by the personal computer in which Windows 2000/XP is installed with control software "

## ■ It is possible to use it in various fields.

This "SUNMAX laser engrave machine" can obtain a steady performance in a lot of fields such as marking, the art craft goods, and handmade craft goods to making and an electronic base of an advertising thing. Moreover, only because it is that the high energy laser light comes in contact with the material, marking and cutting into an impossible part are enabled to the bottom of the space with a narrow ultra thin material, thick material, and material with ruggedness in the equipment that uses a past processing blade.



### • Use example

#### 1. Stamp industry

Can it be appended to this product, and the rubber stamp and the infiltration sign be made with the special software that can work of design a design of a standard Japanese-aza and the alphabet and unique characters, and sculpture the character and the figure converted into BMP file to the surface of the material in the ruggedness.

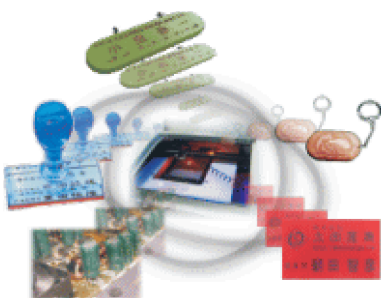
#### 2. Advertisement and decoration industry

Various crest, picture, and characters can be carved for the glass board, an acrylic board, wood, the cork, and paper, etc. , and the cutting character, the coaster, and the business card etc. of a nameplate, a commemoration escutcheon, a door plate, and an acrylic board make the product with which the originality overflows.

#### 3. Electronic industry

This product can ..precise line.. beautifully mark products such as a semiconductor parts and nonmetal electronic parts by using the laser light. A delicate cutting marking to a difficult, soft material and the material, etc. damaged easily is possible in the processing machine that uses the processing blade. Moreover, because the output can adjust a no stage, the precision instrument is not broken. A small amount is suitable for production.

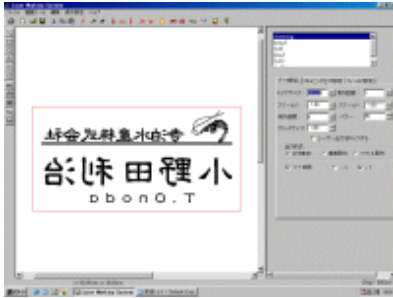
## ■ Sculpture to various materials



It is possible to sculpture to a lot of materials such as acrylic fiber ceramics plastics, woods, the rubber silicon anodized aluminum glass, leathers, paper, and the painted metals.

The flame goes up by high energy of the laser light when a combustible material is processed. It is necessary to spray air in the processing part so as not to damage non-processing part by the flame and to erase the flame. It is equipped with the putting out system that enables the processing to the material that burns easily by a full set of Sunmax.

## ■All in one software



The drawing function and the control facilities are built into special software "Laser Marking System" that the standard is appended to Sunmax.

All the laser engrave machines can be controlled from making the block copy by this "Laser Marking System" one.

A setting detailed in each object like the interval, the angle, and the size etc. of the character is possible.

It is also possible to draw in an arch character.

The product with which the originality or more overflows can be made if the data taken with the scanner and the data that the illustrator makes are converted into the black and white bit map file and it reads by "Laser Marking System".

The function to reverse a convenient character for the stamp making is built in.

Moreover, the scanning speed of the laser light and the setting of the processing area, etc. can be done with this software.

## 2 Structure of system

### ■ Composition of computer

The SUNMAX laser engrave machine does from the personal computer in which Windows is installed from making the block copy to the sculpture. (Use interface: Parallel port)

Recommended composition of the personal computer is as follows.



PC/AT compatible  
540MB of available hard disk space  
16MB of available memory (for SUNMAX)  
8MB of available memory (for LaserMarking System)  
Floppy Disk Drive  
CD-ROM Drive  
Laser Marking System  
XGA Color Display  
Mouse

### ■ Structure of SUNMAX

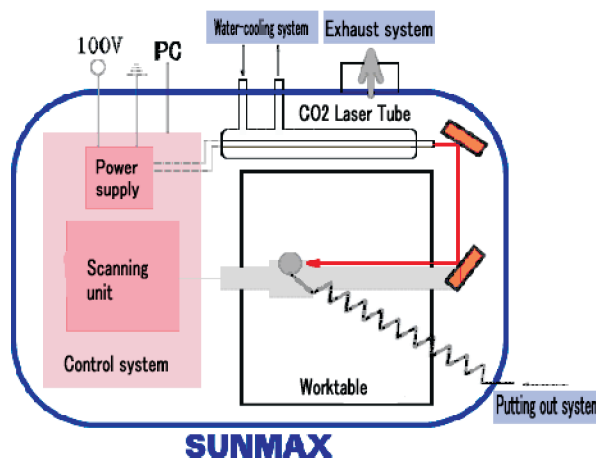
This SUNMAX laser sculpture machine can be divided roughly into two parts.  
The structure is as follows. ◦

Numerical control part

- Control System(Main board)
- Machine transmission system
- Worktable
- Exhaust system
- Optical system

Laser part

- Laser oscillation machine(CO2 laser tube)
- Power supply
- Water-cooling system
- Putting out system



# 3 Installation and adjustment

## 1. Laser sculpture machine and connection of computer

A parallel port is used for the connection of the computer and Sammax.  
The point of the cable is connected with a parallel port of the computer, and the rear end is connected with the socket of a parallel port of the laser sculpture machine.



## 2. Installation of exhaust system

The system that exhausts air with which the inside of the machine is dirty outside is installed.  
It connects in the exhaust opening of the main body and it connects it with an external fan through the exhaust pipe.



## 3. Installation of water-cooled system

The system to cool the laser tube is installed.  
The submerged pump is connected with the hose that connects the hose of the pump with launch entrance (COOL IN) of the sculpture machine, and connects the drain pipe with the connection and the launch entrance in outlet (COOL OUT), and water is poured in the laser tube.  
We will recommend cooling water to be used by 30 liters or more to keep the laser tube at the suitable temperature. Moreover, please the laser tube is not damaged, and substitute regularly, and keep cooling water clean.



#### 4. Installation of putting out system

The laser engrave machine burns the surface by appropriating big energy of the laser light beam to the engrave material. In that case, the flame goes up to the place where the laser light beam is hit.

The convex part that this flame beautifully engraved with great pains might be burnt together.

The putting out system is a system to erase this flame.

The air compressor is connected from the laser engrave machine with the putting out system tube that has gone out.

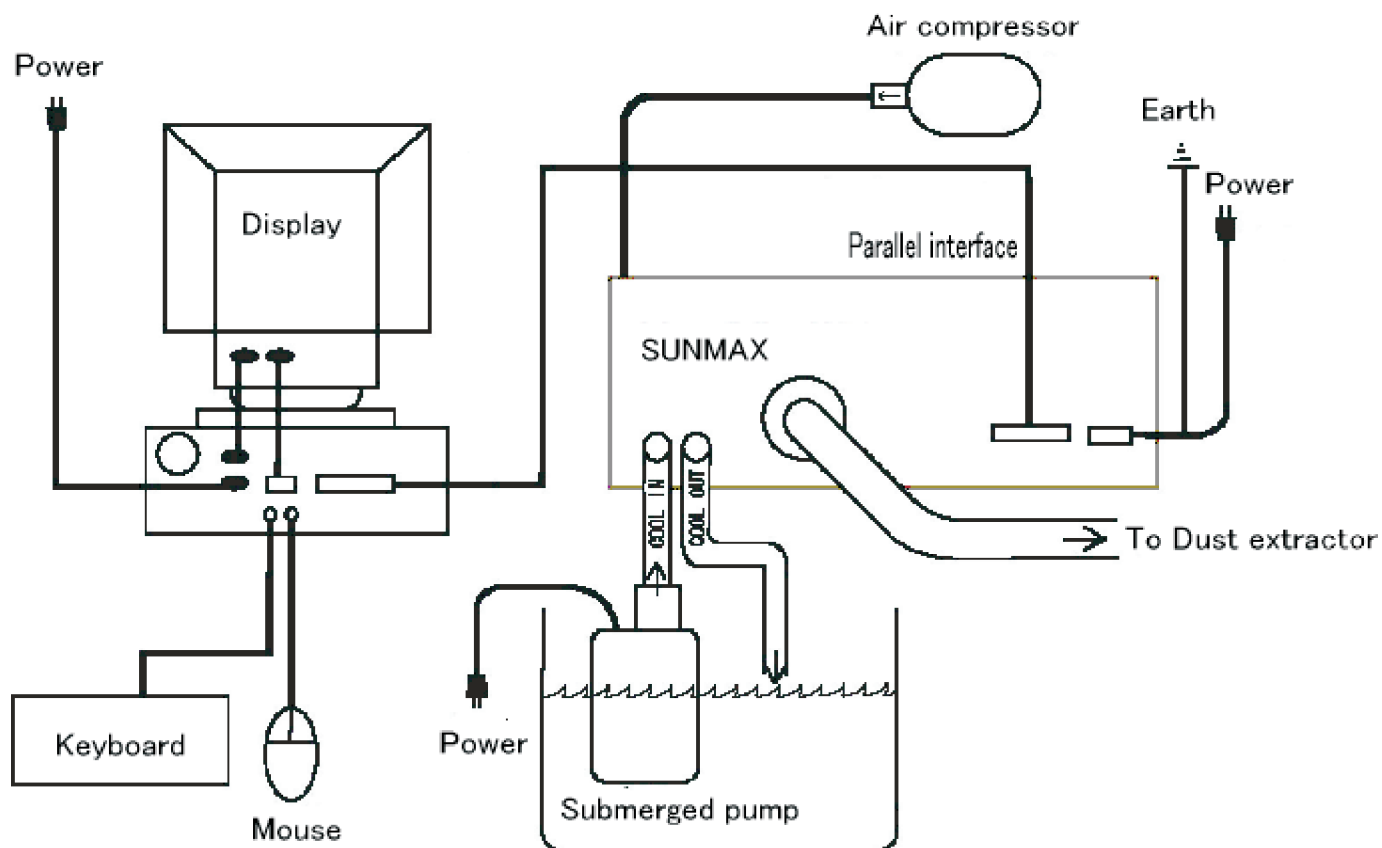


#### 5. Installation of earth cable

Equipment is prevented measuring with a tester etc. , grounding, and being damaged by static Electricity.

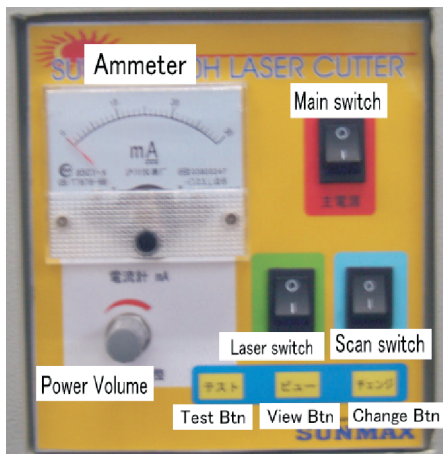
#### 6. Connect chart

Connect chart of the Sunmax laser engrave machine is shown.



## 7. Operation panel

The operation panel is a figure below.



《Control Panel》

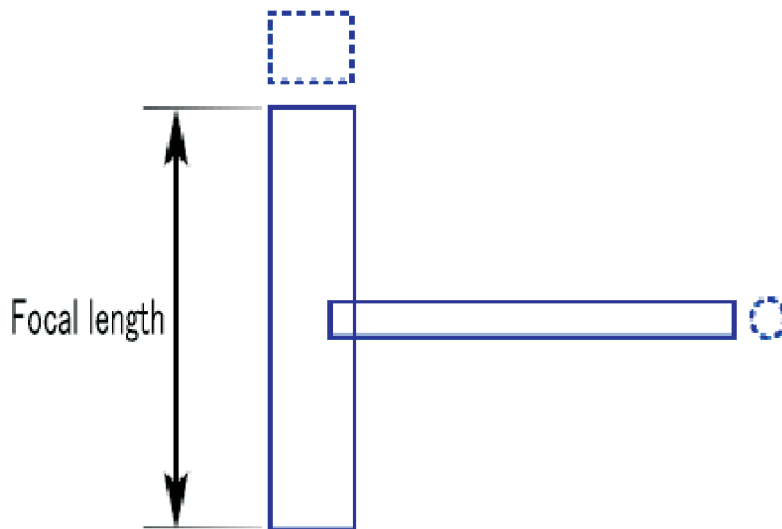
## 8. Inspection of laser part

The operation panel is operated according to the following procedures.

The master electrical switch is turned on.

The laser switch is turned on.

The screw in four places that supports the worktable is matched and the distance with the focus lens of a turning sculpture side and an optical cartridge is matched with T gauge of the main body attachment.



Please refer to Chapter 4 for a detailed setting method.

The laser test button is pushed, and the power adjustment switch is spent clockwise.

Laser light strong to turn the power adjustment switch to the right is launched.

To do round combustion on the sculpture side, it adjusts it. ]

The inspection and the adjustment of the laser part end by this.

The laser switch is turned off, and, next, the scanning part is inspected.



## 9. Inspection of scanning part

Operation is confirmed according to the following procedures.

Whether the computer and the laser sculpture machine are firmly connected with a parallel cable is confirmed.

The master electrical switch and the scanning switch are turned on.

To see and to confirm the movement of an optical cartridge, the protecting cover of the laser sculpture machine is opened.

It switches on a computer, and Windows is started. 。

Start command prompt (MS-DOS prompt), and input commands.

```
c:> copy con prn    <enter>
    pu5000, 5000    <enter>
    Ci500           <enter>
    Ctrl+z          <enter>
```

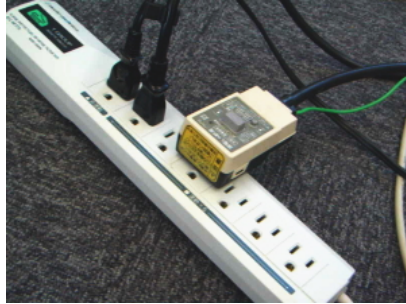
If an optical cartridge moves and a round orbit is drawn, the scanning part is working.

Turn off the main switch and the scanning switch.

# 4 System operation

## 1. System operation

Each code of a parallel of the computer power supply code, the laser engrave machine power supply code, the pump power supply code, the exhaust gas system power supply code, and the computer and the laser sculpture machine cable is connected.



Whether the cooling system, the putting out system, and the exhaust system work normally is checked. Especially, please never make the sculpture machine work when abnormality is found in the cooling system. The laser tube is damaged by the rise in heat of the laser tube.



Focul of laser light

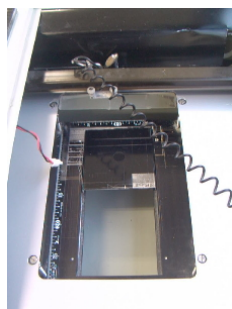


The thickness and the size of the line or the point that the laser light beam sculptures according to the distance of the lens and the sculpture material are different. The focal of the laser light beam is important to achieve an appropriate sculpture. The method is as follows.

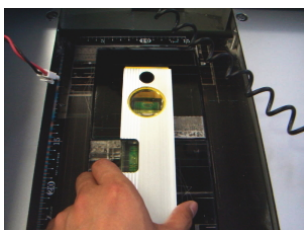
1. It is confirmed to turn off the power supply of the sculpture machine, and removes the protecting cover.
2. A fixed bolt in the four corners of the worktable is loosened.
3. Four fixed screws are turned so that the distance of the sculpture material and the focus lens may become about 52mm, and the height of the worktable is adjusted. About 1mm worktable moves up and down when the screw is made by one rotation.
4. It is confirmed that the horizontal measurement level is used and the worktable is the horizontal.
5. A fixed bolt is tightened at the end, and the worktable is fixed completely.



1. Remove the protect cover



2. Loosens bolts.



4 Check horizontal.



5. Tighten bolts.



3. The height of the worktable is suited.

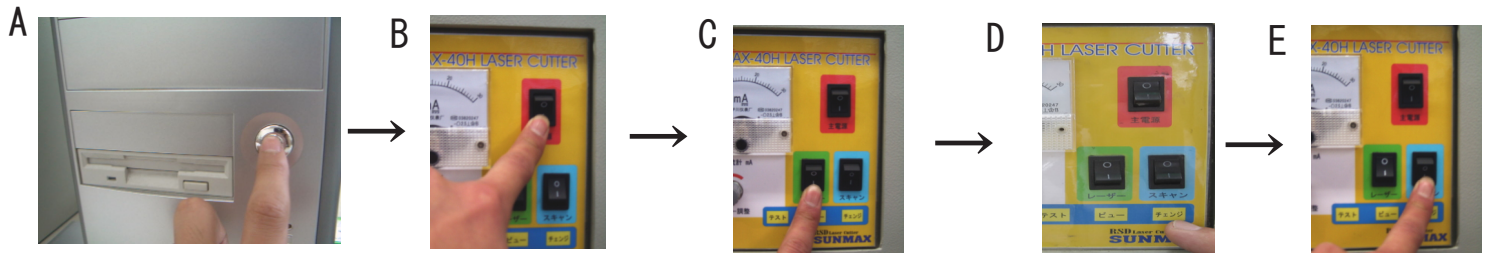
#### 4- 1 Scanning mode

A Turn on PC → go to in this page. After making design → B turn on main switch → C turn on laser switch → E turn on scan switch → go to in this page.

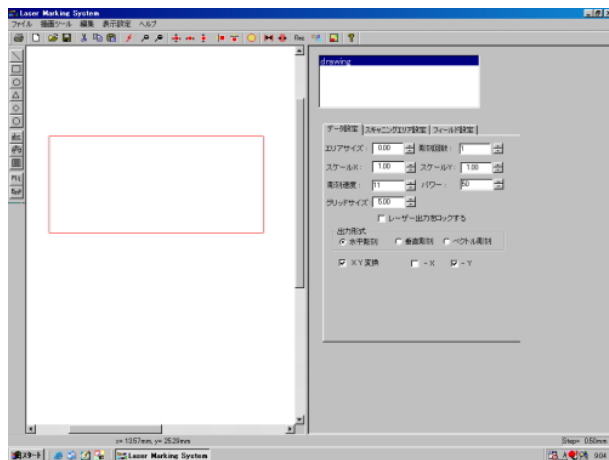
#### 4- 2 Outline mode

A Turn on PC → go to in this page. After making design → B turn on main switch → C turn on laser switch → D push change button → E turn on scan switch → go to in this page.

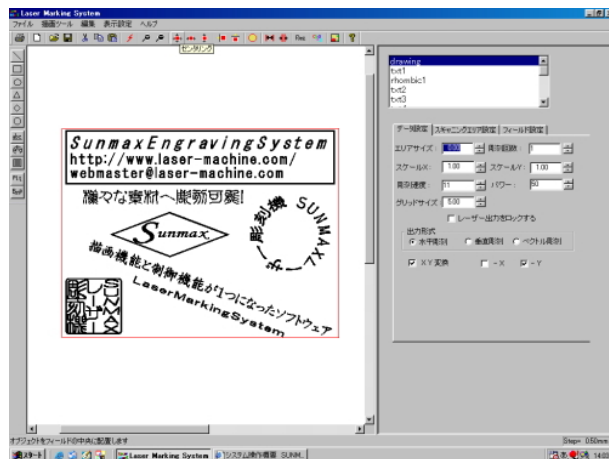
★ The outline mode becomes possible by pushing the change button.



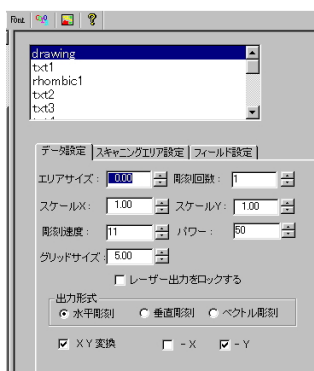
Start Laser Marking System.



The character and the figure are made by using LaserMarkingSystem. Please refer to the manual of Laser Marking System for details.



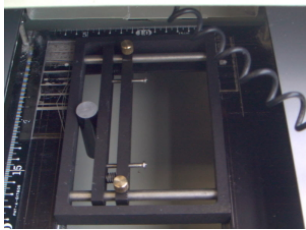
Setting Refer to on this page, and the power supply of the mainbody is turned on. The position, the speed of the plotter, and the scanning area, etc. where the sculpture begins are set with LaserMarkingSystem. Please refer to the manual of Laser Marking System for details.



Power adjustment  
By power volume, the output of the laser light is adjusted.



It sets it up so that may the sculpture material may be fixed to the fastening device (Fixed power is moderately adjusted with a fixed screw on the back of the fastening device), the surface of the sculpture material and the surface of the fastening device be kept the horizontal, and the sculpture material may come on the left of a fixed stand the adjustment catch. Monotony is set up in the worktable instead of the adjustment catch, and it fixes when sculpturing to a flat thing so that the sculpture material should not move monotonously in the sculpture material with a cellophane adhesive tape etc.



Close the protect cover.  
Please shut protecting cover to prevent an unexpected accident by the laser light beam while sculpturing.



It operates automatically until the scanning output is automatically done when the start engrave button is clicked of Laser Marking System, and the sculpture ends.

Protecting cover is taken out after it is confirmed that the sculpture work ended and the open sculpture material is taken out. Each power supply of the computer, the laser sculpture machine, the water-cooling system, and the exhaust system is turned off. The parts such as the rail, pulleys, and the focus lenses are cleaned, and protecting cover is shut.

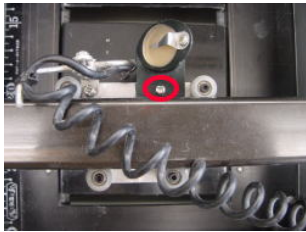
# 5 Routine maintenance

Please work after confirming there is no power supply.

## 1. Cleaning of optical unit

An optical unit is composed of the main body, the lens, and the reflector.

Lenses are parts of Atsmahica important as for the laser light beam. When dirt adheres, it is not possible to sculpture by an enough output. It is always important to keep no Joutai of dirt. The machine screw in the red circle of the photograph in the under part is removed, and an optical unit is removed.



The dirt of the red circle of the photograph in the under part flies by spraying air. Please do not damage the lens.



Please clean the reflector in the upper part of an optical unit, too. (Red circle of photograph in the under part)  
Please do not damage the reflector when you clean it.



Please clean it detaching it from the main body when the dirt of the lens and the reflector is awful. The lens comes off when the lens holder is anti-clockwise turned. It installs it in order of main body → O-ring → lens → lens holder. It is in the lens for the installation. Please install it so that flat one may come to the outside.



The reflector can be removed by loosening the machine screw in the upper part of the main body.

It is in the reflector for the installation. Please install it so that respect that is the mirror may come to the main body side.



## 2. Cleaning of Mirrors

There are two reflectors to lead the laser light beam to an optical unit. (Red circle of photograph in the under part)  
Air is sprayed, and dirt flies. 。  
Please do not damage the reflector when you clean it. 。



## 3. Cleaning of rail

The rail where an optical unit is installed flies to make an optical unit work smoothly, and air is sprayed, and dirt flies.



## 4. Cleaning of worktable

Please inhale with the cleaner etc. , and remove the dust collected in the worktable.  
The dirt that adheres to the worktable with a dustcloth etc. is beautifully wiped off.

## 5. Exchange of cooling water

Please exchange the cooling water to cool the laser tube regularly. The laser tube is damaged when dirty cooling water is used, and it might be damaged. Moreover, please take care about the water temperature when using it for a long time, and exchange it at once when becoming a high temperature.