



**By: Automation Maker (HK) Ltd.**

## **CNC LASER MANUAL**

**V. 4**

## SAFETY RULES

### **Must observe safe matters needing attention - warning**

1. carbon dioxide lasers itself is a black light, when processes sends out the fire then mostly is the laser processing sends out, because blind carbon dioxide laser, therefore please specially pays attention to the laser the way, the scope has the extremely high risk nearby the way. Absolutely may not expose bodily any spot under the laser, otherwise can cause the serious damage to the body. Nearby the equipment strictly prohibits the laying aside being flammable explosive.
2. The electric current supply must stabilize, also conforms to the machine electric power demand, and installs the safety switch, avoids the electric power overloading, all power sources must earth.
3. Do not use the metal which this laser machining can reflect, to the high temperature responded the keen material or any can produce the virulent material, for example: PVC and hard not dragon(Teflon), AB8, Pc and so on, in order to avoid creates to the machine and personnel's injury.
4. Any time, on hand best prepares the proper electric appliance special-purpose fire extinguisher, the recommendation standing-by carbon dioxide (dry ice) the fire extinguisher. Simultaneously reminds you, please note maintains the fire extinguisher in the term of validity.
5. When laser machine work, the operator must defend in the side value, and pays attention to the machine work condition as necessary, does not have arbitrarily to leave the job site, guards against the accident or the fire occurrence. .
6. Has not passed through our company has trained the operator not to have to operate the machine. From this any damage which will create, our company will not undertake the responsibility.
7. Thunders with the lightning when does not want on the air, should close the power source.

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## ONE. Foreword

● Extremely thank you to purchase uses CNC lasers .

※In order to guarantee this product to be able the long-term normal work, brings the biggest benefit for you, please before use, earnestly reads the textbook handbook by all means must

※Because unceasingly improves and the consummation, this handbook content and equipment parameter if have instable,  
Even slightly not separate informs, the factory has the finally explanation power

※If the equipment work is unusual, after when the reading user's manual cannot solve, please prompt relation seller or factory

※Please properly takes care of this handbook, forbids to it completely either the partial illegal photocopying or the dissemination

## TWO. Working conditions request

- 1: Avoids the laser carving cutter installment to the high temperature, high humidity and dust very many places. To is please clean the laser carving machine installment, ventilates good, room temperature approximately 0 °C – 45 °C, also relative humidity approximately 5%–95% environment. If installs the region the temperature front, the humidity condition is unable to tally states the condition, suggested installs the air conditioner or eliminates wet machine improves the environment the temperature, the humidity.
- 2: The laser carving cutter installment the place which inclines to the ground, the working space floor do not have to be steady, the level, cannot vibrate.
- 3: The laser carving cutter do not have to be away from the computer too far, the holding wire should better be in 3 meters, guarantees the data transmission to be reliable and the stability.
- 4: The drawing fan do not have to be away from to the laser machine too far, in order to avoid reduces the exhaust effect. At the same time, overbending avoids the pipeline because of affecting the exhaust effect. The suggestion, the exhaust pipe should better be in 2 meters, because, the length doubles, the drawing fan exhaust effect possibly changes the difference.
- 5: If because of the working conditions factor, must the auxiliary equipment for example: The air blower, the air pump, the cooling water, places to outside, also must pay attention guards against laser to expose to the sun, the rain drenches, guards against flooded. The attention ventilates good. With environmental protection question. If must have to pay attention for auxiliary equipment dot sound-insulated processing ventilates, the equipment radiates the question and will maintain the convenience not to be possible in the future completely to seal the equipment.
- 6: Cooling water temperature approximately 5 °C – 30 °C, when the cooling water temperature is bigger than the permissible value, the laser energy efficiency can rapidly drop, when the cooling water water temperature is smaller than the permissible value, can cause in the laser water to ice up, causes to stir up the fluorescent tube to burst.
- 7: Electric power supply: The power line voltage undulation, can cause the equipment work not to be unstable, the voltage to high can cause the equipment electrical power system damage. The suggestion user installs above 2,000 W the power source manostat.

## THREE. Product characteristic and applicable scope

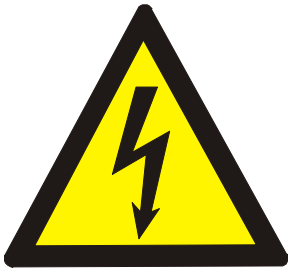
### 1 : Product characteristic

- 【1】 Has the high energy using the laser beam the characteristic, does not have the contact fast sculpture in the work piece surface to leave has the certain depth the writing and the design.
- 【2】 Uses the high performance optics part, the adjustment quickly, the processing width is big.
- 【3】 Uses the differential processor and the balanced straight line guiderail, the carving speed quick, the precision is high.
- 【4】 Newest CAD, CAM and each kind of graph processing software seamless docking and so on software support and AutoCAD, CorelDraw, direct original map output. Industry in first uses the USB data connection, supports hotly inserts pulls out, the data transmission instantaneous completes, when carving does not take the computer resources, greatly enhances the user working efficiency.

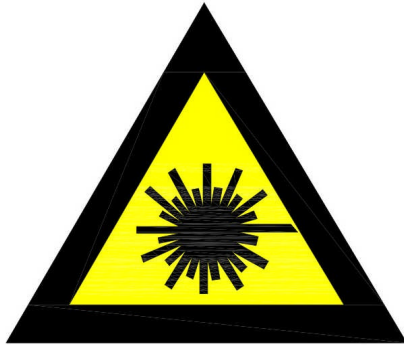
### 2: Applicable scope

This series laser carving cutter is suitable for the rubber, the plastic, the plexiglass, the lumber, the cotton material, the cardboard, the fire wall, the imitation leather, the leather and so on each kind of nonmetallic material carving and cuts. Mainly applies to the handicraft, the advertisement, the ornament, the template, the seal, profession and so on packing printing. Makes lithograph plates the domain in paper box printing, regarding no matter what the intention article may perfectly output on the inexpensive rubber plate, can compare favorably with the expensive flexible version, may be called the profession road to elect! Is pressing the gram force craft processing domain, by the essence, the surface is smooth, receives the general import-export trade partner the high praise!

## FOUR. Safety warning and symbol



This symbol means when connect the power,  
do not open this section or will be got electric shock



This symbol means when laser machine work,  
pay attention to laser refraction direction please,  
do not approach

**WARNING**

1.The laser device is easy to cause material burning.When laser machine work,  
the operator must on duty.

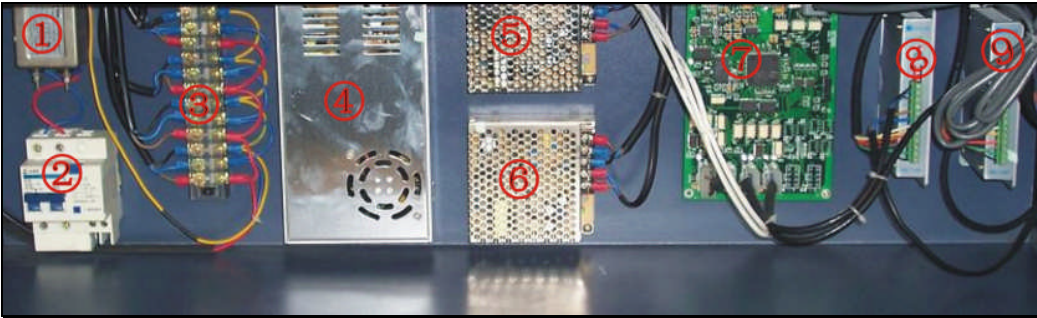
2.When laser machine work,Please inspect the current of water whether maintains  
unimpededly,please maintain the water below 25℃.

3.Order to prevent the accident occurs in work,Please close the cruse of machine.

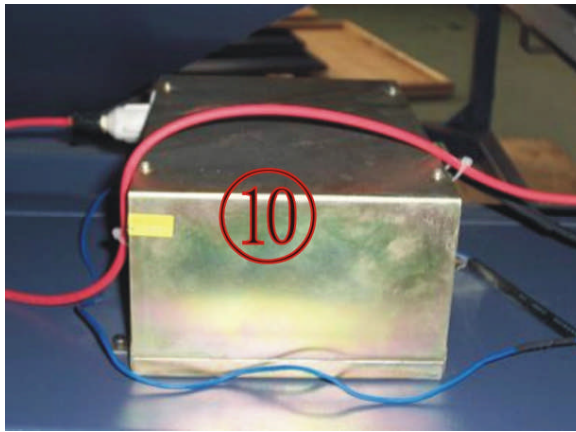
Baisheng Laser Device Company

This symbol means when laser machine work,  
without fail according to this matter,  
the item handles


## FIVE. Laser machine electric circuit partial schematic drawings

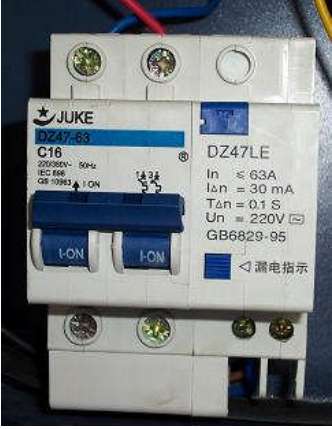
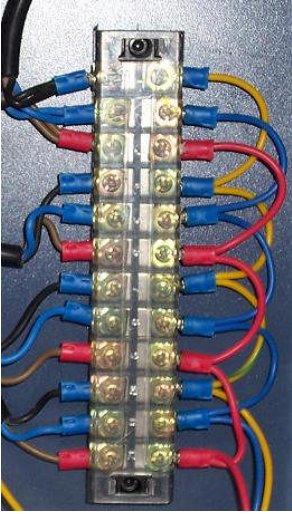



Left side

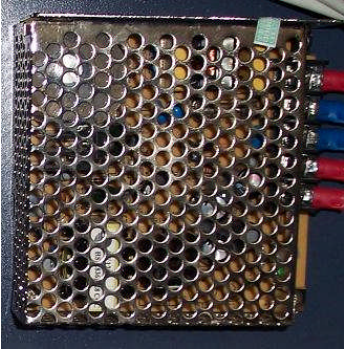
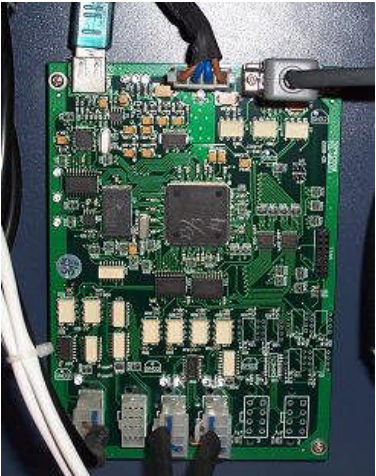

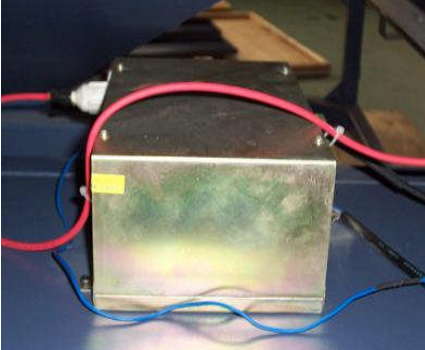


Right side

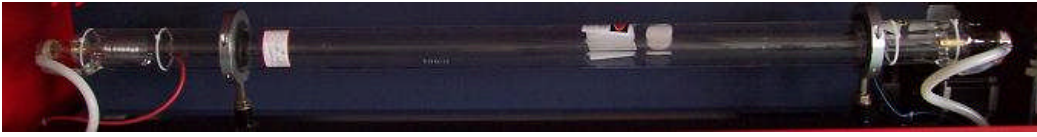
Serial number	part	function
1	 Filter	Filters the electric current the wave ridge and the trough, Guaranteed the machine work is not affected

2	 <p>Safety switch</p>	Protects the machine
3	 <p>Parting line block</p>	Will come in the alternating current to divide into 5 group parallelelectricity, separately to each electronic period power supply
4	 <p>36V switching power supply</p>	Transforms 36V DC 220V AC, supplies for the driver

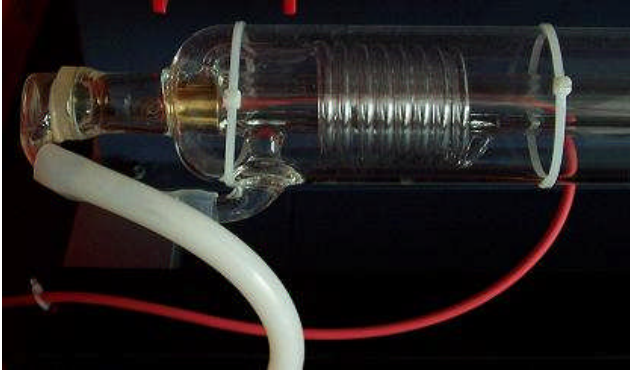
# SALECNC Laser carving cutter user's manual

5, 6	 <p>5V switching power supply</p>	Transforms 5V DC 220V AC, supplies for the Motherboard
7	 <p>Machine motherboard</p>	Controls the machine the operation
8, 9	 <p>Driver</p>	Controls the electrical machinery the work
10	 <p>Lase rpower source</p>	Transforms 220V AC for the laser tube work direct current, withcontrol laser tube work

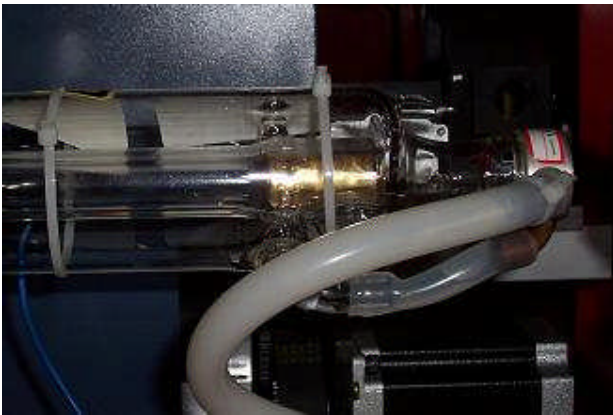
## Laser tube connection schematic drawing



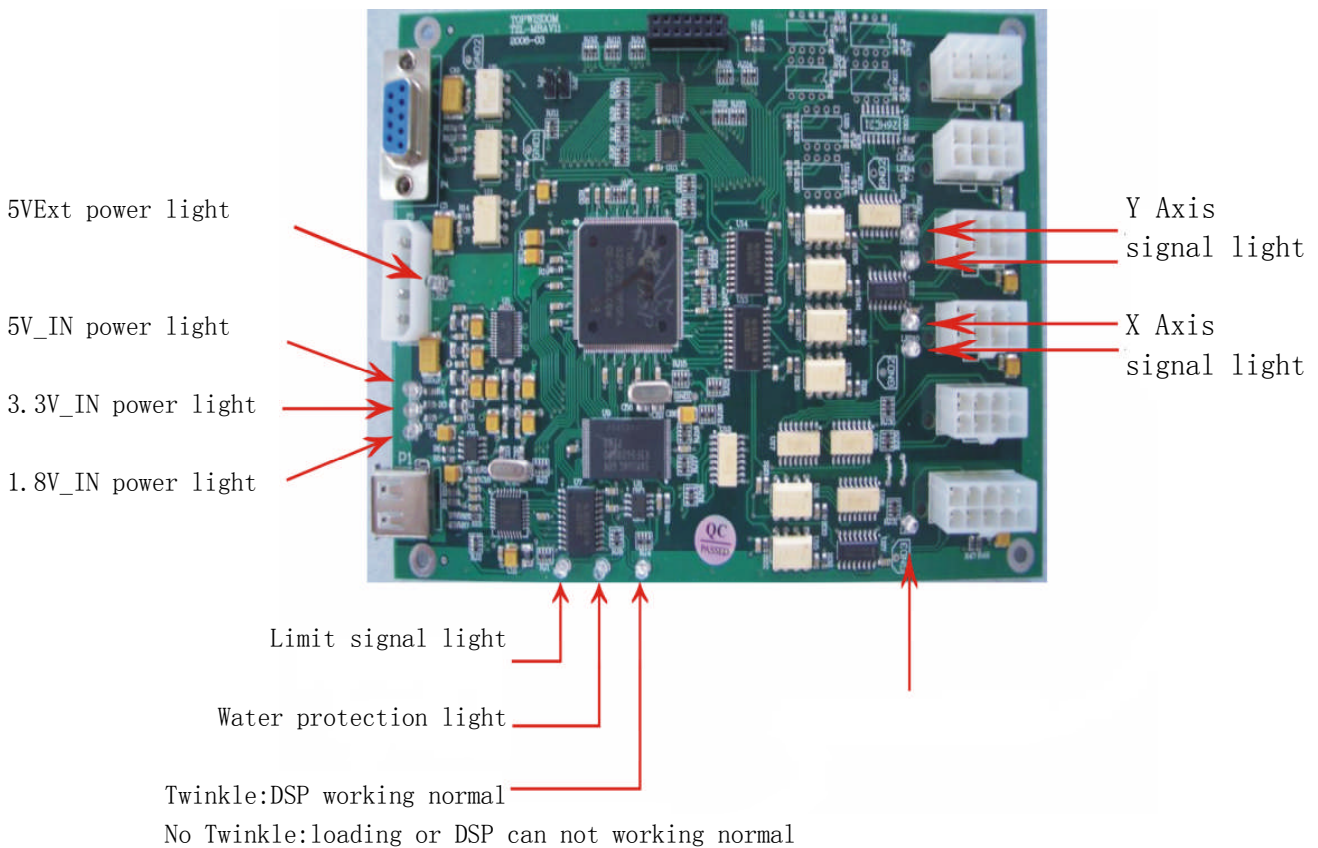
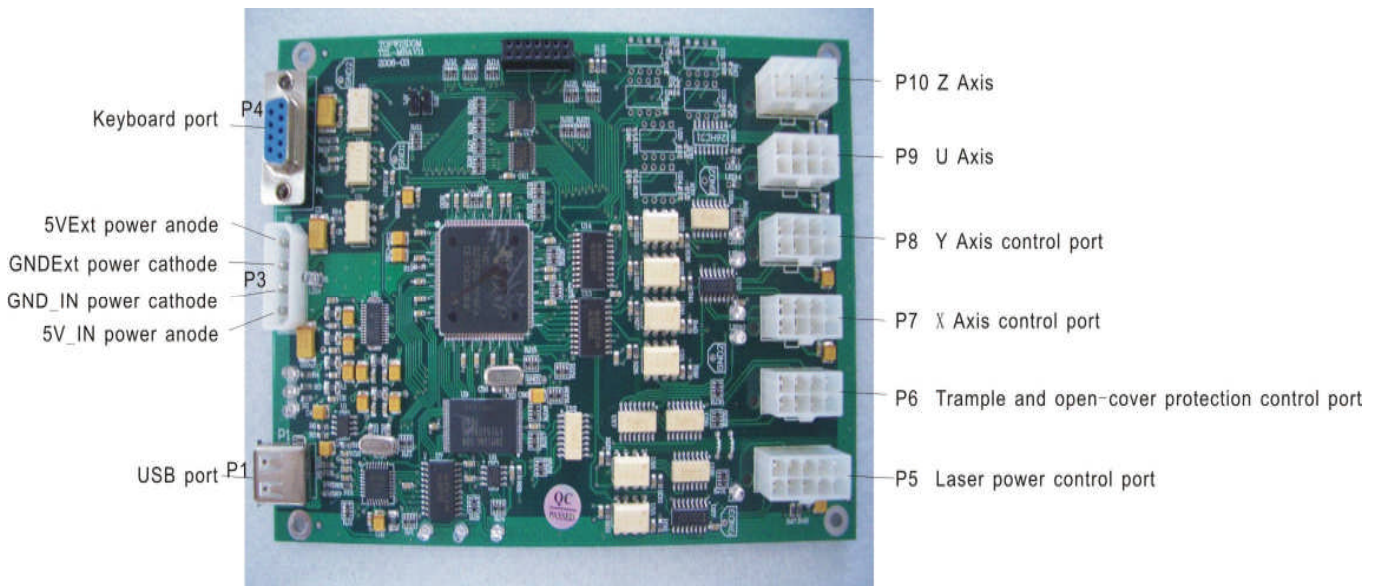
Left side:



Right side:



## Introduction on interfaces



## SIX. User manual

- (1) Connects the laser machine system
- (2) Inserts the laser machine power source, turns on the switch, this timecontrols the power source signal light to be bright, stirs up the baldreplacement.
- (3) Turns on the computer the editor to have to carve on the computer cutsthe content.
- (4) The inspection stirs up the laser tube whether has the water toflow, whether the air pump does flush air.
- ( 5 ) The above-below direction key will stir up the work piece positionthrough the kneading board about which baldly will transfer to needsto carve.
- (6) The inspection work piece with stirs up the bald distance, whether isequal to the focal distance value.
- (7) Establishes the good processing parameter in software, afterdetermined transmits the data.
- (8) Clicks on in the computer the carving either cuts starts to work or on the machine directly according to the repetition.

## I. Explain to keystroke of engraving /cutting control system



- 1、"E-stop "key: No matter machine in which state, pressing this key it will enter the status of restoring, then go back to "anchor point"
- 2、"Menu" key: Machine uses when off-line. It can take the document from the motherboard memory to be separated from PC machine alone to operate.
- 3、"ESC" key: Define key, equal cancelling operation.
- 4、"Pulse"key: use in testing, press once then shine one time. Using in testing the path of rays adjustment.
- 5、"Enter"key: Define key, agree current operation
- 6、"Speed"key: you may use the key "←" "→" "↑" "↓" to change the working speed when machine off-line. "←" or "→" mean defering to 10 units increase or the abatement. "↑" or "↓" mean defering to 1 unit the increase or the abatement. Adjust from 0 to 100.
- 7、"Min power"key: machine can pre- light smallest laser, use "←" "→" "↑" "↓" key to adjust from 0 to 100.
- 8、" Max power" : machine can respond the biggest laser, use "←" "→" "↑" "↓" key to adjust from 0 to 100.
- 9、"Repeat"key: It can repeated carry out the last operation. It can operate origin place or other place, press once then repeated carries out one time.
- 10、"Start/Pause"key: May realize stopping or the continuation when machine in movement, if you haven' t pressed down the "origin" key but just remove X or Y axis a short place, and press this key again, it can return to the original position and continue to carry out the

surplus instruction.

- 11、"Origin"key: use to setting the initial position of machine movement.  
"origin" may choose voluntarily in the machine setting parameter software. selecting "the mechanical zero point", when you press "E-stop" key, machine will return to the mechanical zero point of the machine. The coordinates is "0, 0" .if you select "return point" ,then after you press "E-stop", machine will return to current coordinate of last time operation.
- 12、"↑"key:as waiting status,It means moving up.  
"↓"key:as waiting status,it means moving down.  
"←"key:as waiting status,it means moving left.  
"→"key:as waiting status,it means moving right.

## warning:

Before the use please carefully reads the textbook handbook, if because when operates Causes the breakdown or the accident, should by the user from the load responsibility!

## II.Path of rays structure and adjustment method

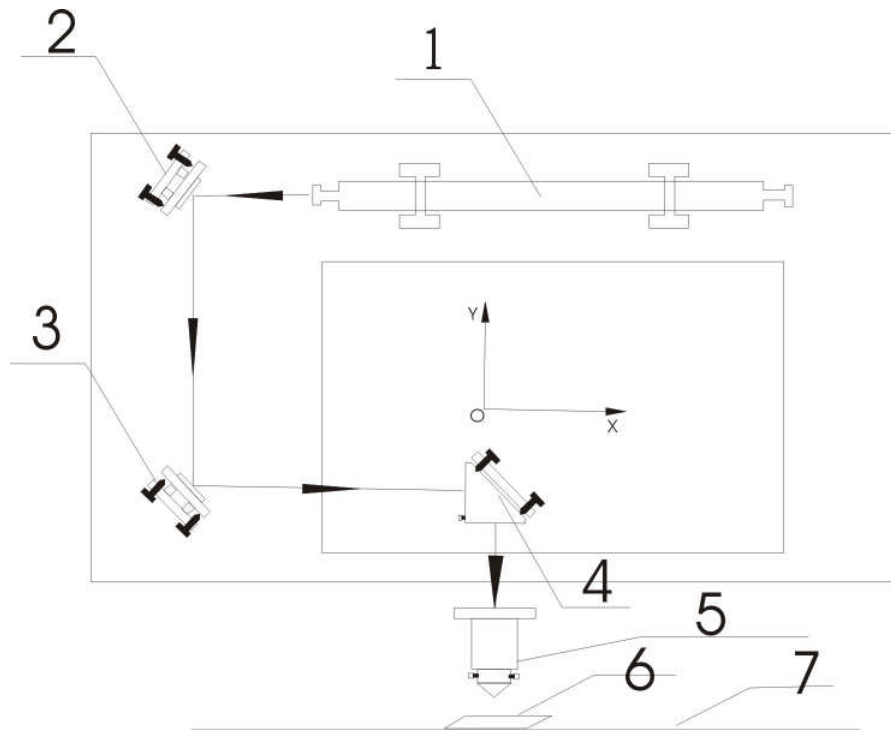
### 1.Focuses the mirror the installment and the adjustment

In stirrs up baldly lower part installs focuses the mirror, after works period of time, focuses on the mirror to be able to have the sundry goods, should promptly clean up, otherwise can affect the carving depth and the effect. If the air pump or the drawing fan work is not good time, must service or the replacement immediately, the mist and dust which when carves cuts produces not to be able to obtain promptly removes, will be able to damage the focusing mirror. When cleaning up should the closing machine power failure, capture the trachea in turn, turns on lathe

Next air outlet and focusing mirror, if the discovery focusing mirror bursts or on the coating level has the big area to draw back the membrane, needs to replace the focusing mirror.

(Behind in detail please look at the maintenance and the maintenance)

### Path of rays system structure



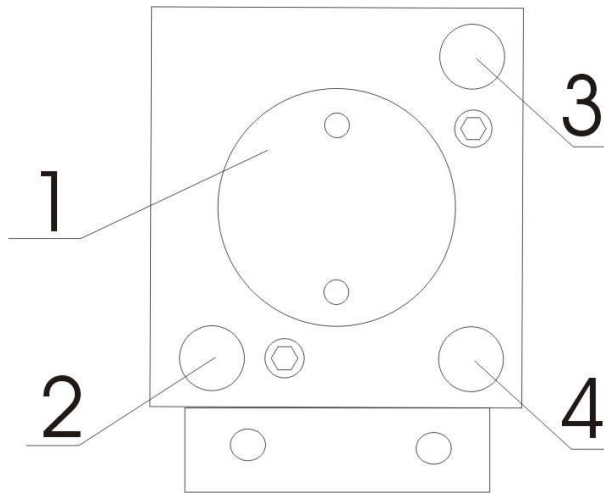
Reflection laser system plane schematic drawing

- |                                  |                                |                                 |
|----------------------------------|--------------------------------|---------------------------------|
| 1.Laser                          | 2.Reflects the mirror holder I | 3.Reflects the mirror holder II |
| 4.Reflects the mirror holder III | 5.Focuses the mirror           |                                 |
| 6.Processing work piece          | 7.Working platform             |                                 |

### 2.Path of rays adjustment and part installment

Explained: The path of rays is the laser reflecting system, hundredabundant lasers carving cutter uses the light the straight line dissemination principle. The complete path of rays by stirs up the fluorescent tube, reflects the mirror holder ( I 、 II 、 III )、 The condensing lens and the corresponding adjusting device composition, is the laser carves the cutter the core to be partial. The path of rays adjusts the quality directly relates the carving with to cut the effect, therefore wants the patience carefully to carry on the adjustment.

①、 Reflects the mirror holder I



Reflects the mirror holder I, s Back schematic drawing

1.Reflector locking piece

2.Adjusting screw A

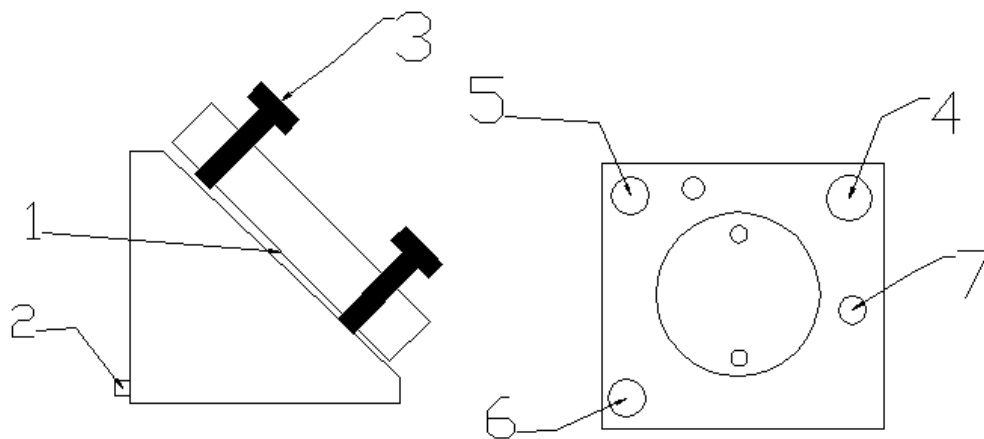
3.Adjusting screw B

4.Adjusting screw C

②、 Reflects the mirror holder II

The Structure of Reflects the mirror holder II and Reflects the mirror holder I Is basically same.

③、 Reflects the mirror holder III



Reflects the mirror holder III, s Back schematic drawing

1.Reflection lens

2.Tight lock screw

3.Adjusting screw

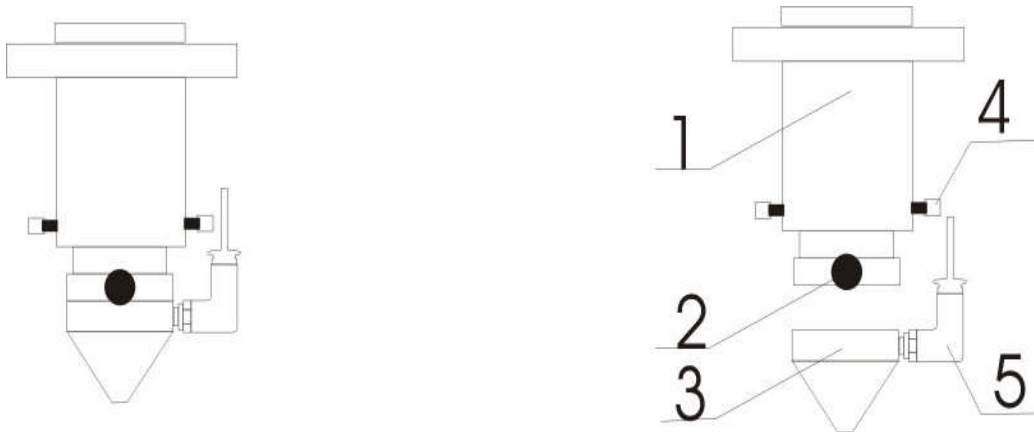
4.Adjusting screw A

5.Adjusting screw B

6.Adjusting screw C

7.Adjustment lock screw

④Focuses the mirror



Condensing lens structure schematic drawing

- |                                 |                                     |
|---------------------------------|-------------------------------------|
| 1. Focusing mirror outer sleeve | 2. Air faucet tightening up screw   |
| 3. Air faucet                   | 4. Outer sleeve tightening up screw |
|                                 | 5. Air feeder                       |

### 3. Reflector installment

In the carving machine altogether has three reflectors, separately is located the laser crown, left side of X axis guide rail and the laser leave the light mouth. The laser sends out the laser is passes through these three reflectors to arrive focuses the mirror. If the reflector appears bursts or seriously draws back the membrane, can cause the path of rays to occur deflects and even is unable to adjust, by now needed to replace the reflector.

### 4. Adjusts the path of rays

Each reflection has 45 angles with the light, according to stirs up the fluorescent tube to leave the reflector which the light meets successively to divide into I, II, III reflection mirror holder.

The reflection mirror holder I accent light is not very important, so long as projected on the lens the central committee to be allowed.

The reflection mirror holder II adjustment is through reflection mirror holder I behind three reflectors adjusting screw A, B, C and left side of X axis guide rail 4 copper screw. The adjustment reflection mirror holder I behind three reflectors adjusting screw expansion and contraction condition may realize path of rays about and about the direction deflection achieves the adjustment identical spot the goal. (The adjusting screw A expansion and contraction condition is adjust the light about to move, the adjusting screw B expansion and contraction condition is adjusts the light the drift angle migration, the adjusting screw C expansion and contraction condition is adjust the light reciprocating.) The light modulator puts when the reflection mirror holder on II, first must in a Y axis furnishing straight line, move through guiderail around, the light should hit on the identical spot (Does not care about is in the light modulator central point). Again through X axis guide rail left side of 2, 4 copper screw expansion and contraction condition may control motion and 3 copper screw may adjust the light about. (After the basically our machine all is adjusts the test to deliver goods, does not need the too big adjustment, so long as carried on the trimming to be allowed).

The reflection mirror holder III adjustment is through reflection mirror holder II behind three reflectors adjusting screw 2, 3, 4 and left side of X axis guide rail 5 copper screw. The principle and adjusts the 2nd reflector is same. After a furnishing straight line, should move to the entire platform four quoins polishes. Also should on the identical spot be precise. Stirs up the bald path of rays adjustment is through the reflection mirror holder III behind three reflectors adjusting screw 4, 5, 6adjusts. Here need specialist or the company has trained the operator adjusts. Is in stirs up bald under with the white paper to press with the finger, after appears the round spot to transfer to again the finger nearby two, again leaves the light (white paper surely not to be able to move). Sees the luminous spot is the round center. Because stirs up the bald hole quite to be small, the possible light to project on stirs up the bald endophragm cannot see the facula, when the necessity must urge to be mad takes moves again. But surely must pay attention to the security, careful finger!

### ★ Attention:

Above works, the operator must operate under the specialist or the factory instruction, when adjustment must pay attention to the security, prevents the laser radiation.

## IV. Software Installation

### 1. AutoCAD

#### Chapter One: Foreword

The Electron Technology CO.Ltd is engaged in the laser carving control system, the laser marking machine control system, Embroidery machine electrically controlled system, Electrical machinery driver, image recognized system and so on multi- domains high tech enterprise in Guangzhou city.

Our software has many types, The second chapter introduction is the AutoCAD direct output software, After installed our software, You can see our control software menu directly appeared in AutoCAD, Like this we organic fuse with the CAD system together, Because it has effective used the CAD formidable edition function, in order to use the CAD function oneself, Therefore the function is formidable, Also as a result of graph edition, Parameter setting, As well as transmit data to the control card and so on all operations all complete on AutoCAD, But does not need save the document other place, in addition uses the software to carry on the operation, Therefore very easy in the application ,Thus occupies the leading level in the present similar industry.

#### Chapter Two: AutoCAD directly output software

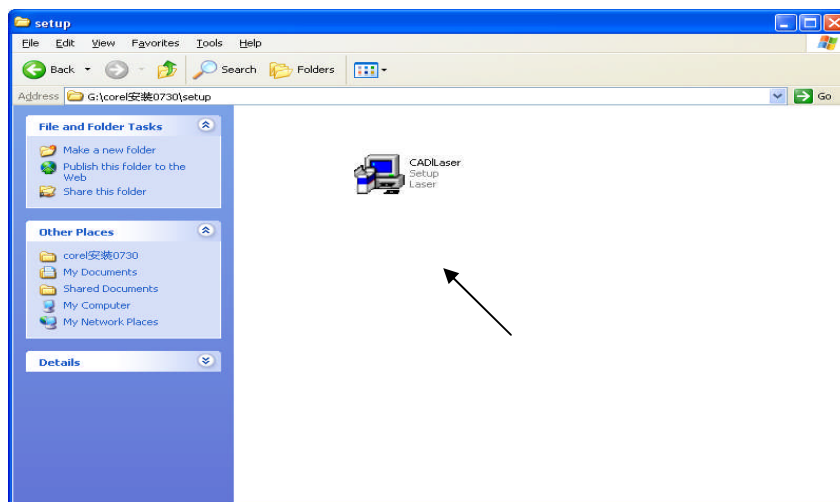
In order to the user convenient use, reduces the sequence of operation, Top wisdom technology company has carefully developed directly output carving control software based on AUTOCAD. The characteristic of software is the operation simple, flexible, usable, below will introduce the software installment and application method to the user.

Working flat roof: Windows98、Windows ME 、Windows NT4、Windows 2000、Windows XP,request above ie6.0 and Windows 2000 SP4.

#### Chapter Three: Install AUTOCAD directly output system

Before installing this system, please install AutoCAD correctly.

Detailed installation of AutoCAD is passed over here. One point that we need to emphasize is that when installing AutoCAD, the VBA support must be installed, other wise this system cannot run.



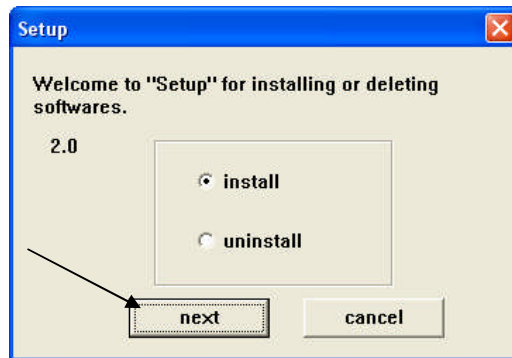
F2-1

Copy the folder with containing all files shown in figure F2-1 to the computer (HD D, for

instance).

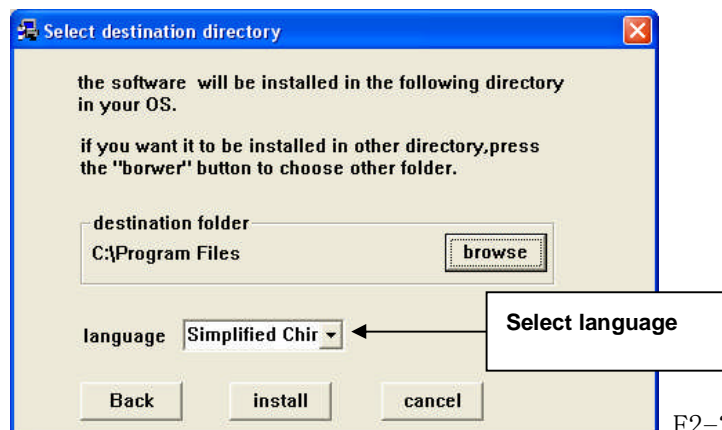


Double click on the installation icon as shown in figure F2-1 to start the installation, and then the menu shown in figure F2-2 will appear:



F2-2

Select “install”, click on “next” in figure F8-2-2 for the next step, and the menu shown in figure F2-3 will appear:



F2-3

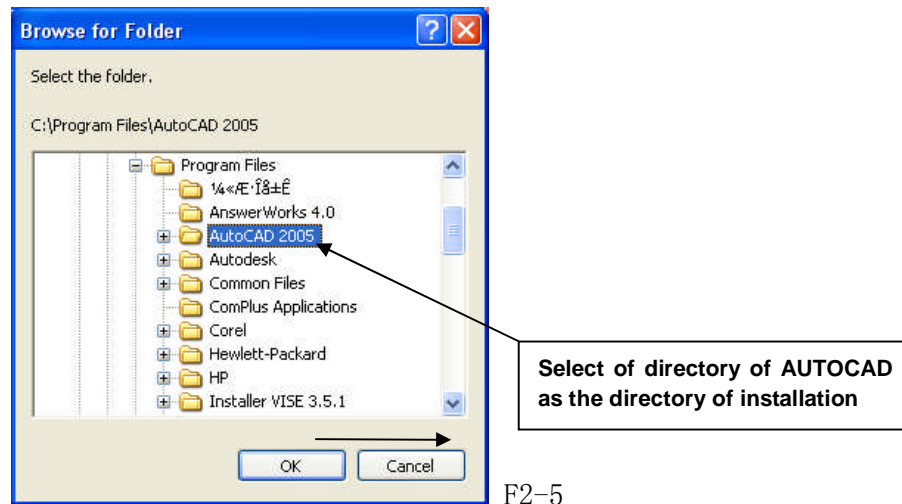
Select language from the pull-down box in the menu shown in figure F8-3, as shown in figure F2-4:



F2-4

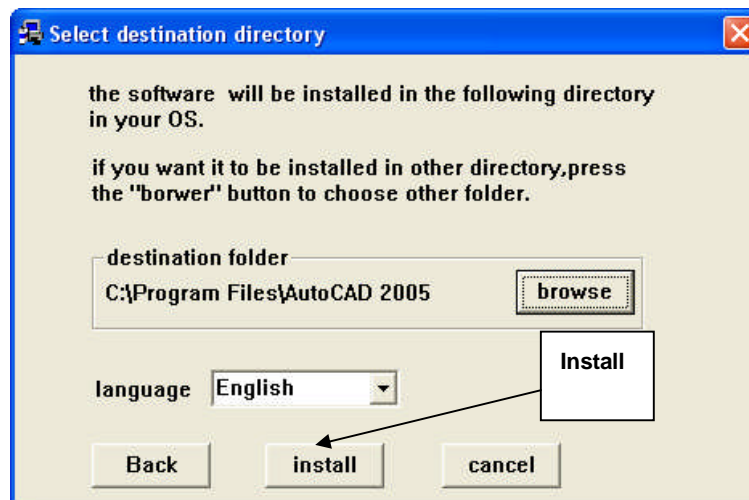
After selecting the language, click on “browse” in the menu shown in figure F2-3 to select

the path of installation, as shown in figure F2-5: You must select the directory where you AutoCAD is installed.



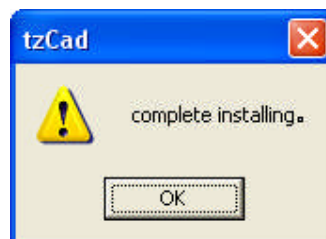
F2-5

After selecting the installation directory, click on “Confirm” in the menu shown in figure F2-5 to proceed to the next step:



F2-6

Select “Install” from the menu shown in figure F2-6, and the system will be installed automatically, after the installation, the window shown in figure F2-7 will appear:



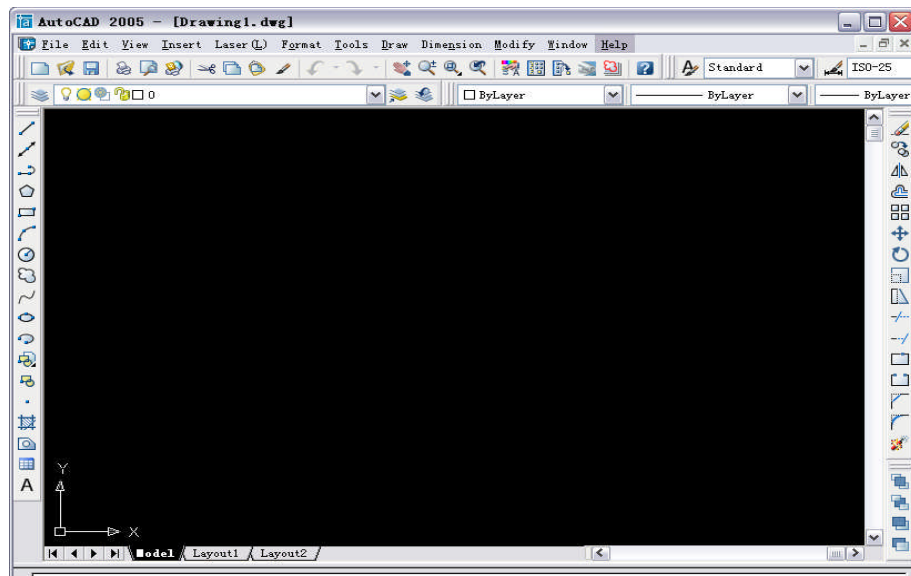
F2-7

Click on “Conform” from the window shown in figure F2-7 to end the installation.

## Chapter Four: Configure the Engraving Program in the CAD Menu

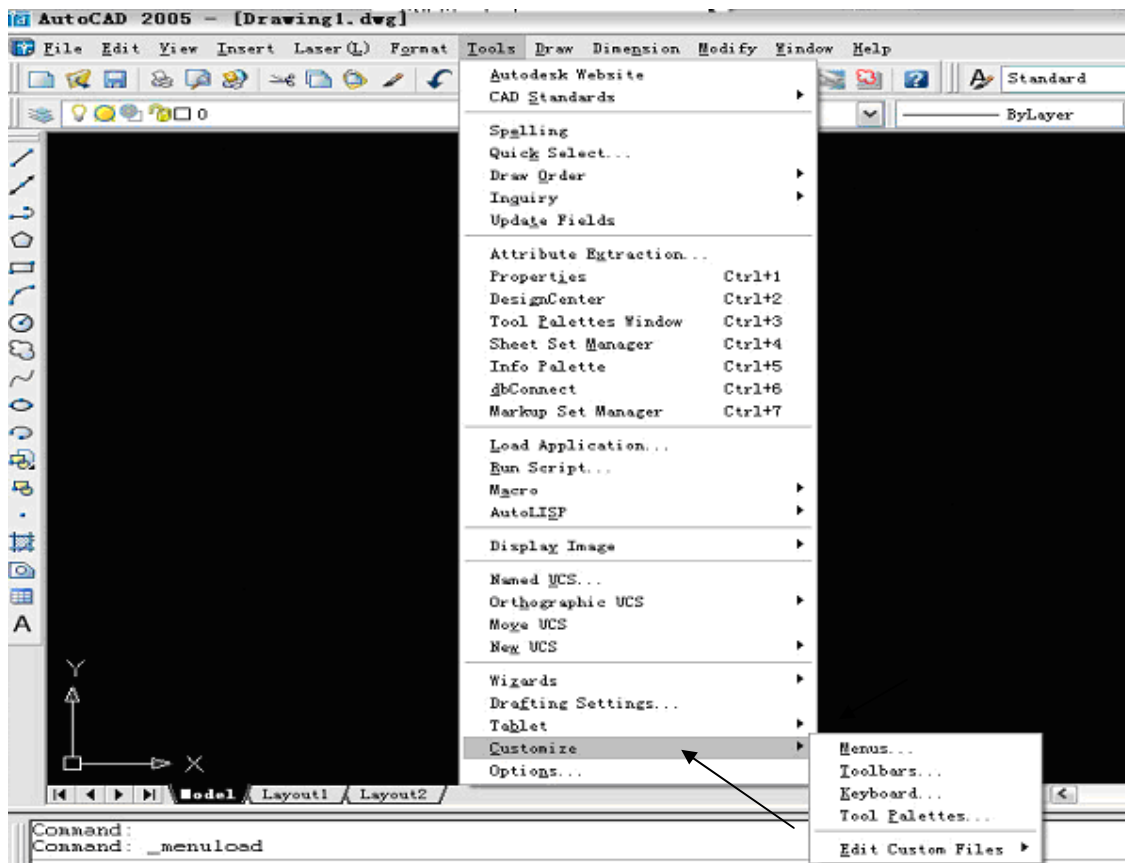
## SALECNC Laser carving cutter user's manual

After the installation, When you use the software for the first time, you need to make configurations for the menu of engraving program, the operation menu is shown in figure F2-8:



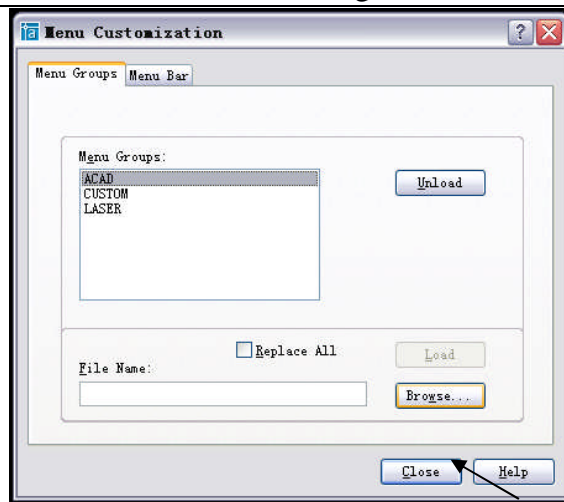
F2-8

Select "Tools" from the menu bar in the window shown in figure F2-8, click to show the pull-down menu, then select "Menu" from "Custom" in the pull-down menu, then the window shown in figure F2-9 will appear:



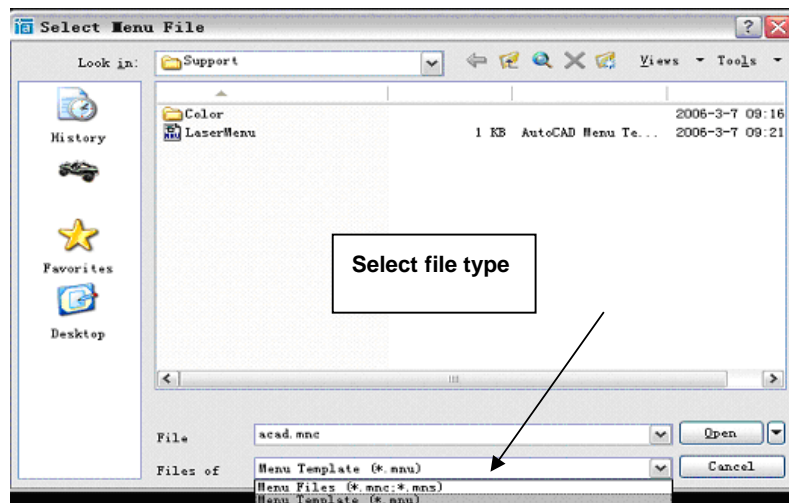
F2-9

Click on the selected "Menu" in figure F2-9, the window shown in figure F2-10 will appear:

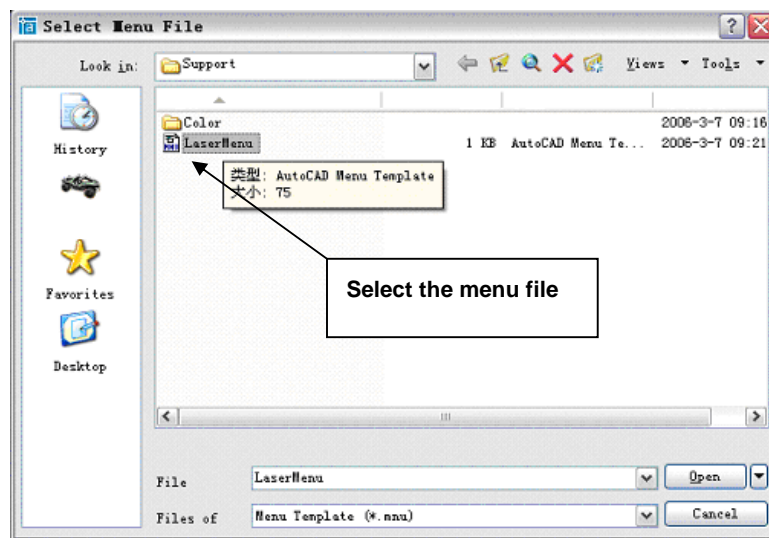


F2-10

Click on “Browse” in figure F2-10 to search for required files from the directory “Support” under the directory of AutoCAD, as shown in figure F2-11:



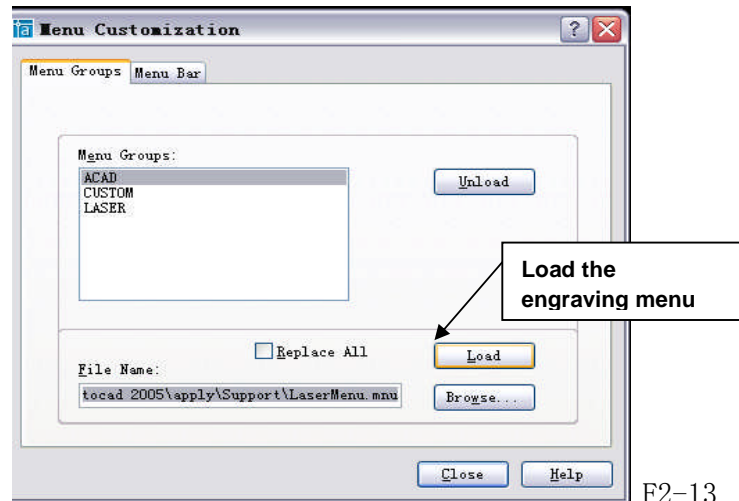
F2-11



F2-12

Set the file type as the \*.mnu format in figure F2-11, and then select our own menu file from figure F8-12, then click on “Open” in figure F2-12 to enter the window shown in figure

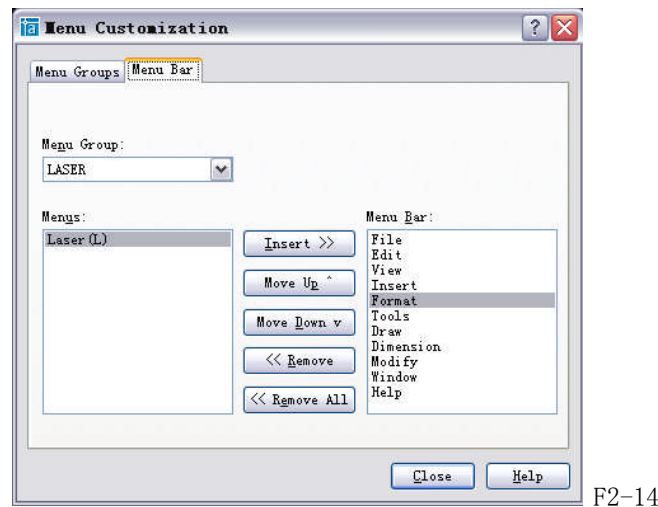
F2-13:



F2-13

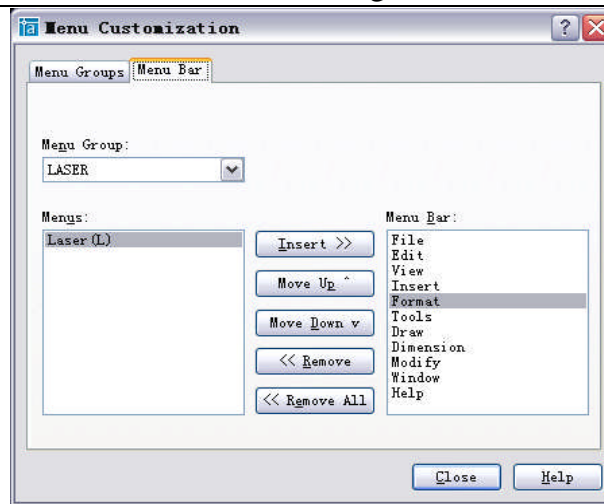
Click on “Load” in figure F2-13 to load the engraving software, and the window shown in figure F2-14 will appear.

**Note:** If the original engraving menu group already exists, please delete it first, otherwise the new menu group cannot be loaded, and do not select “Replace All” in F2-13, otherwise, all menu groups of the system will be deleted.



F2-14

Select the loaded menu “LASER” from Figure F2-14, then click on **Menu Bar** to proceed with the next step.

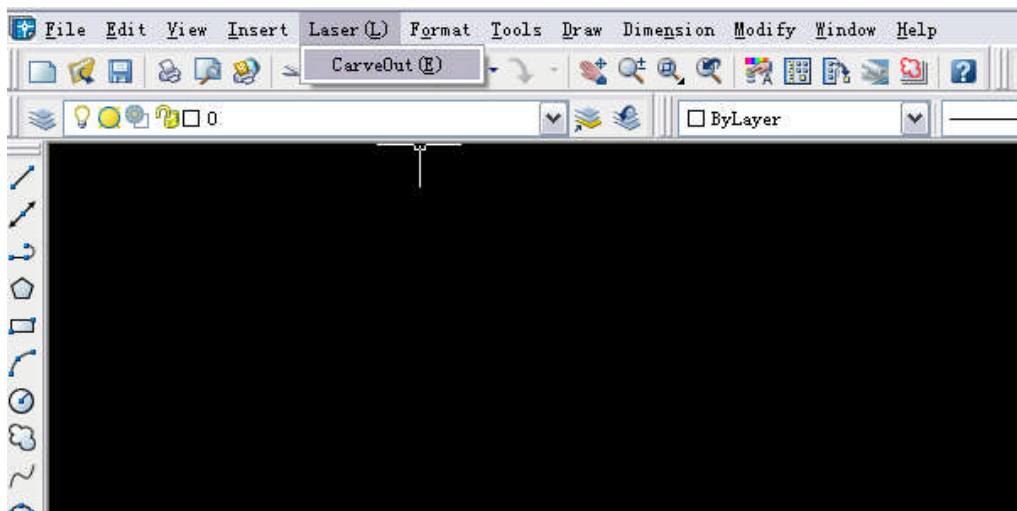


F2-15

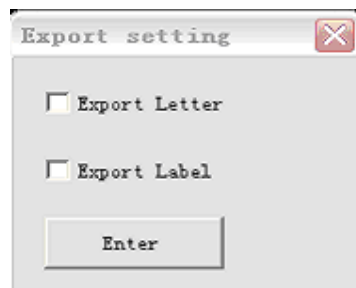
Select “Laser Device” in the menu shown in Figure F2-15, and click on “Insert”, after the menu is inserted, the installation of the AutoCAD direct output software is entirely complete, then the inserted menu of our software will be shown in AutoCAD, and we can use it to directly export the graphics from CAD to our equipment in the future.

## Chapter Five: Software Operation Settings Menu

We can see **Laser (L)** from the menu bar in the operation menu of AutoCAD, as shown in Figure F2-16:

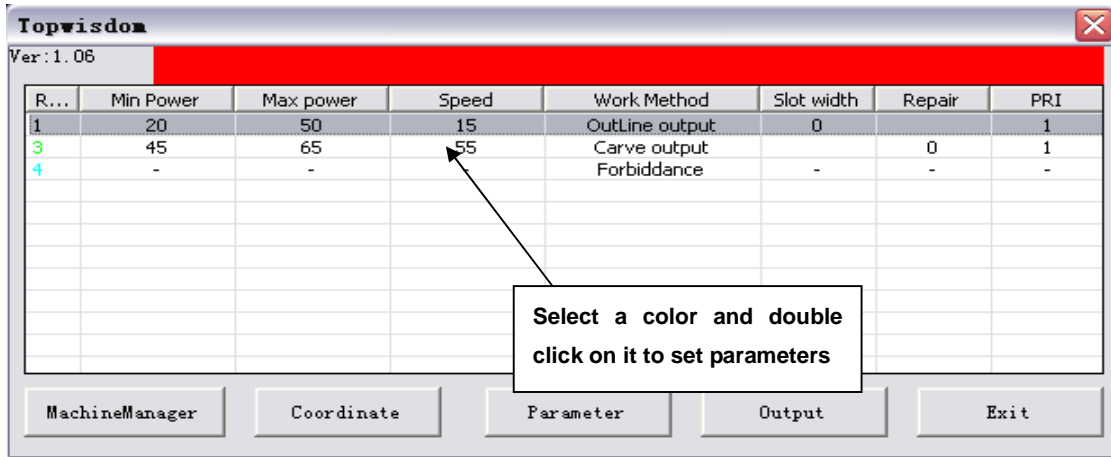


F2-16



F2-17

Draw some simple drawings in the window shown in Figure F2-16, define them with different colors, select the drawing and then select “Engraving Output” from **Laser (L)** in the pull-down menu, and then the window shown in Figure F2-17 will appear: please note that we support large fonts, please consult appendix 1 for settings of characters. Besides, annotations are partially supported, in normal cases, you need not to export the annotations and characters, then just do not select it in F2-17, after than, click on Exit to enter F8-18.



F2-18

In the window shown in Figure F2-18, you can set parameters of a selected color by double clicking on it, as shown in Figure F2-19 and F2-20, The most important parameters are stroke output and clear output. If neither of the two is selected, “output disabled” will be shown (as Figure F2-18); if both are selected, data in this color will be provided with possibility of both stroke and clear output, pay attention that there must be closed drawings for clear. Otherwise, select one of them for one output condition. Meanings for settings in Figure F2-19 and F2-20 are described as follows:

**PRI:** PRI will define the output order of colors, if the colors are with the same PRI, the system will export different colors randomly, Stroke PRI and Clear PRI decides which color to be exported first when Stroke and Clear of the same color are to be exported at the same time.

Those are common settings for colors. Page Set1 and Page Set2 are respectively corresponding to settings for Stroke and Clear. Set1 is for settings of Stroke, where there are settings for engraving features including speed, light intensity etc., for dot date, the dotting time settings are also available;

Error compensation can realize shrinkage and extension for closed drawings according to given numbers for the compensation of the seam width when cutting and stroking. Set2 is for settings of Stroke, which follows the same way, where the meaning of Compensation is similar to that of the error compensation for Stroke, i.e., to shrink or extend the graphics at a certain dimension to compensate the errors of actual dimensions. When the check box of “default” is selected, the light intensity and speed cannot be set and the default values of the machine will be adopted; settings for light intensity and speed are only available in case the check box of “default” is not selected.

### Description of parameters:

**Stroke Output:** When selected, Stroke engraving output for drawings in the current color will be carried out. Parameters of Stroke can be set if this option is selected but cannot be set if it's not selected.

**Clear Output:** When selected, Clear engraving output for drawings in the current color will be carried out. Parameters of Clear can be set if this option is selected but cannot be set if it's not selected.

**Light intensity:** Min. light intensity: light intensity applied when stroking curves or applied for the gradient and top depth when clearing. Please consult appendix 2 for descriptions about the top depth and gradient for gradient clearing. The light intensity range from 0-100%, accurate to 2 digits after the decimal, e.g., 2.11%. Max. light intensity: light intensity applied when stroking straight lines or at the deepest location of clearing. if the is elbow too deep, it means the Min. light intensity is on the high side or the speed is on the low side.

**Dotting function:** CAD is capable of drawing dot data, when dots are available, you can set corresponding functions here, this can define the time for the laser to stay at each dot of the color when engraving.

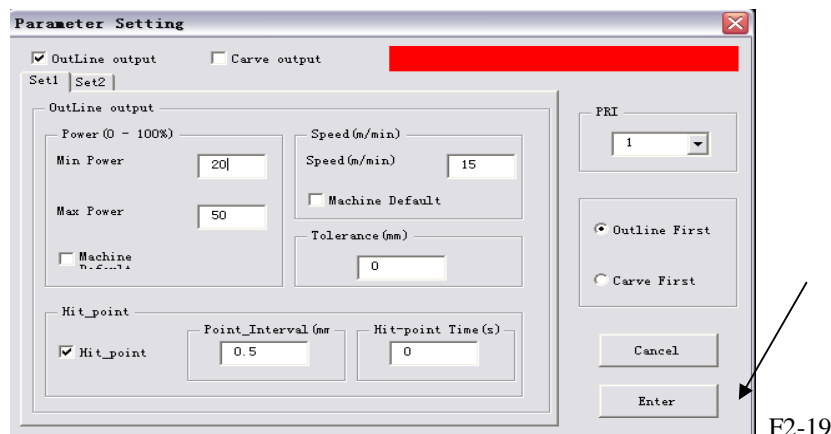
**Default:** if selected, parameters like light intensity and speed etc. will be in accordance with what displayed on the machine.

**Speed:** Moving speed of the laser head, the unit is mm/second.

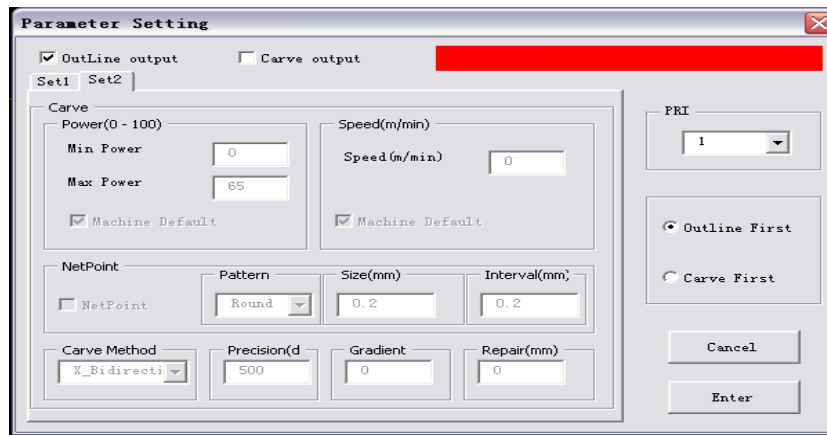
**Error Compensation:** Applied for engraving error ( $-0.5\text{mm} \sim 0.5\text{mm}$ ), errors of operation for closed drawings due to the diameter of the laser spot can be adjusted by the error compensation. For instance: when engraving a circle with the diameter of 5mm, without error compensation, the circle actually exported is with the diameter of 4.99mm, then you can input 0.01 in the option for error compensation to correct the error due to the diameter of the laser spot.

**PRI:** Is used for setting the engraving order of different colors, the smaller PRI, the earlier to be exported, and vice versa.

After the parameter settings, the engraving output can be carried out, the system will remember the last parameter settings to avoid repeated parameter settings. For instance, if you set the red output light intensity at (50%, speed at 20%, no error compensation and PRI at 1), the same setting will be applied for the use of the color red (if any) for the next time.

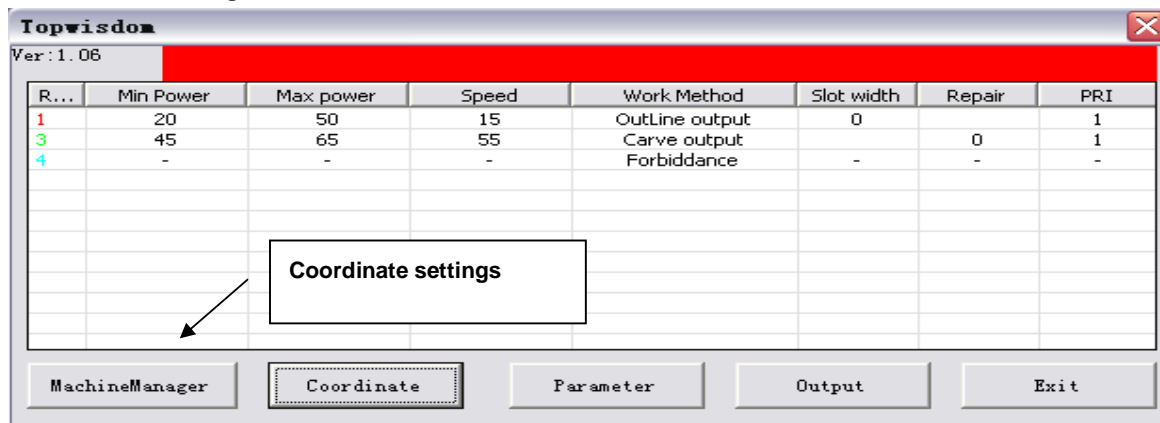


Please consult Chapter 2: Supplementary Description of Clearing for details about clearing in CAD direct output.



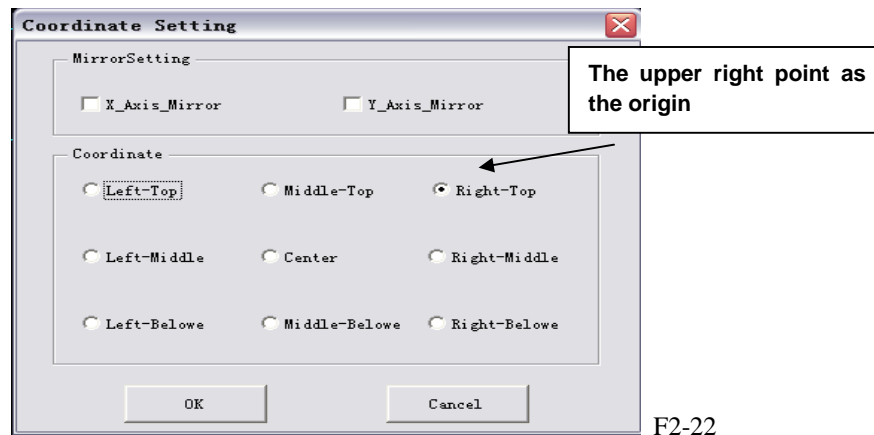
F2-20

After setting parameters for drawings in different colors, click on Confirm to enter the window shown in Figure F2-20:



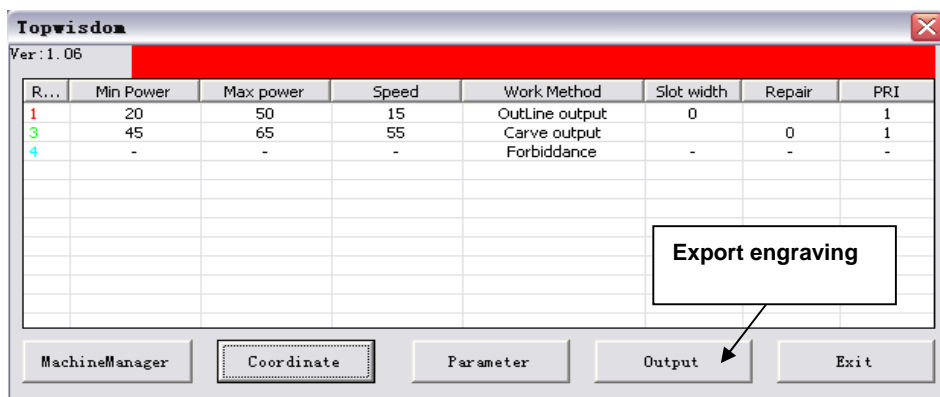
F2-21

After setting the parameters, you can select “Coordinate Settings” in Figure F2-21 to set the coordinate system, there are 9 coordinate points to be selected as the coordinate origin of the machine: right upper, right center, right lower, upper center, center, lower center, left upper, left center and left lower; click on corresponding button, the coordinate origin of the working data has been defined according to the selection of the user. Right Upper: if this point is selected as the origin of the machine, the engraving output will be carried out at the left lower corner of the preset starting point; likewise, if another origin is selected, the machine will carry out the engraving output towards the direction contrary to the starting point of the operation, for instance: if Left Upper is selected as the origin, the machine will carry out the engraving towards the right lower corner of the starting position of current operation; Center Point: the machine will carry out engraving along the 4 sides from the starting position of operation. If the engraving effect is mirrored, you can correct it with the mirror settings, as shown in Figure F2-22, please consult appendix 3 for effects of different coordinate systems:



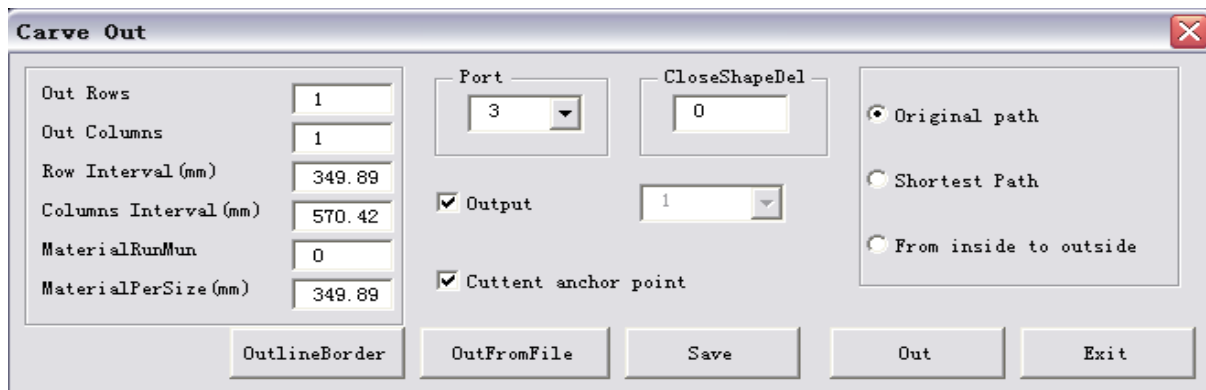
F2-22

After the settings, click on “Confirm” in Figure F2-22 to proceed with the next step:



F2-23

After the settings, select “Output” from the window shown in Figure F2-23 for the engraving output, and the window shown in Figure F2-24 will appear:



F2-24

## Parameters description:

**Current Dot as Registration Point:** The output location of the current graphics on the engraver. **There are two modes:** Current location and origin output, the current location is where the laser head is located, the origin output is corresponding to the registration point set on the control panel of the engraver.

**Port:** the communication port adopted when the computer sends data to the engraver, you can

select it from the full-down menu of port (corresponding to the visual serial port created in the Device Manager of the computer).

Number of rows, number of columns and spacing between rows are used for copying output, i.e., engraving the current drawing in how many rows and columns, to get better effect of arrangement, you'd better copy the arrangement from CAD by yourself.

**Output Path:** if the Original Path is selected, the engraving output will approximately follow the order of drawing the drawing.

If Shortest Path is selected, drawings in the same color will be cut in the shortest path. If Inside to Out side is selected, for closed drawings in the same color, the internal part will be cut before the external part, which is necessary in some cases.

**To a File:** Export the current engraving data to a certain file, when necessary, export the data to the equipment in "From a File" mode, and it is contrary to "From a File", if you need to select a certain file containing engraving data instead of exporting the current drawing, you can adopt this operation mode.

**Output Engraving:** Directly export the graphics file opened currently in CAD to the equipment by engraving.

**Description:** Graphics exported from the engraving equipment is only related to the size of the graphics in CAD instead of the original position of it in the drawing area of CAD.

### Chapter Six: Supports for AUTOCAD Direct Output Annotation Text

Text and annotations in CAD system are normally exported as auxiliary information, therefore, in usual cases, you need not select text and annotations in the window shown in Figure F2-17. However, in special cases, e.g., the user needs to engrave the text in the graphics, and even the annotations, for output, you can select corresponding options in the window shown in Figure F2-17.

First, you'd like to announce that we do not support text and annotations to a fractional, however, there are some limitations, for example, we support 5, 6 types of large fonts, settings for large fonts are as follows: first enter the menu shown in Figure FL-1, select Font in the "Format" menu.

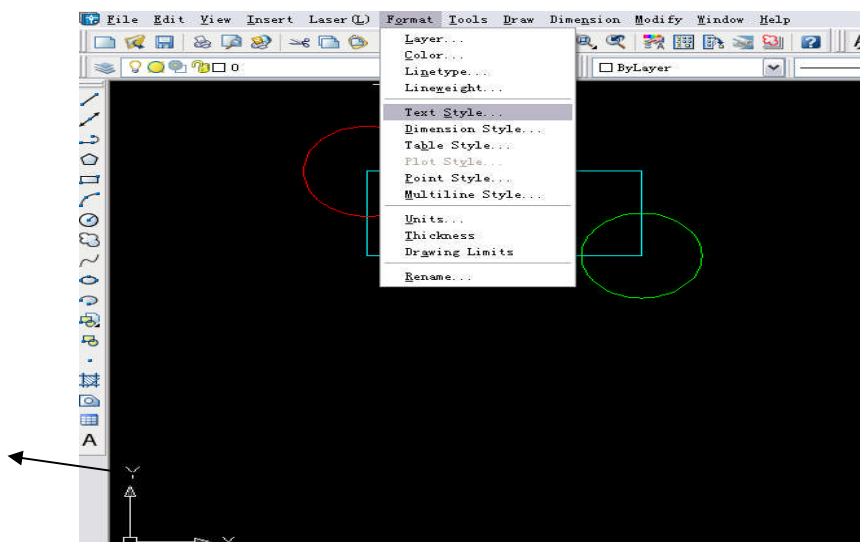


Figure FL-1

Then you'll enter the menu shown in Figure FL-2, select Use Large Font (U). And then select the font file you required from the pull-down menu of Large Fonts (B), we currently supports

the following font files for Chinese: Fs.shx, gbcbig.shx, HT.shx, Hztxt.shx and Khz.shx. So you must select one of the aforesaid files.

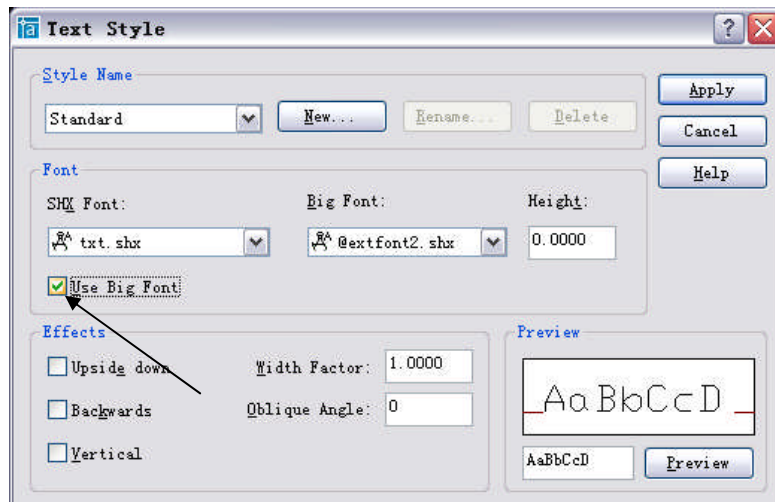


Figure FL-2

After the steps above, the settings are completed, but please do note that when inputting text, as shown in the figure below, after the text inputting tool is selected, the menu shown in Figure FL-3 will appear when inputting text.

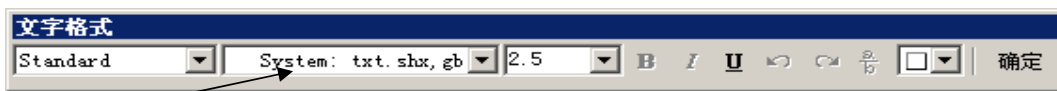


Figure FL-3

Then you just let it adopt the default font shown in Figure FL-3, do not select the English fonts or Song typeface or boldface etc. from the pull-down menu, for those may not be supported by our software temporarily. After this, our software can support the engraving output of text in CAD interface.

If you selected Annotation Support in Figure F2-17, the engraving output of annotations will be supported, but you must note that an annotation is usually provided with an arrow, while we ignore the arrow head and left only the line section.

## Chapter Seven: Clearing Gradient Sketch Map:

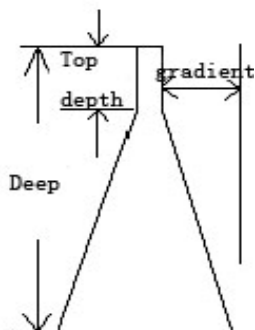


Figure FL-4

## Chapter Eight: Data Coordinate System

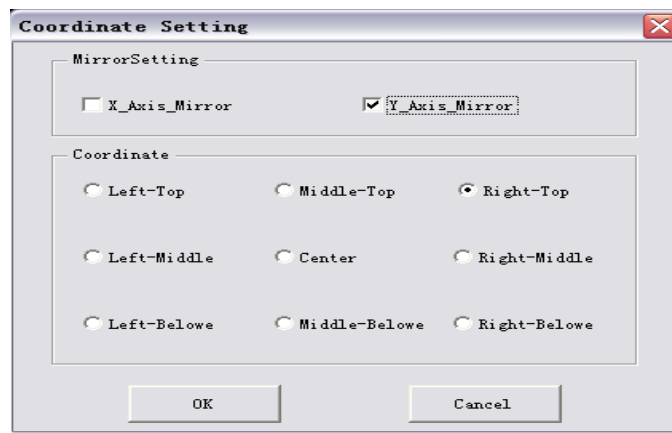


Figure FL-5

In Figure FL-5, the default setting is the Right Upper, which is used in usual cases, other settings will be used to special applications, if we take the current location of the laser head as the initial registration point of current engraving, the figure below shows the position of the exported drawing relative to the laser head at the initial position, assuming the crossing to be the laser head at the initial position.

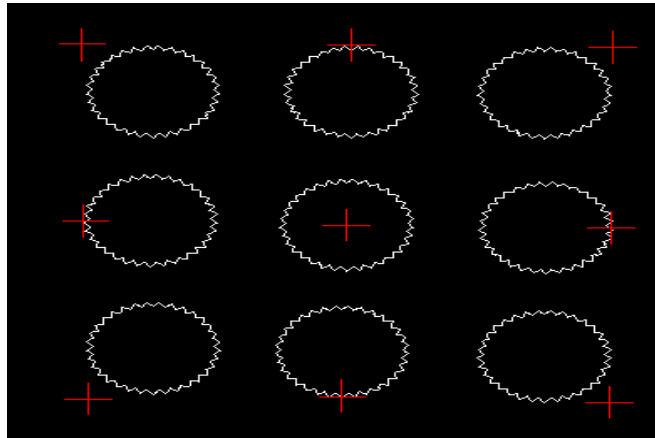


Figure FL-6

If different coordinate modes are selected, the effect shown in Figure FL-6 will appear, e.g., if the initial position of the engraving head of the laser device is set at the right upper corner, the operation will cannot be started if any other mode is selected, because the breadth of the equipment towards the right upper corner has run out of space.

**Mirror Settings:** If the drawings engraved by the equipment have the mirror effect in the X-axis or the Y-axis, you can correct it from with the Mirror Settings. If the mirror direction in X-axis of the software differs from that of the equipment, the effects of the original drawing and the exported drawing will differ as shown in Figure FL-6-1, then you need to modify the mirror settings of the X-axis in the menu shown in Figure FL-5, and settings for the Y-axis should follow the same way.

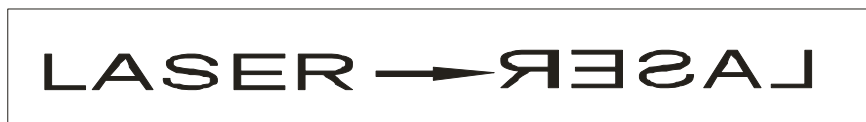


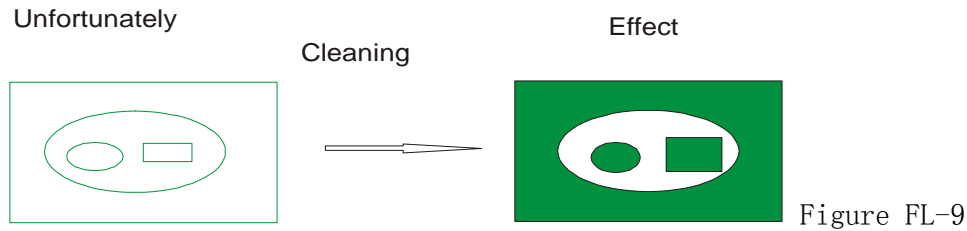
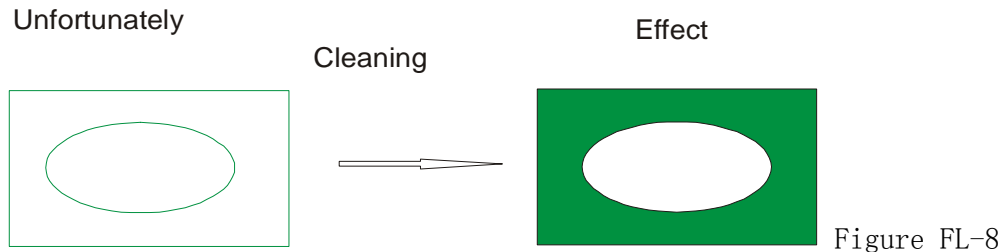
Figure FL-6-1

## Chapter Nine:Supplementary Description of Clearing

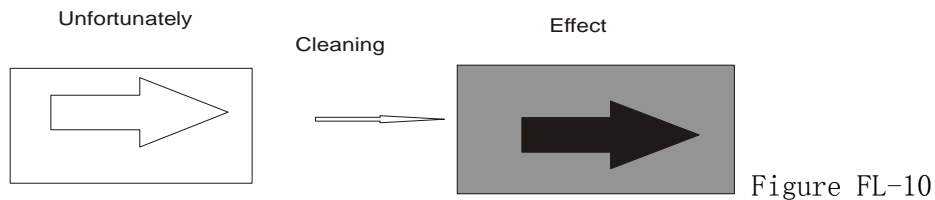
AutoCAD provides the clearing output, which only needs the contour of a drawing instead

of filling, which should be particularly paid attention to.

Please note that for drawings drawn in AutoCAD, the clearing in direct output is carried out according to the contour, you need not to draw the drawings in the filled mode, besides, there's no difference between intaglio and incised inscription, Figure FL-7 shows the effects of the origin drawing and the drawing after clearing output, as there's no difference of intaglio and incised inscription in vector graphics, you may get the effect of incised inscription by drawing, please see Figure FL-8, if there's relation of inclusion between two outline drawings in the same color, the effect shown in the drawing below will be created, if multiple layers of drawings in the same color are included, the effect will be as follows, its rule of clearing output is that: engraving the first layer, not engraving the next layer, and then engraving the further next layer, and the rest may be deduced by analogy. Please see Figure FL-9.



From what described above, we may see that for clearing out of vector graphics, filling is not needed, and there'll not be this kind of influence between drawings in different colors, as shown in Figure FL-10, drawings in different colors are in the relation of inclusion, no influence on each other. There's overlay between the two parts of clearings. We believe you may have deeper understanding for the clearing modes of AutoCAD.



## Chapter Ten:Supplementary Description of Software and CAD Direct Output

Announcement: This document is mainly purposed to provide some methods of analysis and solutions for the disorder of the engraving for vector graphics, as the applications are

diversified, some problems cannot be completely solved by our software alone, Therefore, sometimes the user need to make improvements for the drawing so as to make the operation of the machine in accordance with our ideas.

(1) Some simple drawings may be connected and exported in order

See the figure below:



Figure 1

In Figure 1, we first draw the curve at the center from the left to the right, then draw the line section on the right from right to left, finally, we draw the line section on the left from left to right, according to the original output processing, the result will be as follows.

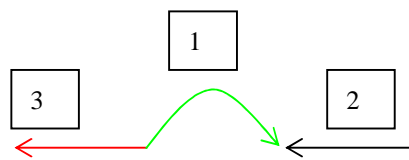


Figure 2

And the order of output by the equipment follows the numbers displayed in Figure 2, the direction for each step of output is shown by the arrow. This effect is poor as its not completed from the beginning to the end b one run.

There are 2 ways to solve this problem, 1: draw the drawings in order or combine them with the merger operation provided in software like CorelDraw or AutoCAD etc., 2: our software engraving can change the order into a smooth and continuous way of operating from the beginning to the end when processing the drawings.

The current software has make processing to drawings as shown in Figure 1 to make them to be exported from the beginning to the end, i.e., this problem of output order has been solved in the latest version of the software. However, we recommend our users to draw the drawings in order when using AutoCAD or CorelDraw etc., if you fail to do that, you can combine them together with the merger operation provided in the aforesaid software, which may provide higher fault tolerance.

(2) Normalized output for complicated drawings are shown in Figure 3 below

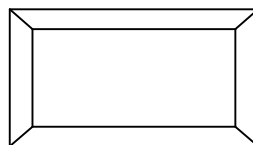


Figure 3

Figure 3 is not so complicated, however, according to our observation, many users will draw the figure in several sections instead of drawing it continuously, therefore, the software will create multiple effects of output (this is relevant to the order of drawing of different users), however, may be none of the effects is what you expect.

Please see the following sample for different effects of cutting.



Cutting 1

Cutting 2

Cutting 3



Cutting 4



Cutting 5

As you can see in the drawings above, it totally takes 5 times to cut the entire drawing, and the procedure is disordered. The effect is not expected, seeing from the stroking in the drawings above, each stroke reaches the end and stops till there' s no connected line section, but it is hard to choice the path in this way, and there' s also great randomness, therefore, the entire drawing is divided into several parts. There' s little software, currently, is provided with the capacity to manage the problems as a whole like human being, for instance, cutting the external rectangle before the internal part etc.. Therefore, we must pay attention to this kind of drawing when drawing, e.g., if you want to cut the two rectangles along the 4 sides, you must combine the separate line sections of the rectangles together with software, thus the disordered engraving will be avoided and a relatively neat path will be achieved. Many users just patch up the drawings stroke by stroke in irregular order, therefore, multiple types of stroking will be created for a drawing as shown in Figure 1, which is actually very simple, while in fact, there are many drawings much more complicated than this one, one joint may be connected with many line sections, and the stroking will be more disordered, so it' s hard to arrange the order effectively by out software alone, and you must solve the problem form the beginning, the method of drawing.

(3) Disordered output for single lines without joint or crossing



Figure 4

Figure 4 seems to the same to Figure 1 at first view; however, the engraving is disordered, why? Let' s amplify the drawing and you can see that there' s no joint between the line sections, so the order cannot the arranged. Therefore, when drawing, pay attention that the joints must be closed.

(4) No display when opening the drawing in a 3rd party engraving software, or run into a wall when using CAD for direct output.

For example, you draw a drawing in CAD, which looks normal, while it cannot be displayed in a 3rd party engraving software, or run into a wall when exported to the equipment. Why? This is normally caused by a small drawing or dot far away from the drawing, which is not what the user expects to process but is just drawn by mistake, this makes the whole drawing to be so large and cannot be seen when opened in another software after zooming out, and the breadth of output will be far exceeding the operation breadth of the equipment, which will also cause problems.

(5) Part of the drawings of CAD direct output or in DXF files cannot be displayed and processed

AutoCAD2005 is newly provided with region tools and table tools, parts of a closed drawing can be processed into the drawing of a region via the region tools on the left. Then the software cannot recognize and process it, so pay attention that there should not be any region drawing

when drawing, if there are some, they should be redrawn by line sections or curves or be broken up with breakup operation. Tables drawn with the table tools should follow the same way, they can be normally exported after being broken up, those are all new features after AutoCAD2005.

## 2. CorelDRAW

### Chapter One: Software Installation



Double click on the icon of TopWisdom CorelDraw direct output software for installation, then the window shown in Figure 1 will appear, then

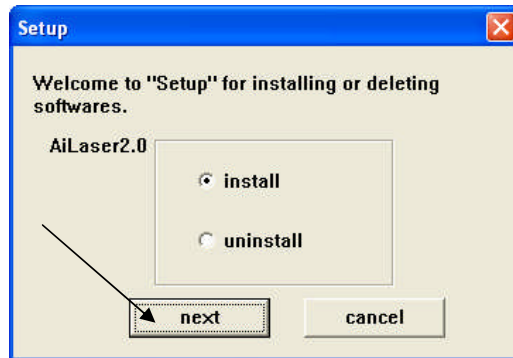


Figure 1

Click on “next” button to enter the window shown in Figure 2:

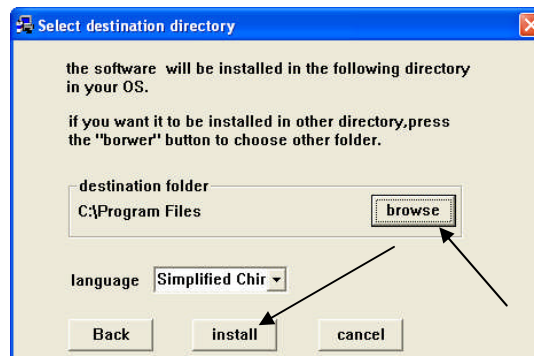


Figure 2

In Figure 2, click on the “browse” button to select directory of CorelDraw on the computer as shown in Figure 3, when reaching the directory of “Corel Graphics 11” or “Corel Graphics 12”, it is OK and the selection cannot be proceeded or there’ s no such a place.

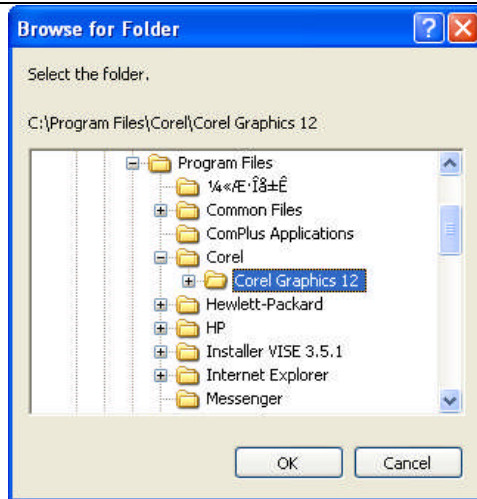


Figure 3

After finding the installation directory as shown in Figure 3, click on “Confirm” and return to the window shown in Figure 2, Click on “Install” to start the installation, upon completion of the installation, the window shown in Figure 4 will appear.



Figure 4

Click on “Confirm” to end the installation. The installation is not really completed then, as you need to make configurations for the CorelDraw software, after the configuration the total installation will be completed, then open CorelDraw, the window as shown in Figure 5 will appear.

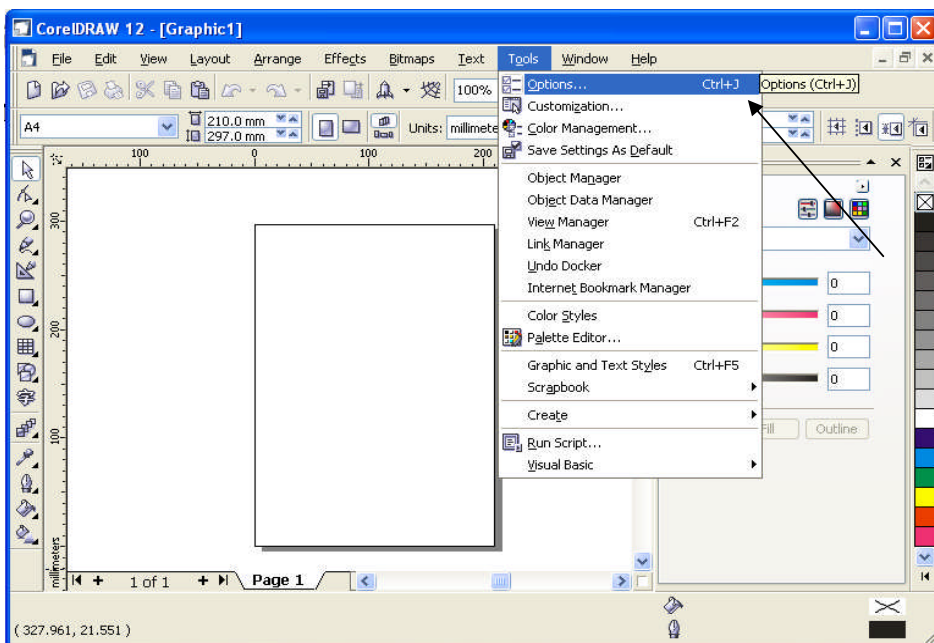


Figure 5

You can select “Options” from “Tools” in the toolbar shown in Figure 5 to enter the

menu shown in Figure 6.

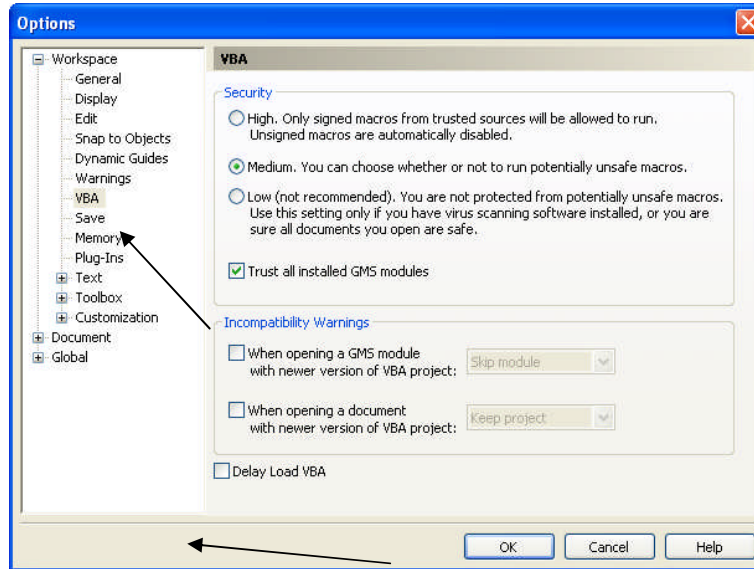


Figure 6

## Chapter Two: Operation Instructions

In Figure 6, first click on the “VBA” as pointed out by the arrow in the left, then remove the check mark before “VBA Installation Delay” at the bottom, then installation is thoroughly completed, each time you restart CorelDraw in the future, the menu in Figure 7 will be shown.

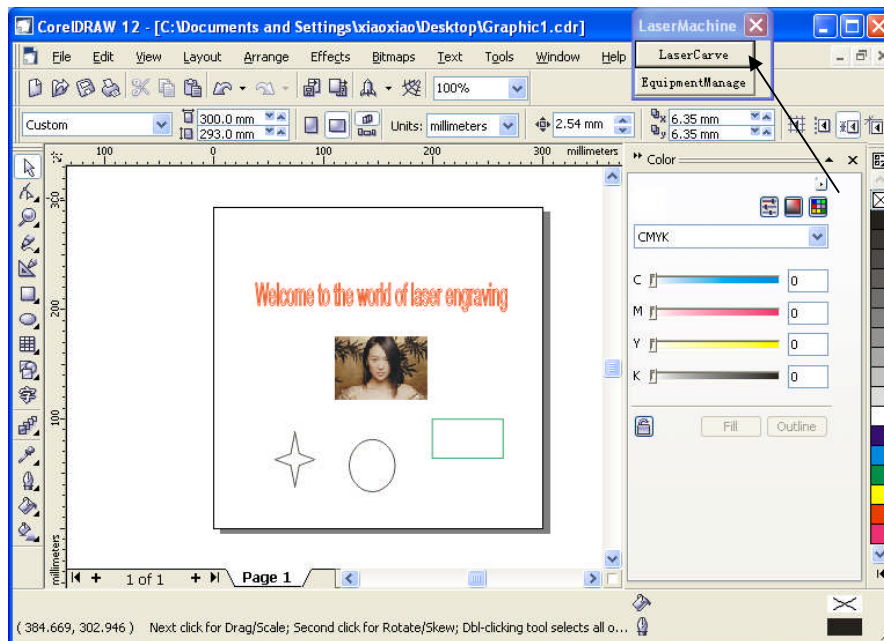


Figure 7

After startup, out processing buttons will be automatically mounted on the menu shown in Figure 7 as pointed out by the arrow. After completing the figure, we can click on the “Laser Engraving” button as pointed out by the arrow in Figure 7 to show the menu in Figure 8.

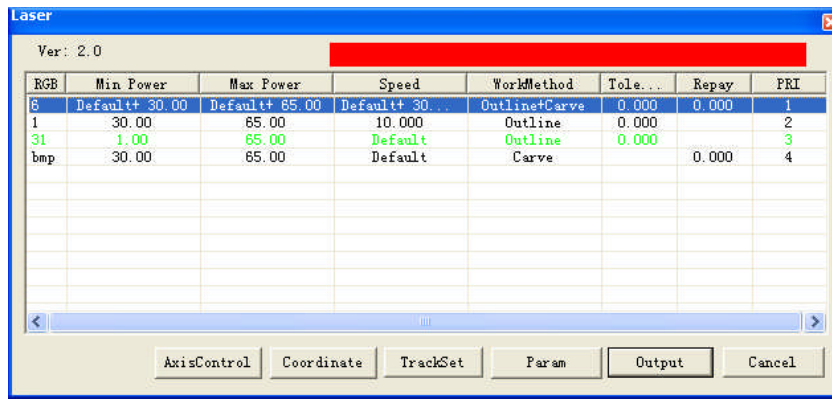


Figure 8

Here, we use different colors for the configuration of engraving parameters, if there are imported bitmaps, there will be independent bitmap settings. You can select a certain color and double click or click on button “Parameter Settings” for settings of these drawings, and then the menu shown in Figure 9 and Figure 10 will be entered.

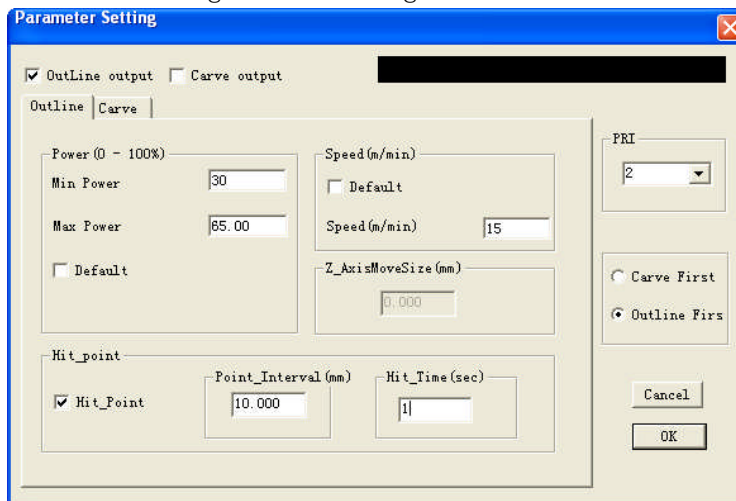


Figure 9

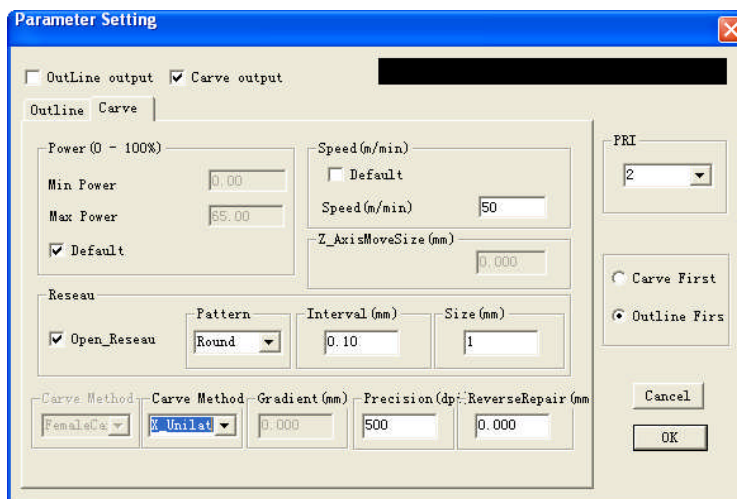


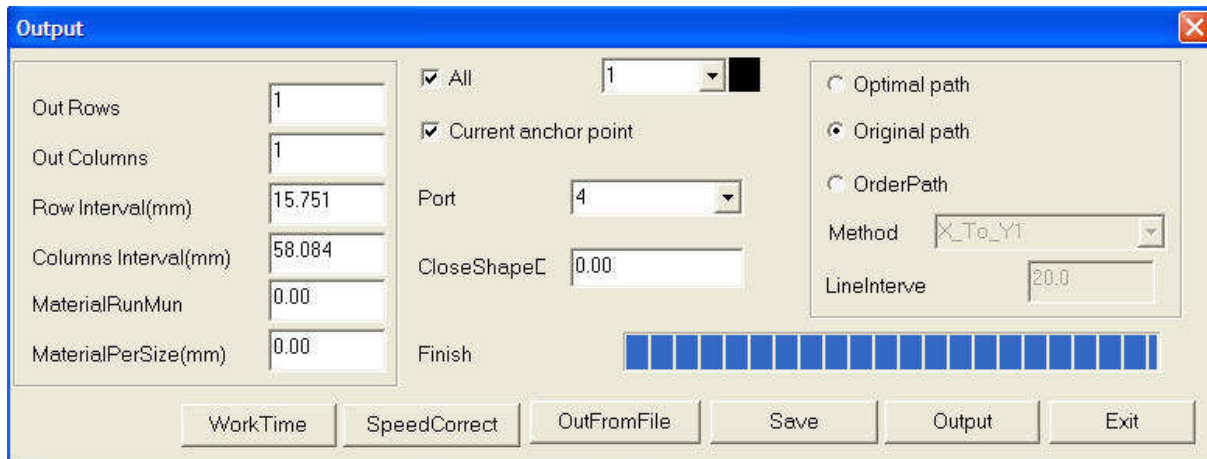
Figure 10

The two most important parameter settings are stroke output and clear output. If neither of the two is selected, “output disabled” will be shown, i.e., no engraving output for this kind of drawings will be carried out; if both are selected, data in this color will be provided with possibility of both stroke and clear output, pay attention that there must be closed

drawings for clear. Otherwise, select one of them for one output condition.

Error compensation can realize shrinkage and extension for closed drawings according to given numbers. PRI will define the output order of colors, stroke PRI or clear PRI decides to export stroke or clear first when they are exported at the same time.

Those are common settings for colors. “Stroke” and “Clear” menus are respectively corresponding to settings for Stroke and Clear. For Stroke, there are settings for engraving features including speed, light intensity etc., for dot date, the dotting time settings are also available; and the settings for Clear follow the same way. When the check box of “default” is selected, no need to set the light intensity and speed and the default values of the machine will be adopted; settings for light intensity and speed are only available in case the check box of “default” is not selected.



### Parameter description:

**Output:** when selected, engraving output for drawings in the current color will be carried out.

**Light intensity: Min. light intensity:** light intensity applied when stroking curves or applied for the gradient and top depth when clearing.

**Max. light intensity:** light intensity applied when stroking straight lines or at the deepest location of clearing. if the is elbow too deep, it means the Min. light intensity is on the high side or the speed is on the low side.

**Dotting function:** Dot spacing and dotting time settings.

**Default:** If selected, parameters like light intensity and speed etc. will be in accordance with what displayed on the machine.

**Speed:** Moving speed of the laser head, the unit is mm/second.

**Error Compensation:** Applied for engraving error (−0.5mm~0.5mm), errors of operation for closed drawings due to the diameter of the laser spot can be adjusted by the error compensation. For instance: when engraving a circle with the diameter of 5mm, without error compensation, the circle actually exported is with the diameter of 4.99mm, then you can input 0.01 in the option for error compensation to correct the error due to the diameter of the laser spot.

**Grids:** Realizes grids output for characters directly inputted in CORELDRAW, including 3 types of grids: Round, square and triangle.

**PRI:** Is used for setting the engraving order of different colors, the smaller PRI, the earlier to be exported, and vice versa.

After the parameter settings, the engraving output can be carried out, the system will

remember the last parameter settings to avoid repeated parameter settings. For instance, if you set the red output light intensity at (50%, speed at 20%, no error compensation and PRI at 1), the same setting will be applied for the use of the color red (if any) for the next time.

If you need to switch the coordinate system of data according to actual situation, just click on the “Coordinate Settings” button in Figure 8 to enter the menu shown in Figure 12.

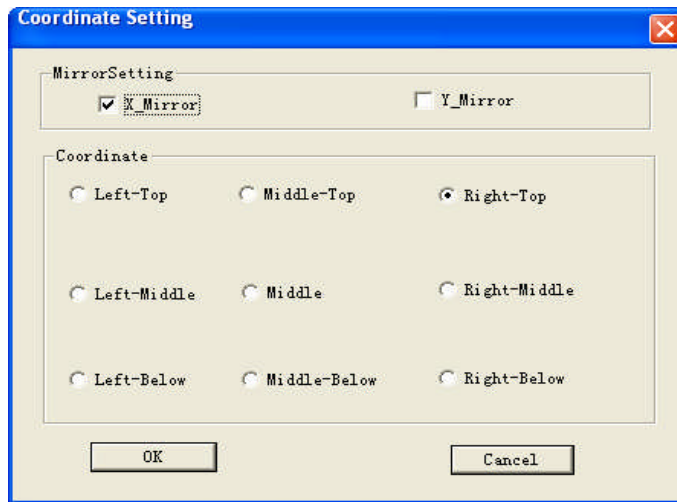


Figure 11

Here, you can set the coordinate system, e.g., setting the origin at upper right. You can set multiple cutting orders for multiple colors and multiple drawings as well as the directions of the plunge point in the software as shown in Figure 11-1

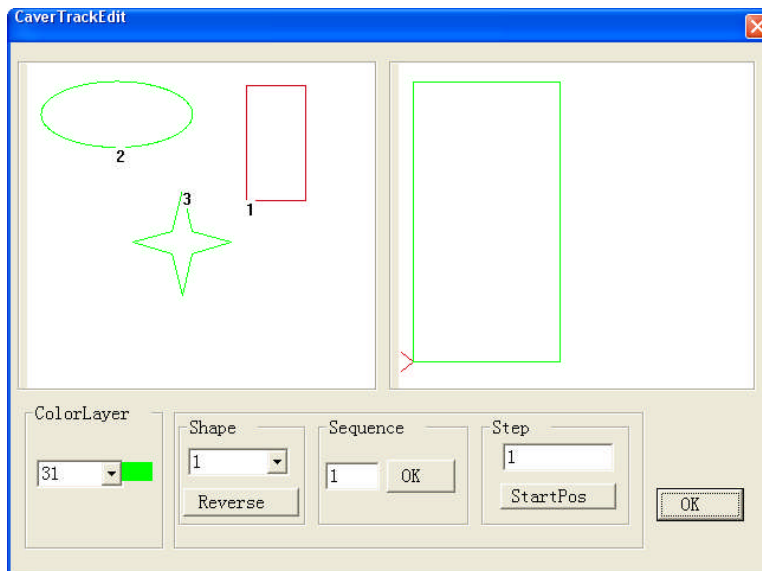


Figure 11-1

To change drawing 3 into the first cutting order, just select drawing 3 and input 1 in cutting order and then click on Confirm.

You can operate the distance of moving in single axis in the software as shown in the figure:

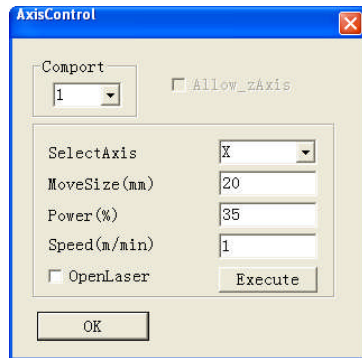


Figure 11-2

You can set the moving distance of an axis separately for descending and ascending. Then return to Figure 8, after the parameter settings, click on “output” to enter Figure 12

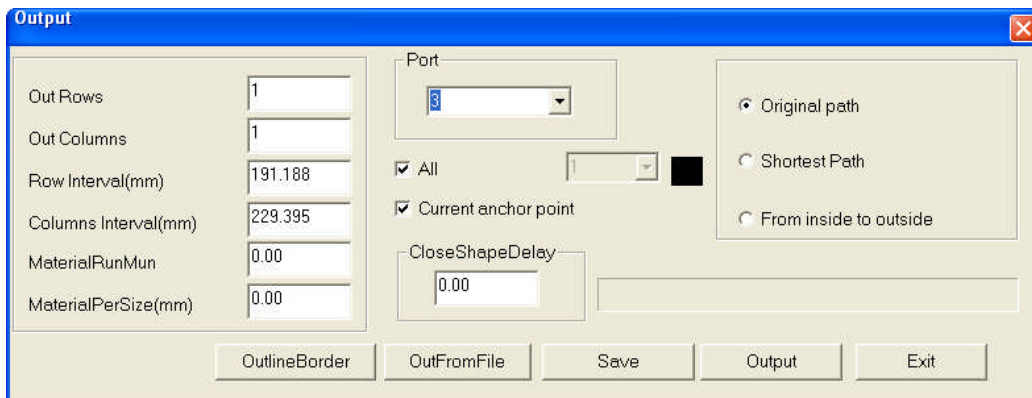


Figure 12

Parameters description: the number of rows and number of columns here mean how many copies of the drawings to be exported during the engraving, if the number of rows is set to 2, two rows will be exported, if the number of column is set to 1, 1 column will be exported, the distance between rows and columns are decided by the row spacing and the column spacing, in default settings, 1 row and 1 column will be exported, then only of one current drawing will be exported.

Feeding time and feeding length are available if the equipment is provided with a feeding device.

**Current Dot as Registration point:** the output location of the current drawing on the engraver. There are two modes: current location and origin output, the current location is where the laser head is located, the origin output is corresponding to the registration point set on the control panel of the engraver.

**Port:** The communication port adopted when the computer sends data to the engraver, you can select it from the full-down menu of port (corresponding to the visual serial port created in the Device Manager of the computer).

**To a File:** Output the current engraving data to a certain file, corresponding to “from a file”, this mode can be adopted when selecting a certain file containing engraving data instead of outputting the current drawing.

**Original Path:** No optimization of the path, the shortest cutting path will be adopted if Shortest Path is selected, from Inside to Outside decides whether the internal or the external part of the drawing is to be cut first.

**Closing Compensation:** Compensation for the mechanical error when cutting the drawing, realizing

the complete joint from the starting point to the terminal of the operation.

### Chapter Three: Machine Parameter Settings

This chapter describes the parameter settings of the laser engraving software and the operation of the parameter setting software. These settings are very important because the parameters of the machine will decide the working status of the engraver, therefore, please read carefully this chapter and do not make any change before you completely understand the meanings of all the parameters. You can enter the machine parameter settings when clicking on the “Equipment Management” in Figure 7 above.



The equipment parameters are the core settings of the engraver, the user needs not to modify them in normal cases, if the modification is necessary, please prepare a backup for correct parameters in advance, if the equipment cannot work normally after the modification, you can rewrite the backup data into the engraver.

Open the parameter settings menu (Figure F7-1, F7-2). This software functions to make settings for the equipment parameters of TopWisdom laser engraving software.

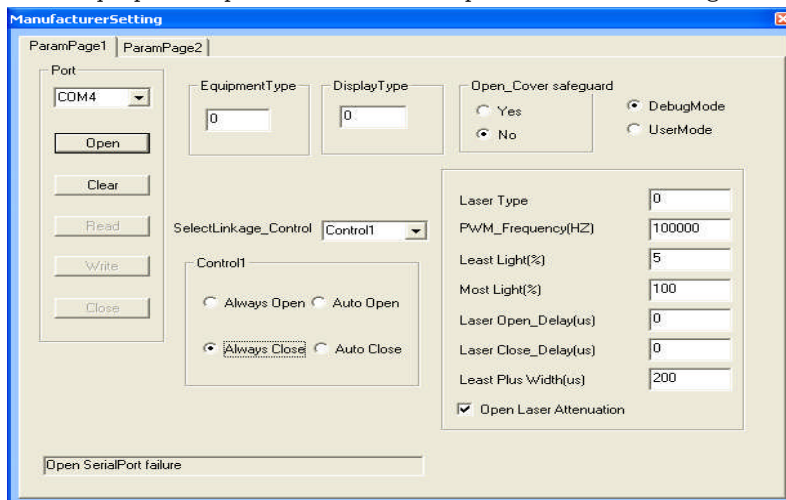
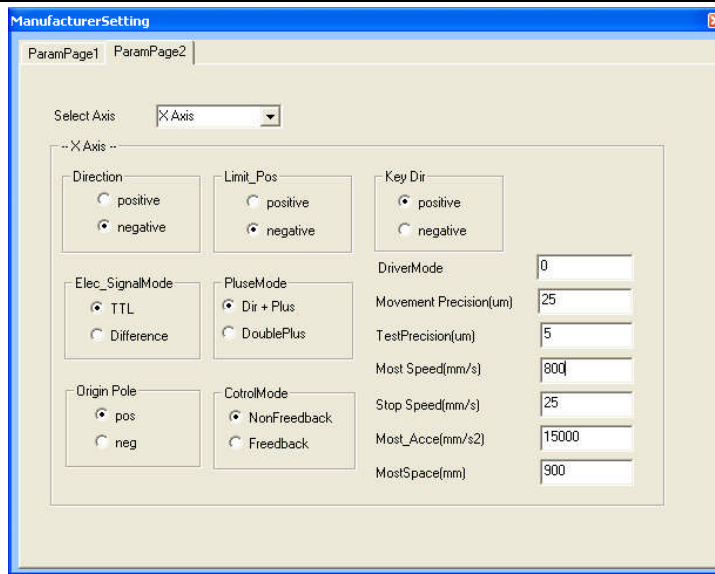


Figure F7-1



F7-2

## Section 1 Toolbar

### Toolbar:



There are 6 buttons in the tool bar, respectively representing: factory settings, user settings, equipment information, open file, save file and exit.

**Factory Settings:** Reference values or limit values for the parameters set by the factory, the user cannot modify the factory settings but can use them as reference.

**User Settings:** The adjustment and settings for the parameters by each user according to the cutting materials, cutting mode, processing features, efficiency requirements of their own to achieve the best processing effect. The user can carry out multiple time of parameter equipment before the operation and adopt the group of parameter settings (i.e., meeting the requirements of the user best) with the best engraving effect after the comparison of the samples engraved. The user can save multiple groups of parameter settings to meet different requirements of engraving.

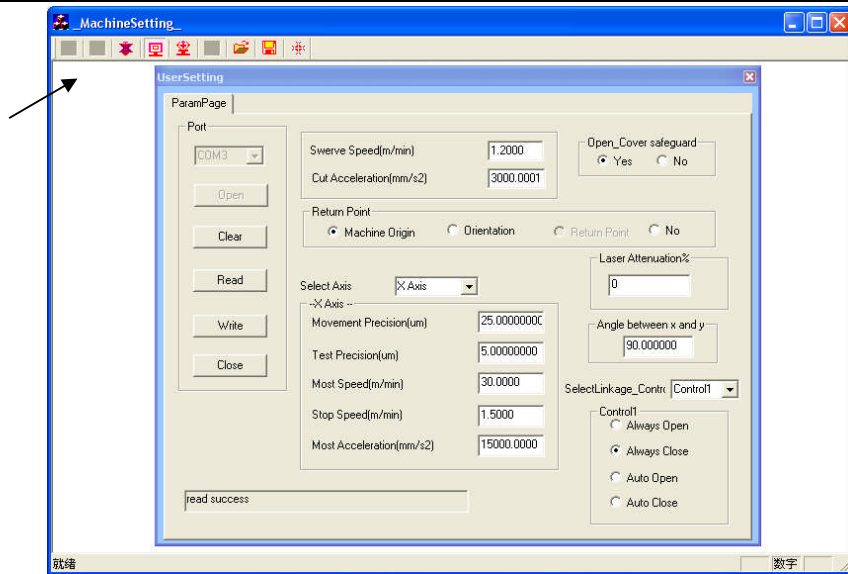
**Equipment Information:** Reflects the status information of the equipment, its parameters will not influence the normal operation of the equipment and cannot be modified by the user in normal cases, however, downloading or deleting files is allowed.

**Open File:** Opens the backup parameter files saved in the computer.

**Save File:** Saves current parameters to a file.

## Chapter Four: Section 2 User Parameter Settings

Click on the User Settings icon, then the menu shown in Figure F7-2-1 will appear:



F7-2-1

## Port:

The communication interface between the computer and the equipment.

The communication between the computer and the equipment is realized via the port, namely, the image information and the equipment parameters on the computer are transmitted to the equipment via the port, TopWisdom laser engraving software adopts USB interface for the connection with the computer.

## Open:

Open the selected port. If the computer cannot find the communication port, it cannot communicate with the engraver and the computer will prompt “port connect error” can show, “Open Serial Port failure” in the status bar, then the equipment parameters cannot be set; contrarily, if the port can not opened, the computer can recognize the machine, and the prompt dialog box will not appear and there will no a message “Open Serial Port Success” in the status bar, then you can read parameters from the equipment and write parameters into the equipment.

## Clear:

Except the options in the pull-down box, all parameters will be set at blank, i.e., no parameter values.

## Read:

Read the parameters saved in the equipment and display the values to the user for reference.

If the you need to modify the parameters, you must read the parameters in the equipment or open the parameter files already saved first, and then modify the parameters (this button is disabled when “Open Serial Port Failure”).

## Write:

Write the parameter values set by the user into the equipment (authorizing code provided by the manufacture is required), and then the equipment will operate according to the parameters written into it. When the parameter settings of the equipment is not completed, click on this button, and the “Some Data is Invalidate” will be shown in the status bar at the bottom, the parameters cannot be written into the machine.

The parameters will be valid once written into the machine except some special parameters, which will be validated after switching off and restart the machine. (This button is disabled

when "Open Serial Port Failure" )

### **Close:**

Close all ports opened, namely, cut the connection between the computer and the equipment.

"Close SerialPort" will be shown in the status bar.

※ TopWisdom software, downloading soft and parameter setting software will use ports and one serial port will be used for the equipment for writing and reading, therefore, once a kind of software is using a serial port, other software cannot use this serial port.

### **Speed at Inflexion (m/min):**

Speed of the equipment at inflexion (a right angle, for instance). The speed at inflexion will influence the effect of engraving.

If the speed at speed at inflexion is high, the curve will be sharp, and the impact to the equipment will be great and thus the effect of engraving will be worse; if the speed at speed at inflexion is low, the curve will be smooth and the equipment will run stably with high accuracy, and thus the effect of engraving will be better, however, the efficiency will be reduced.

The user can set suitable values according the requirements for accuracy.

### **Acceleration of Cutting (mm/S2) :**

The acceleration when the equipment is cutting (stroking). The acceleration of cutting will influence the effect of cutting and efficiency of operation. If the acceleration of cutting is high, the change of cutting speed is fast, the cutting efficiency will be high while the cutting effect will be poor; If the acceleration of cutting is low, the change of cutting speed is slow, the cutting efficiency will be low while the cutting effect will be good.

### **Home Position:**

The location where the laser head finally stays after the operation is completed or reset.

There are two radio buttons: Mechanical Origin and Location Dot.

If Mechanical Origin is selected, the laser head will stay at the mechanical origin after the operation is completed or reset;

If Location Dot is selected, the laser head will stay at the dot defined by the user after the operation is completed or reset.

If the mechanical origin and the registration point overlap, the two options will be equivalent. You may make selection according to your own preference.

### **Select Axis:**

The motion system of the engraver comprises X-axis, Y-axis, Z-axis, U-axis, V-axis, W-axis and the feeding axis etc. (this may differ according to specific configuration of the equipment), the user can make settings according to the actual conditions, e.g., : if only X-axis and Y-axis are required, you only need to set the parameters of X-axis and Y-axis; if you need to control X-axis, Y-axis and Z-axis, you should set the parameters of the 3 axes.

### **Motion Resolution (μm):**

The spacing between two neighboring dots, the unit is μm. The resolution of machines may be changed slightly due to different abrasion and other factors of machines, the user may get the optimal value after multiple times of debugging and settings.

### **Calculation of Resolution:**

Accurate Resolution = Current Resolution × Actual Dimensions/Theoretical Dimensions

### **Current Resolution:**

The resolution set at current operation of the equipment, i.e., the resolution in the parameter settings of the equipment, which can be read from the equipment.

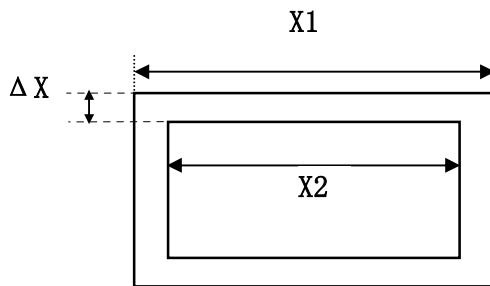
**Theoretical Length:** The length on the effect drawing designed by the user, normally in whole numbers but not exceeding the max. travel.

**Actual Length:**

The length of the track left by the engraver on the engraved material, which can be measured by measuring tools.

**Measurement of dimensions:**

The user may draw a rectangle, then the resolution can be calculate according to the length and width of the rectangle, or you can check if the beam is normal to the dolly by measuring the diagonal of the rectangle. When measuring, the width of the laser beam should be taken into account, namely, the machine actually draws 2 rectangles, the user should measure the lengths of the 2 rectangles respectively and the mean value of the 2 lengths is the actual length. While for the length of the diagonal, you only need to compare if the 2 diagonals of a rectangle are equal. E.g., to measure the length of a rectangle, in the figure below,  $\Delta X$  represents the width of the laser beam, respectively measure the lengths of  $X1$  and  $X2$ , then take the mean value, the longer the line is, the more accurate the result will be.



When calculating the accurate resolution of the X-axis, the actual length should be the track covered by the dolly;

When calculating the accurate resolution of the Y-axis, the actual length should be the track covered by the beam.

**Resolution Inspection ( $\mu m$ ):**

This parameter is valid when the equipment is provided with the closed-loop detection system, this parameter finally decides the errors between the engraved dimensions and the designed dimensions, in this case, only the adjustment of this parameter rather than the minute changes of the motion resolution will influence the engraved dimensions.

This parameter is invalid when the equipment is not provided with the closed-loop detection system. In this case, the minute changes of the motion resolution will directly influence the engraved dimensions.

**Limit Speed (m/min):**

The max. speed allowed for single-axis movement. This value decides the max. engraving speed and cutting speed.

**Stop Speed (m/min):**

The speed of sudden stop during single-axis motion, i.e., the motion stop speed.

If the stop speed is high, the equipment will get greater impact when stopping and starting,

the effect of engraving will be poor while the engraving efficiency will be high;

If the stop speed is low, the equipment will get smaller impact when stopping and starting, the effect of engraving will be good while the engraving efficiency will be lower.

### **Max. Acceleration (mm/S<sup>2</sup>):**

The change rate of speed, the acceleration of single-axis motion, i.e., the capacity of changing from a speed into another one during a given period of time.

If the acceleration is high, the machine will need shorter time to change a speed into another one, the engraving efficiency will be high while the impact to the equipment will be greater, resulting greater abrasion of the equipment;

Contrarily, if the acceleration is low, the machine will need longer time to change a speed into another one, the engraving efficiency will be low while the impact to the equipment will be smaller, resulting smaller abrasion of the equipment.

The acceleration value set by the factory is the protection value for the equipment, because the greater this value is, the greater the impact to the equipment will be, the there will be adverse influences on the performances of the machine, which will even cause failure of the equipment.

The limit speed and the max. acceleration of the equipment should match each other so as to make the equipment work in the optimal status (i.e., the perfect harmony of the working speed and the engraving effect). Generally, the users may carry out reasonable settings according to their requirements for the engraving speed and engraving accuracy.

Provided the user's requirements for the accuracy is met, the user can properly improve the engraving speed and acceleration to enhance the engraving efficiency.

If the current speed has met the user's requirements, or the speed during the engraving cannot reach the max. speed set currently, the user may properly reduce the speed so as to get products with higher accuracy with the same efficiency.

Because different users have different environments and requirements for the engraving, the limit speed and max. acceleration of their equipment will differ. The users can get the satisfactory parameter values after multiple practices.

### **Safety Protection:**

This parameter should be selected according to the specific configuration of the equipment, e.g., if the equipment is provided with the uncapping protection etc. (in factory settings, the uncapping protection etc. are set at "Enabled"), select "Enabled"; whereas, select "Disabled".

When the safety protection is enabled, upon any behavior of the user violating the safe operation rules (opening the cover or approaching the engraving when operation, for instance), the engraver will start the safety protection measures, e.g., suspending the operation, etc.. The user may also mask the "Safety Protection" function when the equipment is under safe protection according to actual requirements, i.e., set the safety protection feature at "disabled". This operation may be carried out during the inspection or testing of the equipment, but it must be performed by professionals and is not recommended for normal users.

### **Laser Lethargy (%):**

With the increase of the operation time of the equipment, the power of the laser device will decline gradually, which will influence the engraving depth of the equipment. To compensate this influence, the equipment will automatically adjust the operation speed according.

With this parameter, the user can get the same processing effect when the laser device decay

without modifying the parameters of the operation files originally stored.

### Gang Control:

This parameter should be decided according to the configuration of the equipment. There are 8 options (control 1~control 8), controlling 8 external devices. Each option is provided with 4 control modes: Always on, Always off, Auto on, Auto off.

Always on: enable this external device whether the machine is operation or left unused;

Always off: contrary to Always on;

Auto on: enable this external device when the machine is operation and stop it when the machine is left used;

Auto off: contrary to Auto on.

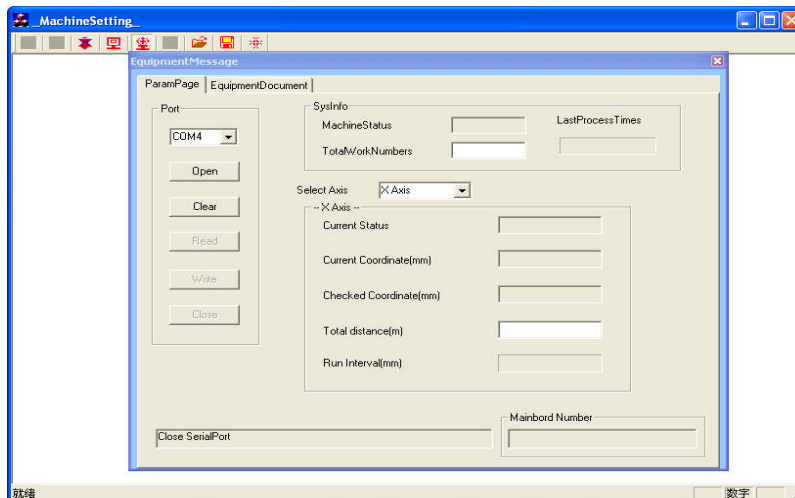
The user may select suitable control mode according to actual requirements.

✘ The factory settings are only for reference and cannot be modified by the user.

The mechanical parameters should not be modified by anyone but the professionals, suitable parameters may be set with reference to the factory settings.

Click on the equipment information icon , the menu shown in Figure F7-2-2 will appear:

All parameters of the equipment information are automatically set by the system, those parameters are just descriptions and statistics of the status of the equipment and will not influence the normal operation of the equipment.



F7-2-2

### (1)System Information

Machine status: Current status of the equipment: operation, idle. (The user cannot modify this parameter)

Accumulated copies: Total workload of the equipment. (The user cannot modify this parameter)

### (2)Select Axis

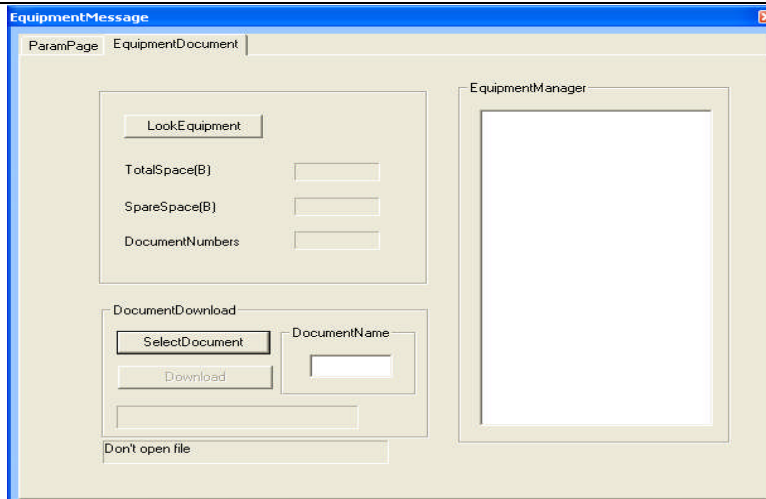
Current Status: the status at current: operation, idle.

Current Coordinate Value (mm): location of the laser head on the selected axis, i.e., the coordinate value corresponding to the mechanical origin.

Coordinate Value of Registration point (mm): the coordinate value of the registration point on the axis, the user may modify this value to achieve precise locating.

Accumulated Travel (m): Total travel covered on the selected axis

**(3)Motherboard Number:** version number of the motherboard supporting the current equipment, this number is provided by the system and cannot be modified by the user.



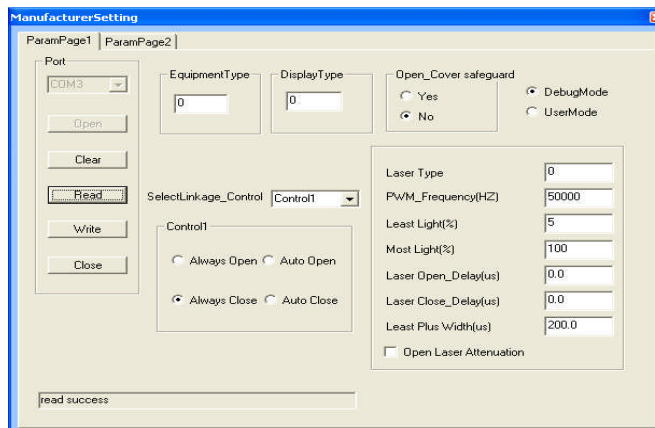
F7-2-3

(4) **Equipment Inquiry:** EMS memory space and files of the equipment

(5) **Download:** downloading files into the equipment

(6) **Equipment File Management:** here you can read the names of the equipment files, delete files or start files, etc. .

See Figure F7-2-4 for the factory settings



F7-2-4

## Equipment Type:

Type of the machine used by the user. There are mainly general engravers and brand engravers.

## Display Block Type:

Display the type of the block according to the specific configuration of the machine.

## Mode Fixed/Mode Optional:

If Mode Fixed is selected, the operation mode of the machine is not changeable and can only be the mode set in factory.

If Mode Optional is selected, there are several modes for selection, the user may switch between the modes and carry out parameter settings according to actual requirements.

## Debugging Mode/User Mode

### Debugging Mode:

The mode used for debugging before leaving factory and cannot be used by the user. When this mode is selected, the system will automatically copy the factory settings to the user settings, therefore, the settings of the machine the user sees for the first time after the machine leaves factory are the settings for the machine after debugging in factory.

### **User Mode:**

The mode used when the user is operating the machine. The user may set the parameters according to actual situation with reference of the factory settings. And the parameters set by the user should govern after the settings, i.e., the PRI of user settings is higher than that of the factory settings, the machine will adopt the user settings when operating. But the parameter values set by the user cannot exceed that of the factory settings, otherwise, the factory settings will govern.

### **Laser Device Type:**

Select proper laser device type according to the laser device used by the machine.

### **PWM Frequency:**

I.e., the light intensity frequency of the laser tube, this value differs according to different types of the laser tubes, please consult the instructions for the laser tube for details.

### **Min. Duty Ratio:**

The min. duty ratio supported by the engraver.

### **Max. Duty Ratio:**

The max. duty ratio supported by the engraver.

**Laser On/Off Delay:** the delay parameter set to avoid the uneven edges of the first stroke and the last stroke when the laser is on or off.

### **Laser On Delay:**

Because it takes a short period to start the laser, in order to make the light and the laser head be started synchronously, the laser device is started before the laser head. I.e., the Laser On Delay.

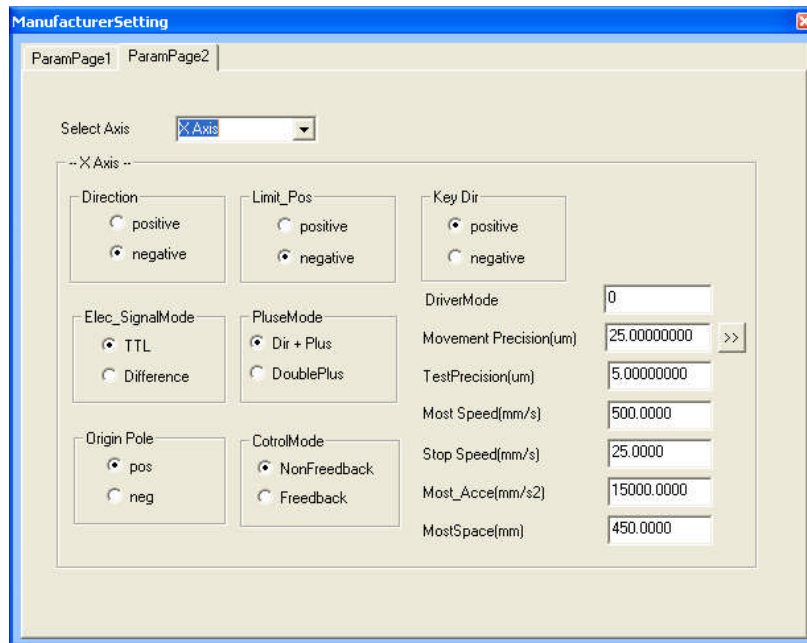
### **Laser Off Delay**

Because it takes another period of time to shut off the laser after receiving the instruction, in order to avoid excessive engraving, the laser is shut off in advance.

### **Min. Pulse Width:**

The min. pulse width to be recognized by the laser device.

**Decay Compensation On:** as the laser tube has decay rate, this option is recommended to be selected.



F7-2-5

**Direction Polarity:**

Classified into positive and negative, when the motion direction of the motor disaccords with the direction control buttons on the keyboard, you can change the direction polarity to make them consistent with each other.

**Limit Polarity:**

Classified into positive and negative, when the motor cannot return to the original position, you can change the limit polarity to make it normal.

**Button Polarity:**

The buttons on the control panel correspond to directions of the motion of the axes, if it moves to the right when you press the left, change the polarity.

**Level Signal Mode:**

There are TTL and differential modes, select the type according to the type of the motor driver.

**Pulse Mode:**

The turning of the motor is driven by pulse. There are 2 modes of pulse sent by the driver: Direction + Pulse, double-pulse; select the type according to the type of the motor driver.

**Origin Polarity:**

The signal polarity when the machine returns to the origin, if the machine returns to the origin when positive pole is selected, this origin polarity of the machine is positive, otherwise, it's negative.

**Control Mode:**

There are 2 control modes: open-loop and closed loop. This is set by the factory according to the actual configuration of the machine, if the machine adopts the open-loop control mode, this setting is open-loop; otherwise, it's closed-loop.

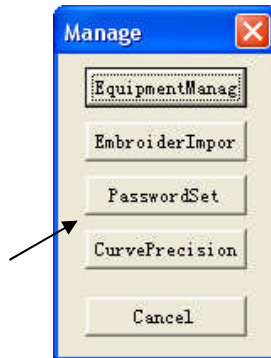
**Transmission Mode:**

The transmission mode of the equipment is the configuration mode of the guide rail and motor of the equipment, please consult the instructions of the machine to decide which mode to adopt.

**Max. Travel:**

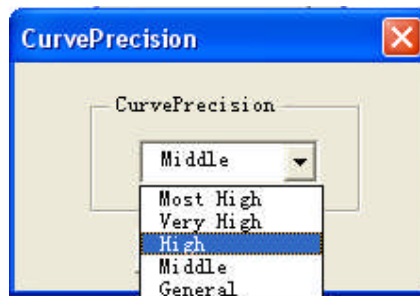
As either the beam or the guide rail has a fixed length, each machine has a max. working breadth (i.e., working range), which limits the motion of the machine within the max. working breadth and makes the trolley and the beam move within the working range. The trolley and the beam will not hit the wall as there's the limitation of max. travel.

Embroideries Import is provided for the convenience of the user to import DST, DSB files of mongline format, the import of CAD files is opened here. Please see the figure below:



Password is provided for unlock the limitations set by the factory.

You can set the curve accuracy with the software to improve the smoothness and speed of the operation, you can select normal, medium, higher, etc..



## Chapter Five: CorelDraw Direct Output

### Preface

This part mainly introduce to you the professional laser engraving motion control card, which is an advanced offline control system provided with file management function and engraving software with complete function. This chapter mainly describes the functions and operation of this software so as to make the users make better use of the functions of this motion control system. Our software is classified into many types, chapter 2 describes the AutoCAD direct output software, after installing our software, the menu of our control software will be directly shown in AutoCAD, thus our software is organically integrated with CAD system, as it effectively utilized the strong editing functions of CAD, i.e., utilizing the functions of CAD, it also has strong functions, besides, as the edit of graphics, settings for the parameters and the data transmission to the control cards as well as all other operations are completed on the interface of AutoCAD, there's no need to save the files for the operation with other software, therefore, the operation is very convenient and our software is in the leading place in the trade.

## SEVEN. Maintenance and maintenance

Maintenance, maintenance, not only may cause your work work to be more effective, may promote the machine the work security and lengthens the equipment the service life, the guarantee processing precision is very important.

**1:** The engine bed body, the laser power source, the computer power source must good earth, earths will not be good can reduce stir up the fluorescent tube the life, when the high-pressure electric discharge can damage the control circuit, even will threaten the safety.

**2:** The bed essential maintenance is clean, specially three straight line guide rails, must frequently scour, prevented the dust causes the machine guide rail to abrade the aging. And spreads lubricating oil to guard against rusts, affects the processing precision.

**3:** The work supports the platform, (specially is cuts) after the long time can glue on the organic matter. Meets the light illumination possibly to be able to brave the smoke, even burns, should regularly eliminate.

**4:** Pays attention to in the bed a row of gusty area not to be possible to stop up, maintains as necessary except the cover unimpededly.

**5:** The cooling water must frequently replace, maintenance clean, every 3- 5 days replace time for are suitable. The suggestion use pure water, and the attention water volume cannot be smaller than 50 litres. And certainly wants the immerse water pump, the water temperature not to be able to surpass 40 °C.

**6:** Reflects the lens and the lens maintenance

( 1 ) Reflector after long time can pollute, reduces the index of reflection, must maintain cleanly, its maintenance period regards the processing material quality characteristic and the operating time length decides. Please use the absorbent cotton festooned club to moisten the special-purpose lens cleanser gently to clean.

( 2 ) The lens lens undersurface possibly can work the volatile matter pollution, on sometimes the surface also can have falls the dust. When discovery not only, also must promptly scour.

**Focuses the mirror clean method:**

I: Wrenches or twist open fastens the tube the screw with to fasten the air faucet the screw, carefully takes down the tube (to for details see focuses mirror structure drawing).

II: With washes the earlobe to blow the lens surface floating dust.

III: Moistens the special-purpose lens cleanser within with the absorbent cotton festooned club gently to clean, wants to clean to the extroverted identical direction, every time scratches a time, needs to replace the absorbent cotton festooned club, removes until the contamination.

### **\*\* Warning \*\***

Do not use the non- lens special-purpose cleanser, otherwise can corrode the lens.

Do not use the compressed air directly to spurt the lens.

Cleanly maintains in front of the lens first clear to wash the hands.

Please directly do not spray any liquid to the lens.

Does not allow back and forth to scratch, may not be incisive scratches the lens surface.

### **\*\* Attention \*\***

Please do not blow the bad lens surface coating level! The overstrain clean movement can damage the lens and reduce the lens the service life! Also do not have to the hand to touch the lens, be please careful! May let long-time which your lens uses!

**EIGHT. Equipment frequently asked questions faq and solution**

Phenomenon	Possible reason	Solution
The laser machine cannot carve	1: Whether the power source is AC220V50HZ 2: Whether electrifies 3: Whether opens switch 4: The software output port establishes whether correct 5: Whether transmits the correct data to give the carving machine 6: The opening machine order isn't whether correct	1: Inserts the carving machine power source, opens switch 2: Transmits the correct document format
The laser machine carving is not normal	1: The operating system has the virus or damages 2: Laser carving software is not normal 3: Chooses the graph to surpass page layout 4: Electrostatic disturbance 5: The path of rays displaces 6: The laser power source damages 7: The related electric circuit logical 'or' circuit damages 8: Laser damage or aging	1: Reinstalls the operating system, looks up kills viral 2: Reinstalls laser carving software 3: Adjustment page layout 4: Meets the firm grounding 5: Adjusts the path of rays (front reference method) 6: Replacement laser power source 7: Replacement electric circuit logical 'or' circuit 8: The replacement stirs up the fluorescent tube
The laser machine cannot cut puts on the material	1: The carving uses the laser strongly passed small 2: The carving uses speed excessively quickly 3: The focal setting is inappropriate	1, inspection water circulating system current of water whether smooth (water pipe bend or water pipe do burst) 2, the inspection focal distance whether normal (redo adjust), 3, inspects the path of rays whether normal (readjusts 4, the

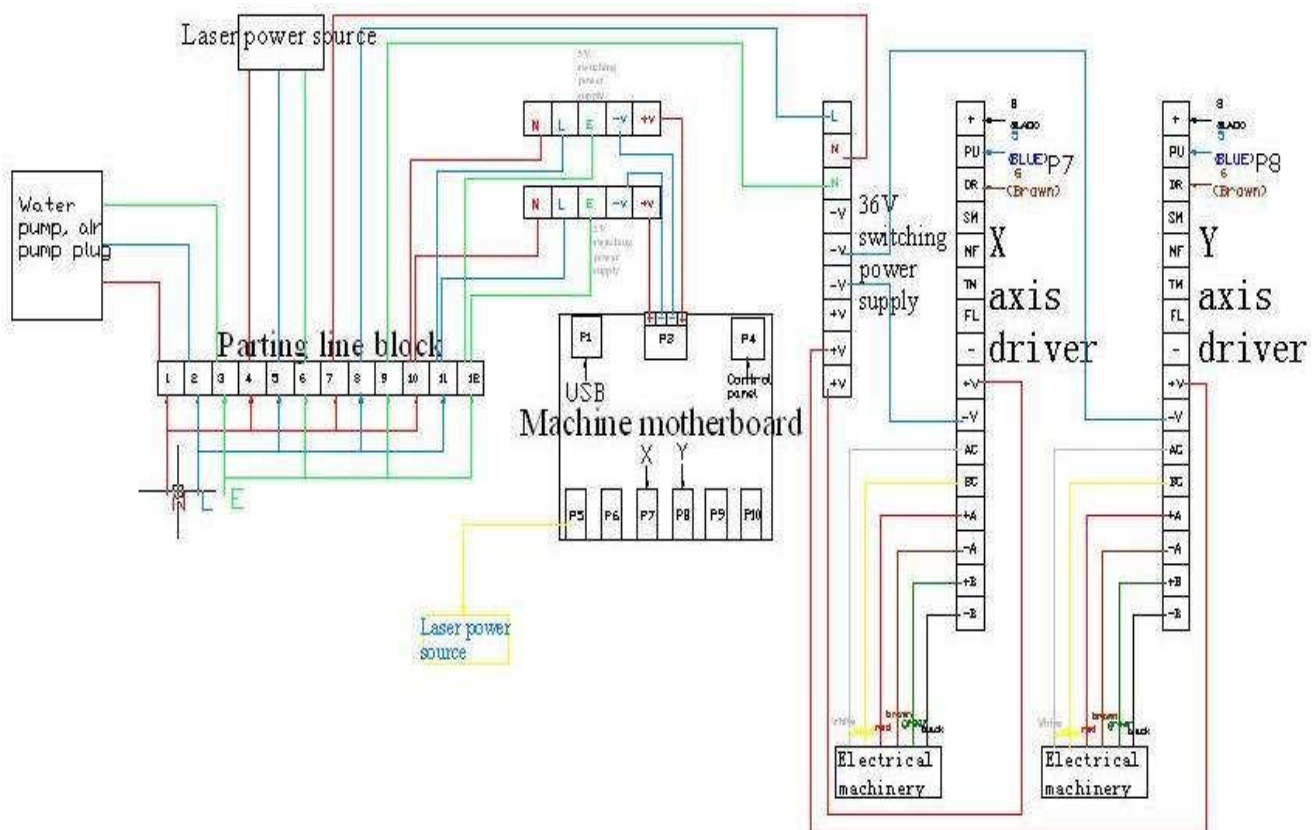
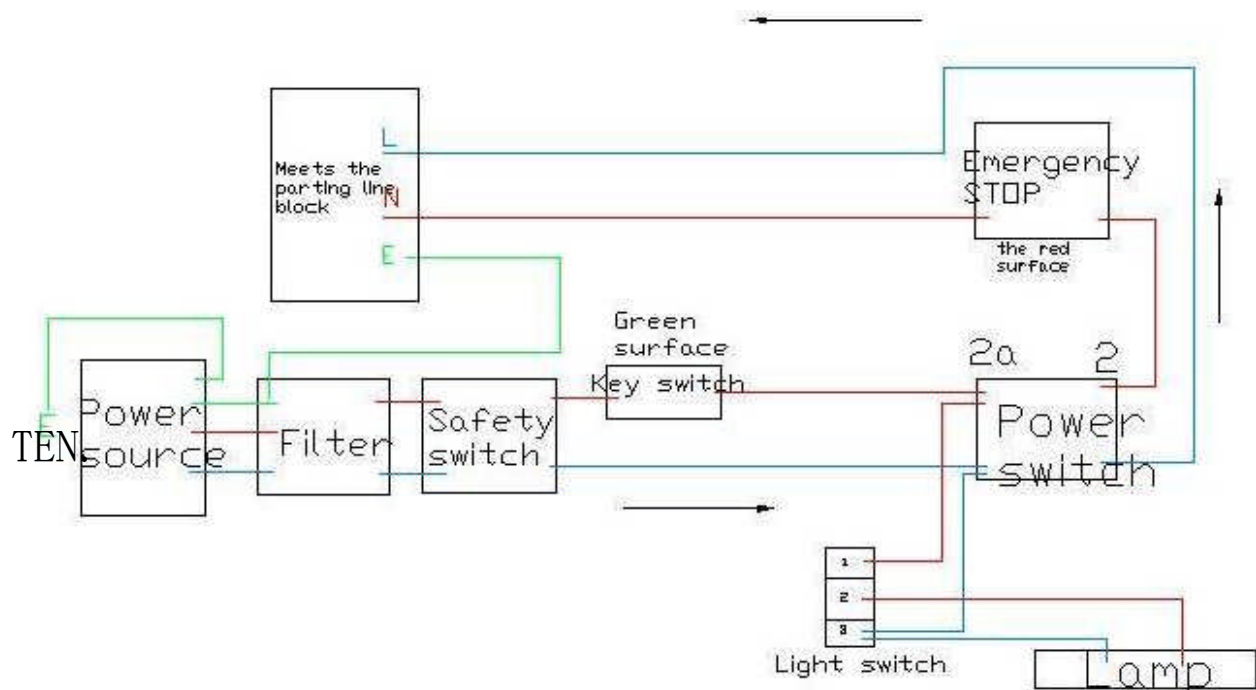
## SALECNC Laser carving cutter user's manual

	<p>4: The lens are polluted</p> <p>5: The path of rays displaces</p> <p>6: Stirs up the fluorescent tube to get older</p>	<p>inspection version material upper berth paper) excessively is whether thick, The water volume excessively are whether many (readjusts )</p> <p>5, the inspection crossbeam) whether parallel (does adjust two side leather belts)</p> <p>6, inspects the lens whether broken (replacement)</p> <p>7, inspects the lens or stirs up the fluorescent tube transmitting end whether receives pollutes (recleans)</p> <p>8, the inspection water temperature) whether is higher than 30 °C (replacement circulating water)</p> <p>9, the inspection stirs up bald or focuses the mirror whether becomes less crowded (fastening)</p> <p>10, the laser electric current luminous intensity must achieve 8mA</p> <p>11, the violent fluorescent tube get older (replacement)</p>
Cuts the line to be wider	<p>1: Whether the focal distance does adjust arrives</p> <p>2: Laser intensity oversized</p> <p>3: Path of rays deviation</p>	<p>1: Readjusts focal distance</p> <p>2: Reduces the laser intensity</p> <p>3: Adjusts the path of rays</p>
The sound is unusual	<p>1: The slide has in the guide rail travelling schedule prevents lives</p> <p>2: Width establishment not to</p> <p>3: Document actual page layout oversized</p>	<p>1: Removes prevents thing</p> <p>2: The change width establishes</p> <p>3: The amendment file</p>
Not on-line	<p>1: The connection port establishment is not correct</p>	<p>1: Reset port</p> <p>2: Again opens the computer and the machine</p>

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The carving too is shallow	<p>1: The operating time too is long 2: The operating temperature too is high</p> <p>3: Water pump knock off</p> <p>4: The air faucet leaves the light mouth to stop up by the sputtering</p>	<p>1: Must pay attention to the machine the maintenance and the maintenance, suitably rests the moment</p> <p>2: Replaces the water pump</p> <p>3: Cleans the air faucet</p>
The XY two axes do not have the uniform motion	<p>1: Graph not closed</p> <p>2: The software carving cuts the parameter not to be right</p>	<p>1: Deletes the unnecessary link</p> <p>2: Reset parameter</p>
The carving falls out of step	The guide rail dust too are many or has the sundry goods	For slide apply oil clean guide rail
Does not leave the laser	<p>1: The laser power source holding wire has not connected 2: The laser power source has not earthed</p> <p>3: Stirs up the fluorescent tube two wiring not to weld</p>	<p>1: Insertion laser power source holding wire</p> <p>2: Earths</p> <p>3 the laser power source: The inspection stirs up the fluorescent tube two wiring</p>

★ Attention: Above has the problem to need the specialized operator to process, the operator could not solve, please with the dealer or the factory relation, was sure not arbitrarily to process!



## Packing List

<b>Product</b>	<b>Quantity</b>
laser machine	one
Centrifugal fans	one
Water tank	two
Comparison focuses part	one
Air pump	one
Water pipe	two
Air pipe	one
Power line	one
Centrifugal fans pipe	two
Cable ties	eight
Handle	two
Water pump	one

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