PowerCut laser control software

– Operation instruction -

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Chapter 1 Summary

1.1CNC system software profile

PowerCut ordinary laser cutting control software is a laser cutting CNC quality goods, which is carefully orchestrated by famous R&D team with many years' industry experience in company. This software is easy to learn , with mature and steady movement control arithmetic , complete cutting process, friendly man-machine interface, and it can be applied in garment, acrylic, furniture and other non-metal laser cutting controls.

1.1.1 composition of the control system

The control system is composed of hardware(motion control card and parts) and softwares.

Softwares'contents and file instruction

File or child directory name	Contents	Instructions
PowerCut folder	Control system installation procedure	Copy
Driver folder	Control card driver,	

Form 1.1.1.1 software contents and file instruction

Hardware equipment composition

Item	Quantity	Instruction
Control card	1	There must be several USB ports and network ports
USB cable, network cable	1	Length within 3 meters

Form 1.1.1.2 hardware equipment composition

1.1.2 software installation

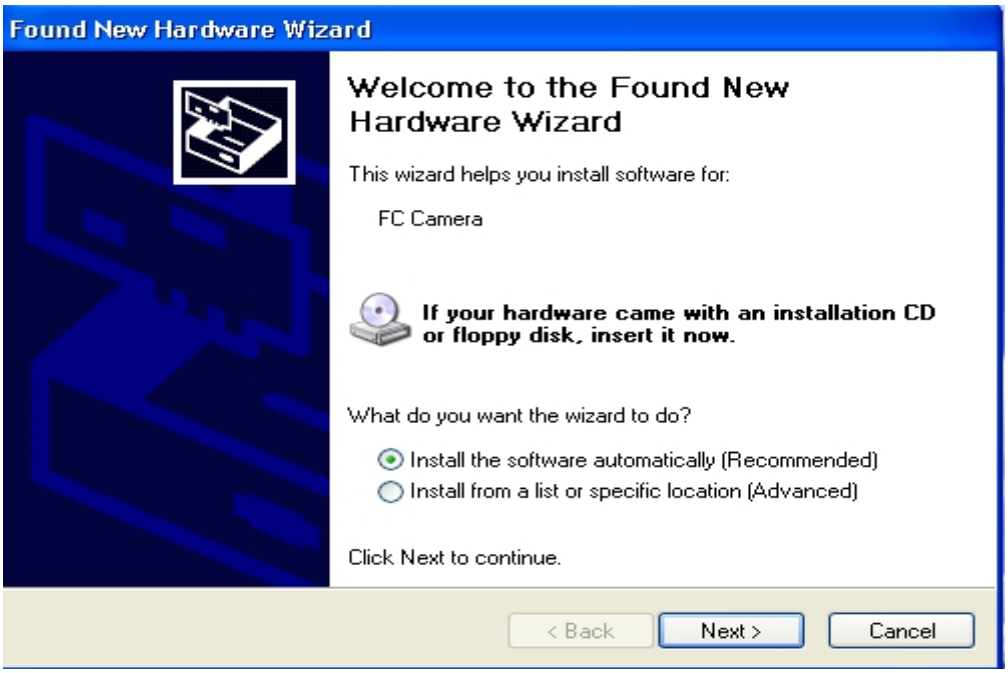
Hardware requirements: CPU Celeron more than 2.1G

memory: more than 256M hardware: more than 20G

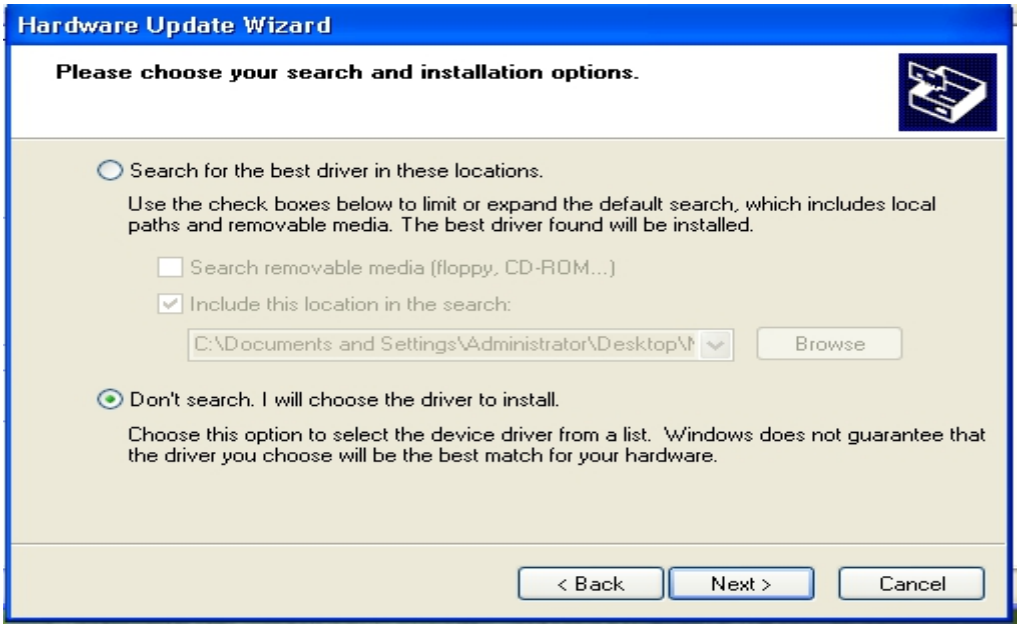
Software requirement: Microsoft Windows operation system (Window2000, WinXP)

1.1.2.2 board driver installation

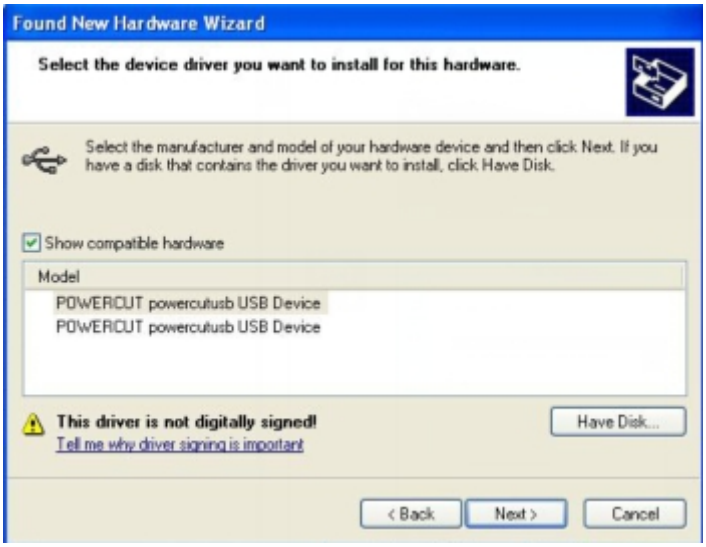
After connecting the board with the machine case, if the computer prompts finding the new hardware, and continue to prompt the hardware can not be used temporarily. At this time, the driver installation procedures are as follows: choose to install from list or appointed place.



Then choose “Don’t search, I want to choose the driver procedure to install myself’



Then click install from the disk.



Now, pls click”browse”, and choose the file ftdibus.inf in the driver files;

Then confirm the file’s path:

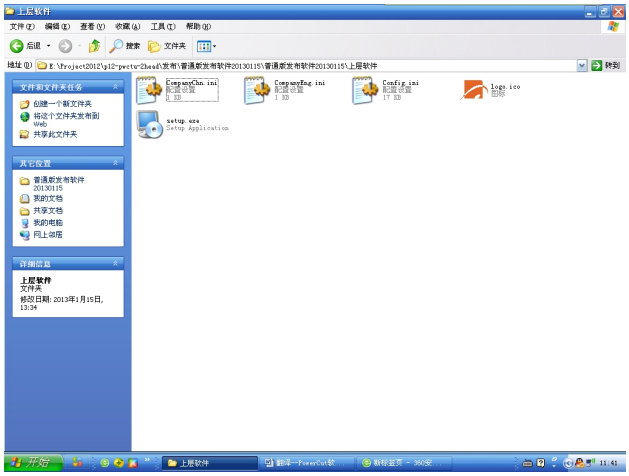
Then click “next step”



At last, complete the installation of the board driver.

1.1.2.5 install power cutting software

After installing the above drivers, we can install PowerCut visual cutting software. Double click setup.exe installation package, and then click continously “next step” to complish the installation.

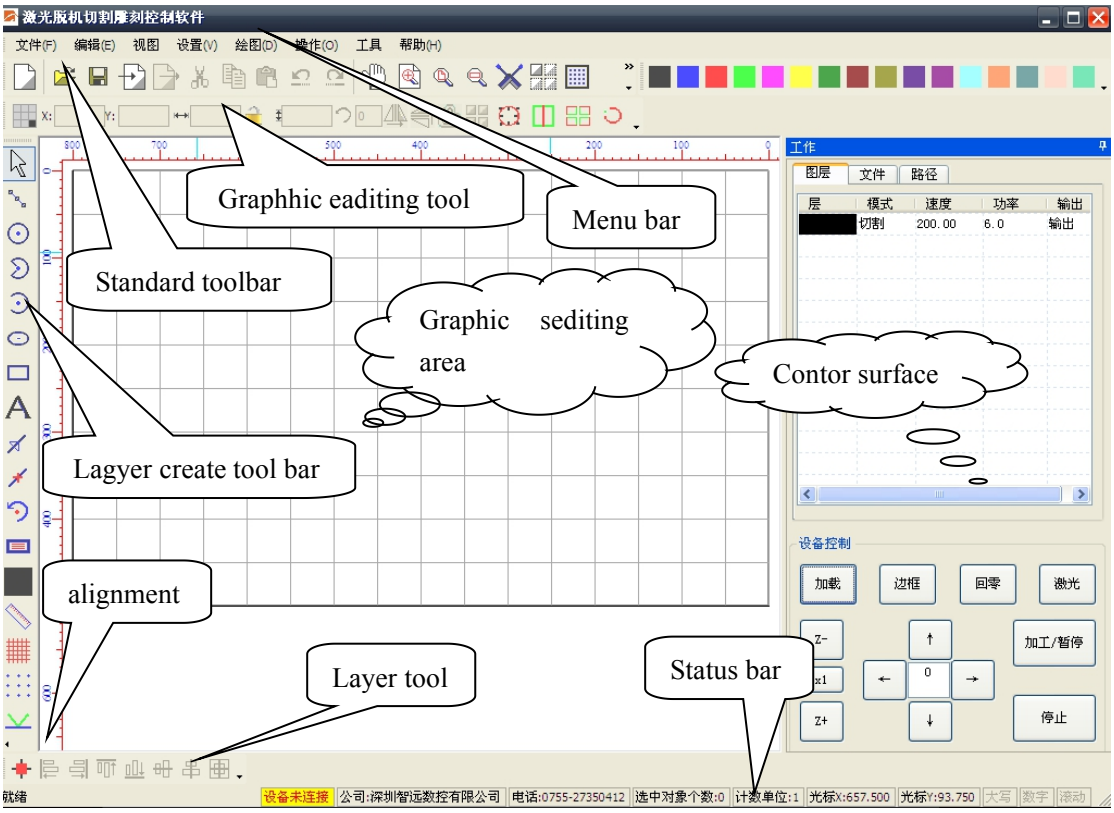


Picture 1.1.2.5.2 the SilentUninstall under the installation folder

1.1.3 Software features

- The interface is friendly, easy to learn and convenient to operate.
- The AI, BMP, PLT,DXF,DST and other many kinds of graphics data formats are all compatible.
- It can do multistage stratified processing and definite the output sequence.
- It can set the machining process and precision personalization, and has the laser head operation trajectory simulation display.
- It has a variety of path optimization functions and pause function during the processing process.
- A variety ways of graphics and processing parameters and its repeated usage,
- It has the function of processing time estimation,cost budgeting, and intelligent layout input.
- Unique double laser system intermittent work and their respective independently work and motion trajectory compensation control function.
- Set the processing starting point, working path, laser head dock position, etc., according to the different needs of processing
- It can be compatible with many kinds of communication mode. Users can adopt USB port communication or network communication according to the actual situation.
- Play the function of adjusting speed during the processing process.
- It has power-off protection function. System can remember the breakpoint if it is power-off suddenly during the processing.while restoring the power, system can find this breakpoint and continue to process.

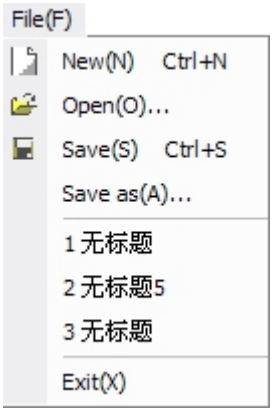
1.1.4 Interface instruction


Graphhic eaditing tool
Menu bar
Standard toolbar
Graphic sediting area
Contor surface
Lagyer create tool bar
alignment
Layer tool
Status bar

Chapter 2 Menu bar

2.1 File menu items

Click ”file” icon on the menu bar or shortcut key Alt+F on the keyboard to open the file pull-down menu.



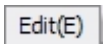
- New: Create new processing documents. You can press the shotcut key Ctrl+N on the keyboard or you can click the ”New” under the menu bar.
- Open : Open the file which is supported by the software. The supported file types includes:



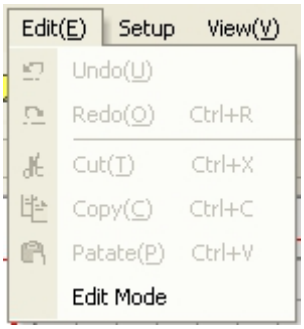
- Save : Save the current editing graphics into PCT file. Press the shotcut key Ctrl+S or  icon to save the file.
- Save as: Save the current editing graghics as PCT file in other place.
- Save as laser file: Save the current editing graphics as laser processing CUT file.
- Exit: Exit powercut software. Press the shortcut key Alt+X to exit.

Tips: The differences between PCT file and CUT file. PCT is the saving file format of PowerCut software, and can be opened and editted in the PowerCut software. CUT file is laser processing file. PCT file can be transferred to CUT file by PowerCut software, and then lead it in CNC system processing. The CUT file can not be opened and editted in the PowerCut software, and the PCT file can not be led in the CNC system processing.

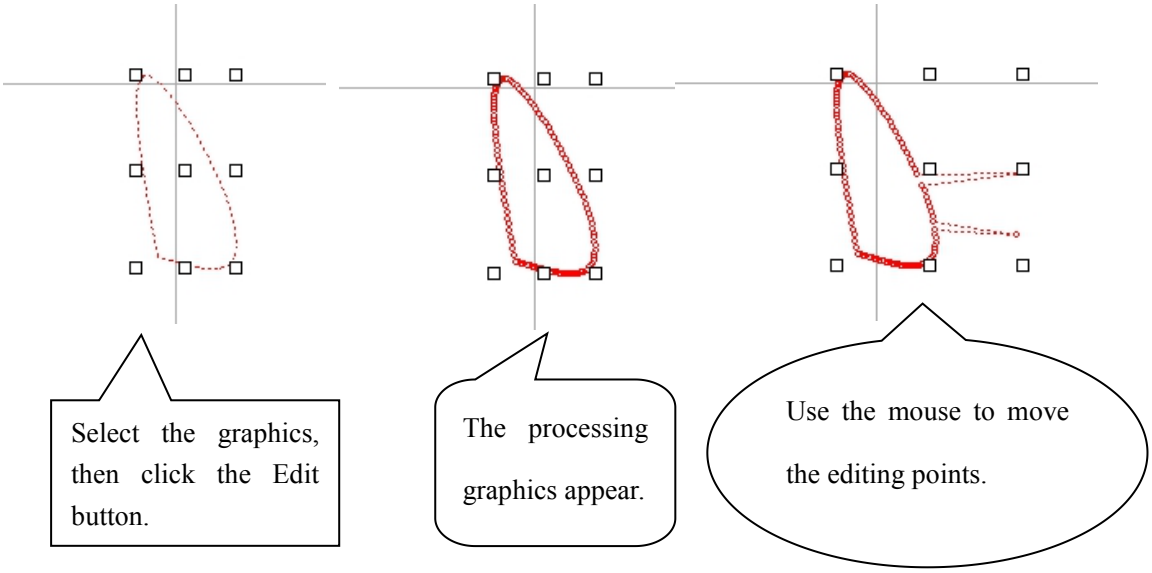
2.2 Edit menu item

Click the 

icon on the menu bar or press the shortcut key Alt+E on the keyboard to open the Edit pull-down menu.

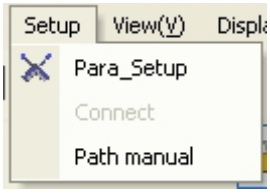


- Withdraw: Withdraw the last operation, and you can withdraw continously
- Repeat : the anti-operation of withdrawing, recovering to the last withdrawing operation.
- Cut: Cut the current selected object, then the selected object disappear, press shotcut key Ctrl+X.
- Copy: Copy the current selected object, then the selected object will remain, press the shortcut key Ctrl+C.
- Paste: Use together with the “Cut” and “Copy”, paste the object, press the shortcut key Ctrl+V.
- Editing mode: After selecting the graphics, click this icon, then appearing the editing points, move the editing points to edit the graphics. This function is mainly used to depict the graphics, such as the graphics on the processing interface:



2.3 Set the menu items

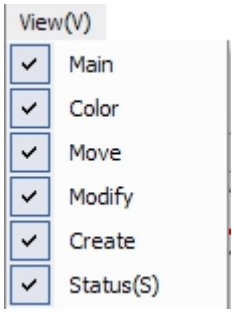
Click the Setup icon on the menu bar to open the "Set" pull-down menu.



- Parameters setting: Detailed instructions pls refer to the chapter 3 standard tool bar.

2.4 "View" menu item

Click the View(V) icon on the menu bar or press the shotcut key Alt+V on the keyboard to open the "Check" pull-down menu.



Menu



Color：



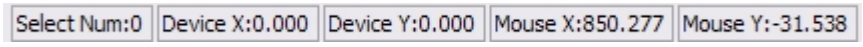
Modify：



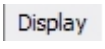
Create：



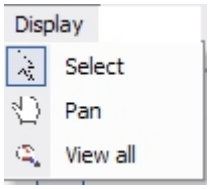
Status bar：



2.5 “Display” menu items

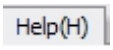
Click the 

icon on the menu bar to open the “View” pull-down menu.

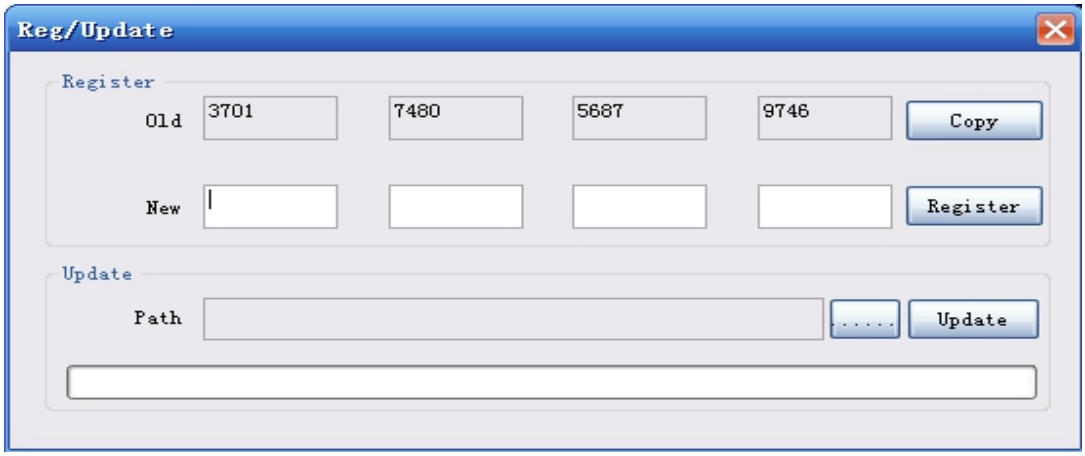


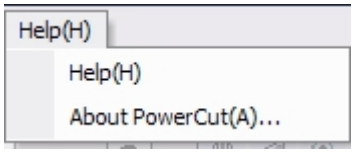
- Choose : choose the graphics object, and the mouse shape is 
- Translation : translate the graphics object, and the mouse shape is 
- All : show all the graphics objects

2.6 “Help” menu items

Click the 

icon on the menu bar to open the “Help” pull-down menu.



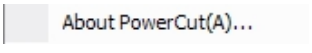


Choose 

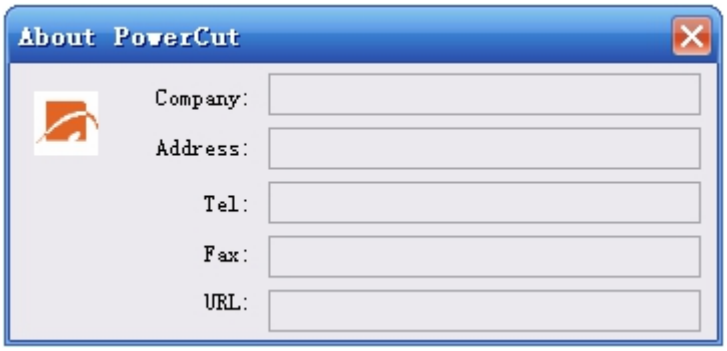
, Pop-up registration/upgrade window, showing the registration/upgrade information.

- Registeration method: After the original registeration code expired, acquiring the new registeration code from the manufacture. Input the new 16 bits registeration code into the box, and then click “register”.
- Upgrate method: Aquire the update documents from the manufacture, and then save to the computer appointed position. Click 

while updating to find the updated file which deposited in the appointed place, and then click 

. Choose 

, pop out “about” window, which showing the company’s related information.


About PowerCut
Company:
Address:
Tel:
Fax:
URL:

Chapter 3 standard tool bar

Standard tool bar realize the ordinary file editing operation, just as following picture showing:



Picture 3-1

3.1 New

Correspond to the icon  on the tool bar. It is used to create a new graphics editing area. Also you can press the shotcut key Ctrl+N.

3.2 Open

Correspond to the icon  on the tool bar， and the file format has DXF/PLT/AI/PCT/BMP/DST/JPG/JPEG，the shotcut key is Ctrl+O.

3.3 Save

Correspond to the icon  on the tool bar，save the current editing graphics and processing parameters as PCT file，the shortcut key is Ctrl+S。

3.4 Lead in

Correspond to the icon  on the tool bar，lead the file to graphics editing area to edit it. This software support the format of DXF/PLT/AI/PCT/BMP/DST/JPG/JPEG etc.

Tips : the differences between “lead in” and “open”: “Lead in”is to insert the graphics file to the current editing file, while “Open”is to reload a file.

3.5 Lead out

Correspond to the icon  on the tool bar ， this software can lead out three formats of PLT、DXF、BMP. Input a file's name and click "save"button.

3.6 Cut

Correspond to the icon  on the tool bar ，select the graphics object and then click this icon again.Then cut and revise the selected graphics. The shotcut key is Ctrl+X.

3.7 Copy

Correspond to the icon  on the tool bar ，select the graphics object and then click this icon. Copy current graphics to clipboard. The corresponding shotcut key is Ctrl + C.

3.8 Paste

Correspond to the icon  on the tool bar，click this icon is to paste the copied or cutted graphics to current graphics editing area. The corresponding shotcut key is Ctrl+V.

3．9 Withdraw

Correspond to the icon  on the tool bar, withdraw the last operation to the current file. The shortcut key is Ctrl+Z.

3.10 Recover

Correspond to the icon  on the tool bar， recover the last operation of the current file. The shortcut key is Ctrl+R.

3.11 Translation

Correspond to the icon  on the tool bar， move the place of the current graphics editing area.

3.12 Show all

Correspond to the icon  on the tool bar， show all the objects to the maximum extent in the graphics editing area.

3.13 Display the page

Correspond to the icon  on the tool bar， display the whole page in the graphics editing area.

3.14 Fractionated gain

Correspond to the icon  on the tool bar， box select the fractionated gainedgraphics in the graphics editing area.

3.15 Parameters setting

Correspond to the icon  on the tool bar， set the system relative parameters.Below are the detailed instructions.

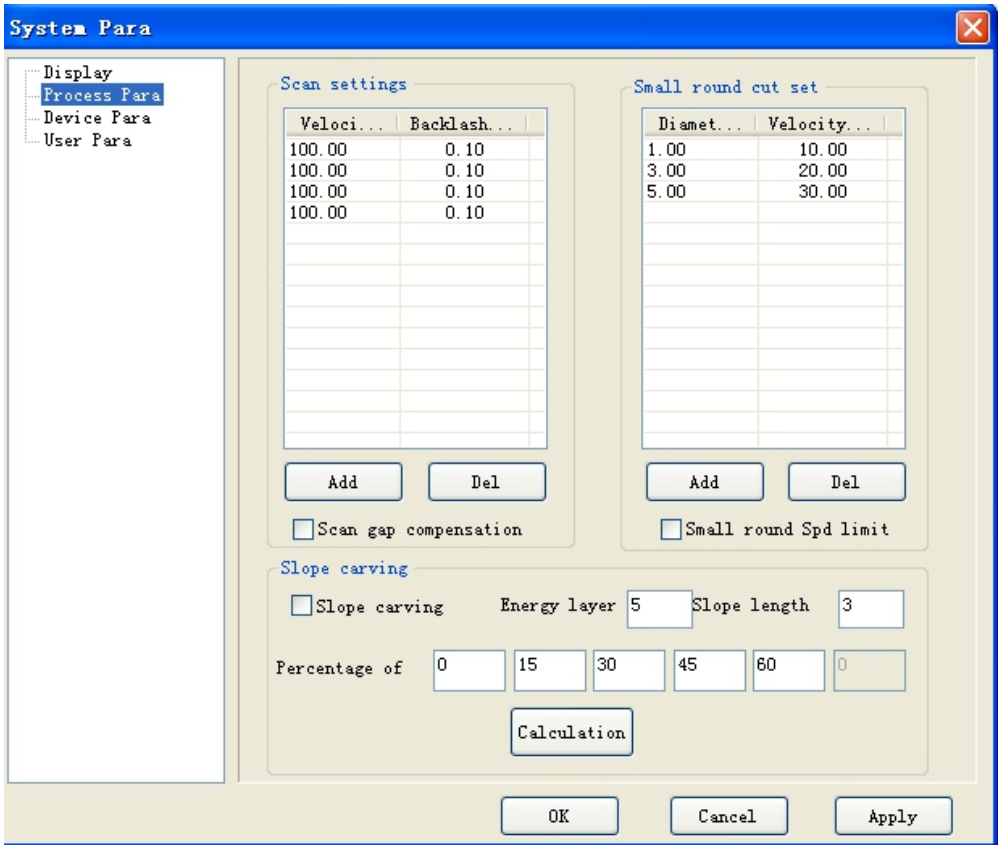


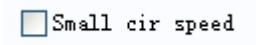
System parameters setting page has four tabs: parameters display, technological parameters, device parameters and extending functions.

3.15.1 parameters display tabs(see the above picture)

- Show grid: If selecting it, it will show grid in the graphics editing area.
- Grid space: set the space between the grids.
- Fine-tune: set the space of the precise movement.
- Paste trimming: set the space between copy, paste and original picture. It is at the 45°direction off the original picture.
- Language select: select the language
- Save : save parameters setting

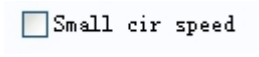
3.15.2 Technological parameter tabs



- Carving parameter setting: carving speed and backlash compensation are one-to-one correspondence. As the above picture showing, the speed of 100 are corresponding to the 1mm backlash compensation.
- Addition: Add one carving parameter. Move the bright high article to the parameters needed to revised, and double click it to revise this carving parameters.
- Cancel : Cancel one carving parameter. Move the bright high article to the parameters needed to be camceld and click it to cancle.
- Check 

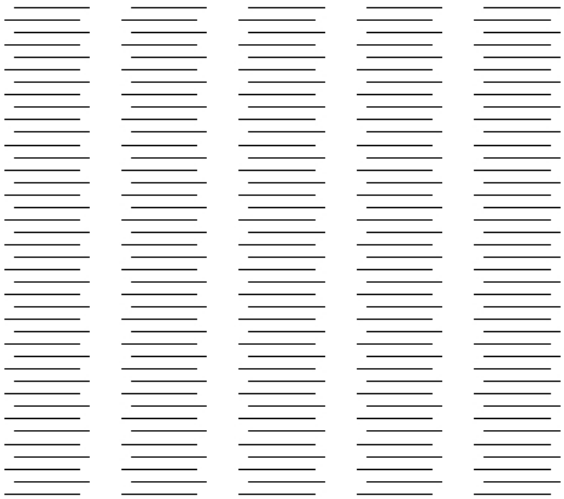
, to make the setting of carving parameters effective.
- Small round cutting parameters setting: the cutting spead are corresponding to the small round. Improve the efficiency under the premise of ensuring the quality.
- Addition : Add one parameter of the small round cutting. Move the bright high article to the parameters needed to revised, and double click it to revise

the small round cutting parameters.

- Cancel : cancel a small round cutting parameter. Move the bright high article to the parameters needed to be camceld and click it to cancel.
- Check 

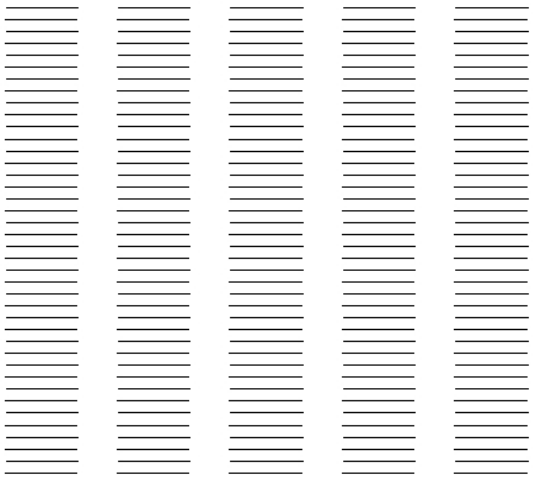
, to make the setting of small round cutting parameter effective.
- Save : save parameters setting

Backlash compensation examples:



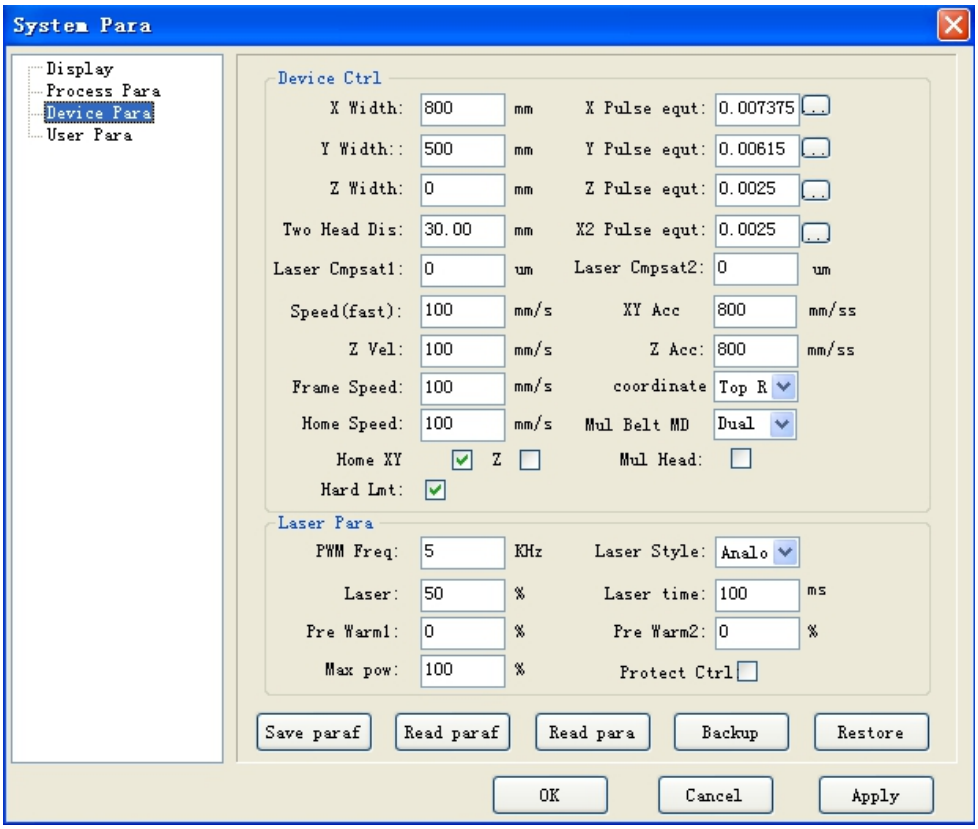
backlash（before compensation）

After the adjustment of the backlash, download and process it to the effect as follows:



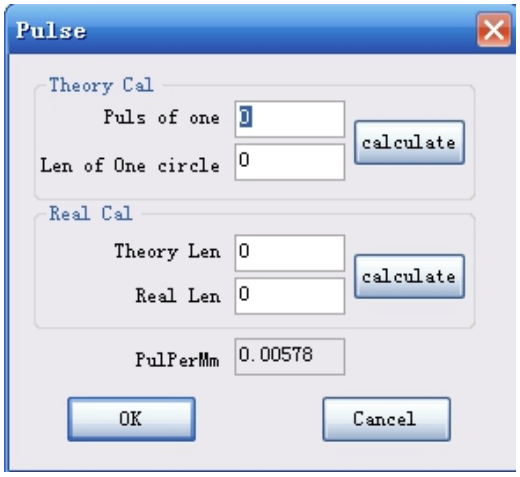
Standard effect (after conpensation)

3.15.3 Equipment parameter tabs:



Equipment control:

- Machine format X: refer to the movement range of table X axis, that is, the max range of the laser head lateral movement(mm).
- Machine format Y: refer to the movement range of table Y axis, that is, the max range of the laser head longitudinal movement(mm).
- Machine format Z : refer to the movement range of the table Z axis. Mainly used to left and right push board machine. The Z axis range is effective push board length minus the X axis format(put X axis as an example, unit mm)， continous feeding machine is out of the limitation of this parameter.
- X axis pulse equivalent : Relative to the each pulse singal, the displacement of the machine moving parts are called pulse equivalent. Also it is called smallest setting unit. Click [...] to set pulse equivalent, just as the following picture:



The are two ways to calculate the pulse equivalent: The theoretical calculation and practical calculation.

A、 theoretical calculation:

The pulse quantity of one circle of motor: step motor: put the 1.8°, 32 subdivision driver as an example, the pulse quantity of one circle of motor: 360/1.8*32=6400 (pulse). Servo motor: put the panasonic servo motor A5 as an example, The motor turns a circle while the PR008 parameter default epistatic machine send ten thousand pulse.

The real go length of motor tuning one circle: This value has been confirm, while the machine is designed. Ask the value from the machine design department.

Click calculate, calculating the pulse equivalent automatically. Click OK, set this value to the X axis pulse equivalent.

B、Practical caculation:

Theoretical length: draw a 100mm straight level. The theoretical length is 100mm to form processing file's cutting.

Real length: Actual length measured by the measuring instruments. Such as 50mm.

Click calculate, caculate the pulse equivalent automatically. Click OK, set this value to X axis pulse equivalent.

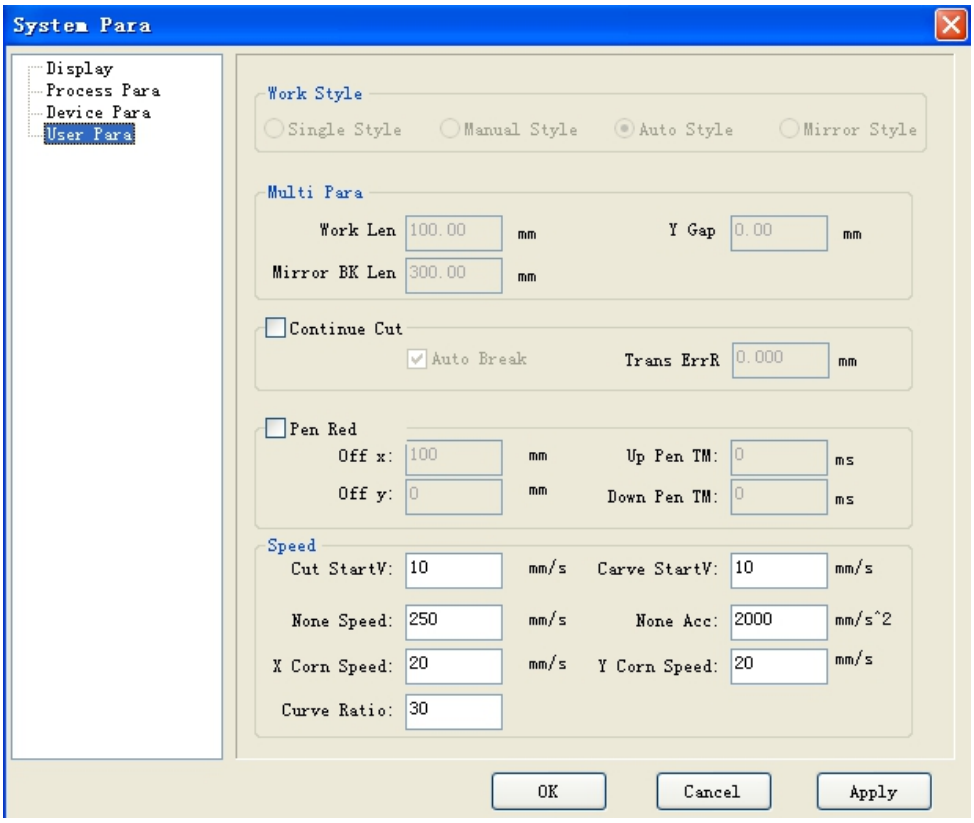
- Y axis pulse equivalent : the caculating method is the same as the X axis pulse equivalent.
- Z axis pulse equivalent : the caculating method is the same as the X axis pulse equivalent.
- Fixed fire power: set the preset(fixed power) power percentage.
- Fixed fire time: set the preset (fixed power) optical time.

- Pre-drive 1: set the laser tube 1 pre-drive power persentage.
- Pre-drive 2 ； set the laser tube 2 pre-drive power persentage.
- The max power: set the laser tube max power percentage.
- PWM frequency: set the PWM wave frequency. Pls set it according to the laser machine's features.
- Back to original point speed : set the speed of backing to the original point.
- Board going speed: set the board going speed.
- Back to the zero axis: set backing to the zero axis.
- Water conservation: check the water conservation while checking, or do not check.
- Read the equipment parameters: read the setting parameters in the control device.

Process setting:

- The movement speed(fast): set the speed of movement by hand.
- Coordinate system: choose the coordinate system(original point switch place, at the upper left or upper right).
- Start-up speed: set the start-up of the motor.
- Curve rate； set the curve's speed ratio. Bigger this value, faster the cutting curve. Otherwise it is slower.
- Travelling speed: set the machine's empty running speed.
- X axis corner speed: set the speed when X axis go through the corner.
- Y axis corner speed: set the speed when Y axis go through the corner.
- Z axis speed: set the movement speed of Z axis.
- Z axis acceleration: set the acceleration when the Z axis moves.
- Save the parameter files: click this command, save the parameter files to the appointed place.
- Application: click this command, download the already parameters to the controller(must control the controller, otherwise, it will display wrong.)
- Read the parameter files: read back the parameters files saved before to the control system.

3.15.4 Extern Fun



Mul Head Machine: if the machine has two x-heads, you should select Mul head,

Work Style:

Single Style: if you only use the first head, select single Style

Manual Style: this style will set two heads at the distance worklen.

Auto Style: this style will cut the graph by nest tool.

Min Len: Two x-Heads's min distance

Work Len: Manual Style, two heads's distance.

X Pulse: x2-head pulse per mm;

Two Head Y: Two x-heads differents in Y direction.

Continue-Cut: if the graph is larger than the plane of the machine. Continue-Cut can auto break the graph int parts and cut.

Auto-Break: if not select auto break, the graph will broken by the plane of the machine, if select, it will be smarted break.

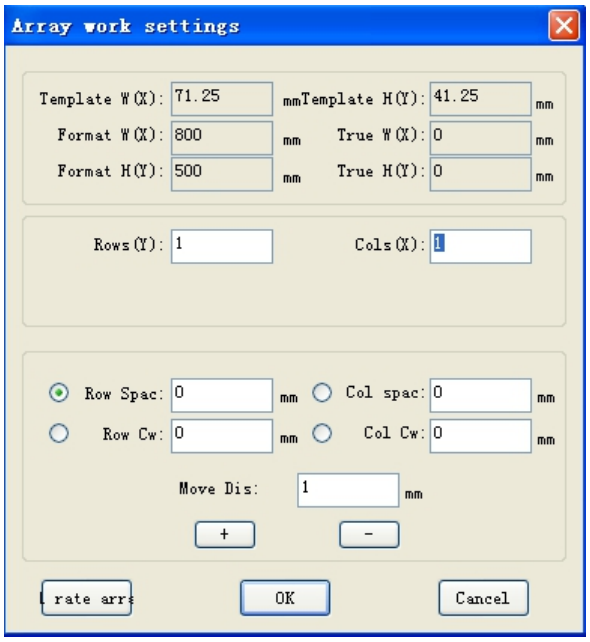
Trans-ErrR: continue-cut cut the connect of two section.

Backup: Backup the control system para

Restore: Restore the system para of Backup before.

3.16 Array processing(virtual array)

Correspond to the icon  on the tool bar， click this icon to enter into array processing setting:



- Model width(X): cut rectangular geometry outside of the array graphic X direction. It is calculated by the software.
- Model height(Y) : cut rectangular geometry outside of the array graphic Y direction. It is calculated by the software.
- Number of columns(X) : set the array number of columns
- Numbers of rows(Y) : set the array number of rows
- The distance between columns: set the X distance of the array graphics
- The distance between rows; set the Y distance of the array graphics
- The width of the format(X) ; set the parameters and page
- The height of the format(Y) : set the parameters and page
- The real width : It is calculated by the software automatically.
- The real height : It is calculated by th esoftware automatically.
- Full format arrangement: click 

button, arrange the full format

as the virtual array way. Then revise the original picture, and all the graphics will be revised automatically.

- Preview : click 

button to preview the array graphics as the set parameters.
- Clear : click 

button to clear the related parameters of the array set.
- Cancel : click 

button to cancel the array operation.
- Confrim : click the 

button to confirm the array operation.

Notice: After use the function of the array processing once, click the button 

, then click 

button again to clear related array parameters. Otherwise, it will array automatically after opening up the second file.

3.17 Path prewiew.

Correspond to the icon  on the tool bar， click this icon to preview processing path.

Chapter 4 Grapgics creation/ Revise the tool bar

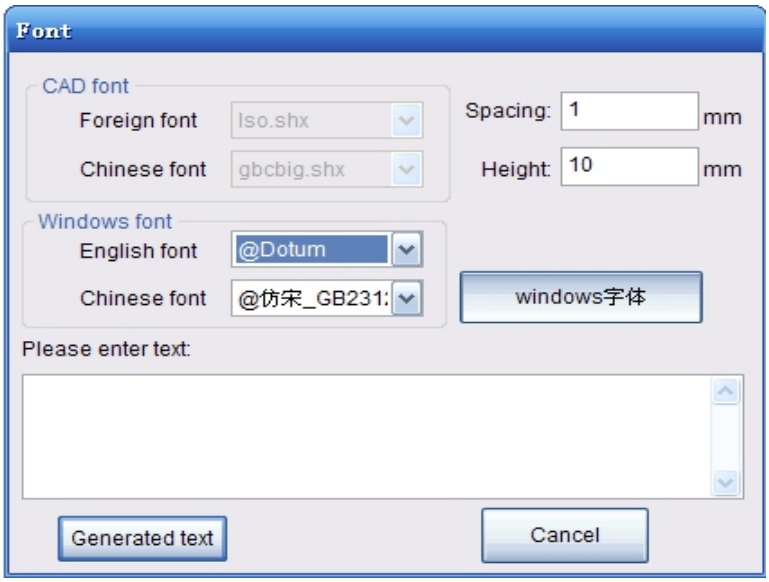
4.1 Create the tool bar

Graphics creation bar is used to create common graphics, such as straight line, curve, round, square, etc. Just as the following picture showing:



- Choose : correspond to the icon  on the tool bar, click this icon, the mouse stays in the state of selecting.
- Broken line: correspond to the icon  on the tool bar. Draw arbitririly several continous broken lines. Click the left button of mouse. Move to the appointed place by mouse, then click the left button again to complish the editing of one angle line. If you want to end the current editing, pls click the right button of the mouse.
- Round : correspond to the icon  on the tool bar, click this icon, the press the left button and push it to draw a round.
- Three Point Circular Arc: correspond to the icon  on the tool bar, click this icon,and press the left button of the mouse to confirm the center of the circle. Drag the mouse to a place and click it to confirm the arc radius, and then drag the mouse and click it to confirm the arc. Draw the radius firstly and then draw the arc.
- Arc : correspond to the icon  on the tool bar, click this icon and press the left button to confirm the arc starting point. Drag the mouse to a place and click it to confirm the finishing point. Then drag the mouse and click to confirm the arc. Draw the starting point and finishing point firstly and then draw the arc.

- Ellipse : correspond to the icon on the tool bar, click this icon and press the left button to confirm the center of the ellipse. Drag the mouse to a place and click it to confirm the X direction diameter of the ellipse. Then drag the mouse per the Y direction and click it to confirm the ellipse.
- Rectangle : correspond to the icon on the tool bar click this icon and drag the mouse to a place to draw a rectangle with any size.
- Word : correspond to the icon on the tool bar. This function is mainly to add word on the graphics and edit it. Click this button, and it will appear the following window:



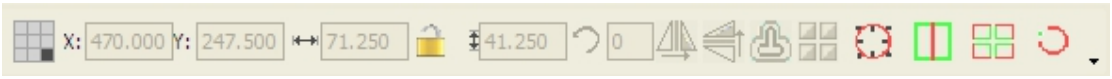
Start: Modify the start point of the obj;

Break: Break the obj into two section

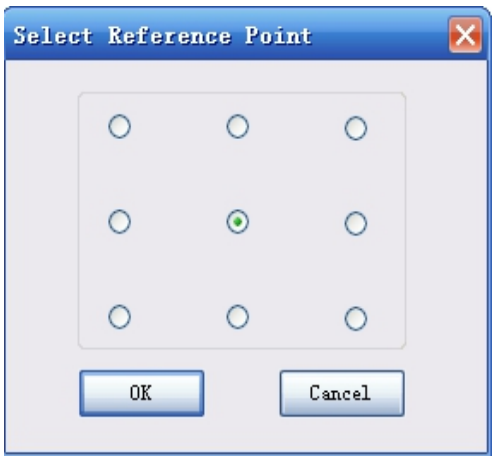
Rotate: Rotate the obj

Plane: Create the plane obj

4.2 Revise the tool bar



- Location setting: correspond to the icon on the tool bar. Click this icon and it will bounce up the window of choosing objects' reference points, as following picture:



When choosing one or serveral objects, the chosen objects would produc a edit box made up of 8 square points and one X. Put the mouse on X, and press the left button to drag the mouse. You can drag the selected object and put the mouse on the any square point among the 8 square points. Press the left button to drag the mouse to enlarge and lessen the selected dobjects. The selected 8 square points and a X correspond to the 9 rounds in the above picture. Select the round at different place. Then the

coordinate will change accordingly. 

shows the geometric attribute, and input the data revised objects' geometric attribute in the edit box.

- Proportion lock/unlock: correspond to the modification icon on the tool bar. Modify the geometric size of one direction when the proportion is locked, and then the geometric size of another direction would change as the same proportion. After the proportion was unlocked, it can not affect each other to modify the geometric size.
- Rotation : correspond to the icon on the modification tool bar. Input the rotation angle in the edit box. Click this icon, and the object will rotate as the rotation angle.
- X mirror

Correspond to the icon  on the tool bar, click this icon. The orininal graphics turn right 180 degree using the verticle line of the center of this graphics as axis, as following picture showing:



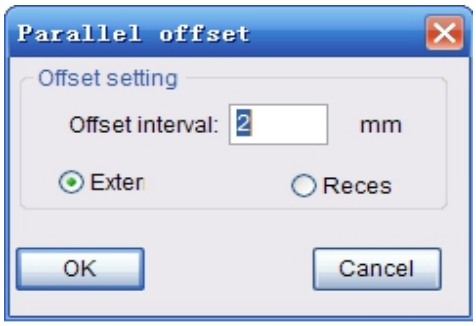
- Y mirror

Correspond to the icon  on the tool bar, click this icon. The orininal graphics turn down 180 degree using the horizontal line of the center of this graphics as axis, as following picture showing:



- Retraction or external expansion

Correspond to the icon  on the tool bar, select the vector graphics needed to be expanded and retracted. Click this icon and it will appear the following window:



Check the needed options and parameters. Click it to confirm, and it will generate the processing graphics which is parallel with the original graphics, just as the following picture showing:

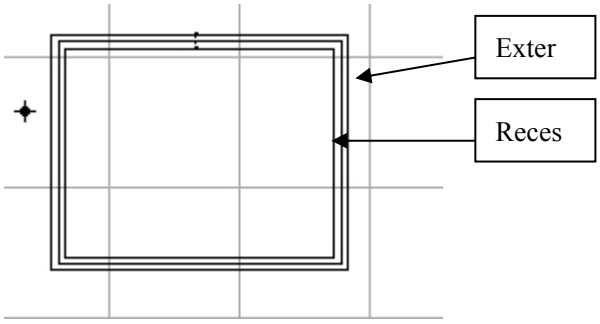
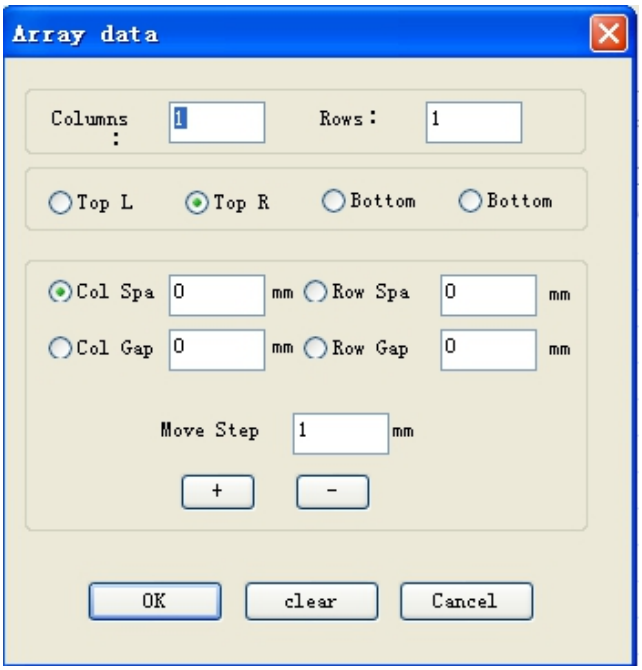


图 6-6

If selecting the retraction, graphics will narrow the internal value inward. If selecting exteral expansion, the graphics would expand. Notice: the rectration value can not excel the radius of the graphics.

- Array(real array): correspond to the icon on the tool bar. Click it and it will bounce up the following dialogue box:



Number of columns: the colum number of the array

Number of the rows: the row number of the array

Space between columns: the column space of the array

Space between rows: the row space of the array

Direction selection of the array: the array at the upper left/upper right/below left/below right side of the original graphics.

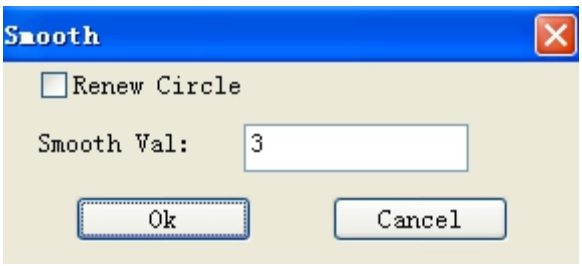
Preview : preview the effect of the array

Confirm: confirm the array

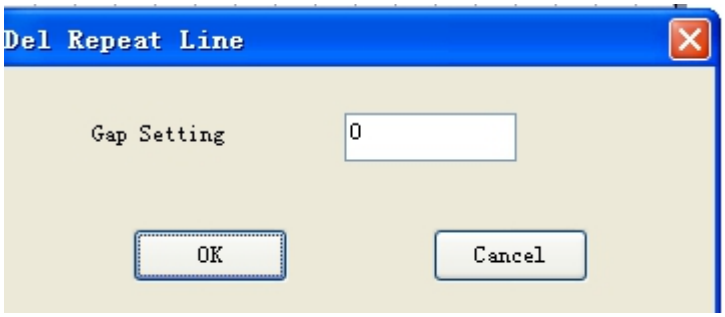
Cancel : cancel the array

Remarks: the differences between array processing (virtual array) and array （real array） . There is only matrix is entity in the virtual array, and other arraied out graphics are only for showing. It has no entity, it moves with the matrix when moving and modifying. The main advantage of it is that its data amout is small. The objects listed by the real array are entities, and every entity can be edited separately.

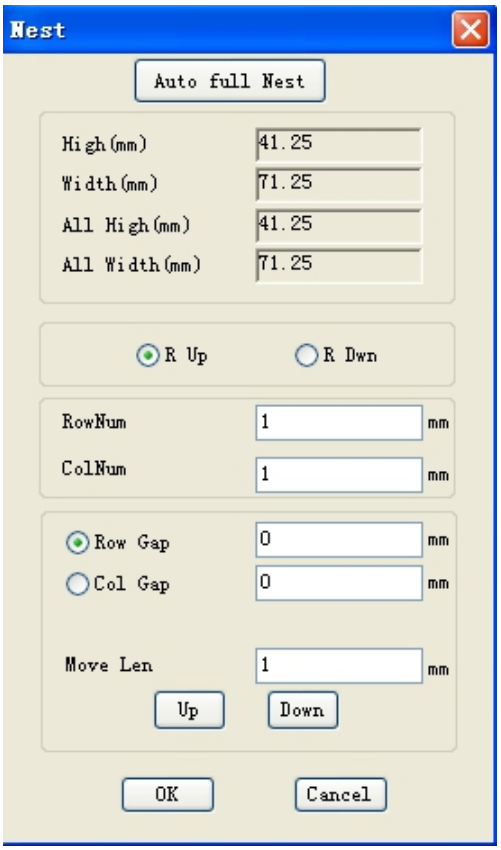
Smooth  smooth the lines by b_spline



Del Repeat Line  Delete the line which is same with other



Nest : Two x-heads Auto Style use nest tool to create the cutting data.



Auto full Nest: two x-heads auto style, nest full machine plane

High, Width: the High or width of Model.

All High, All Width: the total high(width) of the all nested object.

R-Up, R-Dwon: Nest Direction

RowNum: the count of Rows

ColNum: the count of Cols

Row Gap: the gap of rows

Col Gap: the gap of cols

Move Len: when you click the move button to change the Row Gap or Col gap.

Left, Right, Up, Down: raising the value of the gap

Chapter 5 Coverage/Alignment tool bar

5.1 Coverage tool bar

The function of the coverage tool bar is to set the layers of the processing objects.

Adopt different color to show different layer,



Select the graphic object, and then click the color icon on the layer tool column. The graphic object will be atratified. The current software support the nine layer color setting. Each layer can separately set up different processing technology. The detailed introduction are prescribed in the latter parts.

5.2 Alignment tool bar

The alignment tool bar are used to align single or mutiple graphics objects. Alignment tool bar are as follows:

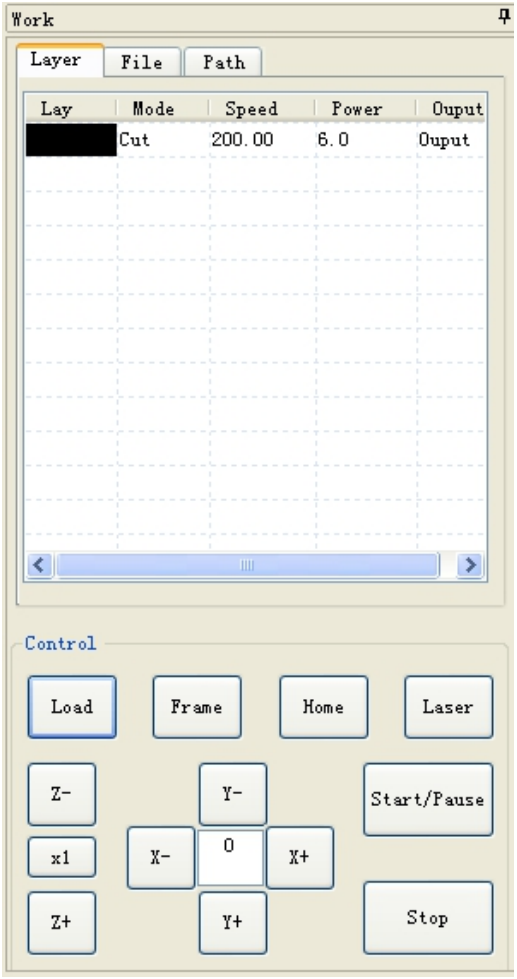


- Align center: correspond to the icon  on the tool bar, the selected objects align wholly with the format center.
- Align left: correspond to the icon  on the tool bar, align left refer to the most left object.
- Align right: correspond to the icon  on the tool bar, align right refer to the most right object.
- Align upper: correspond to the icon  on the tool bar, align upper refer to the most upper object.
- Align below : correspond to the icon  on the tool bar, align below refer to the most below object.

- Horizontal center aligment: correspond to the icon  on the tool bar, align central used the all selected horizontal center line as benchmark.
- Verticle center alignment: correspond to the icon  on the tool bar, align central used the all selected verticle center line as benchmark.
- Center alignment: correspond to the icon  on the tool bar, align central used all the selected objects center points ad benchmark.

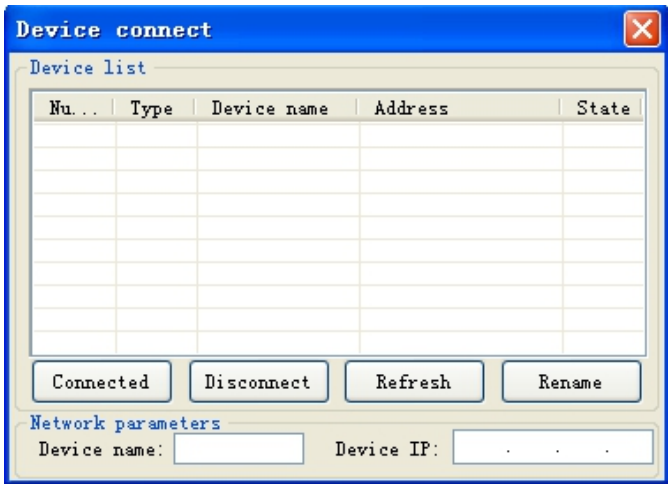
Chapter 6 Working panel

Working panel includes optional equipment, layer management, device control and control by hand, etc. Working panel tabs can be fixed or hiden automatically by clicking the right constant wind nail .



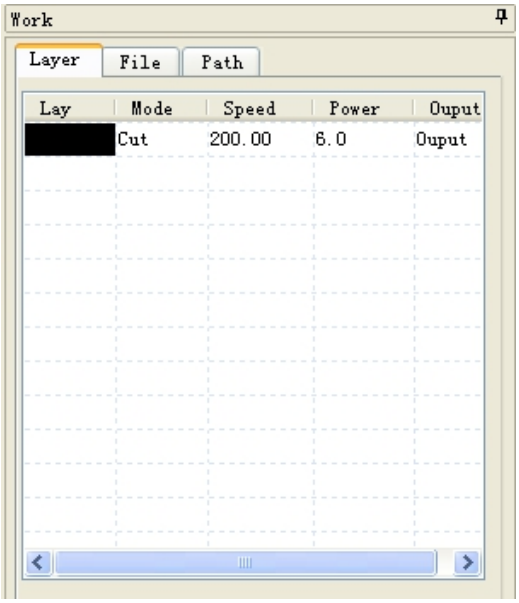
6.1 Optional equipment:

Click button , and it will appear the device connecting dialogue box, just as following picture showing:



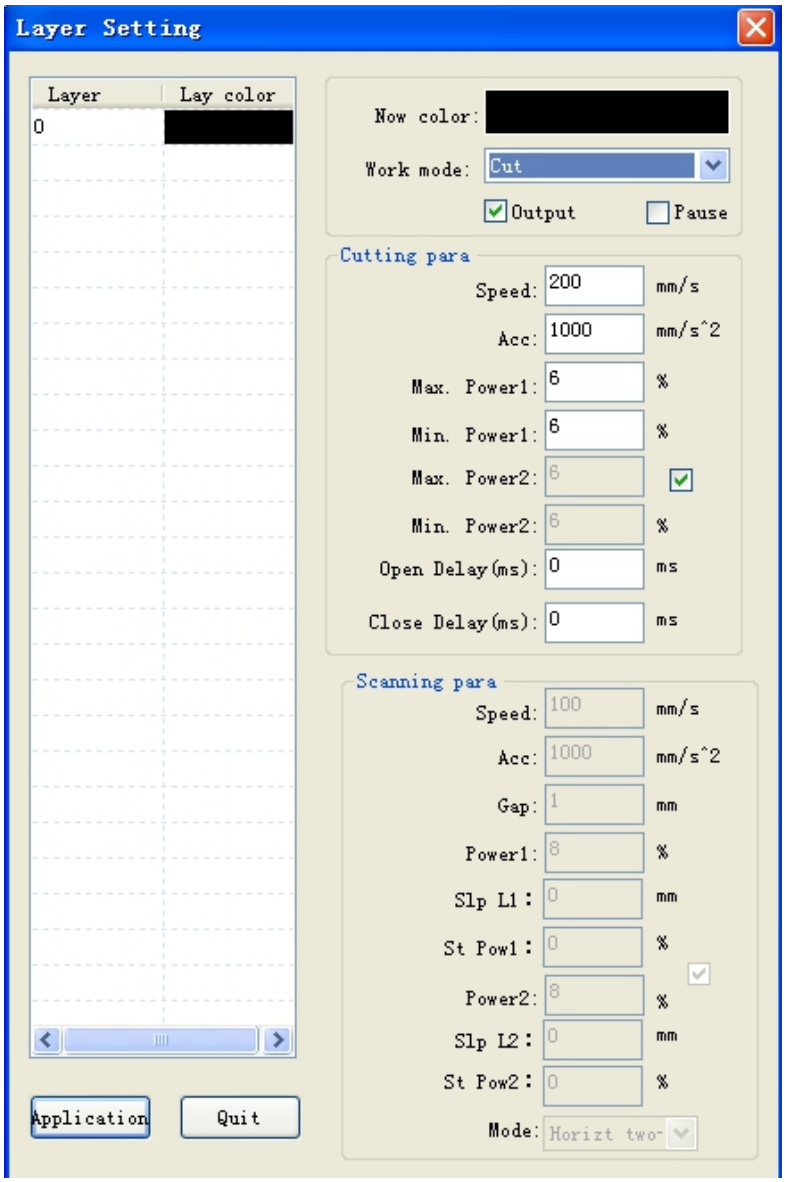
- Equipment list: list the equipment which is available to be connected, including types, equipment name, address, state and other information.
  Move the high lighted article to the corresponding entries, and click or double click the button  to connect the equipment.
  Move the high lighted article to the corresponding entries, and click the button  to switch off the equipment. Click the button  to refresh the equipment and connect the page.

6.2 Layer management

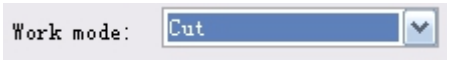


Layer management includes layer color, processing mode, speed, power, output or not and layers' moving up, down, top, and bottom selection operation command button.

- Click a color: the layer information highlighted, click the button , this layer go up a layer; click button Up , this layer go down a layer; Click Top button, this layer moves up to the top; Click Bottom button, the layer moves to the bottom; Click Select button, this color button is selected.
  Remarks: The file's processing order is based on the layers' sequence to change the layeers' sort order, and that is to change the processing order. Click Bottom button, this layer moves down to the bottom; Click Select button to select this color layer object.
- Double click a color layer to open layer information seting box, just as following picture showing:



- Double click a color layer information setting box, all the layers and sequences will appear on the left, and the current layer related information will appear on the right.
- The current layer color: show the current selected layer's color. Click the different layers odn the left, the current layer will change correspondingly.
- Working mode: click the pull-down button on the right, there are 3 working modes in total, just as following picture showing:



Output : check the output to output this layer object when generating laser processing files. If do not check the output, this layer object won't output, and this layer object will not be processed during the process.

Pause : check the pause. The machine pause while processing this layer, then press start button to process.

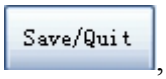
- Cutting, hooking and punching parameters' setting:
  - Processing speed: the speed of the processing graphics object
  - Processing acceleration: the acceleration from the starting speed to the processing speed.
  - Laser energy 1: the laser tube 1 highest speed correspond to the laser power percentage during processing.
  - Corner laser energy 1 : the laser tube 1 corner speed correspond to the laser power percentage during processing.
  - Laser energy 2:the laser tube 2 highest speed correspond to the laser power percentage during processing.
  - Corner laser energy 2 : the laser tube 2 corner speed correspond to the laser power percentage during processing.
  - Close Delay: if use server motor, the motion is delay, then the cutting is not closed when cutting the closed obj, the "Close Delay" is useful to this.
- Carving parameters setting:
  - Carving speed: the speed of carving the processing graphics.
  - Carving acceleration: the acceleration from the starting speed to the processing speed while processing.
  - Carving step space: it is refer to the distance between processing row and

row.

- Carving energy 1: the laser power percentage of the laser tube 1 carving speed while processing the bitmap.
- Carving energy 2: the laser power percentage of the laser tube 2 carving speed while processing the bitmap.
- Carving mode: there are two carving modes for choice: horizontal unidirectional carving and bidirectinal carving. The horizontal unidirectional carving refers to light dipping while carving from left to right direction. And no light dipping while carving from right to left. The horizontal bidirectional carving refers to light digging from both sides.

Click button 

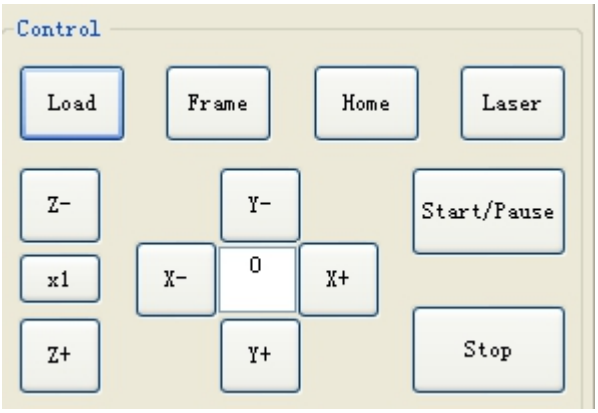
, and confirm the layer information setting.

Click button 

, and quit the layer information setting.

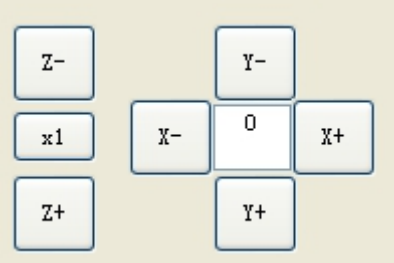
6.3 Equipment control

Equipment control includes start, stop, etc, just as the following picture showing:



File Handling: down the cutting data to the card
Start/Pause: Start Or Pause the motion
Stop: Stop the motion
Frame: Show the frame of all object.
Home: Machine go to home positon
Laser: Laser out.

6.4 Manual control



- X+、X-：Click this button to control the X axis positive and reverse movement.
-
- Y+、Y-：Click this button to control the Y axis positive and reverse movement.
- Z+、Z-：Click this button to control the Z axis positive and reverse movement.
- Accurate movement: 0 input the value and then press the direction button, and the laser head will move at this direction.

Bottom software/hardware operation instruction and line connection

Chapter 1 Summary

1.1、System function

PowerCut laser CNC cutting system is mainly used in laser engraving , cutting and marking.

System's operation and display are all having step function window to reminder. For example: under the main window menu , after calling a certain function, the system will bounce up this function's child window menu. Step setting according to the operation instruction.

1.2、System features

1： Embedded industrial host: high performance ARM processor, 4 inch high brightness industrial LCD screen, 4 inch resistence touch screen, support touch screen control.

2：Strong system reliability, strong anti-jamming ability

3：External interface: USB2.0, RS232, 100M network interface

4：The system provide road 2 photoelectric isolation input, and road 2 photoelectric isolation output.

1. Linkage shaft number: 3 axises
2. Working temperature: 0 ℃- +40℃, atorage temperature 25℃- +60℃

1.3、Software function

1. Use one key to switch the Sino-British double language version.
2. Support the file format cut.
3. There is power-off protection function. If it is power off during the processing , system can remember this breakpoints, and find the breakpoints to continue processing,
4. Conduct the speed adjustment function in the course of processing.
5. Registration code protection function
6. Bottom software U disk upgrate function.
7. continous feeding function.
8. left-right direction push board function.
9. double-head mutual movable function
10. network setting function

Chapter 2 Operation instruction

2.1 Operation panel and press buttons' function introduction

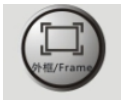
2.11 Operation panel



（2.1 operation panel）

2.12 Key function introduction

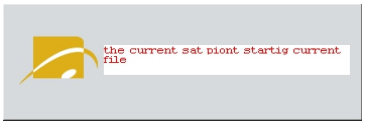
1. （Laser）key：Laser preset key, and test the laser usage. Release light once while click once. It is used to adjust the laser.
2.  (File) key： Enter into the memory file information setting interface. Pressing it with long time can enter into file information interface.
3.  (Set) key：Enter into menu set, and set the parameters.
4. （U Disk）key：Enter into U disk file operation interface.
5. （origin）key：It is used to make the laser head back to the original point.

6. 

（Box）key：to start the frame preview.

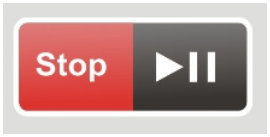
7. 

（Enter）key：Definition key to agree the current operation. Press this key with a long time in the file processing interface, and it will appear a shortcut as follow picture:

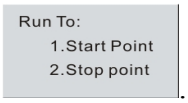


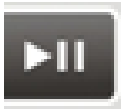
8. 

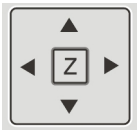
(Sec) key：definition key, used to cancel operation and return to the last interface.

9. 

（Stop）“Reset” key, used to stop the operation of the machine. When long pressing the key 

in the processing interface, there will be a dialogue box bounced up, as the picture: 

.  is the start/pause key. When the equipment is in the state of free or pause, press this key to carry out the function of start. Click this key in the processing state to carry out the pause function.

10. 

(function) key： used to move the X axis and Y axis. Under other interfaces, it can also be used to move the curser up and down to select the menu. Adjust the speed at true time under the processing interface.

11. 

axis toggle key: Press it to shift to axis X2 or axis Z. Control the X2 on the left and right direction. Control the Z on the direction of up and down. Press the Z once to cancel X2 axis or Z axis.

Reminder: X2 axis refers to the second laser head on the X axis of the double heads mutual movable machine.

2.2 System main menu introduction

2.21 Boot interface

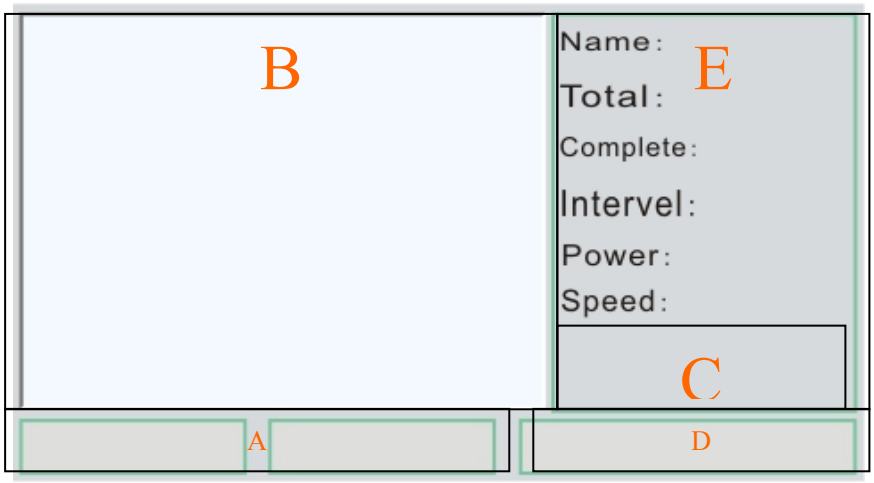
Boot interface, as the picture(2.21)



2.2 boot interface

2.22 Standby interface

After the completion of the initialization, enter into the standby interface.(as picture 2.3)



2.3 standby interface

Picture 2.3 placeA shows the real ordinate value of the X/Y axis.

Picture 2.3 place B shows the graphics of the processing files.

Picture 2.3 place C shows the estimated using time of the processing graphics.

Picture 2.3 place D shows the system's working state.

Picture 2.3 place E shows each parameter while the system processes, including name, amount, complete, interval, power, speed.

Name: the name of the processing file

Amount: the processing times of the processing files

Complete: the completion times of the processing files

Interval: the time interval between the ending time of this process and the starting time of the next process while processing the files.

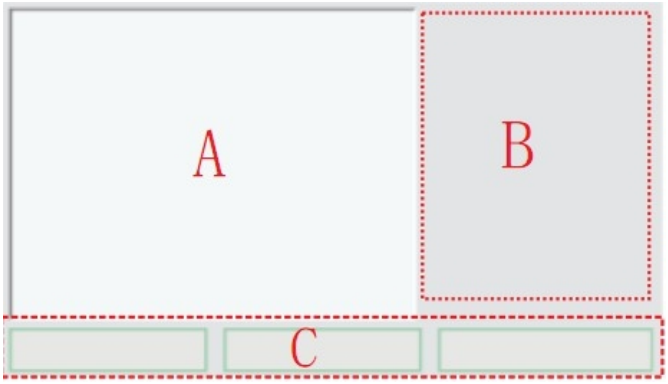
Power: the power mode used by the laser light signal while processing the files.

Speed: the speed percentage while processing files （ press the X direction key to adjust the speed at real time while processing the files）

2.23 Files' interface

Press the "File" key on the standby interface to enter into the file operation interface. As the picture showing:

2.4



Picture 2.4 file interface

Picture 2.4 place A shows the graphics of the selected files.

Picture 2.4 place B shows the files' name list included in the memory.

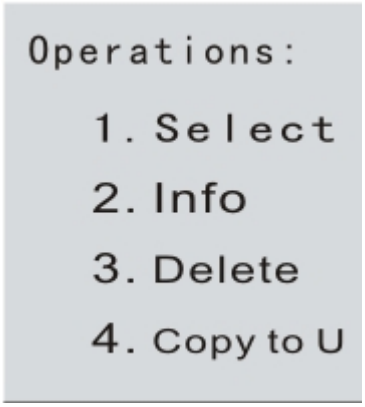
Picture 2.4 place C shows system restored files' parameters, separately including used, unused memory, documents amount.

Used: the capacity occupied by the restored files.

Unused: the rest capacity except the capacity occupied by the restored files.

Files: the current amount of the restored files by the system.

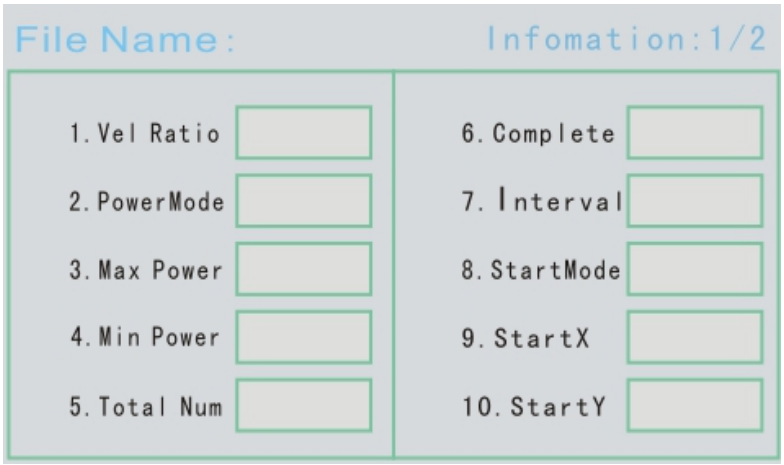
Press "up", "down" keys to check the files. Press the key "confirm" on the operation panel to select the files. Press "ESC" to be back to the file interface. Press "right" key and it will appear the operation iterms of the current files, as picture 2.5:



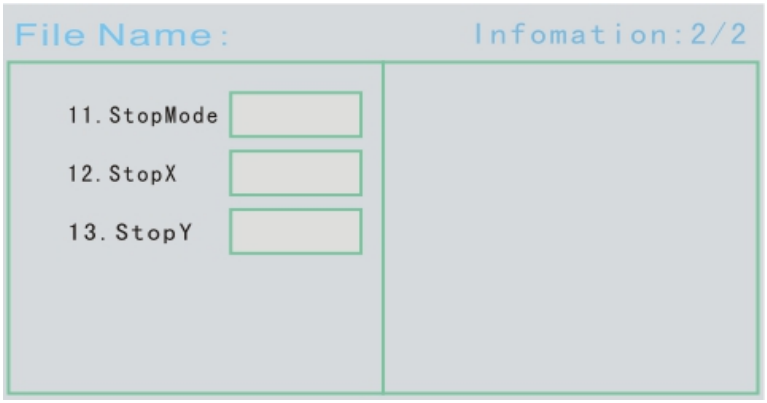
Picture 2.5 file operation items

1. choose: move the curse to this place to press the key “confirm” or “right” key, showing to regard this file as processing files.

2. information: select the file’s parameter setting (the methods to modify the parameters refer to the chapter 2, 2.26 ），as the picture 2.51 and picture 2.52:



picture 2.51 file information (1)



Picture 2.52 file information（2）

（1）speed ratio: the current speed percentage, the range is from 1 to 100.

（2）power mode: the working way of the laser power. It can be divided into “manual” and “automatic” . The mode “automatic” is to process according to the filr power setted by the current file. “manual” mode is to process according to the “manual power”.

（3）maximum power: the laser power value while the current file stays at the “manual” power mode. The range is from 0.0 to 100.00.

(4) minimum power: the laser’s minimum light power while the current file stays at the “manual” power mode. The range is from 0.0 to 100.00.

(5) process amount: the needed processing times of the current files, and the range is from 0 to 20,000.

(6) completion times: the processing times completed by the current file, and the range is from 0 to the 20,000.

(7) time interval: When the files are processed many times, the interval time between the ending time of this process and the starting time of the next process. The unit is second, and the range is from 0 to 999.

（8）starting mode: The starting point’s beginning way of the current processing files, including fixed point, immediate, self definition and four kinds of origin.

Fixed point: regard the parameters setted by anchor point X and anchor point Y in the parameter set as the starting of processing.

Immediate: Regard the place where the laser head locates currently as the processing starting point.

. customization: Regard the starting point X and starting point Y’s parameters in the file information as the processing starting point.

Origin point: Regard the machine origin as the processing starting point.

(9) starting point X: Set the starting point’s ordinate while beginning processing, and the range is from 0.0 to 9999.999. The starting mode is effective while it stays at customization mode.

（10）starting point Y: Set the starting point’s ordinate while beginning

processing, and the range is from 0.0 to 9999.999. The starting mode is effective while it stays at customization mode.

（11）Dock mode: the dock way of the laser head after the completion of the processing, including starting point, customization, origin point.

Starting point: The laser head parked in the location setted by the starting point X and starting point Y after the completion of the processing.

Customization: The laser head parked in the location setted by the dock point X and dock point Y after the completion of the processing.

Origin: The laser head docks at origin after the completion of the pocessing.

（12）Dock point X: Set the X axis ordinate where laser head docks after completing the processing. The range is from 0.0 to 9999.999, and it is effective when the docking mode stays at the customization mode.

（13）Dock point Y: Set the Y axis ordinate where laser head docks after completing the processing. The range is from 0.0 to 9999.999, and it is effective when the docking mode stays at the customization mode.

3. Cancel: refer to cancel the selected files

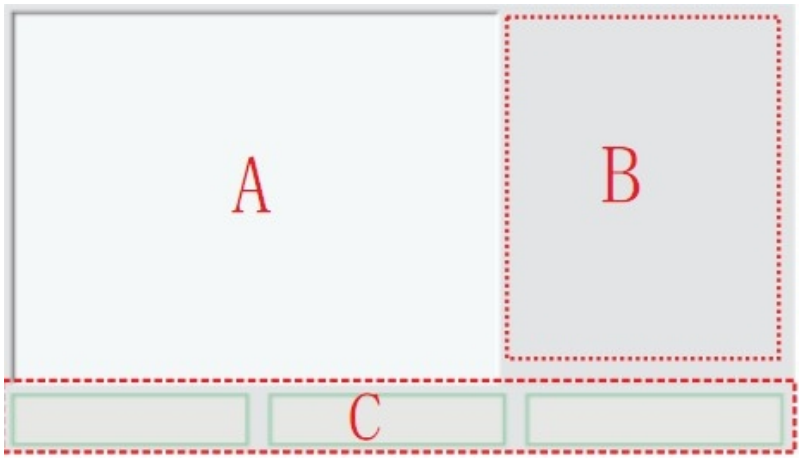
4. Write into U disk: refer to copy the selected files to the U disk

Press “confirm” key to confirm, and press the “quit” key to cancel. Then it will return to the last interface.

2.24 U disk file interface

After inserting the U disk, directly press the “U disk” key on the operation panel to enter into the U disk interface. As the picture 2.6

U disk file



Picture 2.6 U disk interface

Picture 2.6 place A shows the files' graphics

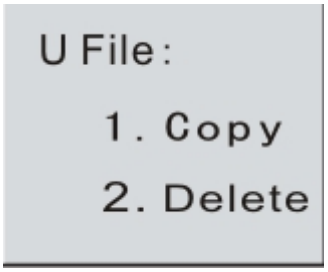
Picture 2.6 place B shows the file name list of the file which is available to copy in the U disk.

Picture 2.6 place C shows the system 's operation state and the files' number of the file which is available to copy.

U disk: the system is under the state of the U disk

File number: the file number in the U disk which is available to copy and process.

Press "up", "down" to select the files. Press "ESC" to quit this interface. Press "right" key to bounce out the this file's operation item, as picture 2.7

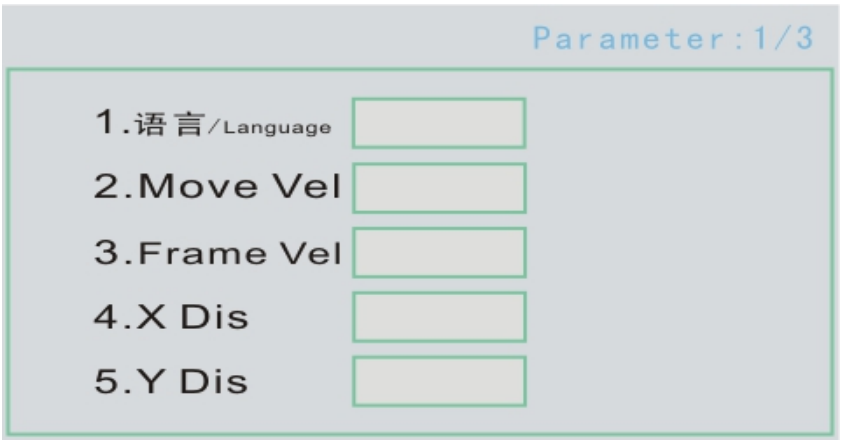


Picture 2.7 file operation item

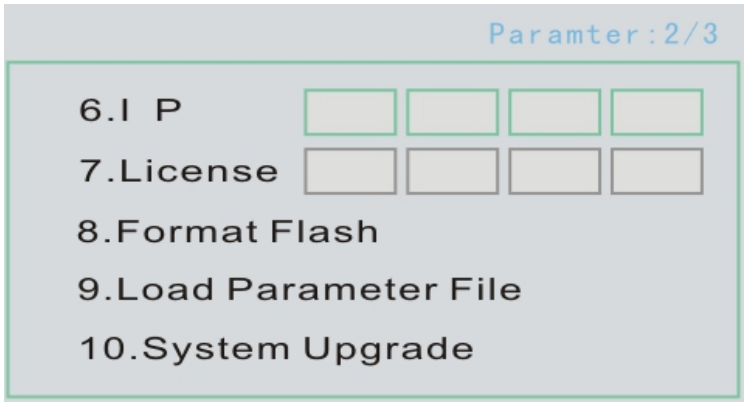
1. Copy: refer to copy this file to the system, and click the "right" key on the operation panel to copy the current file to the restoration area. And set as the current processing files.
2. Cancel: refer to cancel the selected files. After this step, click the "right" key on the operation panel to cancel current files.

2.25 Set the interface

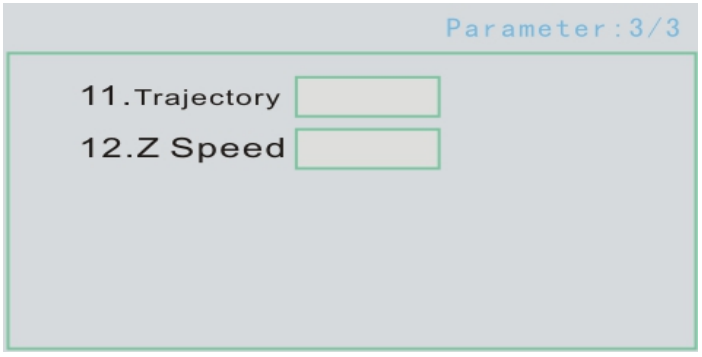
Press the key "set" on the operation panel to enter into the setting interface, as picture 2.8. The setting interface has three pages. Click "down" key on the option five, and the system will turn to the second page automatically, as picture 2.9. Just as the above operation, click "down" key to enter into the third page, as picture 2.10.



Picture 2.8 set the first page of the interface



Picture 2.9 set the second page of the interface



Picture 2.10 set the third page of the interface

1. Language： Transfer to show the language, and it has “Chinese” and “English” for choice.(the transfer method pls refer to the chapter 2 part 2.26)
2. movement speed: Refer to the laser head moving speed. The bigger the value, the faster the speed. The range is from 0 to 500.
3. frame speed: the speed of going along the frame. The bigger the value, the faster the speed. The range is from 0 to 500.

4. Anchor point X: Set the starting point's X axis ordinate when the laser head begins to process. The range is from 0.0 to 9999.999. And it is effective while the starting mode is positioning mode.
5. Anchor point Y: Set the starting point's Y axis ordinate when the laser head begins to process. The range is from 0.0 to 9999.999. And it is effective while the starting mode is positioning mode.
6. IP address: System IP address number. It will be used while connected with the computer.
7. Registration code: The registration code is provided by the supplier, and input it to the tip area in turn. The registration code can be made for a certain time randomly. The system will stop the using after the expiring. If reminding "the registration is expired", you can contact with supplier, and continue to use after getting the new registration code.
8. Formatting flash: formatting all the processing files in the system.
9. Loading parameter files: Use the U disk to load the upper parameters.(the detailed situation pls refer to the upper layer software instruction.)
10. System upgrating: Use the U disk to upgrade the system's current software.(Only refer to the bottom layer software's upgrading)
11. Track display : Display the track of the processed graphics. There are two kinds: point and line.
12. Z axis speed: It refer to the movement speed of the Z axis. The bigger the value, the faster the speed. The range is from 0 to 500. (The methods of changing the parametrs pls refer to the chapter 2 part 2.26)

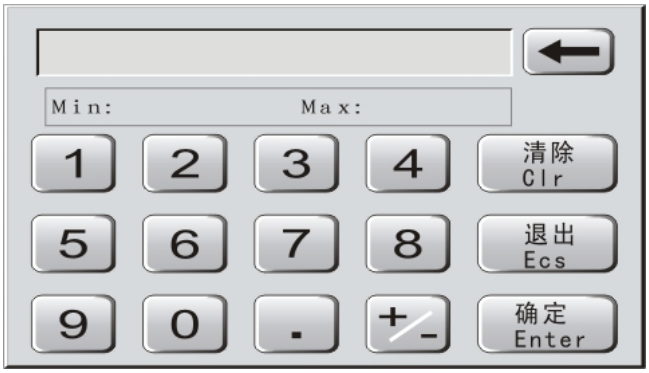
2.26 The methods of modifying the parameters

1. modidy the language type parameters

Move the indicating icon  to the font of the options which need to be modified. Click the key "right" on the operation panel. Then the current option enter into the modification mode. And then click the key "up" or "down" to change the options in the dialogue box. Click the "confirm" button after modification to change the state of the language type parameters.

3. modify the digital type parameters

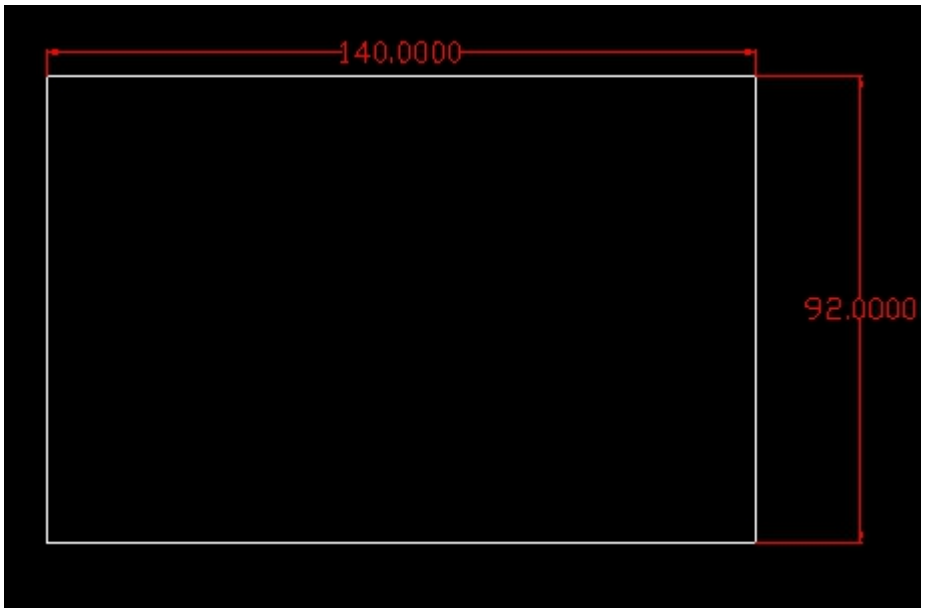
Double-click the digital type options' dialogue box on the touching screen. It will appear the digital dialogue box, as picture 2.11. Then click the number you need and click "confirm" to change the digital type parameters' value you selected.

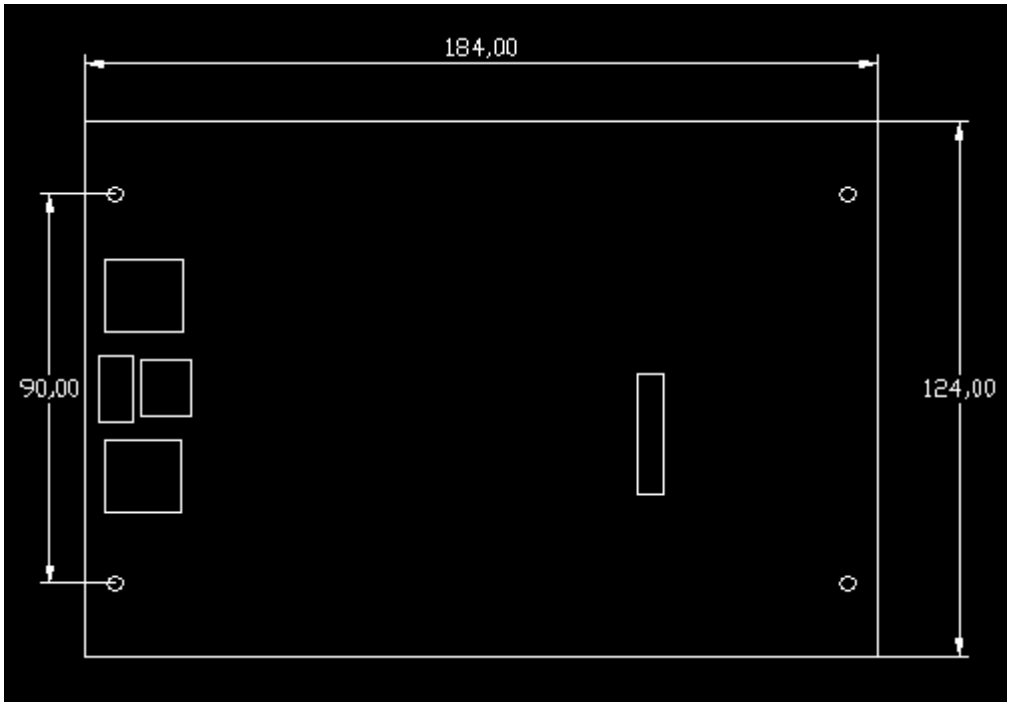


Picture 2.11

Chapter 3 The instruction of the installation and wiring

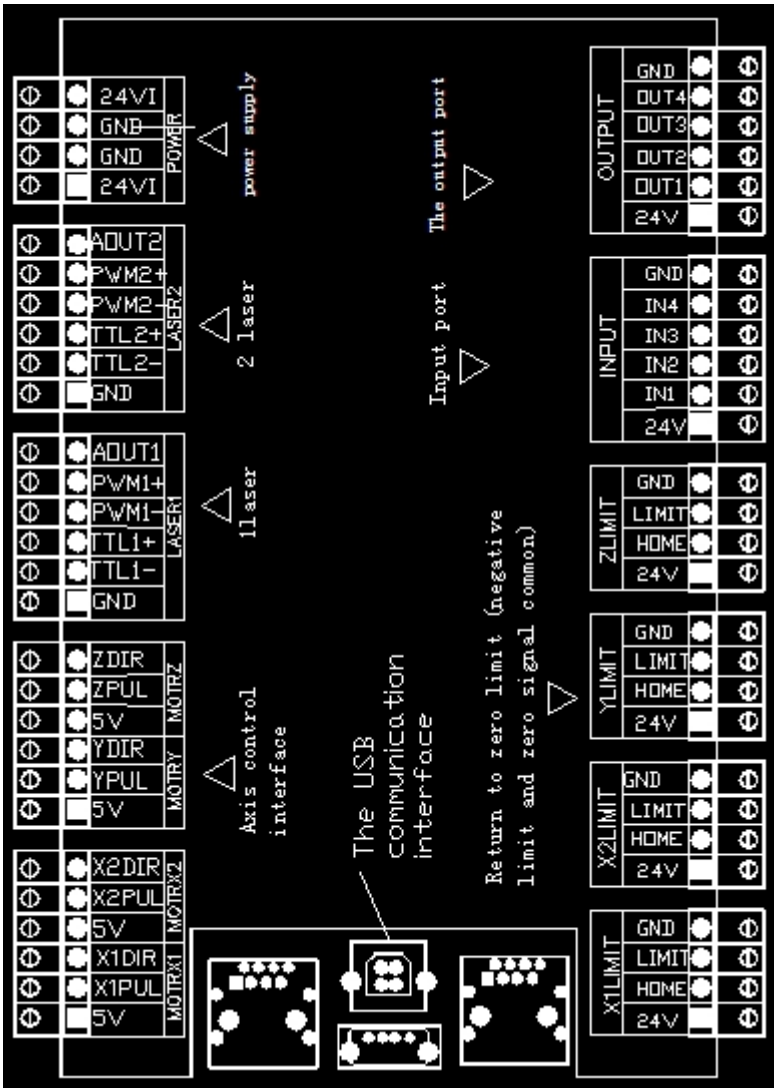
3.1 Installation size





3.2 Wiring instruction

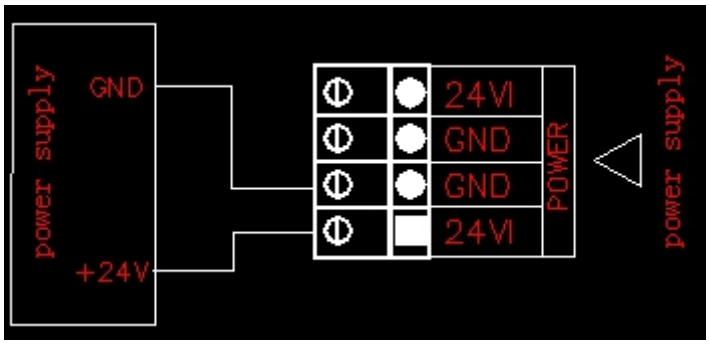
3.21 Interface board



3.22 Wiring diagram

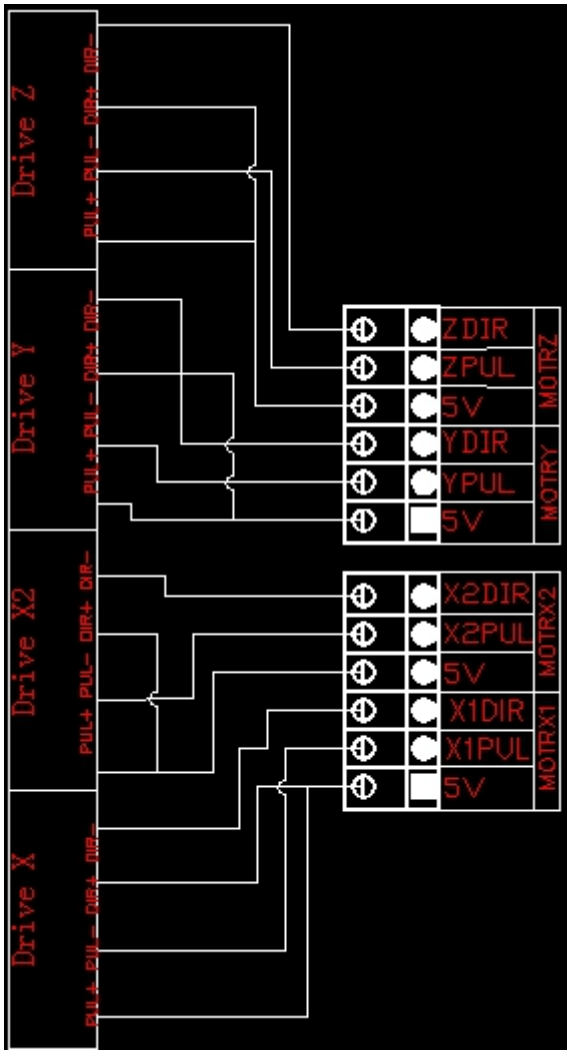
1. power supply port wiring diagram

（1）isolation mode

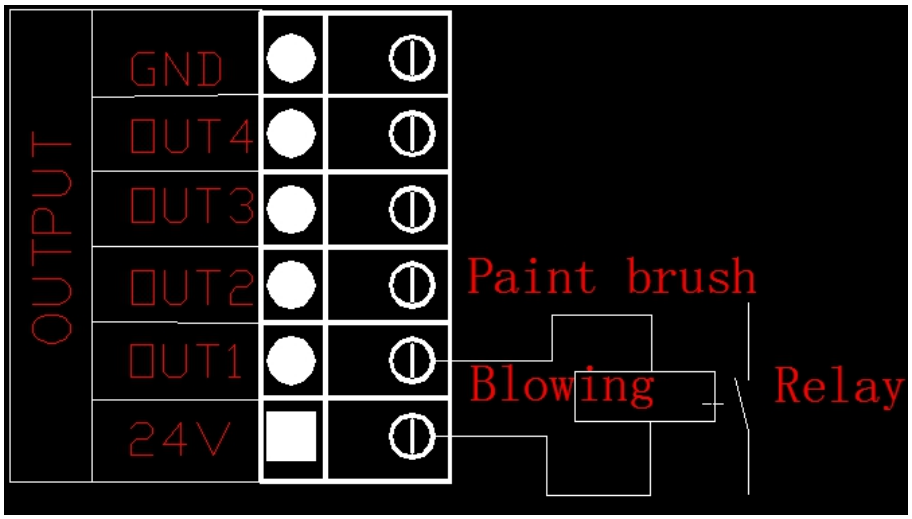


2. X、X2、Y 、Z axis port wiring diagram

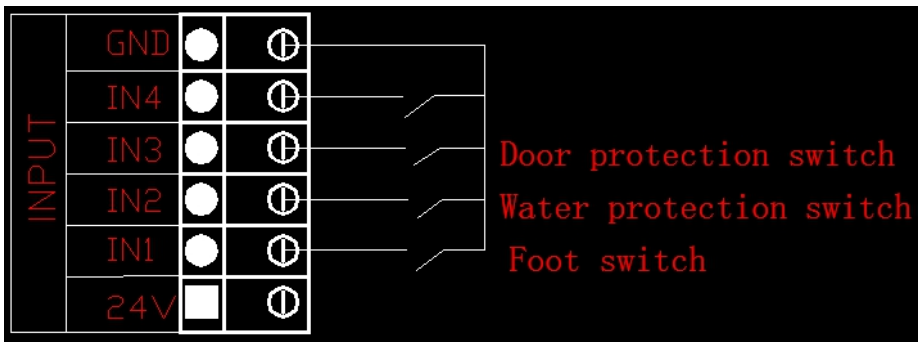
（1） single port



2. Outlet port wiring diagram

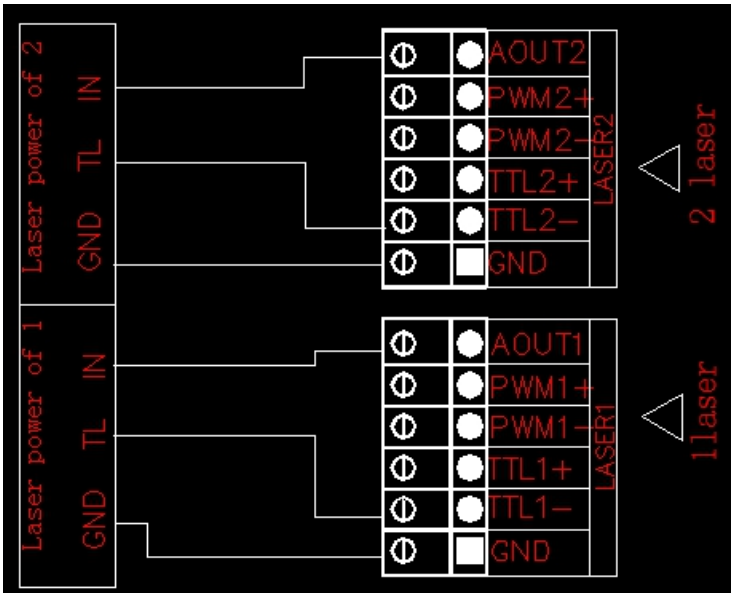


3. Outlet port wiring diagram



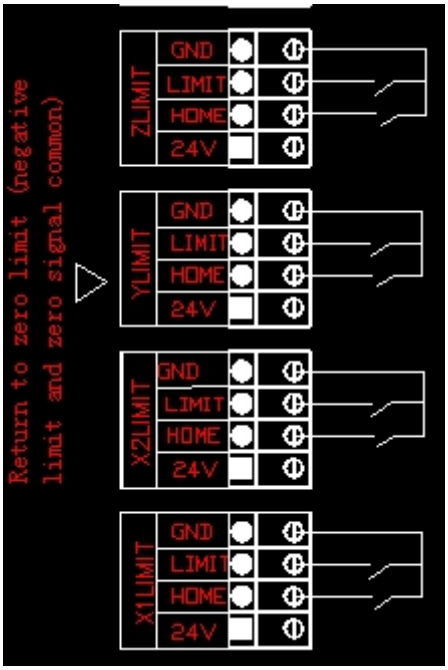
4. laser control port wiring diagram

（1）digital control



Low level light out

5. Limit signal wiring diagram and reset signal wiring diagram



3．3 Port definition instruction

3.3.1 Power supply signal (This system adopt the direct current 12V-24V to supply the power.)

12V power supply interface JP1 in the system (switch power supply interface port)

Pin		Definition
1	D24V	Inner 24V power supply positive (input)
2	DGND	Inner 24V power supply negative(input)
3	24V	outer 24V power supply positive (input)
4	GND	outer 24V power supply (input)

3.3.2 U disk interface port

Marking U-disk. You can directly insert the U disk to read and write.

3.3.3 PC interface port

Marking PC. You can use the USB connection wiring to connect the computer to read and write the files.

3.3.4 Network port

Marking the NETWORK. You can use the network cable to connect computer to read and write the files.

3.3.5 port definition

MOTORX 1、X2 port definition

Pin		Definition
1	D5V	outer The 5V power supply positive (output)
2	X1PUL	X axis pulse signal (Differential signal negative terminal) (output)
3	X1DIR	X axis directional signal (Differential signal positive terminal) (output)
4	D5V	outer The 5V power supply positive (output)
5	X2PUL	X2 axis pulse signal (Differential signal negative terminal) (output)
6	X2DIR	digital signal

MOTORY、Z port definition

Pin		Definition
1	D5V	outer The 5V power supply positive (output)
2	YPUL	Y axis pulse signal (Differential signal negative terminal) (output)
3	YDIR	Y axis directional signal (Differential signal negative terminal) (output)
4	D5V	outer The 5V power supply positive (output)
5	ZPUL	Y axis pulse signal (Differential signal negative terminal) (output)
6	ZDIR	Y axis directional signal (Differential signal negative terminal) (output)

X1 LIMITport definition

Pin		Definition
1	24V	24V power supply positive(output)
2	HOMEX	X origin and X negative limit multiplexing signal (input)
3	LIMITX	X axis positive limited position signal (input)
4	AGND	power supply positive(output)

X2 LIMIT port definition

Pin		Definition
1	24V	24V power supply positive(output)
2	HOMEX2	X2 origin and X negative limit multiplexing signal

	(input)	
3	LIMITX2	X2 axis positive limited position signal (input)
4	AGND	power supply positive(output)

Y LIMIT port definition

Pin		Definition
1	24V	24V power supply positive(output)
2	HOMEY	Y origin and Ynegative limit multiplexing signal (input)
3	LIMITY	Y axis positive limited position signal (input)
4	AGND	power supply positive(output)

Z LIMITport definition

Pin		Definition
1	24V	24V power supply positive(output)
2	HOMEX	Z origin and Z negative limit multiplexing signal (input)
3	LIMITX	Z axis positive limited position signal (input)
4	AGND	power supply positive(output)

LASER1 port definition

Pin		Definition
1	AGND	12V power supply positive(output)
3	TTL-	realeasing light can show the negative signal(output) (light: 0V,light off 5V)
4	TTL+	realeasing light can show the positive signal(output) (light: 0V,light off 5V)
5	PWM+	light signal (differential signal positive port)
6	PWM-	light signal (differential signal negative port)
7	OUT	The light analog signals (output) (0 to 5 v)

LASER2 port definition

Pin		Definition
1	AGND	12V power supply positive(output)
3	TTL-	realeasing light can show the negative signal(output) (light: 0V,light off 5V)
4	TTL+	realeasing light can show the positive signal(output) (light: 0V,light off 5V)
5	PWM+	light signal (differential signal positive port)
6	PWM-	light signal (differential signal negative port)
7	OUT	The light analog signals (output) (0 to 5 v)

INPUT port definition

Pin		Definition
1	24	24V power supply positive(output)
2	IN1	foot switch(input)
3	IN2	water protection switch(input)
4	IN3	Door protection switch(input)
	GND	power supply (output)

OUTPUT port definition

Pin		Definition
1	24V	24V power supply positive(output)
2	OUTP1	blowing(output)
3	OUTP2	paint brush (output)
4	GND	power supply(output)

Chapter 4 Common problems instruction

4.1 the computer connecting problems

The problems' performance phenomenon:

1. remind the communication breakdowns
2. It can not read and write the parameters.
3. The transferring files is ineffective.

Solving steps:

1. To check if the USB line is connected correctly and good. To check if the port of the USB line is connected with the PC.
2. To check if the USB driver program are installed rightly. To install the driver program again.
3. Insert a good USB port again from the computer.
4. Close the machine power one minute and open it again.
5. Restart the computer, and connect equipment and the computer to the ground.
6. Exchange a computer.

4.2 U disk reading and writing problems

Click the U disk files and showing "the U disk is blank or wrong"

Answer: U disk error

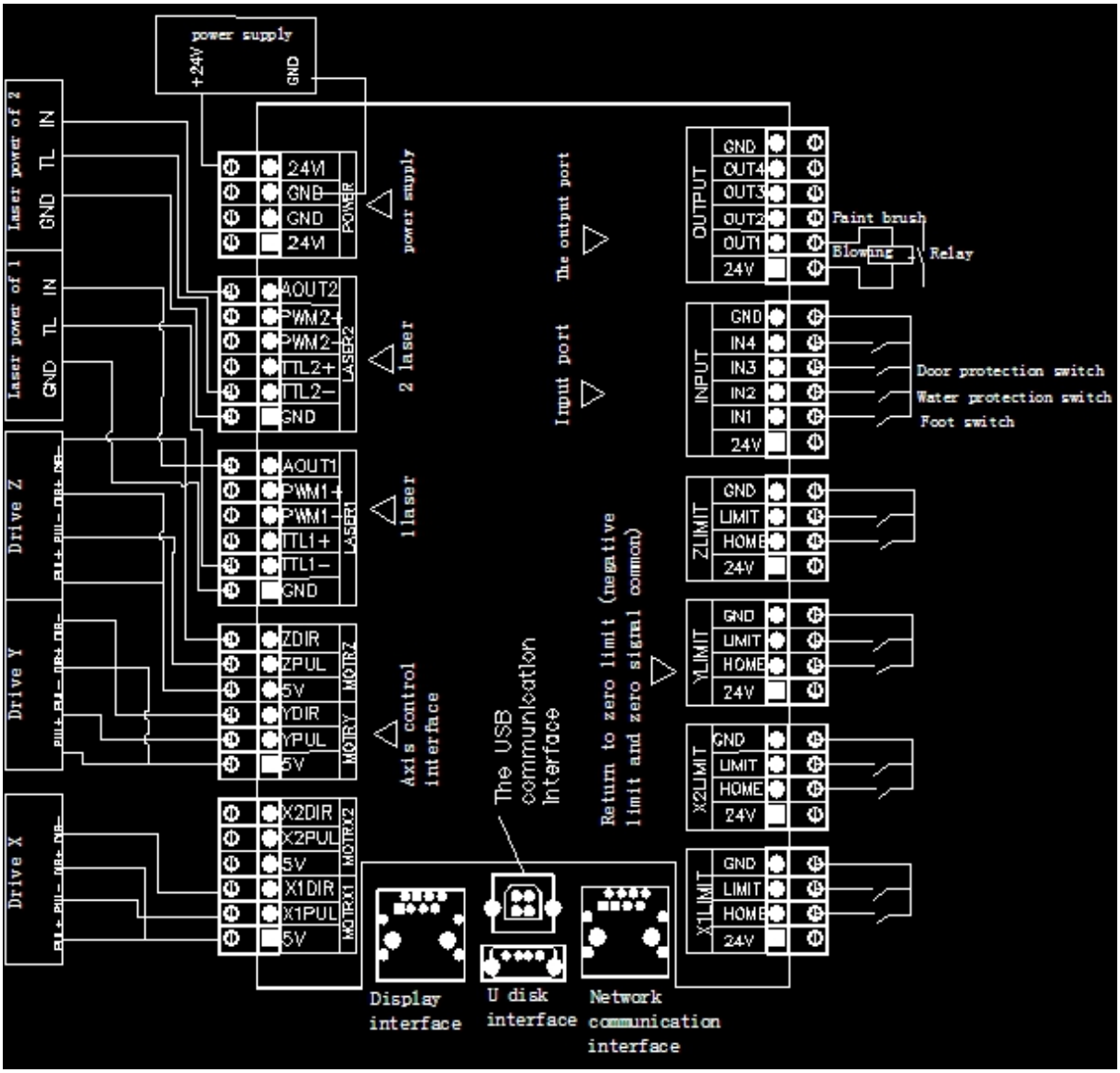
Resolution:

Step 1: check the U disk if it is correct

Step 2: replace another U disk

Chapter 5 Classic laser cutting machine wiring diagram

5.1 ordinary laser cutting machine wiring diagram



5.2 The wiring diagram of the double-heads mutual movable laser cutting machin

