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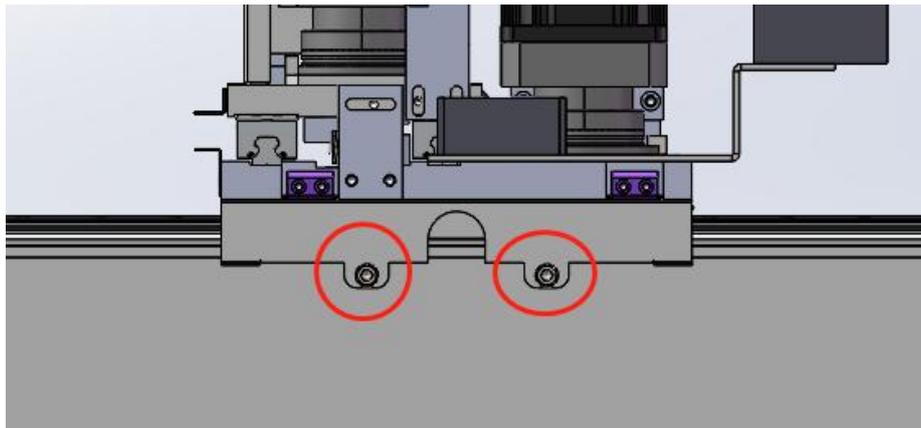
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ST-FL80F Operation Manual

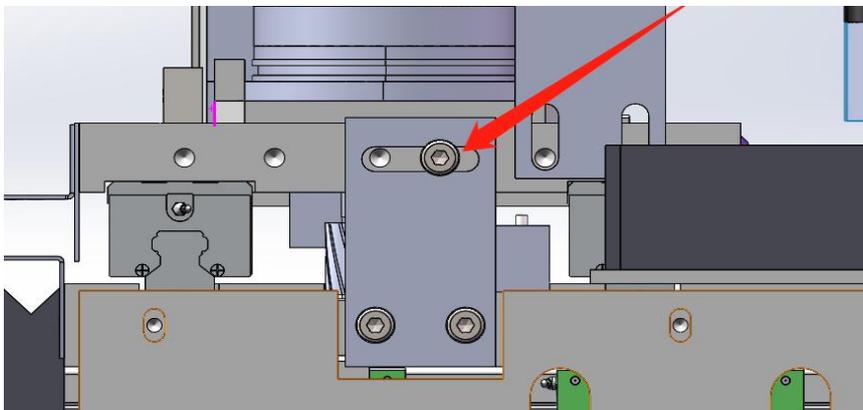
Attention before power on!!

Before the equipment leaves the factory, in order to prevent the XY axis from moving during transportation, the XY axis is limited.

Before powering on, the XY axis limit screws must be loosened and adjusted back to their original positions.



Y-axis: Remove the fixing screws of the rear sheet metal (as shown in the figure)



X-axis: Remove the rear side door of the upper shield, then remove



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the screws shown in the picture (pictured), and push the X-axis moving seat forward to the middle position of the X-axis stroke

Laser cutting machine safety operating procedures

1. The laser cutting shall be operated by a specially assigned person. If more than one person operates, one main operator must be assigned.

2. Strictly implement the following startup sequence

- Gas opening: close the exhaust valve of the gas tank, open the power supply of the air compressor, and open the gas transmission pipeline valve after the pressure of the compressed air reaches the requirements. When using bottled gas, first open the valves of each bottle, and finally open the general valve switch; When using liquid gas, after opening the valve, the booster valve should also be opened to increase the gasification volume and ensure the pressure of cutting auxiliary gas.
- Turn on the general power switch and start the regulated power supply/ transformer, check the output voltage of the regulated power supply/ transformer, and set the voltage between 380-400V.
- Turn on the power of the chiller and dryer.
- Turn on the power of the machine tool control cabinet, release the



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emergency stop button and turn on the key switch, and enter the operation interface after the NC system is started.

3. Strictly implement the following shutdown sequence

- Preparation before shutdown
- Move the cutting head to a safe position, and stop the X and Y axes at a safe position
- Turn off the laser and turn off the main power supply of the laser after waiting for about 3 minutes. Turn off all key switches on the laser electrical cabinet and remove them for safekeeping.
- Press the emergency stop button on the machine tool control panel, turn off the key switch, and take down the key storage. Exit the operation page of the numerical control system, and turn off the power of the main control cabinet of the machine tool when the page prompts that the power can be turned off.
- Turn off the power of chiller and dryer.
- Turn off the regulated power supply.
- Turn off all cutting auxiliary gases before turning off the laser.

Turn off the power supply of the air compressor

Observe the pressure change of cutting auxiliary gas at any time during cutting

Appropriate slings and tools shall be used when loading and



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unloading materials to ensure the safety of personnel and equipment.

Before cutting, confirm the thickness and material of the workpiece, select the appropriate nozzle diameter, focus position, and select the appropriate auxiliary gas and gas pressure.

7. Trial cutting shall be carried out before batch cutting and processing. The cutting parameters shall be properly modified according to the trial cutting effect. Batch processing shall be carried out after the cutting is normal.

8. During the operation of the machine, the operator must not leave the machine tool, and must ensure that an operator can monitor the running state of the machine tool at any time. Once an abnormal state occurs, stop the machine immediately, and continue production after the problem is eliminated.

9. The machine tool must be kept clean, and the operator must maintain and clean the machine tool before leaving work every day. Clean and lubricate the transmission shaft and guide rail once a quarter.

10. Check the water quality of the chiller once a quarter; When the machine tool is turned on after a long time without cutting, check the air and water circuits first, and replace the water for the chiller if



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necessary

11. Precautions for machine tool operation

a. Before executing the action of the machine tool, make sure that all axes have returned to the original point.

b. During the maintenance of the machine tool, it must be ensured that the power supply is in the power off position, and there must be a specially assigned person for monitoring to prevent accidents.

c. The operator shall not look directly at the laser flame during cutting and processing to prevent eye damage. Non machine tool operators shall not enter the cutting and processing area, and shall not touch any machine tool button during processing.

d. Check and adjust the nozzle center according to the instructions after each nozzle replacement.

e. Keep an eye on the temperature of the output water of the chiller at any time. If it fails to meet the requirements, please stop the chiller immediately for inspection.

f. Regularly check the cleanness of lenses and focusing lenses. Once any contamination is found, please clean them immediately according to the specified procedures.



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Start up steps and function description

Turn on the general power switch and start the regulated power supply, check the output voltage of the regulated power supply, and turn on the power supply of the chiller and the dryer. Carefully check the pressure of the laser working gas, auxiliary gas and cutting auxiliary gas. If the gas pressure is not enough, replace it in time and check whether the pipe leaks; Check whether the laser readiness button is damaged (check the indicator) and whether the machine tool emergency stop button is normal; Check whether the limit switch of each axis and the mounting screws of the bump block are loose, and whether the photoelectric switches and proximity switches are sensitive; Check the circulating water level in the water tank of the chiller, and add it in time if it is insufficient.

Turn on the power supply of the machine tool control cabinet and release the emergency stop button. After the NC system is started, enter the operation interface, point the mouse to the PipeCutA icon of "Raytools Cutting System" on the desktop, and double-click the left mouse button to enter the cutting program interface of Raytools

System.

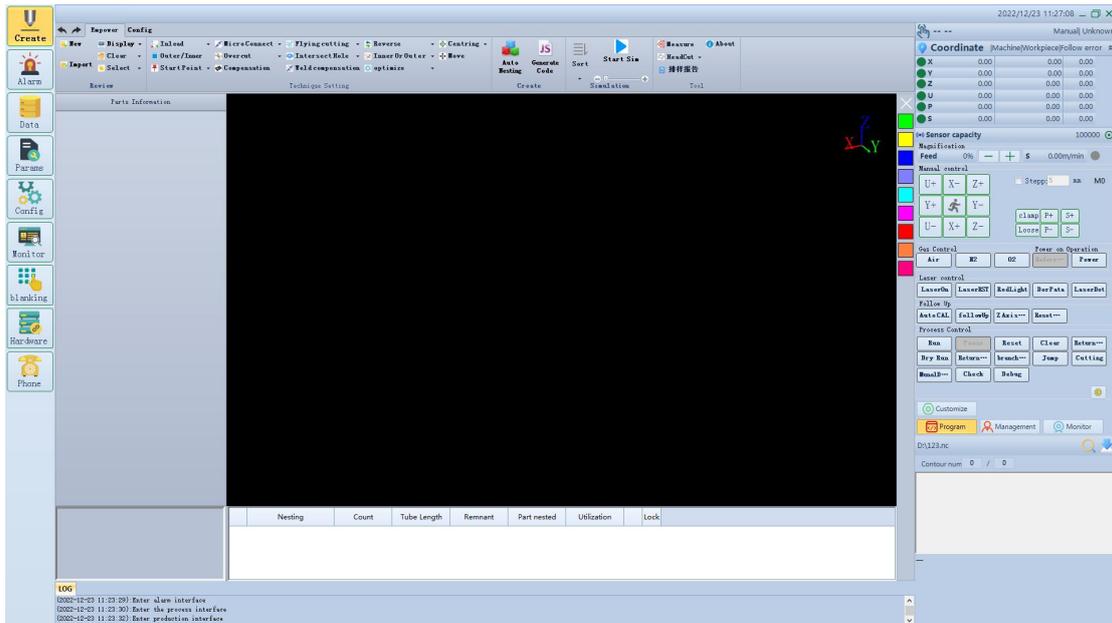




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Schematic Diagram of Main Interface of Raytools Cutting System

Function introduction

a) The black background in the center of PipeCutA interface shows part graphics, and the left side shows part information. The leftmost column is the production interface, alarm information, process parameter settings, system parameters, configuration, monitoring, extended parameters, hardware version, and hotline functions

b) The toolbar is directly above the PipeCutA interface on the left:

1. New: You can create some simple graphics
2. Import: You can import drawn 3D drawings from outside (the drawing format is. Step)
3. Display: display processing path and processing sequence
4. Clear: Clear the selected process



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5. Process settings: expand the small arrows at the bottom. Most process settings can be found here

6. Simulation: simulation of cutting

7. Generation: Expand the small arrow, which contains automatic nesting, and can be used to arrange the figures to be cut.

Generate code: the graphics to be cut can only be cut after generating code

8. Tool: expand the small arrow at the bottom, including canceling the head material and the setting of intersecting holes

9. The right side of PipeCutA interface is called "console". The control operations of most machines are here. From top to bottom, the machine coordinates are: (machine table mechanical coordinates can be observed) Manual control: (control the movement of each moving axis of the machine tool) Gas control, power on operation, laser control, servo control, and processing control.



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Detailed description of the console



a) Coordinates (coordinates of machine tool movement axis can be observed)

b) Manual control: X axis (move the axis forward and backward, which can move the X axis of the machine tool forward, backward)



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and forward), Y axis (move the axis left and right, which can move the Y axis of the machine tool left and right), Z axis (move the axis up and down, which can move the Z axis of the machine tool up and down), A axis (clamp axis, which can control the tightness of the clamp axis), U axis (rotation axis, which can control the rotation of the chuck), S axis (feed axis, which can control the pipe feeding into the chuck), and loosen (which can release the chuck)

Clamping (clamping chuck)

c) Gas control: air, nitrogen, oxygen (the corresponding gas can be blown)

d) Power on operation: enable (power on the motor), return to zero (return to zero for all moving axes of the machine tool)

e) Laser control: laser power on (laser power on external control light output), laser reset (laser reset), red light (laser red light shutter open)

Parameters (laser dotting power can be set), laser dotting (laser dotting)

f) Follow up control: automatic calibration (laser head capacitance calibration), one button follow-up (laser head follows to the pipe), Z-axis lifting (Z-axis rises), reset 88C1 (laser head capacitance reset)



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- g) Processing control: start (start processing), pause (pause processing), reset (program reset), clear alarm (clear alarm), return to the workpiece point (return to the starting point of part cutting), idle operation (idle cutting track, no light), return to the center (return to the midpoint of mechanical coordinate), center separation (pipe center separation point), continue cutting (continue cutting from the place where the alarm is interrupted after an alarm occurs during cutting), cutting (cut a section) Manual commissioning (material rack cylinder control)
Calibration (calibration of pipe level and center) Commissioning (machine test use, can be ignored)
- h) Program: (code of cutting program executed)
- i) Production management (the processing production quantity can be set)
- j) Monitoring (monitoring the real-time dynamics of the machine tool)
- k) User defined (can control the rise or fall of automatic feeding)



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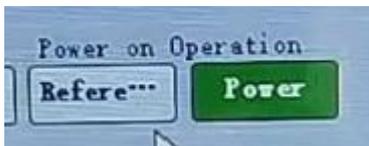
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Startup operation steps

After entering the main interface of the program, there will be a prompt at the top left of the screen that "axis is not enabled" and "X, Y, Z, A, U axis" is not returned to zero.

1. Enable and reset

Click "Enable" on the main interface to open the enable, and click "Return to zero" (confirm whether the inductive switches of each axis are normal and safe before returning to zero) to return all mechanical coordinates of X, Y, Z, A, U and axis to zero. (Must return to zero after each power outage)



2. Centering

After zero return, click "Center Return" on the screen to return X and U axes to the mechanical center point.



3. Pipe calibration

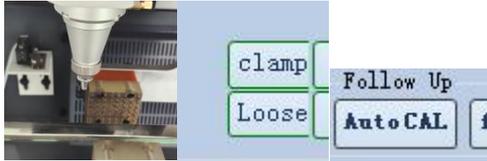
Put the pipe to be processed into the chuck and place it beyond the laser head (there must be pipe under the laser head before



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calibration). Click the clamping on the right side of the screen to clamp the chuck. Click the "Automatic Calibration" on the screen to wait for the completion of automatic calibration.



(Note: the pipes of different sizes need to be recalibrated each time they are replaced)

4. Create a new drawing or import a drawing

After the automatic calibration is completed, click "New" or "Import"



on the screen to create a new graph to be cut or import a graph to be cut. (The format of the imported drawing is. Step) (Note: the size of the new drawing and the imported drawing must be consistent

with the size of the cut

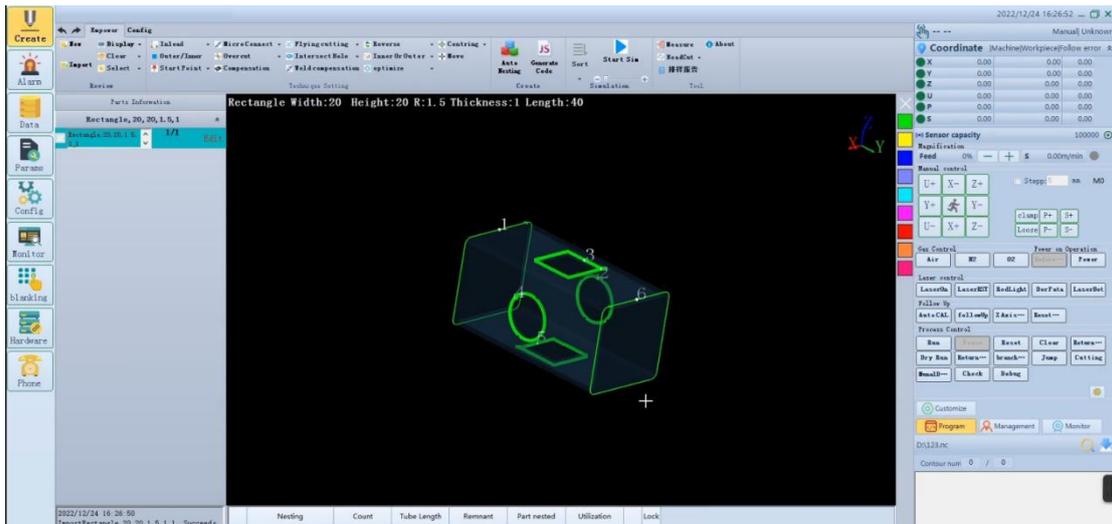
pipe)



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Import drawing footprint

5. correcting

When the pipe to be cut is square, it is necessary to correct the pipe.

a) Click "Check" on the screen, and a window "Leveling" pops up to confirm whether the pipe size is consistent with the actual cutting pipe size. During the correction, ensure that there is pipe under the laser head, click "Start" (be careful not to close this window), and wait for the completion of leveling.



b) Click "Calibrate the beam center", (be careful not to close this window) click Start, and wait for the completion of beam center

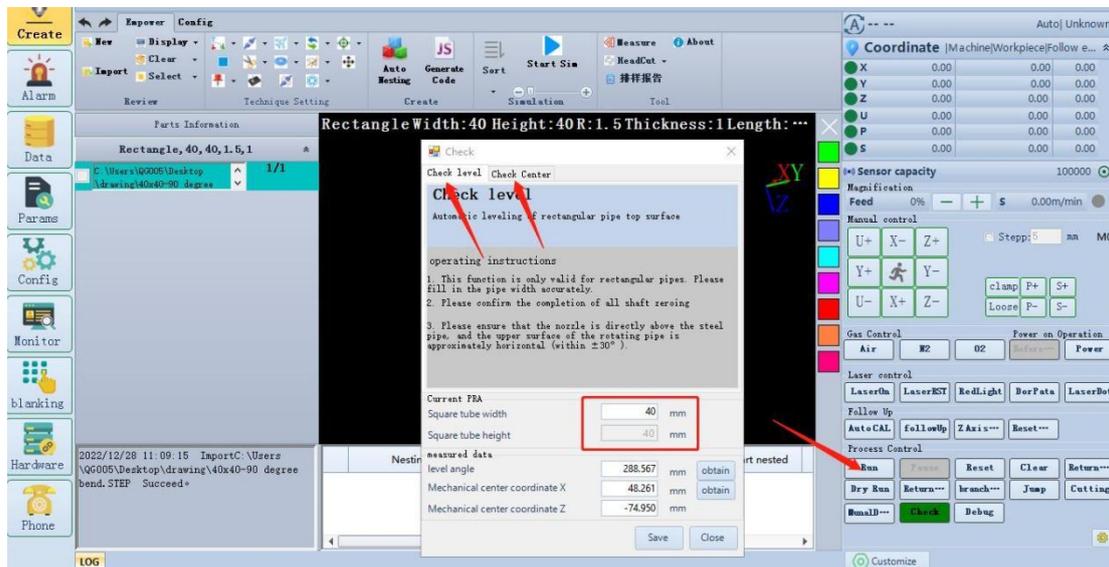


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calibration. Click "Save" in the window to save the calibrated value.



Schematic Diagram of Leveling and Beam Center Calibration

6. Generate Code

Before starting cutting, it is necessary to generate cutting code.



Click the "Generate Code" at the top middle of the screen to expand the small arrow, and the "Generate Code" in it. After

generating the code, click 'Run'  to process and cut the figure

Note: The code needs to be regenerated after replacing the drawing.



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Function description:

1、 Mode switching

1: 显示报警信息

Loading0 idle or stock failed | **Cutting0 in idle**

顶料配置

Distance from zero position of axis A to chuck	108	mm
Retraction distance of baffle in place	100	mm
F-Axis automatic clamping	300	mm/s
warning errors	93	mm

Drawing function parameters

Maximum drawing stroke	400	mm
Drawing and cutting range	130	mm
Full length set for the second time	0	mm Note 1
Reasonable distance of the second drawing	0	mm Note 2
Multi clamp length of clamp pipe	55	mm Note 3
Supporting material safety coordinates	45	mm
Cycle processing times	Infinite	↓
Pinch face	Wide surf	↓

Supporting

Supporting material: 100 mm **获取**

Save

Schematic diagram of mode switching



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1. Single card mode:



Open the "Extension Parameters" on the left side of the

screen, select the single card mode, click the "Save" in



the lower left corner, and click the generation code in the



upper middle of the screen to switch to the "Single Card Mode".

(Mostly used to adjust the cutting process) When cutting in the

single card mode, it is necessary to extend the A-axis to a safe

distance to prevent the laser head from touching the A-axis during

cutting. At the same time, there should be pipes under the laser

head. In the single card mode, the length of the workpiece to be

processed needs to be reserved.

2. Pulling mode:

Click the small arrow on the right of the "Single Card Mode", select

the pulling mode, open the pulling function at the bottom, click Save

at the bottom left corner, and click the generation code at the top

middle of the screen to switch to the pulling mode. (After the cutting

process is adjusted, switch to the drawing mode for batch



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production). After switching to the drawing mode, you can set the drawing range and cutting range (you can set them according to the length of the cutting pattern)

a) Maximum drawing stroke: the maximum distance of each drawing (if the value is set to 200, the maximum distance of each drawing is 200 during processing, that is, the maximum drawing distance of each drawing is 200 mm)

b) Pulling cutting range: cutting distance (if the setting value is 200mm, the cutting will only be within 200mm during processing)

c) Pulling range at the end (distance from the end of the pipe)

d) Pulling stroke at the tail (each pulling stroke at the tail)

e) Clamping length (length of pulling clamp pipe)

f) Cycle processing times (cycle processing times can be set)

g) Selection of pipe clamping surface (wide and narrow pipe clamping surface can be selected for special pipe shape)

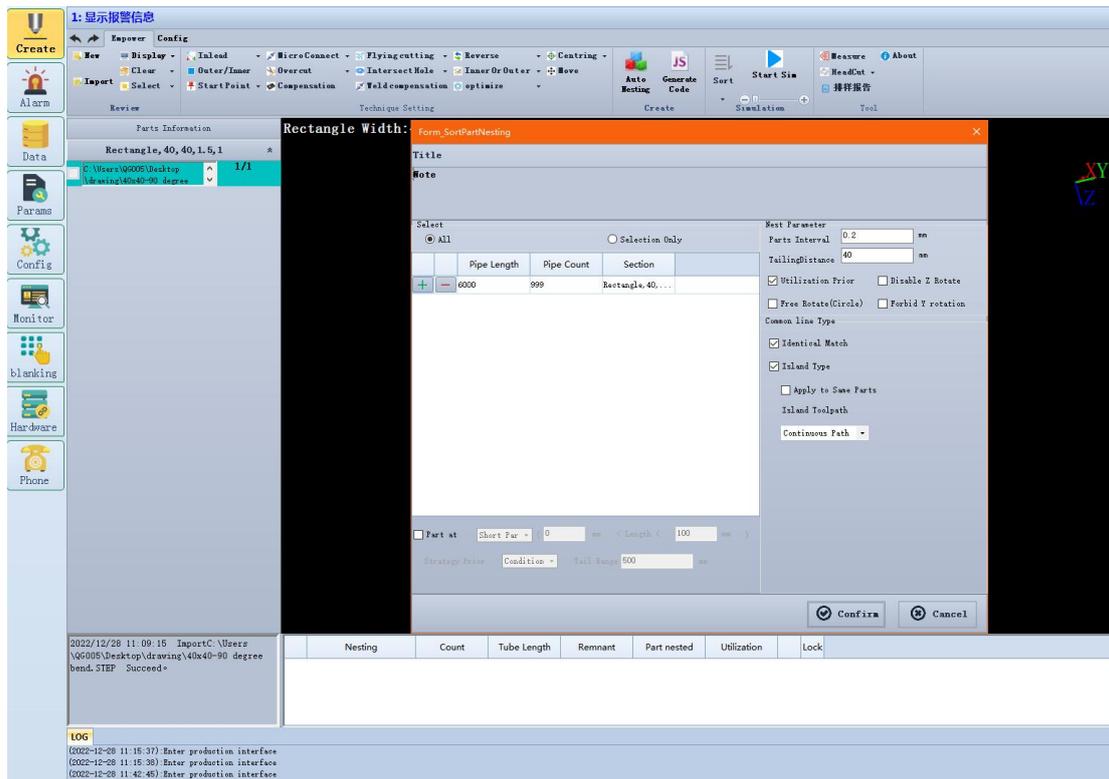
2、 Automatic nesting



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Schematic diagram of automatic nesting

1. Single part nesting

Find the "Generate" expansion small arrow at the top middle of the screen, find the automatic nesting, and layout the parts to be processed. (Note: the nesting length needs to be set according to the actual length of the processed pipe.) When there are multiple parts in the part information pants, the nesting parts need to be checked. In the pop-up dialog box, select "Only the checked parts" and click OK. Wait for the completion of nesting. After nesting, click Generate Code to process the nesting graphics.

2. Layout of parts with the same pipe shape and different sizes



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(mixed layout)

When there are multiple parts with the same tube shape but different sizes in the part information parts. When we want to arrange parts of different sizes, we need to check multiple parts of different sizes. In the pop-up dialog box, select "Only checked parts" and click OK. Wait for the completion of nesting. After nesting, click "Generate Code" to process figures with different size nesting.

3、 Setting of intersecting holes

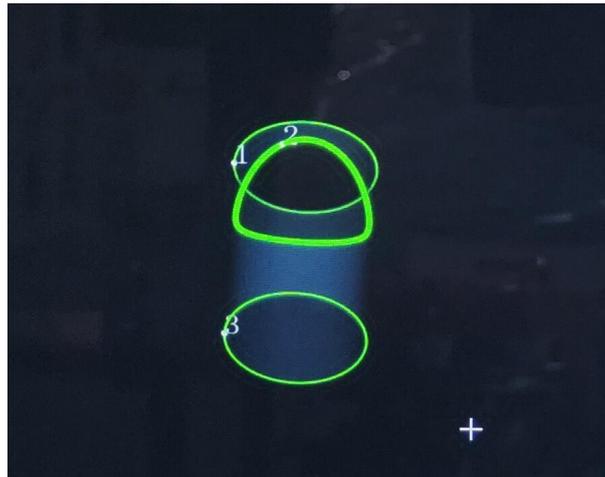
When cutting round pipes, if the round hole on the cut pipe is too large, it is necessary to cancel the intersecting hole for the round hole. (Let the U axis rotate when cutting. If the system is not set, the U axis will not rotate by default)

Select the contour of the hole to cancel the intersection, find the "Tool"  in the middle right of the screen, expand the small arrow, and find the setting of the hole to cancel the intersection.



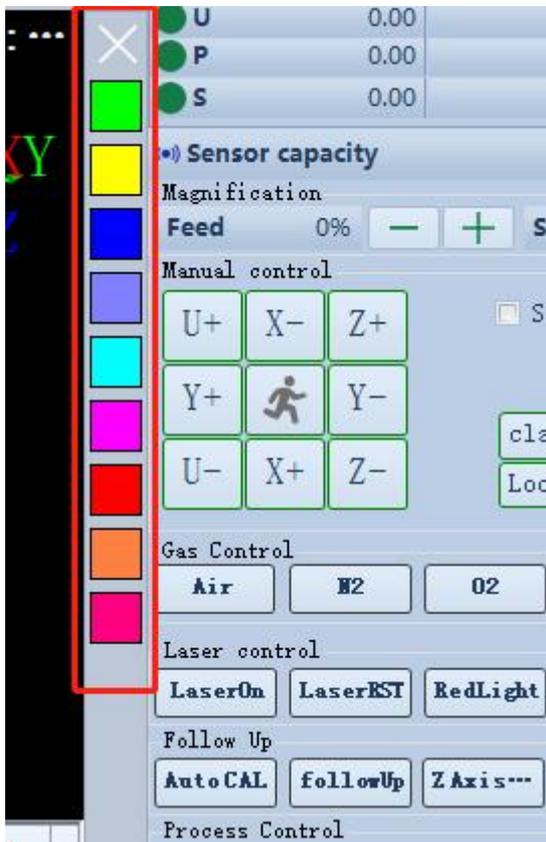
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Schematic diagram of round holes that need to be set to cancel intersecting holes

4、 Layer description (red box below)



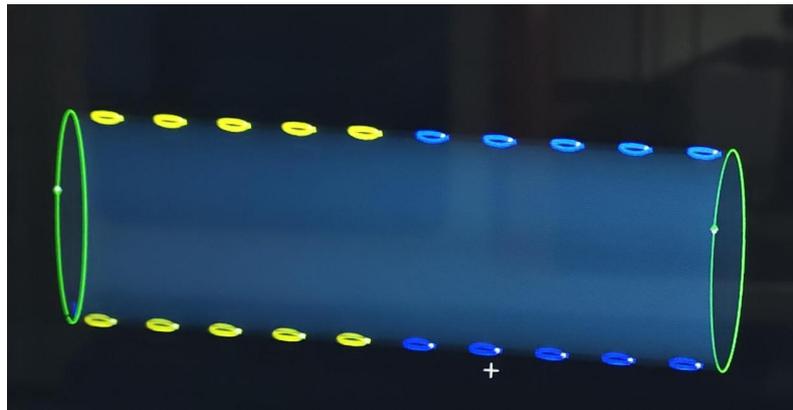
If two or more different cutting processes are required during



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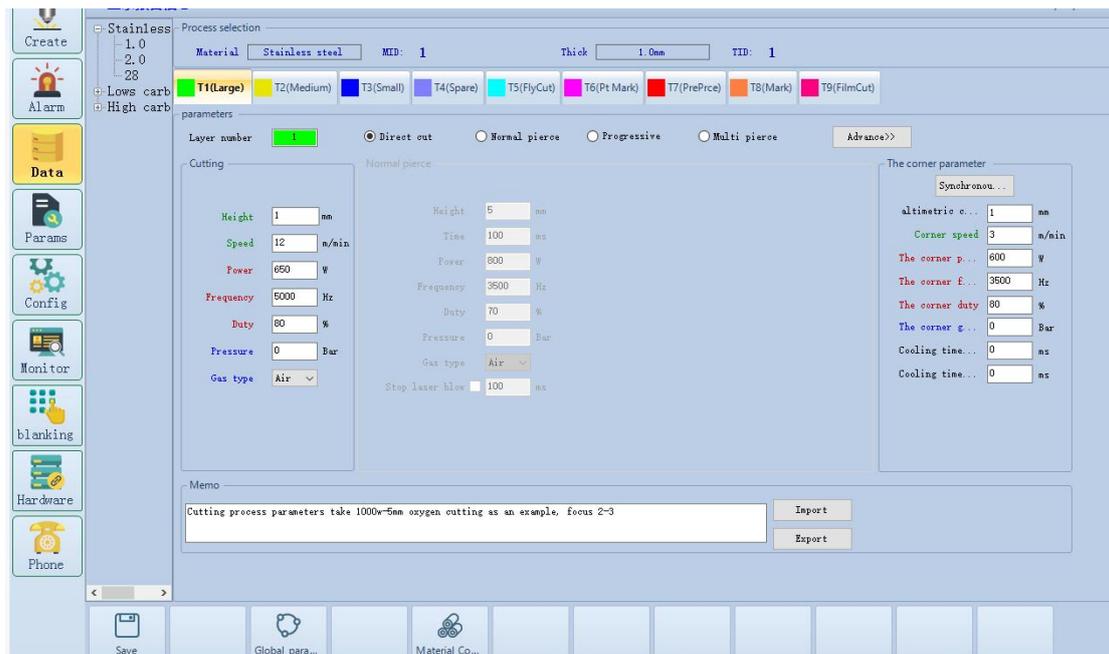
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cutting, different process layers can be switched and different cutting processes can be set. (Setting method: select the contour using different layers, select any layer in the red box of the above figure, generate a code, and then set different processes in the process settings)



Schematic diagram of layer selection

5、 Cutting process (figure below)





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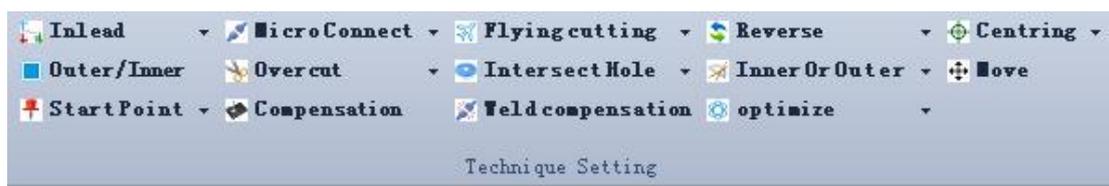
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Schematic Diagram of Cutting Process

- a) Cutting height (height of nozzle from pipe surface during cutting)
- b) Cutting speed (cutting speed of machine tool)
- c) Cutting power (laser power used for cutting)
- d) Cutting frequency (laser output frequency)
- e) Duty cycle (proportion of laser power)
- f) Cutting gas pressure (gas pressure used for cutting)
- g) Cutting gas (the gas used in cutting is air by default, and should not be changed!)
- h) Direct cutting (direct start cutting)
- i) Ordinary perforation (ordinary perforation function can be used for thick pipes to prevent molten slag from rebounding into the nozzle and effectively protect the lens from burning)

Note: The above processes need to be adjusted according to the thickness of the pipe to be cut. When cutting square pipes, the right side can adjust the corner cutting process separately

6、 Detailed description and usage of process settings



1. Lead in: select the contour to add "lead in", click "lead in", and



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set the value to add "lead in" to the selected contour.

Function: introduce the starting point of cutting to the surface of waste materials to prevent burns at the starting end of cutting.

2. Female and male cutting: select internal and external contour cutting.

3. Compensation: select the contour to be compensated, click the "compensation" process, set the length to be compensated, select "shrink in" (decrease) or "expand out" (increase), and click OK to add a compensation process to the selected contour.

Function: In the actual production cutting, the length of the cut part is often inconsistent with the size marked on the drawing, and the laser cutting will also produce a kerf, resulting in inconsistent part length. We can compensate the laser kerf through compensation, so as to ensure the accuracy of product size.

4. Micro connection: click "Micro connection", set the value of "Micro connection", and click the left mouse button on the contour where you want to add "Micro connection" to add "Micro connection". After adding, the selected contour will not cut the micro connected distance.

Function: adding "micro connection" can prevent the waste from falling and ensure the smooth cutting process.



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5. Starting point: change the starting point of cutting (note: the starting point of square tube cannot be set at the corner)

6. Overcut: select the contour to add "Overcut", click "Overcut", set the value, and then add "Overcut" to the selected contour

Function: cut the contour by a certain distance to prevent continuous contour cutting

7. Reverse direction: change the cutting direction

8. Selection of internal and external walls: internal contour or external contour cutting can be selected

9. Centering: after adding centering, the pipe is centered before cutting (only square pipes can be used)

10. Sequence: arrange the cutting sequence. Function: improve cutting efficiency

11. Micro shift: select the contour to be micro shifted, and set the micro shift distance to micro shift the selected contour.

12. Flying cutting: when the figure to be cut is a circle arranged in a regular way, the arc flying cutting process can be selected to improve the cutting efficiency.

Note: The above contents only briefly describe the daily startup operation steps of the operating system. If you do not



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**understand the rest, please contact the after-sales personnel
of the after-sales department, and we will sincerely answer for
you!**