Fangling iTubeSE laser tube cutting software direction for use

Shanghai JiaoLing CNC Technology Co., LTD

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01	2022-9	All	The initial version
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03	2023-9	All	Version revision
04	2023-10	All	Version revision
05	2024-9	All	Version revision

Precautions for use

Thank you for using the iTubeSE laser tube cutting software from Shanghai Fangling Computer Software Company Limited (iTube)! This manual is applicable to the iTube CNC system developed and produced by Shanghai Jiaoling CNC Technology Co., LTD. It introduces the use of iTube in detail, including system characteristics and installation instructions. If you also need the iTube software and the iHC100B Tuner, please read the help documentation. Read the manual and local safety regulations carefully before using the iMC6610 motion controller.

This description is based on iTubeSE V3.0.1. Due to the continuous improvement of this product, the technical parameters and hardware parameters involved in this manual are subject to modification without notice. If you have other questions or opinions about this product and the contents of this specification are not detailed, please consult in time. We will be happy to answer your questions, suggestions and criticisms. Thank you again for your choice and your trust.

pay attention to!

- Inappropriate system setting may cause abnormal work or even damage to cutting materials, machine tools, lasers and other equipment. Please operate or set the parameters according to the requirements of the machine tool and equipment manufacturer.
- Improper operation will cause cutting quality decline, component damage or even personal injury. Please read this manual carefully and receive professional guidance to avoid accidents.
- Shanghai Fengling shall not bear any direct, indirect, incidental or corresponding loss or liability caused by the improper use of this manual or this product!

- The design of this product is not suitable for on-site maintenance. If there are any maintenance requirements, return to the after-sales service (maintenance) center of Shanghai Jiaoling CNC Technology Co., Ltd.:

Address: Room 103, Building C, Peima Travel Science Park, No. 154, Lane 953, Jianchuan Road, Minhang District, Shanghai

Sales: + 86-21-34290970

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Directory

Chapter 1.Software introduction

1. 1 Software introduction

iTubeSE Is a set of software used for laser cutting of metal pipe, with the characteristics of simple operation, powerful function. It includes three-dimensional graphic display, square / round tube / waist circle / elliptical tube / Angle steel / groove steel various types of pipe profile cutting, pipe search, support and other auxiliary control, automatic processing and other functions.

1. 2 Software installation and unloading

Before installing the software, please confirm that the accessories are complete, contact the relevant personnel to obtain the software and drivers, etc.

pay attention to:

i TubeSE Laser tube cutting control software, support win7 and win10 system, do not support xp system.

- **need. NET Framework 4.0 and above the operating environment.**

First, you need to install the Driver Configuration Tool (sense_shield_installer.exe) running the dongle. If not, please contact the relevant after-sales personnel.

According to the wiring diagram, connect the iMC6610 motion controller and the industrial control host with the network cable, and set the iP address of the industrial control host: 172.16.8.7, subnet mask: 255.255.240.0. as shown in the figureAs shown.

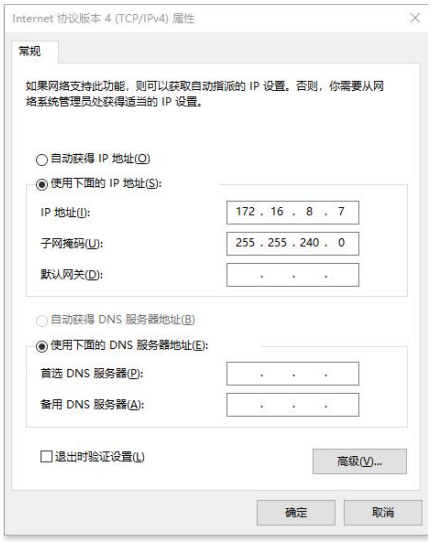


Figure 1.1 The iP address setting of the industrial control host

Copy the iTubeSE software installation package to the system desktop, and double-click to run.as shown in the figureAs shown, the iP address is set to 172.16.8.8 until the software installation is complete. Subsequent upgrades of the software also follow this procedure. If the installation or upgrade fails, please contact our relevant after-sales personnel for processing.

Figure 1.2 Software installation interface

Figure 1.3 Setting up the IP address

After installation or upgrade, double-click the iTubeSE icon on the desktop to run the iTubeSE Laser Cutting software. The figure below shows the interface when the software is started normally.

Figure 1.3 Startup interface

Entering the iTube login interface, you can select the operator or the administrator to login. The operator version will not be able to modify or set some parameters and functions, and the administrator version can use the complete software normally. If you need to log in the administrator version, you should enter the password "1396".

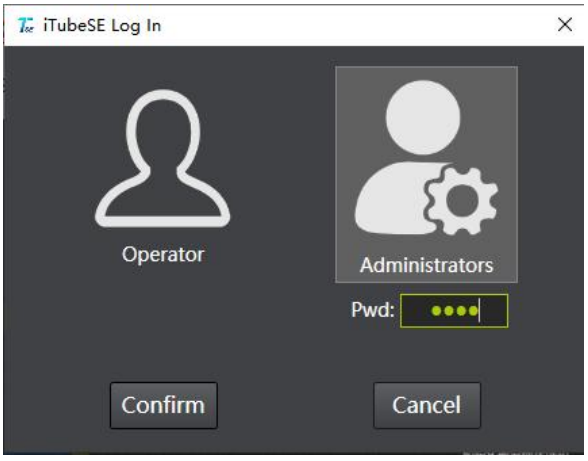
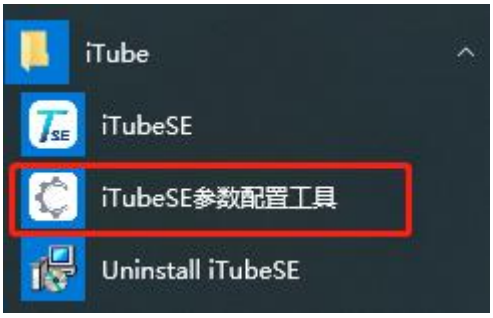


Figure 1.4, Rights management

The iTube software is equipped with a parameter configuration tool, which will not be displayed on the desktop during the first installation. You can find the iTube folder in the beginning to see the iTubeSE parameter configuration tool, and click to open the machine

tool configuration tool. For convenience, you can create shortcuts in the main interface for direct use.



Chapter 2.Main interface observation

iTubeSE After normal startup, enter the main interface of the software, as shown in the figure below.

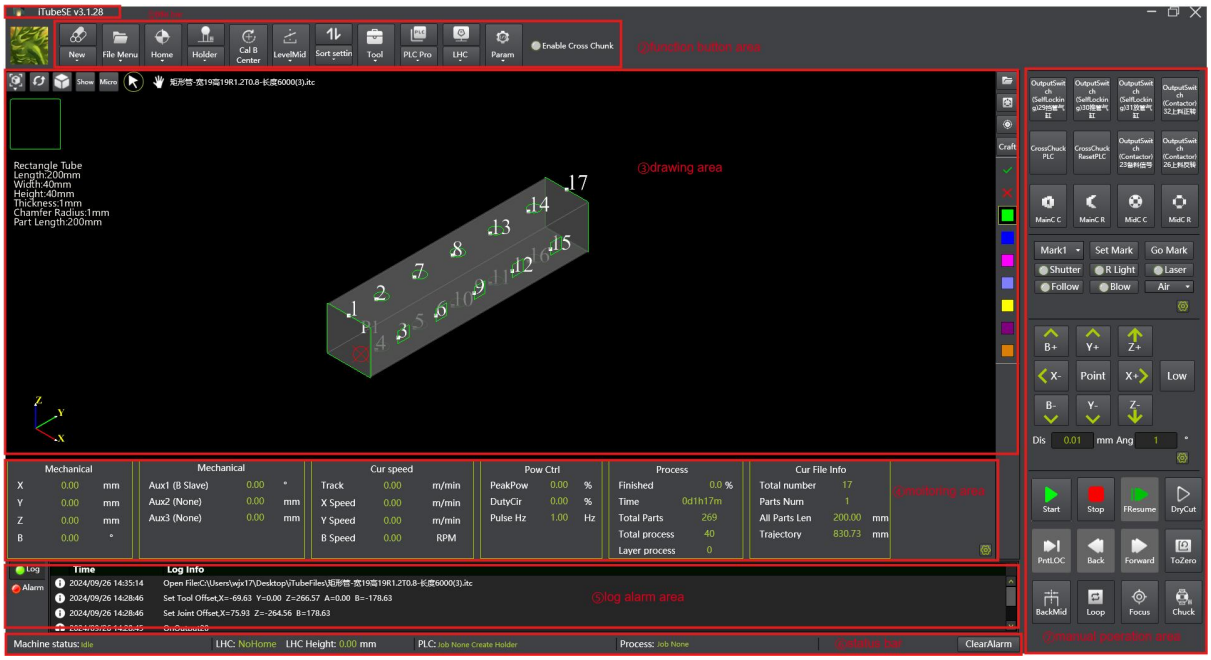


Figure 2.1 Main interface of iTubeSE software

Main interface: it mainly includes ① title bar, ② function button area, ③ drawing area, ④ monitoring area, ⑤ log alarm area, ⑥ status bar, and ⑦ manual

operation area

2. 1 title bar

The title bar can observe the alarm information and warning information. If there is an alarm information and warning information will be displayed here, as shown in the figure.

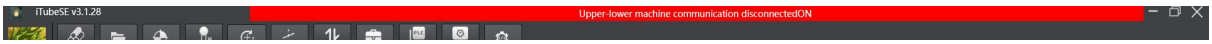


Figure 2.2 Title bar

2. 2 Function button area

Function button area includes new construction, file management, return to origin, bracket control, calibration B axis center, leveling search, tool, PLC process, elevation ator, parameter setting, as shown in the figure. See machining control below, other nodes for details.

Figure 2.3 Function button area

2. 3 Drawing area

The drawing area is used to display the graphics to be processed, including graphics operation and process setting functions. See the drawing and layer process below for details.

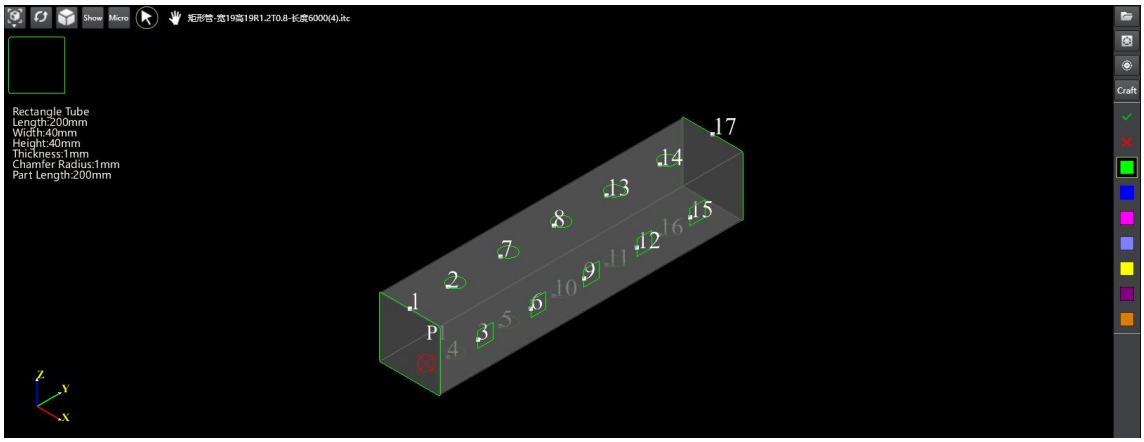


Figure 2.4 Drawing area

2. 4 **Monitoring area**

The monitoring area includes mechanical coordinates, real-time speed, power control, processing progress, user coordinates, current file information, and the relevant processing information that can be seen here during processing.

Fig. 2.5 Monitoring area

Click the setting button in the lower right corner to pop up a small window of information configuration. You can display the content in the configuration information display area, as shown in the figure.

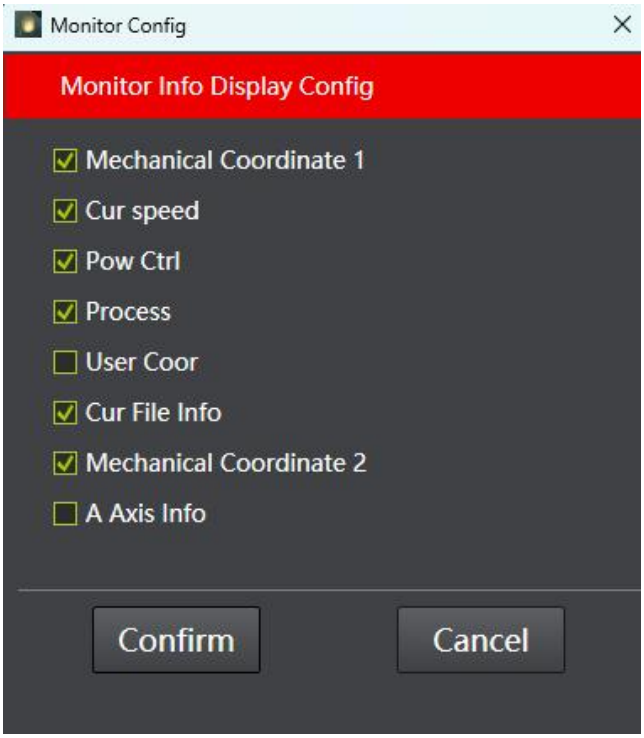


Figure 2.6 Configuration of the monitoring area

2. 5 **Log / Alarm area**

The log area includes the log and the alarm information. Observe the alarm time, alarm information, alarm ID, alarm status and operation here, as shown in the figure.

- After the alarm content removes the alarm state, the alarm message will automatically disappear;

- The contents of the log will not disappear itself.

Figure 2.7 Log / Alarm

2. 6 **status bar**

Here, the machine tool status, elevation regulator state and PLC status can be seen, as shown in the figure.

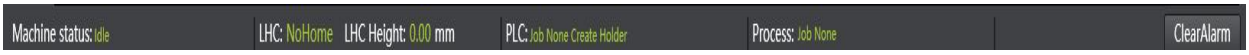


Figure 2.8 Status bar

2. 7 **Manual operation area**

Manual operation area, including manual vehicle shift and spot shooting button, as shown in Fig. See detailed in the manual operation area below.

Figure 2.9 Manual operation area

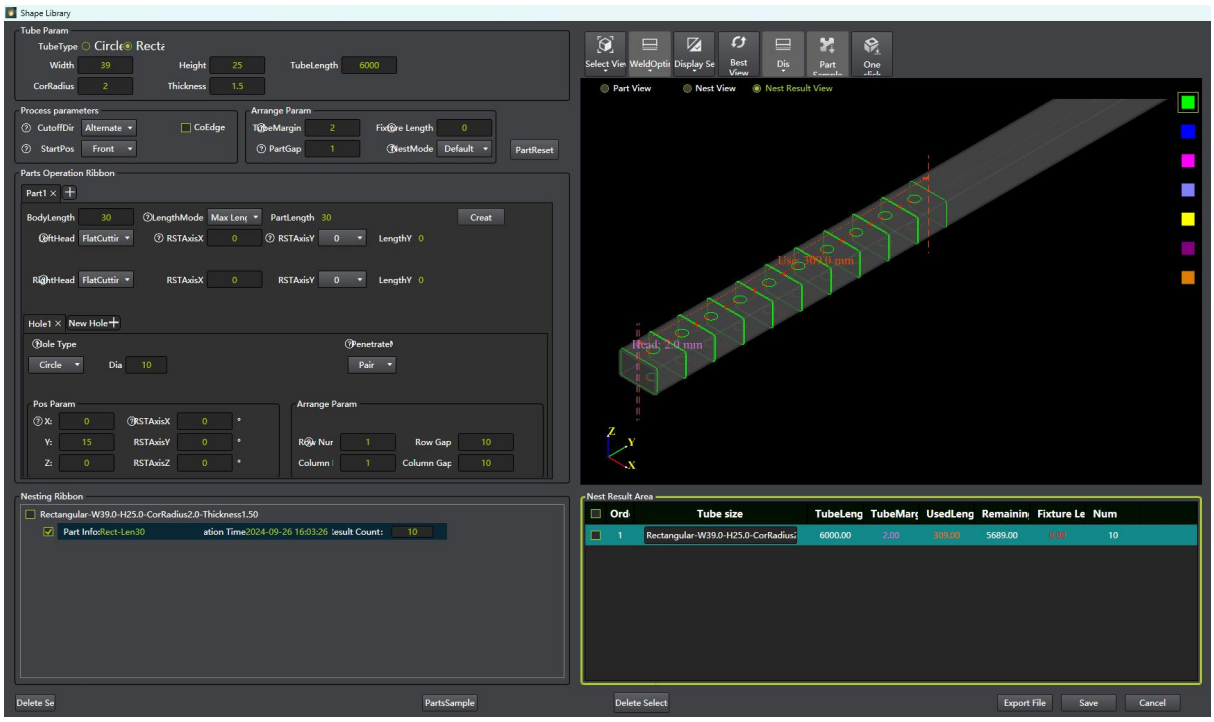
Chapter 3.TubeSE Software function details

3. 1 Quick plotting

Free drawing function is designed for some simple and commonly used pipe materials or some industries specially customized a function that can be convenient and fast drawing in the software. The current functions are general gallery, punching model and stair handrail model, and more models will be opened in the future.

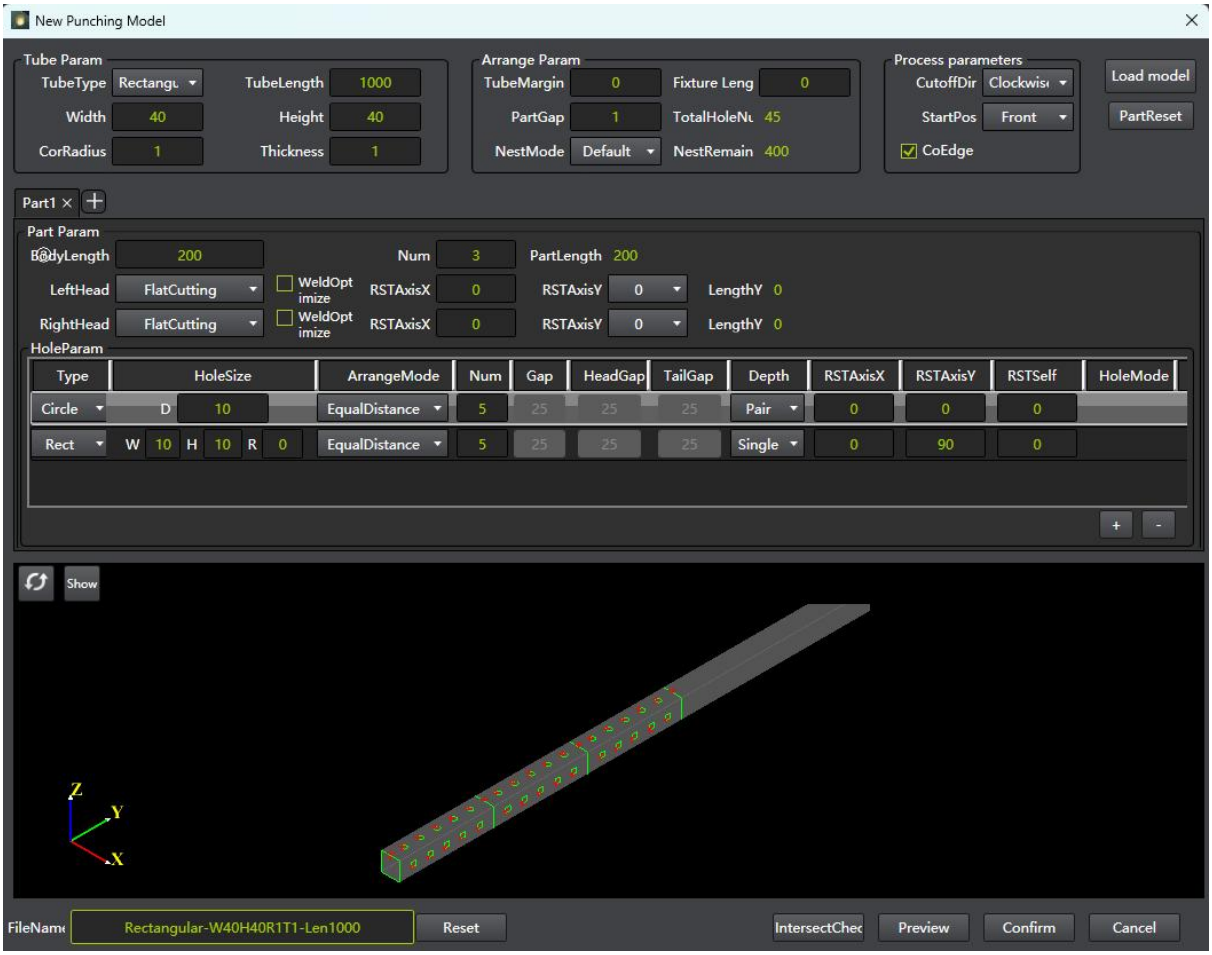
3. 1. 1 General gallery

General gallery is a drawing function for common standard pipes, which can create parts, create holes, measure, weld compensation, parts proofing, text marking, and material typesetting. At present, there are only rectangular tubes and round pipes, and subsequent pipes are under development



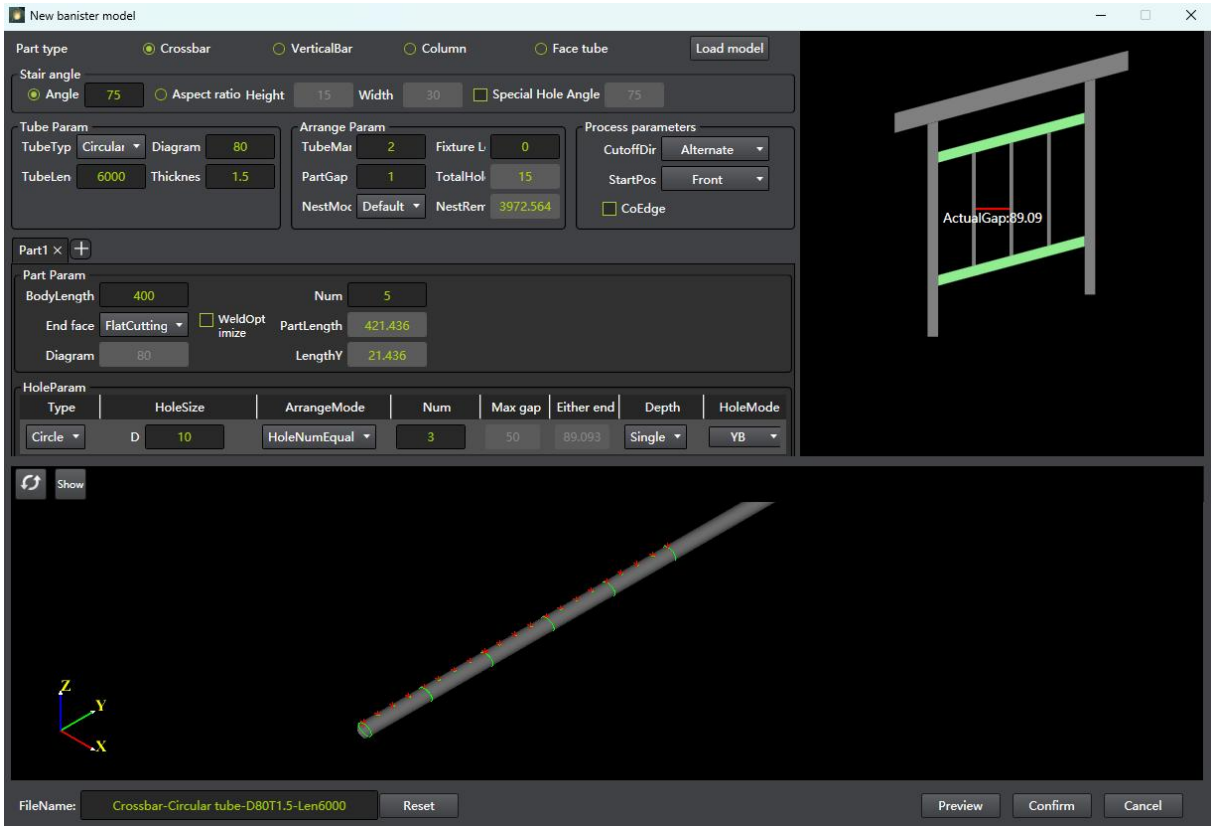
3.1.2 Create a new cut-out permutation model

The new cutting and arrangement model is a specially customized drawing function for the punch industry, which can be more convenient and fast drawing, material typesetting, highly targeted



3.1.3 New armrest model

The new handrail model is a specially customized drawing function for the stair handrail industry, which is divided into four categories: horizontal bar, column, vertical rod and face rod. It can be more convenient and fast drawing and material layout, and is highly targeted



3.2 file management

3.2.1 File open

Click "File Management-Open", you can click open in the menu to select the file to be used, file selection support graphics preview function, select to be processed. The itc-type file, as shown in Fig.

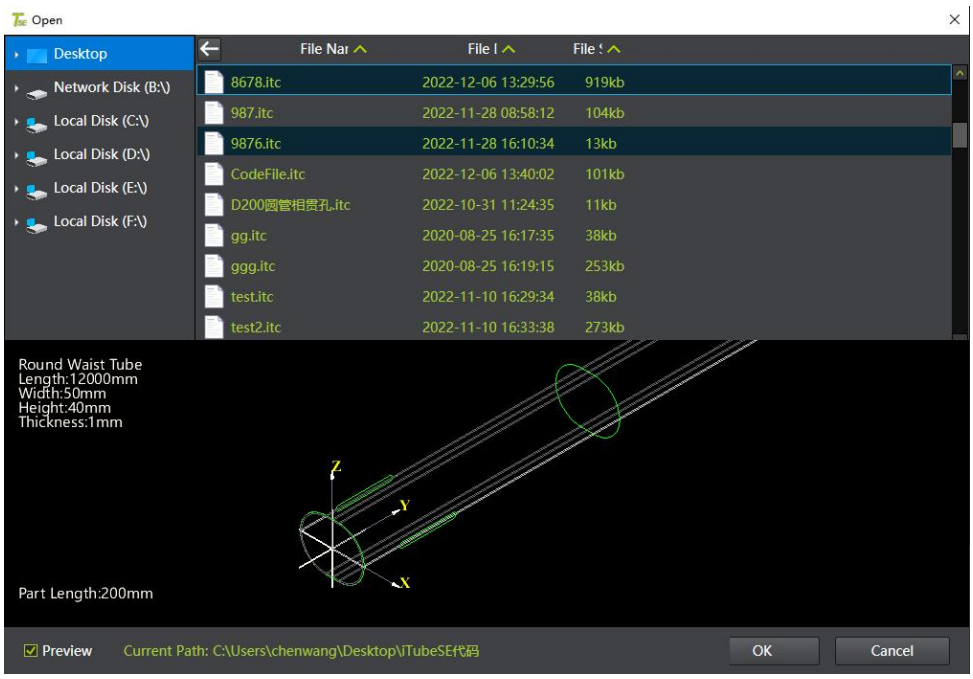


Figure 3.1 File Management-Open

The iTube software can generate processing files using the external packaging software.

3.2.2 Open recently

The 15 recently opened files will be saved. When the file location has not changed and has not been damaged, it can be opened quickly opened with one click.

3.2.3 preserve

Save the machining files in the current software (including parts, sample arrangement results, and knife paths on the base map), but only within the software, and do not create local files. When the file status changes, switch files or close the software or ask whether to save the current file

3.2.4 save as

Save the machining files (including parts, sample results, and underpaths in the current software) to any path

3.2.5 Save tasks / restore tasks

If the file processing is incomplete, click save the task to save the current progress and process parameters as. The itm file, which is open. The itm file can open the file and the corresponding process parameters, and click the recovery task to restore the previous processing progress, which can only be realized if the lower bit machine is not disconnected.

3.2.6 Parameter backup

Click "File Management-Parameter Backup" to generate a backup file *. The it file, select the appropriate location, and enter the backup file name.

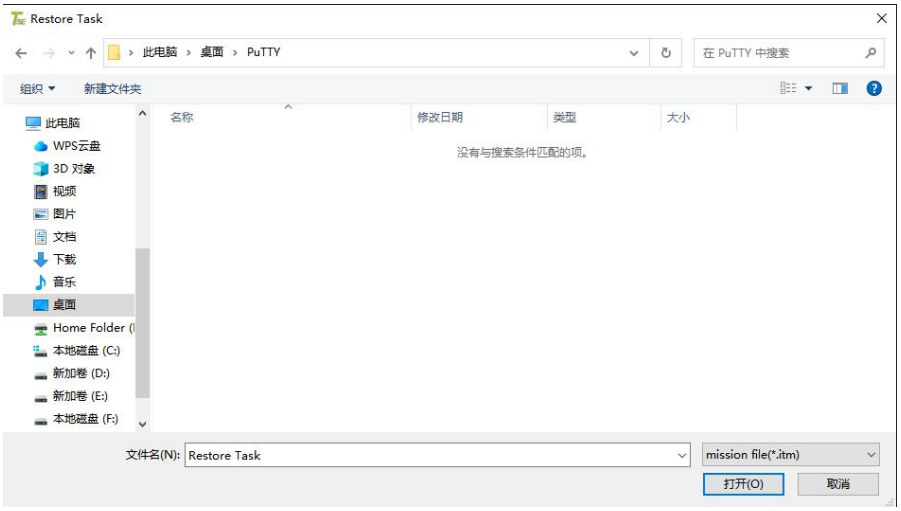


Figure 3.2, Parameter backup

3.2.7 about

Click File Management-About to open the About interface, where you can view software information, authorization functions and decrypt settings.

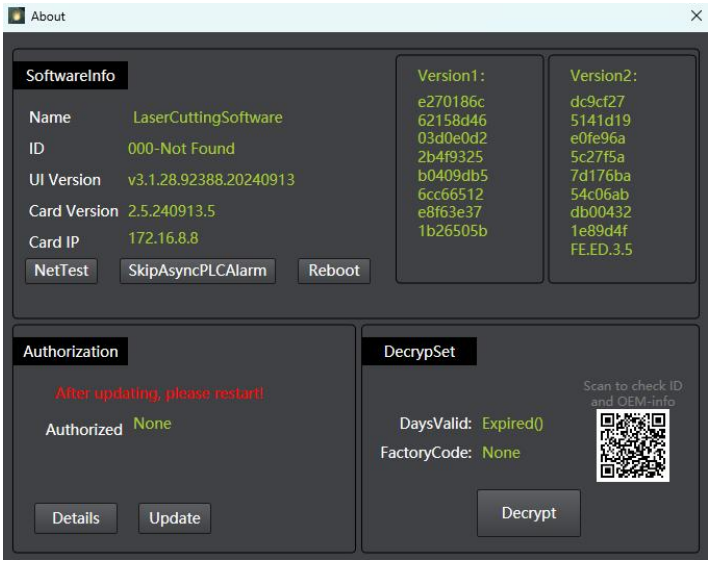


Figure 3.3 for the relevant information

3. 2. 8 Watch the dog device

The function module used to detect the running status of the software is in the general mode to send a message to the watchdog at fixed time intervals. If the overtime watchdog still does not receive the message, the software exception processing process will be executed.

The watchdog parameters can be modified in the iTubeSE parameter configuration tool software, with default values recommended.

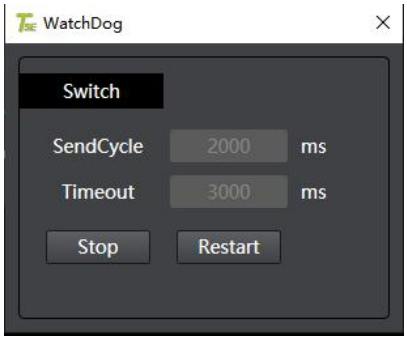


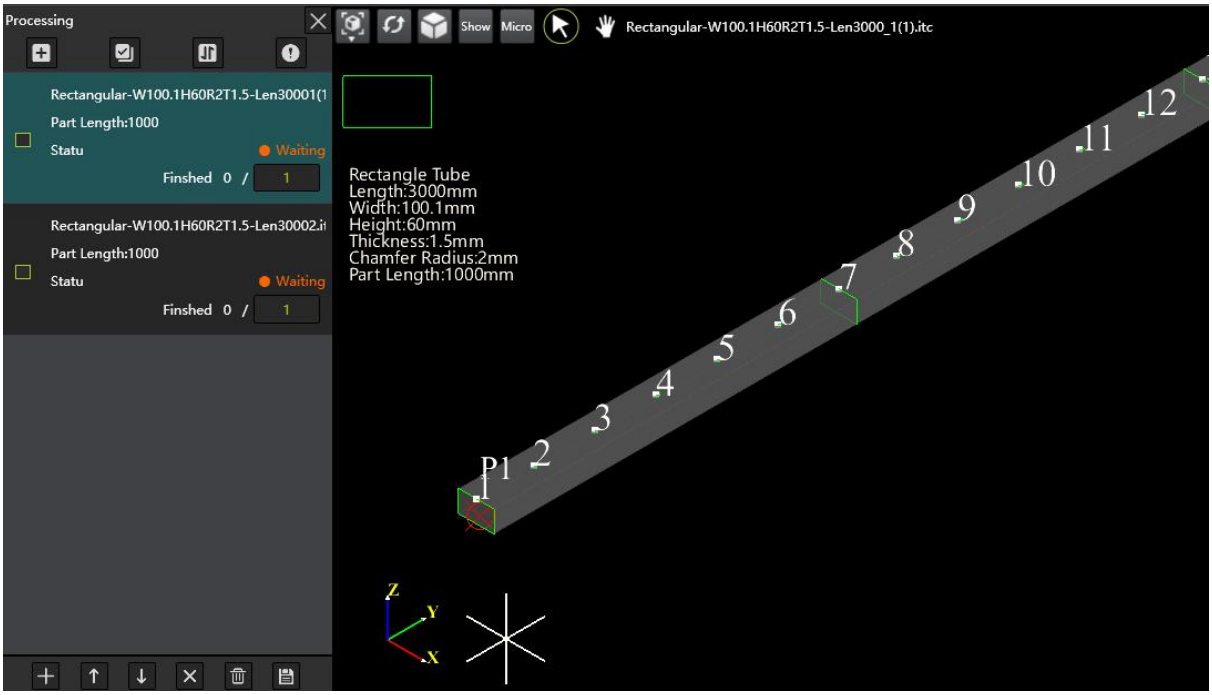
Figure 3.4 Watch-dog

3. 2. 9 One-key fault information saving

The information can be saved as one. The itf file for convenient to collect and send all information during the machine failure.

3.2.10 Processing list

Import the file into the processing list, and configure the corresponding feed PLC, which can be automatically processed according to the order in the list



3.3 back to the origin

The drop-down menu back to the origin includes: all back to the origin, the focus axis back to the origin, the elevation device back to the origin, X axis back to the origin, Y axis back to the origin, B axis back to the origin, support axis back to the origin, avoid axis back to the origin, and back to the origin.

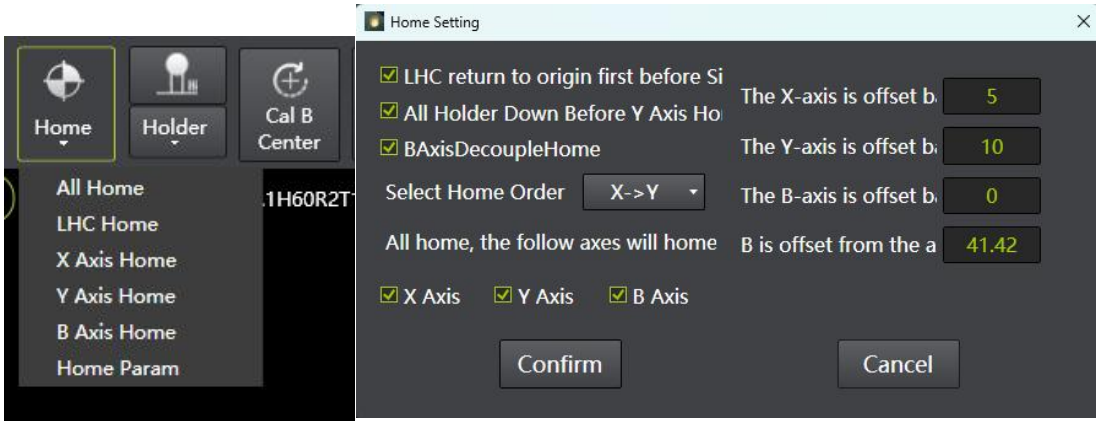


Figure 3.5 Back to the origin

Back to the origin setting can set different ways back to the origin according to the different needs of the user site.

"All back to the origin". After pressing this button, all axes will go back to the origin to calibration the machine coordinates; you can check the options back to the origin setting and add the axis according to the options.

- **Single axis goes back to the origin:** In order to ensure the safety of the cutting head, you can check this item and let the Z axis (the tuner) go back to the origin before the X / Y / B axis goes back to the origin.
- **All stents drop first before the Y axis returns to the origin:** for safety reasons, the stent is preferably in a descending state during the Y axis returns to the origin to prevent the stent from being hit.
- **When all go back to the origin, the X axis also returns to the origin:** check by default. If you want the x axis to return to the origin when performing all back to the origin, you can check this item;
- **When all back to the origin, the Y axis also back to the origin:** checked by default. If you want to return the Y-axis to the origin, this item can be checked;
- **When all back to the origin, axis B also back to the origin:** check by default. Prevent the pipe from forgetting to remove the pipe back to the origin.
- **When all back to the origin, the focus axis also back to the origin:** not checked by default. For convenience reasons, the efficiency can be improved back to the origin.
- **When all back to the origin, the bracket axis is also back to the origin:** not checked by default. For convenience reasons, the efficiency can be improved back to the origin.
- **When all back to the origin, the avoidance axis also back to the origin:** not checked by

default. Prevent collisions for safety concerns.

- **Back-origin sequence:** Set the back-origin order for the X and Y axes.
- **Back-origin offset:** for the back-origin of the common axis, offset a distance after the origin as the origin position.

3.4 Bracket control

Stents are divided into feed support and material pickup bracket. The feed support refers to the support between the main chuck and the middle chuck. In order to prevent the deformation of the pipe, the feed support is added to support the pipe after the pickup tray, the pickup support is added to support the pipe. The bracket control button includes the upper and lower parts, the upper part 

is for manual control of the bracket, and the lower part 

is for support debugging.

3.4.1 **Manual control of stent**

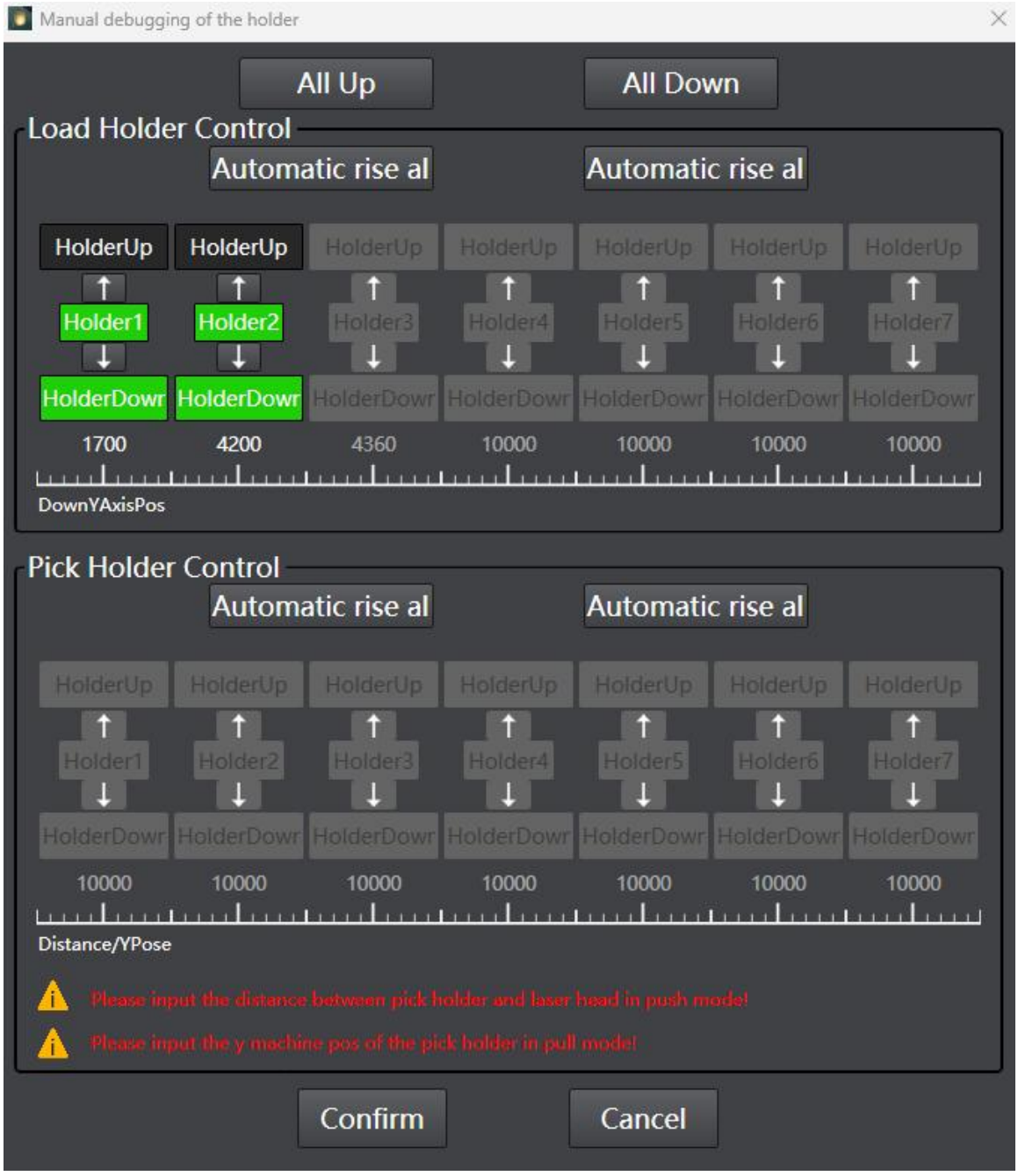


Figure 3.6, Stent control

For the feed support, the drop position parameters corresponding to each support need to be configured in the machine tool configuration tool. After the system returns to the origin, the Y axis reaches the first section of each bracket, considering the parameters such as the rising and fall time and the air shift speed of the bracket to ensure that the bracket will not hit the main drive, and the current

Y axis coordinate is recorded as a reference for the falling position parameters of the bracket. Only scaffolds with Y descent coordinate parameters greater than the current actual Y coordinate values are considered safe supports and can be manually raised and dropped on the manual debugging page.

The manual control of the pickup bracket is not limited.

Only the configured bracket in the parameter configuration tool is operable. Before manually controlling the bracket cylinder rise and fall, it is necessary to measure the time required for the bracket cylinder to rise and fall with a stopwatch, and then configure the bracket rise and fall in the machine configuration tool. After the configuration, test whether the default time is reasonable.

Press the bracket "cylinder rise" and "cylinder down" to lift or drop the bracket cylinder. After the default time is in place, the button becomes green, representing the current bracket cylinder status. Click "All bracket rise" "All bracket Down" and all bracket cylinders that allow to rise or fall to rise or fall together (including feed support and pickup support).

3.4.2 Follow-up bracket debugging

Support feed support and pick up support following, first need to configure the following bracket in the machine configuration tool.

Parameters required:

- Selection of feed support type: cylinder following support and following support
- Select the bracket follower shaft. The basic parameters of the motor and the parameters of the origin are configured on the auxiliary axis page. Multiaxis configuration requires authorization to use.
- The cylinder following bracket needs to be configured with rising and down parameters. If the rise and fall corresponds to the opening and closing of the same output port, you only need to configure the rising output port and the drop output port is 0. Please complete the default time of bracket rise / down according to the actual situation. Open the output port and wait for the default time, the system considers that the bracket cylinder rises / down in place. Follow-up bracket does not need to configure the up and

down parameters.

- Configure the Y drop trigger setting parameters. When the main chuck moves to the Y drop position, the bracket begins to drop; if the main chuck moves to the Y limit position and the bracket has not fallen in place, the bracket alarms and stops the chuck movement.

Note: The above parameters must be configured separately for each used stent.

Optional parameters:

- If "allowed bracket automatic rise" is checked, when the Y coordinate is less than the rising coordinate (if the rising input port is configured, the input port must be valid), the cylinder following bracket opens the rising output port.
- If the mechanical structure has an up and down limit switch with the bracket, the input port can be configured to replace the default time.
- If the mechanical structure has a limit switch before the bracket, the alarm input port can be configured. When the alarm input port is valid and the bracket does not drop in place, the bracket alarm will generate and stop the chuck movement. The alarm input port and the limit position are both to prevent the chuck from hitting the bracket, the former is equivalent to hard limit protection, and the latter is equivalent to soft limit protection.
- If the bracket is a dual output port control, i. e. the up and down are opening different output ports, check "Close the in place output port" and close the corresponding output port after the bracket rises / down in place.

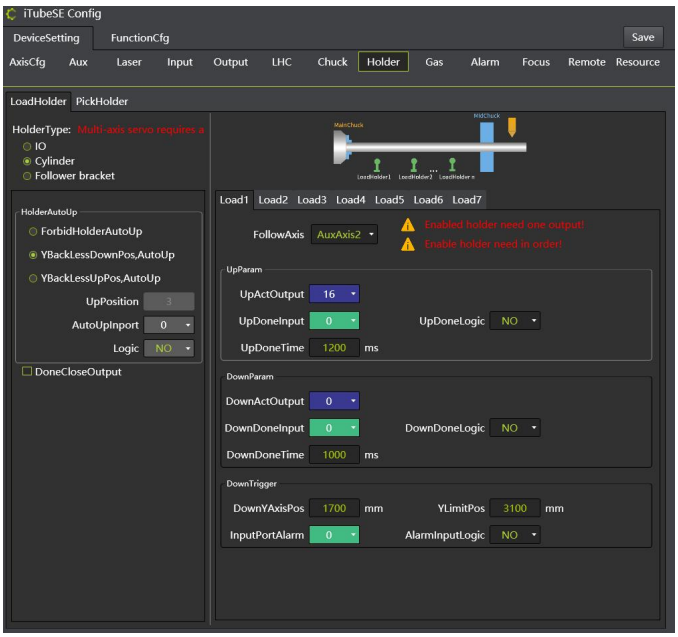
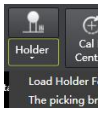


Figure 3.7 Machine tool configuration tool-bracket configuration

Then enter the software, click 

(follow-up bracket debugging), a calibration of the follow-up bracket (only with a rectangular pipe calibration, you can follow the bracket according to different drawings), you can find the position of the bottom of the pipe, so that the bracket and the bottom of the pipe just contact, the bracket just hold the pipe.

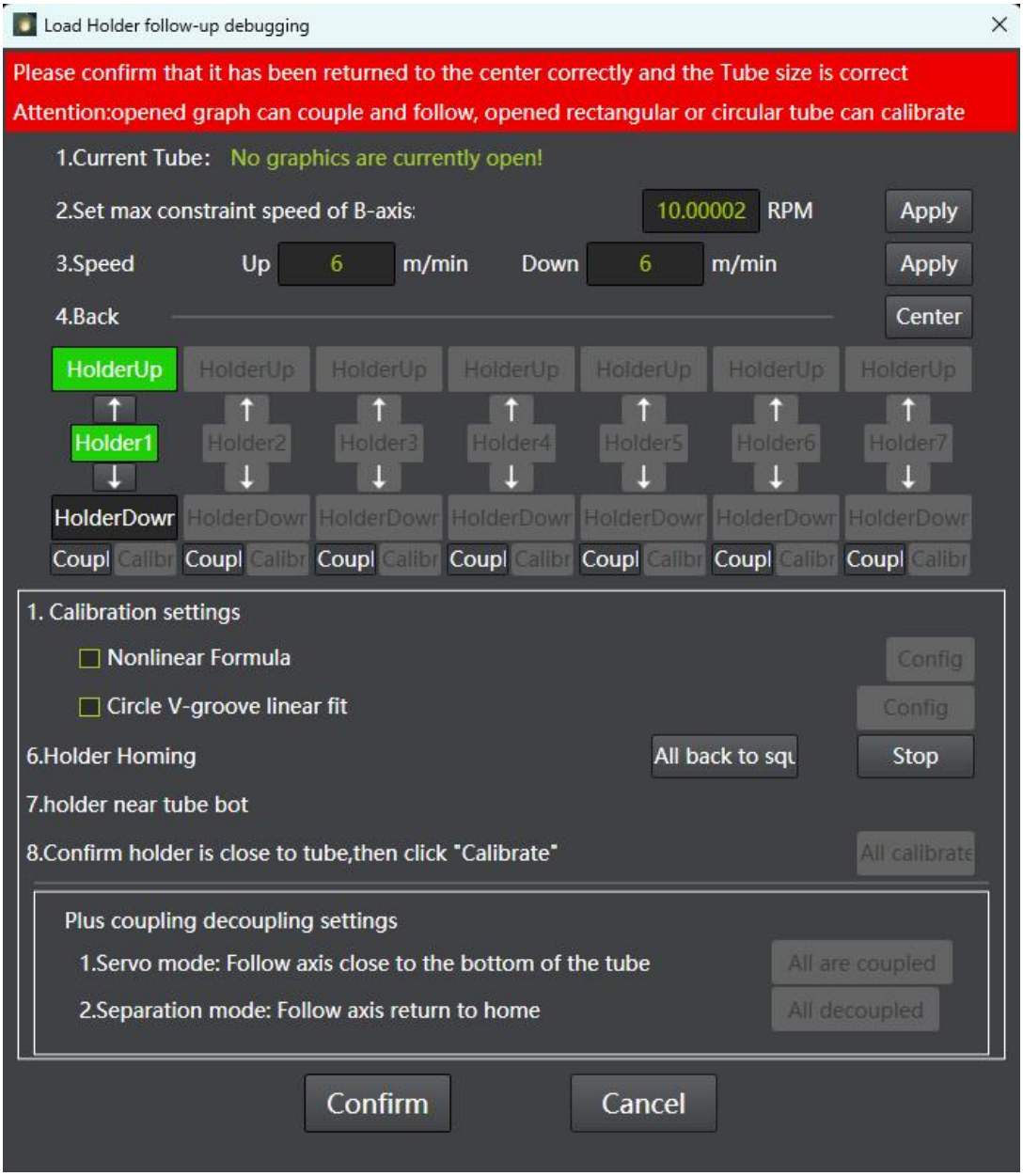


Figure 3.8 Following oning of support

operating steps:

Before retreating the main chuck to the descending distance of bracket 1, hold the rectangular tube, click the middle button once, and straighten the single plane again. Then point the bracket to rise, and then touch the bracket, make the bracket fit the pipe surface, click the calibration button, to complete the calibration.

parameter	explain
size of pipe and tubing	Rectangular tubes are generally used for calibration. After importing the drawings, the software automatically obtains the dimensions of the rectangular tubes.

Maximum velocity constraint for the B-axis	When the following state is opened, limit the maximum speed of axis B in order to prevent the lifting speed of axis B and cause the pipe collision bracket.
Stent point movement speed	The rising and falling speed of the bracket shaft is restricted with the maximum constraint speed of the B axis to prevent the pipe from bumping with the bracket.
Set the start nonlinear formula	If the height of the following bracket is not linear corresponding to the motor motion, the nonlinear formula can be started to fit the actual situation with a primary or quadratic equation.
Enable sectional linear fitting of circular tube V groove	If the support object of the bracket is the circular tube, the fitting mode of the circular tube V groove should be enabled.
Add coupling to follow	Open the bracket following mode, the bracket adjusts the height according to the rotation of the pipe. There are all couplings and all couplings of individual axes
Uncoupling separation	Close the bracket follow, the bracket back docking coordinate, do not adjust the height according to the pipe rotation. There is total decoupling and v decoupling of individual axes

- **Fit calculation: If "Set the start nonlinear formula" is checked, the software can provide a way to calculate the coefficients of the nonlinear formula. Enter the fitting calculation page, set the number of data groups to be measured (the more groups the number, the more accurate the fit); then follow the moving shaft motor each step, measure the corresponding bracket height to fill in, and the last point fit, the coefficient of the nonlinear formula can be calculated according to the data;**
- **Round tube V slot fitting: if you check "enabling linear fitting of round tube V slot", enter the page of configuration V slot, set the number of data groups to be measured (the more the group, the more accurate); then place the round tube of different diameters, close the bottom of the bracket near the ground of the round tube, read the coordinates of the corresponding following axis, fill in the parameters, and finally click save;**

3.5 Calibrate the center of the B axis

In Tools-Shortcuts, you can open the calibration B-axis center interface. When

the mechanical structure is fixed, the rotation of axis B will have a fixed rotation center, and the calibration of the center of axis B will determine the coordinates of the rotation center in the XZ plane (X, Z). The determination of the axis B center requires a standard rectangular tube or a standard round tube without a chamfer (about one meter in length). Before calibration, determine that the system X, Z, B axes have gone back to the origin, then move the cutting head nozzle above the standard pipe, and enter the standard pipe width and height, and finally click to start the calibration center. After the calibration, the measurement results are obtained. If not satisfied, the results can be modified manually, and the calibration process can be stopped at any time. After confirming that the result is satisfactory, press <confirm> to exit.

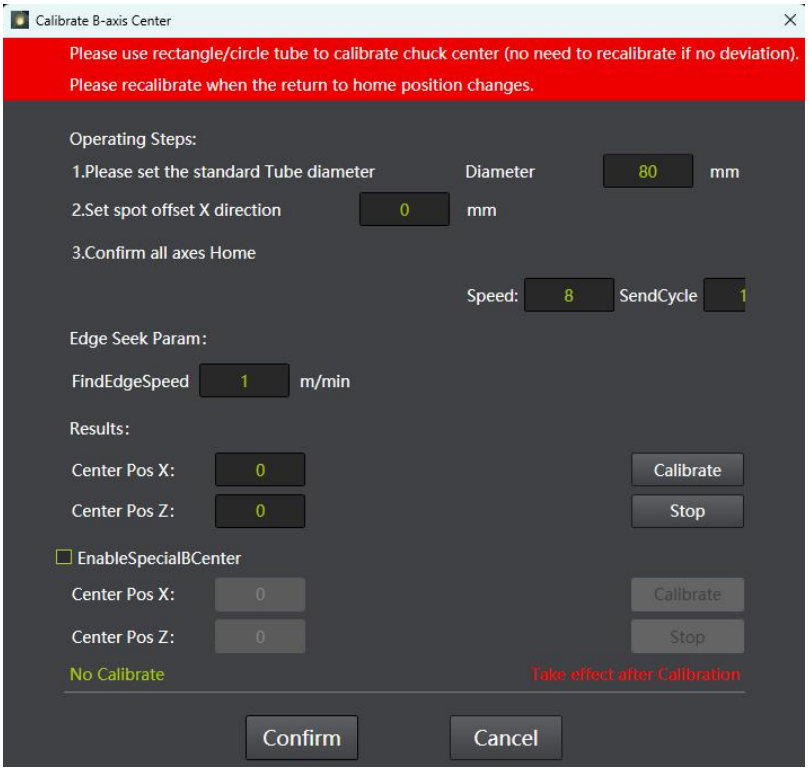


Figure 3.9 Calibrate the center of axis B

parameter	explain
Rectangular tube / round tube dimensions	Set the width and height of the standard rectangular tube or the diameter of the standard circular tube (if the figure is automatically loaded). It is recommended to use the standard rectangular tube without chamfer.
Set the spot offset in the X-direction	Set the spot offset error of the current machine cutting head in the X direction. Application scenario: Measure the center of axis B from the nozzle center. If the perforation is cut out

	because the laser spot is not in the right center of the nozzle, please divide the deviation by 2 and fill in the spot offset.
Determination results	Displays the mechanical rotation (manually enter the appropriate result).
Find edge speed	The speed at which the cutting head moves during edge finding.
Enable the special B-axis center	Suitable for the special machine structure or cutting will have mechanical rotation center changes, the normal B axis B center is not applicable, need to calibrate another B axis B center to ensure that the mechanical rotation center changes, the cutting accuracy will not decline

3.6 Correct in the search

3.6.1 Single-sided correction

In the "correction search" can open the single side leveling interface. The inclined plane can be corrected to the level, and the tilt angle is guaranteed to be optimal within ± 15° .

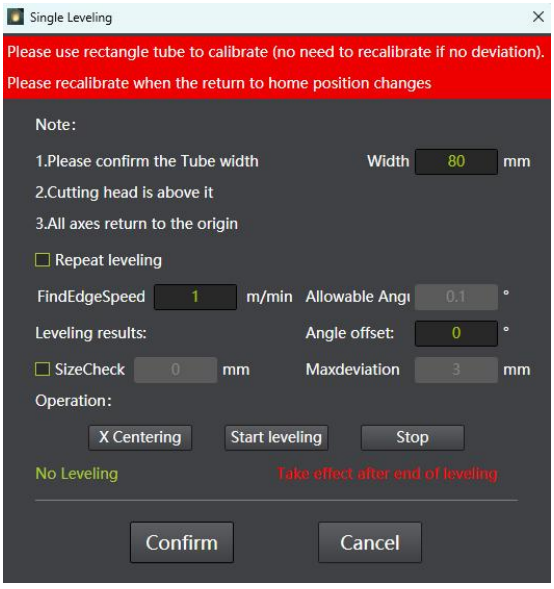


Figure 3.10 Single-sided leveling

With a single plane, please be sure to ensure that all the axes return to the mechanical origin, the size of the pipe is filled correctly, and the cutting head nozzle is directly above the pipe (you can use the "X-axis back in the" " button). After the leveling, click Save.

3.6.2 Type L in search

In the "leveling search" can open the L-type search interface. L-shaped search can find channel steel and Angle steel to ensure the accuracy of processing track.

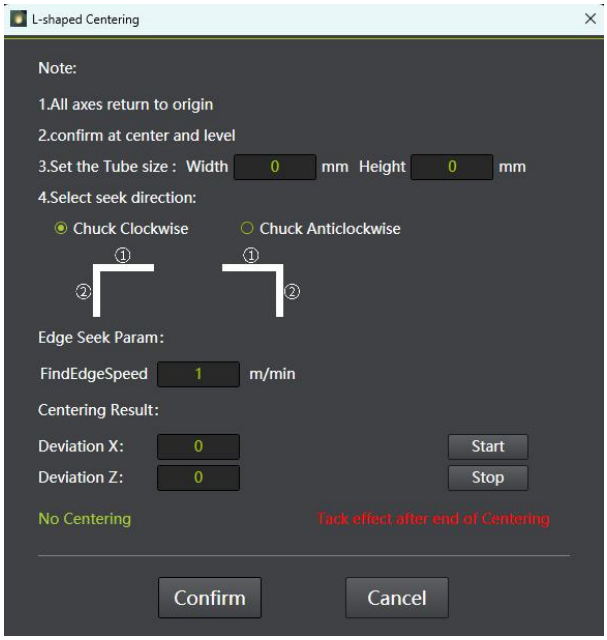


Figure 3.11 L search

3.6.3 At four oclock

In the "flat search" can open the four-point search interface. The four-point search can determine the deviation between the pipe center and the center of rotating axis B when holding the pipe, so as to ensure the accuracy of the processing track during the processing process; in searching the pipe before processing, the software records the deviation between the pipe center and the center of axis B.

Four-point search support rectangular tube, round tube, waist round tube.

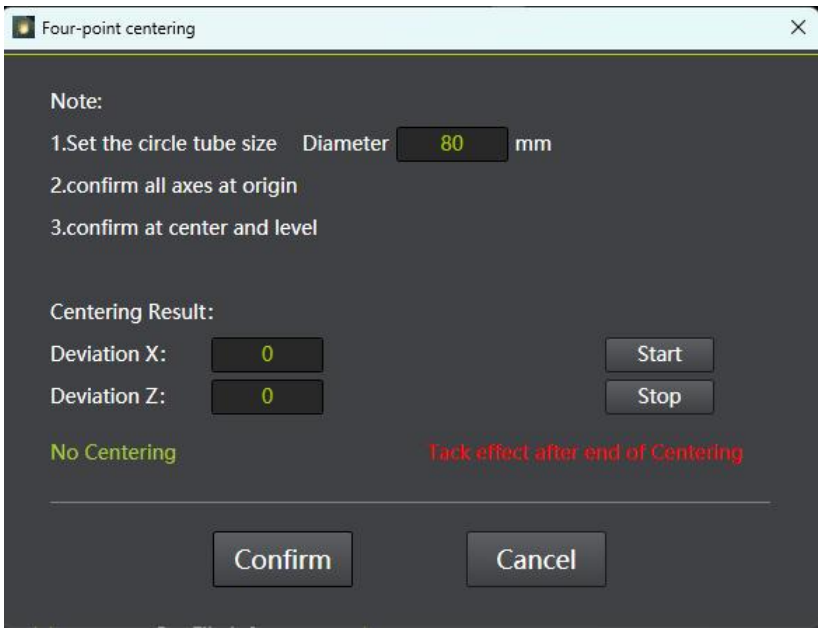


Figure 3.12 Four points in the search

- **Rectangular tube size: automatically read after loading the tube, but also manually input;**
- **Finding the result: display the deviation value between the pipe center and the center of axis B (if the result is not satisfied, you can manually input the appropriate result);**

3.6.4 Five oclock in the search

The five search is actually a single level plus four search; click to search, will first leveling and then search.

Five-point search to support the rectangular tube and waist round tube.

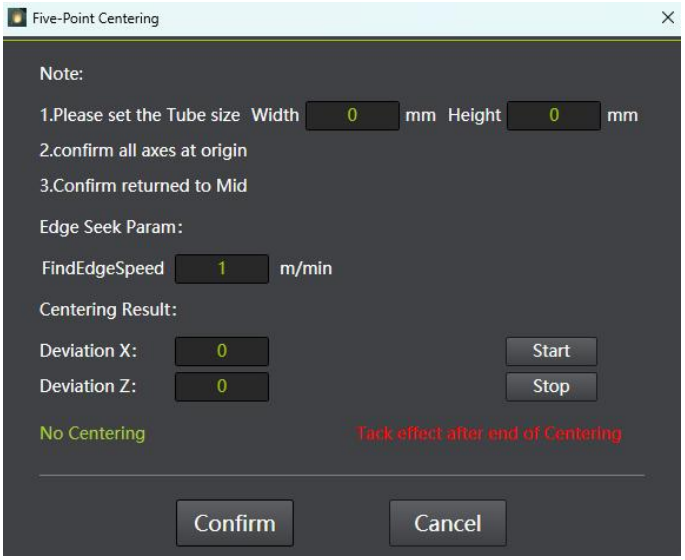


Figure 3.13 Five points of searching

3.6.5 Elliptic search

When the processing file is an ellipse tube, the ellipse search, before the ellipse tube to be as horizontal as possible.

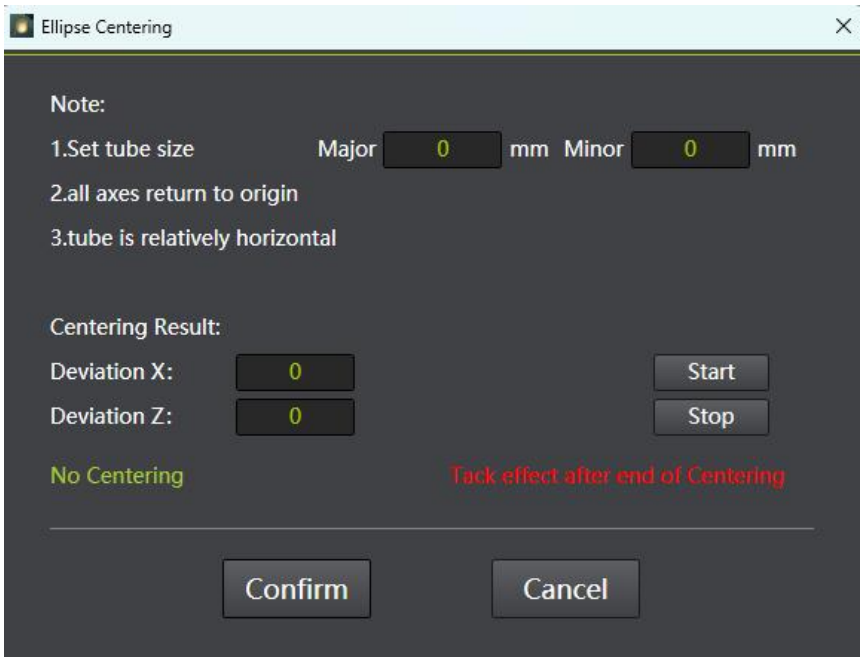


Figure 3.14 Elval finding

3.6.6 H-shaped steel search

When loading H-type steel, H-type steel can be used, and the configuration method is consistent with the four-point search

3.6.7 Manually

The manual determination is mainly used for the determination of pipe level and the determination of central deviation X and Z of pipe processing.

Different pipe pipe level determine mainly for unable to use single plane correction function of different tube, can rotate to approximate level Angle, move the head to the center of the pipe, the head down to follow height, click the "set the current level" button, can be understood as manual performed the single plane correction, this method accuracy may not be high, please use carefully;

Type of pipe center deviation X, Z for cannot automatically draw pipe center deviation

value of pipe, can be different tube leveling, with the raise to follow to the center of the surface of the tube, click on the "automatic calculation offset" will automatically get the current pipe pipe center deviation X, Z value, then click "save the current offset", can save the value;

After the above two steps are completed, the special tube can be processed.

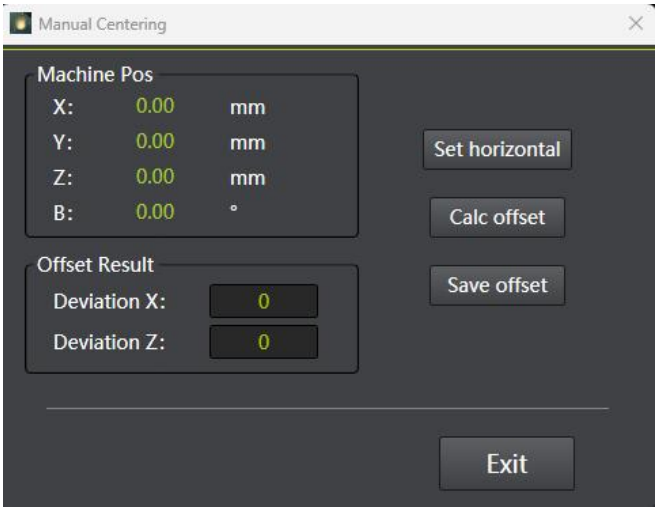


Figure 3.15 Manually fixed

3.6.8 Find edge setting

Before using edge finding, you need to configure the capacitor edge finding input port in the parameter configuration tool.

Click the single point to start the edge, you can choose left, right, up, down single point to find the edge, click the edge stop can stop the edge action.

The edge finding test can be repeated to detect whether the left and right edge finding errors are consistent, and check the edge finding performance of the elevation regulator. Need to use the square pipe, flatten before execution and ensure that the cutting head is above the pipe.

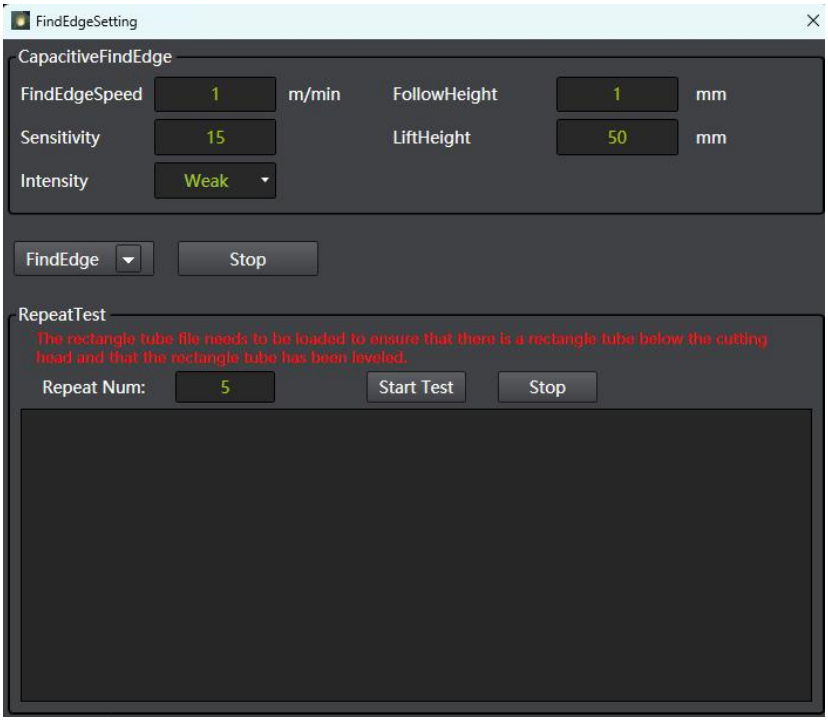


Figure 3.16 Side-finding setting

parameter	explain
Capacitive edge detection speed	The speed at which the gun is cut during edge searching.
Capacitor seeking side follow height	The height set by the raise during edge seeking.
Raise the height of the capacitor	Cut the gun in the movement process needs to be lifted, the height of the lift.
Look for edge sensitivity	Sensitivity of the er er.
Looking for edge strength	Strength of the sensor response during the raise edge setting.
Repeat the number of edges	The number of repeated tests for edge search.

3. 7 Sort Settings

The sorting function allows users to flexibly adjust the processing order according to the processing requirements and artifact features.

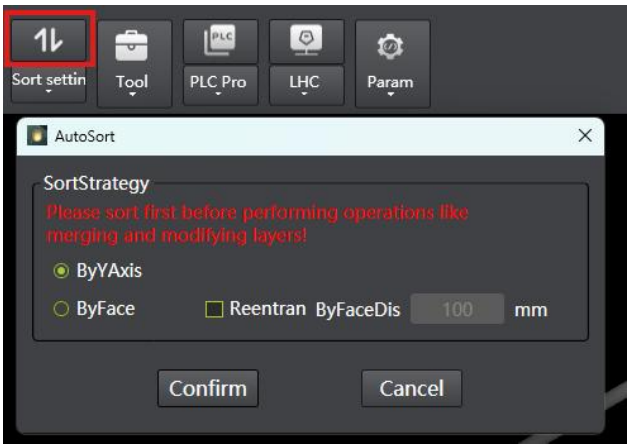
3. 7. 1 Automatic sorting

The automatic sorting function automatically applies the preset sorting strategy. This automated process simplifies the users operation, reduces the need for manual adjustment,

while ensuring the rationality and efficiency of the processing sequence. In practical application, users should select appropriate sorting strategies according to processing requirements and work piece characteristics to achieve the best processing effect.

operating steps:

1. Open the processing file that needs to be sorted
2. Turn on automatic sorting within the sort setting



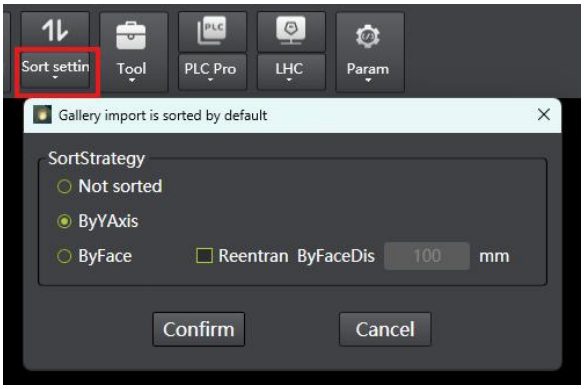
3. Select a sort policy:

① By the Y axis from small to large: according to the Y axis position, from small to large order objects

② Sort by surface: (currently only applicable to rectangular tube, round tube): sort according to the surface of the object

4. After completing the above setting, click confirm, and the software will automatically arrange the processing order according to the selected strategy

3.7.2 The Gallery to import the default sort



In line with automatic sorting, this sorting strategy is only suitable for files exported

from the library mapping. The default is no sorting, select from Y axis to large and by surface.

3.8 tool

3.8.1 debugging aid

3.8.1.1 Single axis debugging

Figure 3.17 Single-axis debugging

This function can be used to measure the bias distance back to the origin of the B1 and B2 disks. During the initial installation process, the return to the origin bias distance between B1 and B2 in the software is 0, while the real chuck is not synchronized. At this point, do a B axis back to the origin. Then unlock B1 and B2 in the "single axis debugging", adjust B1 and B2 to the level by clicking or stepping, and then lock. The mechanical coordinates of B1 and B2 can be viewed in the information display area, and the coordinate values can be saved as the offset distance back to the origin of B1 / B2 respectively, so as to ensure that both B1 and B2 are in a horizontal state after returning to the origin.

When B axis dual drive in the machine configuration, the default is to lock, synchronous movement, need to unlock separate movement, in the "tool" - "debugging tool" can open the single axis debugging interface, single axis debugging for synchronous axis decoupling after separate debugging (unlock password 6931), to ensure synchronization after synchronization. Single drive configuration, no need

to unlock the lock, can directly operate B1-, B1 +.

3.8.1.2 Auxiliary shaft debugging

In this window, the auxiliary axis can be adjusted in the positive and negative direction, point movement / length movement, and the auxiliary axis back to the origin.

When the auxiliary axis is used as an axis from B or a focus axis, do not debug on this page.

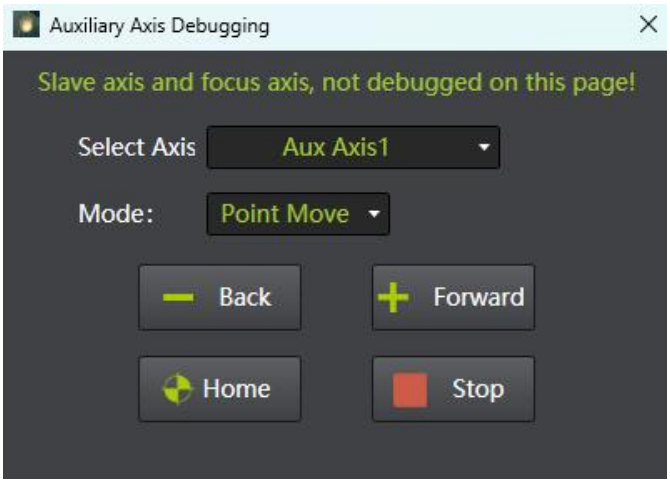


Figure 3.18, auxiliary shaft debugging

3.8.1.3 Cutting monitoring

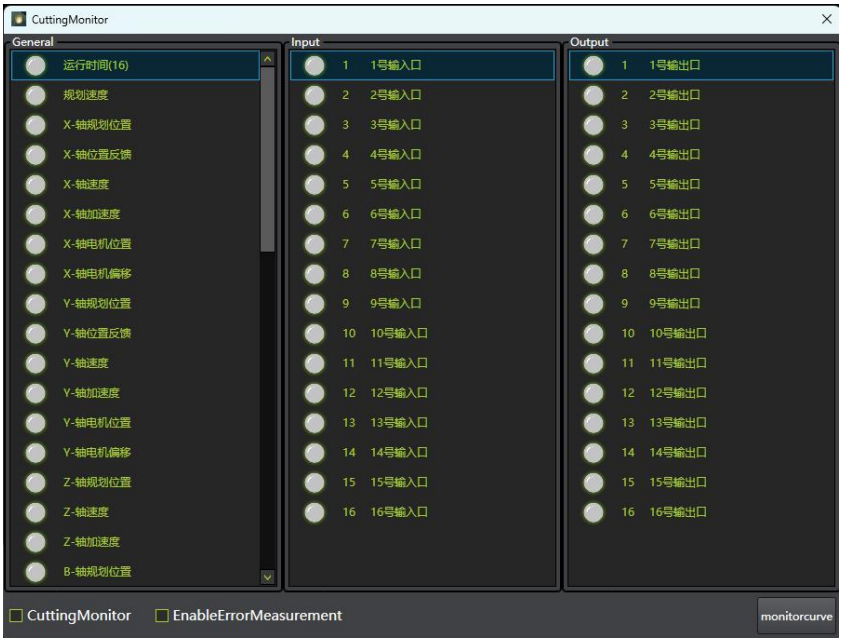


Figure 3.19 Cutting monitoring

To monitoring the process of processing, please contact the after-sales personnel.

3.8.1.4 Track error determination

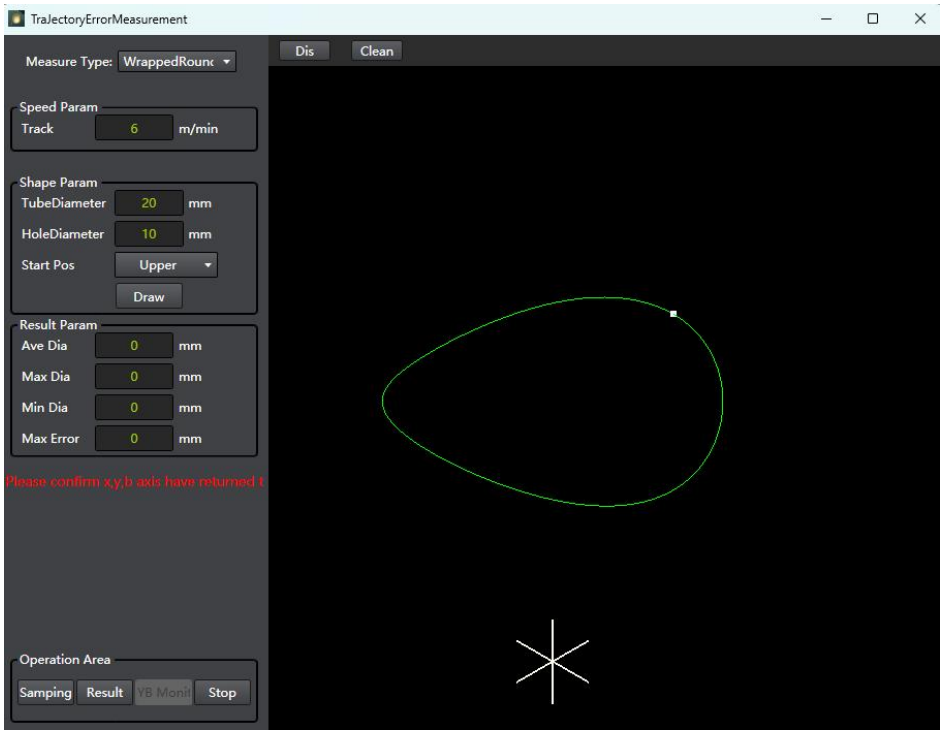


Figure 3.20 Track error determination

The track error measurement can be used for roundness test, rectangdness test, round tube covering roundness test, and can test the error value of relevant graphical instructions and feedback positions.

The circularity test feeds the instruction and feedback position error values of the circular trajectory in the XY mode; the rectangle test feeds the instruction and feedback position error values of the rectangular trajectory in the XY mode and the feedback position error value of the circular trajectory in the default YB mode

Fill in the parameters in the "basic trajectory parameters" and "Figure Parameters", click "drawing graph", to generate test graphs, click "start test", the red track of the interface is the actual track of the feedback, click "display results" after the corresponding error value will be displayed in the "result parameters".

3.8.2 Monitoring tools

3.8.2.1 IO supervisory control

Figure 3.21 IO Monitoring

The IO monitoring interface is opened in the Tools-Monitoring Tools. The IO monitoring interface is mainly used to open / close the output port switch, monitor the state of the input port, complete the simulated input port test, conduct some debugging tests on PWM and DA, and monitor the movement state of each axis.

When IO port has signal, the indicator is green, when no signal, the indicator is gray. When the function of "input port debugging" is checked, you can click the indicator light of the input port to simulate the input port acquisition.

3.8.2.2 Remote control function prompt

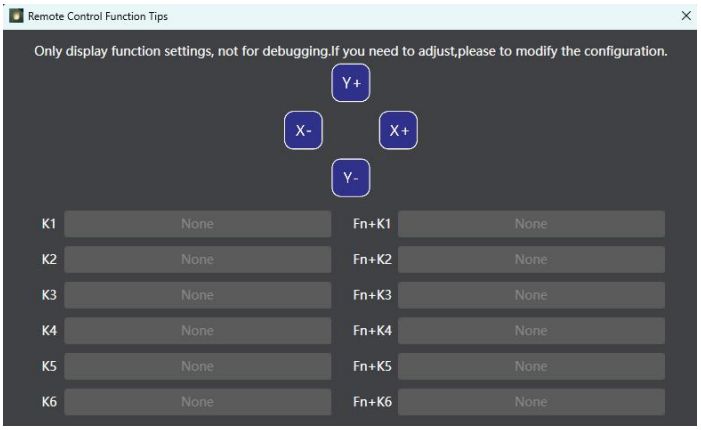


Figure 3.22 Function prompt of the remote control

It is convenient for users to view the specific function content of the remote control K1-K6 custom button configuration, and only the content displayed here cannot be modified. See visible in section 4.1.13 remote control.

3.8.2.3 Encoder detection

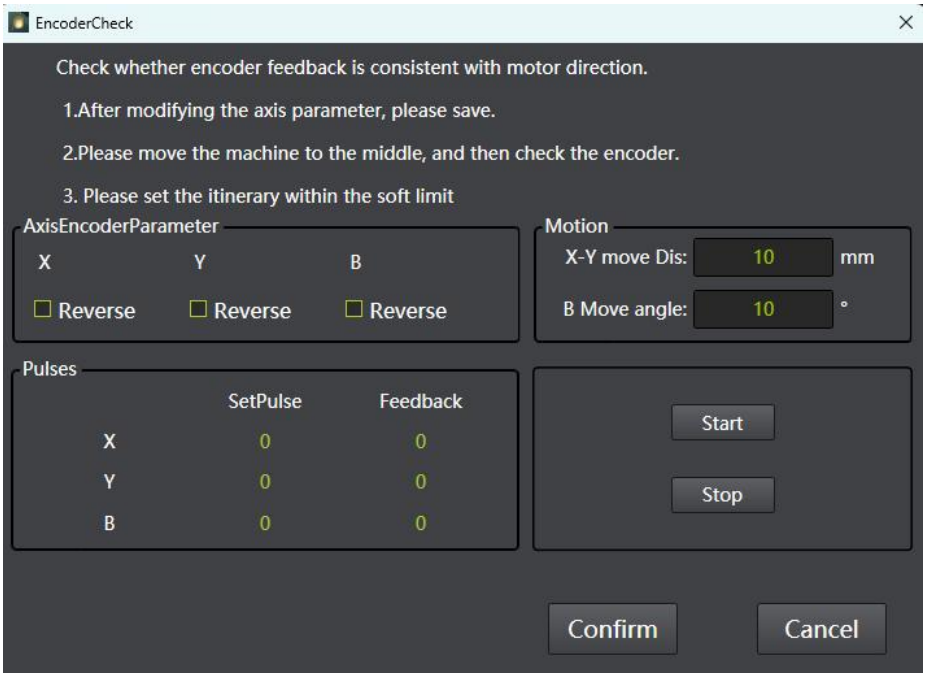


Figure 3.23, Encoder detection

It is used to detect whether the encoder feedback and click direction are consistent, and prompt whether the encoder direction needs to be modified; operating steps:

1. Ensure the correct movement direction of the machine tool;

2, "motion" parameters can be used with default parameters, XY axis motion distance 10mm, B motion Angle 10° ;

3. Click Start and automatically conduct the encoder detection;

After the detection is completed, the detection result will be prompted. If the encoder direction is opposite, check the encoder of the corresponding axis to be reversed.

3.8.2.4 Log records

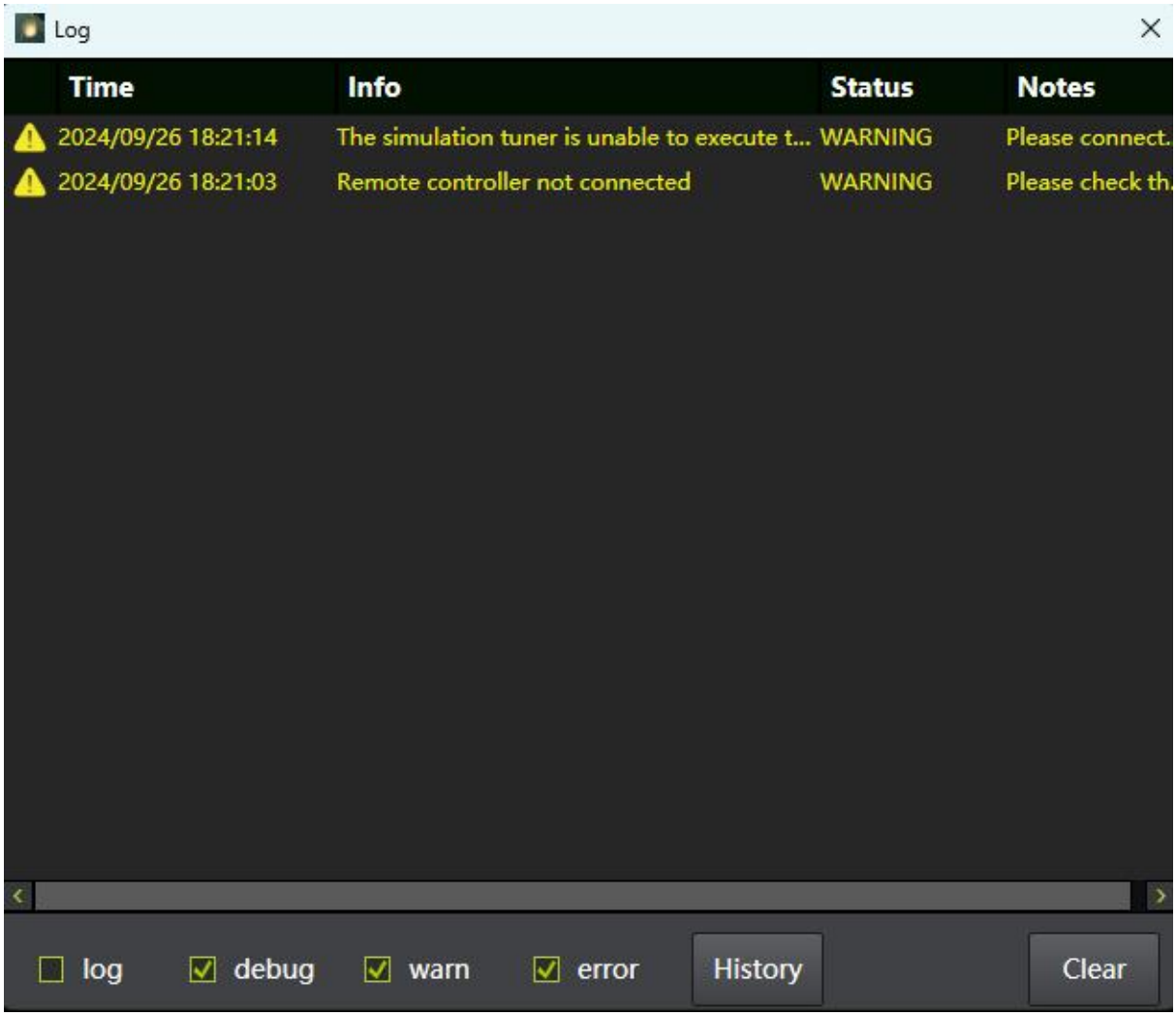


Figure 3.24 Logging Record

Information of the current log, including log, prompt, warning and alarm
Has a filter function.

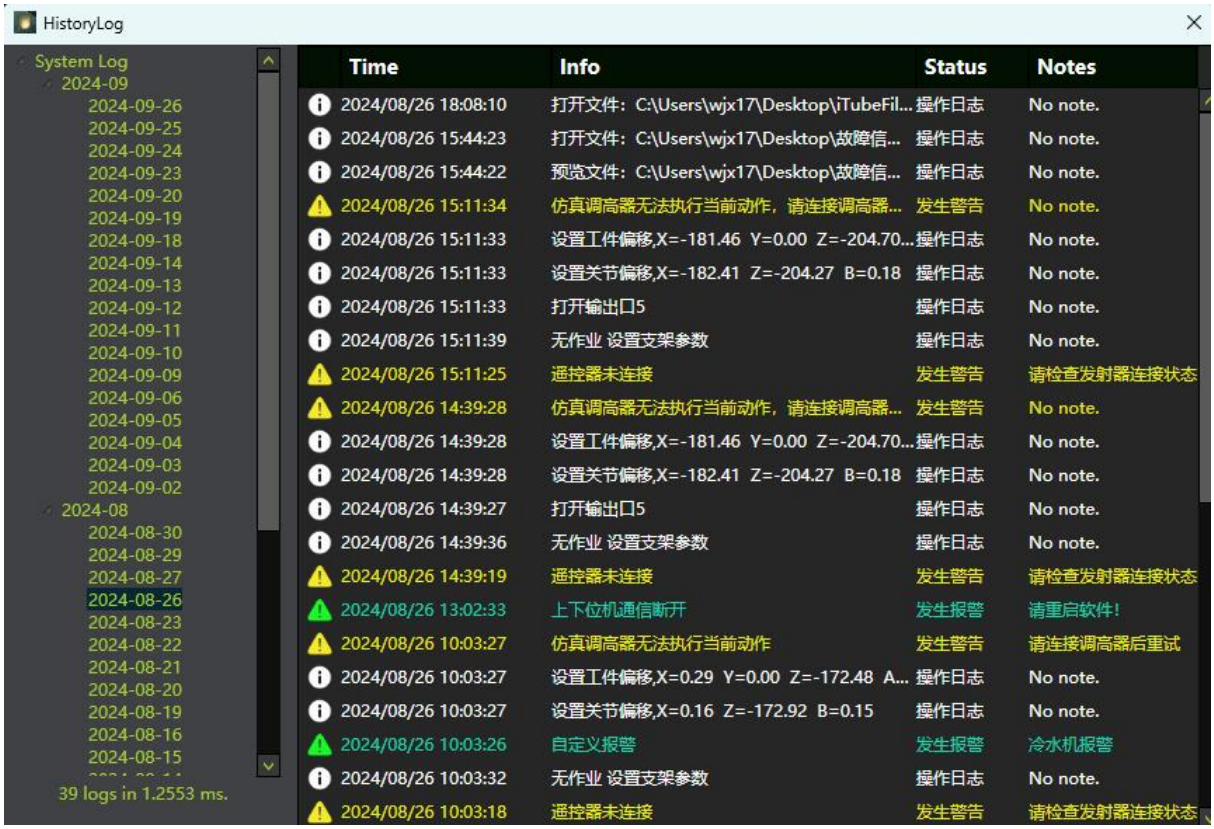


Figure 3.25 History Log

Past records can be seen through the historical information button.

3.8.2.5 Regular reminder of machine tool maintenance

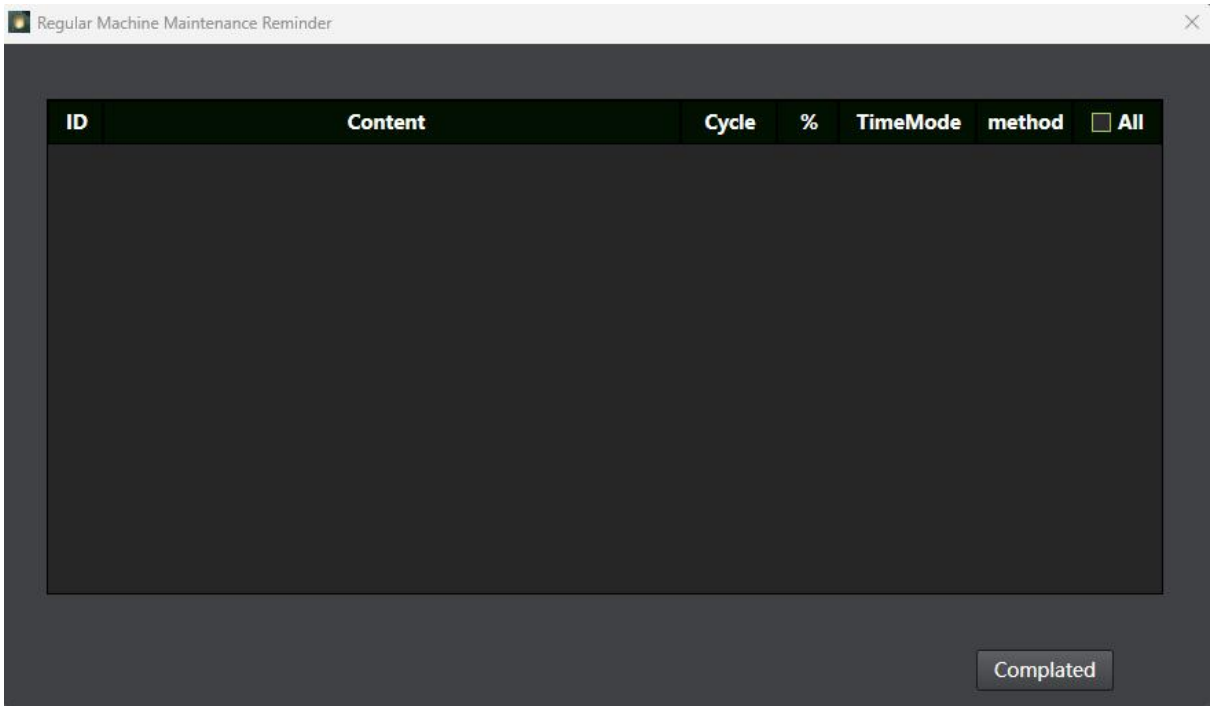


Figure 3.26 Regular reminder of machine tool maintenance

The machine tool reminder information is recorded

3.8.2.6 operational report

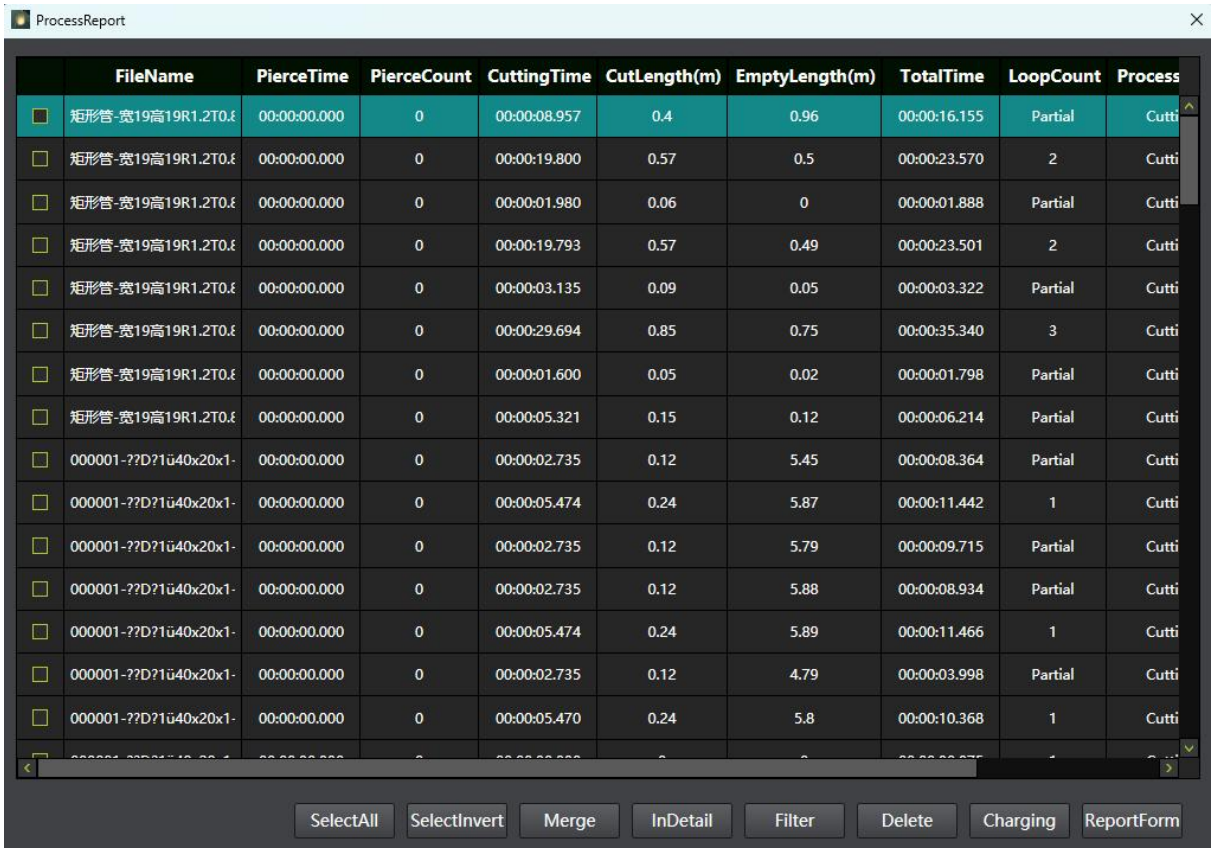


Figure 3.27 Run Report

Record the history of machine cutting, can report statistics, convenient for users to know the specific information of production

3.8.3 auxiliary neans

3.8.3.1 lubricating

Click lubrication in the auxiliary tool of the tool to open the interface of manual lubrication, and perform manual lubrication here to achieve better lubrication effect. Before use, please configure the lubrication output port in the parameter configuration tool. After setting the lubrication parameters, click lubrication start to start lubrication. The starting point and end point of lubrication are the positive and negative soft limit of XY axis. If the short tail process is enabled, the positive and negative soft limit of Y axis is subject to the positive and negative soft limit of point movement in the short tail process (the point moving soft limit should be within the soft limit range of

Y axis, and the exceeding will alarm).

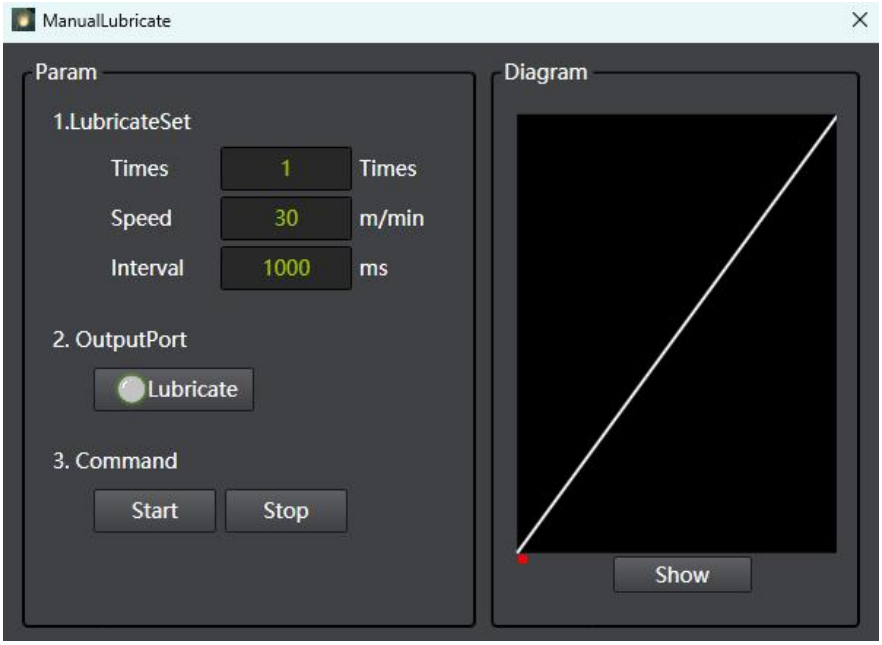


Figure 3.28. Manual lubrication

parameter	explain
Lubrication times	The number of lubrication times, one back and forth once.
Lubrication speed	Speed of lubricating walking.
Lubrication interval	Wait wait this interval for the next lubrication.

3.8.3.2 Copy machine

Before the new machine leaves the factory, the aging test is required to ensure the normal operation. Through the copy machine function, the XYB axis and Z axis are tested. The test method specifies the number of repeated movements along the fixed path, and observes the positioning accuracy and operation of the movement axis.

Z axis empty walk test and XYB axis empty walk test can be performed in the copy machine function interface.

- **Z-axis walk test:** set the height range of the Z-axis as the range of Z-axis lift movement, set the number of Z-axis cycles, you can choose whether to

enable the back to the origin test, check the start, set the N times after the cycle back to the origin once, then do the origin test in the Z-axis walk test.

- **XYB no-walk test:** set the cycle number and cycle interval, and enable the Z-axis test at the same time. The Z-axis test height range is set in the Z-axis test, and the back-origin test is not performed.

Click "pure Z-axis copy machine" to conduct only the Z-axis test, and click "cycle copy machine" to conduct the XYBZ test.

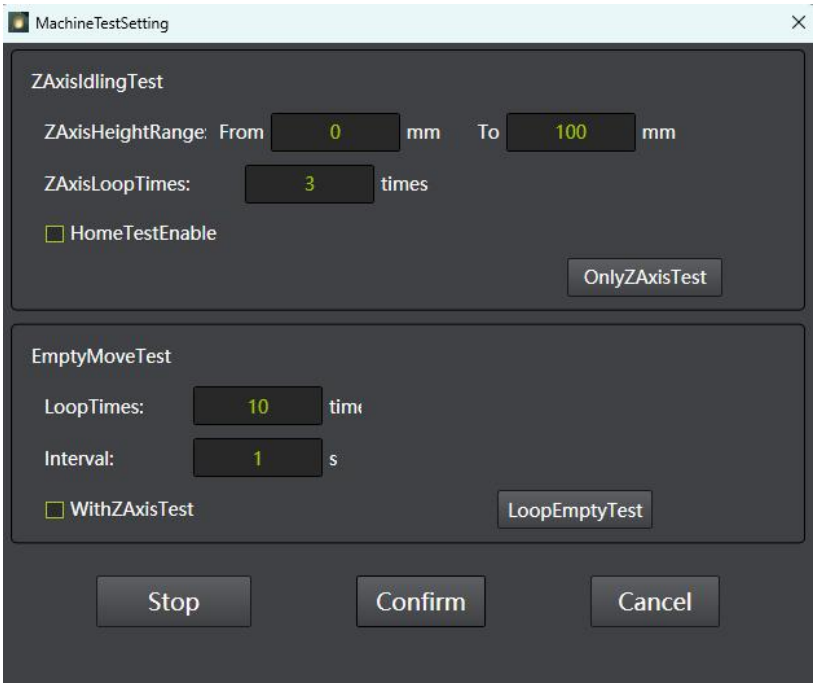


Figure 3.29 Copy machine

3.8.3.3 Optical road debugging

The small machining errors in the production of rack rods need to be compensated for in the case of more refined cutting required by the laser. And these machining errors are not evenly distributed, and need to be measured in sections, and then compensated in segments, so as to meet the customer accuracy requirements. Using the optical path debugging, generate the files in the laser interferometer, and then import the files into the system for pitch compensation.

Select the optical path debugging for the X or Y axis. In the optical path test of the upper half of the interface, the input location coordinate can locate the selected axis to the

coordinate. From the current position to the location point, the laser interferometer will generate the compensation data. In the laser interference in the lower part of the interface, the positioning program can be generated automatically through setting parameters and generate files in the laser interferometer after execution.

Do the operation back to the origin before debugging.

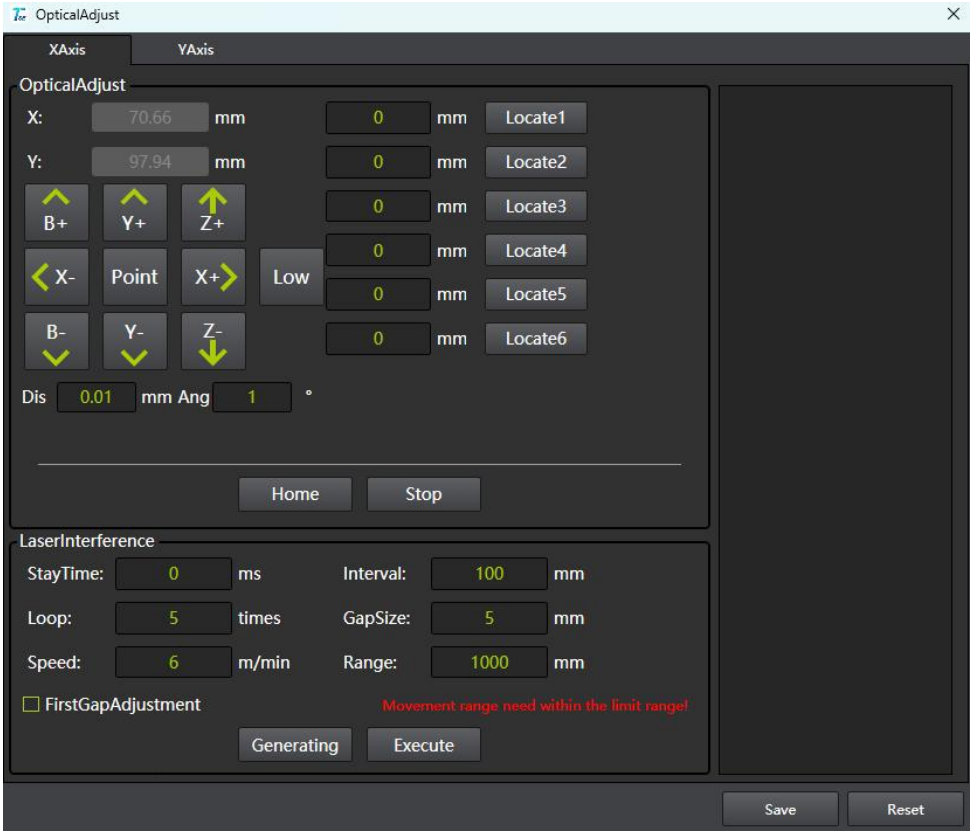


Figure 3.30 Optical path debugging

parameter	explain
residence time	After the walking interval distance, the stay time, waiting for the machine tool to stabilize, the laser interferometer to collect data.
spacing distance	The distance of each fixed length.
cycle index	The number of cycles within the range, the end of the starting point.
adjustment of clearance	After executing from the starting point to the end point of the range, you need to walk another distance and then reverse again.

translational speed	The speed of the fixed length of the movement.
moving range	The final point coordinates.
First gap adjustment	After checking, perform a gap adjustment before the movement, and adjust the distance to the negative movement.

3.8.3.4 Process library management

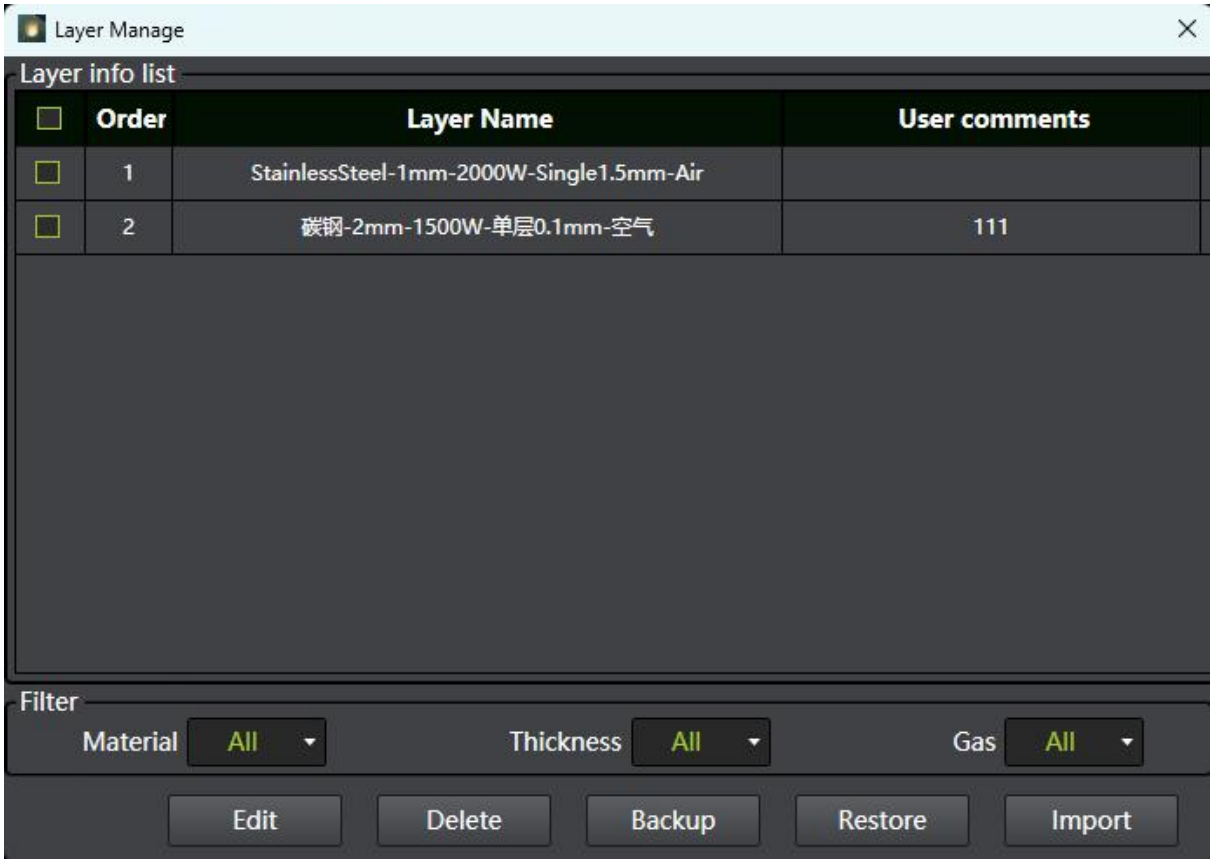


Figure 3.31, Process library management

Process library management can manage layer parameters, including editing process files, deleting process files from the process library, backing up process files, restoring the backup process files to the process library, and importing process files to the process library externally.

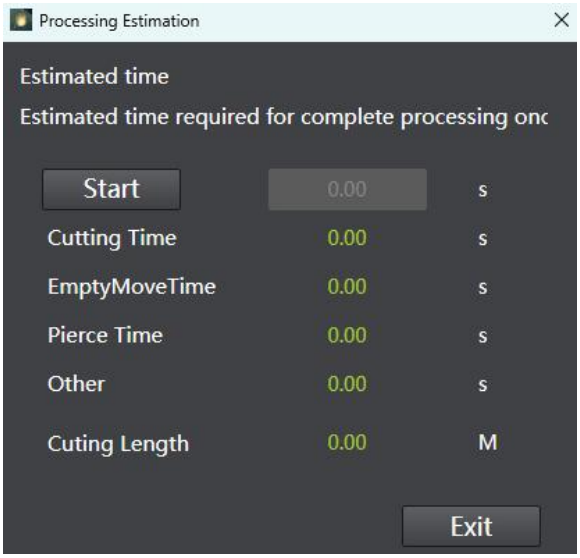
You can select the process file to be operated in batch by clicking through the left tick option, and editing, you can only operate a single process file, you need to select the file first, and then operate.

The file list can be filtered against the selected criteria.

3.8.3.5 Processing estimates

Click "Tool" - "auxiliary tool" - "Processing estimate" to display the interface as shown in the figure below

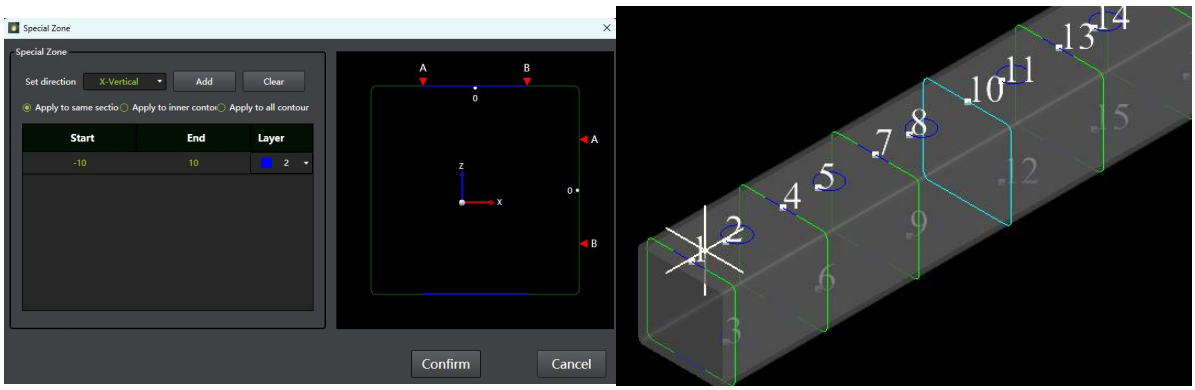
Click "Start estimate", the system will automatically estimate the time required for a complete processing, and display the total processing time, cutting time, empty shift time, perforation time, perforation time, other time, and the length of the cutting parts.



3.8.3.6 Special knife road

Click "Tool" - "auxiliary tool" - "special knife path" to display the interface as shown in the figure below

For special-shaped tubes that need to modify the knife path, there may be different layers. Now you can open the file in the software, and then open the "special knife path". According to the actual needs, set the cut line to the knife to choose and select different layers. After setting, you can choose to apply to the section profile, to the inner hole outline or to all the profiles. After clicking "OK", the contour in the same X direction or Z direction on the Y axis will be modified into this special knife path.



3.8.4 Quick function

3.8.4.1 One key cut off

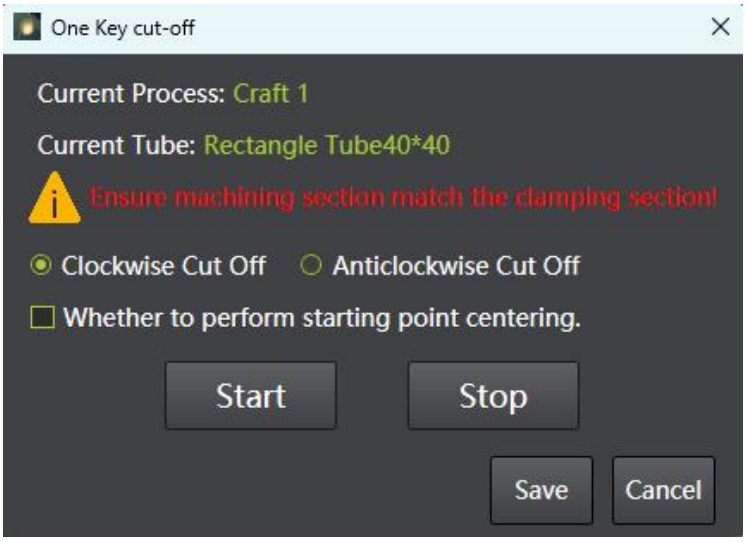


Figure 3.32 One-key cut-off

In "Tools" - "shortcut tool" can open the one-click cut interface. iTubeSE Currently, it only supports the rectangular tube / round tube / waist round tube / elliptical tube. One button cut will cut the pipe clockwise or counterclockwise at the current position of the Y axis. If you check Start Start is selected, a will will will performed executed before cutting.

3.8.4.2 One-click alignment of the tube head

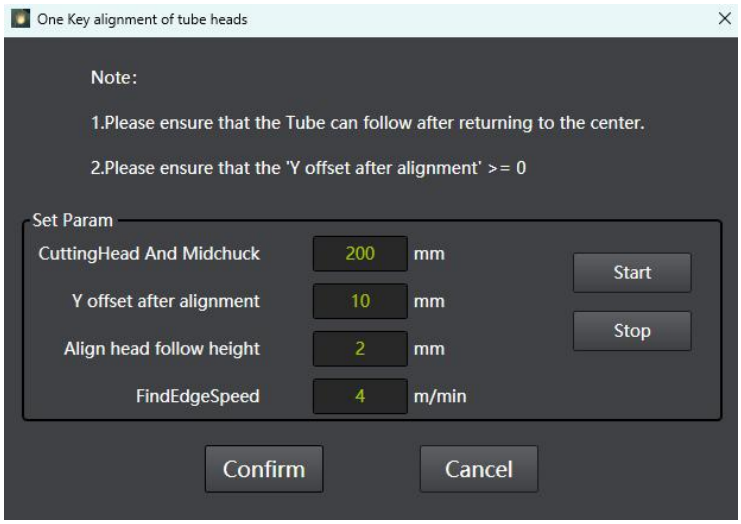


Figure 3.33 One-click alignment of the tube head

The Tools-Quick Function can open the one-click alignment pipe head interface. This function enables the software to automatically find the pipe head and bring the cutting head to a certain distance from the pipe head.

parameter	explain
Cutting head distance and middle chuck distance	To avoid the pipe does not extend below the cutting head to follow the head, in the execution of the function of the pipe will be sent forward for a distance. The parameters default to 200mm and can be adjusted according to the actual situation.
Y offset distance after the alignment	After the cutting head finds the pipe head to the outside edge, the Y-axis will move forward with an offset distance to avoid the shaking of the cutting head at the pipe edge. The default is 10mm.
Follow the height	The following height of the adjustment device during the one-key alignment process is 2mm by default, and only effective in the one-key alignment process.
Find edge speed	The speed at which the cutting head moves during edge finding.

3.8.4.3 Gas DA correction

Figure 3.34 Gas correction

Open the gas DA correction interface in Tools-Shortcuts. The parameters need to be configured in the machine configuration tool for DA gas correction. Set different DA output voltages, measure the actual air pressure of the output in turn, and fill in the measured results in the table. During the cutting process, the corresponding DA voltage will be output according to the required air pressure value. If the required air pressure is not in the table, it will be obtained according to the linear relationship.

operating steps:

1. Select gas to be corrected: air / oxygen / nitrogen; (gas configured in the machine configuration tool)
2. Set the "number of corrected data groups" (set the number of linear nodes of the data, the more groups, the more accurate the fit)
3. Set the DA output time interval (the interval between DA values in the table, without manual output in order)
4. Click Reset DA data: Make data groups equally spaced
5. After the output DA voltage, click the DA voltage, the corresponding output can get the corresponding actual pressure value. In the corresponding actual pressure box, all groups need to be filled in, and the DA voltage and the actual pressure of all groups are fitted into a linear relationship
6. Check "Apply DA correction", and then the fitting result of the current DA value and the actual voltage can be applied in the processing
7. After the correction of each group of data, the correction data can be used.

Relevant operation instructions:

- **DA voltage:** set the DA value to collect the actual air pressure, which can be automatically filled in or manually filled in;
- **Actual air pressure:** fill in the actual air pressure corresponding to DA into the form;
- **Open the gas:** open the gas output port;
- **Close the gas:** close the gas output port;
- **Output the next one:** Output the next one, in array order;
- **DA output successively:** according to the array order, the DA output voltage successively with "DA successively output time interval" as the benchmark;

3.8.4.4 Tube center correction

When some surfaces of the pipe are offset in the X direction, the profile of the offset surface can be adjusted individually by this function. Open the hole in the middle. Measure the hole to get the corrected value of the surface, and fill in the input box of the corresponding surface. After confirmation, the center of axis B and the pipe will automatically change to the corrected value.

It can be corrected separately on the basis of the center of ordinary B axis and special B axis.

History can record the outcome and time of each correction.

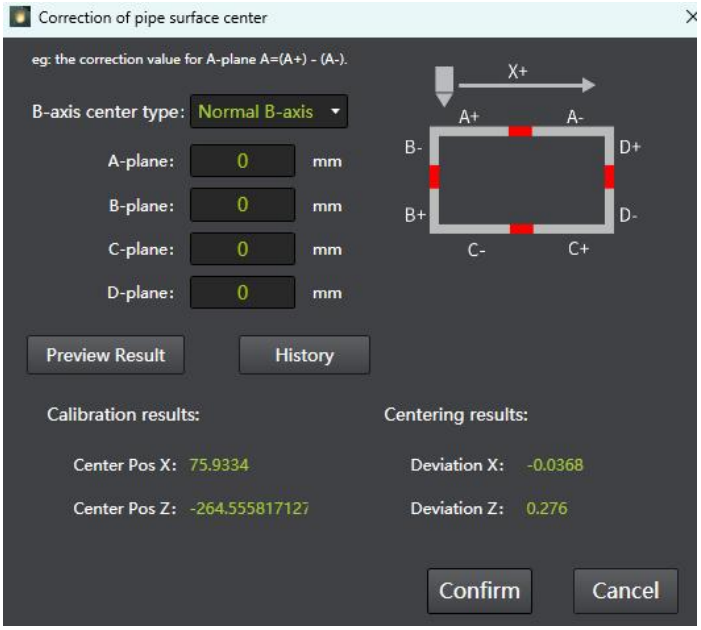


Figure 3.35 Central correction of the tube surface

3.9 PLC process

PLC: Chinese is a programmable logic controller. Simply put, the whole cutting process is broken down into several sub-processes. After sorting, adding, deleting, and copying these sub-processes, the final set of processes the user wants. The functions added to the system involving operation logic are often added to iTubeSE software in the form of sub-processes. Users can choose whether to use it in the PLC.

The upper half of the icon can open the PLC setting interface, and the lower part can open the auxiliary processing process configuration interface.

The overall execution process of the current system PLC is shown below:

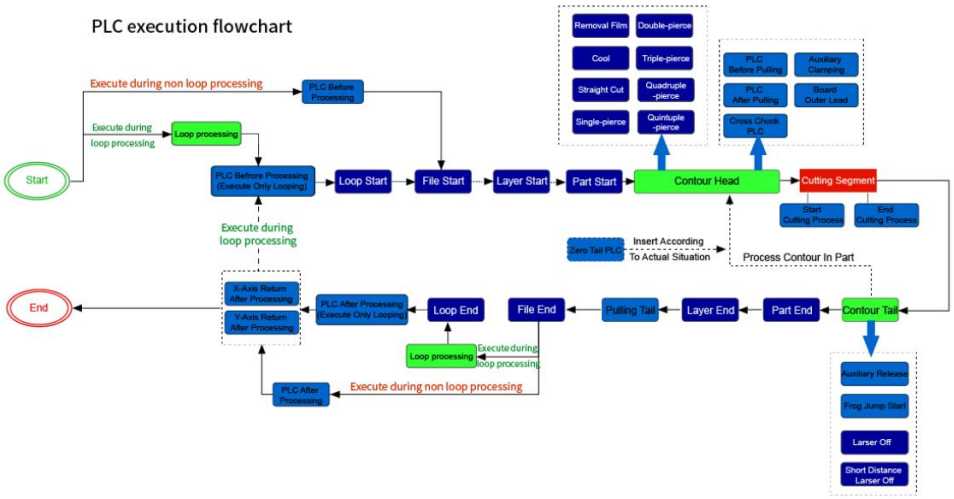


Figure 3.36 Flow chart of PLC execution

3.9.1 PLC set up

3.9.2 **Standard cutting**

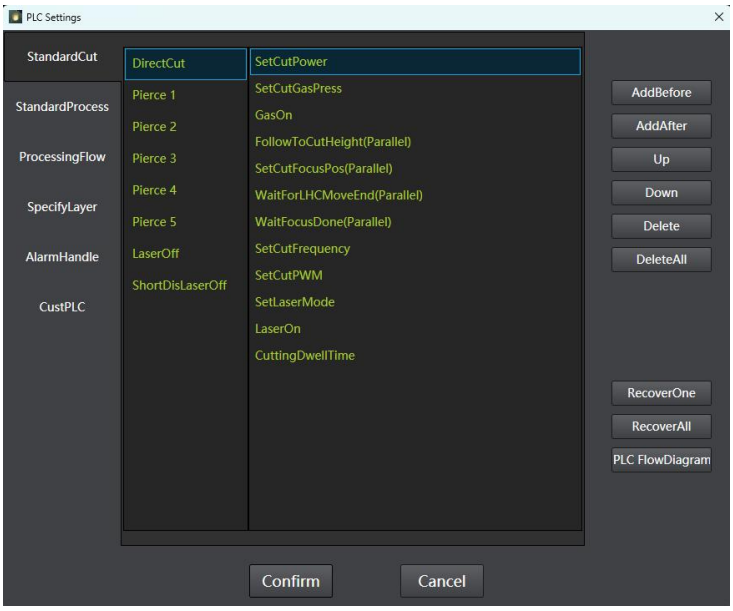


Figure 3.37 Standard Cut

Standard cutting divides the whole cutting process into several cutting processes, including direct cutting, primary / secondary / tertiary / four / five perforation, laser, short distance laser, etc. After setting the cutting method of

each outline, the system will cut the pipe according to the set cutting process. For different cutting processes, the process content can be modified: select the corresponding action, right click the "before / after add" on the right to add the required action and save. It is recommended to modify under the guidance of after-sales personnel.

3.9.3 standard procedure

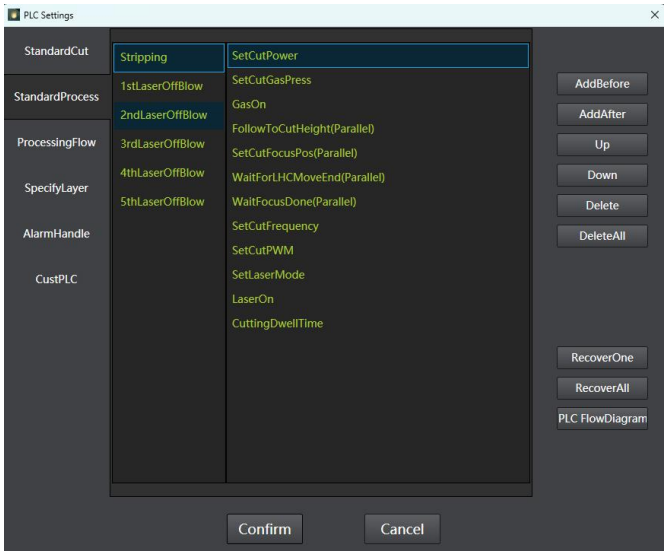


Figure 3.38 The Standard Process

The standard process divides the film cutting process involved in the cutting process and the primary / secondary / third / fourth / fifth stop blowing process into a single action, and the system is carried out according to the set action during the process.

3.9.4 process flow

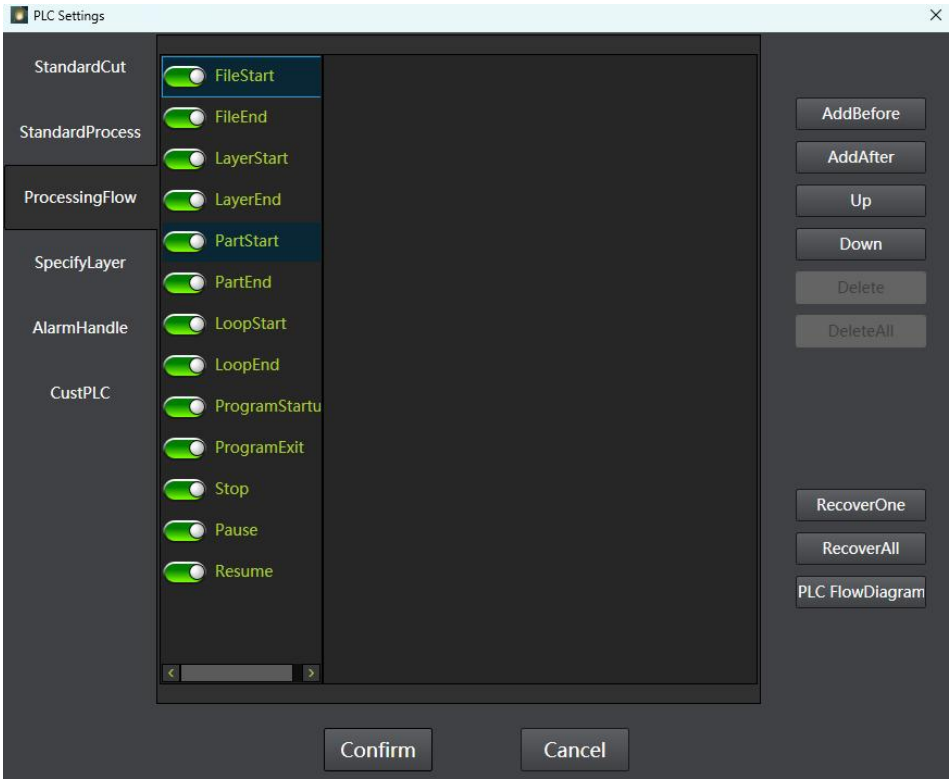
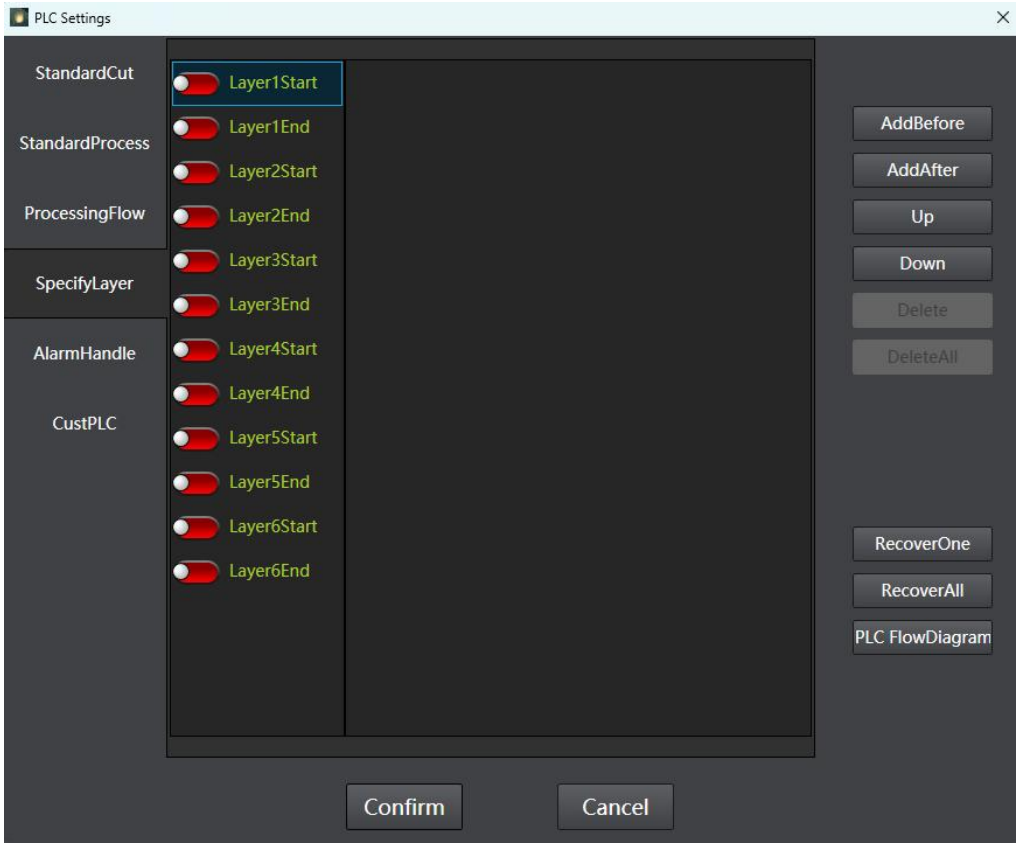


Figure 3.39 Processing process

The processing process is that the system will first execute the action in the process when processing the above action, as the above figure, the file start process is configured with the 26 open the output port, delay 500ms, that is, when loading the file and clicking the start cutting will execute the first open 26 output port and delay 500ms, and then start the cutting process.

3.9.5 Specify the layer



The specified layer is the same as the beginning and end of the layer in the processing process, that is, the system will first execute the action in the process when processing the corresponding layer. As in the figure above, the specified layer is closed by default. After enabling this process, the layer with the corresponding layer in the file will execute the process in the layer first, and then start the cutting process. Specifies that the priority of the layer is greater than the layer start and layer end within the process.

3.9.6 **Alarm processing**

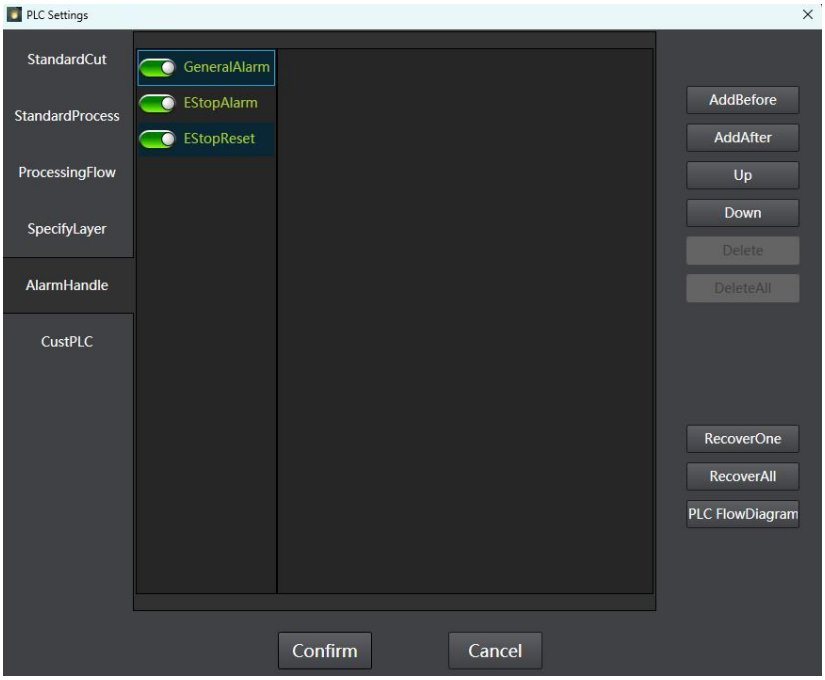


Figure 3.40 Alarm processing

Alarm processing as shown in the figure above, currently divided into public alarm and emergency stop alarm and emergency stop reset, except for the emergency stop alarm alarm are

Public alarm. When the system alarm is triggered, the action process in the alarm will be executed according to the alarm classification. If the alarm process is not configured, only the corresponding alarm action in the machine tool configuration will be executed.

3.9.7 **Custom process**

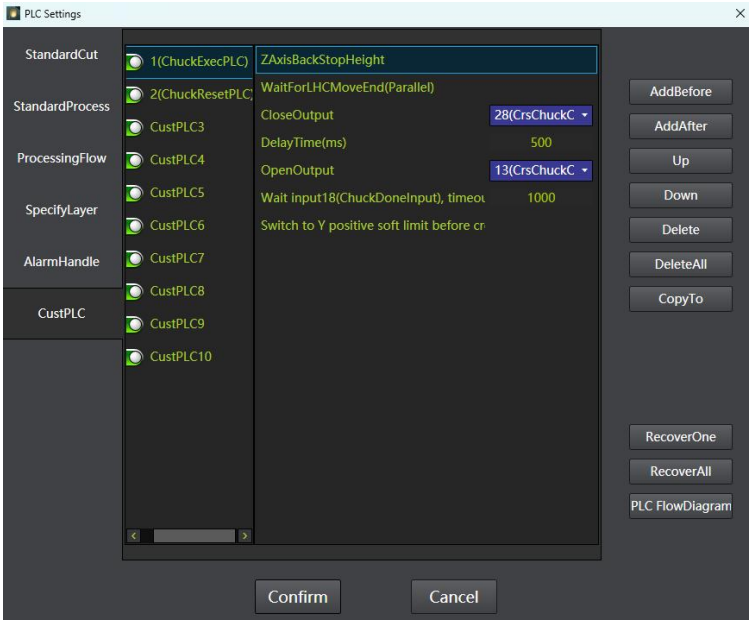
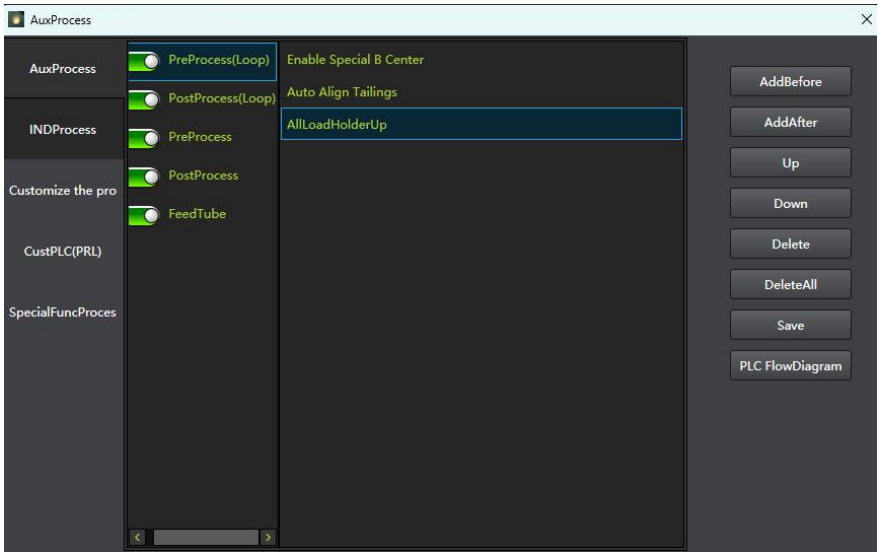


Figure 3.41, Custom Process

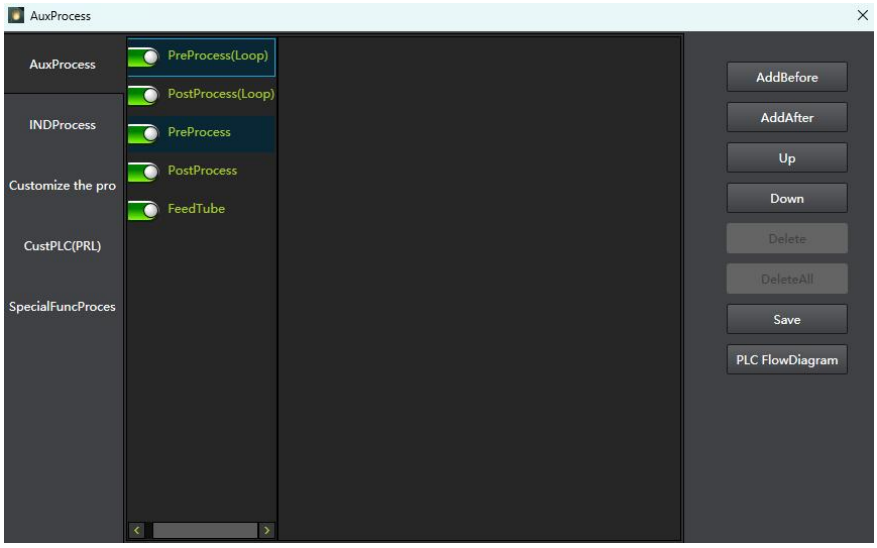
The custom process, the process action is the same as the above process, the PLC action to be used before and after the cutting action, the PLC action and the PLC action and the PLC action to be executed.

3.9.8 Auxiliary processing process

Auxiliary processing process setting, this process action is to assist the process of matching processing or some actions required. Including auxiliary processing process, independent process, custom process, custom process (parallel), special functional process, etc.



3.9.8.1 Auxiliary processing process



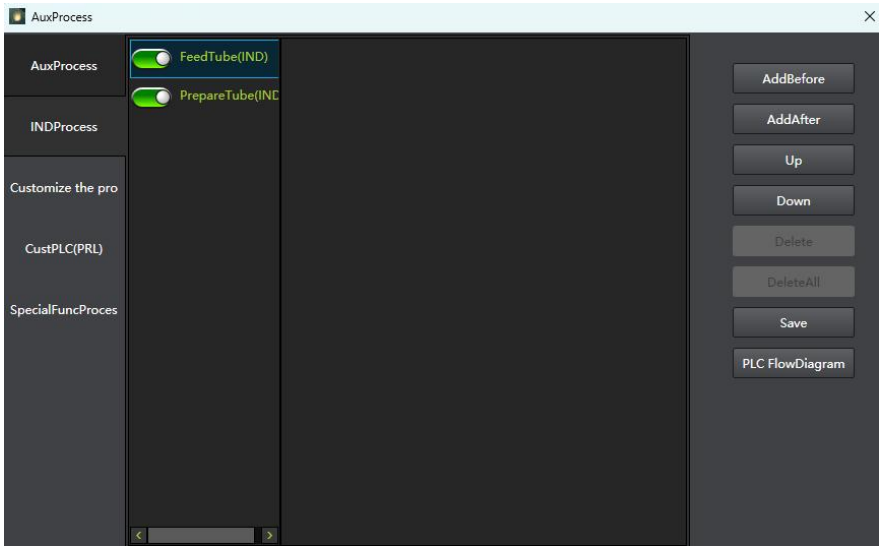
Auxiliary processing process, this process action is to match the processing or some action needs process, the user can according to the actual needs of the pre-process (processing during cycle), processing process (processing during cycle), pre-processing process, after processing process, feeding process process.

- Pre-processing process (executed during cycle): PLC action that can be performed before the processing action, the PLC will only be executed during cycle processing;
- Post-processing process (executed during circulation): the PLC action that can be executed after the completion of the processing action, and the PLC is only executed during circular processing;
- Pre-processing process: the PLC action that can be executed before the start of the

processing action, the process does not limit the use state, circular processing and non-circular processing will be executed;

- Post-processing process: PLC action that can be executed after the completion of the process does not limit the use state, circular processing and non-circular processing will be executed;
- Charging process: for the independent feeding process PLC set with automatic feeding model, configure feeding action here, configure the feeding process to PLC before processing (only during cycle) or PLC after processing (only during cycle), and conduct automatic feeding operation during cycle processing.

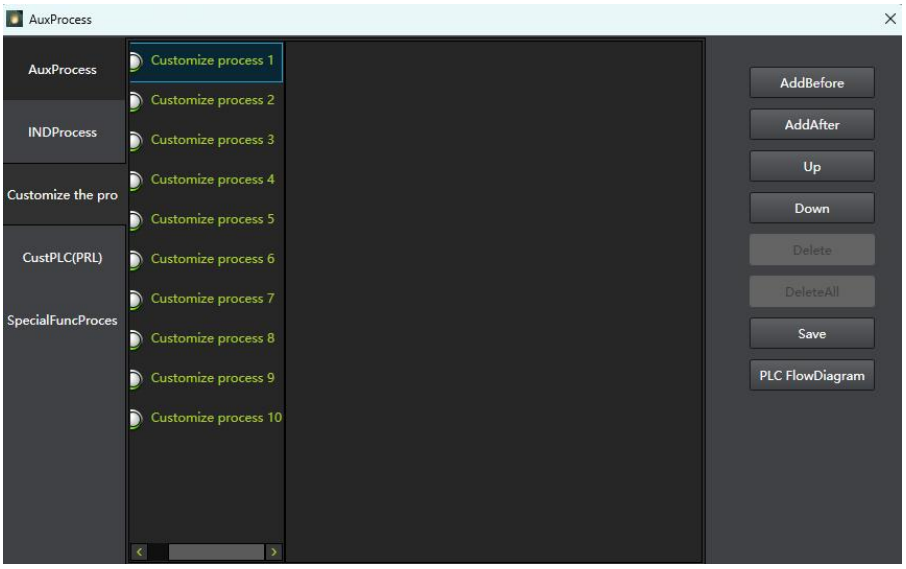
3.9.8.2 Independent process



Independent process, the process action is the same as the above process, the user can configure the independent feeding and material preparation process according to the actual needs.

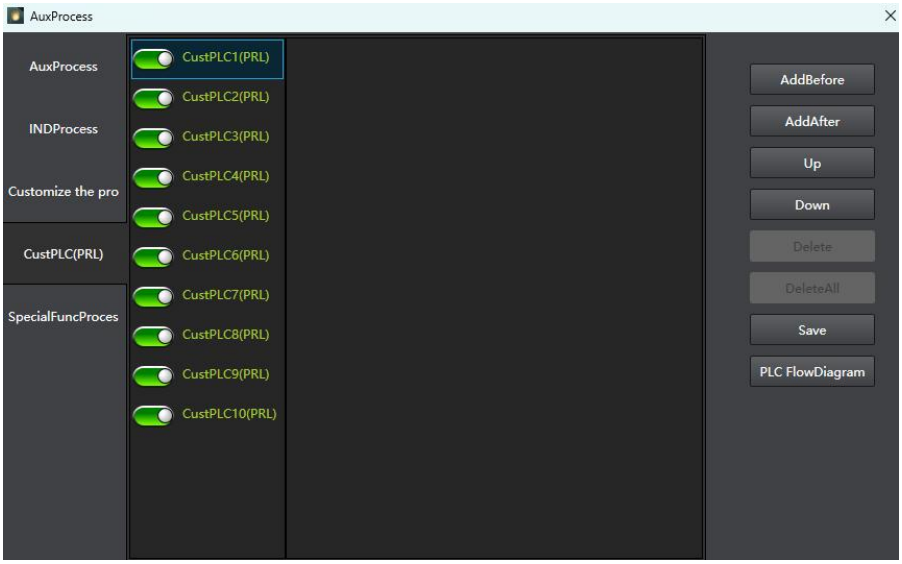
- Independent feeding: PLC for multi-stage automatic feeding equipment;
- Independent preparation: for multi-stage automatic feeding equipment.

3.9.8.3 Custom process



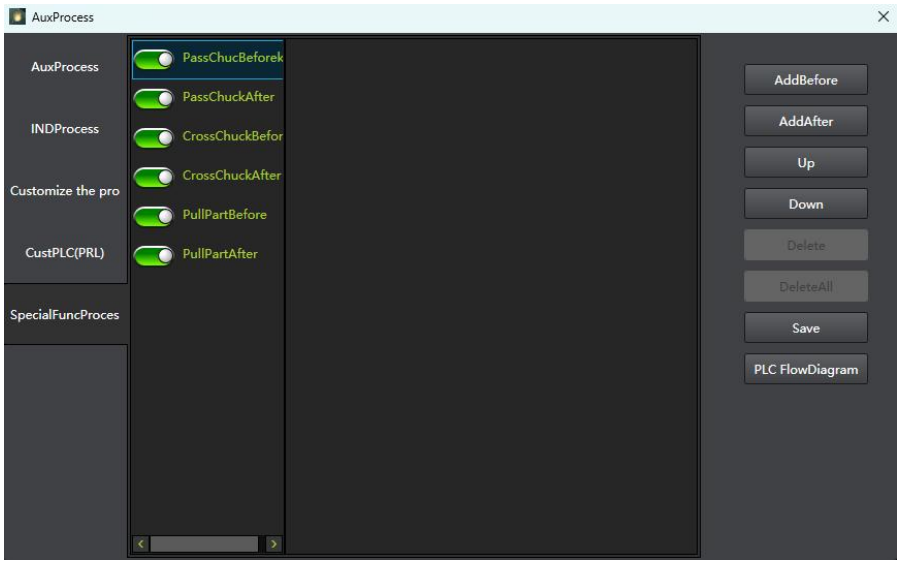
Custom process, process action as the above process, the user can customize according to the actual requirements, the current configuration of feeding process, etc.

3.9.8.4 Custom process (parallel)



Custom process (parallel), process action as the above process, the user can customize according to the actual requirements, this process can be configured reasonable parallel action, can be executed simultaneously.

3. 9. 8. 5 **Special functional process**



Special function process, action as the above process, the user can configure according to the actual needs. At present, the process before cross drive (short tail material), process after cross drive, process before cross drive, process after cross drive, process before pulling, and process after pulling. A process that needs to be performed before or after the corresponding action.

3. 9. 9 **other**

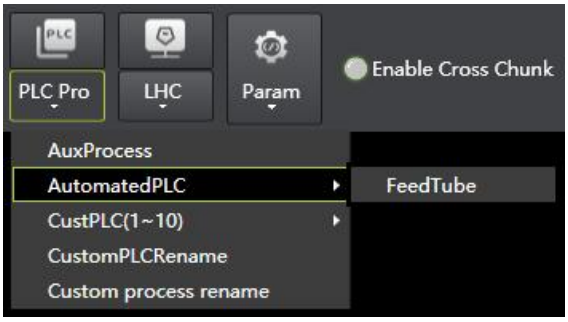


Figure 3.43 Automated Process

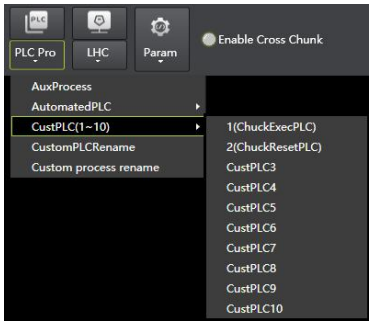
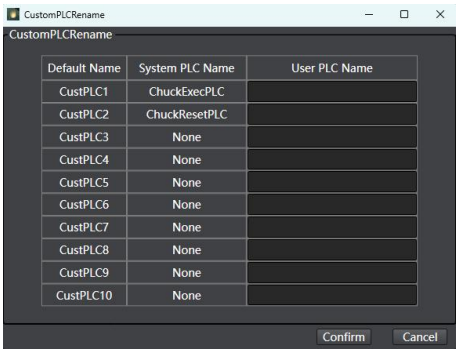
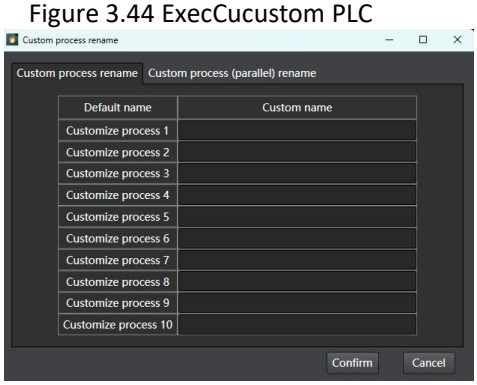


Figure 3.44 ExecCucustom PLC



Custom PLC renaming



The custom process renaming

Implement automation process and execute custom process, that is, click "execute automation process" - "feeding process" to independently perform the feeding process configuration in the auxiliary processing PLC; click "Customize PLC (1-10)" - "Custom PLC 1-Custom PLC 10" to independently perform the action of the custom PLC configuration in the PLC configuration.

You can change the name of the custom PLC in Custom PLC Rename; change the name of the custom process in Custom Process Rename.

3.10 Elevator

Click the pull-down button of [Elevator], and the shortcut button shown in the lower left picture will pop up.

When the regulator type configured in the machine tool configuration tool is iHC100B, clicking t 

he button will pop up the operation interface of the IHC regulator, as shown in the right figure below. For the specific operation of IHC regulator, please refer to the use instructions of our IHC regulator.

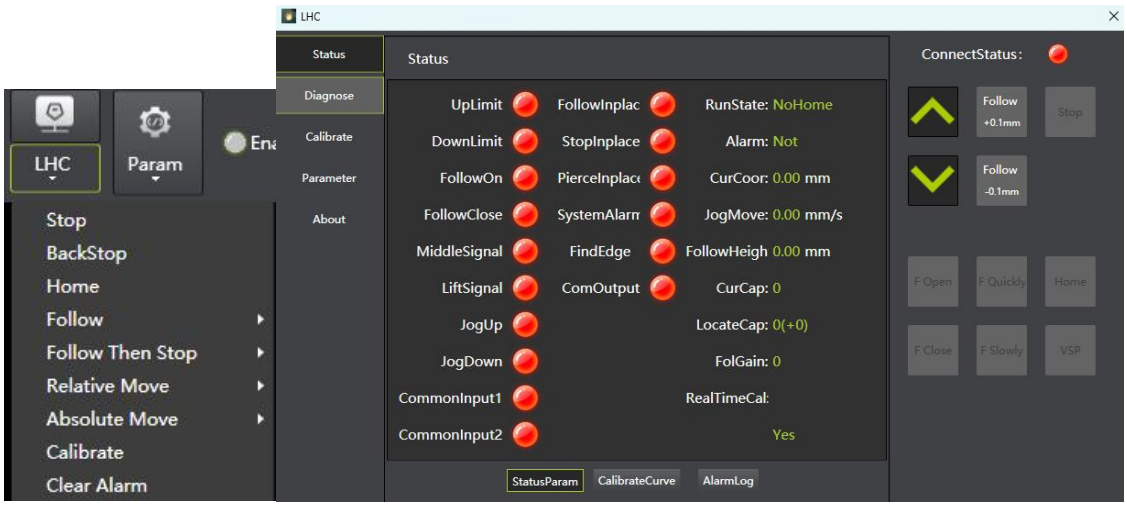


Figure 3.45 Elevator

Drop-down menu shortcut button:

1. **Stop:** in the non-cut state, click the stop to stop the current action and return to the docking point;

2. **Back to the docking point:** in the non-automatic operation state, click back to the docking point regulator will move to the coordinate position of the docking point;
3. **Back to the origin:** in the non-automatic operation state, clicking back to the origin regulator will perform the action back to the origin;
4. **Follow:** in the non-cut state, click to follow and select the height, and the elevation regulator will move down to the corresponding follow height and keep following;
5. **Stop after following:** in the non-cut state, click follow to stop and select the height, and the elevation regulator will move down to the corresponding following height and then stop the action;
6. **Relative movement:** in the non-automatic running state, click the relative movement and select the distance, and the elevation regulator will move a certain distance up or down in the current position;
7. **Absolute movement:** in the non-automatic running state, click the absolute movement and select the coordinate, and the regulator will move to the coordinate position;
8. **One-button calibration:** in the non-automatic operation state, click the one-key calibration, the elevation regulator will automatically execute the servo calibration + floating head calibration;
9. **Clear alarm:** without automatic running state, click clear alarm elevation regulator will clear all current fault reports

3.11 parameter setting

The parameter settings include machining settings, air shift parameters, cutting parameters and unit settings.

3.11.1 global parameter

3.11.1.1 Commonly used parameters

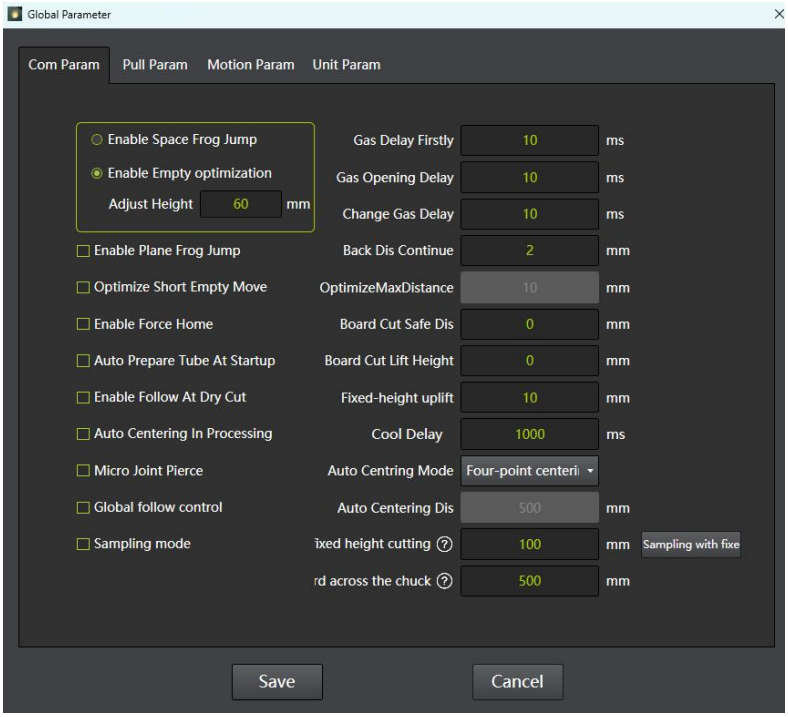


Figure 3.46 Common Parameters

parameter	explain
Open space leapfrog / open air shift optimization	If the space jump is opened, the jump will be adopted when the edge is opened, the air shift optimization is used. The Z axis will be properly lifted according to the size of the pipe in the drawing, so as to ensure that the Z axis will not bump into the pipe.
Turn on the plane frog jump	After checking, open the flat frog jump during the process.

Short-distance airshift optimization	When the space shift distance between two cutting figures is less than a certain value, after cutting the first figure, the Z axis does not lift up, and directly moves to the second figure to start processing. The parameters used for judgment are the "maximum distance" in the common parameters.
Air shift optimizes the maximum distance	Use with "short distance air shift optimization".
Enable the forced-back to the origin	When this parameter is selected, it will be forced to return to the origin each time, otherwise the cutting cannot start.
Turn on the automatic spare material	Click start processing, the file start PLC execution before the need to perform the PLC action.
Empty walk enabled follow	Enable following when it is left later.
Automatic search in the processing	After checking, enable the automatic search in processing, and use the automatic search spacing in processing.
Automatic median spacing in machining	The minimum spacing between the automatic search points in the processing, check the automatic search in the processing, fill in the automatic search spacing, the system will automatically determine the point that can be automatically found.
Current pipe automatic search way	You can choose four / five / elliptical.
Micro-joint perforation	After checking and enabling, make the perforation at the microlink.
Global integration with control	After checking, enter the global control mode, suitable for special pipe processing.
Graphics mode	After checking and being enabled, enter the proofing mode, processing documents do not execute before and after processing plc, and only return to the end point after processing.

Open gas delay	After opening the air path, ensure that the air pressure at the cutting head is stable at the set value.
Air change delay	When replacing the gas, the delay from the original gas to the new gas reaching the stable pressure at the cutting head.
Continue backback distance	After a pause during processing, the cutting gun goes back for a certain distance and continues to cut.
Safe distance for incoming plate cutting	Angle steel, groove steel cutting to the edge of the plate after the plate, cutting this length at a fixed height.
Fine trim for the incoming plate cutting height	Angle steel, channel steel, H type steel and other height sampling, the height of the plate cutting can be fine-tuned to lift a distance, to prevent the gun head from hitting the pipe when entering the plate.
Inboard cutting up height	Angle steel, channel steel, H steel and other height after the completion of the action.
Cooling point delay	In the processing, the cooling point will stop and blow, and the cooling point will continue after the cooling point delay.
Enable high cutting	This function is only for round tubes. After enabled, the gun head is moved to the fixed height position, and the fixed high coordinates are sampled, and the fixed height cutting function can be used carefully.
Open across chuck cards	If the length of the last part in the limit is less than this value, the middle card will be automatically opened when the chuck is crossed

3.11.1.2 Pull material parameters

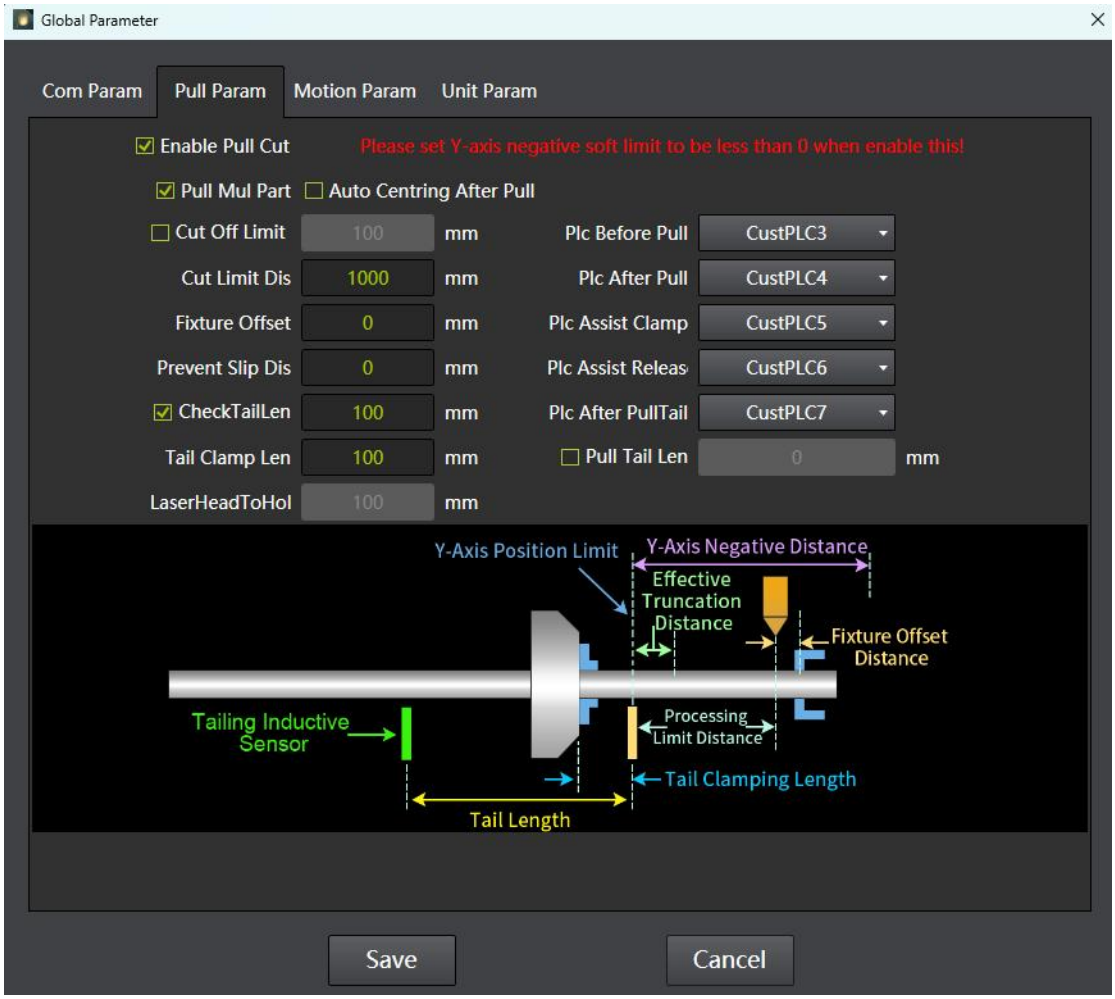


Figure 3. 47 Drawing material parameters

Special parameters for the drawing model:

- **Open pull cutting: the enabling option of pull cutting, check the pull cutting program, do not check the default double chuck cutting mode.**

parameter	explain
Single pull more parts	When the length of a single part of the drawing model is short, check this parameter to pull out multiple parts at a time, and then only pull one part at a time.
After pulling the material, automatically find	After checking, enable automatic search after pulling the material. After each drawing, the starting point of the next contour will automatically locate the middle point for automatic search.

Effective truncation distance	When ked, truncated within this range.
Slide compensation distance	Prevent the supplementary distance of skid given when pulling materials.
PLC process before material drawing	The PLC action to be done before pulling the pipe, such as holding the claw, releasing the chuck..., the custom process in the PLC process of the custom process page can be configured, otherwise the cutting cannot be started.
PLC process after pulling	PLC action required after pulling the pipe, such as chuck clamp, clamp claw release..., the custom process in the PLC process.
Processing limit distance	After a single pull of material, the track to be cut shall be within the processing limit range.
The offset distance of the fixture	The position relationship between the claw and the cutting gun is greater than 0. After the pipe is cut off, the offset distance to the Y axis before pulling the material.
Length of pull tail material	After the last cut of the pull material, it will continue to execute the drawing action, pull out the remaining pipe in the card tray, and the length of the pull out is the length parameter filled after the length of the pull tail material.
The PLC process after pulling the tail material	The PLC action required after pulling the tail material.
Detect the tail material length	The "tail material length" is the distance between the tail material sensor and the chuck fixture, and check the tail material detection function, such as the tail material detection value is 1000mm. When the pipe tail triggers the sensor signal, the system considers the current remaining pipe length is 1000mm, and assist the system to end the current pull material cutting ahead of time and enter the next pipe processing.

The tail material is held in length	That is, the distance between the chuck fixture and the positive limit of the Y axis, which is helpful to judge the holding length of the material, and prevent the tail from pulling too long and the pipe being pulled out.
Distance from the middle device	With auxiliary clamping, the distance from the center of the roller to the cutting head
Auxiliary clamps the PLC	Implement custom PLC, including open auxiliary clamp output port. Custom PLC shall be configured in iTubeSE software PLC.
Assist to release the PLC	Use the auxiliary clamp to perform the custom PLC action, including closing the auxiliary clamp output port, etc. The custom PLC shall be configured in the iTubeSE software PLC.

For pipe users who need to process different lengths, the tail material detection sensor can be added to detect the tail material length of the pipe in real time. When processing different lengths of pipe, the processing can be finished in advance and the next pipe can be processed. The input parameters of the tail material detection sensor can be modified in <iTubeSE parameter configuration tool> - <general input>.

3.11.1.3 movement parameters

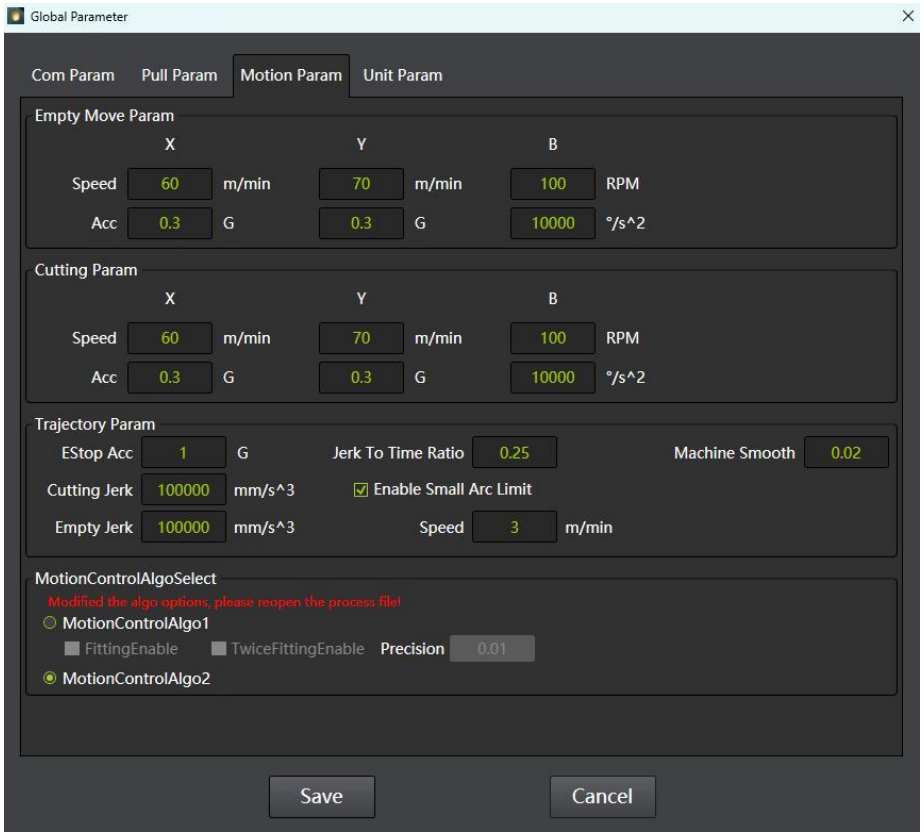


Figure 3.48 Movement parameters

parameter	explain
The X / Y / A / B airshift speed	Set the idling speed of the single axis.
X / Y / A / B maximum processing speed	Set the maximum machining speed for a single axis.
Empty shift acceleration	Set the idling acceleration of the trajectory.
Processing acceleration	Set the cut acceleration of the trajectory.
Urgent stop acceleration	Set the maximum acceleration of the machine during emergency braking.
Maximum acceleration	The maximum acceleration of the acceleration of No.
Acceleration and time ratio	The ratio of acceleration and time, the larger the parameter, the faster the acceleration changes.
Small-circular arc speed-limit	Check and enable the small arc speed limit.

enabling	
Small arc speed limit	Maximum speed when cutting the small arc, the small arc is enabled.
Operation control algorithm selection	The second operation and control algorithm is the optimized motion control algorithm, and it is suggested to choose the algorithm two.

3.11.1.4 Default unit parameters

The default unit parameters can modify the unit display of speed, acceleration, rotation axis, and air pressure:

- **Speed units:** mm/s, mm / min, m / s, m / min;
- **Acceleration units:** mm/s ^ 2, mm / min ^ 2, m / s ^ 2, m / min ^ 2, G (10m / s ^ 2);
- **Angle unit:** ° , rad, r;
- **Angular speed units:** ° / s, ° / min, rad/s, rad/min, r/s, RPM;
- **Angle acceleration units:** ° / s ^ 2, rad/s ^ 2, r/s ^ 2;
- **Air pressure units:** BAR, PSI, MPA;
- **Processing sequence size:** the size of the processing sequence number displayed in the drawing

3.11.2 Processing parameters

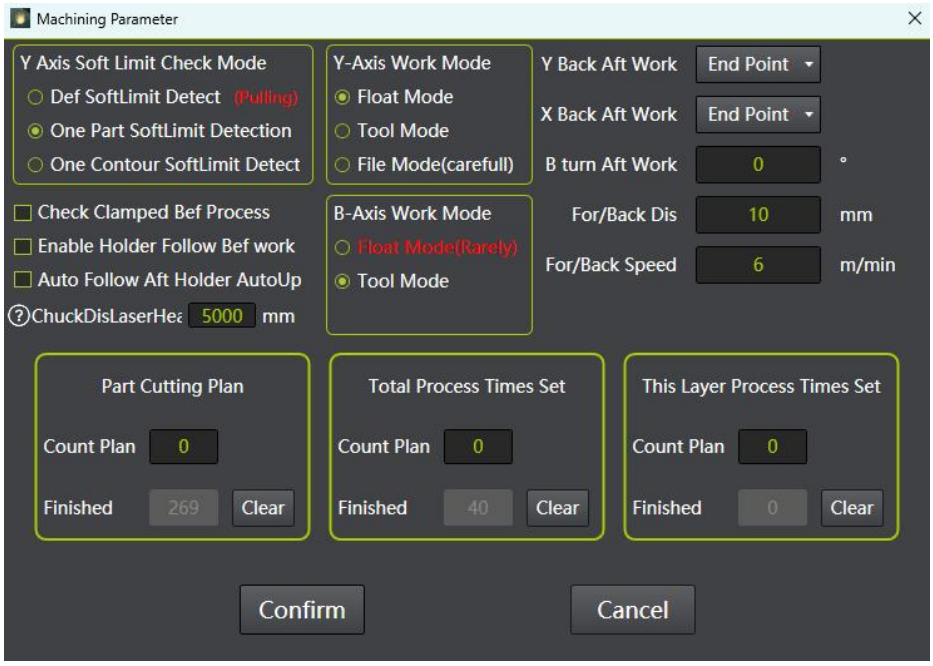


Figure 3.49 Processing parameters

parameter	explain
Y-axis soft limit detection mode before processing	• **Default soft limit detection:** soft limit detection in terms of pipe length. When soft limit protection is enabled, if this function is enabled, the machining will not be allowed when the drawing Y direction length is greater than the Y axis stroke; applicable for drawing mode. • **Soft limit detection of single part:** soft limit detection of parts. When soft limit protection is enabled, if this function is enabled, the drawing will not report "Out of travel range" even if the drawing exceeds the Y axis travel, but allows the machining of parts within the stroke. Some or all parts beyond the Y shaft travel will not be processed; suitable for drive drive mode. • **Soft limit detection in single contour:** soft limit detection in contour units. When soft limit protection is enabled, if enabled, this function will allow machining all contours within the range

	of the Y-axis travel; suitable for drive drive mode.
Automatic open the bracket before processing	This function should be equipped with the feed support. After checking, the feed support function will be automatically opened before each processing.
Check whether the clamp tray is clamped before processing	After checking, the state of the casuck will be detected before each processing, and no alarm is given in the clamped state.
The stent is automatically opened and follows	After checking the scene where the bracket automatically rises and the bracket following function are opened, when the bracket triggers automatically rises, the bracket will automatically open the following.
Distance from the main card to the nozzle	Accurate tail material mode cutting needs to be used with the automatic alignment tail material in the standard PLC.
Y-axis processing mode	● **Floating mode:** process the current Y coordinate as the zero of the machining figure (excluding unmachining layers) ● **Work piece mode:** processing the current Y coordinates as the zero of all drawings (including figures with non-processed layers) ● **Document designation:** for special use scenarios, please contact the after-sales service before use.
B-axis processing mode	Workpiece mode is recommended. Floating mode is to process the current B coordinate as the zero point of B-axis. Please use it carefully. Processing the pipe other than the round tube may cause the consequences of hitting the gun.
The Y-axis returns after machining	The Y axis returns to the position when the document is finished, optional stop / end / mark point 1-6.
The X-axis returns after machining	When the X axis is completed, optional docking point / end point / mark point 1-6.
After axis B	Special models, processing B axis more turn an Angle, convenient

	feeding.
Forward / fallback distance	Set the forward-fallback distance. In the pause state, the forward backback can be used to locate the desired position.
Forward / fallback speed	Set the speed for the forward / backback function.
Limited parts cutting	Stop stop and exit the cut, 0 means not open.
Total processing times is limited	For all processing files, automatically stop and exit the cut, 0 means not open.
The processing times in this figure is limited	For the same processing file, automatically stop and exit the cut, 0 means not open.

3.12 Manual operation area

The manual operation area is on the right side of the software interface, divided into spot operation area and spot operation area. These two areas will be described below:

3.12.1 Point movement operation area

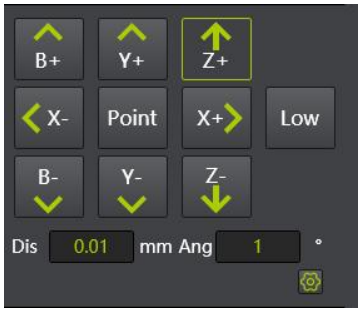


Figure 3.50, click on the operation area

- **Point movement panel:** XYBZ axis point movement or step;
- **Click / set length:** click the click button, the button will switch to the fixed length moving mode, and clicking again will switch back to the click move mode;
- **Low speed:** click the low speed button, can switch low / medium / high speed, corresponding to the manual moving car low / medium / high speed;

- **Fixed length distance:** set the fixed length moving distance of X / Y / auxiliary axis;
- **Fixed length Angle:** set the fixed length rotation Angle of axis B;

Click the button to open the click-setting interface:

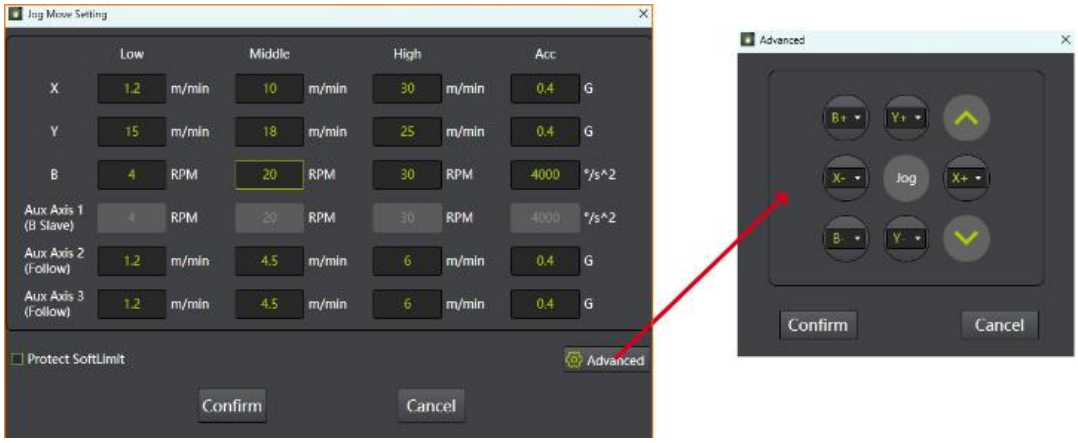


Figure 3.51 Point movement setting

- **Point moving high speed:** X / Y / B / auxiliary axis high speed point moving / fixed length speed;
- **Medium speed:** X / Y / B / auxiliary shaft medium speed point / fixed length speed;
- **Point moving low speed:** X / Y / B / auxiliary axis low speed point moving / fixed length speed;
- **Point action acceleration:** X / Y / B / auxiliary axis point movement / fixed length acceleration;
- **Enable soft limit protection:** set whether the system enables soft limit protection, and the soft limit travel is set in the machine configuration tool;
- **Advanced setting:** you can customize the direction key and freely configure the X / Y / B axis on the point touch panel to adapt to the actual direction of the machine tool.

3.12.2 Point shooting operation area

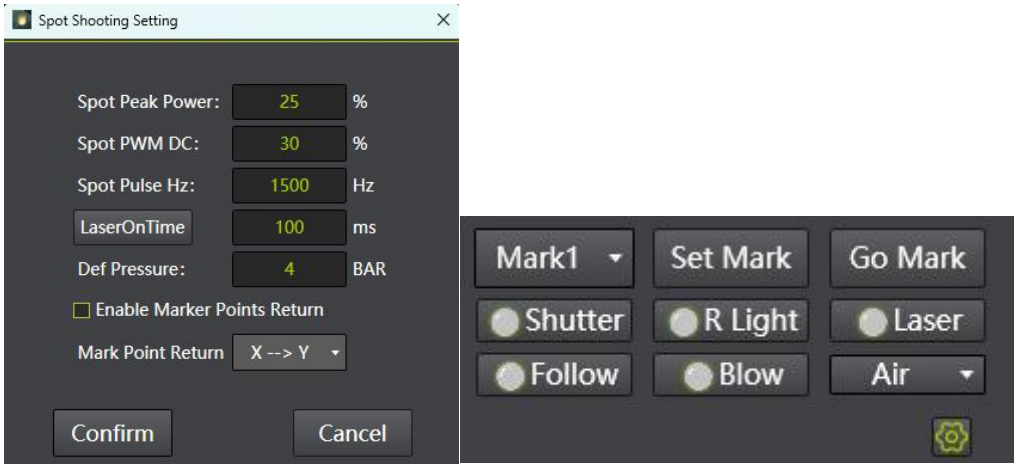


Figure 3.52, dot operation area

- **Marking points:** You can set 6 marking points
- **Set the marking point:** to set the current mechanical coordinate position as the position of the selected marking point
- **Return to the marking point:** Returns the position of the selected marking point
- **Light lock:** laser light switch;
- **Red light:** laser red light;
- **Laser:** laser point-point laser;
- **Follow:** Elevator to follow;
- **Blow the air:** Press down to open the gas;
- **Gas selection:** select the blowing gas type, configure gas in the machine configuration tool;
- Click the button to open the dot setting interface:

parameter	explain
Point-to-point peak power	Peak laser power of the point emission.
Point-shot PWM duty cycle	Laser signal duty cycle of the point emission.
Point-shot pulse frequency	Laser signal frequency of the point emission.
Precise light	Click the precision light button to turn on the laser at a set time.

Default blowing air pressure	Air pressure setting for blowing air.
Enables independent return markers	After checking, you can set the mark XY axis to return to the order, and do not check the XYB axis to return to the mark together.

3.12.3 Custom features

In the custom ribbon, you can set the shortcut function buttons according to your usage habits and requirements to quickly use the function. ITube provides 12 custom function buttons.

Set the custom button in <iTubeSE Parameter Configuration Tool> - <General input>. After saving the required functions on the button, it can be displayed and used in the software.

Figure 3.53, Custom button

3.13 Processing control

Figure 3.54 Functional area

3.13.1 Start / stop

The button is used to start the current processing, 

the button is used to stop the current processing, add the figure to be cut, click 

on the console. After starting the processing, the button 

becomes 

. Click 

will suspend the current processing. After the cutting pause, it 

will become a button 

, and click the continue button to continue the processing.

3.13.2 Continue quickly

After the pause, continue processing.

3.13.3 Empty walk

The difference between empty walking and actual processing is not open the laser, not open the gas, not open to follow. All the other processes are the same. The purpose of the empty walk is to conduct a comprehensive inspection and simulation of the overall processing process without cutting.

3.13.4 Breakpoint positioning

In the processing process, the trigger alarm will lead to a stop (manual stop or stop due to accident), which can be located to the position of the stop interrupt time through the breakpoint positioning, and then continue the processing.

3.13.5 Forward / retreat

After performing the breakpoint positioning or pause operation, click forward / back to adjust the position of the processing point. Forward / fallback distance and speed are set in the machining parameters page.

3.13.6 Back to zero

When the machine moves to the zero point of the figure (the zero point of the work coordinate) of the figure, axis X, Y, Z, and B will return to zero.

3.13.7 Back in

That is, the X and B axes of the machine tool move to the zero point of the workpiece coordinate. (The zero point coordinate of X is equal to the sum of the mechanical central coordinate X of the calibration center of axis B and the central deviation of the pipe X; the zero point of axis B is equal to the angle after single plane leveling)

3.13.8 Circulating processing

Click the cycle processing button to enter the cycle processing page:

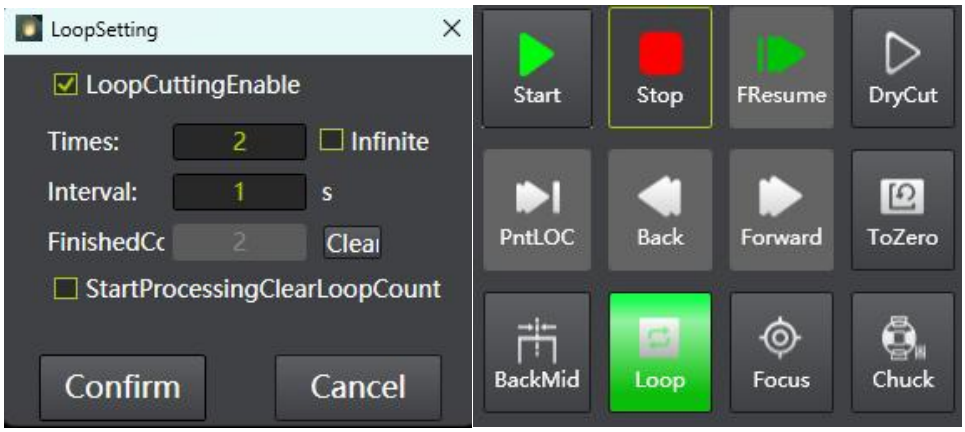


Figure 3.55 Cycle processing

The cycle processing function is used for the cycle processing or for the demonstration processing of the whole tube by empty walking. Then the "Loop" button will brighten, configure the cycle parameters to click 

"start" to start the empty processing cycle.Click 

on the empty walk to start the empty walk cycle; Click 

to pause the cycle, click 

again to continue the cycle, click 

during the cycle will not exit the cycle, and uncheck "Enable cycle" to exit the cycle.

3.13.9 focus control

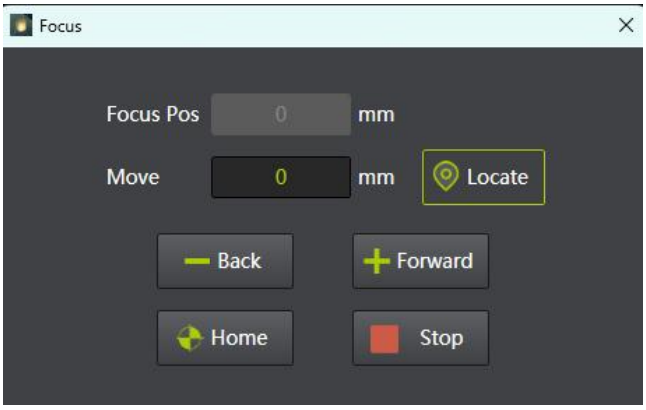


Figure 3.56 Focal control

For servo-controlled focus cutting heads, you can manually adjust the focus position on this page, using the focus axis to first enable the focus

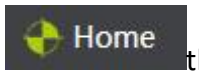
axis in the parameter configuration tool. Including positioning to the specified point, negative point, positive point, back to the origin, stop.

The focal coordinate shows the real-time positional coordinates of the focus.

Enter the coordinates to be located in the moving input box, and after clicking 

the button, the focus is moved to the specified coordinates.

Manual the car button for the focus axis, with each click the coordinates will move 0.1 mm.

Click 

the button to focus the axis back to the origin.

Click 

the button focus axis motion to stop.

3.13.10 Card control

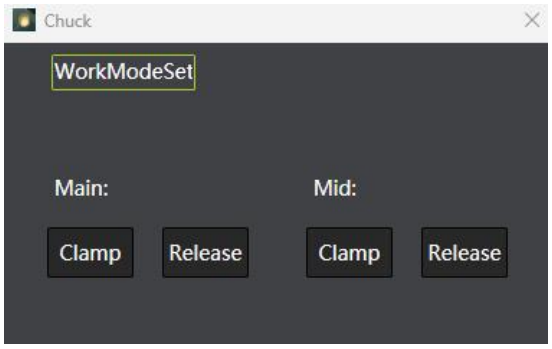


Figure 3.57 Cuck control

Before manually controlling the chuck clamp / release action, measure the time required to have the chuck open and close with a stopwatch, and then configure the "in default time" for clamp and release in the machine configuration tool. After the configuration, test whether the arrival time is reasonable.

With several B axes configured in the parameter configuration tool, the

manual control interface displays several disks. Press "Clamp" and "Release" of a chuck to clamp or loosen the dial. After waiting for the default time, the button becomes green, representing the current chuck state.

3.14 Drawing and layer process

3.14.1 View selection

After the cutting figure is imported into iTubeSE software, the northeast isoaxis view is displayed by default, as shown in the figure below. You can click  on the drawing area to select the desired view type, including: top view, top view, main view, back view, back view, right view, left view, southwest axis view, northeast axis view, southeast axis view, northwest axis view.

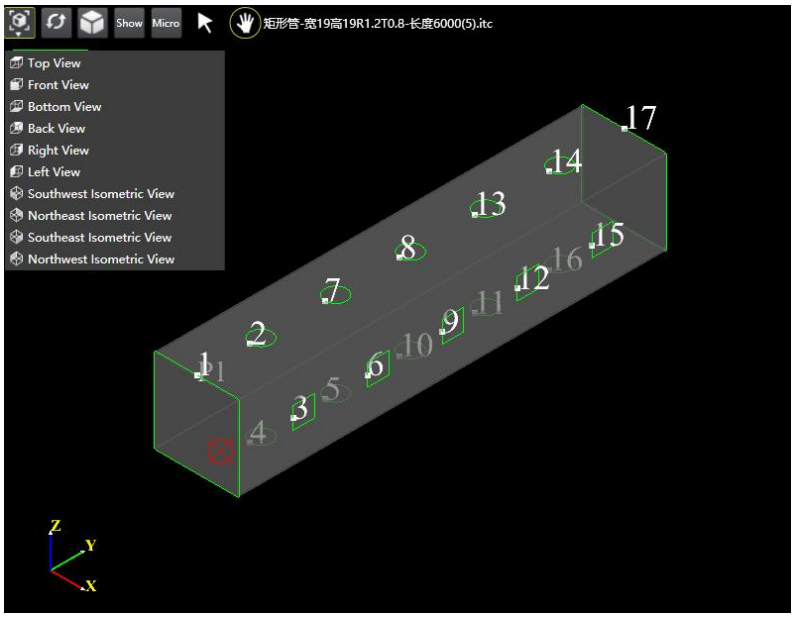


Figure 3.58 View selection

3.14.2 Restore the best perspective

When switching to another view, or cannot go back to the original view after zoom in, shrinking or rotating, you can click  the button to restore

the view to the northeast axis view and adapt to the size of the drawing area.

3.14.3 Render mode selection

The loaded cut graphics can select three different rendering modes, including solid, frame lines, and translucent. After selecting the whole drawing, click  the button to pull down the selection.

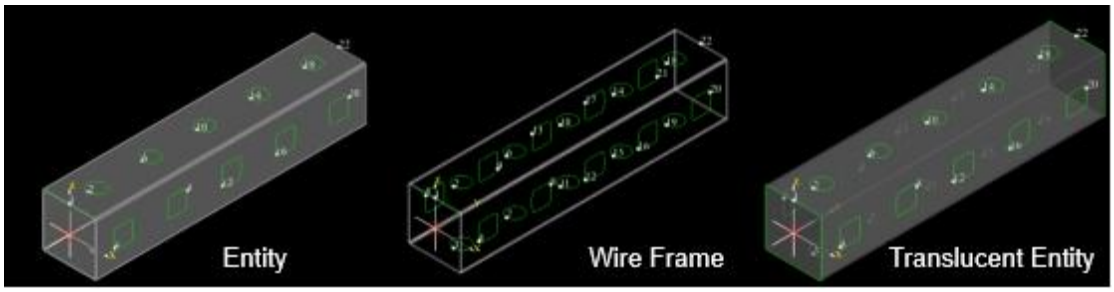


Figure 3.59 Render mode

3.14.4 Mouse mode

The default is pointer mode.  , you can drag and select the outline, click  for the overall translation of the drawing, and move the drawing

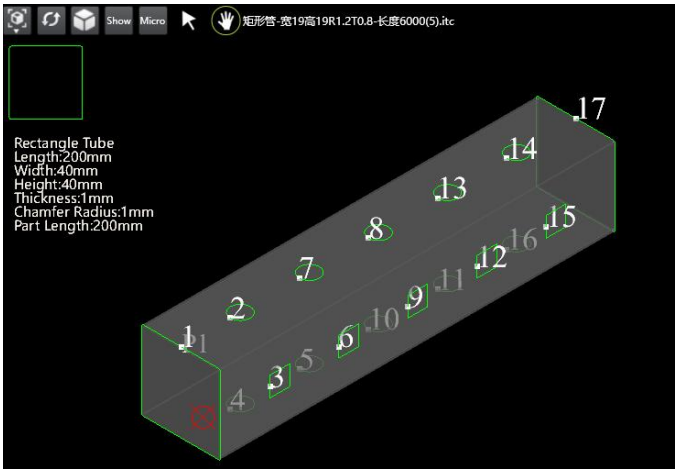


Figure 3.60 Mouse mode

3.14.5 show

The information to be displayed on the graph can be selected by clicking the tick

box, including processing order, starting point, marking point, and track direction.

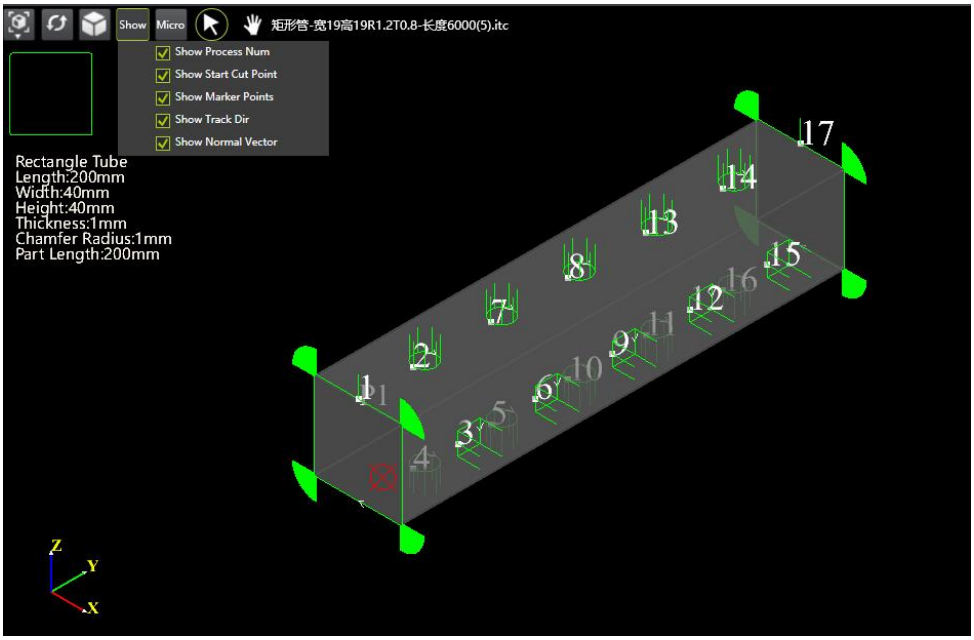


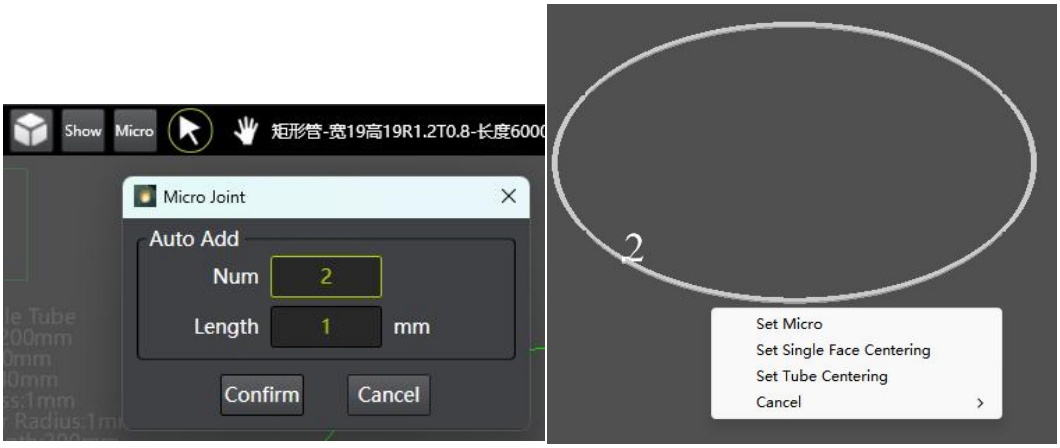
Figure 3.61 shows that the Fig

3.14.6 Micro even

usage method:

1、Click micro connection to set micro connection parameters: the number of micro connection and micro connection length;

2、Select the outline that needs to add the micro link, right click to set the micro link, select right click again to cancel the micro link recovery.



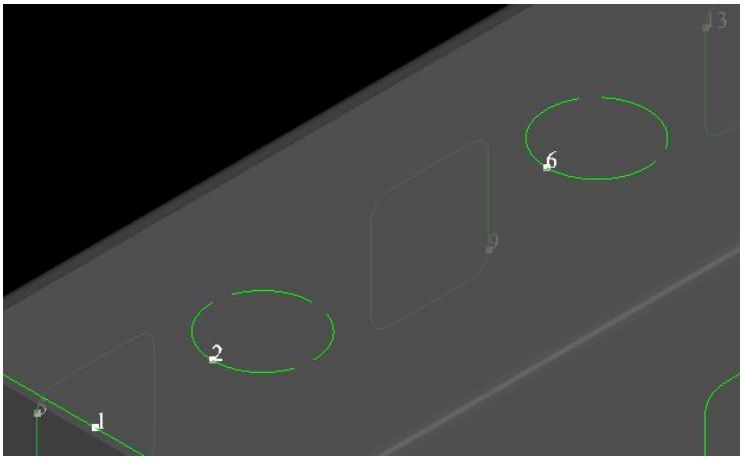


Figure 3.62 Microconnection

3.15 Layer process

If the loaded cut layers contain multiple layers, each layer can be set separately and the user can select the right layer color to modify the layer. If the layer color of the profile is changed to, the profile is not cut in this cut file.

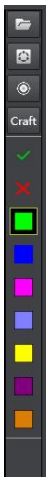


Figure 3.63 Layer selection

Click the process button on the right to enter the process setting interface of the layer. The cutting process of the layer can be set. The perforation process can be set for the thick plate that needs to be punched, and there are special process setting for the rectangular tube over the edges and corners.

3. 15. 1 Cutting process

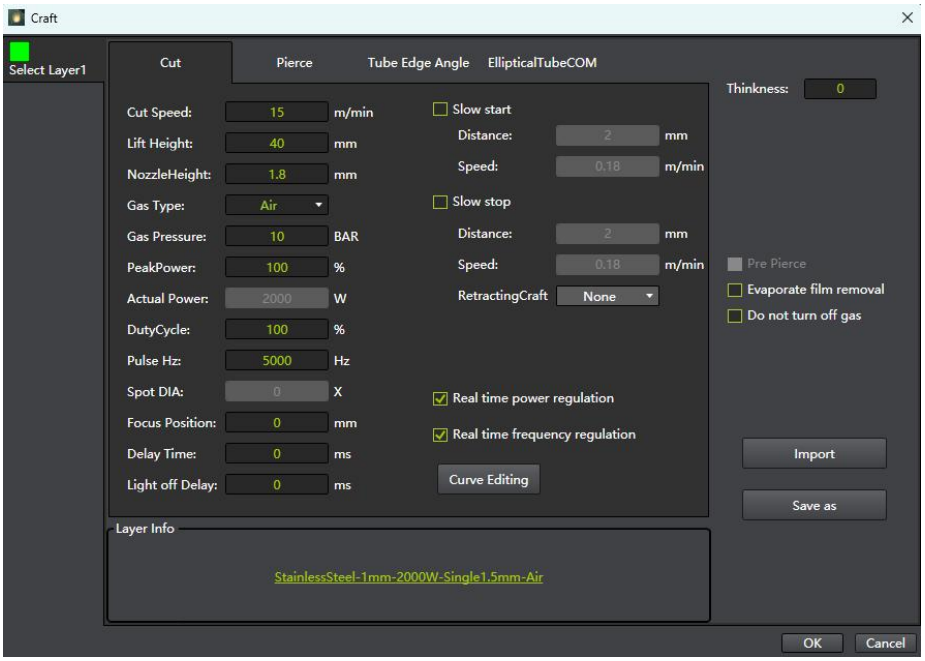


Fig. 3.64 Cutting process

parameter	explain
Lift the height	After cutting a figure, the head of the laser gun needs to be raised up to the height.
The nozzle height	The height of the nozzle at the cutting time.
Gas types	Select the gas at cut.
Gas pressure	This parameter is valid when the gas pressure is cut and the proportional valve is controlled.
peak power	Set the peak power of the laser.
impulse frequency	Set the output pulse frequency of the laser.
duty cycle	Set the output duty cycle of the PWM to control the real-time power of the laser.
focal position	Set the focus position of the laser.
residence time	The laser turns on and stays in place for some time
Pass the light before the delay	The laser stays in place for a period of time before turning off, then turn off the light.

Slow start / stop	Start and stop individually set the speed and distance.
pre-punching	Before cutting the figure, perforate at the starting point of the cutting figure. If the perforation is not perfor, the pre-perforation cannot be checked.
Evaporate the membrane	Cut once before the formal cut, the cutting will not cut the plate through. The pre-cut parameter is the "evaporation defilm" layer setting.
Not cool	The gas is not shut off during the cutting process.
Adjust the power / frequency in real-time	Set the relationship between the power / frequency of the trajectory machining laser and the trajectory speed.
Curve editing	Specific edit power / frequency corresponding to the speed of the curve.

3. 15. 2 **Perforative process**

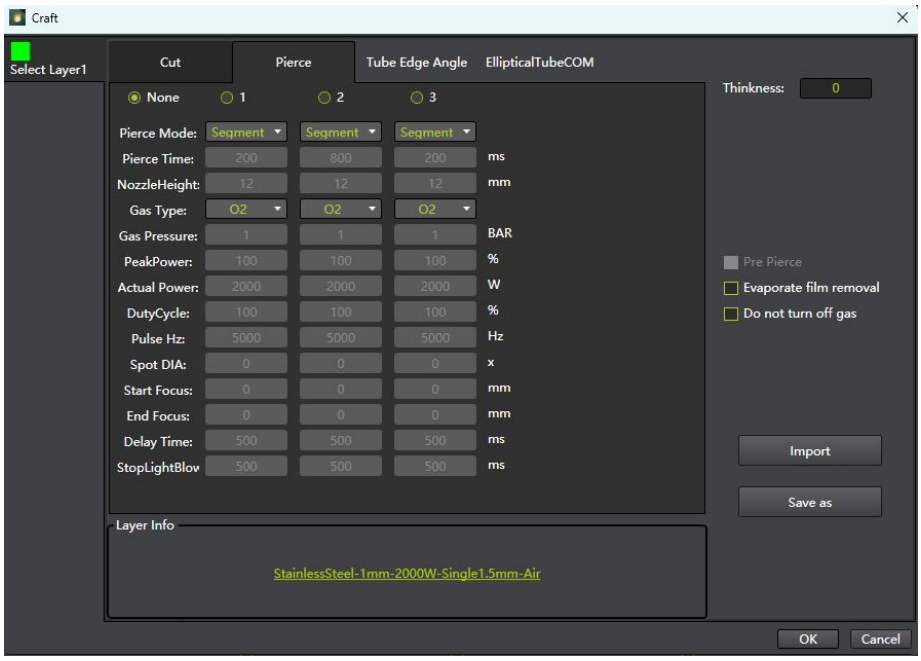


Figure 3.65 Peration process

parameter	explain

The way of perforation	Optional segmented / progressive perforation. Section perforation: perforation and cutting adopt different parameters, usually used for thick plate cutting; progressive perforation is used on the basis of segment perforation, often used for thick plate cutting.
aperture time	The perforation mode is configurable for progressive perforation, that is, the time for the cutting head to move at the lower level of the current height.
The nozzle height	The height of the nozzle at the cutting time.
Gas types	Select the gas at the cut.
Gas pressure	This parameter is valid when the gas pressure is cut and the proportional valve is controlled.
peak power	Set the peak power of the laser.
impulse frequency	Set the output pulse frequency of the laser.
duty cycle	Set the output duty cycle of the PWM to control the real-time power of the laser.
focal position	Set the focus position of the laser.
residence time	The laser turns on and stays in place for some time
Stop the light blowing	The time when the perforation ends.

3.15.3 Pipe edges and corners process

The use of the corner process can make the tube corner cutting effect better. In the corner process, the corner pressure, peak power, duty cycle, pulse frequency, and the speed and acceleration can be constrained on axis B.

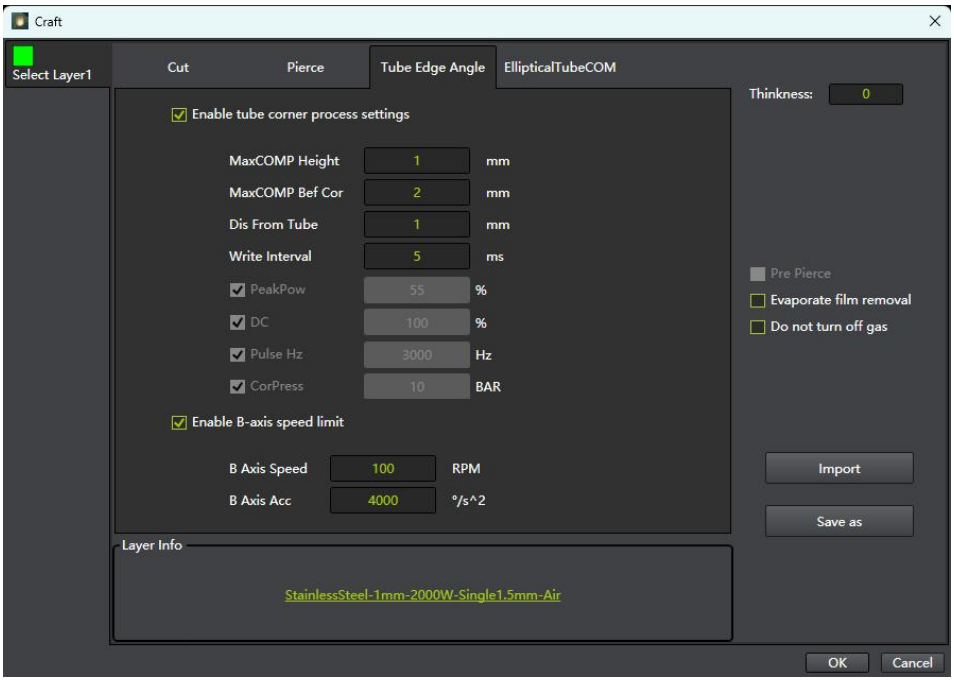


Figure 3.66, angular process

parameter	explain
Enable the tube angular process setting	The tube angular process parameters are enabled when checked, and the lower parameters are disabled when not checked.
Maximum compensation height	The compensation height of the regulator when the rectangular tube rotates to the highest position, when the true follow height = cutting follow height + maximum compensation height.
Maximum compensation height before the corner	That is, the compensation height when reaching the R-angle position
Distance from the tube edge starting compensation	That is, the compensation begins at a certain distance before entering the R corner.
time-write interval	The time interval at which the system sends the raise height parameter to the regulator.
Corner pressure	The corner pressure at the cutting corner can be configured here.
peak power	The peak power at the cutting corner can be configured

	individually here.
duty cycle	The duty cycle can be reduced at the corner to avoid burn parts.
impulse frequency	Set the output pulse frequency of the laser.
Turn on the B-axis speed limit	When cutting pipes of different sizes, the speed and acceleration of axis B often affect the cutting quality of the whole cutting surface. Using individual corner B axis speed can improve the cutting quality without affecting the overall machining efficiency.
B axis speed	Axis B speed set when the speed limit is enabled.
B axis acceleration	The B-axis acceleration that is set when the speed limit is enabled.

3.15.4 Oval pipe compensation

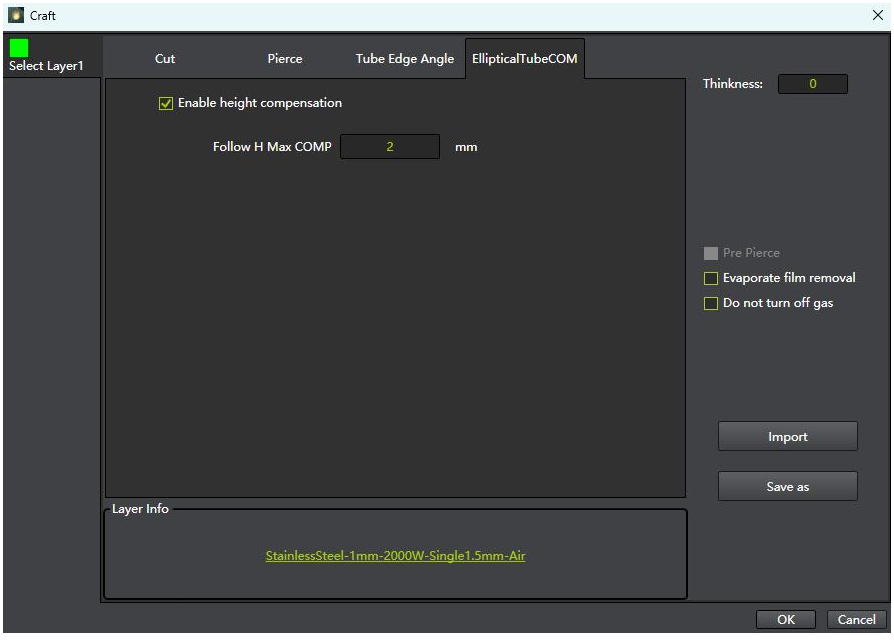


Figure 3.67, elliptical tube compensation

When the loaded file is an ellipse file, the ellipse height compensation can be enabled and then checked.

parameter	explain
Start the compensation Angle	During empty walk, cut, when the dial rotates from the horizontal state to the angle.
Max. compensation value angle	Use the maximum compensation value at this angle.
End the compensation Angle	Start the compensation after the dial rotates to the angle and close the regulator compensation.
Z-axis position maximum compensation value	The maximum compensation value of the Z-axis position prevents the elevation regulator from not following up in time and the cutting head from hitting the pipe wall.
Z-axis position minimum compensation value	The minimum compensation value of the Z axis position is to prevent the elevation regulator from following down in time, and the cutting head is always above the actual pipe.
Follow the height maximum compensation value	Follow the height maximum compensation value.
Follow the height minimum compensation value	Follow the height minimum compensation value.

3.15.5 Public craft

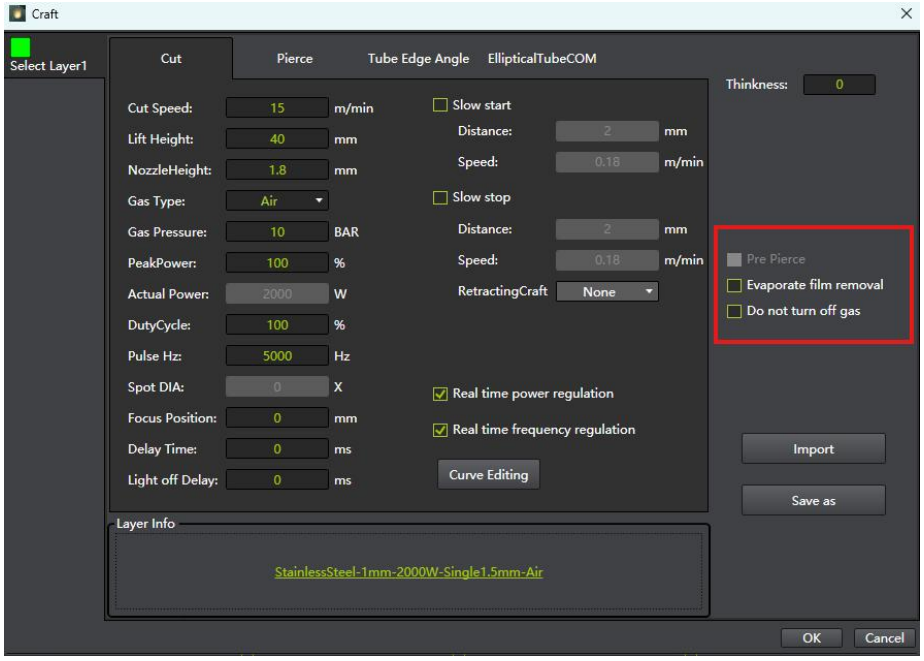


Figure 3.68 Public process

parameter	explain
pre-punching	Perate the beginning of the drawing (or the beginning of the lead) before the actual track cuts. This feature is currently used for single profile, and pre-perforation and evaporation removal cannot be enabled simultaneously.
Evaporate the membrane	Use the cutting track with the membrane parameters, and then perform normal processing according to the layer parameters. Selection of the demembrane parameter setting page appears. This feature is currently used for a single part, and pre-perforation and evaporation removal cannot be enabled simultaneously.
Not cool	After checking, the gas will not be closed during processing.

3.15.6 Save process

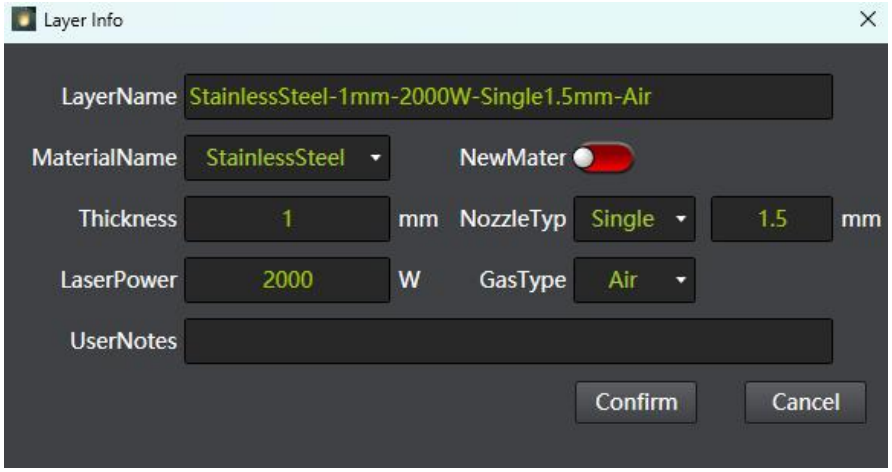


Figure 3.69 Save Process

Save process can save the current process to the process parameter library, through the parameters of this interface constitute the common process file name, convenient for users to identify which cutting situation the process file is applicable to through the file name.

3.15.7 Import process

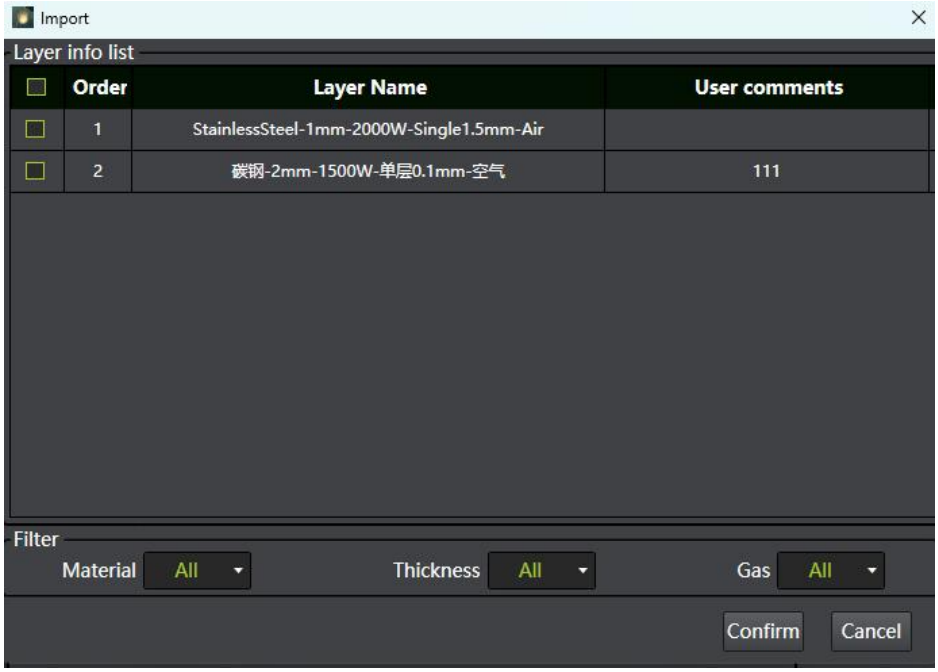


Figure 3.70 Import Process

Users can import process buttons to select previously saved process files from the process library when cutting different pipes.

Chapter 4.iTubeSE Parameter configuration tool

Parameter configuration tool is independent of iTubeSE software and specially used for the configuration of machine tools and various equipment parameters. The software can greatly simplify the interface and operation of iTubeSE software after the debugging of the machine tool, and the stability of the software itself will be better.

Access to the iTubeSE parameter configuration tool requires a password of 1396

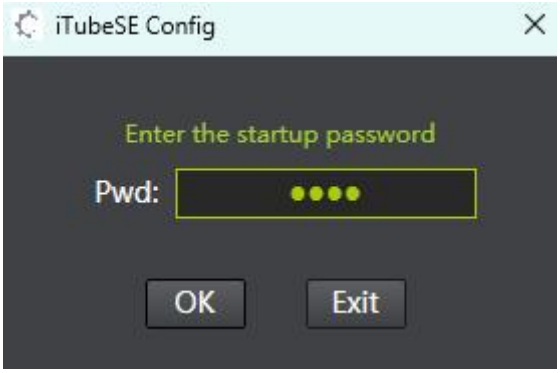


Figure 4.1, start the password

4.1 configuration

4.1.1 Axis configuration

4.1.1.1 X axis configuration

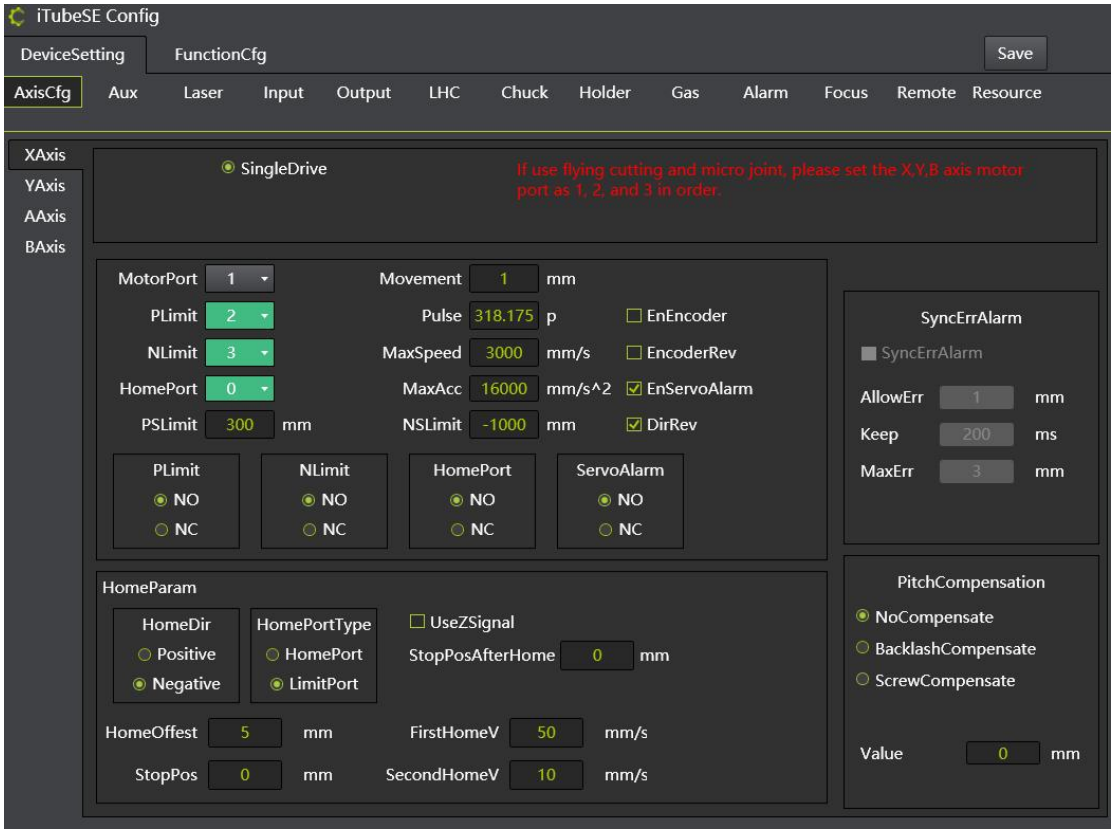


Figure 4.2 The X-axis configuration

parameter	explain
Motor slogan	A1-A6 motor port can be selected.
Positive limit input port	Set the positive limit input port number and the normal open type for the current axis.
Negative limit input port	Set the negative limit input port number and open type for the current axis.
Origin switch input port	When using an independent origin switch, set the port number of the origin switch input and the type.

Servo alarm logic	Set the normal open and close type of the servo alarm input signal.
Positive soft limit	The maximum forward stroke of the corresponding axis after the soft limit protection is enabled.
Negative soft limit	Maximum negative stroke of the corresponding shaft after enabling soft limit protection.
Each movement / corresponding pulse	That is, the axis pulse equivalent, the number of pulses required to be sent when the machine moves 1mm along the X axis or Y axis.
maximum speed	Limit the maximum movement speed of the current axis.
maximal acceleration	Limit the maximum acceleration value of the current axis.
Encoder pulse equivalent	The encoder feedback on how many pulses is 1mm, and the pulse equivalent value remains consistent.
Encoder enabling	Enabling the encoder, collect the encoder signal, as the system coordinate value.
Encoder reverse	Set the direction of the encoder and the motor motion direction consistent.
Servo alarm enabling	Receive and respond to the servo alarm signal of pin 14 in the servo interface, otherwise the signal should not sound.
The direction of movement is reversed	When the actual direction of motion and the growth direction of the current axis are not consistent, check the option to adjust its motion direction.
Return to the origin direction	Direction selection of the corresponding axis back to the origin.
Return to the origin of the choice	The limit port and the origin port can be selected as the feedback signal when returning to the origin.
Using the Z signal	Check this option to collect the Z credit number of the encoder when executing the axis back to the origin.
Return to origin mode	Default secondary return to the origin.

Return origin bias	The offset distance between the axis coordinate mechanical zero point and the origin switch.
Parking coordinates	The position of going back after processing.
First return to the origin speed	Set the speed of finding the origin for the first time.
The second return to the origin speed	Set the speed of finding the origin for the second time.
Reverse gap compensation	Compensation axis for mechanical reasons.

4.1.1.2 Y axis configuration

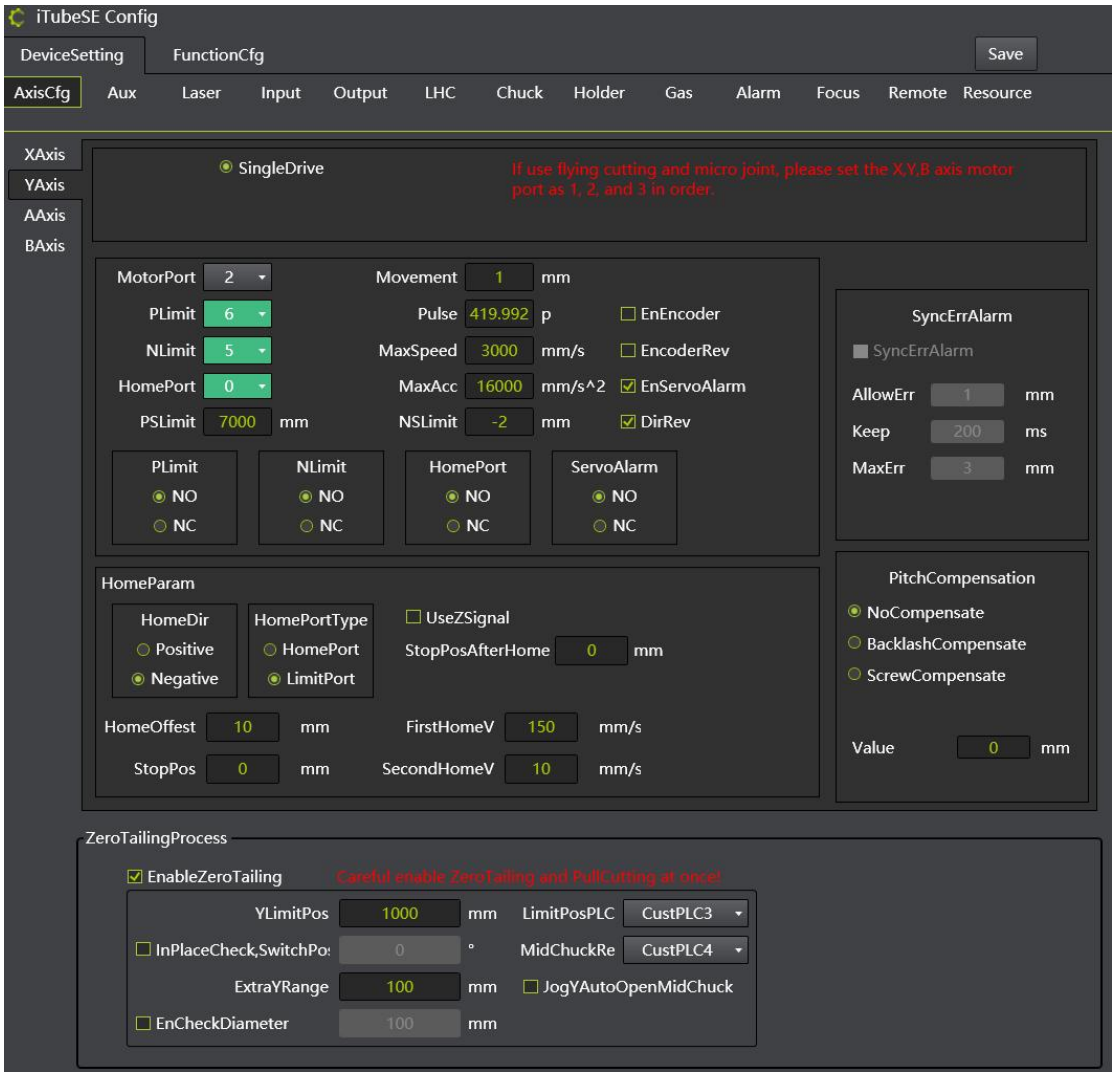


Figure 4.3. Y-axis configuration

Enable short tail process: After tick the short tail process, configure the following parameters:

parameter	explain
Trigger condition: Y-axis coordinates	The mechanical coordinates of the Y axis, the main dial moves to the "PLC executed after reaching the coordinate".
The middle card opens the PLC	Select the custom process to be executed and configure the custom process in plc.
In place to detect	Before performing the short tail action, rotate the Angle of the chuck to the set position, open the middle card and wait for the completion signal detection before performing the

	subsequent cutting action.
Medium-card to reset the PLC	Select the custom process to be executed and configure the custom process in plc.
Additional travel on Y axis	After opening the PLC in the middle card, modifying the soft limit of the Y axis, that is, the current positive soft limit of the Y axis will increase the distance of an additional stroke.
The uck opens automatically in the y-axis	When enabled, manually click the y-axis to the trigger coordinate, and the middle card will automatically open.
Enable diameter judgment	When executing the short tail material process, judge whether the pipe diameter conforms to the range

4.1.1.3 A axis configuration

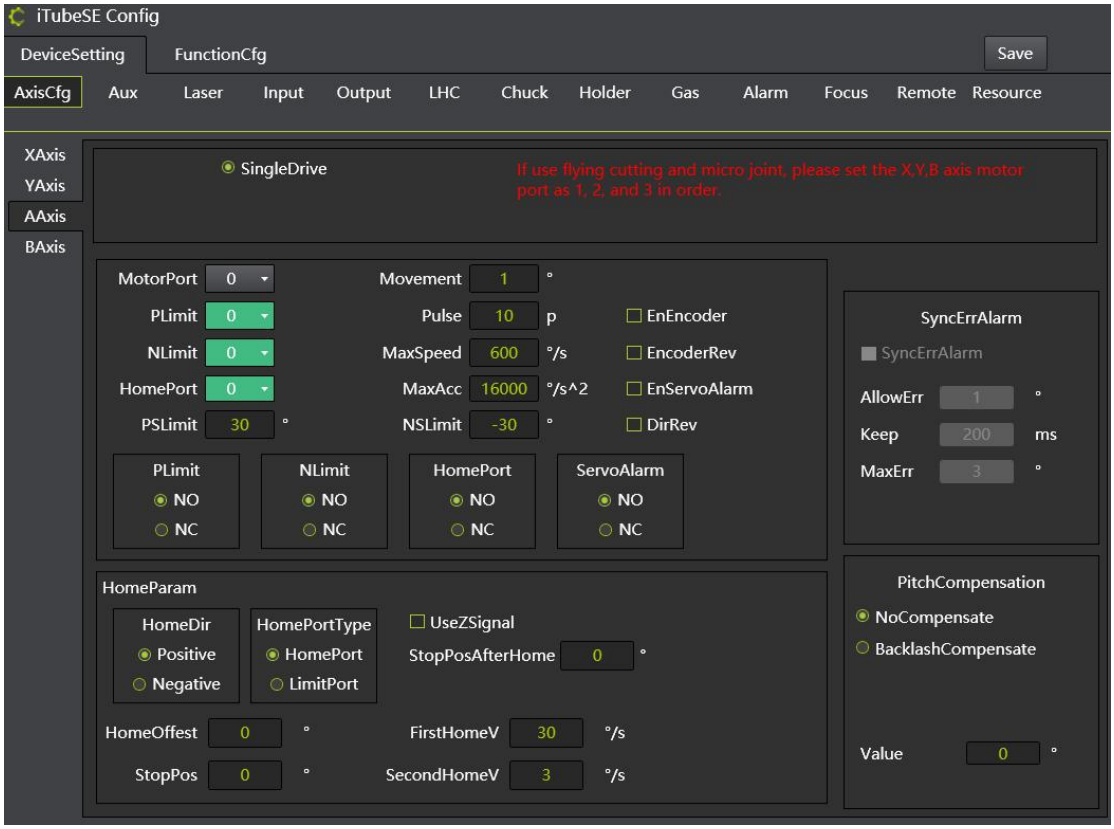


Figure 4.4 axis A configuration

After the configuration of A shaft motor port, A shaft will be

displayed in iTubeSE software and processed as the swing shaft.

4.1.1.4 B axis configuration

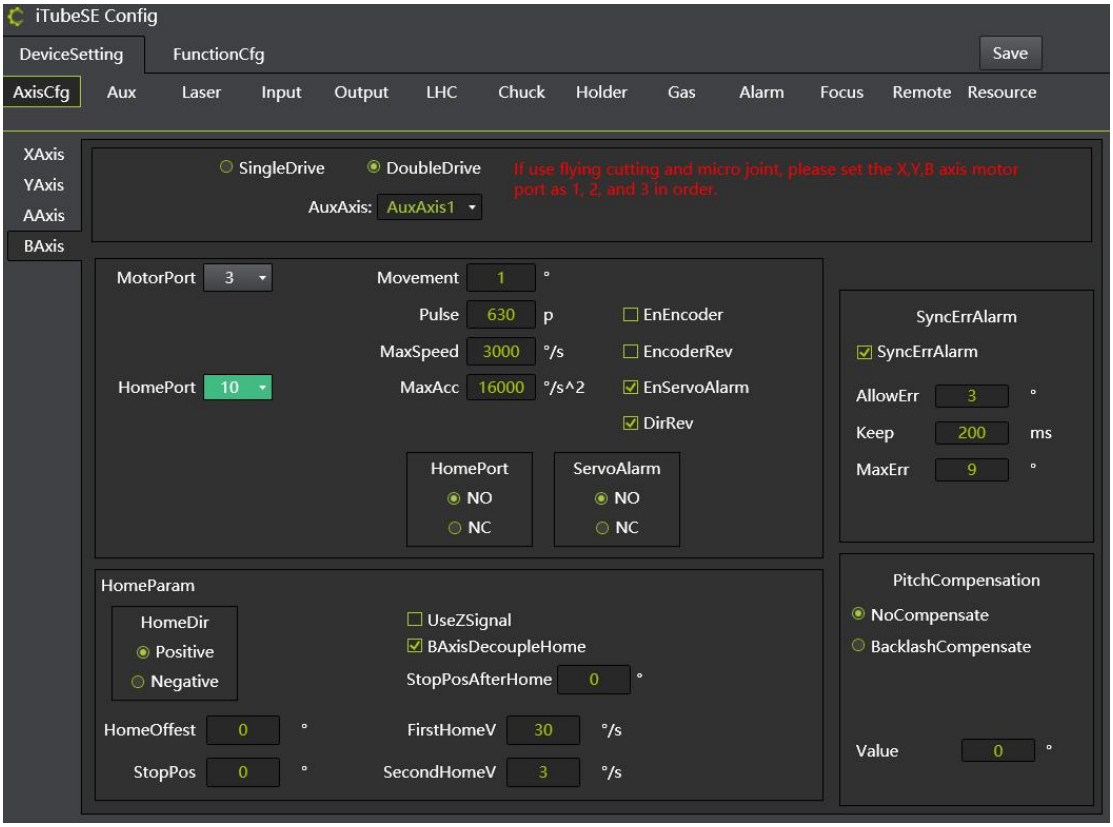


Figure 4.5 B-axis configuration

The dual drive setting is added to the B axis. After selecting the dual drive, the auxiliary axis needs to use in the double crankshaft. The parameters of the auxiliary axis are basically the same as the X / Y axis. Synchronous shaft alarm settings can be configured after using a dual-drive shaft:

parameter	explain
Synchronous axis deviation alarm	Check to enable the synchronization axis deviation alarm, not checked is not useful.
allowable deviation	The position deviation of the synchronization axis reaches a certain value and lasts for a period of time (duration), which will

	produce an alarm.
duration	The synchronous axis position deviation reaches a certain value (allowable deviation) and lasts for a period of time, will produce an alarm.
maximum deviation	The maximum deviation allowed by the synchronization axis, once this value is reached, the machine immediately stops moving.(The maximum deviation must be greater than the allowable deviation).

4.1.2 accessory shaft

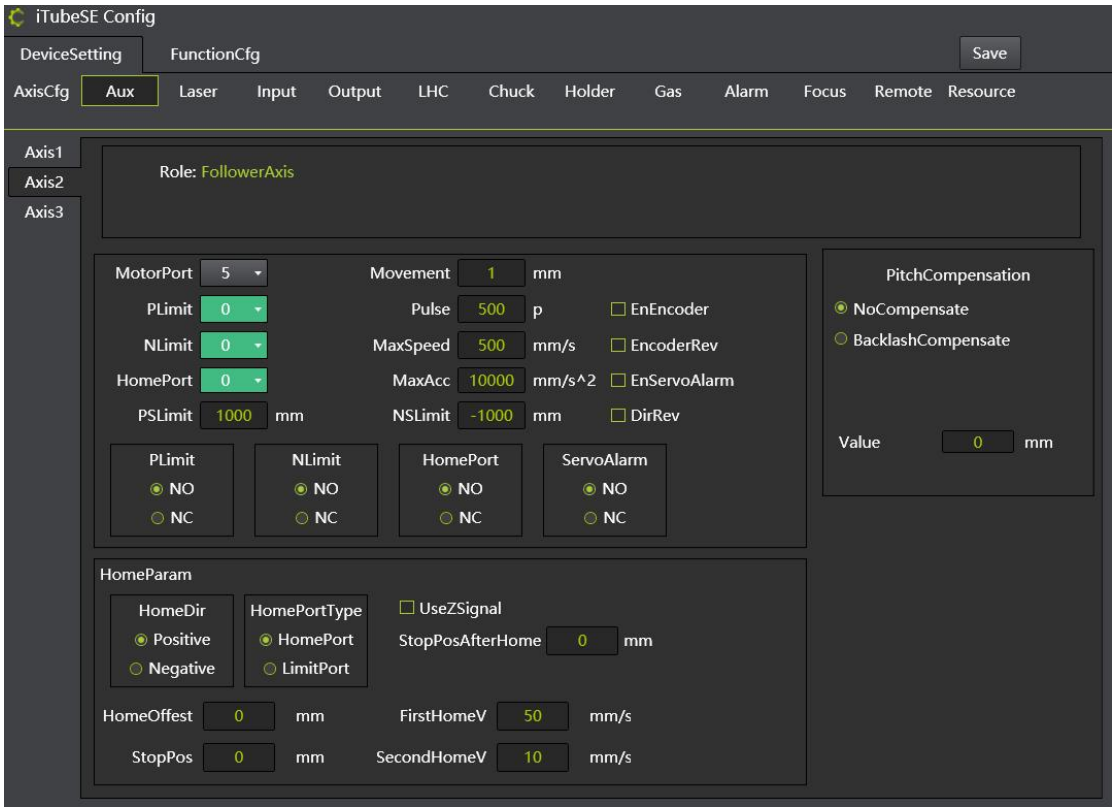


Figure 4.6 Auxiliary axis

The auxiliary axis can be used for the use of B-axis secondary axis, feed support following axis, avoidance axis and focus axis. After axis B, feed support, cross tray and the focus page, it is necessary to enter the corresponding auxiliary axis page to configure the axis. The parameter

content can be coaxial configuration, and the axis configuration parameters.

If automatic feeding is required, please ensure that the three auxiliary axes are unused. At this time, the three auxiliary axes do the auxiliary automatic feeding function.

4.1.3 laser

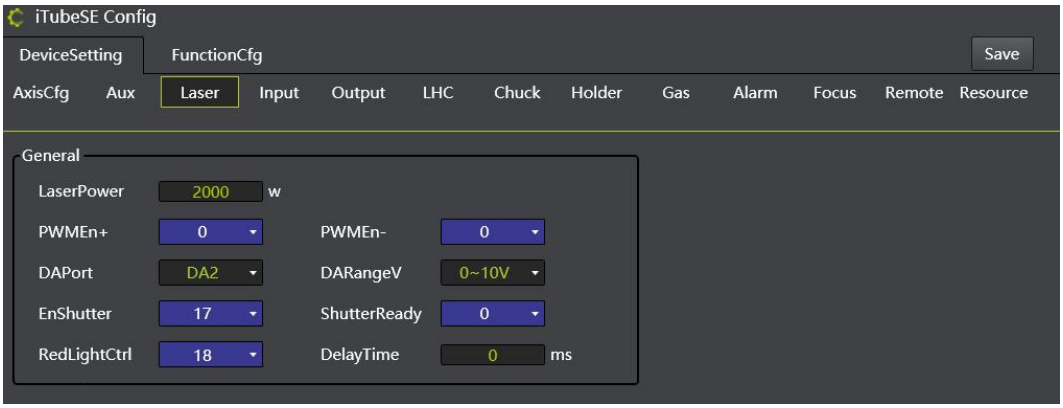


Figure 4.7 Laser device

Support universal DA controls the peak power of the laser generator, PWM sets the real-time power of the laser generator, and the output port controls the light switch signal of the laser generator.

parameter	explain
Laser power	Set the power of the laser generator.
The PWM signal enables the +/-	The PWM enables the positive / minus output ports.
DA mouth selection	Set the laser generator peak power DA output port.
DA voltage range	At 0~10V, 0~5V, and set the DA voltage output control range.
Out of the light can	Set the optical switch output control port number for the laser generator.
Out of the light preparation	Prepare the output port. Red light control: red light control output port.
Time delay time	Deldelay before the output light light '' signal.

4.1.4 general IO statement

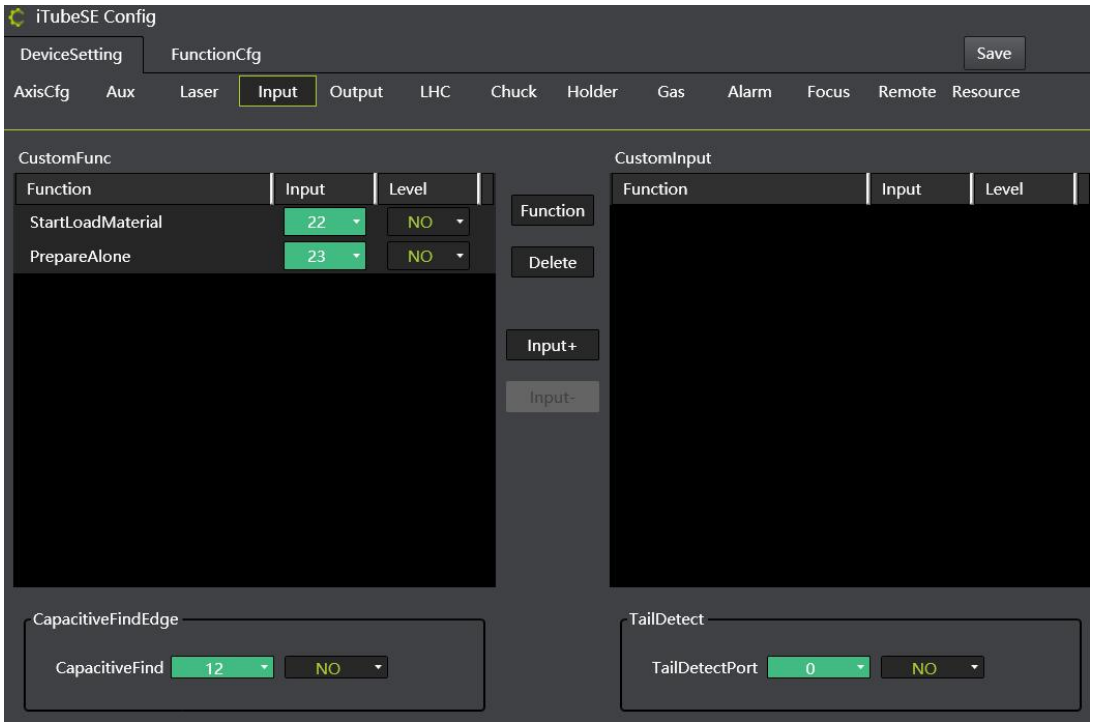


Figure 4.8, universal input

Each input port, which corresponds to a function, is required to connect the corresponding line. For example, the input port 1 is configured as an input signal with the positive limit of X axis, and the photoelectric switch with the positive limit of X axis is connected. If the function of the input ports is one to one, then these input ports are called "not universal". Conversely, if the input port 1 can be configured both 1, connection signal 1, and 2, connection signal 2, then the input port 1 is "universal", also called "configurable".

Click "Function" in the general input interface to configure the required input signal and configure the input signal logic.

The capacitor seeking input port can be configured with the capacitor seeking signal.

Custom input can mark the functionality of the input port.

The tail material detection input port can determine whether it reaches the tail of the pipe.

4.1.5 General output

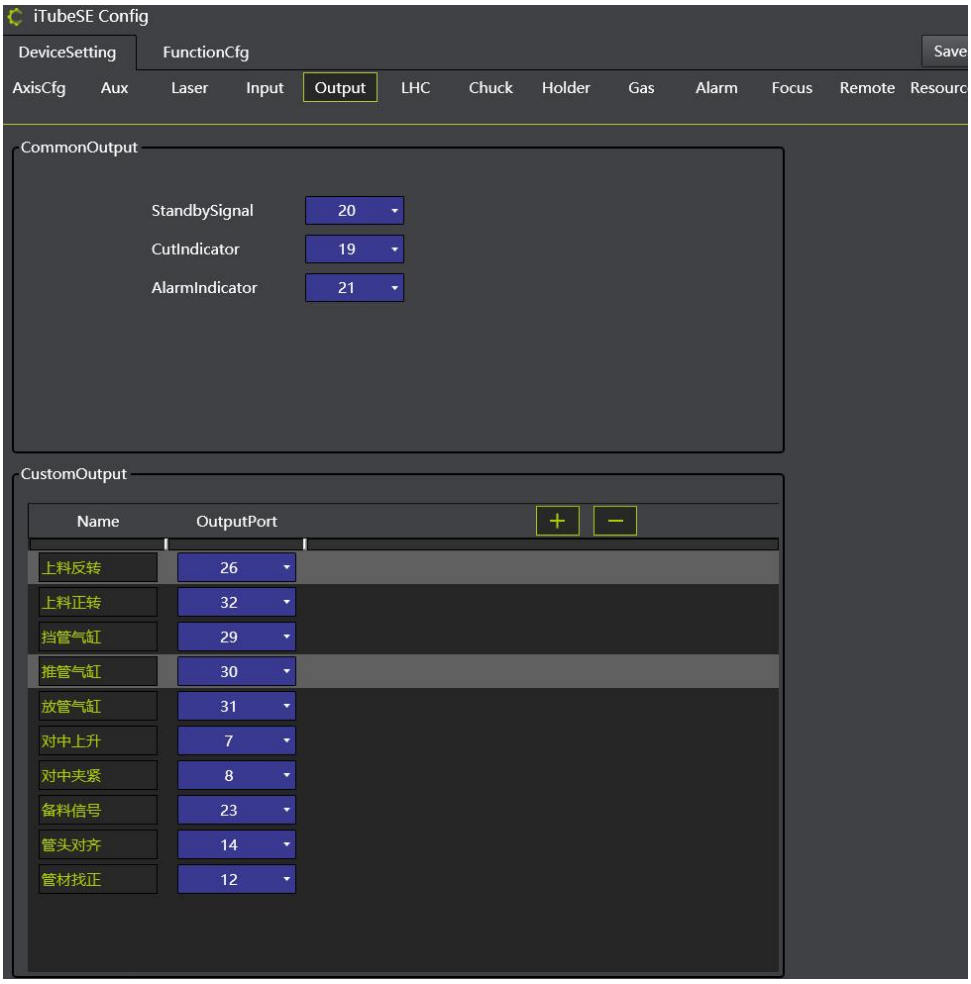


Figure 4.9, the universal output

The general output page contains two functions: a run indicator configuration and a custom output configuration.

The operation indicator light configuration includes three signal lamp output ports: standby signal, processing indicator light and alarm indicator light. The output port needs to be connected to the external indicator light. When iTubeSE software is running, the signal will be output according to the three states of standby machine tool, processing operation and alarm to prompt the user of the current machine tool state.

The general output principle is the same as the general input. All the

output ports are general and can be configured with any desired name. Click "+" or "-" to add or delete the custom output.

4.1.6 Elevator

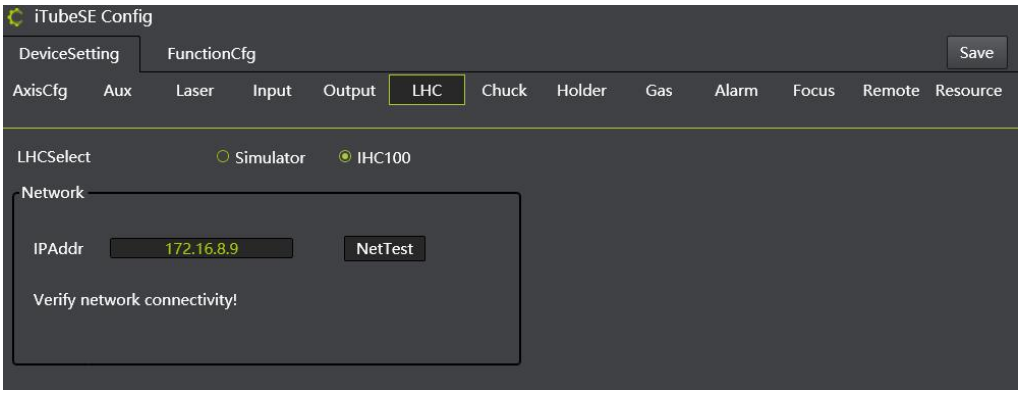


Figure 4.10 Elevator

1. **Elevator selection:** support our iHC100B laser and analog regulator (for equipment debugging stage). Need to support other elevation modulators, please contact the relevant after-sales personnel.
2. **iP address:** Set the iP address of the regulator. The default iP address of iHC100B regulator is 172.16.8.9.

4.1.7 cartridge

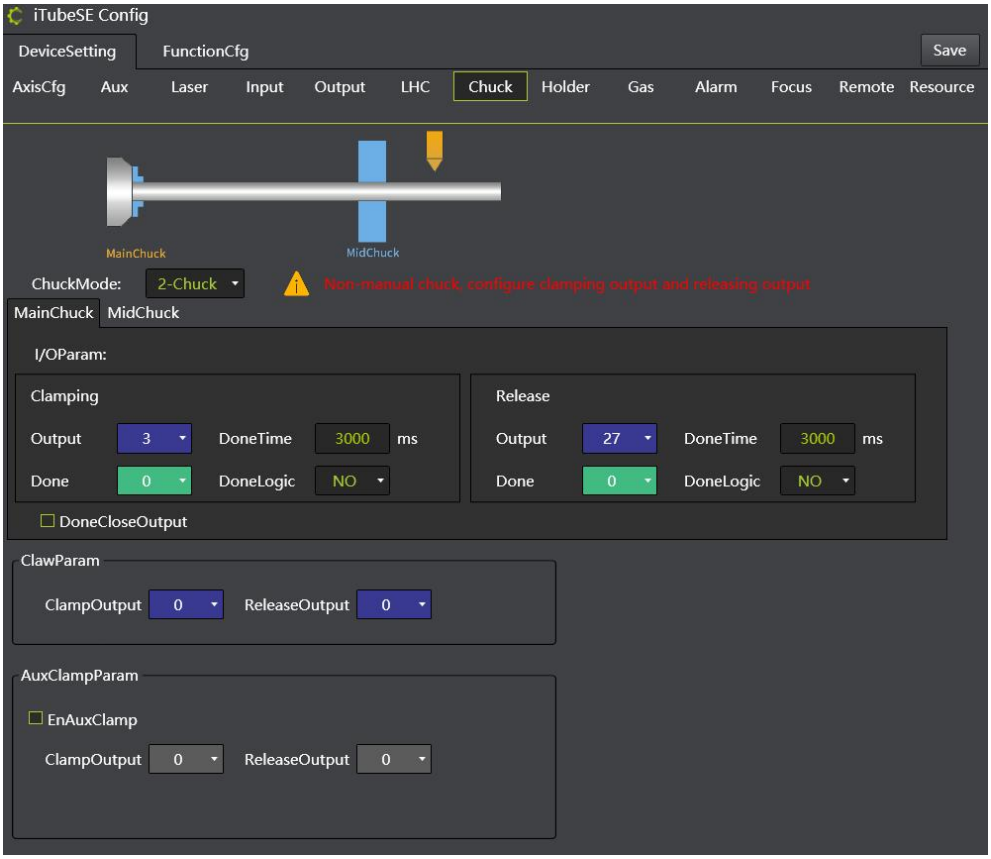


Figure 4.11 Chuck tray

Chuck configuration interface, IO control chuck cylinder clamp release

The auxiliary clamping enables the auxiliary clamping cutting, using the auxiliary clamp to fix the pipe to improve the accuracy.

parameter	explain
Card plate mode	Select manual drive, single drive, double drive mode.
Clamp / release the output port	Set the chuck cylinder clamp / release output; cylinder single IO control if only clamp output or only release output, and dual IO control if both.
Default time in place	Without the "place input port", the system determines whether the cylinder is clamped / released in place by the default time.
In place logic	Set the constant open and close type of clamp / release in

	place.
In place input port	Set the input port number in place.
Close the output port in place	For dual output port control, i. e. tighten and release is to open different output ports, close the output port after the cylinder clamps / release is in place.
Claw parameters	Configure the clamp to release the output.
Auxiliary clamping parameter	Configure the auxiliary clamp and release the output port

4. 1. 8 support

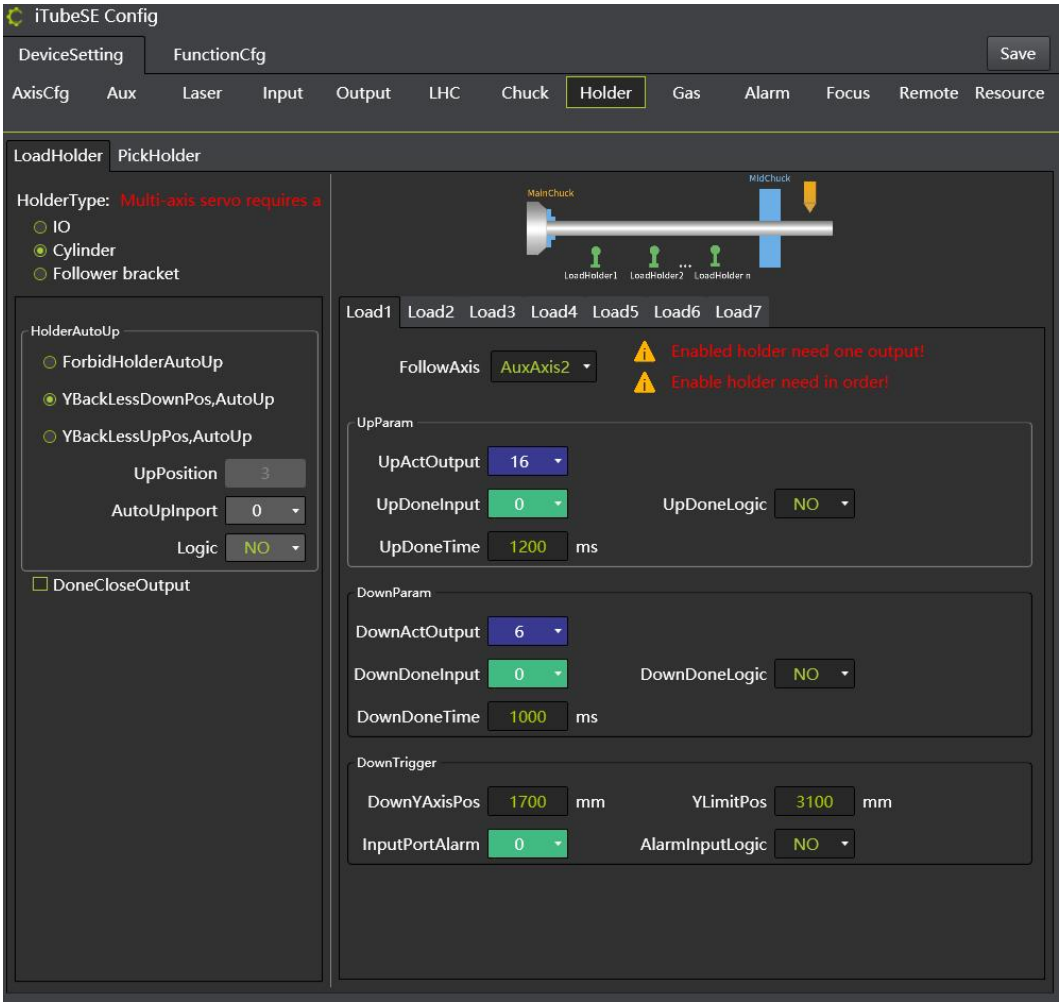


Figure 4.12 Stent

The feed bracket is between the main chuck and the middle chuck, and is used

to support the pipe when the main chuck disk is far away. The bracket can automatically descend and rise depending on the position of the main casuck.

After the middle chuck, the pickup holder is used to support the pipe when the cut but not truncated pipe is longer. The stent can automatically rise and fall according to the length of the protruding pipe

Stent configuration interface, parameter introduction

parameter	explain
The bracket type	The support is divided into feed support and pickup support, the pipe support frame between the double chuck, the pickup support after the single IO bracket (which can only control the rise and fall of the support cylinder), the cylinder following support (which can control the rise and fall of the support cylinder and follow the support shaft, which can follow the pipe and move up and down).
The bracket rises automatically	**Automatic bracket lifting is not allowed:** regardless of the position of the current main cartridge, the bracket can only be raised by manual lifting.
	When the Y-axis fallback is less than the descending coordinate, automatically rise: when the corresponding Y-axis coordinate value of the main chuck is less than the "Y-coordinate when trigger descending" parameter of the corresponding bracket, the corresponding bracket will automatically rise, and the bracket will rise one by one according to the Y-axis coordinate.
	When the Y-axis backback is less than the rising coordinate, it will automatically rise: when the corresponding Y-axis coordinate value of the main chuck is less than the "rising coordinate" parameter below, the bracket will all rise at once; When the automatic rising output inlet is configured, the signal bracket at the input port.

Allow the to is allowed	When configure the input port, the bracket will automatically rise to meet the effectiveness of the rising input port.
Rising coordinates	The Y coordinate of the scaffold automatically rises valid when the Y coordinate is less than the rising coordinate.
logic	Set the normally open and closed type of the stent rising input signal.
Close the output port in place	For dual output control, the rise and down are opening different output ports and closing the output ports after the cylinder rises and fall are in place.
The bracket follows the axis	For the selection of cylinder follower bracket and follower bracket type, configure the bracket follower shaft. Multiple axes need to be authorized to use them.
Y coordinates when the descent is triggered	Y coordinate when the scaffold drops, valid if the Y coordinate is greater than this value.
Y boundary position	Alarm indicates when Y moves to the extreme position and the bracket does not drop in place.
Alarm input logic	Set the normal open and closed type of the stent alarm input signal.
The alarm input port	When the alarm input port is valid and the bracket does not drop in place, the bracket alarm will generate and stop the chuck movement.
Stent distance / Y coordinates	Push the distance between the pickup holder to the cutting head; and the mechanical coordinates of the pickup holder in the Y negative half axis
Security coordinates	The bracket drops to the safe coordinates where the chuck can pass safely

4.1.9 auxiliary gas

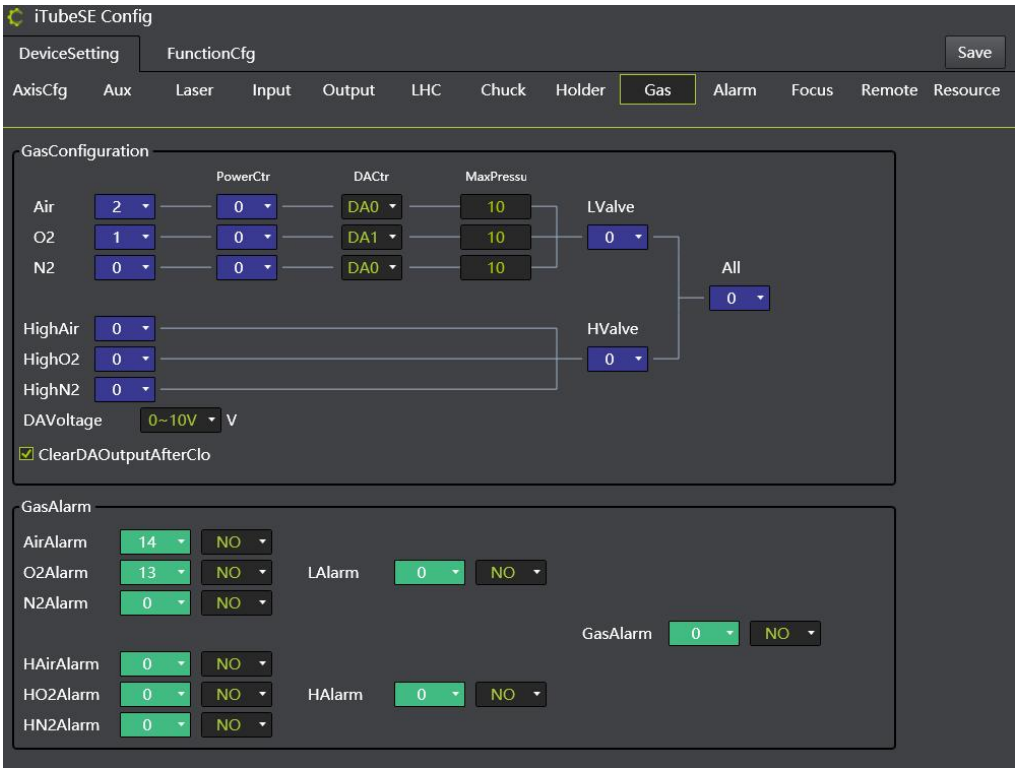


Figure 4.13 Gases

parameter	explain
master valve	Set up the output port number of the switch auxiliary gas main valve.
High and low voltage total valve	Set the switch corresponding to the output port number of the high and low pressure gas solenoid valve.
DA pneumatic control	Set the analog volume DA output port number for proportional valve pressure adjustment.
Proportional valve power supply	Set the output port number for controlling the power supply of the proportional valve.
Air, high-pressure air	Set the solenoid output port number for the control air.
Oxygen, high-pressure oxygen	Set the solenoid output port number for the control oxygen.
Nitrogen, high-pressure nitrogen	Set the solenoid output port number for the control nitrogen.

Maximum air pressure of the proportional valve	Set the air pressure of the proportional valve.
DA voltage range	Select the DA voltage range.
Gas alarm configuration	Select the input port number corresponding to the gas alarm, and you can configure the constant open and constant close type.

4.1.10 report to the police

Click the alarm input option to enter the alarm input configuration interface. In this interface, you can configure the emergency stop alarm, and customize some alarm information.

4.1.10.1. Common alarm

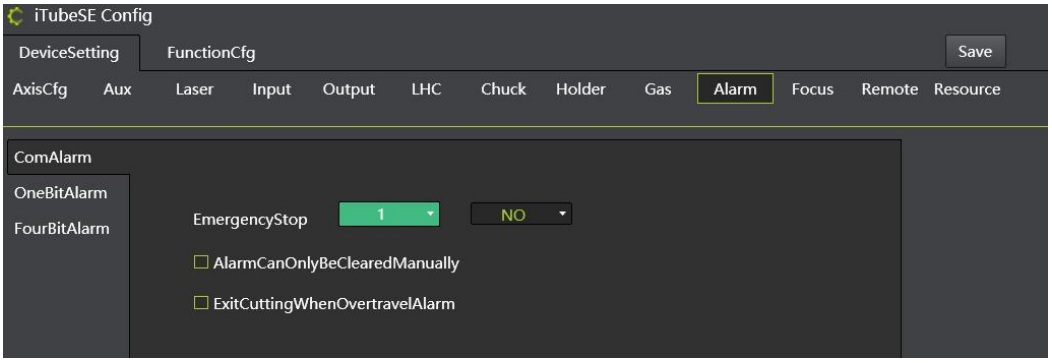


Figure 4.14 Common alarm

parameter	explain
scram button	Set the input port number of the emergency stop switch access and the constant open and closed type of the signal.
The alarm must be cleared	Check this option, and all the alarm messages must be

manually	cleared manually.
Exit the cut during the overtravel alarm	After checking this option, when the elevation regulator exceeds the travel alarm during the operation of the iTubeSE software, the system will automatically stop going out of the machining state.

4.1.10.2. Single input port alarm

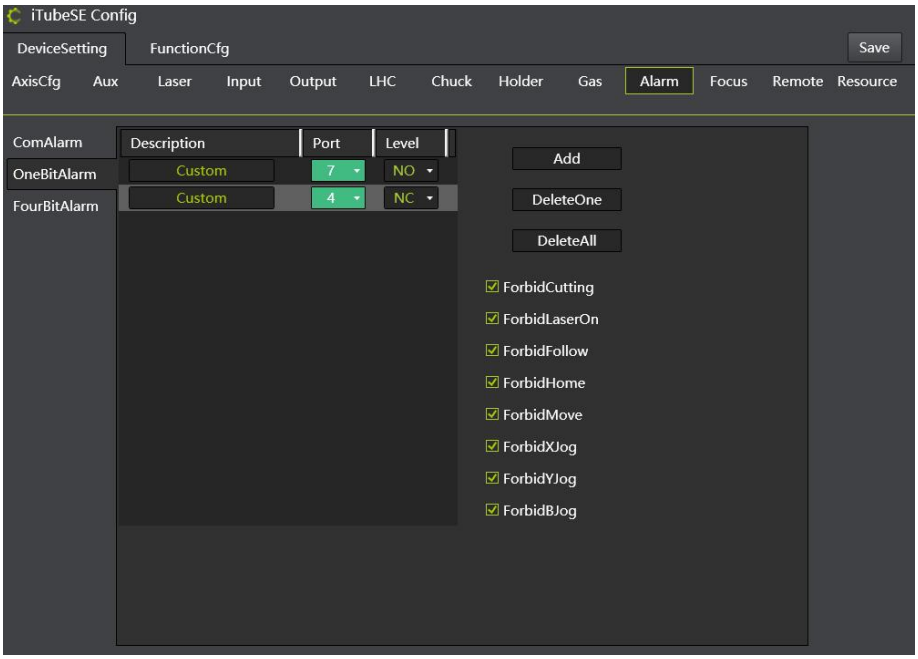


Figure 4.15 Single input port alarm

Enter the single input port alarm page to configure the alarm input port

parameter	explain
Alarm description	You can customize to input the alarm description, Chinese, numbers, letters can be.
Port, level	Set the current alarm input port number and the active and active closing type of the signal.
No processing /... / B point movement is not allowed	After the signal input for each alarm here, the software checks all the restrictions on machine tool processing and movement by default. It should be modified carefully here to

	avoid accidents.

Click Add to add an alarm input port; click Delete to delete a selected alarm input configuration; click Delete to delete all configured alarms.

4.1.10.3. Four encoding alarm

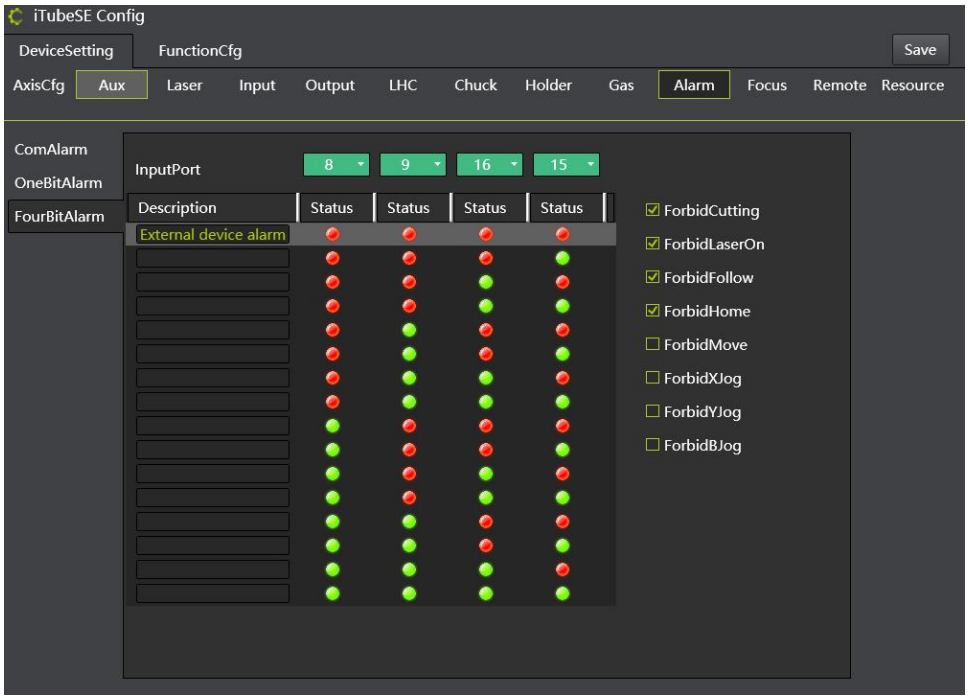


Figure 4.16 Four-digit coding alarm

Four coding alarm is similar to the single input alarm, the difference is that four coding alarm is controlled by four alarm input, four input signal combination, red represents no signal, green represents signal, for each alarm free configuration alarm, and the configuration of each alarm software limit behavior, the default all check, careful modification, to avoid accidents.

4.1.11 focal point

The laser focal axis related parameters can be configured, currently control focal axis and analog volume control focal axis through servo interface. After enabling the focus control, select the corresponding control

mode in the focus axis control mode.

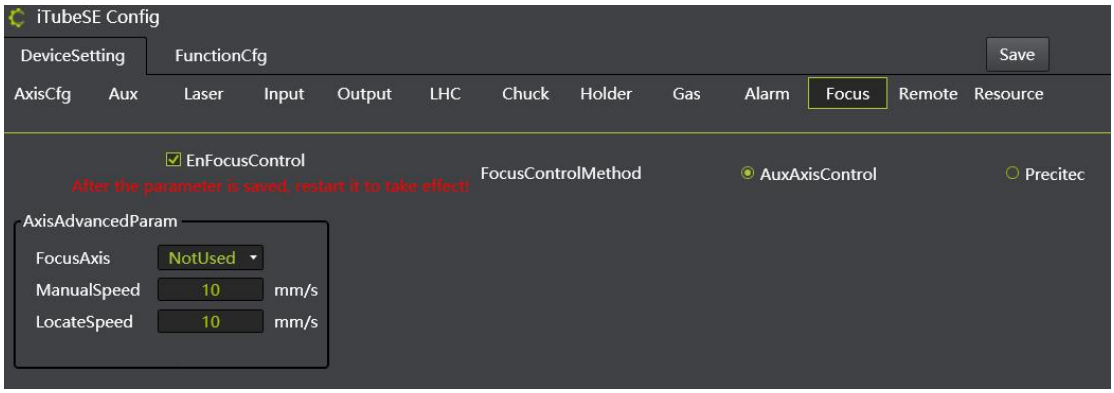


Figure 4.17 Auxiliary axis of control party mode

Auxiliary shaft control mode:

Select the focus axis used in the axis advanced parameters, and select the specific parameter configuration of the axis on the corresponding auxiliary axis page after completion.

parameter	explain
Manual speed	The maximum velocity when the focus axis is positive or negative.
Positioning speed	Max speed when positioned to the specified location.

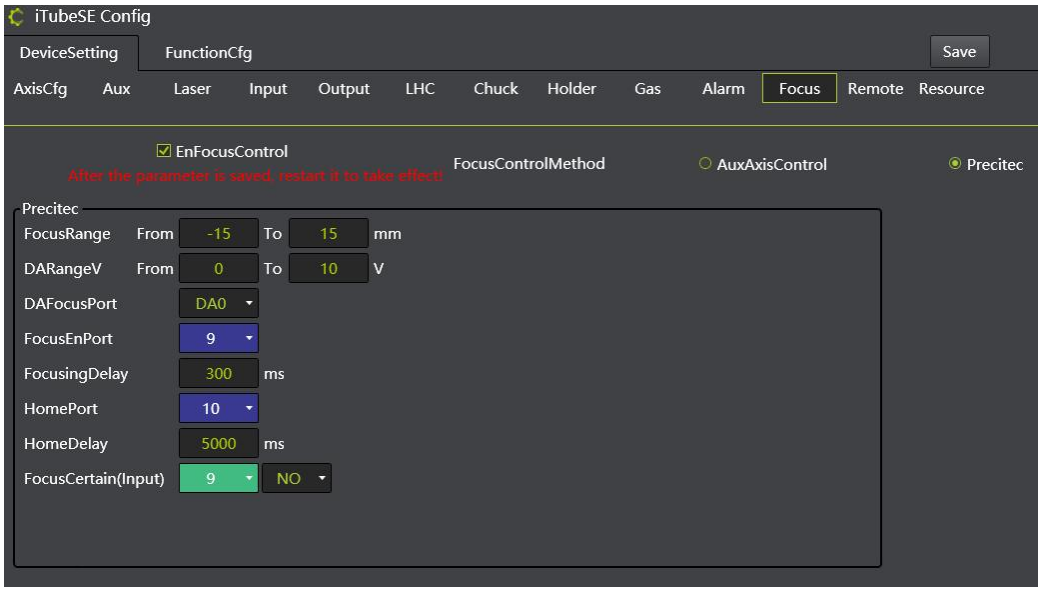


Figure 4.18 Precitec analog quantity control mode

Precitec Analog quantity control mode:

parameter	explain
Focfocus adjusted maximum range	Maximum range during positive and negative motion of the focus axis.
DA voltage range	The range of the DA port output voltage that is proportional to the above focus range.
Focus DA port	DA port serial number, DA1-4.
Focus enables the output port	After the focus enabling output port is configured, the enabling output port needs to output the signal first, and the focus axis will move according to the DA voltage value. If the enabling signal is not output, the focus axis will not move.
Zoom delay	Delay before the focus axis.
Return to the origin output port	After configthe output back to the origin, the output signal first, and the focus axis will perform the action back to the origin, otherwise the focus axis will not perform back to the origin.
Back to origin delay	Extend the focus axis back to the origin first.
Focus determination input port	After the focus determines the input port, when the focus axis is moved in place, the focus axis is in place after receiving the confirmation signal, otherwise the system will wait for the focus axis to move in place.

4.1.12 telecontroller

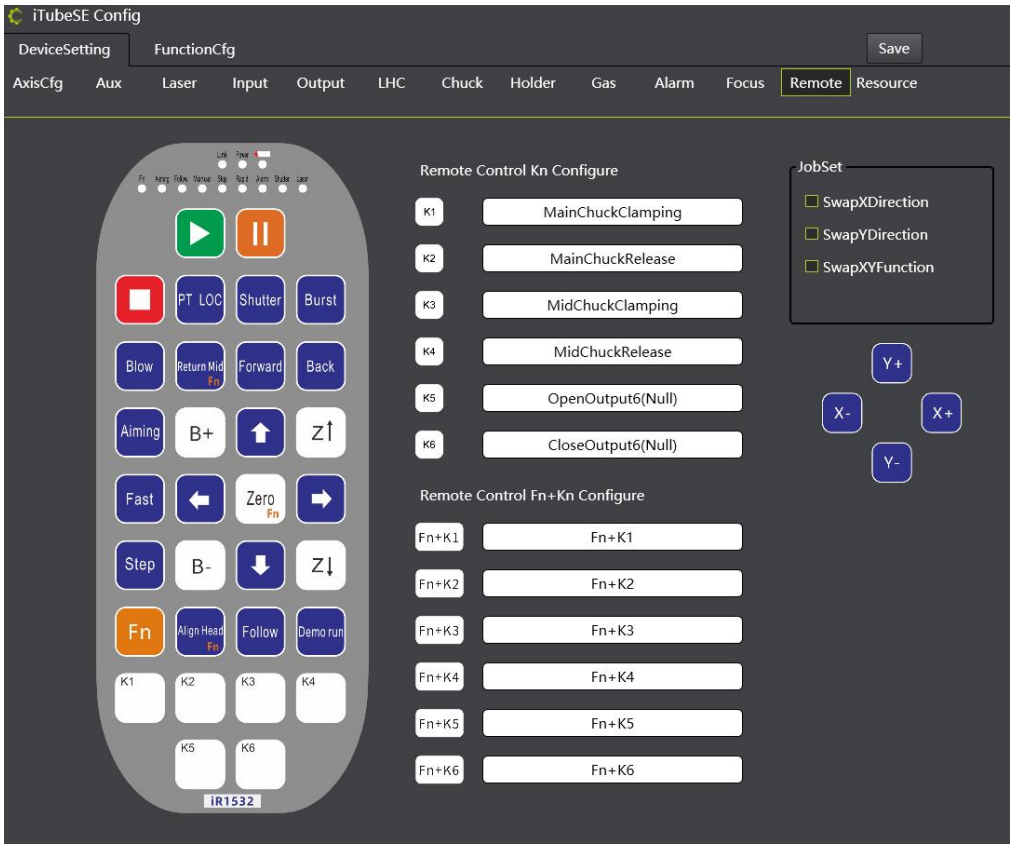


Fig. 4.19 Remote control

In this interface, you can add custom functions to the K1-K6 button and the Fn + K1-K6 of the remote control, and right-click the button in the box to add functions to the custom button of the remote control.

X-axis orientation interchangeably	In order to adapt to different equipment placement, support can modify the direction of remote control X + and X-buttons here;
The Y-axis direction is interchanged	In order to adapt to different equipment placement, support can modify the direction of remote control Y + and Y-buttons here;
X and Y function functions	In order to adapt to different equipment placement, support to modify the direction of remote control X and Y buttons here;

4.1.13 List of resources

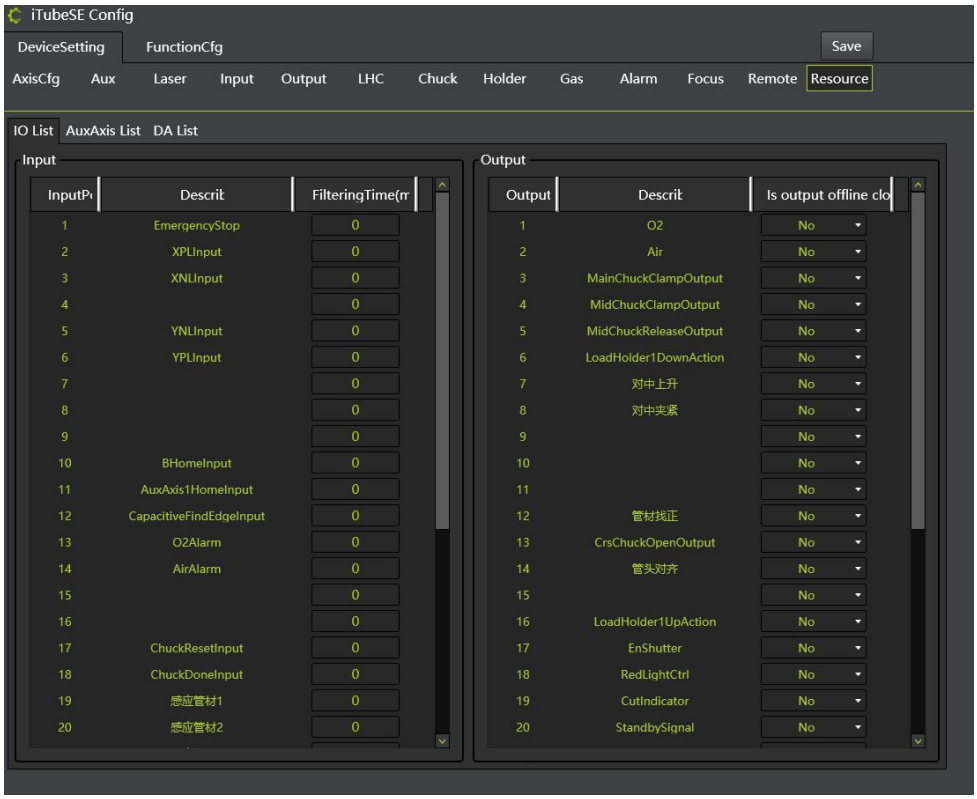


Figure 4.20 IO List

The configured IO port and corresponding functions are displayed to facilitate users to see which resources have been used

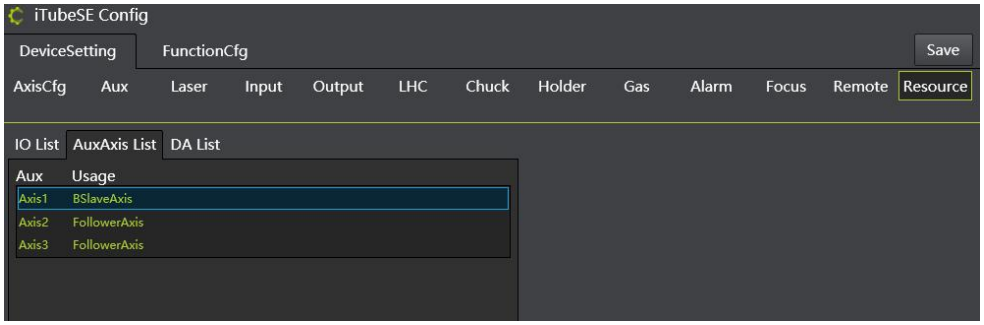


Figure 4.21, a list of auxiliary axes

List the usage of the auxiliary shaft

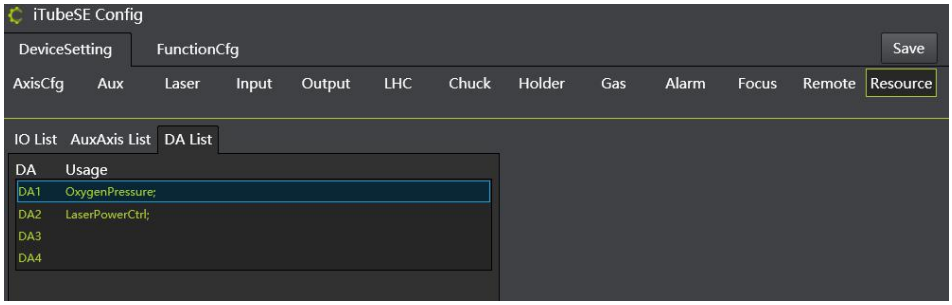


Figure 4.22 The DA list

List the DA usage

4.2 Functional configuration

4.2.1 Cross card plate

The current supported cross-drive mode is: medium card movement, cut gun movement

Medium card movement: lift the elevator up, move the medium dial forward when in place, and then cut the pipe between the main disc and the middle dial; support cylinder control and servo shaft control.

Cut the gun to move: lift the elevator up, cut the gun back after being in place, and then cut the pipe between the main disc and the middle chuck; only support servo shaft control.

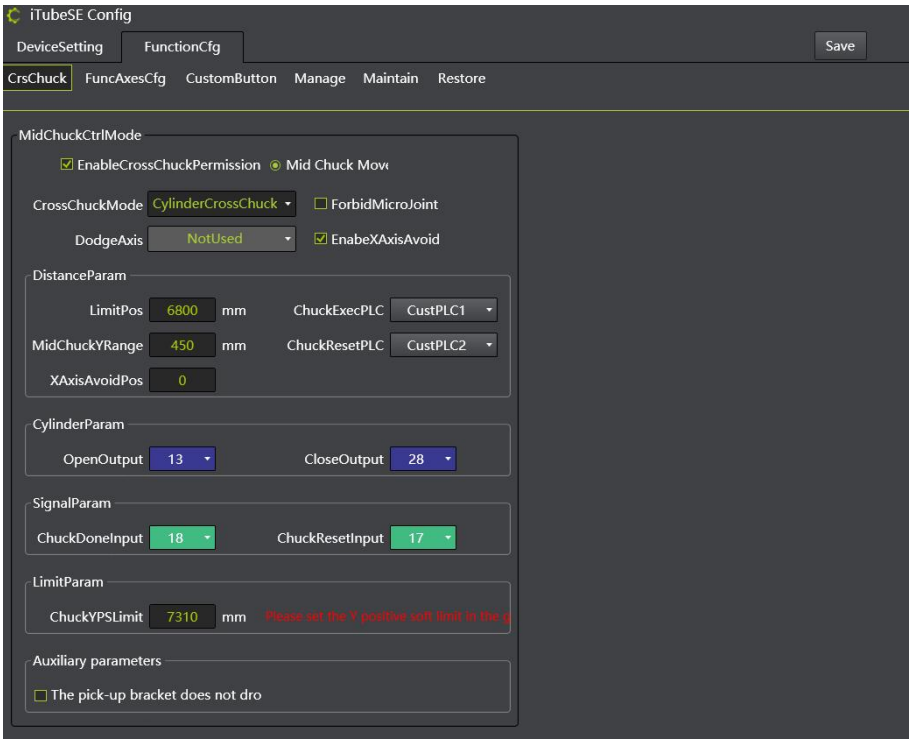


Figure 4.23 Cross-drive drive

Cross-tray related parameters:

parameter	explain

Enables cross-drive permission	Open the cross-drive function, check to configure the lower parameters.
Trigger coordinates	According to the configured trigger coordinate parameter, the system will execute PLC action at the trigger coordinate position or across the drive in advance.
Avoid the axis Y to travel	That is, the stroke that pushes the middle dial forward / cuts the gun backward.
X-axis avoids mechanical coordinates	The X-axis before the drive will move to this coordinate to ensure that the head does not hit the cartridge
PLC across the drive	The system triggers the cross-drive action and performs the custom PLC, including the docking of the elevation regulator, opening the output port, waiting for the input port signal, etc. The custom PLC should be configured in the iTubeSE software PLC.
Reset the PLC across the card drive	After the cross-tray process is completed, the PLC action during manual or automatic reset includes the docking of the elevation regulator, closing the output port, waiting for the input port signal, etc. The custom PLC should be configured in the iTubeSE software PLC.
Open the output port	Configure the cylinder to open the output port serial number. Servo shaft control does not require a configuration
Close the output port	Configure the cylinder shutdown output port serial number. Servo shaft control does not require a configuration
Cross-dial signal	Configure the place input signal number for cross-drive action. Servo shaft control does not require a configuration
Reset the signal across the card drive	Configure the place input signal number for the cross-dial reset action. Servo shaft control does not require a configuration

Y positive soft limit	That is, after the cross-drive PLC action is triggered, the positive soft limit value of Y axis should increase. The positive soft limit value of Y axis can be modified here.
Cross the disc after the pickup bracket does not drop	It is not enabled by default, and the pickup bracket will not drop after crossing the drive

4.2.2 Custom button

Configure the button function. After the configuration is completed, the corresponding functions can be displayed on the main interface, and the user can put the common functions here

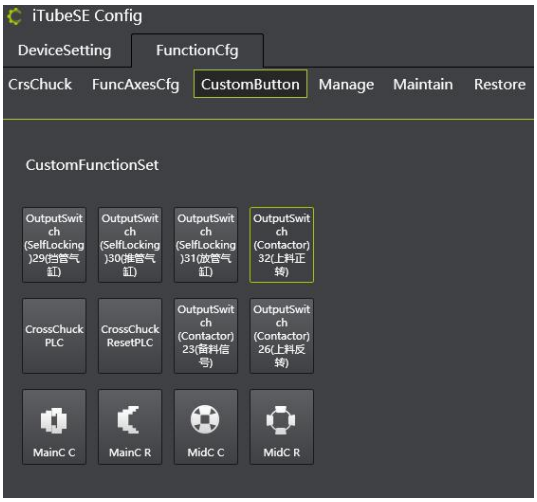


Figure 4.24, Custom button

Right-click on the corresponding button to display the configurable function entry and select the desired entry.

4.2.3 manage

On the management page, the software language can be selected; the control card IP can be set; the watchdog parameters are set; and the user login password can be changed.

You can customize the boot screen, click the "boot screen" button, you can select the picture, you can choose the startup style of light font or dark font; you can customize the icon configuration

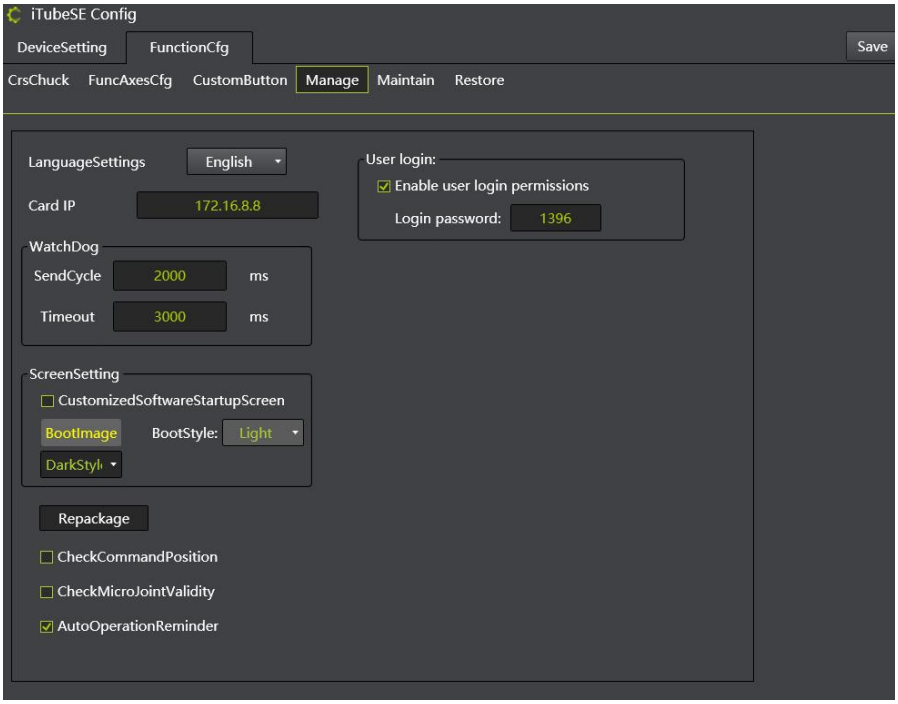


Figure 4.25 Management

parameter	explain
Send cycle	The interval between sending the dog feeding message.
Timeout time	The lower computer determines the timeout time of the upper computer disconnection (that is, the interval between the last message received is greater than the timeout time, the upper computer is considered disconnected).

4.2.4 take good care of ones health

Here, you can enable the machine tool for automatic lubrication, through the lubrication and maintenance of the machine tool;

The machine tool regular maintenance reminder function can customize the maintenance content, cycle and reminder mode. After reaching the specified period, the system will automatically remind the user to carry out the machine tool maintenance in the specified way. The added reminders can also be easily viewed in the monitoring tool of the main software.

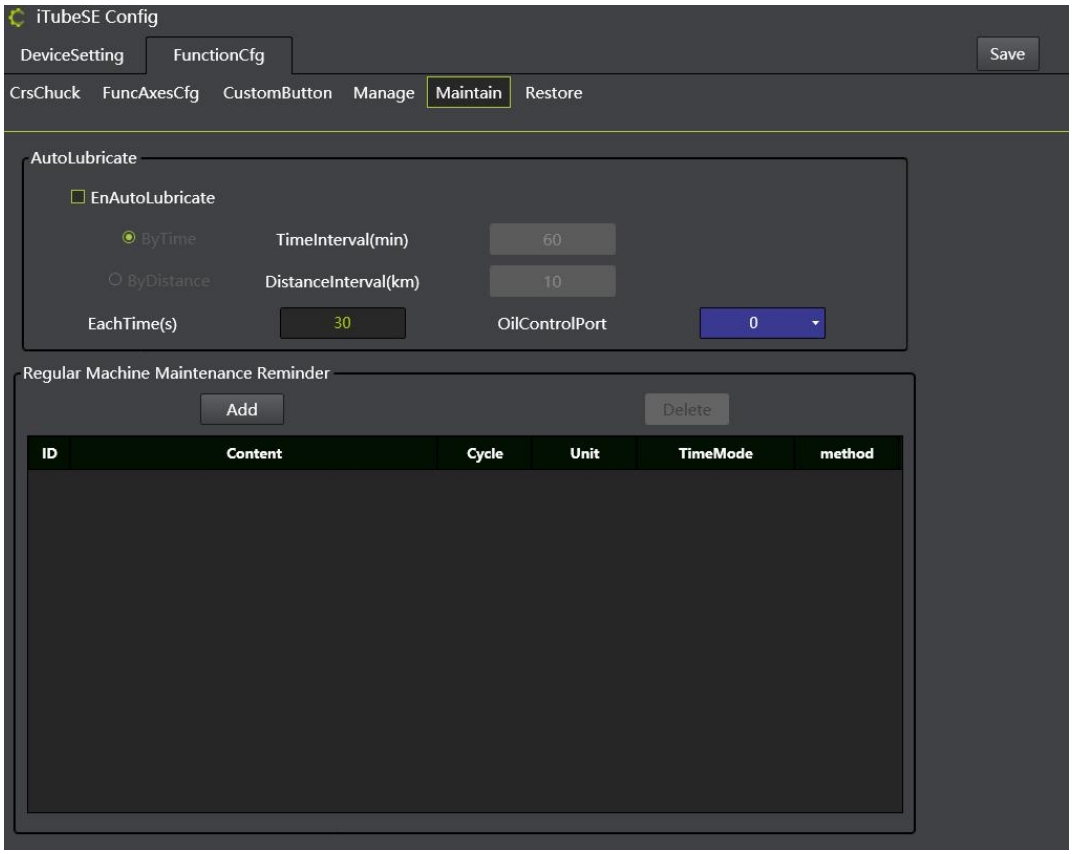


Figure 4.26 Maintenance

After enabling automatic lubrication, select lubrication by time or distance. By time, lubrication refers to the automatic lubrication of the machine for each set time interval, and the automatic lubrication according to the distance.

4.2.5 Backup / Restore

Here you can restore the backed up files and check the parameters to be restored.

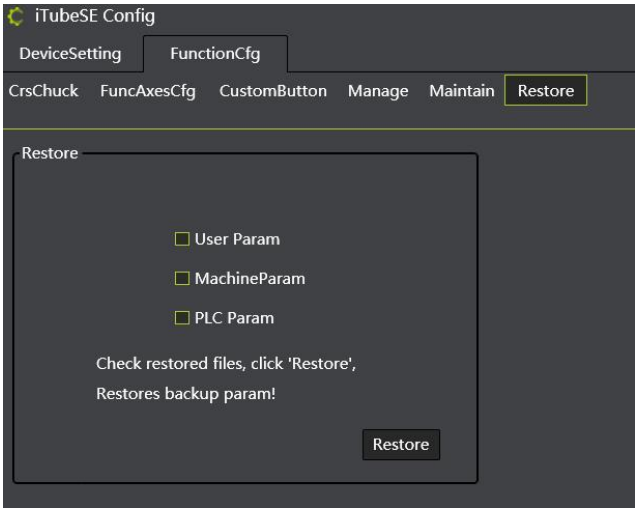


Figure 4.27, Backup / restore

Check the parameters to be restored, then click restore, the file selection dialog box will pop up, select the cutting software backup. The itu file can be restored. After required to restart the software resolution parameters.