Fangling CNC cutting machine control system

F7600 Series CNC Cutting System Use Instructions (V2.5)

ShangHai FangLing Com puter Software Co.,LTD

In September, 2021

Table 1 Revision modification fications

version number	date	Modify the instructions	Modify the author	remarks
V1.0	2017.7.1	Initial version	Hu Zhiqiang	
V1.1	2018.5.1	The V1.0 version was revised	Yin Wenlou	
V1.2	2018.8.22	Update the interface picture. Added a description for calling the FLCAM function. Description for increasing the network disk function. Added task save and load feature descriptions.	Yin Wenlou	
	2018.10.31	Add wiring instructions for Y-axis dual drive.	Yin Wenlou	
	2018.12.10	Add the content of the manufacturer's backup and restore. Improve the content authorized by manufacturers	Yin Wenlou	
V2.0	2019.04.16	Add the wiring with the FCB1200PC Add the wiring instructions to the remote control, F1510,1520 Add the F7600 series (models include: F7600W-DE, F7600W-IN, F 7600WF-IN, F7600S-DE, F7600S-IN, F7600SF-IN)	Hao Qian	
V2.1	2019.06.06	Add the double-car interface and configuration instructions Add the governor configuration instructions Add new button function description (joystick calibration, shutdown, restart shaft card, etc.) Update section, the interface picture	Shi qianyang	
V2.2	2019.08.07	Add the function of visual waste material cover material Add the visual surplus material calibration function Increase the drilling and cutting function	Zhao Chaojie	
V2.3	2019.10.29	Increase edge search function Add the code-jet printer function	Zhao Chaojie	
V 2.4	2020.09.02	Added to the F1219F back wiring instructions		

		Add the F1219F aviation plug internal wiring diagram		
V 2.5	2021.09.20	Version V 2.4 for revision	Wang Chen	

Precautions

Read the manual

This specification is applicable to the F7600 series CNC cutter control system produced by Shanghai Fangling Computer Software Co., Ltd.Please read the instruction manual and local safety regulations carefully before use.

The technical and hardware parameters involved in this manual due to continuous improvement are subject to modification without notice.If you have other questions or opinions about this product, which are not detailed in this specification, please consult timely. We will be happy to answer your questions, suggestions and criticisms.Thank you again for your choice and for your trust.

This product is not designed for site maintenance. for any maintenance requirements, please contact:

Sales: + 86-21-34290970

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Environmental requirements

- The CNC system is suitable for ambient temperature of 0℃ to 50℃, relative humidity of 5-95% without condensation.
- Operating voltage is DC + 24V.
- This controller shall be installed in the console enclosure protected against dust.
- This system is best used away from high radiation conditions such as high pressure and high frequency.

Maintenance

- Hands and feet away from moving machines, control operation or manual can be performed through the front panel keyboard.
- When operating the machine, you should not wear loose clothes and wired ropes to avoid being entangled by the machine.

- The equipment shall be and shall only be operated by trained persons.
- Not authorized by the company, it is strictly prohibited to dismantle the machine independently.
- When using, do not splash acidic, alkaline, corrosive and other items on the control system.

high-handed

- Electric shocks can kill people.It must be installed in accordance with the specified steps and requirements of the packing parts.
- Do not contact the wires and cables when the power supply is switched on.
- The equipment shall be and shall only be operated by trained persons.

catalogue

Chapter 1 F7600 Control System Introduction

1.1 System profile

F7600 series CNC system absorbs the advantages of many domestic and foreign CNC system, and refer to the company F 2000 series, F3000 series and F5000 series system, developed a more perfect function, more powerful performance, more convenient to use the CNC system.The product uses multi-axis digital position control, supports up to 6 axis linkage, among which 4 axes have position monitoring function.Suitable for all CNC machine tools using the position control mode.Such as oxygen and gas, plasma, laser cutting machine tools.

The F7600 controller operates on the linux real-time operating system.Equipped with Cortex-A8 chip and super-large-scale programmable device FPGA.Combine software and hardware.The company has been engaged in CNC system research for many years, on the basis of the original track planning, speed foresight and corner control, introduced the machine tool S-type increase and deceleration and B spline insertion technology, making the machine tool control more stable and the protection mechanism more perfect.

1.2 System characteristics

- Integrated standard graphics library, up to more than 90 kinds.
- Support EIA code and FLCAM, Fastcam, SigmaNest and other packaging software.Support for the suffixes TXT, CNC, NC, MPG, B3 and other G code formats
- Support for ESSI code common instructions
- USB standard keyboard and mouse support
- Graphic scale, rotation, mirror image, arrangement, etc
- Add the cut seam, the original size of the workpiece and the belt cut seam size are displayed at the same time, intuitive and convenient
- Graphical steel plate correction, laser positioning
- Customizable coordinate system that supports all eight possibilities of two-dimensional coordinates
- Edge cutting, to reduce the preheating time of the thick steel plate
- Both input and output port functions and port types (often open and closed) can be customized,
- Oxygen and gas, plasma, powder injection, demonstration and other modes
- Corner automatic speed limit, effectively prevent the machine tool shaking

- Starting row and perforation number, freely optional.
- Dynamic / static processing graphics display, graphics zoom in / out, zoom in state, dynamic tracking of cutting points
- Rapid adjustment of common parameters, real-time acceleration and deceleration in exercise, etc
- Power off, breakpoint memory protection function
- Processing piece meter, running time, perforation times and other information statistics
- Support for the U disk offline upgrade
- Classified management authority to facilitate the manufacturer management
- Operation statistics and real-time status display of the system
- Support USB mouse and keyboard, touch operation, more human human-computer interaction
- Support network data transmission, realize system networking, real-time monitoring operation (subsequent upgrade support)
- Multiple communication interfaces including CAN, RS485, RS232, etc
- Support for encoder feedback to achieve finer cutting
- Support the Longmen bilateral drive algorithm

1.3 qualification

- Number of linkage axes: 2 linkage (maximum to 6)
- Control accuracy: ± 0.001mm
- Motor drive: pulse + direction
- Pulse frequency: 4M
- Running speed: 30m / min
- Power supply: DC24V DC power supply input, power greater than 80W
- Electrostatic test: ± 4KV
- Input and output: 16 input, 16 output, full optical coupling isolation
- System working environment: temperature-10℃ to + 60℃; relative humidity 0-95% no coagulation

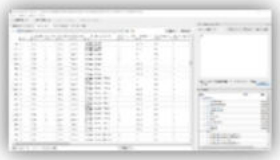
1.4 F7600 Series standard configuration

Table 1.1 Standard configuration of the F7600 Series

order number	product model	Configure the list	graphic
1	F7600W-DE (Splitter)	1.industrial control computer 2.Exercise control card	  (Industrial Control computer) (Motion control card)
2	F7600W-IN (All-in-One Machine)	1.19-inchcapacitive touch screen 2.industrial control computer 3.Exercise control card	  (19-inch touch widescreen) (motion control card)
3	F7600WF-IN (All-in-One Machine) - -F indicates the integrated front electric cabinet and the multi-cut torch control board	1.Integrated front power cabinet (including 19-inch wide touch screen and operation panel) 2.industrial control computer 3.Exercise control card 4.Cut the torch control board more	  (Integrated front power cabinet) (Motion control card)  (Multi-cut torch control board)
Note 1: F7600W-IN all-in-one machine, mounted on the back of the 19-inch touch screen metal case Note 2: F7600WF-IN all-in-one machine, which is built in the integrated front electric cabinet Note 3: F7600WF-IN all-in-one machine, standard with 2 gun control boards.Control 3-4 guns, with expansion board, up to 4 guns independent control Note 4: The full series of F7600 supports touch screen and mouse operation, but another standard keyboard is required			

1.5 F7600S Standard configuration

Table 1.2 The F 7600S standard configuration

order number	product model	Configure the list	graphic
1	F7600S-DE (Splitter)	1.Industrial control computer 2.Movement control card 3. Hole parameter library	  (Industrial Control computer) (Motion control card)  (Small hole parameter library)
2	F7600S-IN (All-in-One Machine)	1.19-inch capacitive touch screen 2. Industrial control computer 3. Movement control card 4. Hole parameter library	  (19-inch touch widescreen) (motion control card)  (Small hole parameter library)
3	F7600SF-IN (including all-in-one machine with integrated front electric cabinet and multi-cut torch control panel)	1. Integrated front electric cabinet (including 19-inch wide touch screen and operation panel) 2. Industrial control computer 3. Movement control card 4. Multiple cutting torch control plate 5. Hole parameter library	  (Integrated front power cabinet) (Motion control card)  (Multi-cut torch control board)  (small hole parameter library)

Note 1: The F7600S-IN all-in-one machine, with the IPC back hanging on the back of the 19-inch touch screen metal case

Note 2: F7600SF-IN all-in-one machine, which is built in the integrated front electric cabinet

Note 3: F7600SF-IN all-in-one machine, standard with 2 gun control boards.Control 3-4 guns, with expansion board, up to 4 guns independent control

Note 4: The full series of F7600 supports touch screen and mouse operation, but another standard keyboard is required

Chapter 2 System boot

2.1 Description of system startup and main interface

After the system is started, the welcome interface is entered, as shown in Figure 2.1.Pictures in the welcome interface can be upgraded to user pictures.When "press any button to proceed next...", press any button, the system enters the main interface.The main interface of the system for the F7600 series is shown in Figure 2.2.

Figure 2.1, Welcome interface

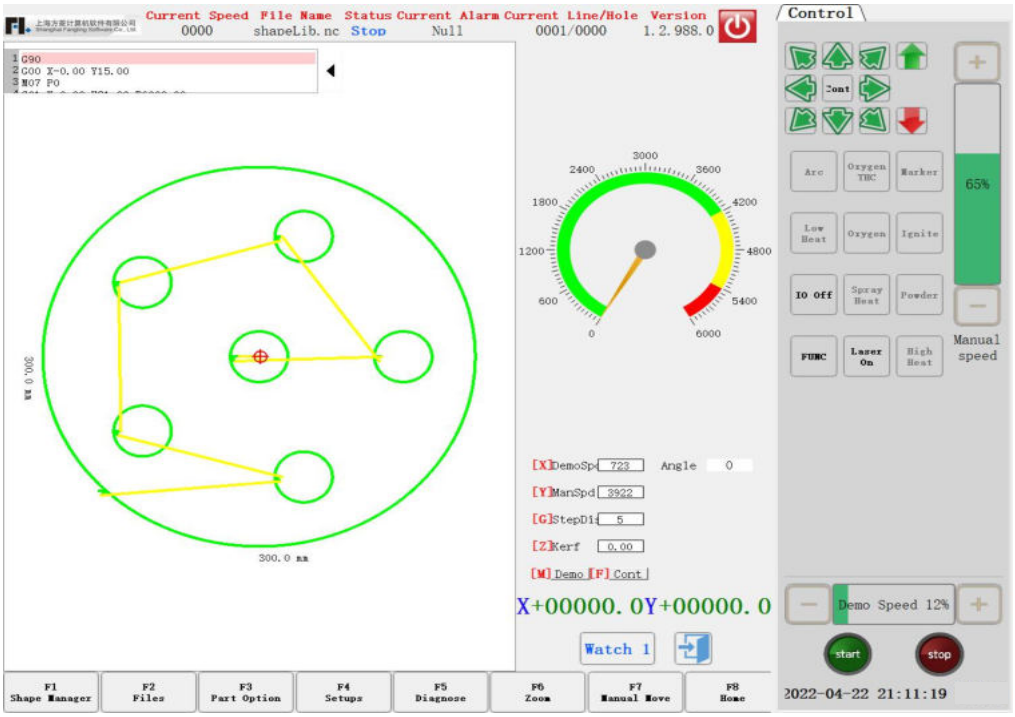
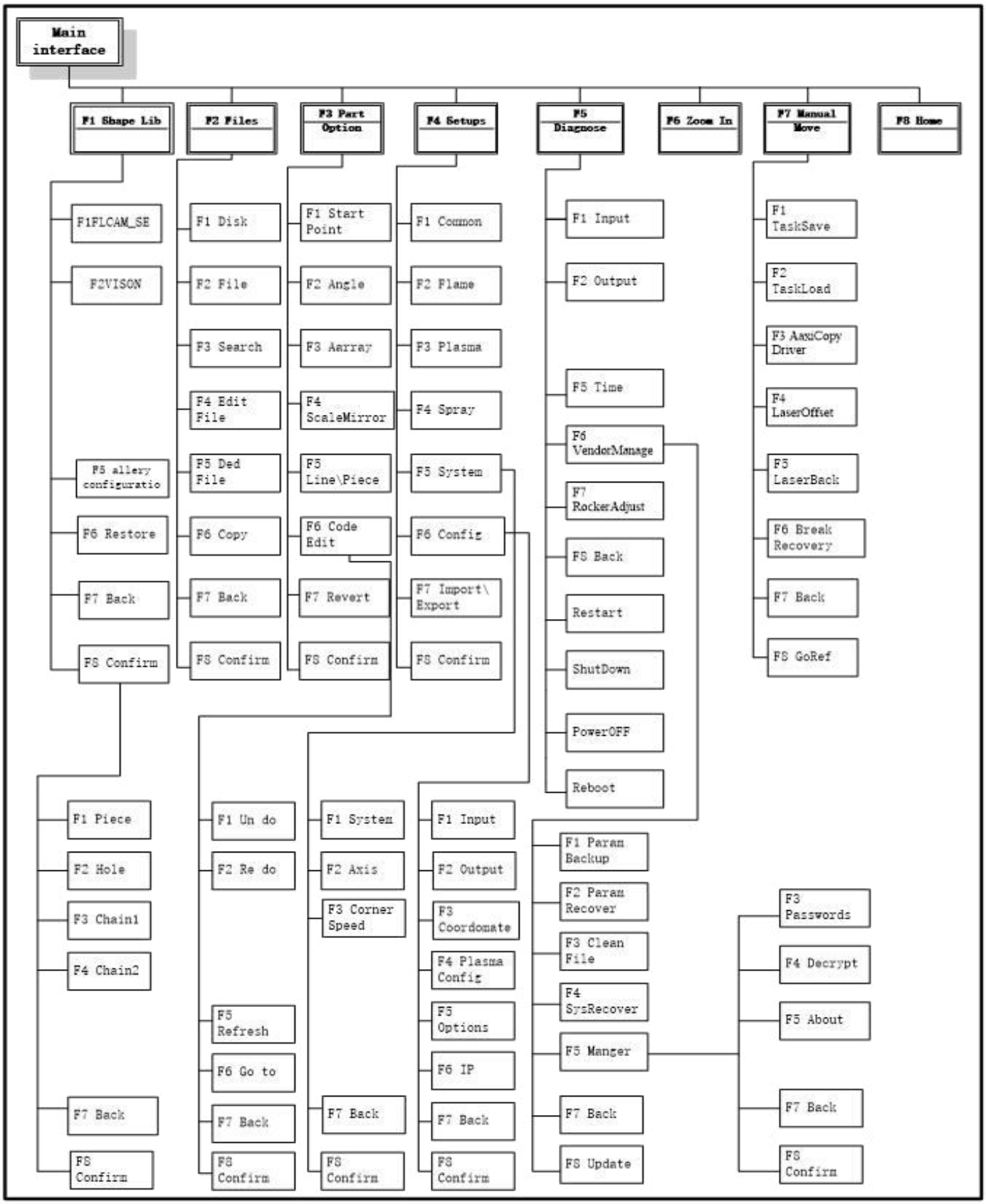


Figure 2.2 Main system interface of the F 7600 series

Under the main interface, press [F1] - [F8] to have the following functions:

- [F1] Graph management: composed of dozens of commonly used parts, most have piece size and hole size

- [F2] File management: enter the optional hard disk files, excellent disk files, find, edit, delete, file import and export, preview graphics and other operations.
- [F3] Part management: mirror the processed parts, rotation, steel plate correction, arrangement, line selection, code editing, etc.
- [F4] Parameter settings: All parameters can be set here.
- [F5] System diagnosis: input and output diagnosis, date and time setting, and manufacturer management.
- [F6] Scale-up the figure: enlarge the cutting figure.
- [F7] Manual shift: manually move the machine tool, this interface can be power off, breakpoint recovery operation, and laser gun bias operation, etc.
- [F8] Zero: after the machine tool starts cutting money or cutting completion, the coordinates can be zero.
- [X]: Set the cutting speed.
- [Y]: Set the manual moving speed.
- [F]: Set the manual moving mode, can be set into the point movement, connection and fixed length of three ways.
- [G]: Set the moving distance of the fixed car.Description: Press G to modify the length distance number and automatically shift to the length mode.
- [Z]: The slit size can be set before the cutting run begins or after the cut ends.
- [M]: Set up the cutting mode, with demonstration modes, oxygen and gas cutting, and plasma cutting modes.
- [START]: Start the cutting.
- [STOP]: Pusing the cutting.
- [Space]: Go to the cutting interface.



2.2 Main interface function index

Figure 2.3 Main Interface Function Index

Chapter 3 Cutting function

As shown in Figure 3.1, press the Space key at the main interface to enter the cutting interface, as shown in Figure 3.2 below

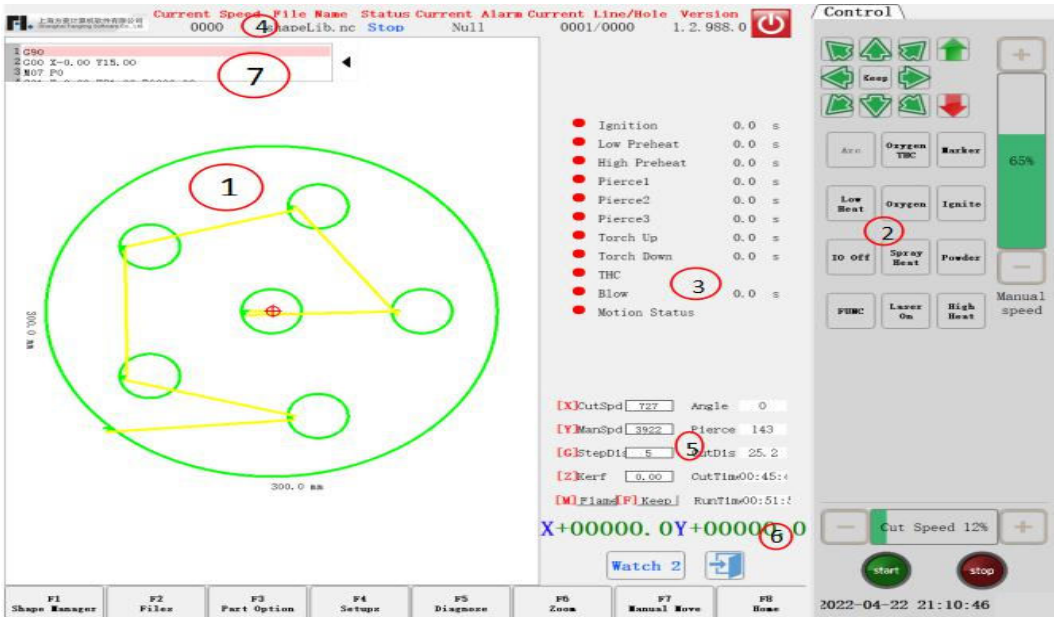


Figure 3.1 Main interface of the F 7600 series

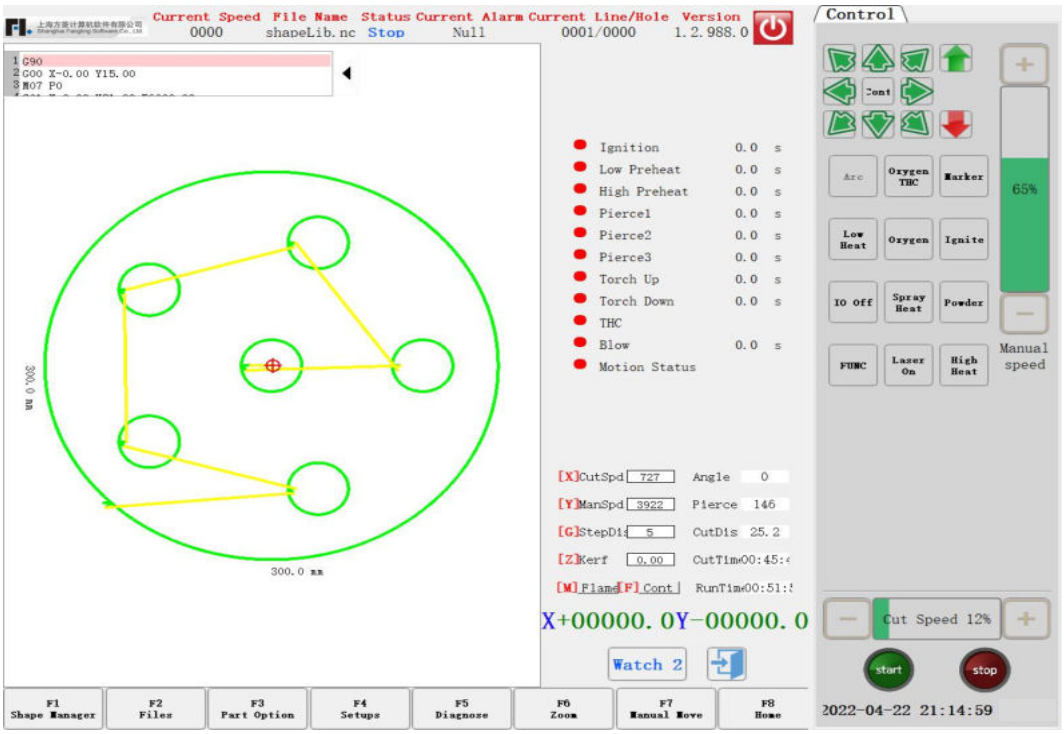


Figure 3.2 Cutting the main interface

- ①Displays the actual cutting track of the current workpiece with the cut values.
- ②The strong electric button operation panel of F7600 can open and close the

corresponding output port through the touch screen operation.

- ③Displays the status of the used input and output port used in the current cutting mode, real-time IO timing output.
- ④Displays the current real-time processing speed, running status, and processing files.In the processing process, the fast speed regulation can be realized by pressing the keys [1] - [9].For example, by pressing the number [3], the speed is automatically adjusted to 30%; by pressing the number [8], the speed is automatically adjusted to 80%.Either [F4] or [END] deceleration, [F5] and [HOME] acceleration.
- ⑤Displays the current cutting speed, and some parameters used for the cut, and some cut statistics.The previous letter of [] is a shortcut key, so you can quickly change the corresponding parameters.
- ⑥The absolute coordinate position of the workpiece where the current cutting torch is located.
- ⑦The currently executed G code whose status bar is a transparent form can be folded or expanded with an arrow on the right.
- [X] Modify the current cutting speed.
- [Y] Modify the current manual moving speed.
- [F] Change the current manual moving mode.
- [G] Modify the fixed length distance when the current fixed length moves.
- [Z] Before or after cutting, press [Z].
- [START] Start the cutting.
- [STOP] Stop and can suspend all actions in progress in the system.
- [F1] Back: the torch returns along the original path (when the I / O port is closed), and the perforation point will pause when falling back.
- [F2] Forward: The cutting torch moves along the cutting track (when the I / O port is closed).
- [F3] Go frame or [F 3] reference: just transferred the processing file, before the machine movement, here is the frame function, the machine tool will walk along the outer outline of the workpiece.After the machine tool movement, here for the return function, the machine tool will return to the workpiece zero coordinate.
- [F4] Slow down: reduce the cutting speed by 3% per every speed.Reduce the manual moving speed when moving cars manually.
- [F5] Acceleration: Increase the cutting speed by 3% for every lower speed.Increase the manual moving speed when moving cars manually.

- [F6] Reduce preheating: reduce the preheating time, skip the remaining preheating time, and the system automatically remembers the preheating time.
- [F7] Preheat increase: increase the preheating time for 15 seconds each time
- [F8] Selected perforation point: selected perforation point when the system is suspended and dynamic amplification after operation.
- Top, lower, left and right 4 direction keys: move the cutting gun manually.

3.1 Cut function index

Index diagram for the cutting interface as shown in Figure 3.3

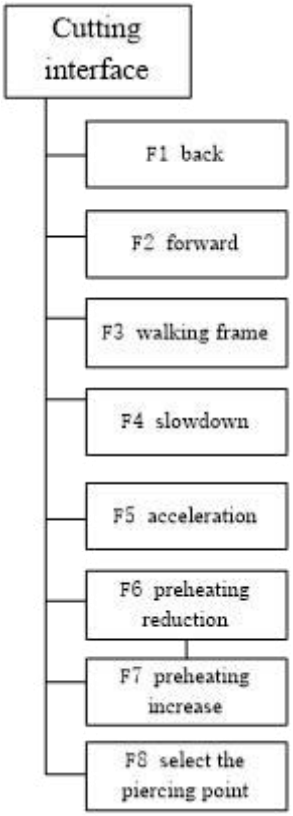


Figure 3.3 Cutting Operation Index

3.1.1 Normal speed regulation

Speed regulation can be performed at the cutting interface system during automatic operation or when the system is suspended.

Press [F5] or [HOME] on the operation panel to increase the speed by 3% over the current speed.By not pressing the [F5] or [HOME] policy, the speed will be continuously increased to the maximum cutting speed.

Press [F4] or [END] on the operation panel, the speed will be reduced by 3% at the current base. If [F4] or [END], the speed will be continuously reduced to 0.5% of the maximum cutting speed.

3.1.2 Fast speed regulation

Rapid speed regulation can be performed at the cutting interface during automatic operation, or when the system is suspended.

Under the cutting interface, press the number key [1] - [9] on the operation panel, and the speed is

quickly adjusted to 10 times the percentage of the corresponding number. For example, press the number [3], the speed is automatically adjusted to 30%; press the number [8], the speed is automatically adjusted to 80%.

3.2 advance

Cut pause or end, press [F2] in the cutting interface, and the system starts to empty away. This process does not have any IO switch process such as ignition or perforation, and move the cutting torch along the outline of the cutting figure.Press the [F2] or [STOP] key again, and the system stops running.

This function can also be used prior to cutting, when trying to see whether the cutting path is correct or whether the code is correct, or when the penetration situation is required during processing.

Forward and cutting speed are set separately, and is used in common parameters.

3.3 draw back

During processing, if the original track is required to return due to uncutting reasons, the following process can be followed:

Press [STOP] first to pause the cutter.

Press [F1] in the cutting interface, and the cutter returns along the original track. When the torch retreats, press [F1] or [STOP] again. If there is too much retreat, press [F2] to advance empty and then advance to the required position.

Note: Forward and backward functions can be repeated until the torch is ideal.

When the torch is in the ideal position, press [START] again. If the current cut code line is G01 or G02 or G03, the system will automatically punch before executing these programs, and then continue to run the current program. If the current line is not G01 or G02 or G03, the system directly performs the current line program.

3.4 Offset cut / cut return / just return

When the torch deviates from the actual path of the current machining, after pressing [Start] again, the prompt in Figure 3.4 appears:

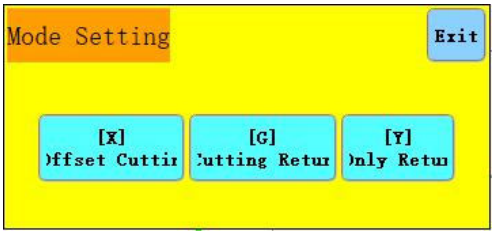


Figure 3.4, with the edge perforation

There are two situations in which this prompt occurs:

1. When selecting Yes, the system automatically stops if the G code of the next processing line is M07.At this point, you can manually move to any edge of the plate and press [Start], the system will appear in Figure 3..4
2. When processing is suspended, when the cutting torch needs to deviate from the track of the actual processing workpiece due to mechanical failure or other reasons, press [Start]..4
3. How to choose the description

1) Offset cutting: If [X] is pressed, the system considers the current point a pause point and continues cutting.The cutting point is offset.When the cutter is suspended or the power is off, if the torch has an offset, or the plate has a translation, or the user wants to offset cut, you can press this key.

2) Cut return: If [G] is pressed, the system cuts back to the pause point and then continues according to the original drawing.This function is particularly useful for thicker steel plates, reducing preheating time and improving cutting efficiency; it is a common edge perforation function.

3) Just return: If you press [Y], the system only quickly returns to the pause point, and then stops.When in the cutting process, the torch is found to have a fault or other problems, it is necessary to move the torch out of the cutting area for maintenance. Press this key when it needs to return to the pause point after the maintenance is completed.After returning to the pause point, press [Start] again, and the system automatically starts the cutting according to the original drawing.

3.5 Refer function

When the processing is suspended, if [F3] is pressed, the system will automatically return to the starting point of the processing workpiece, and the system exits the cutting state after returning to the origin.

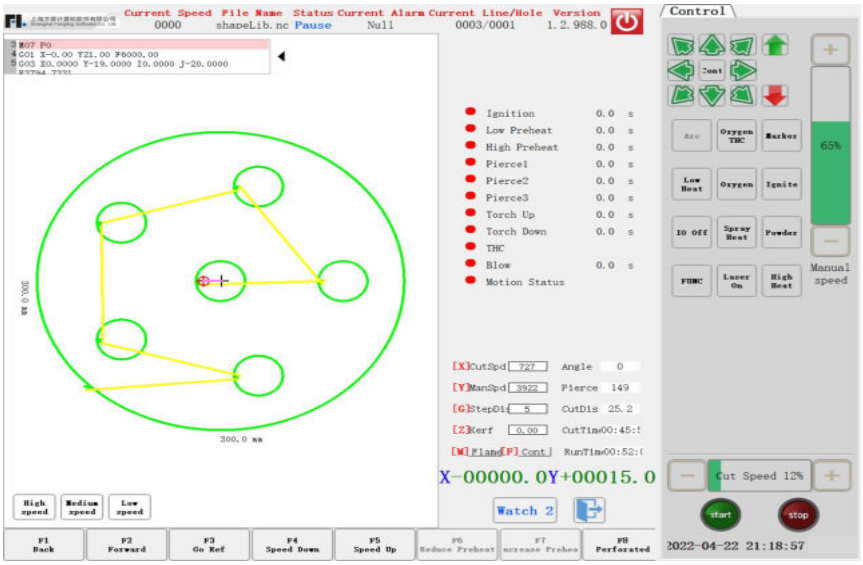


Figure 3.5 Cutting the main interface

During the return process, users can also press [Stop] to stop, and can continue to press [F3], or [Start] to start again.Return parameters and stops are not limited by the number of times.

3.6 Oxygen and gas preheating time adjustment

During preheating, press [START], or [F9], to directly skip the preheating and perforation delay process, and immediately open the perforation signal to start cutting.

During the preheating process, press [Stop] (namely [F10] key) to keep the preheating state until the [F9] key is pressed again, and the system continues to perform the cutting process.

During preheating, press [F6] to end the preheating and remember the preheat before encountering M02 or M30 code.

For example: such as the original system set preheating time for 60 seconds, when the need to preheating, there will be seconds on the interface, normally read 0, the system began to cut to run, but if the system read seconds left 10 seconds press F6, the system immediately stop preheating, start running, and record the preheating time is 50 seconds, the system automatically think the user need preheating time is 50 seconds, in the next preheating, preheating time to 50 seconds.

During the preheating process, the preheating time is increased by 15 seconds, and the later preheating time keeps the increased value until the cutting is finished.

For example, the preheating time set by the system is 60 seconds. During the system reading seconds, press F7, the reading seconds on the interface plus 15 seconds, and the next preheating time, the initial preheating time becomes 75 seconds.

3.7 Choose the perforation point

If [F8] is "Select the punch point", press F8 and the system will prompt

Figure 3.6, select the perforation points

Figure 3.6 If the ESC is pressed, the system returns to the cut interface.If you select F2, you are prompted to select the corresponding line number:

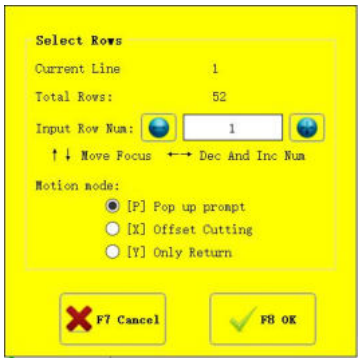


Figure 3.7, Line number selection

At this time, you can enter the line number manually and click [F8] to determine, then the system will cut from the selected code line.If F1 is selected, the system prompts prompt to select the corresponding hole number:

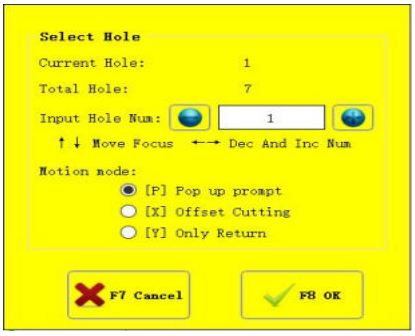


Figure 3.8, hole number selection

At this point, you can enter the hole number manually and click [F8] to determine, then the system will cut from the selected perforation point.

After selecting the row and the hole, you can choose the movement mode, that is, moving to the selected row or hole after the prompt box to prompt the next operation, or directly select the offset cut, just return the operation.

3.8 Dynamic amplification

After the processing begins, [F8] of the cutting interface will become "zoom". When press F8 key, the processing graphics will be enlarged in the drawing area and can be tracked dynamically tracked.

Figure 3.9 Cutting interface function keys during dynamic amplification

- Press the F8 key continuously, and the system will enlarge the graph step by step.
- Press ESC to exit the zoom display and return to the normal cutting interface.

3.9 Exit cutting

When the cutting is not complete, and the cutter is suspended, if the [Esc] key is pressed at the cutting interface, the system will prompt whether to exit the cutting.If [F8] is pressed to exit the cut, if [Esc] does not exit the cut, then continue the cut at the original position.

Figure 3.10 Exit cutting tips

3.10 Walk the border

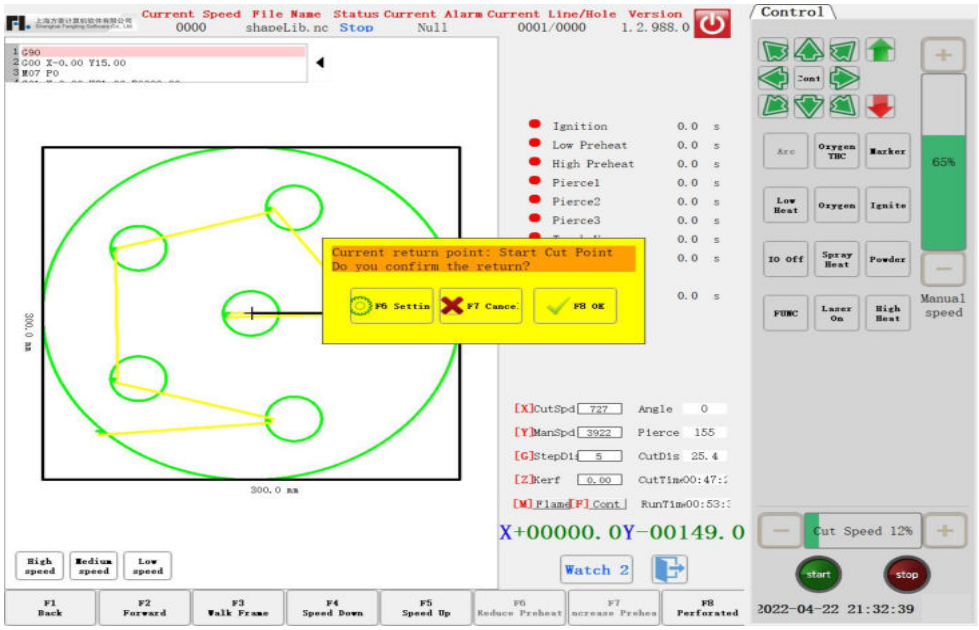


Figure 3.11 Walking along the border

Before starting processing in Figure 3.2, press the space bar [S pace] to enter the automatic processing interface. Then [F3] is the border function. After pressing F3, the system will walk counterclockwise along the black box shown in Figure 3.After walking, the system prompts you.11

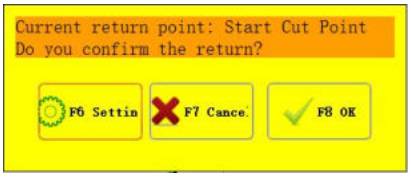


Figure 3.12 Return reference

Figure 3.12 Press F8, the system automatically returns to the starting point of the part. If ESC is pressed, the system stops at the current point. press F 6 to select the starting point (cutting end point, file processing starting point, machine zero point).

During the border process, you can also press STOP to pause the operation and press START to continue walking the border.Press [F3] again will return to the starting point.

3.11 Statistical information function

The statistical information function is used to record the perforation times, total cutting distance, cutting time and running time in plasma and oxygen gas mode.

Plasma cutting and oxygen-gas cutting are calculated separately.

3.11.1 Related statistics information:

Number of perforations: Record the number of perforations during cutting.

Cutting distance: Record the total cutting distance, in metric-m, imperial-ft.

Cutting time: Record the time during the cutting process.

Running time: record the cutting time + empty range time + M07 state time.

3.11.2 Statistics show

Under the cutting interface of oxygen and gas, the lower right corner will display the perforation times, cutting distance (unit: metric system- -m, British system- -feet), cutting time and running time in real time.As shown in Figure 3:.13

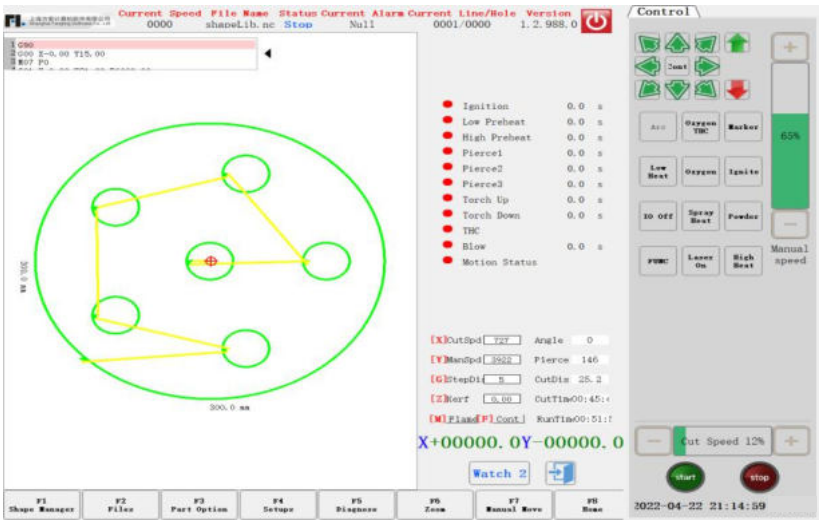


Figure 3.13 Oxygen-gas cutting interface

Under the plasma cutting interface, the lower right corner will display the perforation times, cutting distance (unit: metric- -m, imperial- -feet), cutting time and running time in real time.As shown in Figure 3.14:

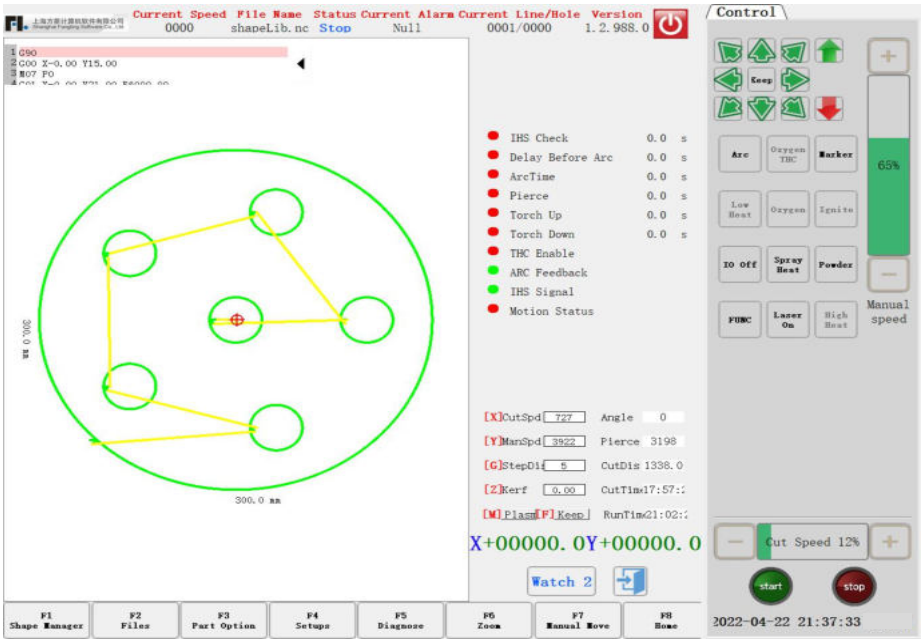


Figure 3.14 Plasma-cutting interface

At the cutting interface of non-plasma and oxygen gas, no statistical parameters are displayed, as shown in Figure 3.15:

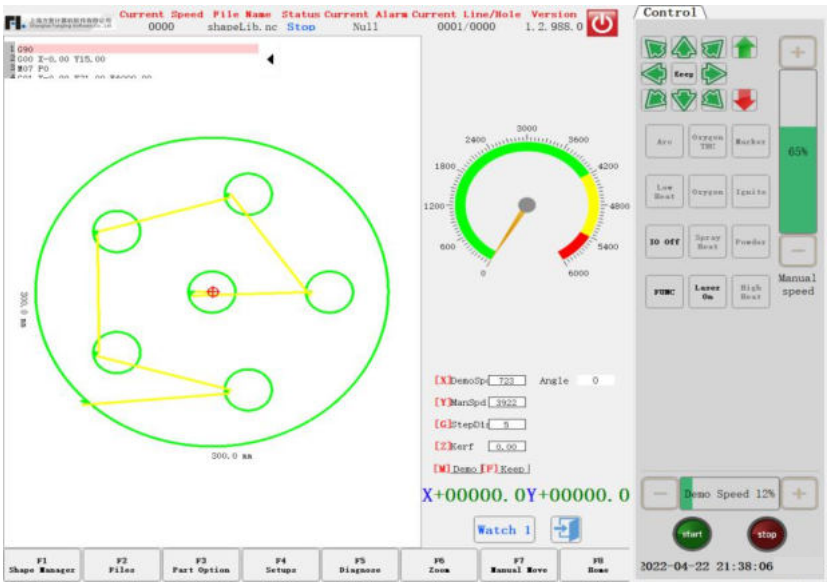


Figure 3.15 Non-plasma and oxygen gas cutting interface

Chapter 4 Graphics Management

Under the main interface, press [F1] to enter the gallery interface, as shown in Figure 4.1

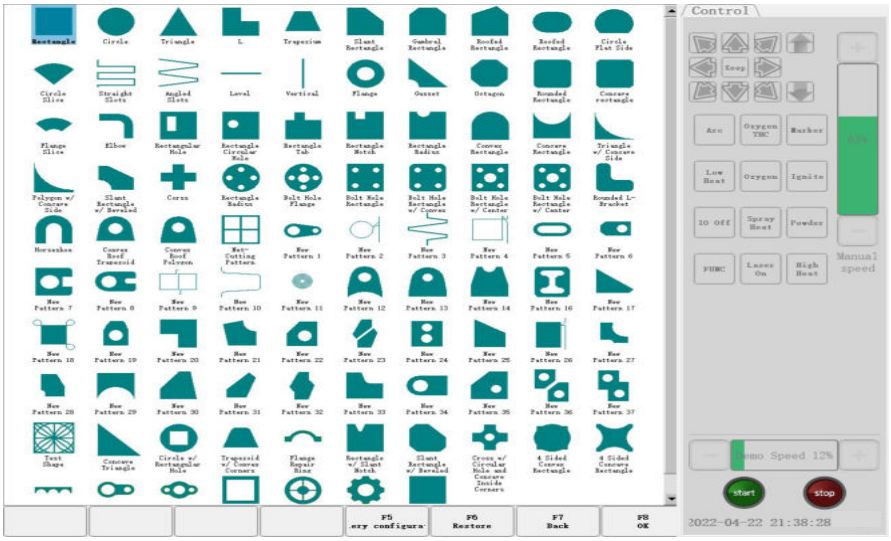


Figure 4.1 Gallery page

Under this interface, press [↑], [↓], [←], [→] to select different graphics, or select directly through the touch screen.The program saves the modifications to the drawing parameters.To restore the default drawing parameters, click the [F 6 Parameter Recovery] button.

4.1 Select the drawing

On the home page interface of the gallery, after moving the cursor to the desired graphics, press [F8] to confirm that the different graphics have two different interfaces, as shown in Figure 4.2

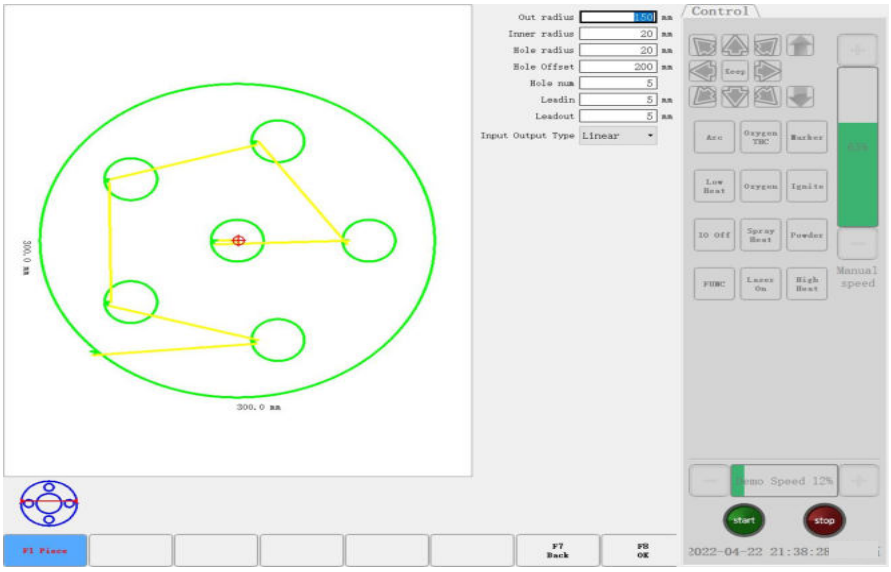


Figure 4.2 Size interface

The left side of the screen shows the actual rendering of the current drawing, and the length and width, and the right side shows some parameters involved in the current drawing, which can be

modified.Below the actual renderings, the reduced renderings appear, and the parameters of the current cursor are indicated.

By [↑], [↓], [←], [→] You can select the dimensions to be modified.After completing the [F8] confirmation, you can automatically enter the cutting function interface in Fig 3.1.

4.2 Sheet / hole size

.2In the size interface of Figure 4, the hole size interface can be accessed as per [F2], as shown in Figure 4.3

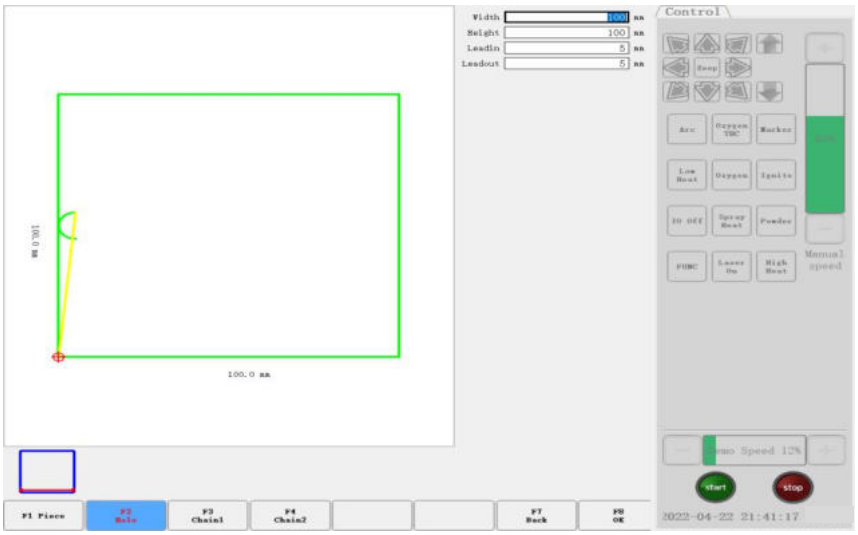


Figure 4.3 Hole dimensions

Modify the same piece parameter sheet size.After the modification, [F8] can also enter the cutting function interface in Figure 3.1.

4.3 Chain cut

This controller can realize the graphics library chain cutting function, chain cutting can reduce the perforation points, improve the cutting quality, flame cutting, reduce the number of perforation improve the efficiency.

4.4 Use the packing software, FLCAM

F7600 series system if FLCAM set software is installed.When clicking on the gallery interface, the FLCAM_SE button appears in the lower left corner of the interface, as shown in Figure 4.4.Clicking on this button will open up the FLCAM.

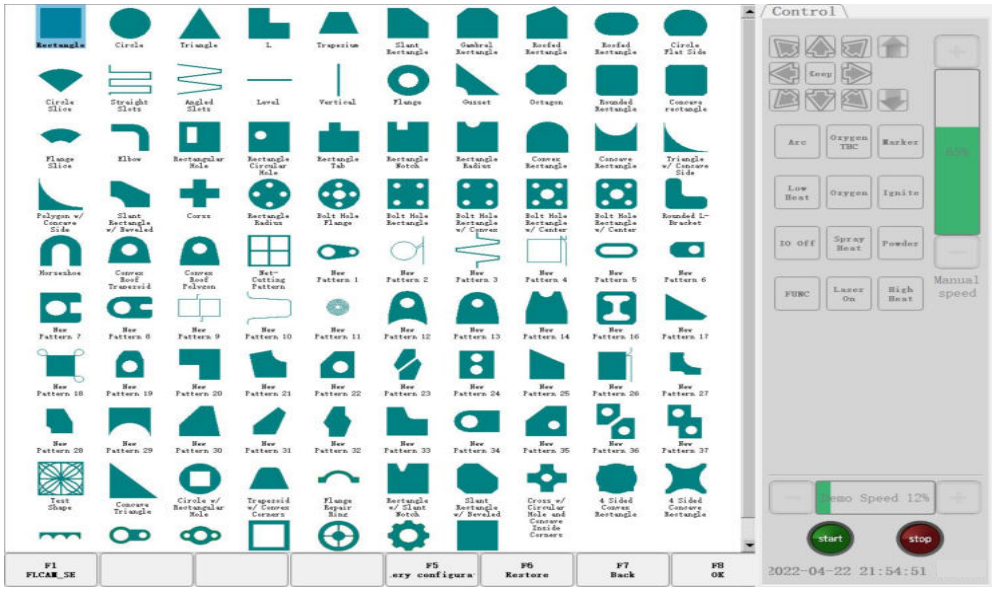


Figure 4.4 F7600 series gallery interface

After the customer edit the cutting drawing in the package software, click the [Export] button under the [File] menu to export the drawing to the FLCAM folder in the F7600 series program working directory (FLCAM directory of local 1).Then click the [Return to CNC] button under the [File] menu, and the desktop will return to the F7600 series operation interface.

Figure 4.5 The F L C A M _ S E menu button

When you return to the F7600 series operation interface, the program automatically switches to the file management interface.The file management interface opens with the FLCAM folder for the local 1.Select the exported file to be processed.

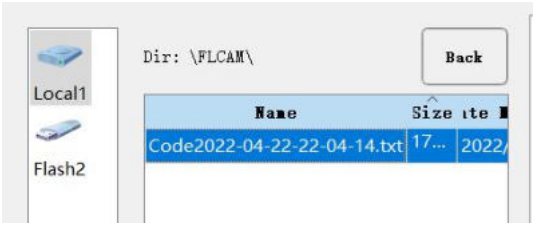


Figure 4.6 Select the FLCAM exported file

Chapter 5 file management

The cutting file formats supported by this system include txt, cnc, nc, B3, MPG, etc.The system can not only edit existing files, but also export existing files, or import external files into the system.

Press [F2] under the main interface to enter the file management interface, as shown in the figure below.

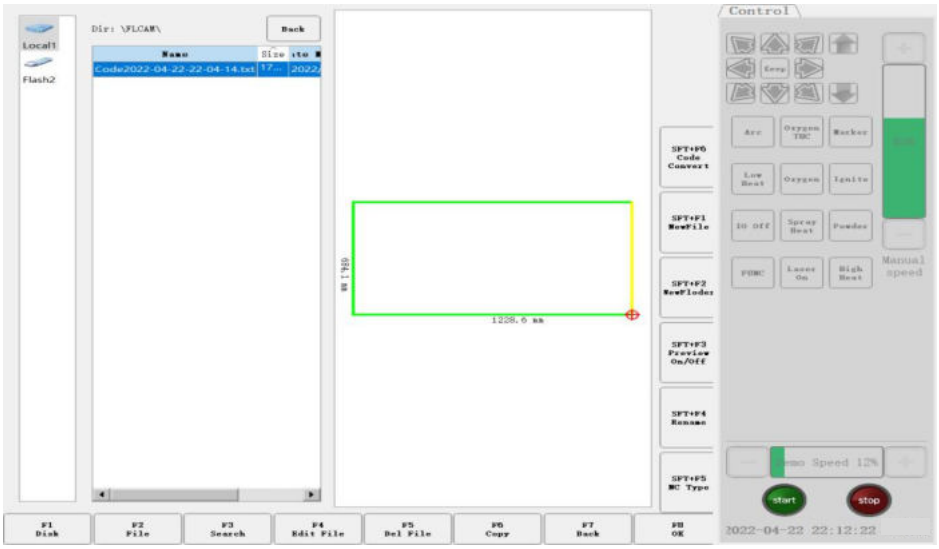


Figure5.1 The Code Interface

Under the file management interface, you can create, find, edit, delete, and copy G code files.

- [F1 disk]: Switch the cursor to the disk character bar, to realize the disk character switch.Continuously pressing F 1 will switch back and forth in the disk character.
- [F2 file]: Switch the cursor to the file bar.
- [F3 Find]: In the overall search of G code files, all the files containing the input characters will be searched out and listed.
- [F4 Edit]: Edit the currently selected G code file, refer to Section 6.4.
- [F5 Delete]: Delete the selected file or the current folder.
- [F6 Copy]: Copy the file to other folders or in the best disk.
- [F7 Return]: Return to the main interface.
- [F8 Confirmation]: If the current cursor is a G code file, transfer the current processing file to the system, and the system automatically returns to the main interface.If it is a folder, the folder opens.
- [SFT + F1]: Create a new G code file.
- [SFT + F2]: Create a new folder
- [SFT + F3]: Turn the live preview function on or off, and the G code file of the cursor is displayed graphically in the preview area.

- [SFT + F4]: Rename the selected file.
- [SFT + F5]: Add a recognized G code file format suffix.
- [SFT + F6]: Code conversion from the code in the G code file to other code.

5.1 tray

Click [F1 disk] to position the cursor to the tray bar for tray character switching

5.2 document

Click [F2 file] to position the cursor to the file bar, and select the files through the up and down keys or [F2]

5.3 seek

Under the file management interface, press [F3] to search the file.Enter part or all of the characters of the searched file name, press F8, and list the searched results.

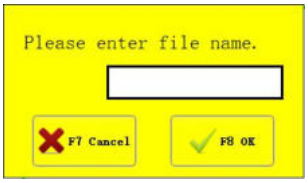
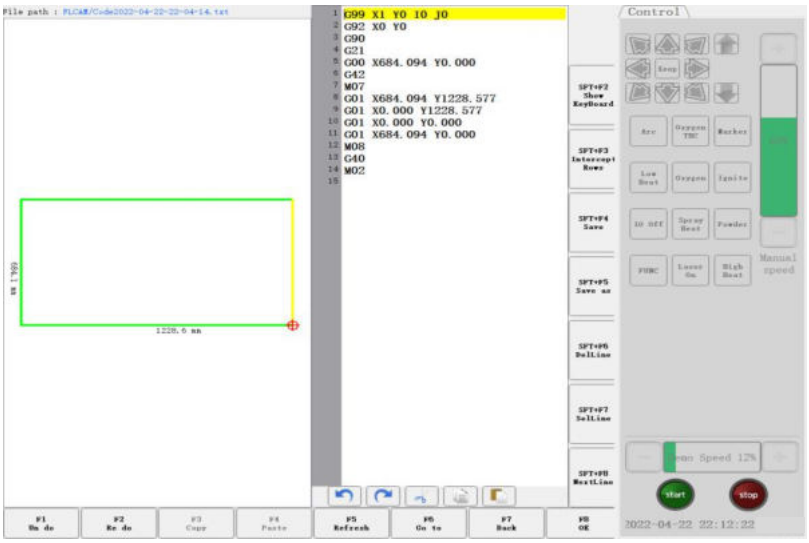


Figure 5.2 Finding a File

5.4 edit

Under the file management interface, move the cursor to the file name to be edited, and press [F4] to edit the code.The selected G code file can be edited, as shown in Figure 5.3



[SFT + F 8] Line change: Add blank lines under the current cursor Figure 5.3 Code editing

- [F1] Undo: Undo the previous operation.
- [F2] Redo: Restore the revoked operation
- [F3] Copy: Select the code to copy, and the Copy button is available.
- [F4] Paste: Paste the copied code.
- [F5] Refresh: Refresh the current code.
- [F6] Jump: Code to jump to the set line.
- [F7] Return: Return to the previous interface without saving the changes.
- [F8] Confirm: Save the changes and return to the previous interface.
- [SFT + F2] Display soft keyboard: you can modify the cursor line G code on the software disk.
- [SFT + F3] intercept G code: select multiple lines of G code.
- [SFT + F 4] Save: Save the modified G code.
- [SFT + F5] Save as: Save the current G code file as another file.
- [SFT + F 6] Delete row: Delete the current cursor row.
- [SFT + F 7] Select Line: Select the current cursor line.
- line.

5.5 deleted file

In the file management interface, press [F5] to delete the file, and the dialog box will pop up as shown in Figure 5.4, and delete the selected file or folder.

Figure 5.4 Delete a file

5.6 copy file

In the file management interface, press [F6] to copy, and the dialog box will pop up as shown in Figure 5.5, and then select the directory to be copied to

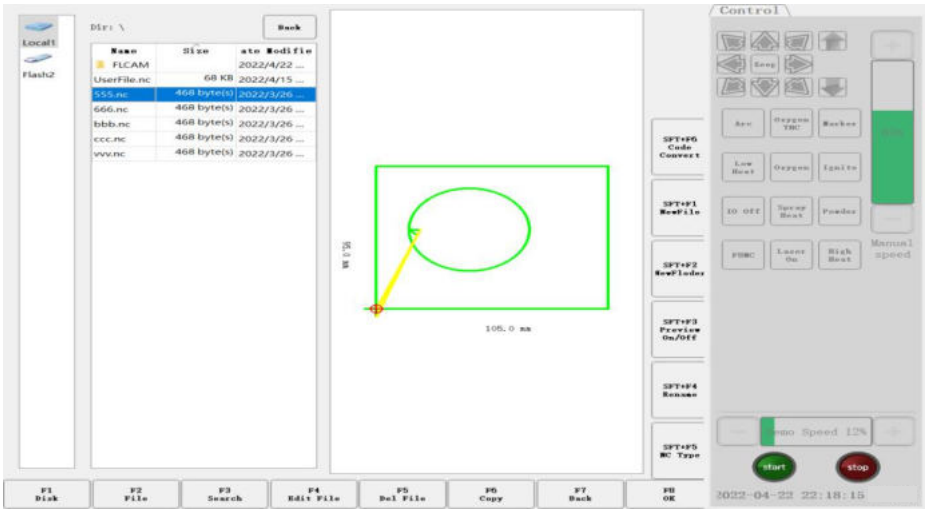


Figure 5.5 File replication

5.7 Other functions

5.7.1 New file, / folder

In the file management interface, press [SFT + F1] new file and [SFT + F2] new folder. You can create files and folders to manage the G code files.

5.7.2 Preview function

In the file management interface, press the [SFT + F3] switch and preview function. When the cursor moves to the corresponding G code file, the graphics of the selected G code will be displayed in real time.You can intuitively observe the part graphics corresponding to the current G code, and select the corresponding processed parts, as shown in Figure 5.6

Note When you open the preview feature, it affects the speed of viewing files.

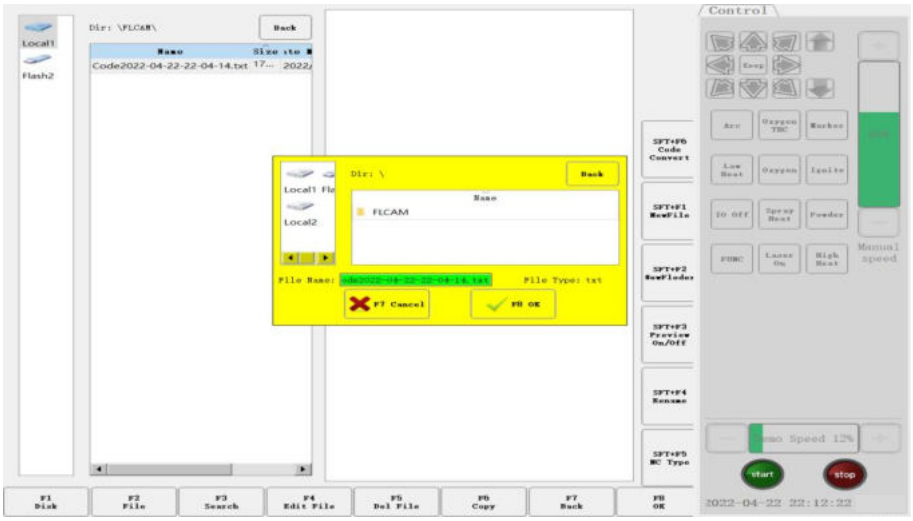


Figure 5.6 Graphic Preview

5.7.3 Modify the file format and rename it

In the file management interface, add the file format by [SFT + F5], and add the file suffix of the recognizable G code, separated by a space, as shown in Figure 5.7

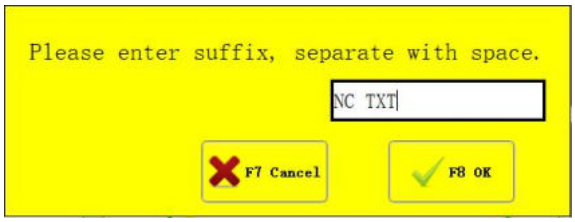


Figure 5.7 G code file format

5.7.4 code conversion

In the file management interface, perform code conversion by [SFT + F6] to customize the code format in the G code file.

ID	Transform Before	Transform After	Comments
1	M14	M07	Start Cutting
2	M15	M08	End Cutting

Figure 5.8 Code conversion

Chapter 6 Part management

Before the cutting, press [F3 Part Management] at the main interface, the starting point of graphics can be selected, angle correction, repeated arrangement, scale scaling, mirror, rotation, etc.The interface is shown in Figure 6.1 component options.

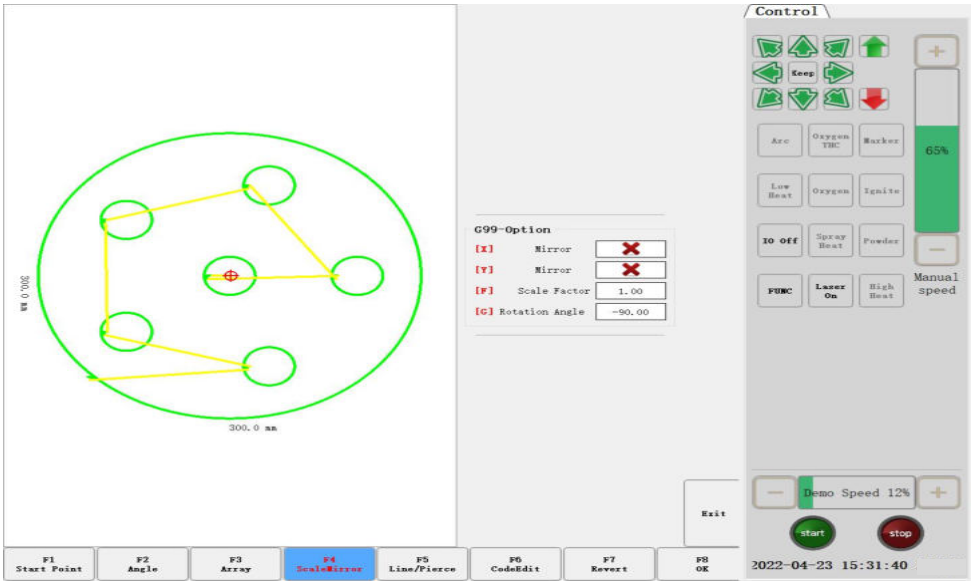


Figure 6.1 Assembly Options

Press X to mirror along the horizontal axis (X axis), that is, up and down the mirror.

Press Y to mirror along the longitudinal axis (Y axis), namely the left and right mirror.

6.1 Starting point selection

After pressing F1, the system prompts you to select the starting point:

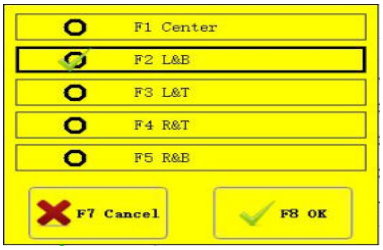


Figure 6.2 Starting Point Selection

Figure 6.2 Press the F1~F5 key, and the starting point of the cutting part automatically jumps to the corresponding position.For example, when you press F5, the part start automatically jumps to the lower right corner.As shown in Figure 6.3

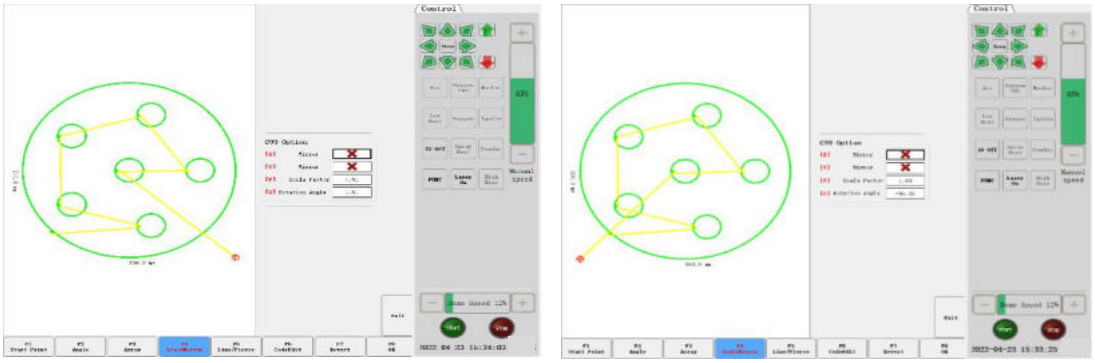


Figure 6.3 Starting point is in the lower left and lower right corners

6.2 angle correct

After [F2], as shown in Figure 6.4, plate correction can be performed or directly.

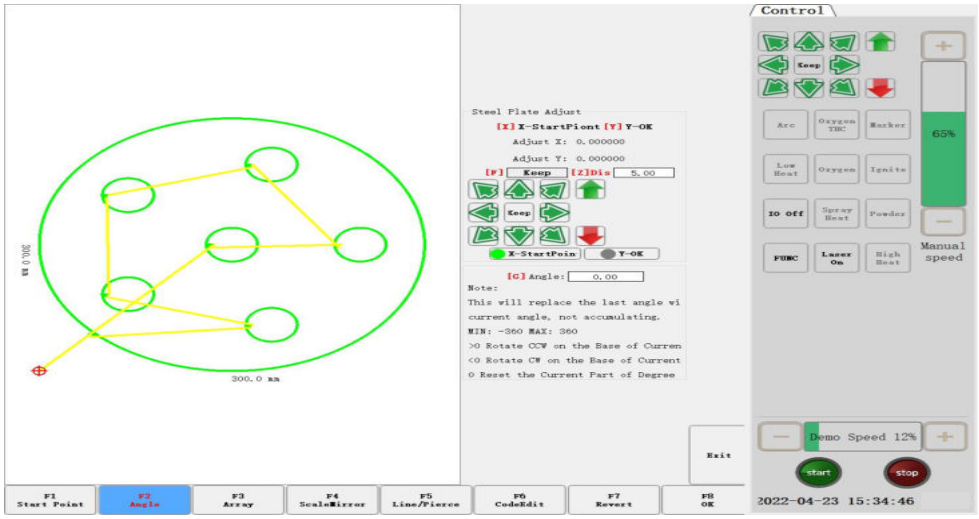


Figure 6.4 Angle correction

At this point, the cutting torch can be manually moved to any edge of the plate or at an angle of the plate.The moving trajectory of the cutting torch is shown in Figure 6.5.When the torch is in a good position, press [X,] to set the current point as the correction starting point.Then, along the edge of the plate, manually move the cut torch to another point.Ensure that the two points are far enough, and that the two points are on the same line as the same side of the steel plate.The trajectory of the moving cutting torch is shown in Figure 6.6.Then press the [Y].The system automatically calculates the offset angle of the current plate, and then automatically corrects the drawing.

Note: If the laser gun is configured for correction, the laser point can be corrected at the edge of the steel plate. Referring to section 9.5 laser bias.

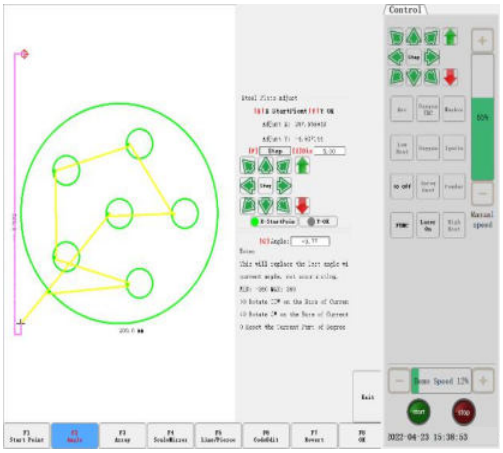


Figure 6.5 Move to the first point track

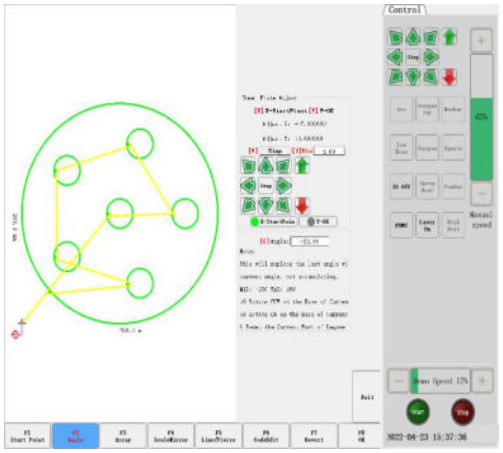


Figure 6.6 Move to the second point trajectory

After the correction is completed, the system prompts whether to return to the starting point. If [F8], the system will return to the starting point of the correction. If [F7], the system will return to the graphical interface.

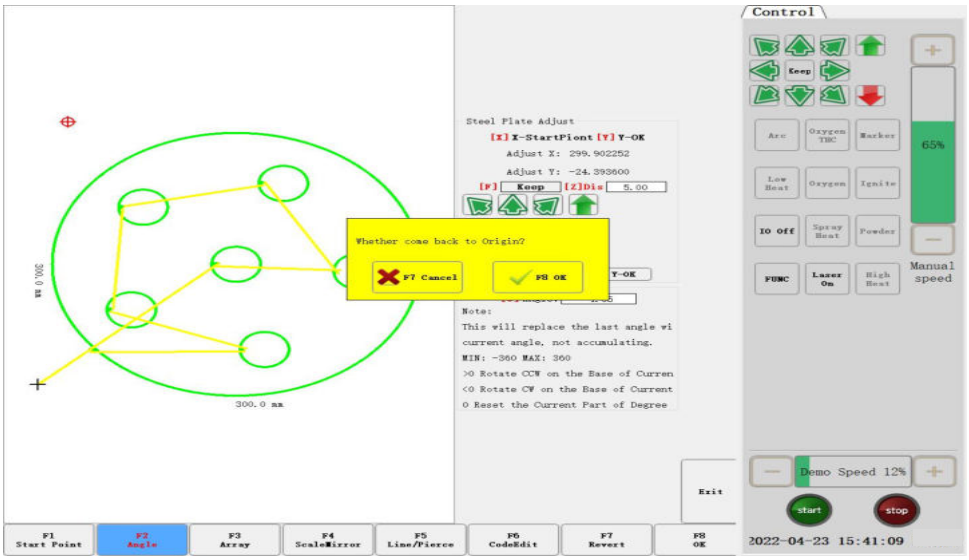


Figure 6.7 Return to the starting point after correction

When knowing the angle of the current machining needs to rotate, use the digital key [G] to input the angle.After manually entering the angle, press ENTER to confirm, and process the drawing will rotate the corresponding angle.The positive angle is counterclockwise rotation, and the negative angle is clockwise rotation.Press the ESC to exit the angle correction.

Note: At the input angle 0, when the machining drawing returns to 0 degrees, then the plate-corrected angle and the manual input angle are cleared.

6.3 permutation with repetition

.8Under the component option interface, press [F3], the system interface is shown in Figure 6, there can be three arrangements, matrix arrangements, staggered arrangements and stacked arrangements.Through the upper and lower left and right keys, you can choose the matrix,

staggered, stack type and other parameters for the arrangement.

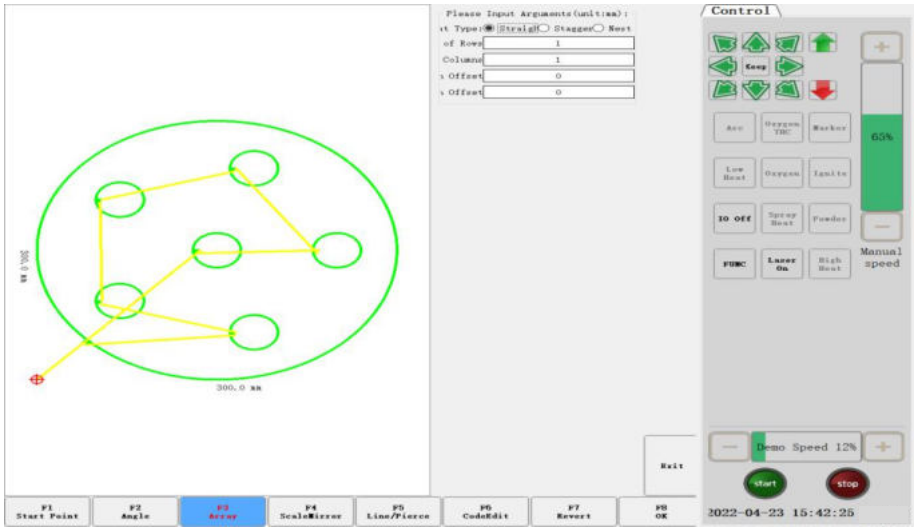


Figure 6.8 Permutation Selection

Select the matrix, then arrange the matrix:

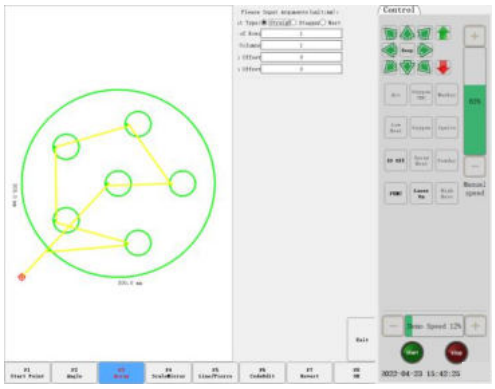


Figure 6.9 Matrix arrangement effect

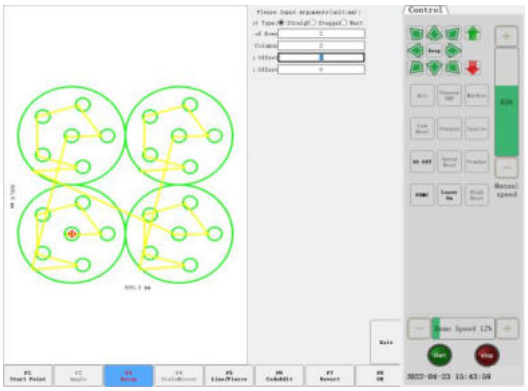


Figure 6.10 Matrix arrangement plot

Select interleave, interleave:

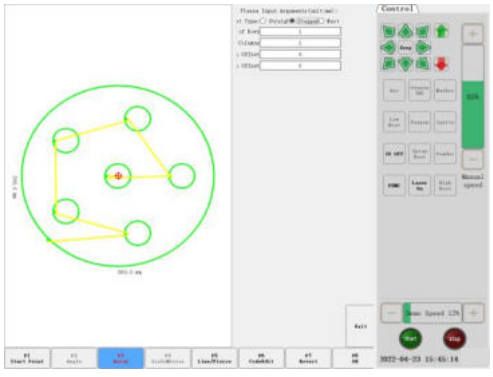


Figure 6.11 Interarrangement

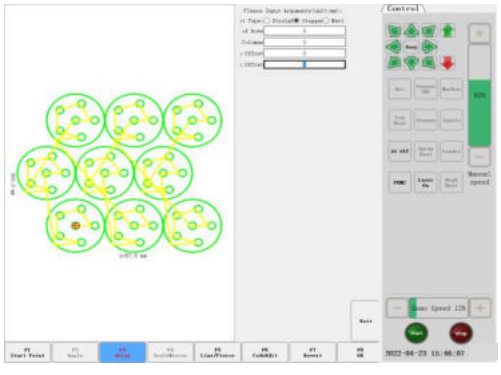


Figure 6.12 Interleaved arrangement effect

If you select stack, arrange stack:

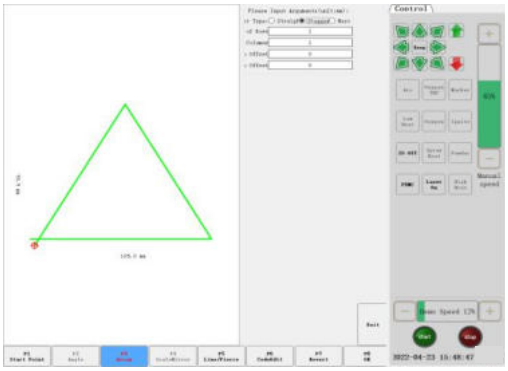


Figure 6.13 Starrangement

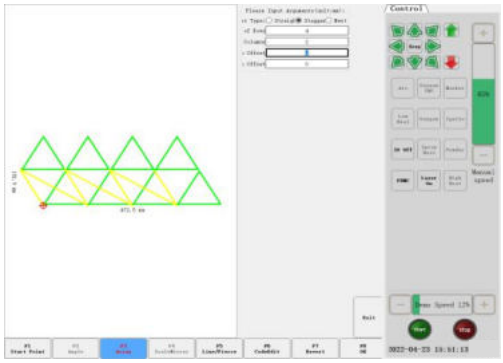


Figure 6.14 Vertical arrangement effect

- The stacked arrangement is mainly applied to the suitable figures, such as triangle, trapezoid, etc.The stacked arrangement first rotates the current graph in the center clockwise for 180°, and then the original graph and the mirror graph, pair-insert arrangement, combined into a new graph.The combination process is shown in Figure 65..1Then, the combined new figures are arranged in a matrix.parameter declaration:
- Number of rows: The number of rows to arrange the combined graph.
- Number of columns: The number of columns to arrange the combined graph.
- Line spacing: the distance between the combined drawing and the combined graph in the Y direction.This parameter can be a negative value.
- Column spacing: the spacing between the combined drawing and the combined drawing in the X direction.This parameter can be a negative value.
- Line arrangement: the distance in the Y direction of the two drawings when the two figures are combined into a new drawing.This parameter can be a negative value.
- Column arrangement: The distance in the X direction when two drawings are combined into a new drawing.This parameter can be a negative value.

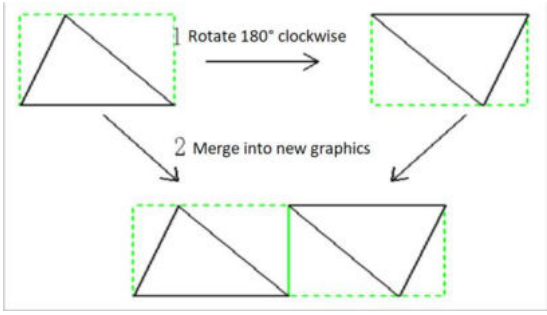


Figure 6.15 is merged into a new drawing

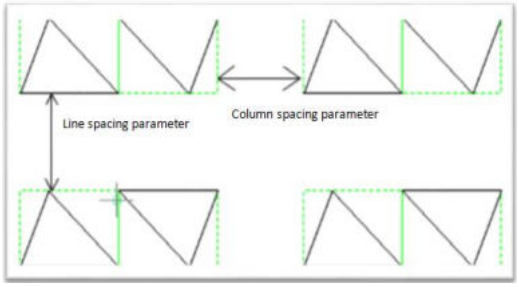


Figure 6.16 Line spacing and column spacing parameters

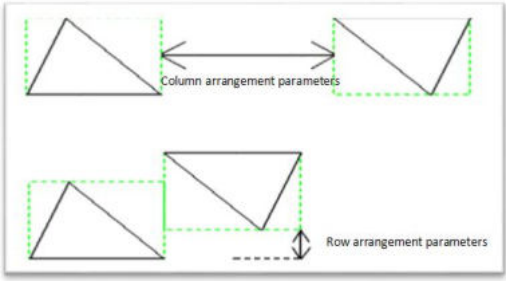


Figure 6.17 Column arrangement and row arrangement parameters

6.4 Scale scaling

Under the component option interface, press [F4 Scale], and the system prompt is shown in Figure 68.1:

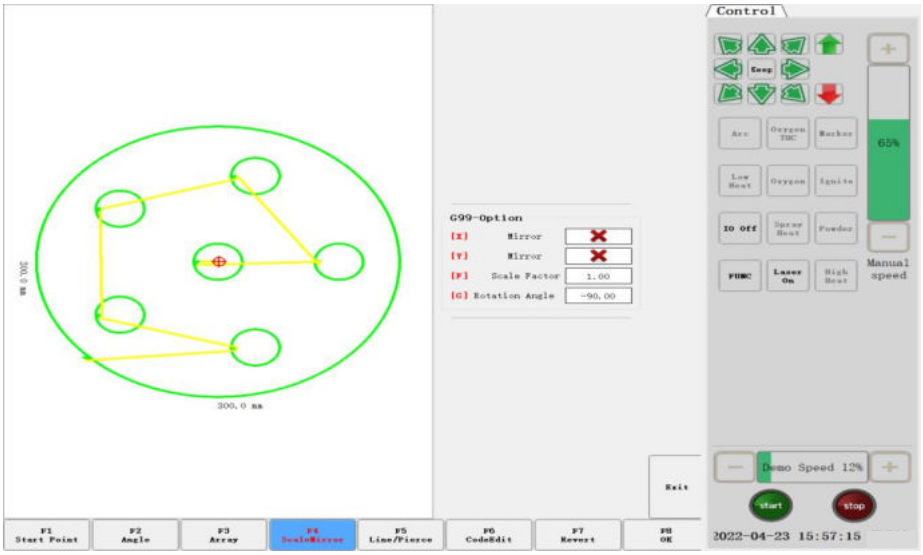


Figure 6.18 Scaling

After entering the scale parameter through the [F] key, the system will automatically zoom in or out when checking the input parameters without errors.

Note: Scale ing also scales the introduction lines and lead lines.

6.5 Choose the line to choose the hole

Under the assembly options interface, press [F5] to perform the row selection operation.system

prompt:

Figure 6.19 Select rows and select holes

6.5.1 Selection of holes

Press [F 1] to select the hole number to start cutting, the system prompts:

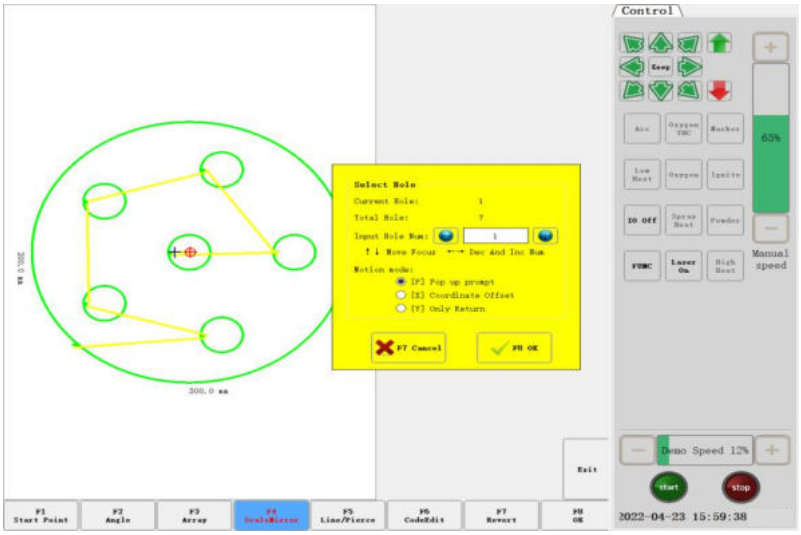


Figure 6.20 Tips for hole selection

At this point, you can directly enter the perforation point to start processing, or you can modify the perforation point through the direction key of the keyboard.M07 statement in G code or ESSI code.

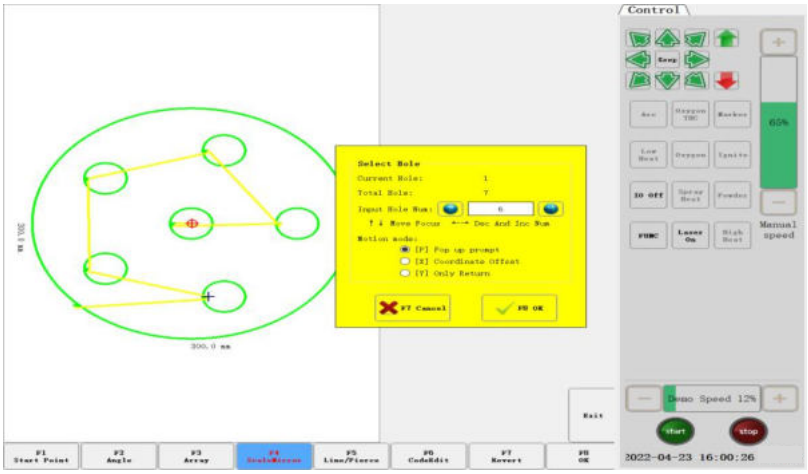


Figure 6.21 Select the sixth hole

After the selection, press [F8] to confirm.

6.5.2 Choose line

Similar to the hole selection operation.The line selection function corresponds to selecting the line number in the processing file.

6.5.3 Select the actions after selecting the holes

After selection or selection, press [F8] to exit to the main interface.After returning to the main interface, there are generally two operations.One is forward / backward, and the other is starting the cutting.

- After returning to the main interface, press space at the main interface and switch to the cutting interface.At the cutting interface, press [F1] / [F2], and the dialog box shown in Figure 6.22 will pop up.

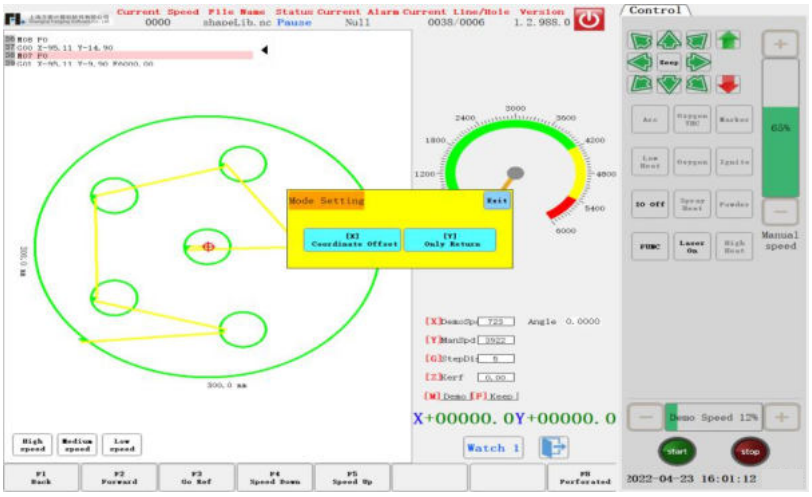


Figure 6.22 Method Selection

- When the cutting gun bias the original cutting path, press START key in the cutting interface, the system prompts as shown in Fig. 6.23, press Y key, the system will directly empty to the selected line number or perforation point, if press X key, the system will return to the original cutting path in the current position to start processing, if press G key, the system will start processing in the current position.

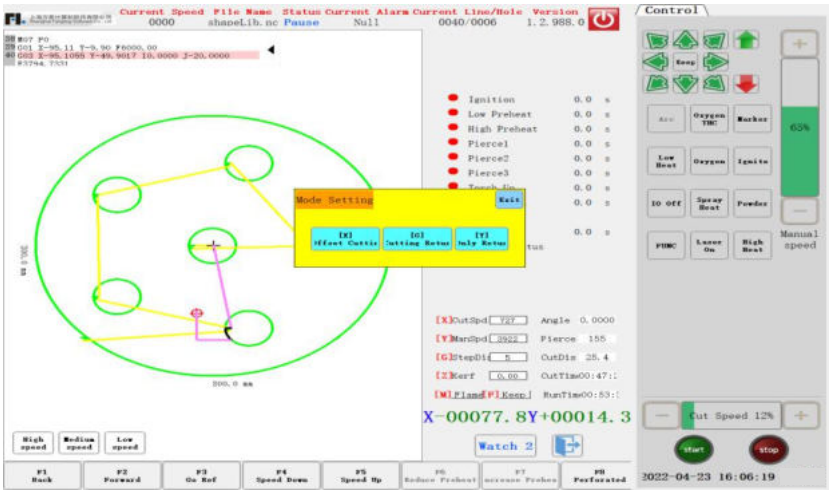


Figure 6.23 Operation of selecting row selecting holes

6.6 Code editing

The code editing function here is the same as the editing function in file management. You can refer to Section 5.4

6.7 Graphics restore

If you want to cancel all the mirror, rotation, correction, scale, arrangement of the graph, automatically restore to the original state of the drawing by [F7] under the component options interface, and cancel all the mirror, rotation, correction, scale, arrangement, and other operations.

Chapter 7 Parameter setting

Under the main interface, press [F4] to enter the parameter interface, with the parameter function interface as shown in Figure 7.1.

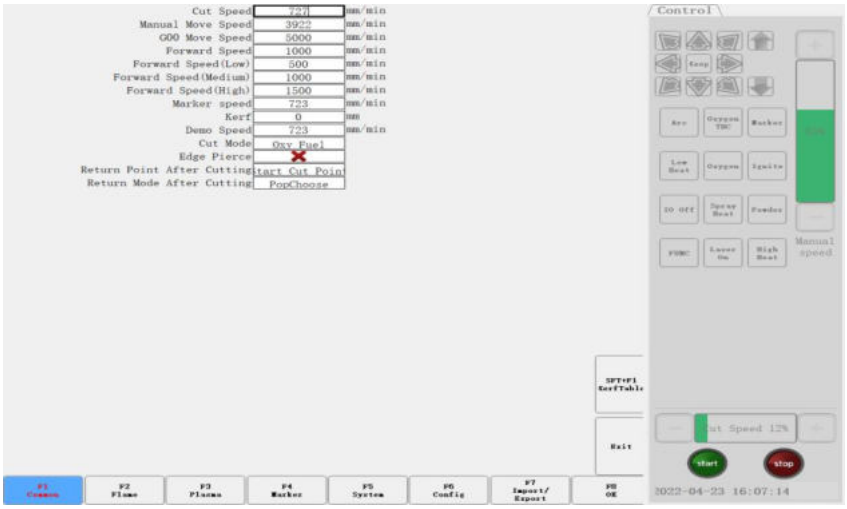


Figure 7.1, Parameter interface

In the parameter interface, there are six parameters that can be set:

- Common parameters: maximum cutting speed, manual moving speed, empty range speed setting, cutting compensation, cutting type selection, edge perforation use and other parameters.
- Oxygen gas parameters: all process parameters used in oxygen and gas cutting.
- Plasma parameters: all the process parameters used in the plasma cutting.
- Powder izing parameters: ignition perforation fixed cycle parameters, powder offset and other parameters.
- System parameters: setting of system pulse number, maximum speed limit, motor parameters and soft limit parameters.
- Configuration: input and output port function configuration, and machine tool coordinates and other related settings.
- Import / Export: Import and export operation of the parameters.

7.1 Common parameters

Figure 7.1 is the common parameters of the system.

- Cutting speed: the maximum speed during cutting.
- Manual moving speed: the speed at which the cutting torch moves manually.
- Empty moving speed: torch moving speed when G00 or torch rapid return is

performed.

- Forward / backward speed: the speed of advancing or retreating along the path when pause in the cut.
- Powder spray speed: the speed when executing the powder spray line.
- Cut joint (half of the cut): the size accuracy of the cutting parts is guaranteed. The user sets the cut joint compensation value according to the cut joint width (the cut joint compensation value should be half of the actual cut joint width). The system will automatically generate a new cutting path to compensate the cut joint.The cutting value can be modified before cutting a workpiece, and after cutting, no modification is allowed.
- Demo speed: Cutting speed in demonstration mode.
- Cutting type: aerobic gas, plasma mode is available.Users can choose in two ways through the drop-down menu.
- Edge perforation: Choose whether to use edge perforation. When using edge perforation, the cutter automatically stops whenever the M07 code is encountered.When the cutter is suspended, the user can manually move the cutting torch to the edge of the steel plate, and then press the "Start" button, then the system prompts:

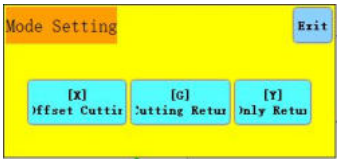


Figure 7.2, edge perforation

When [G] is selected, the system cuts from the current point after ignition perforation to the pause point and then cutting.This is how the edge perforation function.

This function is particularly useful when cutting thick steel plates, which are difficult to perforate and have large holes, and if directly punched through the cutting path, it may affect the quality of the finished product.The application of edge perforation can accelerate the efficiency of perforation, save cutting time, and improve product quality.

Of course, without using edge perforation, the use of introduced line perforation is also a more effective method.

- Return coordinate point after cutting: cutting end point, file processing starting point and machine tool zero point are available, as shown in Figure 7..3

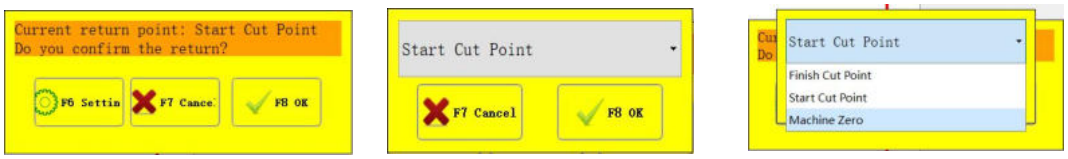


Figure 7.3 Selection of return mode after cutting

- Cut-out return mode: pop-up confirmation and automatic return are available.

7.2 Oxygen gas parameters

Click [F2] at the parameter interface to switch to the oxygen and gas parameter interface.As shown in Figure 7.4.

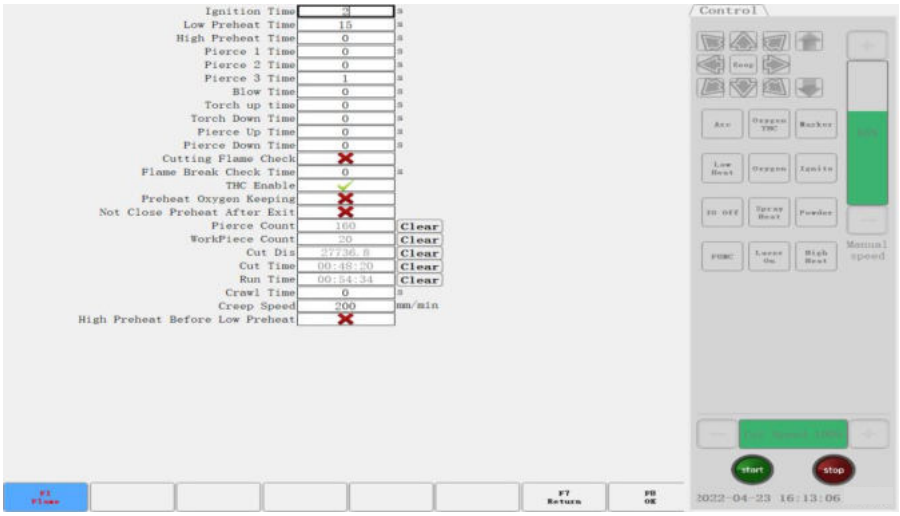


Figure 7.4 Oxygen and gas parameters

- Ignition time: the delay time of turning the high-voltage ignition switch on during the ignition.
- Low pressure preheating time: low pressure preheating time before perforation.Enter any value of 0, in seconds.During the perforation preheating process, when the system is in the low pressure preheating stage, press the "stop" or [F7] button, and the system delay will automatically increase. After the preheating, press the "start" button to end the preheating delay, press the [F7] button, the preheating time will automatically last 15 seconds, and this time will be saved by the system.
- High pressure preheating time: the same as the low pressure preheating delay.Just the open IO is different, the high pressure preheating delay before the low pressure preheating delay.
- Primary perforation time: low-pressure cut oxygen perforation time.Enter any value of 0, in seconds.The IO port is opened when greater than 0 and the IO port if 0.
- Secondary perforation time: the time of medium-pressure cut oxygen perforation.Enter any value of 0, in seconds.The IO port is opened when greater than 0 and the IO port if 0.
- Triple perforation time: the time of high-pressure cut oxygen perforation.Enter any value of 0, in seconds.The IO port is opened when greater than 0 and the IO port if 0.
- Exhaust time: the delay of opening the vent when the gas is turned off.Enter any value of 0, in seconds.
- Rising time: the time when the cutting torch rises when the cutting oxygen is closed.Enter any value of 0, in seconds.
- Time: the time of the torch drops before preheating.Enter any value of 0, in

seconds.

- The rise time: the rise time before the perforation and the rise time at the M08 code or M02 code; the rise time at the M07 code.
- Perforation drop time: the drop time of the torch during the perforation is the drop time of the torch and the drop time during the fixed cycle.
- Cutting flameout detection: according to the user equipment configuration, select whether to use the cutting flameout detection function.
- flameout detection time: after setting the flameout detection function can set the flameout detection time, enter any value of 0, unit: seconds.
- Use the elevation box: Select whether to use the elevation box according to the user device configuration.
- M08 preheating oxygen retention output: If this parameter is set to Yes, the low pressure preheating oxygen IO port is always open before the cutting (i. e. before the M02 code).If No, low pressure preheating is turned off during machining, when M08 or M02 is encountered.
- Preheated oxygen output is maintained: If this parameter is set to Yes, the preheated oxygen is always on.
- Number of perforation: Record the number of perforation during the flame cutting process.
- Number of pieces: record the number of workpieces completed by flame cutting.
- Cutting distance: Record the total flame cutting distance, in units: metric- -meters, imperial- -feet.
- Cutting time: Record the time during the flame cutting process.
- Running time: record the time of flame cutting time + empty range time + M07 state.
- Crawling time: crawl time.See 7.2.1 Dynamic perforation and crawling for details.
- Crawling speed: crawl speed.See 7.2.1 Dynamic perforation and crawling for details.
- High pressure preheating before low pressure preheating: the system defaults low pressure preheating before the default. If the parameter is set to "Yes", high pressure preheating and then low pressure preheating.

7.3 Plasma parameters

7.3.1 Meter parameters

Click F 1 on the plasma parameter page to enter the elevation regulator parameter interface. The specific content can be seen in section 12.6.

7.3.2 Plasma process

Click F 2 on the plasma parameter page to enter the cutting table, or the plasma process interface

is shown in Figure 7.6

Figure 7.6 Plasma Process

This interface is divided into process parameters and common parameters. After selecting the value of process parameters, the common parameters can be modified to modify and form a plasma process parameter table.

- Save process: save after parameter modification.
- Recovery process: dissatisfaction with the modified parameters can be restored to the initial state.
- Insertion process: the new insertion process.
- Delete process: Delete the current page process.
- Damaged parts: plasma cutting vulnerable parts information.
- Complete process: that is, display the complete process.

7.3.3 Plasma parameters

As shown in Figure 7.7, there are plasma parameters, which need to be set when machine tools use plasma cutting.

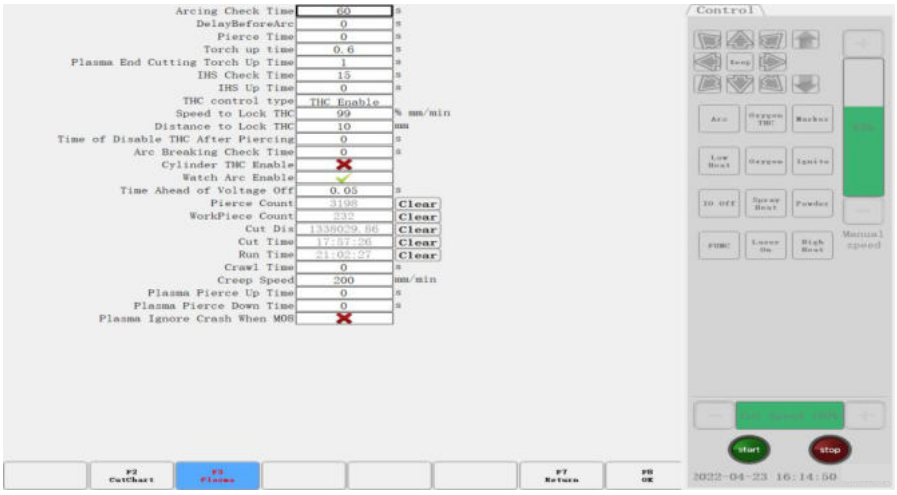


Figure 7.7 Plasma parameters

- Arc detection time: the maximum time to send the arc command to receive feedback whether to receive the command
- Arc delay: waiting time of the system before arc.All of the output ports are closed.Enter any value of 0, in seconds.
- Perforation time: the perforation time, enter any value of 0 in seconds.
- Rising time: the time of the torch rises after the arc.Enter any value of 0, in seconds.
- Time of the torch: time of the torch after M 08.Enter any value of 0, in seconds.
- Location detection time: enter any value of 0 in seconds.For the time used for positioning detection, if no successful positioning signal input is detected after this time, the positioning is considered unsuccessful and the system alarm.If the successful positioning signal input is detected within the detection time, the positioning detection ends and the positioning rise begins.
- Position rise time: enter any value of 0 in seconds.If the successful positioning signal input is detected during the positioning detection process, the cutting torch lifting time.
- Elevation control type: Select to enable elevation and corner elevation.
- Low speed off arc pressure elevation (corner signal): this parameter is the percentage.Open the "close arc pressure automatic elevation" port at X% of the cutting speed to keep the cutting torch at a fixed height, prevent the arc pressure change from changing the cutting torch height, and burn the cutting torch in serious cases.unit:%.
- Close elevation minimum distance: function with low speed closing arc pressure elevation (corner signal).This signal is not adjusted according to the speed closing arc pressure, but according to the length of the line segment at the beginning and

end of the current machining curve.Open the "close arc pressure automatic elevation" within the distance at the beginning of the curve and the minimum distance before the curve to keep the cutting torch at a fixed height.

- After the perforation, the height enables energy delay: after the perforation, the arc pressure is unstable, the elevation is not adjusted at this time, after the delay is set time, wait for the arc pressure to stabilize, the height can be adjusted.
- Arc break detection time: when the arc break occurs, the system delay "arc break detection delay" time, if the arc break still occurs, it is considered to happen, stop the machine operation and alarm.This function is processing the workpiece with the lead line, after the delay of time, the lead line has passed, and the plasma has not broken arc, you can directly start processing the next workpiece.This function effectively prevents the false broken arc phenomenon when cutting the lead line.
- Use cylinder elevation: when this parameter is selected, maintain output.
- Arc pressure detection in cutting: if this item is selected, detect the continuity of arc pressure in cutting, and issue a break arc alarm when the arc pressure is lost.
- M08 close arc pressure early time: under normal circumstances, close plasma arc pressure when M08 encounters.When this value is greater than 0, the plasma arc pressure is closed early before M08 is encountered.unit:s.Use this function when small arcs are cut or drawn.
- Number of perforations: record the number of perforations during the plasma cutting process.
- Number of pieces: record the number of workpieces completed by plasma cutting.
- Cutting distance: Record the total plasma cutting distance in metric-meters, British-feet.
- Cutting time: Record the time during the plasma cutting process.
- Running time: record the time of plasma cutting time + empty range time + M07 state.
- Crawling time: crawl time.See 7.2.1 Dynamic perforation and crawling for details.
- Crawling speed: crawl speed.See 7.2.1 Dynamic perforation and crawling for details.
- Plasma perforation rise time: dynamic perforation parameters, see 7.2.1 dynamic perforation and crawling.
- Plasma perforation drop time: dynamic perforation parameters, see 7.2.1 dynamic perforation and crawling.
- Ignore collision alarm at M 08: when this parameter is selected, when G code runs

to M 08, if input collision alarm signal will be ignored.

7.3.4 Dynamic perforation and crawling

The dynamic perforation and crawling timing diagram is shown in Figure 7.5.

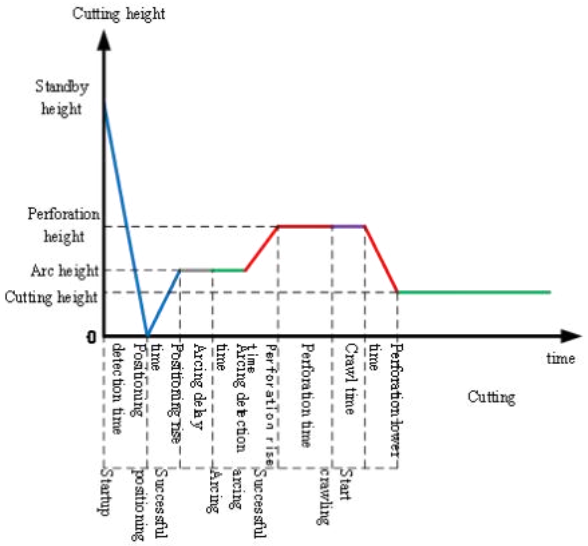


Figure 7.5 Dynamic perforation timing diagram

- Positioning detection time: after starting the cutting, the cutting torch drops. When the system detects the successful positioning signal, the positioning detection time ends early. If the system does not receive the successful positioning signal after the positioning detection time ends, the system will alarm.When this parameter is 0, the system will skip the detection of the successful positioning signal and the torch will not drop, directly enter the positioning rise stage.
- Positioning rise time: after the successful positioning signal is detected, the torch is raised, and the rise time is the positioning rise time.When this parameter is 0, the cutting torch does not improve, and the system directly enters the arc delay stage.
- Arc delay: after the positioning rise time ends, the system will delay a period of time before the arc, this time is defined as the arc delay.When this parameter is 0, the system does not delay and arc directly.
- Arc detection time: after the arc delay time ends, the system will open the arc port and start to detect the successful arc feedback signal. When the successful arc return signal is detected, the arc detection time ends early.If the system has not received the successful arc onset feedback signal after the arc onset detection time, the system prompts the error, and stops the cutting of the current workpiece, and remembers the exit program at the breakpoint.When the parameter is 0, the system

directly detects the successful arc feedback signal. If the signal is not detected, the error will be reported. After the signal is detected, the system enters the next stage.

- Piercing rise time: after the successful arc, the torch begins to rise, the lifting time is the perforation rise time.When this parameter is 0, the cutting torch does not lift, and the system directly enters the next stage.
- Piercing time: After the perforation rise time ends, the system begins to rest on the perforation, and the perforation time is the perforation time.When this parameter is 0, the system jumps the time and enters the crawling stage.
- Crawling time: after the static perforation, if there are more and high slag accumulation at the perforation point, the arc pressure will be very unstable when cutting in the area, and in order to prevent the gun.Therefore, it is necessary to walk forward for a period of time under the condition of prohibited elevation adjustment, which is the crawling time.When this parameter is 0, the system will skip the time and enter the perforation drop stage.
- Piercing down time: After the crawling time ends, the cutting torch drops to the normal cutting height, which is the perforation drop time.When this parameter is 0, the torch does not drop and starts normal cutting.

7.4 Spray powder parameters

As shown in Figure 7.8, it is the powder spraying parameters of the system, which are related to the powder spraying drawing line.

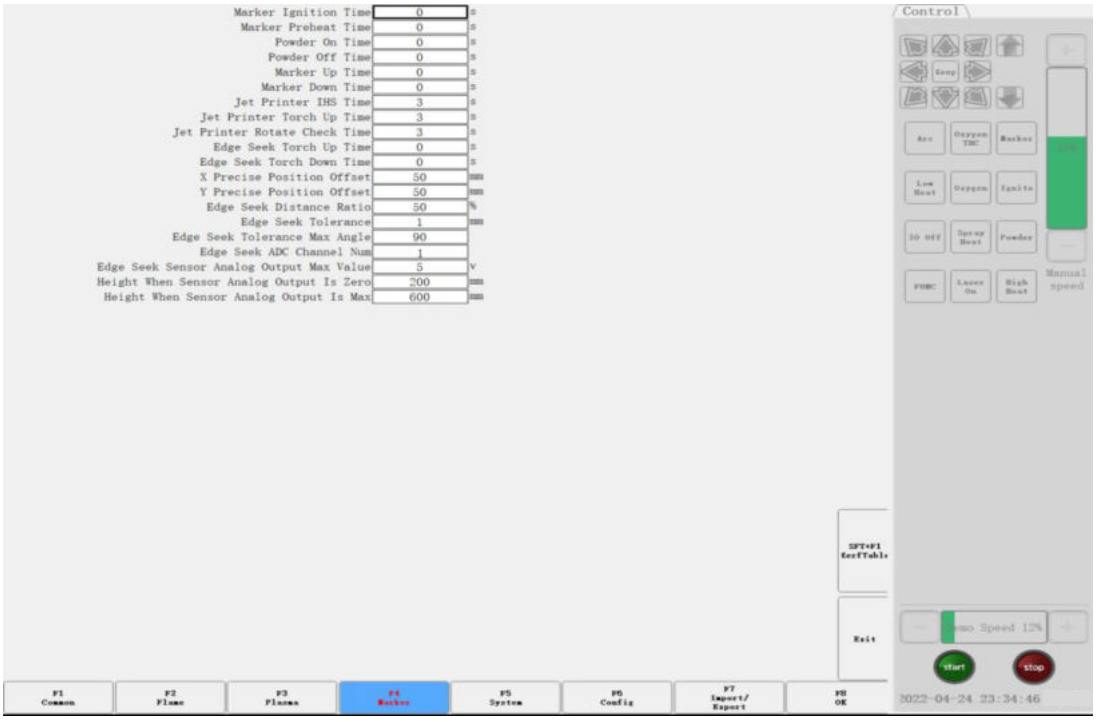


Figure 7.8 Powder Parparameters

- Powder izing ignition time: enter any value of 0 in seconds.
- Preheating time: enter any value of 0 in seconds.
- Yang powder (stir powder) opening time: the delay of the powder mouth opening against the powder mouth, input any value of 0, unit: seconds.
- Powder (stir powder) closing time: the delay of the powder mouth relative to the powder spray mouth, input any value of 0, unit: seconds.
- Powder spraying rise time: the time when the powder spraying gun rises.
- Powder spray drop time: the time when the powder spray gun drops.
- Up time: up time before the system search, when not in use, set 0
- Drop time: after the end of the system edge cut gun drop time, useless, set 0.
- X direction fine positioning offset distance: the distance moved in the X direction before the next edge search (mainly used for offset value during multiple edge seeking at a single point and offset value after coarse positioning stops)
- Y-direction fine positioning offset distance: the distance of the Y-direction movement before the next edge search (mainly used for offset value during multiple edge seeking at a single point and offset value after coarse positioning stops)
- Distance ratio of edge seeking point: adjust the distance of two adjacent edge seeking starting points, the value is the percentage of the current edge (according to the requirements, the larger the better, the larger the value, can reduce the error of

calculation results, but should ensure that the edge seeking point is in the board)

- Edge seeking tolerance: the error size allowed when verifying the edge seeking result.(Use for multiple edges at a single point or at four points)
- The maximum Angle (positive and negative): if the Angle is greater than the maximum Angle of the edge, the alarm edge error is too large
- Number: Select the control card as the edge seeking input signal (effective when selected as the edge seeking input signal, system A D1 interface, A D2 interface)
- Maximum output of analog edge-seeking sensor: (effective when selected as the edge-seeking input signal)
- Sensor analog output is zero height: (effective when selected as edge-seeking input signal)
- Maximum height of sensor analog output: (effective when selected as edge-seeking input signal)

7.5 system parameter

7.5.1 system

As shown in Figure 7.9, it is the system parameters.

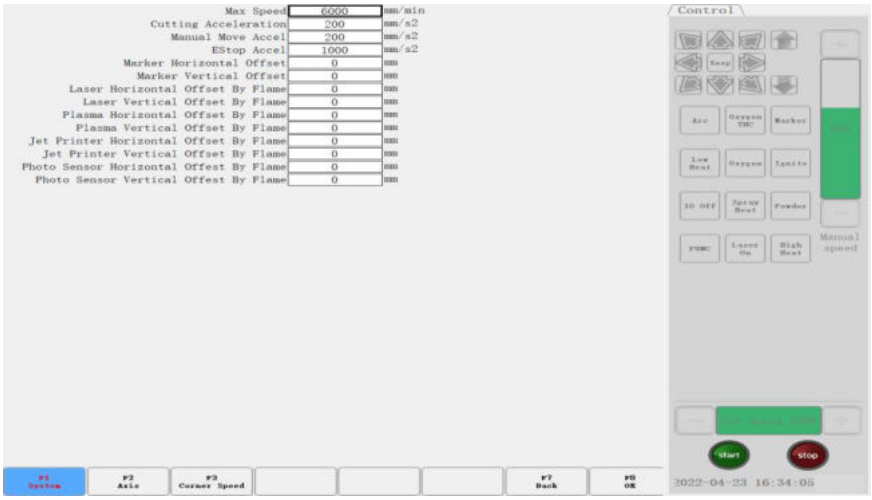


Figure 7.9, system parameters

- Maximum speed: limit the maximum speed of cutting operation in mm / m in.
- Cutting acceleration: the acceleration and deceleration of the machine tool operation during the cutting process.Unit: mm / s2
- Acceleration of manual movement: the acceleration of machine tool operation during manual movement in mm/s2
- Emergency stop acceleration: deceleration of machine tool operation under emergency stop.Unit: mm / s2
- Horizontal offset of the spray gun relative to the flame gun: lateral displacement of

the spray gun relative to the cutting torch.

- Longitudinal offset of the spray gun relative to the flame gun: longitudinal displacement of the spray gun relative to the cutting torch.
- Lateral offset of the laser positioning gun relative to the flame gun: refers to the lateral distance of the laser cursor relative to the flame cutting torch, the positive number indicates the laser cursor in the transverse positive direction of the flame cutting torch, and the negative number indicates the laser cursor in the transverse negative direction of the flame cutting torch.unit:mm.
- Longitudinal offset of the laser positioning gun relative to the flame gun: refers to the longitudinal distance between the laser cursor and the flame cutting torch, the positive number indicates the laser cursor in the longitudinal positive direction of the flame cutting torch, and the negative number indicates the laser cursor in the longitudinal negative direction of the flame cutting torch.unit:mm.
- Horizontal offset of the plasma gun relative to the firearm: lateral distance of the plasma gun relative to the firearm.unit:mm.
- Longitudinal offset of the plasma gun relative to the flame gun: the longitudinal distance of the plasma gun relative to the flame gun.unit:mm.
- Horizontal offset of the spray gun relative to the flame gun: the lateral distance of the spray gun relative to the flame gun.unit:mm.
- Longitudinal offset of the spray gun relative to the flame gun: longitudinal distance of the spray gun relative to the flame gun.unit:mm.
- Horizontal offset of the photoelectric switch relative to the flame gun: the lateral distance of the photoelectric switch relative to the flame gun.unit:mm.
- Longitudinal offset of the photoelectric switch relative to the flame gun: the longitudinal distance of the photoelectric switch relative to the flame gun.unit:mm.

7.5.2 Axis parameters

As shown in Figures 7.10,7.11,7.12, some of the underlying parameters of the axis.

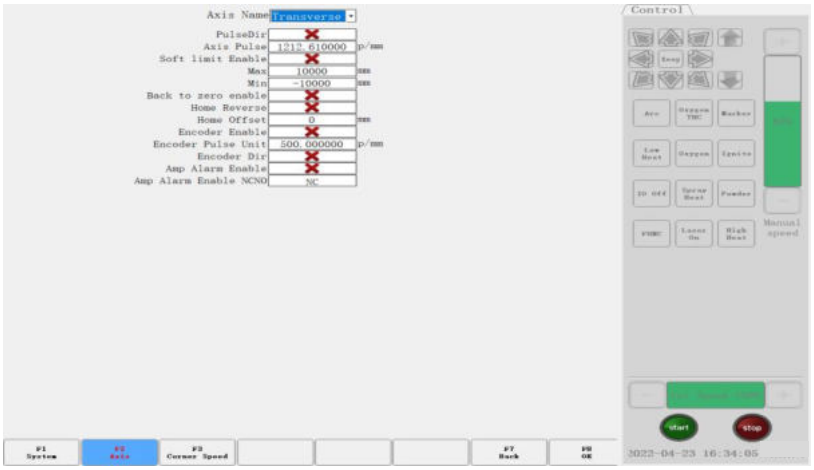


Figure 7.10 Horizontal Axis System Parameters

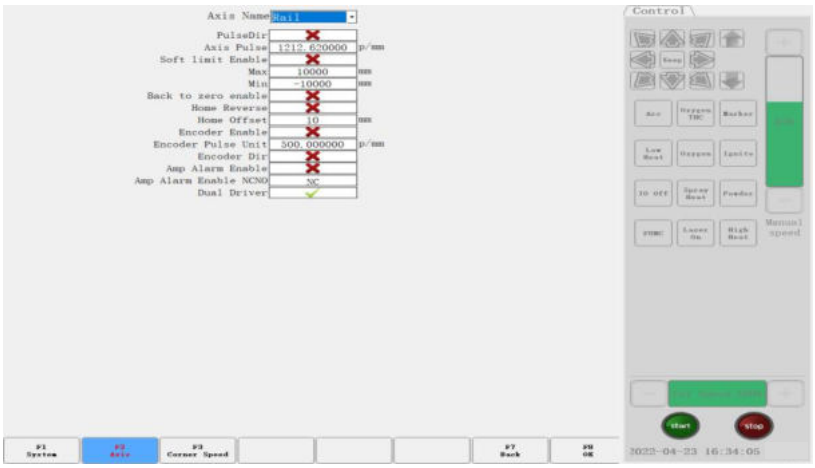
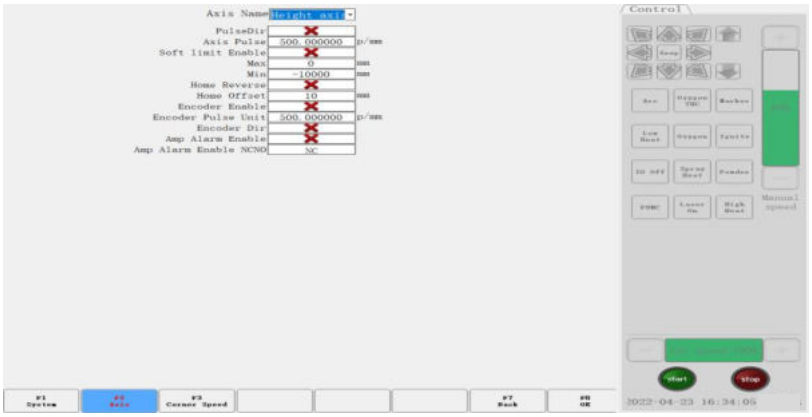


Figure 7.11 Parameters



.12Figure 7 height axis system parameters

- Description of the vertical and horizontal axis system parameters:
- Axis Name: Select the axis to set through the drop-down box.
- Pulse reverse: Set the current selection axis, whether to reverse.
- Pulse number: on the currently selected axis, the number of pulses required to move 1mm, you can retain the last four decimal places.
- Soft limit enables: When this option is selected, the coordinate value of the currently selected axis cannot be greater than the maximum coordinate or less than the minimum coordinate set, otherwise the machine will prompt the soft limit alarm and stop operation.
- Maximum coordinate: the maximum coordinate limit of the system in mm (mm).The system stops operating when any of the current coordinate limit values above the corresponding maximum coordinate.
- Minimum coordinate: the minimum coordinate limit in mm (mm) of the system.The system stops running when any of the current coordinates is less than the corresponding minimum coordinate limit value.
- Bilateral drive: open the dual-drive function of the gantry shaft.
- Back to zero enabling: After enabling, this axis will participate back to zero
- Back to zero: the current axis returns zero to zero in the reverse direction.
- Zero return bias: after zero return, the distance between the origin of the

machine coordinate frame and the zero return switch.(> 0) If the setting is too small, after the zero return, the zero switch may be triggered to report the limit alarm.

- Encoder enables: use the encoder feedback coordinates as feedback from the shaft card.
- Encoder pulse equivalent: the encoder feedback axis moves 1mm, the corresponding pulse type.
- Encoder reverse: the encoder feedback axis coordinate value is reversed.
- Servo alarm enables: turn on the servo alarm function.
- Servo alarm can often open and close: servo alarm input port type selection.
- Double car can enable: open the double car function.

7.5.3 Turnaround speed

FIG 7.13 shows the corner velocity-dependent parameters, which can be set as a percentage of the original velocity at different angles.

Figure 7.13 The corner speed parameter setting

7.6 system configuration

Press [F6] configuration under the parameter setting interface and enter the system configuration interface, where the input IO port, output IO port, system coordinates, controller options and IP can be set.

7.6.1 Input port definition

The controller can change the definition of the input IO port according to the user's needs, including changing the serial number of the IO port on the input terminal, and the normally open or normally closed type of the input port.As shown in Figure 7.12

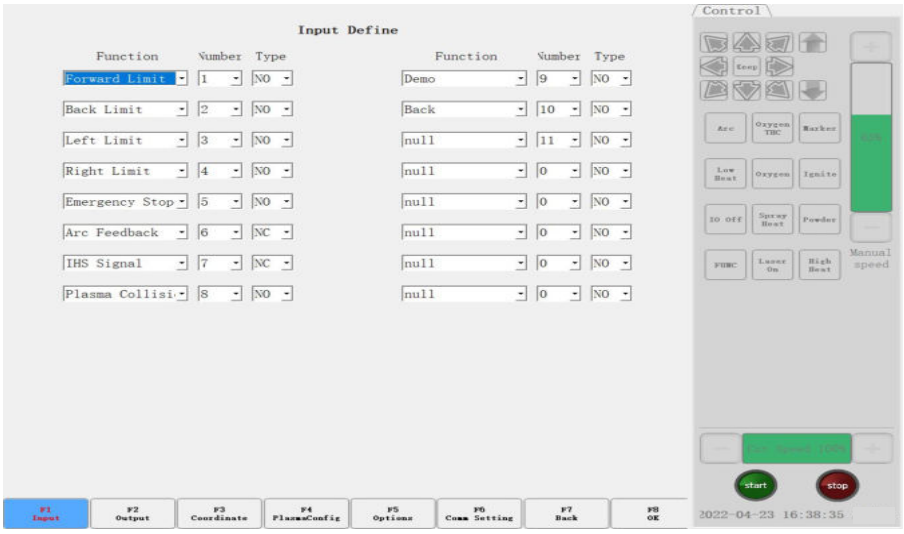


Figure 7.12, Input port definition

In this interface, position the cursor through the direction keys [], [], [], [] and [] to modify, press [Enter] to open the tab of the drop-down box where the cursor is located, move the cursor through [], [], and press [Enter] again to set the selected parameters.

No.: 01~16.

Type: NO often open, NC often closed.

7.6.2 Output port definition

The controller can change the definition of the output port according to the needs of the user: the output port on the serial number of the output terminal and often closed type.As shown in Figure 7.13

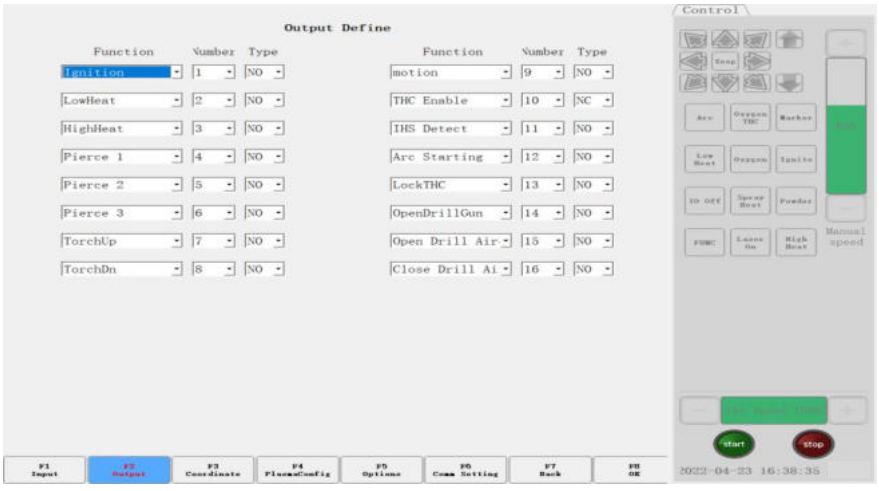


Figure 7.13 Output port definition

In this interface, position the cursor to the option to be modified through the direction keys [], [], [], [], press [Enter] to open the tab of the drop-down box where the cursor is located, move the cursor through [], [], and press [Enter] again to set the selected parameters again.

The output port type is all the triode open and leakage output type.

NO: The output signal is often open.

NC: The output signal is often closed.

7.6.3 Coordinate definition

The system can provide the user's definition of the coordinate system, as shown in Figure 7.14

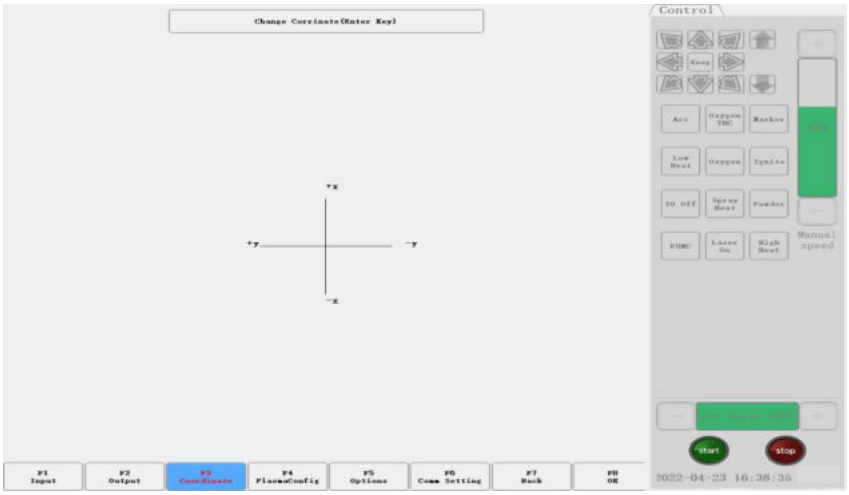


Figure 7.14, the coordinate system definition

Under this interface, continuously press [Enter,], the system can transform in eight coordinate systems.Until the user needs the coordinate system, press [F8 Save] to save the set coordinate system.

7.6.4 Plasma configuration

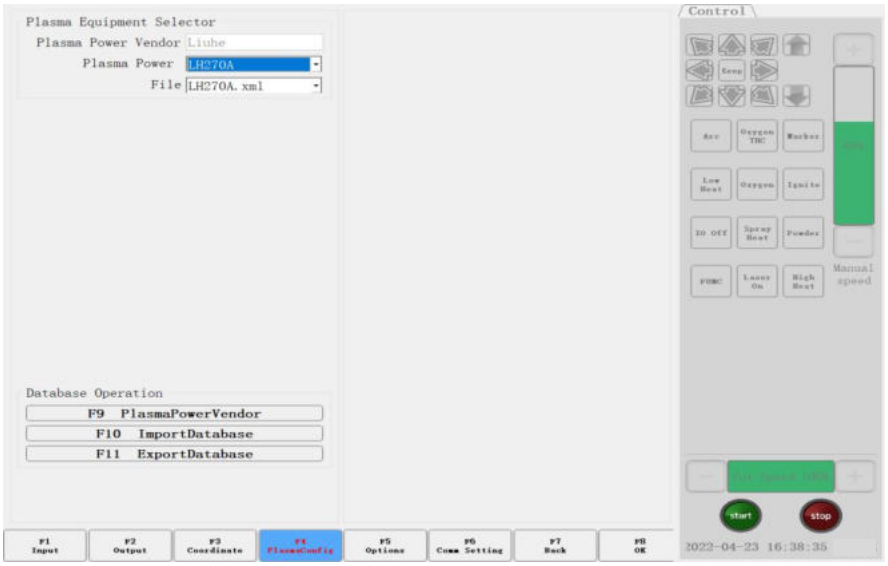


Figure 7.15 Plasma configuration interface

This interface can select different plasma power supply manufacturers by F 9, click F 10 to import the database of the corresponding power supply manufacturers, and click F 11 to export the database.

7.6.5 option

Figure 7.16 Options configuration

Some of the functional options of the system can be configured in the Options interface.

- Remote control type: Select the remote control type selected by the system
- Remote control com port: select the COM port connected by the remote control
- Default coordinates: The default coordinates can be changed to either relative or absolute coordinates.
- Arc IJ coordinates: In G code G02 or G03, the following I or J parameters default to relative or absolute coordinates.In general, the IJ coordinates of the arc are relative coordinates, and only a few arc IJ coordinates of G codes are absolute coordinates.
- Unit Type: Units can be switched between each other in the British and metric systems.
- Small segment fitting: When there are too many small segments in G code and continuous jitter or vibration occurs during machine operation, set the parameter to "yes". Generally, please use "no".
- Steel Plate Angle memory: By default, the Angle after the steel plate correction is not remembered.When this parameter is set to Yes, the plate angle memory is automatically remembered until another plate correction or the angle is reset.
- The F instruction is disabled: When this parameter is Yes, the F instruction (after the G code, i. e., the speed limit instruction) is ignored.
- Manual Angle for steel plate correction: when this parameter is "yes", the manual input angle in the 4.3.3 input Angle section is also used as the steel plate correction Angle. This Angle will be displayed in the main interface. If the steel plate Angle memory function is opened, the Angle will be accumulated into the steel plate correction Angle and be saved.

- Strictly check the G code specification: whether the G code is strictly checked.When using strict G code specifications, you can avoid some code errors, but the code requirements are relatively high.
- Booon prompt breakpoint: if the cutting is not completed, whether it is prompted after the restart.
- Follow error determination: hardware access encoder, and axis parameters use encoder.The interface plots the trajectory using coordinates feedback by the encoder.
- Strictly check the G code specification: when the function is opened, the imported G code will be strictly followed. When the function is closed, the missing M 07 and M 08 in the code will be automatically supplemented to make the processing execute normally.
- Cut joint coverage enables: do the modified cut parameters behind G41, G42 and G43 work.
- Corner tolerance: Using the accuracy of the corner, the lower the value, but the more obvious the deceleration.
- Small arc speed limit enables: When configured, the small arc speed limit function is enabled.
- Small circular arc speed limit speed: adjust the speed of the small circular arc speed limit.
- Speed limit radius of the small arc: set the small arc radius, that is, when the arc radius is less than this value, if the speed limit of the small arc is adjusted.
- Forward and backward point connection: used to control forward and backward when cutting paused.
- Type of zero switch: use zero switch or limit switch.
- Return to zero mode: select the way of the machine tool to return to zero (no zero / primary zero / secondary zero).
- Once back zero speed: back zero parameter: quickly find the speed of back zero switch.
- Secondary return zero speed: return zero parameter: slow speed near the return zero switch speed.
- Use Z signal: return to zero, use Z trust number back to zero.
- Longmen synchronization back to zero: after the zero, the gantry synchronization function will be automatically executed.Need to open parameters: back to zero use Z trust number, axis open encoder feedback.

- Gantry synchronization error alarm: open the gantry synchronization error check function.
- Allowable deviation of gantry synchronization: a certain value of gantry error, and lasts for a certain time (duration of gantry synchronization error).The machine tool will generate an alarm.
- Duration of gantry synchronization error: a certain value of gantry error (gantry synchronization allowable error), and lasts for a certain time.The machine tool will generate an alarm.
- Maximum error of gantry synchronization: the maximum deviation value allowed when the gantry synchronization function is enabled.Once the error reaches this value, the machine tool stops running immediately.
- Demo mode Enable presentation speed: Enable the set presentation speed in demo mode.
- Corner speed limit enables: control whether to open the corner speed limit
- The small arc produced by the slit is not enabled by the speed limit of the small arc: even if the small arc produced by the slit is not limited by the small arc
- Perunch number display enable: display hole number on the graphical interface
- Three-color light mode: Three-color light mode is enabled
- Beming mode: Bee mode is enabled
- Watch dog overtime time: shaft card connection delay time.

7.6.6 IP settings and THC control

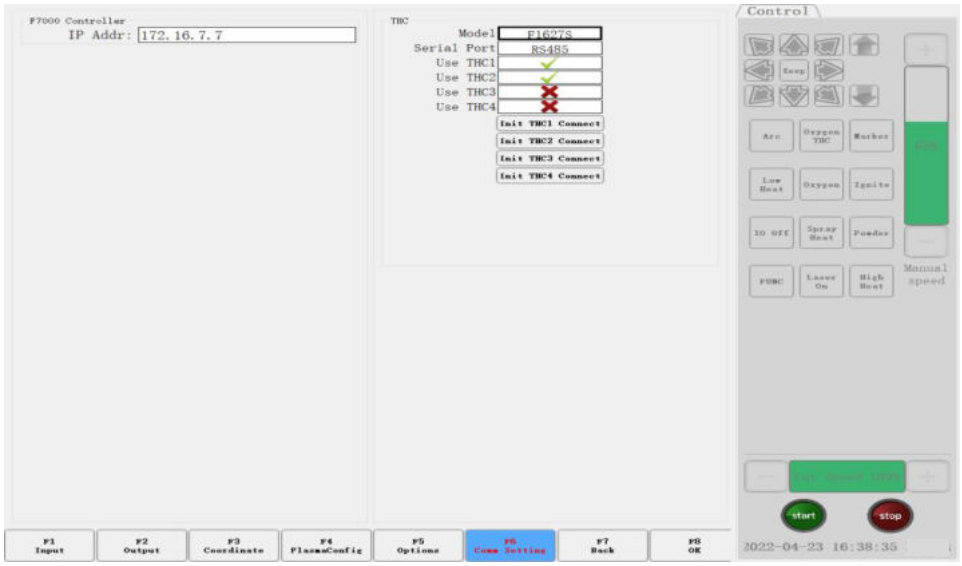


Figure 7.17 The 7600 series IP and THC control interface

- IP address: the IP address of the motion control card connected to the F7600 series.

- Model: Including Common Use, F1627D, F1627S, F1650.
- Serial port: use RS232, RS485 communication
- THC control: Use THC when selected, and you can only control one THC at a time

7.7 Parameter Import / Export

Press [F7] under the parameter setting interface to import and export parameters from the U disk or the native hard disk.Figure 7.18

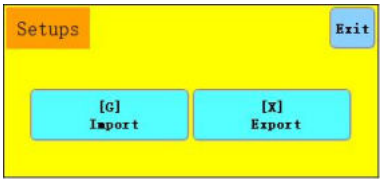


Figure 7.18 Number import / export

Select the [X] export parameter, and the Figure 7.18 dialog box will popup.After selecting the exported location, click [F8 confirm] to save all the parameters of the current system to the target location.When exporting, you can modify the exported file name.1111

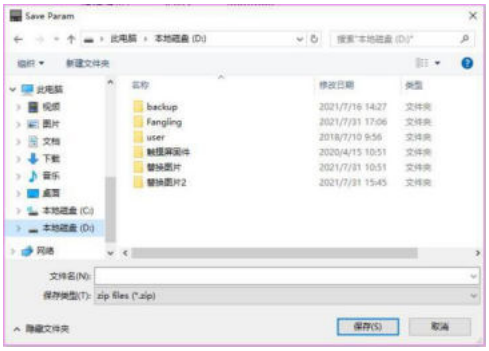


Figure 7.19 The Number is derived

Select the [G] Import parameter to load the saved parameter file.Combined with the parameter export function, it is convenient for users to save the parameters of different materials and thicknesses into parameter files, and to directly load the corresponding parameter files when they need to be used.

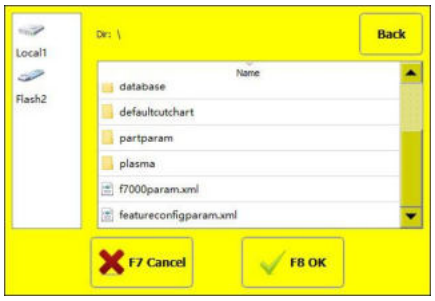


Figure 7.20 Number Import

After modifying the parameters, press [F8] to save them.

Note: After any parameter is modified, and for the modified parameter to take effect, it must be saved, otherwise the system still uses the unmodified parameters.

Chapter 8 Diagnostic functions

Press [F5] under the main interface to enter the system diagnostic interface, as shown in Figure 8.1.Under the diagnostic interface, the input and the output of the system can be diagnosed.

8.1 Enter the diagnosis

In this interface, the system reads the current input IO information and displays the status information of the current input IO.Green "●" indicates a valid input, and red "●" indicates an invalid input.Available to test the input port status.

Figure 8.1 Input port diagnosis

8.2 Output diagnosis

Under the diagnostic interface, press [F2] to enter the output diagnostic interface, as shown in Figure 8.2.

Press [↑], [↓], [←], [→], you can move the cursor to the corresponding output port, open the corresponding output port when pressing [F3], and close the corresponding output port when pressing [F4].Green "●" means the output is valid, red "●" means the output is invalid, and can be used to test whether the output port works properly.

Figure 8.1 Output port diagnosis

8.3 Date time

Set the date and time of the system by pressing [F5], as shown in Fig. 8.3, under the system diagnostic interface.

Figure 8.2, System Time

Move the cursor below the corresponding date or time or week, and press [] or [] to adjust the system time.

8.4 Manufacturer management

In the diagnostic interface, press [F6] manufacturer management, the system restore, screen calibration and other operations.

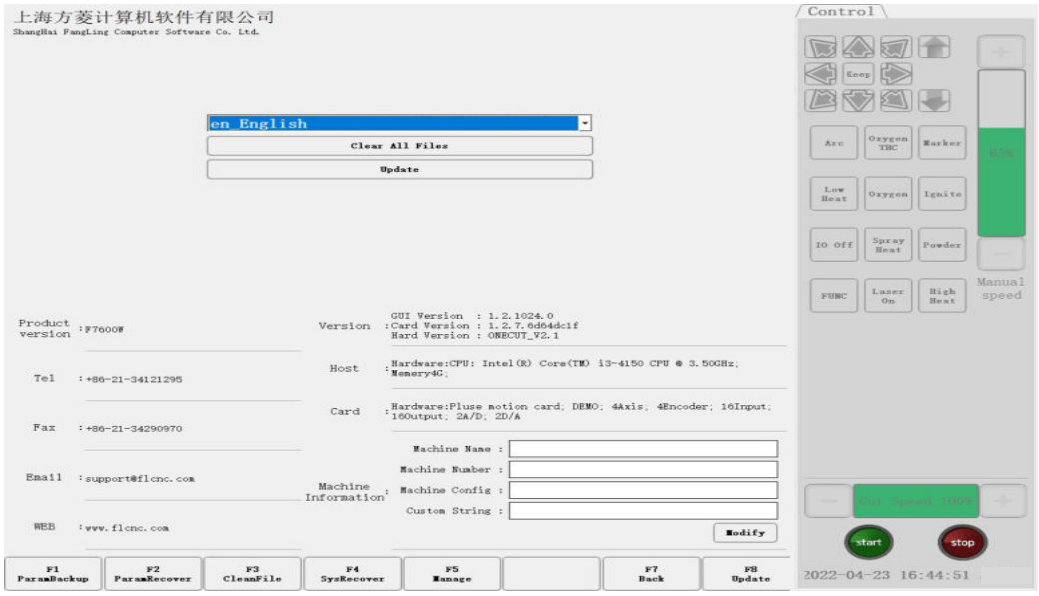


Figure 8.3, manufacturer management

First, put the upgrade file in the optimal disk, and then plug into the USB interface of the system.In the manufacturer management interface, as shown in Figure 8.4, select [F8] upgrade, the system will pop up the upgrade interface, as shown in FIG. 8.5, you can upgrade the system, or change the boot picture, and the logo picture in the upper left corner of the host face.

Description: The F7600 Series upgrade: When the system is the F7600 series, the upgrade popup displays the OneCut Controller Upgrade, which only upgrades the motion controller function.Upgrade the host operation software using the installation package exe file.

Figure 8.4, Upgrade interface

- Update the manufacturer information: the manufacturer information can be updated according to the actual requirements.
- Update welcome picture: choose the excellent disk inside the good boot picture, click to confirm, the next boot will use is a new boot picture.Welcome picture format requirements: picture size 800 * 600 pixels, picture format BMP, JPG, PNG.
- Update logo: Select the logo image to update, click confirm, restart the system, and use the new logo.L ogo picture format requirements: picture size 200 * 30 pixels, picture format BMP, JPG, PNG.

8.4.1 System restore, parameter backup / restore

In Figure 8.4 manufacturer management interface, select [F 4] system restore to restore system parameters to factory parameters.After the restore is successful, the system will automatically restart.Select [F1] to back up the parameters debugged by the manufacturer.Press [F2] to restore the parameters backed up by the manufacturer.For the F7600 series, the manufacturer backup restore address is D: \ backup \ f7600w \ parameter \ F7600param.xml.

8.4.2 manage

In Figure 8.5, click [F 5] to enter the management interface, as shown in Figure 8.This interface can encrypt and decrypt the system.Click the [About] button to see the version number of the system.When the system is started, if there is an authorization error, the system will directly enter this interface.

Figure 8.5, Management interface

Click the [F 3 password] button, and the password reset dialog box will pop up.The default old password is null.The manufacturer can change the new password.After the manufacturer changes the new password, the original authorization will be invalid, and we need to contact the company for re-authorization.During the authorization, the manufacturer needs to provide the modified password and the ID number. The ID number is displayed in the interface, as shown in Figure 8.7.The password is different, and the generated authorization will be different.If the password provided by the manufacturer is wrong, the authorization generated by the company is invalid.**So the manufacturer must keep in mind the modified password.**

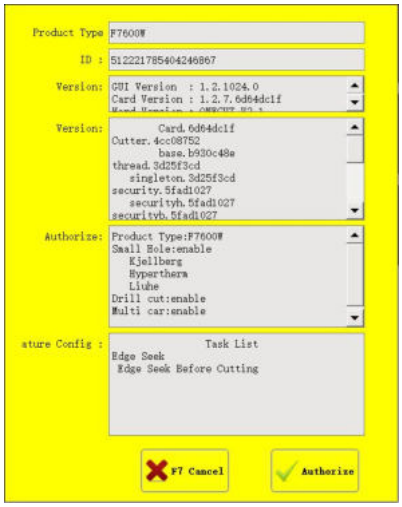


Figure 8.7 About the interface

When the authorization expires, click [F 4] to display the decryption dialog box.Enter a new authorization code for reauthorization.After the successful authorization, the authorization days of the decryption dialog box is updated.

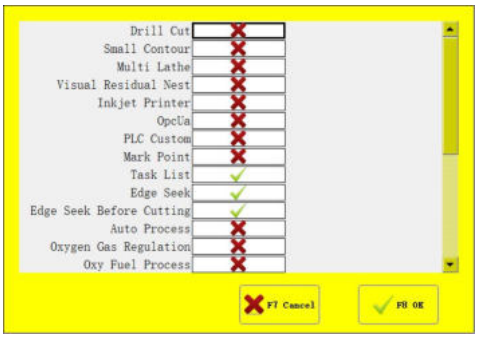


Figure 8.8 Functional configuration

Click F6 to select the functions that need to be turned on or off, and the program will be automatically restarted after confirmation.

8.5 Shaking rod calibration

For the diagnostic interface shown in Figure 8.1, enter the rocker according to F7, as shown in Figure 8.9:

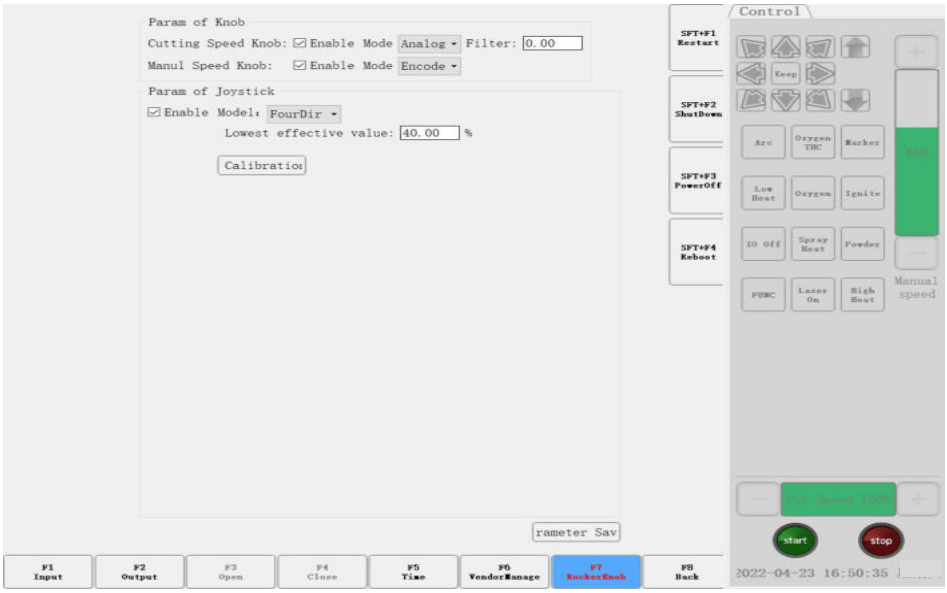


Figure 8.9, joystick calibration

This interface has two parts

Knob parameter interface:

1. Cutting speed knob enables: used to control whether the cutting speed knob on the system works.
2. Manual speed control knob enables: used to control whether the manual speed control knob on the system works.
3. Knob mode: you can choose the analog quantity and the encoder mode.
    1. Knob filter: When the knob rotation range is less than the filter value, the knob rotation will not work.

Shaker bar parameter interface:

1. Rocker enables: used to control whether the rocker on the system works.
2. Model: you can choose four directions and eight directions.
3. Minimum effective value: When the rocker offset is less than the effective value, the rocker will not work.
4. Calibration guidance: according to the prompt steps to complete the swing rod calibration guidance, can remove the impact of inaccurate joystick.

8.6 Restart and shutdown of the program

On the right side of the system diagnostic interface as shown in Figure 8.1, there are two buttons [restart program] [close program].Through these two buttons can restart the program with a closed function.

8.7 shut down

On the right side of the Figure 8.1 system diagnosis interface, this button [SFT + F3 shutdown].

8.8 Restart the shaft card

On the right side of the system diagnosis interface as shown in Figure 8.1, there is a button [SFT + F 4 restart shaft card].Through this button can achieve the shaft card restart function.When using this function, the program must be connected to the shaft card, otherwise there will be an error reminder, waiting for the shaft card to restart successfully, the program will automatically restart.

Chapter 9manual function

Click [F7 Manual Movement] on the main interface of the system to display the manual moving panel.As shown in Figure 9.1, the manual moving mode can be switched through the [F] key, which is divided into three ways: click moving, connection moving and length setting.The four directions of the machine tool can be manually moved by the left and right keys.

Figure 9.1 Manual main interface

The speed in the manual state is controlled by the manual moving speed parameter in the common parameters.When manual movement, press HOME acceleration, EN D to slow, or press the number key under the manual interface, the system speed is automatically adjusted to the percentage of 10 times the corresponding number. For example, press the number [3], the speed is automatically adjusted to 30%; press the number [8], the speed is automatically adjusted to 80%.

9.1 crawl

In the main interface, switch the manual moving mode through the [F] key. In the click mode, press either direction key, the system will move in that direction, release the direction key, and the system stops moving.

9.2 Even move

In the main interface, switch the [F] manual moving mode. In the connection mode, press either direction key and release, the system will move in that direction, press either direction key or [Stop] key again, and the system stops moving.

9.3 Fixed long movement

In the main interface, switch through [F], in the length mode.The system can set the long distance by using the [G] key.

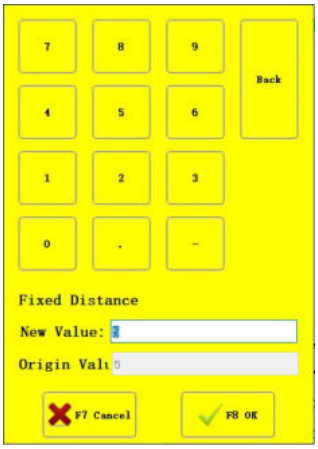


Figure 9.2 Input the long distance

After entering the fixed length distance, press [F8] to confirm.At this point, press either direction key and release, the system will move for a long distance and then stop automatically. During the movement, if either direction key or [stop] key is pressed, the system will stop moving.

9.4 Break point recovery

Breakpoint recovery function, mainly used in the case of power failure during the cutting process and the need to temporarily stop the cutting to deal with other things.To ensure the normal use of the breakpoint recovery function, the following conditions should be met:

1. When the system is in a pause state, the system automatically remembers the current pause point as a breakpoint.

2. The system is in cutting operation. In the case of power failure, the system will remember the position of the power failure as a breakpoint.

3. When you need to continue processing from the breakpoint, after the system is powered up, do not move the position of the cutting torch, and enter the manual moving interface by pressing [F7] at the main interface, as shown in Figure 9.3, and then press the [F6] breakpoint to recover.After recovery, if the torch is not moved and just in the position before power failure, press [START] and the system will start processing directly from the breakpoint.

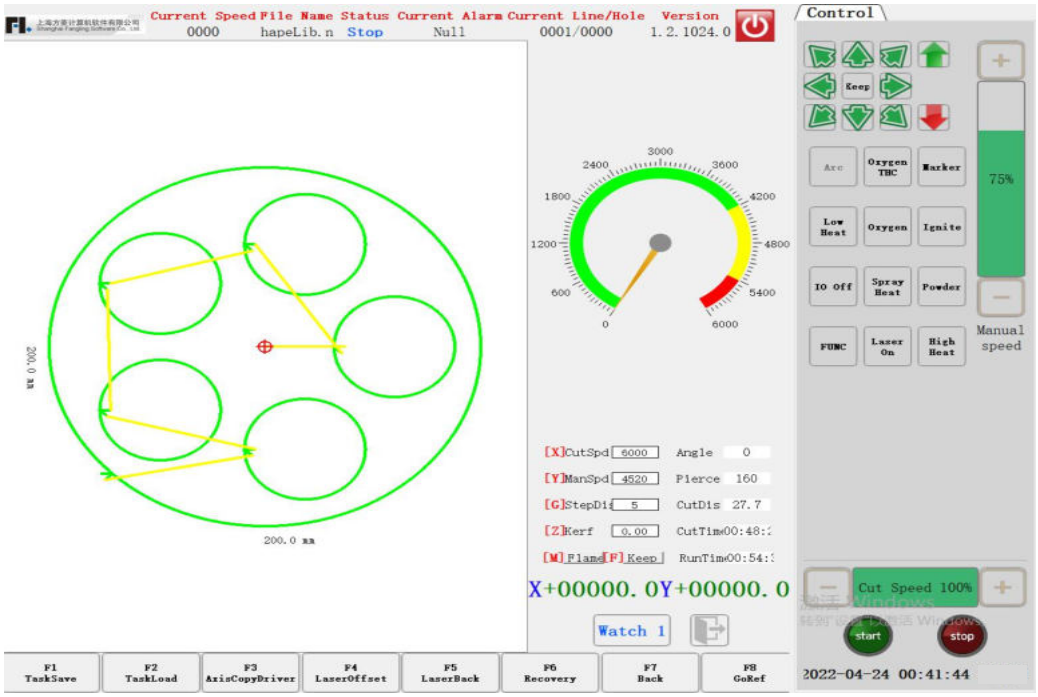


Figure 9.3 Manual interface

After performing the breakpoint recovery, if the current position deviates from the power-off position, you can manually move the cutting torch to the actual breakpoint and use the offset cutting function to offset the cutting torch to the correct cutting path.For example, through the retreat function, move the torch to the perforation point of a part, if the torch position is not in the actual perforation position, you can manually move the torch to the correct perforation position, and then press the start button, by selecting [X] offset cutting.It can also be restored by hole selection or row selection function.(See 6.5).

9.5 Laser bias

Laser offset function means that the user adds a positioning device (laser cross positioning mark or laser point) next to the cutting torch. The distance between the positioning device and the cutting torch is fixed, and this distance parameter is set in the system parameters (Section 7.5).Using this function, users can let the cutting torch bias back to the positioning point after the positioning is completed, mainly applied for steel plate correction, steel plate starting point search, etc.

[F4] Laser offset: Move the cross cursor to the position of the original cutting torch.

[F5] Laser return: Move the cutting torch to the cross cursor position.

9.6 How many cars

9.6.1 Multi-small car configuration interface

After the X-axis parameter configuration in [F 4 parameter setting] - - [F5 system] - - [F 2 axis parameter], the multi-car function can be used after starting the car program (note: the shaft card must be restarted after the multi-car function can be used normally), and enter the manual interface by [F 7 manual] - - [F 3 multi-car manual], as shown in the figure below:

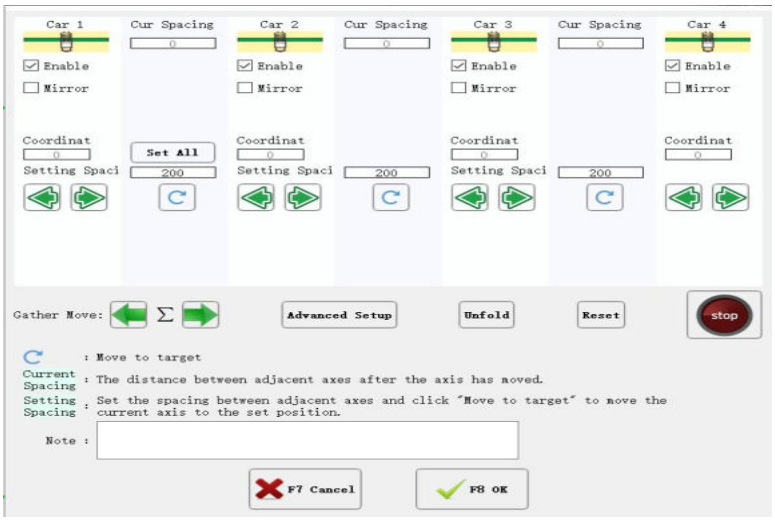


Figure 9.4 Multi-trolley configuration interface

Description of the configuration interface function:

- mode of exercise
- Close motion: When moving, the axes of enabling energy move together (the axis coordinates of enabling energy change).Axis not moved (coordinates do not change).
- Single-axis motion: The current axis can move left and right.
- Ability: to a single axis, enable or close, enable the axis, can be moved.
- Mirror: configure the mirror axis that moves in the opposite direction on the beam.
- Coordinate point: real-time coordinates of the current axis.
- Set movement: enabling axes move left or right together.
- Set spacing: set the spacing between two adjacent axes, can set the spacing of each axis separately, or can first set the spacing of axis 1-2, and then click a key to set, the rest of the axis spacing is the same as 1-2 axis.
- Real-time spacing: the distance between the two adjacent axes after the axis is moved.
- Expand: set the set spacing after click to expand, take the 4 cars as an example, car 2,3,4 will move to the right with car 1,2 cars reach the set spacing after stop, 3,4 cars continue to move, 3 cars reach the set spacing after stop, 4 cars continue to move to the set spacing after stop.

- Reduction: set the initial spacing in the advanced parameters, 4 car, for example,

the car after click the reset, car 2,3,4 will move on car 1 to the left, 2 cars to set the spacing, 3,4 cars continue to move, 3 car to set spacing after stop, 4 cars continue to move to set spacing.

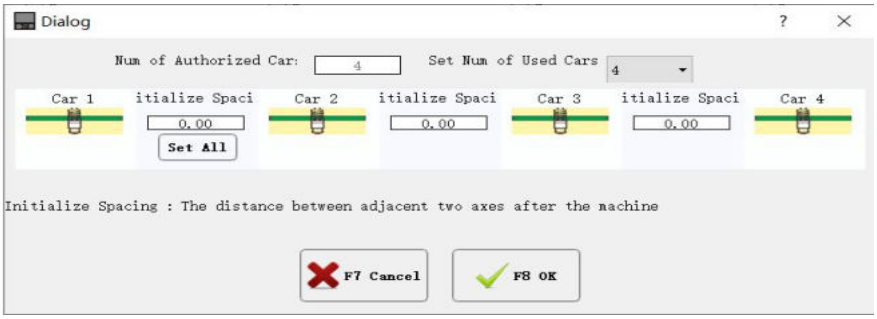


Figure 9.5 Multi-trolley advanced parameter interface

- Number of authorized cars: the number of authorized usable cars.
- Set the number of cars used: select the number of cars to be used.
- Initial spacing: the spacing between two adjacent axes after the machine is reset.

remarks:

When using the multi-car function, confirm and measure the reset spacing of each car (not the distance to the limit as the initial spacing), input and save the initial spacing; use one key expansion and reset function, first set the spacing of the small workshop, click to expand, the enabling car will be expanded in turn in the above way, and the car will reset to the initial spacing according to the above way.

In addition, it is best to do a zero back before the use of multi-car function, and do zero after the sudden power off or external force to shift to ensure the accuracy of coordinates.

9.6.2 Axis wiring

When "double trolley enables" enables, use "shaft 1", "shaft 4" and 2 shaft output terminals on the control card.The Z-axis used in the Drilling and Cut feature is not available.

9.7 Task save and Recovery

In actual production, you can pause a cutting drawing and add an urgent drawing.In this case, the task save and recovery capabilities are used.The premise of using the task saving function is not to move the suspended cut sheet.

9.7.1 Task saving

The task save operation steps are as follows:

1. Pause the cut pattern and exit the cutting state.
2. Click [F 7 manual Movement] on the main interface to switch to the manual moving

interface.

3. Click the [F1 Task Save] button on the manual moving interface.

4. Enter the task name in the pop-up dialog box, and then click OK.

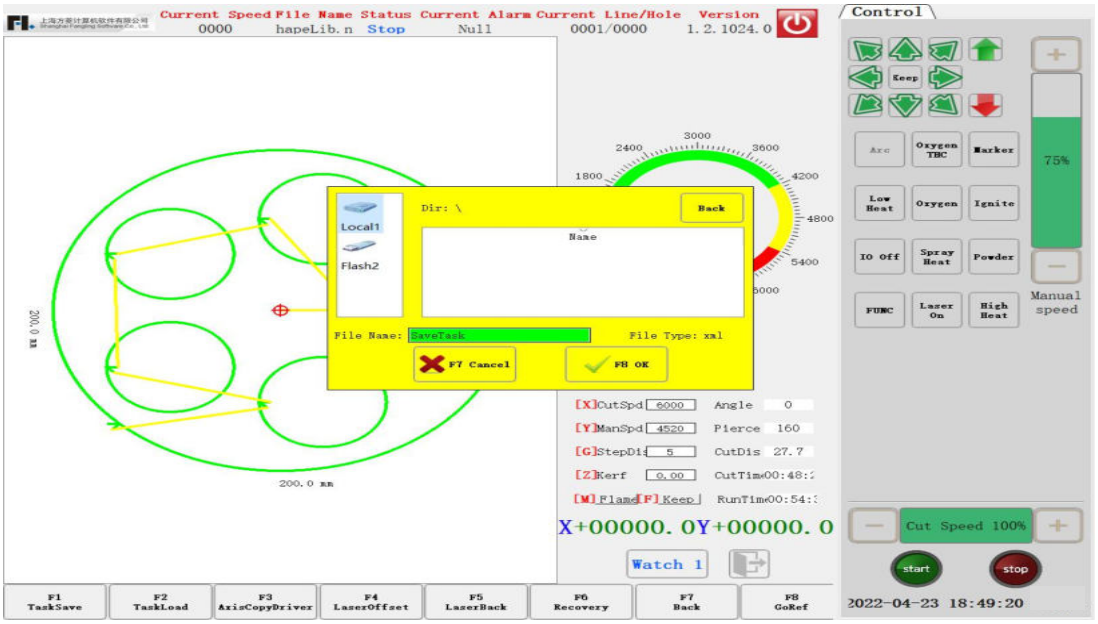


Figure 9.6 Task Saving

5. Manually move the cut gun to the machining position of the drawing to be cut.

6. Process urgent required graphics.

9.7.2 Mission recovery

Task recovery, operation steps:

1. After the emergency graphics processing, switch to the manual moving interface.

2. Move the cut gun to the breakpoint of the previously unfinished drawing by manual shift.

3. Click the [F 2 Task Recovery] button to select the task to recover in the pop-up dialog box.Click the confirmation button after selecting.

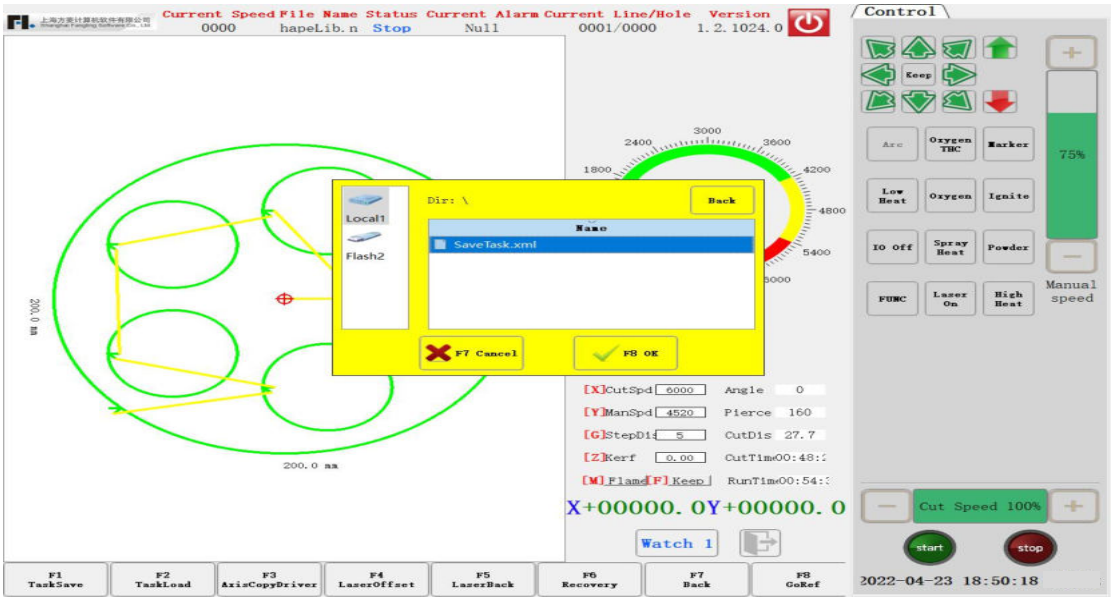


Figure 9.7 Task Recovery

4. After a successful recovery, the program switches to the cutting interface with a "Recovery Success" prompt.Then click the [F9] button to continue the unfinished cutting.

Chapter 10 Terminal description

10.1 F1219F back wiring instructions

As shown in Figure 10.1, it is the F 7600W back interface diagram, CN1 is the power supply input port, CN2 is the communication port, and the connection port of the shaft card, and the network interface.The interface definitions for CN1 and CN2 are detailed in Table 10.1.

Figure 10.1 F7600W back surface interface diagram

Table 10.1 Interface Definitions for C N 1 and CN2

CN1	1	12V power supply is positive	import
	3	The 12V power supply is negative	
	5	The regular beginning of a power switch	Signal switch terminal, 24V, 3A
	7		
	else	reserve	
CN2	3	CANL	The CAN bus connecting the FCB and the F 7600 axis card
	4	CANH	
	21	The panel emergency stop switch often closes the contacts	
	22		
	23	The panel emergency stop switch often closes the contacts	
	24		
	else	reserve	

explain:

1,3 and 4 of CN 2, CAN H and CANL of the C A N bus connecting the F7600 motion controller, and CANH and CANL of the FCB plate.Otherwise the knob on the panel, as well as the joystick, and lift buttons cannot be used.

2. CN 221,22,23,24 are two pairs of normally closed contacts of the emergency stop switch on the panel, and the customer can freely connect them.

Axft card connection: network interface connected using the network cable and F7600 motion controller.

Network connection: the Internet network connection port.

10.2 The F 1219F internal wiring diagram

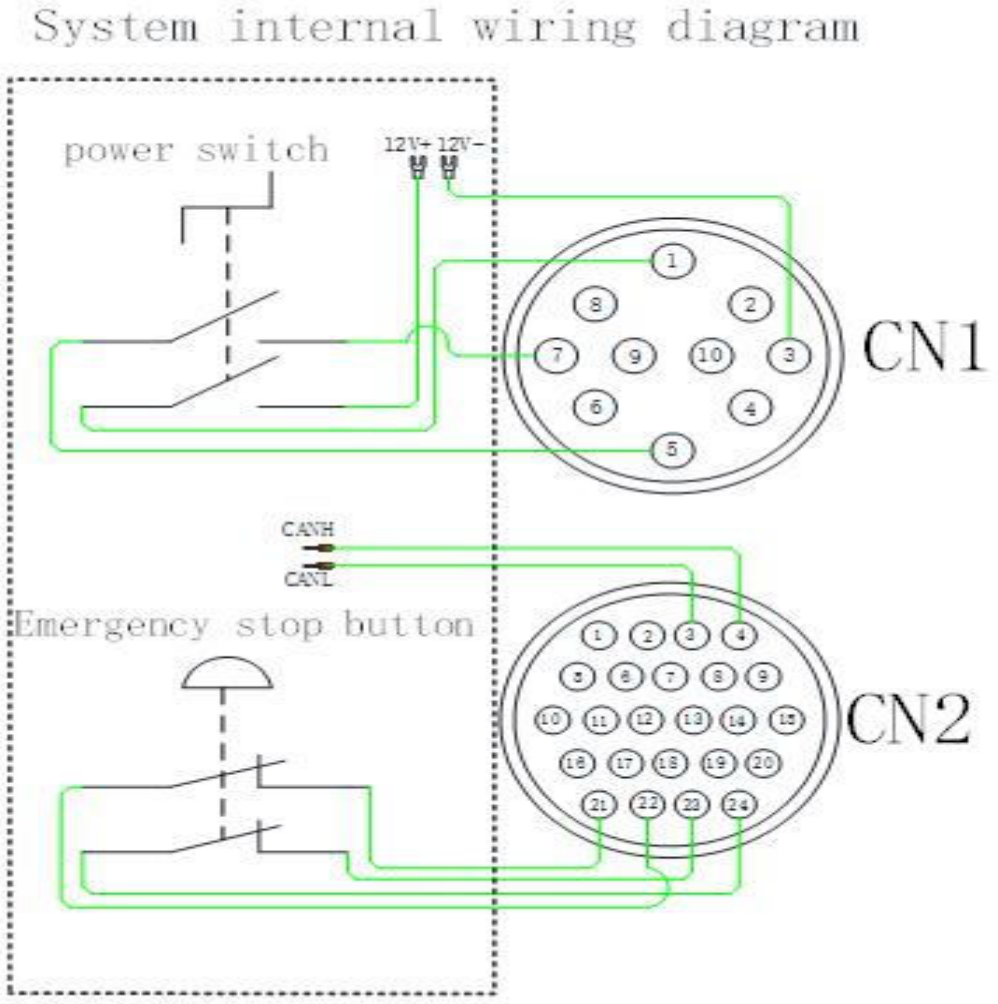


Figure 10.2 Wiring diagram inside the system

10.3 F7000 V 2.0 Motion Controller interface description

10.3.1 F7000 V2.0 Movement Controller Description

F7000 V2.0 motion controller uses network bus communication, including 6 axis servo drive ports, 16 general output ports, 16 general input ports, RS232, RS485 and CAN bus interfaces, 20~10V analog output ports and 20~10V analog input ports, and DC 24V power supply ports.

10.3.2 Interface layout

The overall interface layout diagram of the F7000 V2.0 motion controller, as shown in Figure 10.3

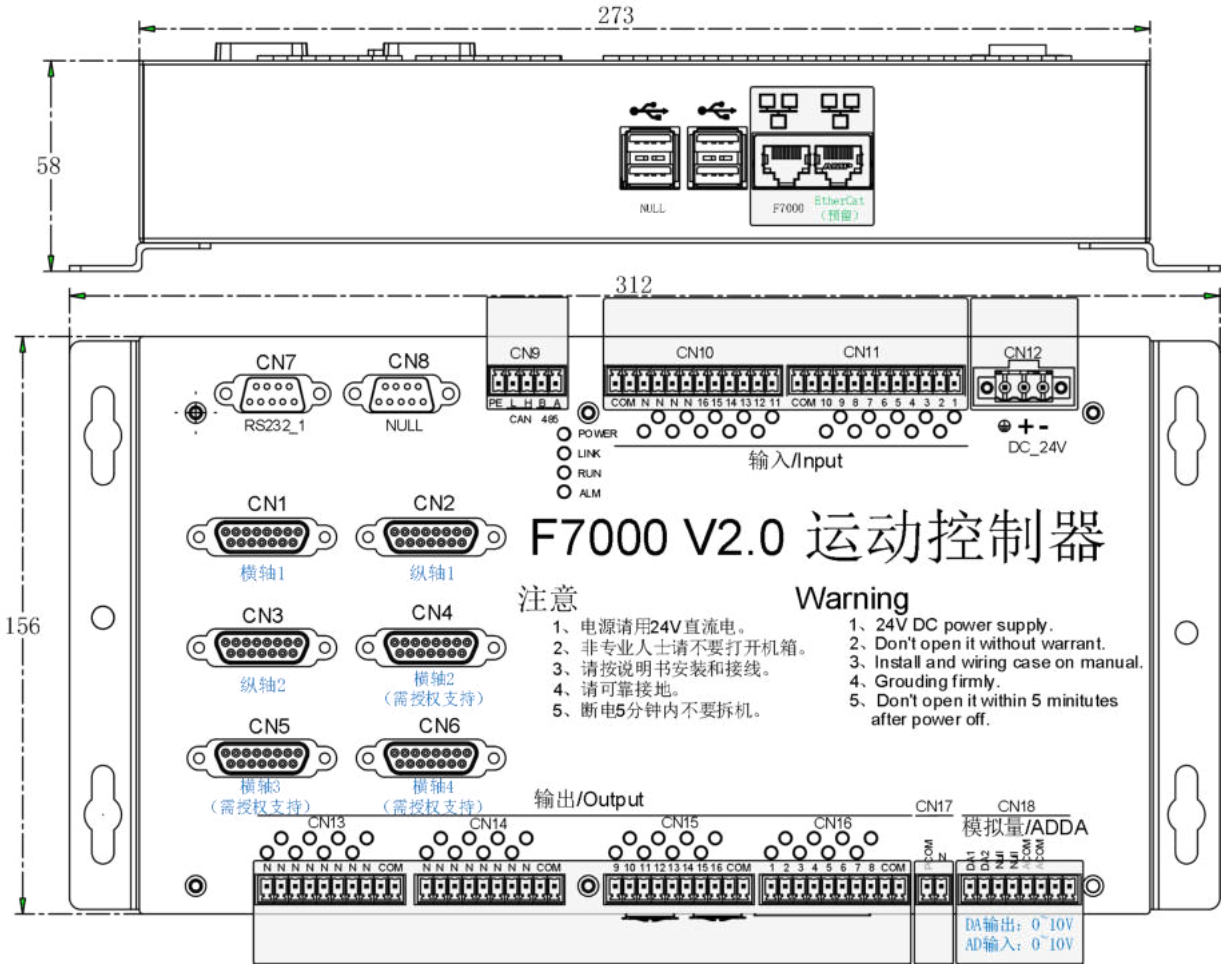


Figure 10.3 F7000 V2.0 Movement Controller

10.3.3 Description of power interface

Power input interface CN 12, DC _24V, power supply DC 24V, 3A.As shown in Table 10.2.

Table 10.2 Description of the power supply interface

The CN 12 power supply interface pin	**Signal name**	**remarks**
1	24V negative	DC 24V power supply ground
2	24V is	The DC 24V power supply is positive
3	ground	ground stud

10.3.4 Servo control interface

F7000 V2.0 has 6 pulse servo control ports, respectively CN1, CN2, CN3, CN4, CN5, CN6, and 6 DB 15 (double row) master head ports.See Table 10.3.

Table 10.3 Interface Order Definition Table

order number	explain	control method
CN 1	Cross axis 1	Pulse + direction
CN 2	Vertical axis 1	Pulse + direction
CN 3	Vertical axis 2	Pulse + direction
CN 4	Cross axis 2	Pulse + direction
CN5	Horizontal axis 3	Pulse + direction
CN6	Cross axis 4	Pulse + direction

Note: Horizontal axis 2, horizontal axis 3 and horizontal axis 4 are horizontal independent servo axes, requiring software authorization support.

The servo control interface is shown in Figure 10.4, and the interface pins are defined in Table 10.4.

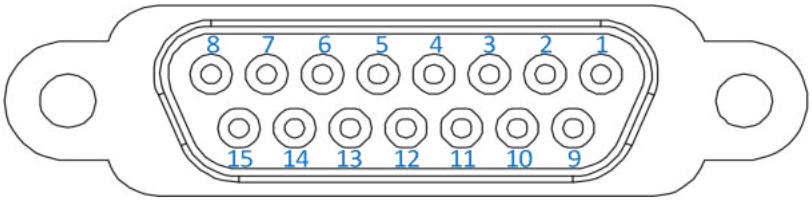


Figure 10.4 Definition diagram of the servo interface pin

Table 10.4 Interface pin definition table

Lead the foot number	**Signal name**	**Lead the foot number**	**Signal name**
1	Pulse positive CP +	9	Pulse negative CP-
2	Direction	10	Direction

	positive DIR +		Negative DIR-
3	encoder A+	11	encoder A-
4	encoder B+	12	encoder B-
5	encoder Z+	13	encoder Z-
6	The SON servo enables the output	14	ALM servo alarm input
7		15	24V power supply ground
8	24V Power Supply Positive (output)		

1-CP +, 9-CP-: Servo control pulse (PLUS) signal, differential output signal

2-DIR +, 10-DIR-: Servo control direction (DIR) signal, differential output signal

3-A +, 11-A-: servo encoder-phase A input signal, differential input signal

4-B +, 12-B-: servo encoder-phase B input signal, differential input signal

5-Z +, 13-Z-: Z phase input signal, differential input signal

6-SON: Servo control enables output signal, default low effective, can be changed to high effective through the jumper

14-ALM: servo alarm input signal, default low effective, can be changed to high effective through the jumper

8-24V +, 15-24V-: DC 24V power output to power the drive.

In Y-shaft single drive, CN1 is the horizontal shaft 1 motor interface and CN2 is the vertical shaft 1 motor interface.As shown in Figure 10.5 below.

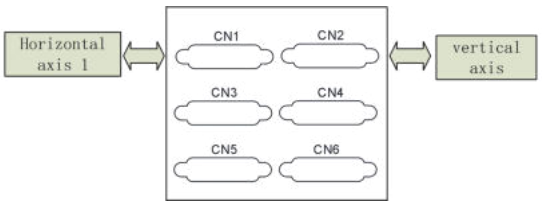


Figure 10.5 Single-drive motor interface

In the axis parameter configuration interface, when the [bilateral drive] parameter of the Y axis is checked, the CN1 port is the horizontal axis 1 motor interface.CN2 and CN3 ports are vertical shaft 1 and vertical shaft 2 motor interfaces respectively.As shown in Figure 10.6 below.

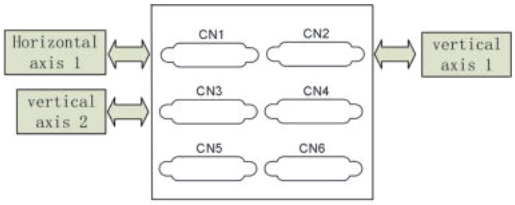


Figure 10.6 Dual-drive motor interface

Note: When the true bilateral gantry side (gantry dual drive), the encoder feedback of the longitudinal shaft 1 and longitudinal shaft 2 must be connected, otherwise the machine will be moved when the unilateral gantry side motor is damaged, and the machine beam will be sprained.

10.3.5 Analog quantity output interface

The F7000 V2.0 motion controller has two analog DA output signals and two analog AD input signals, both from 0~10V. The AD input can be used for the input signal of the laser displacement sensor in the automatic edge seeking.The DA output signal is reserved as a standby interface.

Table 10.5 Definition of analog volume interface

Analog quantity interface pin number	Signal name	explain
1	DA 1	Analog volume output port
2	DA 2	Analog volume output port
3	empty	empty
4	empty	empty
5	AD 1	Analog quantity input port
6	AD2	Analog quantity input port
7	A COM	Simulation quantity is a common ground line
8	A COM	Simulation quantity is a common ground line

10.3.6 Input port wiring instructions

Input port is photoelectric isolated input, low and effective.The input signal may be a mechanical contact switch or a photoelectric switch supporting a constant open and closed input.The common end of the external switch is 24VGND, and the other end is connected to the corresponding input port.The schematic circuit diagram inside

the input port is shown in Figure 10.7.

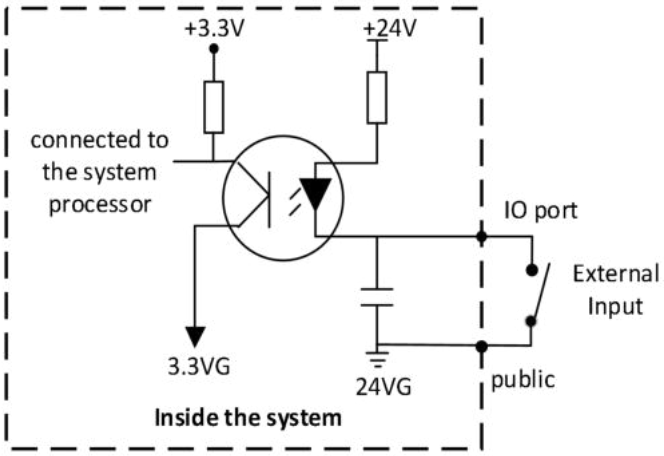


Figure 10.7 Schematic diagram of general input port

There are 16 universal input ports, and all input ports support customization.Support for serial number customization.

Table 10.6 Input port definition

Input port CN11	**Signal name**	**remarks**	Input port CN10	**Signal name**	**remarks**
1	Front limit		11	empty	Unconfigured
2	After the limit		12	empty	Unconfigured
3	left limit		13	empty	Unconfigured
4	right limit		14	empty	Unconfigured
5	jerk		15	empty	Unconfigured
6	The arc is successfully fed back		16	empty	Unconfigured
7	Locate successful feedback		17	NULL	obligate
8	Plasma collision		18	NULL	obligate
9	empty	Unconfigured	19	NULL	obligate
10	empty	Unconfigured	20	NULL	obligate
CO	24VG	24V _GND Power to the ground	C	24VG	+24V _GND Power to the ground

Description: The input port and function description are the factory default configuration and can be changed through the input port definition.

10.3.7 Output port wiring description

The output voltage is 24V, low level; the common terminal of the external relay coil is 24V + (also 24V + to the system) and the other end of the relay coil is connected to the corresponding IO port.

- The output bears the maximum load current of 300m A.
- A total of 16-channel output ports.
- Its typical output port interface circuit is shown in Figure 10.8.

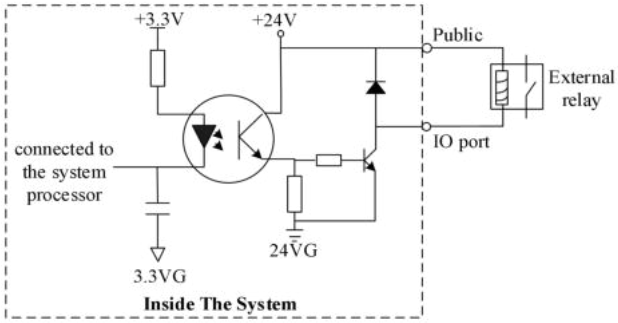


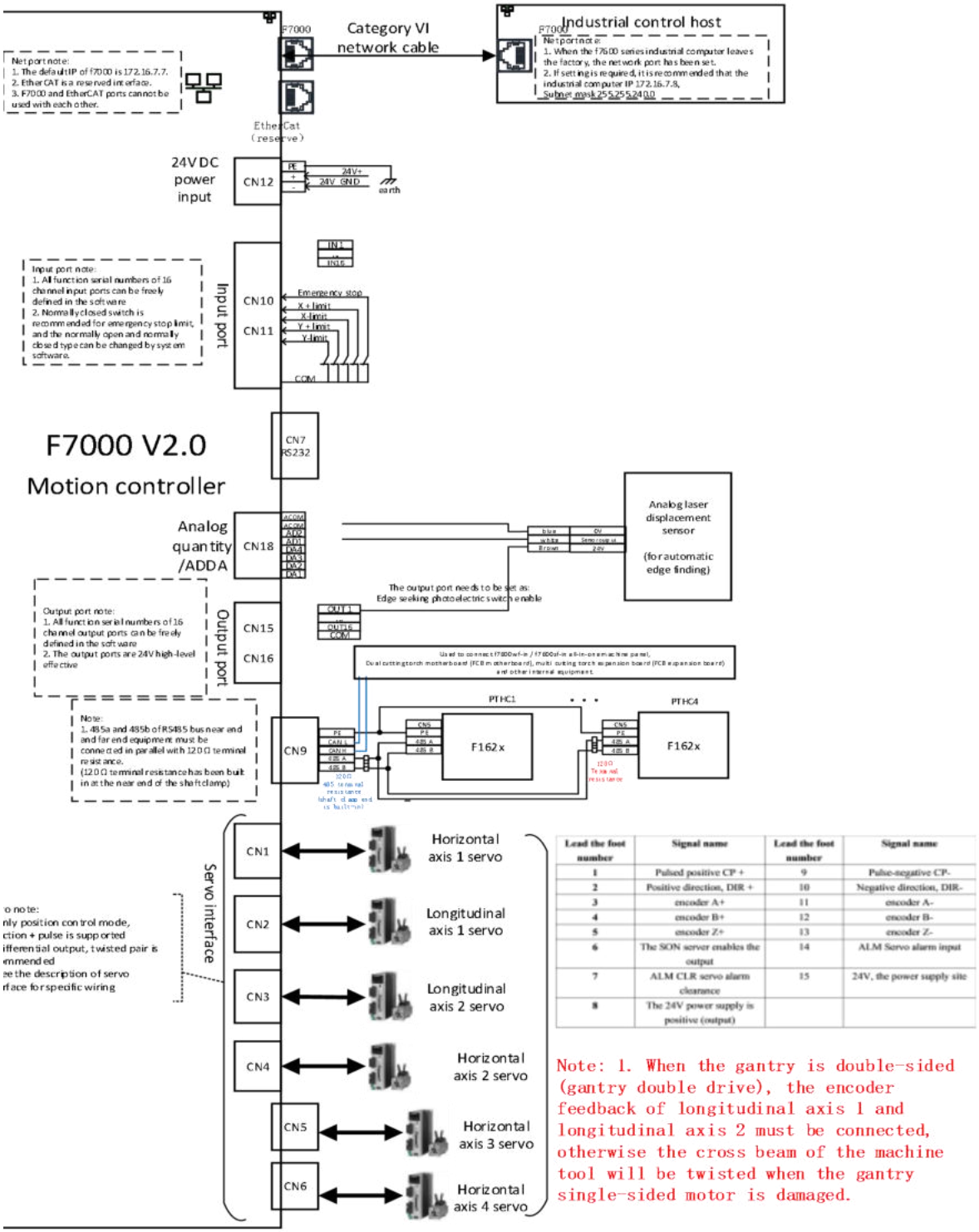
Figure 10.8 Schematic diagram of the output interface circuit

Out16	Signal name	remarks	Out15	Signal name	remarks
1	stir up trouble		9	air-vent	
2	Low pressure preheating		10	Capaciance elevation box enables	
3	High pressure preheating		11	Plasma positioning	
4	Low pressure cutting oxygen		12	Plasma arcs	
5	Medium pressure cutting oxygen		13	Turn off and turn up (Corner signal)	
6	High pressure cutting oxygen		14	dusting	
7	Cut torch rise		15	Yang powder	

8	Cut torch drop		16	Spray powder preheating	
CO	24VG	+24V Power to	CO	24VG	+24V Power to

Table7.10 Output port definitions

10.3.8 F7000 V2.0 motion controller general wiring diagram



Lead the foot number	Signal name	Lead the foot number	Signal name
1	Pulsed positive CP +	9	Pulse-negative CP-
2	Positive direction, DIR +	10	Negative direction, DIR-
3	encoder A+	11	encoder A-
4	encoder B+	12	encoder B-
5	encoder Z+	13	encoder Z-
6	The SON server enables the output	14	ALM Servo alarm input
7	ALM CLR servo alarm clearance	15	24V, the power supply site
8	The 24V power supply is positive (output)		

Figure 10.9 F7000 V2.0

10.4 F7600 and FCB1200PC, F1627D / S wiring instructions

The double cut torch motherboard (FCB1200PC) has a five-in-one dial switch, you can choose different working modes.The mode 2, mode 4 and mode 5 described in this paper all refer to the position of the uncoding switch on the double cutting torch motherboard (FCB 1200PC), as shown in the position of number 8 in FIG. 10.10 below.

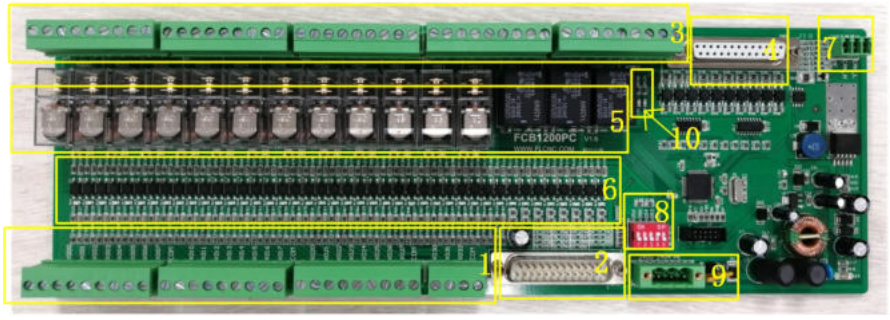


Figure 10.10 Schematic diagram of the double-cut torch main board

The position of 8 in the box above is the —— five dial switch.

SW 1 (X 056): PLC program download control.ON-Download, the OFF does not download.

SW 2 (X055): Extended board selection.ON-Use extension board, OFF-No.

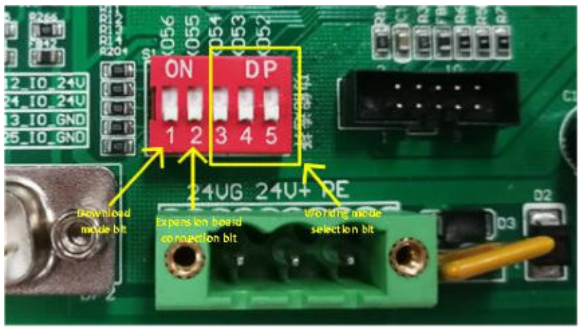


Figure 10.11 Dial code switch

Table 10.12 Code dial switch status selection corresponding mode

work pattern	sw 3 （X54）	sw 4 （X53）	sw 5 （X52）
Mode a	OFF	OFF	OFF
Model 2	OFF	OFF	ON
Model 3	OFF	ON	OFF
Model 4	OFF	ON	ON
Model 5	ON	OFF	OFF
Backup restore	ON	ON	ON

10.5 1 L 1 fire 1 etc, or 2 L 1 fire 2 etc (Mode 2)

- One lifting body, equipped with a flame cutting torch or a plasma cutting torch.
- Or 2 lifting body, the main board connected to the lifting body with a flame or plasma cut torch, the expansion plate connected to the lifting body with a plasma cut torch.

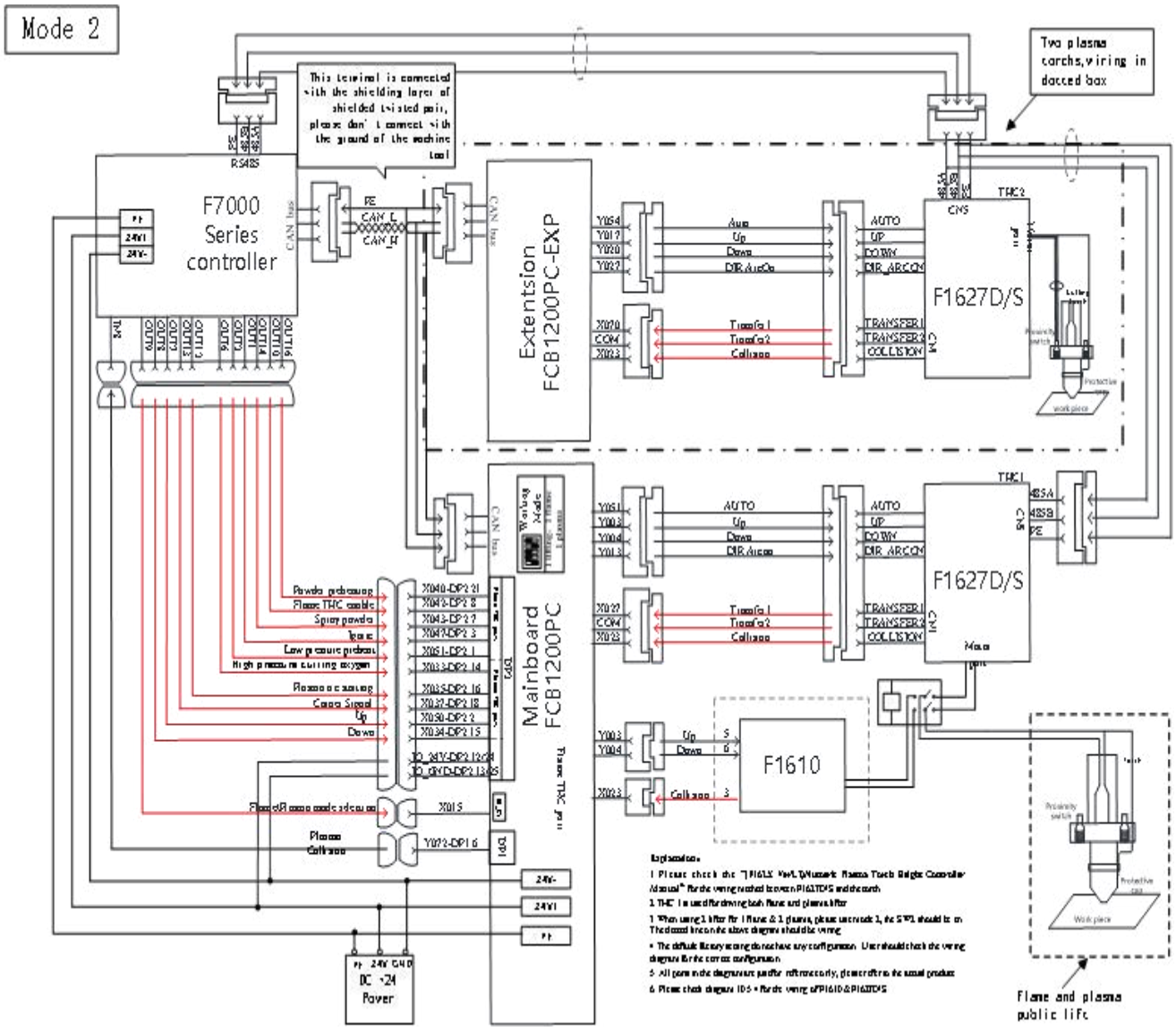


Figure 10.13 Schematic diagram of the two elevation tuners in Mode 2

10.5.1 4 L 4 etc, or 2 L 2 etc (Mode 4)

- Four lifts, each equipped with a plasma cutting torch.
- Or 2 lifts, each lift with a plasma cutting torch.

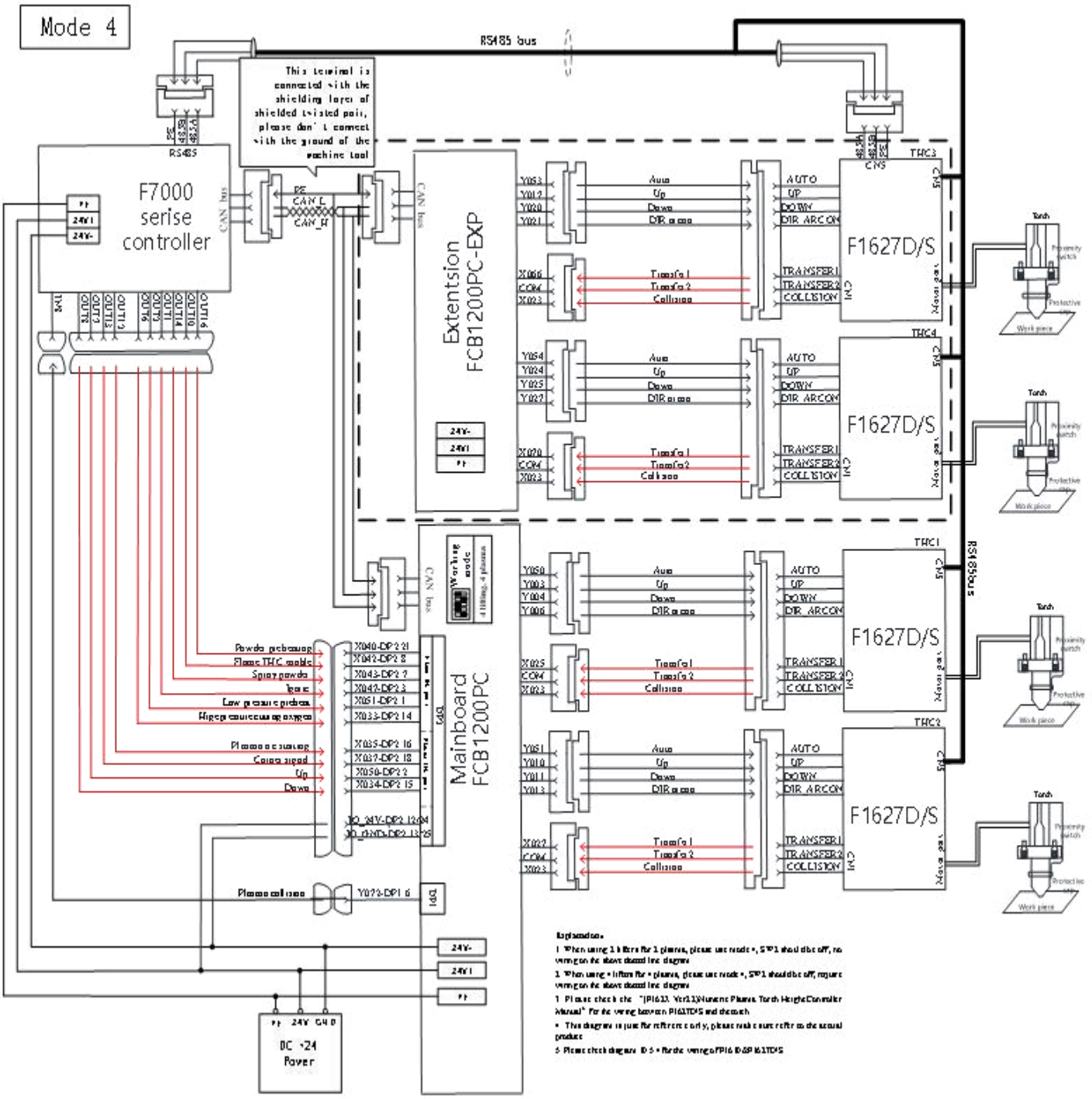


Figure 10.14 Figure of four elevation regulators

10.5.2 2 L 1 fire 1 etc, or 3 L 1 fire 2 etc (Mode 5)

- Two lifts, complete with a flame cut torch and a plasma cut torch.
- Or 3 lifting body, the main board connected to the lifting body with a flame and plasma cut torch, the extension plate connected to the lifting body with a plasma cut torch.

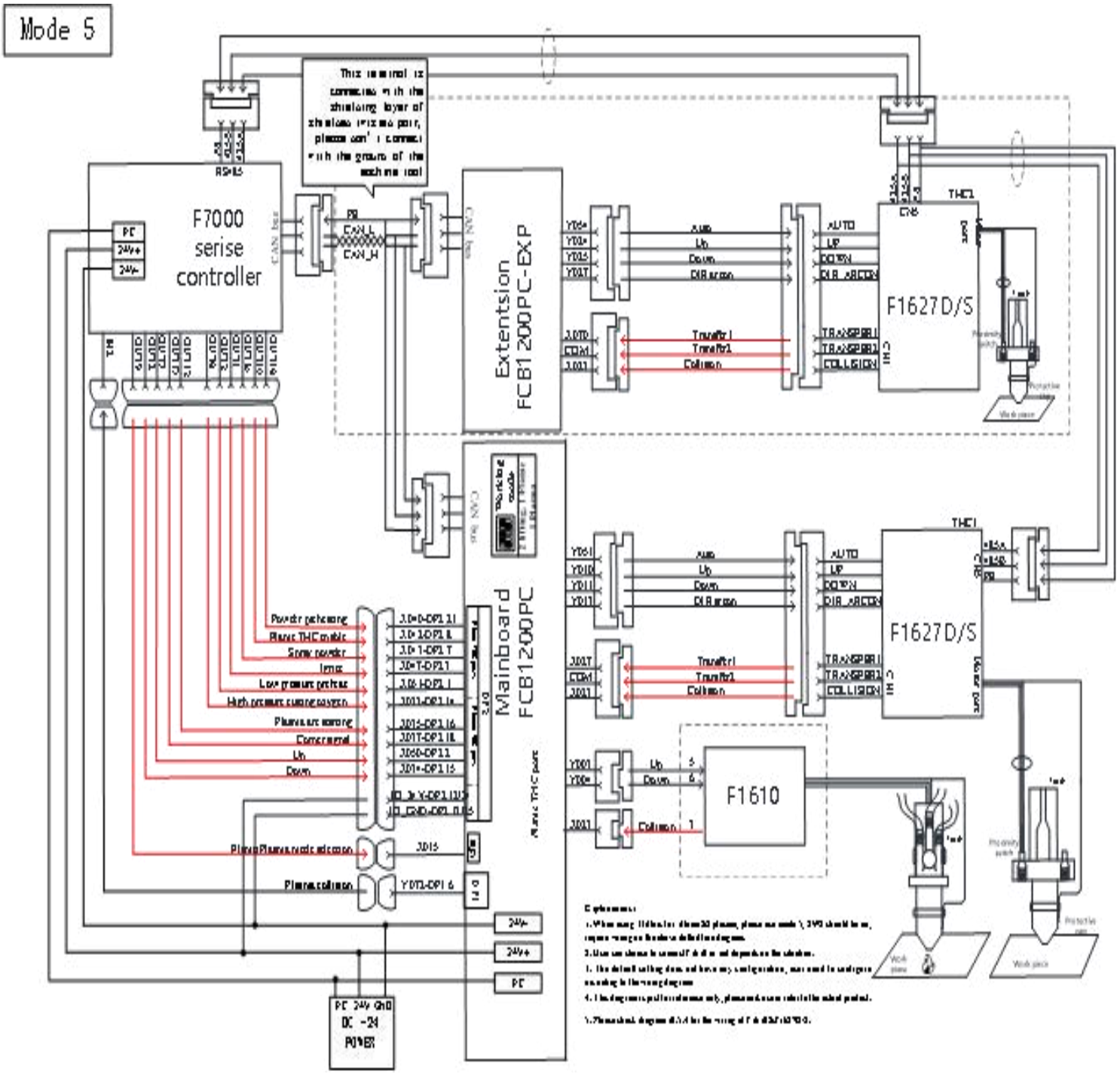


Figure 10.15 Schematic diagram of connecting two elevation tuners in mode 5

10.5.3 For the F1610, the F1627D / S wiring instructions

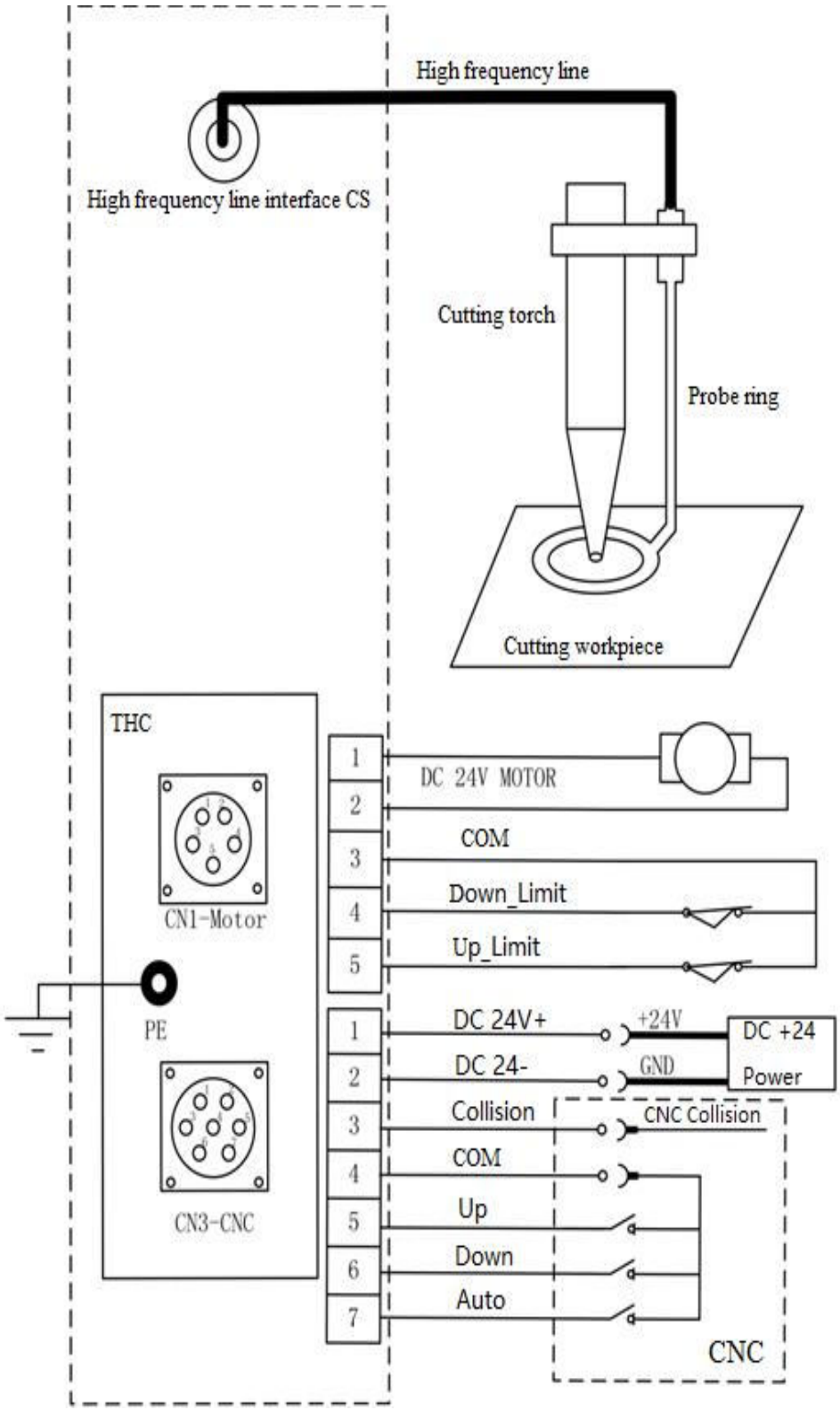
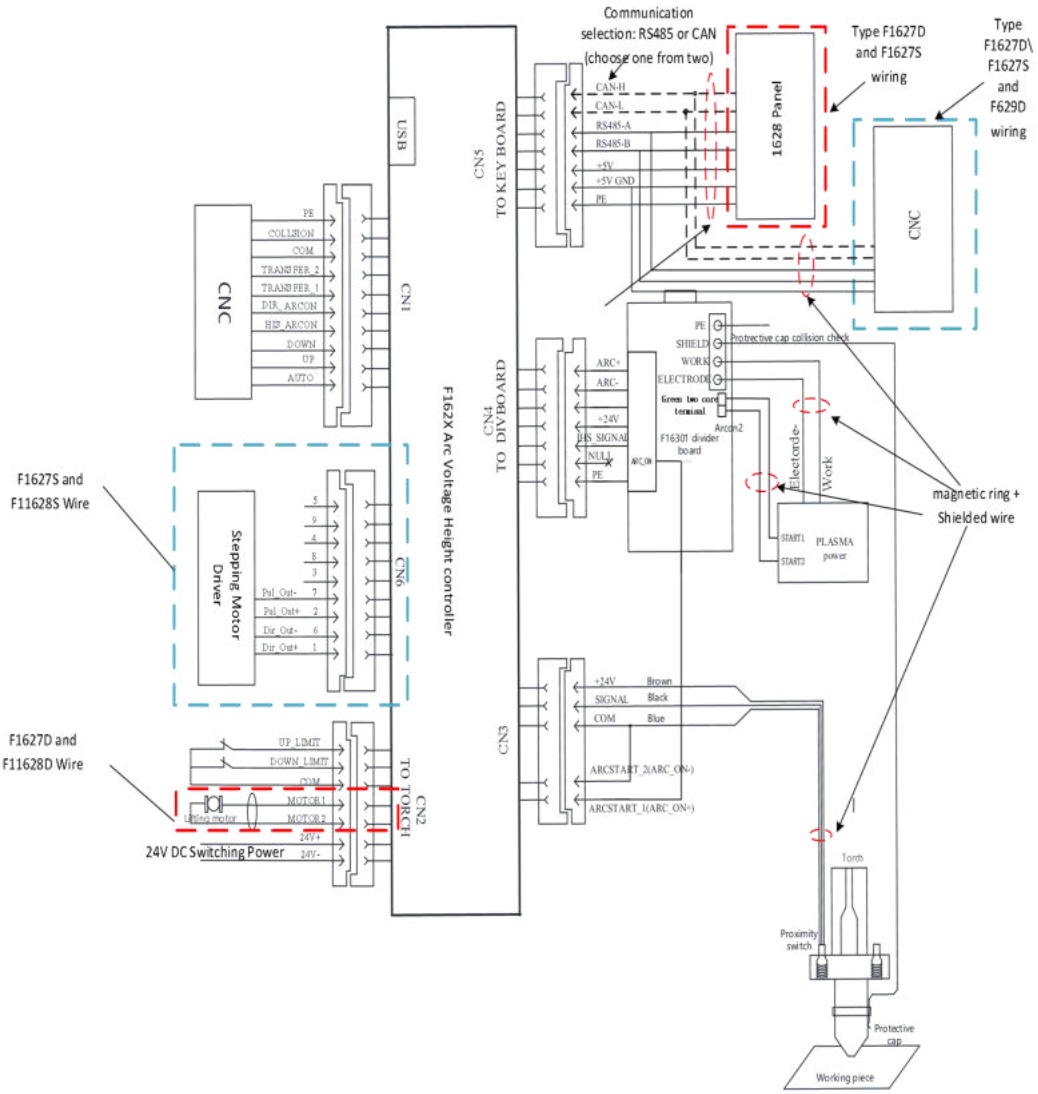
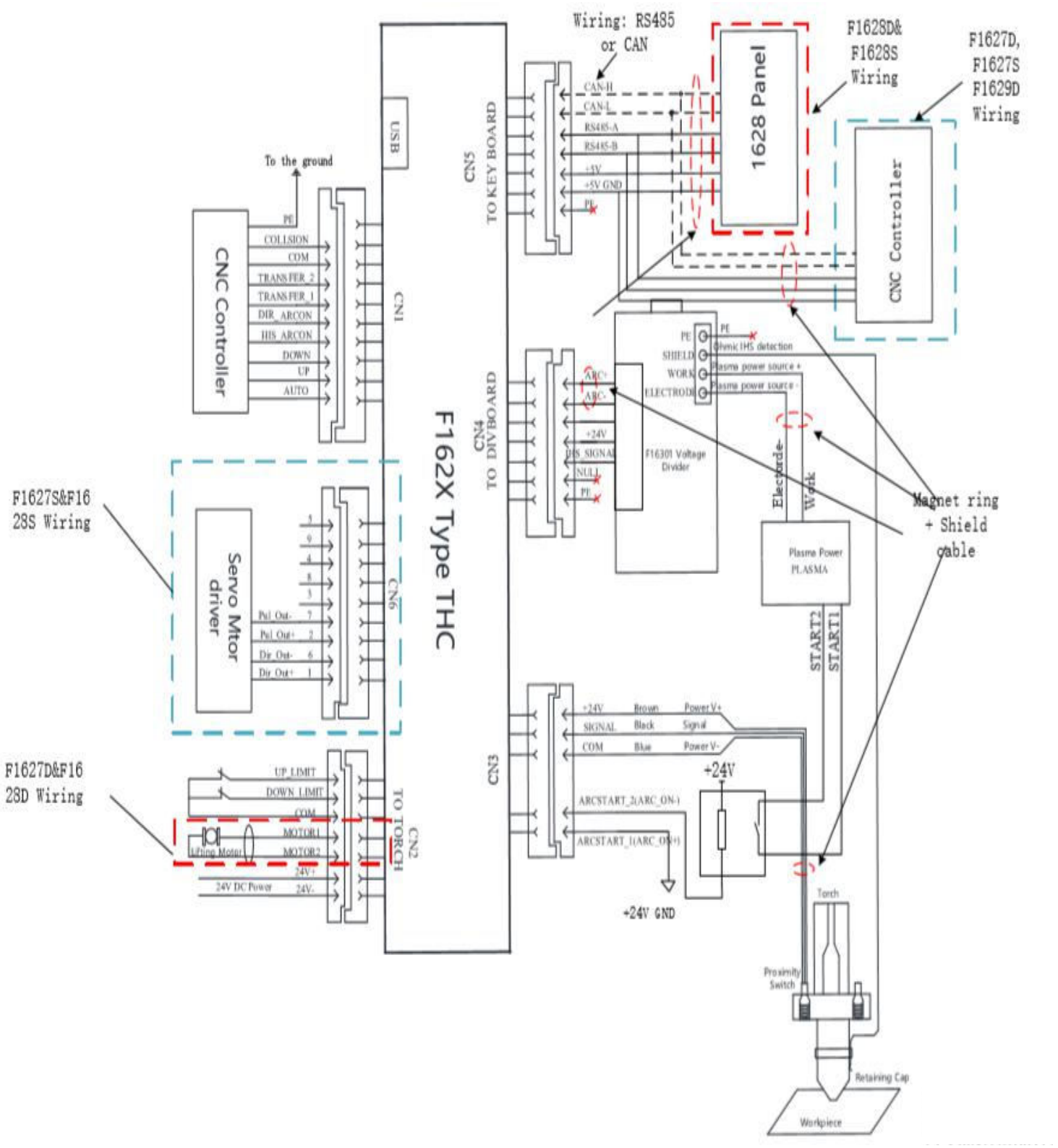


Fig. 10.16 General wiring diagram of F 1610 elevation regulator



（New pressure plate）

Figure 10.17 General wiring diagram of F 1627S elevation regulator



（Old pressure plate）

Figure 10.18 General wiring diagram of F 1627D elevation regulator

10.6 Wiring instructions for the remote control F 1510 and F7600

10.6.1 Introduction to the Remote Control, F1510-T

Performance and characteristics of the wireless remote control module:

1. The 433MHz free ISM frequency band is license-free for trial;
2. Remote control distance> 30m, at least not less than 0.5m;
3. Hardware detection error code, software optimization algorithm, two-way communication, to ensure stable and reliable communication;
4. Send and receiving module match according to address, address can be set manually, up to 128 addresses;
5. Wireless remote control transmission module dry battery power supply, at least 6 months of service time;
6. The receiving module is 8421 or IO with up to 16 output ports.

Remote control layout:

Figure 10.19 Remote Control Layout Drawing

Descriptions of the emitter:

1. key

Start (Start), Stop (Stop), 4 directions (), 1 small hand (Manual), T, T, S +, S-, Ignition (Ignition), Preheat (Preheat), Fast Oxygen (CutOxy), Arc (Plasma), Forward (Forward), Back (Back), Master (Close), ManualRate (ManualRate).Total: 19 keys.

2. pilot lamp

Three manual rate lights (5%, 50%, 100%), three manual mode lights (electric, connected, fixed length).One sending signal indicator, one power indicator (or reuse and signal indicator).

Description: the manual rate is 50% default, manual rate is secondary state, manual rate is continuously pressed, the manual rate change state machine is manual rate secondary (50%) -> manual rate three (100%) -> manual rate once (5%) -> manual rate secondary (50%).When starting, the default is Manual is a state, the light is on, Manual change state machine is Manual once (on) -> Manual secondary (on) -> Manual three times (light) -> Manual once (on).

10.6.2 Receiver output port

Model: Shanghai Fangling CNC F1510-R
Output port: 8 road
Power supply mode: 24VDC.
Each output port corresponds to a LED light showing the IO port state, bright when ON, and extinguished when OFF.

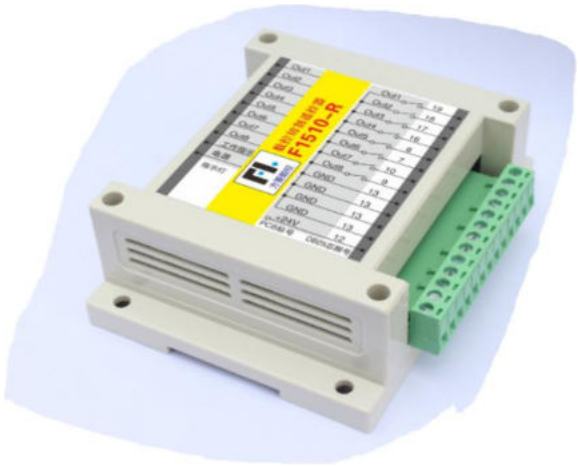


Figure 10.20 Remote control receiver

Remote control and F7600 series wiring instructions:

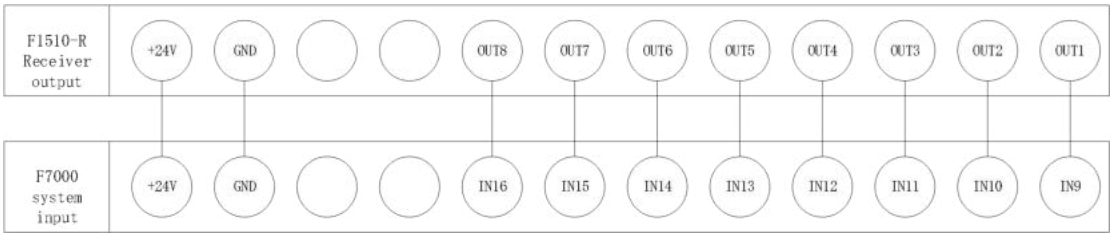


Figure 10.21 wiring diagram of F 7600 pins and F1510-R

10.6.3 The F7600 system uses the configuration of the F

1510-R remote control

After the F7600 system is started, you need to enter the F4 parameter settings under the interface. The F5 option "Remote control type" is set to "8421", and "remote control com port" is set to "no"

as shown in Figure 10.22.

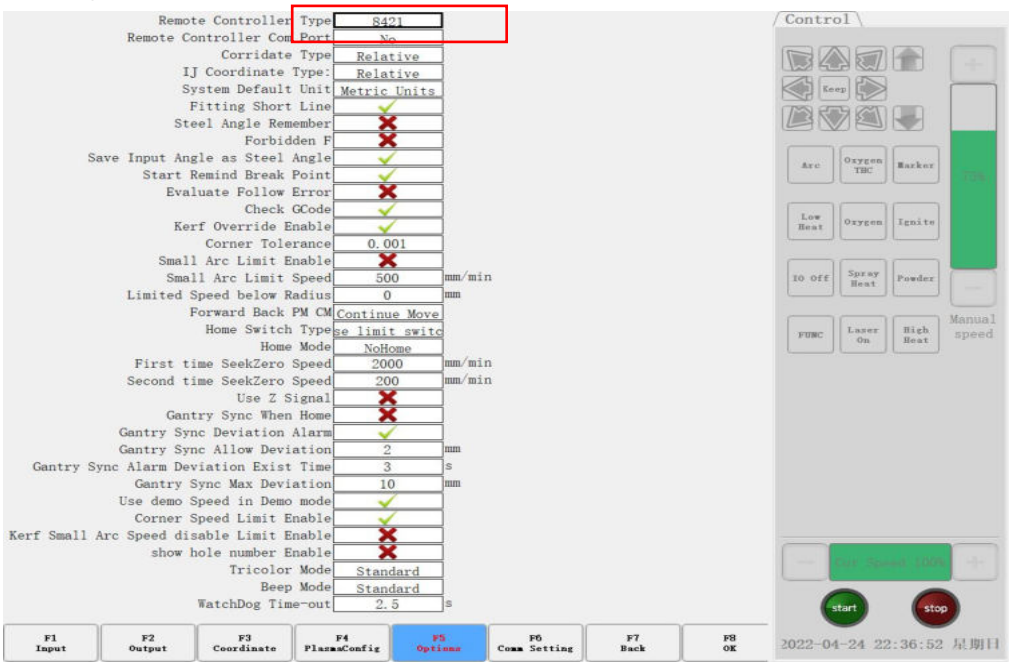


Figure 10.22 Selection of remote control type

Under the F7600 interface, the F4 parameter setting F6 configuration F5 option F1 input port definition is configured in FIG. 10.23

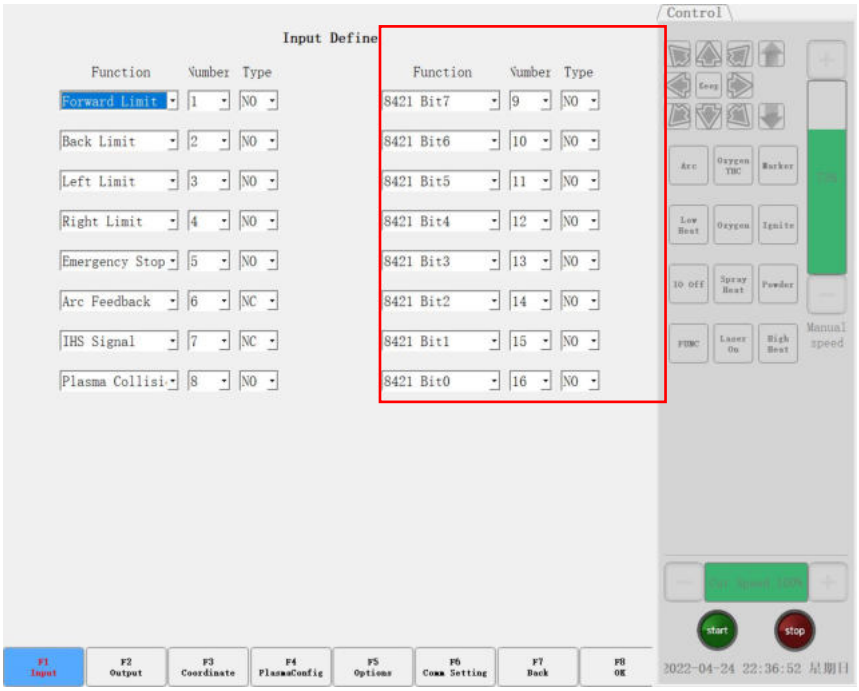


Figure 10.23 Input port configuration

10.7 Wiring instructions for the remote control F1520 and F7600

10.7.1 Introduction to the Remote Control, F1520-T

Performance and characteristics of the wireless remote control module:

1. The 433MHz free ISM frequency band is license-free for trial;
2. Remote control distance> 30m, at least not less than 0.5m;
3. Hardware detection error code, software optimization algorithm, two-way communication, to ensure stable and reliable communication;
4. Send and receiving module match according to address, address can be set manually, up to 128 addresses;
5. Wireless remote control transmission module dry battery power supply, at least 6 months of service time;
6. The F1520 remote control is divided into handheld transmitter F1520-T and receiving terminal F1520-R;
7. The receiving module F1520-R is serial port RS232 for user connection.

Description of Transmitter F1520-T:

Figure 10.24 Remote control layout diagram

1. key

Start (Start), Stop (Stop), 4 directions (), 1 small hand (Manual), T, T, S +, S-, Ignition (Ignition), Preheat (Preheat), Fast Oxygen (CutOxy), Arc (Plasma), Forward (Forward), Back (Back), Master (Close), ManualRate (ManualRate).Total: 19 keys.

2. pilot lamp

Three manual rate lights (5%, 50%, 100%), three manual mode lights (electric, connected, fixed length).One sending signal indicator, one power indicator (or reuse

and signal indicator).

Description: the manual rate is 50% default, manual rate is secondary state, manual rate is continuously pressed, the manual rate change state machine is manual rate secondary (50%) -> manual rate three (100%) -> manual rate once (5%) -> manual rate secondary (50%).When starting, the default is Manual is a state, the light is on, Manual change state machine is Manual once (on) -> Manual secondary (on) -> Manual three times (light) -> Manual once (on).

10.7.2 Receiver F1520-R wiring instructions

The remote control receiver F1520-R uses a standard serial connection to connect the nine-pin DB terminal head to the RS232 serial port of the system, Fig. 10, the serial port remote control receiver..24

Figure 10.25

In FIG10.26, the serial port RS232 may be connected and the receiving terminal may be directly inserted.

Figure 10.26 Back interface drawing

10.7.3 The F7600 system uses the configuration of the F

1510-R remote control

After the F7600 system is started, you need to enter the F4 parameter setting under the interface to configure the F5 option "Remote control type" set to "P2P", "remote control com port" set to "RS 232", as shown in Figure 10.26.

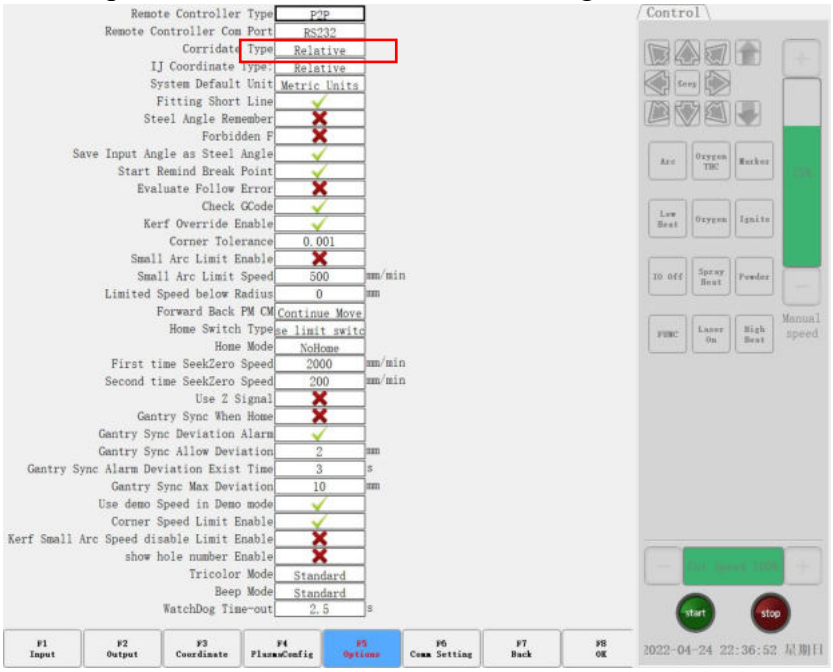


Figure 10.27 Remote Control Type Selection

10.7.4 Remote control F1520 and F7600 wiring instructions:

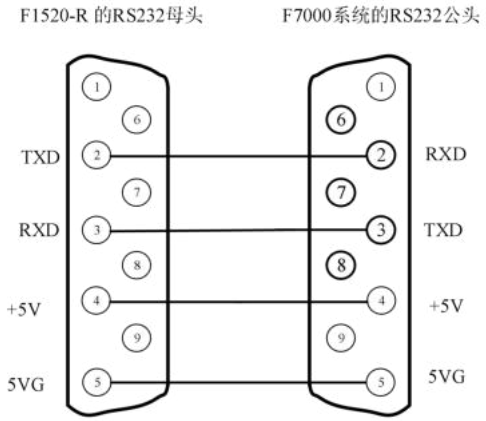


Figure 10.28 F1520-R wiring definition diagram

Chapter 11 Code description

11.1 Programming symbols and instructions

In the cutting machine programming, the following programming symbols are generally used, followed by the corresponding parameters.

Table 11.1 Description of the programming symbols

Programming symbol	function declaration
N	Program segment serial number
G	Prepare code
M	additional function
X	X-axis relative or absolute coordinates
Y	Y-axis relative or absolute coordinates
U	The X-axis relative coordinates
V	The Y-axis has its relative coordinates
I	X-axis coordinate difference of the center to the starting point of the arc
J	The Y-axis coordinate difference of the center relative to the beginning of the arc
R	Radradius of the arc with a positive value less than 180° arc and a negative value greater than 180° arc.
F	Cutting speed, used for G01, G02, G03.

In the following content, all appear in the "/" symbol is or the relationship, such as X / U means either X or U, both cannot appear simultaneously.The n represents parameter values, for example Xn represents the parameter followed by X.[] The presentation is optional, and you can have this or not this item.

11.2 coordinated system

This system adopts the right hand Cartesian coordinate system as shown in Figure 11.1.

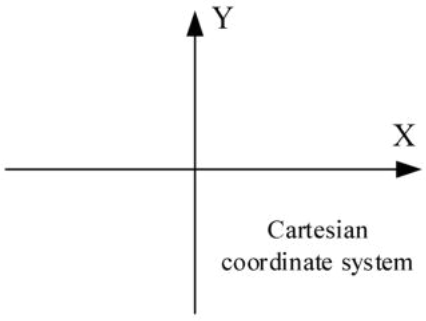


Figure 11.1 The Cartesian Coordinate System

Of course, the system can also define the coordinate system by the user himself, see "7.6.3 Coordinate Definition".

11.3 G code description

The G code supported by this system is shown in Table 11.2.

Table 11.2 Common G code table

G99	Parameters: X / U Y / V I J	Part option parameters
G92	parameter:XY	Reference point settings
G91 / G90	No parameter	Relative / absolute coordinates
G20 / G21	No parameter	The British system / meter system
G41 / G42	No parameter	Left / right cut joint compensation
G40	No parameter	Cancel slit compensation
G00	Parameters:, X / U, Y / V	Fast straight-line movement (empty car)
G01	Parameters:, X / U, Y / V	Straight cutting
G02	Parameters: X / U Y / V I J	Clockwise circular arc cutting
G03	Parameters: X / U Y / V I J	Cross-clockwise circular arc cutting
G04	parameter:P	delayed

1. G92 Reference point setting

Format: G92 [Xn] [Yn]

Parameter meaning:

1. [Xn] [Yn] represents the absolute coordinate of the set reference point and also the absolute coordinate of the machine back.If there is no parameter after G92, the default reference point coordinates is (0,0).General machine tool in (0,0) as the reference point, the sentence code can be omitted.

Note: After the code is added, the reference point coordinates set by G92 are automatically saved, which is valid until the new cut code is transferred, whether turned off or not.After a new cut code is added, if the new code has G92 instruction, the reference point coordinate is the content after G92. If there is no G92, the

reference point default is (0,0).A G92 can only appear once in a code file.

example:

a) G92 X0 Y0

With (0,0) as the reference coordinate, when the "back" function key is pressed, the machine returns to the (0,0) coordinate point.

b) G92 X20 Y0

With (20,0) as the reference coordinate, when the "back" function key is pressed, the machine returns to the (20,0) coordinate point.

2. G90/G91

Format: G90 / G91

Parameter meaning:

1. G90 absolute coordinates.X, appearing in the code, indicates the absolute coordinate values, and U, V indicates the relative coordinate values.
2. G91 relative coordinates.X, Y appearing in the code indicates the relative coordinate values, and U, V also indicates the relative coordinate values.

example:

a. G90 usage

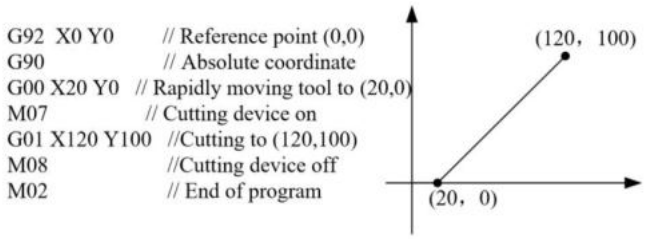


Figure 11.2, G 90 Usage

b. G91 usage

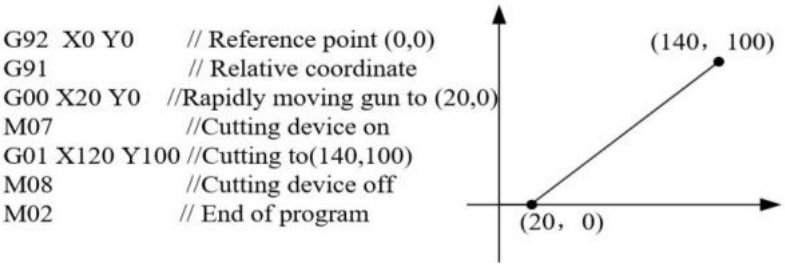


Figure 11.3, G 91 Usage

3. G20/G21

Format: G20 / G21

Parameter meaning:

1. G20 British units, all X, Y, I, J, R, U, V are British units,
2. G21 metric units, and all X, Y, I, J, R, U, and V, which appear after G21, are metric units.

Note: If G20 / G21 is not present in the code, the default is the metric units, and the English and metric conversion formula is: 1-inch 25.4mm.

4. G00 empty movement

This instruction moves the gun quickly to the specified position, and the system moves quickly from the starting point to the specified position at the "empty range moving speed * multiplier" speed.

Format: G00 X / Un Y / Vn [Fn]

Parameter meaning:

1. Fn empty-range speed limit.
2. The displacement of the Un end point X coordinate relative to the current segment start point
3. Displacement of the Vn end point Y coordinate relative to the current segment start point (in the relative coordinate system)
4. Xn end point The displacement of the X coordinates relative to the current segment start point
5. Displacement of the Yn end point Y coordinate relative to the current segment start point (in the absolute coordinate system)
6. Displacement of the Xn endus X coordinates relative to the starting point of the artifact
7. Yn endus Displacement of Y coordinates relative to the artifact start point

example:

```
G92  X0 Y0       // Reference point (0,0)
G91              // Relative coordinate
G00 X100 Y100 //rapidly moving tool to (100,100)
M02
```

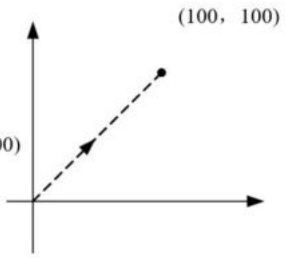


Figure 11.4, G 00 Usage

5. G01 straight-line cutting

This instruction indicates a straight line cutting to the specified position, and the system cuts from the start of the current segment to the specified position.

Format: G01 X / Un Y / Vn [Fn]

Parameter meaning:

1. With the G00 code meaning, the difference is only that G00 means the empty car walking in a straight line (i. e., the output ports are all closed), and G01 means the straight line cutting.

6. G02 in-round interpolation

This instruction indicates the arc (clockwise insertion) cutting to the specified position, and the system cuts from the start of the current segment to the specified position.

Format: G02 X / Un Y / Vn In Jn [Fn] or G02 X / Un Y / Vn R [-] n [Fn]

Parameter meaning:

1. Fn cutting speed limit.
2. Displacement of the Un end point X coordinate relative to the current segment start point, in mm;
3. Displacement of the Vn end point Y coordinates relative to the current segment start, in mm.
4. In The displacement of the center X coordinate relative to the current segment start point, in mm;
5. Displacement of Jn center Y coordinates relative to the current segment start, in mm.
6. R [-] n arc radius, R is positive when the arc is less than or equal to 180 degrees
7. Displacement of the Xn end point X coordinate relative to the current segment start point in mm;
8. Yn endus displacement of Y coordinates relative to the current segment start, in mm
9. The shift of the Xn endpoint X coordinate relative to the starting point of the workpiece, in mm;
10. 1 Displacement of the Y n endpoint Y coordinates relative to the artifact start point, in mm.

example:

```
Example 1: B->A
G92  X0 Y0       // Reference point (0,0)
G91              // Relative coordinate
G00 X60 Y100     //Rapidly move tool to B
G02 X-40 Y-40 I0 J-40 //The arc 1
/(G02 X-40 Y-40 R-40)
M02
Example 2:  A->B
G92  X0 Y0       //  Reference point (0,0)
G91              // Relative coordinate
G00 X20 Y60      //Rapidly move tool to A
G02 X40 Y40 I40 J0 //The arc 2
/(G02 X40 Y40 R40)
M02
```

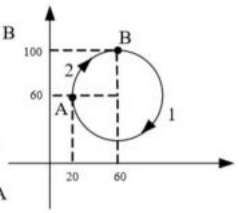


Figure 11.5, G 02 Usage

With G02, only G02 is a circular (clockwise arc), and G03 is inverse circular (counterclockwise arc).

7. G42 / G41 and G40 slit compensation

These functions are the slit compensation function. When the cutting path represented by the code is only the actual size of the workpiece, because of the flame cut / plasma cut exists, the actual workpiece is not the required size without considering the effect of the cut.After the slit compensation is set, the system will automatically calculate the impact of the slit and cut the actual size workpiece.

The G41 / G42 and G40 must be paired together.If G41 / G42 is omitted, the default slit compensation value is zero; if G40 is omitted, the default one is valid.

Format: G41 / / left cut joint compensation
The …… // cutting code
G40 / / Cancel the left cut joint compensation
G42 / / Right cut joint compensation
The …… // cutting code
G40 / / Cancel the right cut joint compensation
example:

```
( Convex Roof Trapezoid w/ Hole )
G21                                   /* Metric Unit */
G91                                /* relative coordinate */
G99 X1 Y0 I0 J0                       A /* scale factor of 1, a rotation angle of 0, and no mirror */
G00 X44.45 Y41.275                    /* Empty Car Walk */
G41                                   /* left cut seam compensation */
M07                                   /* cutting starts */
G03 X0 Y0 I19.05 J0                   The /* cuts a round */ counterclockwise
M08                                   /* cut end */
G40                                   /* cancels the left cut seam compensation */
G00 X-44.45 Y-41.275               /* Empty Car Walk */
G42                                   /* right cut seam compensation */
M07                                   /* cutting starts */
G01 X25.779438 Y58.031634                    /* straight-line cut */
G02 X75.441125 Y0 I37.720562 J-16.756634     The /* cuts clockwise for a round */
G01 X25.779438 Y-58.031634                   /* straight-line cut */
G01 X-127 Y0                       /* straight-line cut */
M08                                   /* cut end */
G40                                   /* cancels the right cut seam compensation */
M02                                   The /* program ends the */
```

Note: Cut compensation shall be half the actual width.

8. G99 Scale, rotation, mirror image

Format: G99 Xn Yn In Jn

Parameter meaning:

1. 1X-Scale factor, 0.001 to 1000 can be set.
2. 1Y-Rotation angle, -360° to 360° can be set.
3. I X axis mirror, mirror along the X axis, 1 for a mirror, 0 for no mirror

4. J Y axis mirror, mirror along the Y axis, 1 means a mirror, 0 means no mirror

Note: For a code, you can have a G99 or no G99. If there is G99, the following parameters X, Y, I, J cannot be omitted, the mirror and rotation are the origin of Cartesian coordinates (0,0) as the reference point.

9. G04 delay

Format: G04 Pn

Parameter meaning:

1. P delay time, followed by the parameter is 0.01 seconds, such as P100 indicates the delay of 1 second.

Programming precautions

1. Programming must include G92 (reference point setting) and M02 (End of program) instructions.
2. The G41 / G42 and G40 must be paired together.If G41 / G42 is omitted, the default slit compensation value is zero; if G40 is omitted, the default one is valid.
3. When G20 / G21 is omitted, the system defaults to G21 (metric unit).
4. With G90 / G91 omitted, the system defaults to G91 (relative coordinates).
5. The M07 and M08 instructions may not be omitted.
6. A parameter is omitted in G00, G01, G02 and G03. If the parameter is the absolute coordinate, the system defaults to the coordinate value of the previous G code; If the relative coordinate, the default parameter value is zero.
7. G00, G01, G02, G03 can be abbreviated as: G0, G1, G2, G3.
8. Continuous G00 (or G01, G02, G03), G00 (or G01, G02, G03) can be omitted.

11.4 M code description

Table 11.3 Common M Code

M07	No parameter	Perforative fixation cycle
M08	No parameter	End the cut-fixing cycle
M 11	No parameter	Establish spray offset
M 12	No parameter	Undo the spray powder offset
M 09	No parameter	Open the spray powder
M 10	No parameter	Turn off the spray powder

M00	No parameter	pause instruction
M02/M30	No parameter	end of program

- M07 perforation and fixation cycle
- The M08 ends the cutting and fixation cycle
- M00 pause

During cutting, the system stops the machine when touching such instructions and waiting for further operation.

- The M02 / M30 program has ended

Chapter 12 Elevator

12.1 Basic instructions

F7600 CNC system V1.2 version added the function of multi-er currently supported F1650, F1627D, F1627S.This document focuses on the regulator configuration and operation interface.

12.2 mode of connection

F1650 See Installation and Commissioning Manual.

For F1627S / D wiring mode, see 10.5 F7600 and FCB1200PC and F1627D / S wiring instructions below.

12.3 Elevator configuration

To use the function of the overer, you need to configure the hyperer in the program.After the program starts, click [F4 parameter setting] - [F6 configuration] - -enter the password 1396- - [F6 communication setting].In the pop-up communication interface, there is a elever configuration option.As shown in Figure 12.1.

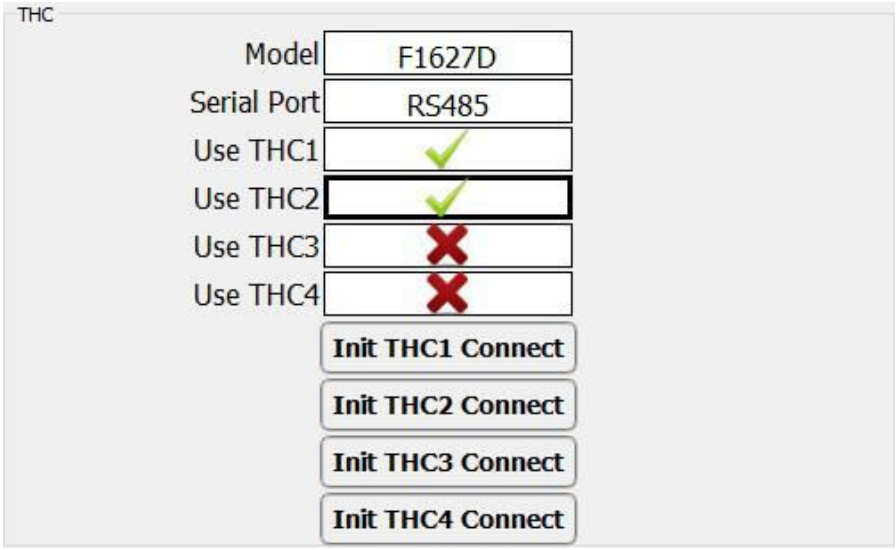


Figure 12.1, Elever configuration

- Model: Select the governor to use.The default governor model is "common", which means using an ordinary IO governor, that is, no external governor. This type of governor does not support multi-elevation function.Note: After the governor model changes, you need to restart the F7600 software.
- Use THC 1,2,3,4: The system mounup to 4 elevation regulators.Please check on the elevation regulator that will be used.If you use only one elevation regulator, check

Use THC1 to turn off the other three options.If using two elevation regulators, check Use THC1 and Use THC2.and so on.

- Initialize the THC1,2,3,4 connection: Multimer communication is achieved via ModBus.Each governor has a ModBus slave station address.If the elevation device's slave station address is the same, the communication will be abnormal.So after the elevation device is connected to the system, you need to set the ModBus slave address of the elevation device.The initialization button is used to change the slave station address function.

12.4 The governor initializes the connection

The hyperer initialization connection process is only configured after replacing the hyperer, and does not have to repeat the configuration when the hyperer device remains unchanged.

Elevator initialization connection steps:

- Enter the governor configuration interface: connect the actual governor 1 to the system and disconnect other regulators.Click the [Initialize THC1 connection] button.A confirmation dialog box will pop up, as shown in Figure 12.2

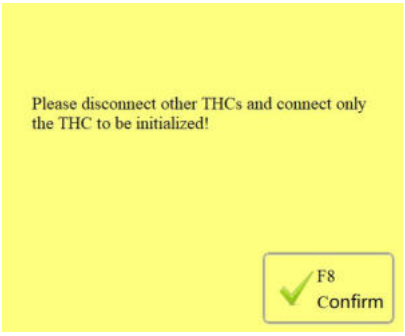


Figure 12.2 The T H C initialization link

- Click on OK.The prompt box in the following figure popup.Resetting the ID is happening at this time.Logic process for reset: Search for the ID of the current connected regulator.Our tuner ID range is 1~15.Then reset the raised slave address to 1. If you click the [Initialize THC2 connection] button, the governor ModBus slave station address is set to 2.the rest may be deduced by analogy.

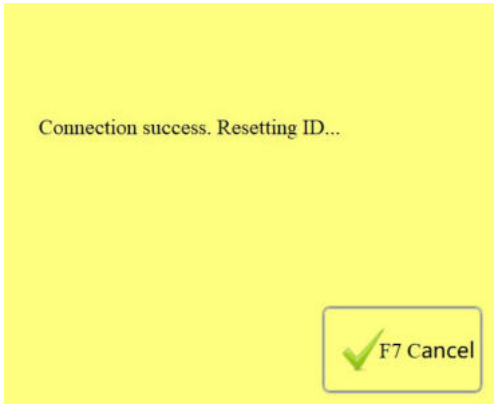


Figure 12.3 THC Reset ID

After the reset is successful, the following interface pop up.

Figure 12.4 The T H C link initialization occurred successfully

Disconnect physical ator 1 or power off.Then access the governor 2 and click the [to initialize THC2] button...Repeat this process until all the tuners to use are initialized successfully.

12.5 The Elevator viewing window

After the elevation configuration is successful, go to the main interface, switch the cutting mode to [plasma], and then click the watch window switch button to switch to the elevation window watch window.The elevation regulator observation window is shown in Figure 12.5 below:

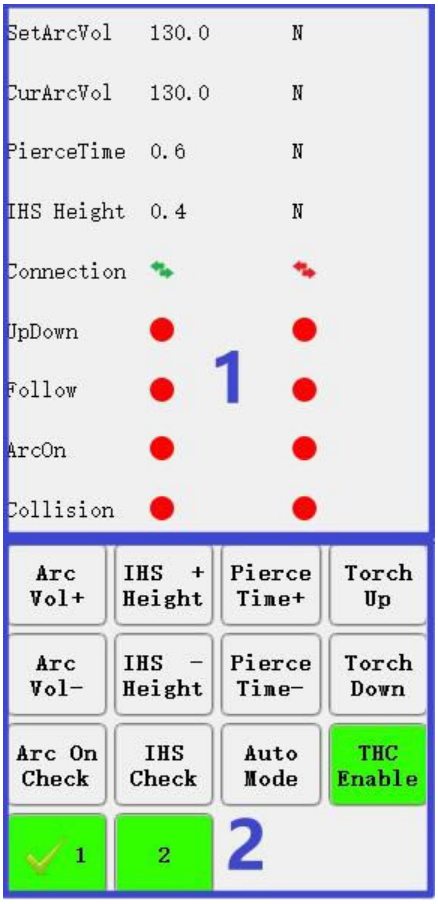


Figure 12.5 Elever Observation window

The observation window can be divided into two parts: 1 status display area; 2 operation area.The current status display area has two sets of data (with several regulators).Data for THC1 are shown on the left and for THC2 on the right.The bottom level of the operation area is a row of digital buttons, currently with buttons 1 and 2. When we click which button, it indicates which THC to select.One more button comes out before being clicked.On which regulator is selected, the operation button in the operation area will operate on which regulator.

12.6 Elever parameter interface

Click on the [F 4 parameter setting] - - [F 3 plasma] - - [F 3 plasma] - - [F1THC] in the main interface.You can enter the THC interface.As shown in Figure 12.6 below:

Figure 12.6

Elever parameter interface has common parameter interface, system parameter interface, input and output parameter interface, diagnosis interface and import and export button of elever parameters.The parameters of the elevation regulator can be modified through the parameter interface, and click to confirm to send the modified data to the elevation regulator.The version number of the regulator is shown at the top of the interface, and the regulator selection box.If you select governor 1, the parameters of governor 1 are displayed on the interface.If 2 is selected, then the parameter of the governor 2 is displayed.Power THC: used to control whether the governor processes the offline state, which cannot operate in the observation window and does not update the state.Every time you enter the THC interface, you will check whether the current connection is normal. If the selected elevation regulator is not connected, the parameters will not be modified.

Chapter 13 Visual residual material

13.1 Basic instructions

F 7600 CNC System version V 2.2 adds camera installation, visual leftover material calibration and fabric features.This document focuses on how to install the camera, how to achieve visual waste calibration and fabric and interface operations.

13.2 Camera installation requirements

13.2.1 Camera selection requirements

At present, the system only supports Hikvision, with cameras with more than 2 million pixels and Ethernet interface.

13.2.2 Camera installation

In order to ensure the accuracy of calibration, the camera should be installed directly above the material table of the machine tool, A is the machine tool table, B is the plate processed by the machine tool, C is the camera, D is the column, the vertical distance between the camera and B is 1500~2000mm, the camera should cover the whole cloth area, as shown in the figure below:

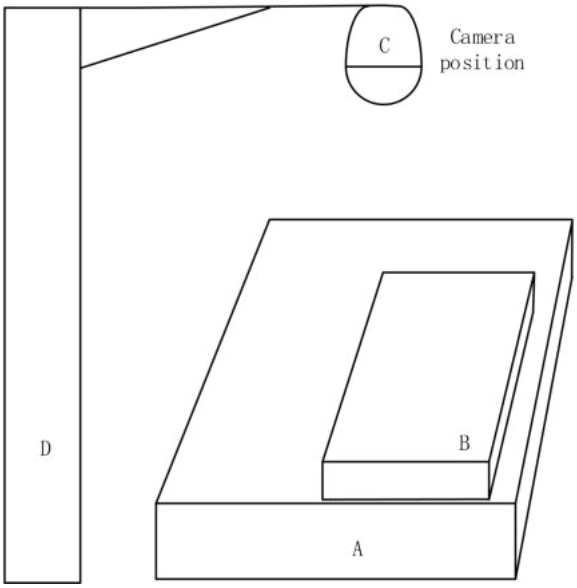


Figure 13.1 Camera installation position

13.2.3 Photo requirements

Photo area: not more than 2000mm transverse and not more than 3000mm longitudinal.

13.2.4 Photo environment

In order to ensure that the picture is clear without shadow, the top of the machine tool should not be closed as far as possible, if the light in the working area is not good, the machine tool around the fluorescent light.

13.2.5 required precision

The identification accuracy should not be no greater than 2.0mm.

13.3 Visual residual material calibration

13.3.1 Visual residual material configuration

Visual residual configuration includes: the offset of the _X axis, the offset _Y axis of the laser gun, select the camera type and the IP address of the camera.

The calibration procedure of the visual waste material is as follows:

- Open the visual leftover material calibration application file (: \ Fangling \ F7600 \ VisualNest \ Calibration.The exe or double-click on the calibration shortcut on the desktop).as shown in the figure:

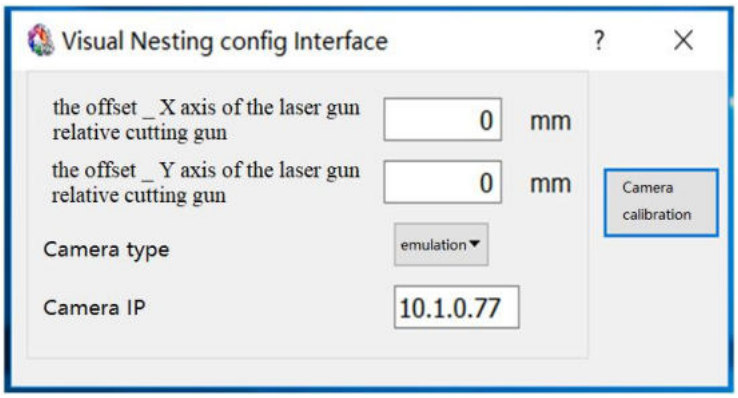


Figure 13.1 Visual waste configuration interface

explain:

1. Click the drop-down box to enter the IP address when selecting the simulation, and the IP address of the linked camera.

2. When the laser gun is offset relative to the cutting gun, the corresponding offset value is input in the corresponding input box

- Click the camera calibration button, open the calibration interface, and use the remote control to make the machine tool back to zero, as shown in Figure 13.2:

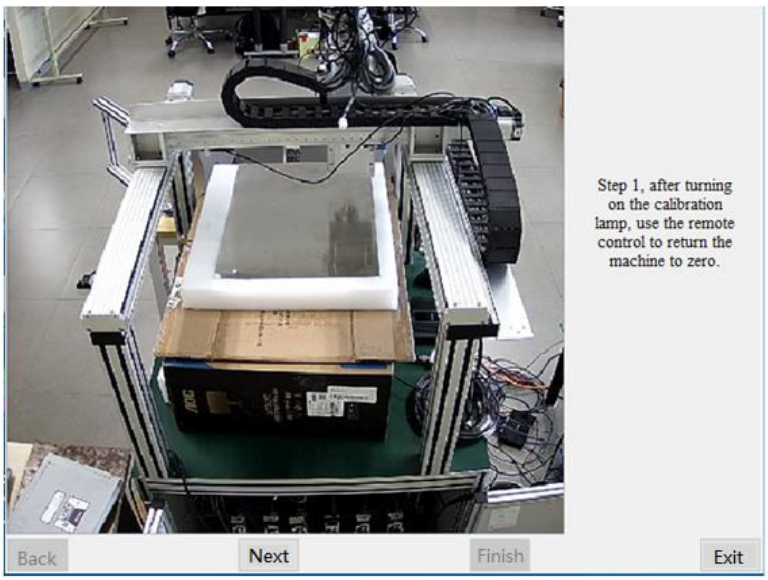


Figure 13.2 Calibration interface

- Click "next step", start the camera calibration, operation machine will move the gun to the upper left corner of the view, then enlarge the image through the mouse button, click the center of the mouse button "get coordinates" button, mechanical coordinates X, Y coordinates is corresponding to CNC cut gun coordinate point, the first calibration point complete calibration, as shown in Figure 13.3:

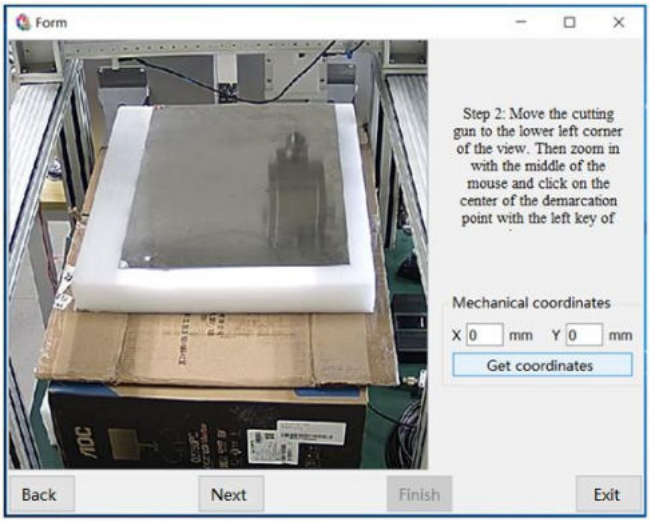


Figure 13.3 Get the first coordinate point

- After the first point is calibration, click "Next" to complete the second calibration point, operate the machine tool to move the gun to the lower left corner of the view, click the middle mouse button to enlarge the figure, click the center of the calibration point with the left mouse button, click the "Get coordinates" button in the interface to obtain the mechanical coordinates X, Y, as shown in Figure 13.4:

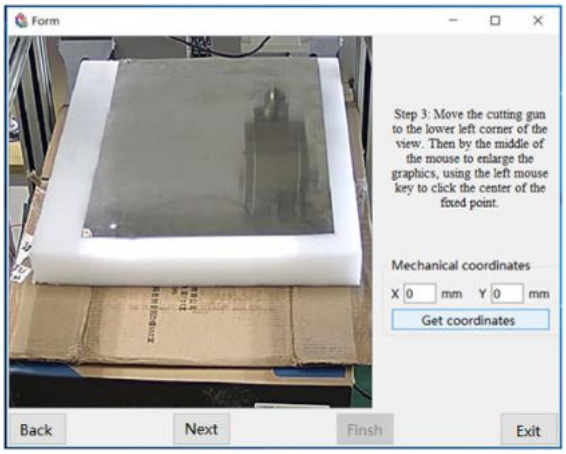


Figure 13.4 Get the second coordinate point

- After the second point is calibration, click "Next" to complete the third calibration point, operate the machine tool to move the gun to the lower right corner of the view, click the middle mouse button to enlarge the figure, click the center of the calibration point with the left mouse button, click the "Get coordinates" button in the interface to obtain the mechanical coordinates X, Y, as shown in Figure 13.5:

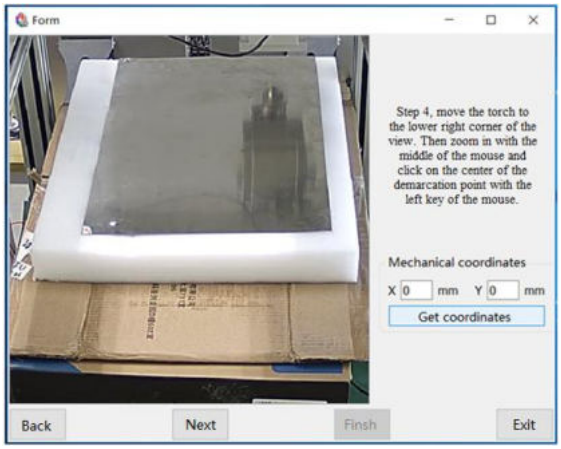


Figure 13.5 Get the third coordinate point

- After the third point is calibration, click "Next" to complete the fourth calibration point, operate the machine tool to move the gun to the upper right corner of the view, click the middle mouse button to enlarge the figure, click the center of the calibration point with the left mouse button, click the "Get coordinates" button in the interface to obtain the mechanical coordinates X, Y, as shown in Figure 13.6:

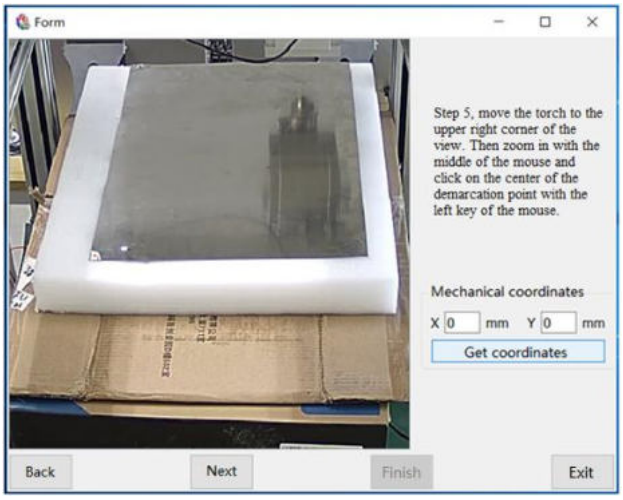


Figure 13.6 Obtain the fourth coordinate point

- After the fourth point is calibration, click "Next" to complete the camera calibration, as shown in Figure 13.7:

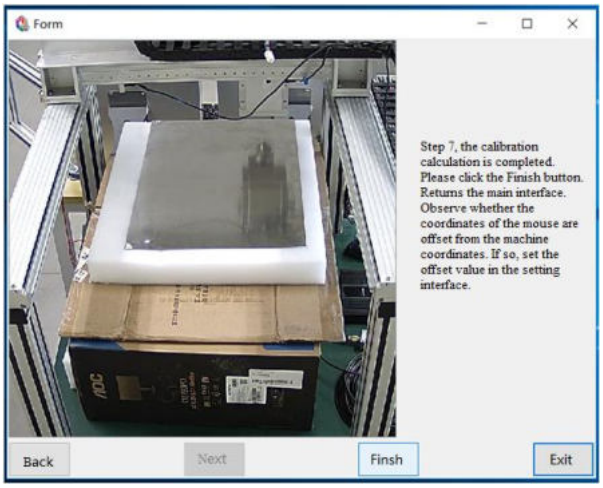


Figure 13.7 Calibration is completed

- Click the Finish button to exit the calibration interface

13.3.2 Visual surplus material fabric interface and processing

Visual residual material fabric interface:

After completing the calibration, open the interface in the following steps:

- Open F7600 software on desktop and operate the machining software, as shown in Figure 13.8:

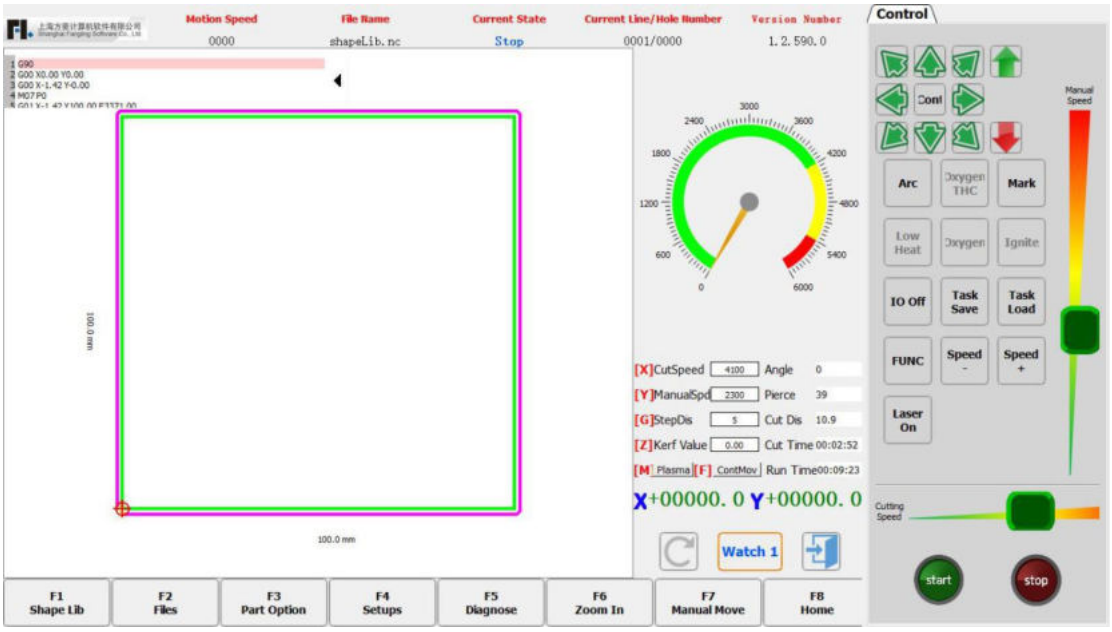


Figure 13.8 Main interface of F 7600 series

- After opening the F7600 interface, click the "Drawing Management" button, as shown in Figure 13.9:

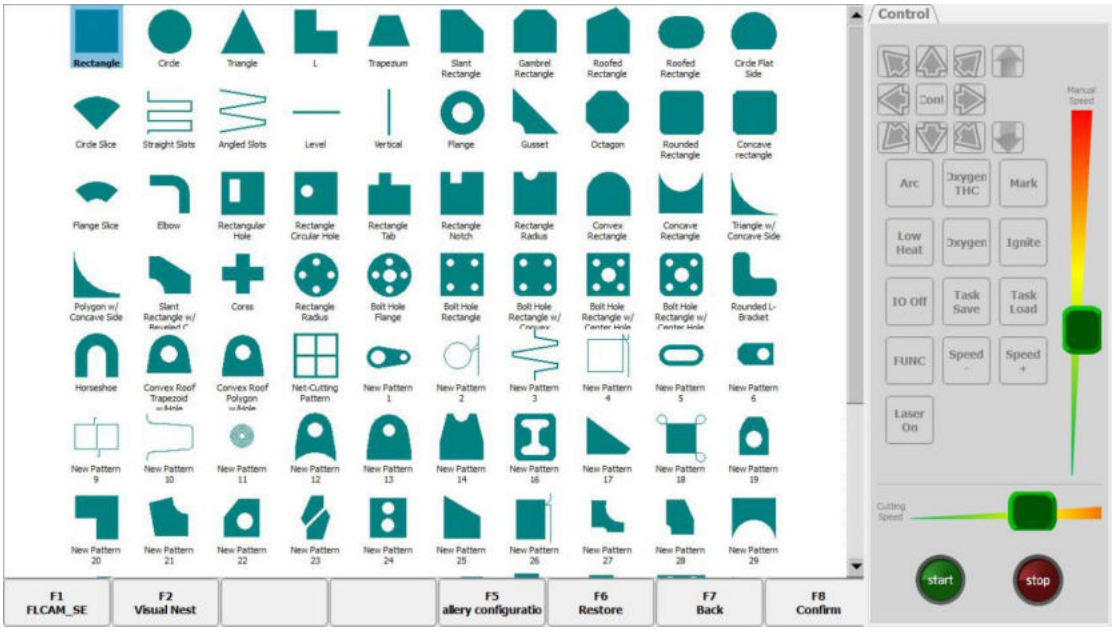


Figure 13.9 Graphic management interface

- Click "F2 / vision" button to open the visual surplus fabric interface, as shown in Figure 13.10:

Figure 13.10 Interface of visual surplus material fabric

The interface consists of view mode, part movement, sorting, G code, part loading list, setting step length and rotation angles, mouse coordinates, part coordinates, etc.

1. View mode:

- front elevation
- vertical view

2. Component movement

- Up: When a part is added to the view, select a part to move the part up, depending on the set step size
- Down: When a part is added to the view, select a part to move the part down, depending on the set step size
- Left: When a part is added to the view, select a part to move the part left based on the set step size
- Right: When a part is added to the view, select a part to move the part to the right, depending on the set step size
- Left rotation: When a part is added to the view, select a part to rotate the part left at the set angle
- Right rotation: When a part is added to the view, select a part to rotate the part right at the set angle

3. sort

- Auto: In the order that the parts are added to the view
- Manual: to sort before and after the selected parts
- Front end: Put the selected part in the first place
- Last place: Place the selected part in the last place
- Backward: Back up the selected part in one bit
- Forward: Place the selected part one forward

4. G code: generate the G code for the parts in the view (if sorted, the G code is generated by serial number)

- Load: Save the G code for part production (if sorted, the G code is generated by sequence number) and exit the packing interface
- Unload: Do not save the G code, and exit the packing interface
- Exit: Close the packing interface

5. List of parts

- Add: Open the File dialog box, select a part to add to the part list, and double-click the selected part in the part list to add the part to the view
- Delete: In the part list, select a part and delete the same part type in the view; select a part in the view, double-click the part to delete the part.

process:

After the visual waste interface is withdrawn, G code is saved to the specified path (GenerateGCode folder) and switched to F7600 processing interface. The set processing steps are as follows:

- After loading back, the resulting graphics code is saved in the GenerateGCode folder, as shown in Figure 13.11

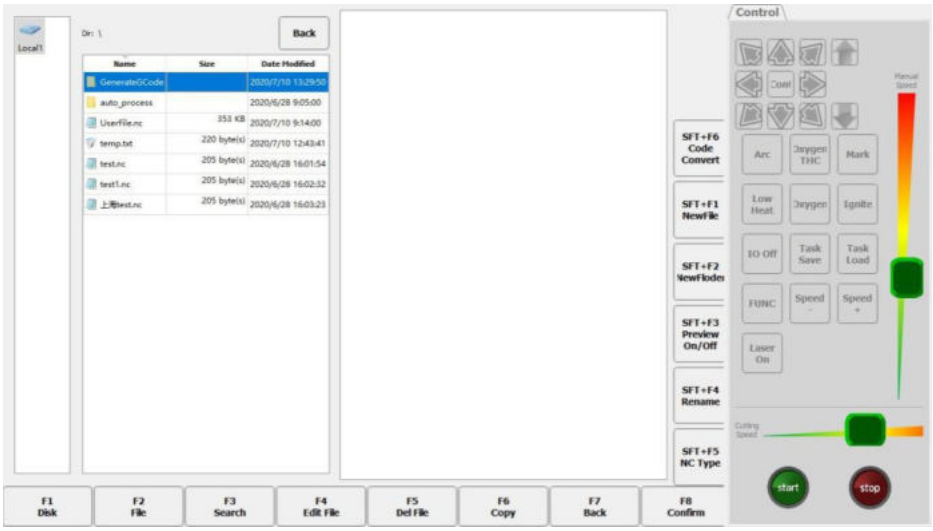


Figure 13.11, Load return interface

- Double-click on the folder and click on the name VNG.Document nc, as shown in Figure 13.12

Figure 13.12, processing preview interface

- Press [F8 confirmation], the parts can be processed to return to the F7600 main interface

Chapter 14 Drilling and cutting integrated system

14.1 resume

F7600 series drilling system for cutting machine with drilling function.There are two ways to control the drilling shaft: one is the motor, the other is the cylinder.Different control mode, the system parameter configuration is different.

The configuration of the drilling integrated system is relatively simple, only requiring the additional configuration of drilling-related parameters on the basis of the ordinary F7600 system.Therefore, before reading this manual, users need to understand the company's F7600 system.Can refer to the company "Fangling CNC cutting machine control system F7600" manual.

Ordinary F7600 system, want to upgrade to drill and cut integrated system, need to update the authorization.

14.2 interface specification

The drill-cutting integrated system requires some additional interfaces.Different drilling shaft control mode, different interface configuration.For the basic IO configuration of the F7600 system and the hardware wiring, refer to the instructions of the Control System F7600.

14.2.1 electric machine control

The input port requires the Z-upper and Z-Lower functions.

Figure 14.1 Conposition of motor control input port

The output port requires the Open Drill feature.

Figure 14.2 Proposition of the motor control output port

The motor interface shall be equipped with CN4 motor port (on F7600 control card) to control the rise of the drill shaft.

14.2.2 Cylinder control

The input port requires the Z-upper and Z-Lower functions.

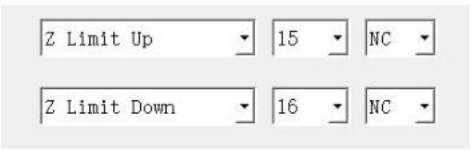


Figure 14.3 Configuration of the cylinder control inlet port

The output port needs to be configured with "open drill rig", "close drilling shaft cylinder"

and "open drilling shaft cylinder" functions.

Figure 14.4 Arrangement of the cylinder control output port

Note: The actual I / O port used in the function and IO are often open and closed need to be connected according to the actual hardware

Line.

14.3 parameter declaration

In the main interface, press [F4 parameter setting] to enter the parameter setting interface, and then press [F4 powder spraying / drilling] to enter the drilling parameter interface, as shown in Figure 14.5.

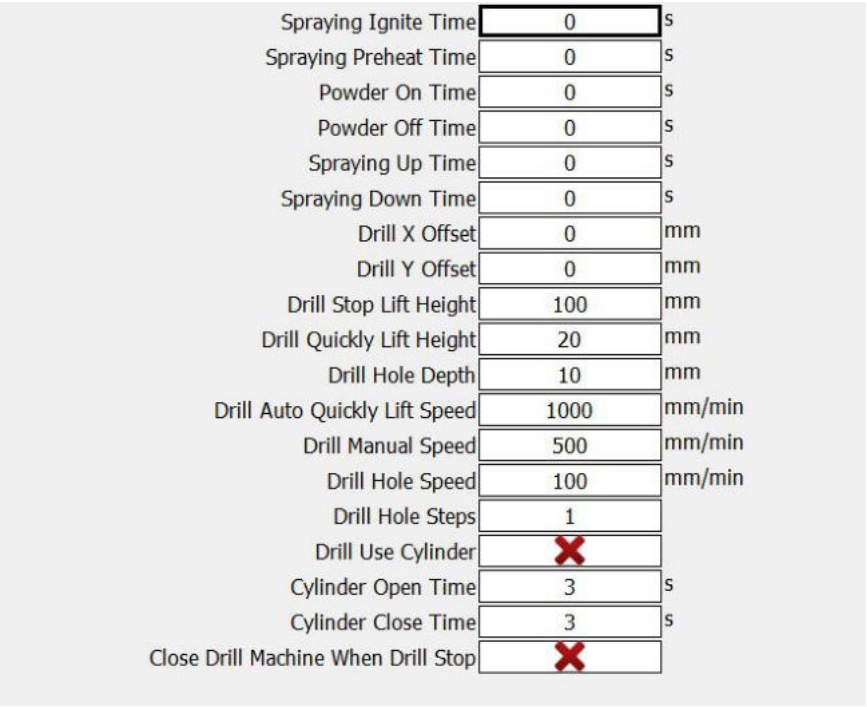


Figure 14.5 The borehole parameters

- Horizontal offset of the drill gun: lateral displacement of the drill gun relative to the slit.
- Longitudinal offset of the gun: longitudinal displacement of the gun relative to the slit.
- End lift distance (height): the distance where the drill gun rises in motor control mode.
- Drilling rapid lift distance (height): In motor control mode, as shown in Figure 3.2,

the drill gun is quickly lifted from B to point A above the plate surface (a certain distance △ d from point B and point C on the plate surface).

- Drilling distance (depth): The depth (d) of the steel plate in motor control mode, as shown in Figure 3.2, plus △ d.
- Automatic bore air-range speed (rapid lift): the speed required for the drill gun to complete the "rapid bore descent distance" in motor control mode
- Manual lifting speed: speed of the drill gun in motor control mode
- Drilling attack speed: the speed required for the drilling gun to complete the "drilling distance" in motor control mode.
- Number of steps per drill: In motor control mode, this parameter is how many times the hole needs to fall up and forth to attack a hole.After each downward attack step, lift up to the zero coordinate position of the plate, and then quickly drop to 2mm above the drilling position, and then continue the drilling.

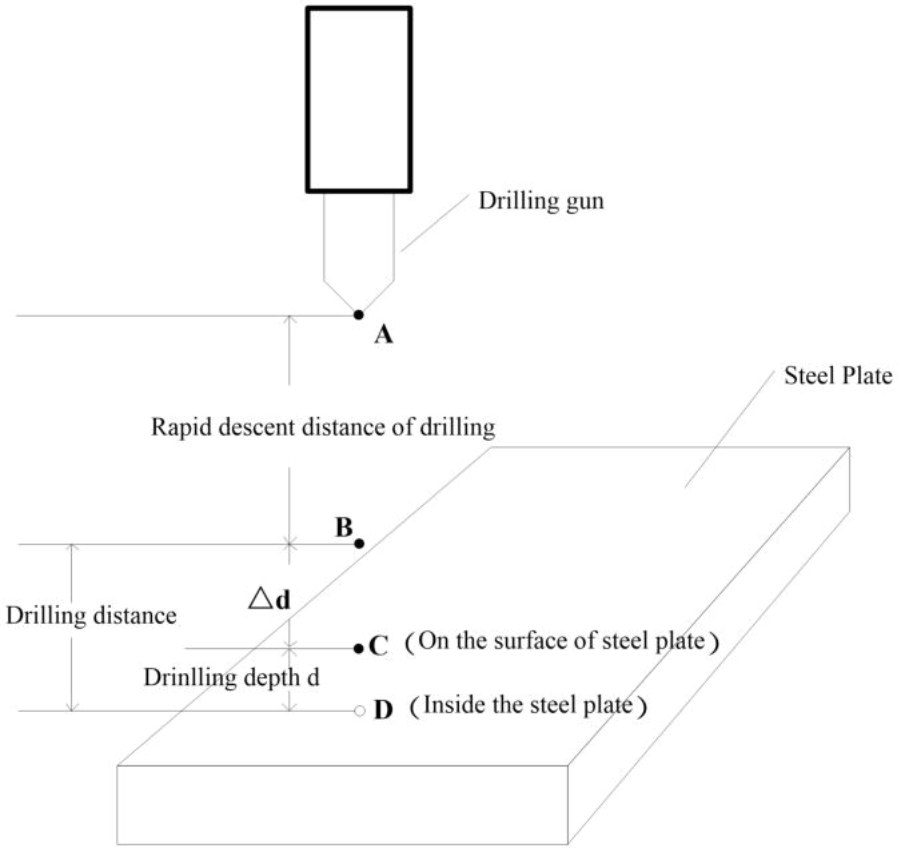


Figure 14.6 Schematic diagram of borehole descent

- Use the cylinder elevation: When this function is selected, the drill shaft uses the cylinder control.
- Cylinder opening time: the time of opening the cylinder in the cylinder control mode.

- Cylinder closing time: cylinder shutdown time in cylinder control mode.
- Motor is closed after each drilling: in motor control mode, the drilling is completed, whether the motor is closed.
- In motor control mode, the z-axis related parameters are located in the axis parameter interface.Enter mode: click [F 4 parameter setting] on the main interface, then click [F 5 system], enter password 1396, then click [F 2 axis parameter], and select "z axis" in the drop-down list of "axis name".

14.4 direction for use

14.4.1 Code description

The G and M codes for the drill are described as follows:

1. Drilling instruction G63

This instruction indicates that the drill gun begins drilling.

2. Offset instruction M11

This instruction indicates the drill gun establishment offset.

3. Back to offset instruction M12

This instruction indicates that the drill gun is offset back.

example:

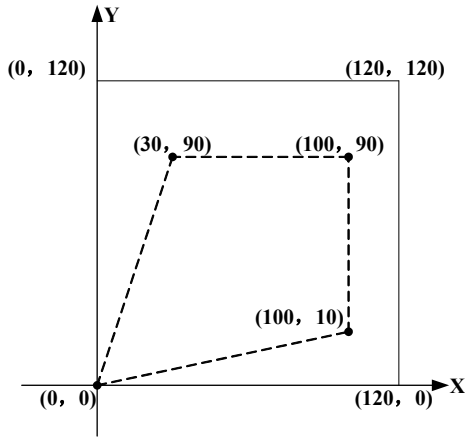


Figure 14.7 Code usage of drilling rig G and M

G92 X0 Y0 / / Set the reference point coordinates as (0,0)

G91 / / Set the relative coordinates.X appearing in the code, the parameter after Y indicates the relative coordinate values.

G21 / / Set up the metric units.All X, Y, I, J, R, U, and V are metric units

M11 / / Establish an offset

G00 X100 Y10 / / drill quickly to point (100,10)

G63 / / Drilling hole

G00 Y80 / / drill gun quickly to (100,90)

G63 / / Drilling hole
The G00 X-70 / / drill gun moves quickly to the (30,90) point
G63 / / Drilling hole
G00 X-30 Y-90 / / drill gun quickly to (0,0)
M12 / / offset back
G42 / / Right cut joint compensation
M07 / / perforation fixation cycle
G01 X120 Y0 / / Straight cut to point (120,0)
G01 X0 Y120 / / Line cut to point (120,120)
G01 X-120 Y0 / / Straight cut to point (0,120)
G01 X0 Y-120 / / Straight cut to point (0,0)
M08 / / End of the cutting and fixation cycle
G40 / / Cancel the right cut joint compensation
M02 / / Procedure ended

14.5 hand operation

Drilling integrated system, manual panel with the drill shaft manually move and zero button.As shown in Figure 14.8 below.

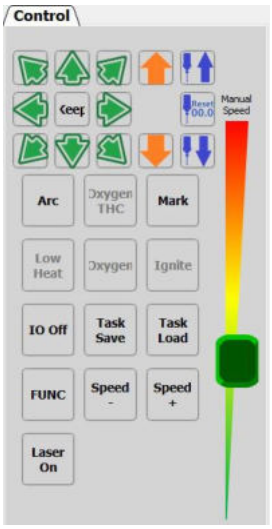


Figure 14.8

14.6 Initial distance setting for the drill shaft

1. Manual drop the drill near the plate surface until the drill shaft is near the drill starting position.Position B in Figure 14.6.

2. Click the drill shaft zero clearance button on the manual panel to clear the drill shaft coordinate to zero.

3. Manual lift the drill shaft to fit to stop.

4. Complete the 0-position setting of the drill shaft.

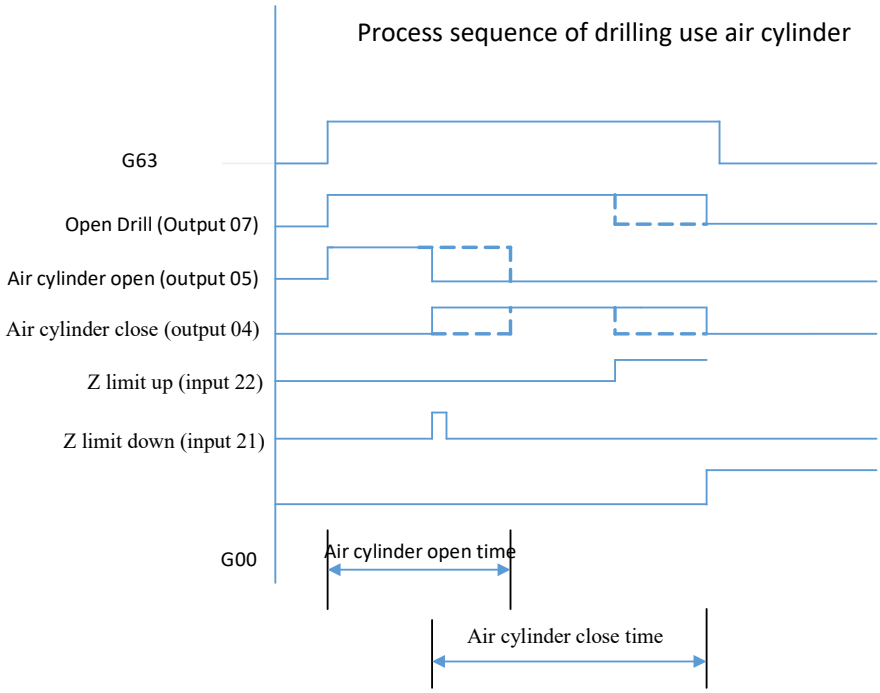
14.7 Instructions for graded drilling procedures

For example, the drilling distance (depth) is set at 10mm. If the number of drilling steps is 4 and the stepping distance of each drilling hole is 10/4=2.5mm, then the drilling process is:

1. First move quickly to position 0, position B in Figure 3.2 (the same below), namely the upper surface of the steel plate.
2. Start drilling 10mm/4=2.5mm, quickly to 0, and 0.5mm(2.5-2) (2mm higher from the last attack).
3. Run at 2+2.5=4.5mm, the total depth is 0.5mm+4.5=5mm, then quickly up to 0; quickly down to 3mm (5-2);
4. Then run at the drilling speed of 2+2.5=4.5mm, the total drilling depth is currently 3+4.5=7.5mm, and then quickly rise to 0 position, quickly drop to 5.5mm(7.5-2) position;
5. Then run at the drilling speed of 2+2.54.5mm, the total depth of drilling is currently 5.5+4.5=10mm;
6. Move quickly to the drill hole fast lift distance (height) or the drill hole end lift distance (height).The last stop height, the system will automatically determine whether the current last hole, if the hole is the last hole, it will quickly move to the lift distance (height) at the end of the hole, if not the last hole, it will quickly move to the rapid lift distance (height).

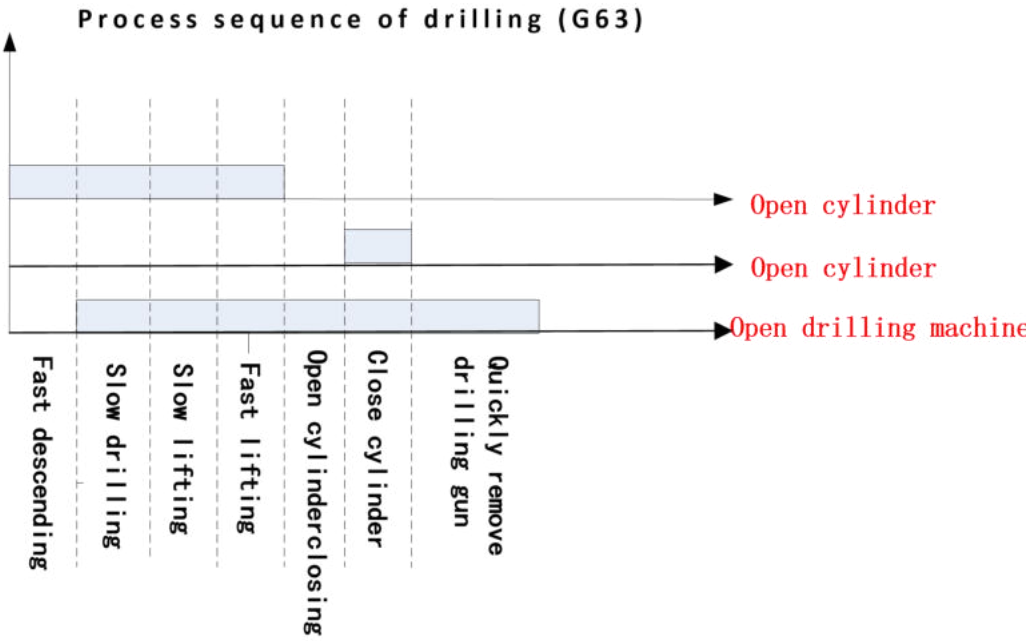
14.8 Cylinder drilling

Figure 14.5, using cylinder drilling is selected.



Work principle is as follows:

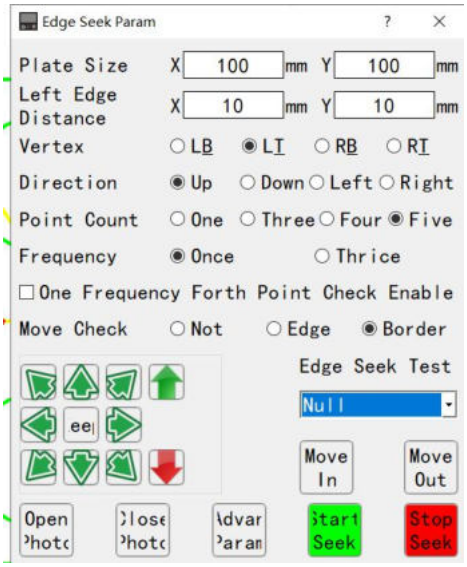
14.9 Drilling timing



Chapter 15 Numerical control auxiliary function

15.1 Looking for edge

F7600 series photoelectric edge seeking function, used for the installation of photoelectric sensor cutting machine, by installing the photoelectric switch on the cutter, auxiliary cutting machine equipment quickly and accurately find the position and Angle information of the steel plate.System implements the automatic photoelectric edge, the user just need to configure the relevant parameters, and then click the "start edge" button, after the end of the system automatically will find edge data processing, verification, and according to the calculated Angle of the user selected G code plate correction, and move the cutting gun to the user specified plate vertex.Side search parameter setting interface as shown in Figure 15.1:



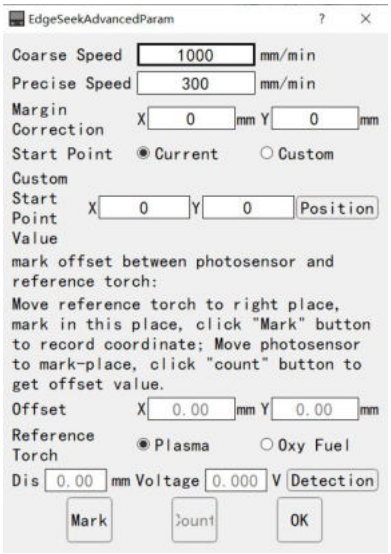


Figure 15.1 Side Search Parameter Settings Figure 15.2 Advanced parameter Settings

15.1.1 interface specification

Output port: configuration needs to configure edge photoelectric switch enabling output port, edge photoelectric switch enabling signal is used to control the photoelectric switch open and off.

Input port: the configuration needs to configure the edge search photoelectric input port, the photoelectric input signal of edge search is input by the photoelectric switch, used to inform the system of the successful edge search in the process of edge search.

15.1.2 Photoelectric sensor wiring

1. The photoelectric sensor 24V wire is connected to the control card 24V output port.
2. Photoelectric sensor 0V wire connection control card search edge photoelectric switch enabling output port.
3. Photoelectric sensor white wire connected to the control card search edge photoelectric input input port.
4. Photoelectric sensor black wire is temporarily useless, can not connected.

15.1.3 Description of the photoelectric edge-seeking parameters

In the main interface, press [F4 parameter setting] to enter the parameter setting interface, and then press [F5 system parameters] to enter the photoelectric switch offset parameter configuration interface, as shown in Figure 15.3:

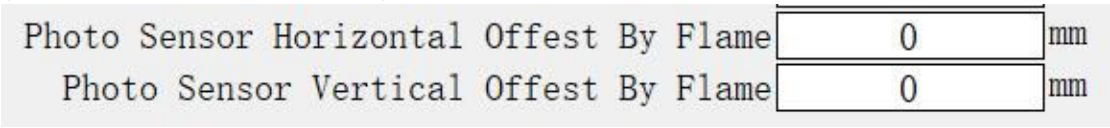


Figure 15.3 Allocation interface of photoelectric switch offset parameters

Description of configuration interface:

- Horizontal offset of the photoelectric switch relative to the flame gun: The calibration calculation can be performed below.
- Longitudinal offset of the photoelectric switch relative to the flame gun: The calibration calculation can be performed below.

In the main interface, press [F4 parameter setting] to enter the parameter setting interface, and then press [F4 powder spraying / drilling] to enter the basic parameter configuration interface, as shown in Figure 15.4:

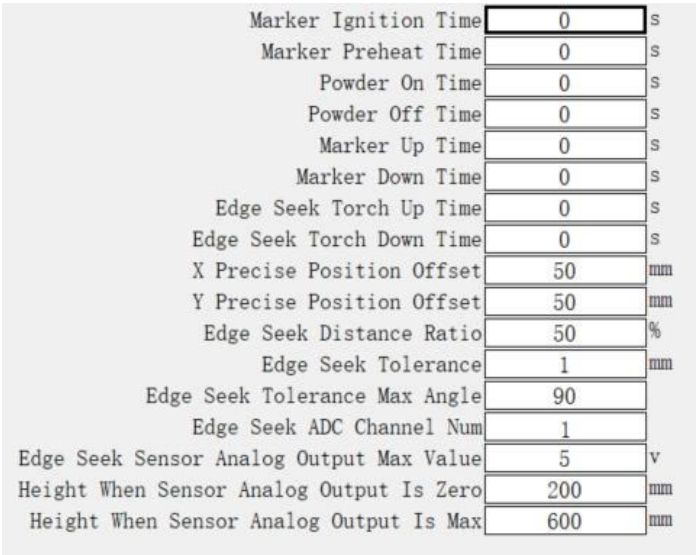


Figure 15.4

Description of the basic parameter configuration interface:

- Drop time: Drop time before the system edge search starts.
- Up time: up time after the end of the system.
- X direction precision positioning offset distance: the distance moved in the X direction before the next edge search (mainly used for the offset value of a single point).
- Y-direction precision positioning offset distance: the distance from the Y-direction movement before the next edge search (mainly used for the offset value of multiple edge search at a single point).
- Edge seeking tolerance: the error size allowed when verifying the edge seeking result.(Use for multiple edges at a single point or at four points)
- Side point distance ratio: adjust the distance of two adjacent edge starting points, the value is the percentage of the current edge (not more than 1m).

In the main interface, click the "photoelectric edge search" button on the right panel, and the operation interface of photoelectric edge seeking will pop up. There are common edge search parameters in the operation interface, as shown in Figure 15.1 and 15.2:

Side-finding parameter configuration description:

- Steel size: the size of the plate to be sought.
- Side distance: the distance between the gun position and the edge of the plate.
- Verx: determine the edge of the plate and where the gun stops last.
- Side points: the number of edge points, four and five points are used to check the result of three points.
- Number of single point: the number of edges for a point.
- Moving along the edge after the edge search enables: whether the photoelectric switch moves along one edge after the edge search ends, so that the user checks whether the edge search result is accurate.
- Single-point edge finding test: used for edge finding test in one direction.
- Open the photoelectric light: Photoelectric switch is turned on.
- Photoelectric off: photoelectric switch off.
- Advanced parameters: It is used to configure the edge-seeking advanced parameters.
- Start edge search: the system begins the photoelectric edge search process.
- Stop edge seeking: stop the photoelectric edge seeking process.
- Click the "Advanced Parameters" button in the interface to configure the photoelectric edge search advanced parameters
- Coarse positioning speed: approximate location of edge points.

- Fine positioning speed: used to find the precise position of the edge point, the smaller the value, the more accurate.
- Edge correction value: Correct the position of the sought edge point.
- Calibration deviation value: there are detailed operation steps in the interface to calculate the position deviation of photoelectric opening and reference cutting gun.

matters need attention:

1. Edge finding result error: the calculation error value is greater than the set error value based on the edge seeking data.
2. System probe signal is not triggered error: the system error causes the edge seeking process to terminate or move to the edge of the plate or terminate the edge seeking process manually.
3. Plate size: X is the length of steel plate in the X axis direction; plate size Y is the length of steel plate in the Y axis direction of the machine tool.The coordinate positions of the last two points of the three-point edge seeking are automatically calculated according to the plate size of the edge. Please ensure that the parameter matches the actual plate size of the edge seeking. It is recommended to set the plate size slightly smaller than the actual edge seeking, and there is a risk of the wrong setting.
4. Side distance: the position of the edge generally outside the board, after the edge after the edge correction, the positive will set the point to the board, the negative value to avoid jitter in the plate edge cutting, if you have set the edge distance, the value can be set to 0.

15.2 ink-jet printing machine

F7600 series printer function for cutting machine with EBS230 printer.The system integrates the EBS230 injection printer communication protocol, connects through the F7600 control card RS232 serial port, transmits the injection content (including the injection font), changes the injection parameters (not implemented, can be configured by the printer software, configuration will be stored in the printer) and sends the injection command.

This function uses the elevation regulator to realize the elevation function for the control and positioning of the lifting body, the code printer is connected to the bottom end of the lifting and positioning of the lifting body.At the same time, the lifting body should have the rotation function to realize the rotation of the code jet, so that the jet can print different directions.

Currently, the spray printer can only spray the ASCII code, and specify the spray content and font size in the G code.Main workflow of printing printer: transfer printing parameters and content information, open printing mode, trigger photoelectric switch, printing, and turn off printing mode.

15.2.1 interface specification

Output: printer up, printer down, printer positioning, printer rotating function, printer up, printer down, printer positioning and output to the regulator, when the rotating output of the printer closes,

the jet rotates 90 degrees and the printer sprays along the vertical axis.

Input port: the configuration needs to configure the functions of successful positioning, 0 degrees and 90 degrees in place. The successful positioning signal is input by the elevation regulator.The signal of 0 degrees and 90 degrees is input by the lifting body.

Photoelectric switch signal of the printer: controlled by the system motion signal. When the system moves, the photoelectric switch is triggered and the printer starts to spray printing. After the system movement stops, the photoelectric switch is closed.

15.2.2 Description of the code-jet printer parameters

In the main interface, press [F4 parameter setting] to enter the parameter setting interface, and then press [F5 system parameters] to enter the printer offset parameter configuration interface, as shown in Figure 15.5:

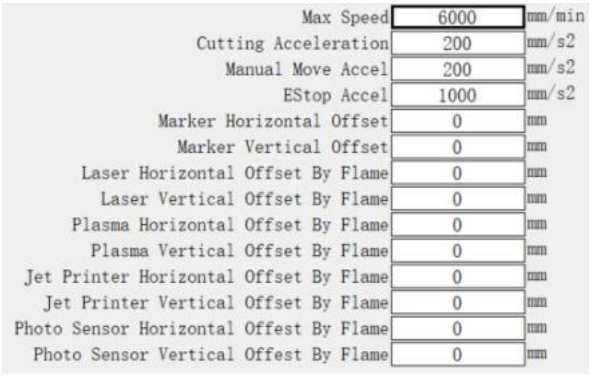


Figure 15.5 Jprinter offset parameter configuration interface

Description of the configuration interface of Sprinter offset parameters:

- Horizontal offset of the spray gun relative to the flame gun: used to achieve the lateral offset of the spray gun in cutting.
- Vertical offset of the spray gun relative to the flame gun: used to achieve the longitudinal offset of the spray gun in cutting.

In the main interface, press [F4 parameter setting] to enter the parameter setting interface, and then press [F4 powder spraying / drilling] to enter the code printer time parameter configuration interface, as shown in Figure 15.6:

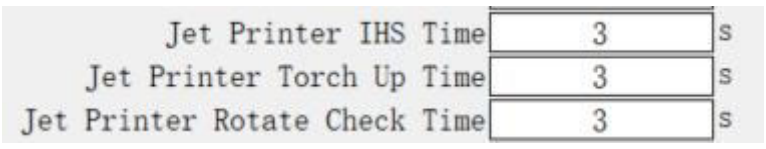


Figure 15.6

Description of the code-jet printer time parameter configuration interface:

- Location detection time: the waiting time for the successful positioning signal of the printer.
- Rotation time of the printer: the system detects the waiting time of 0 degrees or 90 degrees.

- Rising time: the lifting time after the completion of the injection code.

15.2.3 Function instructions of the printer

Spray code: G code description:

- M73: The printer offset open instruction, the printer performs the offset operation
- (><abcdefg): Specifies the spray content, abcdefg is the ASCII code to be sprayed
- (font: F4): Specify the injection font, F4 is the injection font code, refer to EBS230 instructions
- M63: Transfer printing information, send open printing mode command, rotate and locate
- G01 X100: Horizontal forward spray printing, moving trigger photoelectric switch, spray code printer spray printing
- M64: Send the close printing mode command and perform the upward operation
- G00 Xnnn Ynnn: Empty shift instruction
- (><1234567): specifies the content 1234567 as the ASCII code to be sprayed
- (font: F9): Specify the spray font, F9 is the spray font code, refer to EBS230 instructions
- M63: Transfer printing information, send open printing mode command, rotate and locate
- G01 Y100: Vertical forward spray printing, moving trigger photoelectric switch, spray code printer spray printing
- M64: Send the close printing mode command and perform the upward operation
- M72: The printer offset close instruction, the printer performs the bias back

matters need attention:

1. Communication error: the communication between the system and the code printer fails, and check whether the serial port connection is correct.
2. Location timeout: the location detection time.
3. Rotation timeout: No required rotation position signal is still detected after the rotation detection time.

15.3 Illegal shutdown prompt

The F7600 system integrates the illegal shutdown prompt function, the purpose is to prevent the operator from directly power off the power, so as not to damage the computer hard disk.After the illegal shutdown, the application will wait for one minute after the restart. Click OK, and the countdown begins, as shown in Figure 15.7:

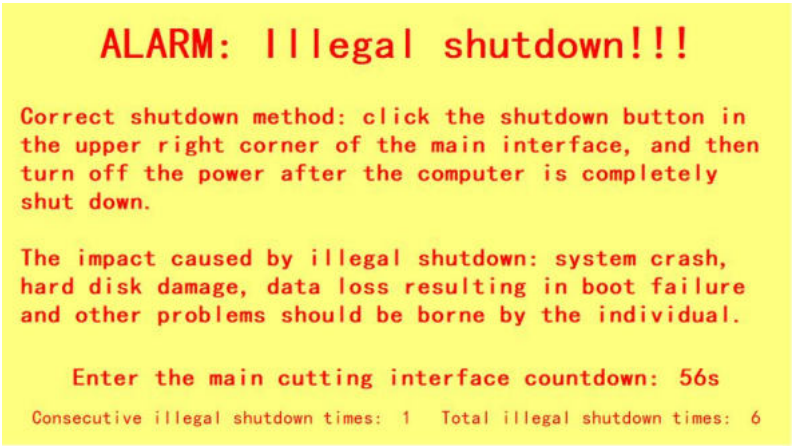


Figure 15.7 Illegal shutdown prompt interface

Chapter 16 F7000 V3.0 Exercise Controller User Manual

16.1 Technical Parameter

F7000 V3.0 Motion Controller	Electric Machine Control	2-axis linkage; maximum extension to 6-axis
		Independent servo alarm, servo capability, encoder feedback
		Motor drive: pulse + direction
	Motion Control Performance	Control accuracy: ± 0.001mm
		Pulse frequency: 4M
		Operating speed: 30m / min
	Analog Volume Interface	A 2-way AD 0~10V analog quantity input
	Bus Interface	RS232、RS485、CAN
	IO Signal	16 way input, 16 way output, full optical coupling isolation
	Network Interface	RJ45*2：1*Ethernet，1*Ether Cat
	Supply Electricity	DC, 24V, 3A
	System Working Environment	Temperature -10℃ to +60℃;The relative humidity is 0-95% without condensation

16.2 Terminal description

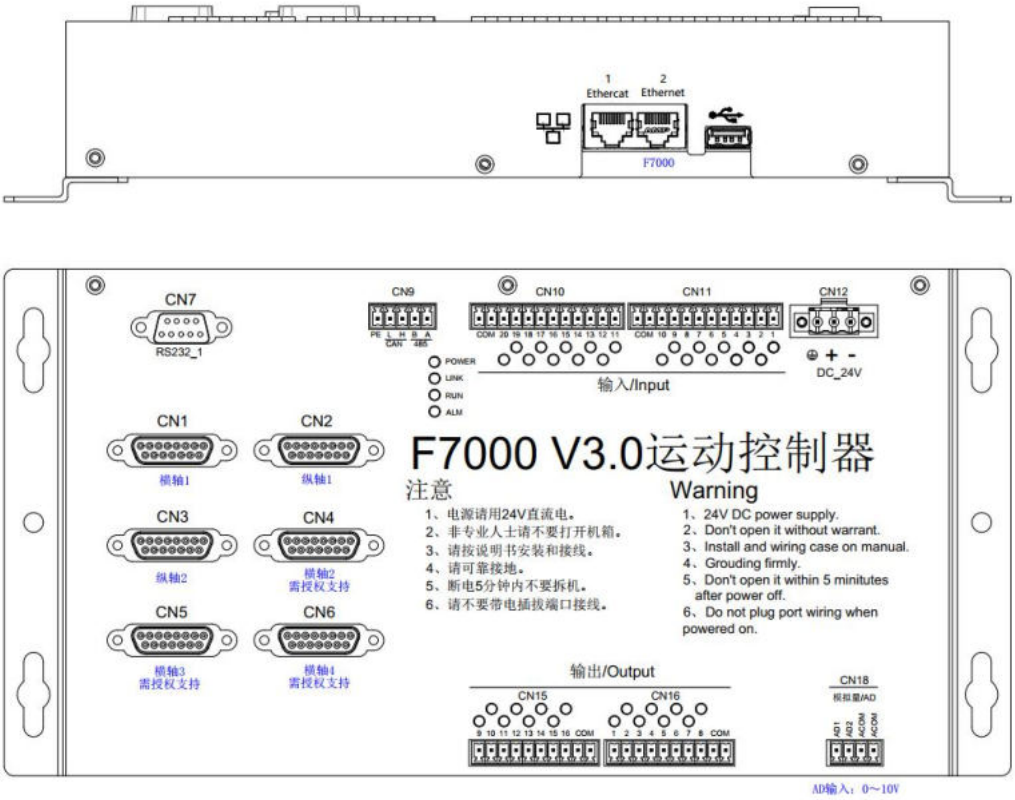
16.2.1 F7000 V3.0 Motion controller description

The F7000 V3.0 motion controller uses network bus communication with 6-axis servo drive interface, 16 general output port, 16 general input port, RS232, RS485 and CAN bus interface, 20-10 V analog volume input port, 2 RJ 45 interface, and DC 24V power supply input port.

Interface layout

Overall interface layout diagram of the F7000 V3.0 motion controller, as shown in Figure 2.1

Figure 2.1 F7000 V3.0 motion controller



16.2.2 Power interface description

Power input interface CN 12, DC _24V, power supply requirements DC 24V, 3A.As shown in Table 2.1.

Table 2.1 Description of the power supply interface

The CN 12 power supply connector pin	Signal name	remarks

1	24V negative	DC 24V power supply site
2	24V is	The DC 24V power supply is positive
3	ground	ground stud

16.2.3 Servo control interface

F7000 V3.0 has 6 pulse servo control interfaces, respectively CN1, CN2, CN3, CN4, CN5, CN6, and 6 DB 15 (double row) master head interfaces.See Table 2.2 in the sequence definition of the servo control interface.

Table 2.2 Interface sequence definition table

order number	explain	control method
CN 1	Horizontal, axis, 1	Pulse + direction
CN 2	Vertical, axis, 1	Pulse + direction
CN 3	Vertical, axis, 2	Pulse + direction
CN 4	Horizontal, axis, 2	Pulse + direction
CN5	Horizontal, axis, 3	Pulse + direction
CN6	Horizontal, axis, 4	Pulse + direction

Note: The horizontal axis 2, horizontal axis 3 and horizontal axis 4 are horizontal independent servo axes and require software authorization support.

The servo control interface is shown in Figure 2.2, and the interface pin is defined in Table 2.3

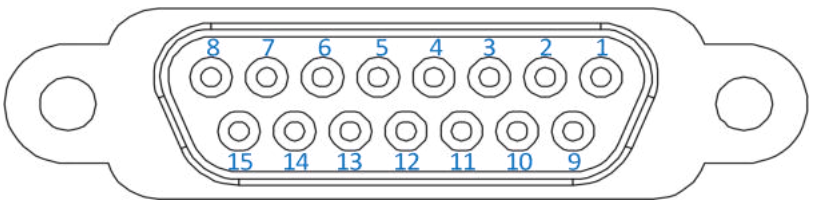


Figure 2.1 Definition diagram of the servo interface pin

Table 2.3 Interface pin definition table

Lead the foot number	Signal name	Lead the foot number	Signal name
1	Pulsed positive CP +	9	Pulse-negative CP-
2	Positive direction, DIR +	10	Negative direction, DIR-
3	encoder A+	11	encoder A-
4	encoder B+	12	encoder B-
5	encoder Z+	13	encoder Z-
6	The SON server enables the output	14	ALM Servo alarm input
7	ALM CLR servo alarm clearance	15	24V, the power supply site
8	The 24V power supply is positive (output)		

1-CP +, 9-CP-: Servo control pulse (PLUS) signal, differential output signal

2-DIR +, 10-DIR-: Servo control direction (DIR) signal, differential output signal

3-A +, 11-A-: servo encoder A phase input signal, differential input signal

4-B +, 12-B-: servo signal B phase input signal, differential input signal

5-Z +, 13-Z-: Z phase input signal, differential input signal

6-SON: Servo control enables output signal, default low effective, can be changed to high effective through jumper

7-ALM CLR: Servo alarm clearance

8-24V +, 15-24V-: DC 24V power output to power the drive.

14-ALM: Servo alarm input signal, default low effective, can be changed to high effective through the jumper

Lead the foot number	Signal name	Lead the foot number	Signal name
1	Pulsed positive CP +	9	Pulse-negative CP-
2	Positive direction, DIR +	10	Negative direction, DIR-
3	encoder A+	11	encoder A-
4	encoder B+	12	encoder B-
5	encoder Z+	13	encoder Z-
6	The SON server enables the output	14	ALM Servo alarm input
7	ALM CLR servo alarm clearance	15	24V, the power supply site
8	The 24V power supply is positive (output)		

16.2.3.1 Y-axis single-drive wiring:

For Y-axis single drive, CN1 is horizontal axis 1 motor interface and CN2 is vertical axis 1 motor interface.As shown in Figure 2.3 below.

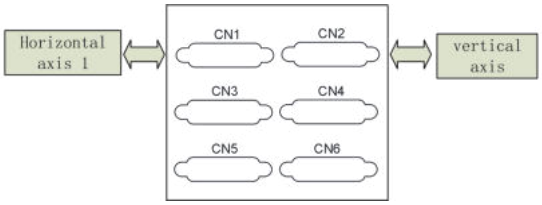


Figure 2.3 Drawing of the Y-axis single-drive wiring

16.2.3.2 Y-axis dual-drive wiring:

In the axis parameter configuration interface, when the [bilateral drive] parameter of the Y-axis is checked, the CN1 port is the horizontal axis 1 motor interface.CN2 and CN3 ports are vertical axis 1 and motor interface of vertical axis 2.As shown in Figure 2.4 below.

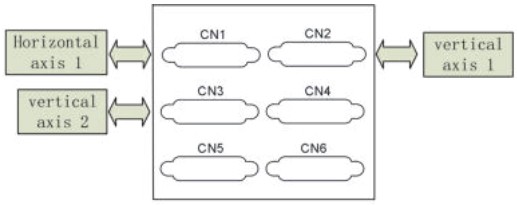


Figure 2.4 Drawing of the Y-axis dual-drive wiring

Note: when gantry true bilateral (gantry double drive), the feedback of longitudinal axis 1 and longitudinal axis 2 must be connected. Otherwise, if the machine will be moved when the single motor of gantry is damaged, the tool beam will be sprained.

16.2.4 Analog quantity input interface

The F7000 V3.0 motion controller has two analog AD input signals from 0 to 10 V, and the AD input can be used for the input signal of the laser displacement sensor in automatic edge seeking.
Table 2.4 Definition of the analog volume interface

Simulation volume interface pin number	Signal name	explain
1	AD 1	Simulation quantity input port
2	AD2	Simulation quantity input port
3	A COM	Common ground line of analog quantity
4	A COM	Common ground line of analog quantity

16.2.5 Inport wiring description

The input port is the photoelectric isolation input, low and effective.The input signal may be a mechanical contact switch, or a photoelectric switch that supports a normally open and closed input.The common end of the external switch is 24VGND, and the other end is connected to the corresponding input port.The schematic circuit diagram inside the input port is shown in Figure 2.5.

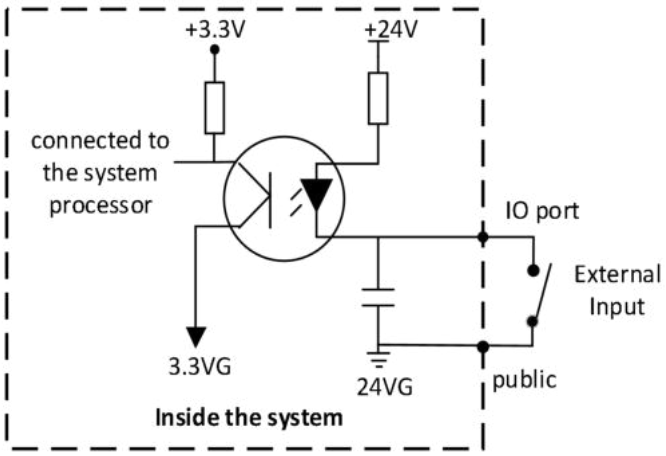


Figure 2.5 Schematic diagram of the internal wiring of the general input port

There are 16 universal input ports, and all the input port functions support customization.Support for serial number customization.

Table 2.6 Input Port Definition

Input port	Signal name	remarks	Input port	Signal name	remarks

CN11			CN10		
1	Front limit		11	empty	Unconfigured
2	After the limit		12	empty	Unconfigured
3	left limit		13	empty	Unconfigured
4	right limit		14	empty	Unconfigured
5	jerk		15	empty	Unconfigured
6	Successful starting arc onset feedback		16	empty	Unconfigured
7	Position the successful feedback		17	NULL	obligate
8	Plasma collision		18	NULL	obligate
9	empty	Unconfigured	19	NULL	obligate
10	empty	Unconfigured	20	NULL	obligate
COM	24VG	+24V _GND The ground of power supply	COM	24VG	+24V _GND The ground of power supply

Description: The input port and function instructions are the factory default configuration, and can be changed through the input port definition.

16.2.6 Output port wiring description

The output voltage is 24V, the low level is valid; the common end of the external relay coil is 24V + (also 24V + to the power supply of the system), and the other end of the relay coil is corresponding to the IO port.

- Output to withstand a maximum load current of 300m A.
- There are a total of 16-way output ports.
- Its typical output port interface circuit is shown in Figure 2.6.

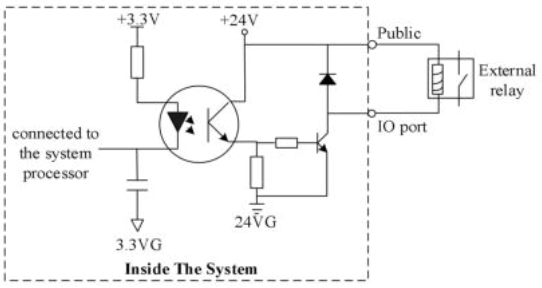


Figure 2.6 Schematic diagram of the output interface circuit

Table 2.7 Output port definitions

Output	Signal name	remarks	Output	Signal name	remarks
1	stir up trouble		9	air-vent	
2	Low pressure preheating		10	Capaciance elevation box enables	
3	High pressure preheating		11	Plasma positioning	
4	Low pressure cutting oxygen		12	Plasma arcs	
5	Medium pressure cutting oxygen		13	Turn off and turn up (Corner signal)	
6	High pressure cutting oxygen		14	dusting	
7	Cut torch rise		15	Yang powder	
8	Cut torch drop		16	Spray powder preheat	
COM	24VG	+24V Power to	COM	24VG	+24V Power to

Description: The output port and function description are the factory default configurations, and can be changed through the output port definition

16.3 general connection diagram

16.3.1 The F7000 V3.0 General wiring diagram is shown in Figure 2.7.

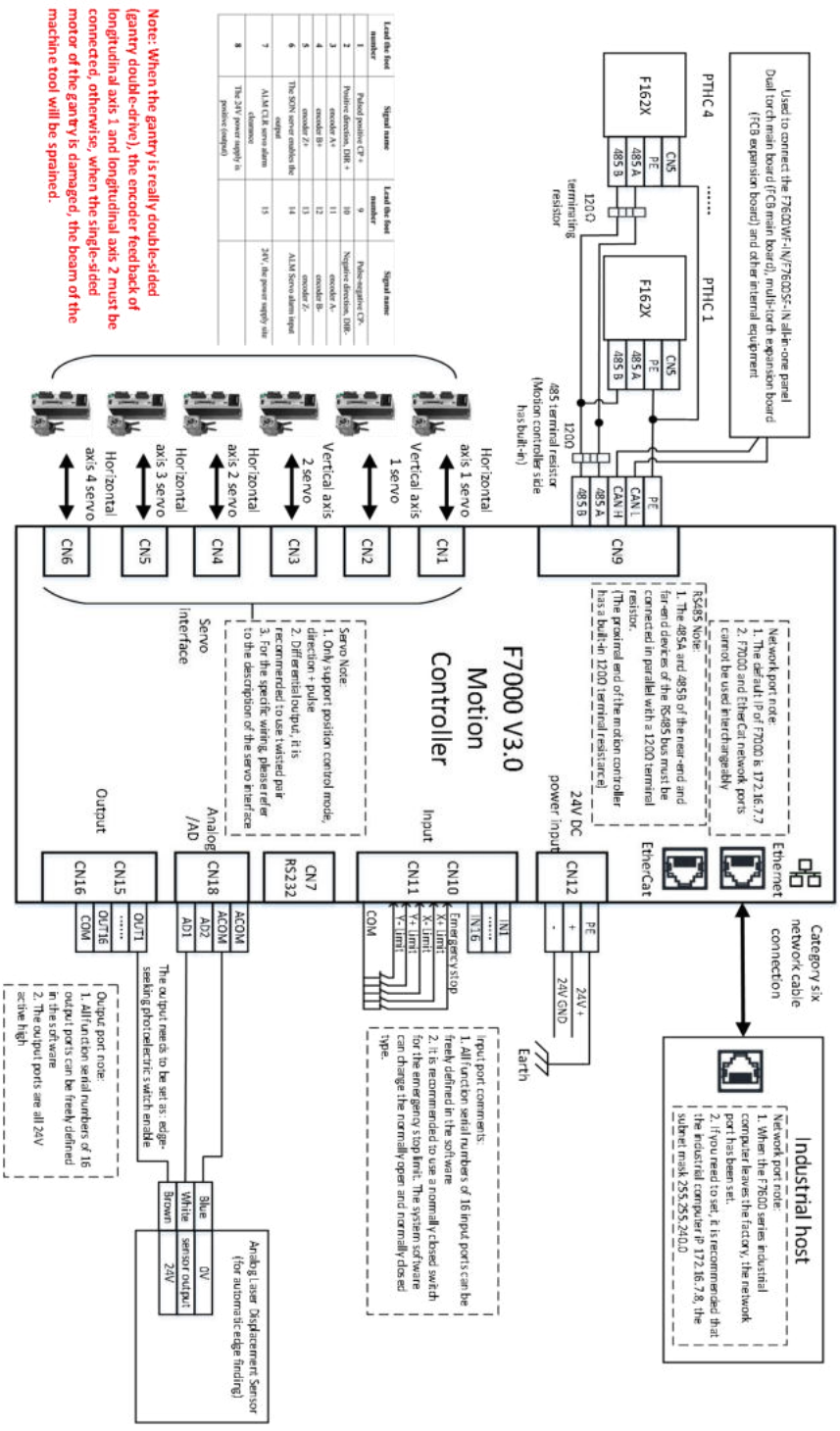


Figure 2.7 F7000 V3.0 System main wiring

16.4 Installation Size

16.4.1 F7000 V3.0 Sport Controller Installation Size

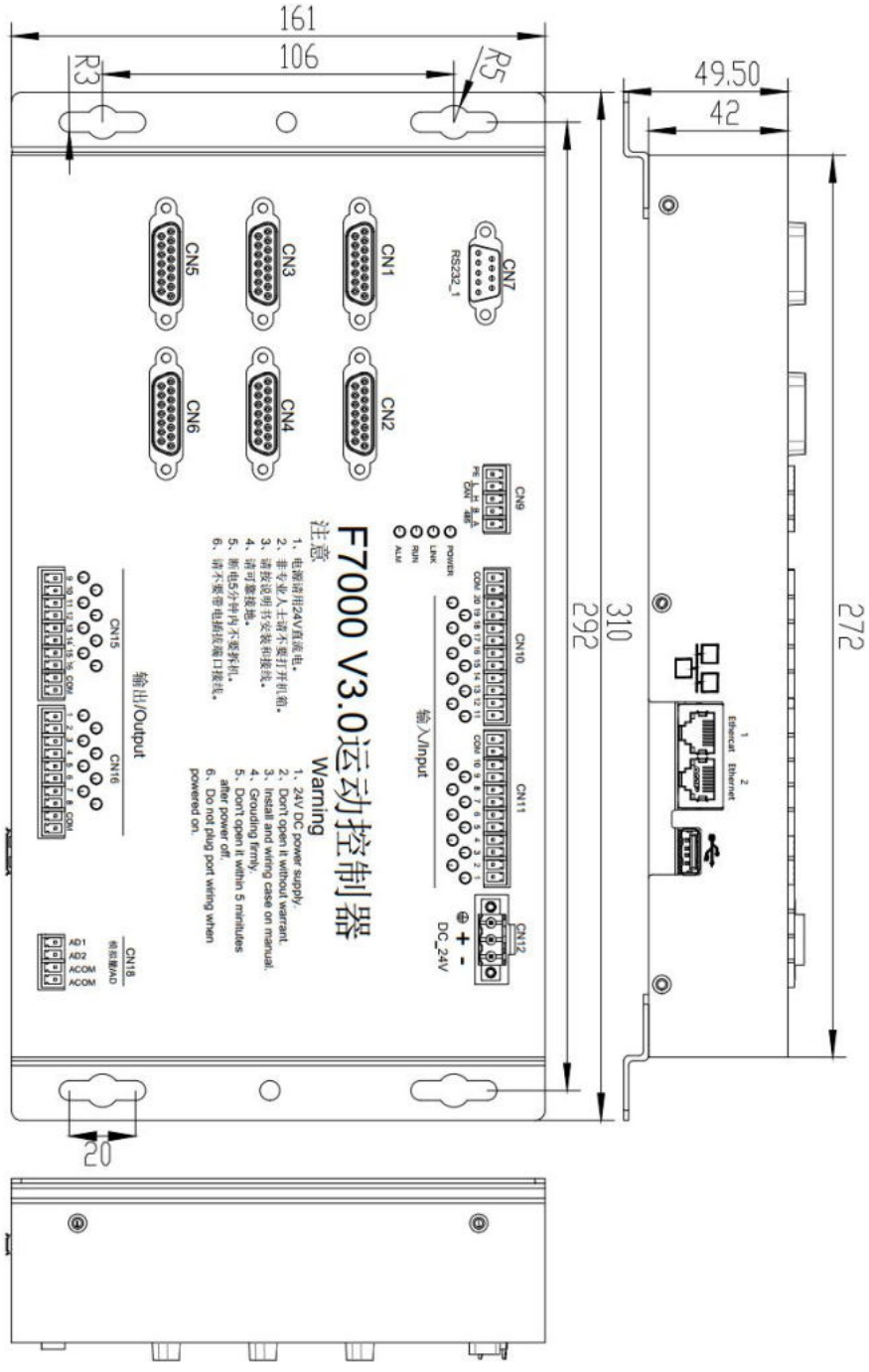


Figure 3.1 F7000 V3.0 Installation dimensions

Appendix 1. Installation Dimensions

unit: mm

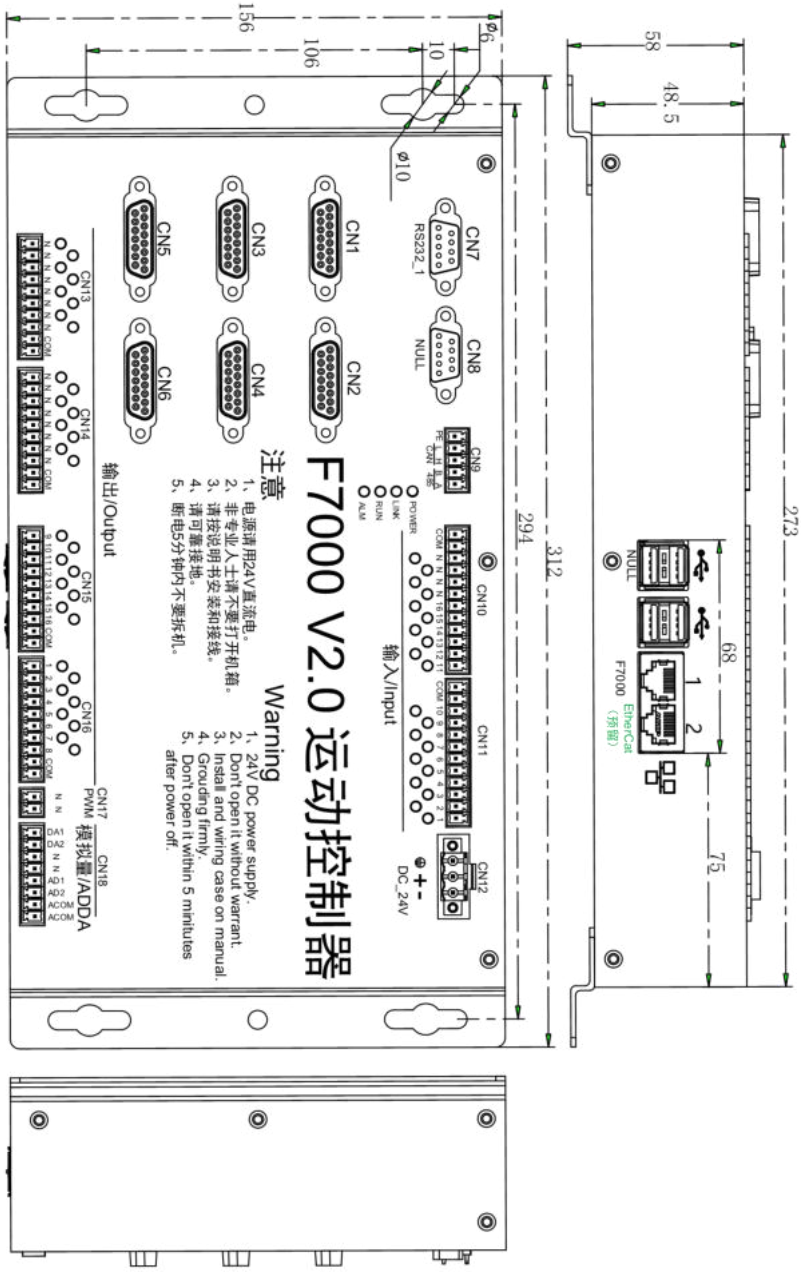


Figure 1 F7000 V 2.0 motion controller installation dimensions

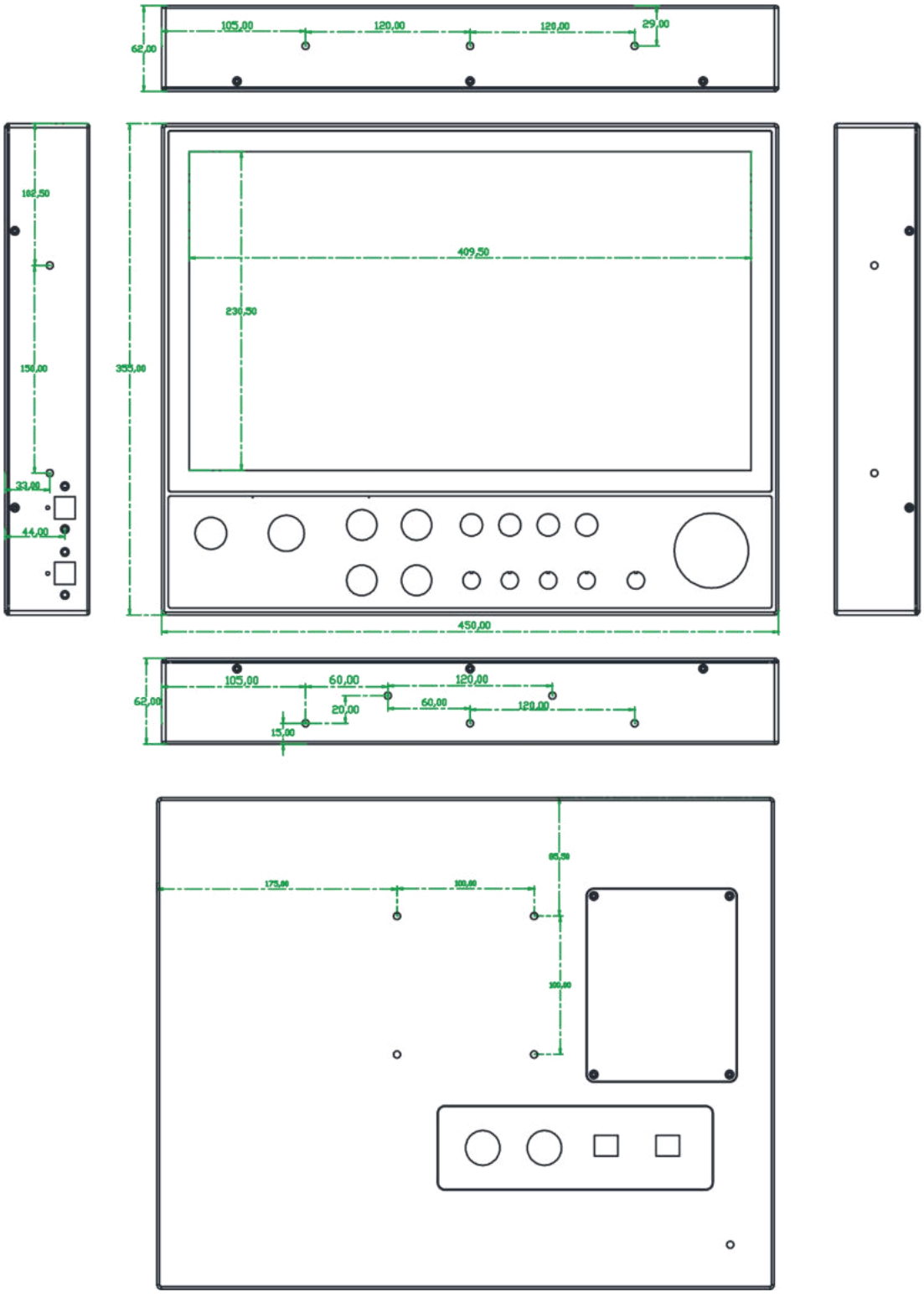


Figure 2 Installation dimensions of the F1219F panel