# 3-4 Axes Spring Former Control System

# User Manual

# About the Arcuchi

Shenzhen Arcuchi Technologies Co., Ltd. was established in 2007. Since its inception, the company has been providing customers with safe, stable, efficient and intelligent industrial control systems and automation solutions. It is customer-oriented and constantly adapts to changes in customer needs, focusing on research, development, production and promotion. Automation technology. Based on the concept of “stay simple to customers and leave complexity to ourselves”, after more than ten years of hard work, we have repeatedly made breakthroughs in innovation from chip design, hardware design, underlying software and platform software. The technical difficulties are difficult to bear.

Shenzhen Arcuchi Technologies Co., Ltd. has been assessed as a national high-tech enterprise and software enterprise with independent software development capabilities. Up to now, the company has obtained a total of 35 software copyrights in the original way, and has obtained 2 authorized patents, and 7 patent applications are pending review. Excellent technology makes extraordinary products. At present, we have completed the development of a full range of injection molding machines, including: all-electric, oil-electric hybrid, two-color machine, two-plate machine, vertical, horizontal injection molding machine series. In terms of punching machines, we have improved the integrated solutions, including: integrated process parameters, servo feeding and receiving, automatic mold adjustment, tonnage, remote management and smart factory to meet the growing high-end needs of the press industry. We have achieved industry leadership in many technologies such as high and low speed algorithms, length detectors, and probe detection of spring machines. In addition, in order to comply with the development of the times, the company initially identified three industrial 4.0 product projects, including: remote management products, smart factory products, lean production management products. In the future development, we will focus on visual, graphic programming and bus technology to make breakthroughs and innovations, develop in accordance with the trend of the times, keep pace with the times, and constantly carry out technical reserves to meet the ever-changing needs of customers.

After continuous efforts with customers' needs, our system products have been tempered, with advanced multi-processor architecture, industrial-grade reliability design, perfect hydraulic transmission, pneumatic transmission, motor control technology, and diverse A/D analog , I / O control module, encoder module, rich fieldbus interface. Its rich functionality and operability delivers a real breakthrough in performance, eliminating the need for customers to exchange expensive pricing for a dedicated control system with top performance.

Strong product research and development strength, standard production management process, perfect product sales network, and sound after-sales technical service to provide customers with one-stop solutions. "Excellent technology, reliable products, timeless brand" is the unanimous pursuit of all of our Arcuchi people. More than ten years of technology precipitation has escorted the rock-solid quality of Arcuchi Technologies.

All staff of Arcuchi dedicated to serve you!

# Table of Contents

# Chapter 1 Introduction

## 1 caution

1. After receiving our products, please take care of it, avoid bumps, so as not to damage the main unit and display.
2. When you unpacking the goods you should detect it at the first time, and check whether the type and quantity of products received are consistent with the order.
3. If there are events about product damage, product mailing errors, product omissions, etc. Please contact our in time to handle the replacement and other procedures.
4. Before using our products, please refer to this User Manual, and familiarize yourself with the key functions and graphical operation interface on the display to facilitate proficiency in production. For system assembly, refer to the electrical connection section in Chapter 4 of this manual. After the system assembled, you should test the whole machine, and then you can start you production. When using our products, if you encounter any problems, please contact us in time, our professional software or after-sales engineers will provide you with technical support in the first time.

## 2 Specifications

1. System Name: Oil Pressure Control System
2. System components:  host, 8-inch color LCD screen, input keyboard
3. Available cylinders: 5-12
4. 1-axis stepper motor control with a maximum output frequency of 5MHz
5. Operating voltage range: 21V-26V

## 3 Special function

1. Runtime line anomaly detection.
2. There are two operation modes including manual and automatic for easy debugging.
3. Production program can be stored automatic.
4. Supporting the U disk copy a list of program directory and system parameter.
5. Supporting the U disk upgrade the system software.

# Chapter 2 Display operation instructions

## 1 Buttons

All operating buttons on the display are located below the LCD screen. In order to facilitate the user's operation, according to different functions corresponding to the buttons, different colors are set to distinguish. The button panel been shown below the Figure 2-1.

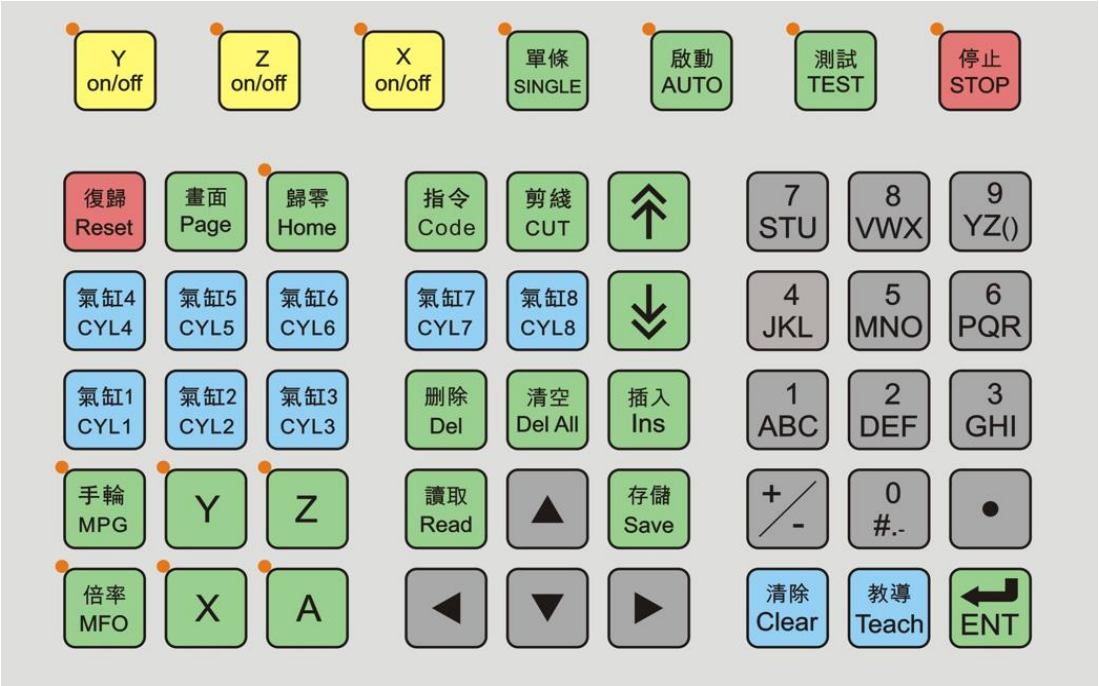


**Figure 2-1 Buttons**

**1. X/Y/Z (on/off)**

When the axis is closed, the corresponding hand wheel axis cannot be selected. The LED on the button lights up to indicate that the current axis is off. It is convenient to turn off some axes during debugging.

**2. Reset**

In any case, press this button to jump to the main screen (monitor page), and the machine will stop immediately. If there is an alarm, the alarm will be cleared and then jump to the main screen (monitor page).

**3. Page**

To achieve switching between the various screens, programming - file storage - working parameters - after-sales service - monitoring page.

**4. Home**

Power-on for the first time: all the used axes are zeroed in the set speed, set direction, and set order (you need to select the sensor switch or servo origin). After zeroing for 60 seconds, the zero return is still not available. When completed, it indicates a "return to zero timeout" fault.

Zero return: After the machine is powered on and after the origin is found, when the zero return operation is performed, the machine will return to the zero point in the memory, instead of relying on the sensor switch or the servo origin to return to zero.

**5. Auto**

Press this button to enter the continuous running state and return to the main screen (monitor page). The LED on the button lights up to indicate that the system is in continuous operation.

**6. TEST**

The LED on the button lights up to indicate that the system is in a test state. Press this button to enter the test production mode, and the production speed can be adjusted by rotating the “SPEED RATE” below. If the "production test knob" is turned counterclockwise to zero at this time, turn the hand wheel to achieve the purpose of hand-shaving the spring.

**7. Stop**

In the "continuous" or "test" state, press this button to stop after the machine has produced the current spring.

**8. MPG**

The hand wheel controls the single-axis operation. When the light is on once, the function is turned on, and the light is turned off again, and the function is turned off. When this function turned on, you also need to select the axis that needs to be operated. (If you need to send the line to the hand, you must first press the "hand wheel", then press the "Y" button, then turn the hand wheel).

**9. MFO**

Press this button in the hand wheel state (the LED light is on), turn the hand wheel, and the corresponding axis will rotate rapidly. Turn off the function (LED light off), turn the hand wheel, the corresponding axis rotates slowly

**10. CLY**

Manual cylinder 1-8 output button, the corresponding cylinder will open once pressed, and the cylinder will close when pressed again.

**11. X/Y/Z/A**

The LED light is on to indicate that the axis is selected.

**12. Page Key**  、 

On the [Programming] page, the page flip shows the valid program line; on the [Program List] page, the page is displayed to display the stored program.

**13. DEL**

This button has two functions:

A. On the [Programming] page, delete the line where the cursor is.

B. On the [Program Directory] page, you can delete the selected program.

**14. Ins**

On the [Programming] page, insert a blank program in the line where the cursor is located.

**15. DEL ALL**

On the [Programming] page, the current program can be cleared.

**16. Read**

On the [Program List] page, press this button to read the selected program. This function is only valid if the machine is not running, otherwise the system prompts "Run, prohibit reading".

**17. Save**

On the [Program List] page, the program can be stored in the current program number. This function is only valid if the machine is not running, otherwise the system prompts "Running, prohibit storage".

**18. Clear**

This button has three functions:

A. When the digital input status is pressed, press this key to clear the data input in the previous step;

B. On the [Programming] page, the number is selected to clear the selected whole block data to blank;

C. When the alarm box is displayed, this button is canceled.

**19. Teach**

On the [Programming] page, when the cursor is on a line, this button teaches the position of the current axis to the program bar.

**20. ENT**

This button has two functions:

A. The confirmation function when inputting data can also directly teach the position of the current axis to the program bar;

B. When the alarm box pops up, this button is the confirmation function.

**21. CUT**

This button function is the tangent program set by the operation parameter page.

**22. SINGLE**

This button function is to stop after running the program once.

**23. Code**

This button function is to set the programming command, and multiple clicks will have different programming commands.

## 2 PAUSE

The emergency stop button is located at the bottom left of the display. When the system is in normal operation, if there is an emergency accident, it is necessary to stop the processing and production. Press this button to realize the emergency stop operation to reduce the adverse consequences caused by the accident. The emergency stop button been shown in the Figure 2-2.

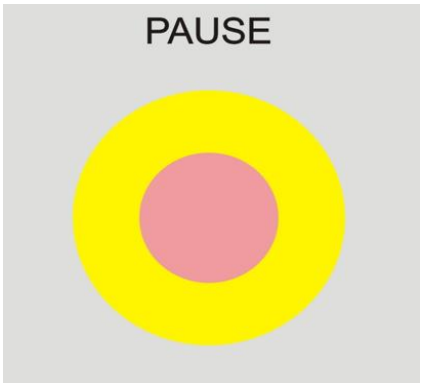


**Figure 2-2 PAUSE**

## 3 SPEED RATE

In the "test mode", the knob is rotated clockwise to increase the machining speed, and vice versa until the machining speed is reduced. In the "test mode", when the "production test knob" is turned counterclockwise to zero point, turn the hand wheel to achieve the purpose of manual machining of the spring by multi-axis linkage. The test knob is shown in Figure 2-3.

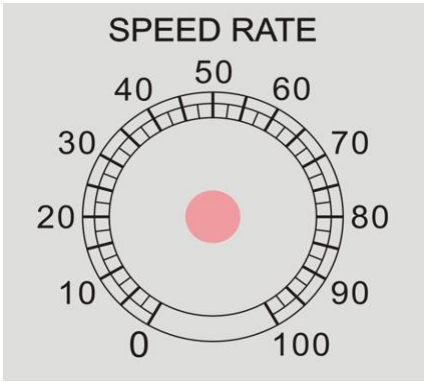


**Figure 2-3 SPEED RATE**

# 4 MPG

In the "hand wheel mode", the hand wheel is turned and the corresponding axis moves to achieve single-axis manual movement. The hand wheel is shown in Figure 2-4.

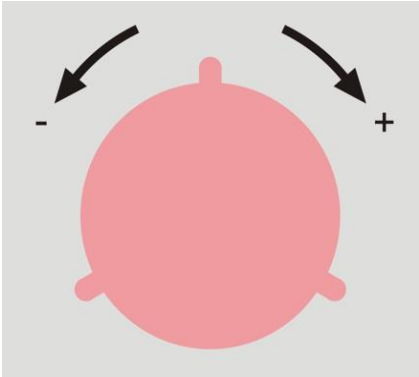


**Figure 2-4 MPG**

# Chapter 3 Operation interface

## 1 Programming page

The programming page provides the user with the programming of the relevant product parameters when producing the product they need. It mainly includes the use of commands, axes, cylinders, probes, etc. The programming page is shown in Figure 3-1.

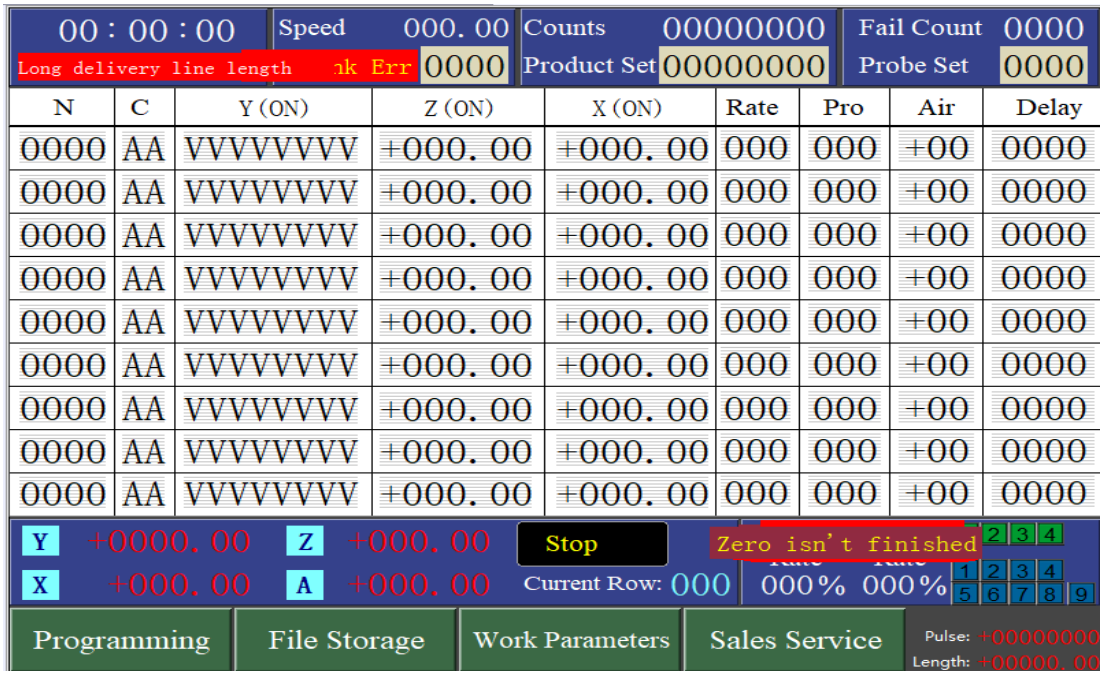


**Figure 3-1 Monitor Page**

1. N

   The current program line number, when empty, indicates that the line program is invalid.

2. Code

   The instructions used by the current program.

3. Y

   This item has three functions:

   A. When the standard command is made, the wire length is set.

   B. When the jump instruction is used, it indicates the jump line number.

   C. When the instruction is repeated, it indicates the number of repetitions.

4. Z

   Pitch axis angle or movement amount setting (The axis has two modes of operation: circular motion and linear motion, which can be modified on the system page).

5. X

   X axis angle setting.

6. Speed ratio

Set the single line running speed. If this item is not set, the program will be produced at the set speed of the item number.

7. Probe
   Current line detection probe number setting.
8. cylinder
   Specify which cylinder to use.
9. Delay
   After the execution of the line program, the pause time, in units of 0.1 seconds
10. Program number
    The stored item number used by the current program.
11. Speed setting
    Set the machine speed in units of revolutions per minute.
12. Production speed
    Current product processing speed display, unit: bar / minute.
13. Production setting
    Product target yield setting (when set to 0, means that the production count is not considered).
14. Production count
    The number of products currently counted has been completed. When the set target number is reached, a "count arrival" alarm is generated.
15. Probe setting
    The maximum number of probe failures (when set to 0, indicates that the number of probe failures is not considered).
16. Probe failed
    The current number of probe failures counted. When the number of failures is equal to the set value, the "probe failed" alarm is displayed.
17. Position
    Displays the current position of each axis.
18. Operating state
    Current working status of the system.
19. Current line
    The line number of the current program run.
20. Test ratio
    Current mode ratio when testing mode, range: 0% to 100%.
21. Probe indication
    When there is a probe input, the corresponding indicator will light.
22. Cylinder indication
    When there is a cylinder output, the corresponding indicator will light.

## 2 File storage page

The file storage page displays the program file name, file serial number, and status of the corresponding file currently stored in the system. The selected file can be read, stored, and deleted. When there are more files, you can check them by pressing the up or down button. The file storage page is shown in Figure 3-2.


**Figure 3-2 File Storage Page**

1. A total of 2000 files can be stored, and the page turning can be achieved by pressing the “Page Up” button.
2. Current program number: The program file number currently called in the [Programming] page.
3. Serial number: The file serial number is displayed.
4. File name: The file identifier of the data stored by the user.
5. Status: Current file status, "OK" indicates that the stored data is valid, and blank indicates that there is no valid data.
6. When reading, first select the file to be read, and then press the "Read" button.
7. When storing, first select the file you want to access, and then press the "Save" button.
8. Serial number quick positioning: You can quickly locate the serial number of the file you want to select.

# 3 Parameter page

The parameter page setting has some common working parameter configuration areas, which is convenient for users to perform related configuration during production, so as to better complete the production task. The parameter page is mainly divided into two modules: working parameters and wire frame parameters, as shown in Figure 3-3.

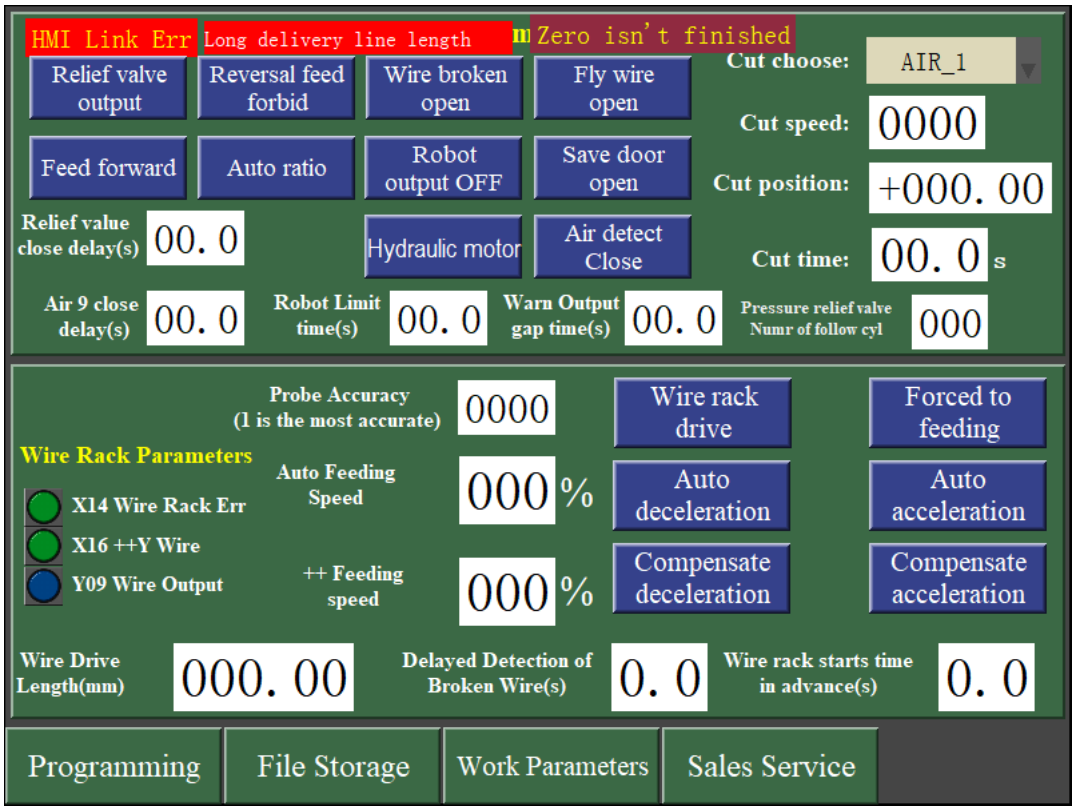


**Figure 3-3 Parameter Page**

1. Wire frame drive: In the linked state, press this button to start the automatic wire feeding function of the wire feeder
2. Forced wire feeding: press this button, the wire feeder will unconditionally feed the wire at the compensation speed;
3. Wire break detection: Check that the wire break input point can be set to normally closed or normally open;
4. Run line detection: check the line input point can be set to normally closed or normally open;
5. Pressure relief valve output: When any cylinder in cylinder 1-5 is open, the relief valve output (Y00);
6. Forward wire feeding: when forward wire feeding, cylinder 9 outputs; when reverse wire feeding or no wire feeding, cylinder 9 is closed and no rewinding is allowed;
7. Reverse line is prohibited: choose whether to allow the Y-axis hand wheel to rewind;
8. Automatic magnification: Select whether to turn on the automatic override switch;

9. Manipulator mandatory output off: select whether to open the manipulator mandatory output switch.
10. Feed speed: Set the automatic feed speed. The machine is in continuous motion. In the “automatic speed control mode”, the speed is automatically adjusted according to the production speed to achieve automatic control of the wire feeder function;
11. Compensation speed: set the compensation line speed
12. Auto Acceleration (Deceleration): Press this button once to increase the line speed (lower) by 1; press and hold the button to increase the line speed (lower);
13. Compensation acceleration (deceleration): Press this button once to compensate for the increase (lower) of the feed line speed; press and hold the button to increase the compensation line speed continuously (lower);
14. Wire breakage abnormality detection time: After detecting the wire breakage detection, the time of detecting the delay;
15. Pre-start time of the wire frame: for continuous production, for the wire frame to start early
16. Probe sensitivity: When the product requires high sensitivity for the probe, please use the No. 1 or No. 2 probe; if the “Probe Touch in advance” alarm occurs frequently, please use the No. 3 or No. 4 probe;
17. Cutter axis selection: Select the cutter axis. After selection, when the trimming button is clicked, the selected axis or cylinder is used as the cutter;
18. Cutting speed: set the speed when the cutter moves;
19. Cutting position: the cutting position to which the cutter is operated;
20. Cut-off time: the time after the cutter is moved to the cut-off position;
21. Delay closing of relief valve: it is used to set the delay closing time of relief valve. When set to 0, it means there is no delay when relief valve is closed.
22. Delay shutdown of cylinder 9: when the feed line forward switch is turned on, the output of cylinder 9 (both manual and automatic output signal)；
23. Robot time limit: Wait for the robot to complete the time to give the signal after issuing the robot start signal. Timeout will report the robot timeout.
24. Pressure relief valve Numr of follow cyl ：You can manually select the first few cylinders to follow the action of the pressure relief valve

# 4 System upgrade page

The system upgrade page is mainly provided to system maintenance personnel and after-sales/software engineers to upgrade the system. The system upgrade page is shown in Figure 3-4.

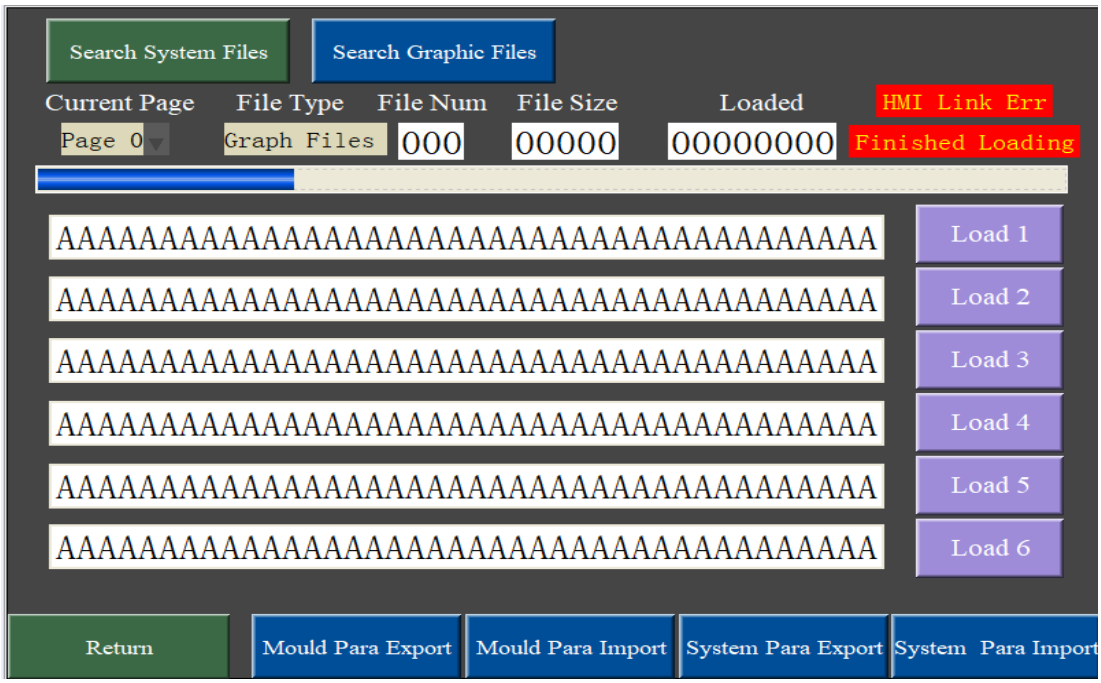


**Figure 3-4 System Upgrade Page**

# Chapter 4 Instruction description and examples

In this chapter, we will introduce all the instructions involved in this system in detail, and provide relevant examples to explain, so that users can master the use of relevant instructions, and skillfully apply to the daily production process.

## 1 Instruction list

| Code | Parameter | Description |
|---|---|---|
| Empty | Empty | Standard execution instructions, run according to program X/Y/Z/A/B/C data |
| J | Line number | Probe jump instruction, if the previous line probe detection fails, the program jumps to the specified line to execute, otherwise the program directly executes downward |
| G | Line number | Absolute jump instruction, the program jumps directly to the specified line to execute |
| L | repeat times | Repeat the start command and use it with the repeat end command N |
| N | Empty | Repeat end instruction |
| CP | Empty | The program starts to detect when it reaches the command line, and has a time in the Y column. When it has not received the signal, it will alarm. (Maximum available time is 999.99S) |
| E | Empty | End instruction (if there is no special need, it can be used when programming) |
| W | Empty | The cutter axis is reversed in the forward and reverse directions (refer to the W instruction for details) |
| SW | Empty | Start welding synchronization instruction |
| WW | Empty | Waiting for the welding end command |

## 2 Probe jump instruction (J)

| Number | Code | Y（ON） | Z（ON） | X（ON） | Speed ratio | Probe | Cylinder | Delay |
|---|---|---|---|---|---|---|---|---|
| 0 | | 0 | 0 | 0 | | | | |
| 1 | | 20.00 | 8.00 | 25.00 | | 1 | | |
| 2 | J | 4 | | | | | | |
| 3 | | 35.00 | 15.00 | 50.00 | | | | |
| 4 | | 50.00 | 5.00 | 100.00 | | | | |

**Probe jump instruction description:**

If the previous line probe fails, the program jumps to the specified line (ie, line 4), otherwise the program executes directly down (ie, line 3).

## 3 Detection instruction (CP)

| Number | Code | Y（ON） | Z（ON） | X(ON) | Speed ratio | Probe | Cylinder |
|---|---|---|---|---|---|---|---|
| 0 | | 0 | 0 | 0 | | | |
| 1 | CP | 10 | | | | | |
| 2 | | 25 | 20 | 25 | | | |
| 3 | | 50 | 25 | 30 | | | |
| 4 | | 25 | 20 | 25 | | | |

**Test instructions:**

When the program runs to the first line of the serial number, it starts to detect whether the product is completed, and the program continues to execute without waiting. The detection time (the column of the Y axis belongs to 10s) will stop the alarm if the product completion signal is not received. If the product completion signal is received, the program will be executed normally.

## 4 Absolute jump instruction (G)

| Number | Code | Y（ON） | Z（ON） | X（ON） | Speed ratio | Probe | Cylinder | Delay |
|---|---|---|---|---|---|---|---|---|
| 0 | | 0 | 0 | 0 | | | | |
| 1 | | 20.00 | 8.00 | 25.00 | | | | |
| 2 | G | 4 | | | | | | |
| 3 | | 35.00 | 15.00 | 50.00 | | | | |
| 4 | | 50.00 | 5.00 | 100.00 | | | | |

**Absolute jump instruction description:**

When the program runs to this line, it jumps unconditionally to the specified line (line 4). When entering this command, press the “Jump Command” button twice.

## 5 Repeat start command (L), repeat start command (N)

| Number | Code | Y（ON） | Z（ON） | X（ON） | Speed ratio | Probe | Cylinder | Delay |
|---|---|---|---|---|---|---|---|---|
| 0 | | 0 | 0 | 0 | | | | |
| 1 | L | 5 | | | | | | |
| 2 | | | 5.00 | 20.00 | | | | |
| 3 | | 50.00 | 15.00 | 50.00 | | | | |
| 4 | N | | | | | | | |

**Repeat instructions:**

Repeat the start command to set a loop body start flag, and set the number of loops to 5, this command needs to be used with the repeat end command. Repeat the end command to set a loop end flag. When entering this command, press the “Repeat Command” button twice in succession. Layer 2 loop nested instructions are now supported.

## 6 Welding start command (SW)

| Number | Code | Y（ON） | Z（ON） | X（ON） | Speed ratio | Probe | Cylinder | Delay |
|---|---|---|---|---|---|---|---|---|
| 0 | | 100 | | | | | | |
| 1 | SW | | | | | | | |
| 2 | | | | | | | 1 | 10 |
| 3 | | | | | | | -1 | |
| 4 | | | | | | | 2 | 10 |
| 5 | | | | | | | -2 | |
| 6 | | | | | | | 3 | 10 |
| 7 | | | | | | | -3 | |
| 8 | | | | | | | 4 | 10 |
| 9 | | | | | | | -4 | |

**Welding start instruction instructions:**

When the program starts running, the Y-axis feeds 100 units, then the start welding procedure is executed, cylinder 1 is opened, the delay is 1 second, cylinder 1 is closed, cylinder 2 is open, delay is one second, cylinder 2 is closed, and so on. If there is no cylinder program in the next line, the welding is finished.

## 7 Waiting for the welding end command (WW)

| Number | Code | Y（ON） | Z（ON） | X（ON） | Speed Ratio | Probe | Cylinder | Delay |
|---|---|---|---|---|---|---|---|---|
| 0 | | 100 | | | | | | |
| 1 | | | 10 | 60 | | | | |
| 2 | WW | 50 | | | | | | |
| 3 | WS | | | | | | | |
| 4 | | | | | | | 1 | 10 |
| 5 | | | | | | | -1 | |
| 6 | | | | | | | 2 | 10 |
| 7 | | | | | | | -2 | |
| 8 | | | | | | | 3 | 10 |
| 9 | | | | | | | -3 | |

**Wait for the welding instruction to end the command:**

The Y-axis feeds the line 100, then the Z-axis runs at 10, while the X-runs to the 60° position, then re-runs the program and starts the cylinder welding program. When it runs to the second line again, waits for 5.0 seconds (50 in the Y column) Decision), after the cylinder welding program is completed within 5 seconds, enter the cycle again, and the cylinder welding is not completed within five seconds, then the alarm will be given.

## 8 Robot command (cylinder 10)

| Number | Code | Y（ON） | Z（ON） | X（ON） | Speed Ratio | Probe | Cylinder | Delay |
|---|---|---|---|---|---|---|---|---|
| 0 | | 100 | | | | | | |
| 1 | | | 10 | 120 | | | | |
| 2 | | | | | | | 10 | |
| 3 | | 100 | 0 | 0 | | | | |

**Robot instruction instructions:**

Line 0 of the program, Y-axis feed line 100 length. In the first row, the Z axis runs at the 10 position while the X axis runs to the 120° position. Line 2: Signal Y12 from the robot is output to output 0V. At the same time, wait for the machine X19 to complete the signal 0V input. If there is input within the specified time, the next line of the program is executed. If there is no input within the specified time, the "manipulator timeout" is reported. Line 3: The Y-axis feeds the line 100 while the Z-axis and the X-axis return to zero. The time to wait for the robot to complete the signal can be configured on the Work Parameters page. (0-9999

seconds)

## 9 Detailed examples

| Number | Code | Y（ON） | Z（ON） | X（ON） | Speed Ratio | Probe | Cylinder | Delay |
|---|---|---|---|---|---|---|---|---|
| 0 | | | 0.00 | 80.00 | | | | |
| 1 | | 50.00 | 1.00 | 120.00 | | | | |
| 2 | | 100.00 | 4.00 | 150.00 | | | | |
| 3 | L | 2 | | | | | | |
| 4 | | | | | | | 2 | |
| 5 | L | 5 | | | | | | |
| 6 | | 120.00 | | 150.00 | | 1 | 1 | |
| 7 | | | | 180.00 | | | | |
| 8 | | 150.00 | 6.50 | 220.00 | | | | |
| 9 | | 100.00 | | 250.00 | | | | |
| 10 | N | | | | | | | |
| 11 | | 100.00 | | | | | | |
| 12 | | | | | | | -2 | |
| 13 | N | | | | | | | |
| 14 | | | | 270.00 | | | | |
| 15 | | 4.00 | | 300.00 | | | | |
| 16 | | | | 360.00 | 150 | | | |

**The following examples are explained in the order of the program line:**

0. The X axis rotates from 0 to 80.00 degrees, and the Z axis does not move;
1. The X axis is changed from 80.00 degrees to 120.00 degrees, while the Y axis is forwardly synchronized to the line 50.00mm, and the Z axis is synchronously pushed out to the position of 1.00mm;
2. The X axis is turned from 120.00 degrees to 150.00 degrees, while the Y axis is forward synchronously fed with a line of 100.00 mm, and the Z axis is synchronously pushed out to a position of 4.00 mm;
3. Set a loop body start flag, and set the number of loops to 2;
4. Open the cylinder 2;
5. Set a secondary loop start flag in the loop, and set the number of loops to 5;

6. When the shaft is turned to 150.0 degrees, the fixed point feeding line is 120.00mm, and the No. 1 cylinder is opened at the same time, and the No. 1 probe touch detection is performed. During the running of this line program, if the probe 1 is not detected at all times, after the program runs, close the No. 1 cylinder and jump to the next line; if the probe 1 detects, close the No. 1 cylinder, stop the line, skip to Next line;
7. The X axis first moves from 150.00 degrees to 180.00 degrees at the default speed;
8. The X axis is shifted from 180.00 degrees to 220.00 degrees at the default speed, the synchronous feed line is 150.00mm, and the Z axis is synchronously pushed out to the position of 6.50mm;
9. The X axis is shifted from 220.00 degrees to 250.00 degrees at the default speed, the synchronous feed line is 100.00 mm, and the Z axis is not moved at 6.50 mm. The program is executed in sequence according to a->b->c->d->a->b->c->d, and after the loop number 5 is reached, the loop is jumped out.
10. Set a loop end flag;
11. The Y axis feeds the line at the default speed of 100.00;
12. Close cylinder 2. Then go back to the position where the first loop starts, repeat the above action 2 times, and then jump out of the loop.
13. The X axis is shifted from 250.00 degrees to 270.00 degrees at the default speed;
14. The X axis is shifted from 270.00 degrees to 300.00 degrees at the default speed, the synchronous feed line is 4.00 mm, and the Z axis is not moved at 6.50 mm;
15. The X-axis is cut from the 30% of the default speed by 300.00 degrees to 360.00 degrees, the wire is not sent, and the Z-axis is not moved at 6.50mm;
16. The program ends and returns to the starting position: the X axis returns to the position of 80.00 degrees at the default speed, and the Z axis returns to the position of 0.00 mm;

# Chapter 5 Circuit connection

## 1 Circuit connection description

The electrical connection part mainly includes two parts of the main controller and the wire feeder. See Figure 5-1 for the electrical connection of the main controller and Figure 5-2 for the wire feeder. The servo line sequence is described as follows:

0/1: white = send line Y, black = inner mold Z

2/3: white = external rotation X, black = internal rotation A

# 2 Main Controller

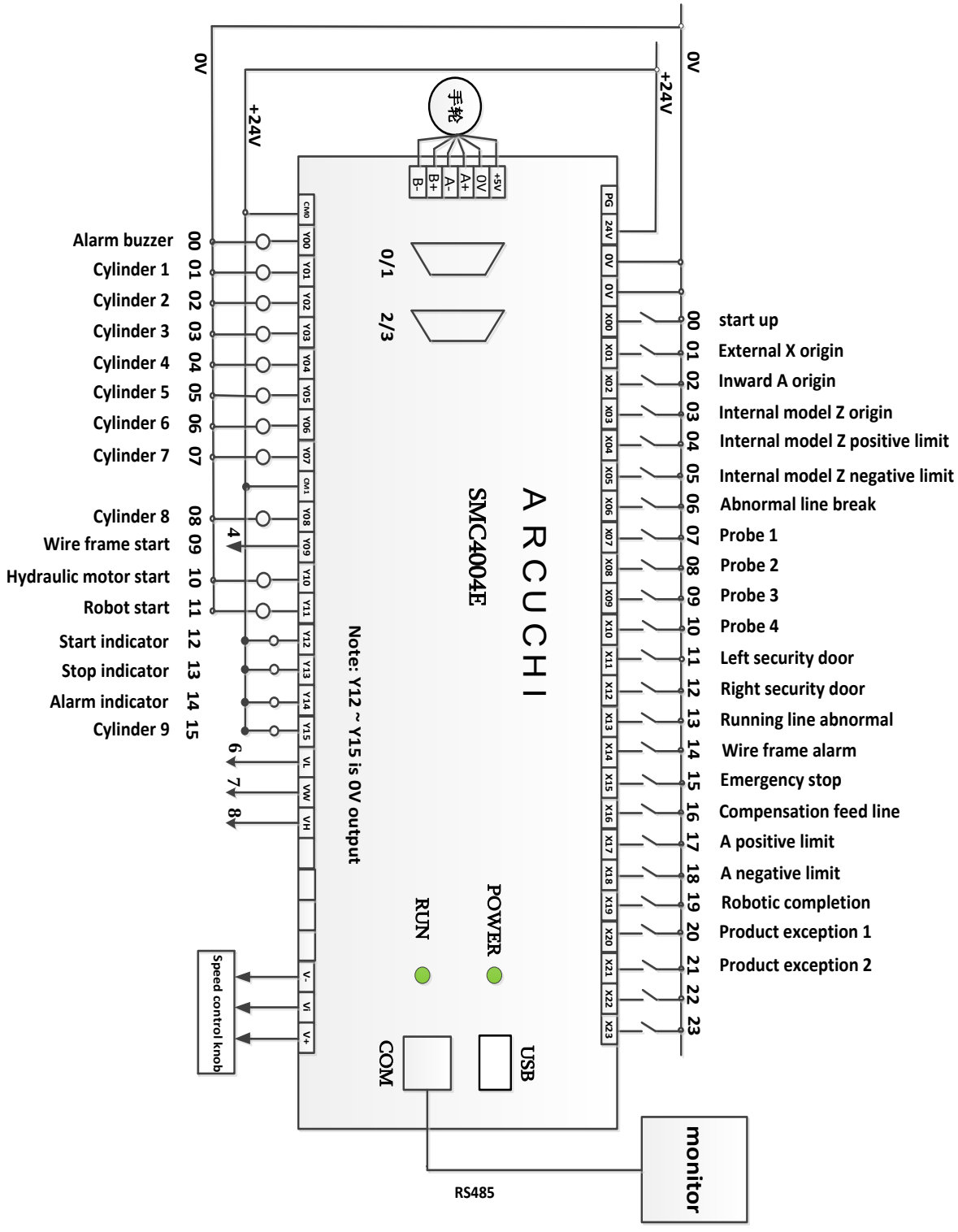


**Figure 4-1 Main Controller**

# 3 Wire feeder

When using the wire rack ready-made control, it is necessary to ensure wiring, you must make sure that compensation wire X13 is connected to oV, and the wire is abnormal X14 is connected to the casing, and the oV of the switching power supply is also connected to the casing.

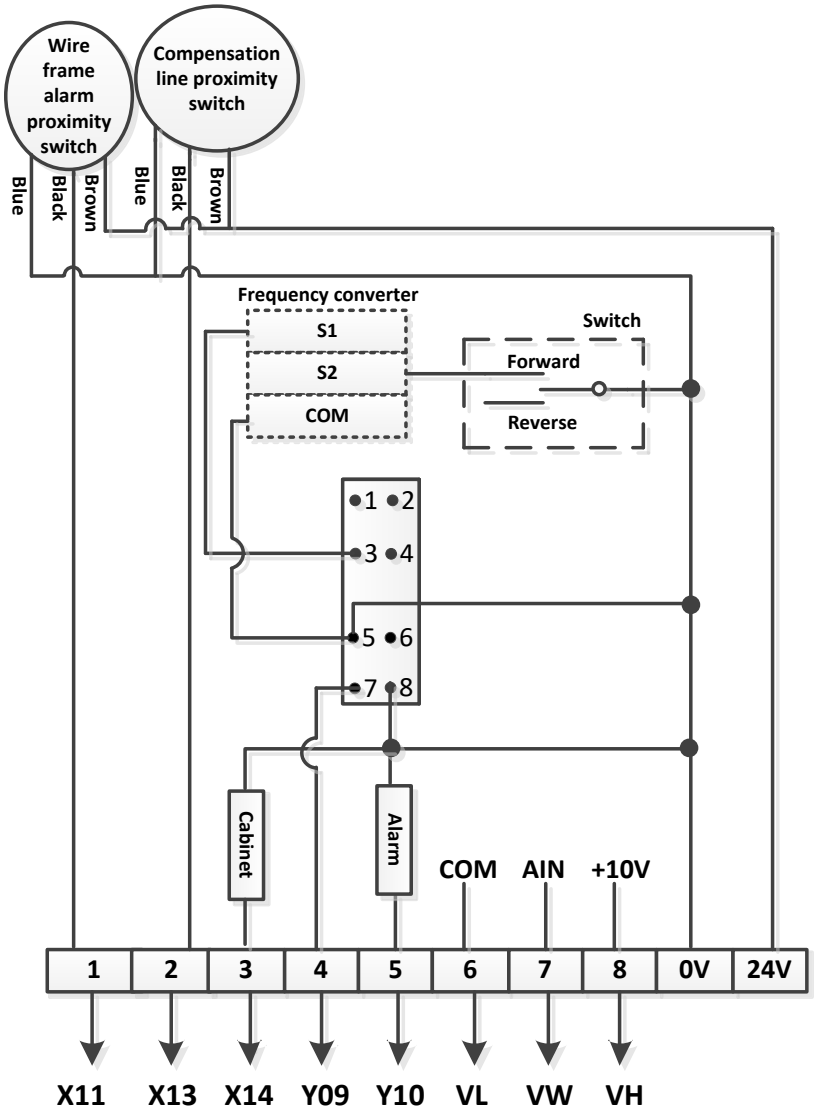


**Figure 4-2 Wire Feeder**

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