User Manual for Fully Automatic Gluing Machine

Model: JH-G810

Illustration: Gluing head of the Machine

Parts Introduction

The mechanical appearance, controlling board and tank cover will be different if the model is different.

Second: the Main Tech Data

1. Power: AC 220V±10, 50 HZ
2. Total Power: 1500W (not include the power of heating system)； 6500w (with highest configuration)
3. Air Pressure: 0.5-0.65MPa (5-6.5kgf/ cm²)

Third: Easy Operating Procedures

Starting Up

1. Check the working area and clear away the clutter.
2. Check and keep the air pressure and power in normal range.
3. Turn right the key switch and power on the machine.
4. Test whether or not the double-liquid valve works normal, gluing quantity is correct or not before the mixing tube is installed; mix ratio test is demanded if the work piece or glue is changed.
5. Test if the static mixing is normal or not after the mixing tube is installed. Dispense glue A and glue B to confirm if tube is filled full without any air bubble.
6. Place the work pieces, edit program or the start point. Test the path of three axis can meet up requirements under the state of glue-off.
7. On the main interface, press "glue-off", the screen displays "glue-on". Press the green button to start up the machine. If machine need to be suspended press green button; for emergency press E-stop button.

Turning Off

1. Cycle function must be closed when the last work piece is finished gluing if cycle is open during work.
2. Work on the self-washing function if your machine includes that. If there is no self-washing, take down the mixing tube, dispense glue A and B simultaneously, and wipe clear the valve head.
3. Turn off the power, clear the working table and wash the mixing tube.

Brief Shutdown

1. Cycle function must be closed when the last work piece is finished gluing if cycle is open during work.
2. Open the self-discharging function. Pay more attention on the self-discharging interval, it should be less than the time during which glue becomes thick.

Notes During Working

1. Enter the "glue mixing interface" before mixing tube is installed, test the gluing of A B is normal or not, gluing quantity correct or not.
2. Test the mixing tube, the blade inside, nozzle, needle and confirm they are not blocked.
3. Before the machine begins working, record the gluing quantity of the mixture in the first 5 second; during the working process, test the AB mixture weight in 5 seconds every another two hours; if the data changes a lot, you must stop and check the machine, otherwise the mixed glue may not cure.
4. Keep close attention on the glue quantity in the tanks. Tank A & B works without glue inside will lead to damages to the parts of machine.
5. Keep lacing work pieces on the frame always at the same position.
6. According to the curing time of the glue, if the machine stops working over 15 minutes and then works again, you should test the gluing quantity of AB mixture.
7. According to the curing time of the glue, if the machine stops working over 30 minutes, mixing tube should be taken down to wash.

Mix Ratio Debugging and Test

1. Enter the "glue mixing interface".
2. Press "select A", and then press "A jog". Set the gluing time is 5s, press "start-up gluing", the machine keeps dispensing glue A for 5S; scale the weight and record it as "glue A". If the actual data is more than the one set up, improve the glue A coefficient; otherwise reduce it until the actual glue weight of 5s meets up requirement.
3. Work out the glue B weight in the same steps above. Record it as "glue B"
4. Install the mixing tube, select Glue AB, and ensure that you have input 5s in the "gluing time". Press "AB jog", the machine dispenses AB mixture. After confirming there is no air bubble inside the tube, press "start-up gluing", the machine keeps dispensing glue A B mixture for 5S; scale the weight and record it as "glue A B quantity". This data must be equal with "glue A" + "glue B"

Vacuum and Self-refilling Steps (Optional)

1. Get the machine stop working.
2. If glue A is vacuum, close the ball valves both at tank A bottom and cover, open the vacuum ball valve,

connect the tubes well.

3. Enter "vacuum interface", set up all the relevant data. Press "Vacuum A" to activate vacuum pump. The vacuum pump will stop after working for the time set up. (Please close the vacuum pump manually when the negative pressure gage reads -0.5kgf/mm^2)

4. Close the vacuum valve, place the tube into the glue container; open the ball valve at tank A cover; glue will be poured into the tank A automatically. Pay attention on the gage, if the glue level is low when the air pressure is back to 0, repeat the operation; pay more attention the gluing time of the second operation.

5. When tank A is full, the screen reads "glue A is full"

6. Close the ball valve on the tank cover, dis-connect the tube, and open the vacuum ball valve and the ball valve at tank bottom.

7. For glue B, repeat the steps 1-6 above. Notes: only one kind of glue can be poured at a time.

Programming (take "dot" as example)

The Main Interface

F1 is a shortcut key to close / open the gluing gun under the working state.

This is the main interface of the teaching box, like the desktop in Windows. All of the operating begins from here; when the operating is finished, it will be back here. Press "3" to begin the teaching programming.


New File

Under the teaching programming interface, press 〈1〉, the system will pop up a tip: "Please reset the working table", only the working table resets, new file can be created.

After the "reset" is finished, it automatically enters the program edit interface and begins the teaching input program process.

When the new file is formed, the system will assign to it a unique and default number of three digits, for example, the first file is named as 001.

On the teaching program interface, press 〈1〉 to build a new file or 〈3〉 to modify a file, enter program editing interface in which, you can finish the programming of all patterns and edit all the relevant data. There are only 8 pieces of orders in each page; if the orders are more than 8, it will display in the following page. Press "page up / down".

Program a Dot
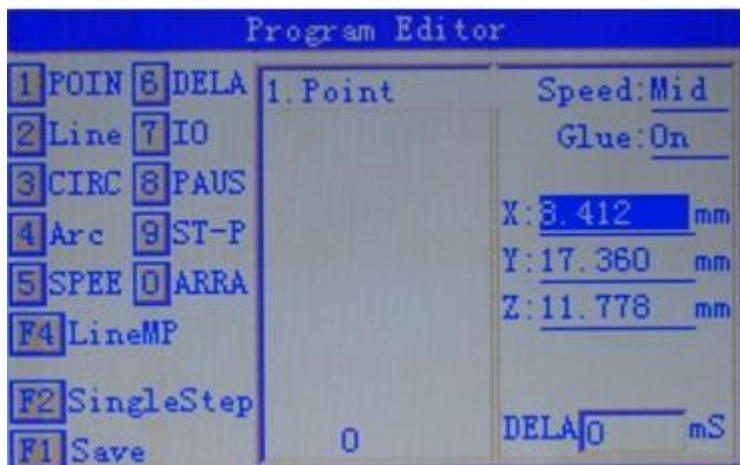
Press 〈1〉 to input a dot pattern. The system will automatically enter the state of order data modifying, user move the working table into the wanted position by pressing the direction keys; press "ENT" to confirm. (Press "switch" , enter "coordinate input mode", you can input directly coordinate or modify the start point delay, after the input press 〈ENT〉 to confirm.)

Order Array function is introduced to serve better programming for the complex work piece.

JD2000 teaching box includes two kinds of array function, file array and order array. File array function works in the" teaching edit interface", it is used to array in files; the content of the processing file generated cannot be modified; and also this kind of array function has not limit on the amount of line and row. Order array function works on the "programming edit interface"; it is used to array in the pattern and control order. You can modify the content generated including inserting a new order, modify or delete array order. It has limit on the amount of line and row. The amount of orders generated by array cannot exceed the size of the file.

Shown as below:

There are 20 circles in "work piece 1" which are listed in arrays, and 19 circles in "work piece 2" also listed in arrays. But there is a square at position A of work piece 2.

Work Piece 1   Work Piece 2
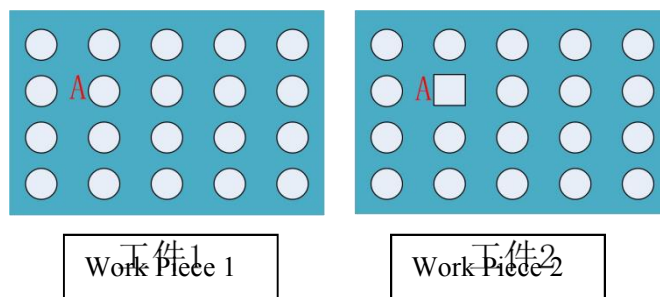
For work piece 1, there are two programming ways: 1) program a circle first and form a respective file; and work the file in the array of 4 lines and 5 rows; 2) program a circle first, work the circle in the array of 4 lines and 5 rows, directly generate 20 circles in a file. But for work piece 2, only order array can be used, because there is a square at position A instead of a circle. Program a circle first, work the circle in the array of 4 lines and 5 rows and generate 20 circles in a file; and then find position A in the file, delete it and insert a square at the very same position.

You can program a complex but regular pattern quickly by using file array and order array together. Shown as below:

There are 4 work pieces in each frame, and each work piece includes 19 circles and a square places regularly.
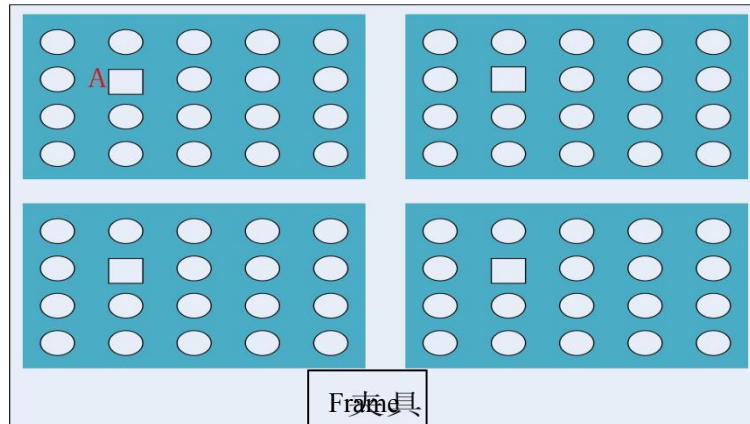
For the programming of the work piece like this, use order array function first according to talked above, program a file of the work piece. Save the file and back to the teaching program interface; and then use the file array function to work the work piece file in array of 2 lines and 2 rows to finish.

Single Step Execution

Single step execution is used to check pattern precision when a programming is competed preliminarily. The object of single step is pattern or control order instead of single order of a pattern. For example, if you work "single step" on any of the key point of a circle, the system will work "single step" on the whole circle, the working table will run a track of circle. The pattern and control order which can be worked on "single step" includes single dot, line, circle, arc, speed, delay, IO port, original dot. When you work "single step" on the speed order, the system will record the speed value of this order and transfer it into the control board; this speed value will be used when it works the next movement order. The single step function can also check the programming accuracy.

Move the cursor onto the order which need to be executed single step, press F2 and you can work single step movement on the current pattern or control order. At the same time, the system will pop up a tip "single step being executed, please wait…", please wait without any operation until the single step ends. The system will be automatically back to "control order input state", and the cursor will moves onto the first order of the next pattern or control orders.

Save the file and back to teaching edit interface.

Edit Process Parameter
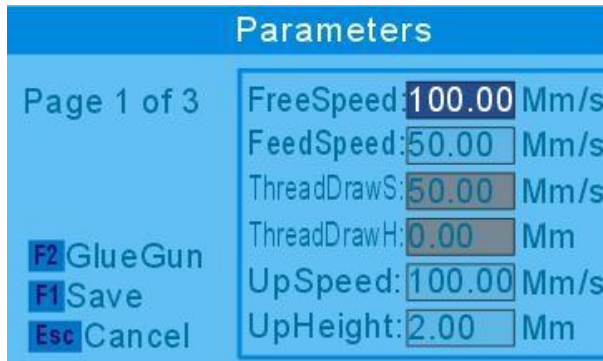
Press 〈4〉 on the teaching edit interface and enter "Process Parameter Interface"
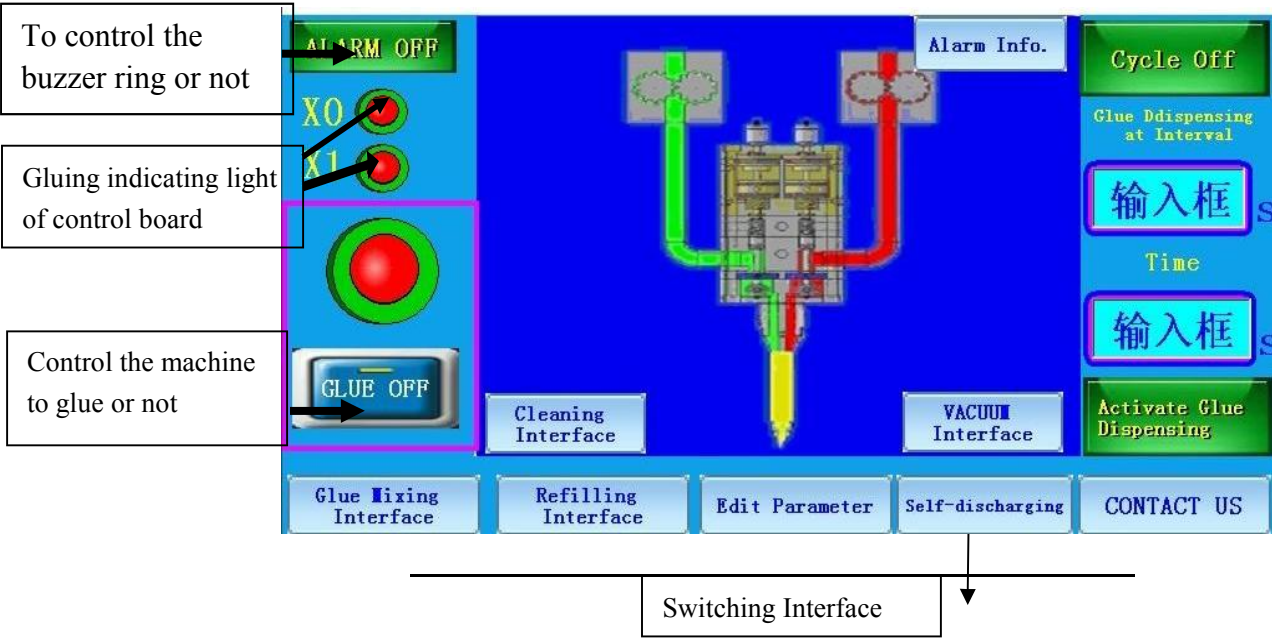
Input the relevant data in the interface, press F1 to save. Press F2 to select gluing gun and enter "process parameter"

- Select glue gun 1 (× will change into √), press F1 to save.
- Back to the teaching edit interface, press "2" to download the program.
- Back to the main interface, press F3 to reset the working table.
- Change "gluing control" into "forbid", press "begin process". Test the track.
- If the track is surely to be correct, change "gluing control" into "permit", begin the production.

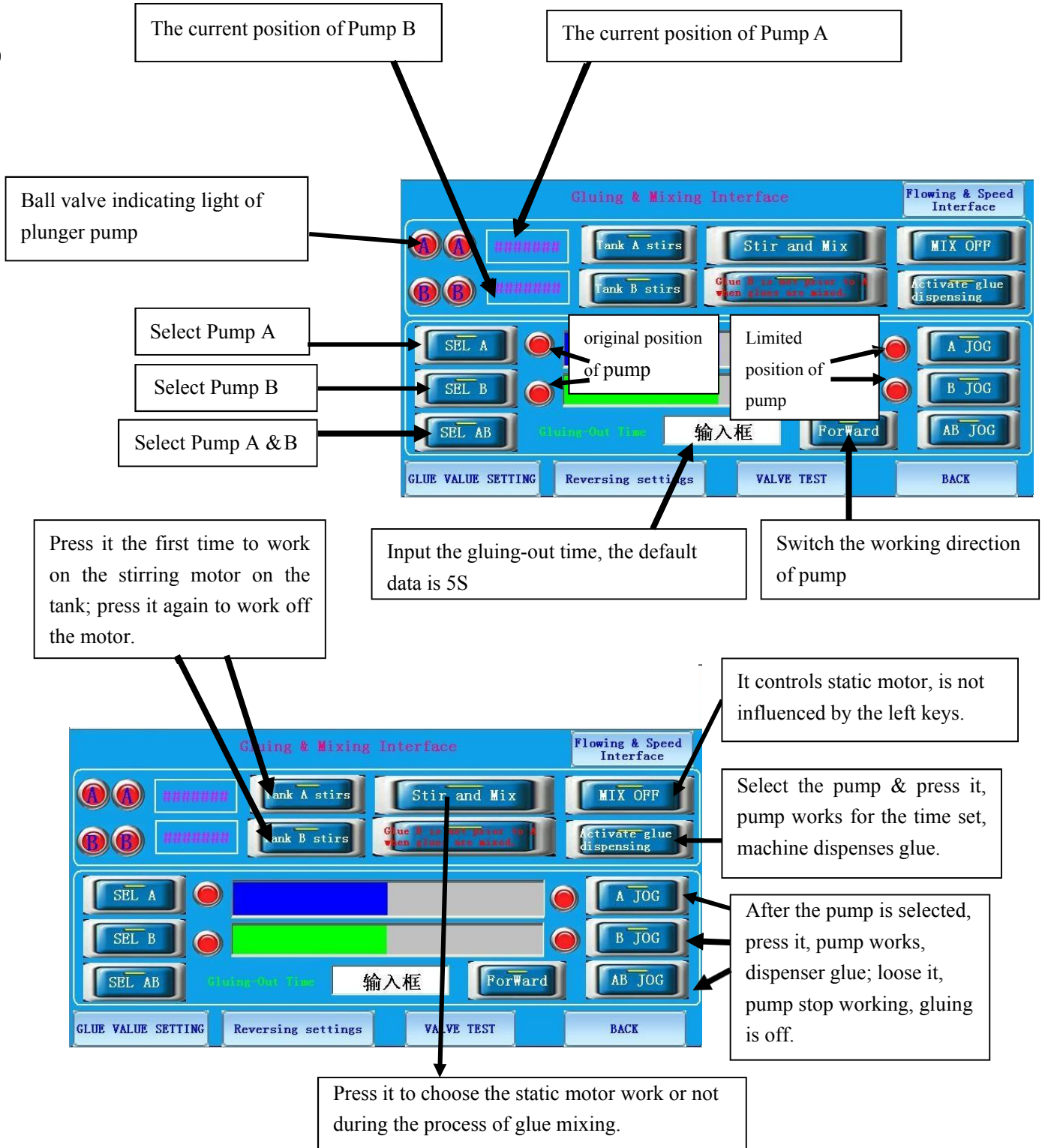# Fourth: Interface & Keys Introduction

The main Interface

To control the
buzzer ring or not

Gluing indicating light
of control board

Control the machine
to glue or not

ALARM OFF

X0
X1

GLUE OFF

Cleaning
Interface

Glue Mixing
Interface

Refilling
Interface

Edit Parameter

Self-discharging

Alarm Info.

Cycle Off

Glue Ddispensing
at Interval

输入框 S

Time

输入框 S

Activate Glue
Dispensing

VACUUM
Interface

CONTACT US

Switching Interface

During the working, the screen will pop up tips or warning information, please operate accordingly.
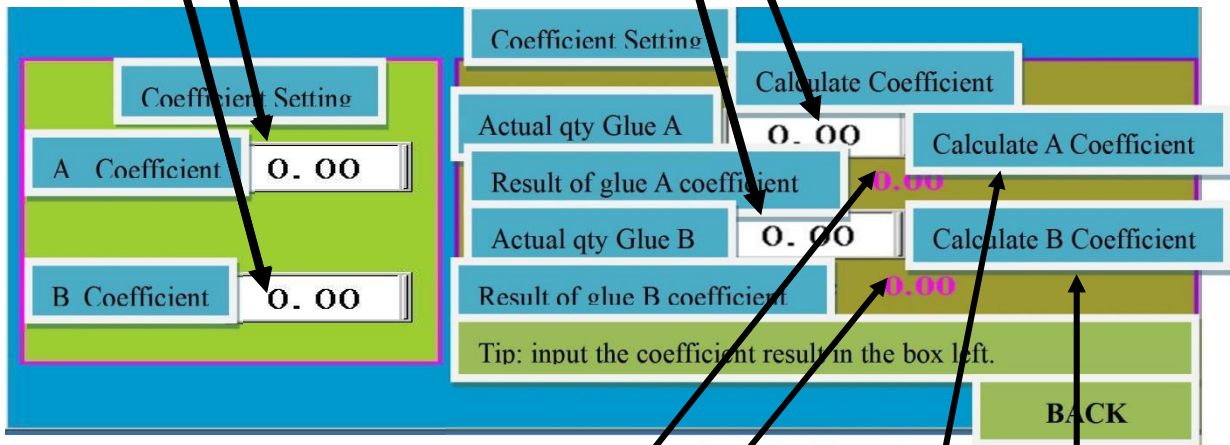
The Gluing & Mixing Interface

200

The current position of Pump B

The current position of Pump A

Ball valve indicating light of plunger pump

Gluing & Mixing Interface

Flowing & Speed Interface

Tank A stirs | Stir and Mix | MIX OFF

Tank B stirs | Glue B is not prior to A when glues are mixed. | Activate glue dispensing

Select Pump A

SEL A | original position of pump | Limited position of pump | A JOG

Select Pump B

SEL B | B JOG

Select Pump A &B

SEL AB | Gluing-Out Time | 输入框 | ForWard | AB JOG

GLUE VALUE SETTING | Reversing settings | VALVE TEST | BACK

Press it the first time to work on the stirring motor on the tank; press it again to work off the motor.

Input the gluing-out time, the default data is 5S

Switch the working direction of pump

It controls static motor, is not influenced by the left keys.

Gluing & Mixing Interface

Flowing & Speed Interface

Tank A stirs | Stir and Mix | MIX OFF

Tank B stirs | Glue B is not prior to A when glues are mixed. | Activate glue dispensing

Select the pump & press it, pump works for the time set, machine dispenses glue.

SEL A | A JOG

SEL B | B JOG

SEL AB | Gluing-Out Time | 输入框 | ForWard | AB JOG

GLUE VALUE SETTING | Reversing settings | VALVE TEST | BACK

After the pump is selected, press it, pump works, dispenser glue; loose it, pump stop working, gluing is off.

Press it to choose the static motor work or not during the process of glue mixing.

Glue Quantity Setting

1) Press **GLUE VALUE SETTING** in the "gluing & mixing interface" to enter the interface below:

GLUE SETTING

A SPEED 输入框 g/5s

B SPEED 输入框 g/5s

RATIO   BACK

The gluing quantity per 5 S of Pump A

The gluing quantity per 5 S of Pump B

Glue Coefficient
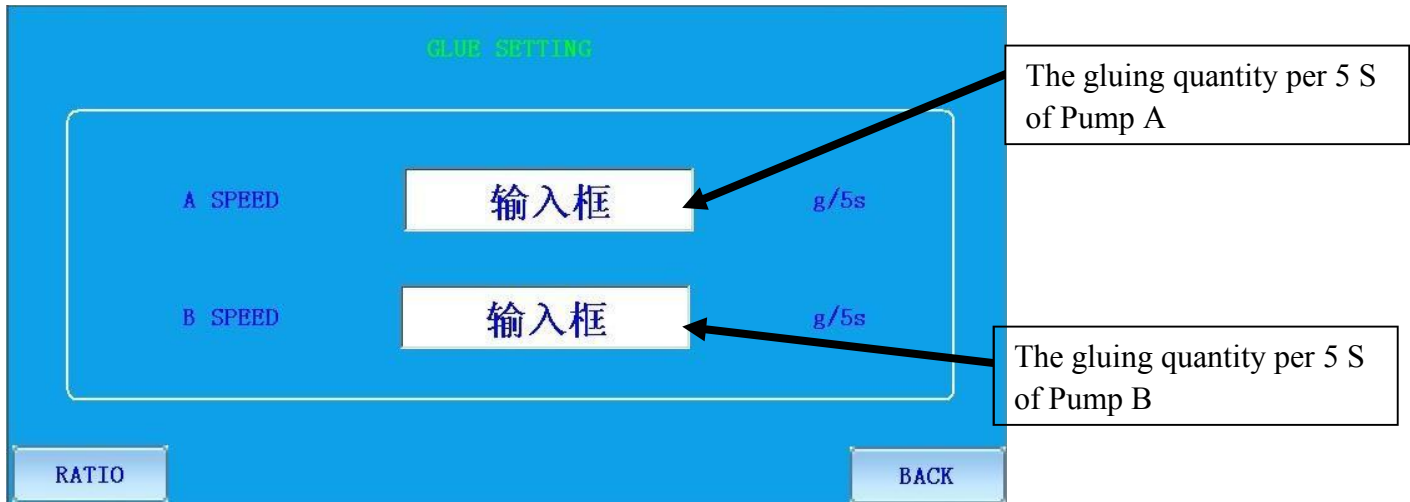
On the "gluing & mixing" interface, set "gluing time" as "5S", select "pump A" or "pump B", press "activate glue dispensing"; the machine automatically dispense the gluing quantity of 5S, weight the glue dispensed and input data into the box.

Coefficient Setting

A Coefficient 0. 00

B Coefficient 0. 00

Coefficient Setting

Calculate Coefficient

Actual qty Glue A   0. 00   Calculate A Coefficient

Result of glue A coefficient   0.00

Actual qty Glue B   0. 00   Calculate B Coefficient

Result of glue B coefficient   0.00

Tip: input the coefficient result in the box left.

BACK

Here displays the coefficient worked out. Input the data inside the corresponding position.

Input the actual gluing quantity inside the box, press here to calculate the glue coefficient.

Edit Parameter

In the "main interface", press `Edit Parameter` to enter the interface below.

PARAMETERS SETTING INTERFACE

输入框 S

Remind to clean

输入框 M

输入框 S

IO STATUS

BACK

(If the machine has self-washing function) the pausing time is up to the data set, it reminds of washing operation.

Pump is activate, delay, valve works.

Pump B works first, delay, and pump A works.

Reversing Setting (only for cylinder pump)

Reversing Setting

A Reverse to Positive compensation	输入框	g
A Positive to Reverse compensation	输入框	g
B Reverse to Positive compensation	输入框	g
B Positive to Reverse compensation	输入框	g

VALVE TIME	输入框	ms
TIME DELAY	输入框	g
A Reversing Volume	输入框	g
B Reversing Volume	输入框	

GLUE IN DELAY

输入框 ms

BACK

Pump runs into the end, waits for the time before it reverse.

A Reverse to Positive compensation 输入框 & A Positive to Reverse compensation 输入框 : when

pump A is reversing, under the state that double-liquid valve is not open, pump A will run forwards for a distance according to the data input.

B Reverse to Positive compensation 输入框 & **B Positive to Reverse compensation** 输入框 : when pump B is reversing, under the state that double-liquid valve is not open, pump B will run forwards for a distance according to the data input.

VALVE TIME 输入框 mS : when pump reverses, reversing valve works for the time set in the box before pump begins move.

TIME DELAY 输入框 : during the gluing process, when the pump reverses working table will stop moving and gluing; after reversing is finished, the machine will keep glue dispensing for the time set here before the working table moves.

Valve Testing Interface

Press **VALVE TEST** in the "gluing & mixing interface" to enter the interface below:
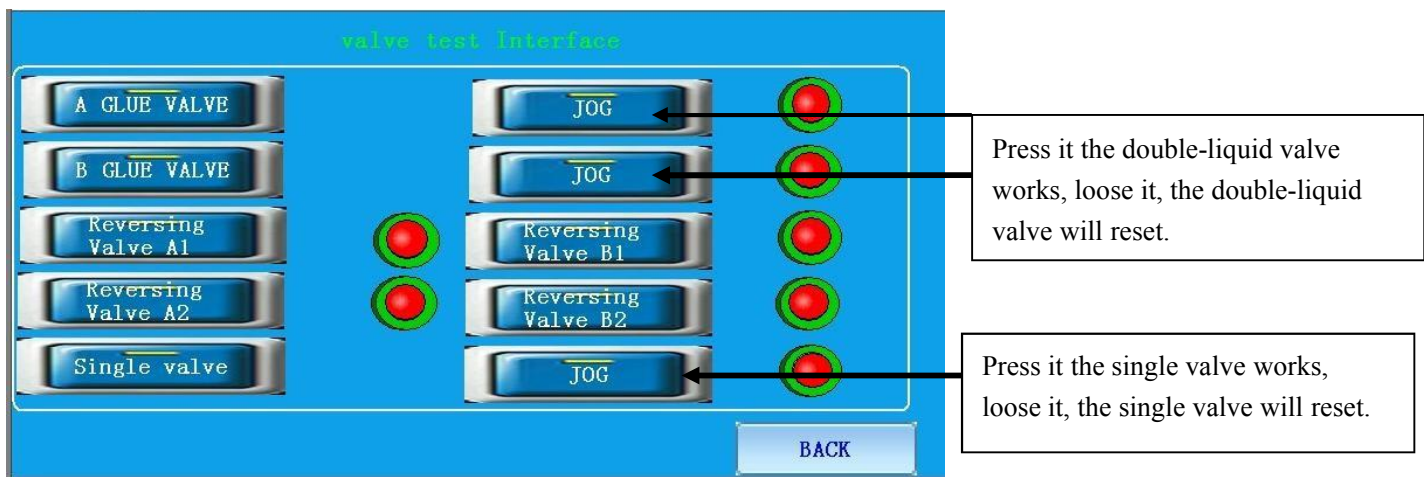
A GLUE VALVE & **B GLUE VALVE** ： The double-liquid valve works the first time press these buttons; the second time press to reset the double –liquid valve.

Reversing Valve A1 & **Reversing Valve A2** : the reversing valve works the first time press these buttons; the second time press to reset the revering valve.

Reversing Valve B1 & **Reversing Valve B2** : the reversing valve works the first time press these buttons; the second time press to reset the revering valve.

Single valve : The single valve works the first time press these buttons; the second time press to reset the single valve.

Vacuum & Refilling Interface (optional function)

Press **Refilling Interface** in the main interface to enter the interface below:

Tank A Vacuum : when it is pressed, vacuum works for the duration set, and vacuum on Tank A; press it again to stop the vacuum.
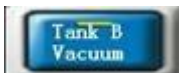
Tank B Vacuum : when it is pressed, vacuum works for the duration set, and vacuum on Tank B; press it again to stop the vacuum.

Vacuum and Degas : Switch into "Vacuum & Degas" interface.

Stop : When it is pressed, the vacuum pump stops working.

输入框 S : The data of vacuum pump working time.

X4 : The upper level sensor of tank;

X2 : The level sensor on the tank cover;

Degas:

Press **in the vacuuming interface, you will enter the interface below:**
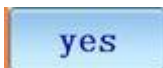
: Press it, the system will be back to the "vacuuming interface", and vacuum according to the time set.
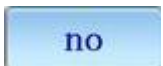
(1）When the machine degasses, make sure close the valves on tank bottom and cover.

（2） When glue A is degassed, open the vacuum valve on tank A, but close the vacuum valve on tank B.

（3） When glue B is degassed, open the vacuum valve on tank B, but close the vacuum valve on tank A.

If the screen displays "glue A (B) exceeds limit!" degassing cannot be operated.

Self-cleaning Interface (Optional Function)
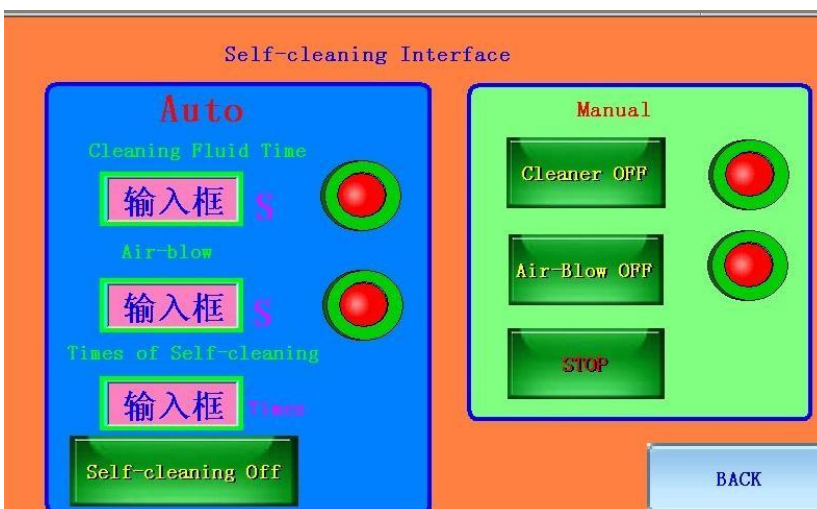
Cleaner OFF : The valve works the first time to press it; press it again to reset the valve;

Air-Blow OFF : The valve works the first time to press it; press it again to reset the valve;

Cleaning Fluid Time 输入框 S : The time that cleaner valve keeps open;
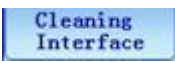
Air-blow 输入框 S : The time that air-blowing valve keeps open;

Times of Self-cleaning 输入框 Time : The times of cycling self-cleaning;

Self-cleaning Off : If this key is pressed, the machine will switch between cleaner valve and air-blowing valve according to the "time" and "times" set up. It will stop automatically when "time"& "times" run out.

STOP : The valve will reset if pressing this key.

Self-cleaning Steps:

1. Stop gluing work. Open the cleaning valve at the nozzle position; close the pressure relief valve on the pressure tank, open the air-in valve.

2. Press **Cleaning Interface** in the main interface to enter the interface above. Set up the related parameter.

3. Press **Self-cleaning Off**

4. As the self-cleaning is finished, the air-in valve on the pressure tank and the cleaning valve at nozzle position must be closed before the gluing work begins.

   The air-in valve must be closed and the pressure relief valve must be open when the cleaner is added into the tank.

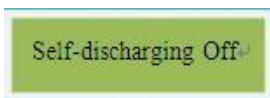**Self-discharging Glue (Optional Function)**

 : The interval between twice glue-self-discharging
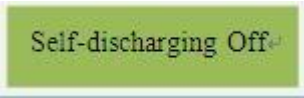
 : self-discharging duration

 : The time from popping up a warning window to glue

self-discharging; the data input should be less than the "interval of self-discharging".

 : Press this key, the machine will discharge glue automatically according to the data set

up.

1. Stop gluing work of the machine

2. Press in the main interface to enter the "self-discharging" interface; set up the related parameters.

3. Press to work the "self-discharging" program.

4. When the machine is need to be working, press to close the self-discharging program.

Some Usual Problems and Solutions
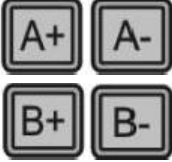
No.	Problems	Possible Reasons	The parts should be checked	Solution
1	No Glues Out	a. No Liquid in Tanks b. Coupling c. filter is jammed	a. tank A & B b. coupling connected to motor is loose c. filter	a. refilling b. locking d. wash the filter
2	The mixed liquid is not even	a. Dual valve doesn't work b. Nozzle is jammed c. Filter is jammed	a. the power source and air source of solenoid valve b. the dual valve c. filter	a. change the sealing ring b. wash the filter
3	Mixture is hard to dry or dry slowly	a. Tubing or valve of glue B is jammed b. Flow speed of glue B is small	Check the tubing system of Glue B and the dual valve	Improve the flow speed of glue B
4	Motor does not work	Motor and driver	Check the connecting cable, driver and the power input	

Fifth: Programming on Motion Control Card

Quick Start

Keys Introduction

Image of Keys	Keys Name	Function		
(Ent)	To Confirm	Equal with the "enter" of a computer, to confirm all of the operations		
(Esc)	Cancel/Back forward	To Cancel an operation or back the former page		
(Ctrl)	Control	When the program is edited, it is used to control the gluing nozzle, change-over nozzle on / off; in the main interface, it is equal with the ctrl of a computer.		
(Del)	Delete	To delete a profile or delete an order		
(Table moving keys image)	Table Moving Keys or cursor moving akey	Working table moving	X, X keys	X Axis Moves left / right
			Y, Y keys	Y Axis moves forward / backward
			Z↑, Z↓ keys	Z Axis Moves up / down
			R, R keys	R Axis moves anticlockwise / clockwise
		Cursor moving	X, X keys	Cursor moves left / right
			Y, Y keys	Cursor moves up / down
Speed	Speed Change Key	To change over the speed of working table; switch the speed among Low / Media / High Speed		
F1	The Help Key	Press this key to show the document help of the current interface		
F2 F3 F4	Multi-function Key	The function of a single key is undefined		

A+ A- B+ B-	Multi-function key and shortcut key	During the 5/6 axis system, it is an assit-axis in the teaching program. You can also define it as new function according to requirement and take it as a shortcut key.
Start 开始	Start	In the main interface, press it to start the process.
Stop 停止	Stop	Press it to stop the machine working during process and reset.
Reset 复位	Reset	The working table will reset if this key is pressed in the main interface / testing page / programming page.

Power-on Test

When the machine is power-on, the main interface reads "please get the working table reset (press ESC to cancel reset)", press ESC to cancel reset, and press "system test" button to enter the testing interface. Test the machine in the current interface. (If the signal driving way of every axis driver is not the way of pulse + direction controlling, a third step is needed and then back to the current testing page), following details are mainly included:

◆ **Is the limit switch correct?**
The limit switch is valid only when the axis arm moves to the limited position, and the relevant indicator light on the testing interface becomes red.
◆ **Can every axis moves to the negative direction well?**
On the system testing interface, press the table moving keys, the axis will move correspondingly. If anything goes wrong, please check the signal wire joint of the controlling card or adjust the axis direction.
◆ **Is the condition of input IO correct?**

Take more tests on the buttons ; to check if the buttons are all valid, and also the relevant indicator light gose red when pressing them.
◆ **Is the condition of output IO correct?**
Please refer to the IO test under the interface of system test.

The 3rd Step: Set Up Data in the Program

Get into the main interface, press <Ctrl> and <A+>, input the set-up of supplier, the default code is 666888; and then begin to set up the program data. Please keep all the data input must be correct. The data should be set includes the periphery length, periphery pulses and the max working area. (You can use the Setup Wizard). Any mistake above will lead to the improper work of the machine. The other data could be set in the future when the

machine is used.

After the system data set-up is finished, you can come into the testing interface; press the "reset", to check the working table works well or not.

If the machine fails to reset, you must re-power on, or the teaching box will not work well.

The 4th Step: Create and Edit a Profile

◆ **Get into the main interface and create a profile according to the next steps:**
1. **Press < profile management> in the main interface**
2. **Press <new> in the profile management interface**
3. **Reminding on "reset", press <reset> and get into the profile editing interface**
4. **Edit the process program**

◆ **Edit the profile**

Get into the profile editing interface; input a single-point command and a straight line command according to the following steps:
1. Press the button "single point" to input a single point command;
2. Press the table moving keys to move the working table into a location and press <Ent> to confirm the command; during this process (you can press <Speed> to change the speed of the working table). Then the single point command is finished.
3. Press <Straight Line> to create a straight line command. (By editing the starting and ending point, two points can define a straight line); then move the table into a certain location, press <Ent> to confirm.
4. The starting point of the straight line is confirmed right now, the system automatically insert a command of the end point; the straight line command is finished.
5. Repeat the steps above from 1-4, other patterns or commands can be inserted.
6. If the new edited command is hoped to be changed, you can move the cursor onto the command, press

   <Ent> and make the changes. If you press the button , the cursor does not move but the table does, that means the system is in the condition that command is being edited. You can press <Ent> to confirm or press <Esc> to cancel edit.
7. As the profile is finished edit; press < Save> to save it; then the screen will be back to the main interface automatically.

◆ **Begin Processing**

Press the <Start > button on the main interface, the working table will work according to the track inside the profile.

◆ **Change the process data (optional)**

If you hope to change the speed or other data, you can press the button < process data> to get into the process data interface to go on with the change work when the process is finished.

◆ **Set up the profile array (optional)**

If you hope to set up the profile array and chamfering, you can press < profiles management> and get into the profile management interface to find the relevant buttons and begin the set-up when the process is finished. After the set-up is finished, press <download> you can download the profile and will be back to the main

interface.

◆ **Change the profile**

If the content of a profile is not satisfying, you can press the <shortcut edit> on the main interface or press < edit> on the profile management interface to get into the profile edit interface. And then press

⚠️ ⬇️ to move the cursor onto the command which you hope to change, press <Ent> to confirm and make the changes on the command. When the change is done, just press <Ent>.

The Basics

Professional Terms

◆ **Keys and Buttons**

Keys means the entity keys on the teach box board. Buttons mean the "dummy buttons" on the touch screen. The Switch means the switches installed with the machine.

◆ **Interface**

Means the screen of the LCD, such as the main interface, the profile management interface.

The Basic Concepts

File Generation, Work process

The work process of the system can be summarized as "file generation →set up data → profile process", the way it works is as follows:

Profile Concept

The system refers to many profile types, the types and functions are as follows:

Profile Suffix	Function	Instructions
.dxf	The flat profile output by drawing tool.	For the use of teach box and PC tool import.
.igs	The three-dimensional profile output by drawing tool.	For the use of PC import
.jt	Process Profile	The generated profiles of dxf and IGS imported by PC tools or the exported profile by teach box; for the use and process of the teach box
.jcfg	Teach box configuration file	For the data import and export of the teach box
.jcc	Controlling card upgrade file	For the upgrade of the controlling card program

.jub	Teach box upgrade file	For the upgrade of the teach box program

The concept of the Teaching Program

Teaching program means a programming way that by recording the key points of a track and form a process file. Two points define a straight line; three points not in the same straight line define a circle or an arc; by recording the start and end points of a straight line in a pattern, it can reproduce this straight line. In a similar way, by recording the three points which are not in the same straight line, (the start, middle and end point of a circle), it can reproduce this circle. Teaching program is a process in which a file is formed by recording the key points of a track.

Graphic & Instructs

Graphic refers to the geometrical locus, such as point, straight line, arc, circle and so on; but in the teaching box, graphics display and be saved in the way of instruct; instruct means the key points to form all those geometrical locus, such as the straight line start point, straight line end point, arc start point, arc middle point, arc end point and so on.

During the programming of this machine, the users choose graphics, the system will automatically insert the instruction of the key points of the chosen graphics; then user move the working table into the target location.

Graphic and Instructs:

Graphics	The Instructs Formed
Single Dot	Single Dot
Straight Line	Straight Line Start Point
	Straight Line End point
Arc	Arc Start Point
	Arc Middle Point
	Arc End Point
The Whole Circle	Circle Start Point
	Circle Middle Point
	Circle End Point
Curve	Curve Start Point
	Straight Line Middle Point or Arc Middle Point
	Curve End Point

Operation Hierarchy Chart

It gets into the main interface when the machine system is started; all of the operations are begun to be done here; it will also be back to the main interface when the operation is finished.

The Operating Details of Teaching Program

As the system joint of human-to-machine, the teaching program pendant mainly finishes the function of forming a file and set-up data. A great part of those instructs of this machine are given by and finally feedback to the teaching program pendant. This chapter will introduce the interface appears sequentially.

The Start-up Interface

Due to the linux operating system is used, when the system is being started up, the LCD screen is in dark; the indicator light LED (up on the keys Ctrl and Del) keeps flashing for about 9s, then gets into the start-up screen as follows:
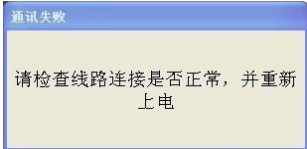

Currently the controlling software is being start up and on test; it gets into the main interface after the test is finished.
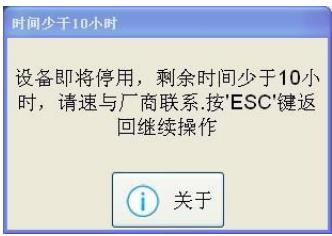
The Main Interface

The system gets into the main interface after it is started up. All of the operating begins here and system will back to the main interface when the operating is done to wait for the further operation.

There will be the following pop-up windows in the specific state when it gets into the main interface initially; the reasons and treatments are here:

Pop-up Window	Reasons	Treatment
复位 请复位工作台(按ESC键可取消复位) 复位	The machine muse be reset when it is powered on in order to find the mechanical origin. If the automatic reset is already set up in the system, it will do that after the system is started up. If no automatic reset is set inside, it displays the current window to remind reset. If the machine is in a debug mode, you can press ESC to cancel reset.	Press <reset> to reset the working table or press <esc> to cancel reset; you can set the automatic reset.
通讯失败 请检查线路连接是否正常，并重新上电	The teaching program pendant cannot communicate with the controlling board.	Please check the joining wire of the controlling board and the teaching program pendant, and then get it power on again.

时间少于10小时 设备即将停用，剩余时间少于10小时，请速与厂商联系.按'ESC'键返回继续操作 （i）关于	In the system it sets the limitation of using time, and the time left is less than 10 hours; the machine will be locked when the time goes out.	You can press <Esc> to continue the current operating; and should contact the supplier quickly to get the password, and then press <Ctrl> & <F4> to unlock.
解锁 剩余时间: 0小时(厂商第二级限制) 解锁密码： 解锁 （i）关于 提示：使用时间已到，请联系供应商或输入解锁密码	In the system it sets the limitation of using time, and the time left is 0; machine is already locked.	Press the button "About" to get the controlling board ID and then contact the supplier for the password and get the machine unlocked.
功能不兼容 请更换示教盒或控制卡 （i）关于	The teaching box does not match with the controlling board function.	Please use the correct teaching box which matches the current controlling board.
版本不兼容 请升级版本 更新示教盒 更新控制卡 （i）关于	The teaching box does not match with the controlling board version.	Please upgrade the teaching box or the controlling program.

When the system is reset, it will display the main interface as follows

ProceFile: Lock
ProceState: Free   About
ProceNum: 0/0
ProceTime: 00:00:00.0   System Test
ProduceCount: 0   Clear   SingleStep
              Prompt
                                Glue disable

Parameter   Edit   Manage   Reset   Stop   Start
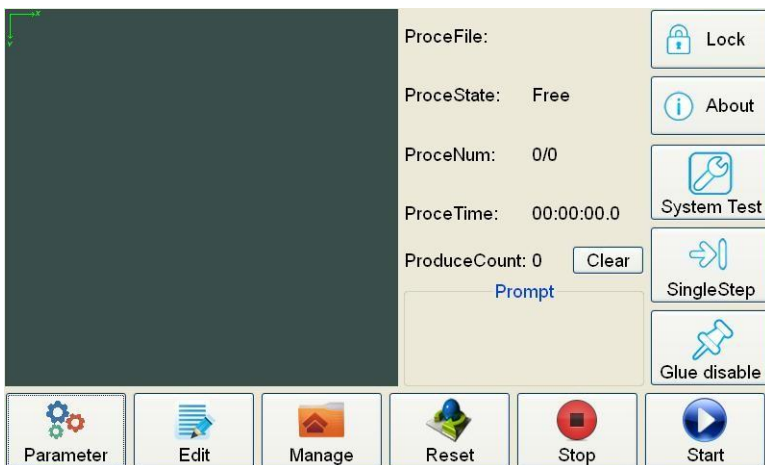
Now we introduce the operating of the main interface in parts.

◆ **Display process graphics.**

When the file is successfully edited and downloaded into controlling board, it is valid and set as the current file. Graphic display area will display the graphic of the current file. If the file is deleted, then it becomes invalid, the area displays gap. The profile body is in white; if the file set file array, the array graphic is in red.

◆ **Display the current location of the working table.**

The working mode displays "being processing" after press the button <start>, now there will be a blue ' •

shown on the graphic displayed. The position of ' • reflect the coordinate of XY axis; the size of ' ' •

reflects the coordinate of Z axis. The bigger ' • is, Z axis is more closed into the original dot.

Process State Area

This area is use to display the current process file and the process state.

◆ **Process file**
Display the name of the current valid files. If the current valid files are connection files, they will be listed in the format of " File1,File2,······"

◆ **Process state**
Display the current process state, such as free, being processing, pause. When the system is in the state of "being process" or "pause", some of the buttons are locked and could not be operated.

◆ **Process Count**
The times of process includes two parts, which are separated by "/". The former part means the process times already finished, the latter one means the cycle times set inside the process times.

◆ **Process Time**
Display the duration of the time which lasts from starting process to end it.

◆ **Output Counts**
Calculate accumulatively the times of process which is successfully finished. It is cleared when pressing the button <reset> or the machine is power down.

Get into the System Test

Press the <System Test> under the idle state to get into the system testing interface.

Get into Set-up of the Process Data

When the current process file is valid, press <process data> under the idle state, get into the interface of process data, change and edit the current process file data.

Get into the Profile Management

Press the <profile management> button under the idle state, get into the profile management interface.

Single-step Executive

Press the button <single-step executive >, get into the single-step executive state; if you press the button <single-step executive > under the process state, the system will firstly finish carrying out the current graphic (e.g. an arc) and then get into the single-step state.

Prohibit / Allow Gluing-out

This function is used in the debug of the machine, to prohibit or allow the gluing-out of nozzle. This button is to switch change-over between "prohibit" " allow" the gluing-out. When the button is [禁止出胶], it means the current state is " allow gluing-out", press the button it will be get into the state "prohibit gluing-out ".

When the button is [充许出胶], it means the current state is "prohinit gluing-out", press the button it will be get into the state "allow gluing-out ".

Process Control

Button		State	Function
These three buttons are at the same position; you can switch the change-over among them according to the state.	[开始]	Idle (Free) State	Press it to begin process
	[暂停]	Being Processed	Press it to suspend the process
	[继续]	Pause	Press it to continue the process
[停止]		Random	The working table will stop if pressing it
[复位]		Random	Press it to reset the working table; or if the state is" being process", the process will stop first and then the working table resets.

The System Test Interface

This interface is used to test if the machine and its hardware of controlling system work well or not. It includes

limit switch test, input IO test, output IO test and the working table test.

Press the button on the main interface and you can get into the system test interface. The system test interface is what it looks like as below:
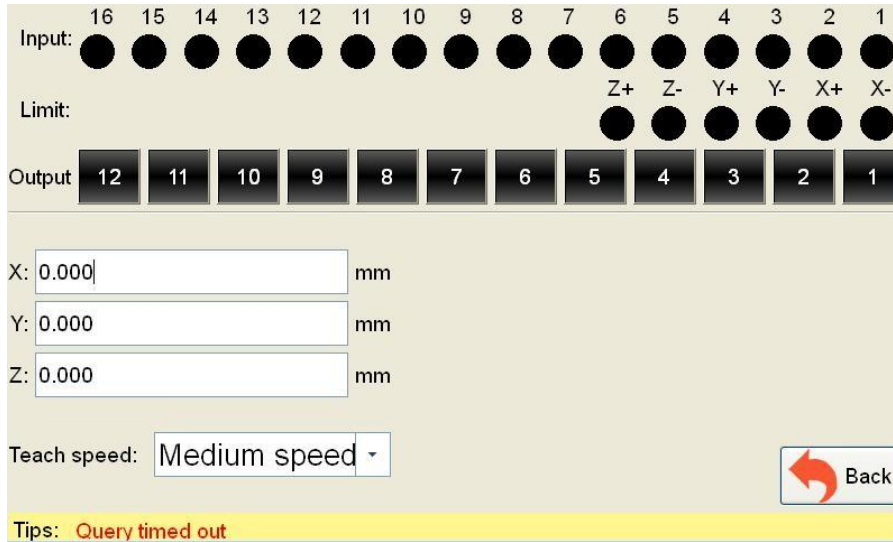
Limit Switch Test

It is used to test if the limit switch works well or not. When the limit switch of each axis moves to the max limited location, if the interface becomes into red from black, the limit witch works well; or the limit switch is something wrong. (The default valid input of the limit switch is low electrical level, so the output should be low level when the limit switch moves to the max limited location. The valid level of limit switch can be changed into high level.) When the first power-on test is taken on the new machine, you must test the limit witch works well or not and then get the machine reset, otherwise ram impact on the working table will be caused.

Input IO Test

It is used to test if the input of IO normal or not. When the input IO is set valid for low level, and the corresponding IO joint is connected into low level, interface screen becomes into red from black, the input IO works well, otherwise it is something wrong.

Output IO Test

It is used to test if the output IO works well or not. Every output IO on the interface is a button, press the button can switch change-over between output low level and output high level.

When the corresponding output IO of the interface is red, output IO exports low level, the same time that the IO indicator light of the control board becomes bright. IO state reads as "open". (If "1" is exported, it is in the state of"glue-on")

When the corresponding output IO of the interface is black, output IO exports high level, the same time that the IO indicator light of the control board becomes dark. IO state reads "close". (If "1" is exported, it is in the state of

"glue-off")

Working Table Test

Working table test is to check if all the mechanical movement normal or not. The moving of the motor is closely related with the data listed below. The data listed below is the default one when the machine goes out from the factory. If the actual data of the machine is different from what listed here, please make changes and then make the working table test.

Data	Factory Default Setting	Instructions
The Driving signal Mode of the Driver	Pulse + Direction	It is defined according to the driving signal accepted by the driver. It can be changed into the mode of double pulse.
Periphery Length / Periphery Pulses	periphery length: 60mm periphery pulse: 3200	Periphery pulse is suitable for the transmission model of the belt pulley; if the mechanical device is screw rod, please change it into periphery length.
Axis Directions	X: origin is the left Y: origin is the backward Z: origin is the upward	Please set the axis directions according to the actual situation, otherwise axis moving error will be caused.

When you test the working table, pleas pay more attention on two sides: 1. the axis can move; 2. the direction of axis is correct. For example: when you press ![icon], X should move into the right; if the X origin is set in the left, coordinate should be continuously adding until the max working area or the limit switch before it stopps. When you press ![icon], X should move into the left; if the X origin is set in the left, coordinate should be continuously reducing until the coordinate becomes into 0 before it stopps.

Process Data Interface

Each process file has a group of process data which is used to set the process speed, cycle times and so on. When a new profile is created, the process will be the default data. You can change the data by the ways: 1. In the profile management interface click on and choose the corresponding file, press <data> buttons to change the process data. 2. In the main interface, press <process data>, you can make changes on the process data of the current file.

No all of the process files use the complete process data; you can choose some of the process data as prohibited. The prohibited data will not display on the process data interface, this is used to prevent the mis-operation of the end-user. The data which can be prohibited includes wire-drawing, glue-off delay, glue-off

distance, terminal point distance, idle glue-dropping, R axis speed.

Interface Operating

Process data interface display is as following shown:

Open glue delay:	10	ms	Auto reset interval:	0	time	Empty speed:	100.000	mm/s
Stop position:	Start	▾	Cycle count:	1	time	Process speed:	50.000	mm/s
			Cycle delay:	0	ms	Elevate speed:	100.000	mm/s
Lampwork:	Nothing	▾	Off glue delay:	0	ms	Elevate height:	2.000	mm
Brushed length:	5.000	mm	Off glue distance:	2.000	mm	Free glue interval:	0	s
Drawing height:	5.000	mm	End distance:	0.000	mm	Free glue time:	0	ms
Drawing speed:	20.000	mm/s				Free glue location:	Click position	

[✓ Submit]   [⚙ Restore parameters]   [✗ Cancel]

Tips: Please click on the appropriate parameters can be modified

Just click the input box and you can input the data; press <confirm> or <Ent> to confirm.

The button <confirm> is used to confirm the change and save of the data. If you change the data by the main interface, the data, after it is saved, will be automatically updated into the control board for process. If you change the data by the profile management interface, it will automatically get back to the profile management interface after the data is saved. If you need it as process control, you need click the <download> button on the profile management interface to update the data.

<Cancel> is used to cancel the change and get the system back to the former interface.

<Restore Data> is used to change the current data back to the factory default process data.

<Save as Default> is used to save the current process data as the default process data. This function will be available only you ask for the factory to open.

Process Data Introduction

◆ **Speed, Process Speed**

During the process of working, the nozzle, set in glue-off, moves with a "speed" to the start point of next graphic, this "speed" is called speed; while with the nozzle glue-on, working table moves with a "speed" regular rules and draw out the track demanded, this "speed" is called as "process speed".

◆ **Raise-up Height, Raise-up Speed**

After the nozzle is glue off, Z axis will moves upward in the "raise-up speed" to some "distance", (this distance is the "raise-up height"), and then moves to the next process location. When you make changes on the raise-up height, the system will directly reflect the change onto the raise-up height data of the profile instructs.

◆ **Wire-drawing Mode, Wire-drawing Height, Wire-drawing Length, Wire-drawing Speed**

The system provides 4 kinds of wire-drawing mode for customers

The wire-drawing data can be chosen to prohibit using.

◆ **Glue-on Delay**

The significance of glue-on delay is to open the nozzle and dispense glue first for some time before the working table begins to work. The purpose of the glue-on delay is in order to solve the problem that the glue viscosity is too high that the glue on the start point of work piece is less than the quantity demanded.

In the dingle point instruct, the value of glue-on delay is the gluing time of the single point working table moves to. In the instructs of straight line, arc and circle, the value of glue-on delay is that working table moves to the start point of a graphic, keeps glue dispensing for some time and then finish the left track of the graphic.

When you make changes on this data, the system will automatically reflect the change onto the glue-on delay data of the profile instructs.

◆ **Glue-off Delay**

Glue-off delay is when the machine finishes a stroke, close the gluing for some time before the Z axis raises up. Glue-off delay data can be chosen to prohibit using.

◆ **Glue-off Distance**

Glue-off distance means close the gluing in advance where is some "distance" from the terminal of the stroke, the glue dispensed on that "distance" is the one left inside the nozzle. (As the below shown). The purpose of glue-off delay is to solve the problem that there are too much glue on the end of the stroke. The glue-off distance data can be chosen to set as prohibited.

◆ **Terminal Distance**

In the common situation, Z axis will raise up to the origin when a process is finished, and then move to the start point of the next process. In order to improve the efficiency, Z axis can raise up to where is some certain "distance" from the origin and moves to the start point of the next process. The "distance" is described as terminal distance. The glue-off distance data can be chosen to set as prohibited.

◆ **Cycle Times, Cycle Delay**

Cycle times is means the times of profile cycle process, when the value is greater than 1, the system finishes gluing on a work piece and stops for some time before it will start gluing on the next work piece.

Cycle delay means the time value between two groups of cycle process.

When the file connection exists, cycle times and cycle delay take the data of the first profile.

◆ **Automatic Reset Interval**

Automatic reset is imported to solve the out-of-step problem of mechanical system. When the automatic reset interval value is greater than 0, (suppose the value is N), then the machine will have a reset automatically once the time it finish N processes. When the automatic reset interval value is set in 0, the machine will not automatically reset. When the file connection exists, automatic reset interval takes the data of the first profile.

◆ **Idle Glue-dispensing Interval; Idle Glue-dispensing Duration**

In order to prevent the blocking in the nozzle, the machine will have an automatic glue-dispensing when it lasts free for some time. The interval of every twice automatic glue-dispensing is the idle glue-dispensing interval value (unit: S). The duration of every automatic glue-dispensing is the idle glue-dispensing duration value (unit: millisecond). When the file connection exists, idle glue-dispensing interval and idle glue-dispensing duration take the data of the first profile.

When the idle glue-dispensing interval is set as 0, idle glue-dispensing function is forbidden.

Idle glue-dispensing data can be chosen to set as prohibited.

◆ **Stopping Position**

Stopping position means the position where the working table stops when a process is finished. There are three options available: "start point" "terminal point" and "stopping point". When "start point" is chosen, the working table will stop at the start point of the profile after the process is finished. When "terminal point" is chosen, the working table will stop at the terminal point of the profile after the process is finished. When "stopping point" is chosen, the working table will stop at the position which user set. This stopping point is set by pressing the buttons on the right of the data. When the file connection exists, stopping position takes the data of the first profile.

Profile Management Interface

When the machine is free, press <profile management> to get into the profile management interface, where you can operate to create, delete, import / export a profile and set the attribute of a profile. The interface is as following shown:

When you get into the profile management interface, if the current profile is valid, the cursor will fall onto the current profile, or the cursor will fall onto the first profile as default.

Click on the <profile name> or <file size> on the title bar, to get the files to arrange in order or inverted order on files list window according to the name or size of profiles.

Interface Operating

Introductions on buttons:

◆ **Import**

Import: to import profiles from other systems. If you use the reservation function to preview the profile imported, it is not in the display scope; you can use revise button to move the graphic in to the visible scope.

◆ **Export**

It is used to export the profile into the U disk to save. The suffix of the profile exported is .jt.

◆ **Read-back**

It is used to get the profiles saved in the control board read back to the teach box. When the control board uses the function of multi-profile, the profile read back is what the dial-up switch is currently choosing.

◆ **Array**

This array means the function of the file array, used to get the complete files form rectangle array to process.

◆ **Connect**

You can use this function to make multi files connected together into a whole, and download the control board. All of the profiles are process according to the sequential order of connecting.

◆ **Delete**

It is to delete the profiles in the files list. If the profile is locked, you must make it unlocked before it can be deleted.

◆ **Revise**

The system provide the revise functions: start point revise, reference point revise, nozzle revise and so on.

◆ **Chamfering**

It is used to set the chamfer of graphics angle.

◆ **Lock / Unlock**

The locking function is used to protect files from being mix-deleted or changed. After the piffle is being locked, you cannot edit or delete it but it could be copy, export, download and preview.

If the file is not being locked, the button displays <lock>, and also the locking bar of files list window is idle at the corresponding position. Click on <lock> to get the file being locked.

When the file is already being locked, the buttons displays <unlock>, and also the locking bar of files list window is marked. Press <unlock> to get the file unlocked.

◆ **Copy**

It is used to copy and form a new file. When you copy a new file, the attribute of the file are all copied but the state of locking.

◆ **Rename**

It is used to change the file name. When a new file is created, the default file name is file** (** is the serial number of the file). You can change the default file name into a new name easily to remember. (The new file name is in 20 characters max.)

◆ **Data**

It is used to change the process data of a file; you need press <download> to re-download the file after change before the data becomes valid. The function of the buttons is equal with the <process data> buttons on the main interface.

◆ **Create New**

It is used to create a new file. You must reset the working table when a new file is created; the new file will automatically get into the profile editing interface when a new file is created.

◆ **The previous age / The next page**

When the files are more than 7, you can use "the previous page" / "the next page" to get the page you want.

You can also use ![up/down arrow buttons] to move the cursor on the files to find the one you want.

◆ **Preview**

It is used to check the file graphic so as to you can find the needed file quickly.

◆ **Download**

1000 files can be saved in the teach box; when you need a file to be process and controlled, you must download it from the teach box to the control board. "Download" is used to finish this function.

◆ **Edit**

Get into the profile editing interface to edit the profile. After the file is finished editing, press <save>, file is saved the same time it is downloaded into the control board for process; the system will be back to the main interface for further operation.

◆ **Back**

Back to the main interface.

Profile Editing Interface

This interface is used to edit the process program. You can insert the new control instruct and also can make changes on the original instruct on this interface.

Programming Basics

Before you use the profile editing interface to edit profile, you must know about the following concepts:

◆ **A graphic can be described with some key points**

In this system, user can take use of single point, straight line, arc, circle, curve, or some of them to compound a track based on the characters of the work piece. When user choose a graphic, the system will automatically insert instructs list with the key points instructs which can describe the chosen graphic; by recording the position of the key points to get to the purpose of recording a graphic.

Graphic	Mathematics Theory & Support	Instructs
Single Point		Single Point
Straight Line	Two different points define a straight line	Straight Line Start Point
		Straight Line End Point
Arc	Three different points in the space, which are not in the same straight, defines an arc.	The Start Point
		The Middle Point
		The End Point
Circle	Three different points in the space, which are not in the same straight, defines a circle	The Start Point
		The Middle Point
		The End Point
Curve		The Start Point
		The Middle Point
		The End Point

◆ **Not any of the key points of the graphic can be omitted.**

You must have the teaching on all of its key points when you create a new graphic. If you cancel the teach of a key point when you have the teach of this graphic, then this graphic could not be built. If a new straight line

is inserted, the system firstly form the start point of this straight line, and wait user to move the working table into the position of the start point; after the straight line start point is confirmed, the system will automatically insert the end point of the straight line. If the user cancels the edit of the end point, then this straight line will be given up due to the lack of the end point.

The similarly, when a key point instruct is deleted, the graphic corresponding with the instruct will also be deleted.

◆ **Insert the instruct first before the working table is moved to a wanted position**

As the following shown:
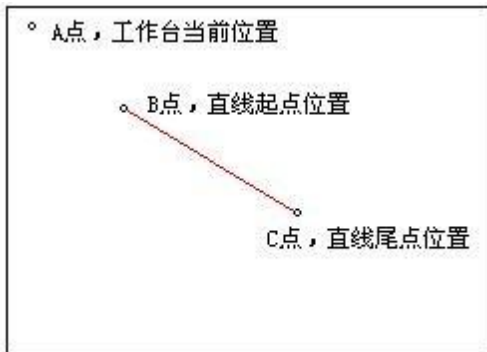
A: the current location of working table

B: the location of the straight line start point

C: the location of the straight line end point

The correct steps are: 1. Insert a straight line graphic, now a straight line start point is formed in the instruct list. 2. Move the working table from A to B. 3. Press < Ent>, record (or confirm) the start point position of the straight line. 4. The system automatically insert the instruction straight line end point. 5. Move the working table into C and press <Ent> to confirm.

◆ **Instruct Choose / Instruct Editing**

As the following shown:
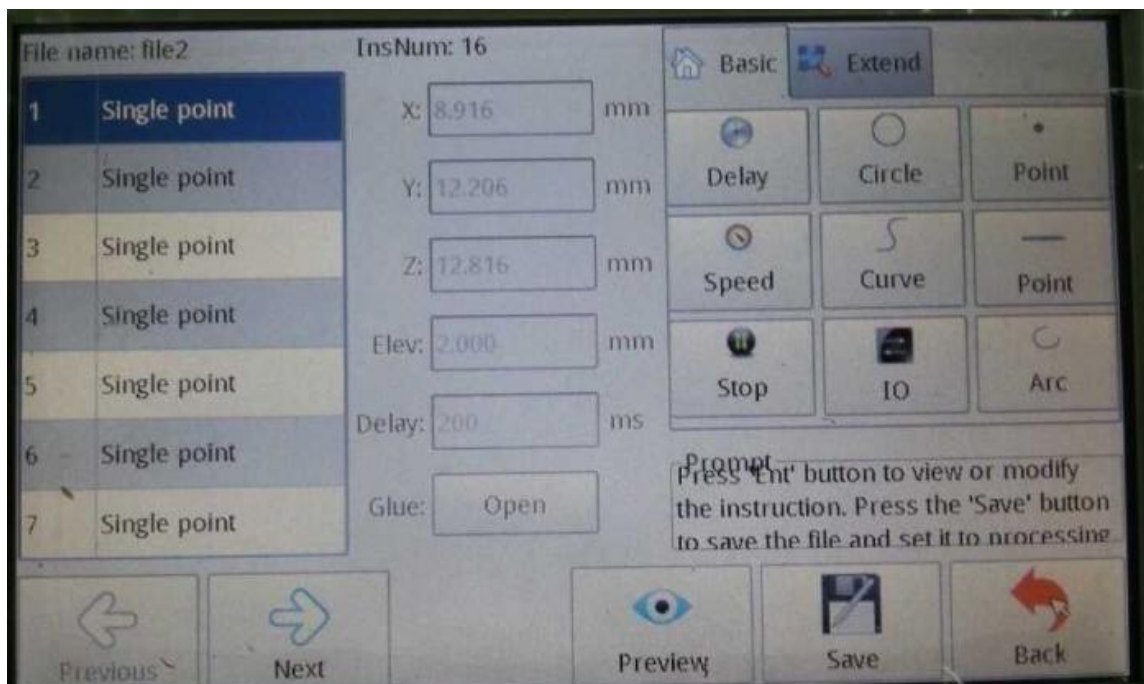
When the instruction listing area is brighter and instruct content area is grey, it means the system is in the state of instruct choosing. Press to choose different instruct and check the content of the chosen instructs (only check but not edit). When the cursor falls onto the wanted instruct, press <Ent> to edit the instruct. When the instruct listing area is grey, and instruct content area is brighter, it means the system is in the state of instruct editing. Press the table moving keys to move the table to the coordinate position of the instructs, click the input box and input the instruct data to edit the instruct. After finish the content editing, press <Ent> to confirm the change or <Esc> to give up the changes and back to the instruct choosing state.

◆ **The Function of <Ent>**

The keys <Ent> has rich functions, which are different in different states. Under the instruct choosing state, pressing <Ent> you can move the working table into the actual position of the instruct, and edit the position and control data of this instruct. Under the instruct editing state, pressing <Ent> you can confirm the edit of this instruct and save its data.

◆ **Insert Instruct / Change Instruct**

Insert instruct means under the instruct choosing state, by clicking the buttons of the basic function area, you can insert a new instruct in the instruct listing and then edit the instruct content and confirm it.

Change instruct means the process that you move the cursor onto the instruct which is waiting for change, press <Ent> and get into the instruct editing state and make changes on the instruct content.

Graphics' Instruction

Graphics' instruct includes axis coordinate, delay, raise-up height, nozzle and other data.

◆ **Axis Coordinate**

It is used to record the coordinate data of graphics, including the coordinate data of X,Y,Z,R axis. You can take use of two modes: 1 move the working table to teach 2 input it directly. When a new instruct is built, the coordinate date is the current coordinate data of the working table. If you use the mode of direct input, input the coordinate of X/Y/Z/R, press <Ent> to move the table into that coordinate position, confirm and edit it.

◆ **Delay**

The function is equal with that of the glue-on delay in process data. When a new instruct is built, it takes the glue-on delay value; if you make new changes on the data, the data of the future newly instruct take the newly value. This data keeps the same changing when you make changes on the glue-on delay data.

◆ **Raise-up Height**

The function is equal with that of the raise-up height in process data. When a new instruct is built, it takes the raise-up height value; if you make new changes on the data, the data of the future newly instruct takes the newly value. This data keeps the same changing when you make changes on the raise-up height data.

◆ **Nozzle**

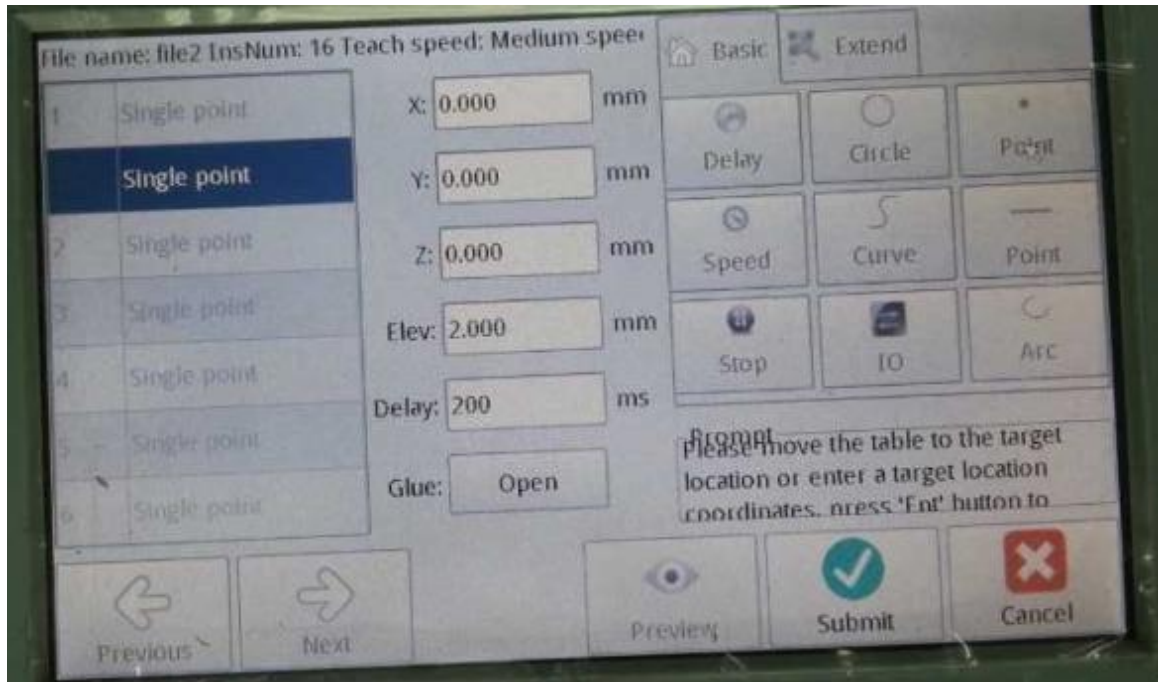It is used to describe switch state of the nozzle instruct. You can switch change-over between ON & OFF by clicking the button after nozzle or pressing <Ctrl> under the instruct editing state.

Programming Interface Operating

The programming interface is as following shown:

The instruction listing area is used to display the file instruct which already exist. The instruction where the blue cursor falls on is the currently chosen instruction. (called as the current instruction)

The instruction content area is used to display the content of the instruction which the cursor currently chooses, such as the coordinate of the axis and delay data. When the cursor moves among the instructions of the instruction listing, the instruction content area refreshes real time, displays the content of the instruction which the cursor falls on. If you press the <Ent> now, the working table will move to the target location of this instruction; also the system gets into the instruction editing state, you can make changes on the coordinate or data.

The area of optional graphics and instructions provide the graphics and instructions which can be optional. User can insert the instruction of the chosen graphic on the back of the graphic where the cursor is by clicking on the relevant buttons. Only under the instruction choosing state, the new graphic instruction can be inserted; which means if the system is under the instruction editing state, you must press <Ent> to confirm or press <Esc> to give up the changes before you can insert the new graphic instruction.

If the location which the cursor falls on is not curve instruction, the reminding area / curve instruction area is used to display the reminding information. When the cursor falls on the curve instruction, reminding area / curve area displays the curve controlling point which can be inserted at the back of the current instruction, a new curve controlling point can be inserted at the back of the current instruction by clicking there.

The Basic Function & Programming Method

In the basic functions, the optional graphics include single point, straight line, arc, circle and curve. The optional controlling instructions include IO port, delay, speed and suspend instruction. (In the following, when an instruction operation is described, usually use "click…button" to insert a new instruction, it refers to under the instruction choosing state, it is the default that a new instruction can be inserted.)

◆ **Single Point**

The programming is as following shown:

1. Press <single point>
2. Move the working table into the target location
3. Make changes on the other data of the instructions
4. Press <Ent> to confirm the editing of the programming

Sometimes in order to avoid a barrier, the single point is inserted; then the single point instructions can be glue-off. The single point instruction after glue-off is called "empty point" in the instruction listing.

◆ **Straight Line**

Based on the theory "two different dots define a straight line", we use the instruction of a start point and an end point to describe a straight line.

The programming process is as following steps:

1. Press <straight line>
2. Move the working table into the location of the line start point
3. Make changes on the other data of the instructions
4. Press < Ent>to confirm the editing of the straight line start point
5. Move the working table into the location of the line end point
6. Make changes on the other data of the instructions
7. Press < Ent>to confirm the editing of the straight line end point

If you want to use several straight line to compound a continuous track, you need open the nozzle at the straight line end point, after the previous straight line is finished editing, press the <straight line>, the system will insert a straight line start point instruction at the back of the end point of the previous straight line, now don't move the working table (because it is continuous track, the start point of the second straight line and the end point of the first one coincide.) press <Ent> to confirm the straight line start point and automatically insert the straight line end point, move the working table to the end point position and confirm the end point (if there is continuous track, open the nozzle at the end point, repeat the process above)

◆ **Arc / Circle**

Based on the theory "three different points in the space in the space define an arc", it uses the arc start point, arc middle point and arc end point instruction to describe an arc. The circle programming is the same as an arc.

The programming is as following shown:

1. Press <Arc>
2. Move the working table into the location of the arc start point
3. Make changes on the other data of the instructions
4. Press < Ent>to confirm the editing of the arc start point
5. Move the working table into the location of any point of the arc. (it is advised that the start, middle and

end point are located in the position of trisection arc)

6. Press < Ent>to confirm the editing of the arc middle point
7. Move the working table into the location of the arc end point
8. Make changes on the other data of the instructions
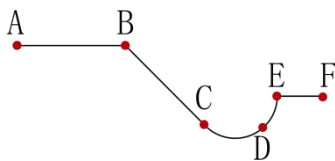9. Press <Ent> to confirm the editing of the arc end point

◆ **Curve**

Any track in the space can be defined out with the compound of straight line and arc. By recording some key points of the curve, you can record the track of the whole curve. The key points of the curve include curve start point (A), curve-line middle point (B, C, E), curve-arc middle point (D), and the curve end point (F), a piece of curve must have a curve start point and a curve end point, between them some curve-line middle points and curve-arc middle points can be inserted. The key points of a curve and the inserted points are as following shown:

1. Curve start point: curve line middle point, curve arc middle point, curve end point
2. Curve line middle point: curve line middle point, curve arc middle point, curve end point
3. Curve arc middle point: curve line middle point, curve end point

The programming of curve is as following shown:

For example, the curve graphic is like below:

The programming is as following shown:

1. Press <curve>
2. Move the working table into the location A (the curve start point)
3. Make changes on the other data of the instruction
4. Press <Ent> to confirm the editing of the start point A
5. Press <curve line middle point>
6. Move the working table into B and press <Ent> to confirm
7. Press < curve line middle point>
8. Move the working table into C and press <Ent> to confirm
9. Press < curve arc middle point>
10. Move the working table into D and press <Ent> to confirm
11. Press < curve line middle point
12. Move the working table into E and press <Ent> to confirm
13. Press < curve End point
14. Move the working table into F, press <Ent> to confirm

◆ **IO Port**

The output IO port can be controlled in the program. When the program runs to IO port instruction, it will update the output IO state of the output IO instruction into output IO. IO port instruction includes an IO output delay value; the system updates the IO output state some time before it executive the next instruction.

Programming method: 1.press <IO port> 2. In the pop-up interface set the output IO state 3 set the IO output delay value 4. Press <Ent> to confirm the IO port instruction

◆ **Delay**

When the program runs to the instructions, it will delay for some time before it executive the next instruction.

Programming method: press <delay>, input the delay value and press <Ent> to confirm it.

◆ **Speed**

In the common situation, when the process file runs, the track of all the graphics runs in the speed of process. But in the working, you can change the process speed timely by changing the running speed value. When the program runs the speed instruction, it will run in the changed speed value until the program runs to end or to the next speed value.

Programming method: press <speed>, input the delay value and press <Ent> to confirm.

◆ **Pause**

When the program runs to "pause" instruction, it will pause to run (it is in accordance with pressing <pause>), until it accepts the continuous process order and continue to executive the next instruction.

Programming method: press < pause>, the "pause" instruction will be inserted at the back of the cursor position.

Extended Functions & Programming Method

The extended functions include insert a profile, mass change, mass delete, instruction array, copy and paste.

◆ **Insert profile**

Using the function of "insert profile", you can copy the complete content and inset it into the currently edited file. Program the repeated track of the work piece into a file, by using the function "insert file" repeatedly to improve the programming efficiency.

Programming method: 1. Press < extended function>, change the optional function into extension page. 2. Press < insert profile>, choose the profile needed to be inserted in the pop-up window, press <confirm>. 3. After the needed-to-be-inserted profile is confirmed, the system will have an inquiring window, operate according to the reminding. 4. Press <confirm>, the system will insert the complete content of the file into the back of the instruction where the cursor falls on.

◆ **How to choose mass instruction**

When using the functions of instruction array, mass delete, mass change, copy, you need choose multi instructions. The system (cursor) achieve the purpose of choosing multi instructions by choosing "start instruction" and "end instruction"

Programming method: 1. Press the one of the extended function, for example "mass change". 2. Move the cursor into the first instruction which need to use "mass change" , press < Ent>. 3. Move the cursor into the last instruction which need to use "mass change", press < Ent>.

◆ **Instruction Array**

Instruction array is a little bit different from files array. As for files array, the files are operated once only when process, the array content is invisible and cannot be changed. But for instruction array, mass instructions are formed, by the way of using array, also the instructions formed actually exist in the instruction listing, they are visible and could be deleted.

Programming mode: 1. Press <instruction array>, choose the instruction waiting to be arrayed using the

method of "how to choose mass instruction" talked in the previous;. 2. Set the array data in the pop-up array setting interface; 3. After the array data is finished setting, the instruction arrayed will directly display in the instruction listing.
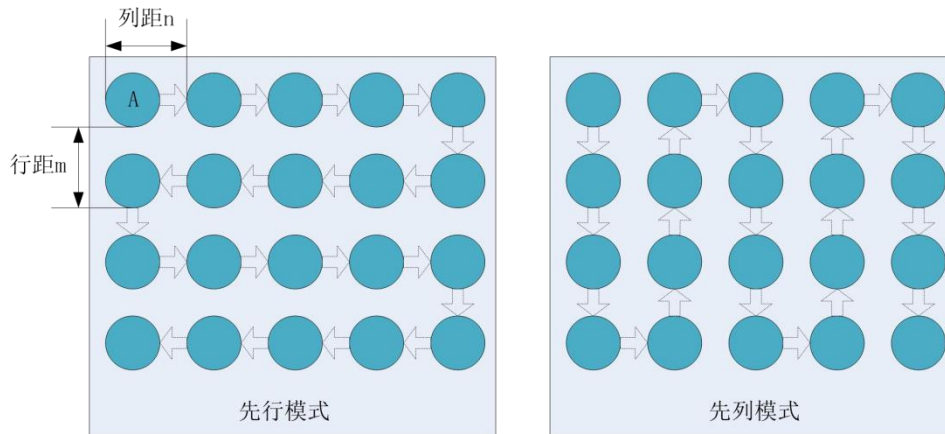
◆ **Mass Change**

By using "mass change", some or all of the functions can be changed in a time, which include: glue-on delay, glue-off delay, raise-up height and height of Z axis. If the work piece processed is plane, but in the programming the height of Z axis in every instruction is not the same due to the cause of avoiding barrier, you can use the "mass change" and set" the height of Z axis" in all the instruction into the same value.

Programming method: 1. Press <mass change>, choose the instruction waiting to be changed using the method of "how to choose mass instruction" talked in the previous. 2. Select the data need to be changed in the pop-up interface and input the new data. 3. Press <confirm> to confirm the change or <cancel> to give up the change.

◆ **Mass Delete**

Multiple instructions can be deleted in a time by using "mass delete".

Programming method: 1. Press <mass delete>, select the instruction waiting to be deleted using the method of "how to choose mass instruction" talked in the previous. 2. Press <confirm> to finish delete in the pop-up interface.

◆ **Copy / Paste**

"Copy" is used matching with "Paste", some of the instructions in the files can be used repeatedly by using this function. Instruction must be copied before it is pasted. When "paste" instruction is used, you can choose to make offset or not on the instruction pasted.

Programming method: 1. Press <copy>, select the instruction waiting to be copied using the method of "how to choose mass instruction" talked in the previous. 2. Press <Ent> to confirm the copy. (<Ent> need to be pressed twice; the first time to be pressed is to confirm the scope of the instruction waiting to be copied; the second time to be pressed is to confirm the motion of copy.) 3. Move the cursor into the position where the copied instruction is hoped to be insert. 4. Press <paste>, select "offset" or not in the pop-up interface, and operate according to the guide. 5. Press <confirm>, the system will automatically paste the copied instruction at the back of the instruction where the cursor falls on.