

# ISRH23 series Soldering Robot

## Instruction Manual

**Thank you very much for purchasing this Robot.**

**This operation manual describes the features and operation of the robot. The detailed describes about the teaching and processing may refer to the operation manual of the “Teaching Pendant”.**

**Before using, read the manual thoroughly for proper use of the robot. Store the manual in a safe , easily accessible place for future reference.**

**The specifications of the robot or the contents of this manual may be modified without prior notice to improve its quality.**

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## □. Safety Instruction

### ⚠ Caution about the main unit

- Only use this robot with rated voltage and frequency (refer to the trademark back of equipment).
- Don't move the XY table and the top head of feeding solder controller for protect them from damage.
- During processing, don't touch the movable parts.
- Before using, check the heating controller and pressure reduction valve have been fasten reliable.
- Keep the unit dry. Don't use or disconnect the unit with wet hands.
- If urgency event occurs, please press the emergency switch (red) at once, and main unit will cut off the power and stop processing file.

### ⚠ Caution about the power cord

- This machine is equipped with a 3-wires grounding plug and must be plugged into a 3-terminal grounded socket. Do not modify plug or use an ungrounded power socket. If an extension cord is necessary, use only a 3-wire extension cord that provides grounding.
- Don't turn on the power of the machine when some parts are damaged, especially the power cord is damaged.

### ⚠ Caution about the teaching pendant

- Do not insert or plug the teaching pendant for protect it from damage. When pulling out the teaching pendant, loosen and remove the fixing screws and then pull out it.
- For protecting teaching pendant from damage, don't fall on the floor or shake it intensively.

### ⚠ Caution about the iron tip

- When the power is on, the iron tip's temperature is very high. Do not touch the metallic parts near the tip.
- During teaching file adjusting, please don't run the heating controller in order to avoid being burned or damage parts.
- The iron tip is very hot and it may cause dangerous accident, so it must be closed and cutted off the power supply when not be used
- Regular check and clean the iron tip. If the tip is deformed or heavily corroded, please replace a new one.
- Turn off the unit and wait till the temperature cools to room temperature when replacing or installing the iron tip.
- Do not use the product near flammable items.
- The soldering process will produce smoke, so please make sure the area is well ventilated.

### ⚠ Caution about the feeder

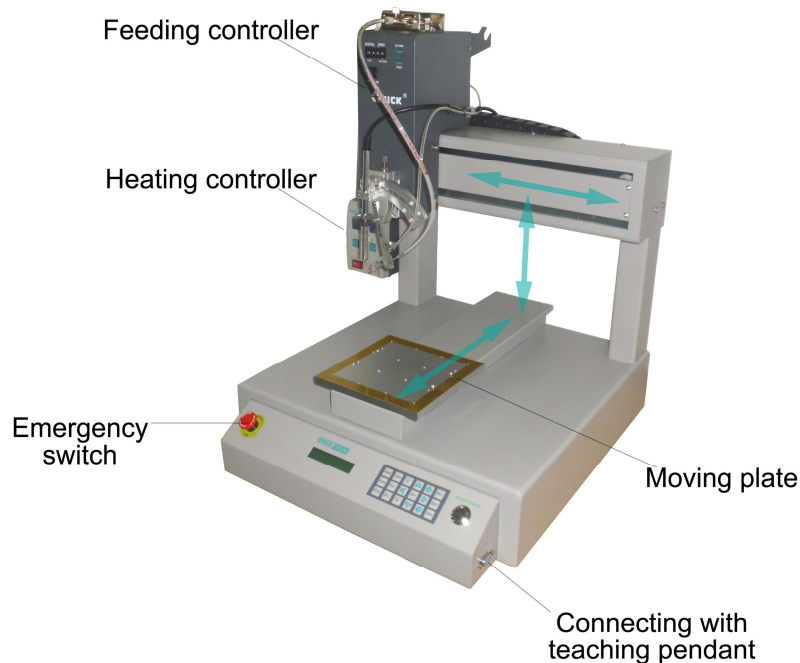
- Check and clean the feeding solder tube and blowing air tube at regular intervals for protecting the tubes to prevent clogging
- During using, don't over bend or revolve the PU tubes.
- Solder wire of different size requires different feeding nozzle. Such as, if the diameter of solder wire is  $\Phi 0.8\text{mm}$ , befitting specification of the feeding nozzle is 0.8mm.

### ⚠ Caution about the air supply

- Make sure the air blowing to the iron tip is dry and clean. Select suitable air pressure according the component. Suggest the air pressure is less than 0.7Mpa.

## □. Summary

This desktop robot is designed fast automatic welding. It is a high-precision and high-resolution soldering control system with 3 axes. Besides, this unit provides us easier programming instructions, more parameters, a larger memory space, and a higher speed. It highly improves the productivity effect. In addition, this precise desktop soldering robot works with the special design iron tip, the soldering temperature curve is fit and the soldering quality is more reliable.



## 2.1 Features

- Comprehensive 3-dimensional drawings support, such as 3-dimensional linear interpolation, capabilities of teaching 3D graphics and user-defined 3D array and so on.
- User-defined array function: Easy solution for moulds deviation. Support user-defined 3D array.
- Group function: This function allows users copy, delete, modify, array, and pan multi-points.
- Excellent teaching pendant. Supporting advanced function, such as array, group edit, sub-procedure, condition-call procedure etc.
- Unique merge function: Easy resolution to process complex multi-layers irregular array and non-array graphics.
- Capable to control the length of feeding solder wire at a single point, and to edit the parameters of any multi-points at one time.
- Smooth functions of changing speed and hi-speed trajectory on the moving. User-definable speed parameters.
- Multiple processing modes, such as single-step operation, overall processing, and automatic loop processing.

## 2.2 Specifications

Table2-1: Main Specification

Item		Description					
Power Supply		100~240VAC					
Power Consumption		80W					
Number of Controllable Axes		3 axis-type					
Type	One Workplate	9220A	9220S	9320A	9320S	9420A	9420S
	Two Workplate	9220D	9220DS	9320D	9320DS	9420D	9420DS
Guide Rail of Tool Load Platform		One	Double	One	Double	One	Double
Size of Tool Load Platform		15×15cm	17×17cm	15×15cm	17×17cm	15×15cm	17×17cm
Moving Range	X axis	200 mm		300 mm		400 mm	
	Y axis	200 mm		300 mm		400 mm	
	Z axis	50 mm		100 mm		100 mm	
Speed Range	X axis	0.1~800 mm/sec					
	Y axis	0.1~800 mm/sec					
	Z axis	0.1~300 mm/sec					
Repeatability	X axis	0.02 mm					
	Y axis						
	Z axis						
Resolution	X axis	0.01 mm					
	Y axis						
	Z axis						
Loading Weight	Head	6 Kg		8 Kg		8 Kg	
	Tool	2 Kg		2 Kg		2 Kg	
Speed Controlling		handle the speed rising and/or dropping automatically					
Storage for Teaching Files		Max. 999 files & Max. 60000 bytes.					
Storage for Processing Files		Max.255 files.					
Working	Temperature	0~40℃					
Ambient	Relative Humidity	20%~90% (no condensation)					
Dimension (W×D×H)		30×37×52cm		42×48×58cm		52×70×58cm	

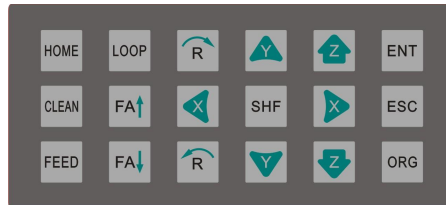
\* The specifications are subject to change without notice.

\* It can be selected among auto-feeding device, auto-cutting device or solder wire alarm device.

## 2.3 Instructions about the Keypad

The keypad on the robot can be used when the teaching pendant is disconnected.

**⚠Caution:** when connecting the teaching pendant with the main unit (robot), the buttons on the front panel of the unit are invalid except **START/PAUSE**, **FEED** & **ORG**. If fitting with throttling valve to control the movement of soldering hadle, the button **FA↑** & **FA↓** can be used.



The functions and detailed use of the buttons refer to the chapter 4 “off-line operation instruction”.

**Table 2-2: Keypad Function**

Button	Function Description	
X← / X→ / Y↑ / Y↓ / Z↑ / Z↓	Control the axis' coordinate	
【HOME】	Move the iron tip to the origin of the processing file, it can be set.	
【SHF】	Switch point processing speed, 3 level: low, middle, high	
【ENT】	Save the set parameters	
【ORG】	Reset, move the iron tip to the zero point (0,0,0)	
【LOOP】	Set the loop operating parameters	
【CLEAN】	Press the clean button and blow towards the iron tip to clean it	
【ESC】	<ol style="list-style-type: none"> <li>Return to file processing interface but not save the set parameters.</li> <li>Into the testing interface, test the axis's function</li> </ol>	
【FEED】	Control feeding solder	
【FA↑】	Turn on the throttling valve to make the soldering handle upward.	Cylinder-controlling type
【FA↓】	Turn off the throttling valve to make the soldering handle downward.	
Ⓜ/Ⓜ	Control the R axis' coordinate	With R axis type
【START/PAUSE】	Start or pause the processing file.	

## 2.4 Course of the File Processing

Completely finish a process file needs three steps: program---adjust---process. The detailed operation may refer to the “operation manual of the teaching pendant”.

**Program:** the method of teaching program.

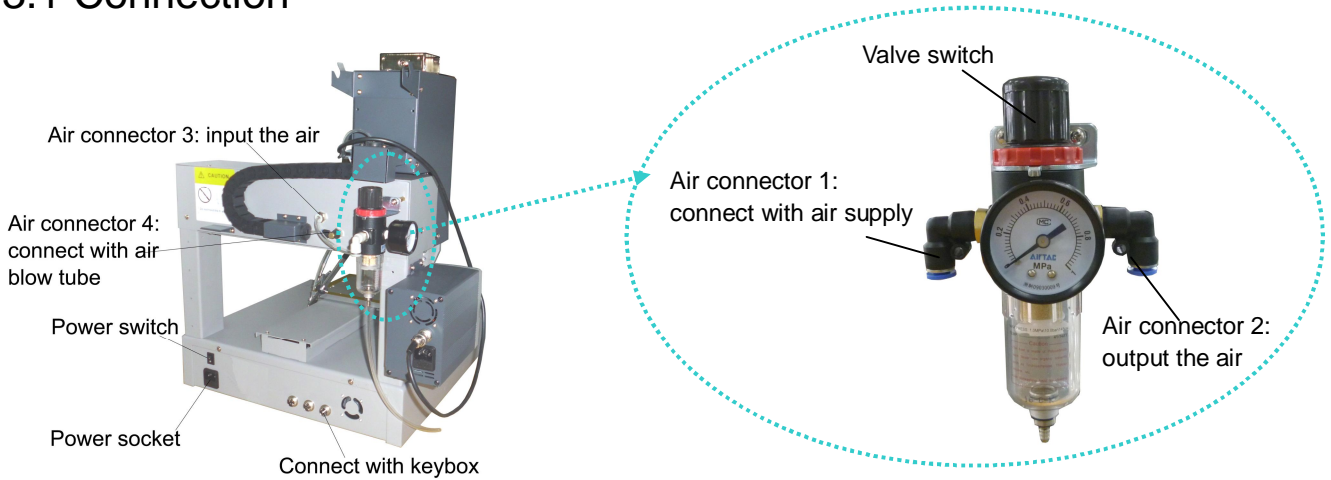
**Adjust:** adjust the programming file, such as origin calibration, slant array, height adjusts, file parameters adjust (including speed, acceleration, delay time, distance etc.)

**Process:** download the program file to the system from the teaching pendant, and then it begins to process.



## □. Connection and Use

### 3.1 Connection



**Connection with the PU tube:** directly insert the PU tube into the joint of air tube.

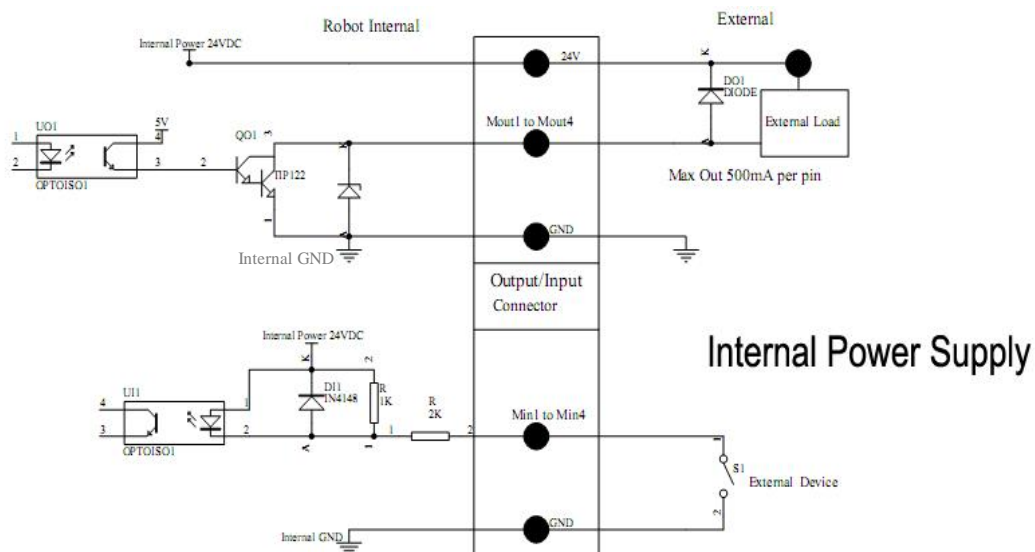
**Pull out the PU tube:** press down the joint head and then pull out the PU tube.

1. Air connector 1: Connect with out air supply by PU tube.
2. Air connector 2: Connect with air connector 3 by PU tube. Decompress through the valve, get clean and dry air to the air connector3.
3. Air connector 4: Connect with blowing tube, the other end of which connects around the iron tip to blow.
4. **Change the iron tip:** pull out the iron tip forward when it has cooled down.
5. **Power socket:** connctet with grouding power cord.
6. **Four-pin socket:** connect with the keybox “START/ORG”.

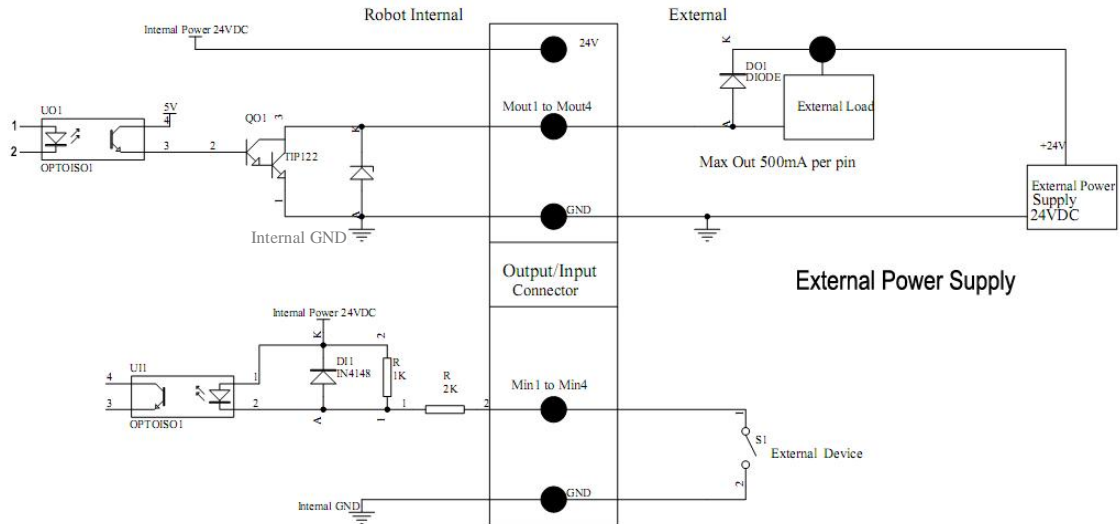
### 3.2 I/O Socket Instruction

*NOTE: the output and input pins can be set special functions at the “system config 2” of teaching pendant.*

#### 3.2.1 Circuit Instruction of I/O Socket



## □. Off-Line Operation Instruction



### 3.2.2 Pins Instruction of Four-pin Socket

The following list describes the pins function of the four-pin socket.

Two-pin socket	Pin NO.	Pin's name	Instrution of pins	Application
	1	Min4	Main signal input 4	Now it's used to connect to "START/STOP" swich.
	2	GND	Ground of power supply	
	3	Min1	Main signal inputting 1	Now used to reset (ORG) signal
	4	Min2	Main signal inputting 2	Now used to connect emergency stop switch

*NOTE: \* If the customers need special function, the input and output signal can be set again.*

### 3.2.3 Pins Instruction of Five-pin Socket

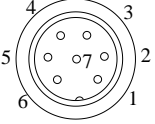
The following list describes the pins function of the five-pin socket. By the socket, it can connect with photoelectricity switch etc.

Five-pin socket	Pin NO.	Pin's name	Instrution of pins	Application
	1	24VDC	"+" power supply	Output signal
	2	GND	Ground of power supply	
	3	Min3	Main signal inputting 3	connect to sensor, such as photoelectric switch
	4	Ein13	External input 13	It's used to alarm when solder wire is blocking or lacking etc.
	5	Ein14	External input 14	It's used to alarm when solder wire is blocking or lacking etc.

*NOTE: \* If the customers need special function, the input and output signal can be set again.*

### 3.2.4 Pins Instruction of Seven-pin Socket

The following list describes the pins function of the seven-pin socket. By the socket, it can control the external device.

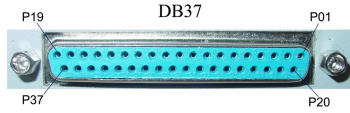
Seven-pin socket	Pin NO.	Pin's name	Instrution of pins	Application
	1	24V	“+” power supply	Output signal
	2	GND	Ground of power supply	
	3	Mout1	Main signal output1, the current is less than 0.5A	Now it's used to feeding signal
	4	Mout4	Main signal output4, the current is less than 0.5A	Now it's used to cylinder movement signal
	5	Ein12	External input 12	Now it's used to reset (ORG) signal, alarm when solder wire is blocking or lacking etc.
	6	Mout2	Main signal output2, the current is less than 0.5A	Now it's used to output working state signal
	7	Mout5	Main signal output5, the current is less than 0.5A	It's only effective as pulse signal inputted

NOTE: \* If the customers need special function, the input and output signal can be set again.

### 3.3 Instruction about DB37 Socket

NOTE: DB37 socket is an optional fitting. It must be ordered if you need it to do information input or output.

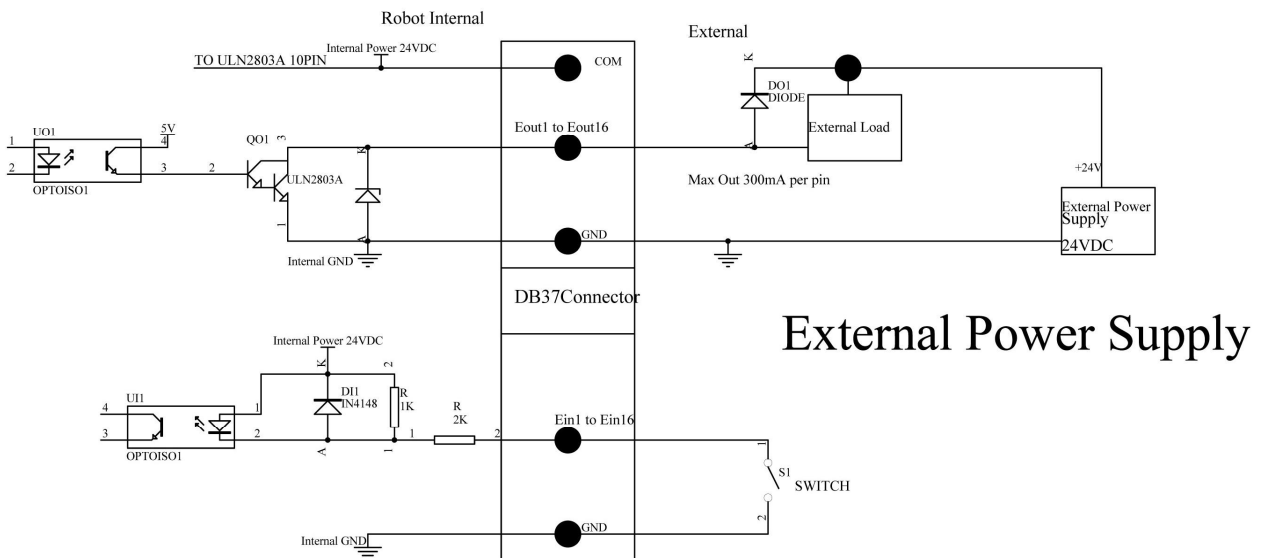
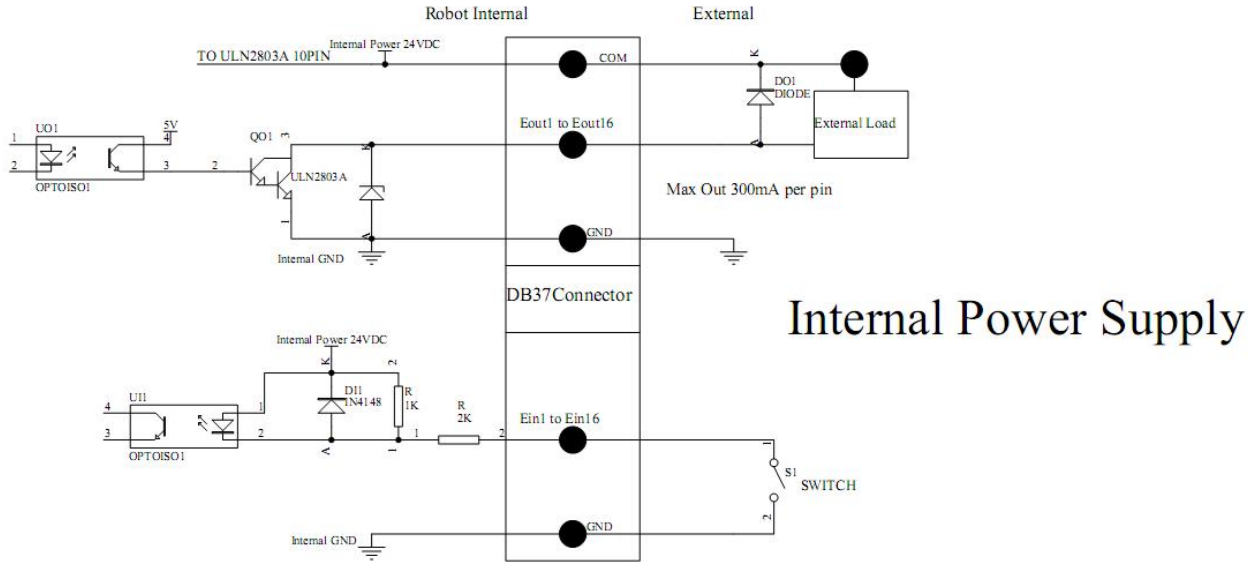
#### 3.3.1 Pins Instruction of DB37

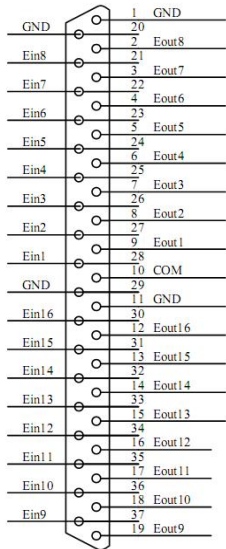
 (socket of DB37)					
NO.	Interface Definition of DB37	Corresponding I/O pins of DB37	NO.	Interface Definition of DB37	Corresponding I/O pins of DB37
1	GND	P01	20	GND	P20
2	Eout8	P02	21	Ei n8	P21
3	Eout7	P03	22	Ei n7	P22
4	Eout6	P04	23	Ei n6	P23
5	Eout5	P05	24	Ei n5	P24
6	Eout4	P06	25	Ei n4	P25
7	Eout3	P07	26	Ei n3	P26
8	Eout2	P08	27	Ei n2	P27
9	Eout1	P09	28	Ei n1	P28
10	COM	P10	29	GND	P29
11	GND	P11	30	Ei n16	P30
12	Eout16	P12	31	Ei n15	P31
13	Eout15	P13	32	Ei n14	P32
14	Eout14	P14	33	Ei n13	P33
15	Eout13	P15	34	Ei n12	P34

## □. Off-Line Operation Instruction

16	Eout12	P16	35	Ei n11	P35
17	Eout11	P17	36	Ei n10	P36
18	Eout10	P18	37	Ei n9	P37
19	Eout9	P19			

### 3.3.2 Circuit Instruction of DB37





Plug of DB37 ( pin type)

Connection of DB37 plug

### 3.4 Instruction of Input & Output

- The following input interfaces and output interfaces are corresponding to the signal pins which are defined as “Min, Mout, Ein, Eout” at the above socket. Also, it is corresponding to the interface at the “IO Test” displaying window.
- After setting, it can test the function of IO interface at the “IO Test” displaying window.
- The interfaces in following table can be set at the the “Input Config” or “Output Config” of “System Config 2” of teaching pendant. It can define the special function for the following input & output interfaces which are corresponding to the above sockets.

#### 3.4.1 IO Function Definition

1. In the “Input Config 2” displaying window, it can set the input interface: Min1~Min4 & Ein1-8 & Ein09~Ein16.

Input Interface	Optional Function
Min1	--, Shoutcut1, Origin BTN, Test input-L, Test input-H
Min2	--, Shortcut 2, Stop BTN, Test input-L, Test input-H
Min3	--, Shortcut 3, Start BTN, Test input-L, Test input-H, Lack fault, Block fault, Temp fault, Temp\Feed fault, Upper CS, Nether CS
Min4	--, Shortcut 4, Foot BTN, Test input-L, Test input-H
Ein1~Ein8	--, Shortcut 5-259
Ein09	--, Origin BTN, Stop BTN, Start BTN, Foot BTN, Test input-L, Test input-H, Adj X-Limit, Shoutcut 260, Upper CS, Nether CS
Ein10	--, Origin BTN, Stop BTN, Start BTN, Foot BTN, Test input-L, Test input-H, Adj X-Limit, Shoutcut 261, Upper CS, Nether CS

## □. Off-Line Operation Instruction

Ein11	--, Origin BTN, Stop BTN, Start BTN, Foot BTN, Test input-L, Test input-H, Adj X-Limit, Shoutcut 262, Upper CS, Nether CS
Ein12	--, Origin BTN, Stop BTN, Start BTN, Foot BTN, Test input-L, Test input-H, Shoutcut 263, Lack fault, Block fault, Temp fault, Temp\Feed fault, Upper CS, Nether CS
Ein13	--, Origin BTN, Stop BTN, Start BTN, Foot BTN, Test input-L, Test input-H, Shoutcut 264, Lack fault, Block fault, Temp fault, Temp\Feed fault, Upper CS, Nether CS
Ein14	--, Origin BTN, Stop BTN, Start BTN, Foot BTN, Test input-L, Test input-H, Shoutcut 265, Lack fault, Block fault, Temp fault, Temp\Feed fault, Upper CS, Nether CS
Ein15	--, Origin BTN, Stop BTN, Start BTN, Foot BTN, Test input-L, Test input-H, Shoutcut 266, Lack fault, Block fault, Temp fault, Temp\Feed fault, Upper CS, Nether CS
Ein16	--, Origin BTN, Stop BTN, Start BTN, Foot BTN, Test input-L, Test input-H, Shoutcut 267, Lack fault, Block fault, Temp fault, Temp\Feed fault, Upper CS, Nether CS

2. In the “Output Config 2” displaying window, it can set the input interface: Mout1~Mout4, Eout09~Eout16.

Output Interface	Optional Function
Mout1~Mout4	--, Nozzle 1, Nozzle 2, Nozzle 3, Nozzle 4, Working Flag, WorkEnd Flag, Cylinder, Clean Output
Eout09~Eout16	--, Ready Flag, Alarm Flag, Working Flag, WorkEnd Flag, Cylinder, Clean Output

3. In the teaching pendant, “Eout09~Eout16” are corresponding to the “Eout8+ (0~8)” at the “IO Test” and “Output (point)” displaying window.

IO Test	
F1 Mout :	1 2 3 4
F2 Eout :	0+ 1 2 3 4 5 6 7 8
F3 Eout :	8+ 1 2 3 4 5 6 7 8
Min :	1 2 3 4
Ein :	0+ 1 2 3 4 5 6 7 8
Ein :	8+ 1 2 3 4 5 6 7 8

*Mout/Eout/Min/Ein is corresponding to the “metal socket” at the back of robot. Besides, it can be test before operation.*

Namely, “Eout8+ 1” is the output interface “Eou09”. “Eout8+ 2” is the output interface “Eou10”. “Eout8+ 3” is the output interface “Eou11”, etc.

### 3.4.2 IO Function Instruction

Function of Input	Function Instruction
--	Not have function.
Origit BTN	Input the reset signal into the unit by corresponding signal pin, and the unit runs the reset (ORG) operation.
Stop BTN	Input the stop signal into the unit by corresponding signal pin, and the unit stops the current operation.

## □. Off-Line Operation Instruction

Start BTN	Input the start signal into the unit by corresponding signal pin, and the unit starts to work or pauses the current work.
Foot BTN	Input the foot switch signal into the unit by corresponding signal pin, and the unit runs the foot switch operation, and the function is similar with the “Start BTN”.
Test input-L	Input the signal “breakover ground” into the unit by corresponding signal pin and the unit comes into the testing state (cannot move and only can program).
Test output-H	Input the signal “not breakover ground” into the unit by corresponding signal pin and the unit comes into the testing state (cannot move and only can program).
Lack fault	Input the signal “lack fault” into the unit by corresponding signal pin and the unit comes into the process, such as stop working, alarming etc..
Block fault	Input the signal “block fault” into the unit by corresponding signal pin and the unit comes into the process, such as stop working, alarming etc..
Temp fault	Input the signal “temp fault” into the unit by corresponding signal pin and the unit comes into the process, such as stop working, alarming etc..
Temp/Feed fault	Input the signal “temp/feed fault” into the unit by corresponding signal pin and the unit comes into the process, such as stop working, alarming etc..
Upper CS	Input the signal “cylinder up sensor (in retraction state)” into the unit by corresponding signal pin and the unit judges the position of cylinder whether in retraction state.
Nether CS	Input the signal “cylinder down sensor (in reaching state)” into the unit by corresponding signal pin and the unit judges the position of cylinder whether in reaching state.
Adj X-Limit	It is effective only when connecting with “9036 tip calibration device” and it is corresponding to the “Ein09”. Input the signal “Adj X-Limit” by “Ein09” to calibrate the X-axis of tip. (Note: only calibrating X/Y/Z at the same time, it can calibrate the tip’s position.)
Adj Y-Limit	It is effective only when connecting with “9036 tip calibration device” and it is corresponding to the “Ein10”. Input the signal “Adj Y-Limit” by “Ein10” to calibrate the Y-axis of tip. (Note: only calibrating X/Y/Z at the same time, it can calibrate the tip’s position.)
Adj Z-Limit	It is effective only when connecting with “9036 tip calibration device” and it is corresponding to the “Ein11”. Input the signal “Adj Z-Limit” by “Ein11” to calibrate the Z-axis of tip. (Note: only calibrating X/Y/Z at the same time, it can calibrate the tip’s position.)
Shortcut	It is corresponding to the shortcut of processing file. The shortcut can be set in the “File Name” displaying window of teaching pendant. It can be use do find the required processing files quickly.
Shortcut1	Min1
Shortcut 2	Min2
Shortcut 3	Min3
Shortcut 4	Min4
Shortcut 5~259	It is corresponding to the “Ein1~Ein8”. Namely, the high & low electrical level of “Ein1~Ein8” can form 255 (1~255) kinds signal. The shortcut (5~259) is the sum of the electrical level digit add 4.

## □. Off-Line Operation Instruction

Function of Output	Function Instruction
--	Not have function.
Nozzle 1	Once the nozzle 1 comes to run the program, the output is in conducting state, or else not.
Nozzle 2	Once the nozzle 2 comes to run the program, the output is in conducting state, or else not.
Nozzle 3	Once the nozzle 3 comes to run the program, the output is in conducting state, or else not.
Nozzle 4	Once the nozzle 4 comes to run the program, the output is in conducting state, or else not.
Ready flag	When the unit comes into the normal ready state, the output is in conducting state, namely, once receiving the “START” signal, it comes to run. And it closes the output after running.
Alarm flag	When set the mode as alarming, once it detects the abnormal state, the output is in conducting state, or else not.
Working flag	When the unit comes into the working state, the output is in conducting state, or else not.
WorkEnd flag	After t finishing the process, the output is keeping in conducting state 200ms, or else not.
Cylinder	Once the unit comes to run the cylinder process, the output is in conducting state, control cylinder motion, or else not.
Clean output	Once the unit comes to run the clean process, the output is in conducting state, do the clean (blowing or revolving brush), or else not.

*Note:*

- *The function settings of input&output don't open to the user. It only operated by Producer Company.*
- *It will not give advance information if some functions are changed.*

## 3.5 Operation of First Time

If using the unit for the first time, user should test the basic functionalities at first.

### Step1: Install and Test

Before using, user should properly install and connect the system.

At first, user should test the basic functionalities of the system with the 'Test' function of the teaching pendant.

Test including: Is there any problem with the axes movements towards positive or negative direction?

### Step2: Parameters Setting

Properly set the global parameters and other parameters using in the processing.

*Remark: Failure to properly set the parameters will cause difficulties in using the system.*

### Step3: Teaching Program

Program a graphic with teaching pendant. Refer to the instruction manual of the teaching pendant.

### Step4: Origin Calibration & Set the Parameters of the Teaching Pendant

1. Origin calibration: User should adjust the start point when a teaching file is created for the first time.
2. Set file parameters.

### Step5: Download & Process

1. Download: please refer to instruction manual of the teaching pendant “Teaching File Download”.
2. Process: please refer to instruction manual of the teaching pendant “File Processing”.



### 3.6 Continue to Work after Interrupt

1. **Function:** For an interrupted processing file, it can continue to work at the next point of the interrupted point after troubleshooting.

2. **The manner of continue the interrupted work:** after troubleshooting, press the “START” button and keep more than 2s not loosely, the robot will continue to work from the interrupted point.

If press the “START” button and keep less than 2s, the robot will start the work from the start-point of the processing file.

3. As the different interrupt type, it can classify the interrupted point as the following table.

	Interrupt Type	Code of Interrupted Type	Start Point of Continue Work (after troubleshooting)
1	press“STOP” key	D	Start from the next point of interrupted point
2	press“EMERGENCY” key	D	Start from the next point of interrupted point
3	press“ORG” key	E	Start from the next point of interrupted point
4	press“PAUSE” key	A, B, A-L	Start from the next point of interrupted point
5	“Lack fault” alarming*	A, B, A-L	Start from the next point of interrupted point
6	“Block fault” alarming*	E	Start from the next point of interrupted point
7	“Temp fault” alarming*	E	Start from the next point of interrupted point

**⚠ Caution:**


- If interrupt the processing by the Emergency Switch, it must pull out the Emergency Switch at first, and then press **ORG** button.
- The above “interrupt type” is effective in the processing mode, and at the teaching mode and debugging mode, the “interrupt type” with “\*” is ineffective.

4. By the action of robot after be interrupted, it can code the interrupted type, A/B/C/D/E/A-L, the definition are as following table.

Code of Interrupted Type	Moving State of Robot when Interrupting	Action of Stop Work after be Interrupted
A	during soldering of point	Finish the point soldering, and then stop at the end point(now stop at the safty height of the end point)
B	During moving of non-soldering point	Pause(stop slowing)
C	When pausing	Still keep on pause

□. Off-Line Operation Instruction

D	Any state	Execute the pause at first, and then stop
E	Any state	Execute the pause at first, and then reset
A-L	During soldeirng of line	Finish the line soldering, and then stop at the end point(now stop at the safty height of the end point)

 *Caution: If power outages during the operation, it cannot continue the interrupted work after troubleshooting.*

## IV. Off-line Operation Instruction

### 4.1 Off-Line Initialization

1. When system is turned on without connecting to the teaching pendant, the LCD will enter initialization interface automatically (Refer to Fig.4-1)

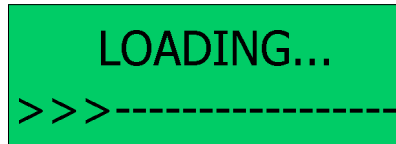


Fig. 4-1: Initialization Interface

2. After about 5s, the initialization finished, the system jumps into the file processing interface.

### 4.2 Off- Line File Processing Interface

1. After initialization, the system will enter the “Processing Interface”. This interface is frequently used when not connected to the teaching pendant. Jump into the other setting interface through the processing interface.
2. In the circulating processing interface, the LCD will display information as “already processed times /set processing times”.

All information showing at the LCD display are as followings:

Fig. 4-2: Processing Interface of non Loop-work

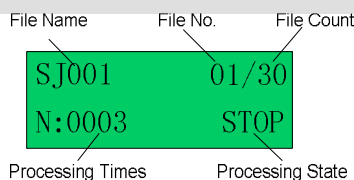
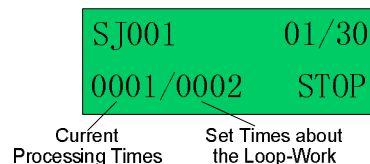


Fig. 4-3: Processing Interface of Loop-work



3. Enter the “Origin calibration Interface” by pressing the “**HOME**” button.
4. Enter the “Testing Interface” by pressing the “**ESC**” button.
5. Enter the “Loop-work Processing Work” by pressing the “**LOOP**” button.
6. In any submenu, it can return “File Processing Interface” by pressing the “**ESC**” button, but the set parameters will not be saved.
7. At the any one submenu, press the “**ENT**” button to save the setted parameters and then return “Processing Interface”.

#### 4.2.1 Select processing File

1. Select the processing file by the directionality buttons.
2. “**←X** \ **↑Y** \ **Z↑**” three buttons can be used to select previous file, and “**X→** \ **Y↓** \ **Z↓**” three buttons can be used to select next file.

#### 4.2.2 File Process

Press the “**START/PAUSE**” button to begin processing the selected file.

This button also can used to pause a file processing and then continue a file processing.

### 4.2.3 Stop the File Processing

It can press “**START/PAUSE**” button or Emergency Switch to pause the processing file.

**START/PAUSE**: only pause file processing, and the file state changes from “WORK” to “PAUSE”. If press this button again, the system will continue the paused processing file, and the file state changes to “WORK”.

**Emergency Switch**: stop file processing and cut off the power supply of the driver at once after pressing emergency switch, the LCD displays “**EMERGENCY STOP PLEASE RESET**”.

Turn the emergency switch clockwise along the arrows to reset it. And then press the “RESET” button to make the iron tip returning zero. After that, it can run the emergency switch again.

### 4.2.4 File Processing Count& State

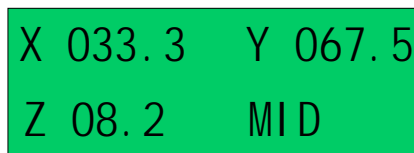
1. At the lower left corner of processing interface, display the processing times. Press “**SHF**” button can clear the digit to 0.
2. At the lower right corner of processing interface, display the file processing state. The processing state is changing with the processing course. The file processing state is as following table.

**Table 4-1: File Processing State**

Work State	Remark
RESET	The system is resetting.
STOP	The process has been stopped.
WORK	In the processing.
PAUSE	The process has been paused.
WAIT	Waiting time for hanging a work-piece during the loop-work process.

### 4.3 Off-Line Origin Calibration Interface

1. During the file processing, it can calibrate the deviation between the processing file and the real route by the origin calibration.
2. At the file processing interface, press “**ORG**” button into the origin calibration interface.



**Fig. 4-4: Origin Calibration Interface**

X/Y/Z/R displays the tip’s current position.

“MID” means the current processing speed is middle.

3. **Orientation**: the tip will move to the origin automatically when coming into the origin calibration interface.

#### 4. Adjusting the tip’s position:

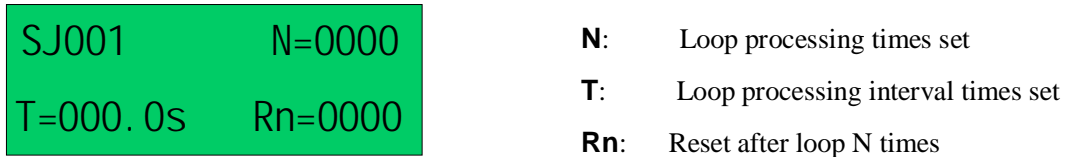
After orientation, press the arrow buttons “ / / / / / / / ” to adjust the tip’s position.

5. **Adjust the point’s speed**: click the “**SHF**” button to change the point speed, MID – LOW – HI.

6. **Calibration:** after calibration, press “**ENT**” button to save the origin change and then return to file processing interface. If press “**CAL**” button, it will not save the calibration result, and directly return to file processing interface.

## 4.4 Off-Line Loop-work Parameter Setting Interface

1. By the loop-work parameters setting, the unit can start the process without people at the locale.
2. Press the “**LOOP**” button at the processing interface and then into the “loop-work parameter setting interface”.



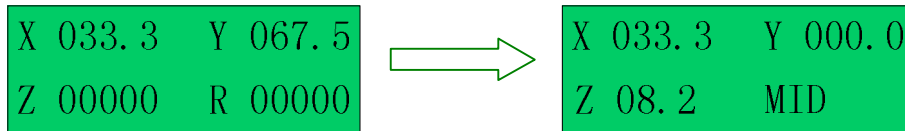
**Fig.4-5: Loop-work Parameter Setting Interface**

3. When setting, select digit by moving the cursor under the digit. Arrow buttons “**←**” & “**→**” can move the cursor left and right, Arrow buttons “**↑**” & “**↓**” can move the cursor up and down.
4. After finishing adjust, press “**ENT**” button to save the parameters and return to file processing interface. When the “N=0000” or “N=0001”, without loop work processing and the file only processes one time.

## 4.5 Off-line Testing Interface

Press the **ESC** button into the testing interface. In the testing interface, it can test the common system functions whether are in right running or not.

The operating interface is as following:



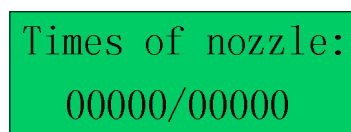
**Fig. 4-6 Testing Interface**

## 4.6 Times of Nozzle Interface

At testing interface, click the **ESC** button again, namely click the **ESC** button twice at “Processing Interface”, it comes into the “times of nozzle” interface (Fig.4-7).

At “times of nozzle” interface, displays the times of nozzle has been used and maximal limit times. The interface only can be viewed and cannot be set. Setting methods need refer “teaching pendant”.

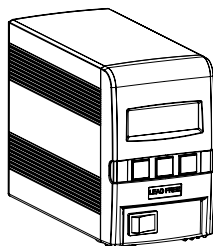
“\*\*\*\*\*/\*\*\*\*\*”: The front digits mean the used times, the latter digits mean the maximal limit times. When used times have been up to the maximal limit times, the system will alarm and hint change the nozzle. If the latter digit is “00000”, it means that it doesn’t limit the using times of nozzle.



**Fig. 4-7 Times of Nozzle Interface**

## □. Operation and Set of Heating Controller

### 5.1 Specification of Heating Controller



<b>Heating Controller</b>	Voltage		100~240VAC		
	Temperature range		80□~480□		
	Powre		90W	150W	
	Handle type		9015	9016 or 9018	
	Heating mode	Not alarm	0, 1		
Alarm		0, 1			

*Note: Solder tip 911 series fits with handle 9016, and 911G series fits with handle 9018.*

### 5.2 Operation of the Heating Controller

The heating controller is fastened at the main unit, and it can adjust the temperature of the iron tip.

**⚠CAUTION:** *The iron tip is very hot after heating. Don't touch the iron tip and near its metallic parts for protecting user from hurt.*

#### 5.2.1 Connection of the Heating Controller

1. Connect the six-cord plug to the socket on the heating controller.
2. Connect the power supply cord.
3. Turn on the power switch of the heating controller.
4. Set the suitable working temperature (it can refer to the "5.2.2").
5. After the temperature is stable, it can begin the soldering process.

#### 5.2.2 Setting Temperature

**Raise Temperature:** Click "△" button, the temperature will rise 1 °C, the screen will display the current setting temperature. If press the "△" button for at least 1s, the setting temperature will rise rapidly. Loose the "△" button when the value is up to the required temperature.

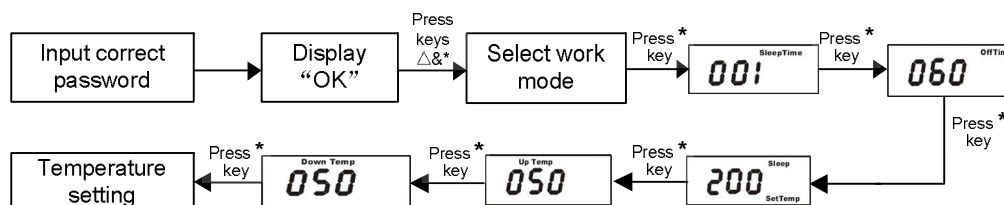
**Reduce Temperature:** Click "▽" button and then the temperature will drop 1 °C, and the screen will display the current setting temperature. If pressing "▽" button not loosely at least 1s, the setting temperature will drop rapidly. Loose the "▽" button when the value is down to the required temperature.

**NOTE:**

- *Make sure the temperature of the controller can be adjusted (inputting password is correct or the password is initial 000).*
- *Do not turn off the power supply when setting the temperature, or else the setting value will not be memorized.*

### 5.2.3 Parameters Setting of Heating Controller

The initial password is 000 and it can set the temperature after turn on the power supply at this state. If user needs to limit the setting temperature, it can change the password and then those being authorized can set the parameters.



#### 5.2.3.1 Setting Password

##### 1. Enter into the password setting

Turn off the power supply. press and hold “△” and “▽” keys simultaneously and then press the power switch until the display shows . It means in the password setting status.

##### 2. Enter the initial password

Press “\*” key after the window shows , and then the window shows . In the status, input the initial password by pressing “△” and “▽” keys. Press “\*” key after inputting the right password, and then the window shows the information the password is right or not.

###### (1) If the inputting password is error:

The soldering station will jump over the password setting process into the normal working process after the display shows the setting password about four seconds. But the temperature cannot be changed in normal working process because of inputting the error password.

###### (2) If the inputting password is correct:

If the window shows , this means the inputting password is correct. After displaying about four seconds, the station will come into the normal work process, and the temperature setting will be allowed.

##### 3. Input the new password

**Note: the next inputting password must be same with the last inputting password and then the new password will be recorded in the soldering station and change the password successfully.**  
(Operation as follows)

###### (1) Input the new password:

When inputting the correct initial password, the window shows and then press “\*” and “▽” keys simultaneously in about four seconds then showing . It is in the new password setting process. Press “\*” key and the window shows . After that, press “△” or “▽” key to input the new password.

###### (2) Repeat the new password:


After inputting the new password and then press “\*” key, the window displays . Now it must input the new password again. Press “\*” key, the window displays . After that, press “△” or “▽” key to input the new password.

###### (3) If the next inputting password is same with the last inputting password:


Press “\*” key and then the new password will be recorded in the soldering station and change the password successfully.

## V. Operation and Set of Heating Controller

### (4) If the next inputting password is not same with the last time:

Press “\*” key to displays  and then input the new password again until the lately two passwords are identical.

### 5.2.3.2 Mode Setting

When inputting the correct password and the displays , press “△” and “\*” keys simultaneously into the mode setting. And the window displays the current setting value. Change the type of the modes by pressing “△” and “▽” keys. The changing series as following:




Working mode table

Working mode	Temperature range	Alarming Type	Remark
0	80°C~480°C	NO	((O)) It is a alarming mark.
1			
2			
3			
((O)) 0	80°C~480°C	YES	
((O)) 1			
((O)) 2			
((O)) 3			


### 5.2.3.3 Sleep Time Setting

**When not operating the controller during a certain period of time (the setting sleep-time), the power supply will be cut off and the controller will come into the sleep state.**

- Select the needing mode and then press “\*” key to the process of setting “sleep time”. The window displays  and then press “△” or “▽” key to change the sleeping time. The range of sleeping time is from 0 minute to 250 minutes.
- After finishing setting the sleeping time, press “\*” key to the process of setting the off time.
- To resume soldering, there are three ways as follows:
  - \* Turn the power switch off and then turn on.
  - \* Press “\*”, “△” or “▽”.

### 5.2.3.4 Off -Time Setting

**If the station isn’t resumed during the sleeping time, the power supply will be shut off automatically, and the station will stop working. Turn on the power switch to resume working.**

- At the “off time ” status, the window displays  and then press “△” or “▽” key to change the off time. **The off time should be longer than the sleep time.**
- The range of sleeping time is from 0 minute to 250 minutes.



### 5.2.3.5 Sleeping Temperature Setting

1. In the process of setting “sleeping temperature”, the window displays “sleep” and “set temp”. And then press “△” or “▽” key to change the sleeping temperature.



Sleeping temperature setting

2. The range of the sleeping temperature is from 50°C to 250°C.

### 5.2.3.6 UP Temperature Setting

1. In the up temp setting, the window displays “Up Temp” and press “△” or “▽” key to change the temperature setting. Once the real temperature (Real Temp) to the setting temperature (set temp) is bigger than the up temp, the controller will alarm when in the alarming mode.
2. The range of the “up temp” setting is from 0°C to 99°C.



Up Temp setting

### 5.2.3.7 Down Temperature Setting

1. In the down temp setting, the window displays “Down Temp” and press “△” or “▽” key to change the temperature setting. Once the real temperature (Real Temp) to the setting temperature (set temp) is bigger than the Down Temp, the controller will alarm when in the alarming mode.
2. The range of the “Down Temp” is from 0°C to 99°C.



Down Temp setting

### 5.2.4 Temperature Calibration

1. The soldering iron should be recalibrated after replacing the iron, the heating element or the tip.
2. This controller adopts digital calibration mode and the revision value is input by pressing key, make the adjustment simply and quickly.
3. Method of recalibrating the temperature: Use the thermometer and it is precise comparatively.
  - (1) Set the temperature of the controller to a certain value.
  - (2) When the temperature stabilizes, measure the tip's temperature with thermometer and write down the values.
  - (3) Press “\*” key unloosely and then press the “△” and “▽” keys simultaneously, it enters the calibrating temperature mode and LCD displays “Cal Temp”
  - (4) Press “△” or “▽” key to record the temperature tested by the thermometer to the controller when the number is not flash. After that, press “\*” key and the process of calibrating the temperature is end.

## V. Operation and Set of Heating Controller

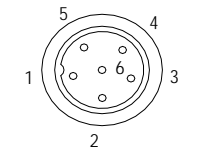
(5) If the temperature still has some departure, you can repeat calibration in according with the above steps.

### NOTE:

- Suggest using the 191 or 192 thermometer to measure the tip's temperature.
- If the temperature setting is locked by the password, it will not be able to calibrate the tip temperature and you must input the correct password.

### 5.2.5 Check the Heating Element

1. Pull out the plug and measure the resistance value between the pins of the connecting plug when the heating element cooling down to the room temperature.
  - (1) If the values of 'a' and 'b' are different from the values in the following table, replace the heating element or sensor or cord assembly. Refer to the following steps.
  - (2) If the value of 'c' is over the below value, remove lightly the oxidation in the joint part of the tip and the heat element with sandpaper or steel wool.

a	Between pins 4&5 (Heating Element)	<4 $\Omega$ (Normal)	
b	Between pins 1&2 (Sensor)	<10 $\Omega$ (Normal)	
c	Between pins 3& Tip	Under 2 $\Omega$	

Note: the pin1 is “-”, and pin2 is “+”.

2. After changing the heating element, do the following test.
  - (1) Measure the resistance values between pin 4 and pin1 or pin4 and pin2, between pin5 and pin 1 or pin 2, between pins 3 and pin 1 or pin 2, between pin 3 and pin 4 or pin 5. If they are not  $\infty$ , the heating element and sensor are touched. This will damage the PCB.
  - (2) Measure the resistance value 'a', 'b' and 'c' (refer to the above form) to confirm that the leads are not twisted and that the grounding wire is properly connected.

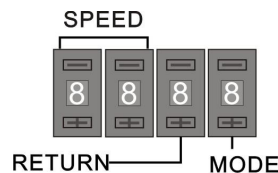
## VI. Operation and set of Self-feeder Controller

### 6.1 Specification of self-feeder controller

Feeding Controller	Item	Feeding (device)	Cutting (device)
	Feeding speed	1~50mm/s	
	Return length	0~4.5mm	
	Solder wire monitor mode	0~9	
	Solder wire monitor device	Option *	
	Solder wire	0.3~1.6 (mm)	0.5~1.6 (mm)

**NOTE:** The feeding device and the cutting device can be selected when order.

### 6.2 Parameter Setting of Self-feeder Controller



Press “+” button on the digit switch, and the match digit will increase one. Similarly, press “-” button, and the match digit will decrease one.

#### 1. SPEED --- feeding speed setting

Feeding speed is designed with two digits. Press the Feeding Speed Switch “SPEED” to choose suitable digit. When the digit is set at 00, the speed is slowest about 1mm/s. When setting at 49, the speed is fastest about 50mm/s. The speed of 50~99 is same with the 49 level, about 50mm/s.

#### 2. RETURN --- returning length setting

Return length is designed with one digit. Press the Returning Length Setting Switch “RETURN” to choose suitable digit. The setting digit is 0~9, denotes the returning length is about 0~4.5mm. If set as 0, it will not return automatically.

$$\text{Return Length} = 0.5\text{mm} \times (\text{setting digit})$$

#### 3. MODE --- monitor mode of solder wire

- (1) Mode is designed with one digit. Press the “MODE” to choose suitable digit. The setting digit is 0~9, which means as following table.
- (2) Solder wire monitor device is optional. And it is used to monitor the solder-wire feeding is normal or not. When it cannot monitor the solder-wire, it will alarm. *Only intalled “Solder wire monitor device”, the mode can be effective.*

\* **NOTE:**

**Work light:** is the red indicating light on the power switch of feeding device.

**Alarm light:** is the indicating light on the solder wire monitor device.

**Table of solder-wire monitor mode**

0	In this mode, it doesn't do the solder wire check.
1	When the solder wire feeding is abnormal, the "ALARM" light is blight. One time abnormal feeding is checked, it outputs alarming signal at once (pin 5 of 7-pin socket). Work light flickers.
2	When the solder wire feeding is abnormal, the "ALARM" light is blight. Abnormal feeding is checked successively 2 times, it outputs alarming signal at once (pin 5th of 7-pin socket). Work light flickers.
3	When the solder wire feeding is abnormal, the "ALARM" light is blight. Abnormal feeding is checked successively 3 times, it outputs alarming signal at once (pin 5th of 7-pin socket). Work light flickers.
4	When the solder wire feeding is abnormal, the "ALARM" light is blight. Abnormal feeding is checked successively 4 times, it outputs alarming signal at once (pin 5th of 7-pin socket). Work light flickers.
5	When the solder wire feeding is abnormal, the "ALARM" light is blight. Abnormal feeding is checked successively 5 times, it outputs alarming signal at once (pin 5th of 7-pin socket). Work light flickers.
6	When the solder wire feeding is abnormal, the "ALARM" light is blight. Abnormal feeding is checked successively 6 times, it outputs alarming signal at once (pin 5th of 7-pin socket). Work light flickers.
7	When the solder wire feeding is abnormal, the "ALARM" light is blight. Abnormal feeding is checked successively 7 times, it outputs alarming signal at once (pin 5th of 7-pin socket). Work light flickers.
8	When the solder wire feeding is abnormal, the "ALARM" light is blight. Abnormal feeding is checked successively 8 times, it outputs alarming signal at once (pin 5th of 7-pin socket). Work light flickers.
9	When the solder wire feeding is abnormal, the "ALARM" light is blight. Abnormal feeding is checked successively 9 times, it outputs alarming signal at once (pin 5th of 7-pin socket). Work light flickers.

#### 4. Solder wire alarm instruction

When the mode is not 0, and the solder wire does't touch the iron tip, here, the alarm light is on (*only with solder wire monitor device*).

When feeding continually, and the time of solder wire touching the iron tip is up to the setting digit (mode), the work light flickers and output the alarm signal.

In 5s after power on the unit, the statue of WORK indicating light means the current working state. The instruction of WORK indicating light can refer following.

	Indicating time	WORK Indicating light	The status of the Indicating light
<b>5s Instruction of WORK Indicating Light after Switch On</b>	2s (first)	Bright 2s	the work mode is "solder feeding"
		Flicker 5 times	the work mode is "solder cutting"
	1s (middle)	not blight	
	2s (last)	Bright 2s	the work mode is controlled by the inside signal (namely, controlled by the parameters setting with digit
		Flicker 5 times	the work mode is controlled by the outside signal (namely, controller by the outside parameters)

#### 5. Feeding pressure adjusting (only feeding device)

The solder wire isn't sent out automatically because of inadequate feeding pressure. At the time, you can adjust the Pressure Adjusting Screw on top of unit to increase feeding pressure clockwise. If the solder wire is twisted because of too strong feeding pressure, you can adjust it anticlockwise.

⚠ **CAUTION:** *don't tighten the pressure adjusting screw for protecting its flexibility from damage.*

## 6.3 Feeding Operation

Do the operation as the feeding mode.

### 6.3.1 Work Mode

1. Turn on the power switch of “FEEDER”, set the parameters of feeding, return etc. The setting methods can refer “Feeding Parameter Setting”.
2. During work, press the “START” or “PAUSE” key to run the soldering flow. It will work as the setting parameters.

### 6.3.2 Testing Mode

**NOTE:** *During testing mode, the feeding length, return length and feeding speed are not controlled by the parameters.*

*Testing mode is suitable to testing function: installing the solder wire and other situation needs make the solder wire feeding or return.*

1. Turn on the power switch.
2. **Return:** press the “Return” button once and solder wire will return one time. During return, the work light is light.
3. **Feeder:** click the “Feeder” button once and then loosen it, the solder wire will feeder one time. If press the button not loosely, it will feeder continually. During the feeding, the work light is light.

## 6.3.3 Operation of Solder Feeder Controller

### 6.3.3.1 Working Mode

1. Open the power switch of the main unit.
2. Set the parameters of the solder feeder controller. After starting the process, the main unit will come to work as the parameters. And this mode is suitable to the process.

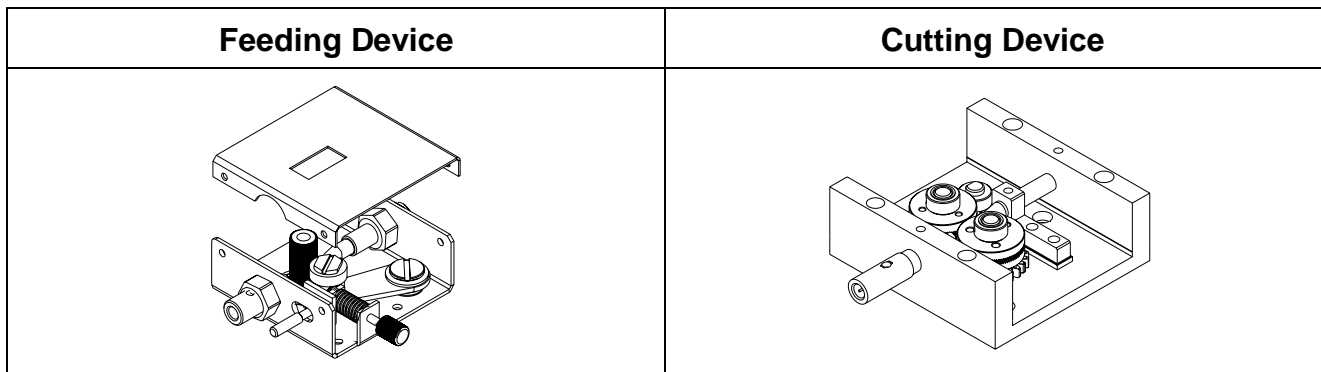
### 6.3.3.2 Testing Mode

**NOTE:** *At this mode, the solder wire length of feeding & return and feeding speed are not controlled by the set parameters.*

1. Open the power switch of the main unit.
2. **Return:** press the “Return” button once and solder wire will return one time. During the return, the indicating light is light.
3. **Feeder:** click the “Feeder” button once and then loosen it, the solder wire will feeder one time. If press the button not loosely, it will feeder continually. During the feeding, the indicating light is light.
4. This mode is suitable to testing function, installing the solder wire and other situation needs make the solder wire feeding or return.

## 6.4 Replace Parts of Feeding & Cutting

### 6.4.1 Select Feeding or Cutting Device



**Feeding Device:** The device is with function of feeding the solder wire automatically. The pressure adjusting screw at the rightside of the device can be used to adjust the feeding pressure.

**Cutting Device:** The device is with function of cutting the solder wire, and also can do feeding automatically.

### 6.4.2 Replace the Blade (option, only in cutting device)

Solder straighten nozzle (02), cutting blade (06) and auxiliary driven gear (10), the three parts must be coincident with the solder wire. Usually, it needs to change the cutting blade. So select suitable cutting blade before replacing the different specification solder wire. Refer to the following steps to disassemble and assemble the parts.

**1. Remove the feeding tube assembly backwards, until it cannot touch the cutting blade (06) and auxiliary driven gear (10).**

Take down the acryl board (12). Loosen the screw (15), and then remove out the feeding tube assembly. After that, loosen the locking screw fixing the feeding position tube with 1.5mm internal-hexagonal spanner. Remove backwards the position tube of feeding (16) until it cannot touch the cutting blade (06) and auxiliary driven gear (10).

**2. Take down the locking cap (07).**

Loosen and remove the fixing screws (08) at the locking cap, and then, remove the locking cap (07).

**3. Take down the drive gear (04) component and auxiliary driven gear (10) component.**

The drive gear (04) component and auxiliary driven gear (10) component must be taken down at the same time. Take the drive gear (04) and driven gear (10) and then move them out towards the axis. It can change a new driven gear (10) as required.

**4. Replace the cutting blade (06).**

The cutting blade (06) is in the assembly of driven gear. Loosen the three inner-hexagon fixing screws (04) at the driven gear with a spanner. Take down the locking cap (07), fixing plate (09) and cutting blade (06) in turn. Then change and install the suitable blade.

**5. Replace the auxiliary driven gear (10) component.**

## □. Operation and Set of Self-feeder Controller

Auxiliary Driven gears (10) are in the auxiliary driven gear component. The two driven gear components must be taken down at the same time. Hold the two gear components simultaneously and move them out along the axis. After that, loosen the fixing screws at the driven gear component and then take down the fixing plate (09) and driven gear (10) in turn.

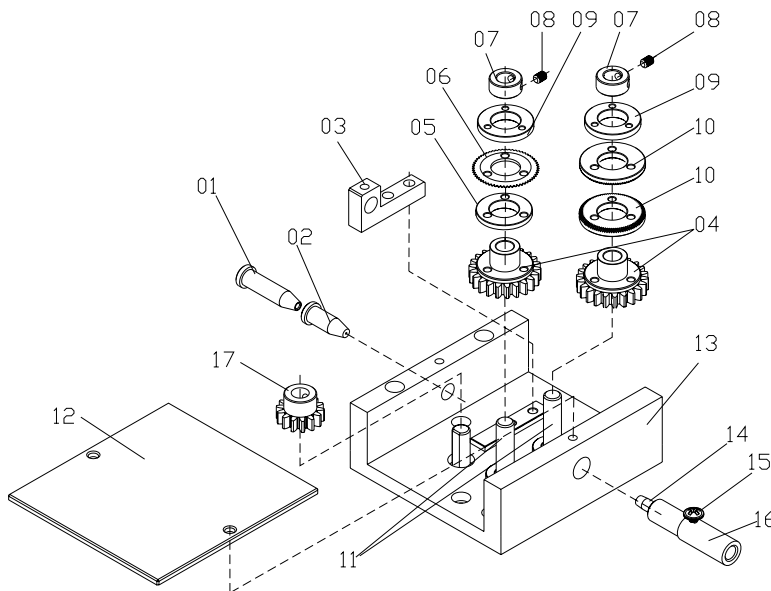
### 6. Assemble the drive gear (04) component and auxiliary driven gear (10) component.

Assemble it in the reserve order of the disassembly.

### 7. Install the assembly of the drive gear (04) and the auxiliary driven gear (10).

Mount them on the axis (11) simultaneously. Aim the blade in driven gear assembly at the notch of the auxiliary driven gear (10), and then mount them on the axis (11) smoothly and levelly. Place the locking caps (07) on the driven gear (04) and the **auxiliary** driven gear (10), after that, screw the locking screws (08) to fasten the locking cap.

### 8. Install the Feeder Tube Assembly.



NO.	Name	QTY.
17	drive gear	1
16	position tube of feeding	1
15	M3 <sub>1</sub> A screw	1
14	feeding tube	1
13	feeder supporting plate	1
12	acryl board	1
11	axis	2
10	auxiliary driven gear *	2
09	fixing plate	1
08	M3 <sub>1</sub> A locking screw	5
07	locking cap	2
06	blade *	
	90 jaggies	1
	60 jaggies	1
	40 jaggies	1
05	blade supporting wheel	1
04	driven gear	2
03	feeding holder	1
02	solder straighten nozzle *	1
01	feeding nozzle	1
NO.	Name	QTY.

Note: the parts with \*, use according to the diameter of the solder wire.

## □. Trouble Shooting

### 1. The System cannot Reset after Booting.

#### **Emergency switch error**

- Check the Emergency switch is pressed by mistake.

### 2. Z-axis or X and Y axes cannot Position Accurately in Processing

#### **1) Loss of steps will cause inaccurate positioning phenomenon.**

Overload, excessive speed or acceleration, insufficient power supply, or mismatched motor drive would lead to the loss of steps. Please check the overload and the parameters setting.

If the inaccurate positioning phenomenon disappears or remits after reducing the speed or acceleration, we can make sure the phenomenon is caused by the motor loss of steps.

If inaccurate positioning phenomenon is very obvious for one axis, please reduce the acceleration of the axis.

#### **2) Error operation will cause inaccurate positioning phenomenon.**

Don't reset when the work done

Make the system reset automatically after each accumulated processing error has been eliminated



