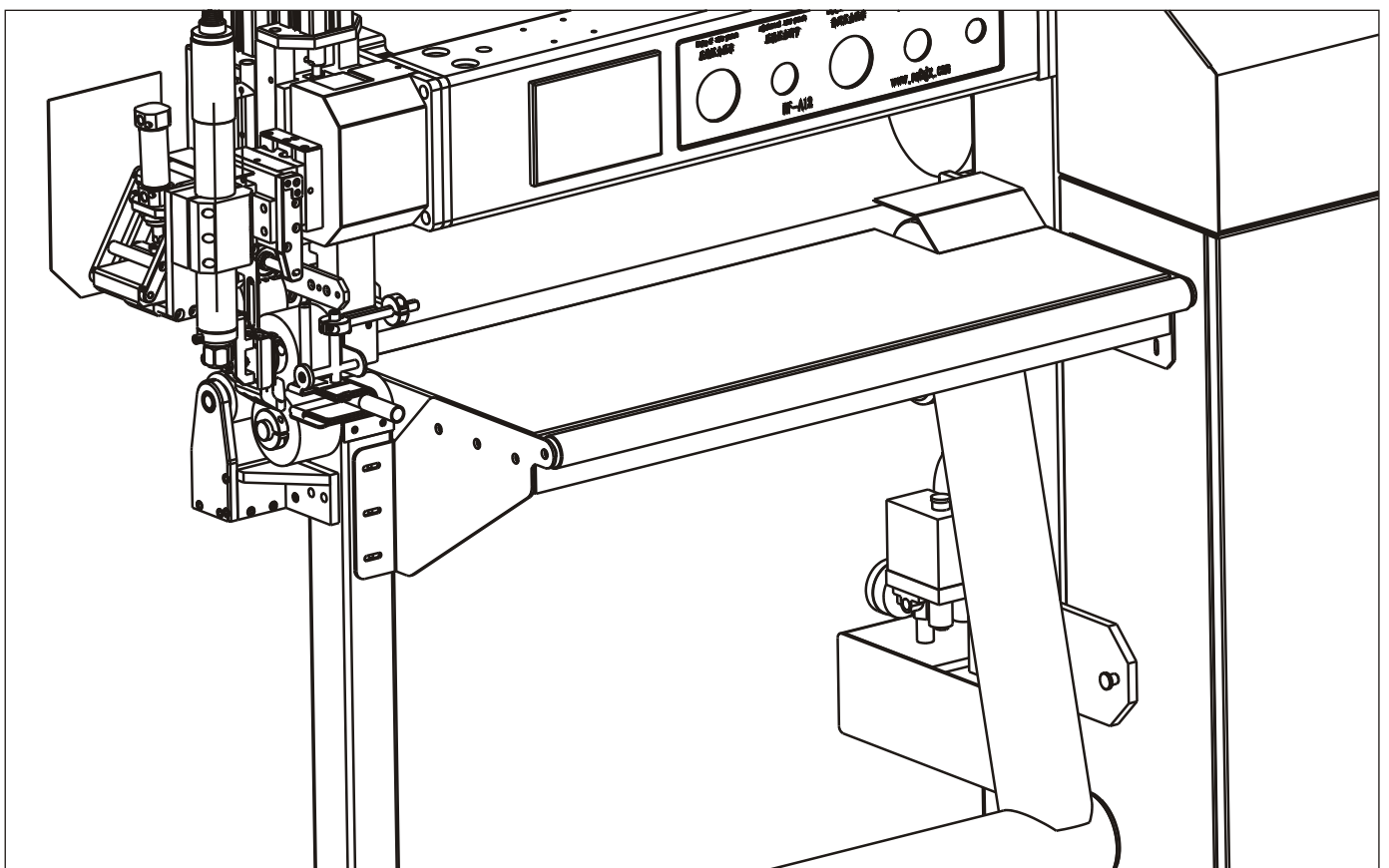


Multi-function Welding Machine

(computer type)

OPERATION MANUAL



Brief introduction

The multi-function welding machine is designed and developed program-controlled double-heating module seam sealing machine by our company. It has the function of hot air welding and hot block welding.

Multi-function welding machine applies the microcomputer technology, digital setting and parameter adjustment by PLC-controlled program, to provide the advantages of easy operation, easy maintenance and better performance and reliability.

Multi function welding machine provides extra-large operation space, which is widely applied to PVC, PU, waterproof and leakproof clothing of rubber fabric or rubber products (for example, tent, screen, waterproof bag, car cover, ship cover, waterproof zipper, military waterproof cover, etc.) and is suitable for the factory manufacturing waterproof protection device of large equipment.

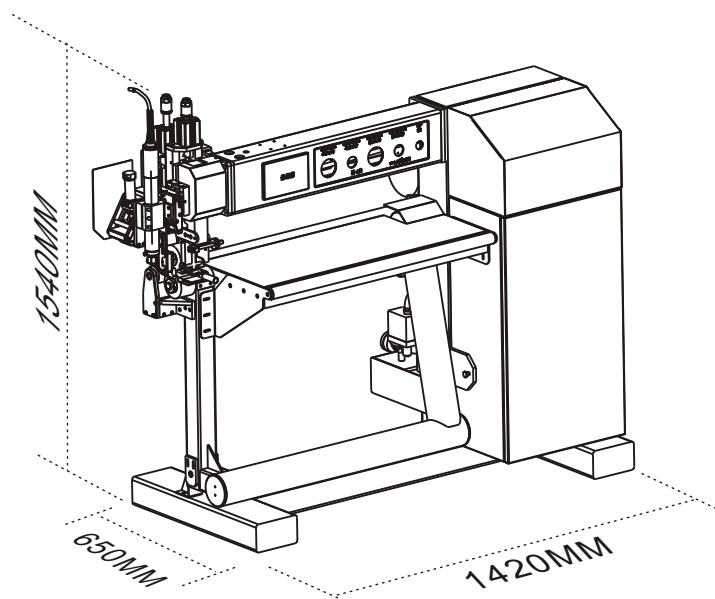


Note: before using this machine, please read the instructions carefully so as not to cause unnecessary injury.

一. Product appearance & Structure



1. Air cylinder of upper support	12. Headlamp
2. Hot air gun	13. Pressure regulating valve of pinch wheel
3. 3D module assembly	14. Pressure regulating valve of hot air
4. Hot air gun grip	15. Power switch
5. Hot air gun cover	16. Tool box
6. Module support	17. Pressure digital gauge of hot air
7. Silica gel wheel	18. Pressure digital gauge of pinch wheel
8. Swinging arm assembly of lower support	19. Electric box
9. Frame welding assembly	20. Support of swinging arm assembly
10. Pedal electric box	21. Touch screen
11. Tape plate support	



二. Principle, characteristic and performance parameters

2. 1 Principle

It warms fabric through hot air from hot air pipe(block) to melt the coating between fabrics, and press fabrics by continuous running of roller to achieve the aim and effect of sealing.

2. 2 Characteristic

- 2. 2. 1 It has extra-large heat-sealing space, suitable for processing of middle, large, extra-large tent, car cover, rubber yacht, open screen, hot gas ship, etc.
- 2. 2. 2 Automatic temperature control and high stability with $\pm 2^{\circ}\text{C}$ temperature fluctuation. Upper temperature limit alarm to protect the heating coil.
- 2. 2. 3 PLC automatic control and the program could be changed any time according to the request of user.
- 2. 2. 4 The machine is made of high quality steel. It's designed to be strong and durable. Main components are the imported electric components with high reliability.
- 2. 2. 5 Upper and lower roller realized independent transmission of motor. Setted upper/lower speed difference function can prevent shrinkage and wrinkle of elastic fabric.
- 2. 2. 6 The double pedal control program is designed according to human mechanics, which is suitable for long term operation, as it makes the operation easy and comfortable and makes operators not easy to be tired.
- 2. 2. 7 The unique structure of heating tube makes filtration of inlet air to be free of water and oil.
- 2. 2. 8 Super strong torque dynamic design .

2. 3 Performance parameters

- 2. 3. 1 Power (max) :3000W , Rated voltage :AC~220V, Rated frequency: 50/60Hz
- 2. 3. 2 Hot air temperature(max) : 700°C , Hot block temperature(max) : 450°C .
- 2. 3. 3 Power of heating tube: 2500W.
- 2. 3. 4 Total pressure: 0. 35~0. 5
- 2. 3. 5 Pressure of upper column roller:0.01 ~0.5Mpa .
- 2. 3. 6 Operation speed :20m /min
- 2. 3. 7 Shape size :1540x730x1420mm
- 2. 3. 8 Roller width :15 /20 /30 /40 /50mm
- 2. 3. 9 Roller diameter :75mm
- 2. 3. 10 Width of hot air nozzle :10 /20 /30 /45mm
- 2. 3. 11 Noise :<80dB

三. Structure and function instruction

3. 1 Structure of mechanical components

It's made up of frame assembly, air gun assembly, slider assembly, swinging gun and adjusting assembly, upper column assembly, lower assembly and transmission assembly.

3. 2 Circuit control components

It consists of panel control, transmission component, program control component and heating component.

3. 3 Air control components

It consists of water filter, pressure regulating valve, solenoid valve, muffler, pressure gauge, flow restrictor, air cylinder, connector and air pipe.

3. 4 Function of mechanical components

- 3. 4. 1 Frame assembly: used to support components and electric box of machine.
- 3. 4. 2 Revolving arm assembly: used to fix lower roller and provide transmission.
- 3. 4. 3 Slider assembly: used for the up-down movement of upper column (upper roller) .

- 3. 4. 4 Swinging gun and regulating assembly: used to adjust and swing in/out the hot air gun.
- 3. 4. 5 Upper column assembly: used to control the transmission of upper column and press the heat sealing tape and clothing.
- 3. 4. 6 Lower column assembly: used to fix transmission component of lower roller and support fabric.
- 3. 4. 7 Transmission assembly: used for transmission of upper and lower roller.

3. 5 Function of circuit control components

3. 5. 1 Control panel and power switch

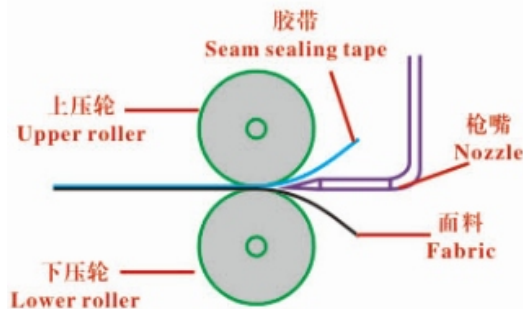
- A. Power switch: used to start and stop the power of the machine.
- B. The touch screen controls the program control of parameters setting and displays the parameters.

3. 5. 2 Function of transmission components

Upper and lower independent stepper motor: used to provide power supply to upper and lower roller through transmission system; it can independently regulate speed difference.

3. 5. 3 Function of heating components

- A. The heating component consists of inner heating tube and outer tube, transferring the heat from blower fan heating inner tube to heat sealing adhesive tape and clothing for adhesion as below picture.



3. 5. 4 Function of hot components

- A. PLC temperature controller: used to control the current of solid state relay heating tube to regulate the temperature range of heating tube.
- B. Voltage stabilizer (solid state relay) : used to control the current of heating tube to control the temperature of heating tube.

Notice: the control circuit applies the most advanced voltage stabilizer (solid state relay) to prevent damage of inner heating tube caused by instable voltage during operation and improve the lifetime and temperature accuracy of inner heating tube.

- C. Temperature sensing wire: used to transfer the temperature signal of heating tube to the temperature controller to control the operation of voltage stabilizing and regulating module (solid state relay).
- D. Nozzle regulating valve: used to regulate air pressure of nozzle. (The pressure of the nozzle can not be less than 0.05MPA, otherwise it will burn the heating tube easily)

3. 6 Function of air control components

- A. Water filter, atomized lubricator and total pressure regulating valve are usually connected together (referred to as atomized lubricator assembly); its main function is filter the water in the air, feed suitable lubricant to the air circuit and regulate the total air pressure.
- B. Pressure regulating valve: used to regulate the pressure of upper pinch wheel. Pull the handle up and move the handle to the left or right direction. Increase by moving clockwise and decrease by moving anticlockwise.
- C. Solenoid valve: used to control the movement of all air cylinders.
- D. Muffler: used for air exhaust of electromagnetism and muffling.

- E. Pressure gauge: (on the control panel)
 - a. The total pressure gauge is used to display the total air pressure value.
 - b. The pressure gauge of upper pinch wheel is used to display the pressure value of upper pinch wheel.
 - c. Nozzle pressure gauge: used to display the pressure value of nozzle.
- F. Flow restrictor: used to regulate the movement speed of air cylinder.
 - a. The flow restrictor of upper column air cylinder is used to regulate the speed, stability and smoothness of upper column lifting.
 - b. The flow restrictor of swinging gun air cylinder is used to regulate the speed, stability and smoothness of swinging gun.
- G. Air cylinder: upper column air cylinder, swinging gun air cylinder and scissor air cylinder.
 - a. The upper column air cylinder is used to control the lifting of upper column (upper pinch wheel).
 - b. The swinging gun air cylinder is used to control the swinging in-out of heating gun (outer heating tube).
- H. The air pipe and quick connectors are used to connect the pneumatic control assemblies.

3.7 Function of other switches

- A. Anticreeper air switch: used to protect the main power of the machine.
- B. Left pedal switch: control the lift of upper column pinch wheel; stepping down is to control the lowering of upper column pinch wheel and loosening the pedal is to raise the wheel.
- C. Right pedal switch: control the swinging in of heating gun and start the pinch wheel.

Note 1: If the left pedal is not stepped down and just stepping down the right pedal, only the pinch wheel will move and the heating gun will not be swung in. This function could feed the tape.



四. Operation guide -----

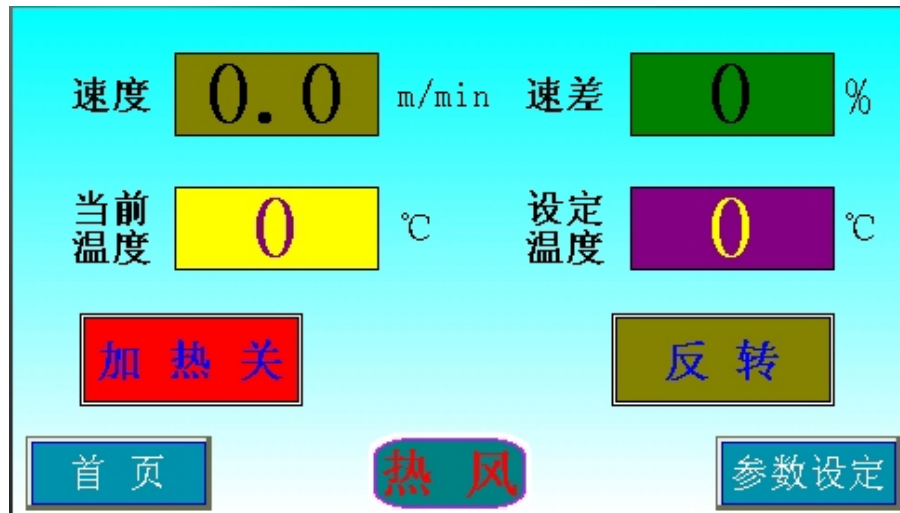
4. 1 Operation preparation

- 4. 1. 1 Open the air compressor, then open the air passage which connects to hot air seam sealing machine to inspect the total air pressure of hot air seam sealing machine is should be setted at 3–3.5kg/m² when the gauge of the barometer is raised to more than 0.35Mpa.
- 4. 1. 2 Before heating the machine, it is necessary to inspect that whether flammable explosives exist in the surrounding environment.
- 4. 1. 3 During heating the air hot gun, clothing, human body or other non operating items can not touch the heating tube of air hot gun, so as not to burn or scald.
- 4. 1. 4 It is necessary to wear protective gloves (A half - finger glove) for workers so as not to scald hands when heating or adhering fabrics.

4. 2 Start up program

- 4. 2. 1 Start the main power switch of electric box and the power switch in front of electronic box (Touch screen will connect to the power supply, and it is programmable)
- 4. 2. 2 Operating procedures of programmer parameters setting
 - 1. Automatic programmer controller and screen is applied to the machine. Various functions can be setted, so long as you press every key
 - 2. Turn on the power switch, the chinese/ english language can be choiced by users.

Main operation menu



1. Speed: m/min. Speed value of upper/lower roller, forward speed and its value: touch the key of speed value to input speed value, the regulating range is 1-20m/min.
2. Differential speed: used to adjust the differential speed rate of upper/lower roller, so as to synchroize or differ the speed of upper/lower roller and the upper roller speed is basis. For example, upper/lower roller is synchronal when differential speed rate is 100%. The speed of lower roller will be faster when the rate is above 100% and it will be slower when the rate is below 100%. (Lower roller will be slow when the rate arrives 95% and it will be fast when the rate arrives 105%).

Notice: Factory standard value is 100%. This function is suitable for the process of fabric corner and elastic fabric's differential speed.

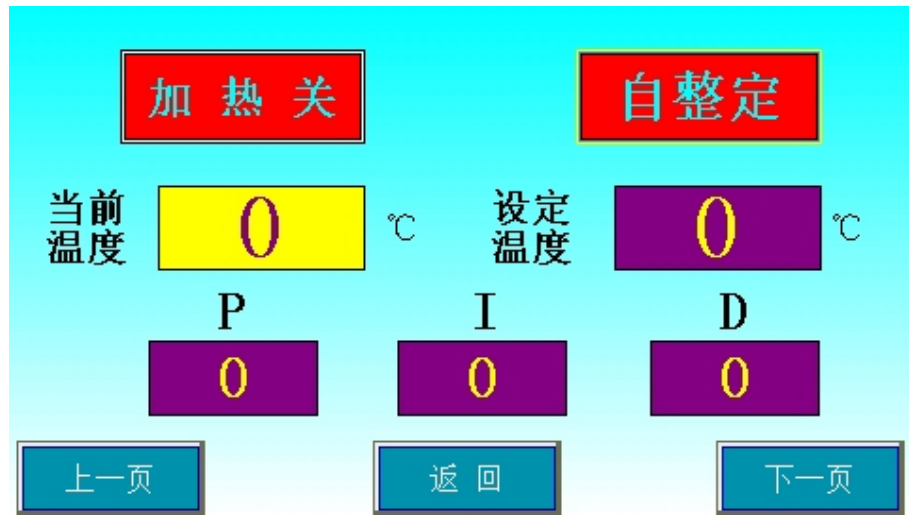
3. Heating key: Press the "heating key", the heating tube would automatically start to hot and the green light displays "heating on". Press the "heating key" one more time, the heating tube would stop heating and the red light displays "heating off".
4. Reversal key: Press the key of "reveral key" and the roller starts into reverse.
5. Current temperature: Display the temperature value of heating gun nozzle.
6. Setting temperature: Used to adjust hot air temperature.
7. Parameter setting: Press the setting key into parameter regulating menu to set the date. Password box options will be displayed in the menu. Input the password "2222" and press the enter key into parameter regulating menu. If inputed wrong password, you can't enter into the parameter regulating menu and should reenter the password.



Item	Factory parameters
transverse in-gun delay	0.45/s
transverse out-gun delay	0.02/s
portrait in-gun delay	0.10/s
backlashing delay	0.10/s
positive revolve speed	**m/min
reversal speed	5m/min
backlashing speed	4m/min
shutdown delay	5m/min

1. Transverse in-gun delay: Regulate the synchronous working of heating gun and pinch wheel and functional description. Press transverse in-gun delay to enter the required time with unit of 0.01 second and press Enter key. In order to match the swinging in of heating gun and starting of pinch wheel for the synchronous starting of heating gun and pinch wheel; if the swinging-in of heating gun causes the breakage of seam and tape, decrease the number; if the blank occurs on the clothing, increase the number; the regulation range of number is 0.01-1.0second.
2. Transverse out-gun delay: Regulate the synchronous stopping of heating gun and pinch wheel and functional description. Press the option of transverse out-gun delay to enter the required time with unit of 0.01 second and press Enter key. Function: The stopping delay of idle wheel is to match the synchronous swing-out of heating gun and stopping of pinch wheel, so that when the heating gun swings out of tape wheel, the pinch wheel will stop immediately; if the breakage of seam and tape occurs during operation, increase the number; if the blank occurs, decrease the number; the regulation range is 0.01-1.0second.
3. Portrait in-gun delay: Regulate the synchronous working of heating gun and pinch wheel and functional description. Press the option of Portrait in-gun delay to enter the required time with unit of 0.01 second and press Enter key. In order to match the swinging in of heating gun and starting of pinch wheel for the synchronous starting of heating gun and pinch wheel; if the swinging-in of heating gun causes the breakage of seam and tape, decrease the number; if the blank occurs on the clothing, increase the number; the regulation range of number is 0.01-1.0second.
4. Backlashing delay: Function: to prevent the blank on the clothing during pausing, as when the two wheels stop suddenly, the pinch wheel has the inertia to cause the blank on the adhesive tape and clothing; if it's set too long, it will cause tape breakage; if it's set too short, it will cause blank; the regulation range is 0.01-1.0.
5. Positive revolve speed: Regulate the positive revolve speed of pinch wheel and the regulating range is 1-20min/m.
6. Reversal speed: regulate reversal speed of pinch wheel in main menu and the regulating range is 1-20min/m.
7. Backlashing speed: regulate the reversal speed when swinging gun left the welding position and the pinch wheel is stopped. The regulate range is 1-20min/m.
8. Shut down delay: turn off the heating switch on the main menu and turn off the power switch of starting, so that the machine will enter the state of automatic shut down and it will shut down automatically in setted minutes. If the machine will not be used for a long time, it's recommended to turn off the main power. The regulating range is 1-10min.

Temperature regulating menu:

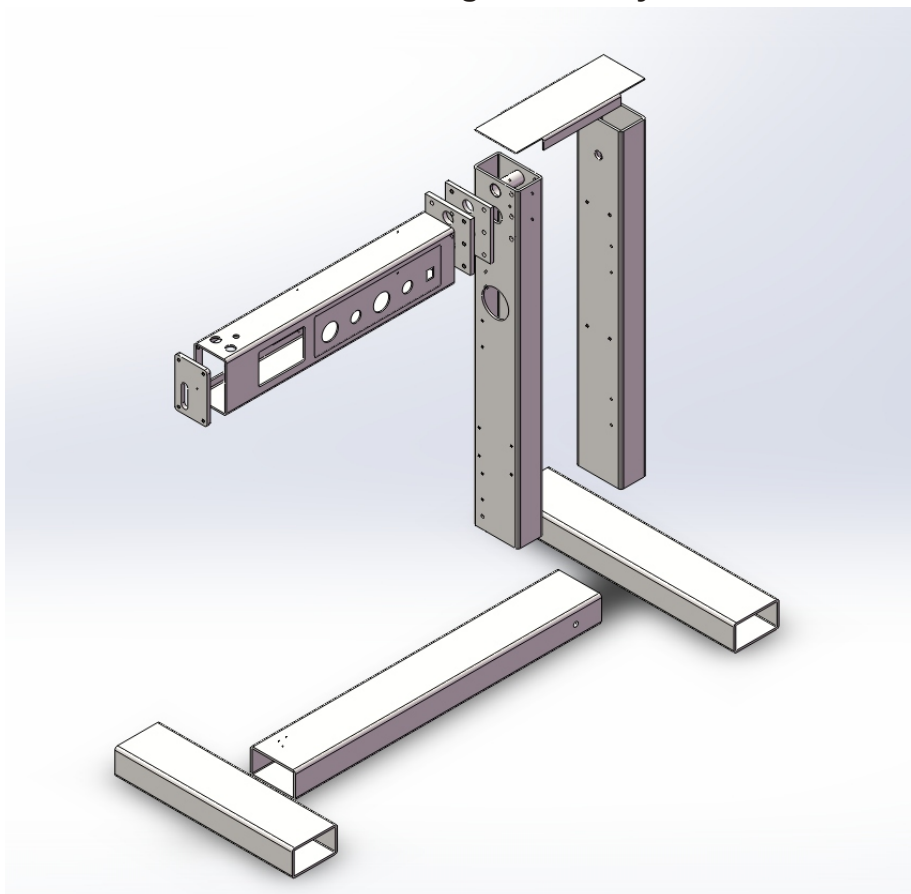


1. Heating gun: It consists with main operating menu, playing the role of heating on and off.
2. Automatically setting: Automatically measure, count and set the best suitable P, I, D value. Automatically adjust inner parameters of temperature controller to make the temperature stable. Function: first turn on the heating and press the key of automatically setting. Automatically setting would be accomplished when the light turned into red from green.
3. Current temperature: Consistent with main operating menu.
4. Setting temperature: Consistent with main operating menu.
5. P, I, D: Read, display and automatically adjust parameter of P, I, D.

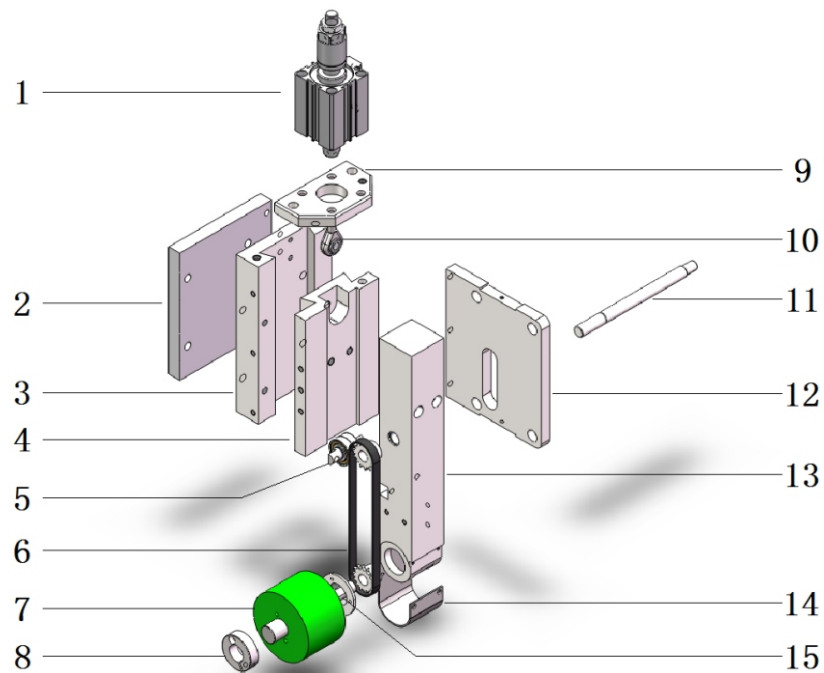
五. Part Manual

Please indicate the number, part number and name when choose and buy part.

1. Brief introduction of frame welding assembly

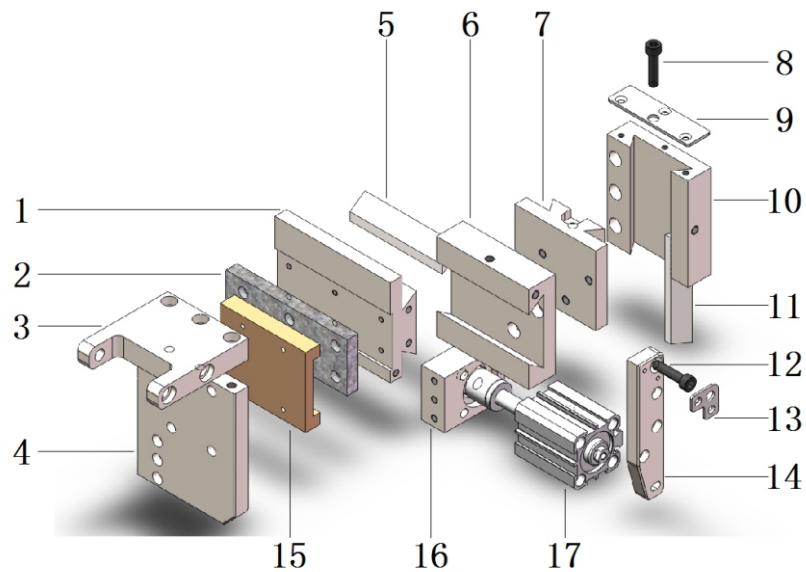


2. Transmission assembly of upper support



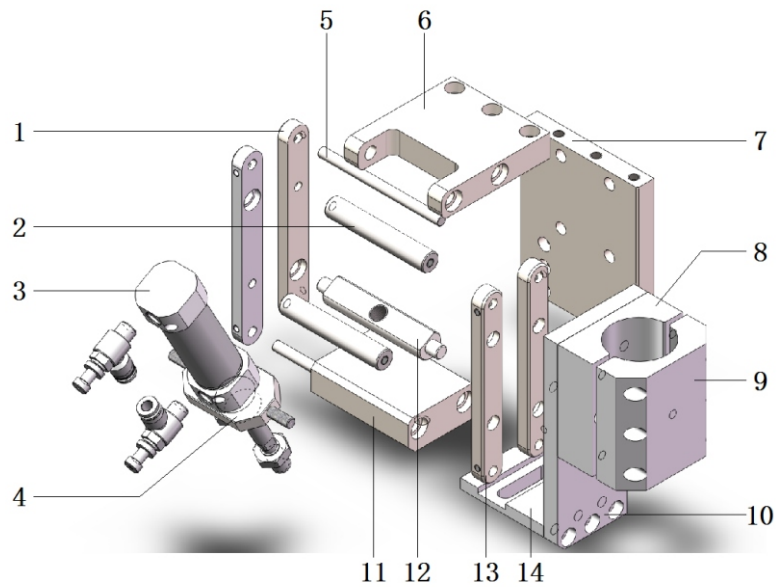
Numble	Name	Quantity
1	SADI-40x40 air cylinder	1
2	slide block	1
3	spout	1
4	slider	1
5	chain tension assembly of upper support	1
6	transmission chain of upper support	1
7	upper skin wheel	1
8	upper skin wheel limiter	1
9	cover of upper/ lower cylinder	1
10	M8 joint bearing	1
11	transmission axle of upper support	1
12	connect board of slider block	1
13	upper support	1
14	cover of upper support	1
15	skin wheel axle of upper support	1

3. Regulating assembly of gun control component



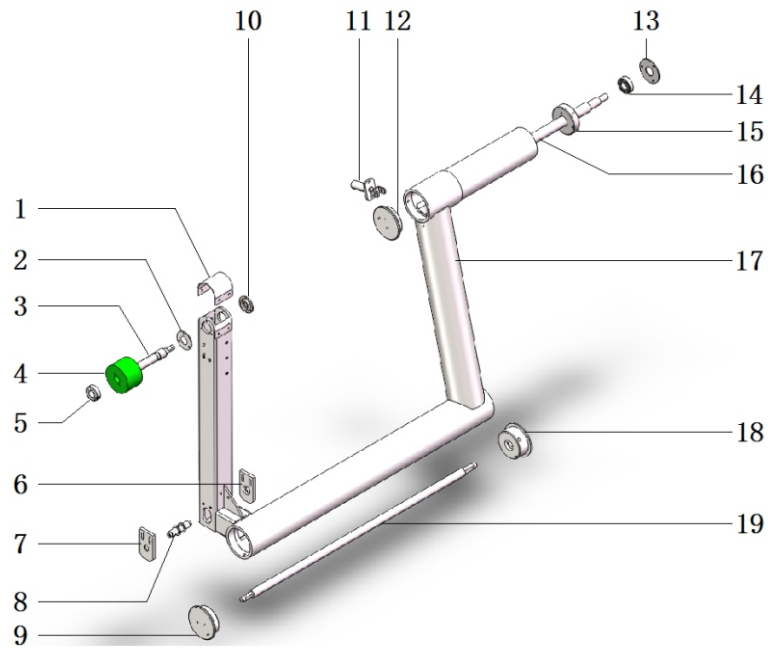
Numble	Name	Quantity	Remarks
1	front and back regulating block	1	
2	front and back guide of swinging gun	1	
3	swinging support block	1	
4	front and back slider block of swinging gun	1	
5	front and back regulating groove slot iron	1	
6	front and back regulating groove	1	
7	upper and lower regulating block	1	
8	upper and lower regulating bolt	1	M6 Inner six angle
9	upper and lower regulating block card	1	
10	upper and lower regulating groove	1	
11	upper and lower regulating groove slot iron	1	
12	front and back regulating bolt	1	M6 Inner six angle
13	front and back regulating block card	1	
14	front and back connect block of push pull cylinder	1	
15	front and back slider of swinging gun	1	
16	front and back push-pull cylinder block	1	
17	SDAJ-25x30 cylinder	1	

4. Transmission assembly of swinging gun



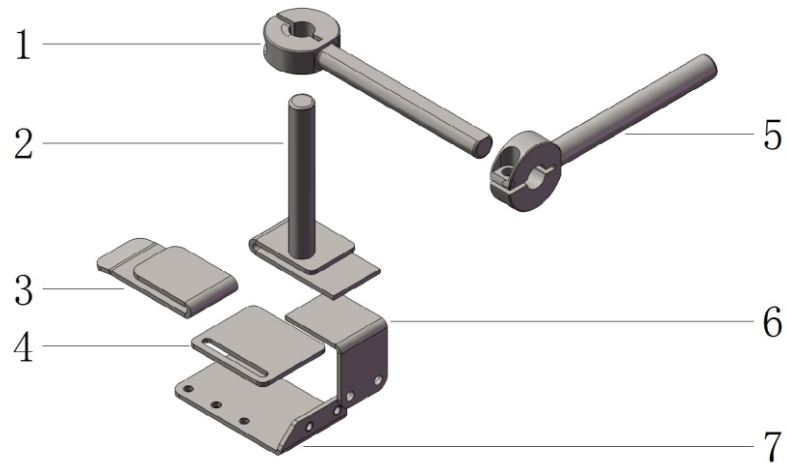
Numble	Name	Quantity	Remarks
1	back swing link	2	
2	upper fixed rod of swing link	2	
3	MIC-25x30 cylinder	1	
4	swing cylinder block	1	
5	connecting axle of swing connecting block	2	
6	swing support block	1	
7	front and back slider block of swing gun	1	
8	base block of gun grip	1	
9	cover of gun grip	1	
10	connecting board of gun grip	1	
11	swing cnnecting block	1	
12	top rod axle of swing air gun	1	
13	front swing link	2	
14	connecting block of air hot gun	1	

5. Lower swind arm assembly



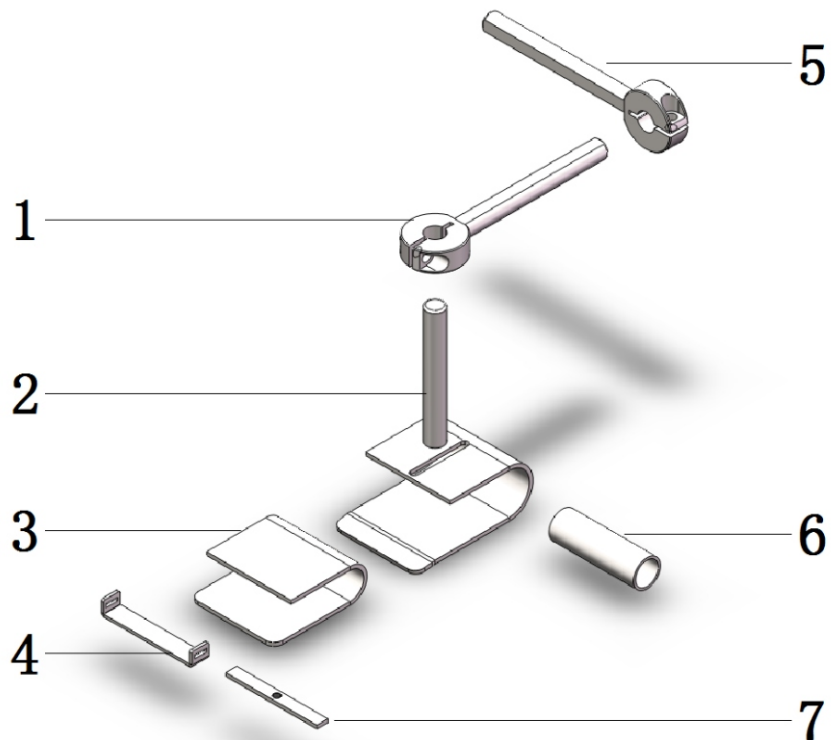
Numble	Name	Quantity	Remarks
1	Lower support cover	1	
2	Left bearing cover of lower support	1	
3	Lower leather wheel axle	1	
4	Lower leather wheel	1	
5	Limiter of lower leather wheel	1	
6	Right cover of lowersupport regulating bearing	1	
7	Left cover of lowersupport regulating bearing	1	
8	Lower transmission double row sprocket	1	
9	Left cover of lower transmission bearing	1	
10	Right bearing cover of lower support	1	
11	Tension assembly of lower swing arm chain	1	
12	Center bearing cover of swing arm	1	
13	Bearing cover of swing center axle	1	
14	Deep groove ball bearing 6004-2Z	1	
15	Bearing combined cover of lower support swing arm center	1	
16	Center transmission axle of lower support	1	
17	Welding assembly of lower support swing arm	1	
18	Right cover of lower transmission axle	1	
19	Lower transmission axle	1	

6. Module assembly of opposite side



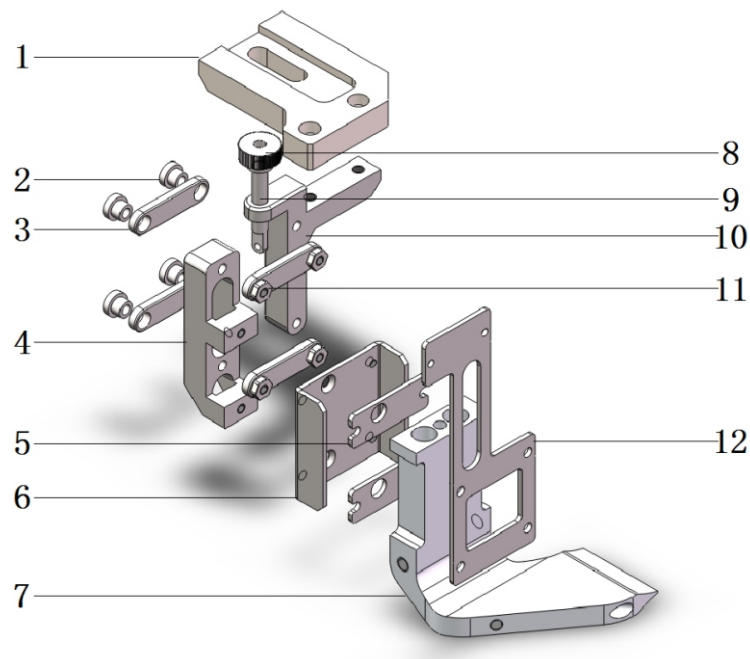
Numble	Name	Quantity	Remarks
1	regulating rod one of opposite side	1	
2	upper coiling of opposite side	1	
3	lower coiling of opposite side	1	
4	connecting block of lower coiling	1	
5	regulating rod two of opposite side	1	
6	upper and lower connecting block of opposite side	1	
7	lower base of opposite side	1	

7. Module assembly of crimper



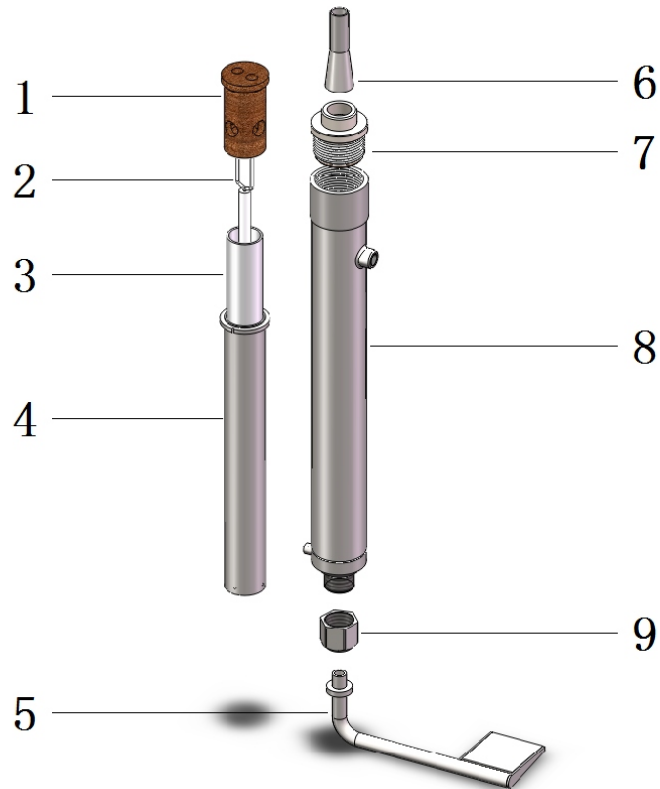
Numble	Name	Quantity	Remarks
1	regulating rod one of crimper	1	
2	outer ring of crimper	1	
3	inner ring of crimper	1	
4	C-type card of crimper regulation	1	
5	regulating rod two of crimper	1	
6	rope-wearing pipe of crimper	1	
7	regulating block of outer ring	1	

8. Heating block assembly



Numble	Name	Quantity
1	connecting stand of hot block	1
2	bush	4
3	piece of hot block regulation and connection	4
4	active support	1
5	shim	2
6	fixed stand of heating block	1
7	heating block	1
8	connecting nut	1
9	spring connecting head	1
10	regulating block	1
11	nut	1
12	cover of heating block	1

9.Hot air assembly



Numble	Name	Quantity
1	bakelite	1
2	electric hot air	1
3	glass pipe	1
4	lining pipe	1
5	air blower	1
6	coil spring turn ring	1
7	fixed nut	1
8	outer pipe	1
9	tighten nut	1

六. Debugging technical requirement

6.1 The total air pressure should be between 0.35~0.5MPa.

6.2 The upper pinch wheel pressure should be between 0.1~0.5MPa.

6.3 The oil level of atomized lubricator shall be between the highest and lowest level.

6.4 The lifting of upper wheel shall be smooth without strong vibration and rapid impact noise.

6.5 When the upper and lower wheels are pressed together, the edges of two wheels shall be parallel.

6.6 Backlashing requirement

Step down the left pedal and then step down the right pedal. Loosen the right pedal

after the pinch wheel moves and observe whether the upper and lower pinch wheels have some reverse rotation, i.e. backlash. Backlash is necessary, as it is the main action to eliminate the blank of pressing tape.

- 6.7 Requirement of swinging gun
The swinging in-out of heating gun shall be smooth and spontaneous, the speed shall be moderate and it shall be free of rapid impact noise.
- 6.8 Requirement of drive technology
Inspect to ensure the least blank position (use one hand to catch one pinch wheel and use the other hand to rotate the other pinch wheel and the voidage of rotation of two pinch wheels is the blank position). Too much blank position is prone to generate blank. Inspect whether the drive chains of complete machine are tightened correctly and whether the fastening screws of sprocket gear, sprocket wheel and universal joints are loose.
- 6.9 The heating coil (inner tube) and outer heating tube shall not be loose and the inner heating tube shall be aligned with air inlet of outer tube.
- 6.10 All control air circuits are required to be sealed without leakage.
- 6.11 The heating gun nozzle shall be located 20 degrees to the parallel line of upper and lower pinch wheel and the heating gun shall be adjusted to be 4-6mm above the centerline of upper and lower pinch wheel and 2-4mm away from the upper pinch wheel. But the distance between the heating gun and two pinch wheels could be regulated according to the water-proof clothing material and heat-sealing adhesive tape to meet the requirement of adhesion.
- 6.12 It's required that the gun nozzle should be horizontally parallel with the edges of upper and lower pinch wheels. If it's not parallel, it will cause one side of tape not to be adhesive.

Note: As the different thickness of clothing materials, different heat-sealing adhesive tapes, different competence of operators and different environmental climates will directly affect the product quality. The commissioning staff shall pay attention to the main change elements as following:

- A. The heating temperature is adjustable.
- B. The total air pressure is adjustable and pressure of upper wheel is adjustable.
- C. The air output is adjustable.
- D. The distance between gun nozzle and upper and lower wheels is adjustable.

七. Repair and maintenance

7.1 Inspection and maintenance item

7.1.1 Air circuit repair

- A. Inspect to ensure the total air supply shall maintain the pressure of 3.5 kg/cm².
- B. Inspect the total air pressure regulating valve: pull out the handle of total air pressure regulating valve and rotate the handle one round; if the index of total pressure gauge, it's necessary to clean the water filtration cup.
- C. Inspect whether the flow restrictors of air cylinders become loose.
- D. Inspect whether the air pipes are aging, damaged, loose and leakage.

7.1.2 Electric circuit repair

- A. The installation, maintenance and repair of the electric control system of this machine should be in compliance with the national safety regulation to prevent the equipment and fatal accident.
- B. When it's necessary to replace the electric component, try to select the same type component as original piece or equivalent component.
- C. Clean the interior of electric control cabinet regularly when the machine is shut down (depending on the condition of working field).
- D. Fasten the connecting terminals of electric control system regularly when the machine is shut down.
- E. To prevent the damage of PLC, display panel and operation panel, do not plug and pull

the connecting wires between PLC and display panel and operation panel when the power is on.

- F. If the trouble could not be solved, please contact our service network all over the country in time.
 - G. We're not responsible for the consequences caused by violation of safety operation and repair regulation (refer to relevant national standards).
7. 1. 3 Repair of mechanical components
- A. Inspect whether all the drive sprockets are moved or loose; if so, adjust or fasten the screw of sprocket.
 - B. Inspect whether the chain is too loose or too long; adjust the chain tension or adjust the distance of bearing support; if the trouble could not be solved after the adjustment, shorten the chain.
 - C. Inspect whether the heating gun nozzle is parallel and aligned with upper column wheel; if it's not parallel and aligned, make adjustment according to the above-mentioned method.
 - D. Inspect whether the lifting of upper column is smooth or the blank position is too big.

Note: No matter how durable the mechanical part is, it will generate the wearing after long-term usage to cause abnormal mechanical movement and if it's not repaired in time, it will cause the serious damage of some components, which could not be repaired, so it's necessary for maintenance staff to be familiar with them and make daily maintenance and routine maintenance strictly according to technical requirement to prolong the service life of the machine.

7.2 Common trouble and troubleshooting

7.2.1 Bad adhesion of heat-sealing adhesive tape and water-proof clothing

Cause:

- A. The bad adhesion could be caused by the distance between heating gun nozzle and upper pinch wheel (too far, too high or too low), blocking of gun nozzle, too fast rotation of pinch wheel, too low temperature of hot air and too low air output.

Troubleshooting:

- A. Clean the dirt inside the gun nozzle and regulate the distance of gun nozzle and reset the temperature and speed.

7.2.2 Too much blank position during rotation of pinch wheel and tape pressing generates the blank.

Cause:

- A. The drive chain is too loose or too long due to wear.
- B. Wear of gear and universal joint.
- C. The blank position occurs at upper and lower pinch wheel bearing and radial direction of pinch wheel.

Troubleshooting:

- A. Fasten each chain.
- B. Replace the gear and universal joint.
- C. Replace the pinch wheel and make it fit with pinch wheel bearing.

7.2.3 The upper column could not be lift to the right position or moves unsmoothly and unstably.

Cause:

- A. The air pressure is not enough or the flow restrictor is not regulated well.
- B. The three fastening screws beside the slider support are not regulated well (too tightly).
- C. The exhaust muffling net is blocked with dirt.

Troubleshooting:

- A. Regulate the air pressure, repair the leakage or readjust the flow restrictor.
- B. Add the lubricant to the moving part of slider support.
- C. Clean the dirt in the muffling net.

7.2.4 Too much deviation of value of temperature controller or the temperature controller displays "" during normal operation.

Cause:

- A. The temperature sensing wire is damaged or the compensation lead wire breaks up somewhere.
- B. Parameter setting of temperature is modified.

Troubleshooting:

- A. Replace a new wire or temperature line.
- B. Reset the parameters of temperature controller.

Besides the above-mentioned common troubles, the other troubles which are not found by our company exist during the long term production. Please contact us when you can't solve the problems by yourselves. We'd like to receive your feedback about your impression on our machine and performance of our machine from you.