

BGA/SMD
Rework Station
(MODEL: WDS-520)
USER MANUAL V1.0



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I. Precautions & Installation

1. Cautions

Thank you very much for purchasing **WDS-520**

Please read carefully and follow these cautions before the operation of this equipment in order to make the best use of its functions and prevent any negligent accident or break down.

■ The operation of rework station should be complies with following precautions.



Turn on the main power of rework station and check the air discharging from both of upper and lower heaters. If it is not discharged, stop the operation and inspect the equipment.



Check the status of soldering with magnifying lens and naked eyes after finishing the work. If the attachment of BGA solder ball is defective, measure the temperature with real-time temperature profile sensor and adjust it befittingly before reworking. Or there can be a damage of soldering, BGA or PCB board.



Clean the surface of the equipment regularly. Especially contaminants have not to be accumulated on the hot air outlet of lower heater because they could reduce thermal efficiency and heater lifetime and affect operation quality.



Only educated engineers are suggested to modify setup program.



Do not use the equipment with a portable hot air blower or other equipment at the same time while operating rework station. It can cause burning accident or operation fault by abnormal rise of heating Temperature.



Inflammable substances with a risk of fire or explosion have to be kept away from the equipment, and a target subject PCB should be worked on PCB holder.



Do not touch high-temperature area and wear radiating gloves to prevent burn accident.



Do not use inflammable spray, liquid or gas near the equipment.



High voltage components are installed inside of the equipment, so do not use disassemble the front and rear panel discretionaly.



Immediately turn off the power supply and separate the power code if metal or liquid accidentally falls down into rework station while operating. Remove the substance after temperature of the machine is dropped.



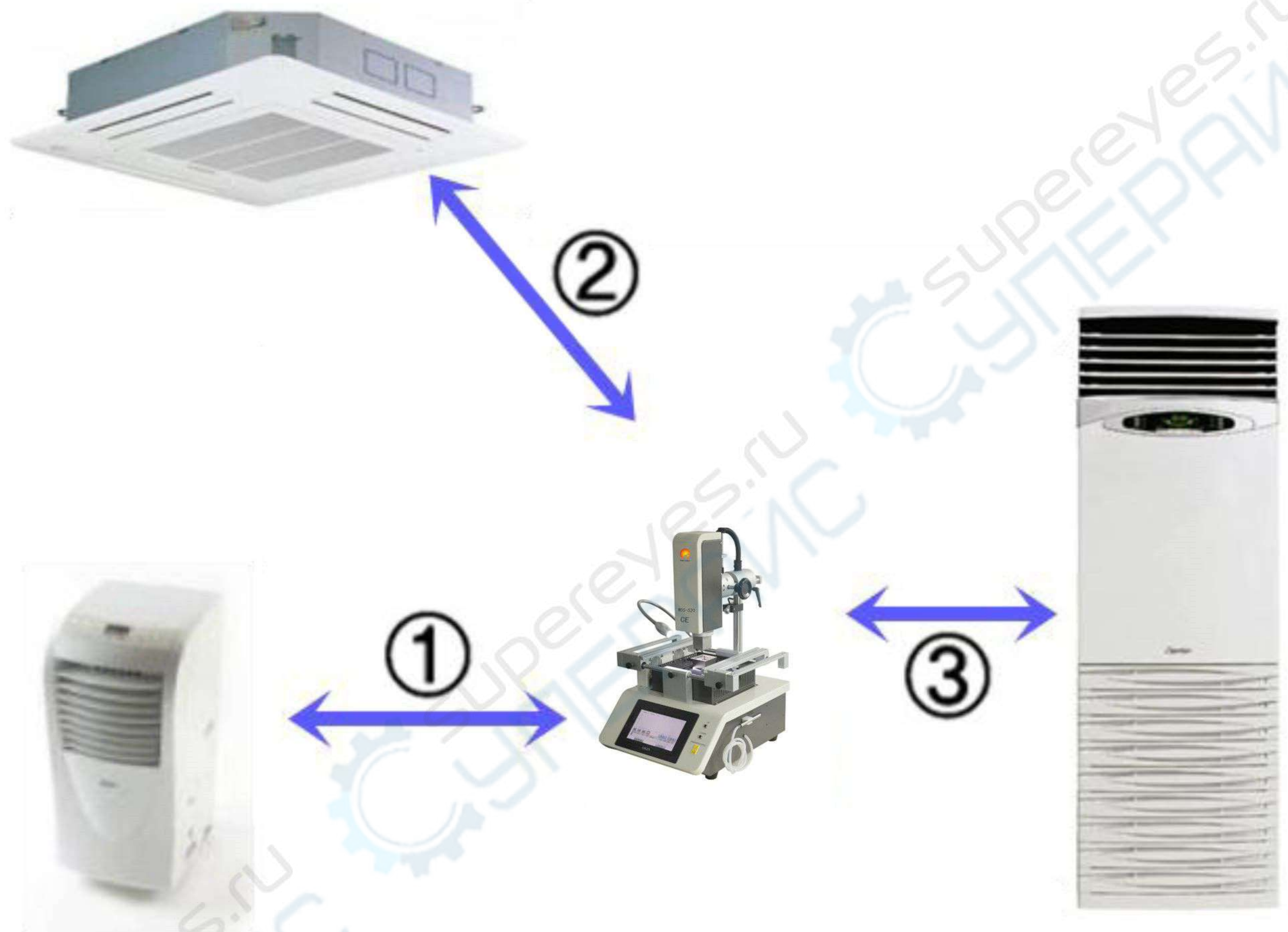
If rework station is not operated for a long time, saved parameters can be deleted by running out of program back up battery.



In cases of damages from operator' s negligence, free A/S cannot be responsible for the company.

2. Installation

Please install the equipment in a place with stable room temperature.



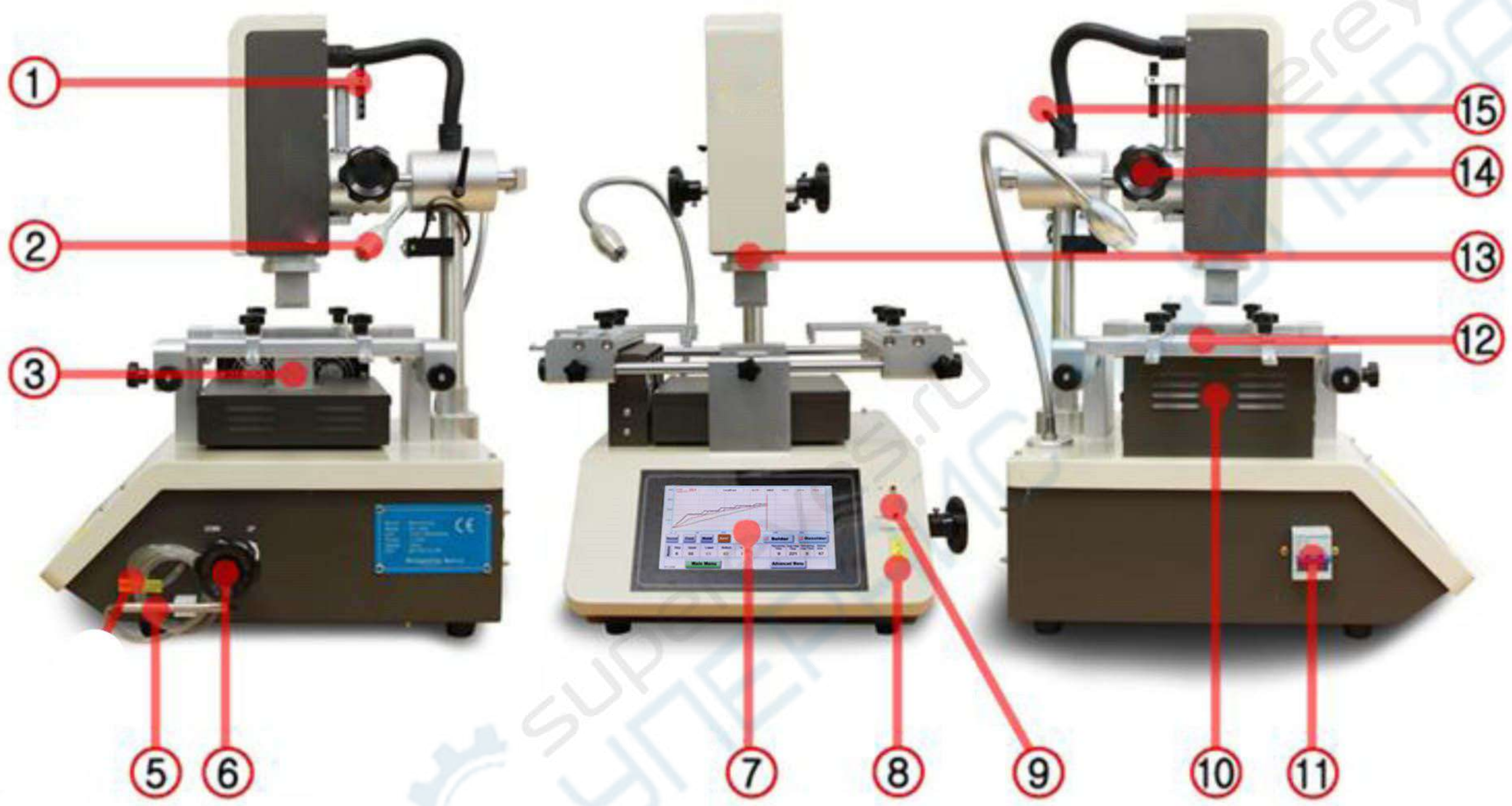
1 Standing type air conditioner (small): Install it leaving an interval of at least 1.5m from the equipment.

2 Ceiling type air conditioner: Install it more than 5m from the equipment because it can directly affect the air inlet of upper heater.

3 Standing type air conditioner (large): Install it more than 5m from the equipment where the place does not point to the direction of the wind.

III. Production Introduction

1. WDS-520 : Title of each part



1	Upper heater alignment pin	6	Lower heater moving knob	11	Short circuit Block switch
2	High luminance LED lamp	7	monitor	12	PCB fixing holder
3	Lower heater and nozzle	8	External temperature sensor	13	Upper heater and nozzle
		9	Heater operation lamp	14	Upper up/down moving knob
5	Suction nozzle	10	Cooling fan	15	Upper horizontal moving knob

2. Composition

No.	Item	Description	Unit	Q'ty	Note
1	Rubber nozzle	8mm	PCS	2	
2	PCB fixing holder	200mm	PCS	6	
3	Fixing holder knob		PCS	6	
4	Nozzle	10*10 mm	PCS		four nozzles selectable as free of charge
5	Nozzle	13*13 mm	PCS		
6	Nozzle	15*15 mm	PCS		
7	Nozzle	18*18 mm	PCS		
8	Nozzle	20*20 mm	PCS		
9	Nozzle	24*24 mm	PCS		
10	Nozzle	28*28 mm	PCS		
11	Nozzle	30*30 mm	PCS		
12	Nozzle	34*34 mm	PCS		
13	Nozzle	38*38 mm	PCS		
14	Nozzle	44*44 mm	PCS		
15	Nozzle	35*35mm	PCS	1	
16	Brush		PCS	1	
17	Temperature sensor	K TYPE	PCS	1	

2.1 WDS-520 Parameters and Specifications:

1	Power supply	AC220V±10% 50/60Hz
2	Total Power	3500W
3	Up heating Power	800W
4	Down heating power	Second 1200W, IR 1400W
5	Machine Dimension	395×450×590mm
6	PCB location	V-shape card slot, PCB holder can be adjustable by X and Y axes with universal jigs.
7	Temperature Controlling	K-type thermocouple closed loop control, independent temperature control, precision up to ±2°C
8	PCB size	Max 205×260mm Min 20×20 mm
9	Preheating Area	200x200mm
10	Available PCB thickness	0,5mm - 3mm
11	BGA picking way	Built-in vacuum pump, with a special pen absorbs the BGA
12	Available component size for PCB	1 - 35mm
13	Suction capacity	120g
14	Temperature sensor	K type
15	Electrical Material	High sensitive temperature control module, Delta PLC, Touch Screen made-in Taiwan
16	Lighting way	High brightness LED light
17	Machine weight	About 19kg
18	Others	Rapidly positioning by laser

WDS-520 BGA rework station main characteristics:

1. Equipped with touch panel interface and high sensitive temperature controlling to ensure it work stably and reliably. And it can storage multiple temperature profiling data of users. With password protection and modification function while power on. The temperature profiles will be displayed on the touch screen;
2. Adopted with Linear slider, all the three axles (X, Y, and Z) can do fine tuning and quick orientation with perfect positioning accuracy and speedily maneuverability.
3. Three temperature zones to heat up independently, hot air heat up between up and down zones, IR heat in the bottom, temperature precise control is in±2°C. The upper temperature zone can be moved freely according to needs. The top and bottom heaters can be set several segments control at the same time. IR heating zone can be adjusted output. Preheating will be more energy efficient.
4. The hot air nozzle can be rotated in 360 degree, the IR heater in the bottom can heat up the PCB board uniformly.
5. High accuracy K-type thermocouple closed-loop controlling. It can test temperature accurately through external temperature measurement interface, PCB board positioned by closed V-shape slot. The flexible and convenient universal jigs can prevent any damage or PCB deformation as well as it is suitable for all size of BGA package.
6. Adopt double cooling fan to cooling PCB board rapidly, improve work efficiency.
7. The built-in vacuum pump and external vacuum nozzle is able to take BGA chips out easily.
8. Having alarm prompt function after welding is done.
9. It has Passed CE certificate. It is equipped with emergency stop switch and protection equipment to power off automatically when abnormal accident happened. Under this situation that temperature is out of control, circuit can automatically cut off the power with double over temperature protection function.
10. It widely used to reworking mobile phones, ipad, GPS, video player, set-top boxes and other electronic products.

III. Operational Pre-action

The BGA rework for PCB should be complies with following procedures.

1. Bakeout

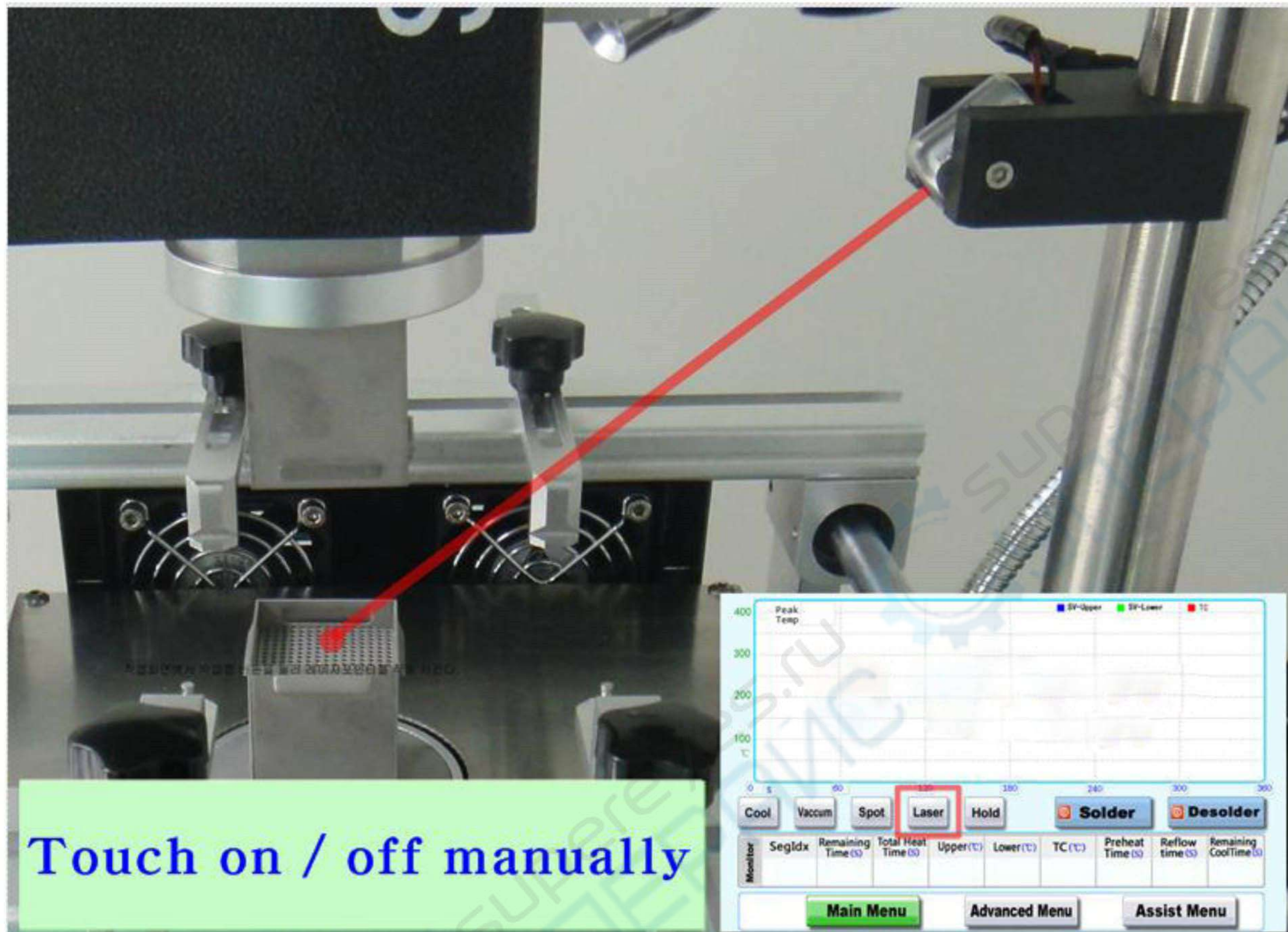
It is suggested that PCB and BGA are worked after baking in about 8H~20H(125°C) by chamber device. The purposes of baking are removing moisture on BGA and PCB and preventing internal damages such as Popcorn, bubble detachment, and deformation in the operation

Moisture Sensitivity level

Thickness	Level	125°C / Baking period
≤1.4mm	2a	4 hours
	3	7 hours
	4	9 hours
	5	10 hours
	5a	14 hours
≤2.0mm	2a	18 hours
	3	24 hours
	3	31 hours
	5a	37 hours
≤4.0mm	2a	48 hours
	3	48 hours
	3	48 hours
	3	48 hours
	5a	48 hours

2. Target subject PCB mounting

1.1. working point



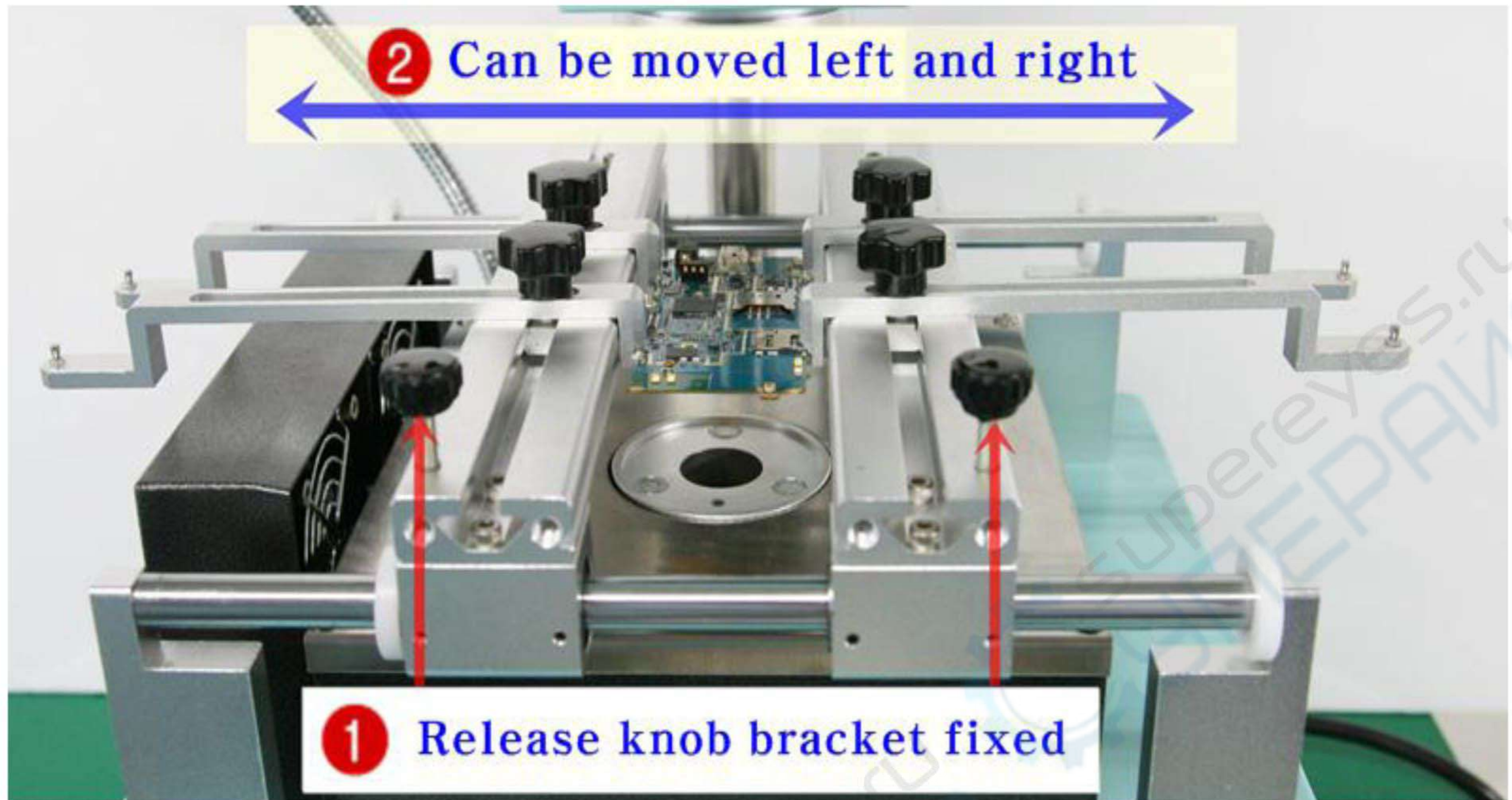
1.2. PCB mounting

1.2.1 Match the target subject with the center of working point using PCB fixing bracket.



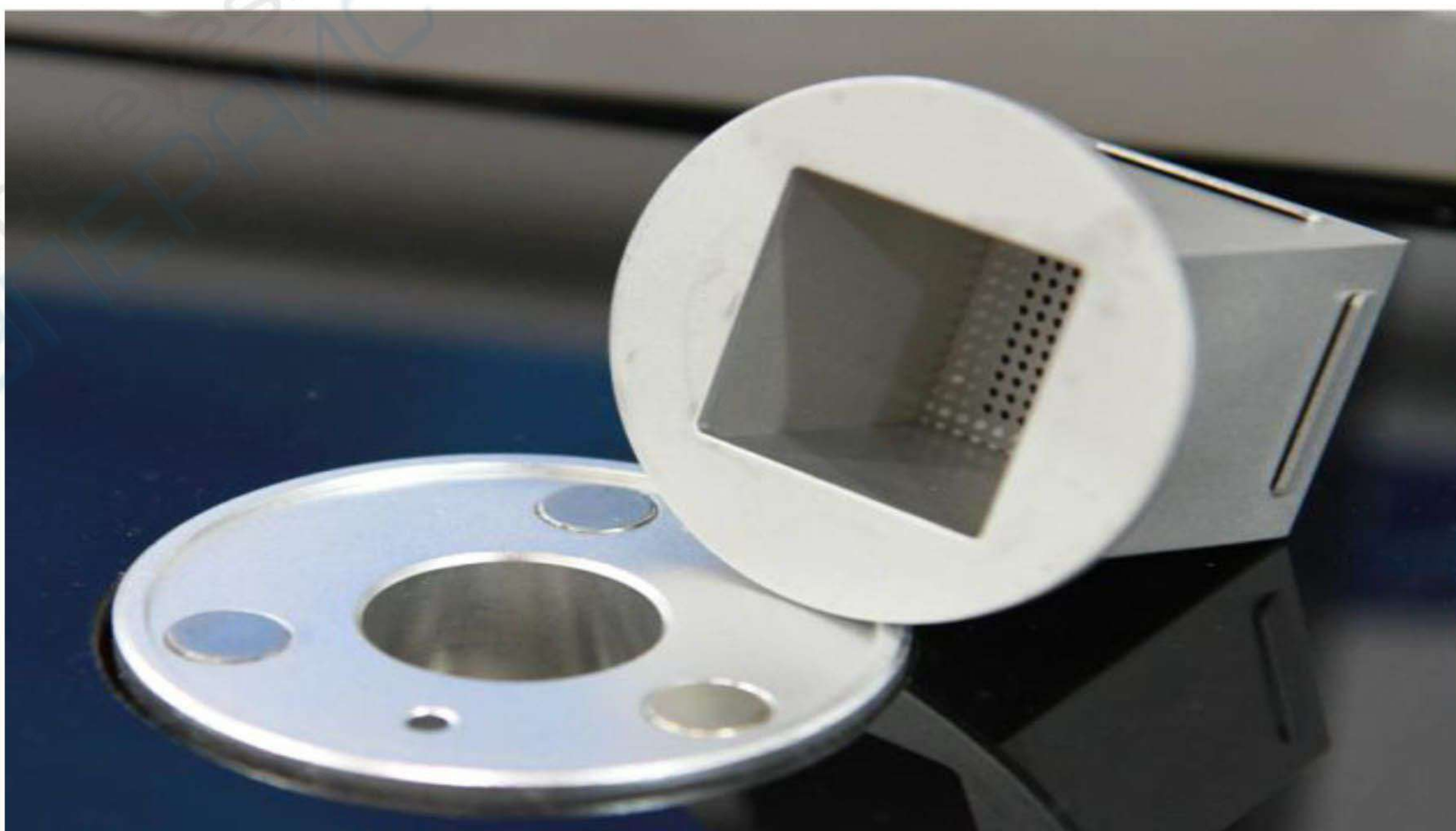
1.3 Horizontal moving of PCB

1.3.1 It is movable to right and left releasing shaft fixing knob.



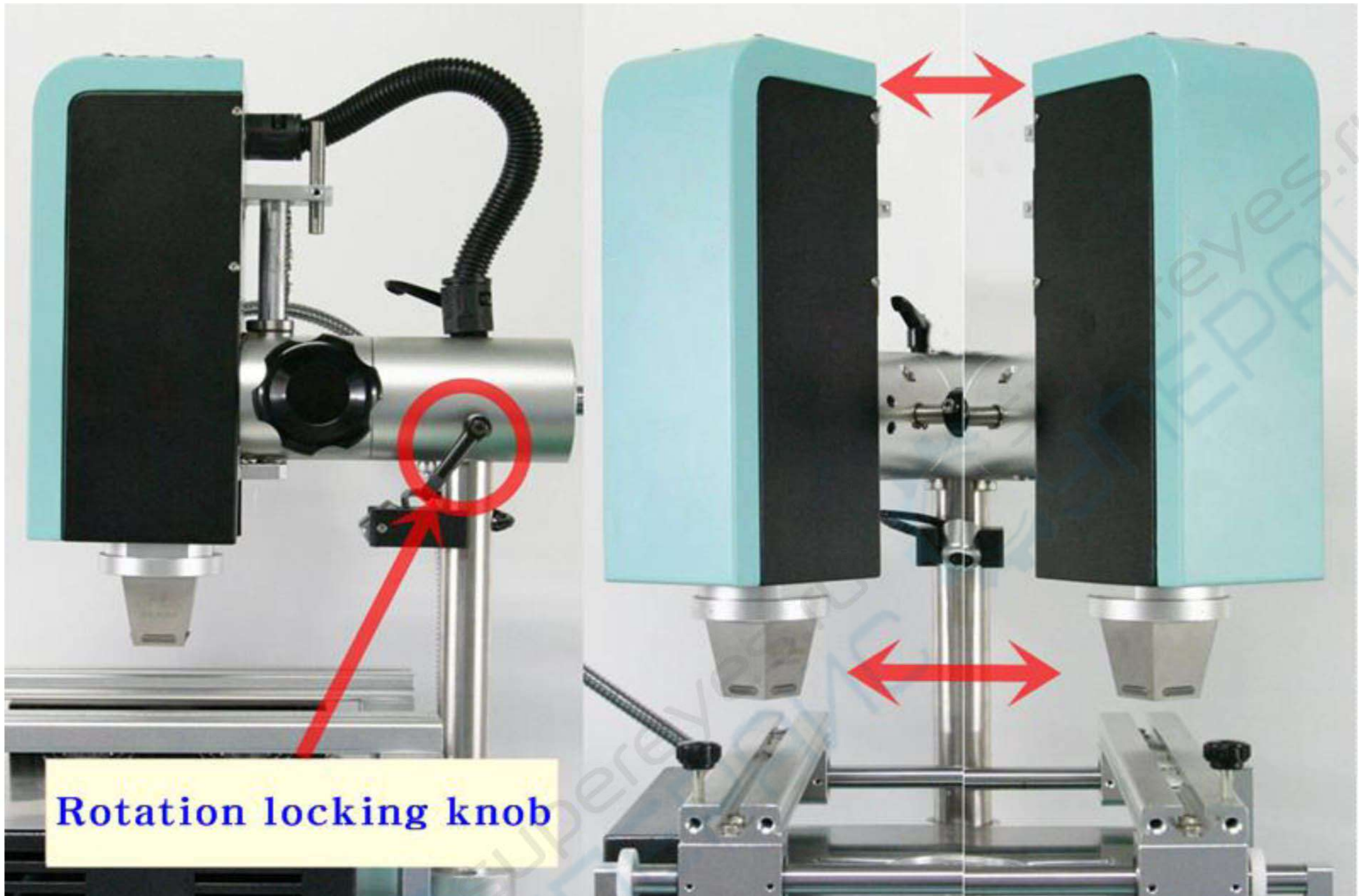
3. Nozzle mounting

2.1 Mount the upper nozzle selected as fixing method by magnetic system on hot air outlet of the upper and lower heater like following picture.



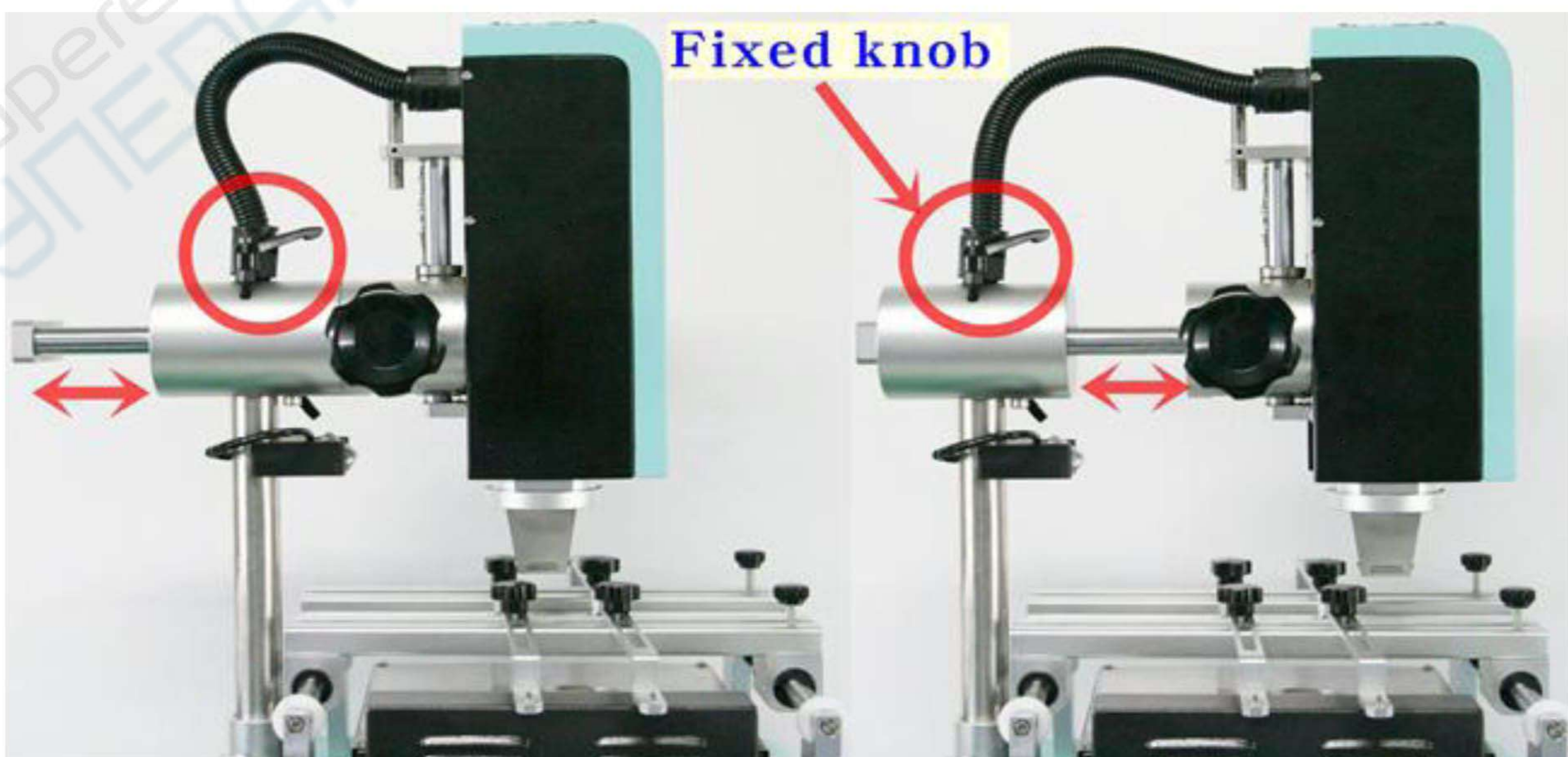
4. Right and left control of upper heater

3.1 Right and left turn of upper heater is available by releasing fixed lever, and then the lever can be fixed in required position.



5. Front and rear control of upper heater

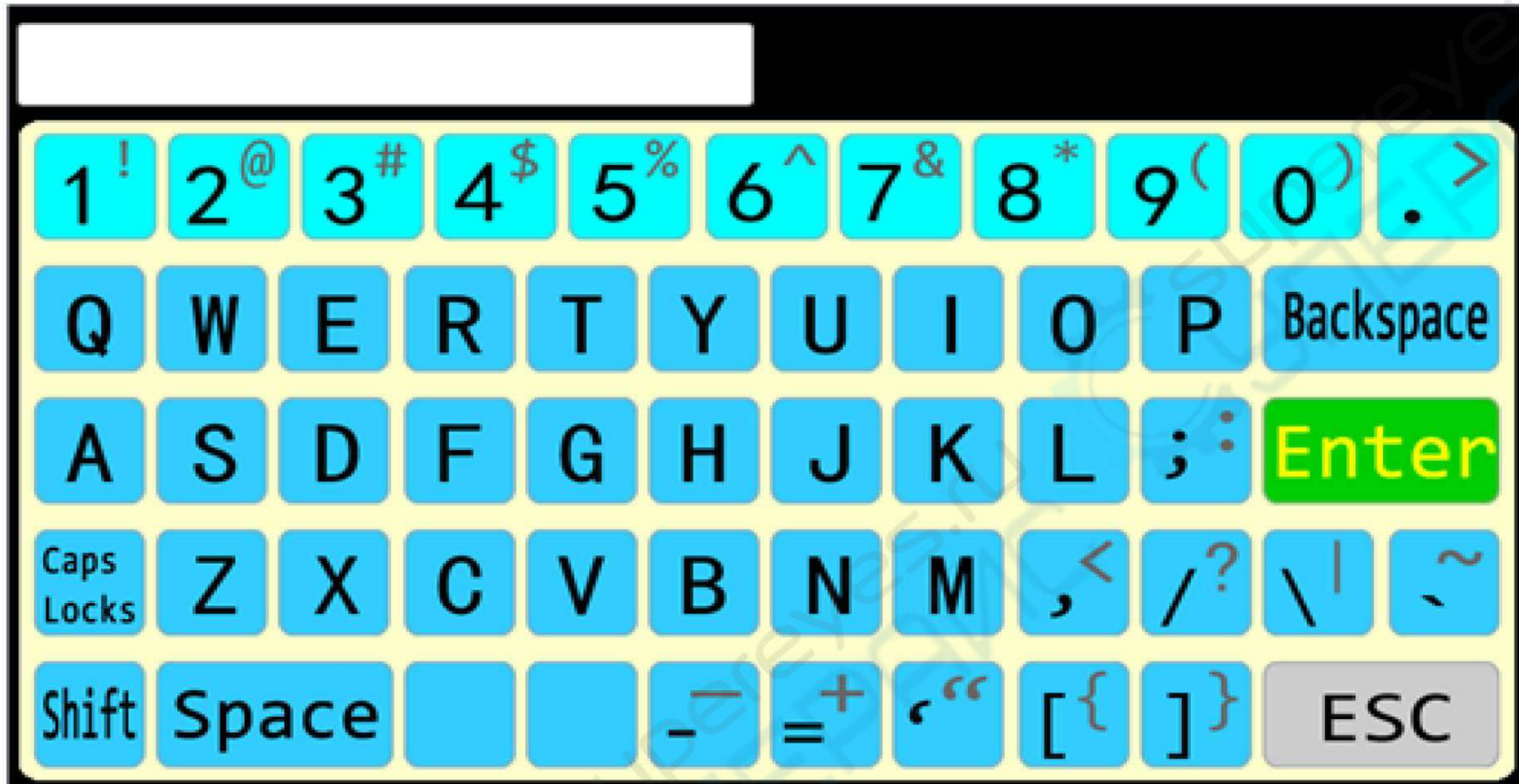
4.1 Moving front and rear of upper heater is available by releasing fixed lever, and then the lever can be fixed in required position.



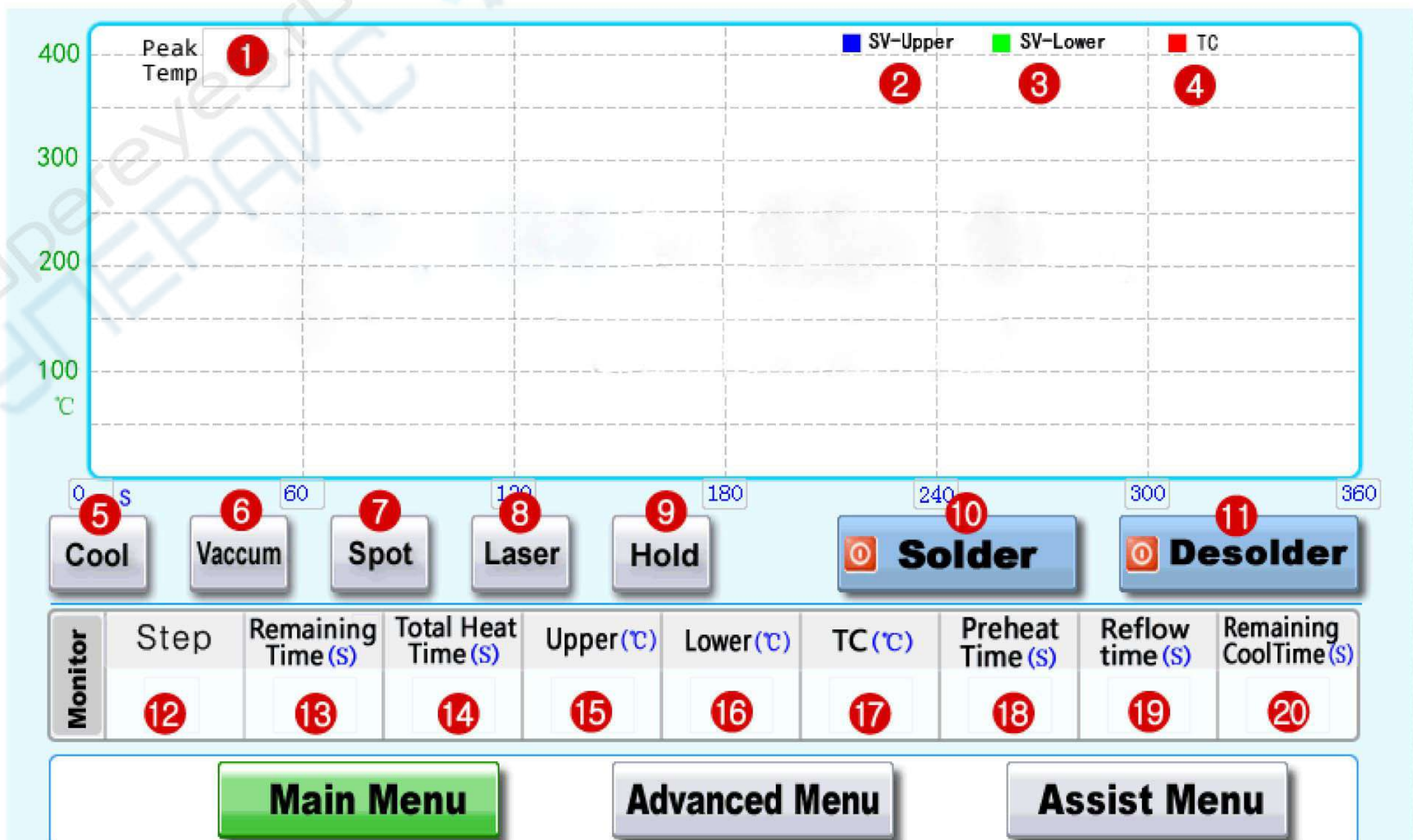
IV. Screen Display

1. Data input display

- Following screen is appeared by the touch for input every setting value.



2. Working display



- 1 **Peak temp:** Indicating the current temperature of external sensor
- 2 **SV-Upper:** Indicating set temperature and time of steps of 1 to 9 in the upper heater with blue line
- 3 **SV-Lower:** Indicating set temperature and time of steps 1 to 9 in the lower heater with green line
- 4 **TC:** Indicating the temperature change of external sensor in red line
- 5 **Cooling:** Manual operation button of cooling fan
- 6 **Suction:** Manual operation button of suction nozzle
- 7 **Lamp:** Lamp control button
- 8 **Working point:** Laser pointer control button
- 9 **Pause:** It maintains the current temperature of upper heater by pushing the button in the required step while processing program, and the time for rest process is remained.
- 10 **Component Assembly:** Set program is operated by pushing the button, and a buzzer sounds three times 13 seconds before completion. Heating is stopped with long buzzer sound at the completion, and cooling fan is worked for setting time.
- 11 **Component removal:** Set program is operated by pushing the button, and a buzzer sounds three times 13 seconds before completion, and suction nozzle is operated automatically 10seconds before completion.
- 12 **Step:** Indicating the running section of the steps of S1 to S9
- 13 **Remaining time:** Indicating remained time in the running section of the steps of S1 to S9
- 14 **Total Heat time:** Indicating total period from the moment of pushing the component removal or assembly buttons to the current
- 15 **Upper:** Indicating real-time temperature of upper heater
- 16 **Lower:** Indicating real-time temperature of lower heater
- 17 **TC:** Indicating real-time temperature of external temperature sensor
- 18 **Preheat time:** Indicating warm-up time of corresponding section in upper heater by input starting and ending temperature into the 'warm-up

start and end' among etc settings on the temperature setting display

19 Reflow time: Indicating the time during the upper heater temperature stays in over temperature from setting value saved in 'reflow' section of etc settings on the temperature setting display.

20 Remaining Cooling time: Cooling time can be input in the 'cooling' section of etc settings on the temperature setting display, and cooling fan is operated after the input time is finished.

3. Temperature setting display

Current Curve		Curve manage									Save	Save As
		S1	S2	S3	S4	S5	S6	S7	S8	S9		
Upper	°C											
Time	s											
Lower	°C											
Time	s											
Others												
Preheat-L	°C	Preheat-H	°C	Reflow Temp	°C	Cool Time	s	U/C	°C	L/C	°C	
UpAirSped	50~100%	LwAirSped	50~100%	NozzleSize	mm	NozzleSize	mm	Remarks				

Main Menu Advanced Menu Assist Menu

- 1** Current Curve: Name of the adapted program
- 2** Curve manage: Operating the previously saved program
- 3** Save: Saving changed setting value on the current program
- 4** Save as: Copy the current or changed setting value as different name
- 5** Steps: Each level of running section of S1 to S9
- 6** Upper heater setting: Setting of temperature and time for each section
- 7** Lower heater setting: Setting of temperature and time for each section
- 8** Preheat-L starting: Setting the starting temperature for checking the time of warm-up section
- 9** Preheat-H ending: Setting the ending temperature for checking the time

of warm-up section

- 10 Reflow Temp:** Setting the temperature for checking the time of reflow section
- 11 Cool Time:** Inputting cooling time
- 12 Upper+/-:** Setting of integrated rising and falling of the temperature for whole section of the upper heater (Example 1: If input 10, the temperature of whole section of upper heater is rose 10degrees, and if input -10, the temperature would be fell 10degrees)
- 13 Lower+/-:** Setting of integrated rising and falling of the temperature for whole section of the lower heater (Example 1: If input 10, the temperature of whole section of lower heater is rose 10degrees, and if input -10, the temperature would be fell 10degrees)
- 14 Upper air volume:** Setting 50%~100% of air volume
- 15 Lower air volume:** Setting 50%~100% of air volume
- 16 Upper nozzle:** Note adopting recorded size for upper nozzle of the selected program without effect for function
- 17 Lower nozzle:** Note adopting recorded size for lower nozzle of the selected program without effect for function
- 18 Remarks:** 12 letters of alphabet or number can be available for input

4. Additional functions

This function the method that the equipment calculates the temperature and time of the upper and lower heaters with AI(Artificial intelligence) based on numerical value of external temperature sensor and operates by itself, and it is attached with heat-resistant tape at the bottom of the component which needs to remove its external sensor. The function of AI is operated based on following chart.

Soldering	Unit	Warm-up	Pre-heating	Max.Temp.	Note
SnPb	Temp.(°C)	50	160	217	Finishing operation in 217
	Time(sec)	50	70	50	degrees of sensor temperature
Pb-free	Temp.(°C)	50	190	230	Finishing operation in 230
	Time(sec)	50	70	50	degrees of sensor temperature



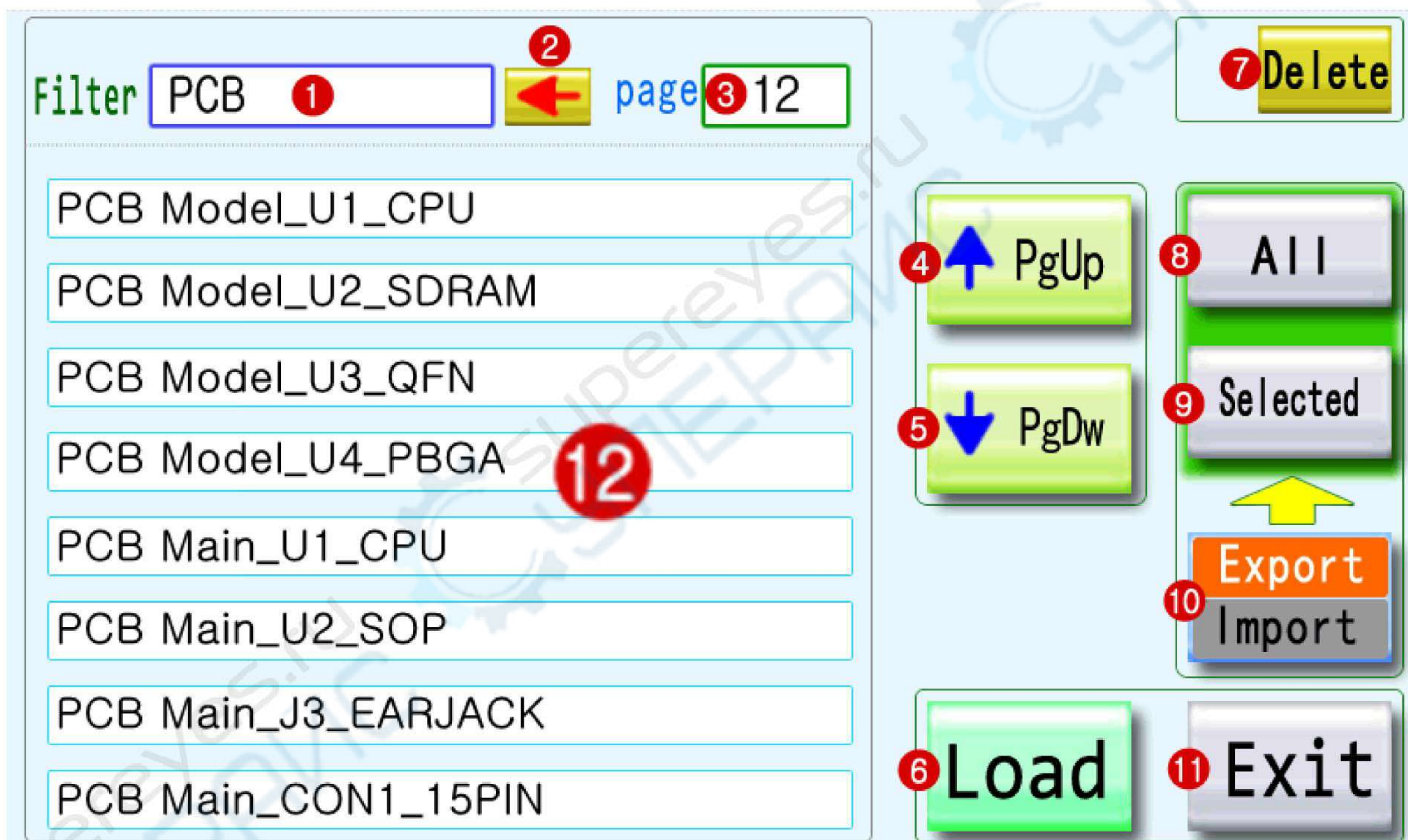
- ① Standard mode: Applying for normal PCB
- ② Upper high temperature mode: Applying metallic components
- ③ Lower high temperature mode: Applying heat protection design PCB or

PCB with over 1.5mm of thickness

- ④ **Special mode:** Removal the particular area maintaining the melting point about 100seconds
- ⑤ **Leaded:** For solder with Pb
- ⑥ **Lead Free:** For solder without Pb
- ⑦ **Auto Caculate:** Lamp control button

5. Program management display

- If importing button is touched, the screen is changed to following picture.



- ① **Searching word:** Indicating all programs starting with input initial alphabet of the required program in the search blank
- ② **Moving first page:** Moving to first page from the current page
- ③ **Page:** Indicating the current page.
- ④ **Previous page:** Viewing the previous page
- ⑤ **Next page:** Viewing the next page
- ⑥ **Program application:** Touch the required program and push this button to change the screen to temperature settings display and apply the selected

program

- 7 **Delete:** Touch the program and push this button to delete it without additional question.
- 8 **All:** Exporting and importing the selected memories to external memory
- 9 **Select:** Selecting between external memory and built-in memory.
- 10 **Memory status:** Indicating the occupied memory at the moment
- 11 **Exit:** Move to operation setting display screen
- 12 **Program list:** Indicating the list of program saved

V. Program control & rework

1. Temperature setting

	S1	S2	S3	S4	S5	S6	S7	S8	S9
Upper $^{\circ}\text{C}$	50	100	140	160	180	200	225	250	225
Time s	10	20	20	20	60	15	10	40	10
Lower $^{\circ}\text{C}$	50	80	120	140	160	180	210	230	210
Time s	10	20	20	20	60	15	10	40	10

Others

Preheat-L $^{\circ}\text{C}$	Preheat-H $^{\circ}\text{C}$	Reflow Temp $^{\circ}\text{C}$	Cool Time s	U/C $^{\circ}\text{C}$	L/C $^{\circ}\text{C}$
UpAirSped 50~100%	LwAirSped 50~100%	NozzleSize mm	NozzleSize mm	Remarks	

Main Menu Advanced Menu Assist Menu

- 1.1 1 Touch the temperature and time for each section of upper and lower heater to modify them in the temperature setting display.
- 1.2 1 If the setting values are stated like above picture, step 1 keeps the upper temperature 60°C for 5 seconds and changed

to step 2 to keep 60°C the temperature for 5 seconds. Like this way, the heating of the upper and lower heater is processed according to applied temperature and time to step 9.

- 1.3 **2** There can be the damage of PCB if the temperature condition for selected program is over or lower and stable operation is available through the temperature compensation of upper and lower heater. For example, If input 10 for upper and input -10 for lower, the temperature of upper heater is rose 10degrees, and the temperature of the lower heater would be fell 10 degrees.

2. Removing components and mounting

2.1 Import the desired program like following picture.

Current Curve PCB Mode1_U1_CPU **Curve manage** **Save** **Save As**

	S1	S2	S3	S4	S5	S6	S7	S8	S9
Upper °C	50	100	140	160	180	200	225	250	225
Time s	10	20	20	20	60	15	10	40	10
Lower °C	50	80	120	140	160	180	210	230	210
Time s	10	20	20	20	60	15	10	40	10

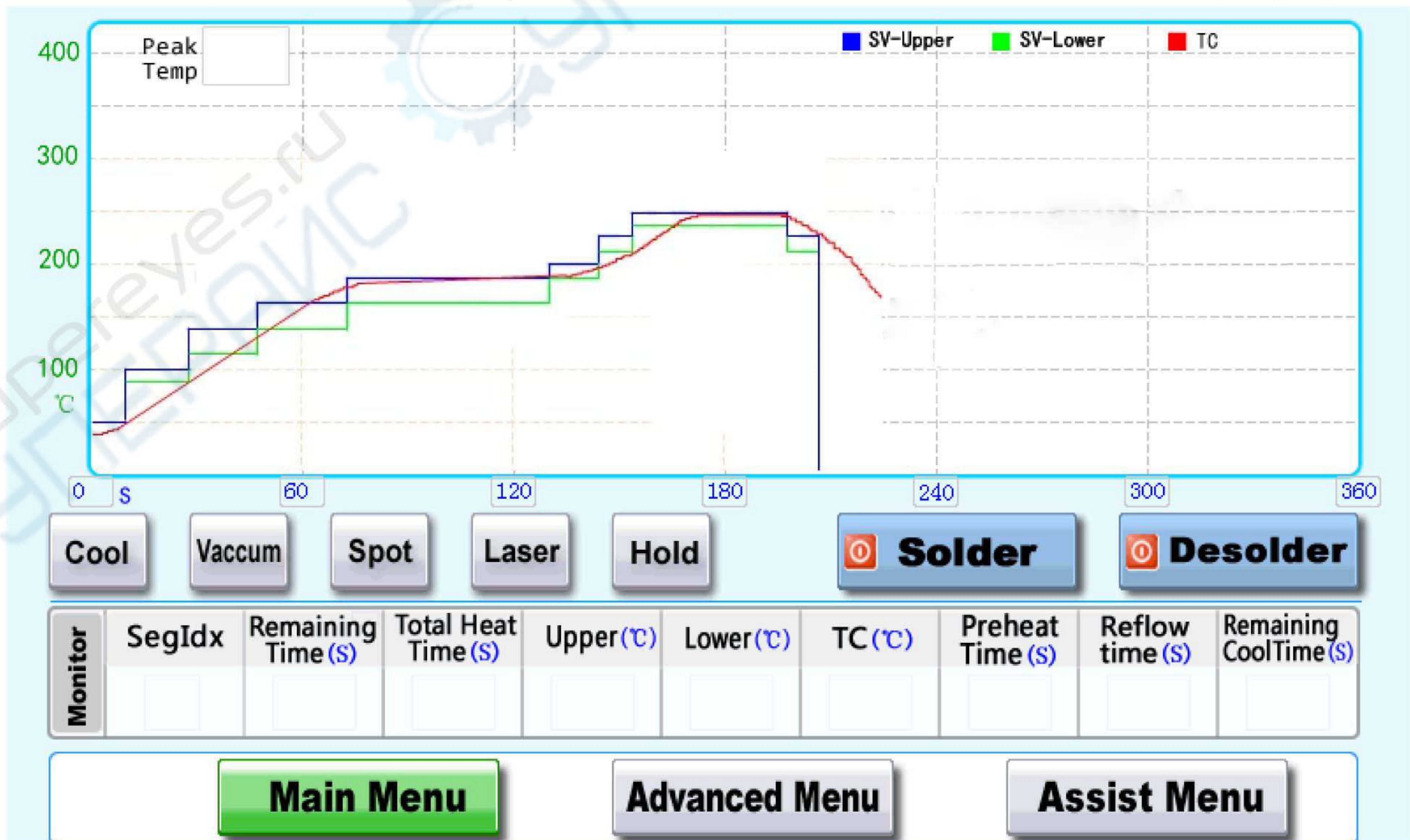
Others

Preheat-L °C Preheat-H °C Reflow Temp °C Cool Time s U/C °C L/C °C

UpAirSped 50~100% LwAirSped 50~100% NozzleSize mm NozzleSize mm Remarks

Main Menu **Advanced Menu** **Assist Menu**

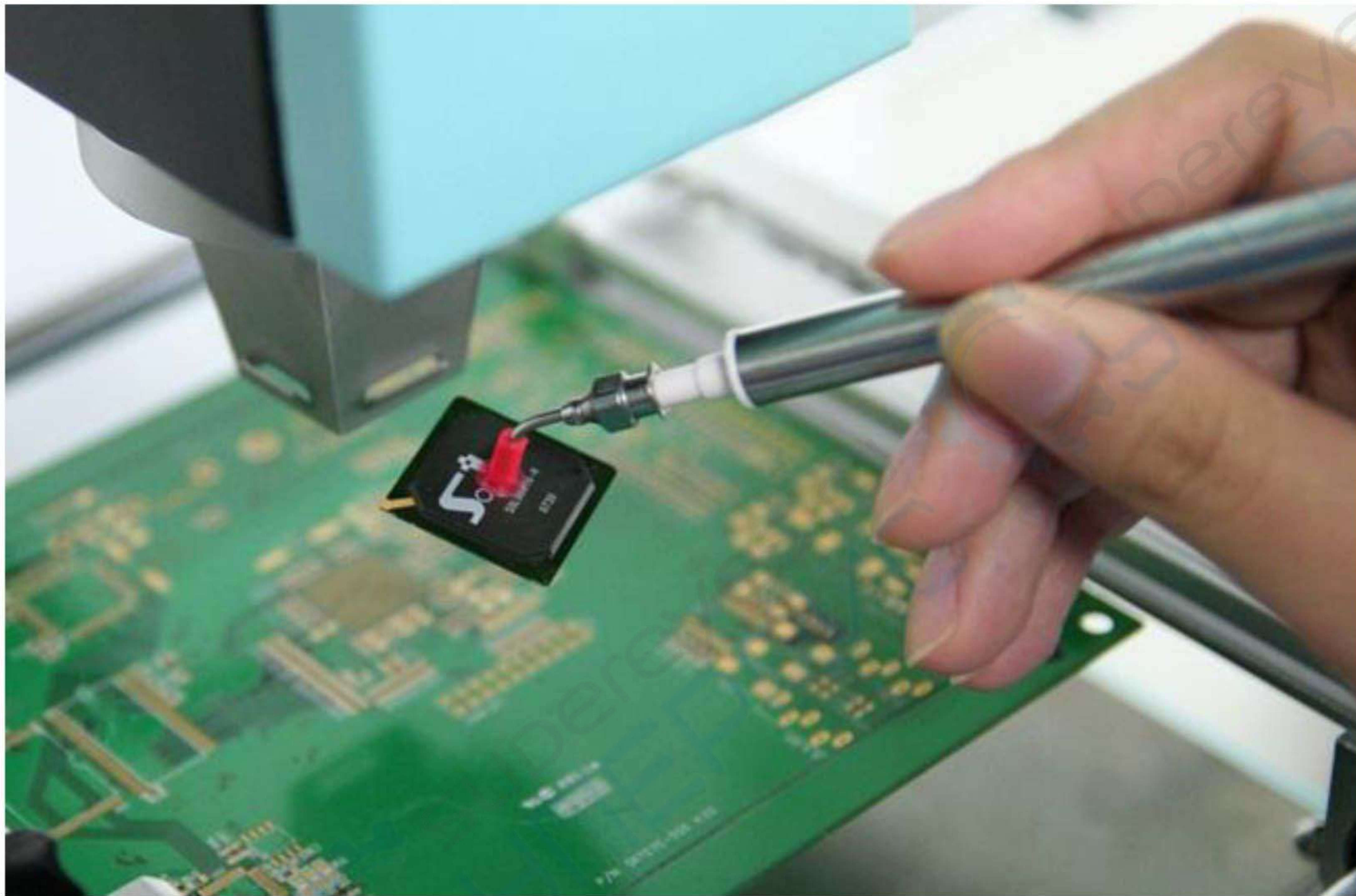
2.2 The setting value is applied automatically on the screen after importing the program and screen changing to working display, and also the value of temperature and time of upper and lower heater can be checked by a graph.



2.3 The heating is started by pushing the 'removing components' buttons. The buzzer sounds three times 13seconds, and suction nozzle is operated 10seconds automatically before completion. Then stop by holding upper heater moving knob after blocking the air hole until right before the completion.



2.4 Raise the upper heater after buzzer sound and remove the target components using suction nozzle as soon as possible. Cooling fan is operated automatically after 10seconds, and suction function is also automatically stopped after 3minutes and 30seconds without particular manual operation.



2.5 Remove remaining solders and clean the removed area using soldering iron and solder wick

2.6 Fall the lower heater down after spreading the jell type no-clean flux and arranging the new components.

2.7 Heating is started pushing the mounting button by the program used for components removal, and the all process is completed when the heating is finished and cooling fan is operated.

2.8 Inspect the status of mounting with naked eyes and microscope.

3. Save and copy

3.1 Save(Temperature setting display)

- changed program is saved by pushing the save button after changing program.

3.2 Copy(Temperature setting display)

- User can save the changed program as different name by pushing 'Enter' button after pushing the copy button and change the name of the program, and screen changed to temperature setting display after the process.
- Title of file is available for inputting maximum 18 alphabet letters.

3.3 Exporting to external memory

- Insert Micro SD into the slot on the right side of the equipment.
- Select the desired program on the program list display and touch the select button, then selected programs are copied on the external memory
- If pushing 'all' button, every list would be copied on the external memory

3.4 Importing to built-in memory

- Select external memory by touching the button of External/built-in memory Push the select button after

touching the desired program, then the selected programs are copied on built-in memory.

- Copy the program list of external memory by pushing 'all' button

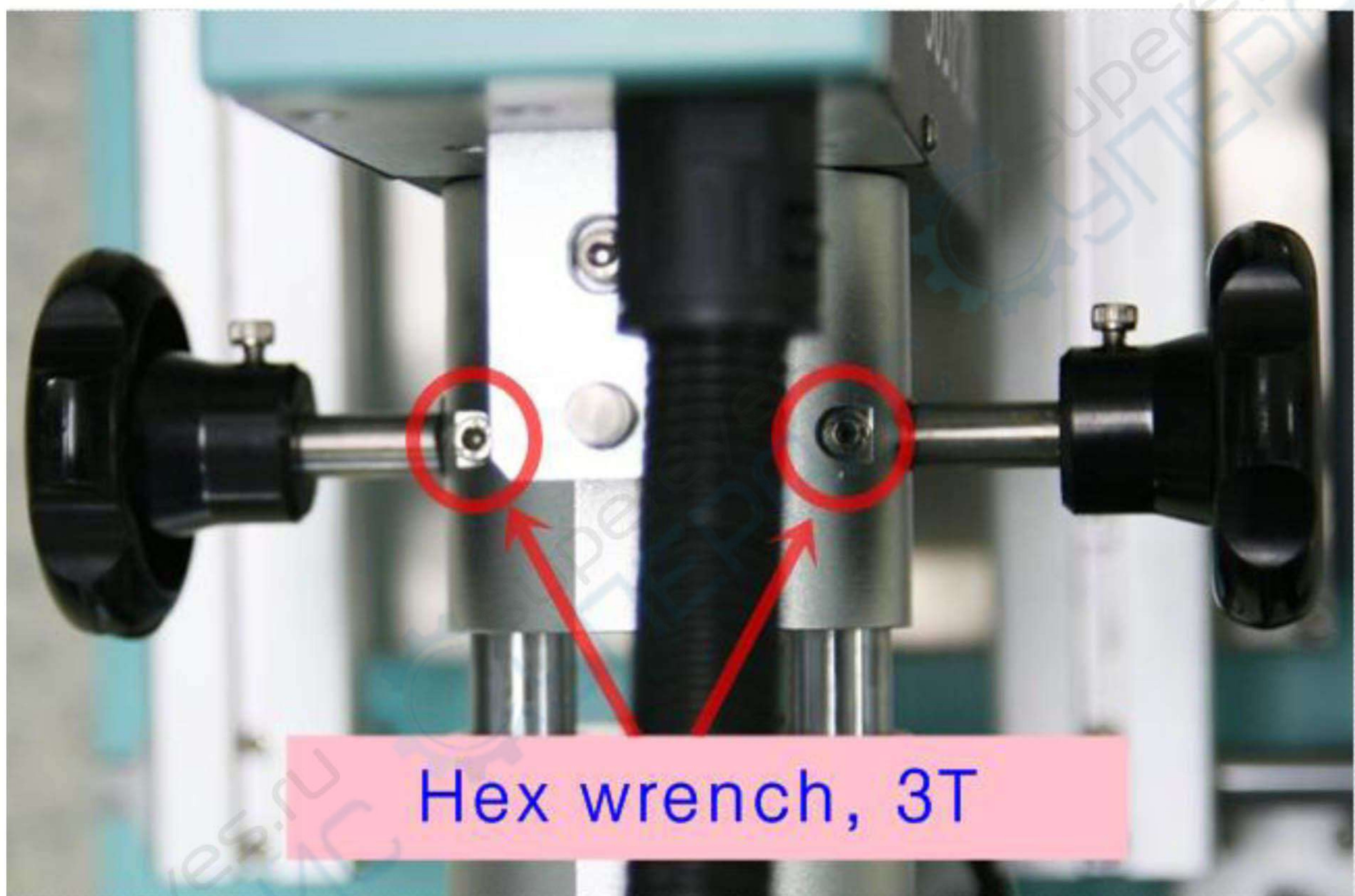


VI. Maintenance

1. Looseness of vertical adjustment of lower heater

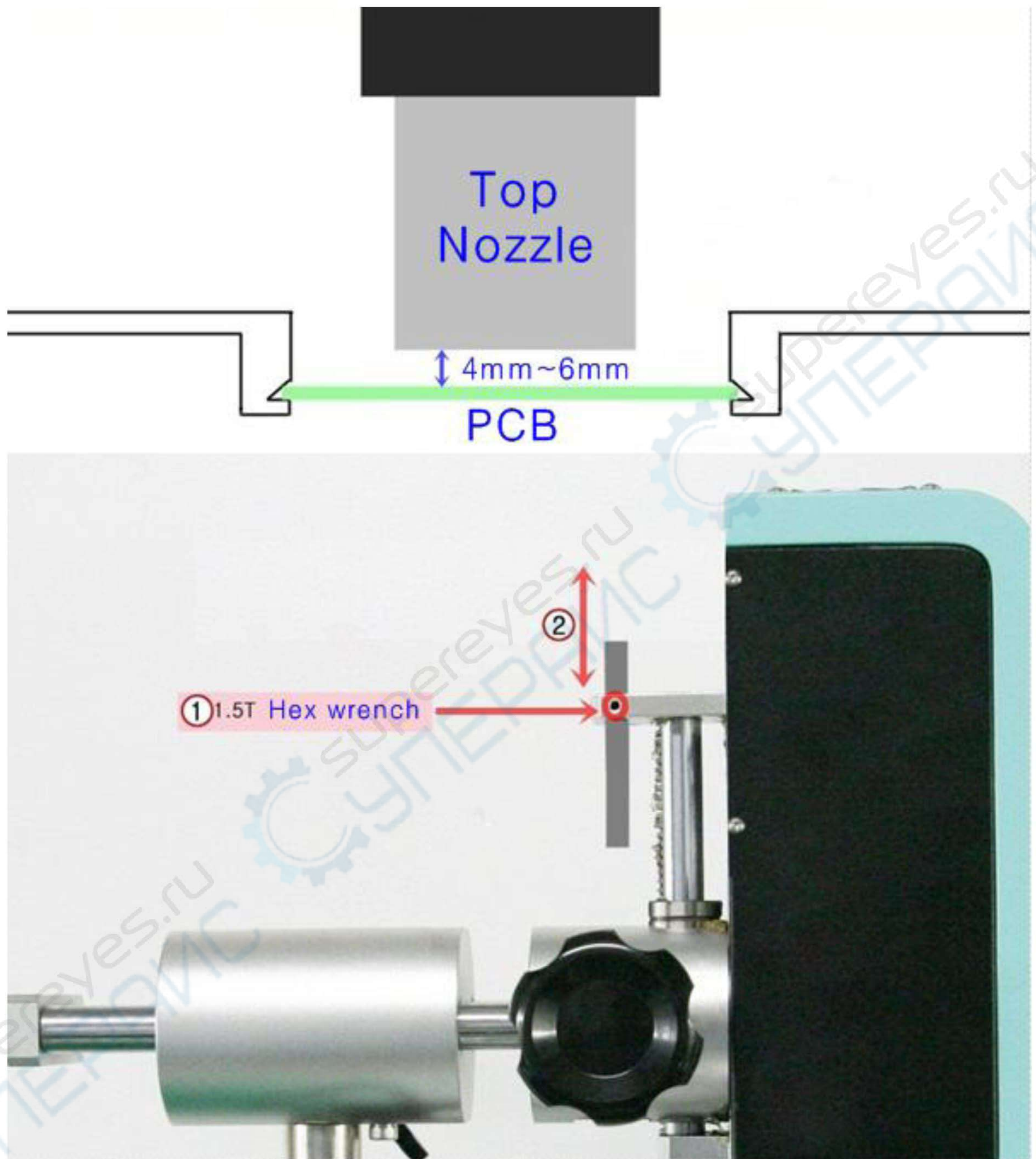
(Frequently)

- If there is looseness or tightness for vertical moving of upper heater, adjust both of up and down of the heater by 2mm hex wrench



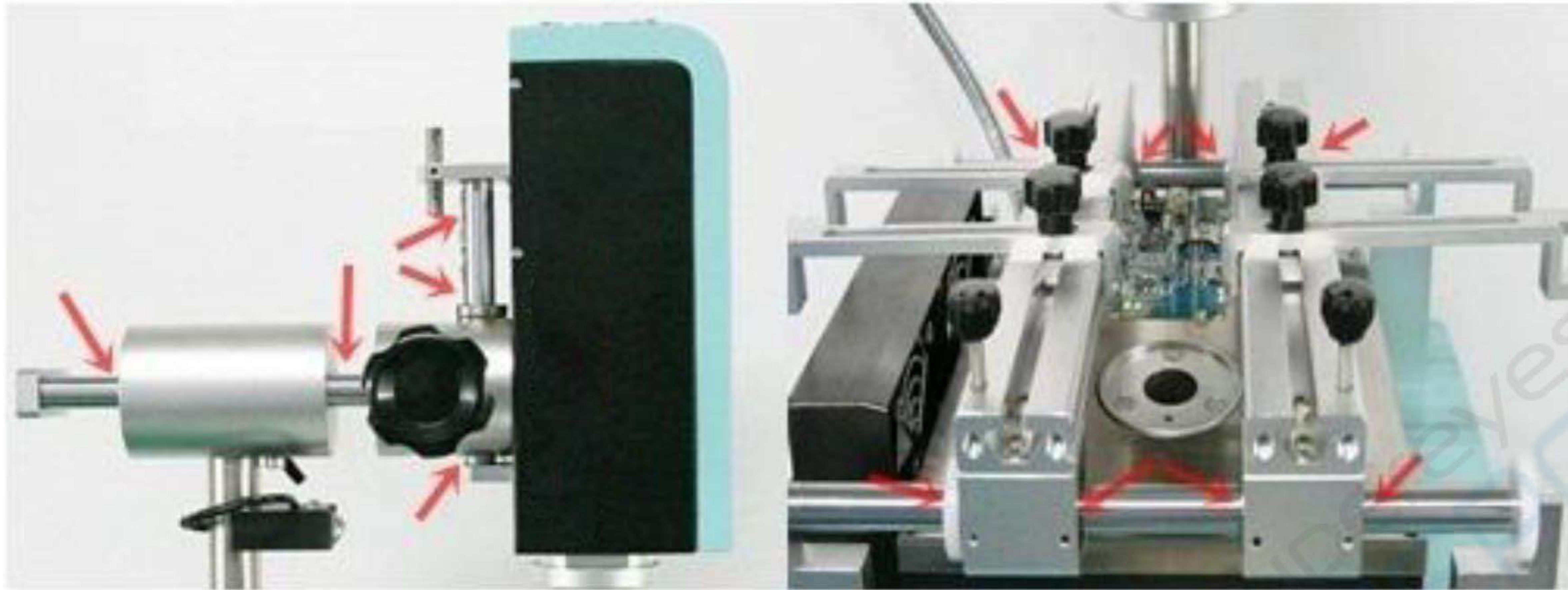
2. Adjusting the upper heater descent limit (Once a month)

- ① Releasing 1.5T set screw ② Fixing the shaft adjusting up and down



3. Shaft maintenance (once or twice a month)

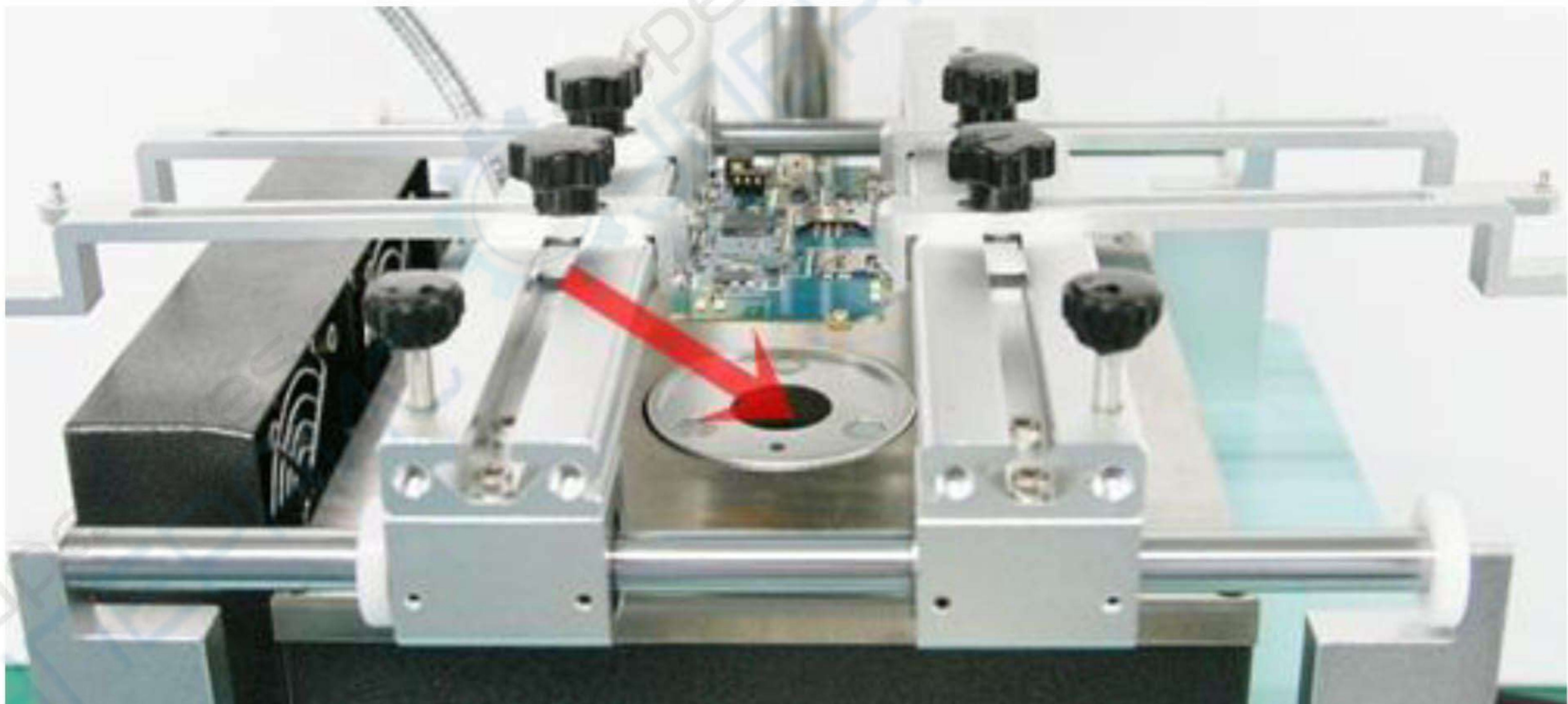
- Spread lubricant to the moving shaft once a month



4. Lower heater for foreign substances

(Frequently before operation)

- Checking foreign substances in lower heater



VII. Warranty

Quality Warranty (For customers)

Title	WDS-520
Period	1 year
Customer	
Address	
Name of person in charge	
Tel	

Warranty service information

It would be repaired free of charge if an error occurs in normal use within the warranty period from the date of purchase (within 1 year from the date of purchase)

The cost for product delivery service for repair would be covered by sender.

Chargeable service information

Following cases can be repaired with service charge (Repair cost, replacement cost, labor cost).

1. Error or damage after warranty period
2. Chargeable services within warranty period,
 - Damage or error by a convulsion of nature (Fire, salt damage, gas damage, earthquake, storm or flood, lightning, over power)
 - Damage or error by careless use after installation (Move, fall, shock, damage, radical action)
 - Damage or error by defects of power supply or connecting devices.