BGA Rework Station (SP-360C)

User's Manual

Version：V1.03

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Directory

I. Instructions on Installation and Operating Precautions

To ensure safety and prevent possible damage to the rework station, it is required to install the rework station at a location complying with the following conditions.

◆ Away from inflammables.

◆ Install the rework station at a location free from splashing of water or other liquids.

◆ Install the rework station at a location free from the direct airflow impact from air conditioner, heater or ventilator.

◆ Install the rework station at a location with good ventilation.

◆ Install the rework station at a dry location.

◆ Install the rework station at a location free from excessive dust.

◆ Install the rework station at a location free from vibration or shock.

◆ Install the rework station at a stable and flat location.

Power Supply

Power and voltage should meet the following requirements:

◆ Use the power supply with little voltage fluctuation

Voltage fluctuation： AC220V±10% 。

Frequency fluctuation： 50/60Hz±0.3% 。

Space Requirements

To facilitate operation, component replacement and maintenance for the rework station, it is required to reserve >300mm space at the back of the rework station, for the upper part of the machine will be moved and rotated while

Reserve >300mm space at the back of the **machine**

300
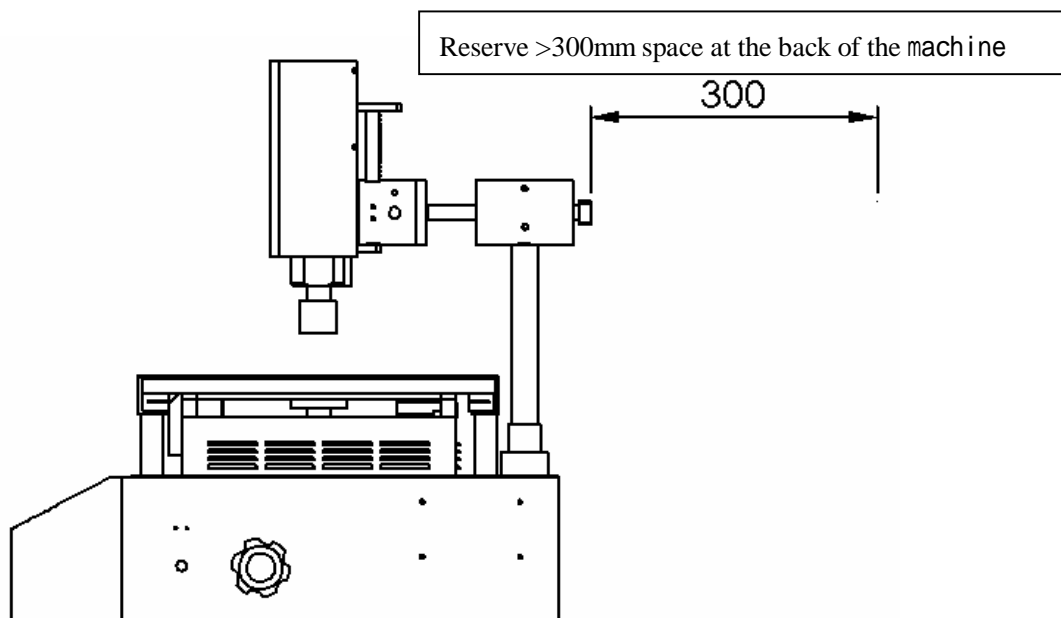
Operating Precautions

1．While using the rework station, please follow the following operating precautions:
   After turning on the power supply master switch of the rework station, check whether there is airflow/wind blowing from both upper and lower hot air heaters. If no wind blowing, no heating, otherwise the heaters will get burnt.

2．Set the different profiles for various BGA to be reworked. The maximum set temperature of any segment of the profile shall be less than 300℃. Refer to the BGA tin bead welding profile for the temperature setting while using the lead-free rework.

3．Check for the perfection of the PCB plate soldering-pan and BGA tin beads one by one prior to the installation of BGA; check the appearance one by one after the BGA welded, and stop installing the BGA and measure the temperature if any abnormal symptom occurs. The welding can be continuously performed only after the proper adjusting; otherwise it may damage the BGA or PCB plate.

4．Regularly clean the surface of the machine. In particular, keep the IR heating plate surface clean, and prevent the contaminated material deposits on it. The deposits may affect the proper heat radiation and result in the poor welding quality as well as considerably reduce the lifetime of the IR heating body.

5．Operator without being trained can not change any set parameter.

6．Avoid electric fans or other equipment blowing towards the rework station while it is working or it may cause abnormal temperature rise in heating zone and thus the work piece will get burnt.

7．Keep the heating zone away from inflammables after startup or it may cause fire or explosion, put the PCB for process onto the PCB supporting racks.

8．To avoid burn, please wear heat-proof gloves and never touch the high-temperature zone while working.

9．Never use inflammable sprays, liquids or gases at any location close to the rework station while the machine is working.

10．Don't remove the front panel or cover of the electric cabinet because the electric cabinet contains HV (high voltage) components which may cause electric shock.

11．In case any metal or liquid accidentally falls into the rework station while working, shut off power and remove power line immediately. Remove such foreign matter or contaminants after the machine cools down. If contaminants remain there, they may give off bad smell after restart.

Ⅱ. Introduction of Rework Station SP360C

BGA Rework Station SP360C made by Shuttle Star has 3 heaters (Upper Heater, Lower Heater and Bottom IR Heater). Thereinto, the Upper Heater & Lower Heater which are hot air heaters heat directly towards the BGA chip to make sure the chip get enough heat, so that it can reach its melting point and be soldered well. The large heating area at the bottom is series IR heating panel called Bottom IR Heater, which heats directly towards the whole PCB(preheat) to make sure PCB be heated evenly, so that it won't get deformed.

SP360C overall schematic diagram：
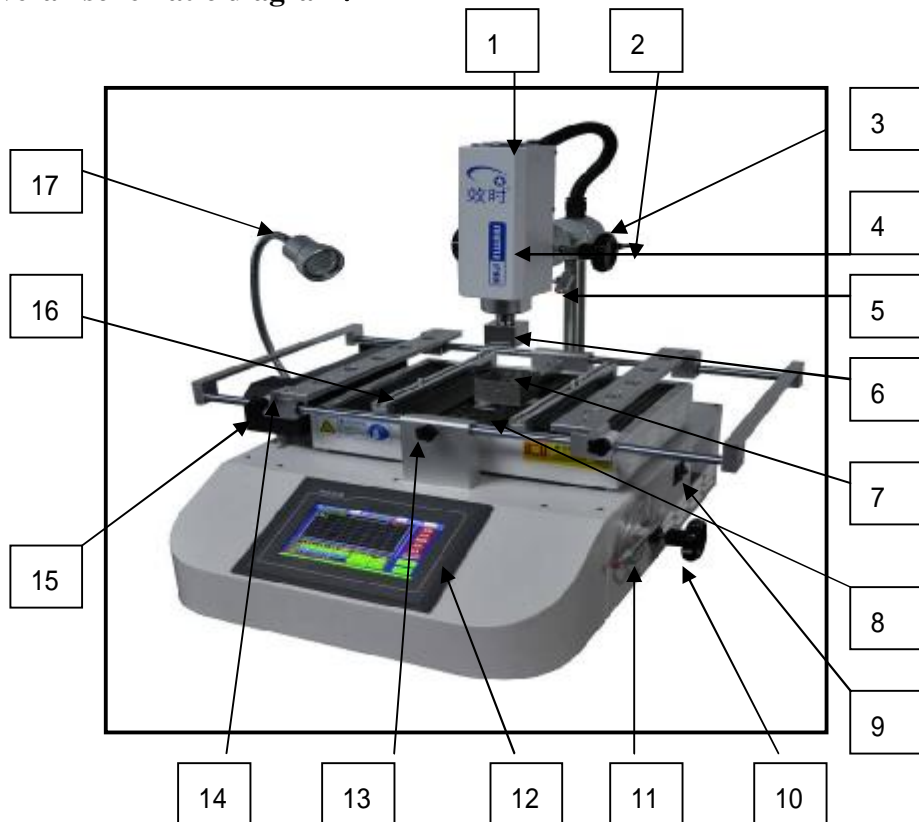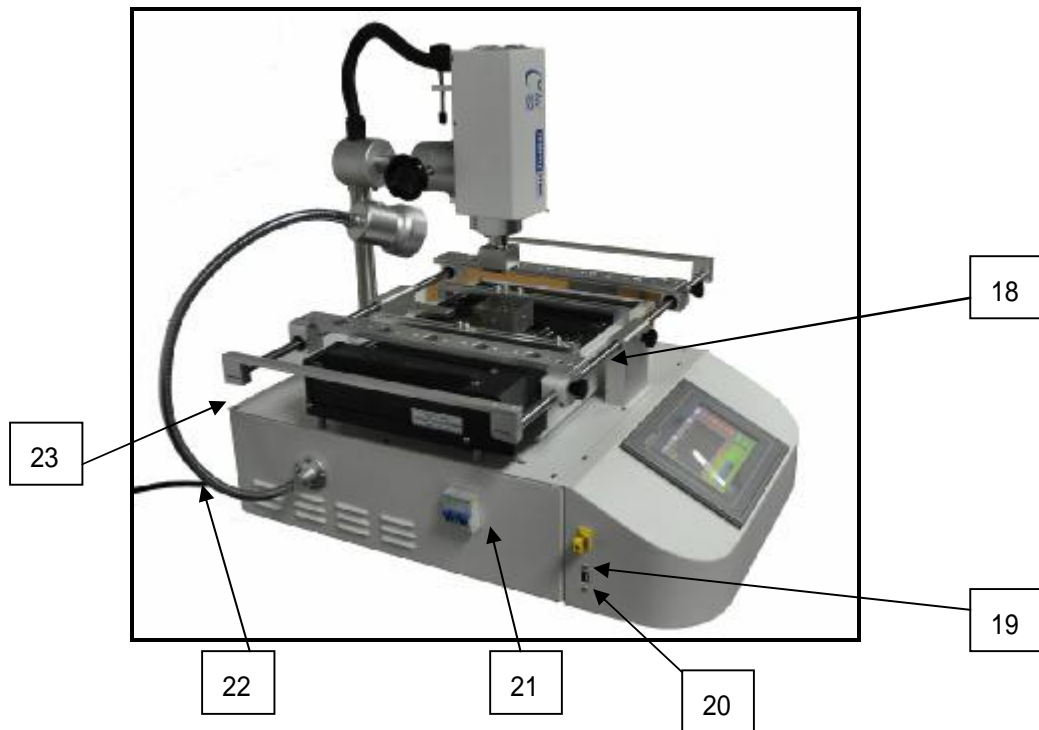
Part name:

1、knob for micro-adjusting the height of upper heater

2、knob for locking the upper heater in longitudinal direction

3、knob for locking the upper heater from forward and backward

4、knob for adjusting the height of upper heater

5、laser pointer for alignment

6、upper Heater

7、upper nozzle

8、lower nozzle

9、lower heater

10、option switch for bottom IR heating panel(Bottom IR Heater)

11、knob for adjusting the height of lower heater

12、vacuum pen

13、USB interface

14、touch screen

15、thermocouple / wire sensor

16、PCB supports locking knob

17、PCB positioning knob

18、LED lamp

19、PCB supporting bar

20、PCB clamping device

21、bottom heating panel(Bottom IR Heater)

22、cooling fan

23、mains switch

Ⅲ.Operating Procedures

BGA rework on PCB should comply with the following procedures：

1.Bakeout：

> Both PCB and BGA chip must be baked in a constant temperature oven with a temperature range from 80℃～100℃ for 8h～20h.The purpose for baking is to dehumidify the PCB as well as the BGA in case bubble phenomenon occurs during rework.

Table1 moisture sensibility grade：

grade	time	time
1	timeless	≤30℃/85％ RH
2	1 year	≤30℃/60％ RH
2a	4 weeks	≤30℃/60％ RH
3	168h	≤30℃/60％ RH
4	72h	≤30℃/60％ RH
5	48h	≤30℃/60％ RH
5a	24h	≤30℃/60％ RH
6	Refer to the labeled time	≤30℃/60％ RH

Table2 baking time：

encapsulation thinkness	moisture sensibility grade	baking time
≤1.4MM	2a	4h
	3	7h
	4	9h
	5	10h
	5a	14h
≤2.0MM	2a	18h
	3	24h
	3	31h
	5a	37h
≤4.0MM	2a	48h
	3	48h
	3	48h
	3	48h
	5a	48h

2.Clamping board：

   2．1.To choose upper nozzle and lower nozzle suitable for BGA size

    2．2.Upper nozzle is fixed onto the upper heater head; tighten the screw for tightening
upper nozzle to fix it. It can be adjusted according BGA's position and angle. Lower
nozzle is fixed on the lower heater head; can tighten the screw for tightening lower
nozzle to fix it. Rotate the knob adjusting lower nozzle up and down clockwise to lift the
lower nozzle. This time, tighten the screw for tightening lower nozzle to fix it.

diagram：

Screw for tightening upper **nozzle**

Upper nozzle

Lower nozzle

Knob adjusting lower nozzle up and down

Screw for tightening lower nozzle
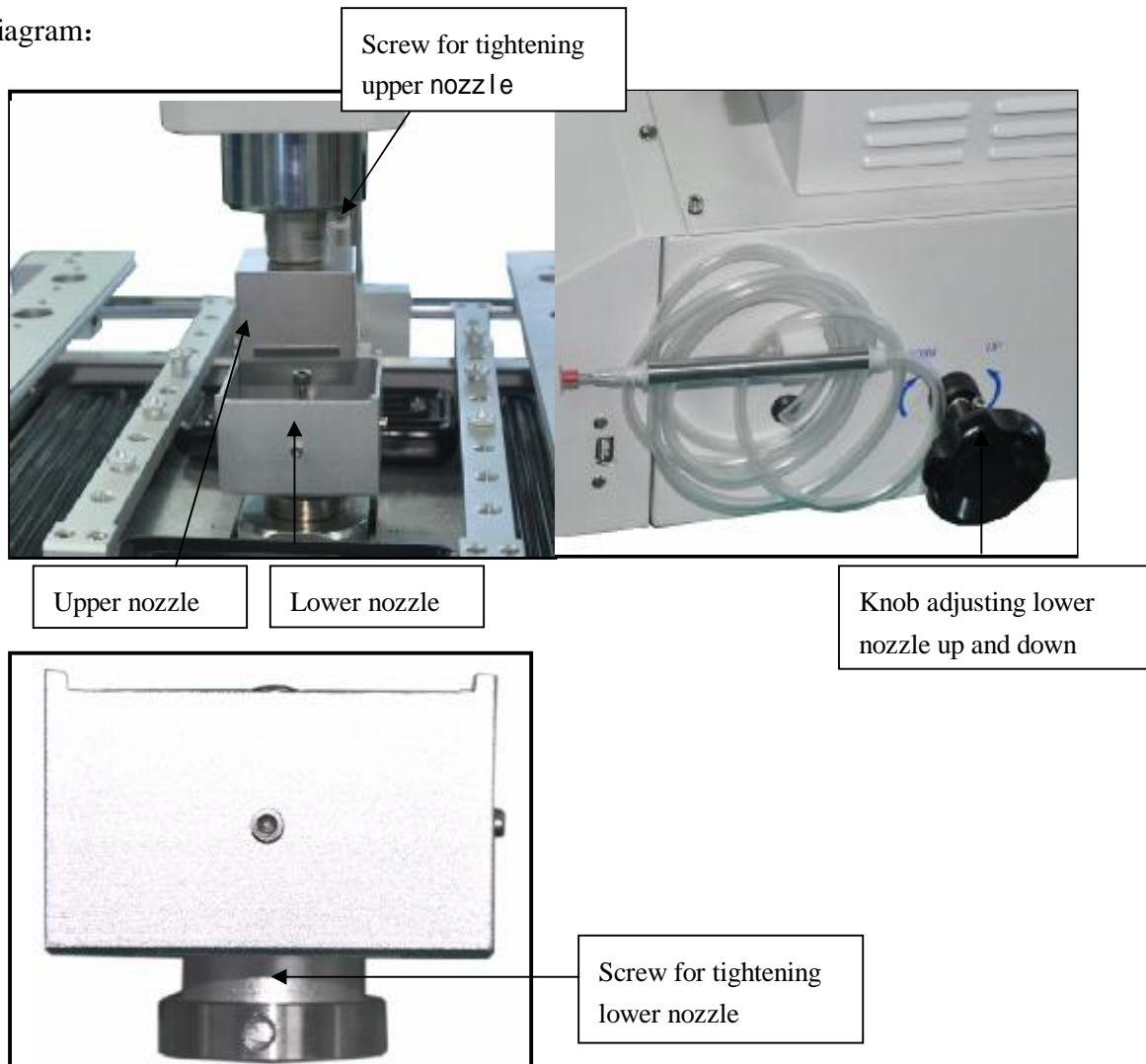
    2．3. Adjust the position of nozzles, rotate the Knob adjusting upper heater up and down,
lower the upper heater, by rotating the Knob adjusting upper heater forward & backward,
make sure the cores of upper and lower nozzles are in one line. Then lock the Knob for
locking upper heater forward & backward to make the upper heater can not be moved
forward and backward any more. Finally, lift the upper heater and put it aside. If need to
rotate the upper heater, loosen the Knob for locking upper heater from rotating, if not
tighten it.

diagram:

Knob for locking upper heater from moving forward & backward

Adjust the position of nozzles

Knob adjusting upper heater up and down

Knob for locking upper heater from rotating
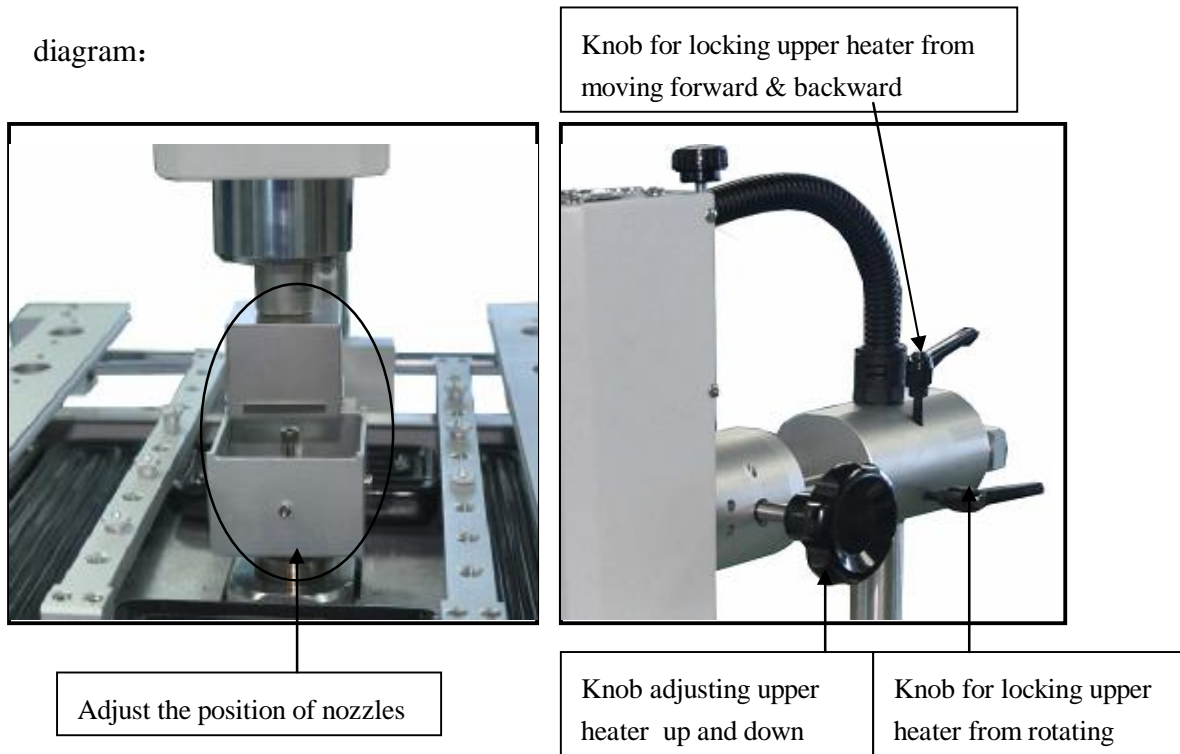
2．4．Adjust PCB clamping device and PCB support bar, close up the clamping device and support bar both sizes before putting PCB on it, then lift the PCB support pillar(which can be adjusted to a proper position according to PCB size) and make it be in line with the stage of the PCB clamping device(which prevents the PCB from getting deformed). As shown in the following picture:

PCB support pillar

Hole for putting **support pillar**

PCB clamping device
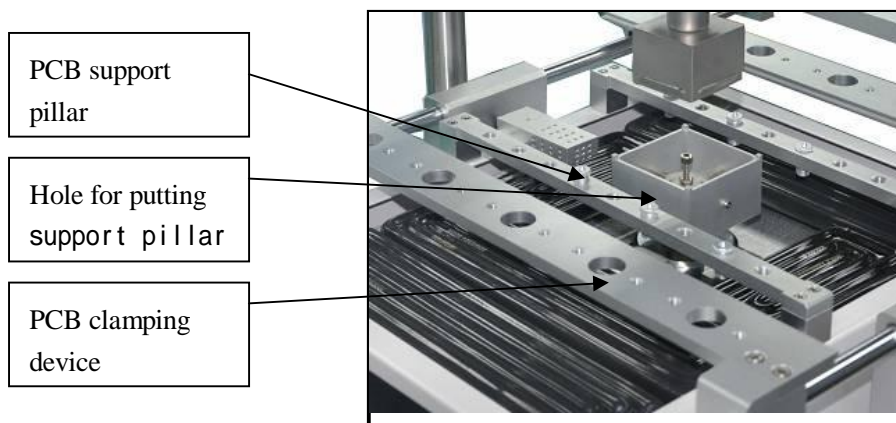
2．5、Put PCB onto the support bar, then align BGA chip with the upper and lower nozzles, make their cores in one line. Adjust PCB clamping device till the board is in the stage of the clamp device.

2．6、Lower the upper heater head, adjust PCB forward & backward, make sure the upper nozzle can cover the whole BGA chip, then lock the positioning mechanism for

clamping. Meanwhile adjust PCB clamping device left & right, make sure the whole BGA chip is covered by upper nozzle completely, finally lock the positioning mechanism for clamping.

diagram：

PCB put on the stage of clamping

Knob for lock clamping device

PCB positioning mechanism for **clamping**
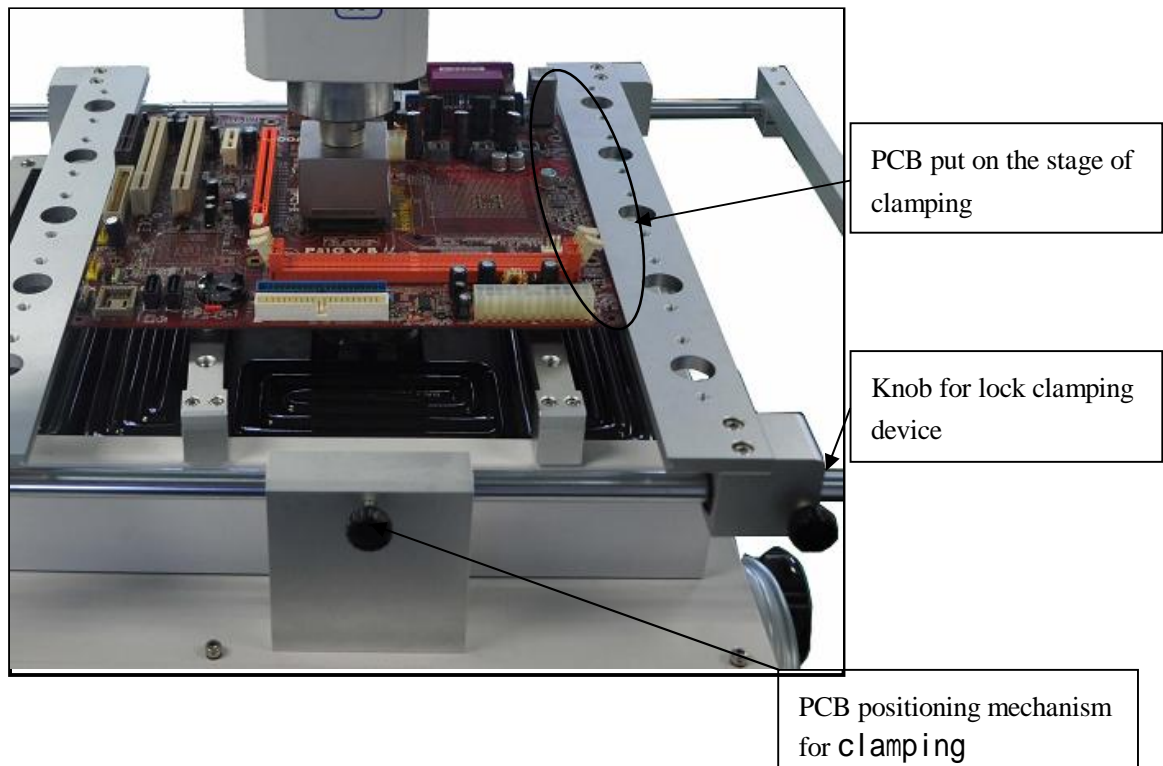
Conclusion：A qualified board clamping should be as follows:

① The whole PCB must be inside of the bottom area IR heater, so that is can be heated evenly.

② The upper nozzle must properly cover the BGA, so that the chip can be heated evenly. Besides, the cores of BGA chip, upper and lower nozzle must be in one line.

③ The PCB support pillar should touch the board lightly.

3、Remove/Desolder：

3．1．Clip PCB to the board supports, clamp and fix the PCB as what we introduced above.

3．2．Select or set a suitable profile, click "Remove" on the touch screen, the system will perform desolder process. When heating completes, it will give alarm, meanwhile the vacuum is available for pick up chip(it will buzz when the pen starts vacuum). This time, rotate the knob to lift the upper heater head, then immediately plug the hole of the

vacuum pen up with the thumb and remove the suction nozzle on the tip of the pen to the BGA chip then pick it up from the PCB. Release the vacuum pen, the BGA will come down from the pen. Heating finishes 8 seconds(this value is settable) later, the system starts cooling automatically. After cooling, we can take the PCB out from the supports.


Distance between nozzle and BGA 1mm

Vacuum pen' hole

Plug the hole up with **thumb**

To pick up BGA
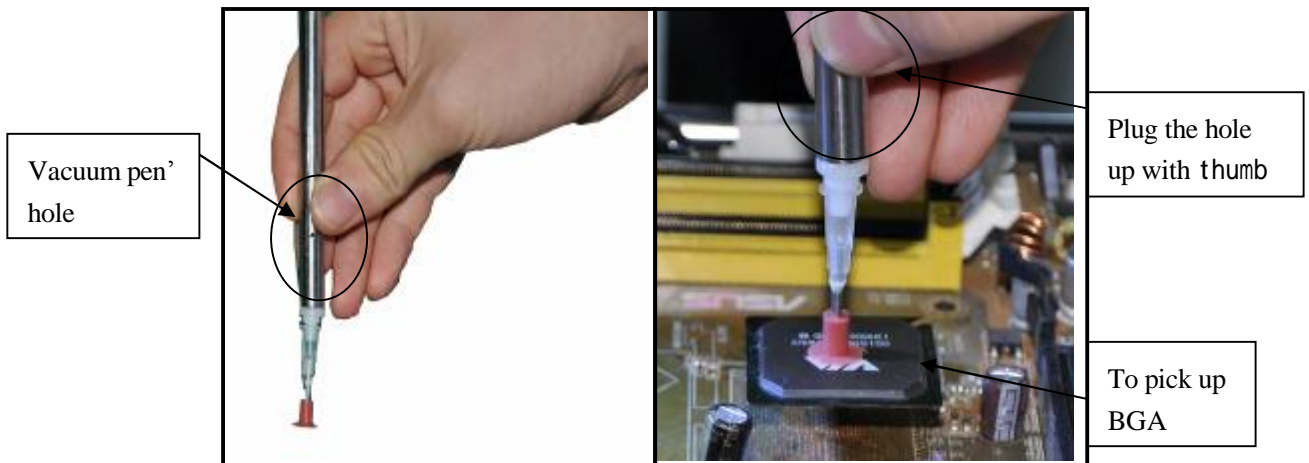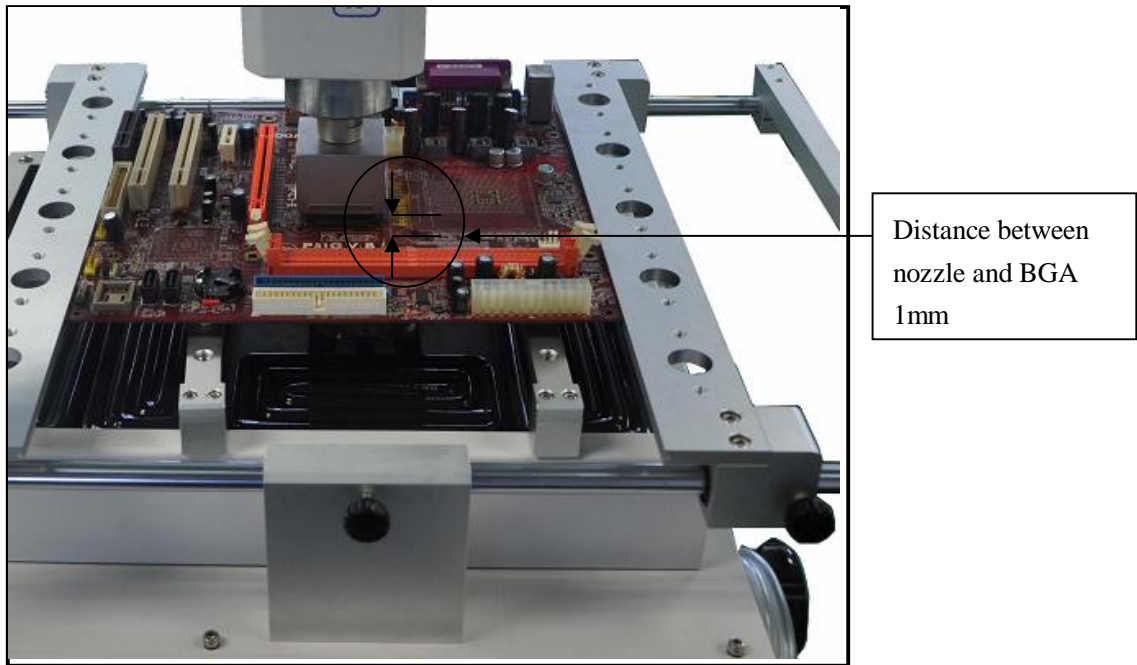
4. Clean pad ：The PCB pad and BGA pad must be cleaned in a short time after desoldering. Because damage to the pad is small while the PCB or BGA haven't cooled of completely. Please refer to the following steps.(cleaning PCB is the same)

4．1. Prepare a soldering iron with temperature 370℃(for leadfree chip) and 320℃ (for

leaded chip)

4．2.Apply a small layer solder flux to BGA equally

4．3.Mop the chip with the soldering iron to clean it.

4．4.Take a wick to clean the pad until it is neat.

4．5.Wipe pad: To ensure the reliability of BGA soldering, wipe the pad with some
   volatile solvent as strong as possible, such as industrial alcohol.
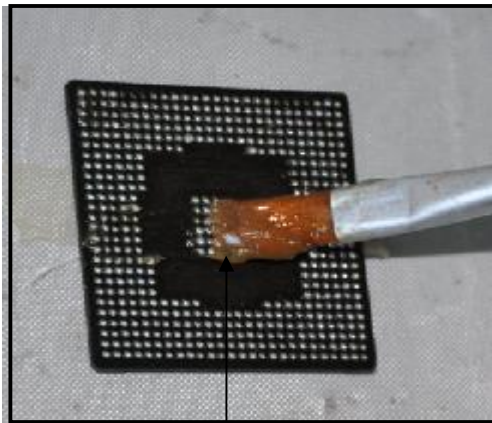
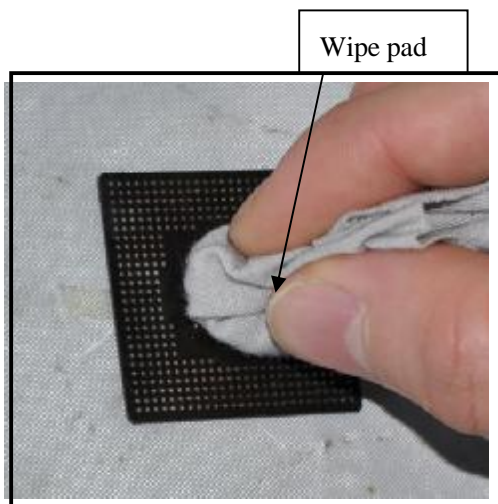
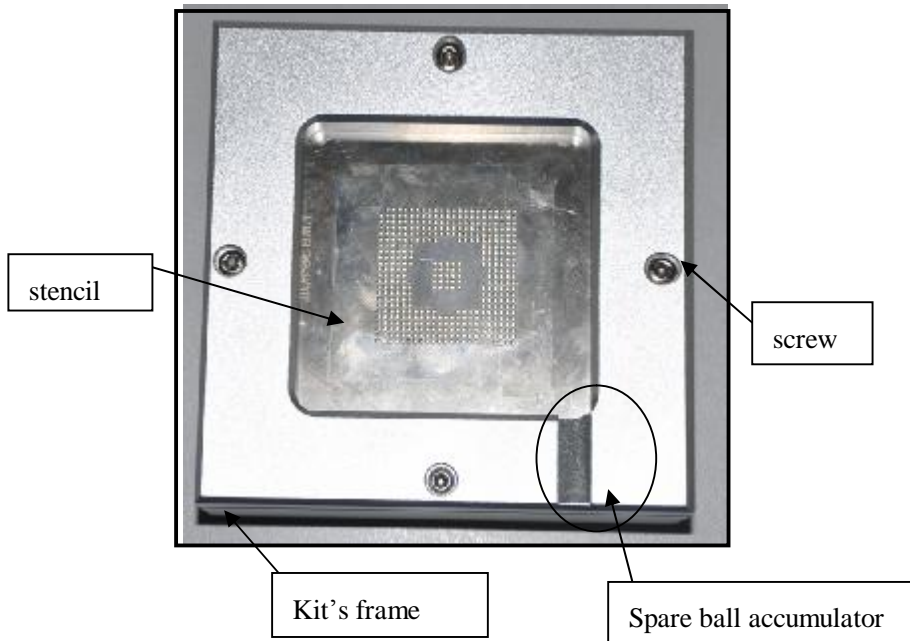Apply solder flux
with brush
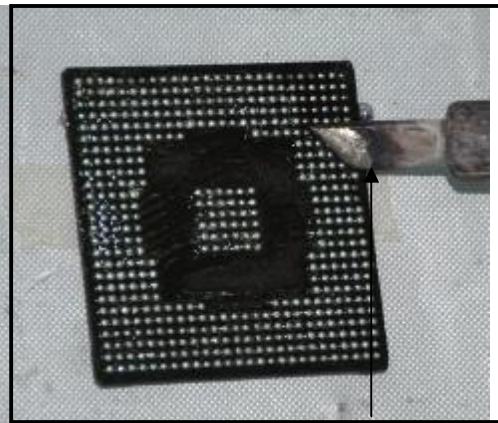
Mop the pad with
soldering iron
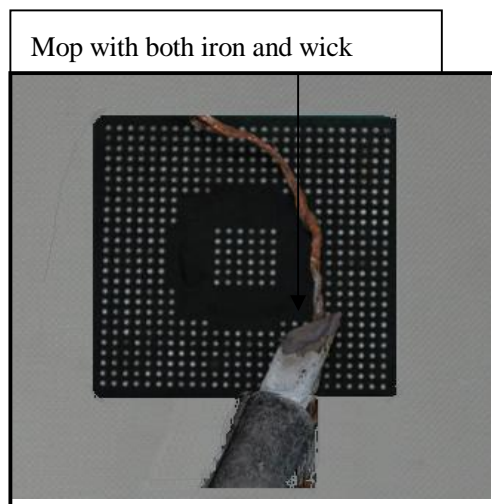
Mop with both iron and wick

Wipe pad

5、BGA Reball：

5．1.Choose a stencil, a reballing kit and proper solder ball that match the BGA, put the
   stencil between the kit's frame and cover, then rotate the screw to lock up.(But
   please do not lock it tight, so that it can be micro-adjusted and moved)

stencil

screw

Kit's frame

Spare ball accumulator

5．2．apply solder flux to BGA equally, then place BGA as the picture showing below; adjust the locating block to make BGA's diagonal and the reball kit's diagonal match together, only in this case the BGA is located in the center of the reball kit; finally lock the four locating block it fix it.

Locating block

Apply solder flux

Screw adjusting the gap between BGA and stencil

Reball kit's diagonal

Lower die holder
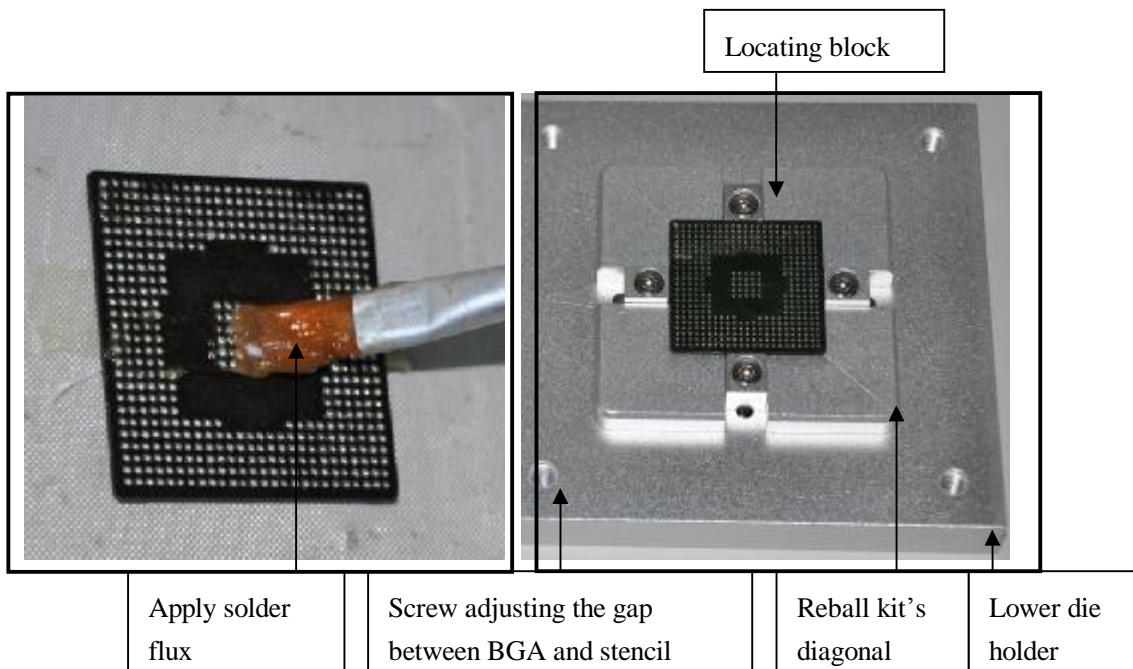
5．3．Put the cover with stencil inside over the kit; then move the stencil lightly to make its holes match the BGA pins. In case this method is not good enough to

make stencil's holes and BGA pins match each other,(pay attention to the deviation place) open the cover(frame), readjust BGA and repeat all those actions only to make sure the stencil's holes match the BGA pins; finally lock; otherwise, you have to micro-adjust the stencil.

Final lock

Adjust stencil to make its holes match the BGA pins
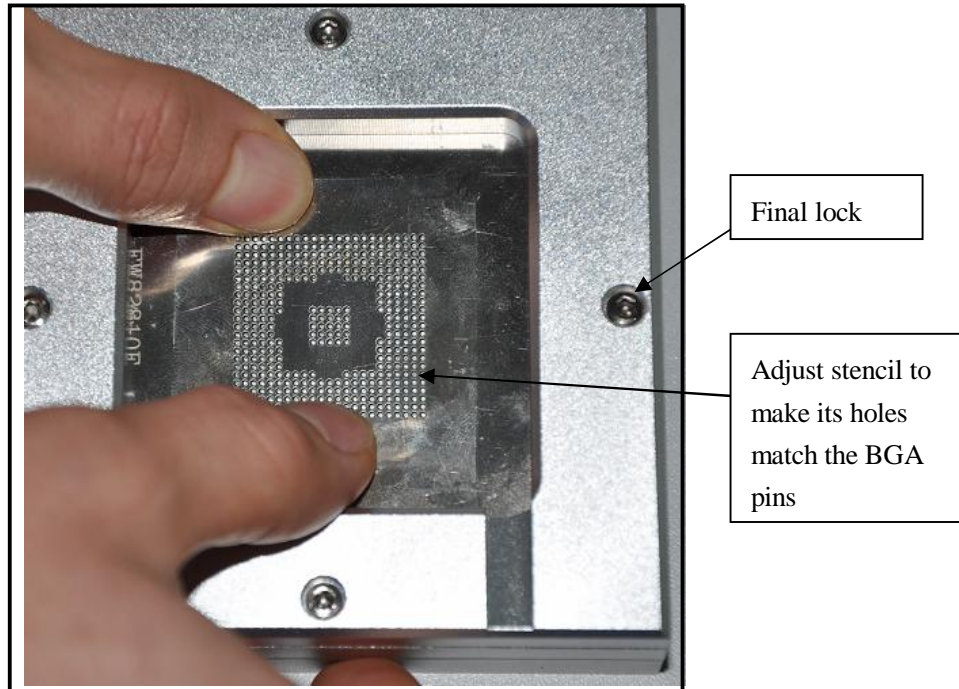
5．4．Adjust the gap between BGA and stencil. By adjusting the Screw adjusting the gap between BGA and stencil, we can make the gap between BGA and the stencil 2/3～3/4 of the ball diameter. Make sure one hole for one ball going through only and it is convenient to take out the stencil.

5．5．First, exam the solder ball size whether it matches the chip and stencil; second put it on the stencil as the following picture shows, then shake the whole kit lightly to let the ball drop to the BGA chip through the stencil's holes. Finally check whether every pin has been reballed (make sure no pin missing), then we can put the spare balls aside and take out the cover.(note that tilt the kit while taking out the cover in case that the reballed balls go out together with the stencil. After that, the qualifiedly-reballed BGA can be taken out.(At this time if some pins found missing(not yet reballed), we can make it up by a right tweezers. After reballing completely, recollect the spare balls.

5．6．When change for other BGA chip of different size as well as solder ball, please repeat steps 1-4
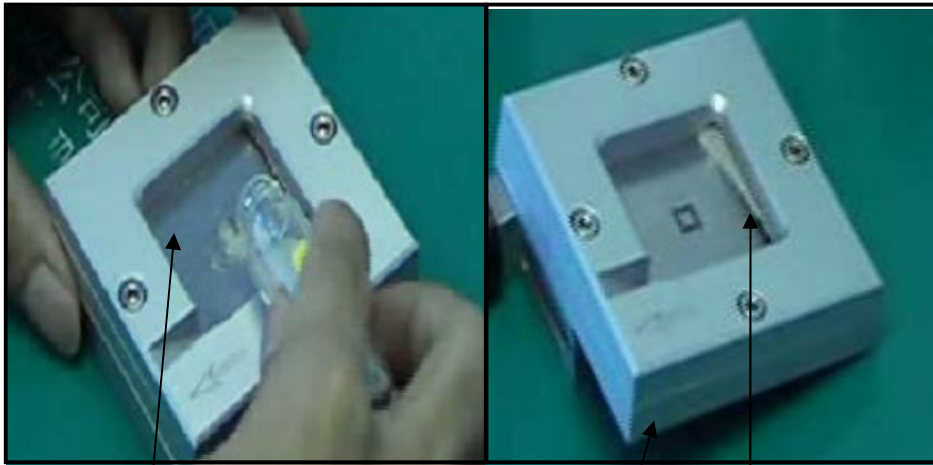
| Put solder ball on | | Tilt the kit | Put the spare balls aside |

6、BGA reball soldering

6．1. Prepare a soldering station for BGA reball soldering, set soldering station temperature at 230℃ for leaded BGA and 250℃ for leadfree BGA

6．2. After setting temperature, start the soldering station and wait for the temperature going to the required value and being constant.

6．3. When the temperature keep constant, put the reballed BGA onto the soldering station with a high-temperature paper underlaid to heat, meanwhile use a hot air gun as a assistant heating from the upper surface.

6．4. When the balls are melted, they become liquid with light color and line up. Also it will give off fumes. Seeing this, stop heating and take away the BGA from the station.

| Soldering station | High temperature paper | BGA balls are melted |
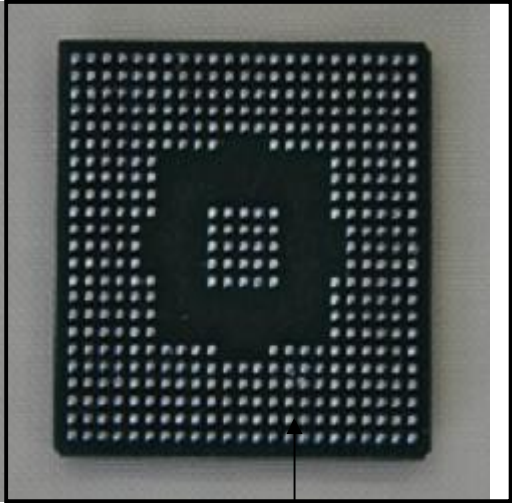
7. Apply solder flux:

    7．1.To guarantee soldering quality, make sure that the PCB pad is free of dust before applying solder flux. The best way is to wipe the pad before applying solder flux every time.

    7．2.Apply a layer of soldering flux on the PCB solder pad with a brush pen. Excessive flux may result in the balls shorted, in reverse, it easily causes missing solder. So the soldering flux coating shall be even with a proper amount so as to remove the dust and foreign materials from the BGA tin beads and improve the welding effect. (Applying solder flux to BGA is the same)

8、Placement：

Lay the PCB on a table, place the reballed BGA onto the PCB manually. Align BGA pad with PCB pad by referring to the silk-screen frame. Note that the direction sign on BGA should be corresponding with the one on PCB.

9、Solder：

    9．1．Clip the PCB with renewed BGA placed to the supports, exam the alignment of BGA and PCB, adjust the supports .

    9．2. Set or choose a appropriate profile according to the PCB type, start "Solder" on touch screen, it will perform soldering process. When finish, it buzzes to give alarm, meanwhile cooling stars as well.(The cooling time can be set in the profile) Then lift upper heater and put it aside. When cooling completes, take PCB out of the machine.

Notes：The difference between Solder and Remove process is the way of cooling, i.e. cooling starts right after soldering completes, but cooling starts 8 seconds (time is settable) after desoldering/removing process completes.

Ⅳ.Introduction to Touch Screen Control

Turn on the machine. The touch screen will automatically POWER ON, as shown in Fig.1

Fig. 1

The company's LOGO is located at the top left corner.

English：Click it to select English menu

Chinese：Click it to select Chinese(simplified) menu

Password：click the black column to input password.

Note：If password is missing, it can be recovered only by re-downloading program. Therefore, please keep it in mind.

User permissions shown as follows:（password can be changed only in the group of Engineer）：

Default password	Group	Permissions
1234	Technician	Can enter operating mode only, in this mode, parameters can be read only
8888	Engineer	Can enter both operating and debugging mode, in this mode, parameters can be changed and saved.
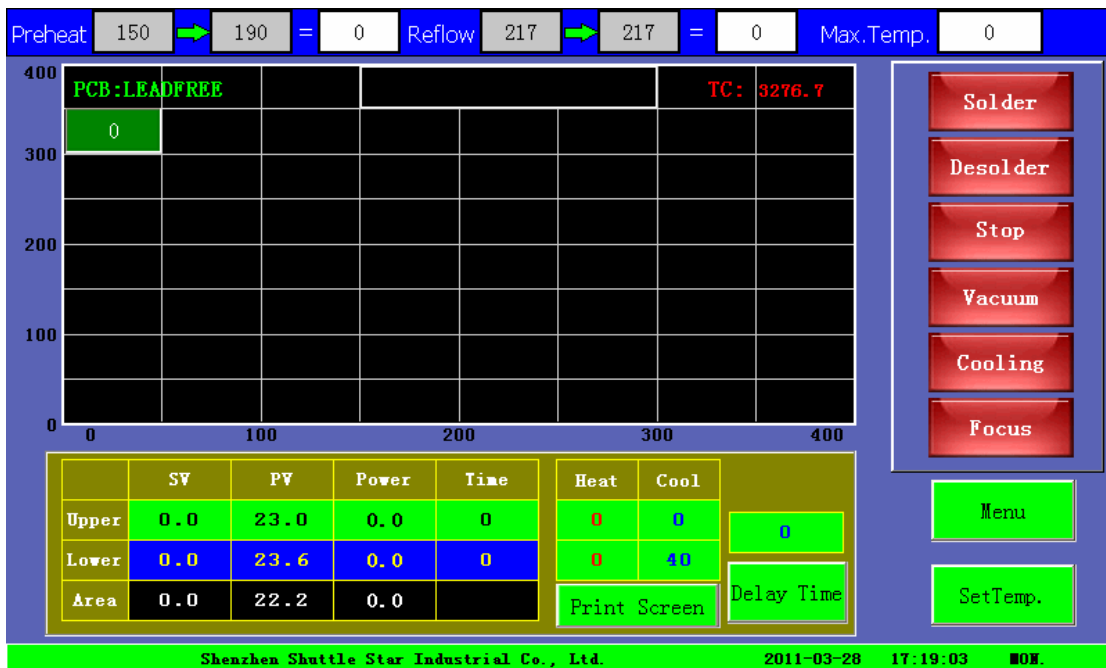
Fig.2

In Fig.2：

The upward side if the analysis column：

Preheat：the first column for setting low preheat temperature; the second column for setting high preheat temperature; the third column shows the time taken from low preheat temperature to high preheat temperature.

Reflow：the first column for setting low reflow temperature; the second column for setting high reflow temperature; the third column shows the time taken from low reflow

temperature to high reflow temperature.

Max.Temp.：shows the max temperature that the wire sensor senses from the BGA.

The black zone shows the real-time profile trends, where: green line stands for upper heater, blue line stands for lower heater, red line stands for the practical profile from BGA.

PCB：next is the profile name(usually are the BGA model numbers)

Stanby：to show the status of the machine

The top middle zone in the whole black zone shows the alarm events

TC：shows the currently sensed temperature by wire sensor

X-coordinate indicates time, unit: second
Y-coordinate represents temperature, unit: centidegree

Solder：click it to automatically perform the soldering process according to the selected profile.

Desolder：click it to automatically perform the desoldering process according to the selected profile or set parameters.

Stop：stop the system while running.

Vacuum：vacuum start switch. Press-down means ON, reset means OFF

Cooling：start cooling function (it will stop cooling automatically while heating)

Laer pointer：to power on the laer pointer

Menu：click to enter menu column, refer to Fig.3

SetTemp.：click to enter parameter setting column, refer to Fig.6

SV：shows the set value of temperature

PV：shows the practically measured value of temperature

Power：shows the current power

Time：shows the time that the constant temperature lasts in the current stage.

Heat：at the upper displays the constant-temperature time of this stage, at the lower displays the total heating time.

Cool：at the upper displays the cooling time currently remained, at the lower displays the current total cooling time.

Status：shows the system status

PrtScm：click it to print the screen, refer to Fig.9
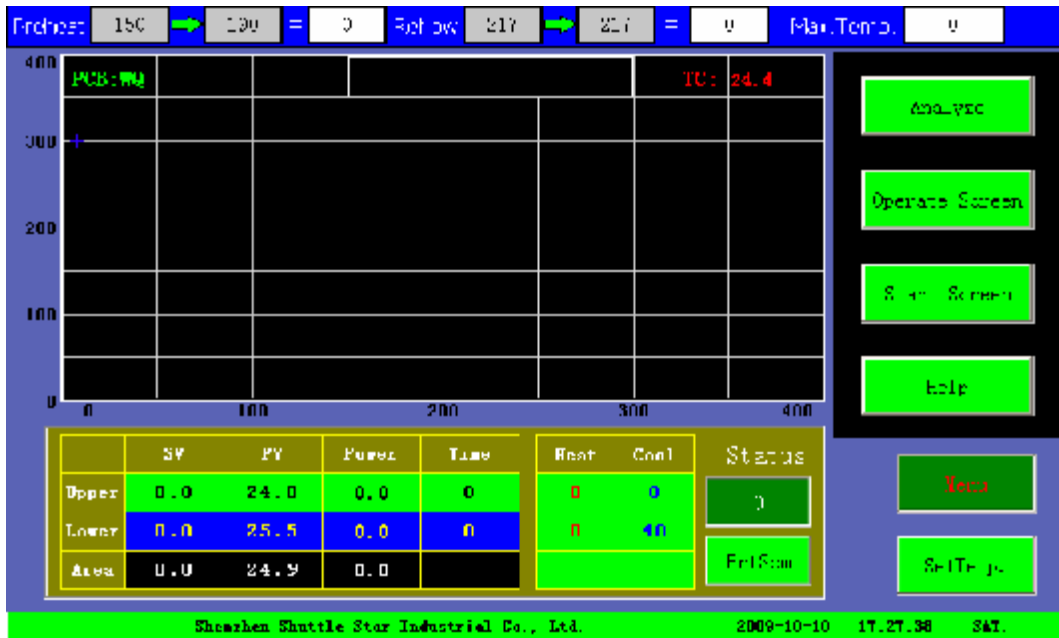
Fig.3

In Fig.3：

Analyze: click it to enter analysis column, refer to Fig.4

Operate Screen：click it to return to operating screen, refer to Fig.2

Start Screen：click it to return to start screen, refer to Fig.1

Change password：enter to change password, input new password then click"OK".

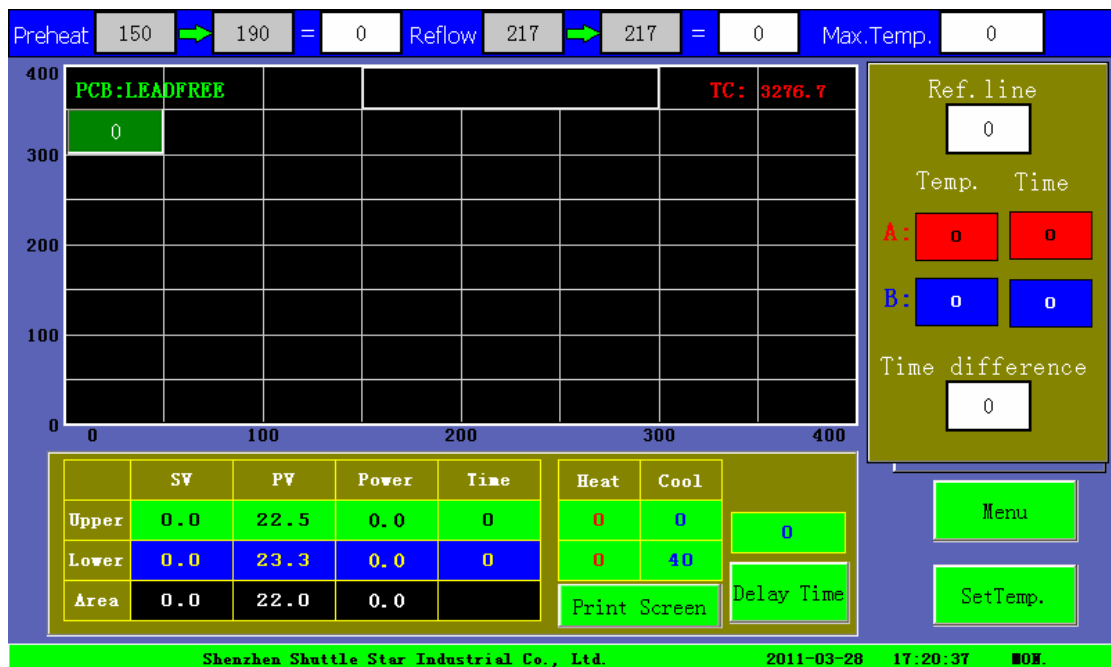Help：click it to enter 'Requirement for solder', refer to Fig.5

Fig.4

21

In Fig.4：

Line: input a temperature value, there will be a referring line showing the temperature value in the profile diagram.

A：the left column for setting temperature (Y coordinate for point A); the right column for setting time(X coordinate for point A)

B：the left column for setting temperature (Y coordinate for point B); the right column for setting time(X coordinate for point B)

Time difference：shows the time that the profile runs from point A to point B:There three ways of operating the analyze function:

1、 Input the a general value in the Temperature and Time column of A & B directly, exam point A and B whether they are intersecting the profile line.

2、 Input the temperature of the line first, then click the intersecting point A & B

3、 Click on the profile line without moving your figure, drag point A or B to the point where shows the temperature you want to analyze, please note that the input column for A & B at the right shows the current data of Temperature and Time while A & B is being dragged.

Tip：Point A and point B appears alternately; e.g. first click point B appears, second click point A appears, then third click point B appears again.
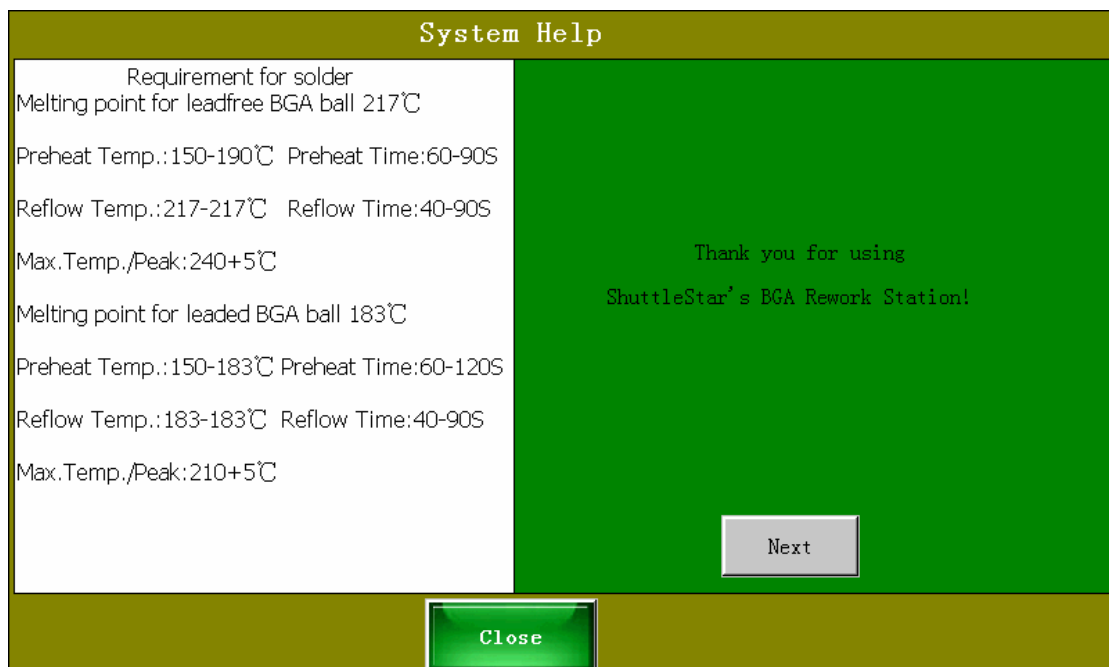

Fig.5

In Fig.5：Describes the requirement for BGA soldering.

Set Temperature

PCB: LEADFREE   Nozzle: 38*38

	1	2	3	4	5	6	7	8
Upper Temp.	55	205	180	250	200	0	0	0
Upper Time	45	80	40	85	5	0	0	0
Lower Temp.	55	205	180	260	280	0	0	0
Lower Time	45	80	40	20	70	0	0	0

Pre.Power	Area	Area	Upper Offset	Lower Offset	Cooling	Alarm
0	0	160	0	0	40	5

Save   Download   Close

Fig.6

In Fig.6：

PCB：click it to enter edit window, refer to Fig.8

Nozzle：Here describes the size of nozzle that this chip needs.

Click the profile setting in the yellow zone, popping an edit window like Fig.9

Pre. Power：Here shows the output power for Bottom IR Heater while heating.

Area：Here shows the set temperature for Bottom IR Heater, i.e.

Upper Offset/ Lower Offset：Here we can input the compensation value for lower heater if we would like to change the profile or parameter setting. If we input "10" it means the SV(set temperature) for lower heater increase 10℃ at whole; if we input "-10" it means the SV(set temperature) for lower heater decrease 10℃ at whole.

Cooling：Here shows the time that the system takes for cooling automatically once heating completes

Alarm：Here shows the alarming time 5s, also "5s" means the system give alarm 5 seconds before the heating completes. When alarm stops, heating completes.

Save：click to save the set and good to the system

Download：click it to download the current profile for use

Close：click it to close the window if no changes want to take.

Fig.7

In Fig.7：

Input characters: please input the PCB name

： switching key for different input method, ： page up & down to select

word；

Fig.8

In Fig.8：

After click the input column in the yellow zone, input the profile code to the popped window,

then click 'OK'

Fig.9

In Fig.9

Tip: Please insert USB, here we can cut the current menu picture and download to USB(there is a USB interface outside) Picture's format is *.BMP; * stands for PCB's information.

Ⅴ. Creating a Profile

Usually speaking, our company make and save 2 standard profiles in the machine during adjustment, 1 for leaded chip called leaded profile, 1 for leadfree chip called leadfree profile. The user can create new appropriate profiles for diff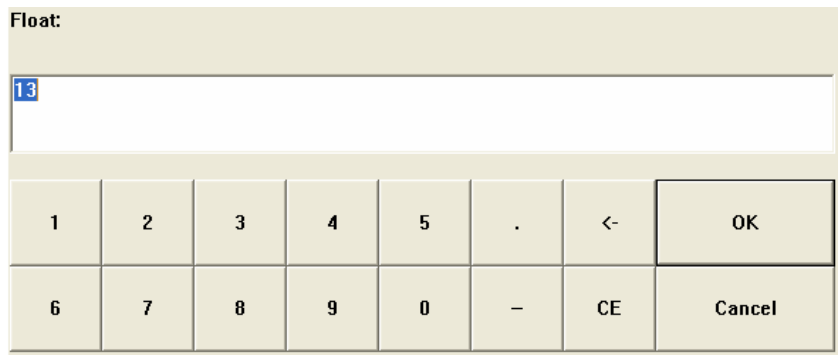erent BGA chips based on the existing standard rofiles in the machine. Before creating a new profile for a BGA, we have to use a existing profile and test whether the profile fits the BGA by inserting the wire sensor into the BGA while desoldering to see the temperature.

Best leadfree profile requirement：
Preheat temperature： 150-190℃
Preheat time: 60-90 S
Reflow temperature: 217-217℃
Reflow time: 40-90 S
Max temperature(peak/TC) 241℃±5℃

Set Temperature								
PCB:	WQ				Nozzle:	30*30		
	1	2	3	4	5	6	7	8
Upper Temp.	55	205	180	250	200	0	0	0
Upper Time	45	80	45	75	10	0	0	0
Lower Temp.	55	200	180	260	200	200	0	0
Lower Time	45	80	45	20	55	10	0	0

Pre.Power	Area	Area	Upper Offset	Lower Offset	Cooling	Alarm
0	0	Ball	-5	0	40	5

Save　Download　Close

Leadfree profile setting (Fig.1)

During the whole heating process, there 8 stages from preheating to cooling, but usually only 5 stages are enough and available

1．PRE., Stage 1: preheating the board; in this stage, temperature is low, usually below 100℃; like in Fig.1 55℃

2．RISE, Stage 2, temperature rising; in this stage, we want temperature rise quickly, so we usually set 205℃ for leadfree and 190℃ for leaded.

3．Cons., Stage 3, keeping temperature constant, in this stage, we keep a constant temperature of 20-30℃ lower than stage 2 so as to wipe off the impurity on the board, because during this period the flux is volatilizing which does good for wiping off the impurity.

4．REF., Stage 4, ball melting and reflowing; in this stage, the ball begins to melt and reaches to the peak, so the temperature should be high(usually is highest) and time should be long.

5．REF., Stage 5, reflowing(from the peak to ball's melting point); in this stage, temperature must be lower than Stage 4, and time usually is 5~10S in upper heater.

Insert the wire sensor into the BGA to test the temperature of it

Testing temperature (Fig.2)

6．Check the PCB to be repaired, and confirm it is leaded or leadfree. E.g. PCB is leadfree (of course BGA also leadfree): First of all, we choose a leadfree profile and check the settings(as in shown Fig.1). Second, clamp the PCB to the supports and insert wire sensor into BGA (for testing temperature). Third, star 'Remove' (as in shown Fig.2). When heating completes, look over the 'Analyze' column to check the preheat time, reflow time and max. temperature(peak) whether they meet the requirement of leadfree technology.(as in shown Fig.1)

7．If every parameter in Fig.1 meets requirement, that means this profile is suitable for this BGA, then we can save it as "LF+..(BGA model number). Next time we repair the same BGA chip as this, we no need to test the profile any more, but use it directly. In reverse, we have to change settings then save.

8．If the max temperature/peak(TC) is lower or higher than the standard required temperature 245℃(leadfree), we can take a method as follows:

　　e.g. The tested Max temperature is 220℃, （245-220）×1.2=30

　　e.g. The tested Max temperature is 260℃, （245-260）×1.2= -18

　　we put "30" or "-18" to "offset", then we can get a suitable profile.

9．If the preheat time is too short which doesn't meet requirement(60~90s leadfree), there are two solutions to make a suitable profile:

　9．1．When the profile running finishes stage 2 with a temperature(TC) below 150℃, we

can increase the set temperature or prolong the time in this stage on both upper and lower parts. The standard requirement is that TC/ wire sensed temperature must up to 150℃ when stage 2 ends.

9．2． The profile running finishes stage 2 with a temperature(TC) of 150℃ or more. In this case, we should prolong the time in stage 3. The prolonged time must be the number missing in preheat time. i.e. We prolong how much seconds it misses in the preheat time(preheat time must be between 60~90s).

10. If reflow time is too short below (40~90s) which also does not meet requirement, the solution is to prolong time in stage 4 or 5. The same as point 9．2． i.e. to prolong how much seconds it misses in the reflow time(reflow time must be between 40~90s)

11． Suppose the preheat time and reflow time are too long (preheat time over 60~90s, reflow time over 40~90s), we can take a reverse method of the above.

12． After changing the setting, we get a new profile. Also we have to test this new profile again. The method of testing is the same as what we mentioned in Fig.2. Even this profile is still not qualified, we have to change and readjust setting again and again until it is qualified, then save in the machine.

Best leadfree profile requirement：
Preheat temperature： 150-183℃
Preheat time： 60-120 S
Reflow temperature： 183-183℃
Reflow time： 60-90 S
Max temperature(peak/TC)： 210℃±5℃

Leaded profile setting

The method worked on leaded BGA chip is the same as leadfree one.

★ Rework Skills

1、If we are not sure the BGA is leaded or leadfree, for safety concerns, we take a leaded profile to test (To test means to desolder a BGA with the wire sensing inserted). During heating, when "TC" on the touch screen goes to 190℃, flip the BGA with a tweezers. Here, if the balls are already melted, we can say it is leaded. In reverse, we can say it is leadfree. Only when "TC" goes to 217℃ can the BGA balls be melted, we might know it is leadfree.

2、Usually we select or make an appropriate profile according to the size of BGA and the thickness of PCB. The thicker PCB is, the more temperature in lower part we need to increase.

3、Profile setting for South Bridge and North Bridge is almost the same. But exactly NB(North Bridge) needs a little more temperature than SB(South Bridge).(usually a few degrees only) For the two-store VGA on laptop motherboard, we need to increase temperature in lower part and decrease temperature in upper part a bit(in stage 4 of upper part, set 210-220℃). The reason why we do so is that high temperature in upper part will damage the small chips on the VGA.

## Ⅵ. Instruction on Installation of Supporting Clamp for Laptop PCB

Usage of clamps for laptop PCB:

1．We offer a set of clamps for laptop PCB along with the machine(4 pcs) as shown in the following picture.

Knob

Clamps

Clamps' neck
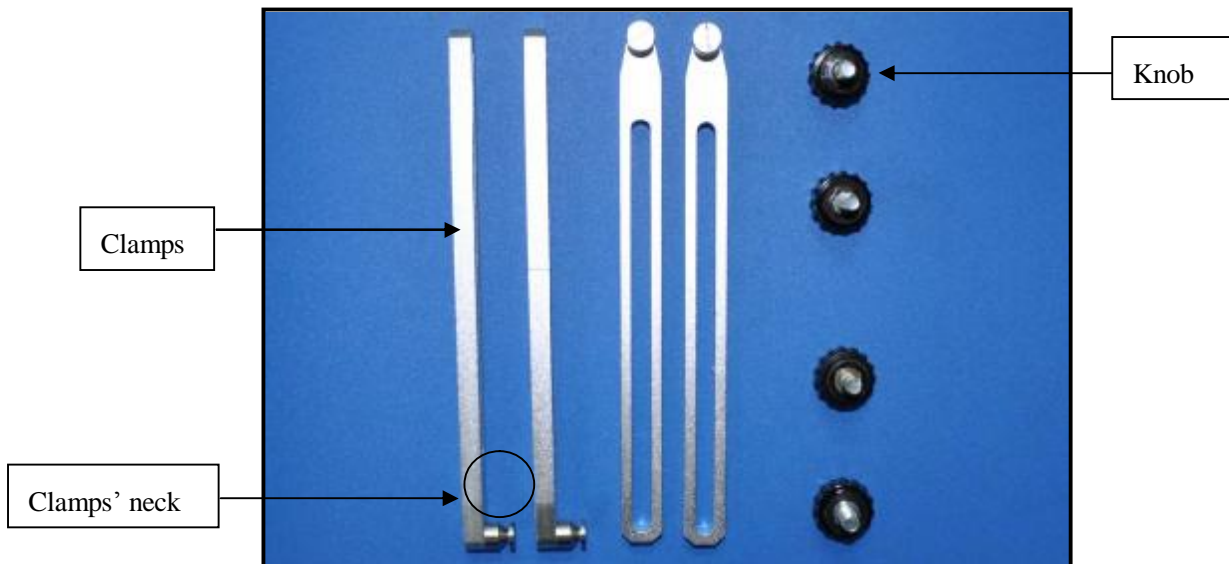
2．The clamps are fixed on the tapped hole of PCB supports according to the PCB size, fixed by rotating the knob, as shown in the following picture:

Tapped hole
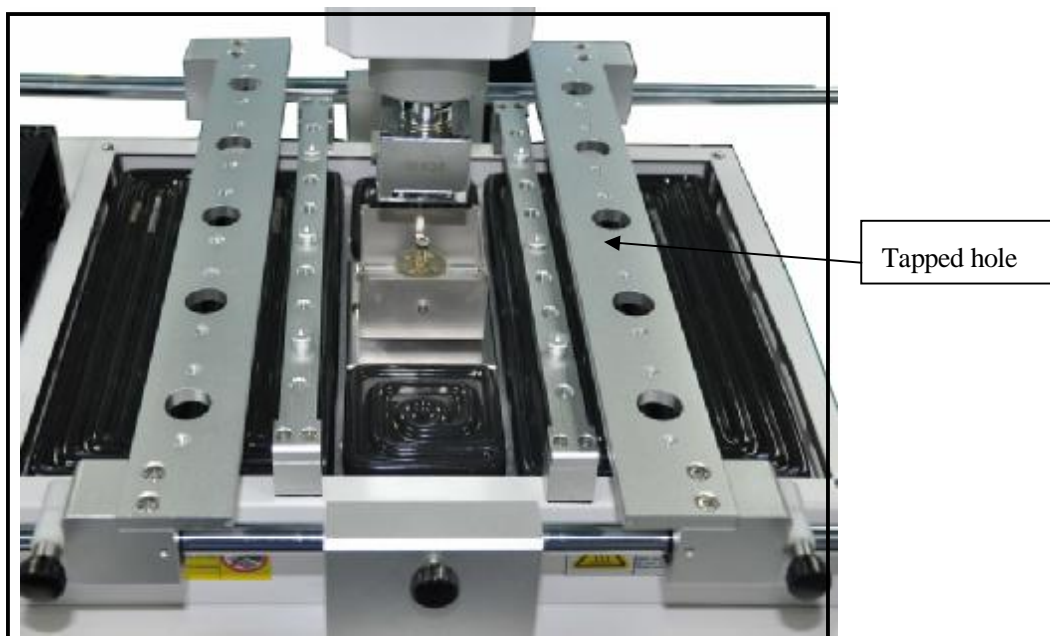
Fixing

3．Clamping laptop PCB, put PCB on the supports, make sure the cores of BGA, upper nozzle and lower nozzle are in a line. Adjust PCB clamping device, move the clamps to the holes on PCB and fit, then fit the knob on the supports, finally pull the clamps tight before tighten the knob to make the PCB neat.

Refer to the following picture:

Fixing knob

Locking PCB

Ⅶ. Alarm Malfunction and Troubleshooting

1. Bottom IR not heating !

Troubleshooting: 1）.check whether the profile parameters(bottom temperature) is correct.
2）.check the whether the indicator of SSR is power on when the machine is turned on, and whether PLC has data output.
3）.alternate the SSR to exam whether it is broken.
4）.check the IR heater(take a multimeter to measure the resistance of the IR heater, whether connecting line is well-connected.

2. Upper / lower part heating abnormal!

Troubleshooting: 1）.check whether the profile parameters(upper / lower temperature) is correct.
2）.check the whether the indicator of SSR is power on when the machine is turned on, and whether PLC has data output.
3）.alternate the SSR to exam whether it is broken.
4）.check the upper / lower heater element(take a multimeter to measure the resistance of the IR heater, whether connecting line is well-connected.

3. Thermocouple shows wrong value 3276.7

Troubleshooting: 1）check whether the wire head of the thermocouple is fine.
2）cut the damaged part of the wire, and twist tow newly-comeout heads.
3）check the inner connecting line of the thermocouple, whether it is well connected, if not, re-connect it(yellow is +, red is -)

4. The vacuum too weak to pick up the IC

Troubleshooting: 1）.check whether the vacuum is working
2）.check whether the windpipe is loose
3）.check whether the vacuum pen leaks

5. Tripping while starting machine

Troubleshooting: 1）check whether the ground line and null line in the plug get shorted.
2）disassembly the IR heater panel to check whether the wire is loose.
3）check whether the wire connection in lower heater is shorted circuit.

Ⅷ. Maintenance

In order to guarantee the machine function and prolong service life of the machine, during usage, we have to do some maintenance on the system regularly as follows:

Components name	Maintenance method	Maintenance period
Upper heater	Open the cover, clean the fan with high-pressure air	1 month
Up& Down Drive mechanism on upper heater	Apply some butter on lead rail, rack, gear and other drive mechanism	1 month
Electronic box	Open the back cover of the machine, use vacuum cleaner to suck the dust and dirt, and check whether the components fixed well	3 months
Forward& Backward Drive mechanism on upper heater	Apply some butter on lead rail, rack, gear and other drive mechanism	1 month
Rotating part mechanism on optical system	Apply some butter on the drive parts	1 month
Bottom IR heating panel	Clean the heating tube with dry cloth(do not use wet one)	1 day
PCB clamps	Apply some lubricant to the PCB supports and shaft of support guiding axle	1 month

Ⅸ. Technical Specification

Technical specification

Applicable PCB	Max PCB size	430mm×350mm
	Workable area	430×350mm
	PCB thickness	3mm
Applicable BGA	Max size	55mm×55mm
	Min size	1mm×1mm
	Max weight	80g
Temperature control	Upper heater	350℃
	Lower heater	350℃
	Sub(bottom) IR heater	300℃
	Temperature control	16sections of programmable temperature control setting
Power consumption	Power for operation	3500W
	Main(upper) heater	800W
	Lower heater	800W
	Bottom IR heater	2400W
System parameter	Dimension	650*500*600mm
	Weight	36KG
Input voltage	Power for requirement	AC 220V 4KW

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