VECTECH BGA 3000DX

BGA/SMD Rework System

Instruction Manual

Thank you for purchasing our BGA/SMD Rework System. The system is exclusively designed for reworking and soldering SMD components. Please carefully read this manual before operating the system. Please keep the instruction manual properly for future reference.

Catalogue

1. Overview

Thank you for using VECTECH 3000DX Rework System. This system which adopts microprocessor control and infrared sensor technology to soldering and desoldering the surface mount components safely and accurately. It can also control the whole technical process and record all the information by means of the soldering software (BGA Software), thus meeting the higher technical demands of modern electronic industry. It becomes one of the most valued electronic equipment in this field. VECTECH 3000DX consists of two parts: IR VECTECH 3000DX infrared rework system and PL VECTECH 3000DX precision optical alignment placement system.

In order to control the soldering process optimally and get the nondestructive and reproductive PCB temperature, heating power of IR VECTECH 3000DX is up to 3400W(max), suitable for all applications, such as large or small PCB as well as lead-free process. In order to realize more strict process window requirements required by lead-free soldering and effectively control the temperature of the PCB and the whole mounting chip, the IR 3000DX adopts the technology of re-flow soldering controlled by closed-loop, ensuring the precise and smaller technical window for even heat distribution and appropriate peak value of temperature to release reliable lead-free soldering.

IR VECTECH 3000DX rework system adopts microprocessor control and infrared sensor technology with accurately components desoldering ability. Because of the non-contact infrared temperature sensor, the soldering process is under the monitoring of non-contact infrared sensor and optimum control of process can be achieved at any time; the middle-wavelength infrared heater has a well-proportioned and safe heating and power and flexibleness necessary for the system, so it can also deal with some PCBs with big thermal capacity easily. The adjustable aperture under the infrared heater can protect the adjacent components (which are sensitive to the temperature) on PCB from being heated, thereby protecting the safety of the components.

IR VECTECH 3000DX works under the "open environment". The system itself has 10 built-in process storage channels, and the process parameters in each storage channel can be set and modified through the control box. The parameters can also be set and modified by the external computer through the BGA SOFT software.

The use of RPC（Reflow Process Camera) provides the critical visual information for judging the melting of solder during the whole soldering and desoldering process.

PL VECTECH 3000DX precision optical alignment placement system provides precise alignment

control for soldering process of IR VECTECH 3000DX rework system. The precision fine-adjustment and fine-alignment information provided by RPC ensures the perfect desoldering results.

PL VECTECH 3000DX uses an external control box to control the operation, together with IR heating system and RPC monitoring system, it forms a complete set of BGA rework system, creating a high-end work place for the rework of modern electronic products.

2. Product Picture

3. Packing List

Please check whether the following parts are included and intact.

* VECTECH 3000DX main unit ---1PC

* Control box---1PC

* IR Camera(RPC)---1PC

* PCB anti-collapse support---2PCS

* VECTECH 3000DX operation manual ---1PC

* Video line ---1PC

* * BGA tool box---1PC

*Computer mainframe(option）---1PC

*LCD display (option）---1PC

Note: The parts will be packed according to the packing list. If you don't purchase the optional part, it will not be in the package. If any part stated above is missed out, please contact with our company or agents immediately.

4. Safety Instructions

Note: For safety of system and operator, please read this manual carefully before operating the unit.

Please note that the unit is suitable for soldering and desoldering of electronic components.

Note: Top and bottom IR heater will be very hot during working, so explosive and combustible object or gas and solvent is strictly prohibited in working areas, also please don' touch the hot housing parts.

Note: The laser alignment device includes a secondary laser device, so avoid direct laser beam exposure to eyes.

Note: When the system fails and needs to be maintained, it should be carried on by a experienced and authorized technician or expert, or contact with service agent and factory.

The unit contains dangerous voltage inside! The inexperienced work is dangerous for operators.

5. Specifications and Technical Parameters

5.1 Specifications

IR System:

1．General Power:　　　　　　　　3400W（max）
2．Power of Bottom Heater:　　　400W*6=2400W　　（Infrared heating tube）
　Bottom Heater Area:　　　　　　232*232 mm²
3．Power of Top Heater:　　　　　120W*6=720W　（Infrared heating tube, wavelength2~8μm，size:60*60mm）
4．Top Heater Range:　　　　　　20~60mm
6．Vacuum Pump:　　　　　　　12V/300mA，　0.05Mpa
7．Top Cooling Fan:　　　　　　24V/300mA　15CFM
8．Laser Alignment Tube:　　　　5V/30mA　　2pcs
9．LCD Display Screen:　　　　　65*23（mm）　　16*2 character

10．Communication: Standard USB connector (Connect with PC）

11．Z Axis Motor: Stepper motor

12．Z Axis Range: 140mm (max)

13．Infrared Temperature Sensor :   0~300℃（Testing range）

14．K-type Sensor Channel   3 channels

15．Max PCB dimension: 400mm*400mm (max)

16．Fuse: 3pcs, 5A*2PCS（220V）20A*1PCS（220V）

PL System:

1．Power: About 15W

2. Camera: 2.38 million effective pixels;

                           a) 30X optical, 12X digital;

                           b) HD 1920 * 1080P;

3．Vacuum Pump: 12V/600mA   0.05Mpa (max)

4．LED Lighting: White LED(bottom & top light sources, brightness is adjustable)

5．Z Axis Range: 180mm (max)

6．Prism Module Range: 95mm(max)

7. Z axis Motor: Stepper motor

   Total Net Weight：   90kg

5.2 Technical Parameters

TL：Melting temperature of solder

Preset dissolution alarm temperature, ensure T2 < TL < T3 when setting, otherwise the process cannot be completed.

T1：Heat preservation starting temperature of reflow soldering

T2：Heat preservation ending temperature of reflow soldering

T3：Peak value temperature of reflow soldering

T0：Valve temperature: The bottom temperature trigger value for local heating (the top heater starts to work) after the whole plate is preheated, that is to say, the top heater starts to work only when the bottom temperature reaches the T0 set value, otherwise only heated at the bottom, which is equivalent to a preheater. T0 < TB is required during setting, otherwise the rework process cannot be started.

Tir: Set bottom preheating temperature.

TB：The real-time temperature of bottom heater

TC：The real-time temperature of top heater

S1：Heating time rising from T1 to T2

S2：Heating time rising from T2 to T3

S3：Heat preservation time of T3

The IR part of VECTECH 3500DX BGA rework system can store 10 workflow parameters internally, and the parameters can be modified as required. The following two groups of process parameter data are set for reference:

Regular lead process parameters:

0. T1=150°C   S1=50s   T2=160°C   S2=45s   T3=200°C   S3=15s   TL=183°C   TB=150°C
    T0=100°C

Regular lead-free process parameters:

1. T1=170°C   S1=55s   T2=180°C   S2=60s   T3=235°C   S3=30s   TL=217°C   TB=170°C
    T0=130°C

6. Installation and Connection

6.1 Place The System

* Unwrap the packing of the unit, then take out VECTECH 3500DX main unit and put it on the
 horizontal worktable.

* Confirm whether the packaging box is in good condition, and the accessories are consistent with the list to
 ensure completeness.

* If you need to connect the computer to the device, please make sure that the computer is working properly
 and the drivers are installed completely.

6.2 Install Video Capture Software (SDK3000)

a.Install Camera Client
 Double-click to run the "HD-CAMERA_*.*_YYMMDD_***_setup.exe" as follows:
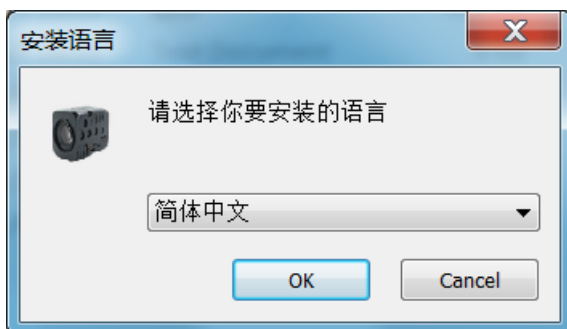
Step 1: Select the installation language, as shown in the figure;

Step 2: Click "Next" and select the installation directory, as shown in the figure;
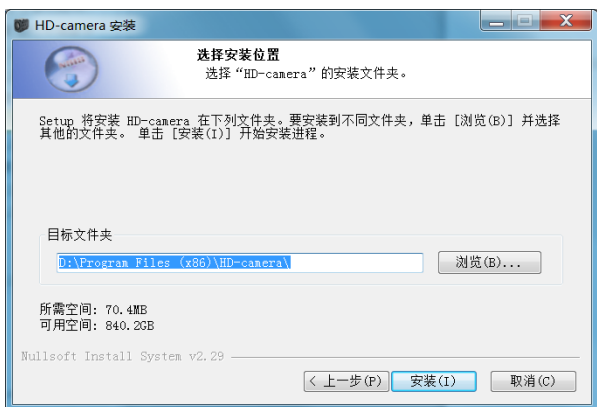
Step 3: Click "Install" to complete the installation as shown in the figure;
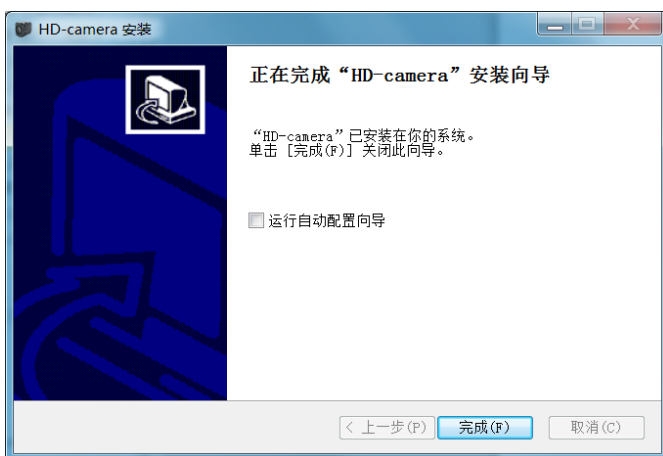
Step 4: Click "Finish" to complete the installation.
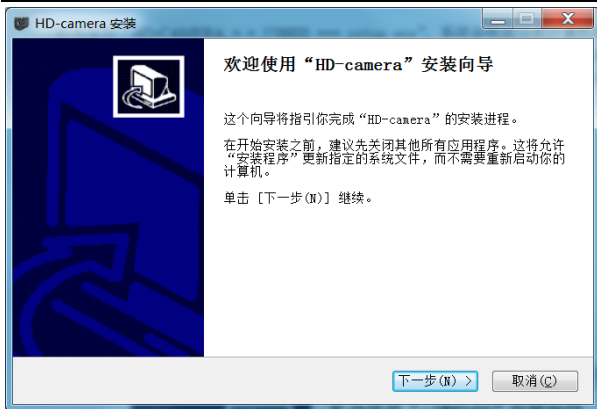
The function of "running automatic configuration wizard" means that the software automatically searches for all cameras that can be connected, and according to the IP address of the local computer, changes the devices that are not in the same network segment with the PC to the IP of the same network segment with the PC, and automatically adds cameras. After the automatic configuration is completed, log in HD-CAMERA for t he first time, and the software automatically plays the real-time video stream.

This feature is not enabled by default when the D-CAMERA installation is complete. The detailed diagram of running the automatic configuration wizard is as shown in the figure
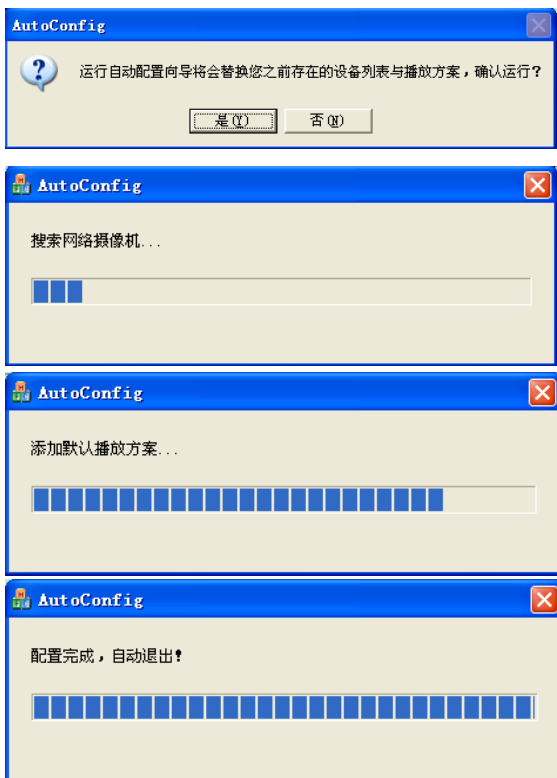
b. Configure the web address

In the control center, set the network ports of the two cameras as fixed IP addresses:

192.168.0.108 and 192.168.1.108
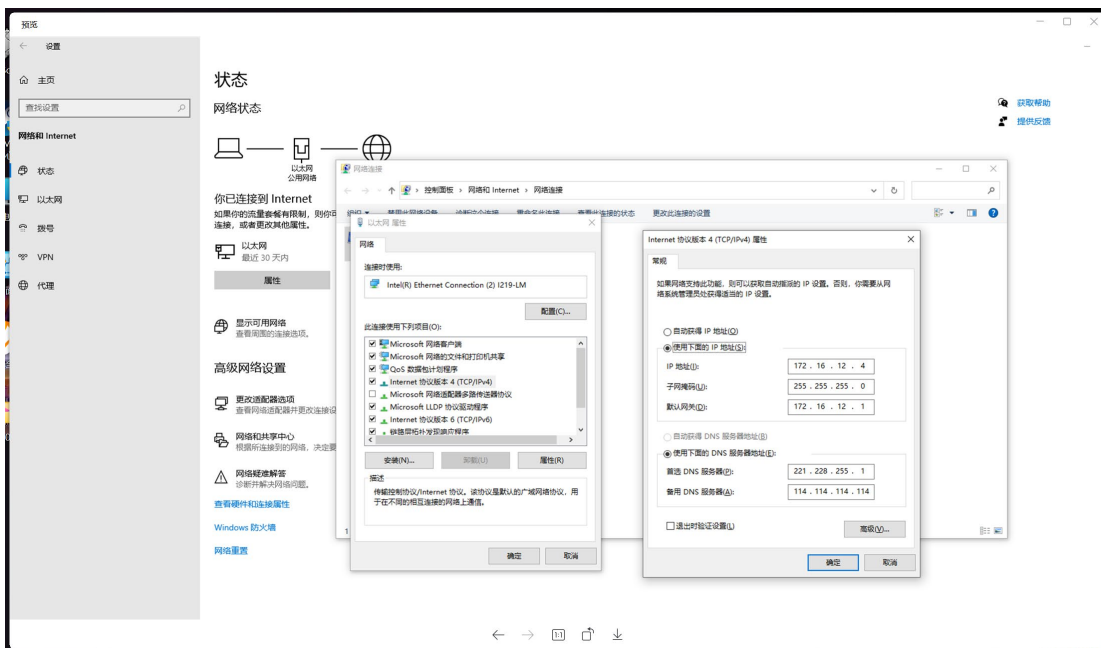
c. Log in to the video software

d.Double-click HD-CAMERA ( ) on the desktop to open the login box of professional HD-CAMERA video monitoring system, as shown in the following figure:

The default account **admin** is used for initial login, and the password is **123456**.
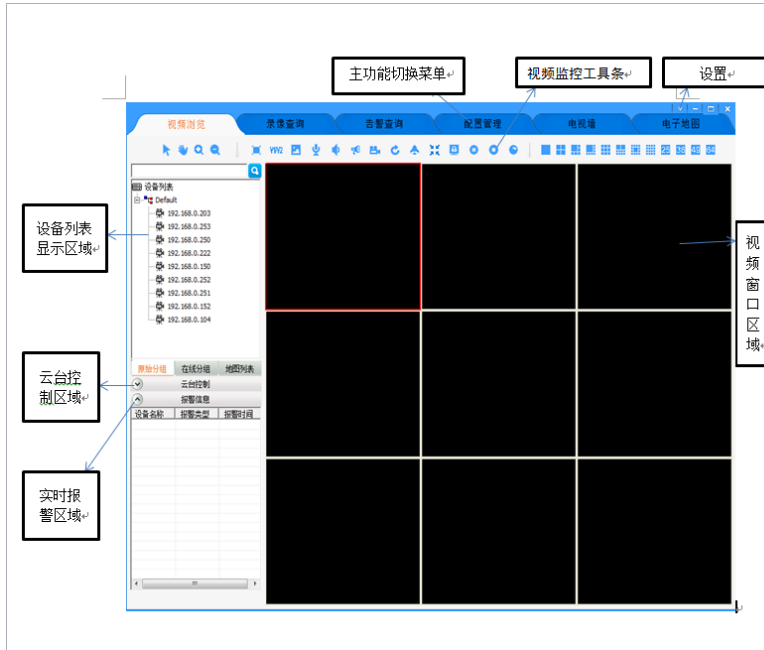
Double-click the graphical interface. You can view the image in full screen.

6.3 Install RPC Reflow Soldering Monitoring System

1. Unscrew the RPC fixed knob of the bracket, assemble the RPC camera, and tighten the knob.

2. Plug the RPC connecting wire into the socket under the bracket.

Notice：Plug and unplug in the direction of the eight-core socket when the RPC camera is inserted, in case the pin breaks.

3. To adjust the position of RPC, loosen the fixing knob in the corresponding direction, and then tighten it.

RPC Module
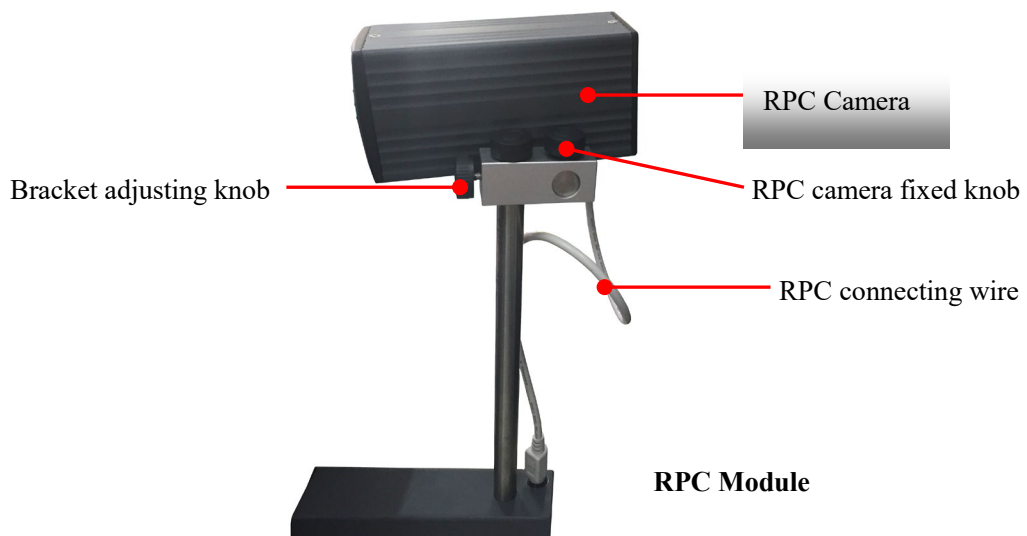
6.4 System Connection
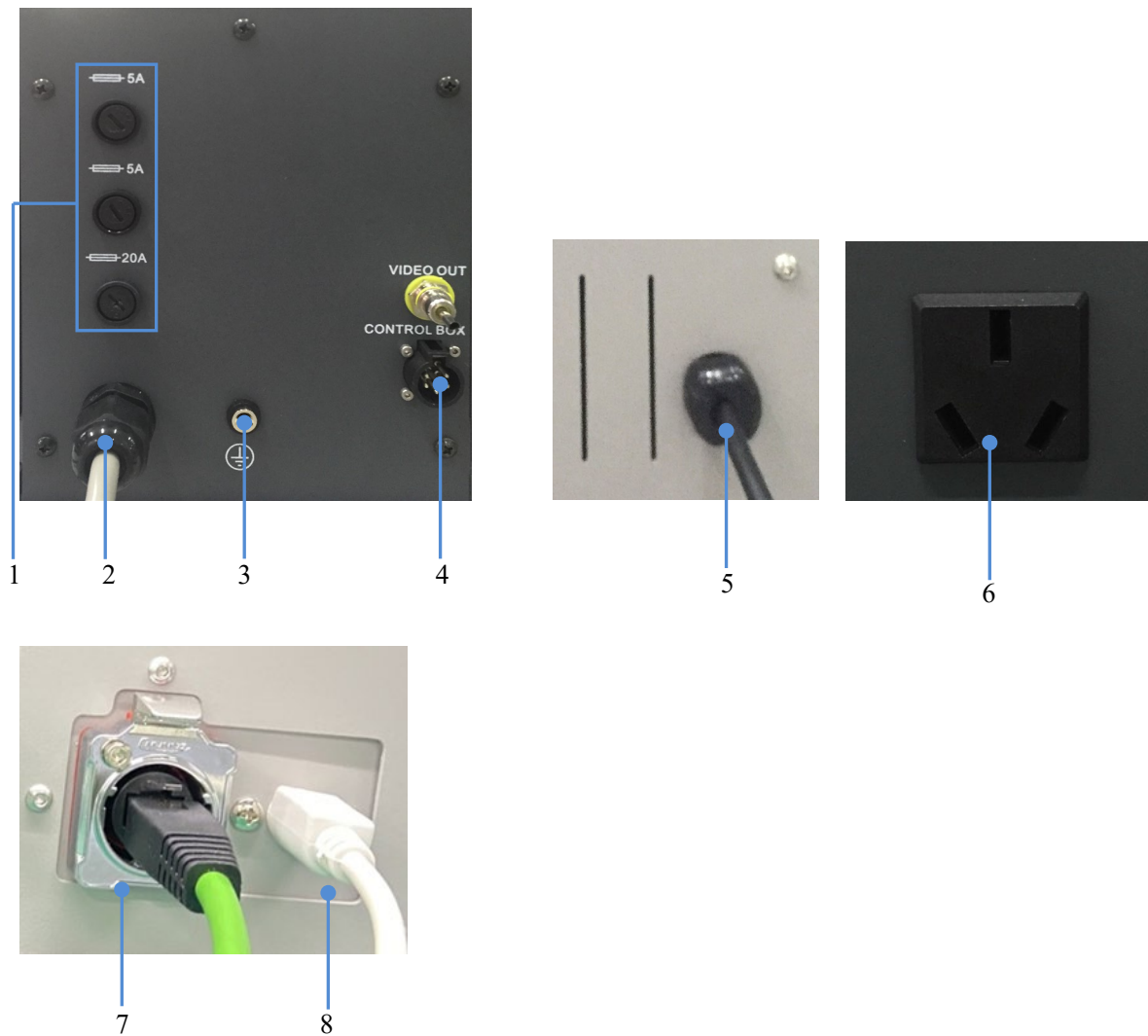
1. Fuse socket: The user need to replace the fuse according to the corresponding model.

2. Power socket: Connect the external input power through the power cord to ensure that the external input

power is consistent with the information on the label.

3. ESD socket: connect to external grounding wire.

4. Control box socket：Connect to control box.

5. USB connection line: Connect the PC for equipment connection.

6. Power socket：Support 220V AC, 5A external device.

7. Video network cable: Connected to the computer network port.

8. Video adjuster port: adjust the zoom in, zoom out, and focus of the picture.

NOTE:

*Insert the connecting plug of control box into the socket (Control box).

*Insert the USB cable into the USB socket of the external device.

＊Connect the grounding wire to the ground jack.

*Please check whether the voltage of the power supply is consistent with that of the device specification label, connecting the power after confirmation.

*Please confirm whether the parts are installed before starting the system.

After all the connections are completed, plug the power plug into the socket and turn on it.

6.5 Video Driver Installation

After the unit is turned on, the computer system automatically prompts for the update driver.

1. USB driver installation

    Computer prompts for driver installation
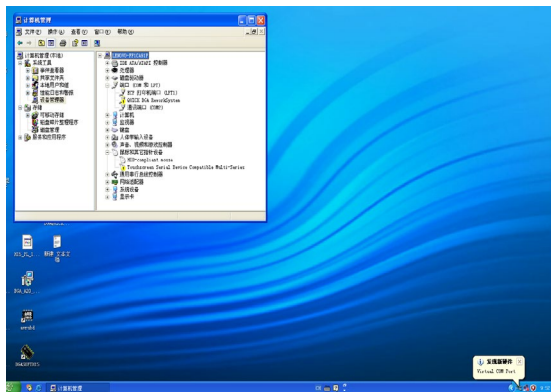
    Click to update driver
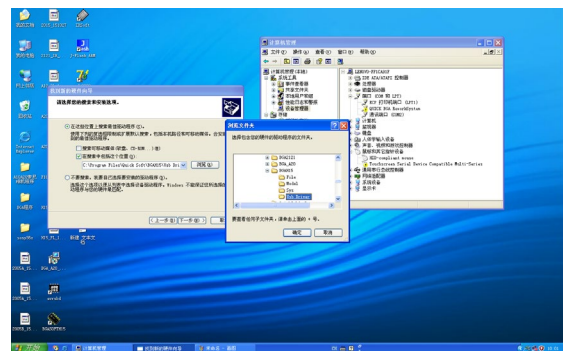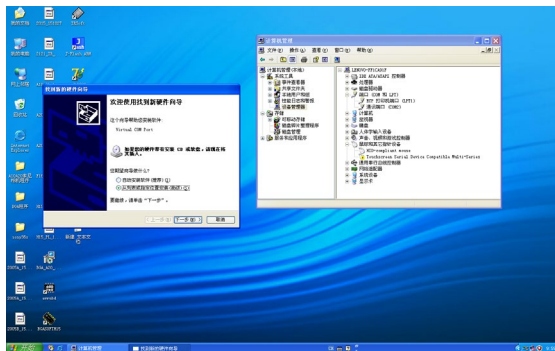
    The USB driver is usually in the operating software installation package of the C disk. Click to install until it is completed.
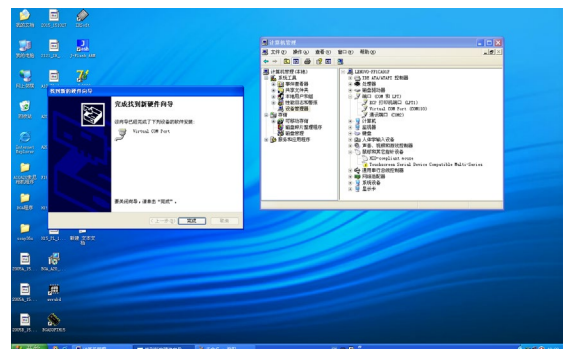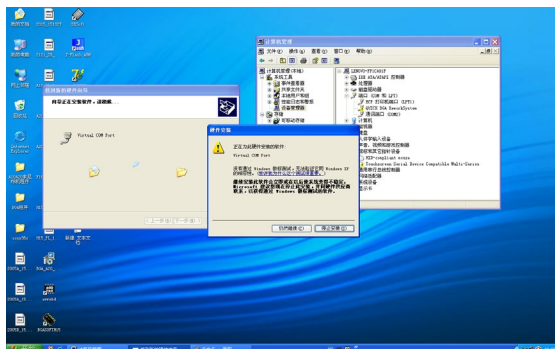
Install as shown in the figure, the installation is complete.

7. Control Box and Operation Keys

7.1 Control Box

IR Control box

A. When selecting working flow, the "UP/DOWN" knob controls the cursor to roll up and down or the digit to increase and decrease; in the standby state, press the "UP/DOWN" knob to make the top heater move up and down.

B．The function of "OK" key is to confirm and return to the previous level when the BGA-IR is in the parameter setting state.

C．The function of "STOP/COOL" is to stop and end the process when the BGA-IR is in the process, and to turn on or off the cooling fan when the BGA-IR is out of the process.

D．Function of "START" key: in the standby state, make the IR part of the rework system call the current saved process of the equipment and start the process.

E．The function of "IN-OUT/SUCK":cooling fan stretch out or retraction.

F．Function of "MENU": The function is realized by pressing the "UP/DOWN" key. Press "MENU" to enter the menu interface. Press it each time to enter the lower setting.

PL Keyboard

G. Function of "Z" key: rotate it , can realize suck nozzle movable.

H. Function of "R" key: rotate it , can realize the suction nozzle: θ clockwise or counterclockwise rotate, rotate degree have no limit.

I．The function of "ZOOM/IN-OUT" : rotate this key to adjust the magnification of the image, and press this key to control the entry and exit of the bit prism.

J．The function of "FOCUS/SUCK": rotate this key to realize manual focusing of the camera, and   press this key to suck or mount the chip.

K．The function of "TOP-LIGHT": rotate it to adjust the brightness of the light on the counter prism, press this key to turn off the light, and release it to turn on the light.

L．The function of "BOT-LIGHT": rotate it to adjust the brightness of the light on the counterpoise prism, press this key to turn off the light, and release it to turn on the light.

7.2 Operation Keys

Emergency knob: in case of equipment failure, press this key to cut off the power supply.
Power switch: control the power ON/OFF state of the system.

8. IR Heater and Bottom Heating System

8.1 Part Descriptions

8.1.1 Heating Window
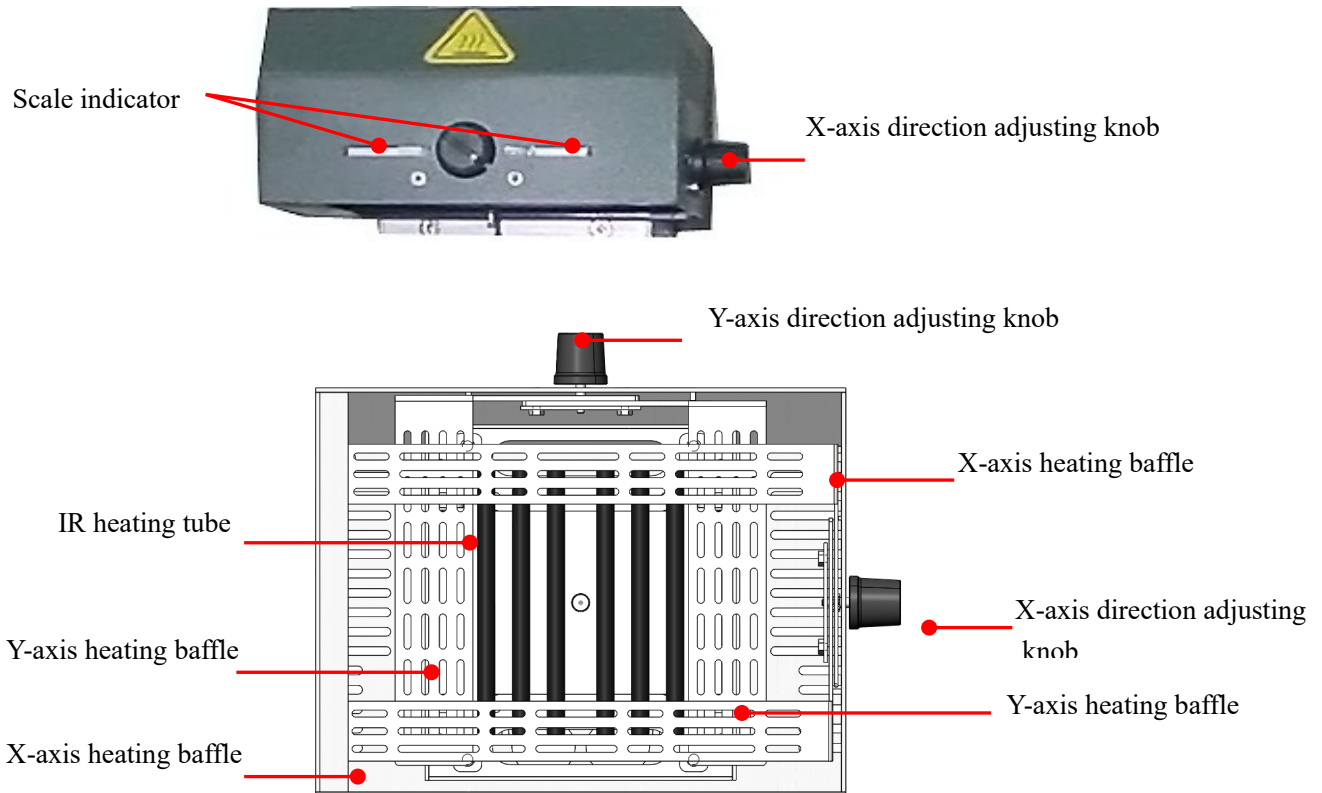
The heating window of the infrared heater on the top of the equipment can be adjusted from 20 * 20 (mm) to 60 * 60 (mm) by two adjusting knobs. Before starting the process, make sure the aperture is turned on, then adjust its window size. The scale "2" on the heater housing is 20mm and "3" is 30mm. If you want to adjust it to 50 * 50, just turn the two knobs to the scale "5".

Note:

Adjust that size of the heating window can reduce the amount of heat to the components adjacent to the BGA, but when the size of the heating window is adjusted to be small, the utilization rate of the heat generated by the top heater during continuous operation is seriously reduced, a large amount of heater heat is retained inside the heater, and continuous operation can shorten the life of the heater, so when the equipment is used, the window is generally opened to the maximum, to ensure the maximum utilization of heat.

8.1.2 IR Reflow Heating Module

Multi-function display screen

Suction rod module

K-type sensor interface

Cooling fan

Infrared temperature sensor & Infrared laser indicator

8.1.3 Bottom Heating System

1.Heating area: 232x232mm；
2.Total power: 400Wx6=2400W；

232mm

232mm

17
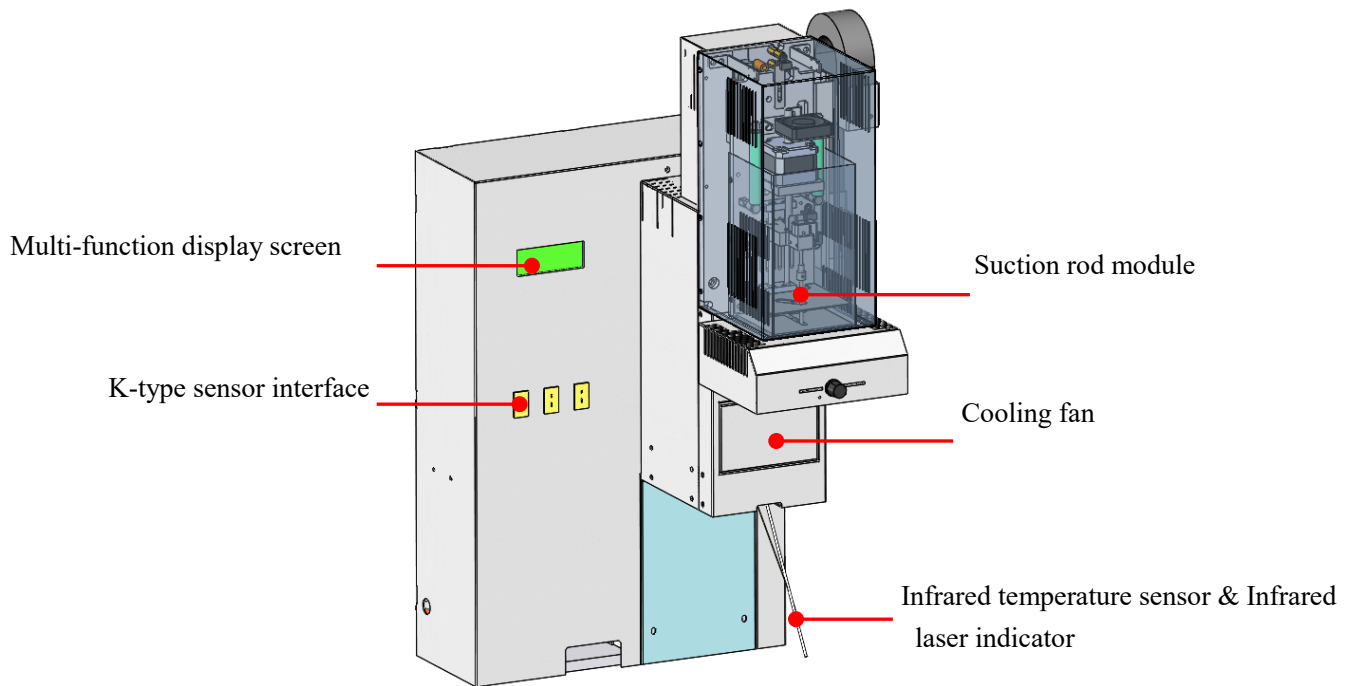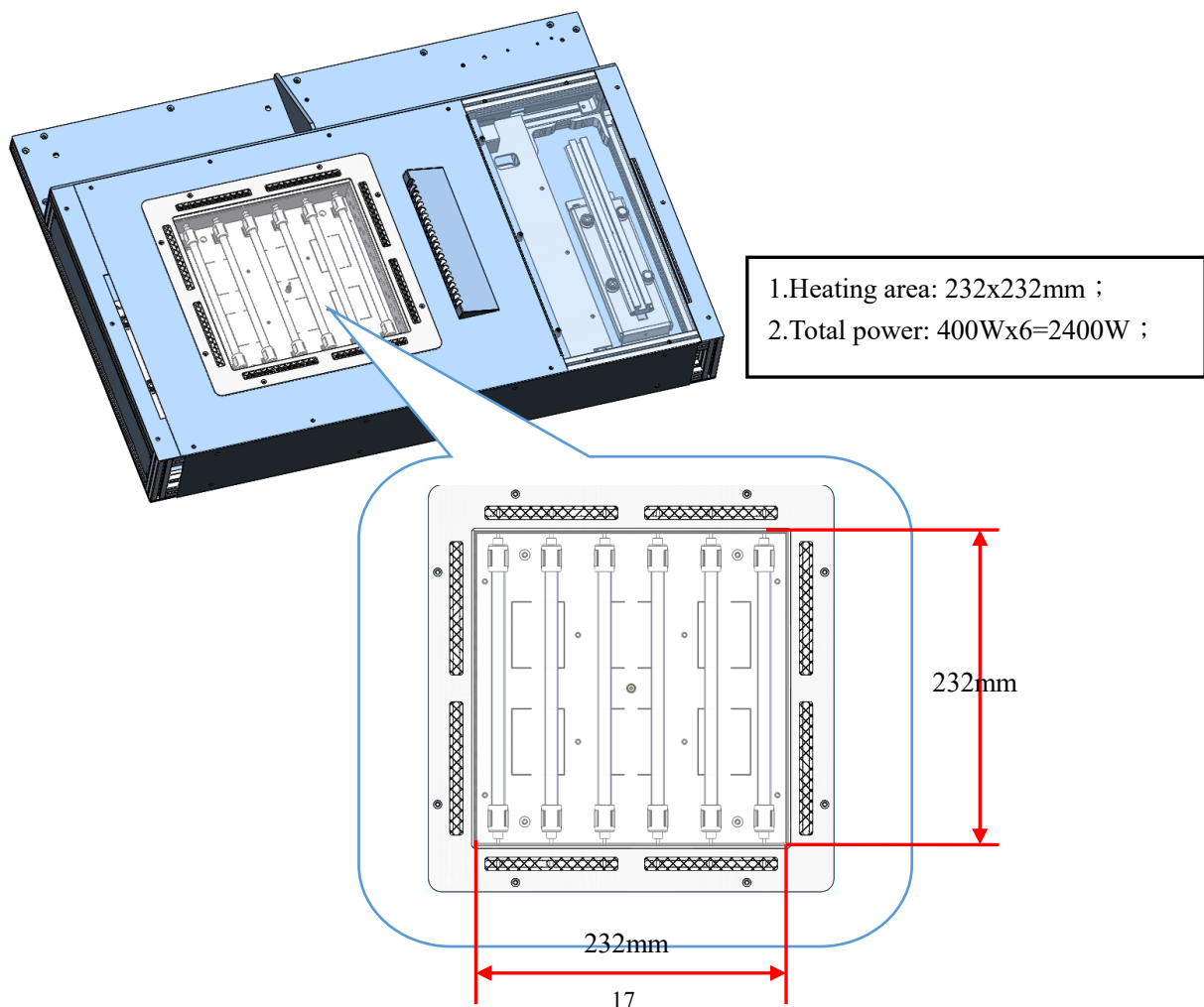
8.2 Parameters Setting

Parameter settings order as the follows:

A. _password: *** （Password settings）

B、_select: 0 （Flow settings, if entered, specific parameters can be modified）

C. _type: solder （Soldering and desoldering working mode settings）

D. _laser: off (Laser alignment settings)

E. _baud: 19200 （Communication rate settings）

A. Input password

The initial password of system is "000". At the same time, system also has the universal password "159". If you forget the setting password, you can input "159" to make the password of system come back to initial password "000".

Note: If you want to modify any parameter to the system, you must input password, otherwise, you can only browse them.

For instance: Input the initial password "000" of system.

| TC:022˙C Tb:019˙C
ready for flow | Press MENU → | _password: ***
select: 0 | Press MENU → |

| password: ***
select: 0 | rotate MENU → | password: 0**
select: 0 | Press MENU → |

| password: 0**
select: 0 | rotate MENU → | password: 00*
select: 0 | Press MENU → |

```
┌─────────────────────────┐                    ┌─────────────────────────┐
│                         │   rotate MENU      │                         │   Press OK
│   password: 00*         │  ─────────────►    │   password: 000         │  ─────────────►
│                         │                    │                         │
│   select: 0             │                    │   select: 0             │
└─────────────────────────┘                    └─────────────────────────┘
```
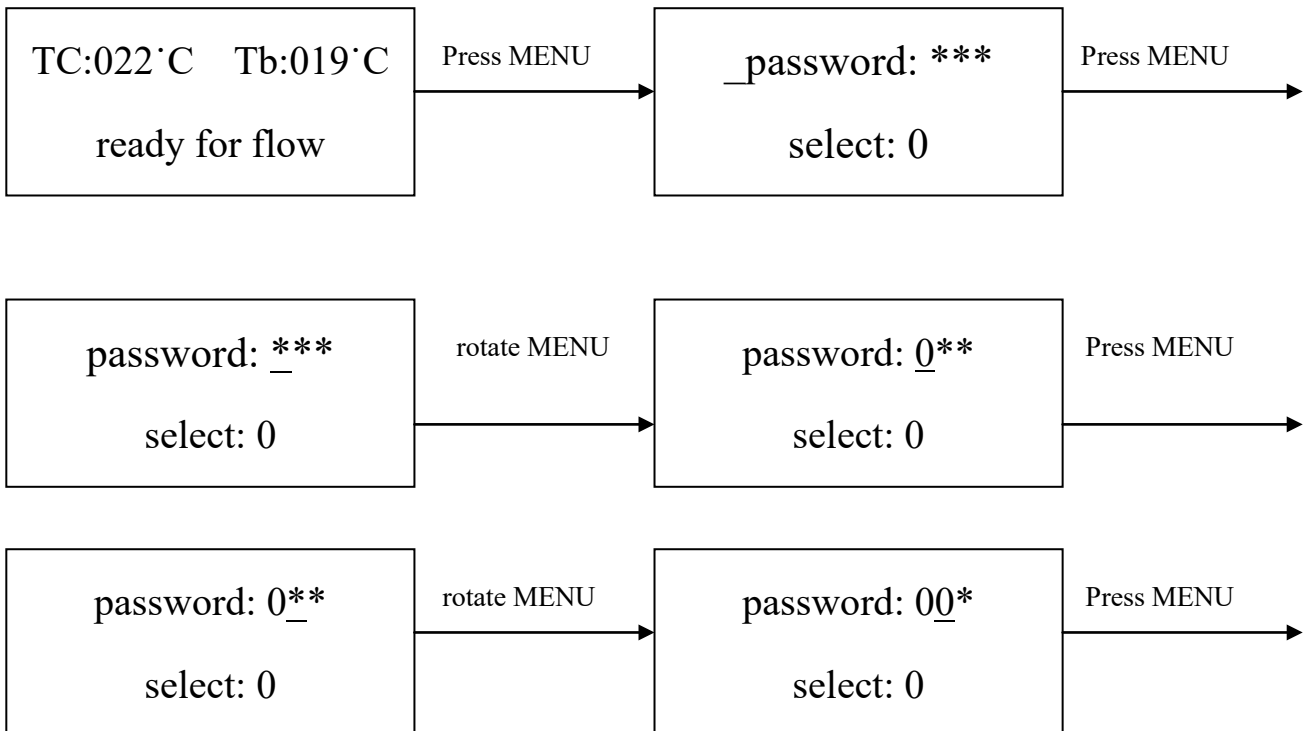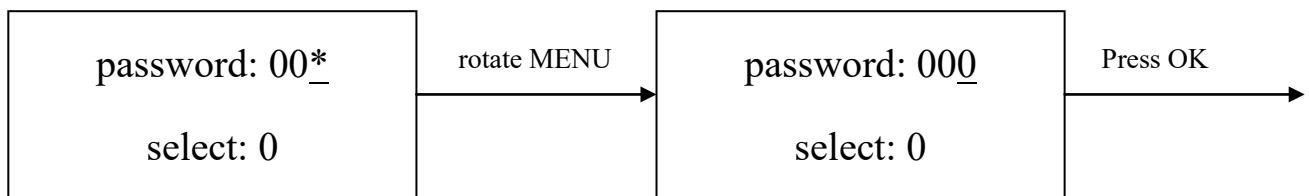
```
┌─────────────────────────┐
│                         │
│   Saving Password!      │
│                         │
│   Any key return        │
│                         │
└─────────────────────────┘
```

After input password:

1. If you want to modify the password, re-enter above mode to input the new password. If password is modified successfully, it will show:

```
┌─────────────────────────┐
│                         │
│   Saving Password !     │
│                         │
│   Any key return  !     │
│                         │
└─────────────────────────┘
```

2. If you want to modify the next working flow, operate as the following B; If you don't want to modify, please press **OK** key to browse the following parameter settings.

B. Modify Working Flow

For instance: Modify the working flow and make it become flow 1 .

```
┌─────────────────────────┐                    ┌─────────────────────────┐
│                         │   rotate MENU      │                         │   Press MENU
│   _password: ***        │  ─────────────►    │   password: ***         │  ─────────────►
│                         │   Step①            │                         │   Step②
│   select: 0             │                    │   __select: 0           │
└─────────────────────────┘                    └─────────────────────────┘
```

```
┌─────────────────────────┐                    ┌─────────────────────────┐
│                         │   rotate MENU      │                         │   Press OK
│   password: ***         │  ─────────────►    │   password: ***         │  ─────────────►
│                         │   Step③            │                         │   Step④
│   select: 0             │                    │   select: 1             │
└─────────────────────────┘                    └─────────────────────────┘
```
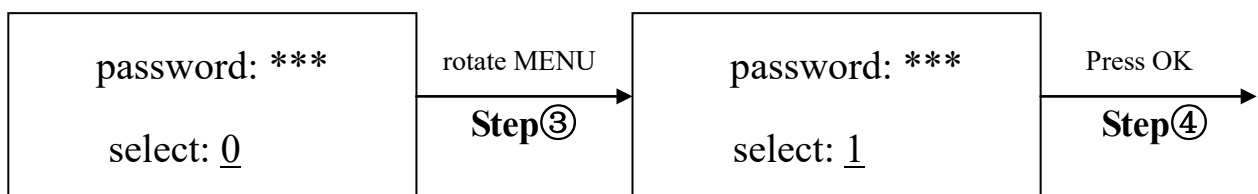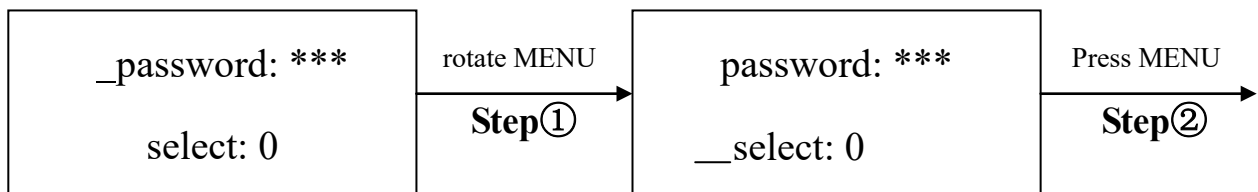
```
┌─────────────────────────┐
│                         │
│   password: ***         │
│                         │
│   _select: 1            │
│                         │
└─────────────────────────┘
```

1. When carrying on the forth step (**Step④**), if press "MENU" key, you can browse and modify parameter

of this flow, shown as C-1. (**If the correct password has been input.**)

2. After finishing modifying of working flow 1, if you want to modify the next working mode, operate as C;

  If you don't want to modify it, yon can rotate **DOWN** knob to browse the next parameter settings.

C. Modify Working Mode

For instance: Modify the working mode and make it in "desolder" mode.

(Solder is the soldering mode and desolder is the desoldering mode)

```
┌─────────────────────┐                    ┌─────────────────────┐
│                     │   rotate MENU      │                     │   Press MENU
│  password: ***      │ ─────────────────► │  select: 1          │ ─────────────►
│  _select: 1         │                    │  _type: solder      │
│                     │                    │                     │
└─────────────────────┘                    └─────────────────────┘

┌─────────────────────┐                    ┌─────────────────────┐
│                     │   rotate MENU      │                     │   Press OK
│  select: 1          │ ─────────────────► │  select: 1          │ ─────────────►
│  type: solder       │                    │  type: desolder     │
│                     │                    │                     │
└─────────────────────┘                    └─────────────────────┘

┌─────────────────────┐
│                     │
│  select: 1          │
│  _type: desolder    │
│                     │
└─────────────────────┘
```
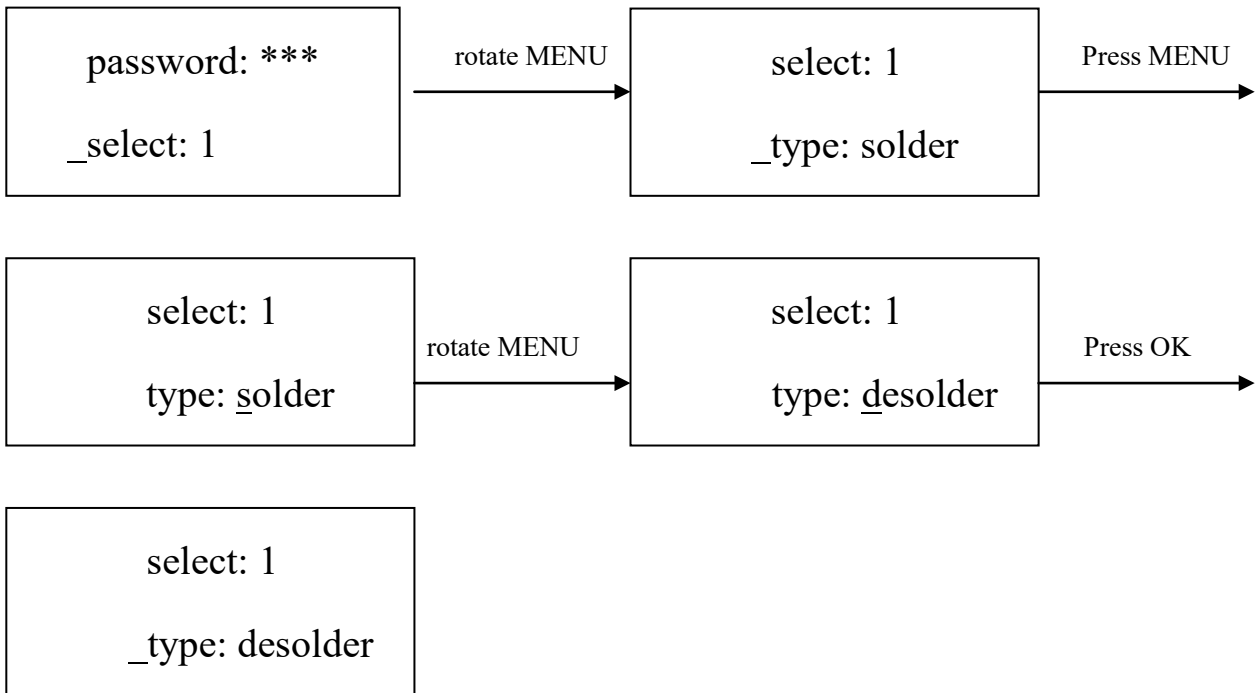
After finishing modifying working mode, if you want to modify laser alignment mode, operate as D; if no need to modify it, please press MENU key to browse the next parameter settings.

C-1. Modify Parameter of Working Flow

1. Select the working flow first before modifying parameter of the certain working flow.

2．The modification of parameters shall follow the following process curves, all of which shall be subject to the temperature curve measured by the oven temperature test board, and this setting curve is the   simulation value.

The soldering process is decided by T0, TB, T1, T2, T3, S1, S2 and S3. It describes the temperature curve during the system working. TL is the preset solder melting point temperature used to alert the operator that the process is entering the reflow zone.

T0

T0 is the valve value for bottom temperature required by top heater when it heats up. Also it is the first temperature of this technics process. When the work flow begins, the bottom heater starts to heat up. After reaching the T0, the top heater begins to heat up.

TB、Tir、TC

TB: The real-time test temperature of bottom preheating. Tir: The set temperature of bottom heating TC: Real-time temperature of top heating

T1

The heat preservation starting temperature of reflow soldering T1 is the second temperature of this process. The temperature rises to T1 with a proper speed the component permits. In parameter modifying, use the UP and DOWN knob to set the value of T1.

T2

It is the temperature when finishing the heat preservation of reflow soldering. The pre-heating temperature rises to T2, after the time of S1 finishes. Within this time, heat preservation of PCB component is finished so that the internal temperature of the PCB is balanced.. In parameter modifying, use the UP and DOWN key to set the value of T2.

T3

It is the peak value temperature of reflow soldering. When the temperature reaches T2, the system controls the heating power to make the PCB surface rise to the peak temperature T3 evenly within the set time (S2). When the peak temperature is reached, the process enters the reflow zone for the next step.
T3 value can be set by DOWN and UP in parameter modification.

TL

The equipment alarm alerts the operator of the TC starting temperature at which the process enters the reflow zone. (when setting T2 < TL < T3)
During the soldering or desoldering process (which can be viewed through the camera), observe the temperature of TC when the solder melts. When setting the process parameters, the user can input the melting point temperature value in the TL item in the software. After that, every time the process TC reaches TL,   t he equipment will give an alarm to remind the operator that the process enters the reflow zone. DOWN   a nd UP can be used to set TL value in parameter modification.

S1

Heating time rising from T1 to T2. User can set the value in the range of 0~999s.

S2

Heating time rising from T2 to T3. User can set the value in the range of 0~999s.

S3

After the temperature reaches T3, the heating time of the constant T3 temperature, and user can also set the value in the range of 0~999s.
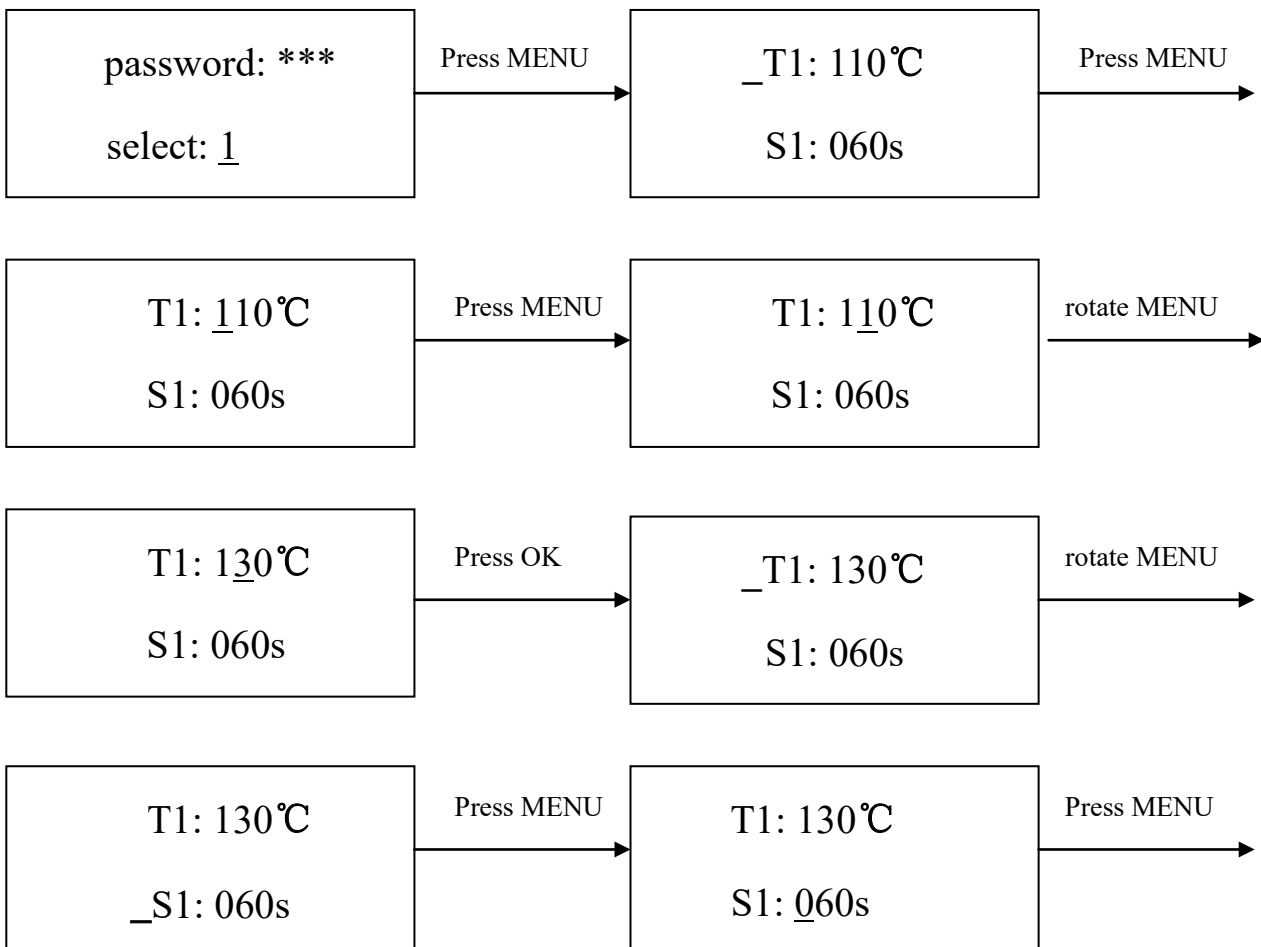
Unit

It's used to set the unit of display temperature during work flow. In parameter modifying, use UP and DOWN keys to set the value .
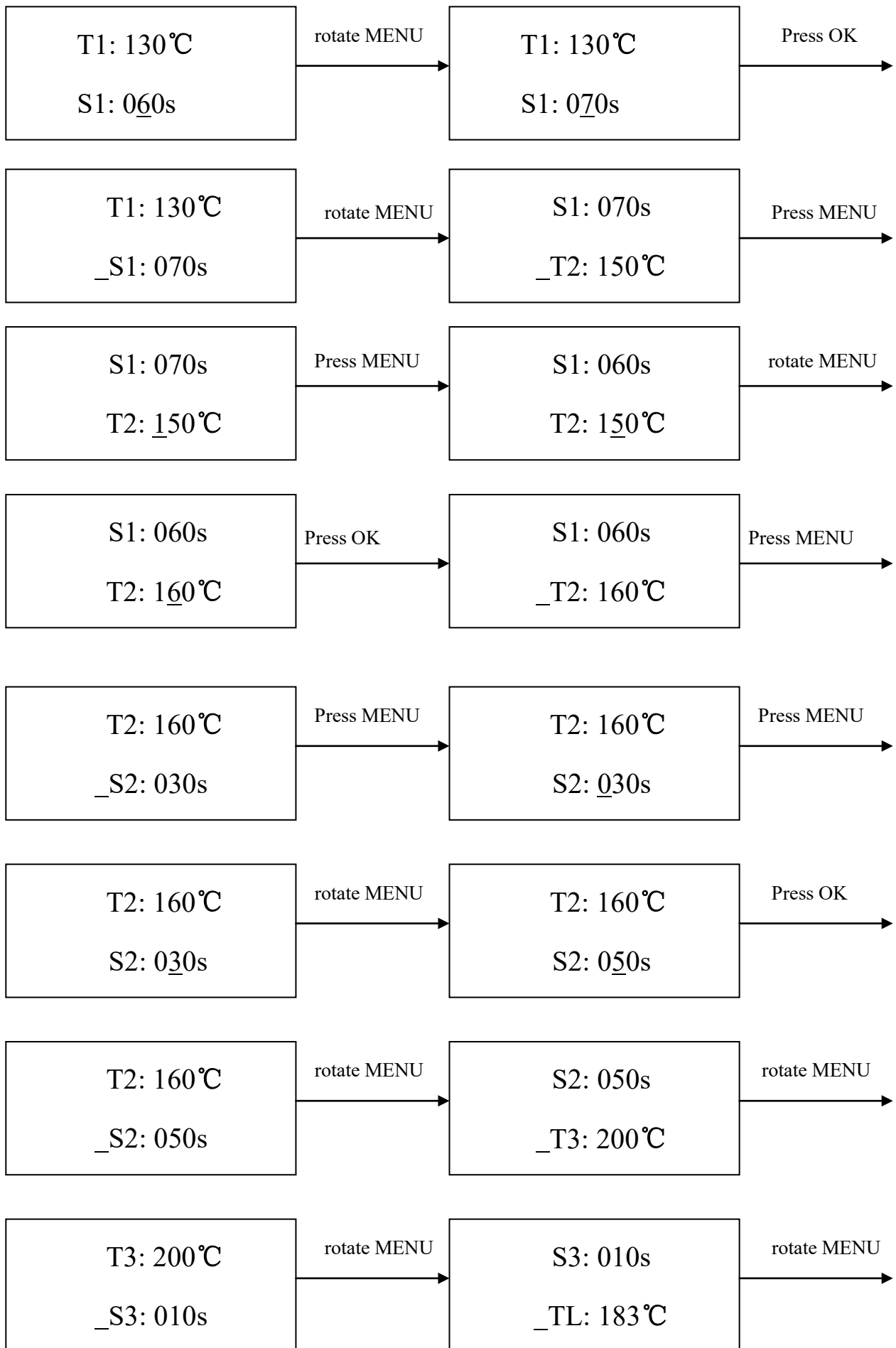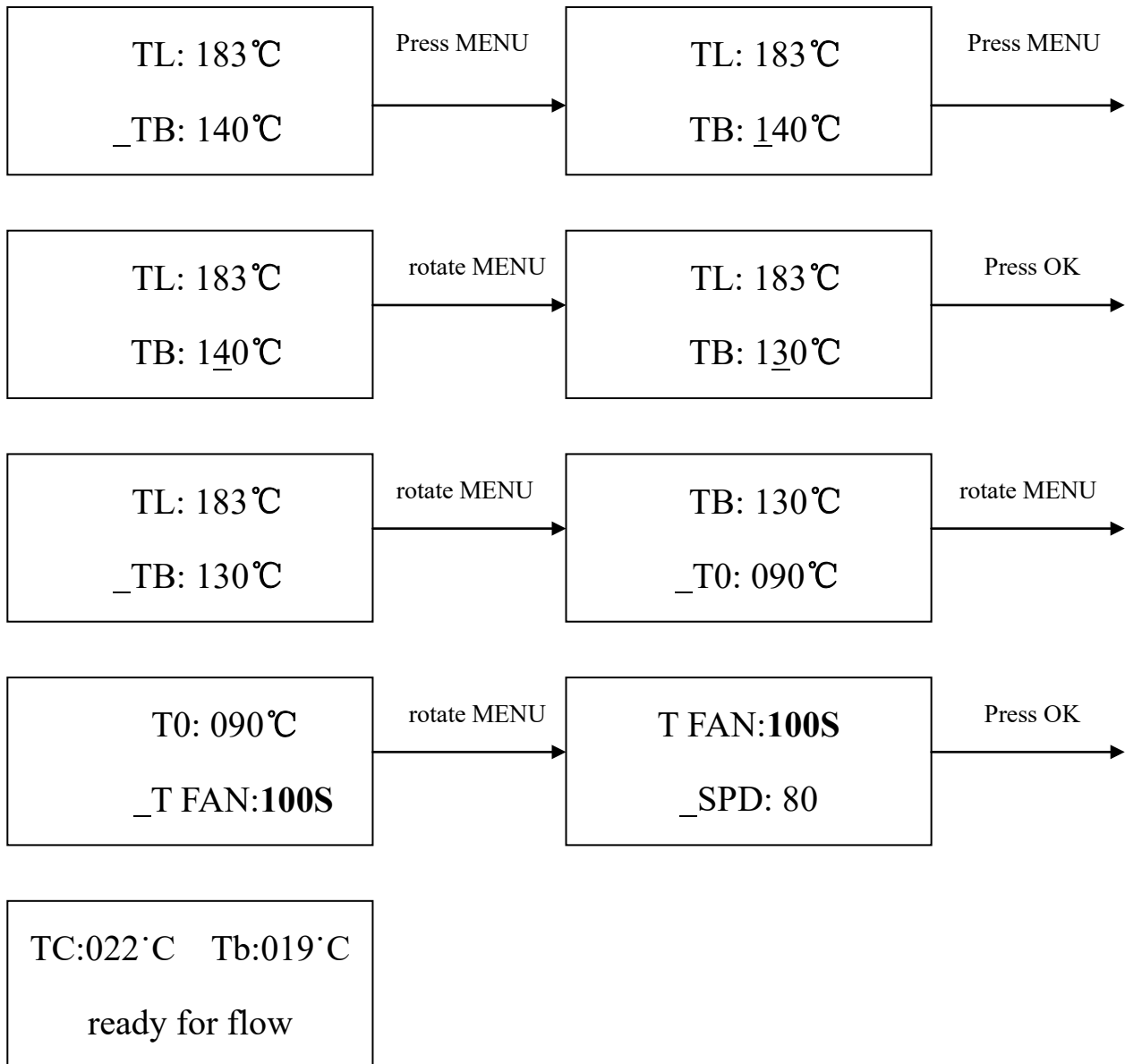
Password

It is used to set the password. To protect the equipment from unnecessary or unauthorized modifications, the password parameter is set. When its value is set to 0 (000 is displayed), password protection is disabled. Process modifications are possible when the password setting is valid. The parameter password is common to all processes and can be valid or invalid within each process. The system needs to input the correct password before any modification can be made. Refer to A.

For instance : Modify parameter of flow 1 and make T1=130℃, S1=70s, T2=160℃, S2=50s, TB=130℃.

(Flow one has been selected)

| password: ***
 select: 1 | Press MENU → | _T1: 110℃
 S1: 060s | Press MENU → |

| T1: 1<u>1</u>0℃
 S1: 060s | Press MENU → | T1: 1<u>1</u>0℃
 S1: 060s | rotate MENU → |

| T1: 1<u>3</u>0℃
 S1: 060s | Press OK → | _T1: 130℃
 S1: 060s | rotate MENU → |

| T1: 130℃
 _S1: 060s | Press MENU → | T1: 130℃
 S1: <u>0</u>60s | Press MENU → |

T1: 130℃ S1: 0<u>6</u>0s	rotate MENU →	T1: 130℃ S1: 0<u>7</u>0s

Press OK →

T1: 130℃ _S1: 070s	rotate MENU →	S1: 070s _T2: 150℃

Press MENU →

S1: 070s T2: <u>1</u>50℃	Press MENU →	S1: 060s T2: 1<u>5</u>0℃

rotate MENU →

S1: 060s T2: 1<u>6</u>0℃	Press OK →	S1: 060s _T2: 160℃

Press MENU →

T2: 160℃ _S2: 030s	Press MENU →	T2: 160℃ S2: <u>0</u>30s

Press MENU →

T2: 160℃ S2: 0<u>3</u>0s	rotate MENU →	T2: 160℃ S2: 0<u>5</u>0s

Press OK →

T2: 160℃ _S2: 050s	rotate MENU →	S2: 050s _T3: 200℃

rotate MENU →

T3: 200℃ _S3: 010s	rotate MENU →	S3: 010s _TL: 183℃

rotate MENU →

TL: 183℃ _TB: 140℃	Press MENU →	TL: 183℃ TB: 140℃	Press MENU →

TL: 183℃ TB: 140℃	rotate MENU →	TL: 183℃ TB: 130℃	Press OK →

TL: 183℃ _TB: 130℃	rotate MENU →	TB: 130℃ _T0: 090℃	rotate MENU →

T0: 090℃ _T FAN:**100S**	rotate MENU →	T FAN:**100S** _SPD: 80	Press OK →

TC:022˙C   Tb:019˙C ready for flow

D. Modify Laser Alignment Mode

For instance: Modify the laser alignment mode and set it to "on".

Note: This laser is specially used for equipment debugging, and it is turned off in non debugging state.

select: 1 type: desolder	rotate MENU →	type: desolder _laser: off	Press MENU →

type: desolder laser: off	rotate MENU →	type: desolder laser: on	Press OK →
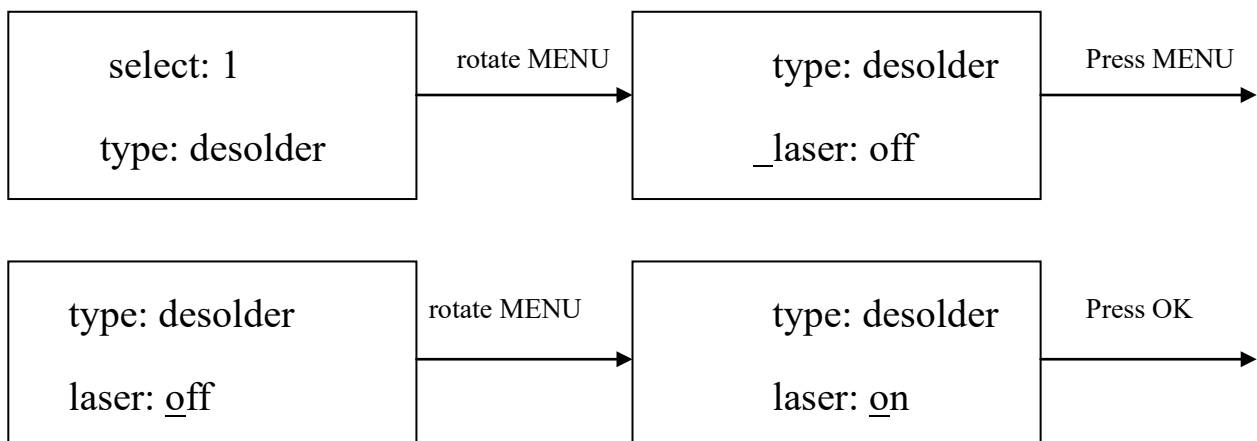
```
  type: desolder

  laser: on
```

1. After finishing the modification, the next step communication rate, external keyboard will not be able modified.

2. Press OK key to exit. At this time，all user modifications to the parameter settings have been saved, IR window will display:

```
  TC:022℃   Tb:019℃

  ready for flow
```

3. All process parameters have been selected，press the "START" key, and the system will execute the corresponding operation.

E. System Error Indication

1. In initial state, if the top sensor or external sensor is broken, it displays:

```
  TC: ***℃   Tb: ***℃

  T   sense error !
```

If the bottom sensor is broken, it displays:

```
  TC: ***℃   Tb: ***℃

  B   sense error !
```

If above status happens, user should stop operating.

2. When TC is less than 180℃ during operation, if the rising temperature is less than 7℃, and the system will exit the process and display "TC raise error".

```
TC: ***℃    Tb: ***℃

Move error !
```

3. If TC temperature is over than 265℃ during operation, the system will exit the process and display "TC over error"

8.3 Operating Process Instructions

Note: Top and bottom heater will be very hot during working, so please don' touch the hot housing parts.

Note: The laser alignment device includes a secondary laser device, so don't see the laser bean directly.

8.3.1 Soldering Process Instructions

1. Turn on the system.

2. Move PCB fixture with fixed PCB and make it above the bottom heater of the IR heating system (the components to be soldered have been accurately aligned and mounted on the PCB pads by the PL alignment system), so that the components to be reworked are between the top and bottom heaters, and   the alignment laser is positioned at the center of the PCB.
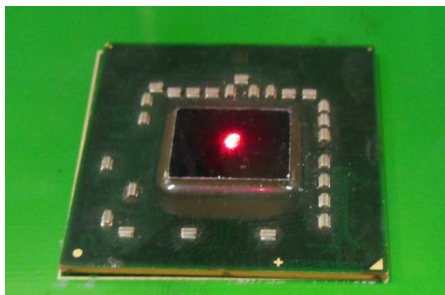
3. Adjust the heating window to select a reasonable heating range. If there are no components that are not resistant to high temperature within the heating range, no adjustment is required.

4. Adjust RPC in appropriate place, adjust size and focus of image with CONTROL BOX   so that the solder state of the reworked component can be clearly displayed.

5. Select parameter with CONTROL BOX. (Refer to Parameters setting)

    A. Select the required flow. If the parameter needs to be modified, perform the corresponding operation

. (Refer to B and C1)

B. Select the Solder work mode. (Refer to D)

C. If the communication rate does not change, press the "OK" key to exit, and the IR window displays:
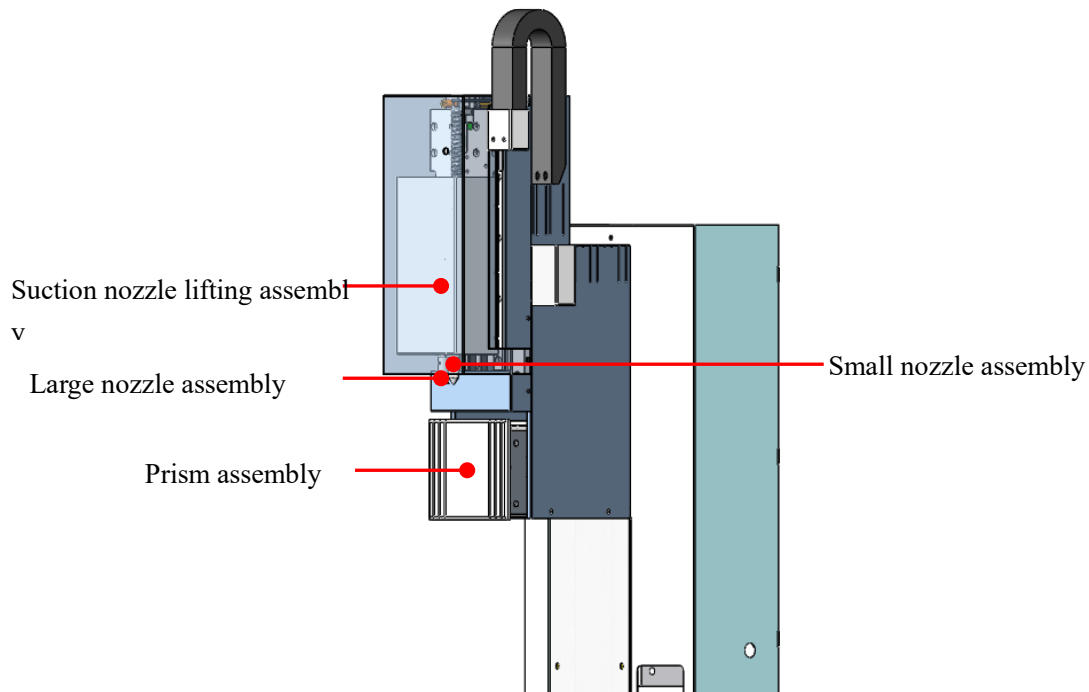
> TC:022˙C   Tb:019˙C
>
> ready for flow

D. Press "START" key and the system start working, performing the content of selected flow.

6. IR window will display series of setting temperatures and the current temperature of TB and TC during working, and will indicate when it reaches T1, T2, T3 and TL. S1, S2 and S3 are counted down and users can clearly know the progress of the flow.

7. If you see the solder has melted down (Can be observed through the cooperation of RPC and Monitor), you can press MENU key to calibrate temperature of TL after the flow is finished.

8. When the temperature reaches TL, there will be a alarm signal.

9. When the temperature reaches T3, the sound signal changes to a briefness sound and the system delays heating by S3. After that, the system will not heat up anymore and exit the process automatically, the rework soldering process is over.

10. The system can perform a series of function action during working.

A. After pressing the "START" key, the top infrared heater goes down to the bottom, and prompts an alarm sound, indicating the start of work.

B. When the rework process is finished, the top infrared heater goes up, and the top cooling fan and the bottom crosswise cooling fan work at the same time to blow air for cooling.

C. The blowing time of the top and external cooling fans can be set. After the cooling, the whole soldering process is over.

8.3.2 Desoldering Process Instructions

1. Turn on the system.

2. Move PCB fixture with fixed PCB and make it above the bottom heater of the IR heating system (the components to be soldered have been accurately aligned and mounted on the PCB pads by the PL alignment system), so that the components to be reworked are between the top and bottom heaters, and

the alignment laser is positioned at the center of the PCB.

3. Adjust the aperture system to fit the window size. If there are no components that are not resistant to high temperature within the heating range, no adjustment is required.

4. Adjust RPC in appropriate place, adjust size and focus of image with CONTROL BOX so that the solder state of the reworked component can be clearly displayed.

5. Select parameter with CONTROL BOX.

   A.

   Select the required flow. If the parameter needs to be modified, perform the corresponding operation.

   B. Select the desolder work mode.

   C.

   If the communication rate does not change, press the "OK" key to exit, and the IR window displays:

   ```
   TC:022˙C   Tb:019˙C

   ready for flow
   ```

   D. Press "START" key and the system start working, performing the content of selected flow.

6. Press the "START" key, the bottom heater starts heating; the top heater goes down in place.

7. R window will display series of setting temperatures and the current temperature of TB and TC during working, and will indicate when it reaches T1, T2, T3 and TL. S1, S2 and S3 are counted down and users can clearly know the progress of the flow.

8. When the temperature reaches TL, it will give an alarm alert automatically (Low frequency).

9. When the temperature reaches T3, it will also give an alarm alert automatically. (High frequency)

10. When the process is finished, the suction rod will automatically descend to trigger the vacuum pump. After the PCB is sucked, the suction rod will automatically ascend, and the system will stop all heating.

11. The top heater moves up to the origin, the top fan extends, and the suction rod automatically places the PCB in the PCB placement area on the fan.

12. The top and external cooling fans will work at the same time to blow air for cooling.

13. The blowing time of the top and external cooling fans can be set. After the cooling, the whole desoldering process is over.
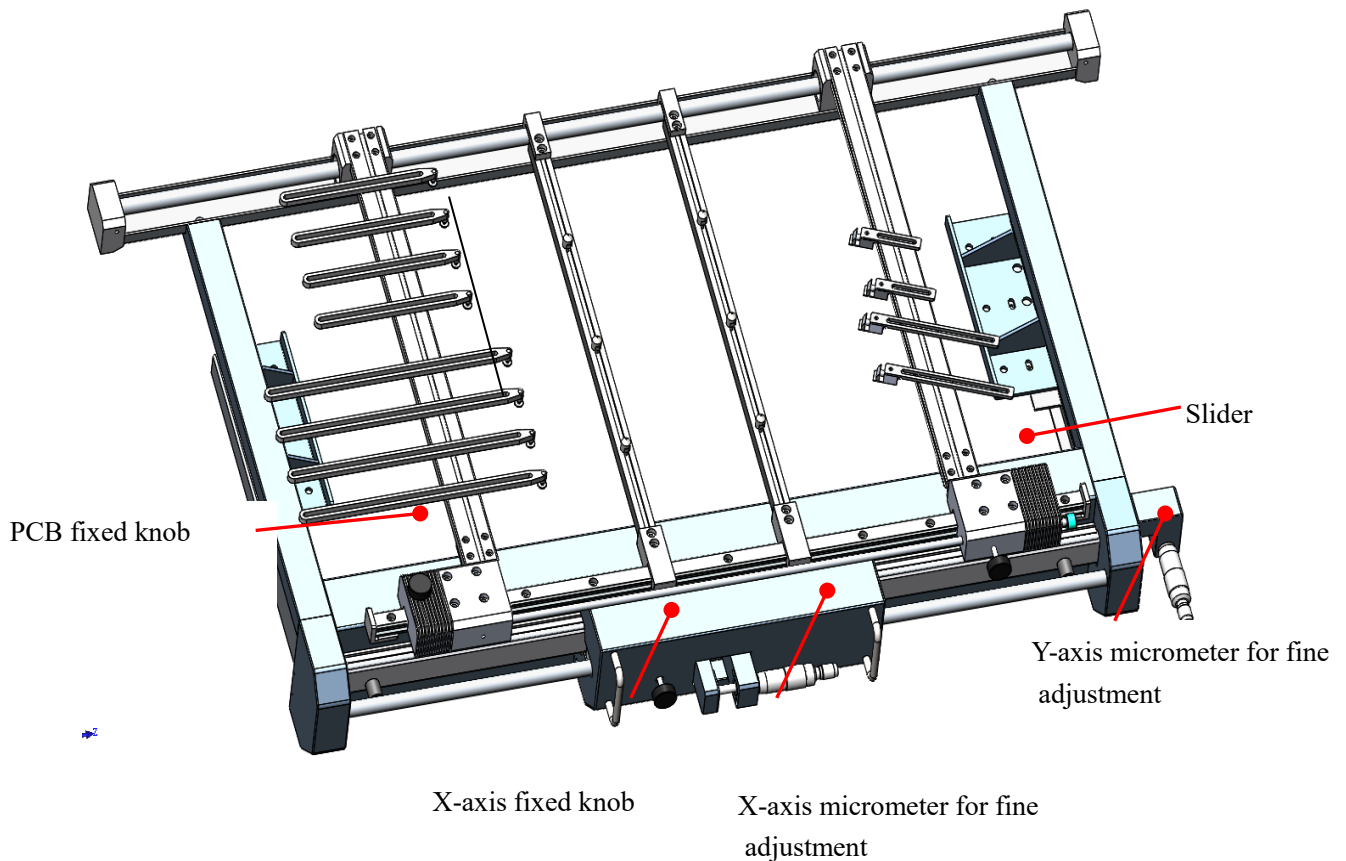
9. PL System Operation

Suction nozzle lifting assembl v

Large nozzle assembly

Small nozzle assembly

Prism assembly

9.1 Component Function

1. Crosswise Cooling Fan

On the basis of the existing top cooling, a crosswise cooling fan is added to the system, and the crosswise cooling fan and the top cooling fan are carried out simultaneously. The cooling efficiency of the PCB is accelerated, the vertical temperature difference of the PCB is reduced, and the cooling uniformity is improved.

2. PCB Fixture

PCB fixed knob

Slider

Y-axis micrometer for fine adjustment

X-axis fixed knob

X-axis micrometer for fine adjustment

* The slidable PCB fixture is able to fix PCBs of different sizes. It has four fixed knobs and two adjustable micrometer knobs. Two PCB fixed knobs are used for locking the PCB clamp bars to fix the PCB on it. The other two adjustable micrometer knobs are used for locking the movement of the X axis and the Y axis of the fixture to prevent the unnecessary longitudinal or crosswise movement of the fixture; the micrometer adjusting knob is used for fine adjustment when the components are aligned.

* Unscrew PCB fixing knobs and move the slider to open the PCB clamp bar, make the distance in accordance with PCB size. Fix PCB between clamp bars and tighten PCB fixed knob after adjusting position. If you want to lock PCB fixture, please tighten the X axis and the Y axis fixed knob.

* For fine alignment of components, first move the PCB under the prism so that the pad image appears on the display, and then fine-tune it. Rotate the "X-axis micrometer for fine adjustment" to move the PCB fixture left and right to adjust the left and right position of the PCB. Rotate the PCB clockwise to move it to the right and counterclockwise to move it to the left. Rotate the "Y-axis micrometer for fine adjustment" to move the PCB fixture forward and backward to adjust the forward and backward position of the PCB. Rotate the PCB clockwise to move forward and counterclockwise to move backward.

3.RPC Camera(Reflow Process Camera)

The position of RPC can be adjusted. First, unscrew the fixed knob in corresponding direction and then adjust.

The RPC camera can be moved up and down or rotated.

RPC Camera

Bracket adjusting knob

RPC camera fixed knob

RPC connecting wire

RPC Module
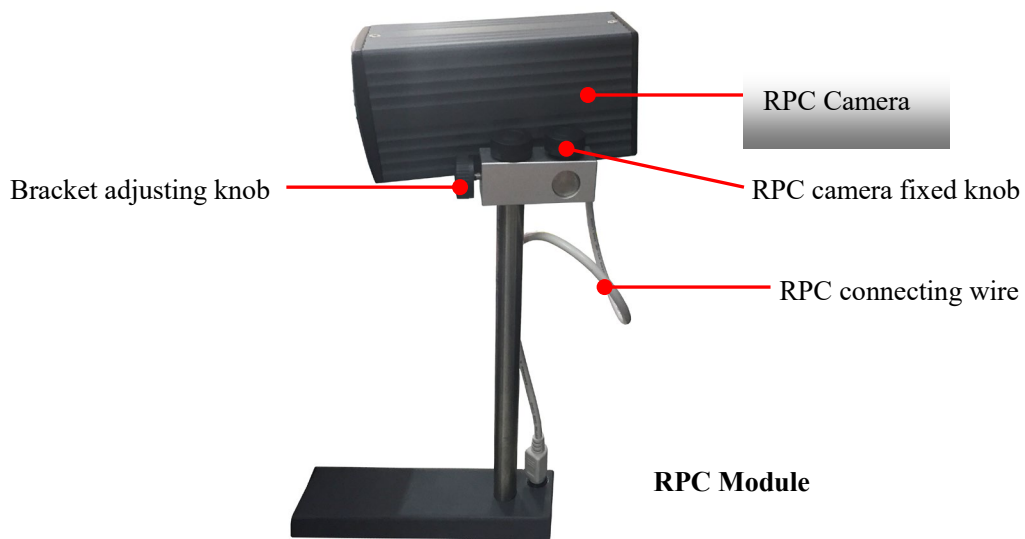
4.PL Camera

* It needs to use PL camera during the component aligning. The PL camera transmits the images of the soldering spots on the PCB and the soldering component pins on the suction nozzle to the display through video signals. The user can see the images of the soldering spots and the soldering component pins on the display, and can align them through various adjustment functions.

* When the PL camera is automatically extended, its upper and lower LED illumination brightness can be adjusted by using the keys on the keyboard: rotate the "TOP-LIGHT" key to adjust the illumination (white light) at the top of the PL alignment arm; rotate the "BOT-LIGHT" key to adjust the illumination (white light) at the bottom of the PL alignment arm.

PL吸咀
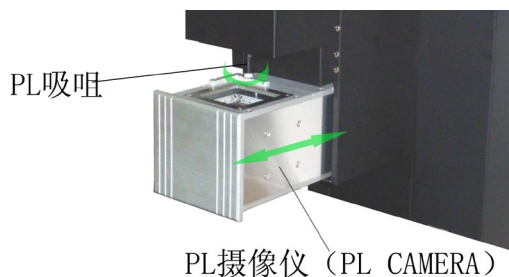
PL摄像仪（PL CAMERA）

PL 吸咀：PL suction nozzle
PL 摄像仪：PL camera

9.2 Aligning Process Instructions

1．Place the soldered components in the center of the jig. Move the PCB fixture to align the suction nozzle with the components in the jig. Press the "suck" key and the suction nozzle moves downward to suck the components in the tray. The components should be sucked from the center. When the suction pad comes

into contact with the component, the vacuum pump starts to work to create a vacuum and suck the components.

2．After the component is picked up, the prism alignment module will automatically determine whether it is extended. The following process occurs automatically:

PL-HEAD （ suck ） down→ auto suck the chip → PL-HEAD （ suck ） upward →automatic extension of prism alignment module→manual aligning（See following steps）.

3．Observe whether the image display　　　　meets your own requirements, and use the keys of the Control Box to adjust to make the displayed image meet your own requirements. For specific adjustment, please refer to "Control Box Function Description".

4．Unscrew the PCB fixing knobs on the PCB fixture to open PCB clamp bar. Fix the soldered PCB on the PCB fixture and adjust the position. Make the monitor display the image of soldering spot, and make the images of soldering spot and component in the same central position, which is convenient for adjusting. After the general adjustment, the alignment operation can be started.

5．Focus and light adjustment

Firstly adjust the sharpness of the PCB pad, dim the brightness of the top white light, and adjust the focus of the camera(by adjusting the knob "FOCUS/SUCK") to make the image of the PCB pad as clear as possible.

Then, dim the brightness of the bottom white light, brighten the top white light, and manually adjust the focal length of the chip solder ball by adjusting the distance from the chip to the contrapuntal prism (through the knob "Z") until a distance is found to make the chip solder ball image the clearest.

Finally, adjust the brightness of the top white light and the bottom white light to make the image of the chip solder ball and the PCB pad form an obvious and clear color difference image.

6．Adjust the angle of the chip so that the image angles of the chip solder ball and the soldering pad are consistent and horizontally parallel.

7．Finally, the position of the PCB is adjusted so that the solder balls of the chip overlap the image of the soldering pad.

8．After the component is aligned, press the Sucks key to mount it automatically.

9．Move the PCB fixture to move the rework part of the PCB to the designated heating center. At this time, the soldering can be carried out, and the whole aligning process operation is completed.

10. System Calibration

The precision alignment function of the equipment may be subject to deviation due to vibration during transp ortation. The system should　be calibrated before the first use. The specific calibration steps are as follows:

1. Firstly　check whether the device needs to be calibrated.

① Prepare a set of alignment calibration jig;

② Align the laser to the cross center of the lower jig, and put the white upper jig module into the

calibration frame of the lower jig to align the center, as shown in the following figure;
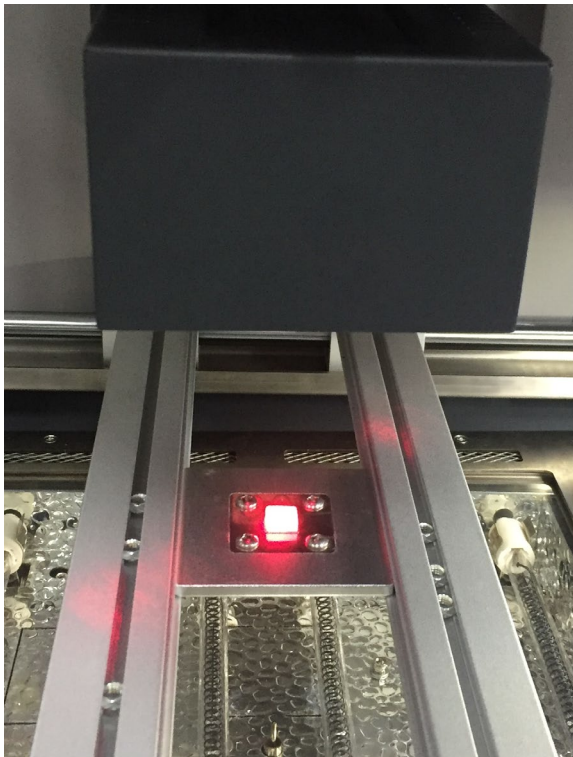
③ Click the "Align in" key, and then click the "Suck chip" key, and the equipment will automatically ab

sorb the white upper fixture module;

Note: Do not move the movable parts such as the fixture during the operation!
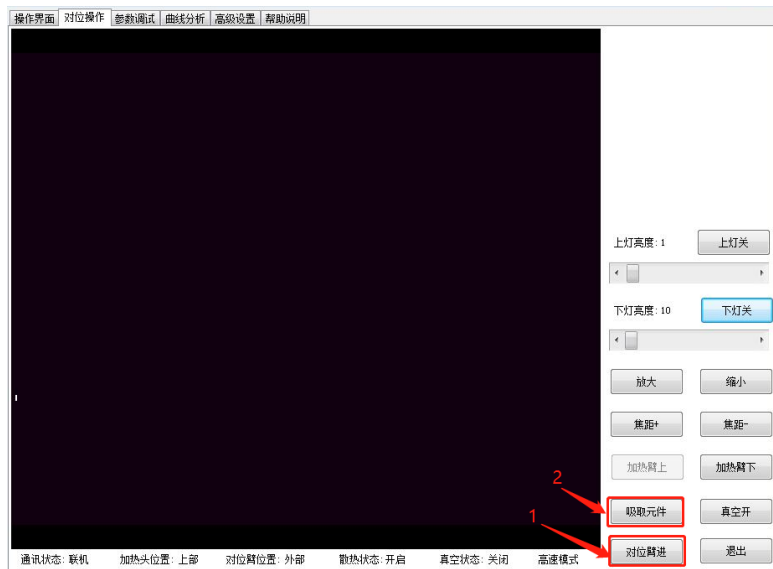
④After sucking the chip, the alignment prism automatically extends out, using the operation key to adjust the size and the definition of the image, and the cross center images of the white upper jig module and the lower jig are overlapped and clear, which indicates that the equipment does not need to be calibrated;
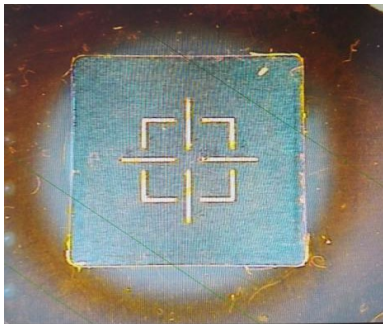
⑤ If the cross centers of the white upper jig module and the lower jig are not coincident, it indicates that calibration is required, as shown in the following figure;
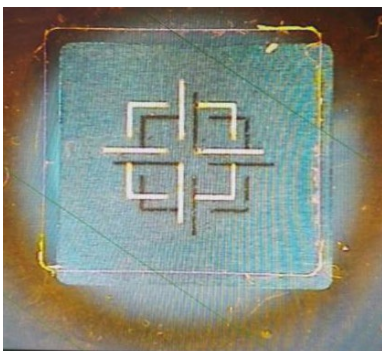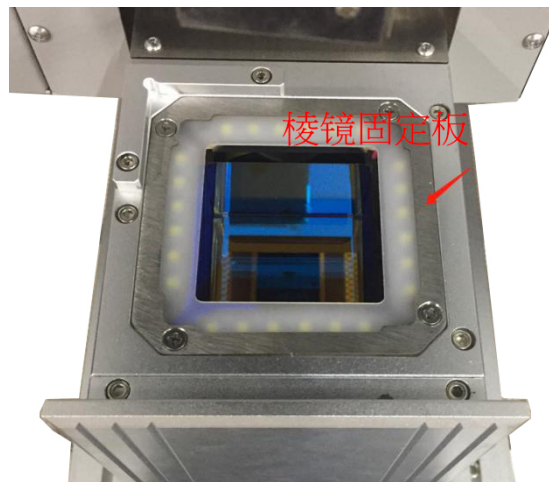

2. Calibration procedure:

① Remove the eight fixing screws on both sides, remove the trim panel, and unscrew the locking nut of the alignment mechanism, as shown in the following figure;
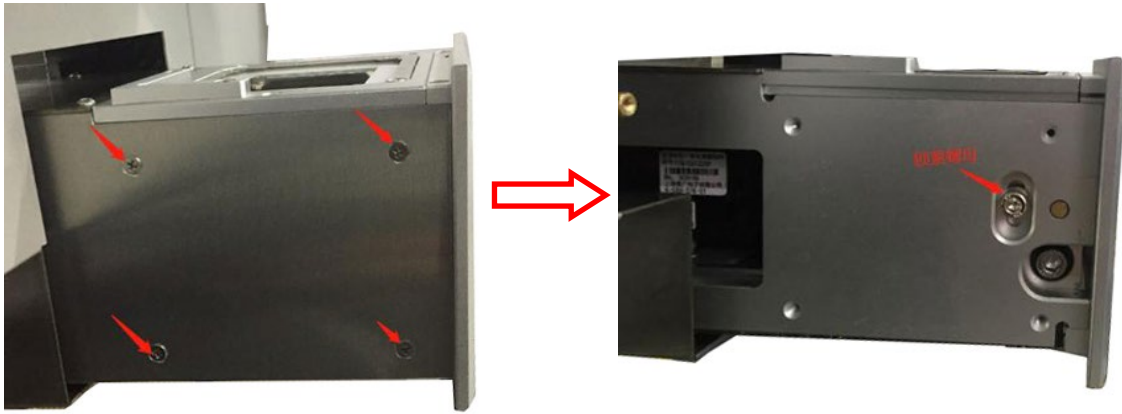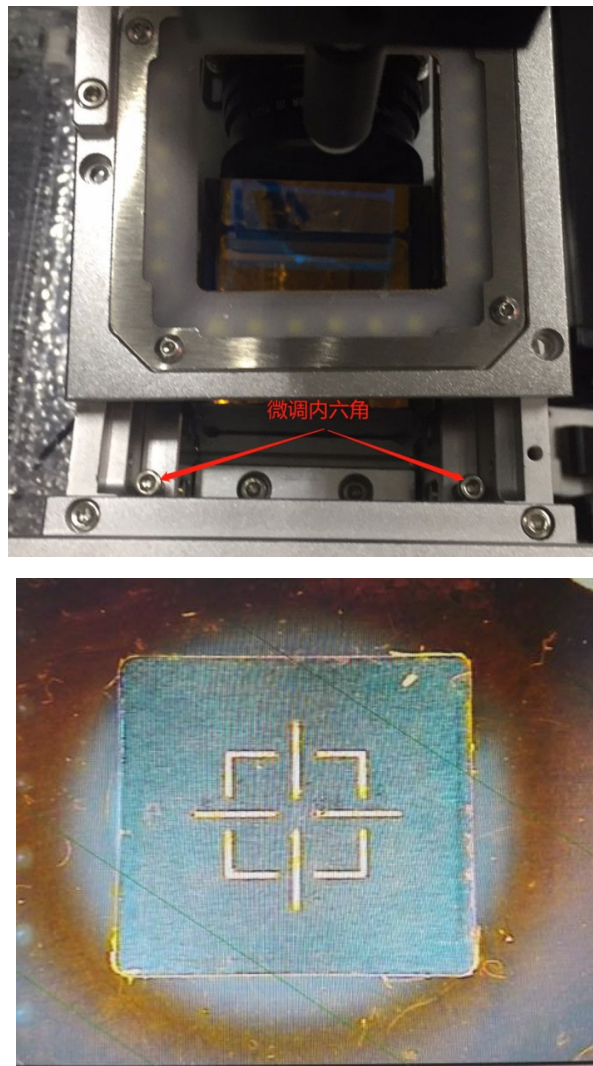
② Remove the 3 screws on the upper prism fixing plate with an Allen wrench, and lift the upper light source fixing plate of the prism from the front, as shown in the figure:

③ Loosen the prism locking nut, start to fine-tune the hexagon socket head cap screw, change the angle of the prism to make the images completely coincide, and fix the locking nut;
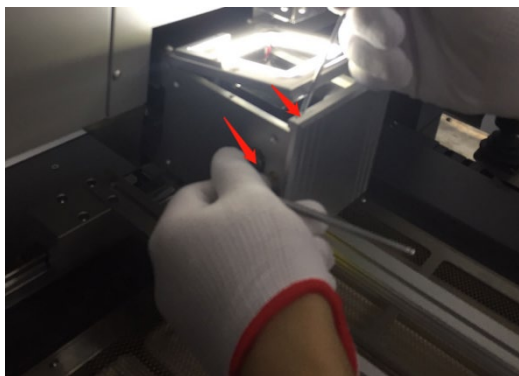
④ Click the "Mount Component" key to place the white upper jig module to the cross center of the lower jig.

⑤ If the white upper jig module cannot completely coincide with the cross center of the lower jig, continue to adjust according to following 3 steps.

Remarks:

a. Adjust the fine adjustment hexagon socket head cap screw counterclockwise to change the position of the pad and the upper and lower module images

b. Rotate the right prism locking nut clockwise, and the white upper jig module image moves upward to the left, rotate counterclockwise to move downward and right. And that scale of left and right movement is large and the scale of up and down movement is small.

c. Rotate the left prism locking nut clockwise, and the white upper jig module image moves upward to the right, rotate counterclockwise to move downward to the left, with a large amount of left and right movement and a small amount of up and down movement.

11. System Maintenance

Remark:

For ensuring reliable function and maintenance of equipment, please use parts provided by original factory.

Please turn off power switch of each part and pull out power plug when it is not in use.

 Note:

After cutting off the power supply, the housing is still very hot, so please don't use any dangerous or combustible solvent to clean it.

Clean the components:

* Clean the dust of the equipment with a clean dust-free cloth.

* Suggest to use dry or wet dust-free cloth to clean the equipment. Solder and flux on the bottom heating plate can be removed with a dust-free cloth dipped with thinner. Be careful not to damage the ceramic heating plate.

*Gently wipe the prism of the PL camera with absorbent cotton, and apply the thinner (such as alcohol) appropriately. Do not damage the surface of the prism.

*Clean the PCB fixture and its rails with a lint-free cloth sprayed with clean oil. Lubricate the rails and bearings regularly.

Replace suction pad:

If you want to replace the suction pad of IR system, please turn off power, and replace it after the vacuum suction nozzle and top heater are cooling down.

Remove the broken old suction nozzle and install a new suction pad in a clockwise direction.

Note:

PL VECTECH 3000DX is a precise equipment. Please don't make any modifications to it to avoid the reduction of equipment accuracy.

12. SOFT Software Instruction

12.1 Operation Interface

1. Operation interface: the interface reflects the execution of the process in real time, by this interface we can

real-time operate the soldering process.

2. Parameter of operation interface is set base to "parameter debugging interface", and don't need to set again

in operation interface.
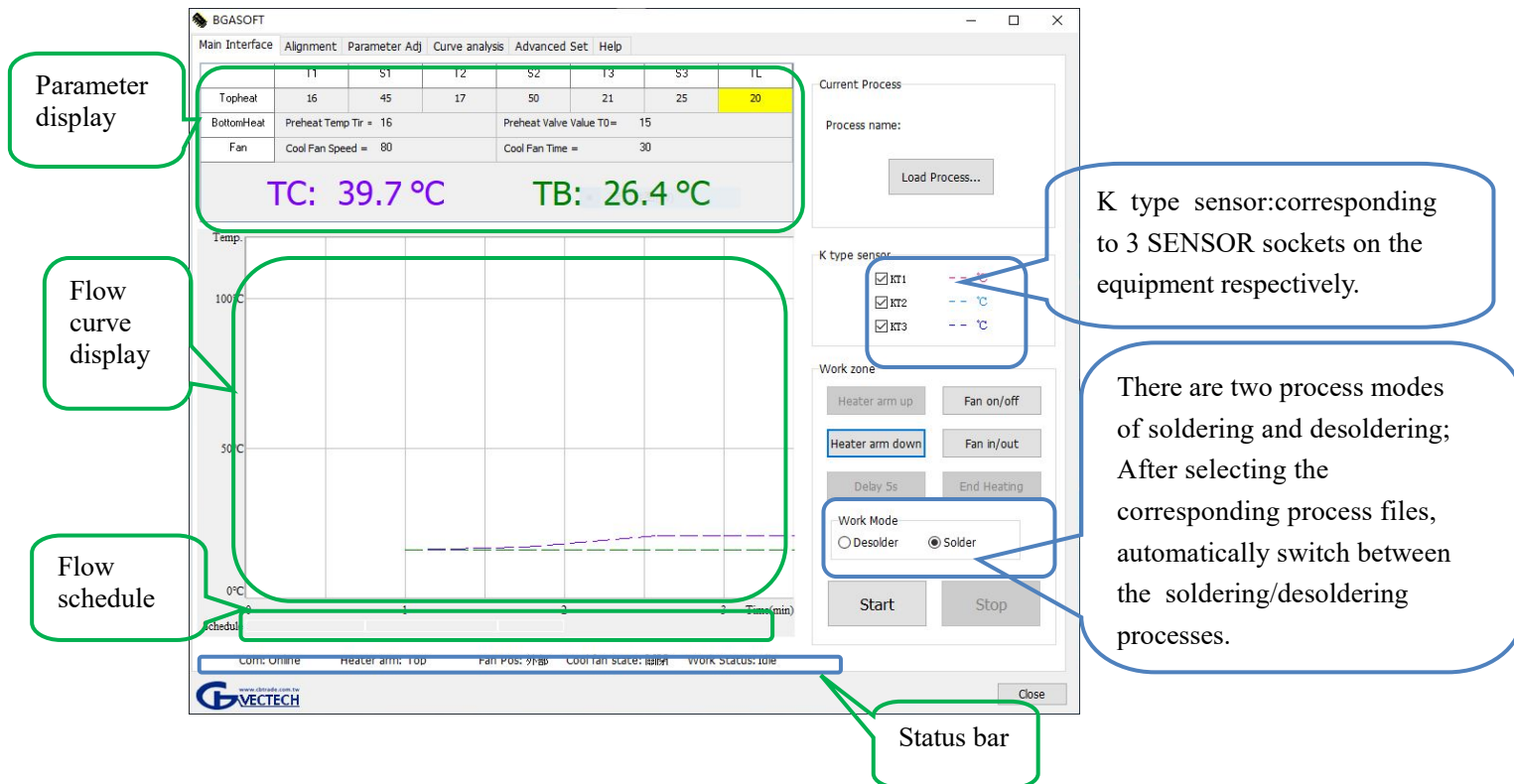
Parameter display: the parameter of this area can not be setting in "operation interface", it can be setting in

parameter debugging interface.

Flow select:refers to the process flow file of desoldering or soldering with edited parameters.

K type sensor: KT1~KT3, only connect with external K-type temperature sensor, can display

the temperature of the corresponding test part.

Flow curve display window: temperature curve of KT1－KT3, easy to real-time observation and curve

analysis.

Flow status bar: this bar display flow status by color, color is corresponding to each working segment in

the parameter display area. (D1-Cool column. Cool is green).

Status bar: real-time display current state, contain communicate state （online/offline）, the location of heat

head(up/middle/down）, aligning arm location（external/middle/interior）, head dissipation

（on/off）,vacuum state（on/off）.

Only when communicate state is online, can the process be automatically carried out by the

software.

Working area: contain every working key "heat arm up", "heat arm down",

"dissipation on/dissipation off", "cooling fan in/out".

Delay 5s: When the processing flow reaches the S3 stage, each time this key is clicked,

the heating in S3 stage will be extended for 5S.

12.2 Parameter Debugging Interface

1. Parameter debugging interface: when soldering or desoldering the new chip, by this display window, the desoldering and soldering debugging is carried out through the display window so as to debug the process parameters meeting the process requirements.
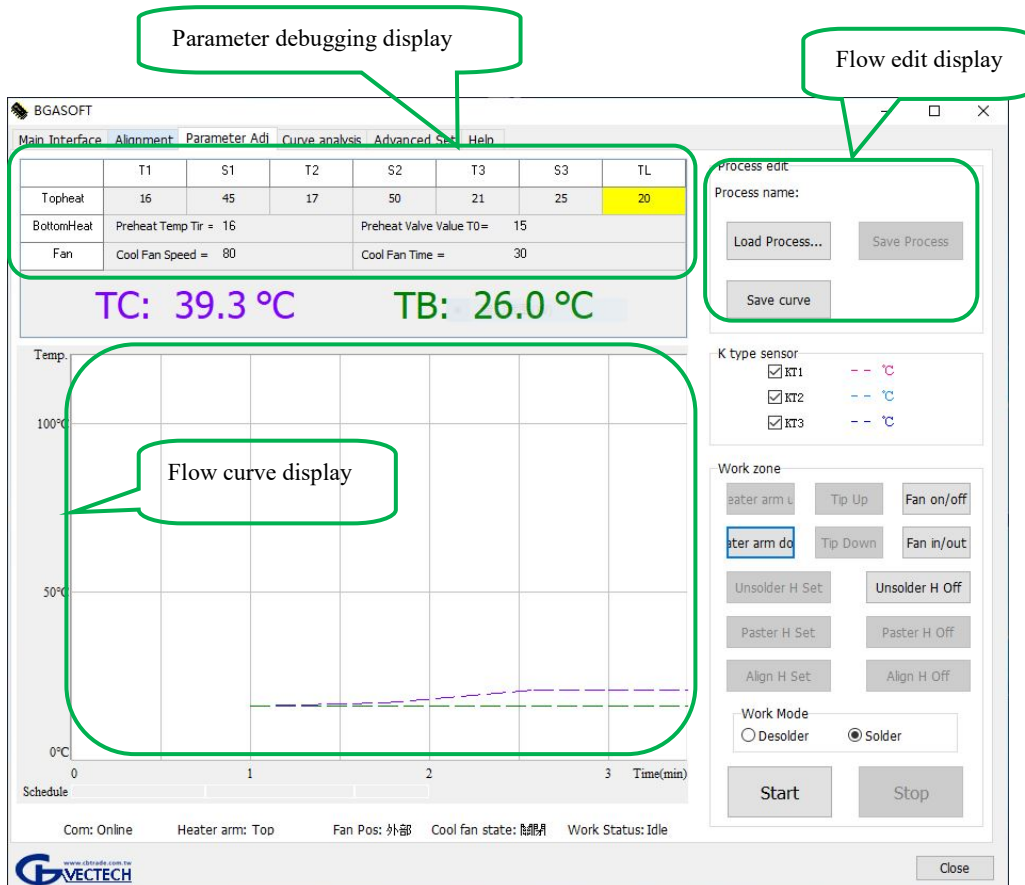
2. Alignment height: Memorize the set alignment height. After the setting, the alignment height is   a utomatically memorized, and the saved process is applied when the chips with the same specification are   ali gned, so that the alignment height does not need to be adjusted again.

3. Cancel alignment height: Cancels the saved alignment height.

4. Mounting height: Memorize the set mountig height. After setting, the chip height is automatically memorized, and the saved process is applied when the chip of the same specification is mounted in the future, and the alignment height does not need to be adjusted again.

5. Cancel mounting height: Cancels the saved mounting height.

6. In the flow edit display, display the name of the target process.

7. After editing parameters in the parameter setting window, click "Save Parameters" and "Save Curve" in   t he "flow edit display" to save the current setting parameters and curve process.

8. In the parameter setting window, you can set parameters.

9. T0: the top infrared heating system starts to work only when "TIR ≥ T0" . For no special use, please set   t he Tir setting value to be greater than T0.

10. You can also click "Select flow" in the "Flow edit display" to apply the previously saved parameters for modification.
Note: For parameter setting, please refer to the technical requirements.

12.3 Curve Analysis Interface

1. Curve analysis interface: the interface can analyze the curve of KT1-KT3 process to understand the peak temperature, heating slope, temperature change and time of each heating process of the process, so as to judge whether it conforms to the process flow.

2. In the curve analysis interface, you can open, save or delete the current curve, or call out the saved curve file for analysis.

3.   After the flow file is opened, the flow curve display window automatically displays the flow curve; if the flow file contains the test data of the external K-type temperature sensor, the K-type thermocouple test data analysis window displays the corresponding temperature rise time, maximum temperature rise slope and peak temperature.
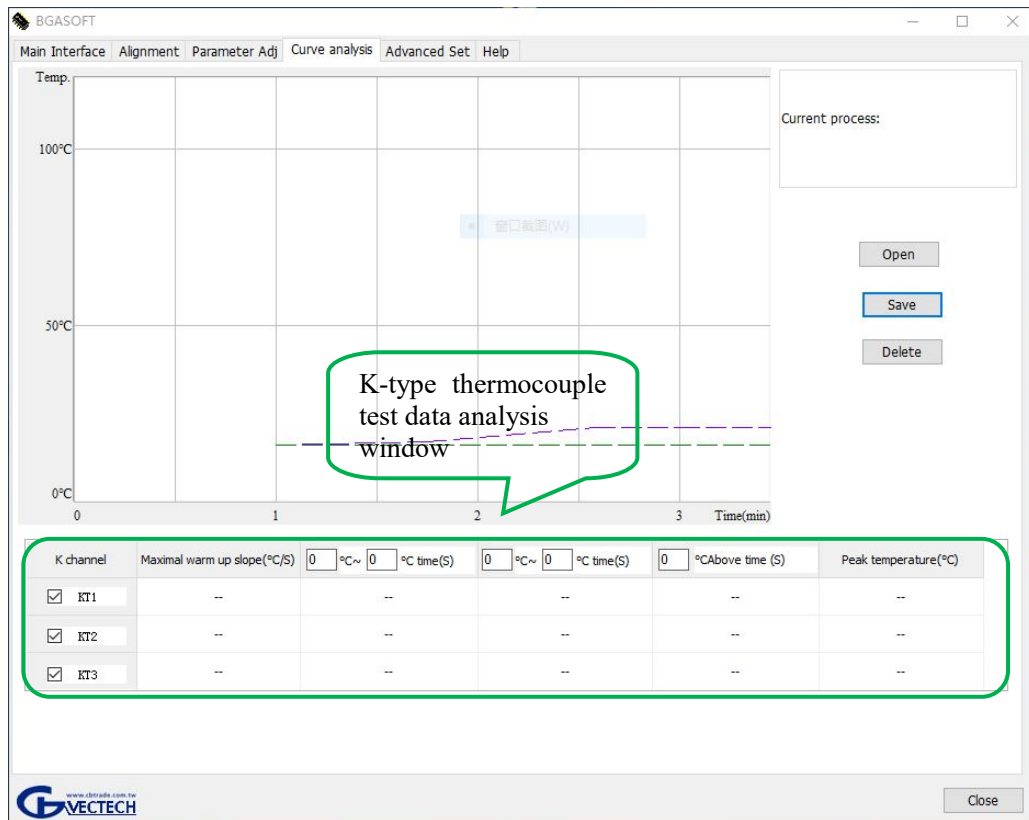
12.4 Advanced Setting Interface

1. Advanced setting: in this interface, we can set operation limits of authority, communicate, video etc. And it also can set preheating valve value, the color and line width of the temperature curve, and choose from three languages: Simplified Chinese, English and Traditional Chinese.

2. Password setting: you can set two password protection permissions: "Login Password" and "Parameter Protection".

   The person who has obtained the "login password" permission has the permission to operate the software, but no permission to modify the parameters. The person granted the "parameter protection" permission can not only operate the software, but also modify the parameters.

   If the "parameter protection" password is not set, the person who obtains the permission of "login password" can also set the parameter.

2. Language version selection: you can select the appropriate language "Simplified Chinese", "English" or "Traditional Chinese".

   If "Simplified Chinese" is selected, all operation interfaces of the software are in Simplified Chinese.

   If "Traditional Chinese" is selected, all operation interfaces of the software are in traditional Chinese.

   If "English" is selected, all operation interfaces of the software are in English. (See the English manual for details)

4. Color setting of K-type thermocouple curve : different colors and curve widths are provided for setting. In the process display window, the temperature tested by the K-type thermocouple will be displayed in the form of the curve, and different colors are used to distinguish which thermocouple displays the temperature.