设备使用说明书
Help Manual

全自动视觉印刷机，值得托付!

Automatic visual printer which is worth to trust!

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Function explanation and operation of attached menu

第一章　系统描述

Chapter 1 System description

1.1 功能特性 Function

- 先进的上视/下视视觉系统，独立控制与调节的照明，高速移动的镜头，精确地进行 PCB 与模板的对准，确保印刷精度为±0.02mm。
  Advanced up/down visual system, independent controllable and adjusted lighting, high speed mobile camera lens, precisely alignment for the PCB and template and make sure that the printing accuracy is ±0.02mm.

- 高精度伺服马达驱动及 PC 控制，确保印刷之稳定性和精密度，无限制的图像模式识别技术具有±0.01mm 重复定位精度。
  High accurate servo motor and PC control which can insure the stability and precision of the printing. Unlimited image pattern recognition technology has the repeated positioning accuracy for ±0.01mm.

- 直线马达闭环印刷头，具有特殊设计的高刚性结构，刮刀压力、速度、行程均由电脑智能控制，维持印刷质量的均匀稳定；刮刀横梁经过特殊优化结构设计，轻巧且外形美观。
  The linear motor closed-loop printing head has a specially designed high rigidity structure. The pressure, speed and stroke of the scraper are intelligently controlled by the computer Control, maintain the printing quality of uniform and stable; scraper beam through special optimization structure design, light and beautiful appearance.

- 可选择人工/自动网板底面清洁功能。自动、无辅助的网板底面清洁功能，可编程控制干式、湿式或真空清洗，清洗间隔时间可自由选择，能彻底清除网孔中的残留锡膏，保证印刷品质。
  The bottom of the board can be cleaned by manual or automatically. The clean function for the bottom of board is automatic and without assists. It can be programmed to control the dry, wet or vacuum cleaning. The cleaning time interval can be free to choose. It can clean all the solder paste inside the board holes and insure the printing quality.

- 组合式万用工作台，可依 PCB 基板大小设定安置顶针和真空吸腔(选配)，使装夹更加快速、便捷。
  There is composite worktable which can set a thimble and vacuum chamber (optional) according to the size of PCB baseboard. It makes the fixture assembling more fast and easy.
- 多功能的板处理装置，可自动定位夹持各种尺寸和厚度的 PCB 板，带有可移动的磁性顶针和真空平台及真空腔，有效地克服板的变形，确保印刷均匀。
  There is a multifunctional device to deal with boards. The device can automatically positioning and pick up various size and thickness PCB boards. It has mobile magnetic thimble, vacuum platform and vacuum chamber, which can avoid board deformation effectively and insure the even of printing.
- 具有 “Windows 7 视窗” 操作界面和丰富的软件功能，具有良好的人机对话环境，操作简单、方便、易学、易用。
  Windows 7 operation interface and abundant software functions. Good man-machine dialogue environment, simple operation. It is easy to learn and operate.
- 具有对故障自诊断声、光报警和提示故障原因功能。
  Sound and light alarm function. It can indicate the reason of the fault.
- 无论单/双面 PCB 基板均可作业。
  Can deal with the PCB base board no matter it is single side or double side.
- 可完美印刷 0.3mm 间距的焊盘。
  It can print 0.3mm spacing bonding pad perfectly.
- 2D 检测功能及 SPC 系统（标配）。
  2D inspection and SPC system (standard).

选项：以下功能如用户需要选用，请与我司联系，只要在基本配置的价格上增加下面选项的价格，即可满足您的要求。

Option: The following functions can be selected after you connect with our company. The extra fee need be charged on the base of the basis configuration expense.

- 闭环式印刷头
  Closed-hoop printing head

- 橡胶刮刀
  Rubber scraper
- 真空腔
  Vacuum chamber
- 真空平台（印刷 0.4—0.6mm 厚薄板时选用）
  Vacuum table (It can be used to print the 0.4—0.6mm boards)
- 三段式轨道
  Three-stage rail

1.2 技术参数 Parameters

技术参数 Technical parameters ND2

PCB参数 PCB parameter		
最大板尺寸 (X x Y) Maximum board size（X x Y）	450mm x 350mm	
最小板尺寸 (Y x X) Minimum board size（X x Y）	50mm x 50mm	
PCB厚度 PCB thickness	0.4mm~6mm	
翘曲量 Warpage	≤对角线1% ≤1%Diagonal	
最大板重量 Maximum board weight	3Kg	
板边缘间隙 Board margin gap	构形至 3 mm Configuration to 3mm	
最大底部间隙 Maximum bottom gap	20mm	
传送速度 Transfer speed	1500mm/s(Max)	
距地面的传送高度 Transfer height from the ground	900±40mm	
传送轨道方向 Transfer orbit direction	左－右、右－左、左－左、右－右 L-R,R-L,L-L,R-R	
传输方式 Transfer mode	一段式轨道 One stage orbit	
PCB夹持方法 PCB damping method	可编程弹性侧夹+自动调节板厚+边缘锁定基板压紧（ 选项：1、底部整体吸腔式真空；2、底部多点局部真空） Programmable elastic side clamp + Automatic adjustment plate thickness base plate pressing (Option: 1. Bottom integral cavity type vacuum; 2.Bottom multi-point local vacuum)	
板支撑方法 Support method	磁性顶针+等高块（选项一、真空腔体；选项二、专用的工件夹具）	

	Magnetic thimble + Equal high block(Optional:1.vacuum suction cavity;2.special workpiecefixture)
印刷参数 Printing parameters	
印刷头 Printing head	悬浮式智能印刷头（两个独立的直联马达） Floating intelligent printing head(two independent direct connected motors)
模板框架尺寸 Template frame size	470mm x 370mm~737 mm x 737 mm
最大印刷区域(X x Y) Maximum printing area (X x Y)	450mm x 350mm
刮刀类型 Scraper type	钢刮刀/胶刮刀(角度45°/55°/60°按印刷工艺匹配选择) Steel scraper/Glue scraper（Angel 45°/50°/60° matching the printing process)
刮刀长度 Scraper length	300mm/520mm（可选配200mm~550mm长度) (optional with length of 200mm-550mm)
刮刀高度 Scraper height	65±1mm
刮刀片厚度 Scraper thickness	0.25mm Diamond-like carbon涂层 0.25mm Diamond-like carbon coating
印刷模式 Printing mode	单或双刮刀印刷 Single or double scraper printing
脱模长度 Demoulding length	0.02 mm - 12 mm
印刷速度 Printing speed	0 ~ 200 mm/s
印刷压力 Printing pressure	0.5kg - 10Kg
印刷行程 Printing stroke	±200 mm（从中心） (From the center)
清洗参数 Cleaning parameters	
清洗方式 Cleaning mode	1、滴淋式清洗系统；2、干、湿、真空三种模式 1. Drip cleaning system; 2. Dry, wet and vacuum modes
清洗擦拭板长度 Length of cleaning and wiping plate	380mm/500mm（可选配300mm，450mm,，500mm） (optional with 300mm, 450mm，500mm)
影像参数 Image parameters	
影像视域 (FOV) Field of view	8mm x 6mm
平台调整范围 Platform adjustment range	X:±5.0mm,Y:±7.0mm,θ:±2.0°
基准点类型 Benchmark point type	标准形状基准点 (见SMEMA 标准)，焊盘 /开孔

	Standard shape benchmark point（SMEMA standard）， solder pad/openings
摄像机系统 Camera system	单独照相机，向上 / 向下单独成像视觉系统,几何匹配定位 Independent camera，upwards/downwards imaging vision system，geometric matching location
性能参数 Performance parameters	
重复定位精度 Repeat position accuracy	±10.0μm @6 σ，Cpk ≥ 2.0
印刷精度 Repetition accuracy	±15.0μm @6 σ，Cpk ≥ 2.0
循环时间 Cycle time	7s（不包含印刷及清洗）(Exclude printing and cleaning)
换线时间 Product changeover	＜5min
设备 Equipment	
功率要求 Power requirements	AC220V±10%,50/60HZ,15A
压缩空气要求 Compressed air requirements	4~6Kg/cm²
耗气量 Gas Consumption	约5L/min About 5L/min
操作系统 Operating system	Windows 7
外观尺寸 External dimension	1152mm(L) x1415mm(W) x 1540mm(H)（不含三色灯， 显示器和键盘）(Without light,monitor and keyboard)
机器重量 Machine weight	约1000Kg About1000Kg
用户权限 User Permission	不同的用户有不同的权限（密码输入） Different users have different permissions (password input)
环境温度 Environment temperat	23±3°C
相对湿度 Relative humidity	45~70%RH4

1.2.3 光学系统（Fiduciallymark 光学对准标记）Optical system(Fiduciallymark optical alignment mark)

标记点探测 Fiducial Mark Detection	用一个 CCD 相机通过网板和基板上两个标志点进行识别 Use a CCD camera to detect through the two fiducial marks on the stencil and base board
调整方式 Alignment Mode	用相机探测到 PCB 和网板位置，通过视觉校正系统软件控制方向工作台作 X—Y—θ 方向修正，实现网板与基板的对准 Use camera to detect the position of PCB and stencil. Correct the X—Y—θdirection of the worktable through the visual alignment system software and insure the alignment of the stencil and base board.
标记点形状 Fiducial Mark Shape	任何形状 Any shape
标记点大小 Fiducial Mark Size	可做成直径或边长为 1mm～2.5mm 的各种形状的孔，允许偏差10% Any shape of holes which diameter or length are 1mm ～ 2.5mm. 10% offset allowed.
标记点类型 Fiducial Mark Type	透空型：周边用薄铜材料 半透空型：中间为透明或半透明涂层材料可用镍、青铜等 Open type: thin copper material on the surrounding. Half-open type: transparent or semitransparent coating material on the middle. Can be nickel, bronze, etc.
标记点要求 Fiducial Mark Require	标志点涂层表面要求平且光滑 Coating surface of the fiducial mark need be even and smooth.

1.3 机器外形尺寸 Equipment dimension

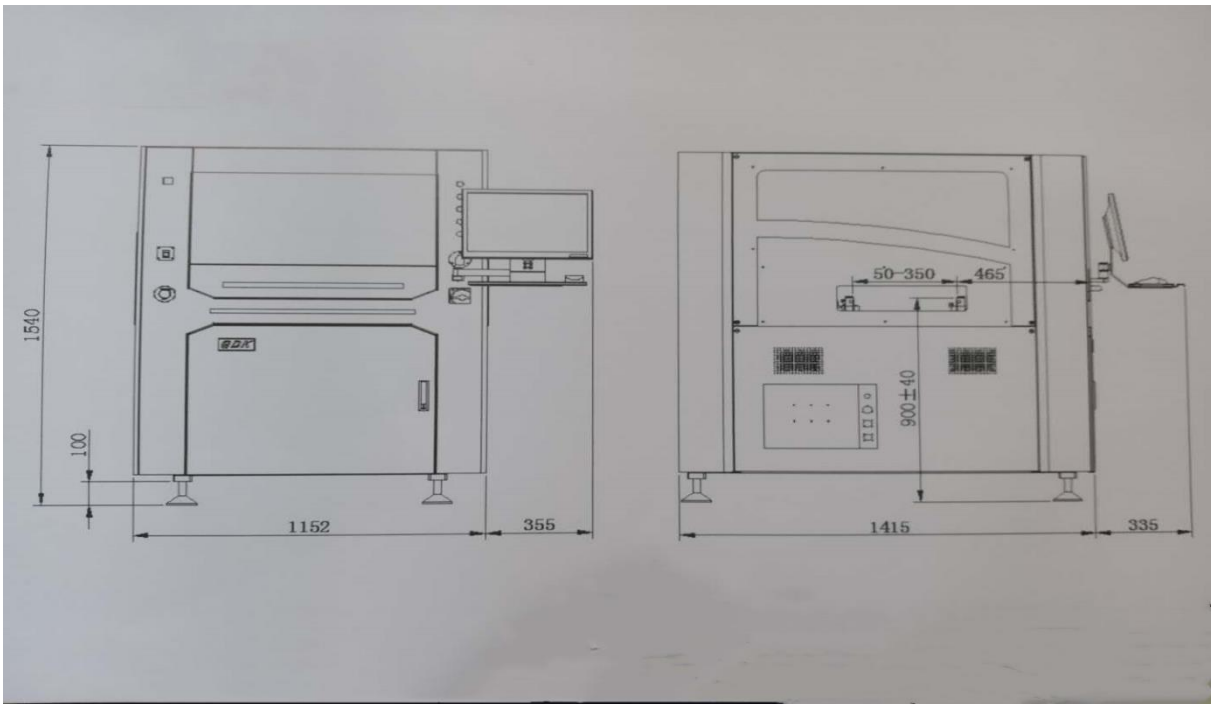


图 1-1 机器外形图

Pix 1-1 Equipment dimension

1.4 系统的主要组成 Main sections of the system

本机包括机械、电气两大部分。

机械部分由平台校正系统、**PCB** 传输及其定位系统、图象捕捉系统、钢网自动定位及其清洁系统、刮锡系统等组成。电气部分由电控系统及控制软件、计数器、驱动器、步进电机、伺服电机以信号监测、和气动系统系统组成。

The equipment includes two sections, machinery and electric.

Mechanical section includes table alignment system, PCB transmission and its positioning system, image capture system, stencil automatic positioning system and corresponding cleaning system and solder paste removed system,etc. Electrical section includes electronic control system and control software, counter drive, stepping motor, servo motor, signal monitoring system and pneumatic system.

1.4.1 平台校正系统 Worktable alignment system

组成：包括 Z 轴升降装置（升降底座、升降丝杠、控制电机、升降导轨等）、平台移动装置（丝杆、导轨及分别控制 X、Y、Θ方向移动的控制电机等）、印刷工作台面（磁性顶针、真空吸腔（选配））等。

Component: Z-axis lifting device (lifting base, lifting screw, control motor, lifting rail etc.), table mobile device (screw, rail and control motor which can control the direction on the X、Y、θ, etc.), printing table (magnetic thimble, vacuum chamber (optional) etc.).

功能：通过机器视觉，工作台自动调节 X、Y 及Θ方向位置偏差，精确实现印刷模板与 PCB 板的对准。

Function: Worktable can adjust the positioning offset of the direction of X、Y、 θ through the equipment vision. It can insure the alignment of the printing template and PCB board.

1.4.2 PCB 传输及其定位系统 PCB transmission and the positioning system

1.4.2.1 PCB 传输系统 PCB transmission system

组成：包括运输导轨、运输带轮及同步带、步进电机、停板装置、导轨调宽装置等。

Component: It includes the transmission rail, conveyer belt roller, synchronous belt, stepper motor, board breaker device and the device which can adjust the width of the rail etc.

功能：对 PCB 进板、出板的运输、停板位置及导轨宽度的自动调节以适应不同尺寸的 PCB 基板。

Function: Input and output the PCB, board breaker position and adjustable rail width. It can match different sizes of PCB base board.

1.4.2.2 PCB 定位系统-底部支撑 PCB positioning system-bottom supporting

组成:磁性顶针、顶销、偏心顶针、等高块，专用工装夹具（Grid-Lock）等。薄板可选用选配真空吸腔。

Component: Magnetic thimble, top pin, eccentricity thimble, contour block, special fixture (Grid-Lock) etc.. Thin board can select the vacuum chamber.

功能：基板边缘夹紧系统将基板固定提高至更高层次，为获得最佳的基板夹持力，边缘夹紧系统使用软件控制压力，调整以匹配被编程基板厚度，该解决方案辅以顶部夹持系统稳固地夹持基板，提供最佳的模板基板间密合，实现锡膏的有效沉淀，有效提高印刷品质.

Function: Base board edge holding system fix the base board and lift it to a higher level to get the best holding force. Edge holding system uses the software to control and adjust the pressure to match thickness of the programmed base board. This solution can help the top holding system to hold the base board firmly. It can support the best connection between the template and base board and insure the Effective precipitation of the solder paste and improve the printing quality.

1.4.3 图像捕捉系统 **Image capture system**

组成：包括 CCD 运动部分和 CCD—Camera 装置（摄像头、光源）及高分辨率显示器等，由视觉系统软件进行控制。

Component: It includes the CCD movement, CCD-Camera device (camera, light source) and high resolution screen etc.. Control by the visual system software.

功能：上视/下视视觉系统，独立控制与调节的照明，高速移动的镜头确保快速、精确地进行 PCB 和钢网板对准，无限制的图像模式识别技术具有 0.01mm 的辩识精度。

Function: Up/down visual system, independent controllable and adjustable lighting, high speed mobile lens which can insure the make the PCB and stencil aligned fast and accurate. Unlimited image pattern recognition technology reaches 0.01mm recognition accuracy.

1.4.4 钢 网 自 动 定 位 及 其 清 洁 系 统
Stencil automatically positioning and the cleaning system

1.4.4.1 钢网自动定位系统 **Stencil automatically positioning**

组成：包括网板移动装置及网板固定装置等。

Component: It includes stencil mobile device and stencil fixed device etc..

功能：只需输入钢网 MARK 点位置就可以自动定位,更方便用户不同大小钢网的灵活更换.
适用的钢网夹持装置,可支持钢网最小为 370x470mm （ 470 左右方向放置), 最大为 737× 737mm, 厚度 20~40mm.

Function: Inputting the stencil mark location can positioning automatically and it is convenient for operator to replace different sizes of stencil. The stencil holding device can hold the Min. stencil whose size is 370x470mm (470 left and right direction placed) and Max. stencil whose size is 737×737mm and thickness is 20~40mm

1.4.4.2 钢网清洗系统-擦拭组件 Stencil cleaning system-wipe component

组成：包括真空管、文丘里管、鼓风机、清洗液储存和喷洒装置、卷纸装置、升降气缸等。网板清洗装置被安装在视觉系统后面，通过视觉系统拖动清洗系统移动，自动清洗网板底面。

进行清洗时清洗卷纸上升并且贴着模板底面移动，用过的清洗纸被不断地绕到另一滚筒上。清洗间隔时间可自由选择，清洗行程可根据印刷行程自行设定。进行湿洗时，当储存罐中清洗液不够时，系统出现报警显示，此时应将其充满清洗液。干、湿、真空洗周期可自由调节。

Component: It includes vacuum tube, venturi tube, blower, liquid restore and spraying device, paper roller, lifting cylinder etc.. Stencil cleaning device is assembled behind the visual system. Cleaning system will remove by the dragging from visual system. The bottom of the stencil will be cleaned automatically.

The cleaning roller paper lift up and remove on the bottom of the template when do the cleaning. The used cleaning paper will roll to another roller continually. The cleaning interval can be selected freely. The cleaning movement can be set on the base of the printing movement. Doing the wet cleaning, the system will alarm if there is not enough cleaning liquid in the restore container. Then operator need full the container with cleaning liquid. The cycle of the dry/wet/vacuum cleaning can be adjusted freely.

功能：

自动有效的分离式清洗结构，大功率风机加文丘里真空发生装置抽真空，喷射系统加可编程的喷洒清洗液，干、湿、真空三种清洗方式,并可任意选择自由组合，用户可根据实际需求设定清洗周期、时间及速度等参数，长短擦拭纸通用,拆卸方便,节约资源；加强型的真空栅,充分利用风机效率, 彻底清除网板孔中的残留锡膏，保证印刷品质。

Function: Automatic, effective and separating cleaning structure. High power fan and venture vacuum device do the vacuum pump. Spraying system, programmed spraying cleaning liquid and three cleaning methods (dry/wet/vacuum). These can be selected and combined freely. Operator can set the cleaning cycle, time, speed etc according to the actual need. General paper is easy to assemble and disassemble and it can save resource. Enhanced vacuum gate and good fan can removed the remaining solder paste in the hole on the stencil. It can insure the printing quality.

1.4.5 刮锡系统 Solder paste removed system

组成：包括印刷头（刮刀升降行程自动调节装置、刮刀片安装部分）、刮刀横梁及刮刀驱动部分（步进马达、驱动皮带等）等。

Component: Printing head (scraper lifting movement automatic adjustment device, scraper blade assembling section), scraper beam, scraper drive section (stepping motor, driving belt) etc..

功能：悬浮式能平衡自重的自适应刮刀，刮刀 Y 方向驱动使用随动结构，双滑块线性导轨，印刷平稳,动作敏捷，独立直联式步进马达控制,内置精确压力控制系统，能精确的测定刮刀原始压力值,无需顾及刮刀片类型，长度，重量或者厚度的变化.可编程实现印刷工艺灵活多变。

Function: Suspended, balanced and adaptive scraper. The driving on the Y direction of the scraper is moving structure. The linear rail has two sliders. These make the printing even, stable and fast. Controlled by the independent and direct stepping motor. Accurate pressure control system can set the original pressure value precisely regardless of the change of the type, length, weight and thickness of scraper. It can be programmed to insure the flexibility of the printing technology.

1.4.6 电控系统 Electronic control system

组成:Windows 7 操作系统，集成电路，智能化的先进软件控制。

Component: Windows 7 system, integrated circuit, advanced intelligent control software

特点：安全，维修方便，极大地方便了用户的使用。

Feature: Safe, convenient maintenance and easy operation.

1.5 工作原理 Working principles

由以上各部组成的全自动视觉印刷机在印刷焊膏时，锡膏受刮刀的推力产生滚动的前进，所受到的推力可分解为水平方向的分力和垂直方向的分力。当运行至模板窗口附近，垂直方向的分力使粘度已降低的焊膏顺利地通过窗口印刷到 PCB 焊盘上，当平台下降后便留下精确的焊膏图形。

When the automatic visual printer prints the solder paste, the solder paste will move forward with the force from the scraper. The force will be divided into horizontal component and vertical component. When move to the nearby of the template window, the vertical component let the low viscosity solder paste go through the window and it will be printed on the PCB bonding pad. The clear solder paste picture will remains after the table descends。

第二章 设备安装与调试

Chapter 2 Equipment installation and debugging

2.1 开 箱 Open the equipment

开箱后，请您首先做好以下工作：

Do the following checks after opening the equipment

1. 对照《装箱清单》所列各项进行查验。
   Recheck all in items on the packing list.
2. 检查机器各部分是否有损坏，包括另箱包装的显示器、键盘、鼠标及刮刀板等，并将它们重新安装到印刷机上。
   Check all the units, including the screen, keyboard, mouse and scraper board etc.
   And assemble them on the printer.
3. 将运输导轨上的固定扎带剪开。
   Cut off the fixed tie on the transmission rail.
4. 刮刀横梁固定在网框横杆上的，请将固定带剪开。
   Scraper beam is fixed on the frame beam with the tie. Cut off the tie.
5. 请将网框横杆上的固定套松开，使网框支板能左右移动。
   Loose the fixed sleeve on the frame beam so that the frame supporting board can move left and right.
6. 将运输时安装的工作台固定板取下（如图 2 –1 示）。
   Take off the fixed plate which is assembled inside the table during the transportation.(see pix 2-1)
7. 检查各连接处是否有松动脱落，各运动部分传输皮带有无脱落。
   Check all the connections are loosen or not and the transmission belts are loosen or not.
8. 检查各直线导轨上的滑块有无滑脱。
   Check the sliders on the linear rail slip or not
9. 检查电气元件是否固定、接触是否良好。
   Check electronic components are fixed or not, connected or disconnected.

10. 开机前请务必详细阅读本《操作说明书》。

Read help manual carefully before turn on the equipment.

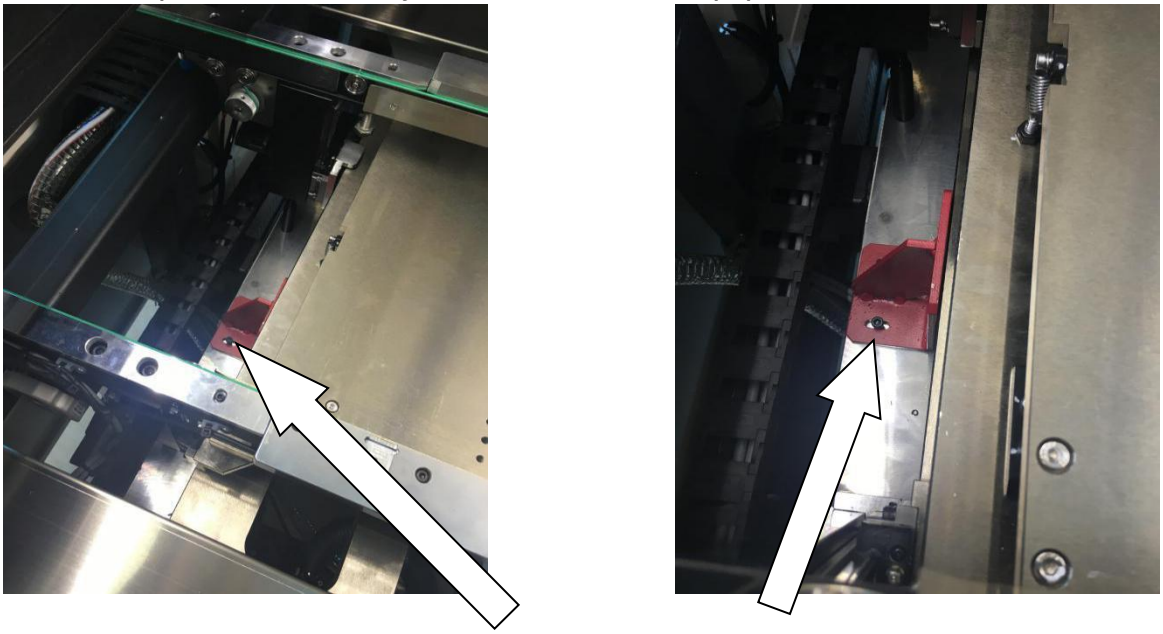
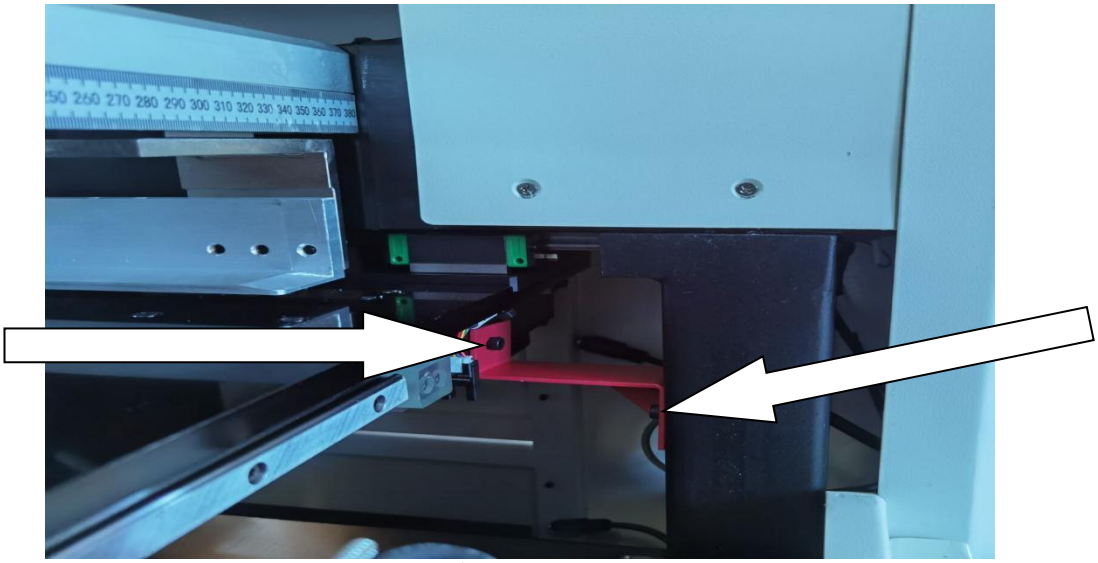


图 2-1工作台固定板（红色）Fixed plate on the table (red section)



CCD固定板（红色）CCD fixing plate (red)

2.2 操作环境 Operating environment

环境温度：不论印刷机内有无工件，该机的工作环境温度最好在 23±3℃之间。

Temperature: No matter there are work pieces or not inside the printer, the operation temperature is best between 23±3℃.

相对湿度：该系列机的工作环境相对湿度应＜70%。

Relative humidity: The operation relative humidity of this serial of printer need be ＜70%.

储存条件：机器储存应防潮、防尘、防暴晒。在运输过程中，请尽量避免过高的湿度、震动、压力及机械冲击。

Restore requirement: Dampproof, dustproof, anti-exposure. Avoid high humidity, shake,

pressure and mechanical shock during the transportation.

安装空间：见机器外形结构图。

Installation Space: See the pix of equipment appearance structure

2.3 设备安置及高度调整

Equipment location and height adjustment

1. 将印刷机移动安置到选定位置。调节机器下部四个可调机脚（调整范围：±20mm），确定所需的设备高度。

   Place the printer in a selected location. Adjust the four adjustable mounts on the bottom of the equipment (adjustment range: ± 20mm). Make sure the equipment height.

2. 调水平。调整方法是：

   Adjust the horizontal. Methods are following:

   a) 使用精密水平仪（框式水平仪）进行测量。

      Measure it with accurate spirit level (frame spirit level).

   b) 通过四个可调机脚，对印刷机反复进行水平调整，直到其完全水平为止。

      Adjust the four mounts, do the horizontal adjustment on the printer repeatedly until it is totally horizontal.

   c) 将可调机脚螺母锁紧。

      Fasten the screws on the mounts.

2.4 电源气源 Power supply and air power

1) 请使用 AC 220V、50/60Hz 具有额定电流的稳定电源，用户在使用本机器过程中如电压不稳定，应自备稳压电源。

   Stable power: AC 220V 、 50/60Hz and rated current. If the current is not stable during the operation, please prepare a regulated power supply.

2) 请使用稳定的压力为 4e～6kgf/cm^2 的工业气源。

   The stable pressure of industrial air power need be 4e～6kgf/cm$^{2.}$

图 2-2 电气源接口位置图

Pix 2-2 Power supply and air power port location

2.5 工控机控制系统安装 Installation of the industrial computer control system

按图 2-3 将工控机控制系统中显示器、键盘及鼠标等安装到印刷机主机上，并与工控机连接，然后接通电源。

Assemble the screen, keyboard and mouse etc on the printer and connect it with the industrial computer and turn on the power supply.

图 2-3 印刷机外形图

Pix 2-3 Printer external view

2.6 软件安装 Software installation

2.6.1 软件功能简介 Software introduction

本软件我司最新推出的 全自动视觉印刷机控制软件，具有 Windows7 视窗操作界面，功能强大，参数设定方便，操作简单且安全可靠，易学、易用。

This automatic visual printing control software is researched by our company. Windows7 interface powerful functions and safe. Easy to set parameter, learn and operate.

此软件在全自动视觉印刷机上的应用，实现了机电一体化的控制，大大地提高了印刷机的自动化程度和控制精度，保证了印刷质量。

This software applied on the automatic visual printer realizes the control of mechanical and electrical integration. It improves the automatic level and control accuracy of the printer and insures the printing quality.

本机器所用软件具有如下一些功能：

This equipment software owns following function:

1) 印刷参数设定
   Printing parameter setting
2) 机器参数设定
   Equipment parameter setting
3) 导轨宽度自动调节
   Adjust the width of rail automatically
4) 视觉系统辨识及钢网与 PCB 板自动对准
   Visual system identification, alignment of the stencil and PCB board
5) 网板与 PCB 板自动夹紧
   Stencil and PCB board can clamp automatically

6) 网板自动清洗
Automatic cleaning of the stencil
7) I/O 故障自动检测并声光报警、提示故障原因
Automatic inspect the I/O fault and sound-light alarm and indicate the reason of the fault
8) 报警记录
Alarm record
9) 生产设置
Production setting
10) 自动归零操作
Return to zero automatically
11) 在线 PCB 板计数
Online PCB board counting
12) 自动钢网定位
Automatic positioning of the stencil
13) 自动刮刀测高
Automatically measure the height of the scraper

2.6.2 软件安装 Software installation

机器出厂前已经安装了驱动软件和操作系统软件。在使用过程中，如须重新安装，请按下列步骤进行。

The equipment has installed the driving software and operating system software. If the software need be reinstalled during the operation, please do it according to the following steps.

1) 打开电脑 F 盘。Open the Disk F in the computer.

2)把 printer 文件复制到电脑 C 盘的根目录下。 Copy the printer files to the root directory of the Disk C.

3) 打开 printer 文件， Open the printer files.

4) 完成后把 “  ” 图标用快捷方式放到桌面上。Put the “  ” icon on the desktop with shortcut.

5) 在桌面上双击 “  ” 图标即可打开驱动软件。Open the driving software by double clicking the “  ”icon

第三章　生产工作流程

Chapter 3 Production flow

3.1 开机前检查 Check before turning on the equipment

- 检查所输入电源的电压、气源的气压是否符合要求；
  Checking all the input voltage of the power and pressure of the air power meets the requirements.
- 检查机器各接线是否连接好；
  Check whether all lines are connected.
- 检查设备是否良好接地；
  Check whether the equipment is grounded.
- 检查气动系统是否漏气，空气输入口过滤装置有无积水，是否正常工作。
  Check whether pneumatic system leaks and whether there is water in the air input port filter and normally work.
- 检查机器各传送皮带松紧是否适宜；
  Check whether the transmission belt is loose.
- 检查是否有无关的碎物留在电控箱内，电控箱内各接线插座是否插接良好；
  Check whether there is residue inside the electric control case and whether all the sockets are connected.
- 检查有无工具等物遗留在机器内部；
  Check whether there is any tool lost inside the equipment.
- 根据所要印刷的 PCB 板要求，准备好相应的网板和锡膏；
  Prepare the stencil and solder paste according to the requirements of the PCB board printing.
- 检查磁性顶针是否按所要生产的 PCB 尺寸大小摆放到工作台板上;
  Check whether the magnetic thimble is put on the worktable according to size of PCB board.
- 检查清洗用卷纸有无装好，检查酒精箱的液位（液面应超出液位感应器）；
  Check whether the rolled paper is installed and the liquid level inside the alcohol tank (Liquid level should be beyond the liquid level sensor).

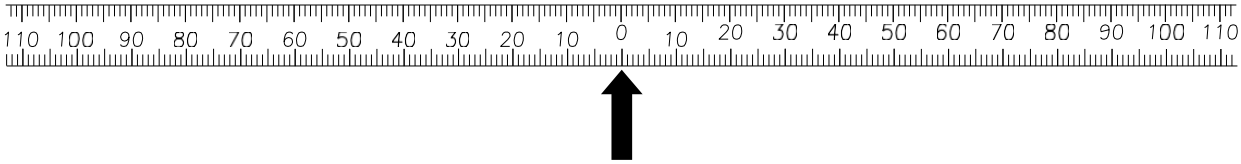
- 检查机器的紧急制动开关是否弹起；
  Check whether the emergency switch bounces.
- 检查三色灯工作是否正常，检查机器前后门是否关好。
  Check whether tri-color light work normally and the doors in the front and back are closed,

3.2 开始生产前准备 Preparation before the production

3.2.1 模板的准备 Template preparation

1) 模板基材厚度及窗口尺寸大小直接关系到焊膏印刷质量，从而影响到产品质量。模板应具有耐磨、孔隙无毛刺无锯齿、孔壁平滑、焊膏渗透性好、网板拉伸小、回弹性好等特点。
   The thickness of base material of template and the size of window relate directly to the printing quality of the solder paste and then relate to the production quality. The template need has following features. Wearable. There is no burr and sawtooth on the pore. Wall of hole need be smooth and even. Solder paste permeability is high. The extension of stencil is small. Good resilience.

2) 根据网框尺寸大小移动网框支承板，将网框前后、左右方向的中心对准印刷机前横梁及左、右支承板上的标尺 “0” 刻度位置，居中摆放后，再将网板锁紧。
   Remove frame supporting plate according to the size of the frame. Let the centre in the front/back/left/right direction of frame align at “0” position scale on the scale plate of the front beam of printer and the left/right supporting plate. Place it in the centre and fixed the stencil.



网框中心对准箭头指示处
The centre of the frame aims at the position remarked by the arrow

图 3-1
Pix 3-1

注：本机器推荐用户使用规格为 650×550mm 的网框（见《用户手册》附 1 推荐使用的网框尺寸）。
Notice: The size of the frame recommended for this equipment is 650 ×550mm(See the frame size in the attachment 1of the help manual)

3.2.2 锡膏准备 Solder paste preparation

1) 在 SMT 中，焊膏的选择是影响产品质量的关键因素之一。不同的焊膏决定了允许印刷的最高速度，焊膏的粘度、润湿性和金属粉粒大小等性能参数都会影响最后的印刷品质。
The quality of the solder paste is one of the critical factors which will affect the quality of the production in SMT industry. The difference of the solder paste can determine the highest speed of printing. The viscosity and wettability of the solder paste and the size of the metal particle etc. also will affect the quality of the production.

2) 对焊膏的选择应根据清洗方式、元器件及电路板的可焊性、焊盘的镀层、元器件引脚间距、用户的需求等综合起来考虑。
Selecting the solder paste need consider the cleaning method, weldability of the component and circuit board, bonding pad coating, the space of the component pin and operator need.

3) 锡膏选定后，应根据所选锡膏的使用说明书要求使用。
Use the solder paste according to the help manual of the selected solder paste.

4) 在使用之前必须搅拌均匀，直至锡膏成浓浓的糊状并用刮刀挑起能够很自然的分段落下即可使用。
Mix the solder paste fully until it is very thick and can drop segmentedly and naturally when it is stirred up.

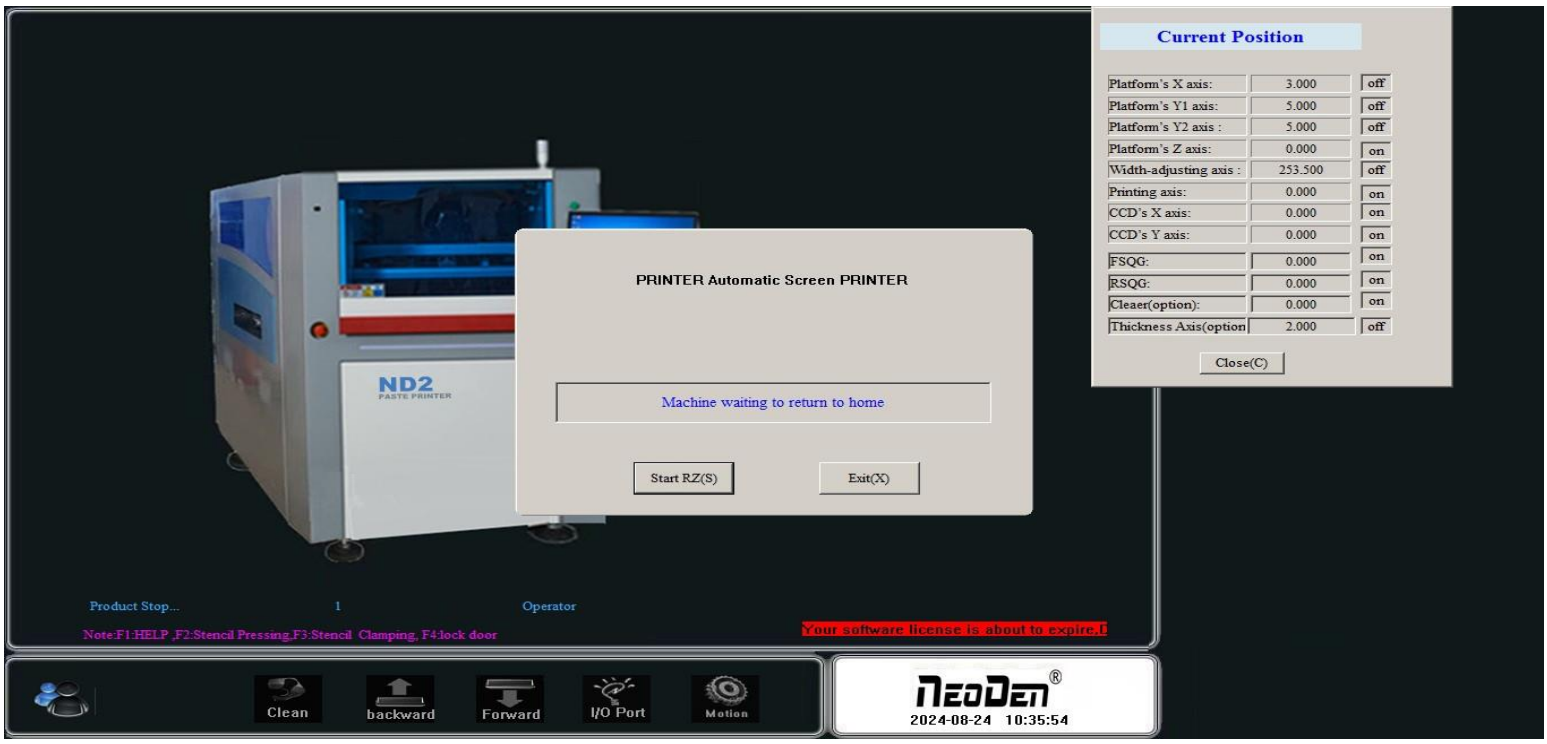
5) 锡膏从冰柜中取出不能直接使用，必须在室温 25℃左右回温（具体使用根据说明书而定）；锡膏温度应保持与室温相同才可开瓶使用
Operator can not use the solder paste directly when it is taken out from the freezer. It can be used after the warming up in the room temperature which is about 25℃.(see the help manual of the solder paste). The solder paste container can be open when the temperature of solder paste and room temperature is the same.

6) 使用时应将锡膏均匀地刮涂在刮刀前面的模板上，且超出模板开口位置，保证刮刀运动时能将锡膏通过网板开口印到 PCB 板的所有焊盘上。
Spread the solder paste evenly on the template which is assembled before the scraper. The solder paste need be spread beyond the open position of the template to insure that scraper can print the solder paste on all of the bonding pads of the PCB boards through the stencil open position.

3.2.3 PCB 定位调试 PCB Positioning adjustment

1. 打开机器主电源开关。
   Turn on the main power switch of the equipment.
2. 进入印刷机主画面。如图 3-2
   Enter the main interface of the printer. See pix 3-2

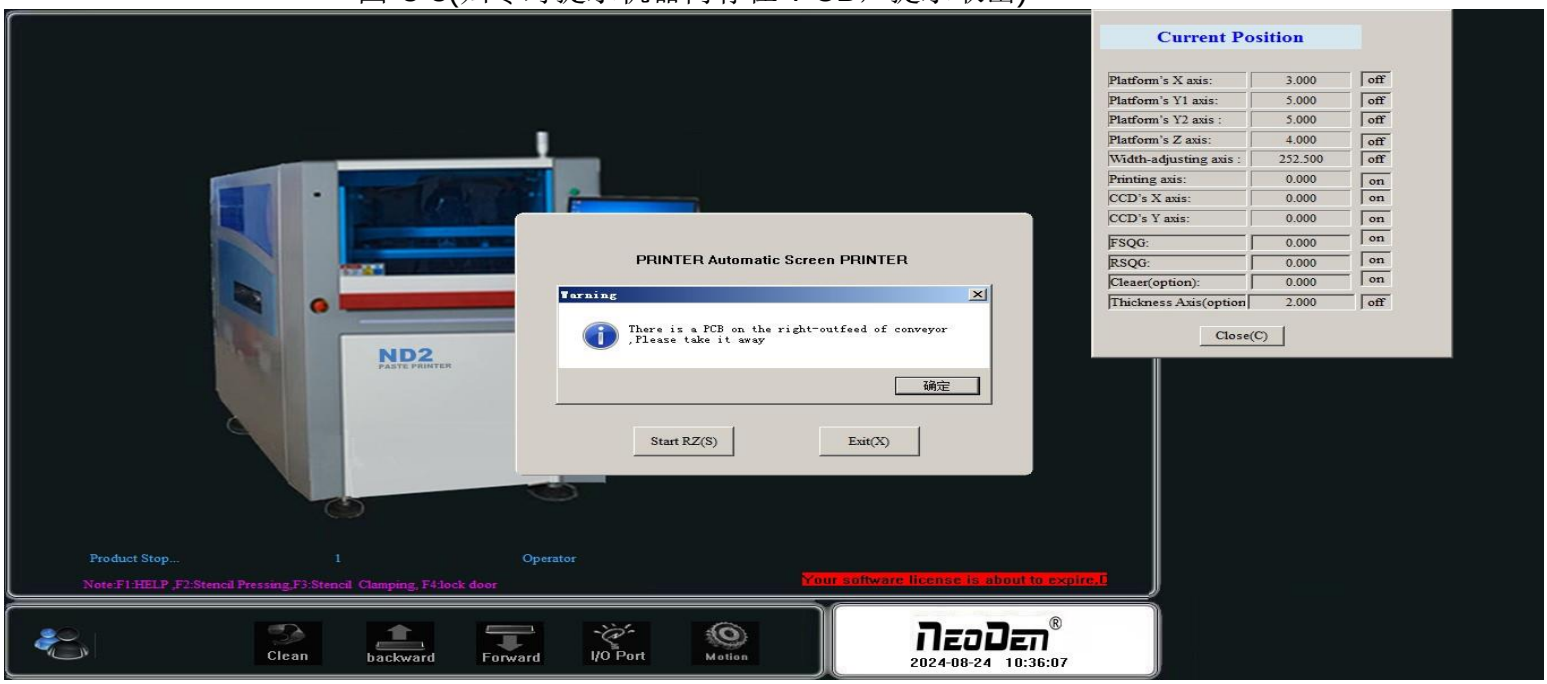
图 3-2(打开机器程序的主界)



Pix 3-2 (The main interface of the program)

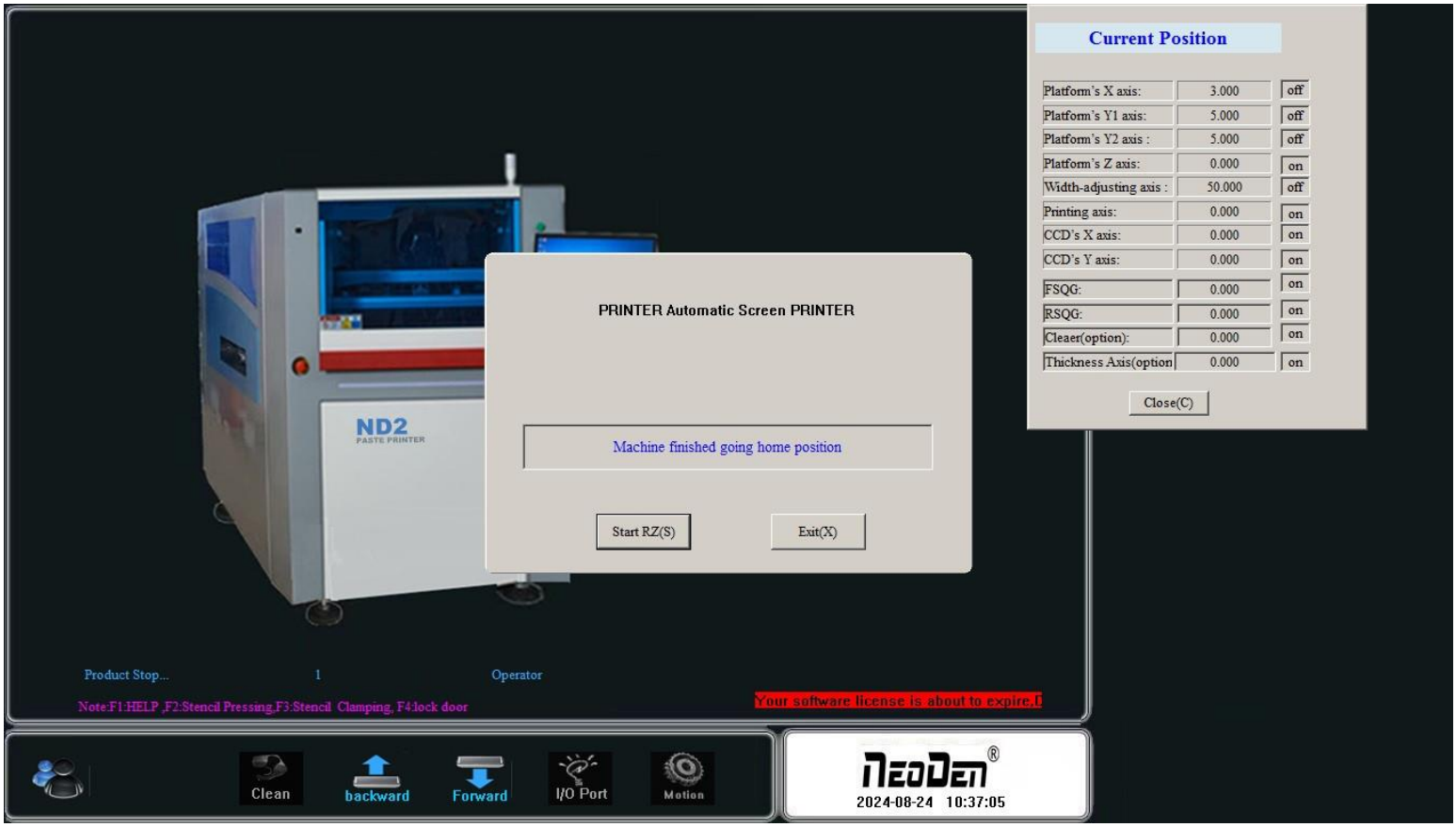
3. 机器会自动转入归零模式。单击[退出]按钮，机器退出归零模式；单击[开始归零]按钮，机器转入归零进程，并自动检测机器内部是否存在 PCB 板,如图 3-3,如机器内有 PCB，请在该提示下状态下取出，并单击[确定]按钮,机器正式开始归零直到完成,如图 3-4。
The printer will enter into the mode of returning to zero. Clicking the 退出(exit) button, the printer exits the mode of returning to zero. Clicking the 开始归零(return to zero) button, the printer will enter into the process of returning to zero and inspect automatically whether there is PCB board inside the printer. See pix 3-3. If there is PCB board, please take out it according to the indication and click 确定(OK)button. The process of returning to zero finished. See pix 3-4.

图 3-3(归零时提示机器内存在 PCB，提示取出)



Pix 3-3 (take out the PCB when the indication comes out during the process of returning to zero)

图 3-4(机器进入归零状态)



Pix 3-4 (the printer enter the mode of returning to zero)

4．在图3-4中点击{退出}或者单击菜单栏按钮，出现3-5画面选择“三级权限”用户，输入密码“printer”，点击确定。进入到“三级权限”用户环境。

Click“退 出”(exit) button in the pix 3-4 or click “  ” button in the main menu bar. See the interface in the pix 3-5. Select 三级权限（level 3 permission）, input passport printer, click 确 定 and go to the user environment of Level 3 permission

用户权限说明； 一级权限为最低操作者使用，可以调用旧程序及生产操作。
二级权限有除机器参数与刮刀设置外所有权限 。
三级权限可以修改机器参数 3、4 与刮刀设置

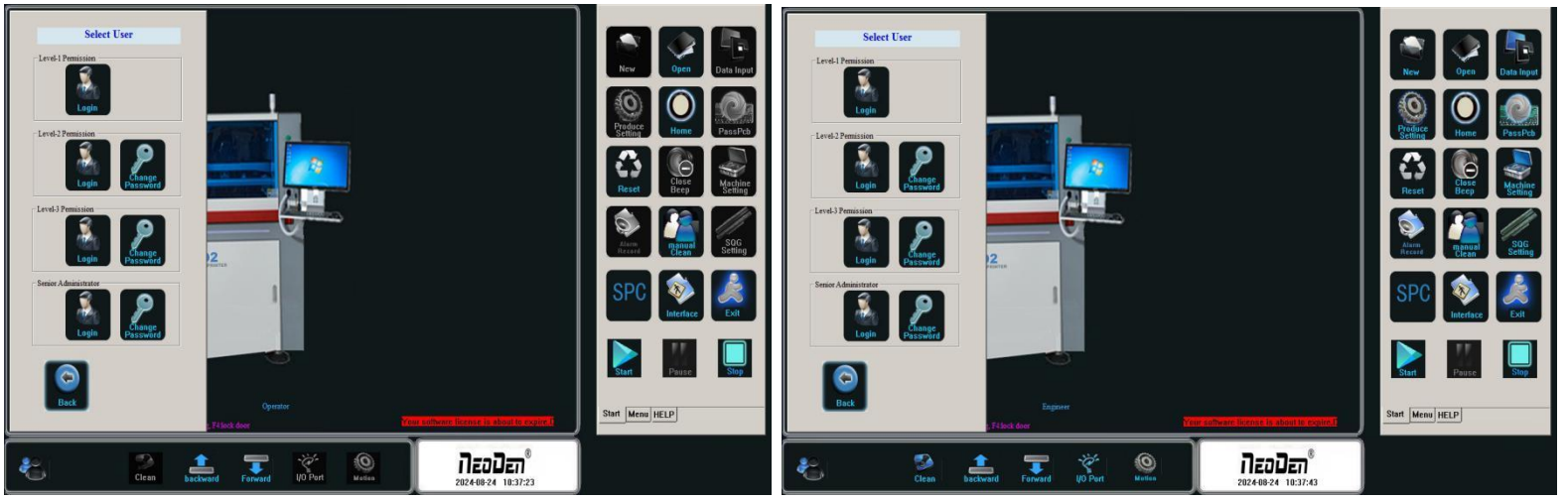
Rights management explanation:

Level 1 permission（一级权限） is for the lowest-level operator. Operator can uses old program and production operation.

In level 2 permission（二级权限）, there are all permissions excluding the parameter setting of equipment and scraper.

In level 3 permission （ 三级权限）, operator can revise parameter 3,4 of the equipment and scraper setting.

图 3-5(选择不同权限用户并输入对应的用户密码)



Pix 3-5(Select the permission and input the corresponding password)

5 单击[

]按钮，如图3-6，新建一个程序,如‘‘test’’，输完文件名后单击[确定]。进入test 程序的设置。如图3-7，3-8，3-9。

Click 
” button to create a new application. See Pix 3-6. Name the application *test* and click “确定”to go into the setting of the *test* application. See Pix 3-7, 3-8, 3-9.

图 3-6(要生产的 PCB 的名字)

Pix3-6(the name of the produced PCB)

6.在图 3-7 中，在 PCB 设置栏目下,输入 PCB 的长 200，宽 100，厚 1.6 三个参数。及其它所有数据均有默认值，请根据自己的生产工艺自行修改。

Input 3 parameters under the PCB setting column. See pix 3-7. PCB length is 200, width is 100 and thickness is 1.6. Other data have default and operator can revise according to the production technology.

7.单击[下一步>>]按钮，进入到 3-8 画面，单击[确定]按钮进入 3-9 画面。该界面主要进行模板匹配设置。

Click “ 下一步>> ”(next step) button to go to the interface show in the pix 3-8. Click “确定”（ok）to go to the interface show in the pix 3-9. Do the template matching setting in this interface.

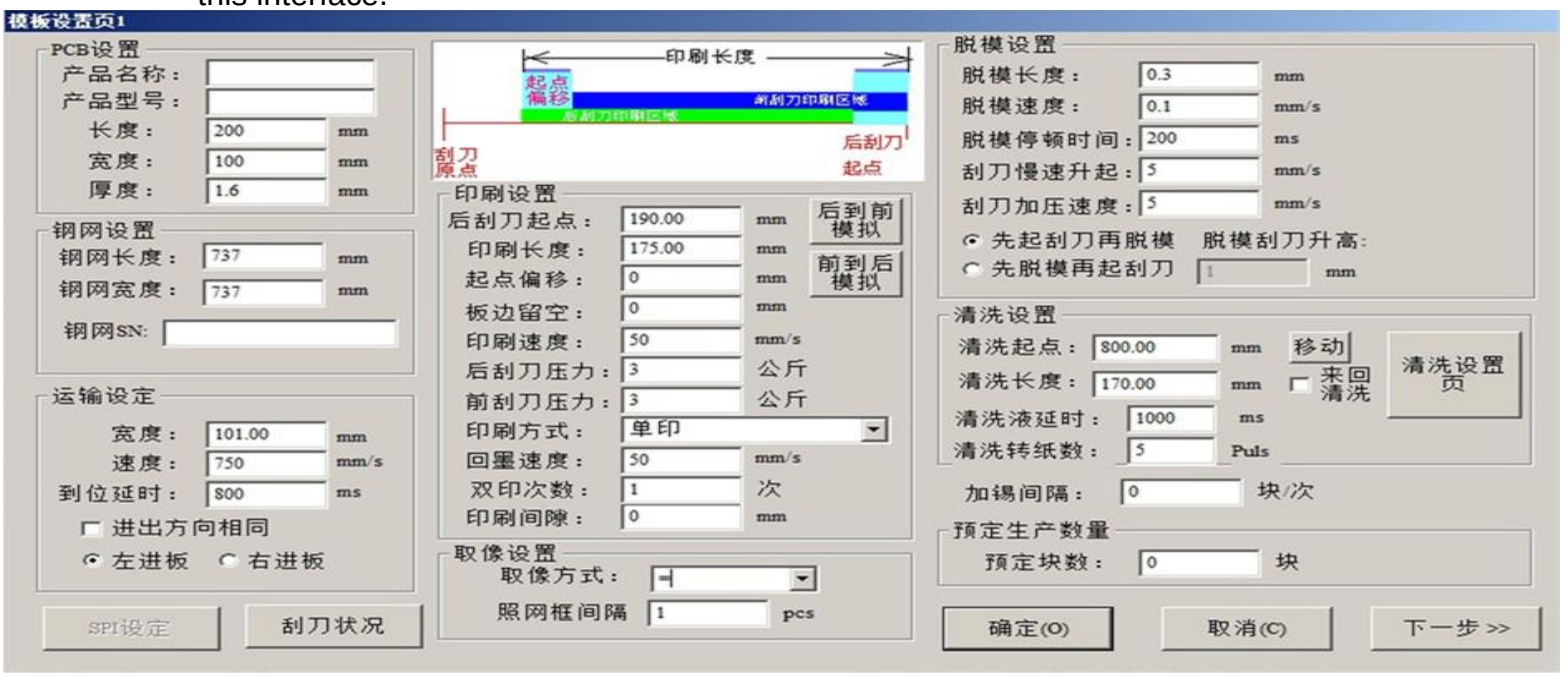
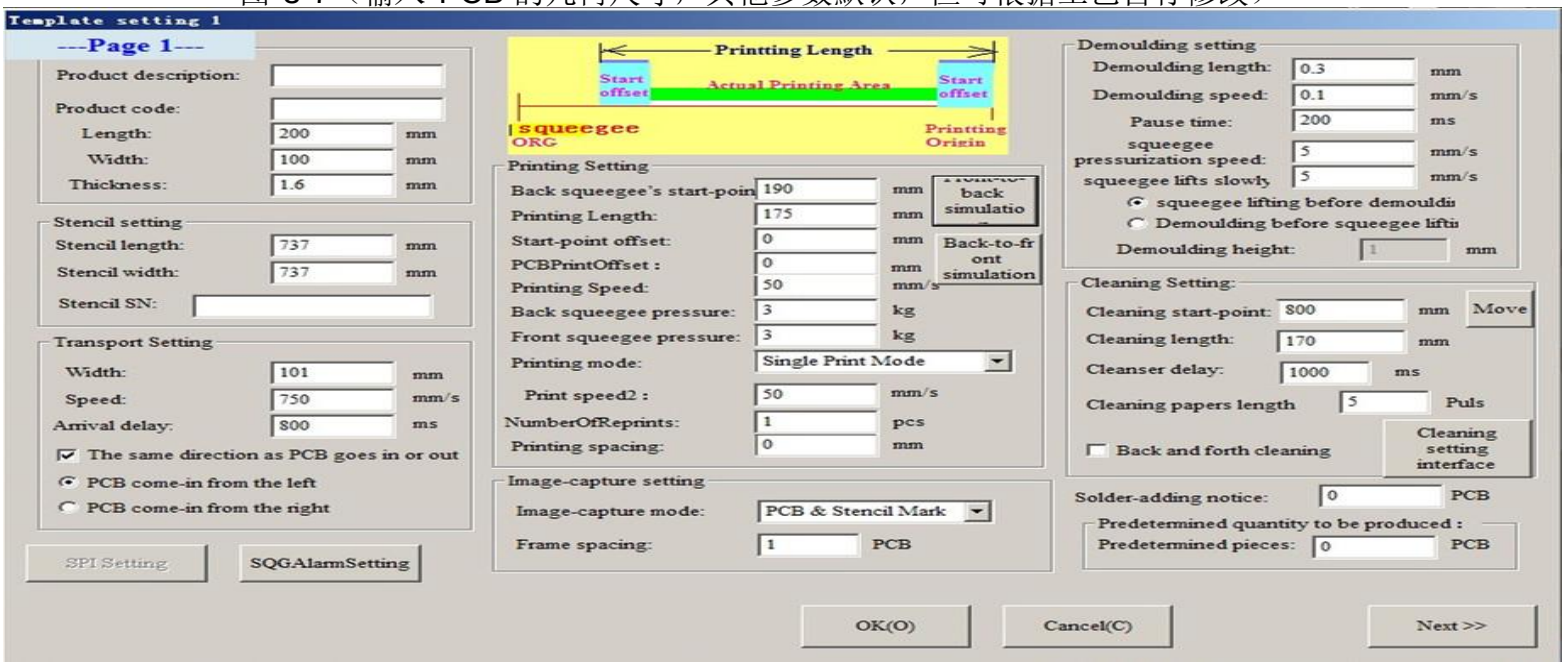
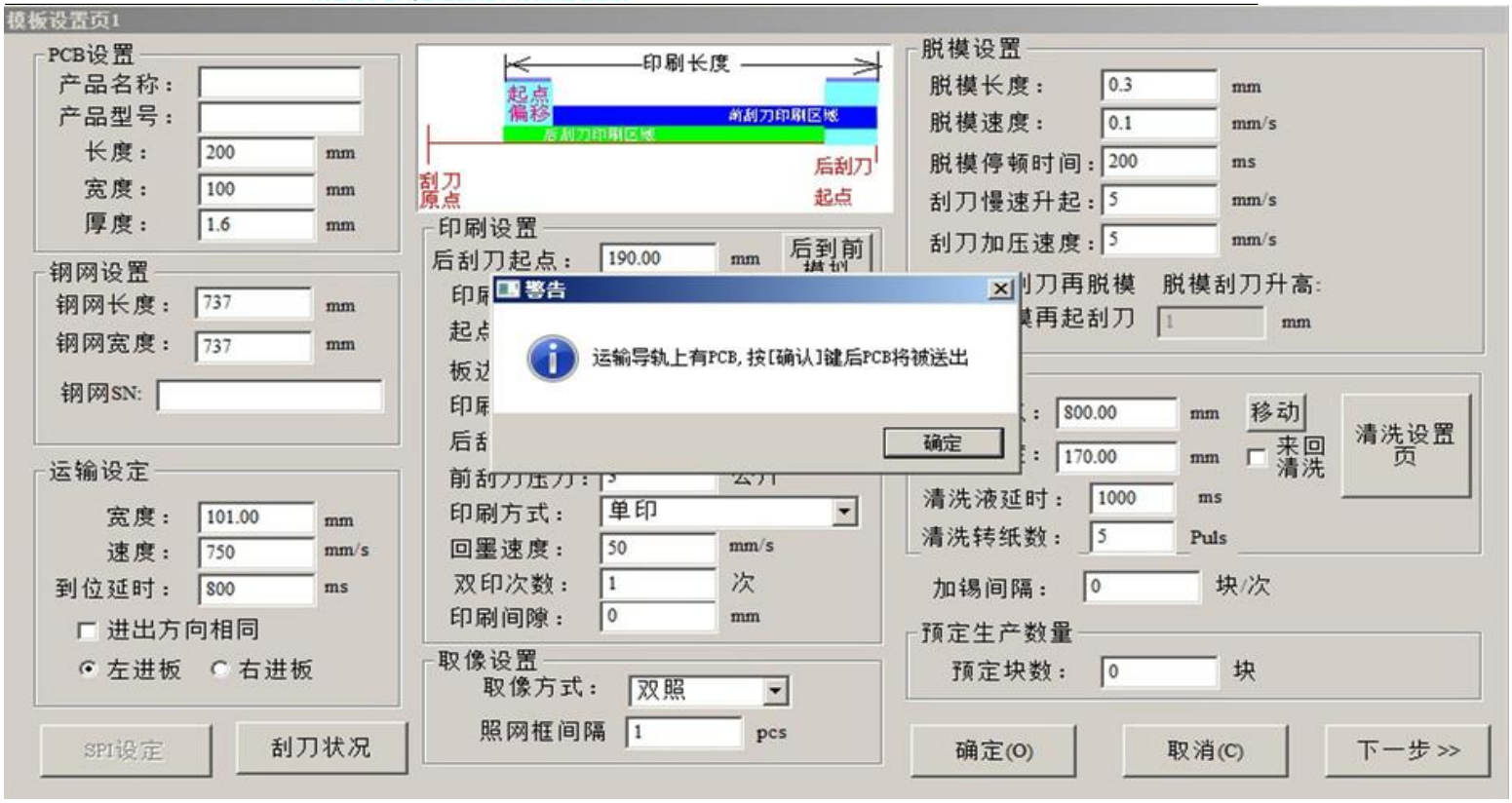


图 3-7（输入 PCB 的几何尺寸，其他参数默认，但可根据工艺自行修改）



Pix 3-7(input PCB size data, other parameters are default and these defaults can be revised according to the production technolog


模板设置页1
PCB设置
产品名称：
产品型号：
长度： 200 mm
宽度： 100 mm
厚度： 1.6 mm
钢网设置
钢网长度： 737 mm
钢网宽度： 737 mm
钢网SN:
运输设定
宽度： 101.00 mm
速度： 750 mm/s
到位延时： 800 ms
进出方向相同
左进板 右进板
SPI设定
刮刀状况
印刷长度
起点偏移
前刮刀印刷区域
后刮刀印刷区域
刮刀原点
后刮刀起点
印刷设置
后刮刀起点： 190.00 mm
后到前
印刷方式： 单印
回墨速度： 50 mm/s
双印次数： 1 次
印刷间隙： 0 mm
取像设置
取像方式： 双照
照网框间隔 1 pcs
警告
运输导轨上有PCB, 按[确认]键后PCB将被送出
确定
脱模设置
脱模长度： 0.3 mm
脱模速度： 0.1 mm/s
脱模停顿时间： 200 ms
刮刀慢速升起： 5 mm/s
刮刀加压速度： 5 mm/s
脱模刮刀升高:
mm
800.00 mm 移动
170.00 mm 来回清洗
清洗液延时： 1000 ms
清洗转纸数： 5 Puls
清洗设置页
加锡间隔： 0 块/次
预定生产数量
预定块数： 0 块
确定(O)
取消(C)
下一步 >>

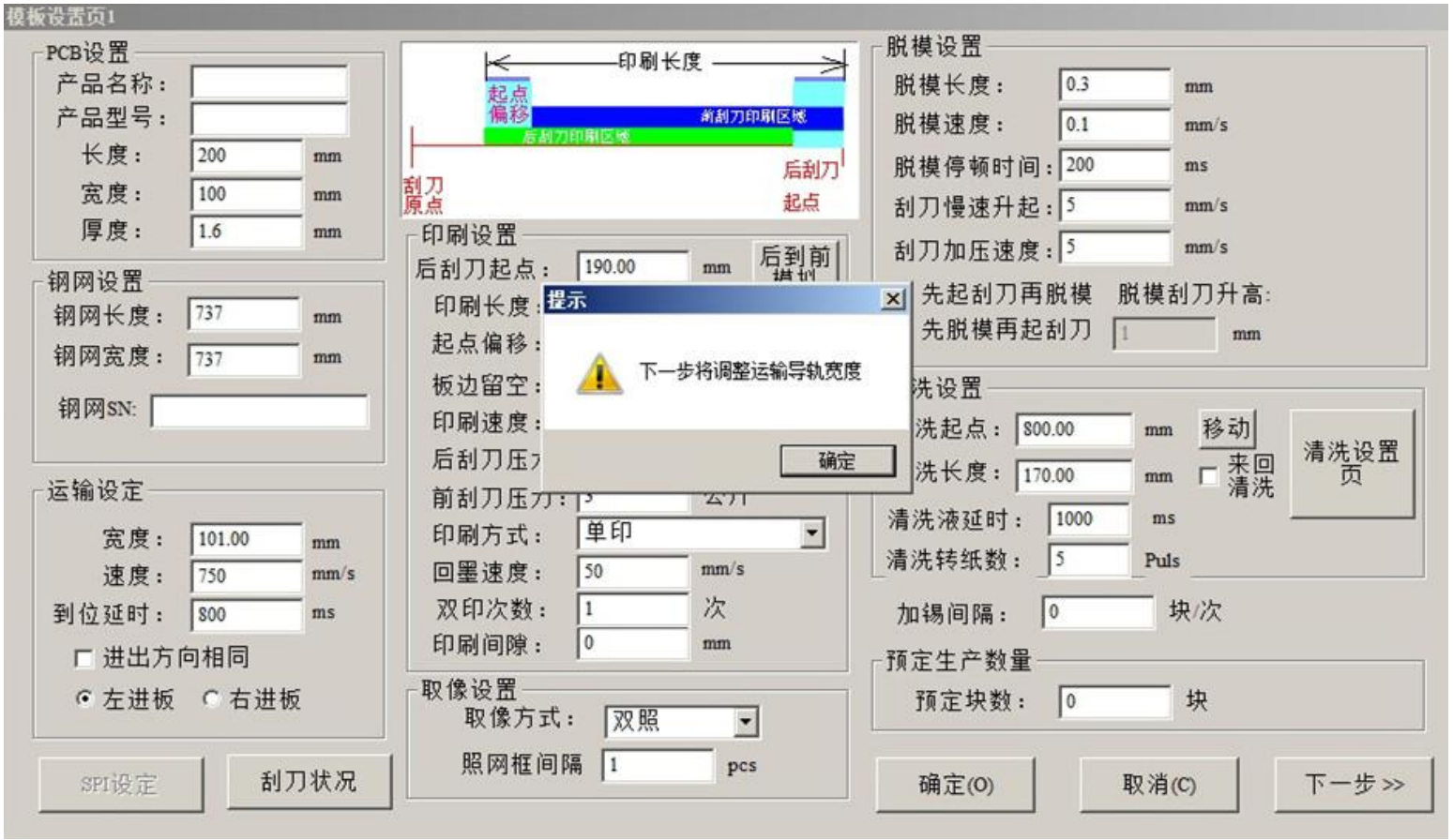
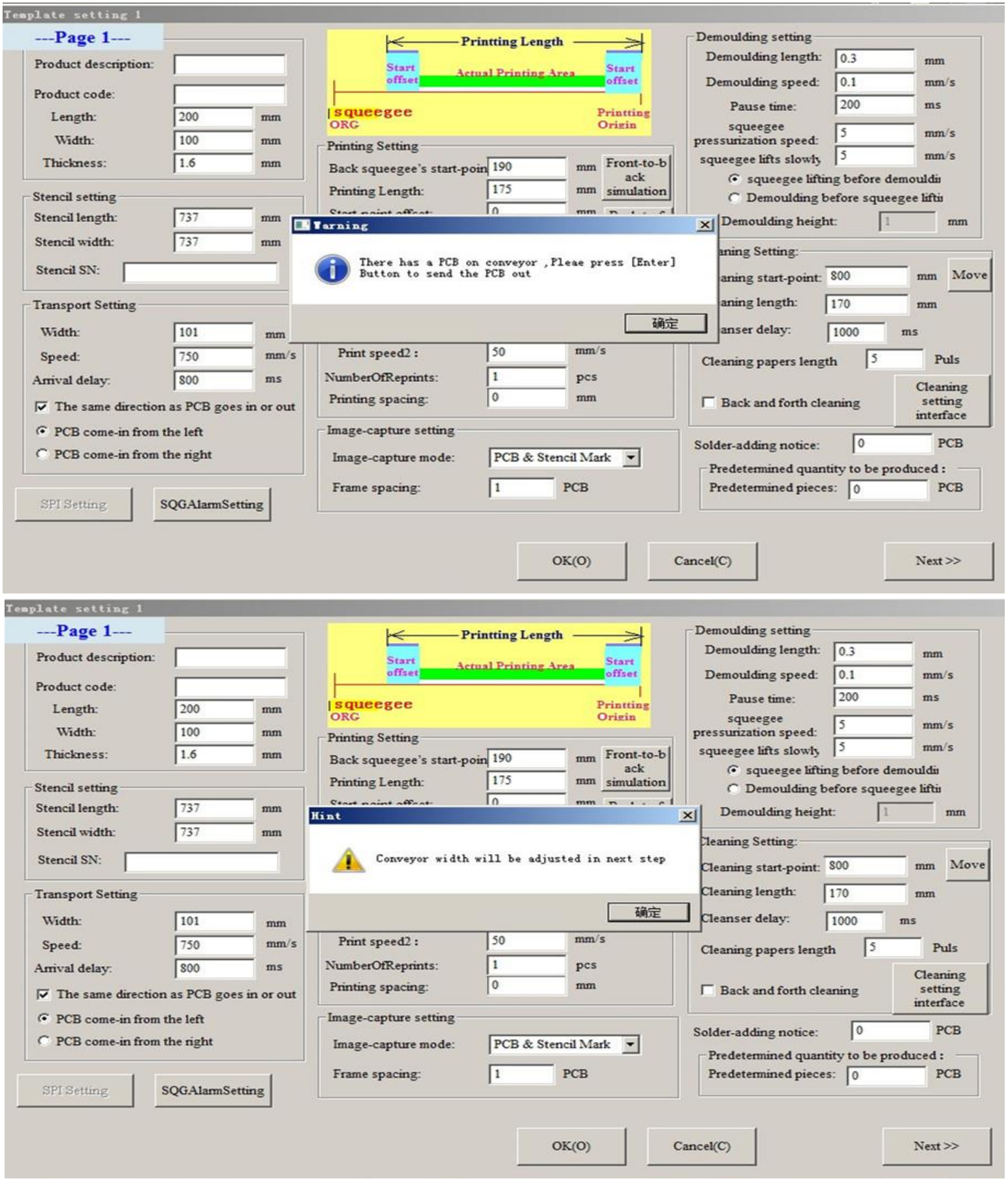
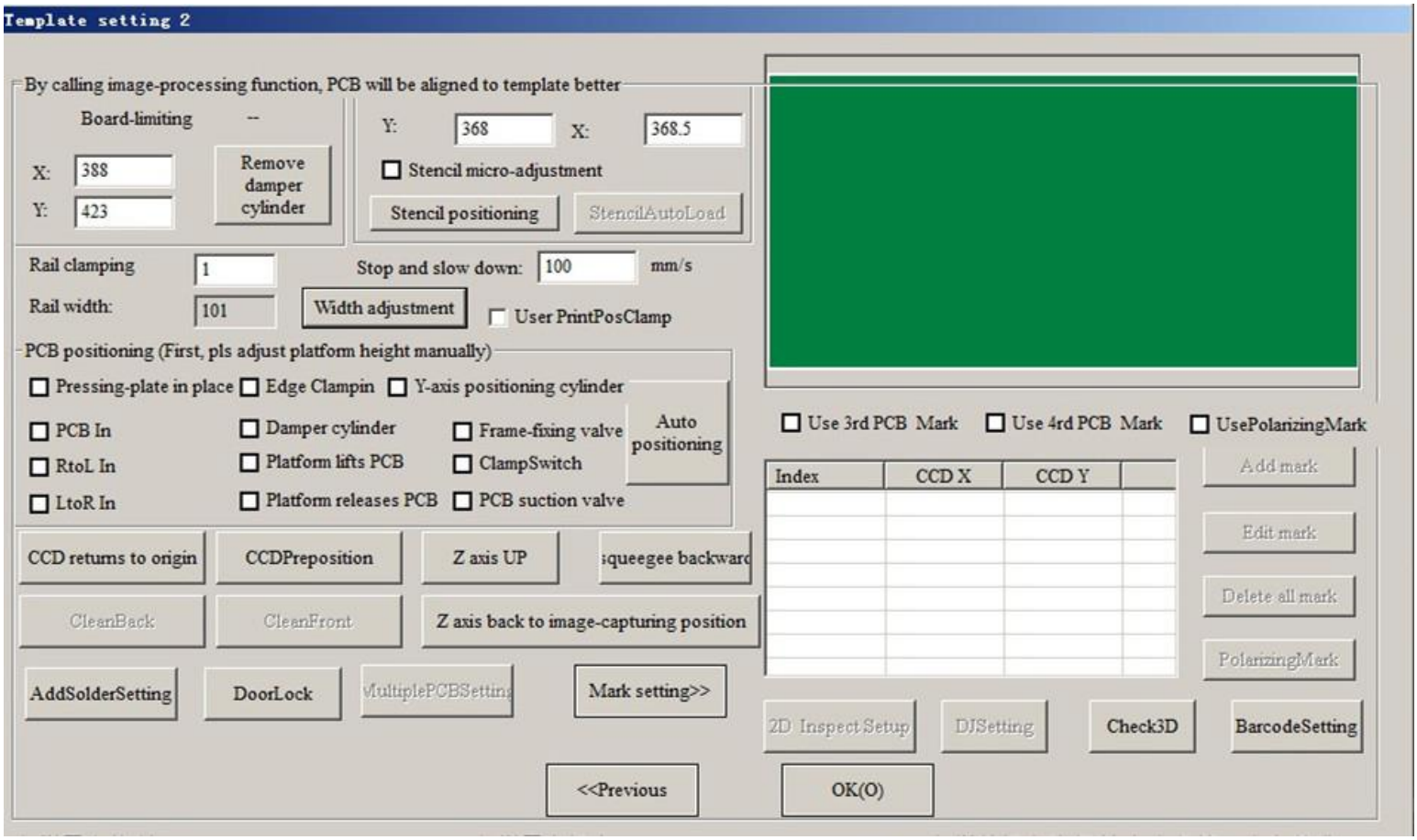

模板设置页1
PCB设置
产品名称：
产品型号：
长度： 200 mm
宽度： 100 mm
厚度： 1.6 mm
钢网设置
钢网长度： 737 mm
钢网宽度： 737 mm
钢网SN:
运输设定
宽度： 101.00 mm
速度： 750 mm/s
到位延时： 800 ms
进出方向相同
左进板 右进板
SPI设定
刮刀状况
印刷长度
起点偏移
前刮刀印刷区域
后刮刀印刷区域
刮刀原点
后刮刀起点
印刷设置
后刮刀起点： 190.00 mm
后到前
印刷方式： 单印
回墨速度： 50 mm/s
双印次数： 1 次
印刷间隙： 0 mm
取像设置
取像方式： 双照
照网框间隔 1 pcs
提示
下一步将调整运输导轨宽度
确定
脱模设置
脱模长度： 0.3 mm
脱模速度： 0.1 mm/s
脱模停顿时间： 200 ms
刮刀慢速升起： 5 mm/s
刮刀加压速度： 5 mm/s
先起刮刀再脱模
先脱模再起刮刀
脱模刮刀升高:
mm
洗设置
洗起点： 800.00 mm 移动
洗长度： 170.00 mm 来回清洗
清洗液延时： 1000 ms
清洗转纸数： 5 Puls
清洗设置页
加锡间隔： 0 块/次
预定生产数量
预定块数： 0 块
确定(O)
取消(C)
下一步 >>

图 3-8


Template setting 1
---Page 1---
Product description:
Product code:
Length: 200 mm
Width: 100 mm
Thickness: 1.6 mm
Stencil setting
Stencil length: 737 mm
Stencil width: 737 mm
Stencil SN:
Transport Setting
Width: 101 mm
Speed: 750 mm/s
Arrival delay: 800 ms
The same direction as PCB goes in or out
PCB come-in from the left
PCB come-in from the right
SPI Setting
SQGAlarmSetting
Printting Length
Start offset
Actual Printing Area
Start offset
squeegee
ORG
Printting Origin
Printing Setting
Back squeegee's start-poin 190 mm
Front-to-back simulation
Printing Length: 175 mm
Print speed2 : 50 mm/s
NumberOfReprints: 1 pcs
Printing spacing: 0 mm
Image-capture setting
Image-capture mode: PCB & Stencil Mark
Frame spacing: 1 PCB
Tarning
There has a PCB on conveyor ,Pleae press [Enter] Button to send the PCB out
确定
Demoulding setting
Demoulding length: 0.3 mm
Demoulding speed: 0.1 mm/s
Pause time: 200 ms
squeegee pressurization speed: 5 mm/s
squeegee lifts slowly 5 mm/s
squeegee lifting before demouldi
Demoulding before squeegee lifti
Demoulding height: 1 mm
aning Setting:
aning start-point: 800 mm
Move
aning length: 170 mm
anser delay: 1000 ms
Cleaning papers length 5 Puls
Back and forth cleaning
Cleaning setting interface
Solder-adding notice: 0 PCB
Predetermined quantity to be produced :
Predetermined pieces: 0 PCB
OK(O)
Cancel(C)
Next >>
Template setting 1
---Page 1---
Product description:
Product code:
Length: 200 mm
Width: 100 mm
Thickness: 1.6 mm
Stencil setting
Stencil length: 737 mm
Stencil width: 737 mm
Stencil SN:
Transport Setting
Width: 101 mm
Speed: 750 mm/s
Arrival delay: 800 ms
The same direction as PCB goes in or out
PCB come-in from the left
PCB come-in from the right
SPI Setting
SQGAlarmSetting
Printting Length
Start offset
Actual Printing Area
Start offset
squeegee
ORG
Printting Origin
Printing Setting
Back squeegee's start-poin 190 mm
Front-to-back simulation
Printing Length: 175 mm
Print speed2 : 50 mm/s
NumberOfReprints: 1 pcs
Printing spacing: 0 mm
Image-capture setting
Image-capture mode: PCB & Stencil Mark
Frame spacing: 1 PCB
Hint
Conveyor width will be adjusted in next step
确定
Demoulding setting
Demoulding length: 0.3 mm
Demoulding speed: 0.1 mm/s
Pause time: 200 ms
squeegee pressurization speed: 5 mm/s
squeegee lifts slowly 5 mm/s
squeegee lifting before demouldi
Demoulding before squeegee lifti
Demoulding height: 1 mm
Cleaning Setting:
Cleaning start-point: 800 mm
Move
Cleaning length: 170 mm
Cleanser delay: 1000 ms
Cleaning papers length 5 Puls
Back and forth cleaning
Cleaning setting interface
Solder-adding notice: 0 PCB
Predetermined quantity to be produced :
Predetermined pieces: 0 PCB
OK(O)
Cancel(C)
Next >>

Pix3-8

图 3-9（Mark 点匹配）



Pix 3-9(Mark point matching interface)

注：Notice:

A．[钢网夹紧阀]：侧夹钢网；

(ClampSwitch): Side clip steel mesh

B．[钢网装载]：把钢网拖到Y向位置

(Stencil AutoLoad):Dray the steel mesh to the Yposition

C．[清空标志点]：把所有Mark点坐标全部清除；

(delete all mark): Clear the coordinates of all mark points.

D [增加防呆点]：防止板放反增加一个标志点

(PolarizingMark): Add a mark point to prevent the board from being reversed

E．[宽度调节]：对进行运输导轨宽度调节；

(width adjustment): To adjust the width of transmission rail.

F．[移动挡板气缸]：将 CCD 移动到设置的坐标上去；

(remove damper cylinder): Remove CCD to the setup position

G．[网框固定阀]：自动定位钢网的时候，点击该按钮机器会松开钢网支撑架，用手将钢网架移到指定位置，并夹紧；

(frame fixed valve):Clicking this button when do the stencil's automatic positioning, the equipment will loose the support frame and remove the stencil supporting frame to the designated spot and fix it by hand.

H．[钢网定位]：自动定位钢网的时候，钢网自动气缸会随刮刀横梁移动到指定的位置，并伸出气缸杆，将钢网插到气缸杆位置后点击[确定]，系统重新将钢网锁紧；

(stencil positioning): When do the stencil' automatic positioning, the stencil automatic cylinder will move to the designated spot along with scraper beam and will release cylinder guide. Plug the stencil into cylinder guide and click "确定 "（ok）button, the system will re-fasten the stencil.

I． [钢网微调]：当钢网定位位置不准确时，可点击此按钮并用鼠标调整挡钢网气缸位置。

(stencil fine adjustment): When the positioning of the stencil is not correct, click this button and adjust the position of stencil cylinder with mouse.

J．[刮刀后退]：让刮刀后退到后起点位置，手工对钢网的时候使用；

(scraper back): Let scraper comes back to the starting position at the back. Do it when operate manually on the stencil.

K．[Z 轴上升]：Z 轴上升到印刷位置。手工对钢网的时候使用，看焊盘和网孔是否对正；

(Z axis lifts up): Z axis lifts up to the printing position. Do it when operate manually on

the stencil. Check whether the bonding pad align at the hole.

L．[CCD 回位]：点击后 CCD 会回到原点，手工对钢网的时候使用。

(CCD return): Click it and CCD will return to the original spot. D Do it when operate manually on the stencil.

M．[MARK 点设置]：点击后 PCB 标志点成可编辑状态。

(MARK setting): Click it and PCB mark will become editable.

N．[Z 轴到取像位置]：点击后 Z 轴会升到取像位置，手工对钢网的时候使用；

(Z axis comes to the position of capturing image): Click it and Z axis will lift to the position of capturing image. Do it when operate manually on the stencil.

O．[自动定位]：点击后机器会自动定位 PCB。这个按钮经常使用，通常设置好 PCB Mark 点到边的距离后点击该按钮，机器会自动执行停板气缸到位、PCB 压板机构开启、PCB 传送、PCB 到位停止、Z 上升到取像位置、侧压夹紧、PCB 压板机构关闭、停板气缸复位、CCD 回到原点。至此 PCB 定位完毕，后面只需进行 PCB，钢网 Mark 点匹配即可。

(automatic positioning):Click it and the equipment will automatically positioning the PCB. This button will be used frequently. Click this button after setting the distance between the PCB Mark and the side. The equipment will automatically execute the return and reset of board limit cylinder, the open and close of the PCB pressure plate mechanism, PCB transmission, the stop at given spot of the PCB. And the Z axis will lift up to the position of capturing image and lateral pressure will clamp. Then PCB positioning has been done. Next should need be done is to match the PCB and stencil mark spot.

a．(挡板气缸)：开启/关闭停板气缸；

(board limit cylinder):Turn on /turn off board limit cylinder

b．(运输开关)：开启/关闭运输传送带；

(transmission switch): Turn on /turn off transmission belt

c．(压板到位)：开启/关闭导轨压板；

(pressing plate in place): Turn on /turn off the pressing plate of the rail

d．(平台顶板)：平台顶起 PCB 上升到取像位置；

(platform lifts the board): Platform lifts the PCB to the position of capturing image.

e．(平台松板)：平台从取像位置下降到进板高度（Z 轴回到原点）；

(platform declines the board): Platform declines to the boarding height(Z axis return to

the origin)

f. (导轨夹紧)：开启/关闭导轨夹紧 PCB；

(rail clamps): Turn on /turn off that rail clamps PCB

g. (PCB 吸板阀)：开启/关闭真空吸盘/吸腔，吸住 PCB；

(PCB suction valve): Turn on /turn off the vacuum sucker/suction chamber, suck PCB

h. (网框固定阀)：开启/关闭钢网固定气缸与夹紧气缸；

(frame fixed valve): Turn on /turn off stencil fixed cylinder and clamping cylinder.

6 3-9 画面左上角白色方框内的 4 个圆圈表示 PCB 或钢网的 4 个 Mark 点。一般我们选择 2 个对角的点进行匹配即可。通常情况下，为了在搜索马克点时 Mark 点能出现在 CCD 的视域里，我们需要在选择匹配的Mark 点时输入Mark 点到边的距离,如图3-10，3-11 所示。

The four cycles in the white box which is in the top left corner of pix 3-9 represent the four mark points of PCB or stencil. Usually select two diagonal points to match. In general, in order the mark point can exist in the view of the CCD when search it, operator needs input the distance data between mark point and side when select the matching mark points. See pix 3-10 and 3-11.

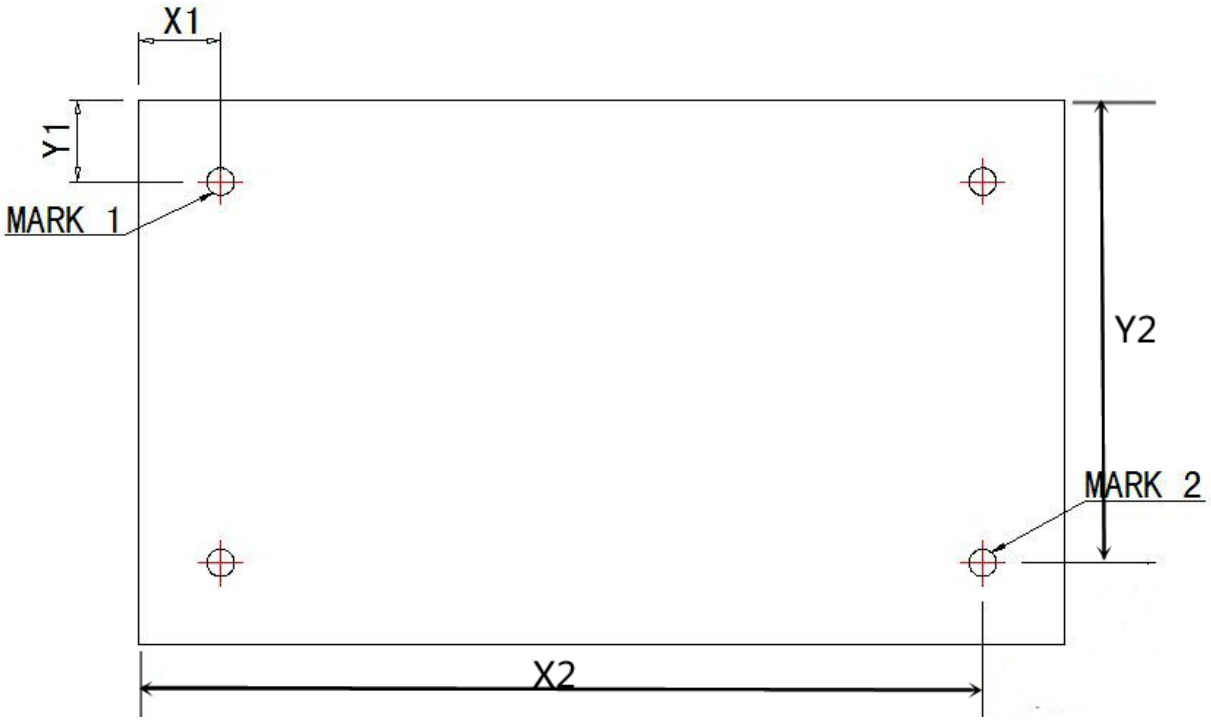


图 3-10【PCB Mark 点到边距离】

Pix 3-10(the distance between PCB mark and side)

图 3-10 是 PCB Mark 点到边的距离，输入后搜索 PCB Mark 点时，所选的 PCB Mark 点能直接出现在视域里；

It is the distance between PCB mark and side show in the pix 3-10. Input the distance date when search the PCB mark point, the selected PCB mark point can show in the field of vision.

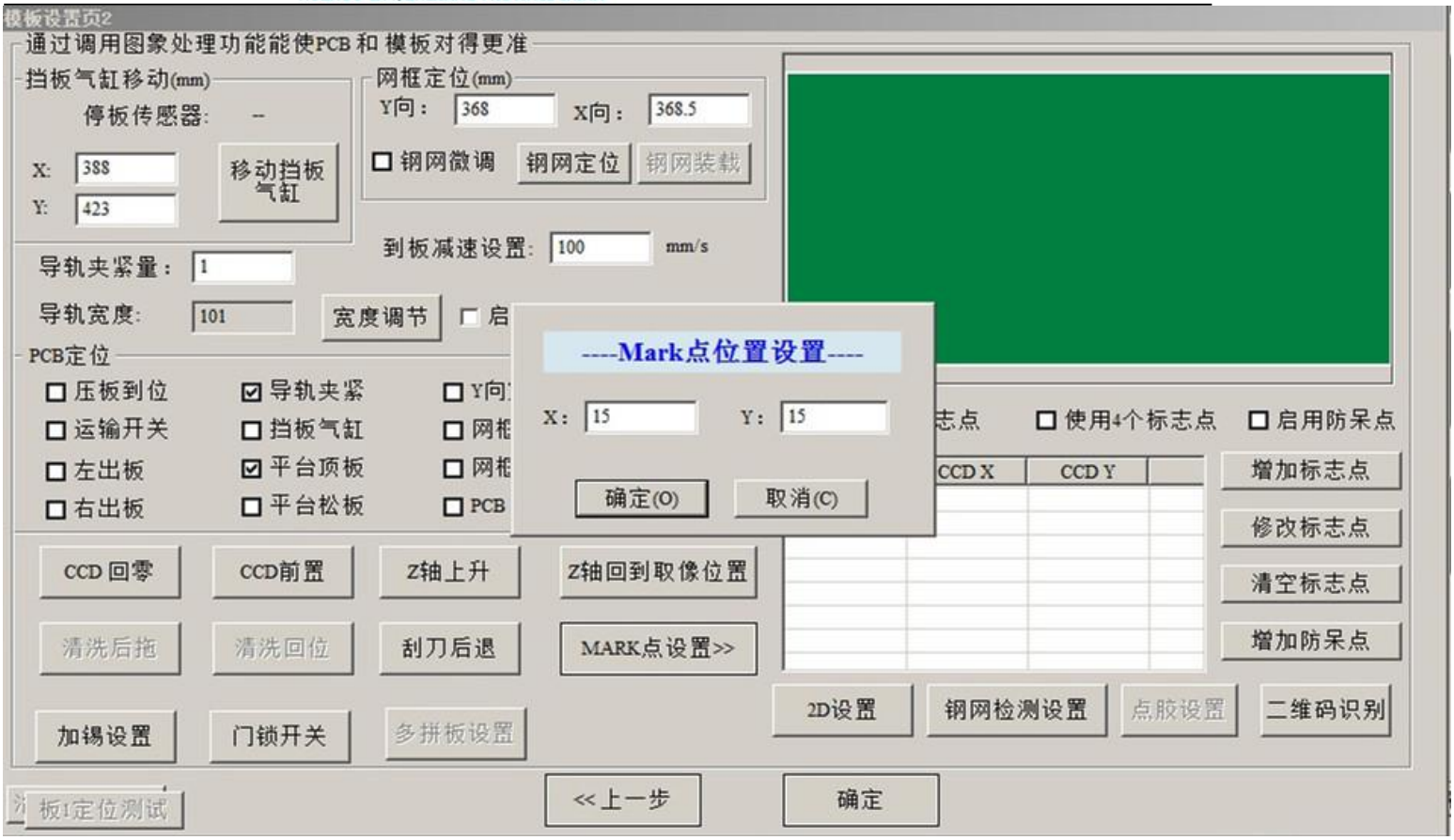
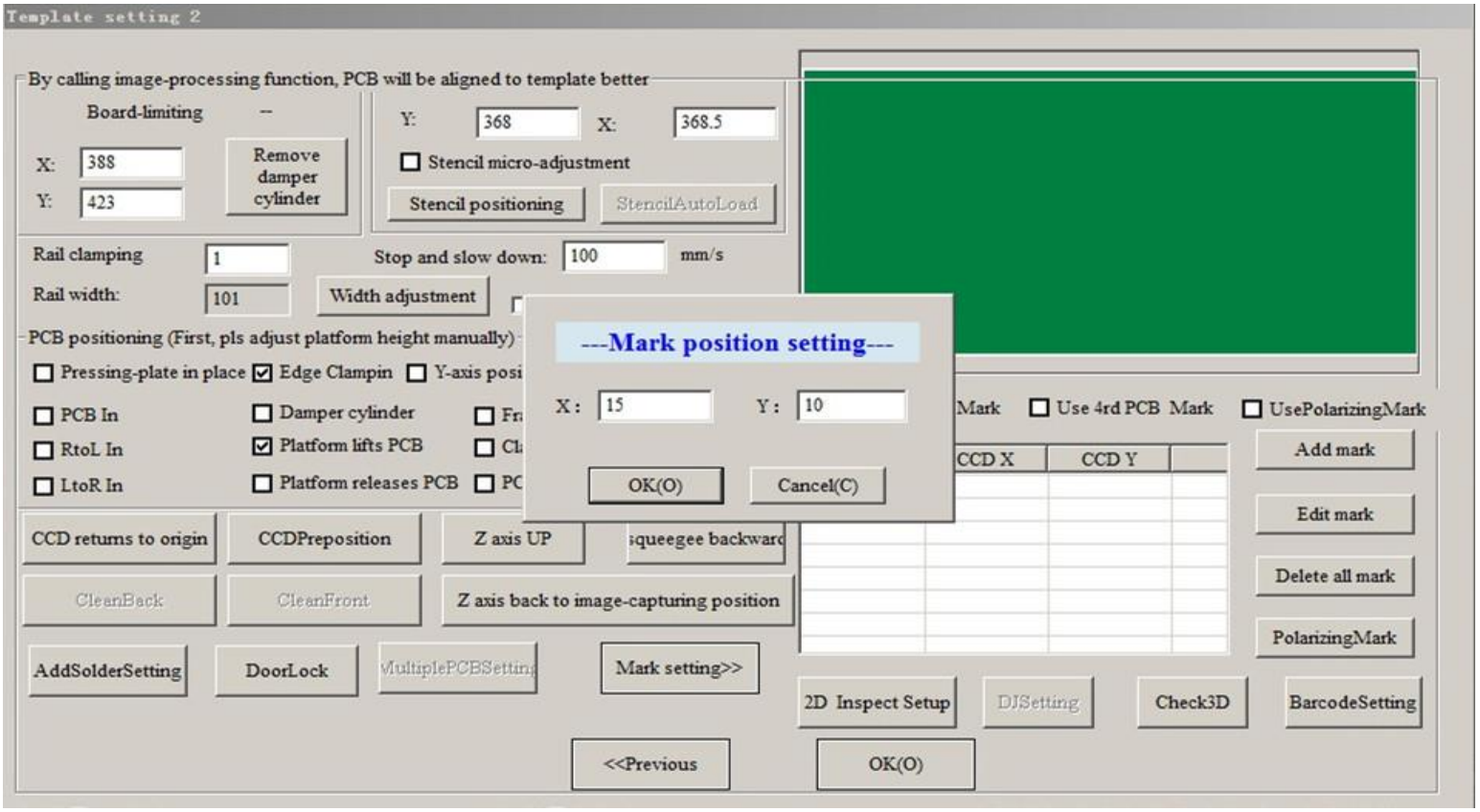


图 3-11（输入 PCB Mark 点到边距离，尺寸关系参考图 3-10）



Pix 3-11(input the distance data between PCB mark point and side. The size relationship in pix 3-10 is for the reference.)

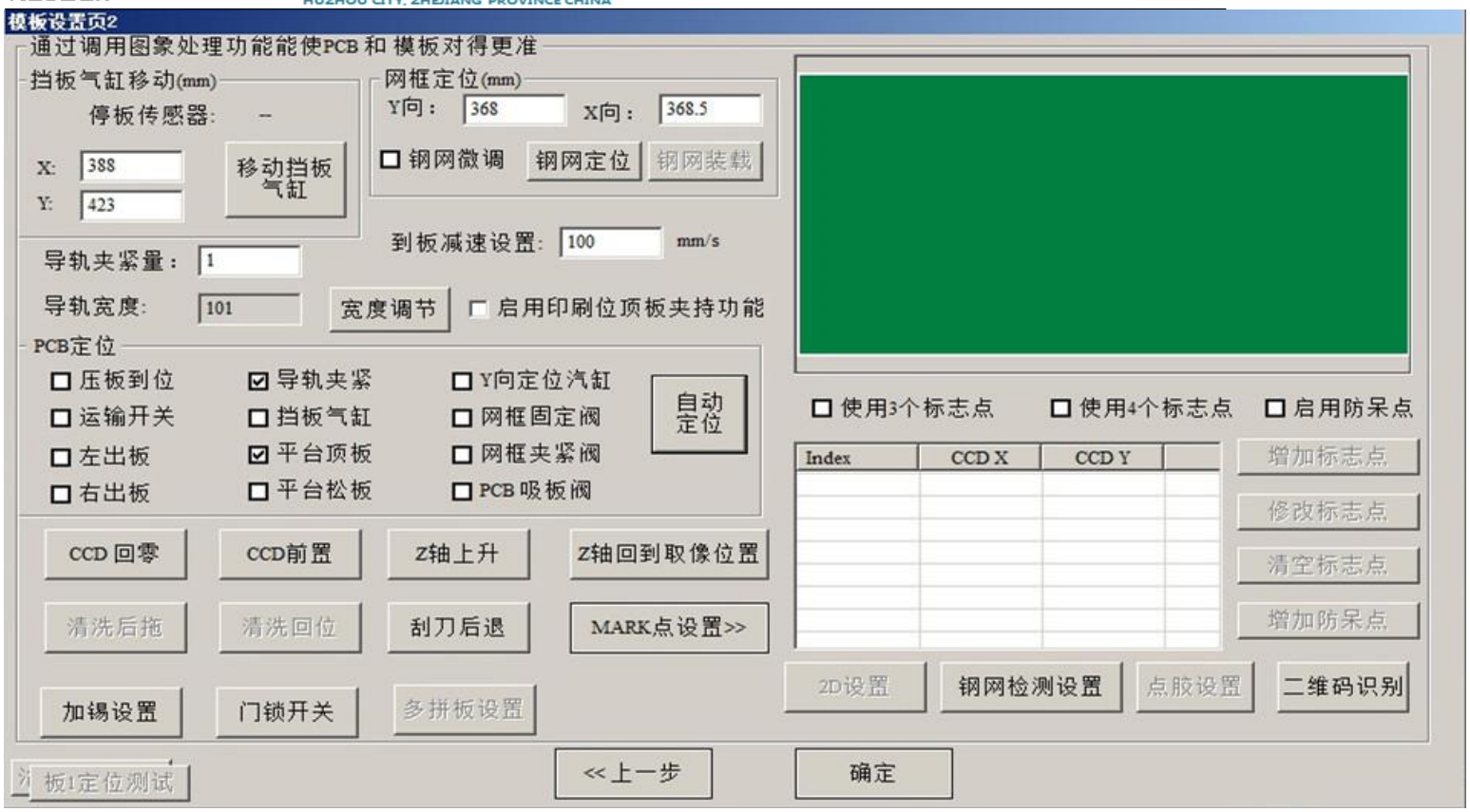
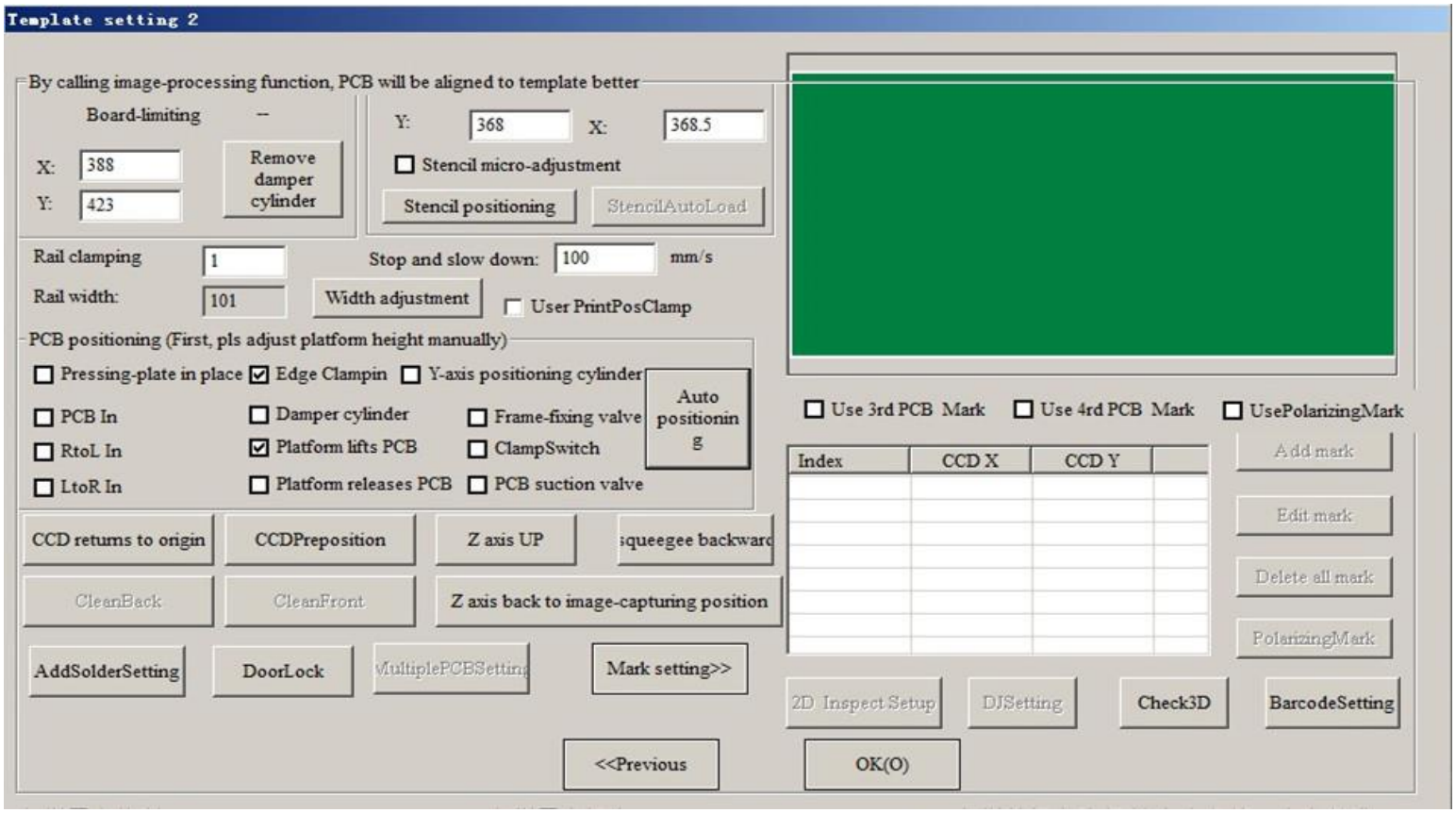


图 3-12（PCB 定位）



Pix 3-12(PCB positioning)

注意：设置好 PCB 标志点到边距离后，将 PCB 放置在运输轨道入口处，点击[自动定位]PCB 自动送到预定位置并固定夹紧。如图 3-12；点击[Z 轴上升]将PCB 顶到钢网位置，打开(网框固定阀)把钢网放入并与 PCB 对齐。

Notice: Place the PCB in the entrance of the transmission rail after setting thedistance between PCB mark and side. Click (automatic positioning) button, PCB will be delivered automatically to the preset position and will be clamped and fixed. See pix 3-12. By clicking(Z axis lifts up) button, the PCB will be lift to the stencil position. Turn on frame fixed valve and put in the stencil and let stencil align at PCB

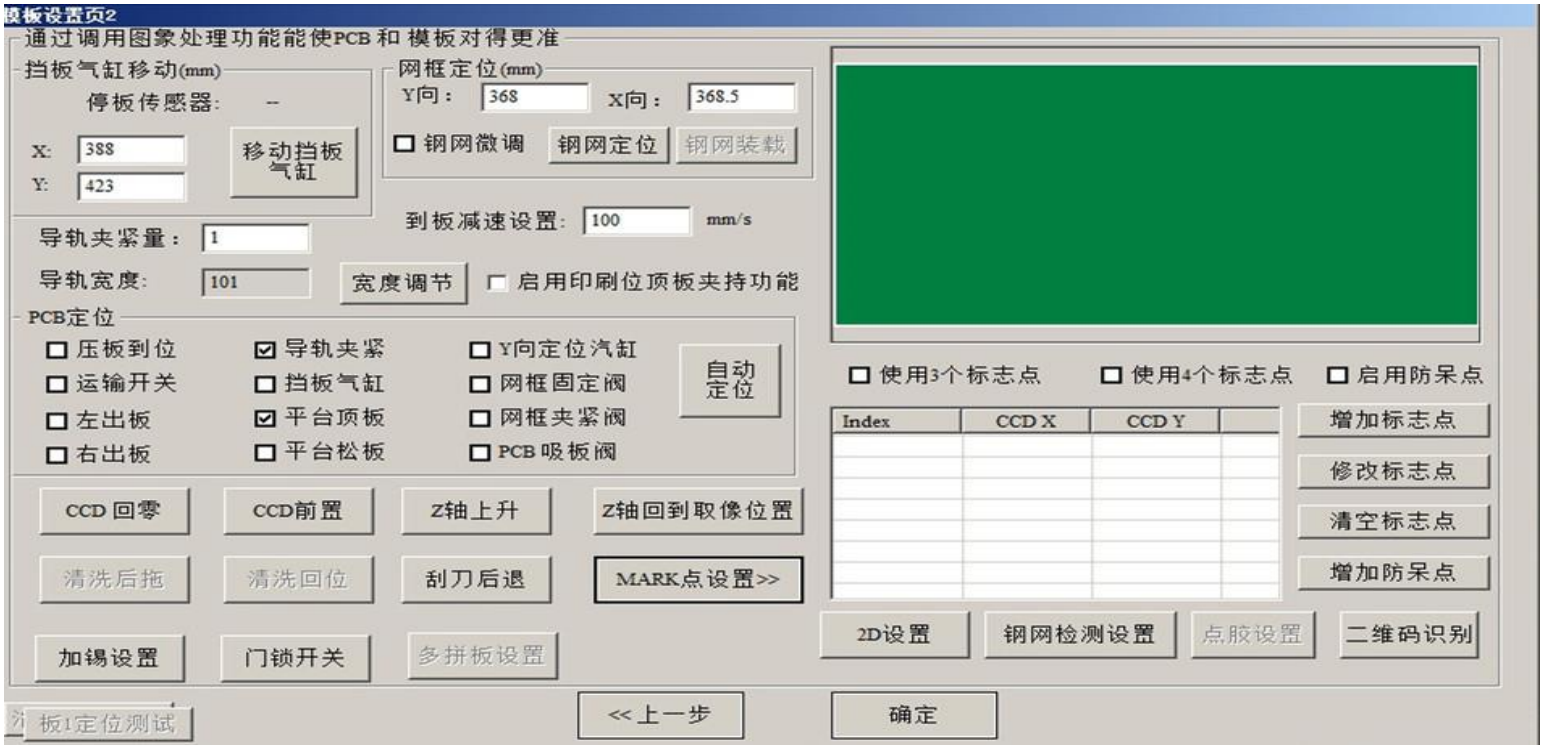
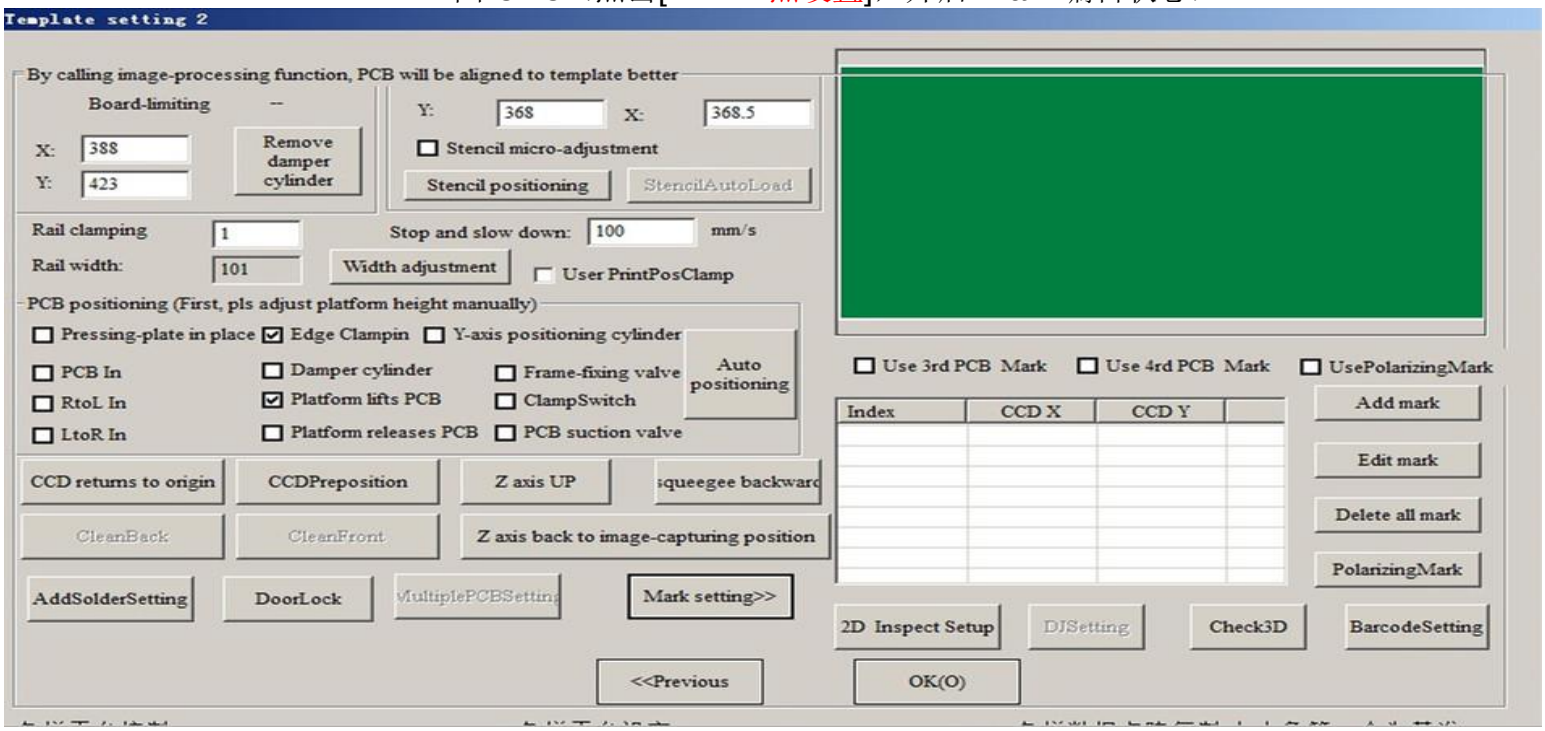


图 3-13（点击[MARK 点设置]，开启 Mark 编辑状态）



Pix 3-13(the mark can be edited by clicking the "MARK 点设置"(Mark point setting) button.

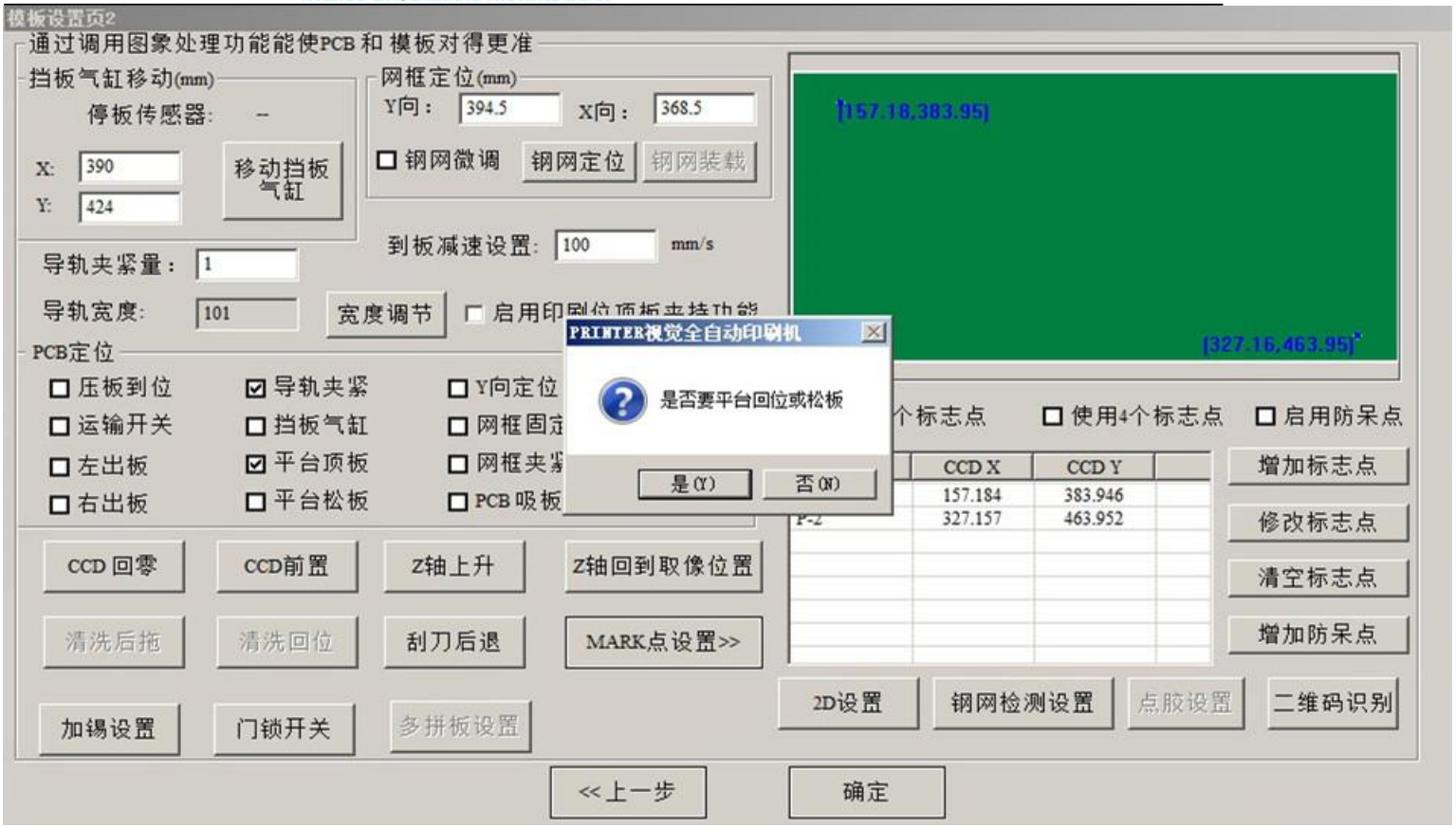
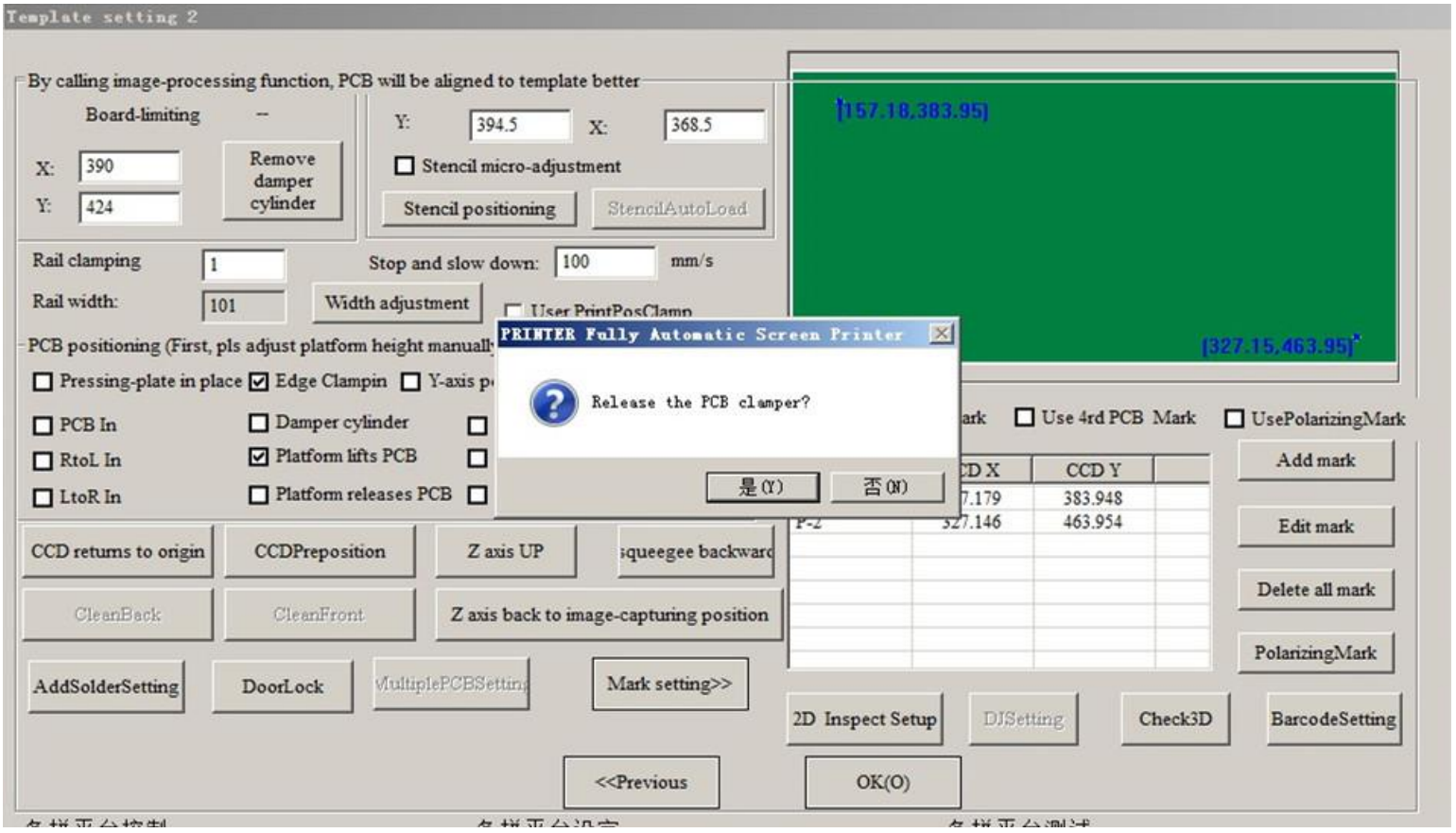


图 3-14（Mark 点设置完毕后保存的界面，点击是回到主界面）



Pix 3-14(The saved interface after setting of mark point and click “是”(Yes)to come back the main interface

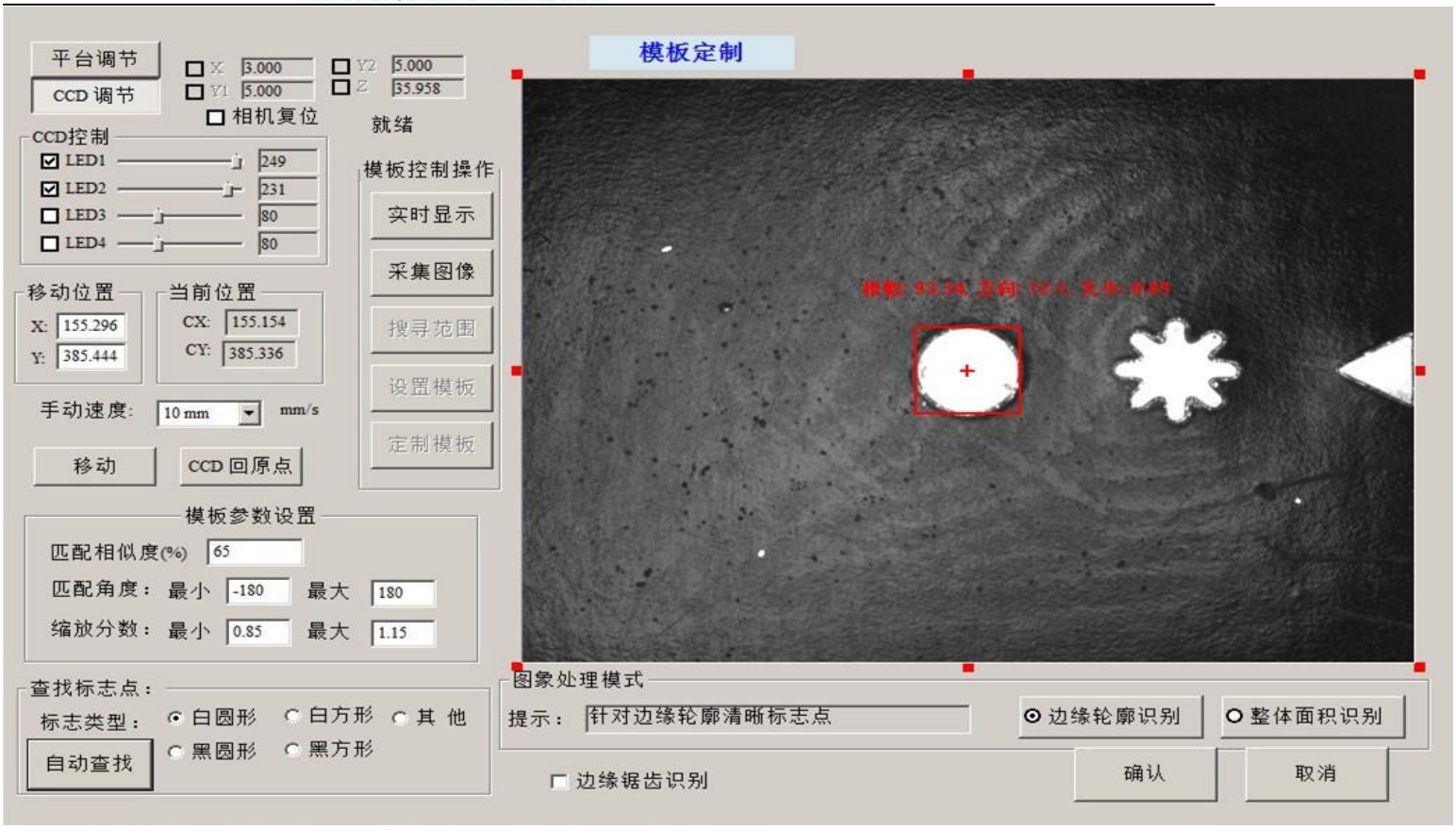
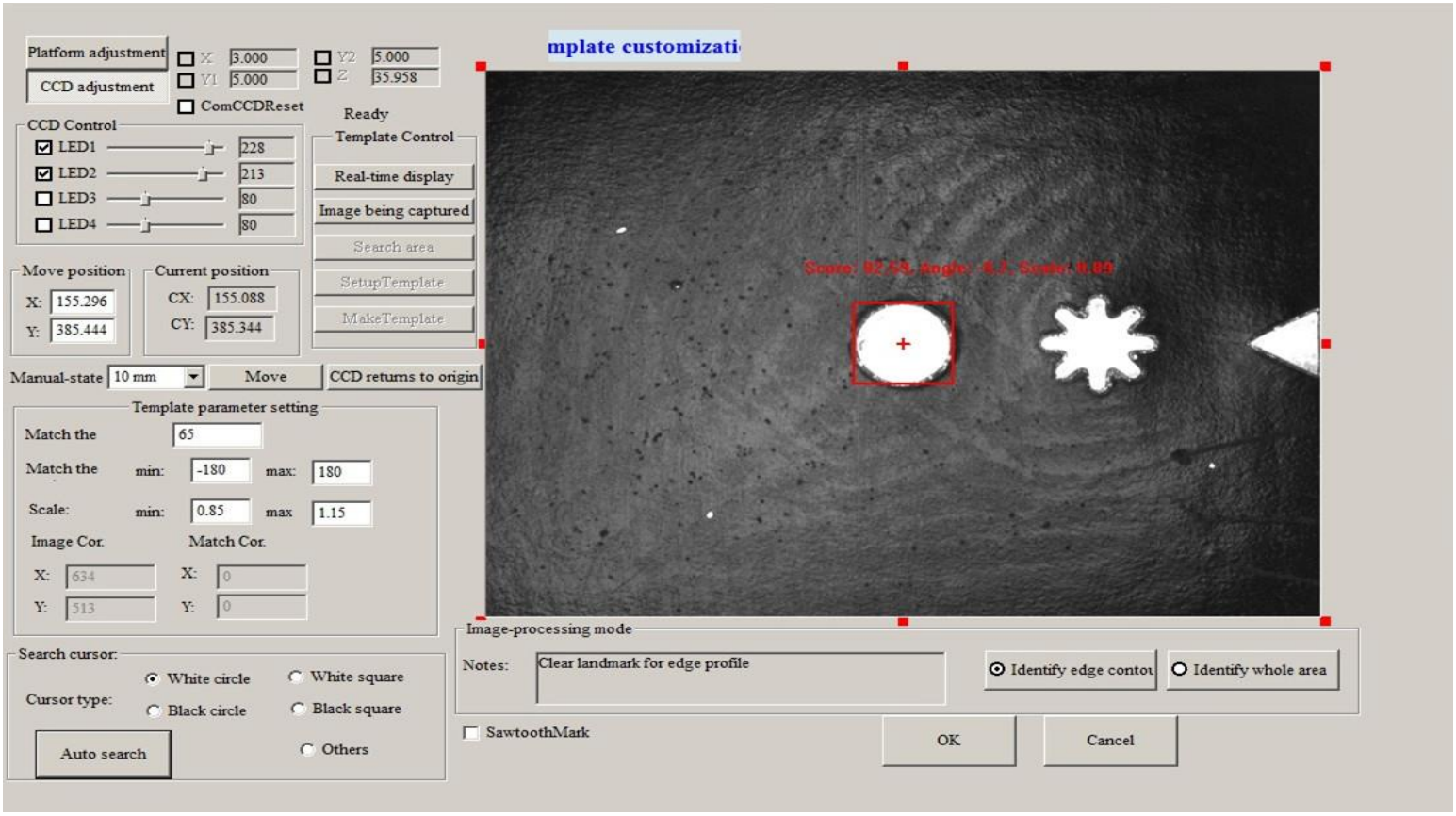


图 3-15（点击自动查找）



Pix3-15 click “自动查找”(automaticsearching)button)

Pix 3-15 the PCB mark point will exist in the field of vision. Clicking

注：各按钮功能解释

Notice: The introduction of all the buttons.

A，[平台调节]：点击输入密码后调节平台的高度，平面位置等；

(platform adjustment): Adjust the height and position of the platform after clicking “输入密码”（input password）button.

B，[CCD 调节]：移动 CCD 位置；

(CCD adjustment): Remove CCD.

C，[LED 1,2,3,4]：调节 LED 灯的亮度

[LED 1,2,3,4]: Adjust the brightness of the LED.

D，[手动速度]：使用键盘上方向键移动 CCD 的速度；

(manual speed): Adjust the CCD speed by pressing the direction keys on the keyboard.

E，[匹配相似度]：MARK 点质量匹配分数设定分数越高，Mark 点越难设别，精度越高；反之亦然；

(matching degree of similarity):The setting score is higher for the mark point matching, it is more difficult to set mark and the accuracy is more higher. And vice versa.

F，[移动位置]：修改里面的参数后点[移动]，CCD 会移动到对应的坐标上去；

(position change): Revise the parameter and click “移动”（move）button, the CCD will move to the corresponding position.

G，[当前位置]：显示当前 CCD 的坐标；

(current position): Show the current position of CCD.

H，[CCD 回位]：点击后 CCD 回到原点位置；

(CCD comes back to the origin): CCD will come back to origin after clicking this button.

I, [移动]：点击后 CCD 从[当前位置]移动到[移动位置]；

(move): CCD will move from origin to the changed position after clicking this button.

J，[标志点类型]：5 种选项供勾选；
(remark type):There are five options for selecting.

K，[自动查找]：系统自动识别选定类型 Mark 点；
(automatic searching): The system will automatic searching the selected mark point.

L，[模板控制操作]：设定搜索范围，并当自动查找失败时手动设置 MARK 点；
(template control operation): Specify the searching scope. When the automatic searching fails, operator sets the mark point manually.

M，[实时显示]：实时显示图像，手动设置 MARK 点使用；
(real-time display): Display the real-time image. Click this button when set the mark point manually.

N，[采集图像]：采集当前图像，手动设置 MARK 点使用；
(image capture): Capture the current image. Click this button when set the mark point manually.

O，[搜索范围]：在视域中划出一个区域后点击该按钮设定搜索范围，系统只在该范围中识别 Mark 点，该功能用在视域中有 2 个以上相似 Mark 点时。用于过滤掉不需要识别的 Mark 点；
(searching scope): Click this button to set the searching scope after drawing a region in the field of vision. System only identifies mark point in this scope. This function can be used when there are above 2 similar marks in the field of vision and it can filter the useless identified mark points.

P，[设定模板]：在视域中标示一个图像范围，点击『定制模板』系统将该范围中图形识别为 Mark 点模板，
(template setting): Mark a image scope in the field of vision. Click “ 定 制 模 板”(template customization) button and the system will identify the image in this scope as the template of mark point.

Q，[定制模板]：将设定的图形范围作为 MARK 点模板；
(template customization): Setup the image in this scope as the template of mark point.

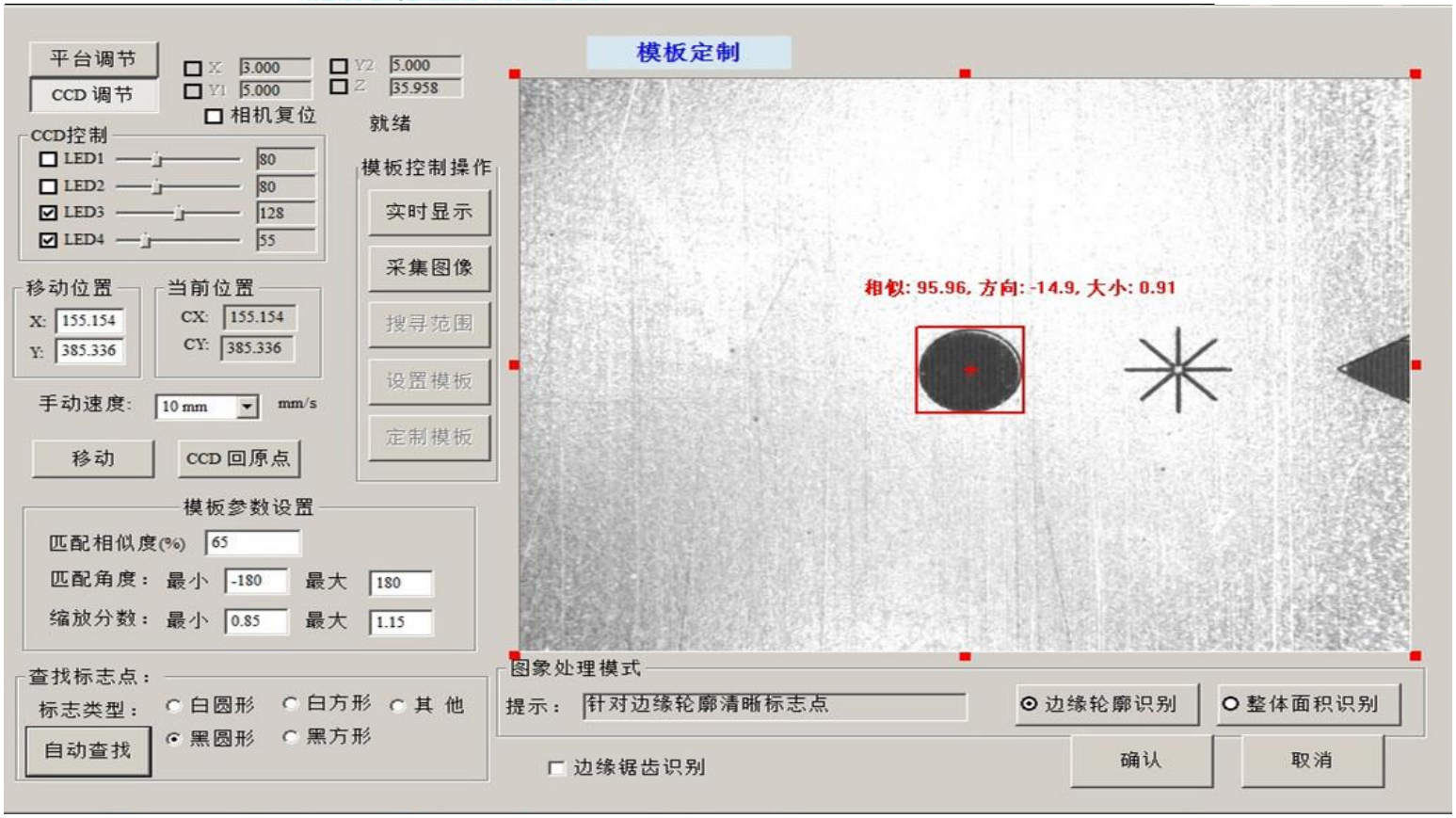
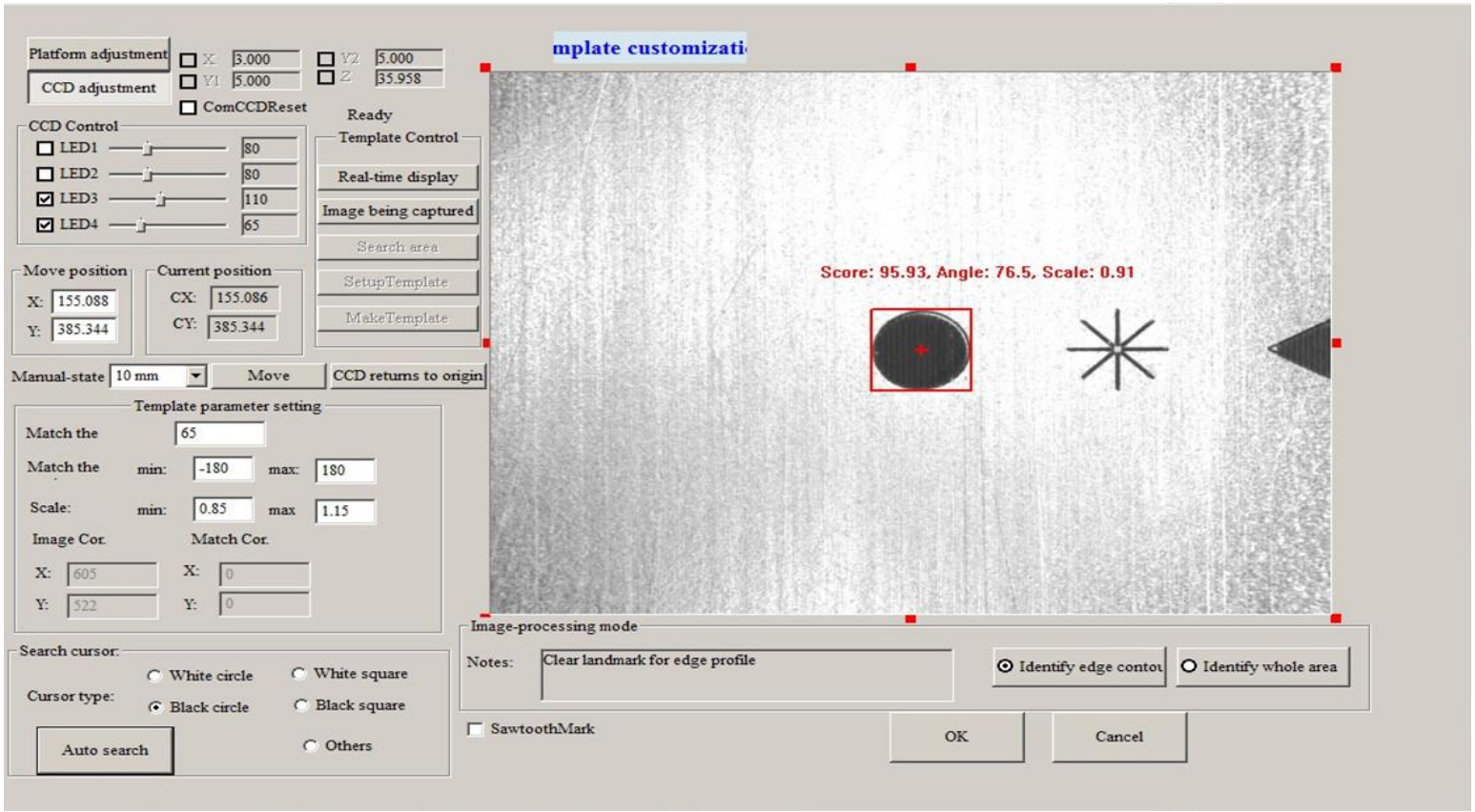


图 3-16 钢网 Mark 点的匹配，匹配完成后点击[确定]



Pix 3-16 the matching of stencil mark point. Click “确定”（ok）button after the matching is finished.

9，在图 3-15 中调节 Led1、LED2 的亮度，使 Mark 和周围背景颜色区分开，一直调到 Mark 点轮廓清晰，黑白分明方可。然后点击[自动查找]按钮，系统会自动捕捉到 Mark 点，点击[确定]完成 Mark 点的抓捕，回到图 3-13 界面。

Adjust the brightness of Led1 and LED2 in the interface of Pix 3-15. Distinguish the mark point from the background color until the outline of mark point is clear, black and white. Click“自动查找”(automatic searching)button, the system will automatically capture mark point. Click“确定”（ok） button to finish the image capture and return to the interface in the Pix 3-13.

10. 钢网和 PCB 的 Mark 点匹配完成后在图 3-13 界面上点击[确认]按钮进入图 3-14 界面，再点击[是]按钮回到主界面，至此，完成 Mark 点的匹配。

Click“确定”（ok） button after the matching of stencil mark point and PCB mark point is finished and it will enter into the interface in pix 3-14. Click“是”（yes）button to return to main interface. Then the mark point matching is finished.

3.2.4 刮刀压力和速度的选择 Selection of the pressure and speed of the scraper

刮刀的压力及刮刀速度是钢网印刷中两个重要的工艺参数。

The two parameters of the pressure and speed of the scraper in the stencil printing are very important.

刮刀速度：选取的原则是刮刀的速度和锡膏的粘稠度及 PCB 板上 SMD 的最小引脚间距有关，选择锡膏的粘稠度大，则刮刀的速度要低，反之亦然。对刮刀速度的选择，一般先从较小压力开始试印，慢慢加大，直到印出好的焊膏为止。速度范围为 15～50mm/s。在印刷细间距时应适当降低刮刀速度，一般为 15～30mm/s，以增加锡膏在窗口处的停滞时间，从而增加 PCB 焊盘上的锡膏；印刷宽间距元件时速度一般为 30～50mm/s。（＞0.5mm pitch 为宽间距，＜0.5mm pitch 为细间距）

Scraper speed: The selection of scraper speed is related to the solder paste viscosity and the min pin space of the SMD on PCB board. The viscosity of solder paste is higher, the speed of scraper is lower and vise versa. For the selection of scraper speed, do the trial printing with small pressure in general. And add the pressure slowly until print the good solder paste. The speed range is 15～50mm/s. Lower the scraper speed in order to add the delay time in entrance for solder paste so that to add the solder paste on the bonding pad of

PCB when print the narrow space and the speed is 15～30mm/s in general. The printing speed for the large space component is 30～50mm/s. (＞0.5mm pitch is large space，＜0.5mm pitch is narrow space）

本机器刮刀速度允许设置范围为 0～200mm/s。

The allowed scope of scraper speed is 0～200mm/s.

刮刀压力：压力直接影响印刷效果，压力以保证印出的焊膏边清晰，表面平整厚度适宜为准。压力太小，锡膏量不足，产生虚焊；压力太大，导致锡膏连 接，会产生桥接。因此刮刀压力一般是设定为0.5～10kg。

Scrape pressure: The pressure has direct influence on the printing performance. The suitable pressure is the one that can insure the clear edge, even surface and good thickness of the printing solder paste. Too little pressure and insufficient solder paste will lead to empty solder. Too much pressure will bring about solder paste connection and bridging. So the scrape pressure is set from 0.5kg to 10kg.

3.2.5 脱模速度和脱模长度 Speed and length of demoulding

脱模速度：指印刷后的基板脱离模板的速度，在焊膏与模板完全脱离之前，分离速度要慢，待完全脱离后，基 板可以快速下降。慢速分离有利于焊膏形成清晰边缘，对细间距的印刷尤其重要。一般设定为3mm/s，太快易破坏锡膏形状。

本机器允许设置范围为 0～20mm/s。

Demoulding speed: It is the speed after the printed base board separates from the template. Before the solder paste separates from the template completely, the separation speed need be slow. After completed separation, the base board can decline fast. Slow separation speed is good for the clear edge formation of solder paste. It is very crucial for the narrow space printing. Generally, the speed is set at 3mm/s. If the speed is too fast, the shape of solder paste will be damaged.

The allowed scope of demouding speed is 0～20mm/s.

PCB 与模板的分离时间：即印刷后的基板以脱板速度离开模板所需要的时间。时间过长，易在模板底面残留焊膏，时间过短，不利于焊膏的站立。一般控制在 1 秒左右。

Separation time for the PCB and template: It is the time for the printed base board separates from template with stripper plate speed. Too much time, it is easy to remain the solder paste on the bottom side of template. Too little time, it is not good for the standing of solder paste. The speed is controlled at about 1 second in general.

本机器用脱模长度来控制此变量，一般设定为 0.5～2mm。本机器允许设置范围为 0～10mm。

The printer control this variate by the demoulding length which is set at 0.5～2mm. The allowed scope for this printer is 0～10mm.

3.3 试生产 Trial production

在以上准备工作做完以后，即可进行 PCB 板的试印刷。操作方法是：

Can do the trial printing of the PCB board after above preparations are finished. The operation methods are as following:

1 单击主工具栏中的[]按钮，出现图 3-18 界面，在该界面上勾选显示调节窗口，然后点击[确定]按钮回到软件主界面。

Click the “ 

”(production setting) button in the mail tool bar. The interface in the Pix 3-18 will be displayed. Select “显示调节窗口” (display adjustment window) and click “确定”（ok）button to come back to the main interface of the software.

2 在软件主界面上点击[]按钮，接下来按软件提示操作进入生产模式，机器在完成 PCB 运输，定位，取像，Z 轴上升到印刷位置后，出现图 3-18 画面。

Click “ 

” (start) button in the main interface of the software. According to the software instructions, it will enter production mode. The interface in the pix 3-18 will be displayed after the finish of the PCB transmission, positioning and image capture and the Z axis lift up to the printing location.

3 在 3-18 界面下，检查 PCB 是否和钢网紧贴，要求是 PCB 刚好挨着钢网，否则需调节 Z 轴高度，直到满足要求。检查 PCB 焊盘是否和钢网网孔重合，如不重合，则需要调整平台 X、Y1、Y2，直到重合为止。

Check whether the PCB is against stencil in the interface of pix 3-18. The PCB need be against stencil. Otherwise operator need adjust the height of Z axis until the PCB is against stencil. Check whether PCB bonding pad and stencil hole is overlapped. If not, please adjust the X,Y1,Y2 of platform until PCB bonding pad and stencil hole is overlapped.

在图 3-18 界面下安装刮刀，注意：刮刀片安装前应检查其刀口是否平直，有无缺损。

Assemble the scraper in the interface of pix 3-13. Please check whether the blade is even, straight and damaged before assembling the scraper blade.

4 以上工作完成后点击[确定]按钮，完成第一块 PCB 的印刷。

Click “确定”（ok）button after above preparation are finished. Then the printing of the first PCB are finished.

5 如印刷结果不符合质量要求，应重新进行参数设置或在主界面上点击[

]按钮进入图 3-19 界面输入平台及印刷误差补偿值，直到印刷结果满足质量要求，方可正式开始生产。

If the printing performance can not meet the quality requirement, operator need reset the parameter or click “ 

” (production setting) button to enter the interface of pix 3-19. Input the error compensation value of platform and printing in that interface until printing performance can not meet the quality requirement and then can start the production officially.

6 锡膏印刷质量要求：

The quality requirement of solder paste printing.

本机器设定锡膏厚度在 0.1—0.3mm 之间、焊膏覆盖焊盘的面积在 75%以上即满足质量要求。

The thickness of solder paste for this printer need be 0.1—0.3mm. There are above 75% solder paste printed on the bonding pad.

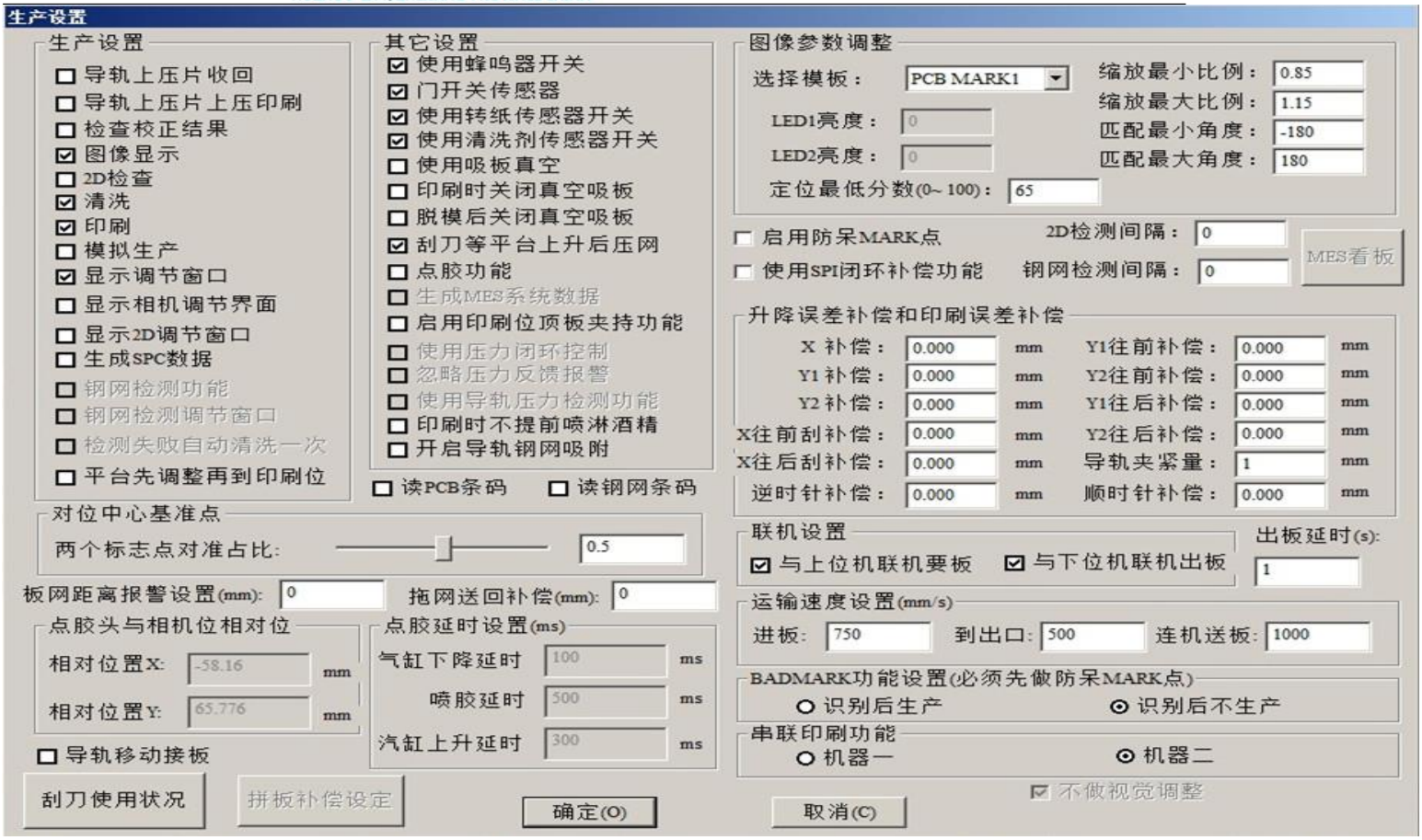
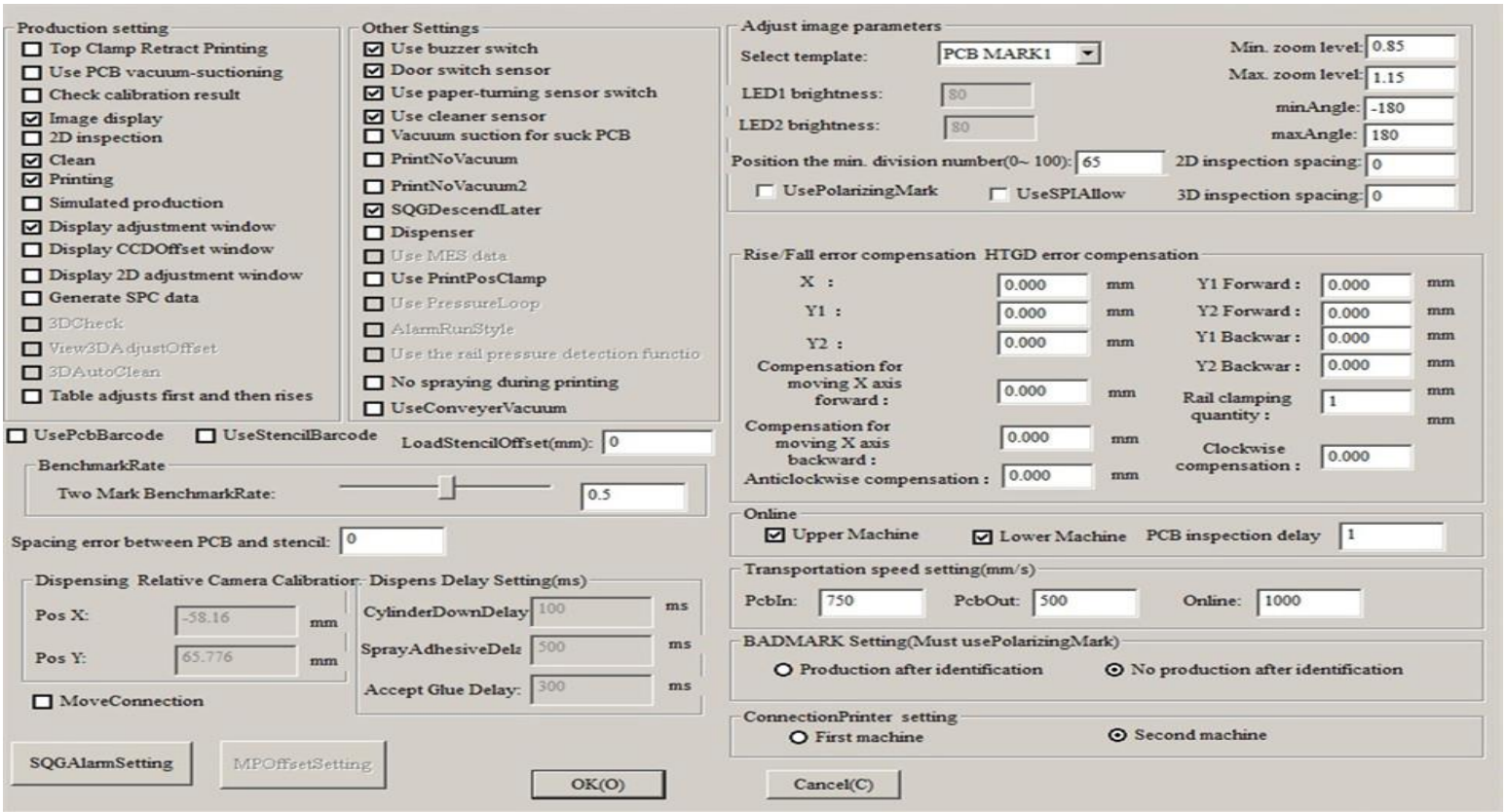
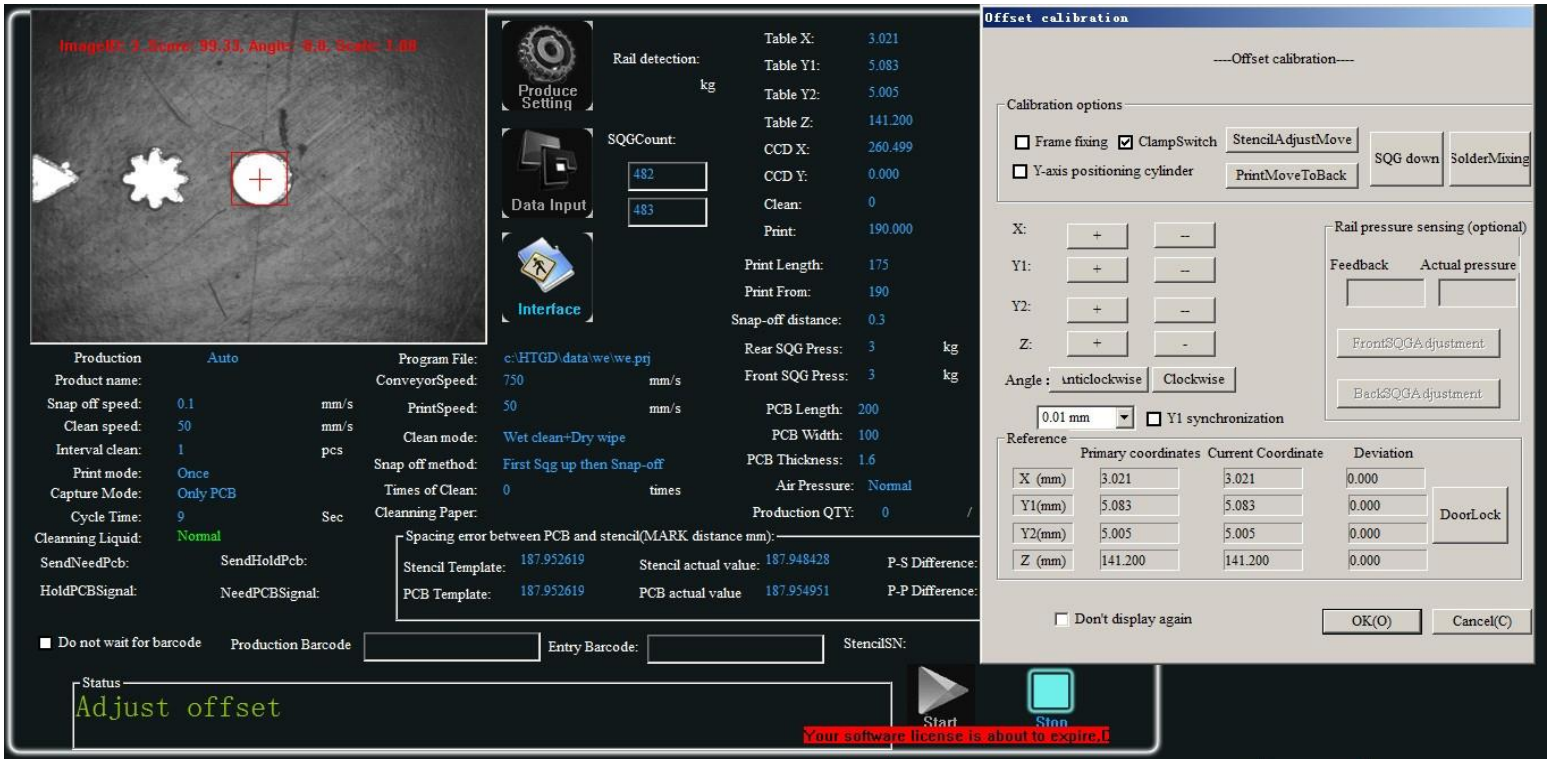


图 3-18（生产设置界面）



Pix 3-18(production setting interface)

图 3-19（微调窗口）



Pix 3-19(fine

第四章　操作系统说明

Chapter 4 Introduction of the operation system

4.1 系统启动 System start-up

打开机器主电源开关，将自动进入主窗口画面。操作程序如下：

打开总电源开关 ⟶ 打开气源开关 ⟶ 打开机器主电源开关 ⟶ 进入机器主画面（主菜单）

Turn on the main power switch and enter into the main window. Operation steps are as following:

Turn on general power switch ⟶ turn on air power switch ⟶ turn on the main power switch of the printer ⟶ enter into the main interface (main menu)

4.2 主窗口组成 Main window

图4-1　主窗口画面

Pix 4-1 main window

主窗口包括两个部分：

Main window includes two sections:

- 主工具栏 1 main tool bar 1

- 主工具栏 2 main tool bar 2

421 主工具 1 栏功能解释及其操作 The explanation and operation of the functions in main tool bar 1.

1.  ：用户权限。不同的用户有不同的权限；

 : User permission. Different users have different permissions.

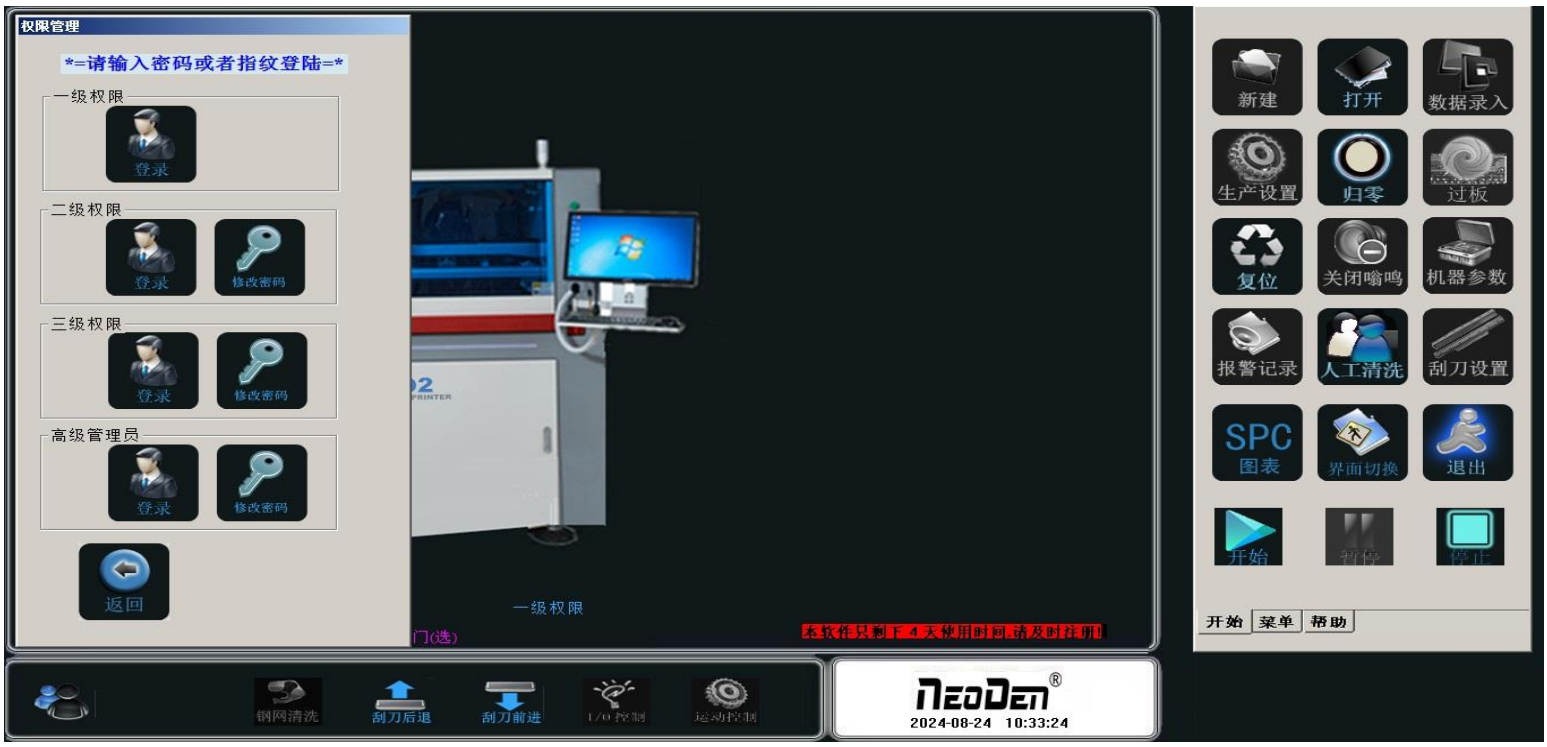
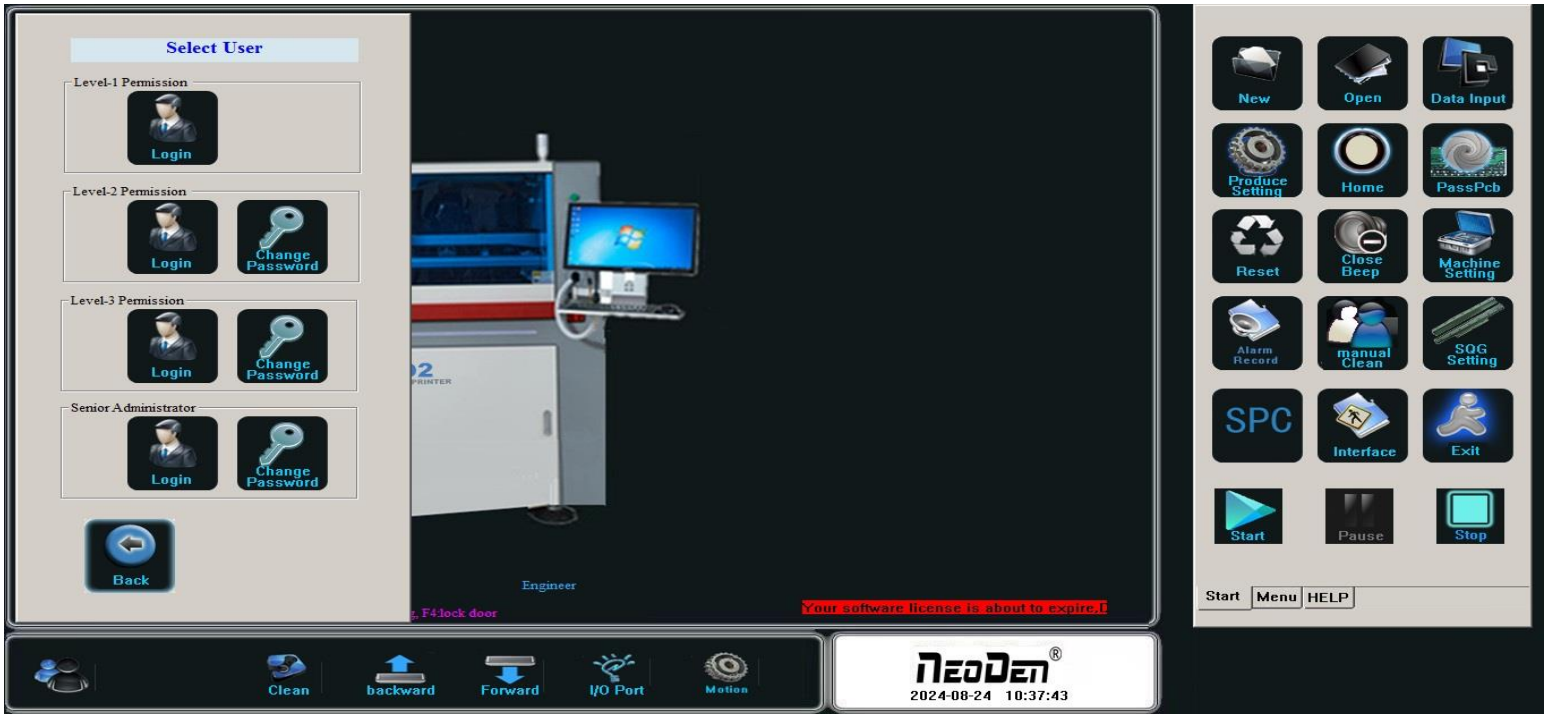


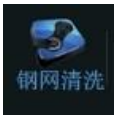
图 4-1（用户设置界面）



Pix 4-1 (user setting interface)

2. 

：钢网清洗。当机器自动清洗不能满足工艺要求的情况下，点击该按钮可对钢网进行人工清洗。洗完后点退出回到机器主界面；



: Stencil cleaning. Click this button to do manual cleaning of thestencil when the automatic cleaning can not meet the technology requirement.

图 4-2（钢网清洗）　　Pix 4-2(stencil cleaning

3. 

：刮刀后退。点击刮刀向后移动到印刷起点；

: Scraper moves back. Click this button and scraper will remove to the printing origin.

4. 

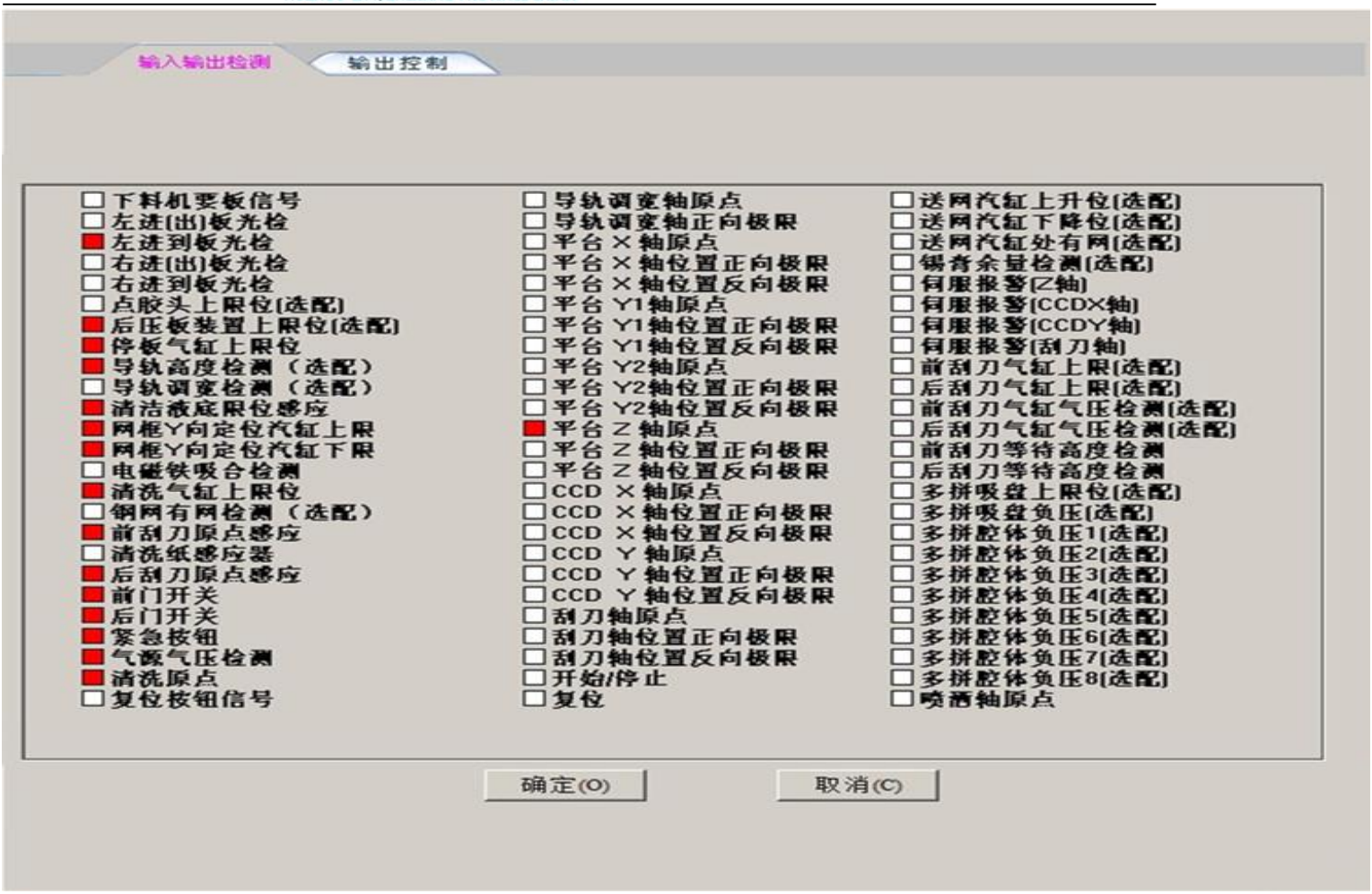
：刮刀前进。点击刮刀向前移动到印刷终点；

: Scraper moves forward. Click this button and scraper will remove to the printing end point.

5. 

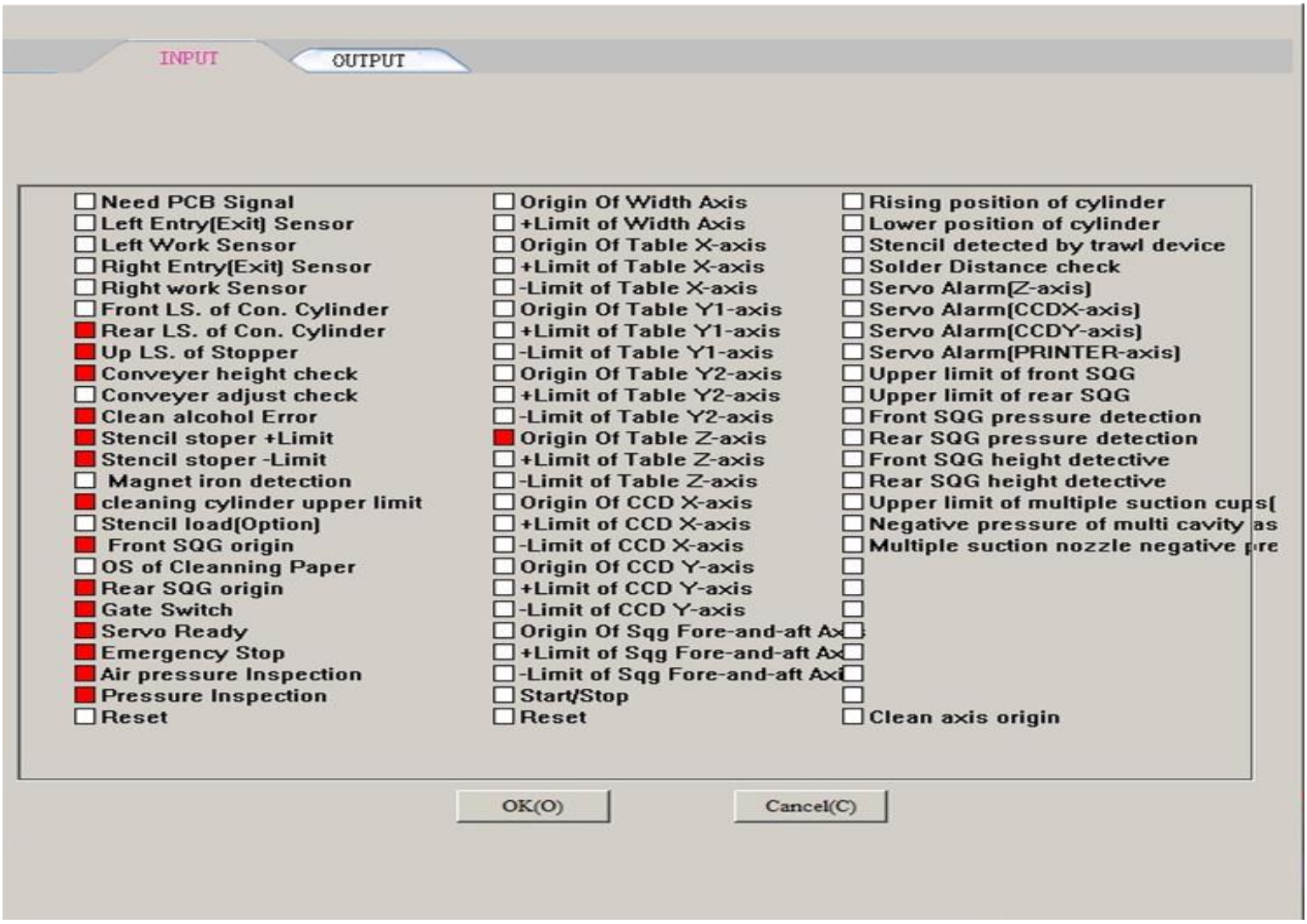
：I/O 控制。点击该按钮出现图 4-3 界面，该功能主要用在检测机器的 I/O 是否正常上；

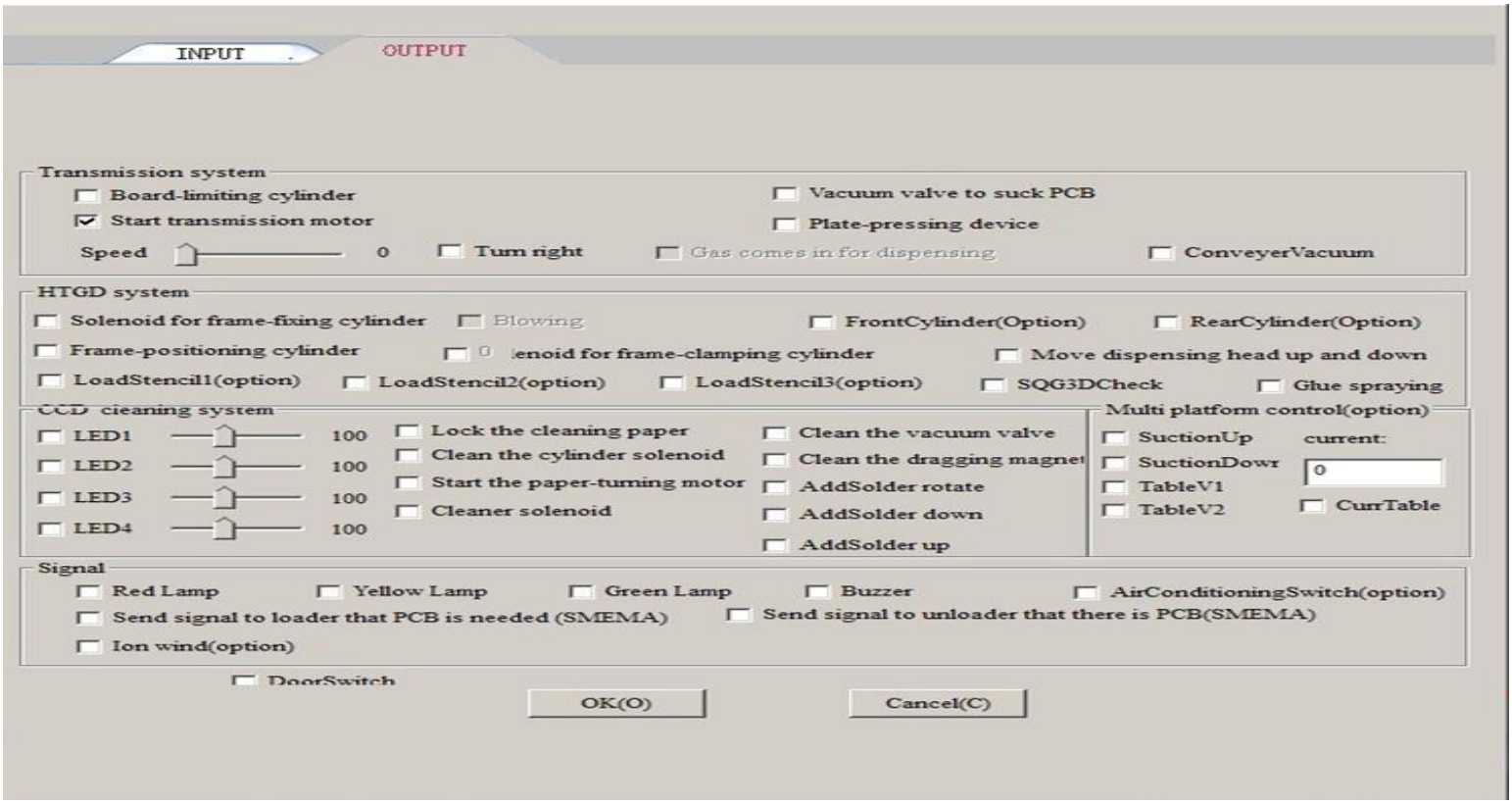
: I/O control. Clicking this button will display the interface on pix 4-3. This function is used to test whether the I/O of the printer is normal.


输入输出检测
输出控制
下料机要板信号
左进(出)板光检
左进到板光检
右进(出)板光检
右进到板光检
点胶头上限位(选配)
后压板装置上限位(选配)
停板气缸上限位
导轨高度检测（选配）
导轨调宽检测（选配）
清洁液底限位感应
网框Y向定位汽缸上限
网框Y向定位汽缸下限
电磁铁吸合检测
清洗气缸上限位
钢网有网检测（选配）
前刮刀原点感应
清洗纸感应器
后刮刀原点感应
前门开关
后门开关
紧急按钮
气源气压检测
清洗原点
复位按钮信号
导轨调宽轴原点
导轨调宽轴正向极限
平台X轴原点
平台X轴位置正向极限
平台X轴位置反向极限
平台Y1轴原点
平台Y1轴位置正向极限
平台Y1轴位置反向极限
平台Y2轴原点
平台Y2轴位置正向极限
平台Y2轴位置反向极限
平台Z轴原点
平台Z轴位置正向极限
平台Z轴位置反向极限
CCD X轴原点
CCD X轴位置正向极限
CCD X轴位置反向极限
CCD Y轴原点
CCD Y轴位置正向极限
CCD Y轴位置反向极限
刮刀轴原点
刮刀轴位置正向极限
刮刀轴位置反向极限
开始/停止
复位
送网汽缸上升位(选配)
送网汽缸下降位(选配)
送网汽缸处有网(选配)
锡膏余量检测(选配)
伺服报警(Z轴)
伺服报警(CCDX轴)
伺服报警(CCDY轴)
伺服报警(刮刀轴)
前刮刀气缸上限(选配)
后刮刀气缸上限(选配)
前刮刀气缸气压检测(选配)
后刮刀气缸气压检测(选配)
前刮刀等待高度检测
后刮刀等待高度检测
多拼吸盘上限位(选配)
多拼吸盘负压(选配)
多拼腔体负压1(选配)
多拼腔体负压2(选配)
多拼腔体负压3(选配)
多拼腔体负压4(选配)
多拼腔体负压5(选配)
多拼腔体负压6(选配)
多拼腔体负压7(选配)
多拼腔体负压8(选配)
喷洒轴原点
确定(O)
取消(C)


输入输出检测
输出控制
运输系统
停板气缸
吸板真空阀
压板装置
导轨锁定气缸(GTS)
启动运输马达
速度
0
右转>>
定长运动测试
导轨钢网吸附
印刷系统
网框固定气缸电磁阀
网框夹紧气缸电磁阀
前刮刀气缸(选)
后刮刀气缸(选)
网框定位汽缸
钢网检测光源
点胶头升降
点胶喷射
拖网汽缸整体升降(选配)
拖网汽缸抓紧(选配)
拖网汽缸整体微调(选配)
点胶进气
CCD与清洗系统
LED1
LED2
LED3
LED4
100
清洗纸锁定
清洗气缸电磁阀
启动转纸马达
清洗剂喷射阀
清洗真空阀
清洗拖动磁吸
加锡气缸摆动
加锡气缸伸出
加锡气缸缩回
多拼板控制(选配)
吸嘴升降
吸嘴真空
平台真空1
平台真空2
当前分拼:
0
分拼真空
平台真空8
信号
红灯
黄灯
绿灯
蜂鸣器
门开关控制
向上料机发要板信号
向下料机发送有板信号
空调开关(选配)
入口离子风(选配)
喷气
确定(O)
取消(C)

图 4-3（I/O 检测）





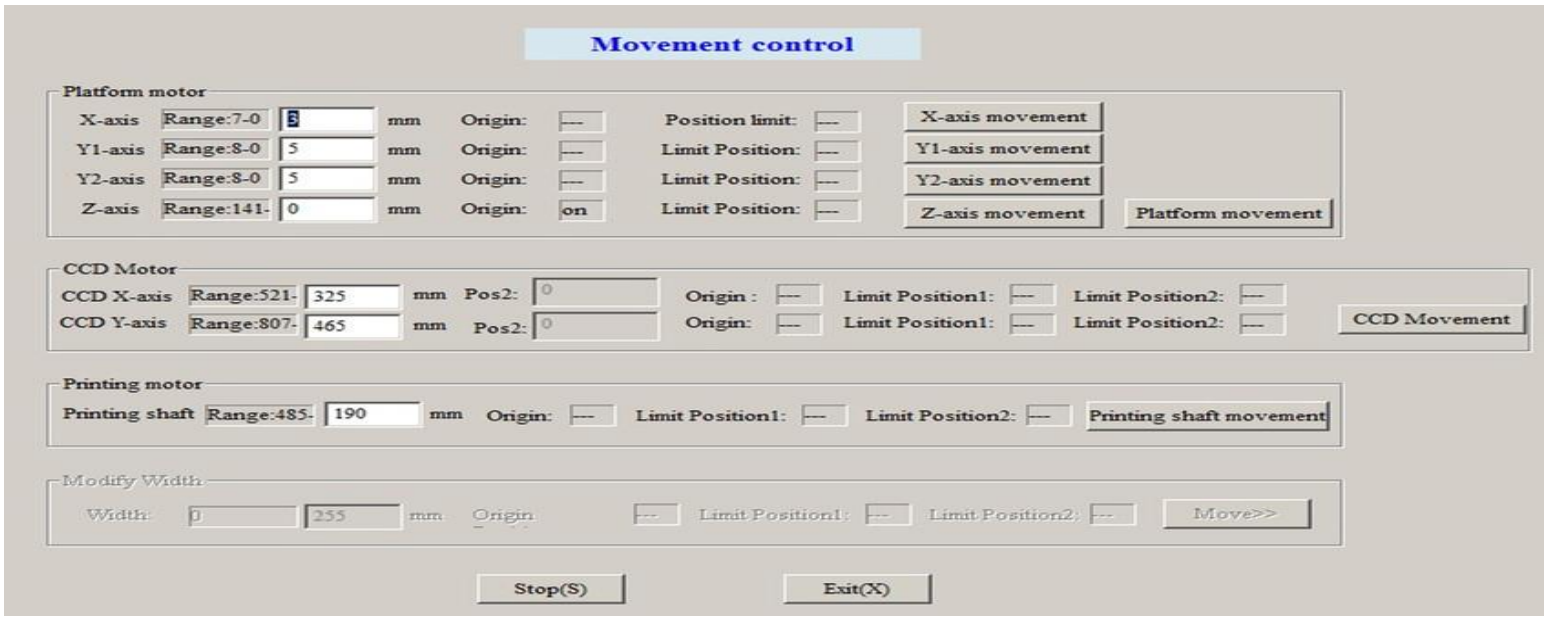
Pix 4-3(I/O test)

6、 

：运动控制。该功能主要用在调试机器或检查机器故障上。点击该按钮后出现图 4-4 界面。在该界面上对应空白的格子里填上数据，点击右边的[I]按钮，对应的轴会移动到所设置的数据处。

: Movement control. This function is used to check or resolve the faults of the printer. Clicking this button will display the interface of pix 4-4. Input the data in the corresponding blank in the interface and click the “I” button and the corresponding axis will remove to the setup position.

图 4-4（运动控制）



Pix 4-4 (movement control)

4.22 主工具栏 **2** 功能解释及其操作
The explanation and operation of the functions in main tool bar 2

1. 

：新建工程。新建一个印刷程序，点击该按钮在图 3-6 界面上输入工程的代号点击[确定]然后按第三章讲的内容做程序即可；

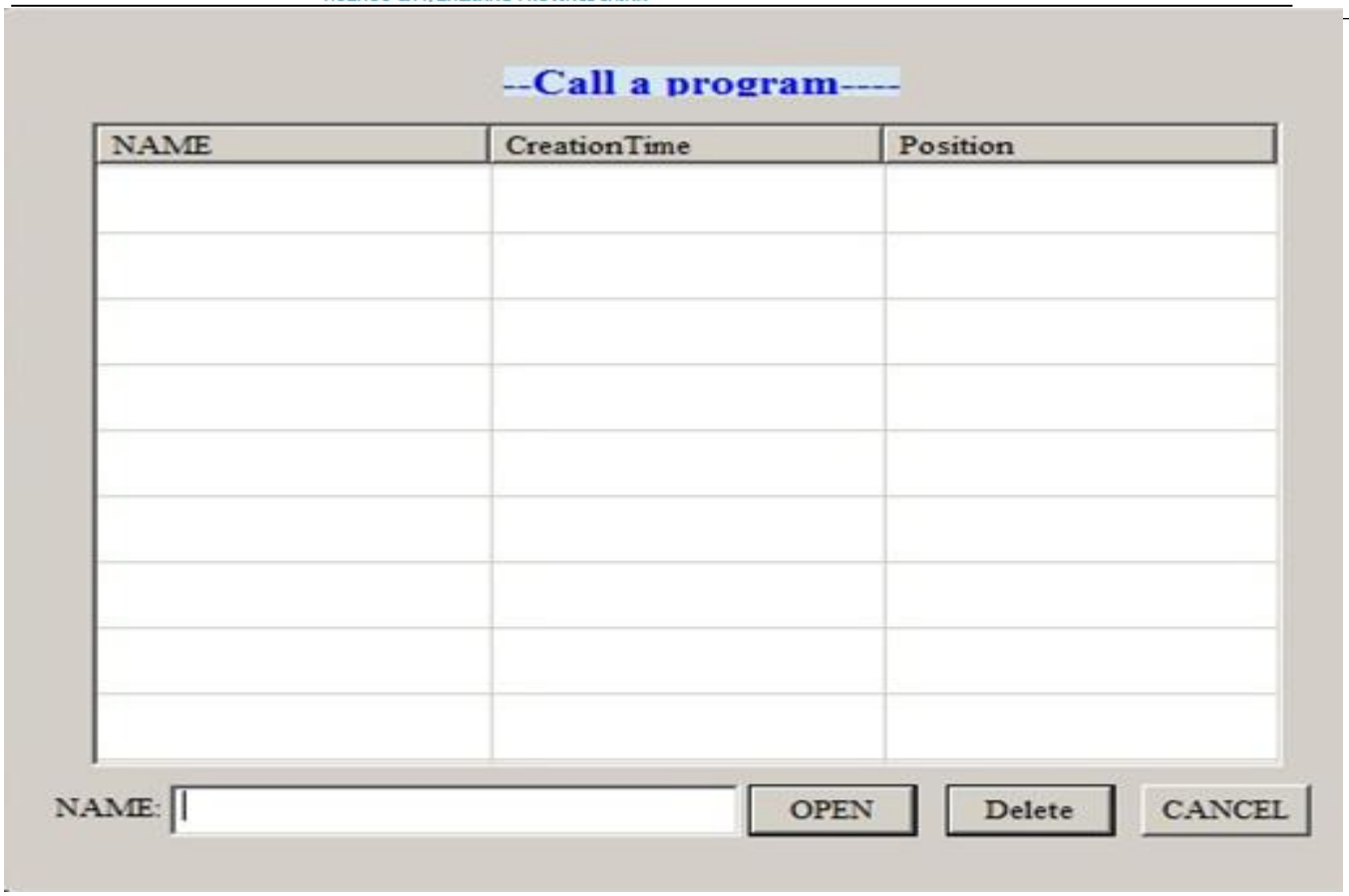
: New project. Create a new printing program. Click this button in the interface of pix 3-6. Input the project name and click “确定”（ok）button and program it according to the introduction in chapter 3

2. 

：打开工程文件按钮。打开一个之前建立好的程序。如图 4-5，选择要打开的工程，点击[打开]即可；

: Open project file. Open a program which has been done before. Select the project and click “打开”（open）button. See pix 4-5.

图 4-5（打开工程）



Pix 4-5(open project)

3. 

：数据录入按钮。该按钮在两种状态下使用。
: Data input. Use this button under the following two conditions:

一．打开工程或新建工程时

该状态下单击该按钮出现图 3-7 所示的界面。该界面下的设置请参照第三章。

Open project or create new project.

The interface in the pix 3-7 will display under the above conditions. Please refer to the chapter 3 to set this interface.

二．在生产过程中按机器外壳上的 “ Start/Stop ” 按钮后

该状态下单击该按钮出现图 3-7 界面，相关设置请参考第三章。

Press the “Start/Stop” button on the shell of the printer during the production.

The interface in the pix 3-7 will display under the above condition. Please refer to the chapter 3 to set this interface.

4. 

：生产设置按钮。点击该按钮后出现图 3-18 界面。在该界面下可设置的

项目有: Production setting. Clicking this button will display the interface of pix 3-18. The settable items in the interface are as following:

生产设置：有很多选项，勾选后执行，反之不执行；

Production setting: Many options can be selected. Start execution after the selection and vise versa.

平台补偿：输入平台补偿值；

Platform compensation: input the platform compensation value.

刮刀 Y 向补偿：当机器对位精度达到要求时，印出来的锡膏是偏的，这时就要根据偏移的数值输入相应的补偿。前后刮刀均不一样。

The Y direction compensation of the scraper: when the matching accuracy meets the requirement and the printing solder paste is offset, the operator needs input the corresponding compensation value according to the offset data. It is different for front and back scraper

其他设置：同样有很多选项，勾选后执行，反之不执行；

Other settings: Many options can be selected. Start execution after the selection and vise versa.

5. 

：归零按钮。单击该按钮后按软件提示操作机器将执行归零动作。如图 3-2，3-3，3-4 所示。

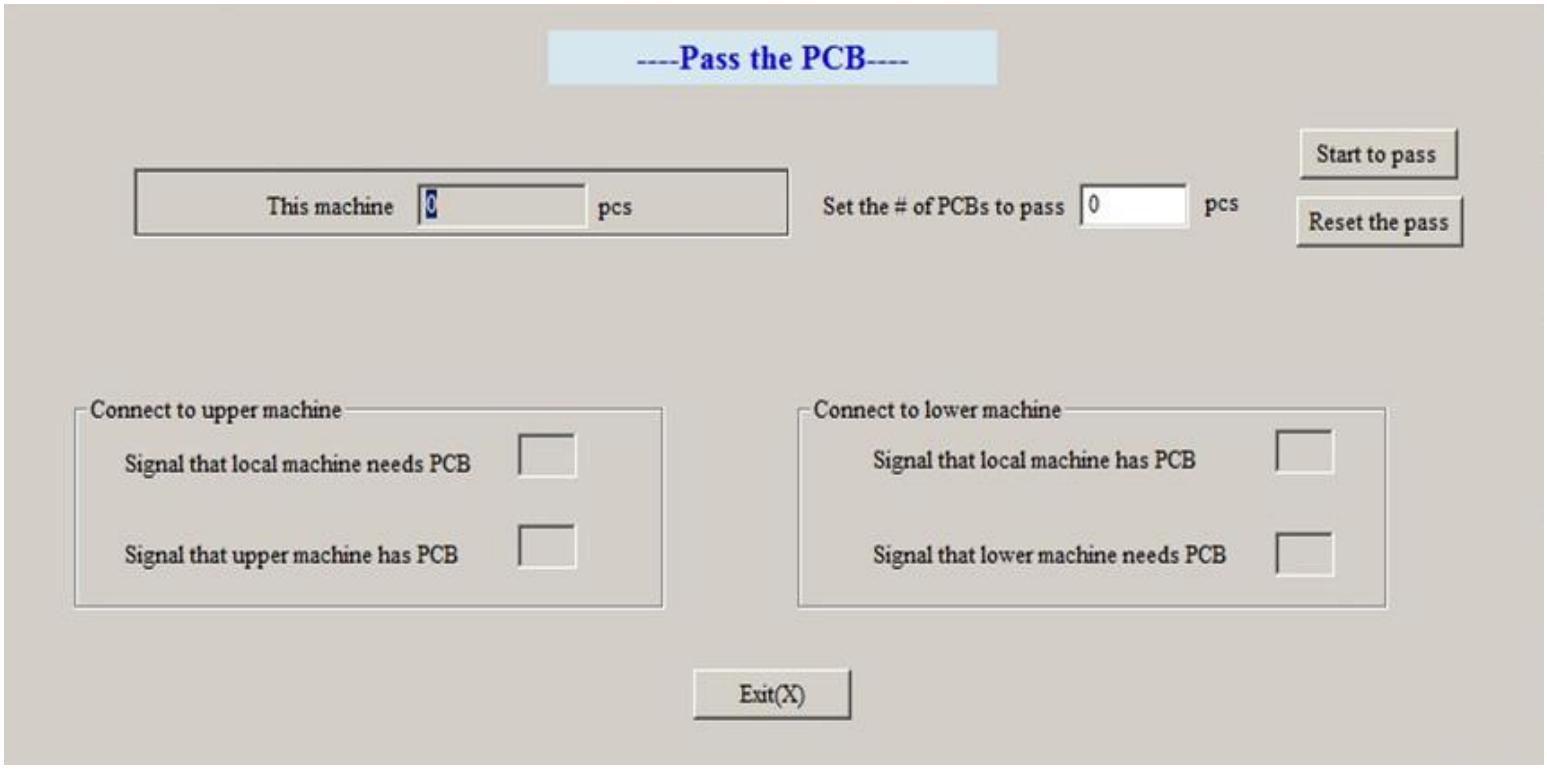
Return to zero. The print will do the movement of returning to zero after clicking the button. See Pix 3-2，3-3，3-4.

6. 

：过板功能。点击该按钮后出现图 4 - 6 界面。机器只执行过板功能相当于过板机使用。

: Pass board. The interface in the pix 4-6 will display by click this button. The printer will pass the board and it can be used as a equipment which can pass board.

图 4-6（过板界面）



Pix (board pass interface)

Reset. All signals will reset by clicking this button. There is no interface display by clicking this button

7： 

：·复位按钮。单击该按钮后机器各信号复位。单击该按钮不会出现任何界面。

8： 

：关闭蜂鸣按钮。单击该按钮后报警声音关闭。单击该按钮不会出现任何界面。

: Turn off buzzer. The alarm sound fades by clicking this button. There is no interface display by clicking this button.

9. 

：机器参数设置。点击该按钮可以对机器个参数进行设置。如图4-7，4-8，4-9，4-10。

: Printer parameter setting. Set the parameters by clicking this button. See pix 4-7，4-8，4-9，4-10.

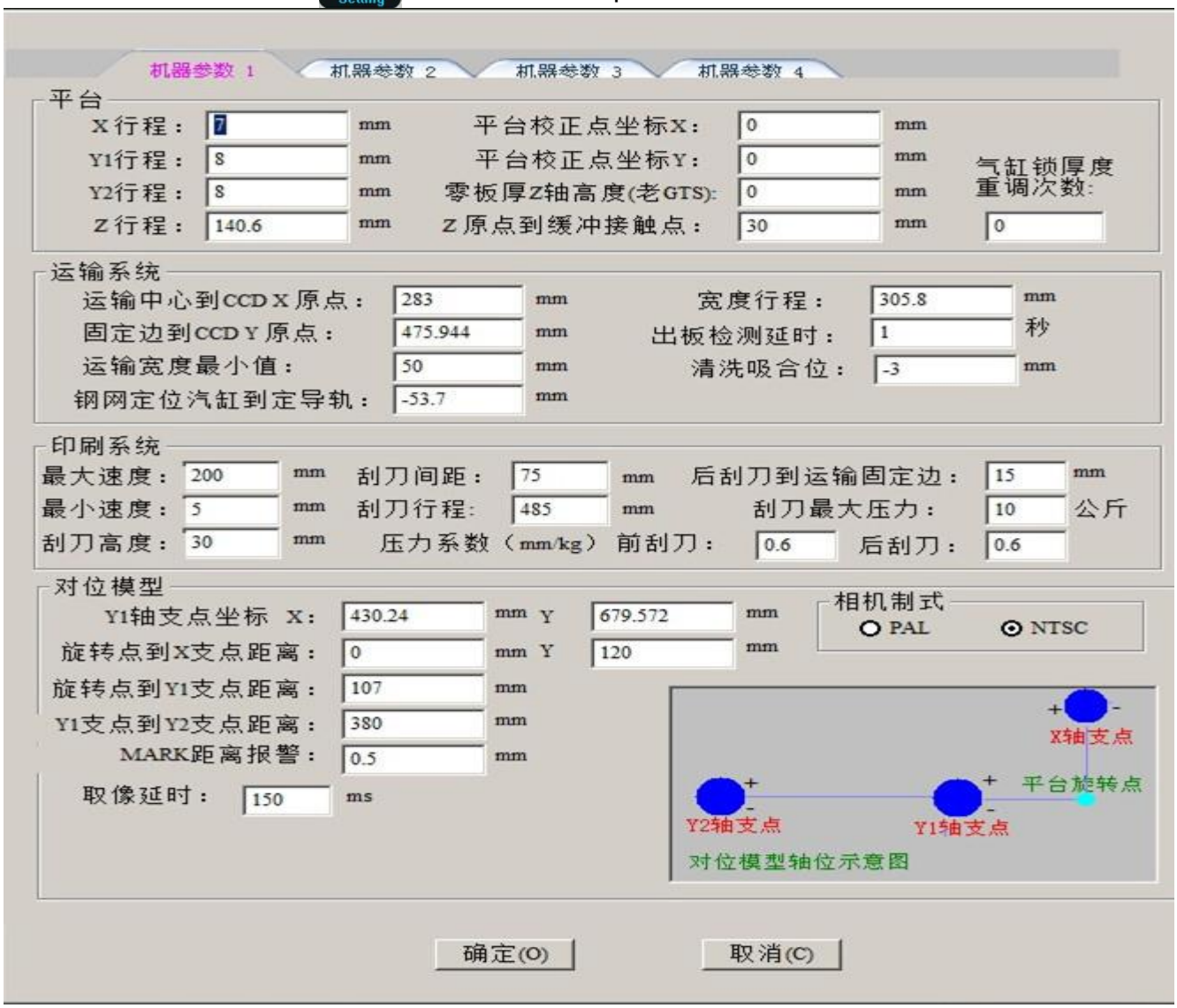


图 4-7（机器参数 1）

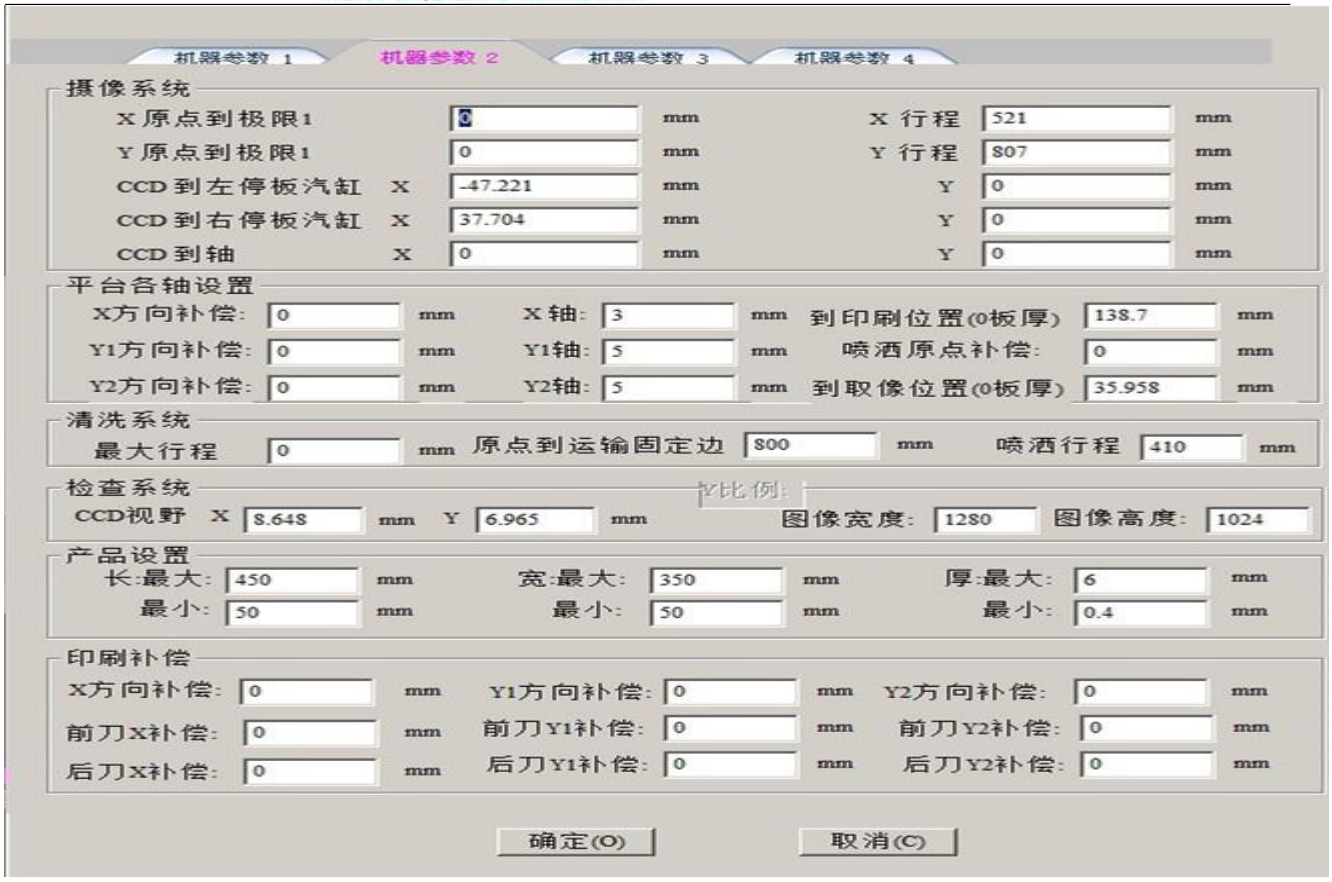
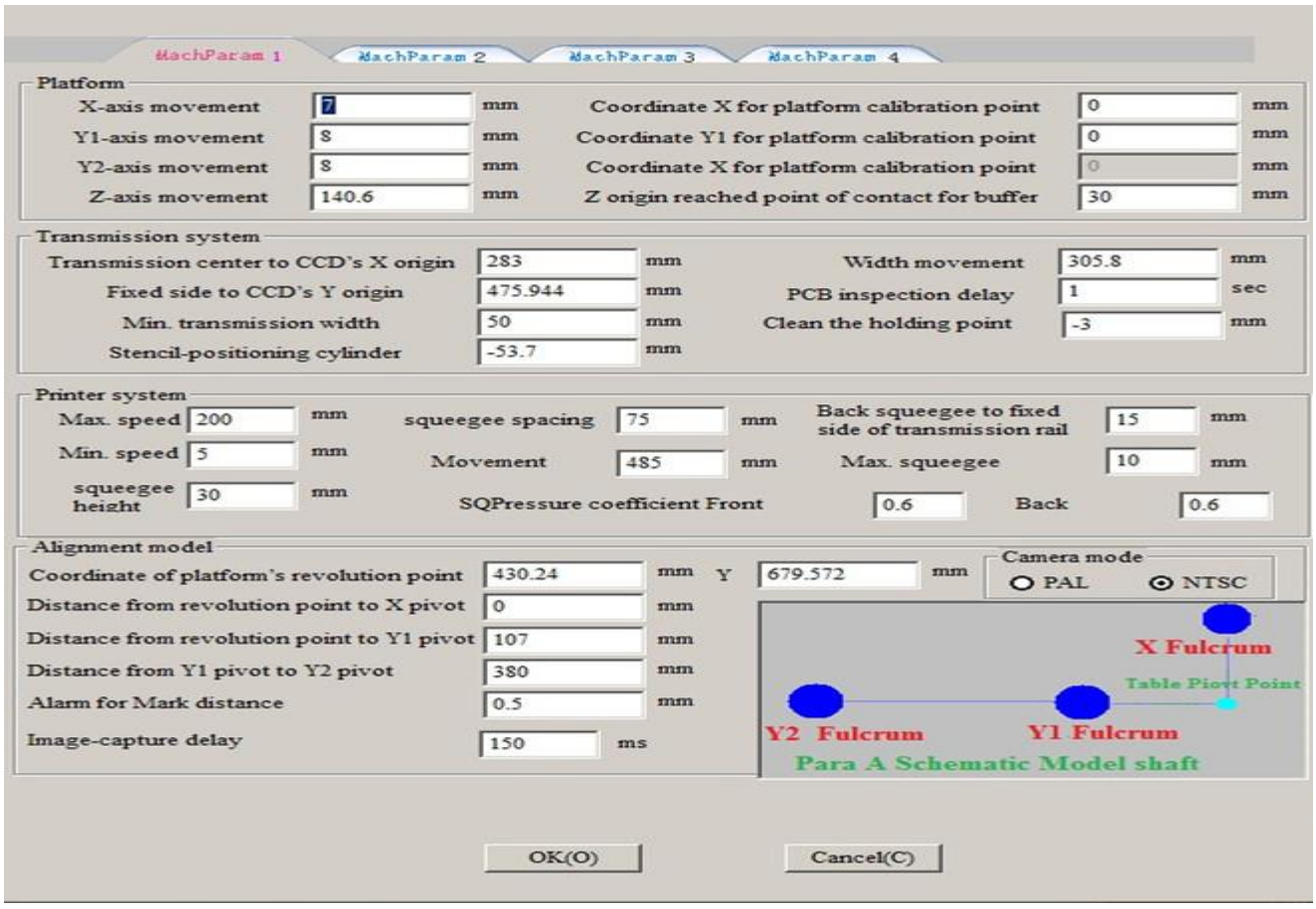
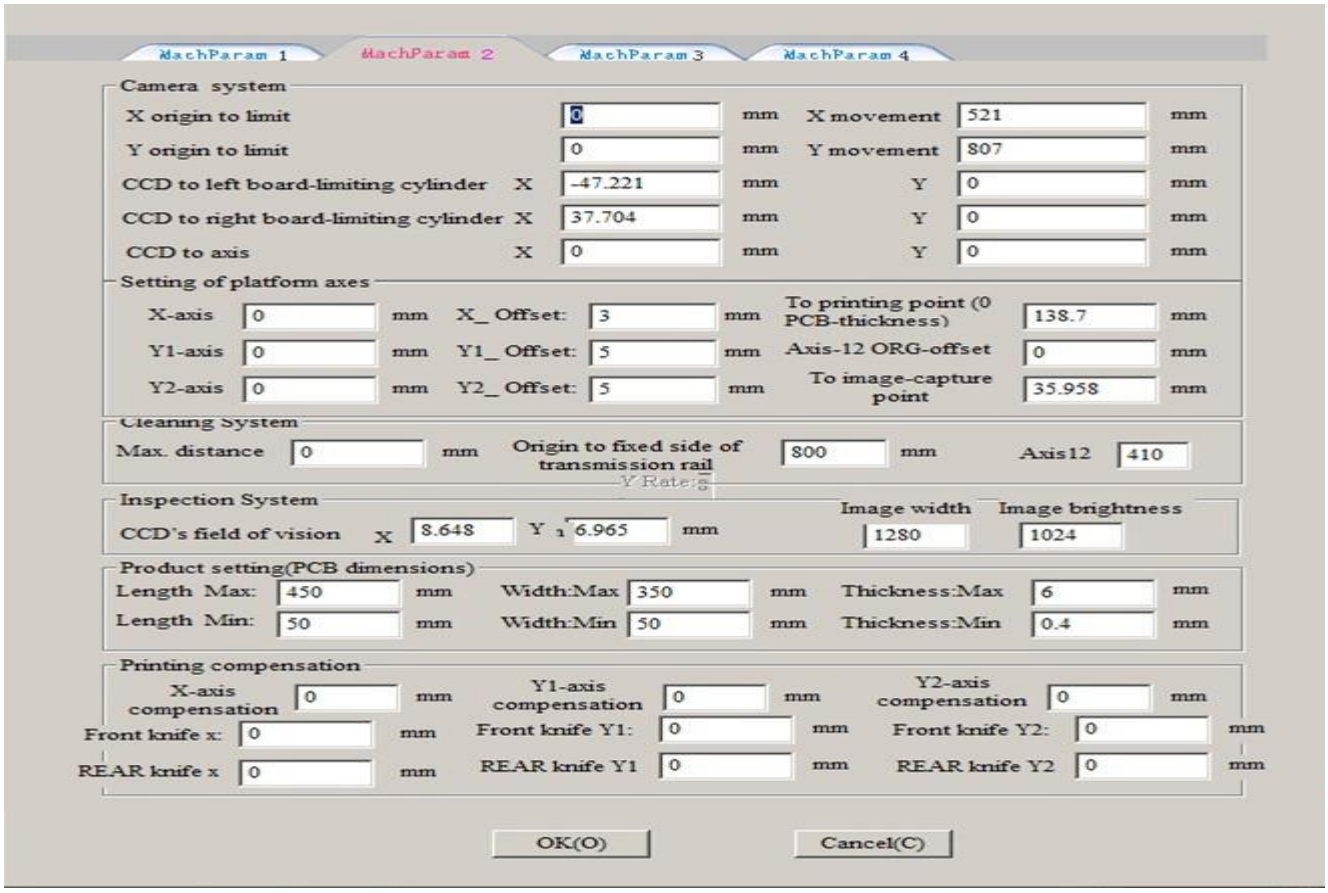


图 4-8（机器参数 2）



Pix 4-7(printer parameter 1)



Pix 4-8(printer parameter 2)

机器参数一：如图 **4-7 Printer parameter 1. See pix 4-7.**

A．平台 platform

主要进行平台各轴行程的设置；

Do the setting on the movement of the axes.

B．运输系统 transmission system

设置运输导轨的最大/最小宽度、运输导轨固定边到 CCD 原点的距离、PCB 到位延时及运输导轨中心到 CCD X 原点的距离等；

Set the Max/Min width of transmission rail, the distance between the fixed side of transmission rail and CCD origin, the delay arrive of PCB, the distance between the centre of transmission rail and X origin of CCD.

C．印刷系统 Printing system

设置刮刀横梁的行程、前刮刀到运输固定边的距离、刮刀移动的最大/最小速度及刮刀的最大压力；

Set the movement of the scraper beam, the distance between front scrape and the fixed side of transmission rail, the removed max/min speed of scraper and the max pressure of scrape.

D．对位模型 matching model

设置平台调整数学模型基本参数，此处参数为机器精准度基准，非原厂专业人员不得随意更改。

Set the basic parameters of platform adjusted mathematical model. These parameters are the standard accuracy and can not be revised freely except the professional operators from our company.

机器参数二：如图 4-8 Printer parameter 2. See pix 4-8.

该栏目主要进行摄像系统、清洗系统、平台各运动轴设置、校正系统、产品设置、印刷补偿等刚能的设置。

Do the setting on the camera system, cleaning system, motion axes of the platform, alignment system, production setting and printing compensation.

机器参数三：如图 **4-9 Printer parameter 3. See pix 4-9.**

该栏目主要进行各运动轴导程以及不同配置设备选项的设置。

Do the setting on the movement of motion axes and different configuration equipment options.

机器参数四：如图 4-10 **Printer parameter 4. See pix 4-10.**

该栏目主要进行各运动轴的速度加速度及每转细分数设置。

Do the setting on the acceleration of motion axes and subdivision number.

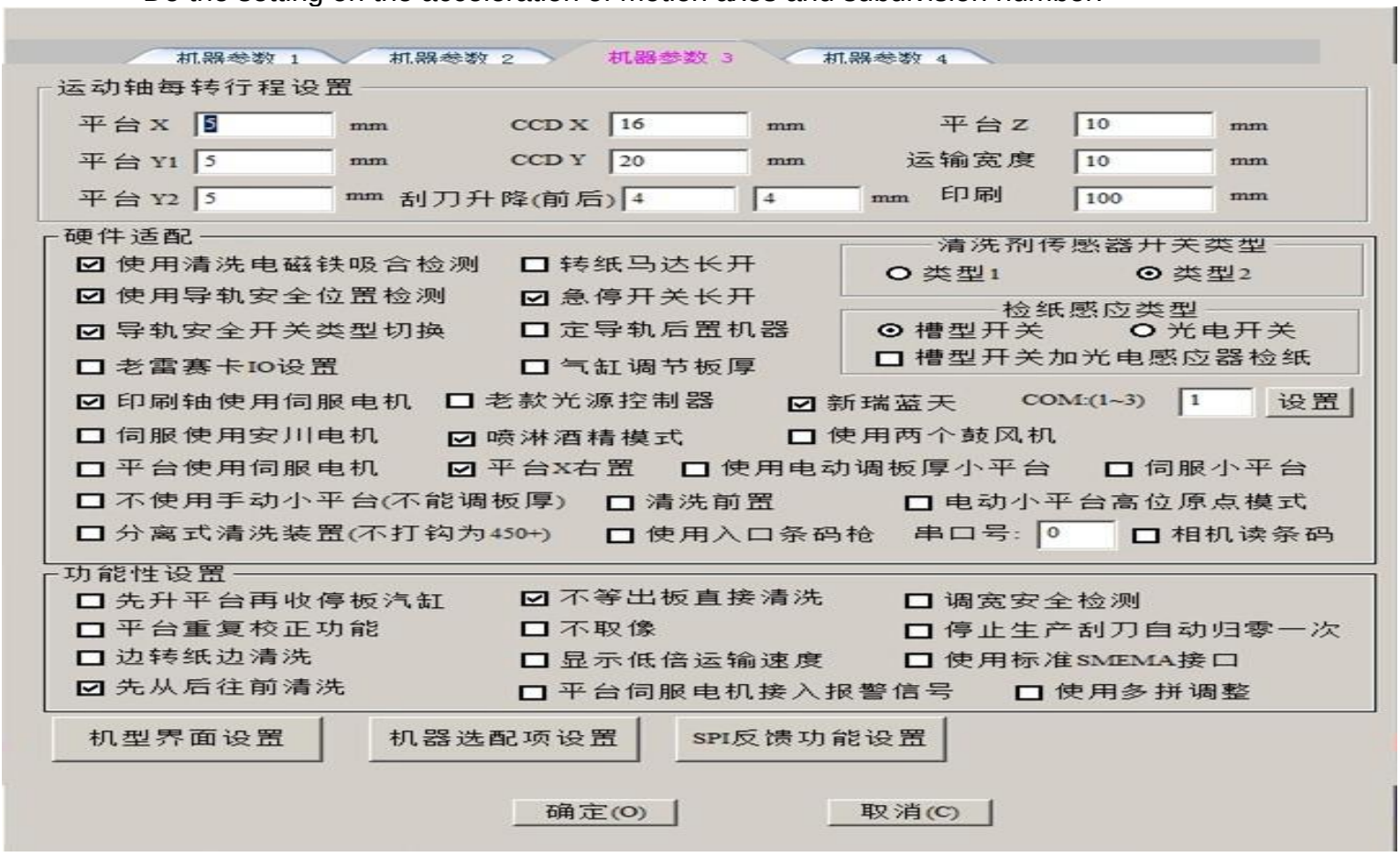


图 4-9（机器参数 3）

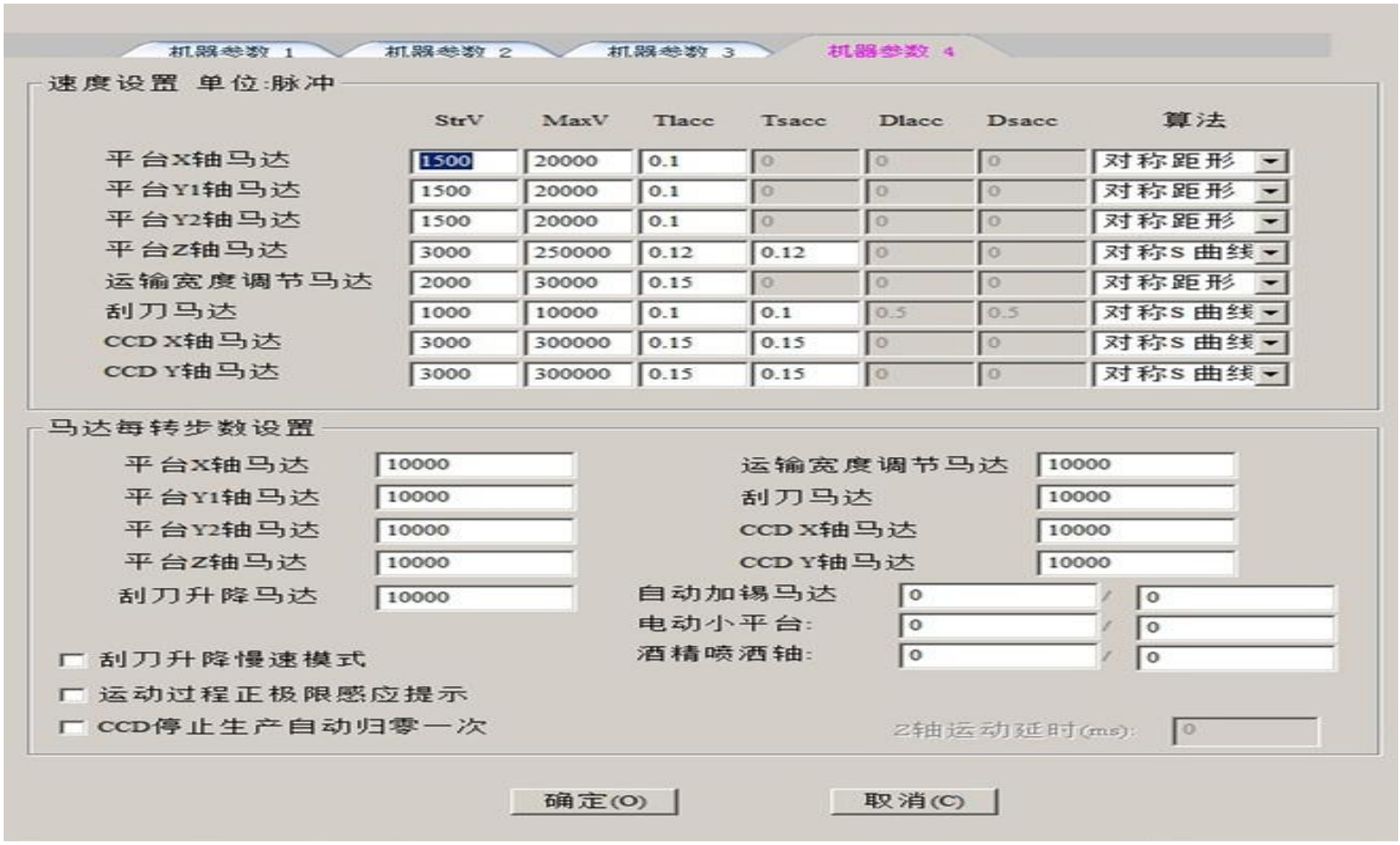
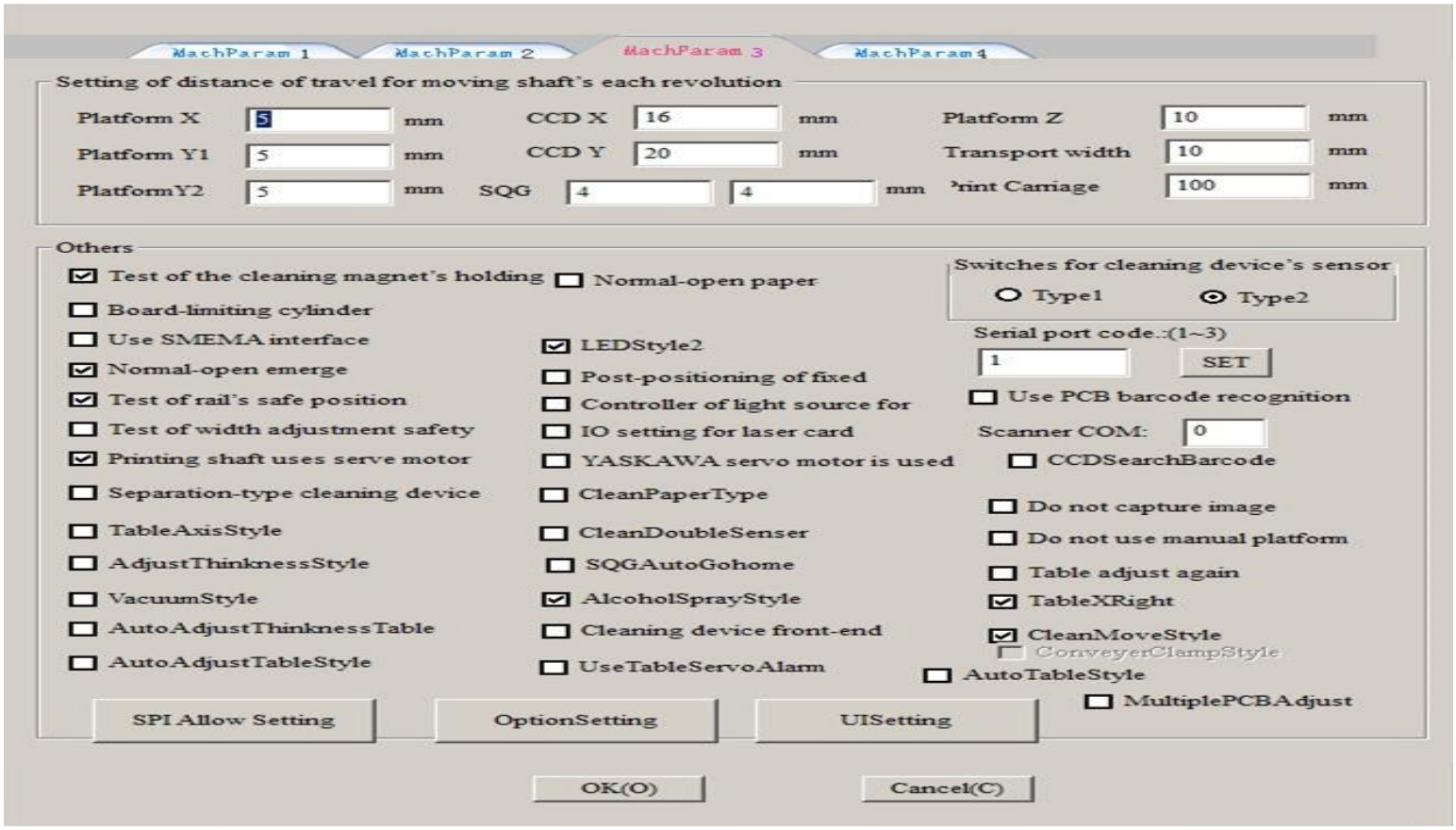
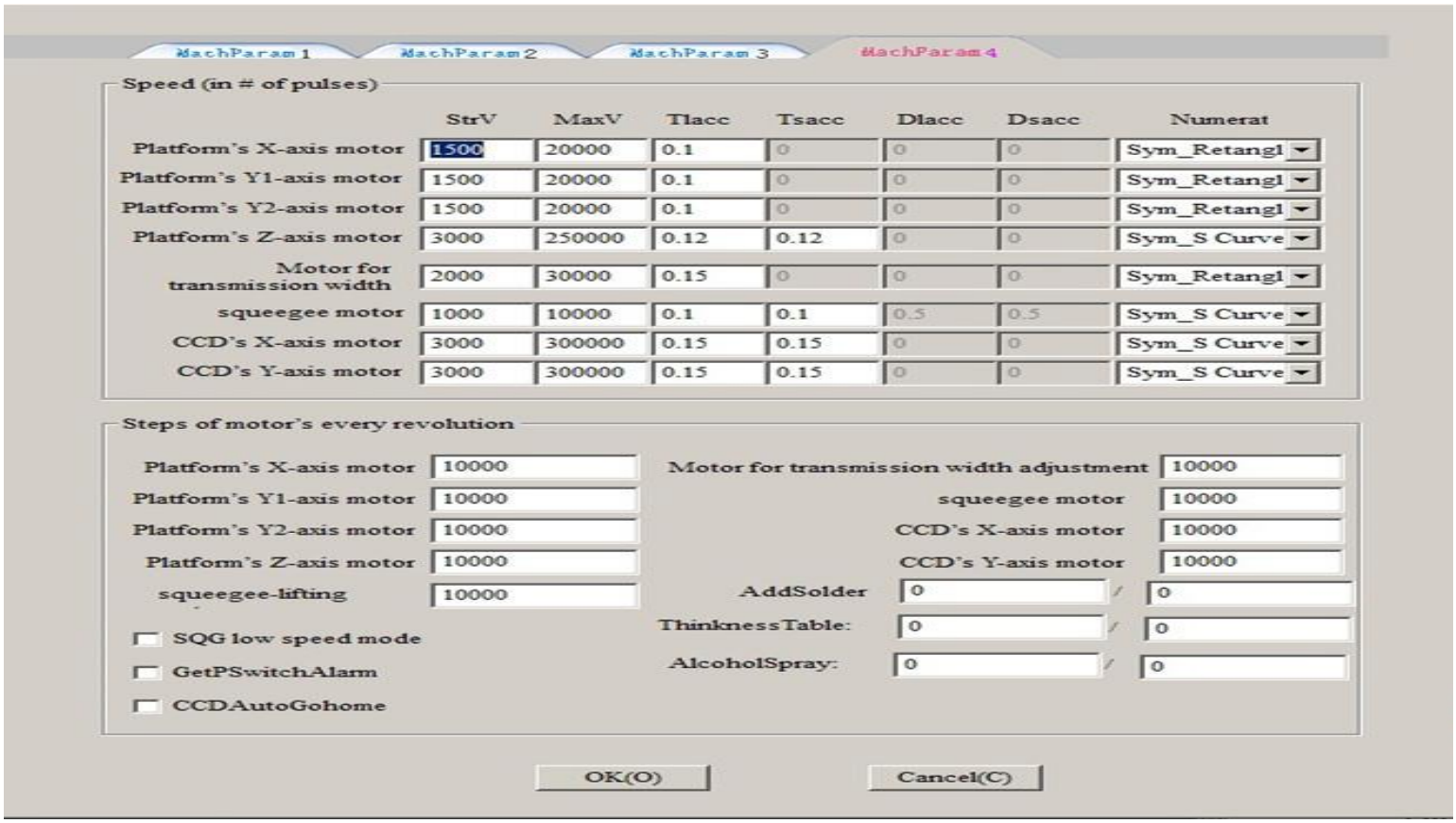


图 4-10（机器参数 4）



Pix 4-9(printer parameter 3)

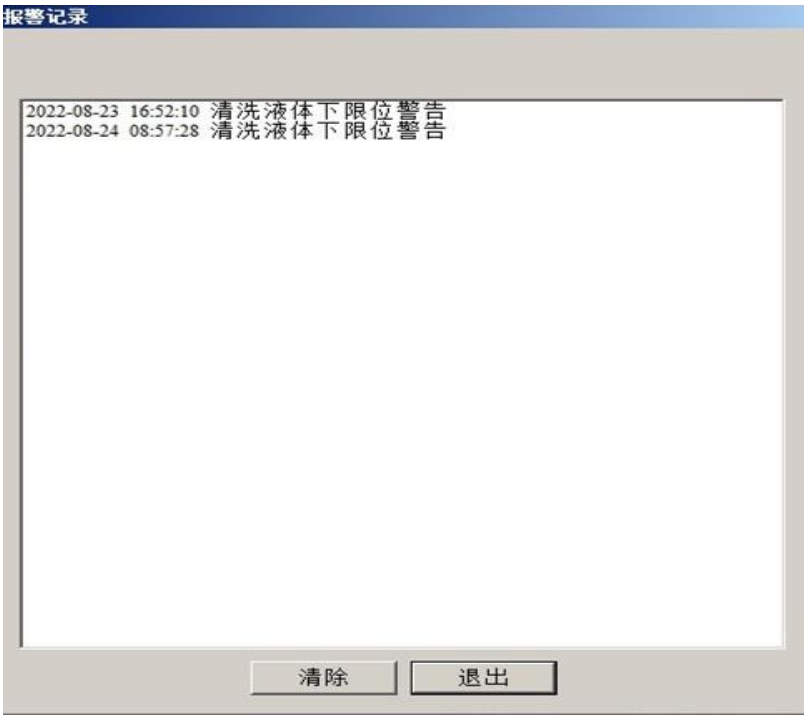


Pix 4-10(printer parameter 4)

10： 

：报警记录按钮。单击该按钮后如图4-11；

: Alarm record. The interface in the pix 4-11 will be displayed by clicking this button



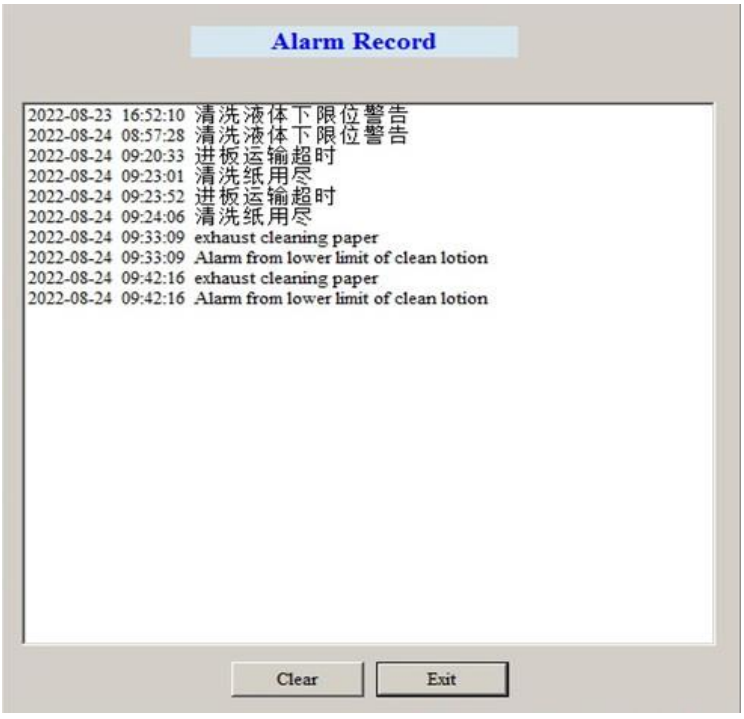


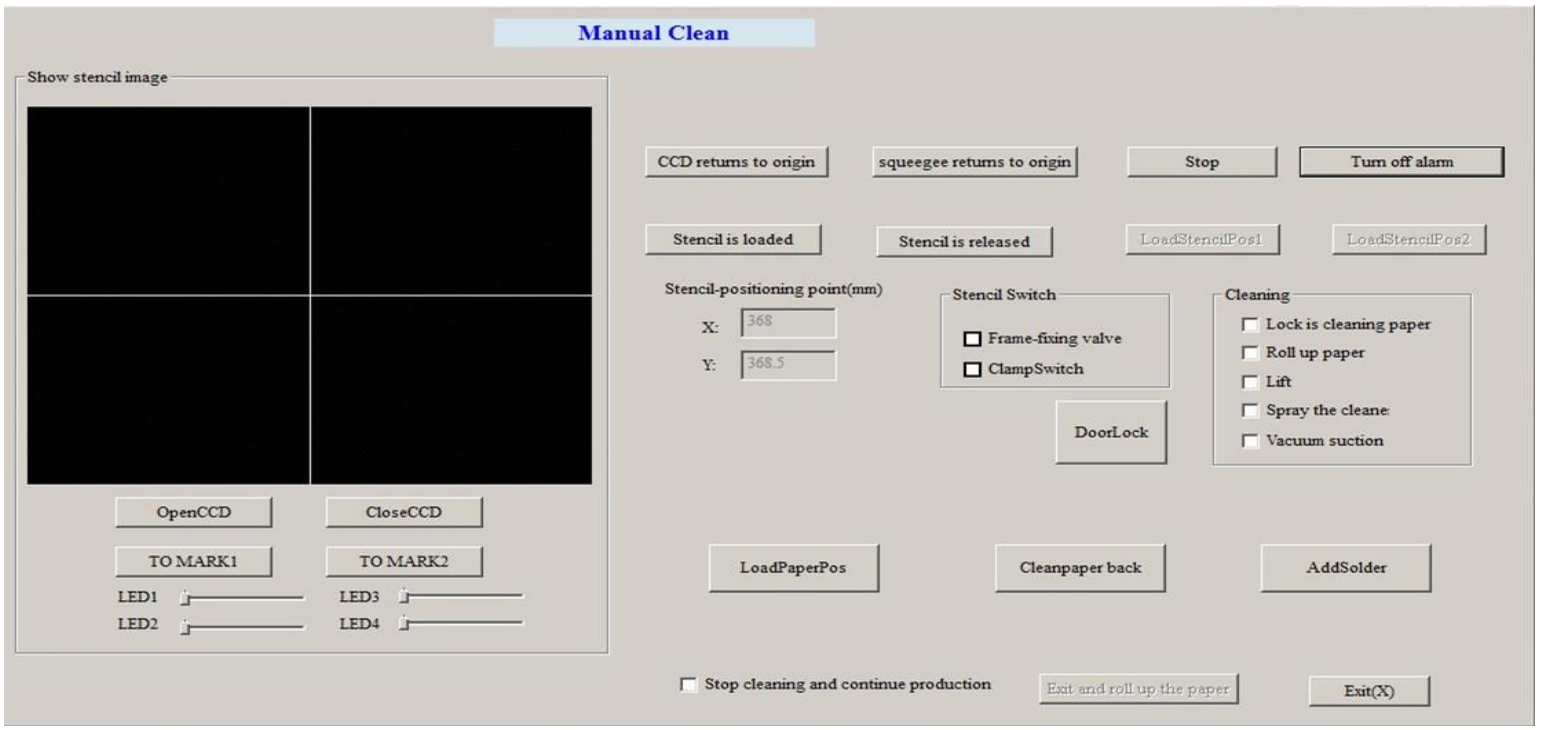
图 **4-11**（报警记录）

Pix 4-11(alarm record)

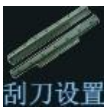
11： ：人工清洗按钮。单击该按钮后如图4-12；

: Manual cleaning. The interface in the pix 4-12 will be displayed by clicking this button.

图 4-12（人工清洗）



Pix 4-12 (manual cleaning)



12： ：刮刀设置按钮。单击该按钮后如图 4-13，在此界面可设置前后刮刀压 力零点位置；程序编辑完成后将 PCB 放置在运输导轨中间段，点击 “Z轴到印刷位置” ，选择 “刮刀轴点动” 后点击 “印刷轴后退” 或者 “印刷轴前进” ，使要测试的刮刀处于 PCB 位置，点击待测试刮刀的 “找压力零点” ，刮刀会自动下降到接触钢网后停止，再同样测试另一个刮刀，完成后升起刮刀并将 Z 轴回到零位，点击退出完成刮刀测试。

: Scraper setting. The interface in the pix 4-13 will be displayed by clicking this button. Operator can setup the zero point position of front and back scraper pressure. After the program has been edited, place the PCB on the middle section of the transmission rail. Click “Z axis lifts up to the printing position”button, select “the movement of scrape axis point” and click “printing axis moves back” button or “printing axis moves forward” button. Place the tested scraper in the PCB position. Click “search the pressure zero point” button of the tested scraper, the scraper will decline automatically to the stencil position and stop after touching with the stencil. And test another scraper with the same method. After finishing another scraper, lift up the scraper and let Z axis return to the zero position. Click “退出”（exit）button, then finish the scraper test.

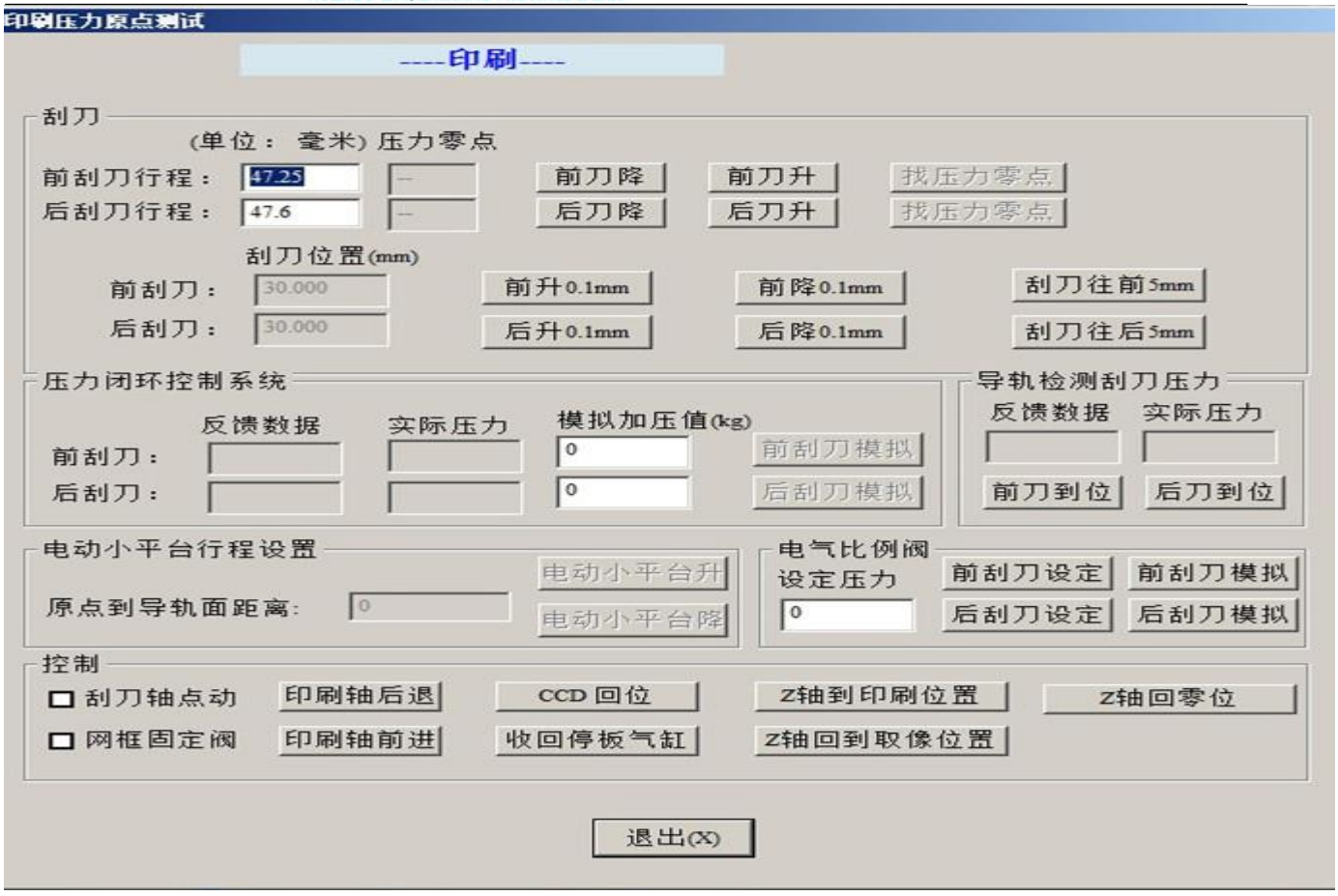
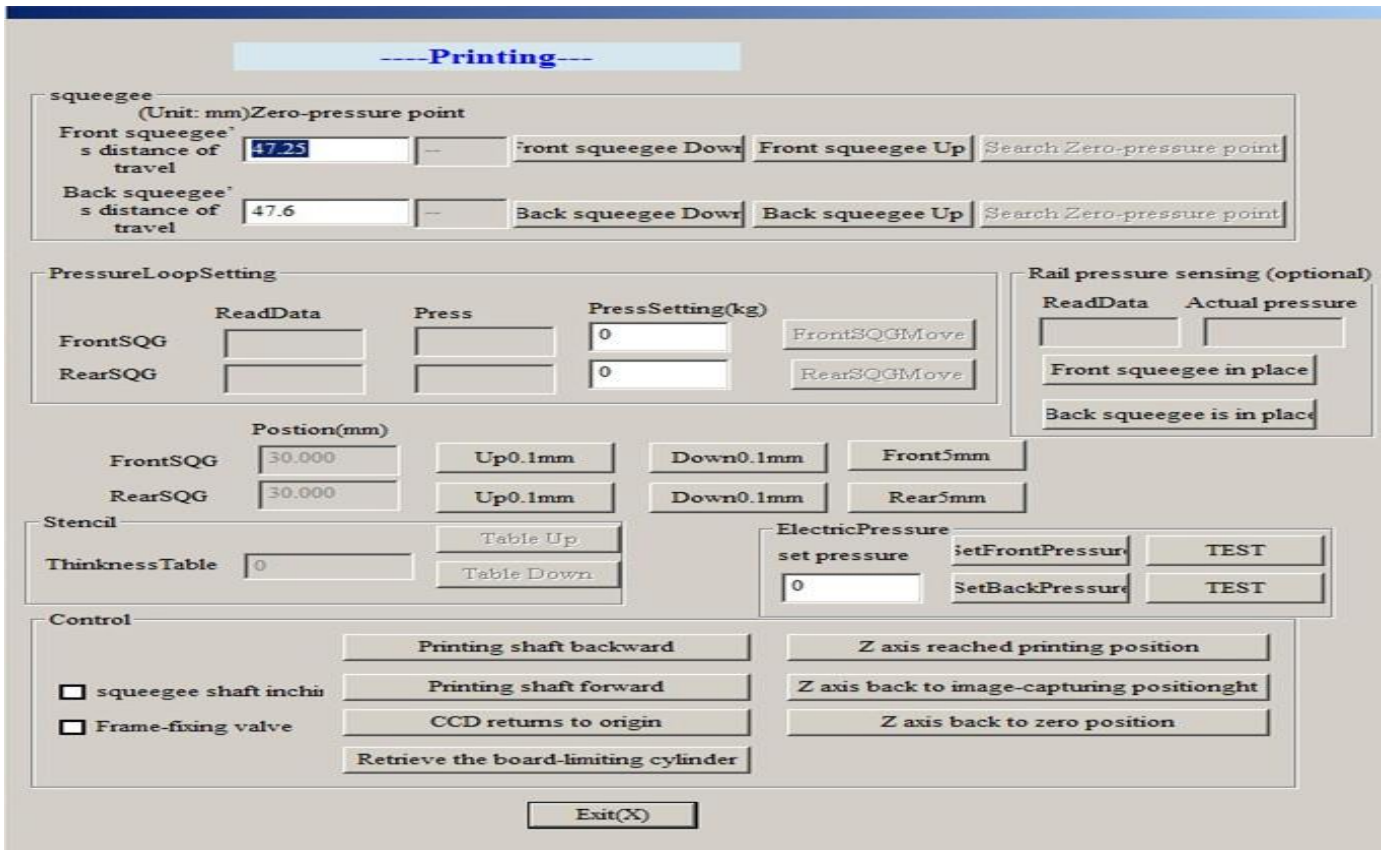


图 4-13（刮刀设置）



Pix 4-13(scraper setting）

13：  ：界面切换按钮。单击该按钮进行生产界面与主界面的切换；

：Interface shift. Do the shift of the production interface and main interface by clicking this button.

14：  ：退出按钮。单击该按钮退出系统；

: Exit. Exit the system by clicking this button.

15： 

：开始按钮。单击该点击该按钮后系统会执行“判断运输导轨上有 PCB 板”、以及“提示是否调整运输导轨的宽度”等操作，依次点击是或否后机器执行印刷操作。

: Start. After clicking this button, the system will judge whether there is PCB board on the transmission rail and will indicate whether it needs to adjust the width of the transmission rail etc. The equipment will do the printing operation by clicking “是 ”（yes）button or “否”（no）button .

16： 

：暂停按钮。此按钮只作为状态提示；

: Pause. This button is only used as the notes for the state.

17： 

：停止按钮。点击该按钮并确认后机器会停止生产动作；

: Stop. The printer will stop production by clicking this button.

4.23附属菜单解释及其操作 **Function explanation and operation of attached menu**

1：开始 菜单 帮助 ： 主界面点击菜单进入如图 4-14

Start Menu HELP :Click “menu” button in the main interface to enter the interface in the pix 4-14

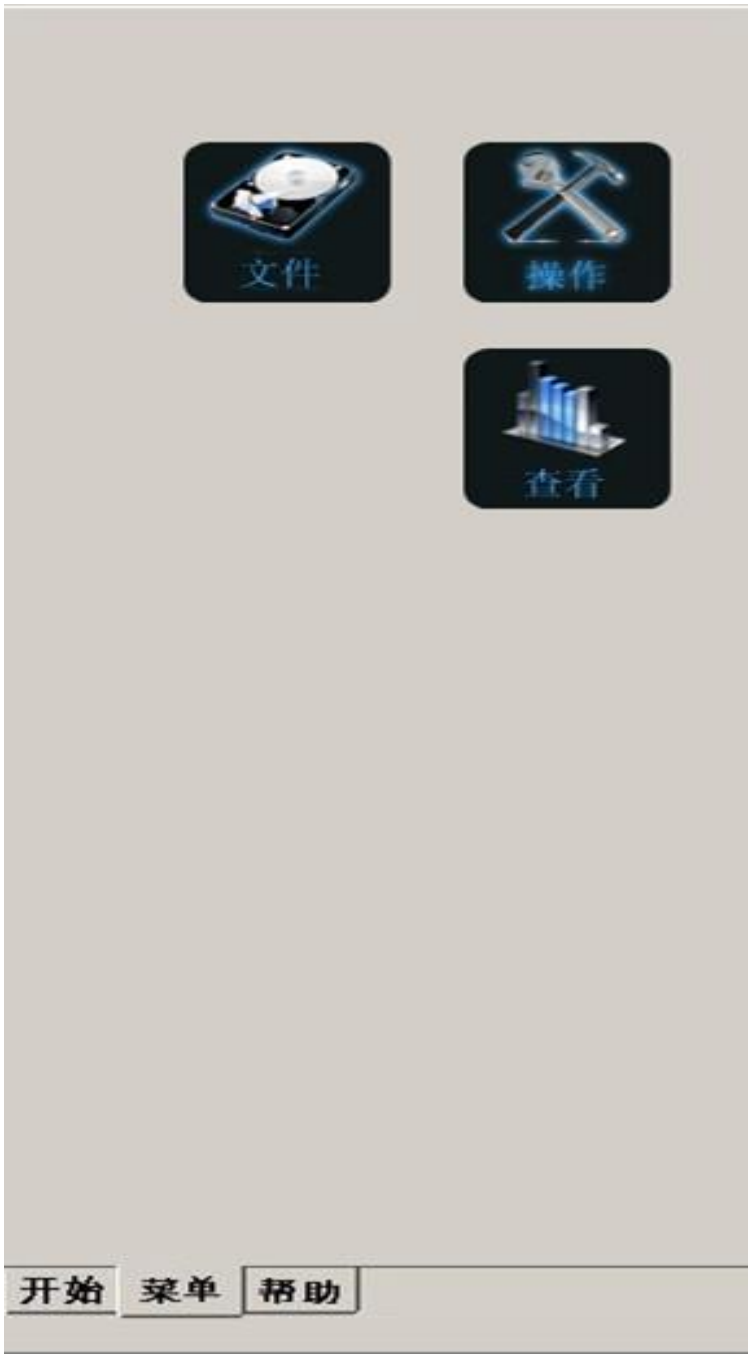
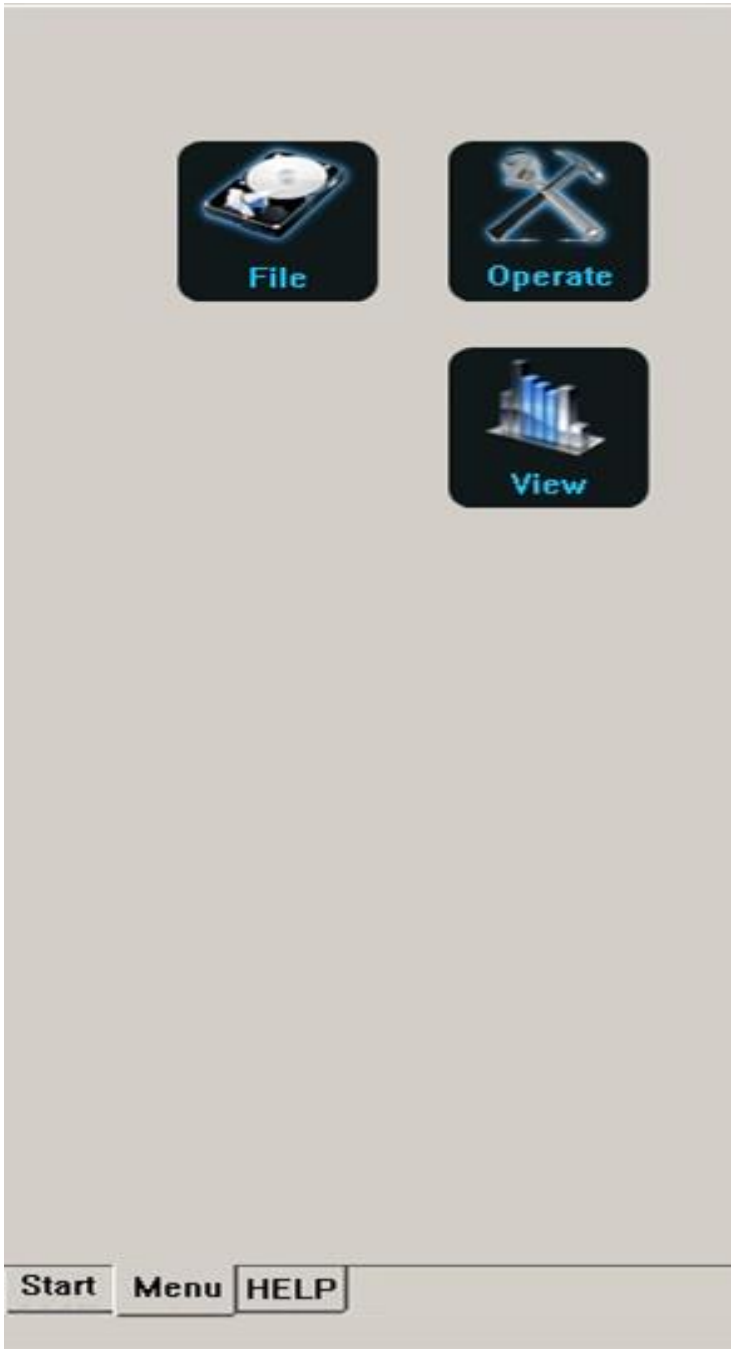


图4-14（附属菜单）

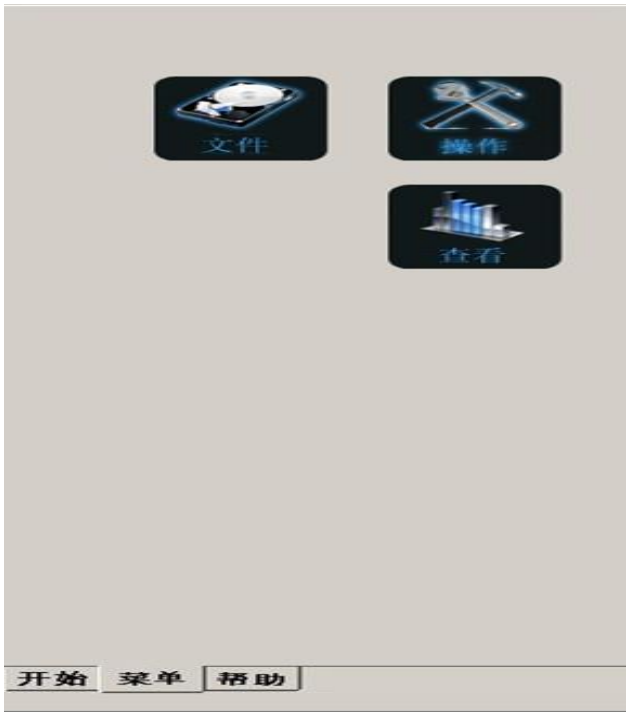


Pix 4-14(attached menu)

2： 

： 操作按钮。在图 4-14 中点击操作按钮打开操作菜单如图 4-15

: Operation. Open the operation menu by click this button in pix 4-14. See pix 4-15.



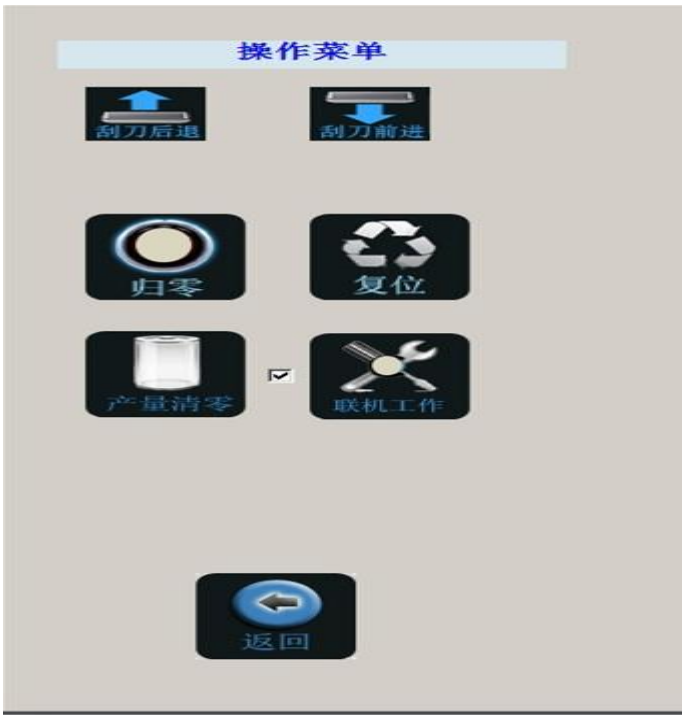
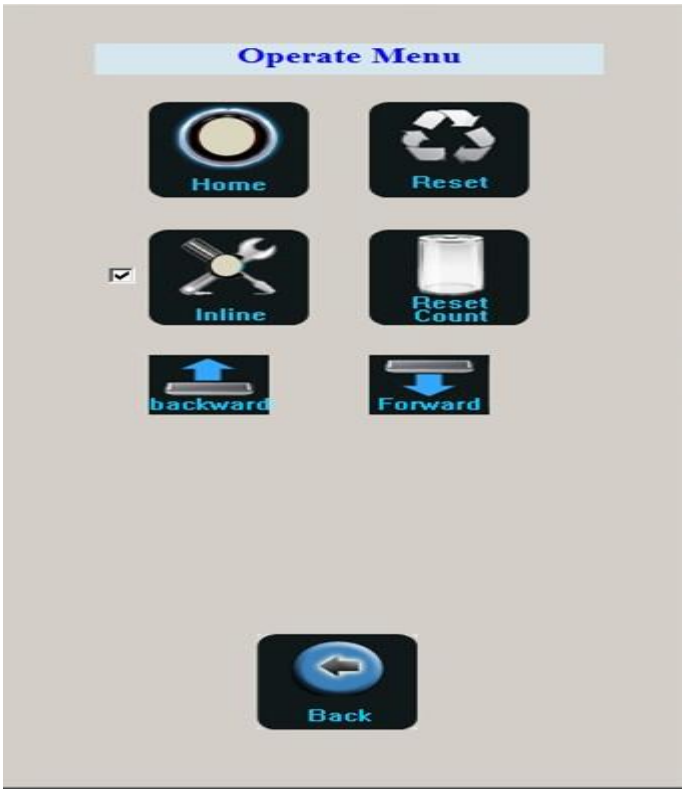


图 4-15（操作菜单）



Pix 4-15(operation menu)

3： 

联机工作按钮。单击该按钮一次切换’ ’ 状态，此状态表示自动在线生成开启；

:On-line operation.Click this button and shift  state one time. This state means the start of automatic online.

： 产量清零按钮。在图 4-15 中点击产量清零按钮按提示操作清除产量；

: Reset on the output. Clicking this button in pix 4-15 will reset the output.

5： 

： 返回按钮。单击该按钮关闭操作菜单回到图4-14；

Clicking this butt on will close the operation menu and Come the interface in the pix 4-14

6： 

： 帮助按钮。单击该按钮打开帮助菜单如图 4-16；
: Help. Enter into help menu by clicking this button. See pix 4-16.

图 4-16（帮助菜单）

Pix 4-16(help menu)

7： 

： 注册按钮。单击该按钮打开注册界面如图4-17，在此输入注册码后成为正式版本，可无限期使用

: Registration. Enter into registration interface by clicking this button. See pix 4-17. Inputting the registration code will become official version and can be operated indefinitely.

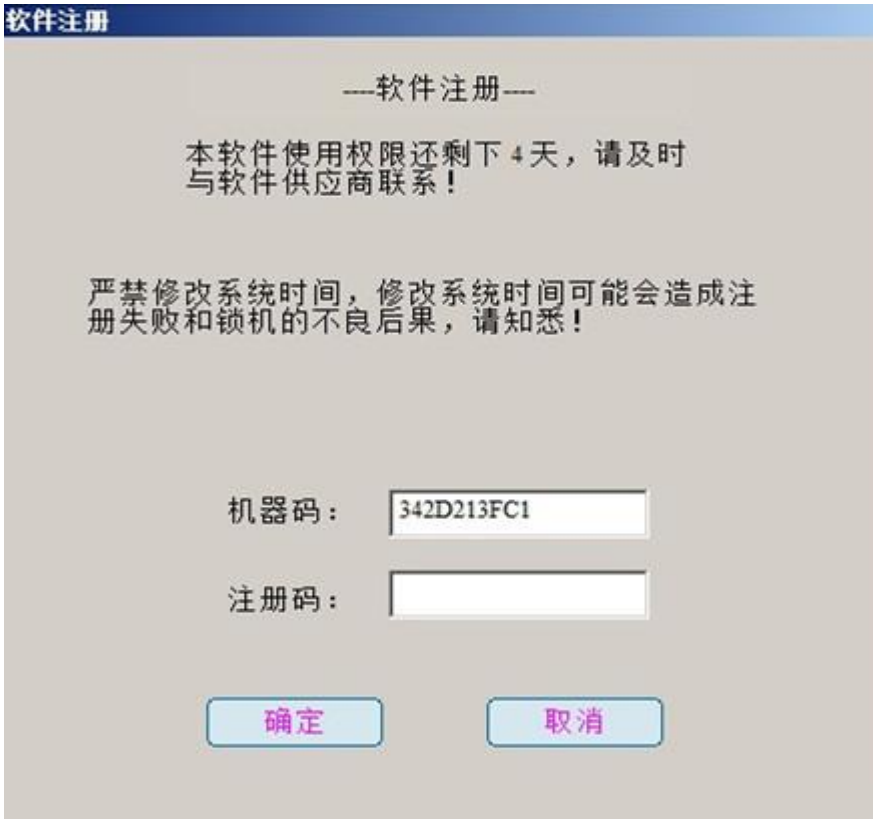
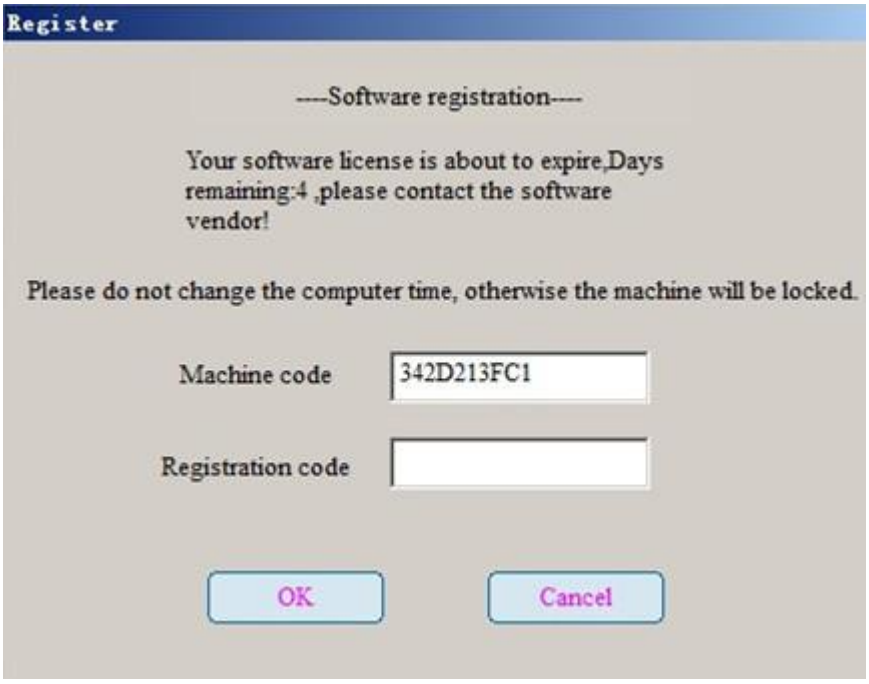


图 4-17（注册界面）



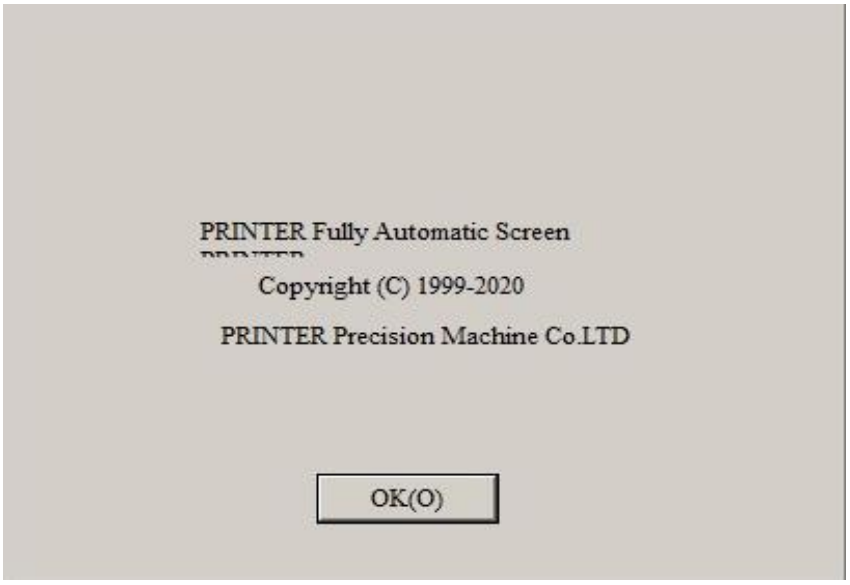
Pix 4-17(registration interface)

8： 

： 版本信息按钮。单击该按钮打开如图4-18，

: Version information. Enter into the interface in pix 4-18 by clicking this button.

图 4-18（版本信息）



Pix 4-18(version information)

9： 

： 中英切换按钮。单击该按钮将中文界面切换成英文；

： Chinese and English shift. The Chinese interface will be shifted to English interface by clicking this button

第五章　报警处置
Chapter 5 Alarm disposal

5.1 机器报警项目 The alarm items

1 气压不足报警
Insufficient air pressure

2 紧急按钮按下时报警
The emergent button has been pressed

3 清洗装置不在原点报警
The cleaning device is not at its position

4 伺服马达驱动器报警
Servo motor driver alarms

5 门开关警示
The alarm of the open/close of door

6 清洗纸已经用完警示
The cleaning papers have been used up.

7 清洗液用完警示
The cleaning liquid has been used up.

8 运输超时，请按复位键警示
Please press reset button when the transmission is overtime.

5.2 报警项目解释及处置方法 The explanation and disposal of the alarm item

1 气压不足报警，当压缩空气的压力达不到我们设置的最低值或者超出最高值时，软件会弹出报警对话框，同时三色灯显示红色，蜂鸣器呜呜作响。如图 5-1 所示：

When the air pressure is insufficient, the system will alarm. If the compressed air pressure can not reach the Min value or above Max value which are set-up before, the software will display the alarm dialogue box and the tricolor light will show the red color and the buzzer will make whining noise. See pix 5-1.

图 5-1（气压不足报警）

Pix 5-1 (alarm when there is not insufficient air pressure)

通常有三种可能会造成该状况，请按照下面的介绍使用排除法依次解除故障，直到机器正常工作。

Usually there are three possibilities which will lead this situation. Please deal with the faults in turn with exclusive method according to the following introductions until the equipment can work normally.

A 气动三联件上的‘‘三通残压阀门’’处在关闭状态

The three way residual pressure valve on the pneumatic FRL is at the closed.

请检查该阀门是否处在关闭状态，如是关闭的，请开启。如是开启的，请参照 B 介绍寻找原因；

Please check whether this valve is closed. If it is closed, please open it. If it is open, please find the reason according to the B introduction.

B 外部供气线路泄漏，或者外部供气源（空压机）停止工作

The external air supply line leaks or the external air supply power (air compressor) stop working.

请确认机器左下角的气压表压力是否正常，正常值在 0.4～0.6MPa 之间，如正常，请参照 C 介绍寻找原因。如不正常，请检查外部气源（空压机）是否正常工作，供气线路是否有泄漏，排除所有的故障，直到气压表指针指在 0.4～0.6MPa 之间。

Please confirm whether the pressure in the barometer which is assembled in the lower left of the equipment work normally. The normal value is 0.4～0.6MPa. If the value is normal, please find the reason according to the C introduction. If the value is abnormal, please check whether the external air supply power (air compressor) works normally and whether the air supply line leaks. Exclude all the faults until the value is 0.4～0.6MPa.

C 若‘‘三通残压阀’’是开启的，气压表压力又在 0.4～0.6MPa 之间，机器还在报警，请检查气压表信号线接触是否良好。直到完全排除报警，机器正常工作方可。若以上 3 种方法均不能解决故障，请电话联系原厂售后辅助解决。

If three way residual pressure valve is open and the pressure value in the barometer is 0.4 ～ 0.6MPa and the equipment alarms, please check whether the signal connection line of the barometer is good. The equipment can work normally until all the faults are resolved. If the three methods above can not exclude the fault, please contact with the after-sale staff from firm.

2 紧急按钮按下时报警如图 5-2 所示：

请旋转紧急按钮，使之弹起，解除报警。注意，本机设置了两个紧急按钮，一个在机器右前面板上，一个在机器后右上角。

The system alarms after pressing the emergent button. See pix 5-2.

Please rotate the emergent button until it bounces, then the alarm is released. Please note that this equipment has assembled two emergent buttons. One is on the front panel of the equipment and one on the upper right corner of the equipment.

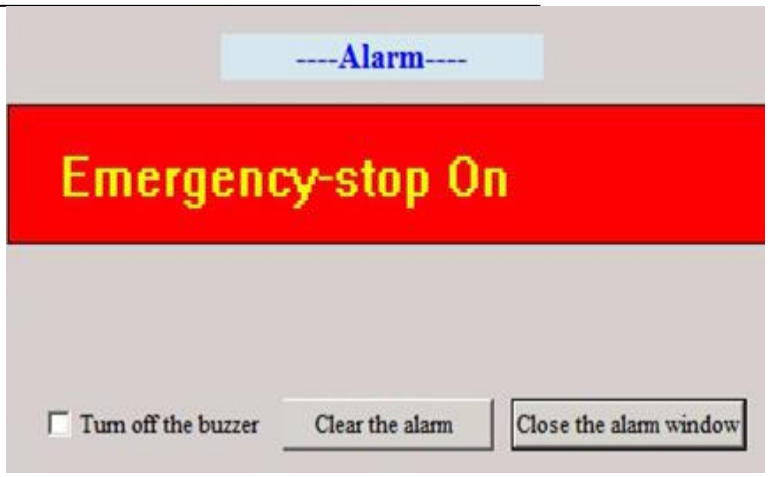


图 5-2（紧急按钮按下时报警） Pix 5-2(the system alarms after pressing the emergent button)

3 清洗装置不在原点报警，如图 5-3 所示 The system will alarm when the cleaning device is not at its position. See pix 5-3.

该状况是清洗架不在原点导致的，请打开机器后门，用手将清洗架往后拉，使之回到原点。然后关上后门，并按下机器前面板上的 “RESET” 按键，使机器复位，解除报警。

This situation will happen when the cleaning rack is not at its position. Please open the back door of the equipment, pull the cleaning rack backward and make it back to its position. Close the back door and press the “reset” button on the front panel of the equipment, then the equipment will reset and the alarm will be released.

图 5-3（清洗装置不在原点报）

Pix 5-3(alarm when the cleaning device is not at its position)

4 伺服马达报警，如图 5-4 所示。Servo motor alarms. See pix 5-4.

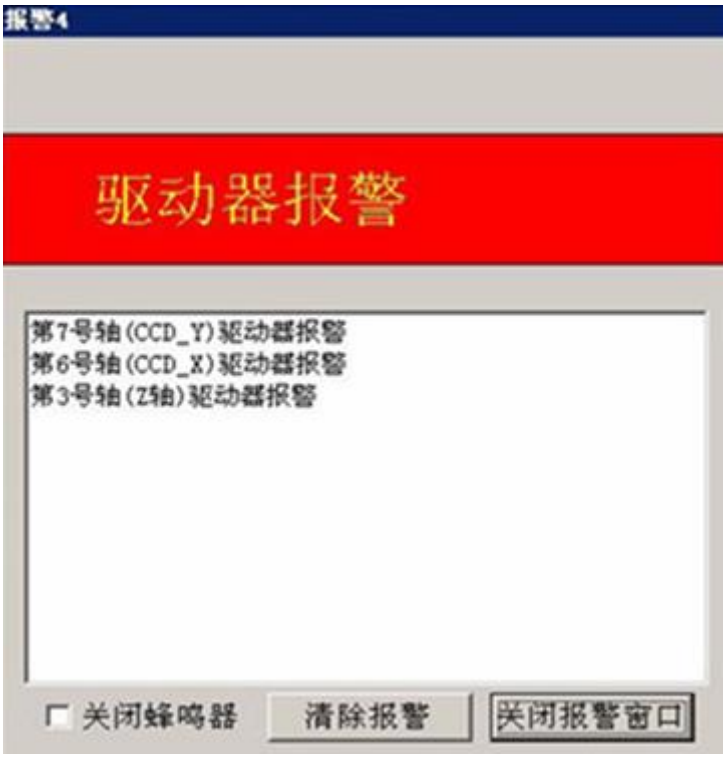


图 5-4（驱动器报警）

Pix 5-4(driver alarms)

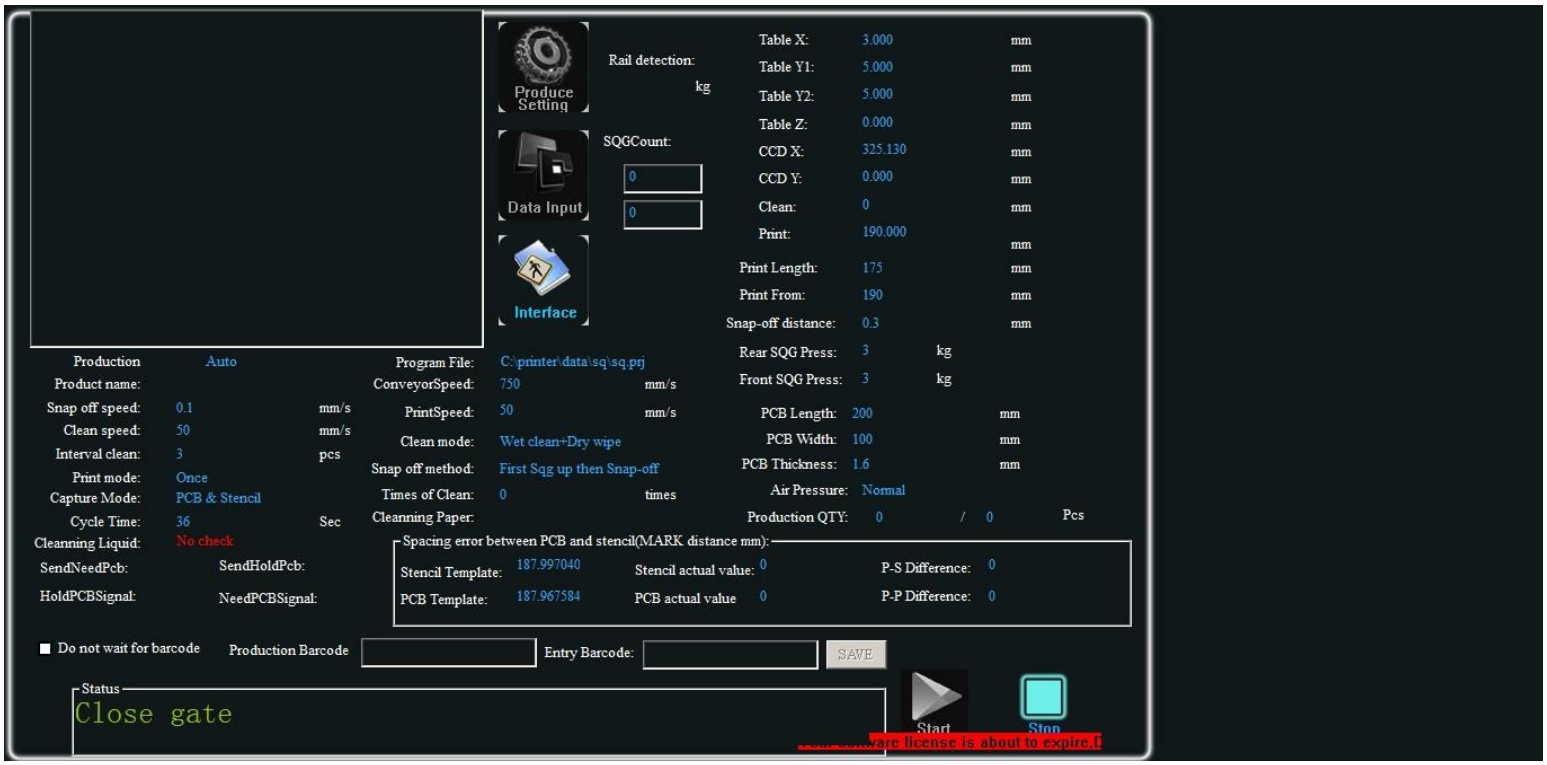
出现该报警，通常是伺服马达过载引起。首先按下 “紧急按钮” 断电状态下检查机器机械部分，是否有干涉或运行不到位现象。如有类似现象，请找到原因后立刻排除；如机械部分没有任何问题，请检查线路，是否有松动、接触不良等现象。最好重新拔插下与伺服电机及其驱动器连接的插头。排除完所有的问题后将紧急按钮回弹，使机器上电，并复位、归零、重新运行程序。

Usually it is caused by overload of the servo motor when this alarm occurs. Firstly press the emergent button and check whether the mechanical section of the equipment at the power down state has interfere or wrong running phenomenon. If there are such phenomenons, please find the reason and exclude the fault. If the mechanical section is good, please check whether the line is loose or disconnected. It is better to replug the plug which connects the servo motor and servo driver. Rebounce the emergent button after excluding all the faults. Turn on the power of the equipment, reset, and return to zero and rerun the program.

5 门开关警示，如图 5-5 所示 。这是在生产设置（图 3-18）里面勾选了使用门开关后才会出现的状况。当勾选了该功能时，前后门，任一个处在打开状态，机器都会停止工作，并提示 “请把门关闭” 。这时我们把门闭，并依次按下机器右前面板上的 “RESET” 按钮和 “START/STOP” 按钮，机器正常工作。如不勾选该功能，则机器运行过程中开启前后门系统会以 1/3 速度工作，很危险。所以建议生产的时候将该选项勾上。

The alarm of the open/close of door. See pix 5-5. This suitation will occur after selecting the door switch function in the interface of production setting (pix 3-18). If select this function, one of the front/back door is open, the equipment will stop working and reminder “请把门关闭”(please close the door). Then operator needs close the door and press in turn the “RESET” button and “START/STOP” button which is on the front right panel of the equipment and the equipment can work normally. If do not select this function, open the front or back door during the operation, the system will work at 1/3 speed. It is very dangerous. So recommends selecting this function during the operation.

图 5-5（请把门关闭）



Pix 5-5(please close the door)

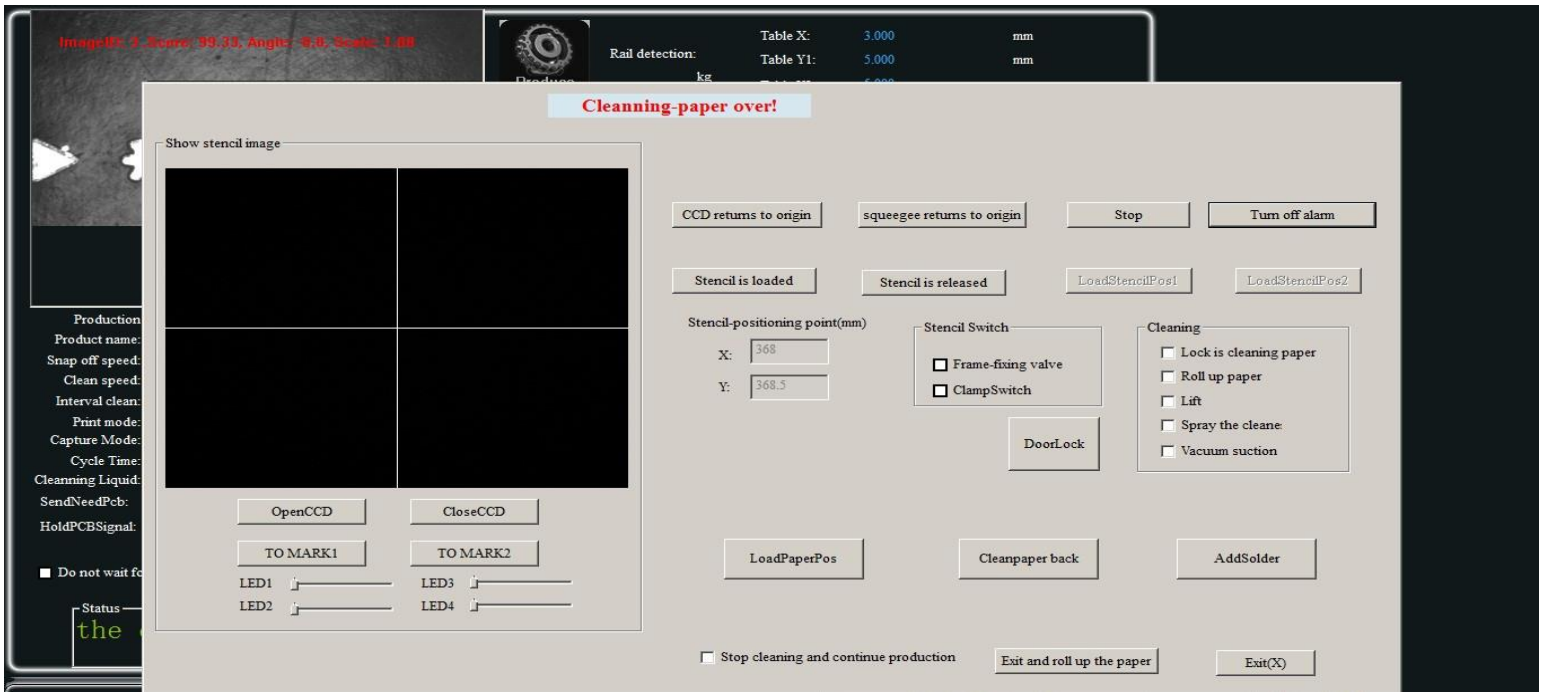
6 清洗纸已经用完警示如图 5-6 所示 The cleaning papers have been used up. See pix 5-6.

该对话框出现时，三色灯会变成红色，蜂鸣器会鸣鸣作响，同时机器停止运转。提示清洗

纸用完了。请打开机器后门更换新的清洗纸，更换完成后关闭后门，并依次按下机器右前面板上的 “RESET” 按钮和 “START/STOP” 按钮，机器正常工作。

The tri-color light will become red and the buzzer will make whining noise and equipment will stop working at the same time when this dialogue box displays. It means that the cleaning papers have been used up. Please open the back door of the equipment to replace the new cleaning papers. Close the back door after the replacement of the cleaning papers and press in turn the “RESET” button and “START/STOP” button which is on the front right panel of the equipment. Then equipment can work normally.

图 5-6（清洗纸用完）



Pix 5-6(the cleaning papers have been used up)

7.清洗液用完警示，如图 5-7 所示 The cleaning liquid has been used up. See pix 5-7.

对话框出现时，三色灯会变成红色，蜂鸣器会呜呜作响，同时机器停止运转。提示清洗液用完了。请打开机器前下门取出清洗液存放壶，并将之灌满并放回原位固定，然后关闭前下门，并依次按下机器右前面板上的 “RESET” 按钮和 “START/STOP” 按钮，机器正常工作。

The tri-color light will become red and the buzzer will make whining noise and equipment will stop working at the same time when this dialogue box displays. It means that the cleaning liquid has been used up. Please open the front bottom door of the equipment to take out the liquid container and full it with cleaning liquid and place it at this original position. Close the front bottom door and press in turn the “RESET” button and “START/STOP” button which is on the front right panel of the equipment. Then equipment can work normally.

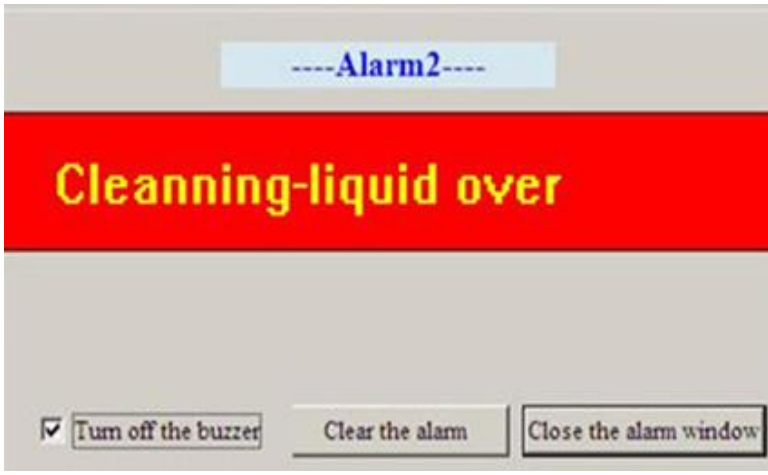
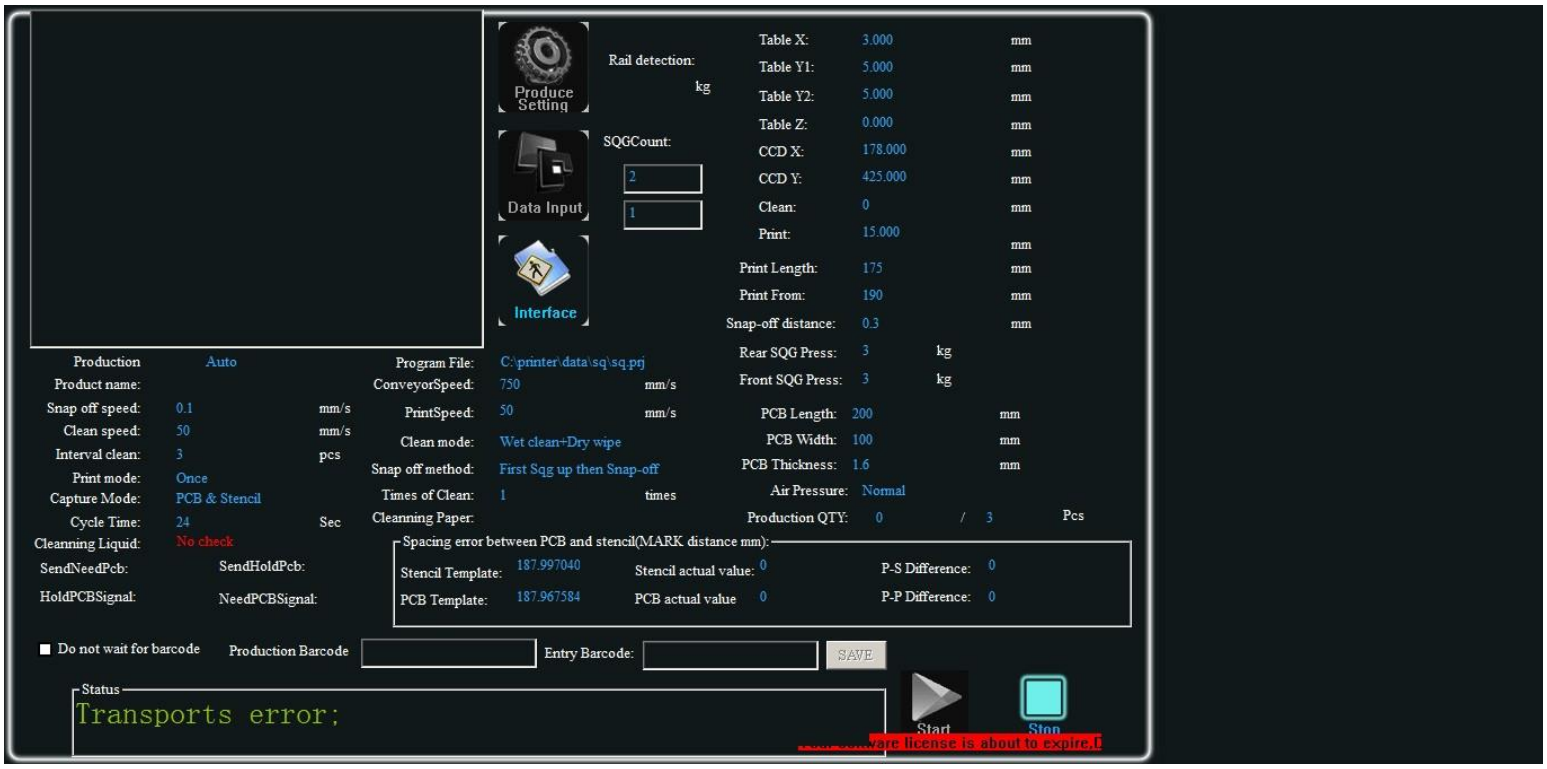


图 5-7（清洗液用完） Pix 5-7(the cleaning liquid has been used up)

运输超时， 请按复位键警示。如图 5-8 所示 Please press “reset” button when the transmission is overtime.

图 5-8（运输超时）



Pix 5-8(transmission is overtime)

出现该状况主要有两种情况：There are two reasons when this situation happens.

1 运输马达启动时，运输导轨上没有 PCB；

There is no PCB on the transmission rail when the transmission motor start-up.

2 CCD 横梁上安装的到板电眼失效。

The board arrive magic eye which is assemble on the CCD beam fails.

解决办法：首先检查运输导轨上有没有 PCB。如果没有，请在运输导轨进板端放入正在生产或测试的 PCB，按软件提示依次按 “RESET” 键， “START/STOP” 键，机器正常工作；如果有 PCB，还出现该提示，那就是 CCD 横梁上安装的到板检测电眼失效，请检查电眼线路接触是否良好，电眼的检测高度是否合适（电眼的有效检测距离会因 PCB 的颜色不同而有所变化）排除这些原因后还不能解除该报警，请联系原厂售后。

Solution: Firstly check whether there is PCB on the transmission rail. If not, please place the produced or tested PCB on the board passing point of the transmission rail. Press in turn the “RESET” button and “START/STOP” button according to the indication from the software and equipment can work normally. If there is PCB but still occurs the indication, then the board arrive magic eye which is assemble on the CCD beam fails. Please check whether the line connection of the magic eye is good and the inspection height of magic eye is appropriate (The effective inspection distance will change as the different color of PCB). If the alarm can not be released after all these reasons are excluded, please contact with the after-sale staff from firm

第六章 2D 锡膏检测操作说明

Chapter 6 Operating introduction of 2D solder paste inspection

2D 锡膏印刷质量检查与分析功能，对偏移，少锡，漏印，连锡等印刷不良问题能快速检测，检查印刷效果，并确保印刷质量

2D solder paste printing quality check and analysis function can inspect fast on printing fails, such as the offset, insufficient solder paste, missing printing and solder paste bridging etc. It can check the printing performance and insure the printing quality.

6.1.1 .进入 2D 检测界面，建立检测点。Enter into the inspection interface of 2D.

1.打开做好的程序，然后重新抓捕标志点

Open the program and recapture remark.

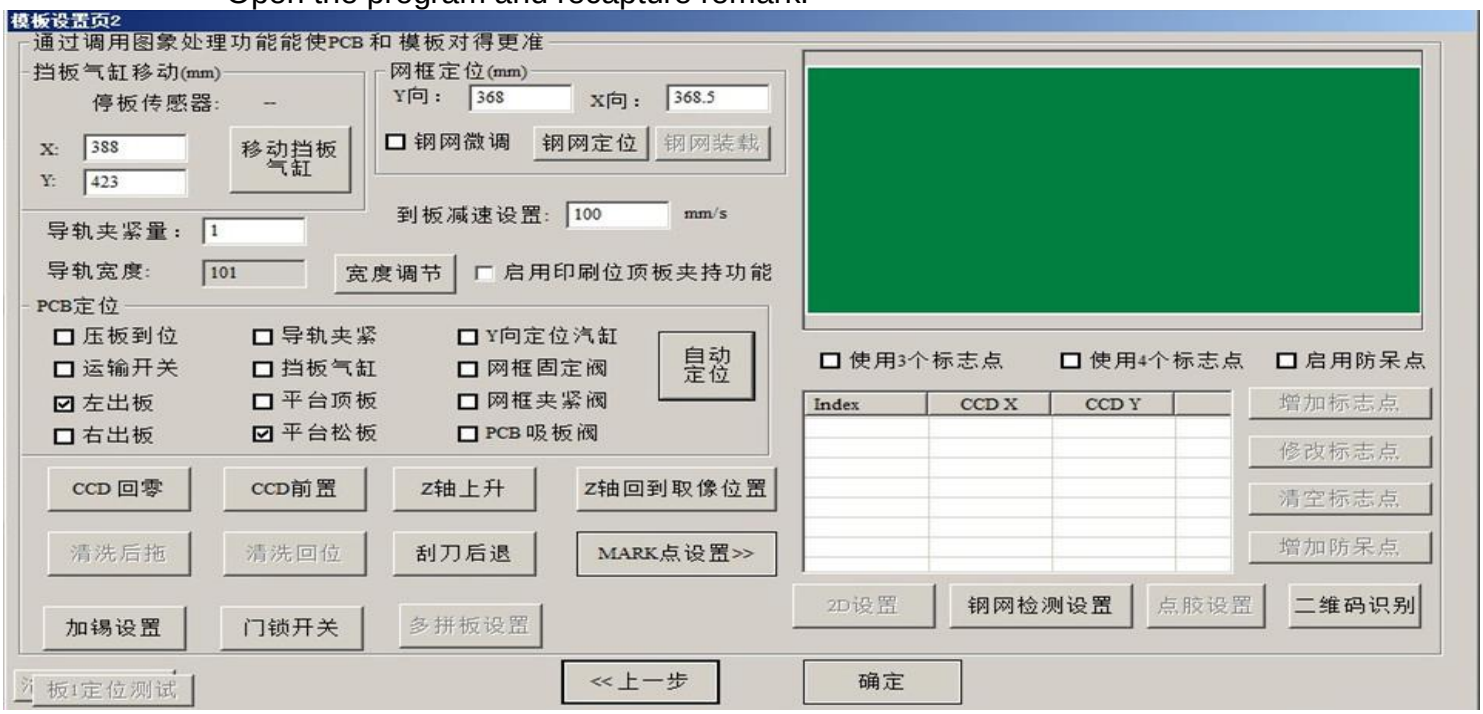
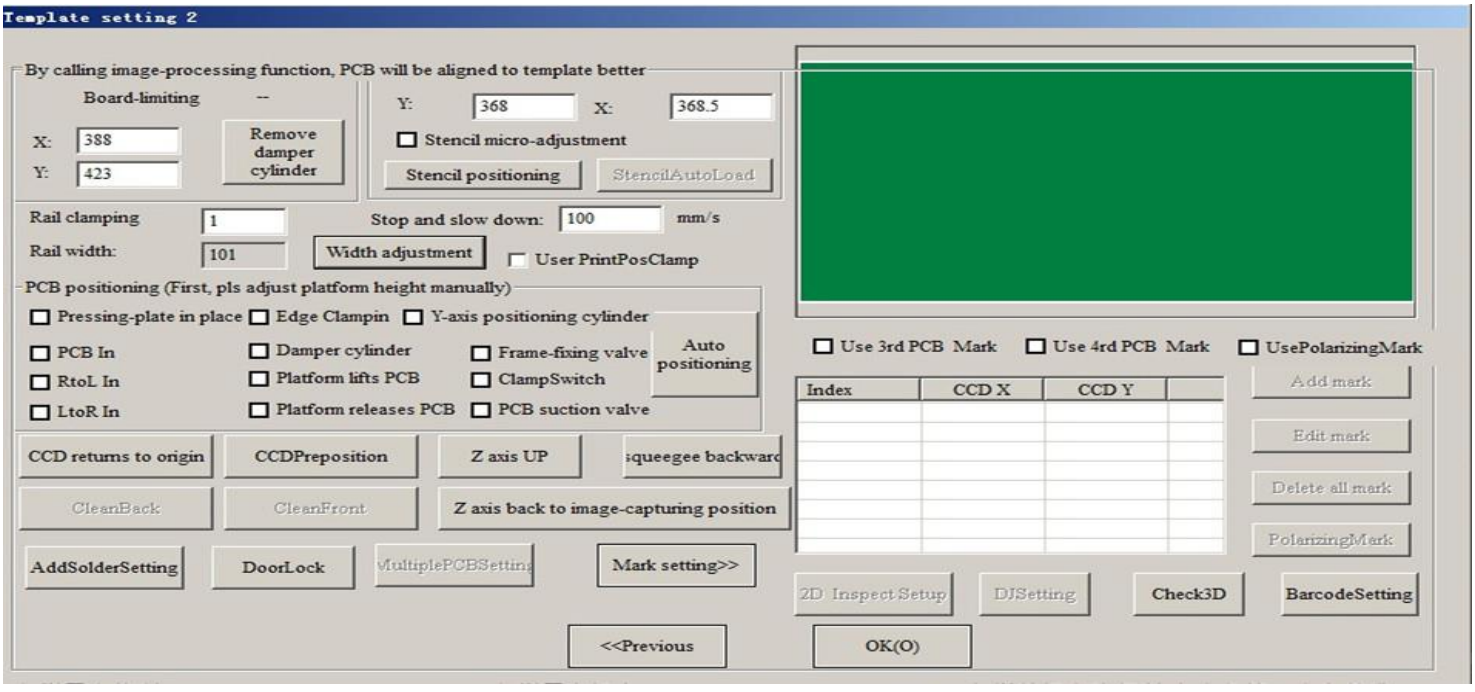


图 6-1（模板设置页 2）



Pix 6-1(Template setting page 2)

2 点击 2D 检查模板设置，进入 2D 检测界面。

Click “2D 检查模板设置”(2D inspection template setting) button and enter into 2D inspection interface.

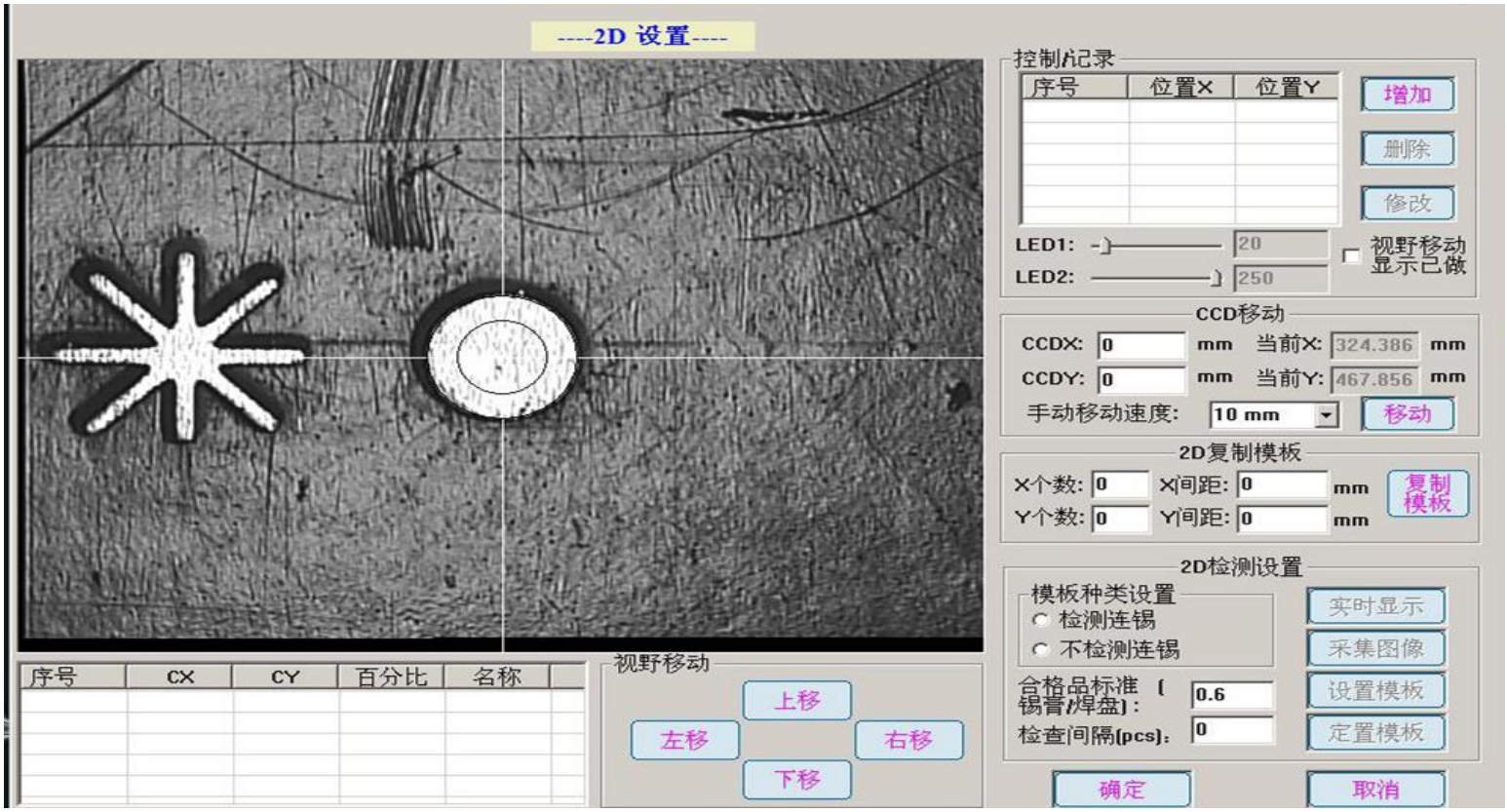
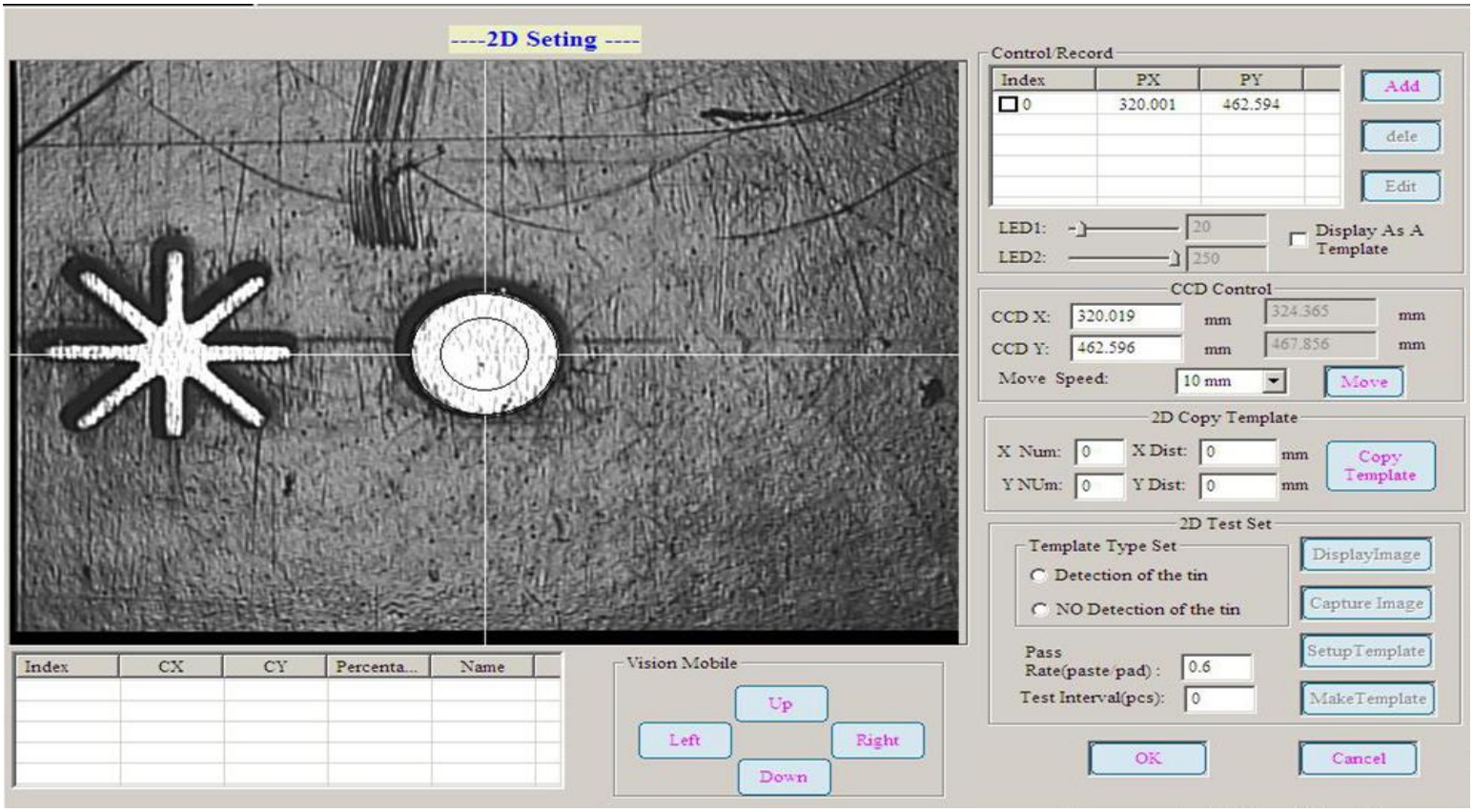


图 6-2（2D 检测界面）



Pix 6-2(2D inspection interface)

3 点击增加记录，建立检测点。点击实时显示，并调整 LED1 与 LED2 光源，使图像达到图中效果。

Click “增加记录”(add record) button and build inspection spot. Click “实时显示”(real-time display) button. Adjust the light source of LED1 and LED2 and make the image achieved the performance in the below pix.

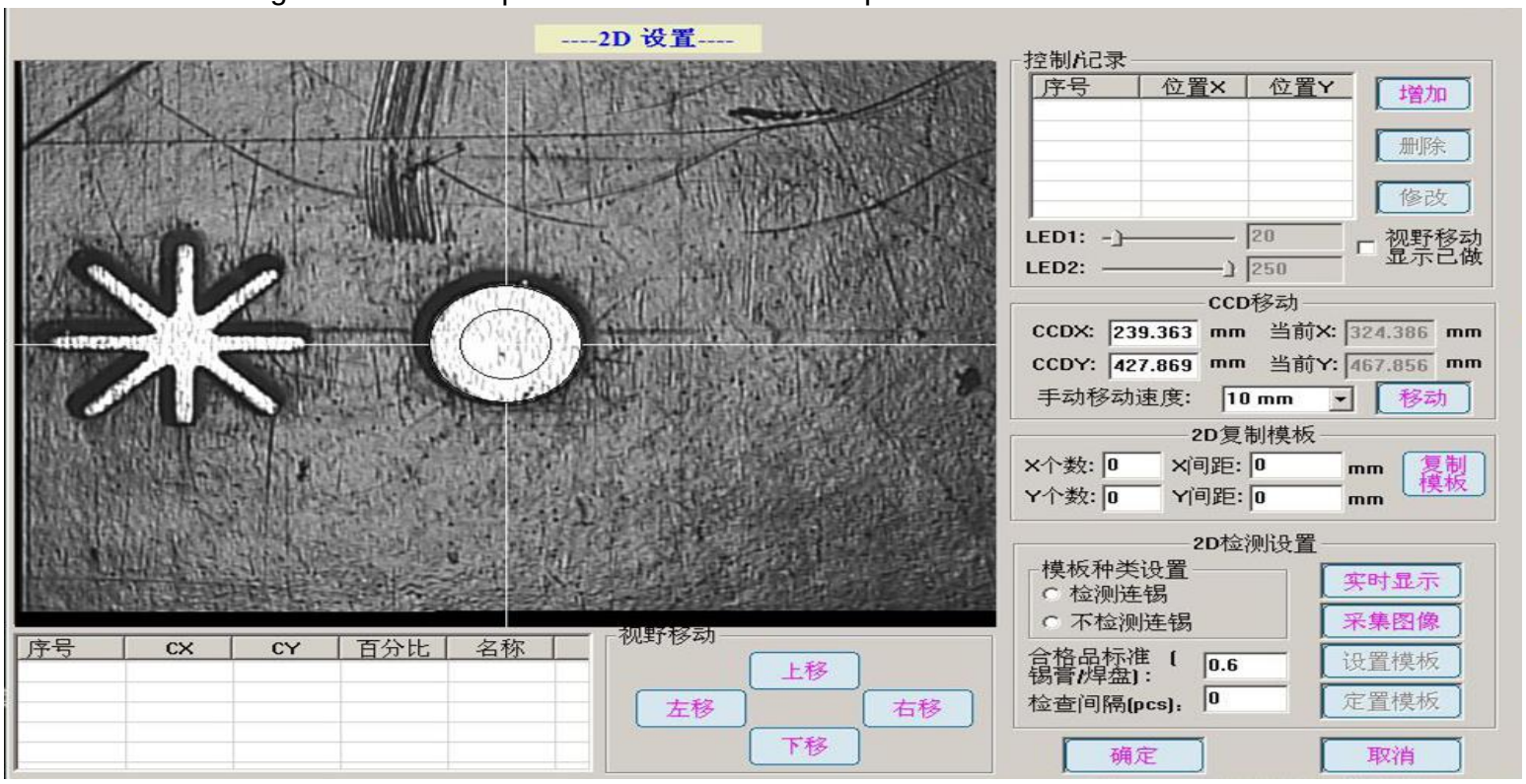
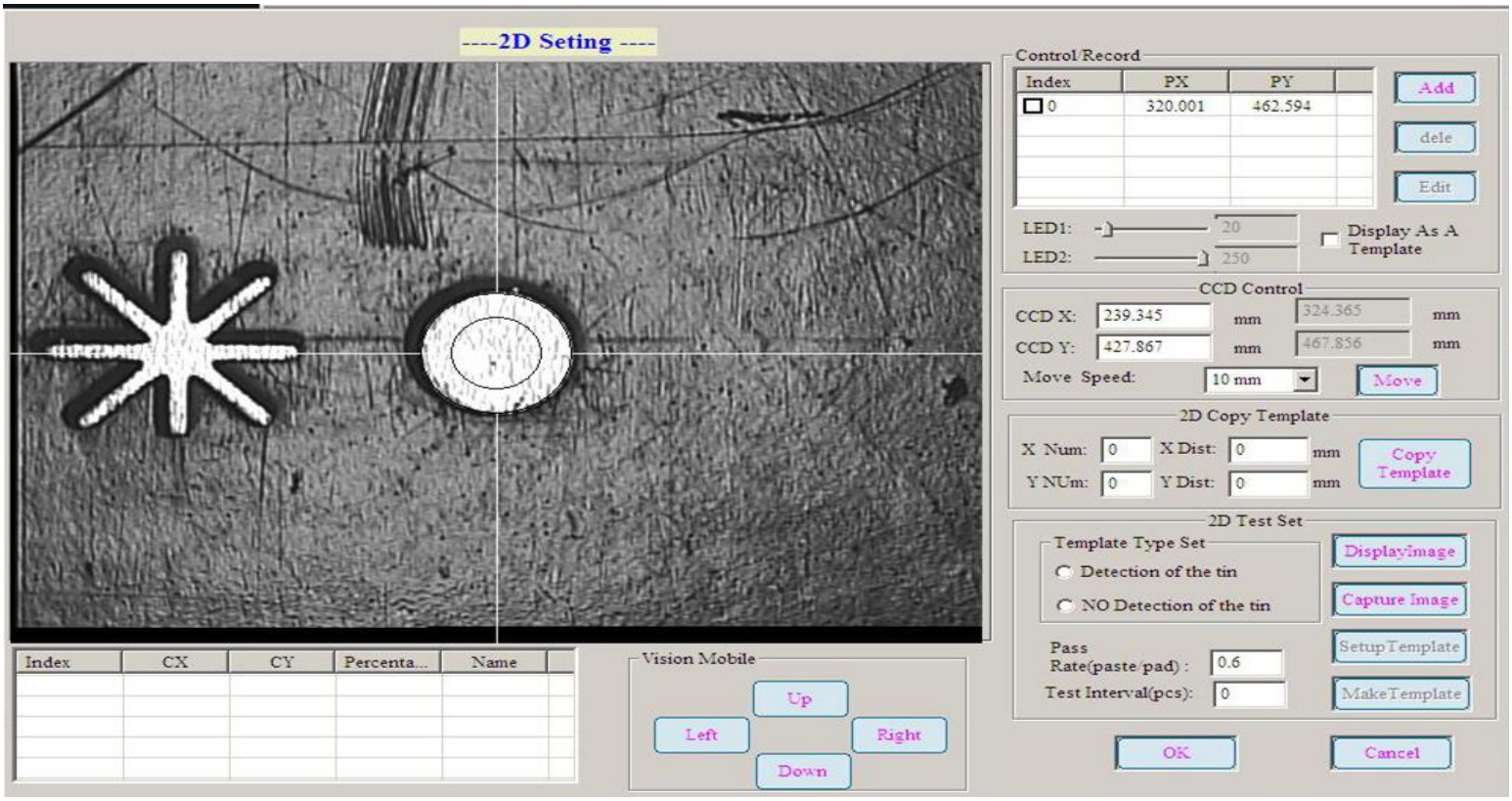


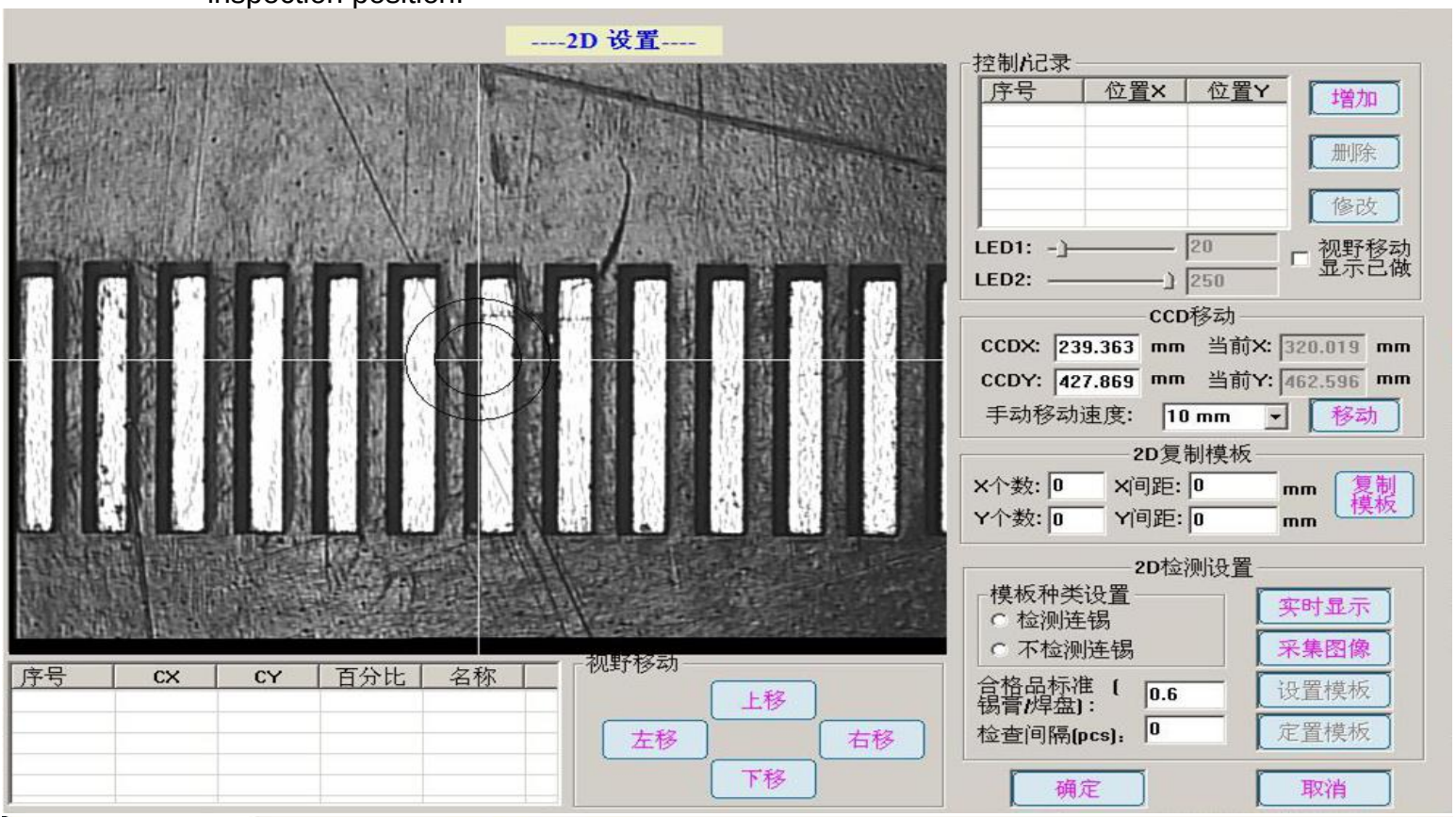
图 6-3（实时显示界面）



Pix 6-3(real-time display interface)

4 点击移动，然后使用键盘上的方向键，移动到要检测的位置

Click “移动”(move) button and press the direction key on the keyboard. Move to the inspection position.



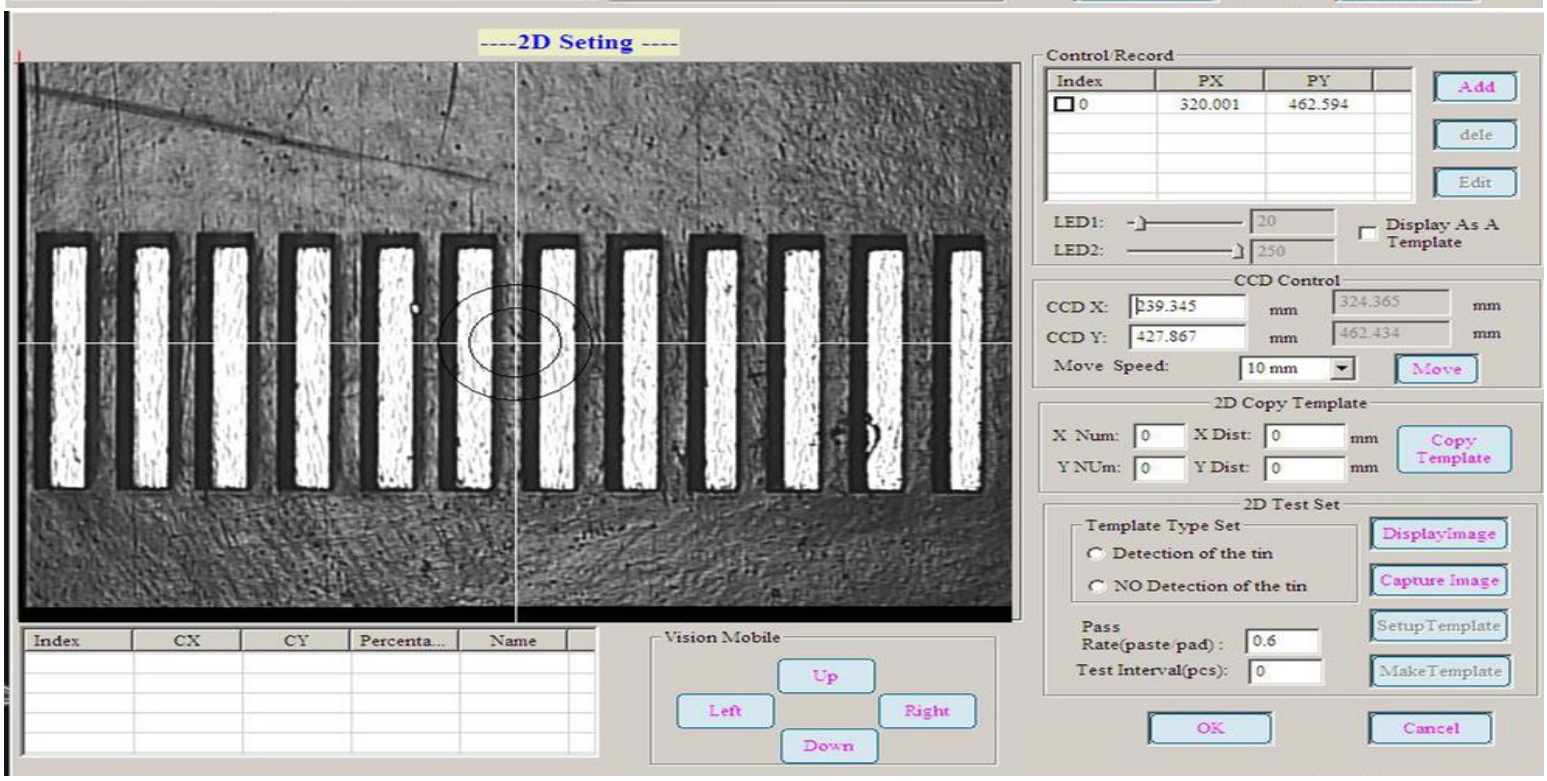


图 6-4（查找检测点）Pix 6-4(search the inspection spot)

5 点击采集图像，然后点击设置模板，手动设置 6-5 图上绿色方框

Click “采集图像”(image capture) button and click “设置模板”(template setting) button. Setup the green square box manually in the pix 6-5.

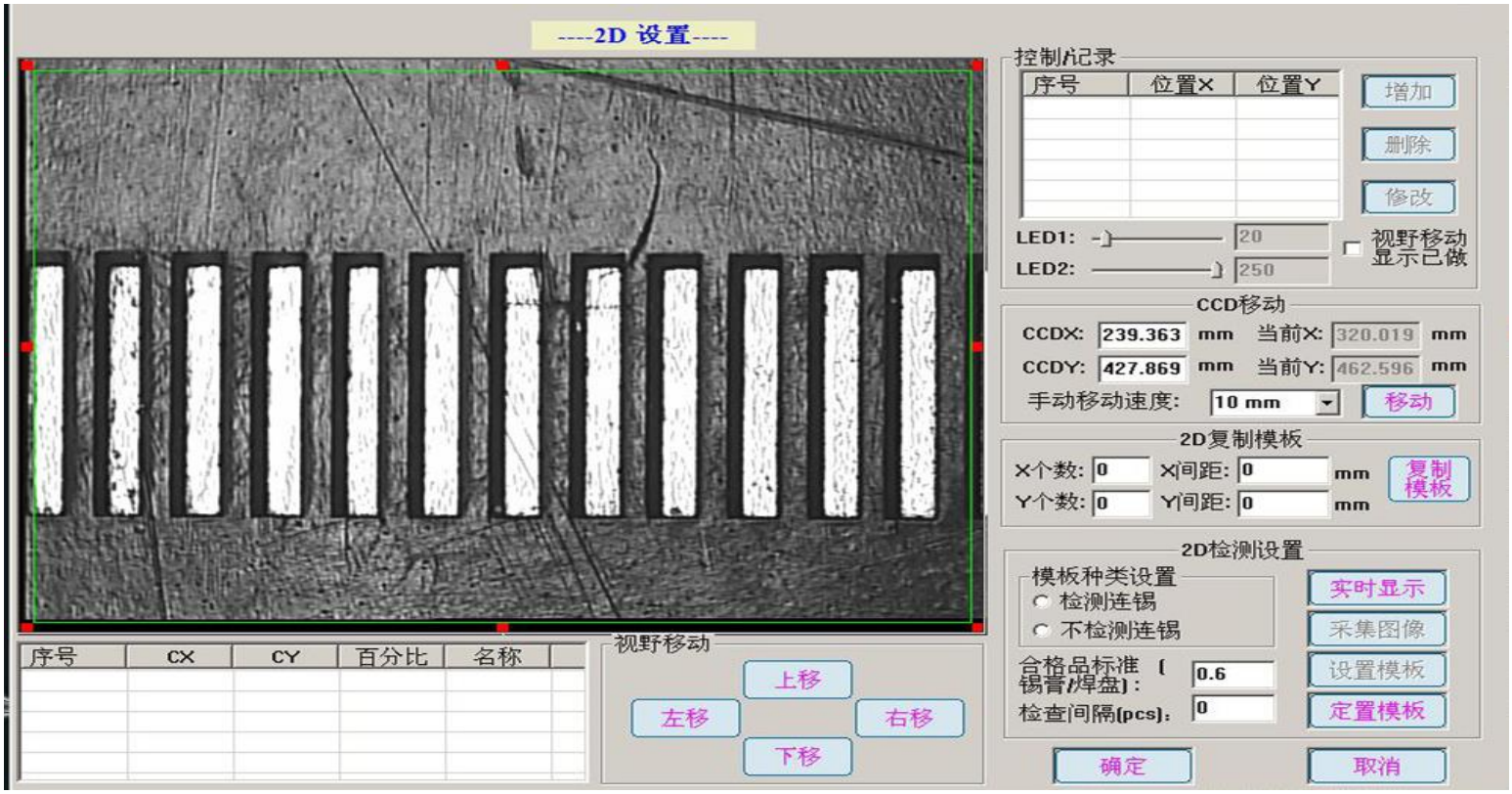


图 6-5（设置模板）

Pix 6-5(template setting)

6　如图 6-6，设置好检测点后，点击定置模板。

Click “定置模板”(template customization) button after setting the inspection spot. See pix 6-6.

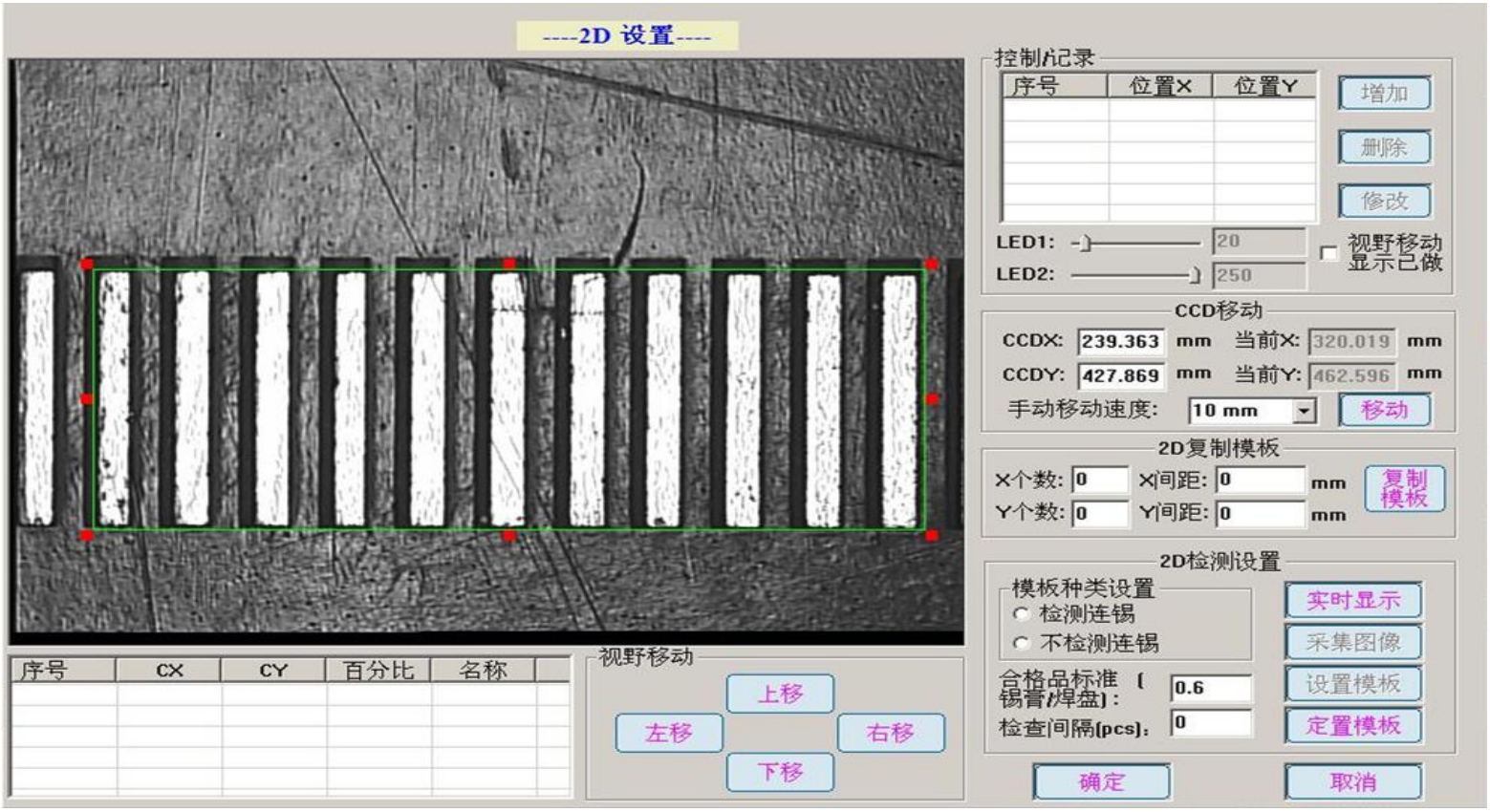
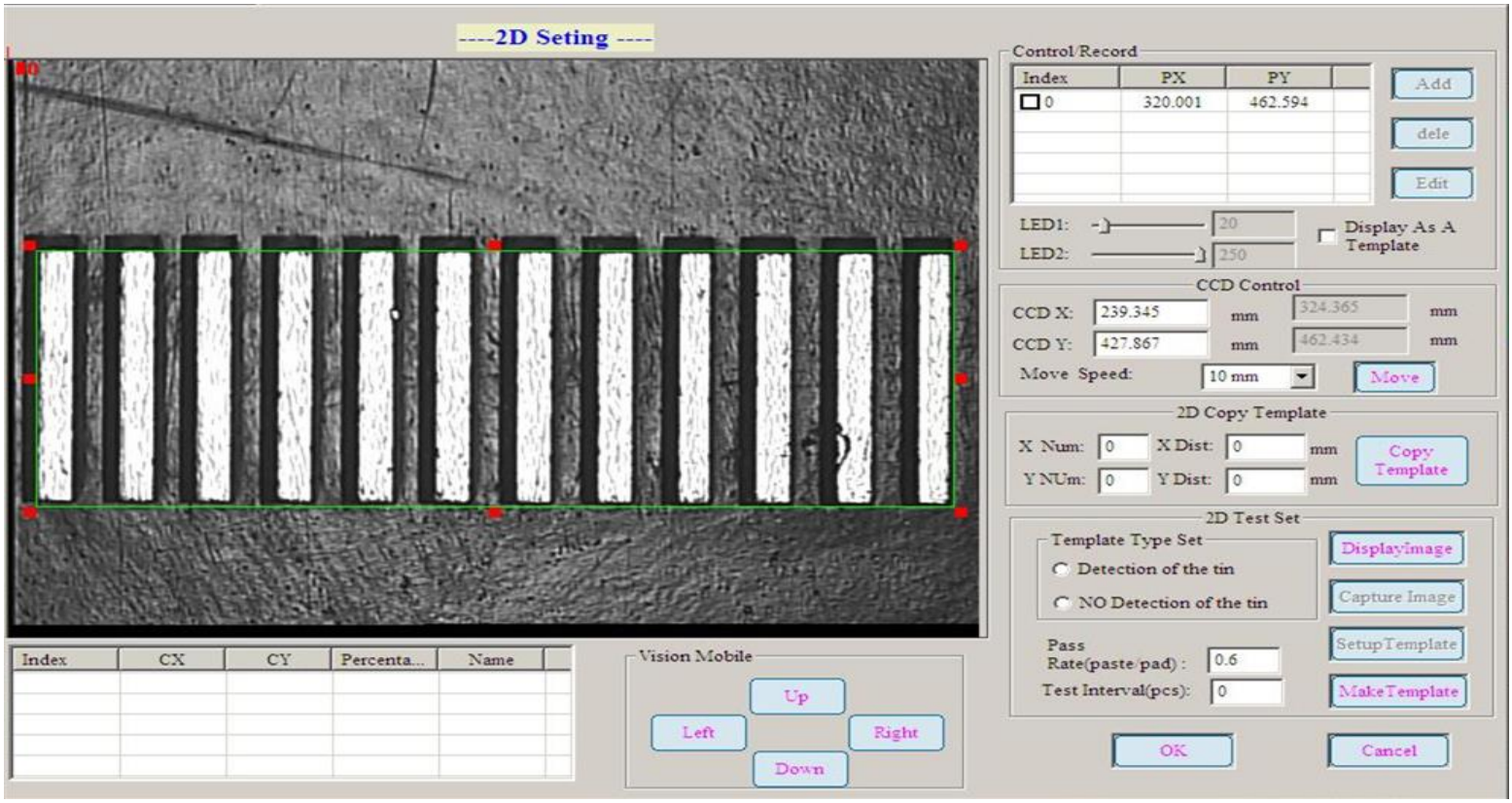


图 6-6（设置检测点）



Pix 6-6(setup the inspection spot)

7. 点击定置模板后，如图 6-7，显示检测点序号和坐标。如果还有需要设置检测点，则点击增加记录，进行如上第三步以后的操作。

After clicking “定置模板”(template customization) button, it will show the item and positioning of the inspection spot. If operator needs to setup more inspection spot, please click “增加记录”(add record) button. And do the operations from step 3 to step

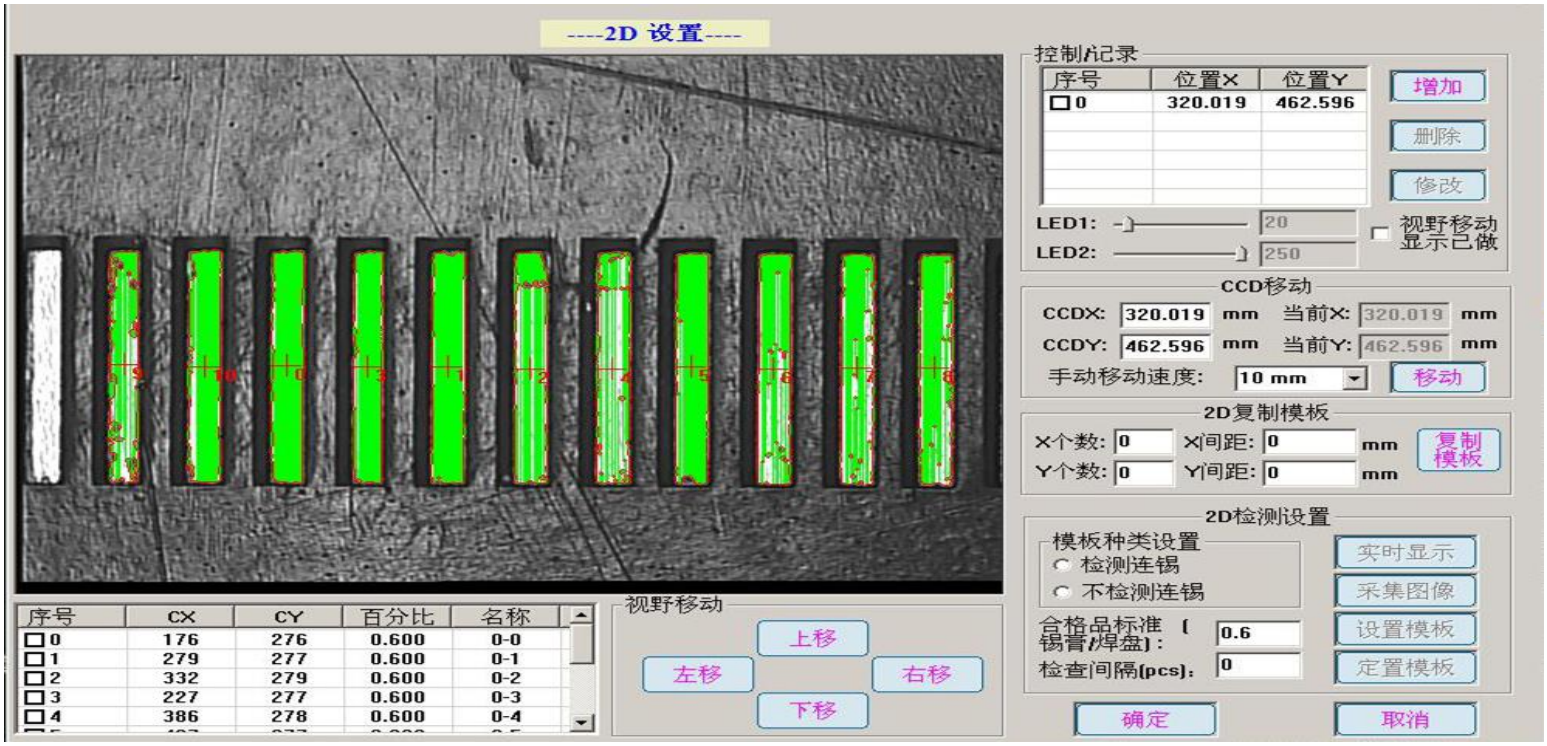
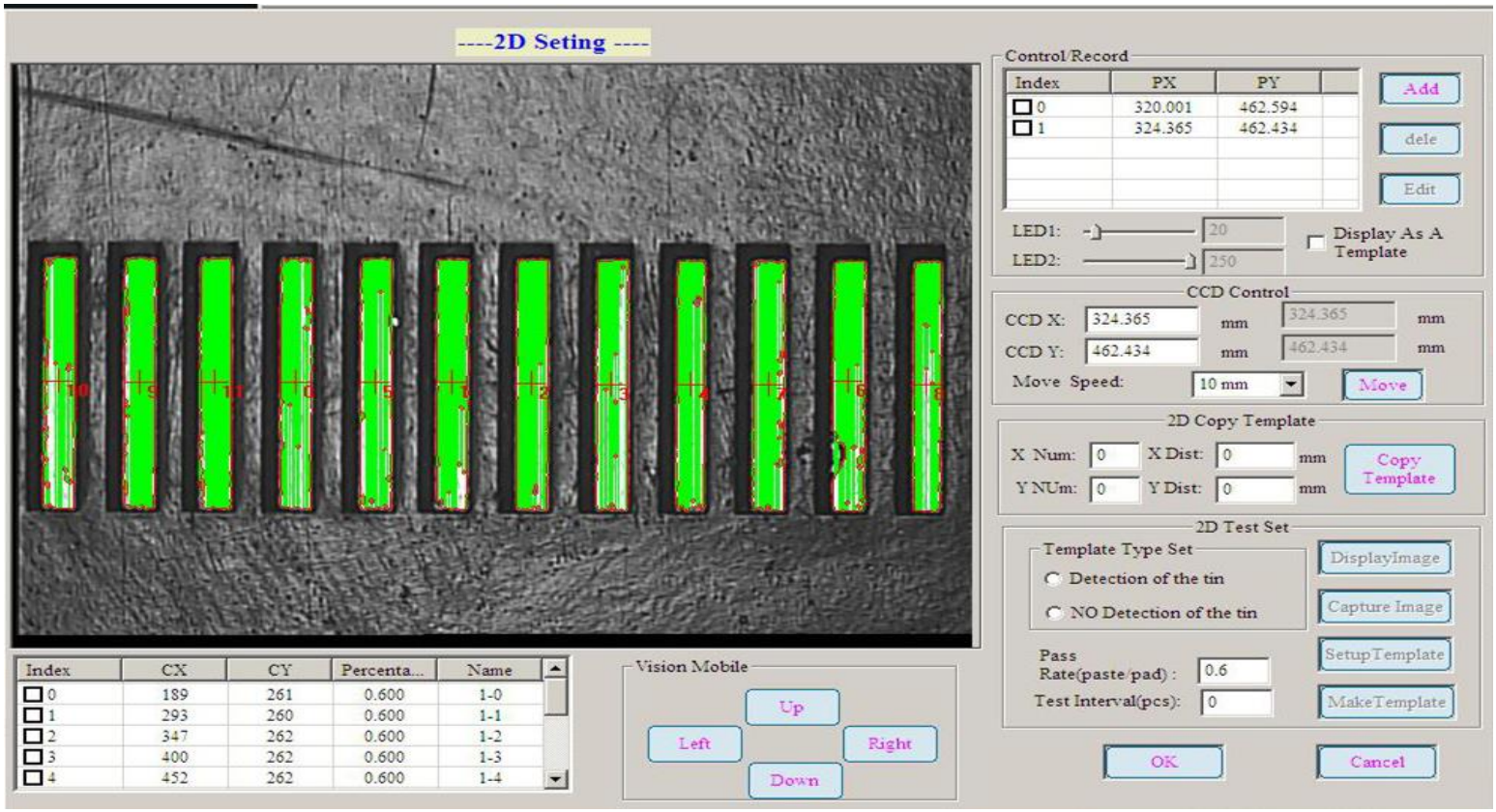


图 6（检测点）



Pix 6-7(inspection spot)

8 输入要检测的 PCB 上锡膏可以合格通过的覆盖率，本机器设定焊膏覆盖焊盘的面积在60%以上即满足质量要求(即合格分析锡膏/焊盘：0.6)。

Input the cover rate which can pass the inspection for the solder paste printed on the PCB. If there are above 60% solder paste printed on the bonding pad, then it can meet the printing quality requirement. (The qualified rate: solder paste/bonding pad: 0.6)

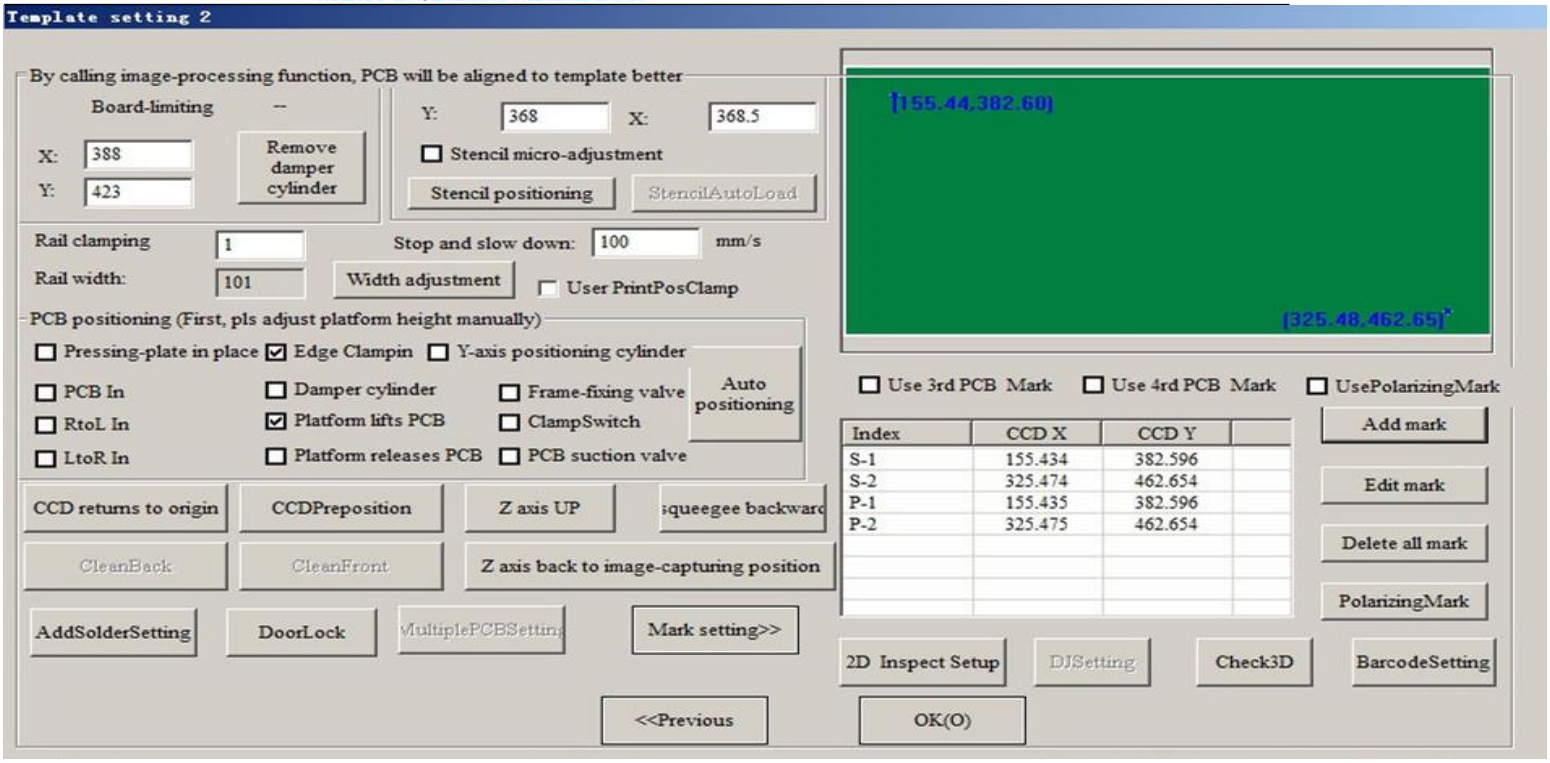
9 如图 6-7，点击确定，完成 2D 检测点的建立、增加的动作及参数设置。

Click “确定”（ok）button, then finish the build of 2D inspection spot, movement add and parameter setting. See pix 6-7.

10 点击确定，保存已更改的数据。如图 6-8

Click “确定”（ok）button to save the changed data. See pix 6-8.Pix 6-8(click “确定”（ok）button after setting the 2D inspection)

图 6-8（2D 检测设置完确定



11点击生产设置，打开生产设置界面，把 2D 检测选项选上，并点击确定保存设置。

Click “生产设置”(production setting) button and enter into the interface of production setting.

Select “2D检测” (2D inspection) and Click “确定”(ok) button to save the setting.

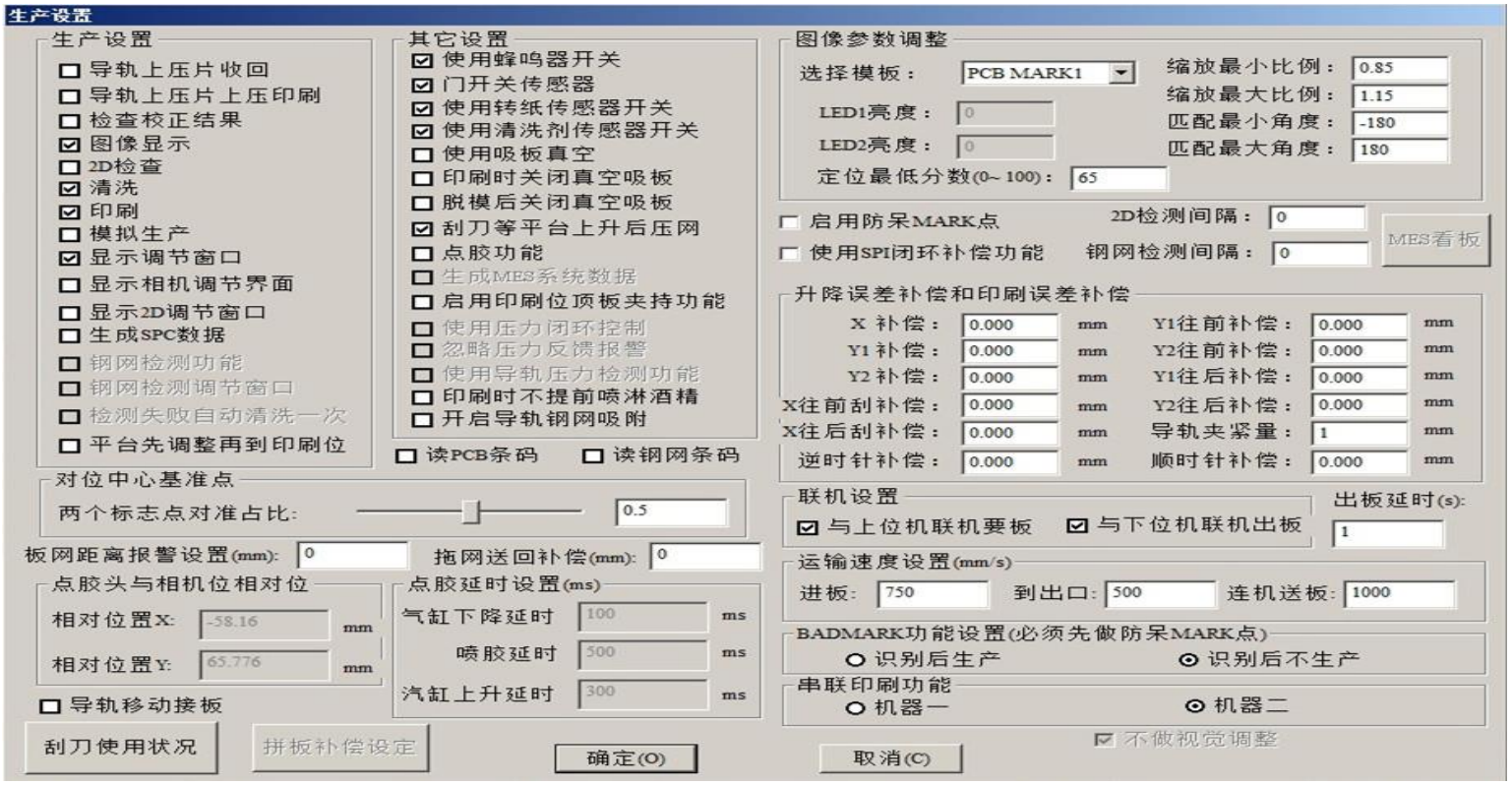
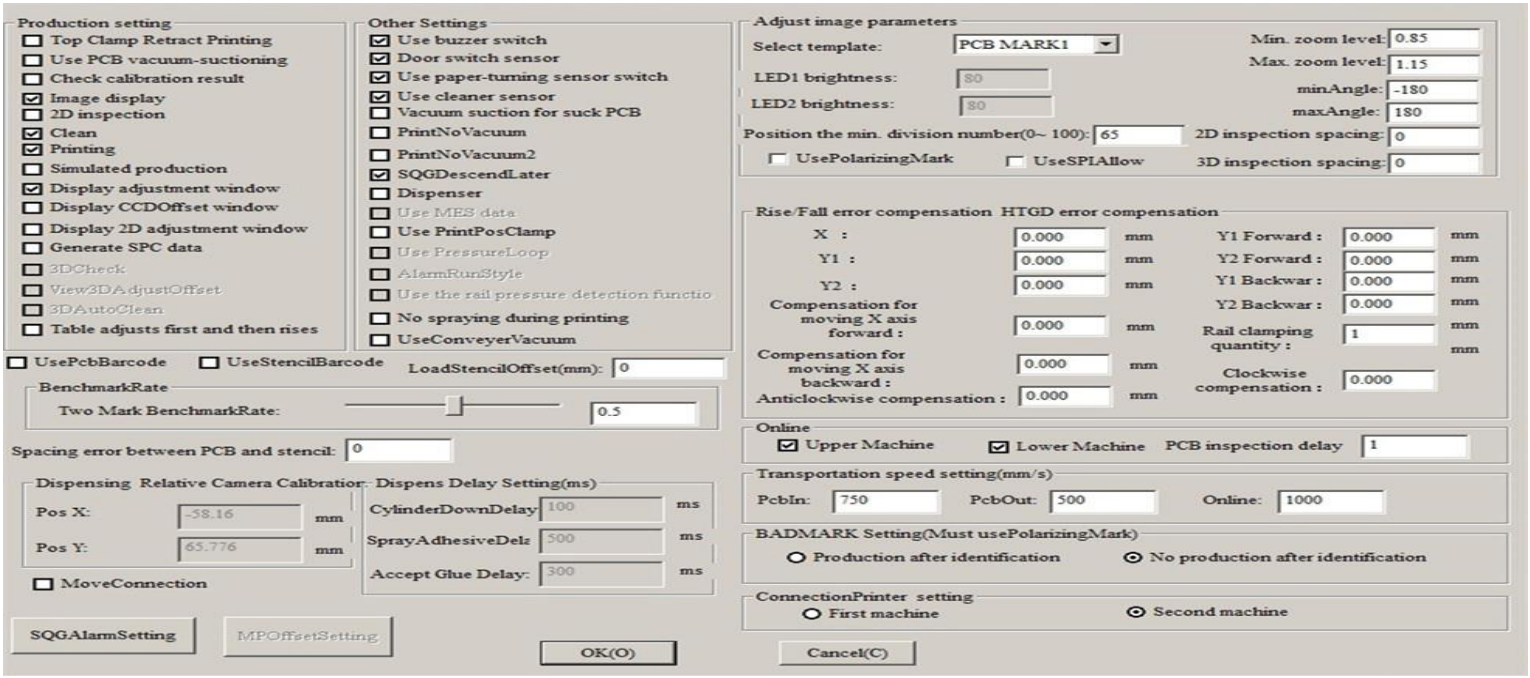


图 6-9（生产设置界面）



Pix 6-9(production setting interface)

12 点击开始按钮 

进入生产状态。印刷完成后，显示检测界面。

Click “ 

” (start) button to start production. The inspection interface will display after the printing has been finished

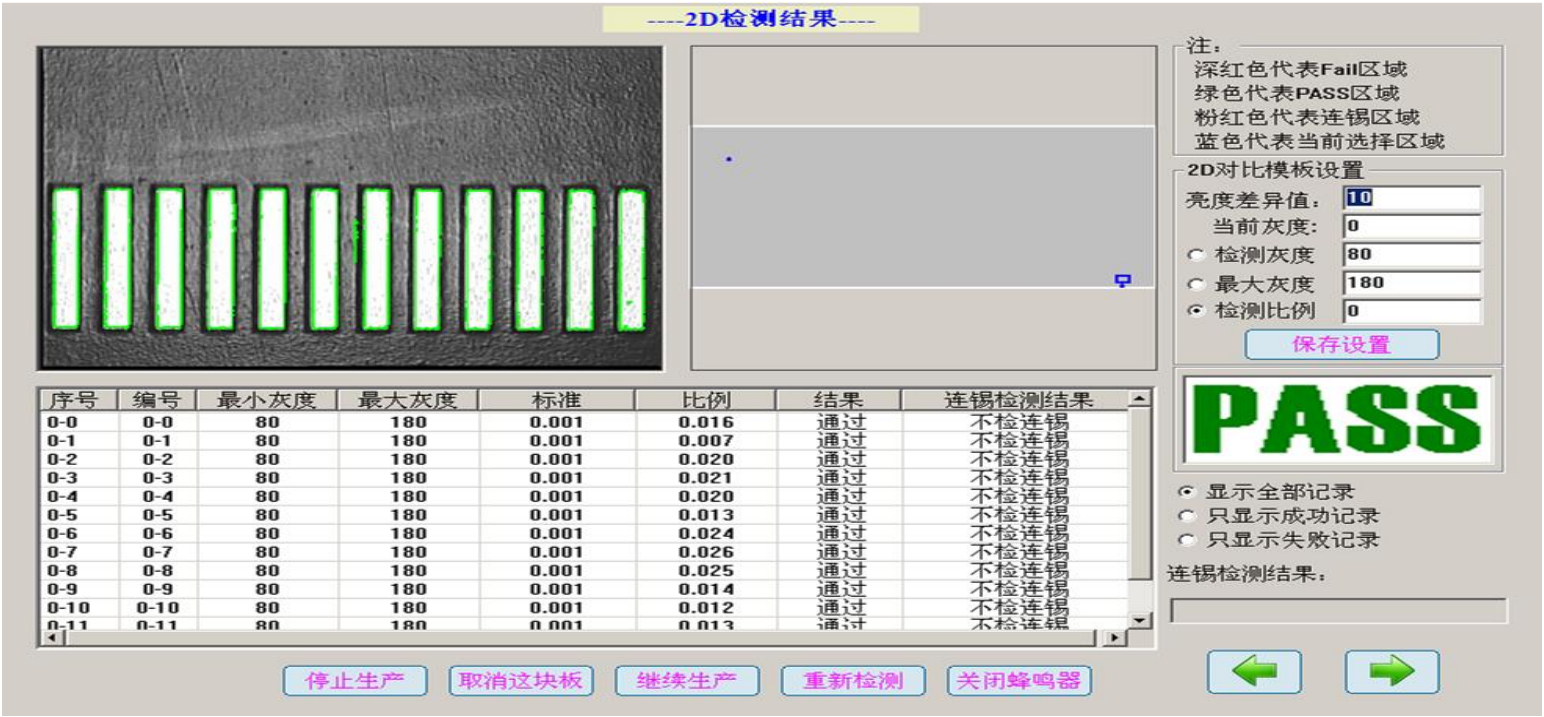


图 6-10（检测界面）Pix 6-10(inspection interface)

第七章　新增功能介绍说明
Chapter 7 Introduction of the new functions

SPC 系统简介及使用说明 SPC system introduction and operation

7.1 名词解释 Noun explanation

用 PPPK 衡量过程能力，要求 PPK>=1.67 才能进入量产阶段，所以又把 PPK 称为初期能力指数。PPK 通过 PPU 或 PPL 的最小值来计算， 计算公式 PPU=(USL-X-bar)/3s 和
PPL=(X-bar-LSL)/3s
Measure process capability by PPPK. When the PPK>=1.67, it can enter into mass production stage. So PPK is called initial capability indices. PPk is calculated by the minimum value of PPU or PPL. Calculation formula: PPU=(USL-X-bar)/3s and PPL=(X-bar-LSL)/3s.

很多公司由于对过程能力的一知半解，往往只要求计算 CPK 的指数来衡量过程能力是否足够，事实上进入正常生产后应该通过 Cp\CPK\PPK 三个指数之间的差别来判断过程是否有问题，如果有问题是管理上还是技术上有问题，Cp>1.33 表明过程变差比较小，此时还要看
CPK,当 Cp 和 CPK 相差很大时表明过程有较大的偏移,需要做居中处理，再比较 CPK 和 PPK， 如果两者相差不大表明受特殊因素的影响小，如果两者相差很大表明受特殊因素影响大。工序在稳定状态下的实际加工能力，即在操作者、机器设备、原材料、操作方法、测量方法和环境等标准条件下，工序呈稳定状态时所具有的加工精度,这时我们一般会通过 CP、CPK、PP 以及 PPK 等参数作为一个评断标准.

Many companies often only require calculating CPK to measure whether the process capability is enough because that they know a little knowledge of process capability. Actually, after entering into normal production, whether the process has problems should be judged by the difference between the three indices Cp\CPK\PPK. If it has problems, where are the problems, the management or technology? When the Cp>1.33, it indicates process variation is small. At this time it also should see CPK. When there is big difference between CP and CPK, it indicates the process had large offset. It needs to do center processing, and then compare CPK with PPK. If they have little difference, it indicates that it is less affected by special factors. If they have big difference, it indicates it is affected by special factors a lot. The process of actual processing capacity at steady state is affected i special factors. Namely the operator, machinery equipment , raw materials, operating method, measure method and environment and so on .The process shows the processing precision when the stable state . At this time we usually do a judge standard by parameters such as CP, CPK, PP, and PPK etc.

Cp：过程能力，仅适用于统计稳定过程，是过程在受控状态下的实际加工能力，不考虑过程的偏移，是过程固有变差（仅由于普通原因产生的变差）的 6σ 范围，式中 σ 通常用 R-bar/d2 或者 s-bar/c4 来估计。所以过程能力是用过程在受控状态下短期数据计算的。因此又将过程能力称为 “短期过程能力”，实际中常将短期省略。这个指数只是针对双边公差而计算的，对于单边公差没有意义。计算公式为:CP=(USL-LSL)/6σ.

Cp: Capability of process. It applies to statistical stable process. It is the actual processing ability of process in a controlled state, regardless of the deviation of the process. It is 6σ

range of process natural variation (due to the common cause variation). In the formula, the σ usually is estimated by R-bar/d2 or s-bar/c4 .So process capacity is calculated with short-term data when the process in controlled condition. Therefore the process capacity usually is called “short-term process capability”. In fact, short-term often be omitted. The index is calculated only for bilateral tolerance. For unilateral tolerance, it does not make sense. Calculation formula: CP=(USL-LSL)/ 6σ .

CPK：过程能力指数，是在过程有偏移情况下的过程能力，前提是要过程稳定且数据是正态分 布，而且数据应该在 25 组以上（建议最少不要低于 20 组，数据组越少风险越大），只考虑过程受普通原因的影响。因为过程只受到普通原因变差影响是理想状态下的，从长期来说过程总会受到各种特殊原因的影响，所以又被称为短期过程能力，也叫潜在过程能力。CPK 通过 CPU 或 CPL 的最小值来计算，计算公式:CPU=(USL-X-bar)/3σ和 CPL=(X-bar-LSL)/3σ.

CPK: Capability Index of Process, it is the process capability when the process has deviation. Preconditions are that the process is stable, data is normal distribution and the data should be above 25 groups (suggestion: at least no less than 20 groups, the less data groups, the greater the risk), only consider the effect of process by common reason. It is the ideal situation when the process is just affected by common reasons deviation. In the long term, process is always affected by all kinds of special reasons. So it is also known as short-term process capability, also called potential process capability. CPK is calculated by the minimum of CPU or CPL. Calculation formula: CPU=(USL-X-bar)/3σ and CPL=(X-bar-LSL)/3σ .

Pp：过程性能，是过程长期运行的实际加工能力，过程总变差（由子组内和子组间二种变差所引起的变化，如果过程处于不受控状态，过程总变差将包括特殊原因和普通原因）的 6σ 范围，式中 σ 通常用则称 x 服从均数为 μ，标准差为 σ2 的正态分布。样本的标准差 s 来估计。此时不考虑过程是否受控。因此过程性能也称长期过程能力，也叫性能指数。计算公式:Pp=(USL-LSL)/6s

Pp: Performance of Process, It is actual processing capacity of process in long-term running. It is 6σ range of process total variation (changed by two variation subgroups within and between subgroups, if the process is in uncontrolled condition, actual processing capacity includes special reason and common reason), In the formula, σ is usually called X obey mean μ, the standard deviation is σ2 normal distribution .The sample standard deviation uses s to estimate. Whether the process is controlled at this time is regardless. So process performance is also called the long-term process capability, also is known as performance index .Calculation formula: PP=(USL-LSL)/6s .

PPK：过程性能指数，因为计算不需要过程稳定（因为在计算公式中已经考虑了普通和特殊两 种原因的影响），所以在 PPAP 手册中要求在产品进行试生产过程不稳定时（此时过程受两种原因影响），特殊因素的影响往往比较容易找到。如果 Cp 值本身就很小那说明过程受普通因素的变差影响大，此时若想提升过程能力往往需要更多的投入和更高的决策才能使问题得到解决。所以即使有时候 CPK 值很高(比如大于 2) ,如果其与 Cp\PPK 相差较大的话还是需要对过程进行改进。

PPK: Performance index of process. The calculation does not need process stability. Because calculation formula has considered the influence from common reason and special reason. So PPAP manual had been required during the trial production process is not stable (this process is affected by two reasons). The special factor is easier to be found. If the CP value itself is small and then it means that common factor variation has big influence on the process. At this time it often needs more investment and higher decision to make the problem solved to improve process capability. So even if sometimes CPU value is very high (such as above 2) and it has larger difference with CP and PPK , it still need to improve the process.

7.2 软件操作步骤 Software operation steps

1、将 U 盘中的“CPKDataRT.exe”文件拷贝到“F”盘根目录下。如图 7-1
Copy “CPKDataRT.exe” in USB
flash card to the root of the disk “F”. See pix 7-1.

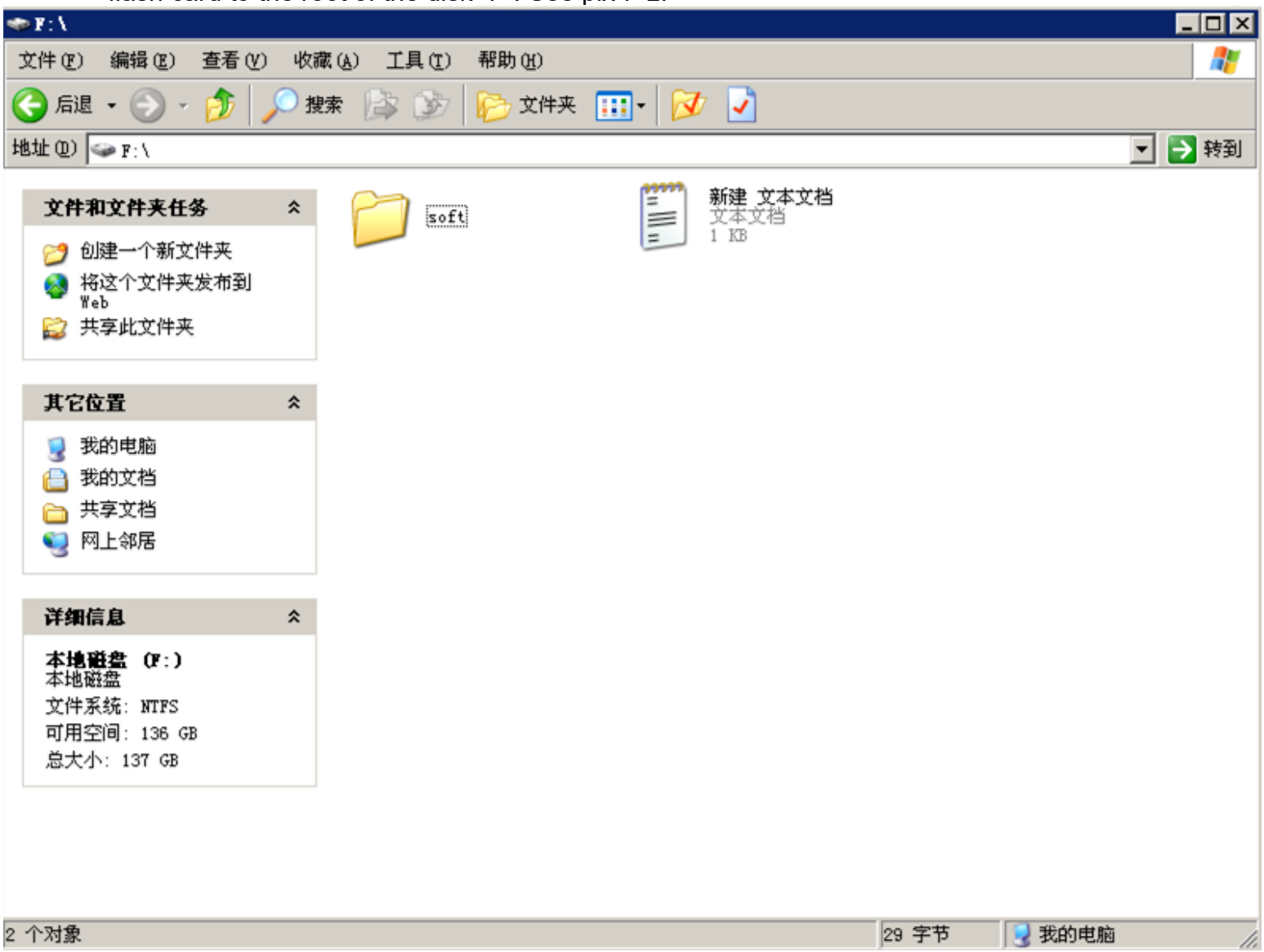
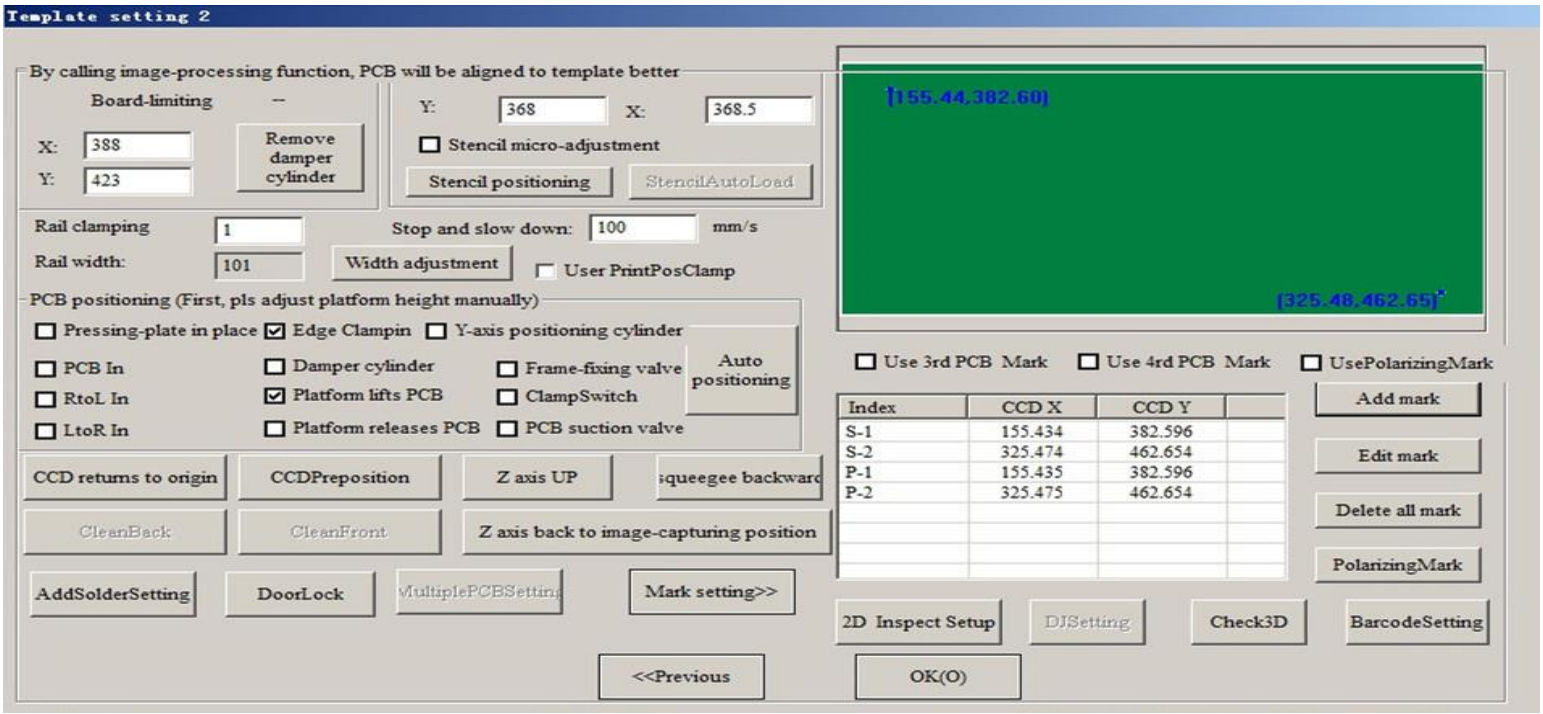


图 7-1 Pix 7-1

2、找一块 PCB，按常规做生产程序步骤，做完 PCB MARK 点识别过程。如图 7-2
Find a PCB board. Do production program steps by convention. Finish PCB MARK point indentified process. See pix 7-2.

图 7-2



Pix 7-2

3、在 PT 软件主界面上点击“生产设置”，在弹出的界面上选择相应的选项并确定。如图 7-3

Click “生产设置”(“Product setting”)in PT software main interface. Select the appropriate options on the pop-up interface and Click “确定”（ok）button. See pix 7-3.

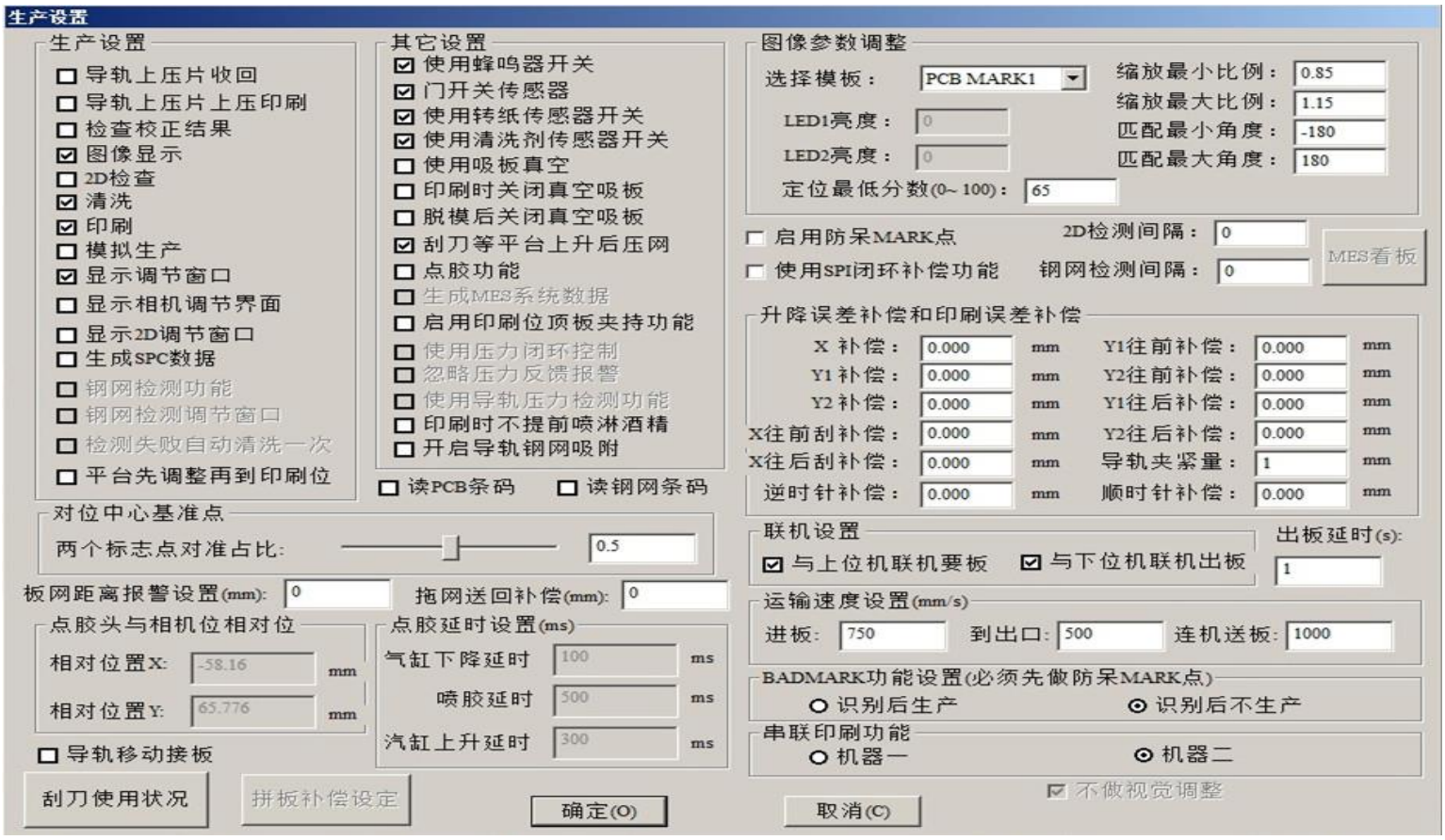
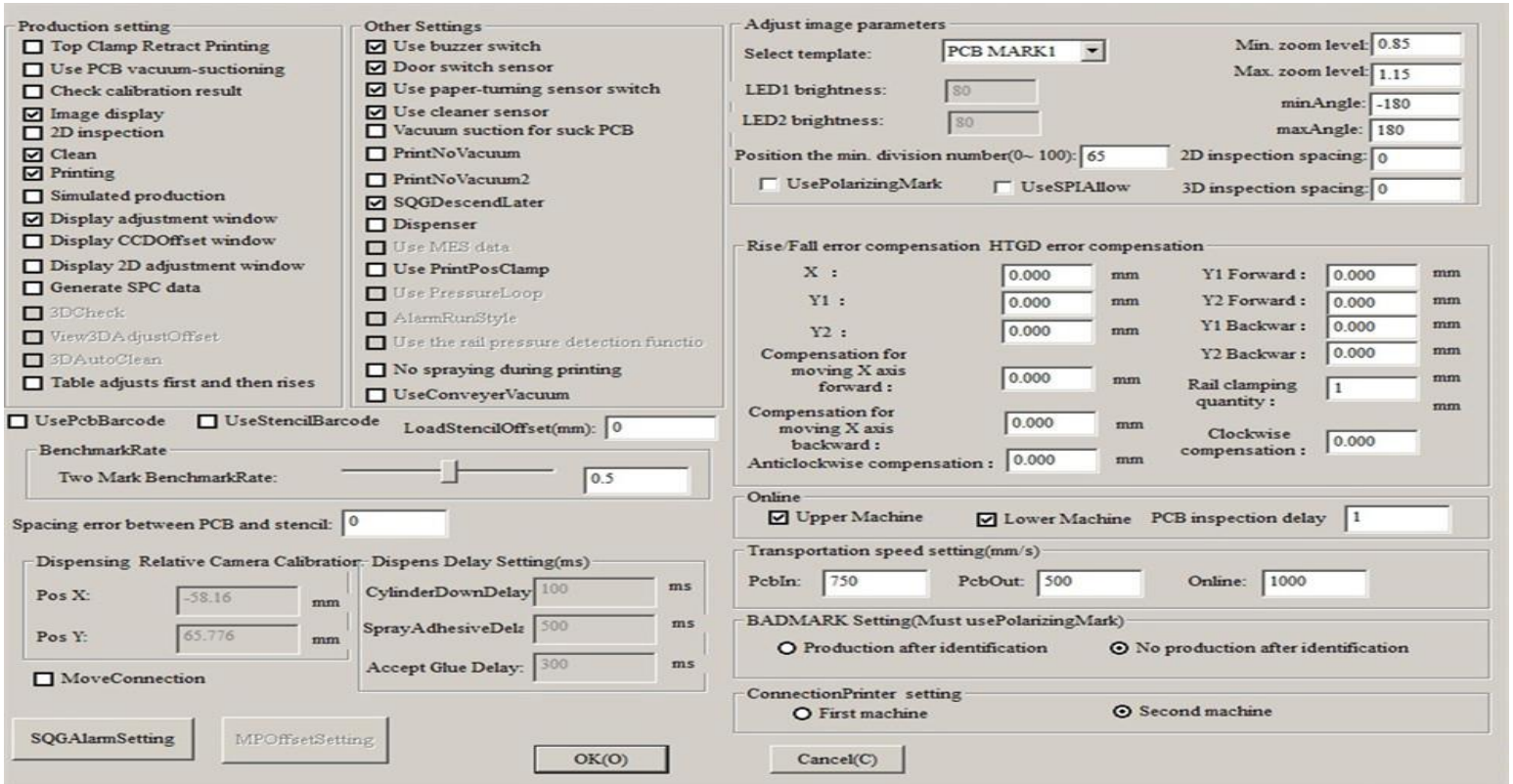


图 7-3



Pix 7-3

4、在 PT软件主界面上点击 “ SPC ” 按钮，会启动 SPC 程序，在 SPC 软件界面上点击 “ 设置 ”

按钮，在弹出的对话框中设置参数，印刷机 SPC 参数需要与图 7-4 中的参数一致。

Click “SPC” button in PT software main interface. It will start the SPC program. Click“设置”（setting）button to set parameters in the pop-up dialog box. Printer SPC parameters need to be consistent with the parameters in pix 7-4.

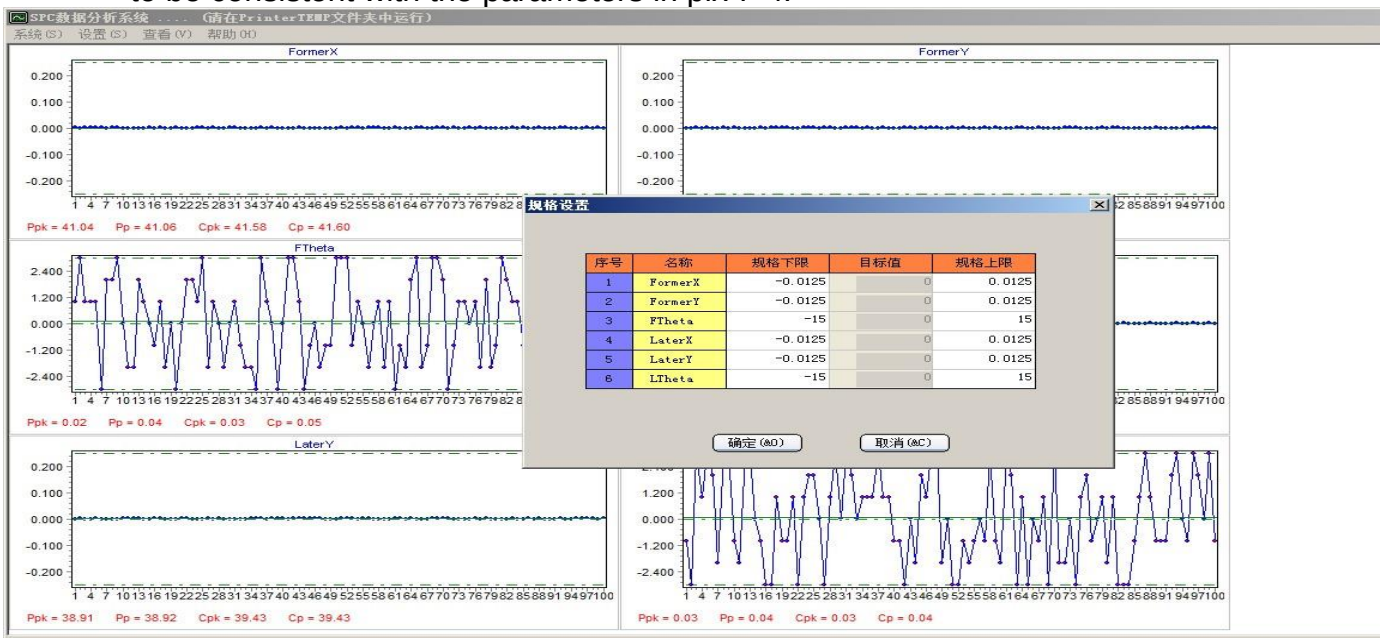


图 7-4Pix 7-4

5、回到 PT 软件主界面，确认生产设置中的选项跟图 7-3 一致，点软件界面上的开始按钮，将 PCB 放入机器轨道一端，开始测试。点击PT软件主界面上 “SPC” 按钮。采样 100 次。得出图 7-5 或者图 7-6 中的结果。

Back to PT main interface and confirm the options in the production settings are consistent with the options in pix 7-3. Click “开始”（start） button in the software interface. Put the PCB into the end of the machine track and start test. Click “SPC” button in PT software main interface. Do the sampling 100 times. Get the results in pix 7-5 and pix 7-6.

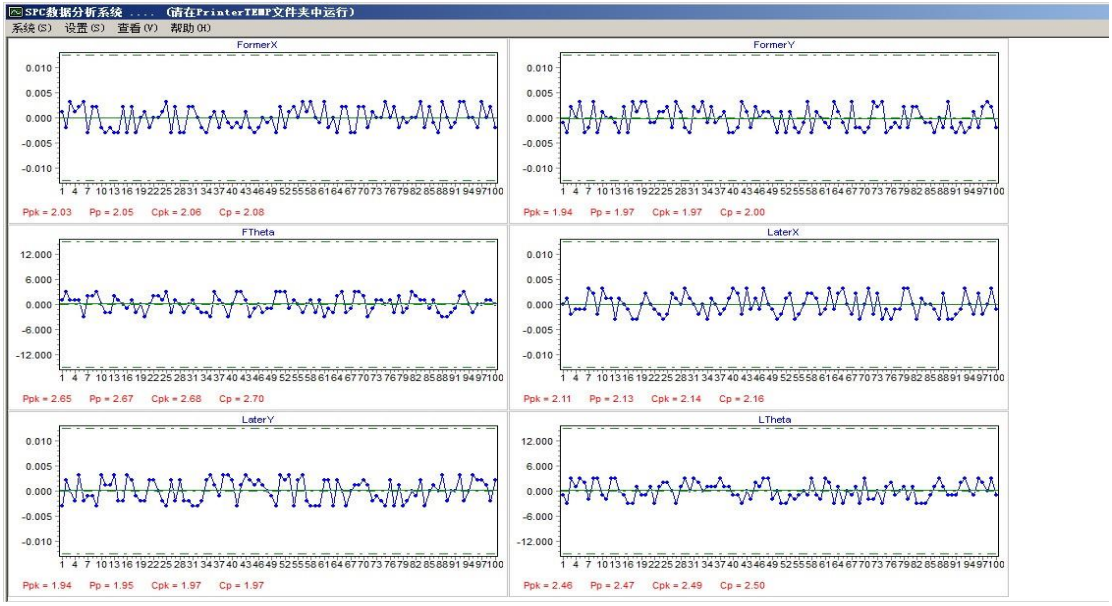
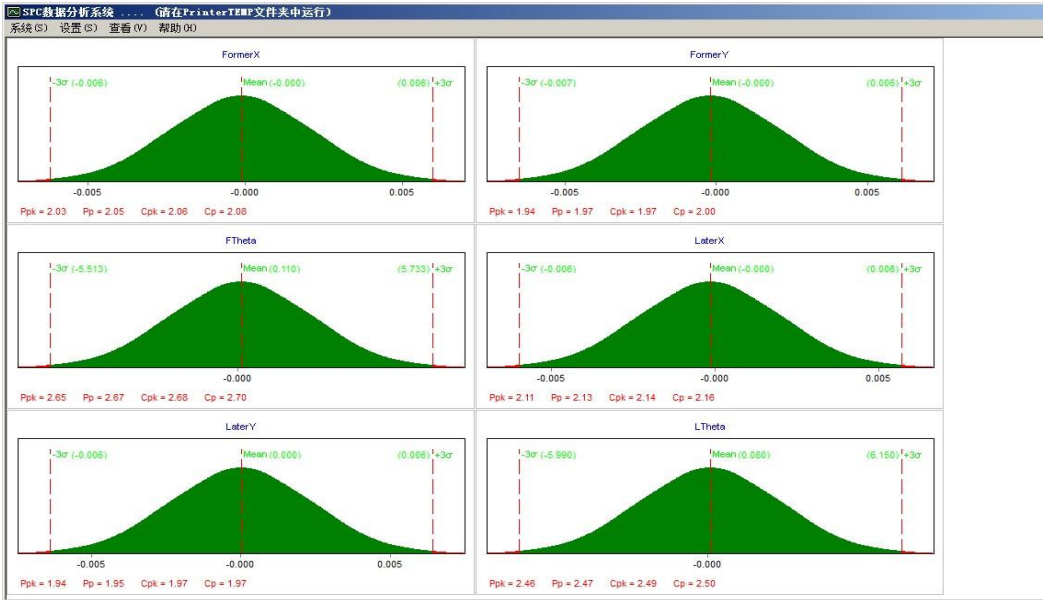


图 7-5 Pix 7-5



Pix 7-6

注意：测试期间会弹出图 7-7 显示测试 2D 的画面，这个不用管。软件要求是这样的。Note: Pix 7-7 which is the 2D test picture will come out during the test. Please do not worry about this. It is the requirement from the software.

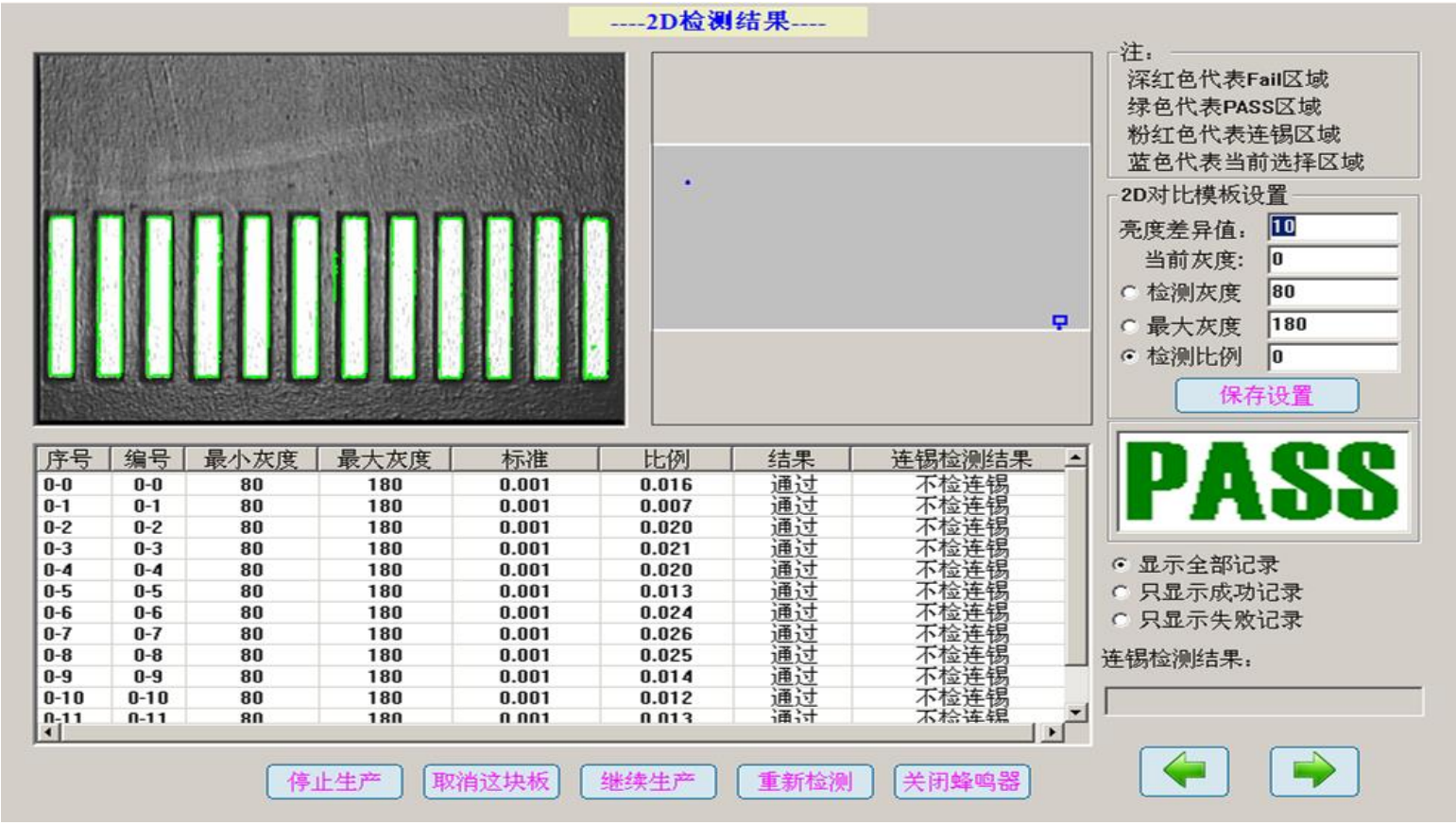


图 7-7　Pix 7-7

最后测试 100PCS 将图 E，图 F 截图，放到 Word 中，打印出来即可。
Finally, test 100 PCS and get the screenshot of pix E and pix F. Put the two screenshots into Word and print them outa