VS-300C vision-guided dispenser

Software operation manual

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Copyright description:

Current version:

V1.00

Operation descriptions:

please read this manual in details before installing or operating software, then follow the instructions in the manual to operate; in case of any abnormal operations, please contact us, and we will serve you wholeheartedly.

1 Introduction

1.1 software introduction

VS-300C vision-guided dispensing software use mechanical vision technology to locate the work pieces automatically, then calculate the dispensing position according to teaching task,to run the glue coating automatically. The VS-300C can realize the intelligent dispensing work.

1.2 image input

Image and teaching task will be input, and dispensing task will be output. In order to identify and locate the parts accurately, the system should have the appropriate image input. The requirements of the software for imaging: the part of the template in vision should have a certain degree of contrast.

2.Software install and uninstall

2.1 PC program install

1) insert the install disk into CD-ROM.

2) double-click to open the driving disk.

3) double-click‘VS-300C_V1.01_beta_Setup.msi’file, to run the install program.

Installation wizard will be shown in figure 1, then click **Next step**; choose the location for installing in figure 2 **Installation path**, and click **Next step**; After confirming the **software installing**, click **Next step** to start installing, as shown in figure 3;click **Close** after installation is done, to exit the **Installation wizard**, shown in figure 4;

Figure 1　install wizard

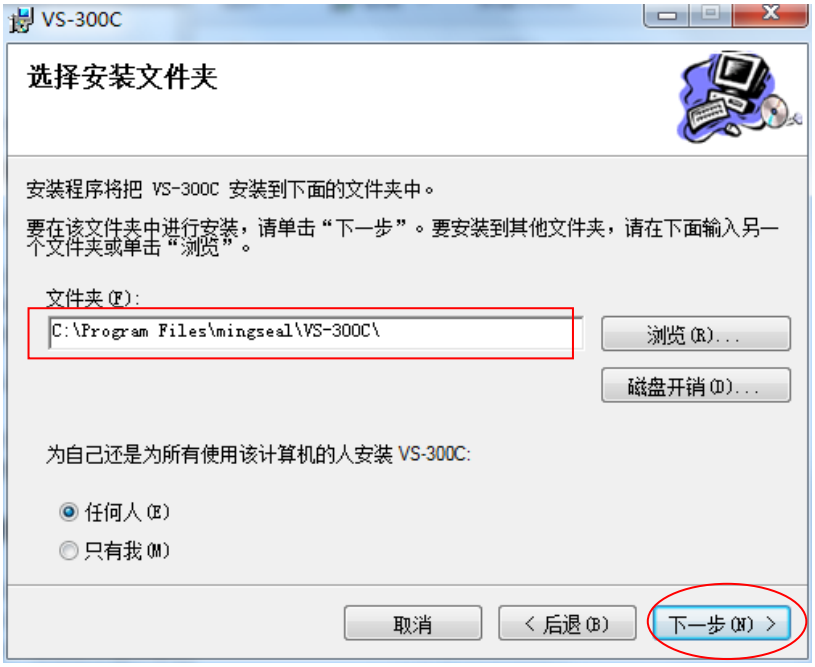

Figure 2 Installation path

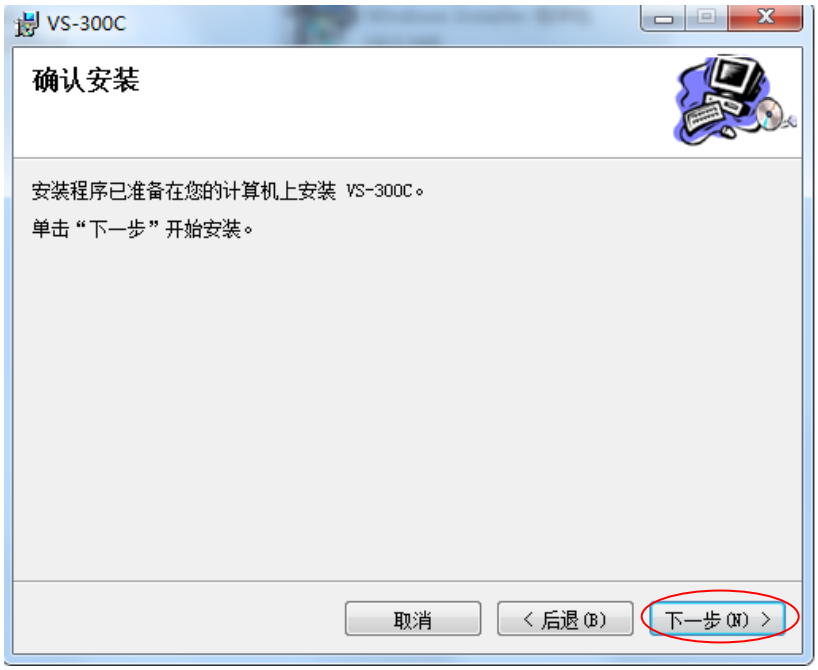

Figure 3 Installing confirming

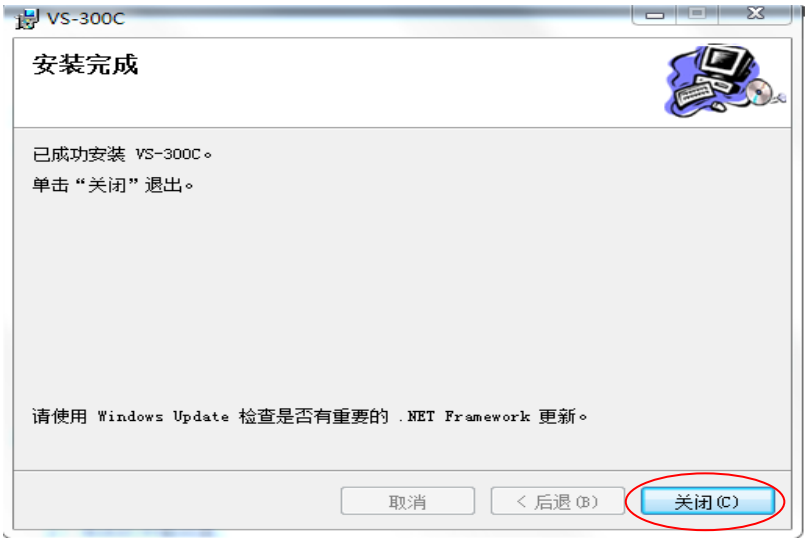

Figure 4 Installation done

1） Run the **Permission setting**, right click the VS-300C logo in the menu, to open **property page**; then run the **Property** according to the shown in figure 5.

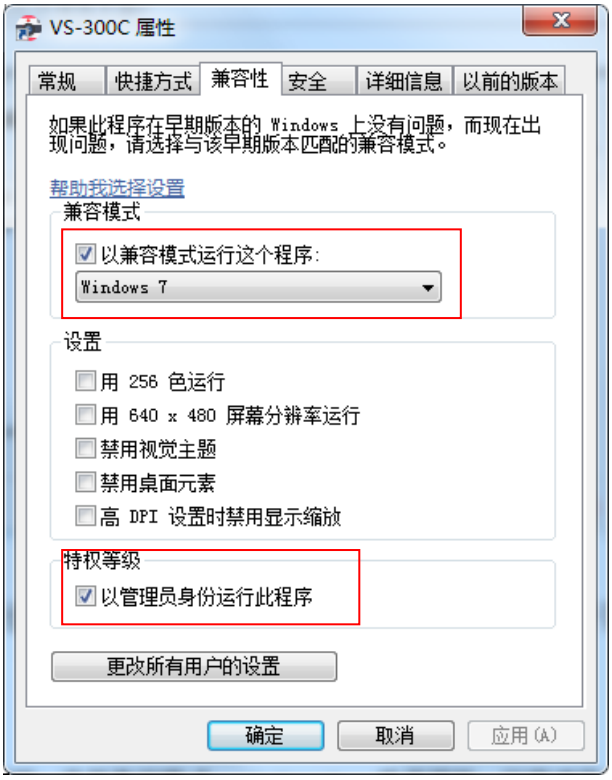

Figure 5 Permission Run settings

Precautions:

Before installing the VS-300C PC software, please ensure that the driving program of camera already been installed; for the camera driving program details, see the Appendix.

2.2 Start the software

Normally, the software will automatically run after the boot. If there is an exception or in other cases which need manual start, the operator can take the following method to operate:

Method 1: click the "VS-300C" shortcut on the desktop, start the program;

Method 2: open "my computer", enter the installation path,in which to find the file "VS-300C.exe", double-click to run.

2.3 Uninstall the PC software

VS-300C PC program uninstall method is as follows:

1) Click ‘start’;

2) enter the control panel;

3) select ‘Add/remove program’;

4) find the ‘VS-300C’ in the list, click ‘Change/delete’;

5) in the pop-up message box, click ‘Yes’, and uninstall the software;

6) remove the ‘mingseal’ folder in the installation directory.

3. Main interface introduction

The main interface of VS-300C host computer and its components are shown in figure 6. The main interface mainly consists of the common button area, the work piece arrangement area, the image display area, the parameter setting area and the statistical information area. Common button area mainly includes the button of the moving platform, help button and exit button; work piece arrangement area is

mainly used for displaying and setting of the arrangement of the work piece; image display area is mainly used for shooting the work piece image and processing results show; parameter setting area is mainly used for setting parameters, as well as the teaching task, the system parameter and the location parameter information; statistical information area is mainly used for statistical dispensing work piece number display.

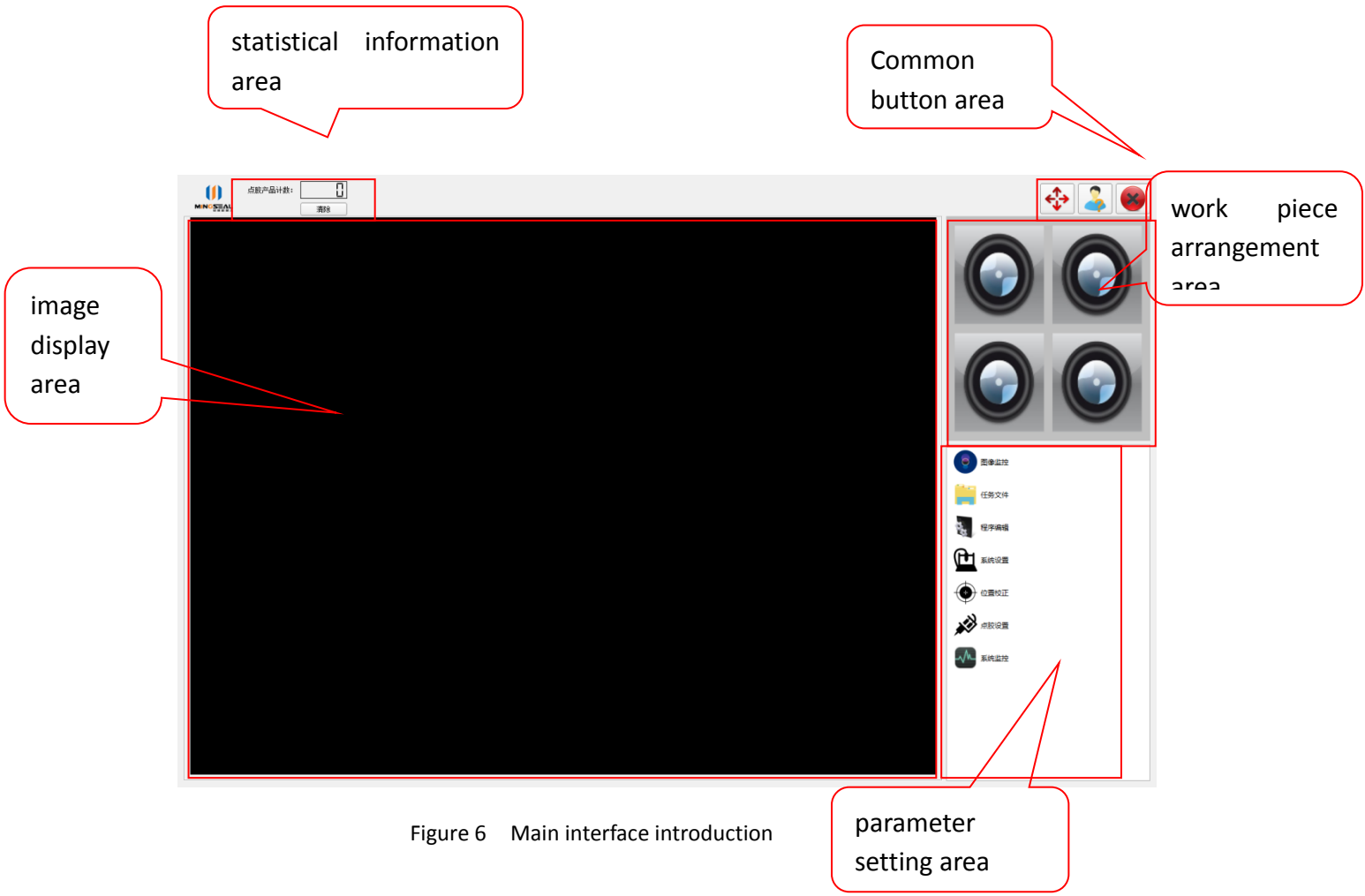

Figure 6 Main interface introduction

4 Software use and setting

Software installation is completed and when the initial launch of the software, the figure 7 will pop up, because there is no teaching task.

Figure 7 Information cue

4.1 platform movement

Click the platform button on the main interface, and the interface of platform movement controlling will pop up, as shown in figure 8. There are two main types of movement: continuous and single step. In continuous type,long press by left button of mouse on each coordinate axis, and the platform will continue moving; in single-step type, click the button of each coordinate axis, the platform will move to the direction corresponding to a plurality of pulses, each movement of the pulse number can be set through ‘speed/pulse’ setting.

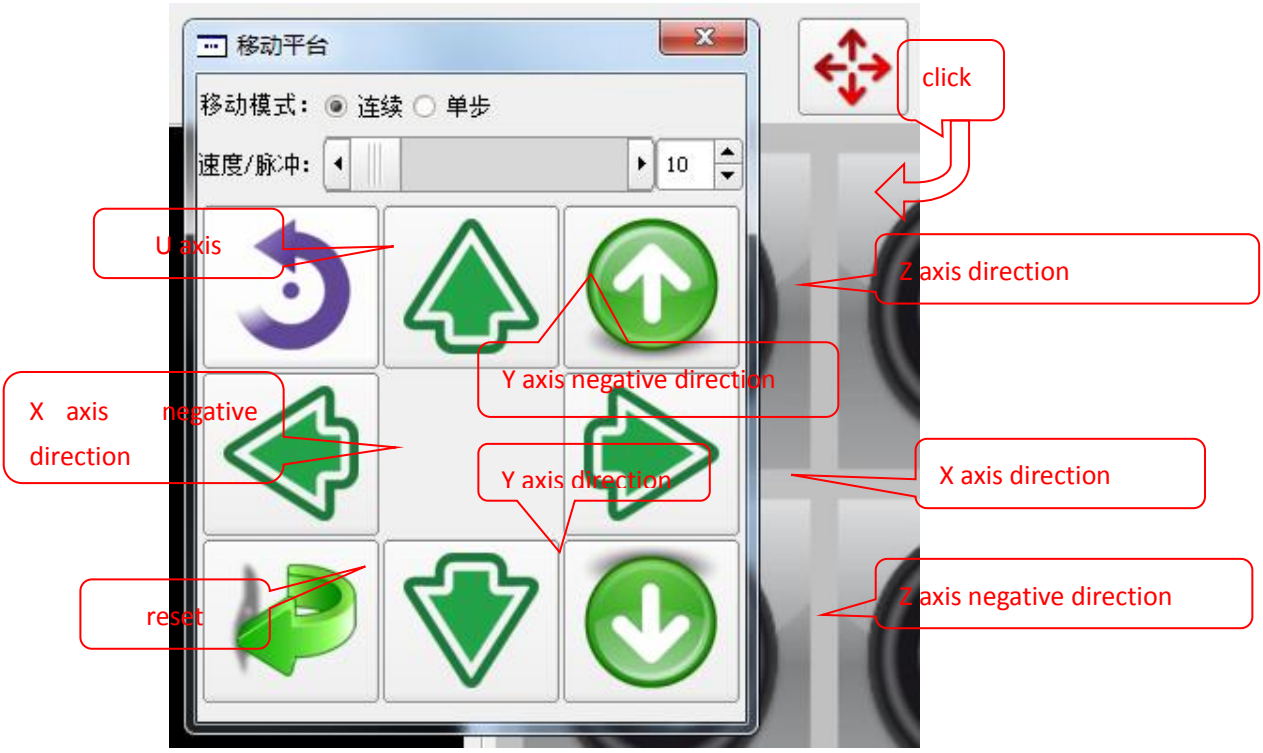

Figure 8 platform moving interface

4.2 work piece array setting

In the work piece arrangement area of main interface, double-clicking the mouse will pop up the shooting-location settings interface, as shown in figure 9. The work piece arrangement refers to the parts laying on the fixture board; according to ranks of work pieces on the fixture board, the parameters setting will lead to the corresponding changes in the image.

The starting point on fixture board refers to the location of first part on board, and the unit is mm; the coordinates origin is the reset position. For example, in Figure 9, the fixture start point(10,10) indicates that the platform moves to 10 mm in X direction, and the position in Y axis direction of 10 mm is capable of making the first part in the camera's vision field.

Note: please try to make the part in the center of the image when setting the starting point on the fixture board.

The Row distance refers to distance between rows, which can be set according to the design dimension of the fixture board, and the number of rows will be

changed according to setting; the unit is mm.

The Column distance refers to distance between columns, which can be set according to the design dimension of the fixture board, and the number of columns will be changed according to setting; the unit is mm, too.

Array types

Vertical dispensing refers to dispensing route along the Y axis direction;

Horizontal dispensing refers to dispensing route along the X axis direction;

S mode dispensing refers to dispensing route in 'S' shape;

Z mode dispensing refers to dispensing route in 'Z' shape.

Figurre 9 work piece array setting

4.3 task operation

Task operation mainly includes task creation, task swift and task deletion, and these operations can be completed in the task file page. Click the task file button in parameters setting area of main interface, then enter task file page, as shown in figure 10.

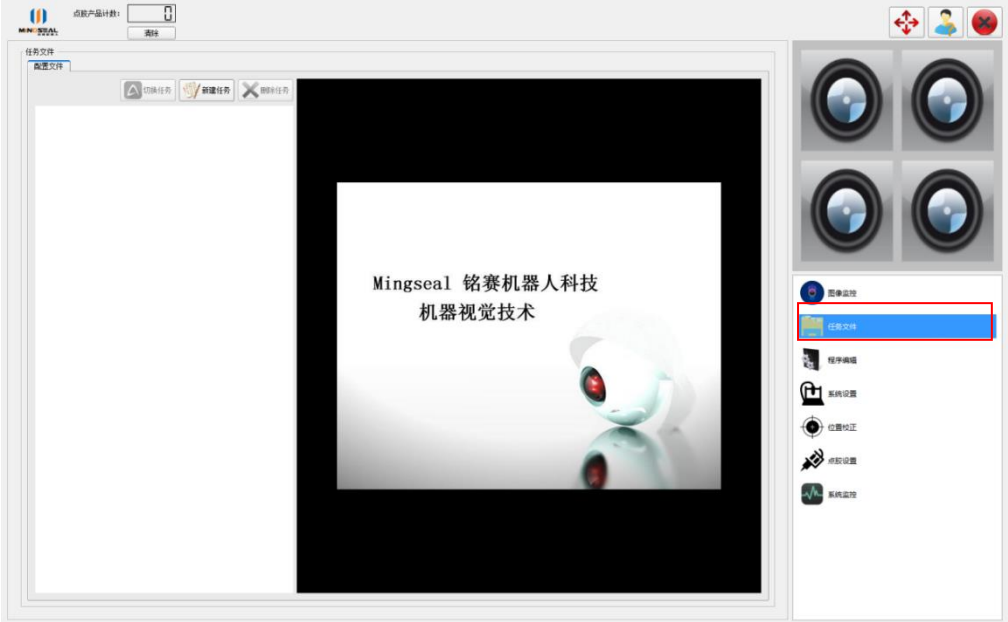

Figure 10 task file

4.3.1 task creation

1) click task creation button, then pop on the task saving interface, as shown in figure 11;

2) input the task name in task saving interface, for example, test 1, shown in figure 12;

3) click confirm button, to start task creating. When the task creation is finished, the tips of creation OK will pop on, and one new file will be added in tasks column on the left.

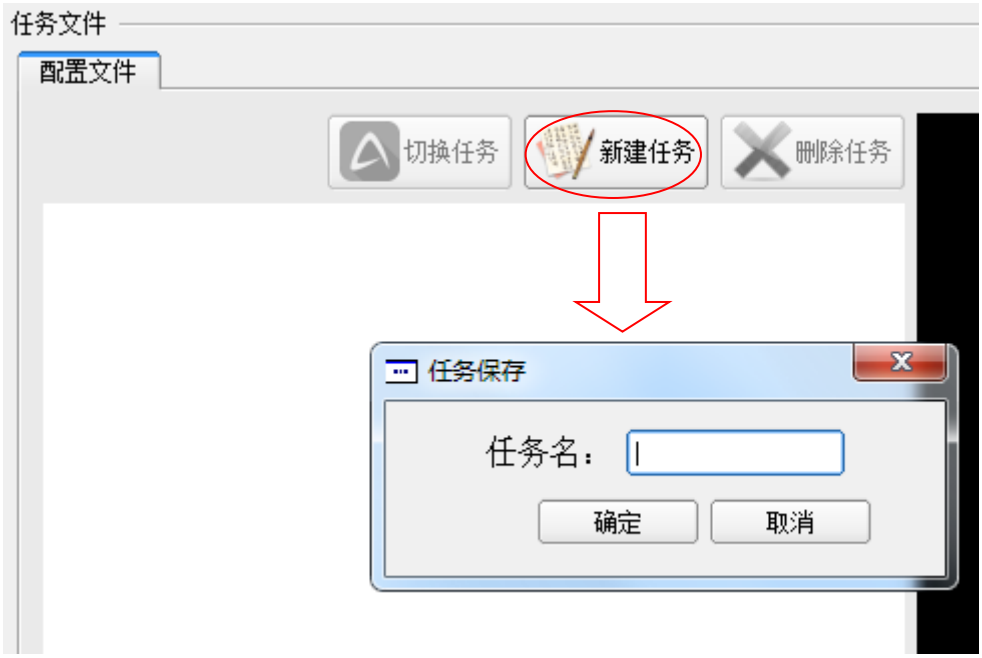

Figure 11 take creation

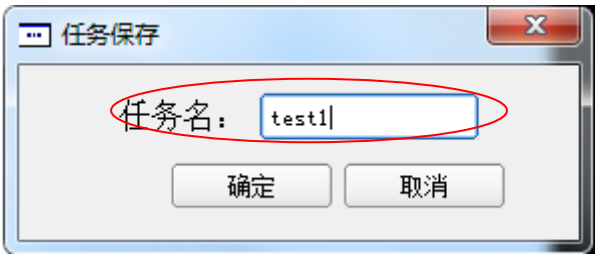

Figure 12 task name

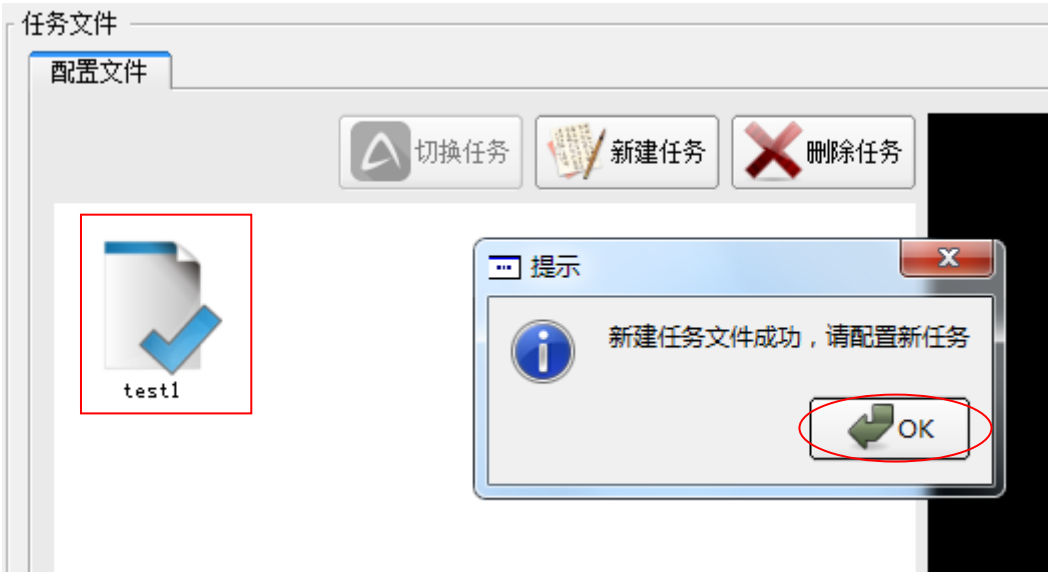

Figure 13 task file creation OK

4.3.2 task deletion

1) click the task file which to be deleted, and the file will change to blue color, as shown in figure 14;

2) Click the 'task deletion' button after file being selected, then the **task deletion confirm** interface will pop on, shown in figure 15; then click 'yes' to delete the task.

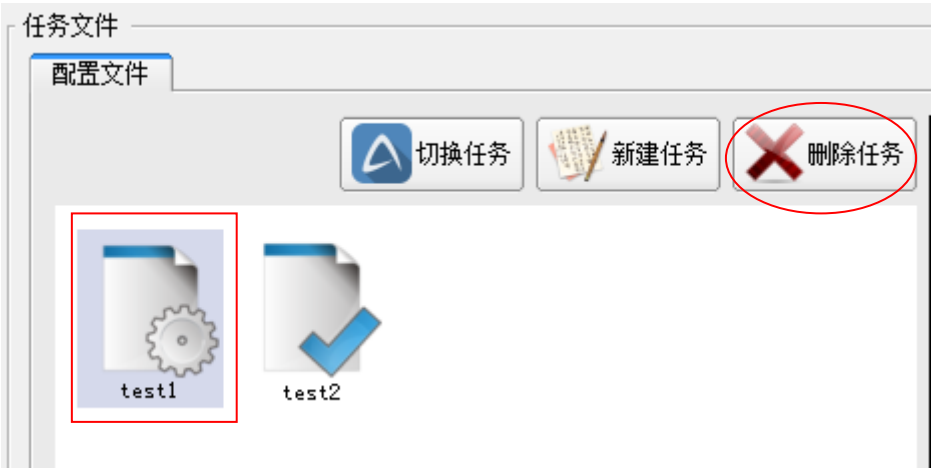

Figure 14 task selection

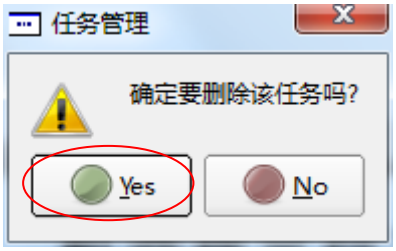

Figure 15 deletion confirm

4.3.3 task switch

1) with a single click of the mouse to the target task file, select it, then the task file's background color will turn to light blue, as shown in Figure 14; file test 2 with 'tick' is the current task, file test 1 is the task to be switched.

2) select file with a single click of the mouse 'task switching' button, then you can switch the task; the completion cue will pop on when the task switching is done, and the target task file will display 'tick', as shown in Figure 16.

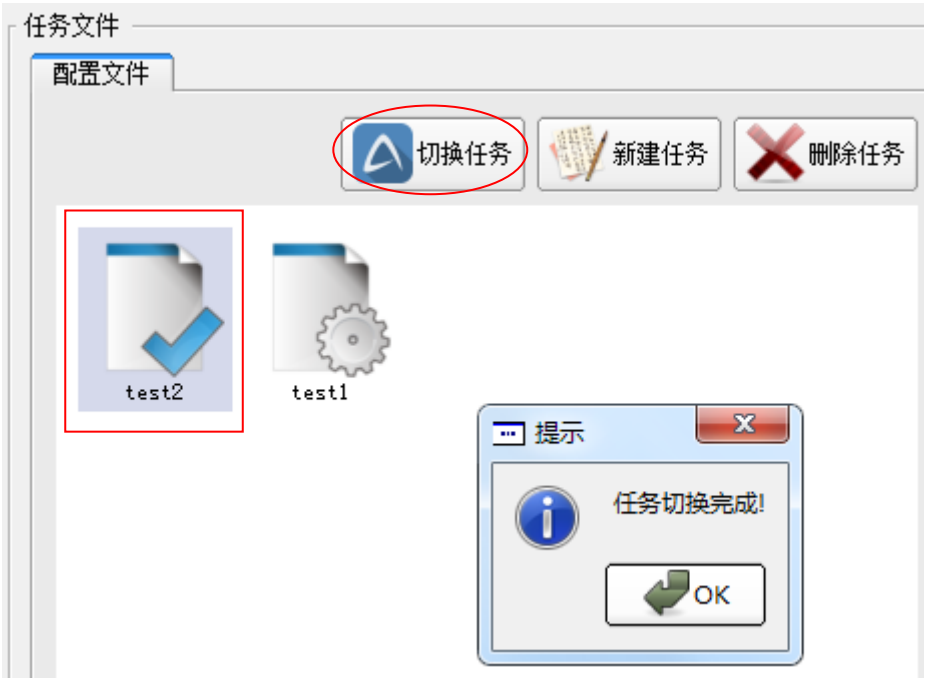

Figure 16 task switch completion

4.4 System calibration

4.4.1 Camera calibration

1) Click ‘move to calibration position’ button, if the mark point does not appear in the view field of camera, then move the mark point to the camera view field through the movement platform (it is better move mark point to the image center); click ‘set calibration position’ button, recording the position, in order to move directly to the right position next time, as shown in Figure 17;

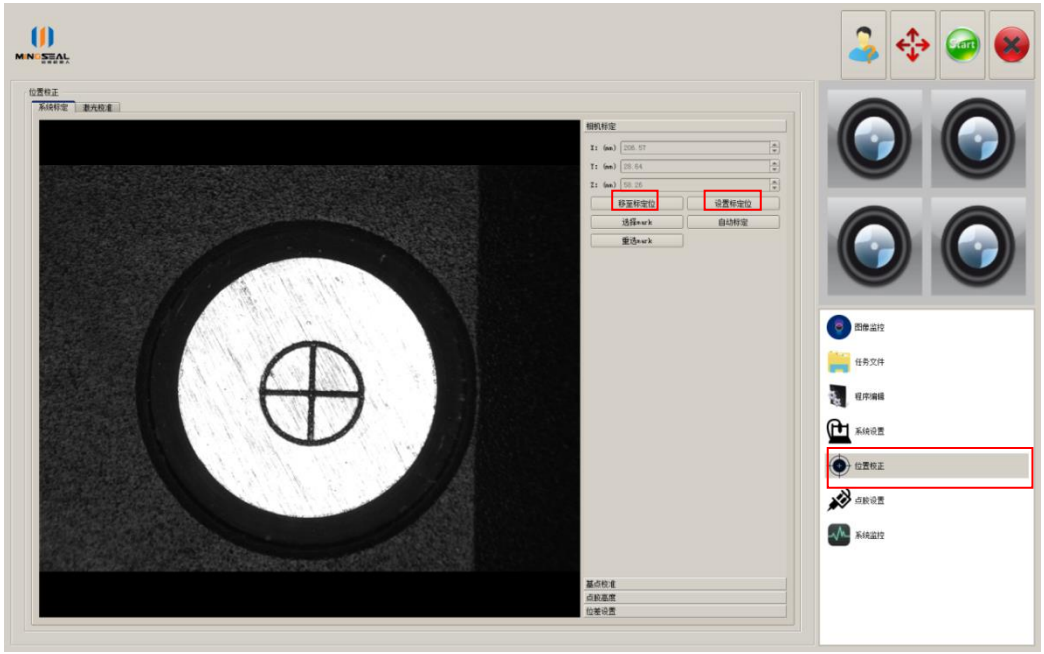

Figure 17 move mark point to view field

2) click the ‘select mark’ button, then left click the mouse to select Mark figure(near the Mark point center in the left image area), as shown in Figure 18;

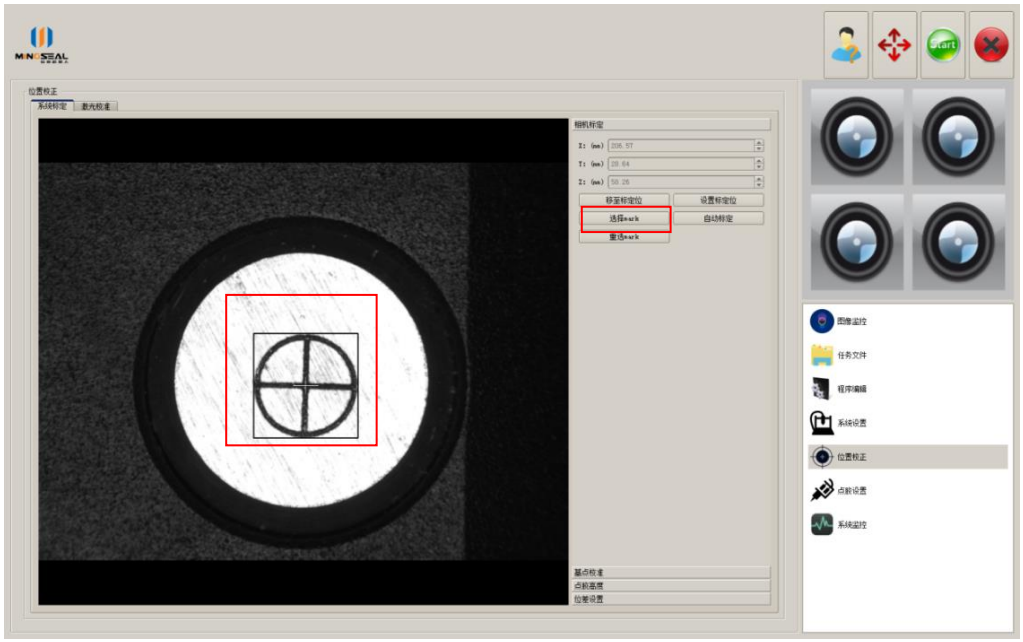

Figure 18 Select Mark figure

3) click the ‘automatic calibration’ button, then the system starts automatic calibration; the calibration process interface as shown in Figure 19;

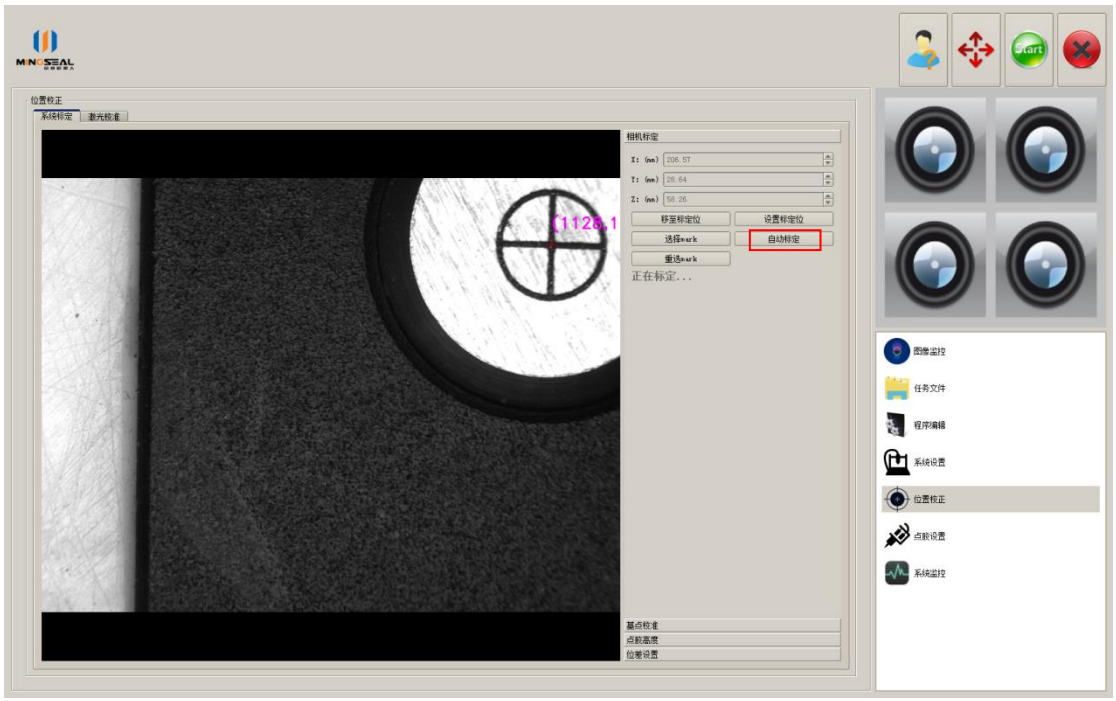

Figure 19 Automatic calibration process

4) after the automatic calibration, the interface will remind the user ‘calibration complete’, as shown in figure 20.

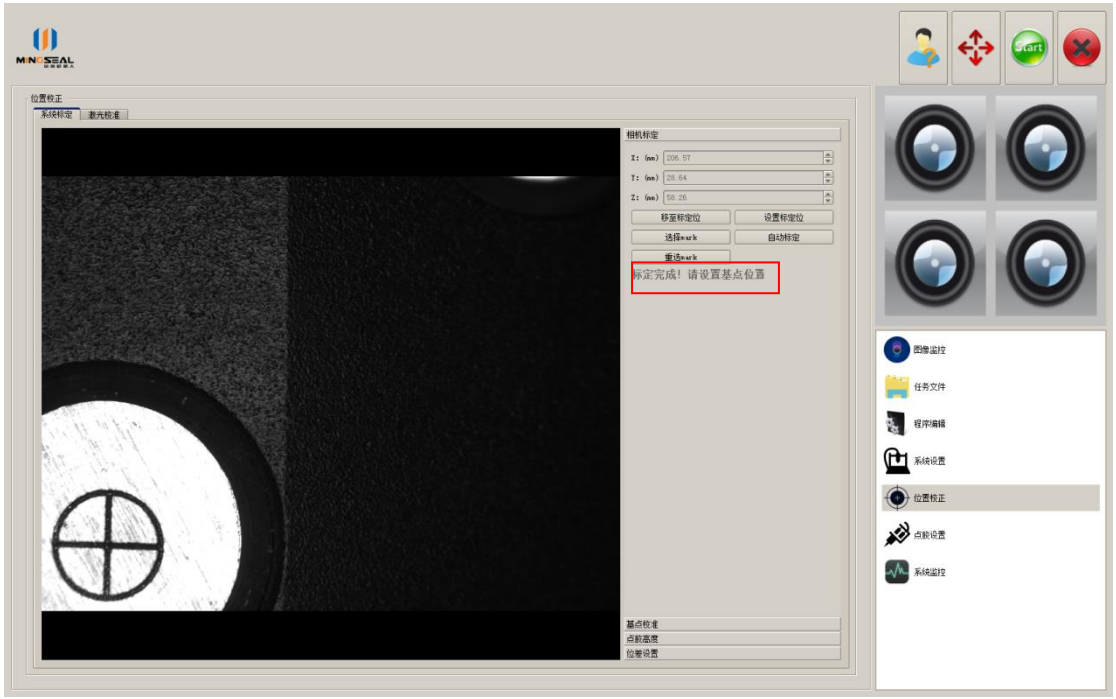

Figure 20 Automatic calibration complete

4.4.2 basis point calibration

1) Choose any position for dispensing in the work piece, click ‘positioning needle basic position’ button, if the needle is not in alignment with the dispensing position, move the platform to make the needle to it; then click ‘setting needle basic position’ button, recording the coordinates, to set it to be the **needle basic position**, and dispense on it; the parameters interface as shown in Figure 21;

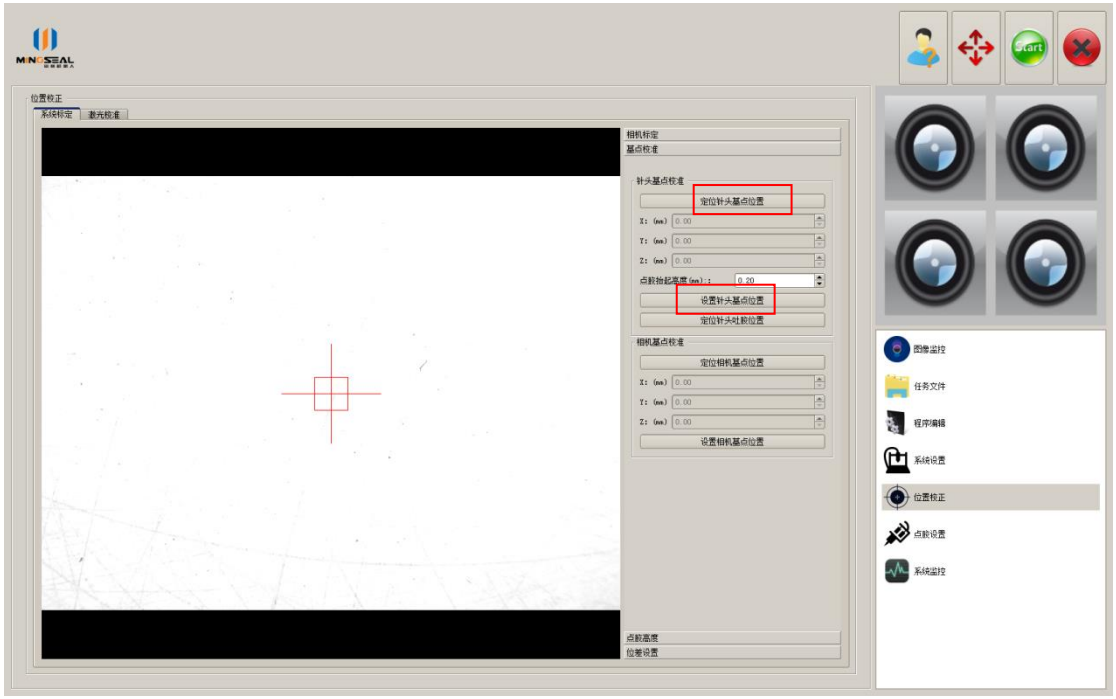

Figure 21 needle basic position

2) Set the **dispensing lift height**, dispensing lift height refers to the distance between needle and the work piece during dispensing in step 1, and the unit is mm;

3) Click ‘camera basic point positioning’; if the dispensing glue center is not in alignment with the cross center of the image field in step 1, then move the platform to make the two centers into coincidence; click ‘set camera basic position’ button, recording the coordinates, and set it to be the camera basic position, shown in figure 22;

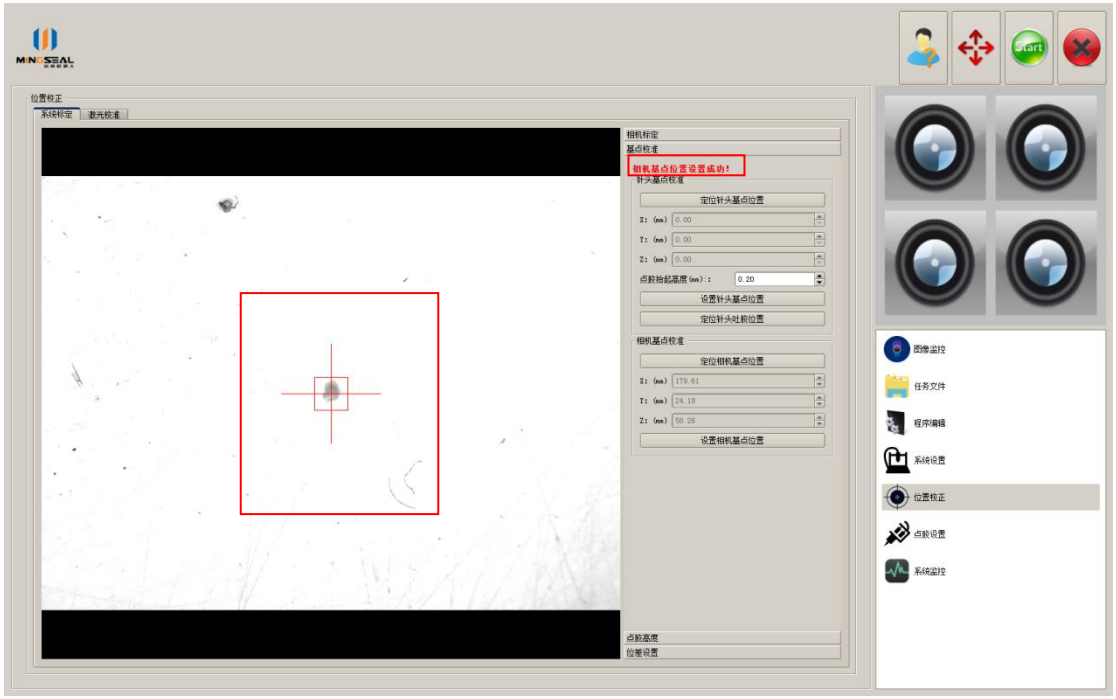

Figure 22 Camera basic position setting

4.4.3 dispensing height

Dispensing height refers to the needle height to work piece during dispensing work; the setting method is to move the platform to the right position for dispensing, click ‘set dispensing height basic position’ button, as shown in Figure 23.

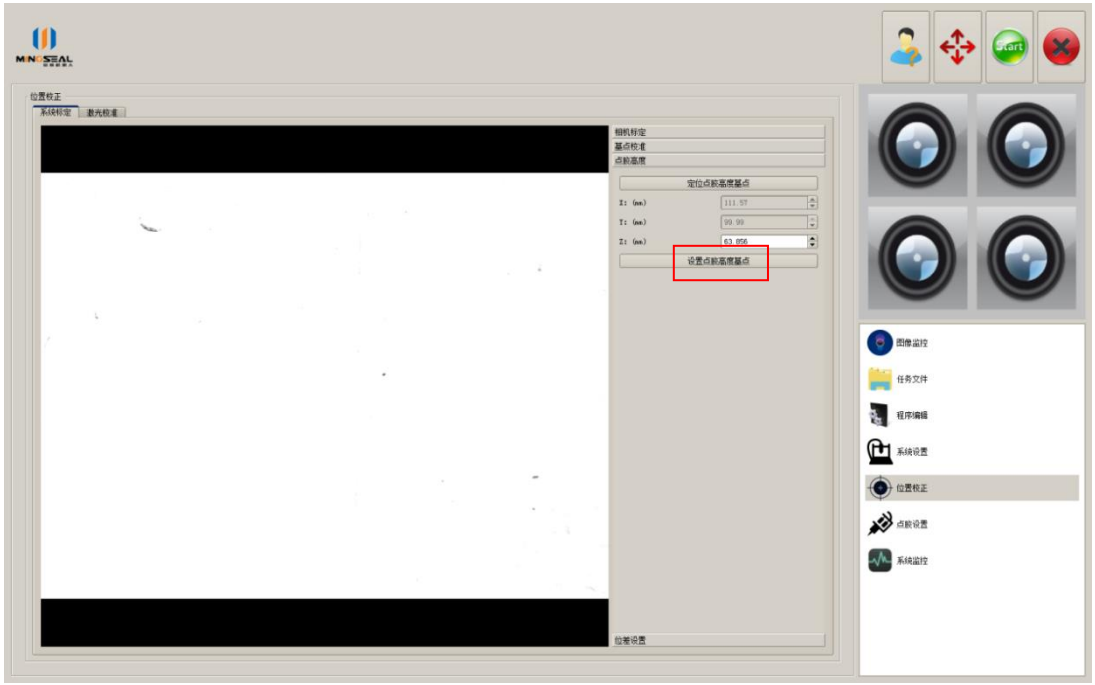

Figure 23 dispensing height setting

4.4.4 position difference setting

Position difference refers to the difference between calibration flat surface and work piece, and the unit is mm. The calculation method of the difference value is as following two:

Method 1: use a caliper (note the positive and negative input);

Method 2: move the platform, to make the needle and the calibration surface in touch, recording the Z axis coordinates to be 1, then move the platform to make the needle and work piece in touch again, recording Z axis coordinates to be 2; the value between 1 and 2 is the position difference.

Note: Position difference is divided into positive and negative, which is based on the calibration surface; negative value refers to the work piece surface lower than the calibration surface, and positive value refers to the work piece surface higher than the calibration surface.

4.5 Task programming

Click the ‘program editing’ button in the parameters setting areas of main interface, then the task programming interface will pop on.

4.5.1 Obtain the template image

1) move the platform to make the work piece in the vision field of camera;

2) click the ‘capture’ button to get a template image, then the camera stop image acquisition; if the camera is required in continuous acquisition state, click ‘quit’ button; the interface of template image capturing is as as shown in Figure 24.

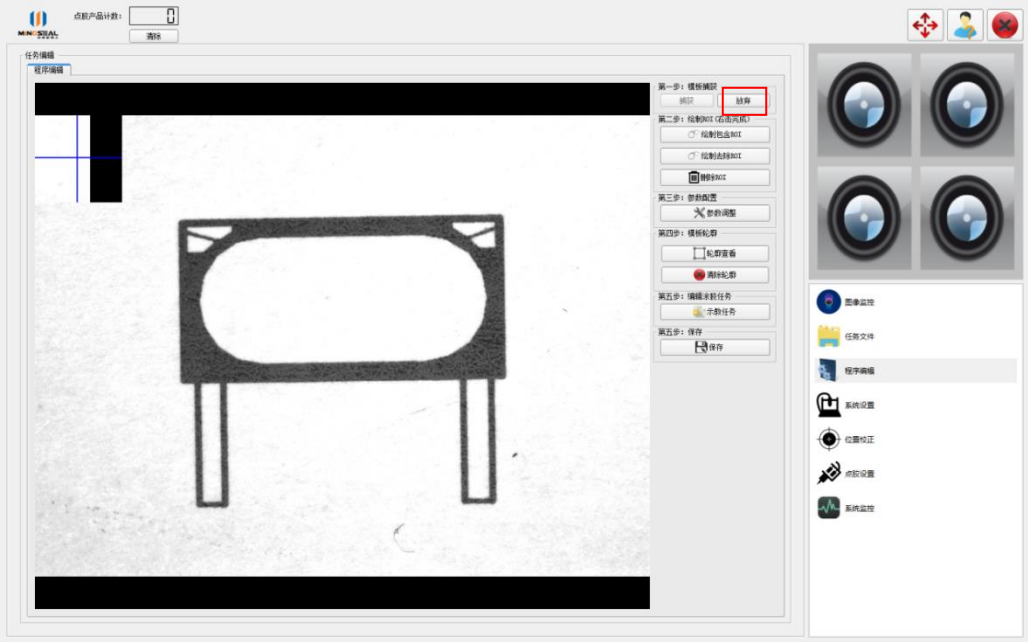

Figure 24 Template capture

4.5.2 Template ROI drawing

1) Click ‘draw containing ROI’ button, then left click the mouse to start the draw containing ROI in the image display area; right click to complete the draw containing ROI;

2) Click ‘draw removing ROI’ button, and left click the mouse to the image part to remove in the image display area; right click to complete the draw removing ROI; if the image quality is good, do not need to remove interference, and this step can be

skipped.

3) if the drawing ROI is not ideal, click the ‘delete’ button to delete the ROI, and draw it again; the operation interface is as shown in figure 25.

Figure 25 ROI drawing

4.5.3 Template parameters adjustments

1) click the ‘parameters’ button, the interface of template parameters setting will pop on, as shown in figure 26; the interface parameters are as follows:

The minimum matching degree: the minimum matching degree will be invalid if lower than this value; the general value for setting is 0.8; the larger parameter is, the faster operating does; but for parts with more interference, it can be appropriate to reduce the value;

Complete credibility: when the matching parameters is over this value, the searching will stop immediately and the current valve will be used; for the parts of very prominent appearance, the value can be reduced; the lower parameters is, the faster working speed is; the general value for setting is 0.99, which means optimal to be obtained in global search;

The maximum angle: the maximum deflection angle to match the work pieces

between image and template; the smaller value, the faster speed;

Maximum feature points: maximum use of the number of feature points for shape matching;

Contour contrast: it refers to the middle section of the work piece; when the degree of light and shade contrast is less than the value, the dividing line of part will be ignored; the smaller value is, the slower matching speed is.

Figure 26 Template matching parameters

2) Click again ‘parameters adjustment’ button after the matching parameters is set, then the setting interface of template matching parameters will be closed.

4.5.4 Template profile viewing

Click ‘profile view’ button, the part dividing line critical point will be indicated on the image display area of left side; the operator can judge the matching parameters of template is reasonable or not, according to these key points, which is as shown in Figure 27. If operator do not want to display these key points, click the ‘clean profile’ button to clean them from the image display area of left side.

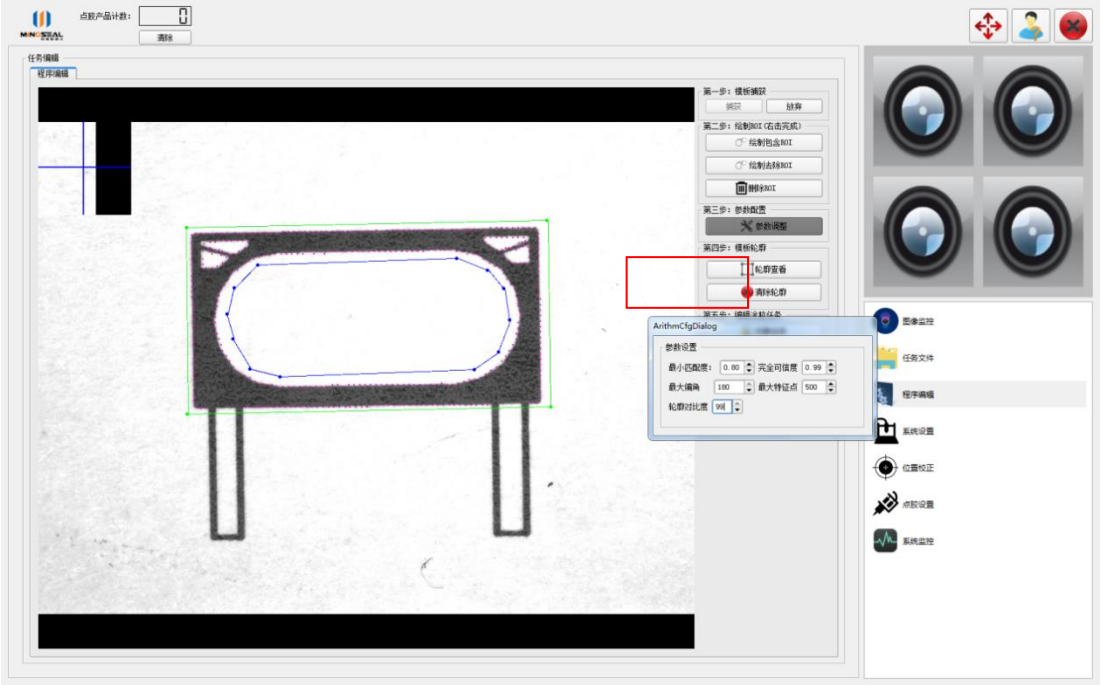

Figure 27 Profile viewing

4.5.5 dispensing task programming

Click the ‘task teaching’ button, the interface of task teaching will pop on, shown as figure 28; the key points involved in task programming can be divided into the following five categories:

Independent point: point for dispensing, which can be used in teaching type; any independent points or starting points can be inserted before or after it.

Starting point: line or circle for dispensing; independent point can be added before it, and middle point, arc point or ending point can be added after it.

Middle point: line for dispensing; which can be any point except for the first and last point; middle point & arc point can be added before or after it; the ending point can be added after it, if there is no.

Arc point: middle point in the Arc dispensing; starting points or middle points can be added before it, and middle or ending point can be added after it.

Ending point: The last point in the line or arc dispensing; starting point, middle point and arc point can be added before it, and independent point can be added after it.

Note: a trace line must have an ending point, otherwise the task is wrong.

Figure 28 Task teaching

The followings will take the runway-shape dispensing trace as an example, showing the dispensing task programmings:

1) Add the starting point near the intersection of the straight line and the arc, as shown in figure 29;

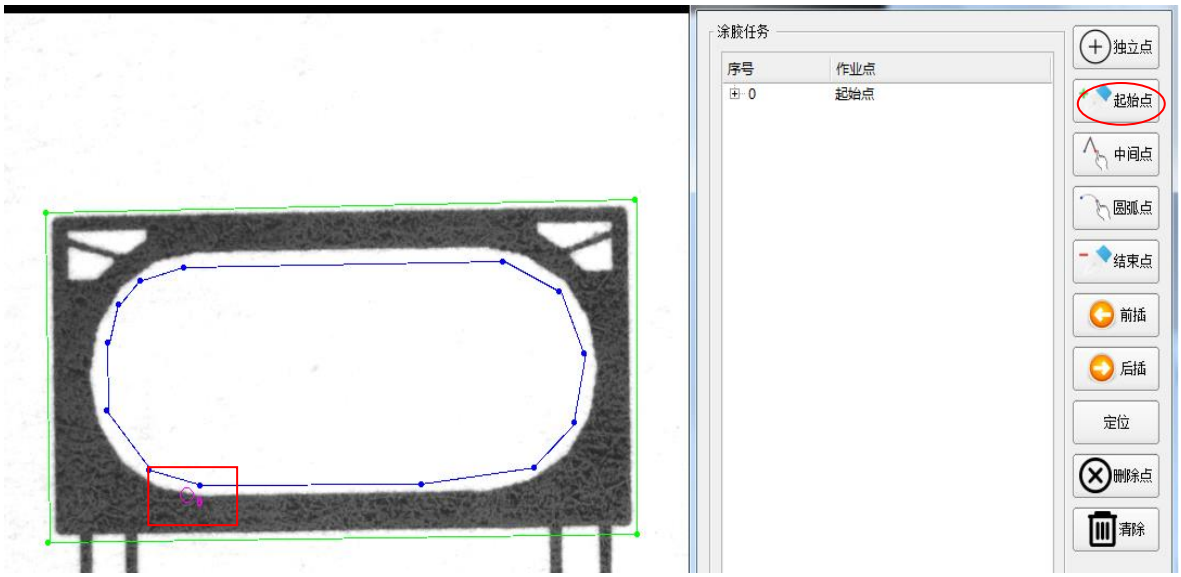

Figure 29 Starting point adding

2) Add the arc point on 45 degrees of the arc line, as shown in Figure 30.

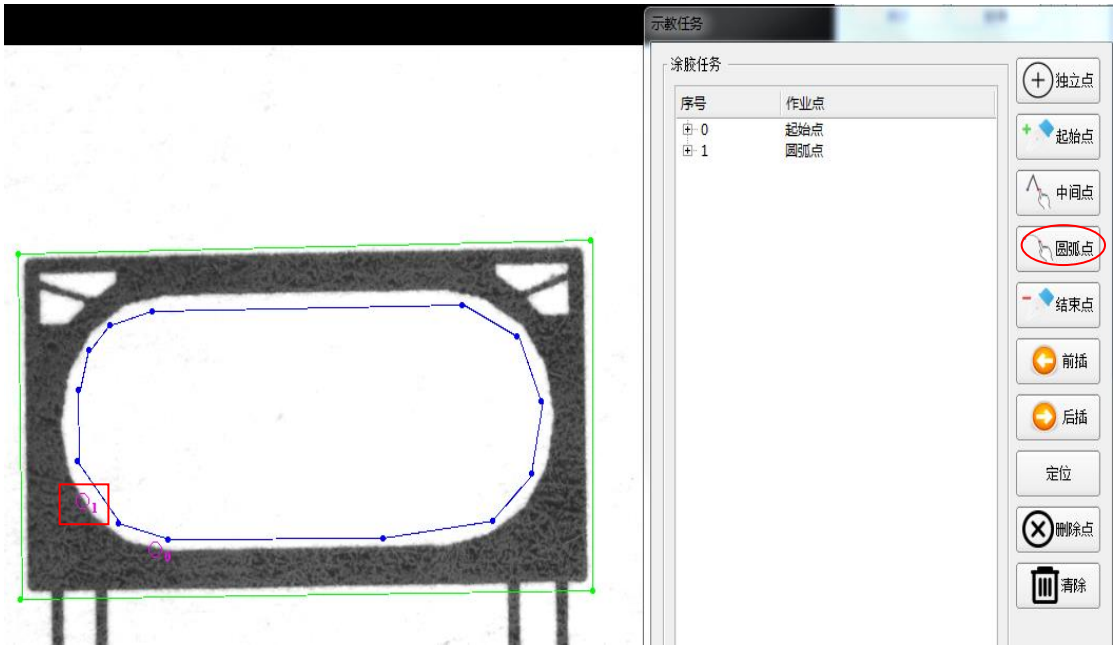

Figure 30 Arc point adding

3) Add the middle point on 90 degrees of the arc line, as shown in figure 31;

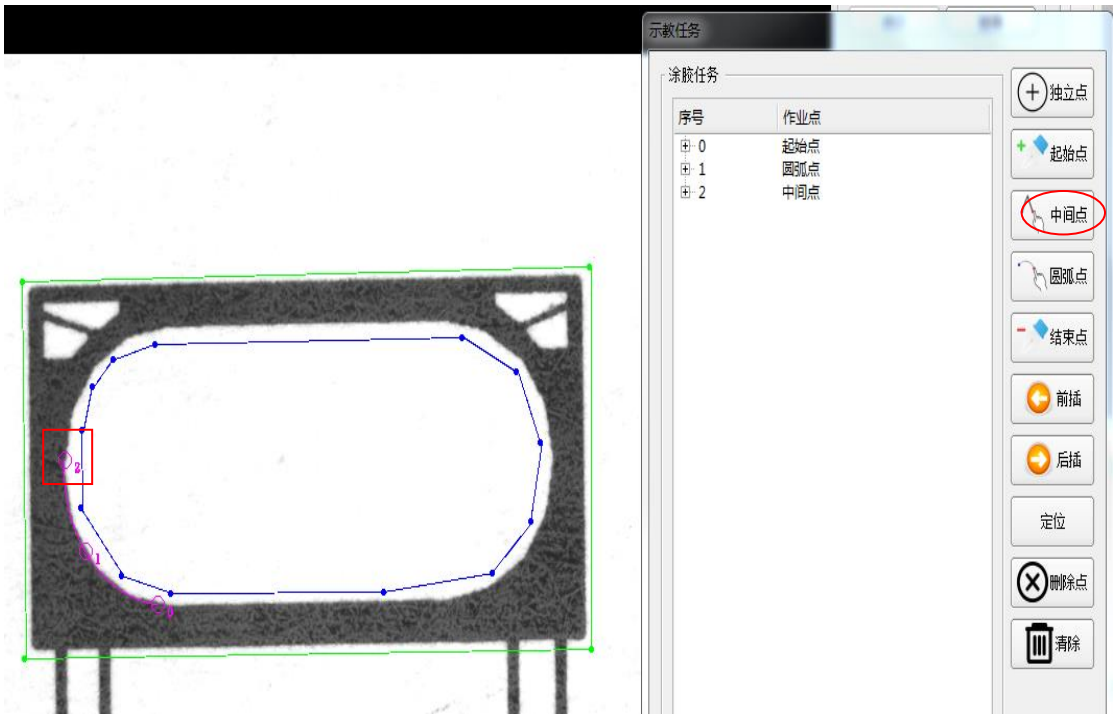

Figure 31 Middle point adding

4) Add the arc point on position of 45 degrees after middle point, as shown in figure 32;

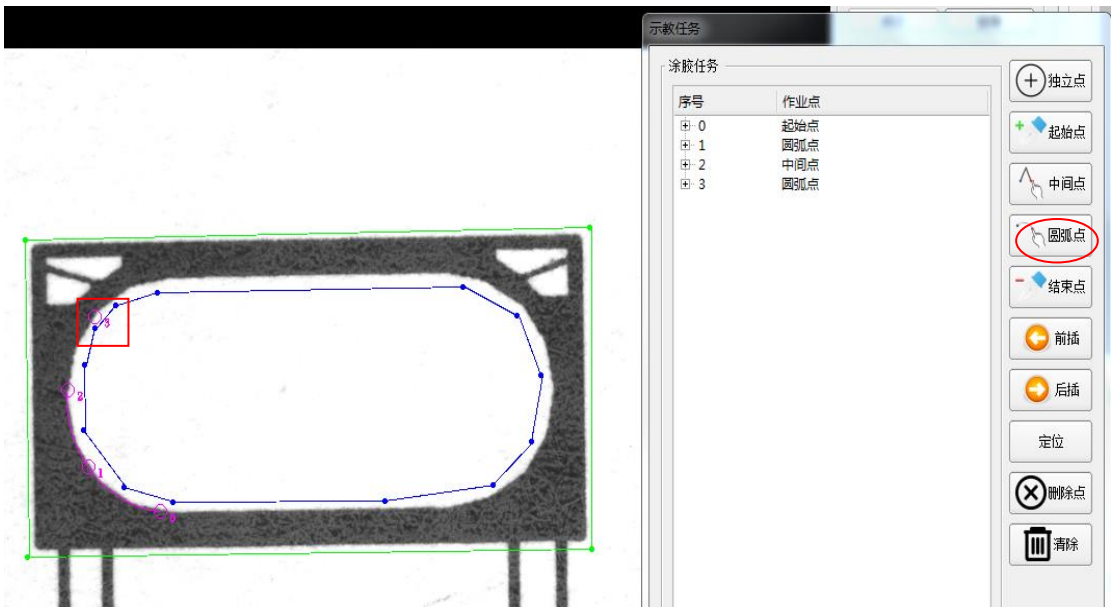

Figure 32 Arc point adding

5) Add the middle point near the intersection of arc line and straight line, after the middle point, as shown in figure 33;

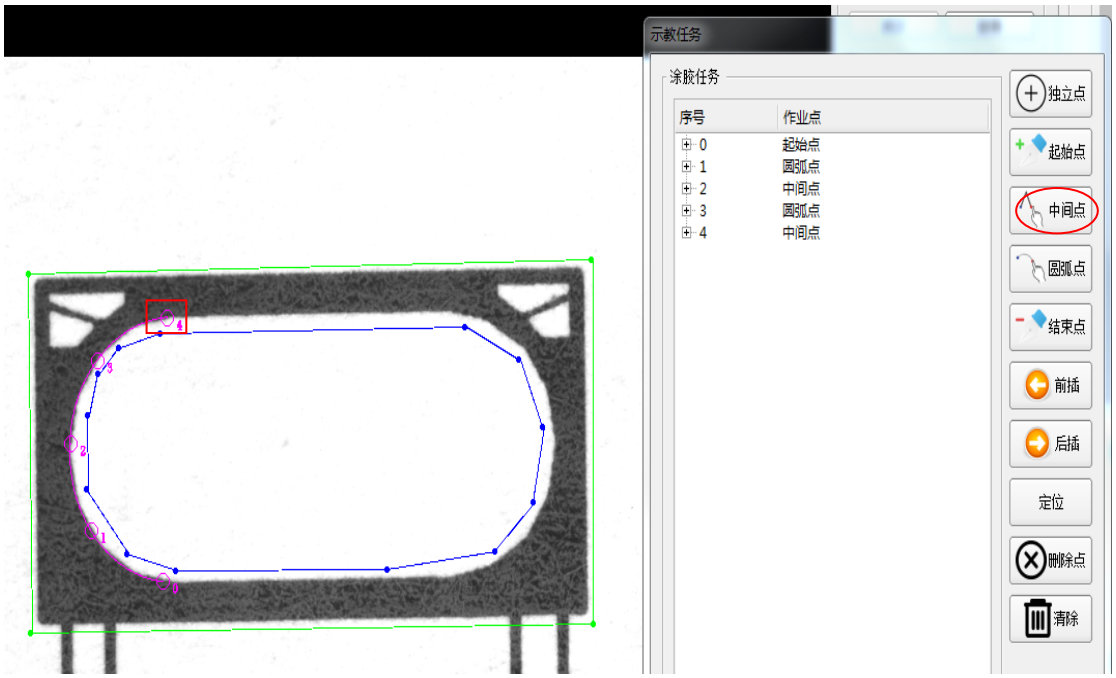

Figure 33 Middle point adding

6) Add the middle point near the next intersection of straight line and arc line, as shown in figure 34;

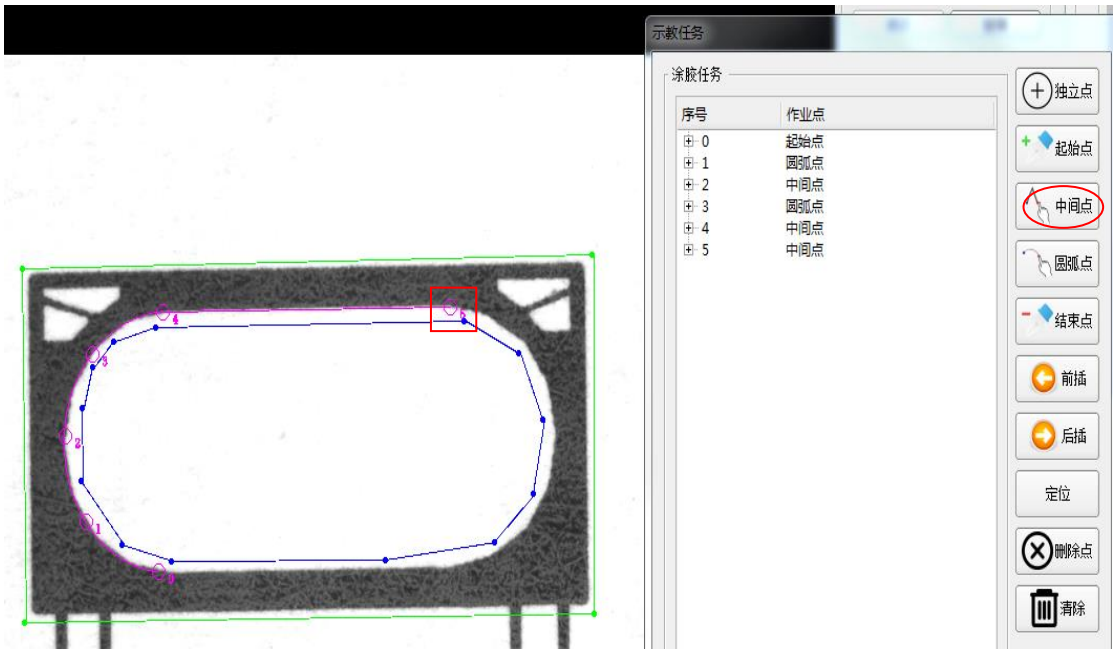

Figure 34 Middle point adding

7) Add the arc point on the position of 45 degree after the last middle point, as shown in figure 35;

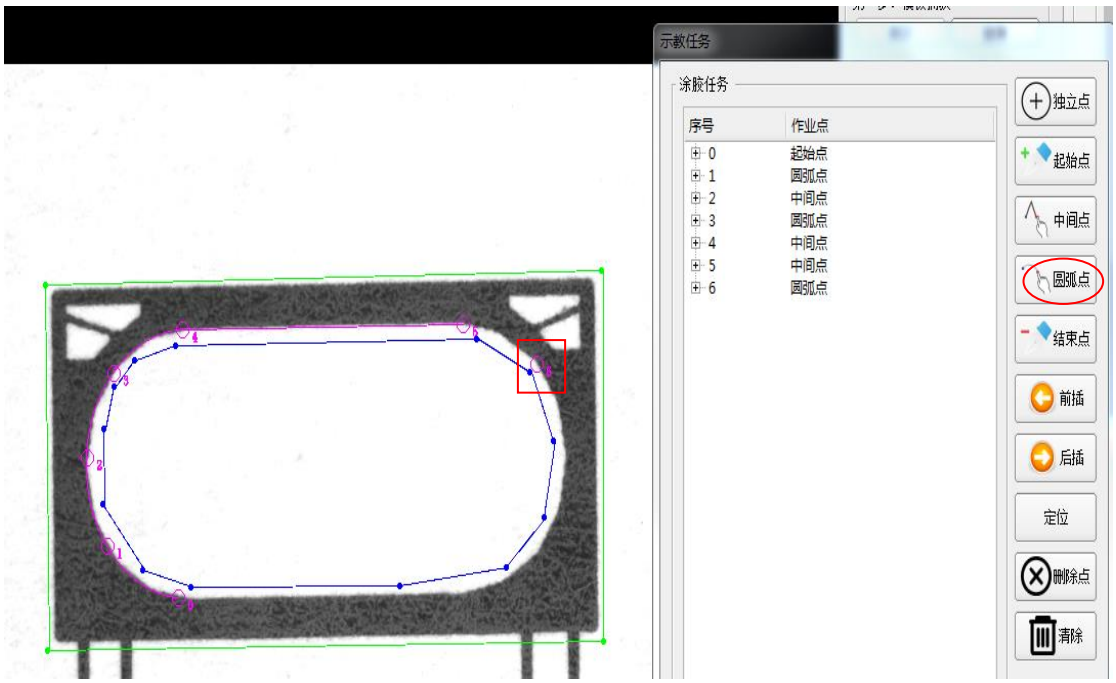

Figure 35 Arc point adding

8) Add the middle point on the position of 90 degree of the arc line, as shown in figure 36;

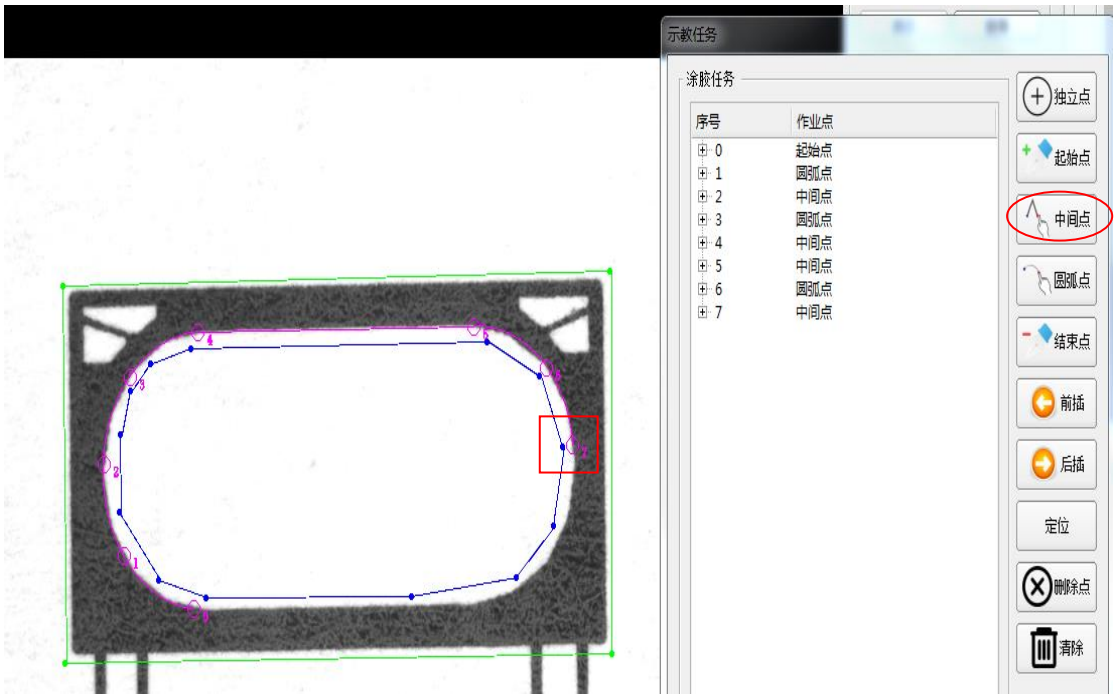

Figure 36 Middle point adding

9) Add the arc point on the position of 45 degree after the middle point, the arc point is as shown in figure 37;

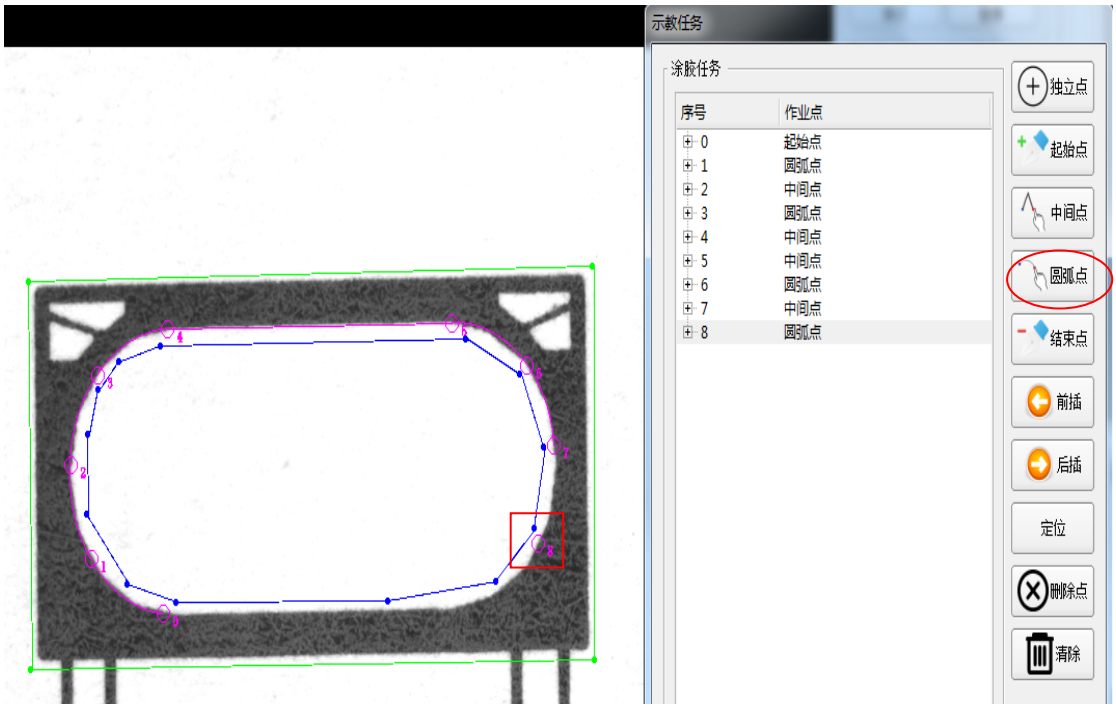

Figure 37 Arc point adding

10) Add middle point on the next intersection of arc line and straight line, as shown in figure 38;

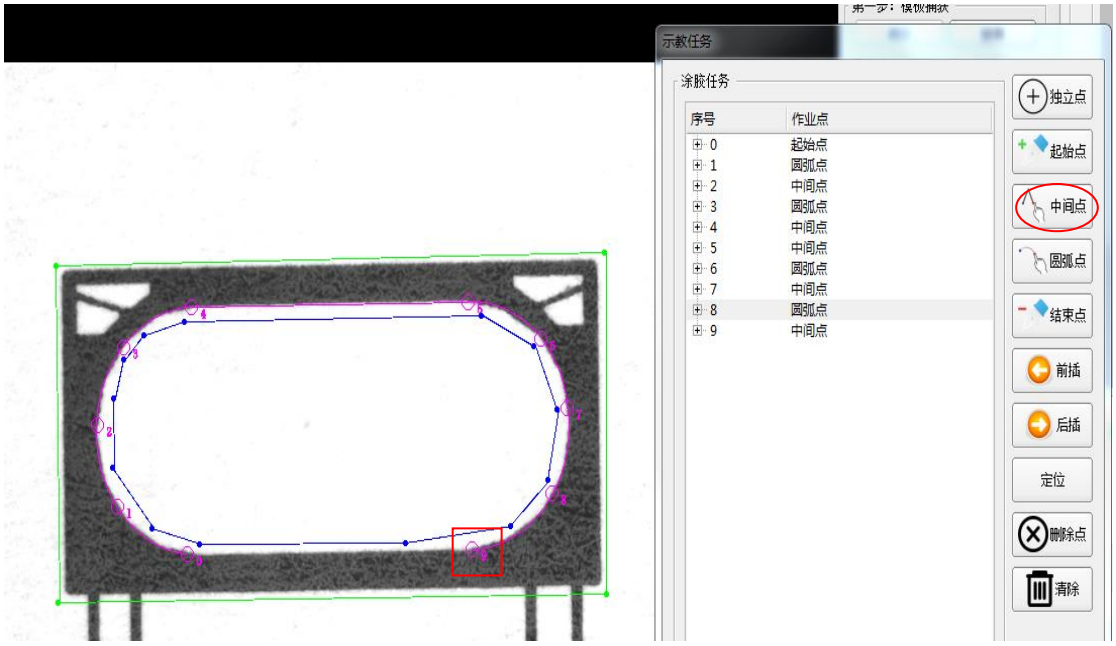

Figure 38 Middle point adding

11) Add the ending point near the starting point, as shown in figure 39;

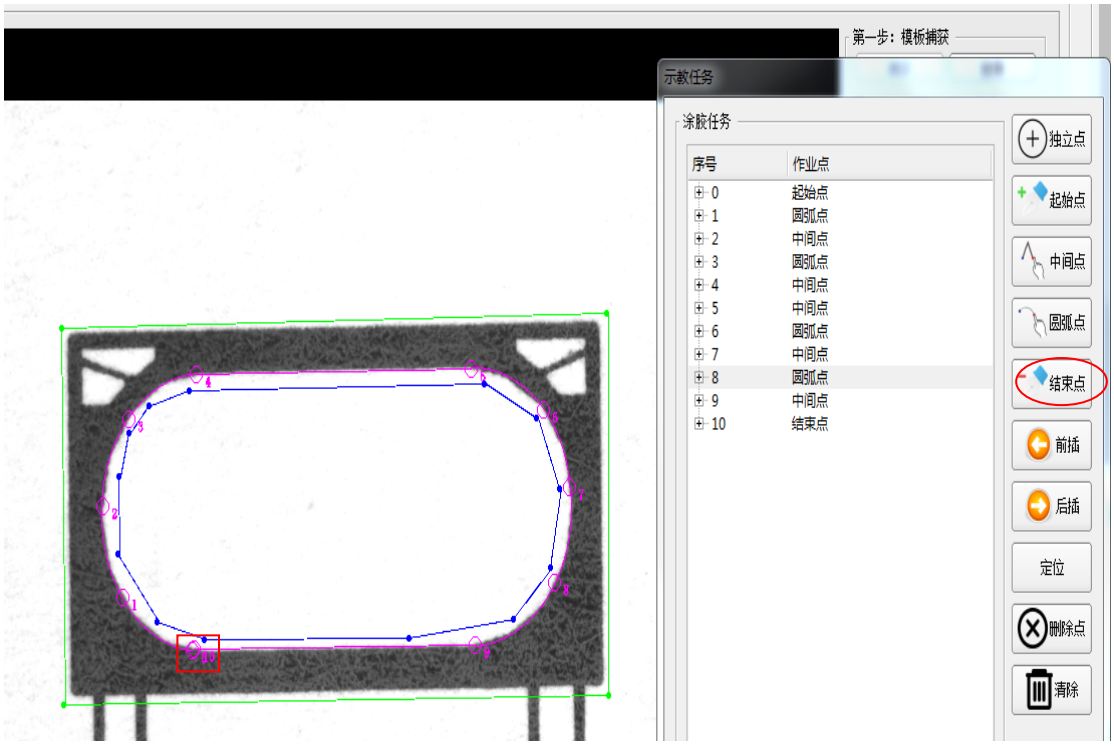

Figure 39 Ending point adding

12) if the independent dispensing point need to be added, then choose the independent point, and add it on the dispensing position, as shown in figure 40;

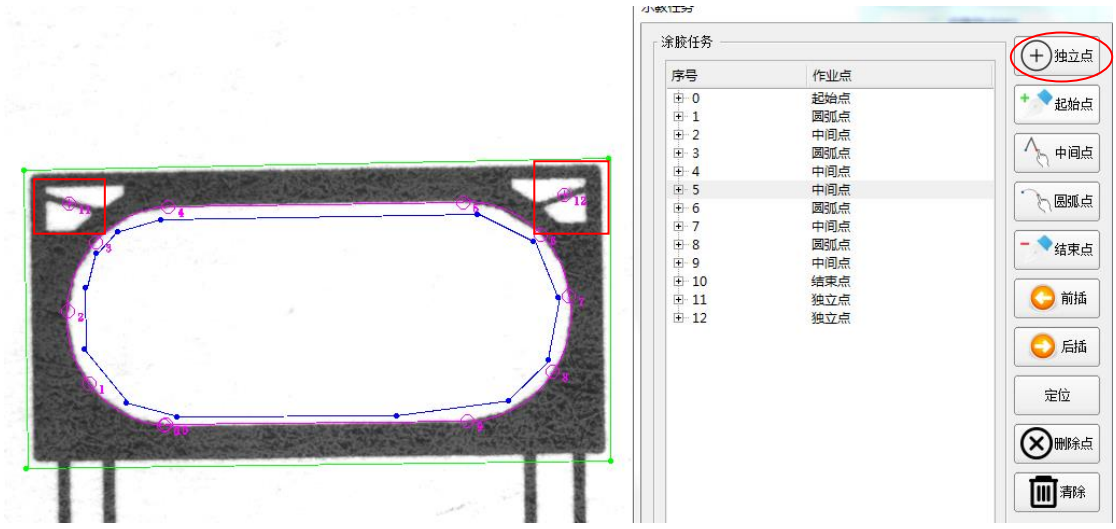

Figure 40 Independent point adding

13) After the task programming, if some points need to be added in the middle section, user can use ‘front insert’ or ‘rear insert’ button; for example, if one middle point need to be added after the No. 4 middle point, firstly click the No.4 point in the tasks list, and click ‘rear insert’ button, then click ‘middle point’ button; left click the mouse on the position need to add point in the left area of image, to complete the adding operation. After the operations, then click ‘rear insert’ to choose rear insert, as shown in figure 41; same operations for front insert before the selected point.

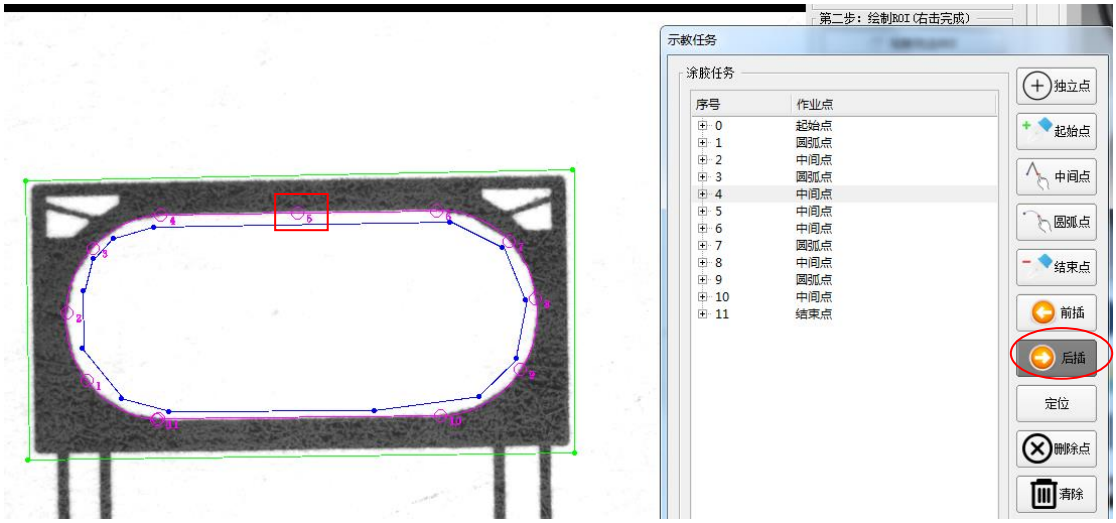

Figure 41 Point rear-inserting

14) Key point positioning; choose one key point in the dispensing tasks list, then click ‘positioning’ button, the platform will move the needle to the point position; ‘positioning ’button as shown in figure 42;

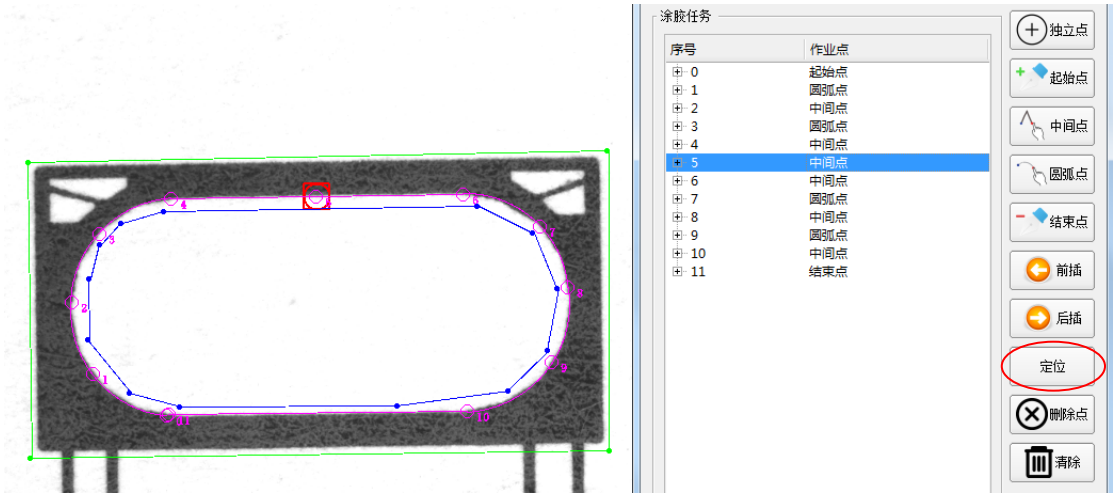

Figure 42 Key point positioning

15） Key point deletion; choose the key point to delete in the dispensing tasks list, then click the ‘delete’ button to delete the key point;

16) All key points deletion; click ‘delete’ button, then the delete confirmation interface will pop on; select "yes" option to delete all the key points in the dispensing tasks list, as shown in figure 43;

Figure 43 All key points deletion

17）Exit; click ‘confirm and exit’ button to exit the teaching tasks programming page.

4.5.6 Parameters saving

Click the ‘save’ button in the 5th step, to save all the parameters set in the programming interface, as shown in figure 44;

Figure 44 Parameters saving

4.6 System setting

Click the ‘system setting’ button in the parameter setting area on the main interface, the left page will go to the system setting page, as shown in figure 45.

Figure 45 System setting

4.6.1 Running setting

The main parameters on Running setting interface are as below, shown in figure 46:

Vacuum adsorption: when the vacuum adsorption is chosen during running, PLC will turn on the vacuum adsorption, to adsorb the work piece on the fixture board, so that it can be fixed; if user does not need the vacuum adsorption function, then remove the hook on the interface;

Empty camera running: use the cross in image to place the dispensing needle when running, to position the dispensing trace;

Cycle operation mode: After selecting, click the ‘run’ button in PLC, then the cycle mode is running; if not selecting, only run once;

Pre-dispensing: If the needle begin to dispense but with a slow speed, user can select this option, to make the needle pre-dispensing before the dispensing task begins;

Dispensing No.: the numbers of pre-dispensing;

Dispensing delay: the delayed time when pre-dispensing, and the unit is ms;

xy axis idle-running speed: xy axis moving speed of platform when dispensing task is running;

z axis idle-running speed: z axis moving speed of platform when dispensing task is running;

Acceleration: platform moving speed in increasing;

Deceleration: platform moving speed in decreasing;

Speed in inflection point: platform moving speed in inflection point;

Acceleration in inflection point: platform acceleration speed in inflection point;

Camera staying time in shooting: the staying time when platform move to the position for shooting;

Shooting positioning speed: platform moving speed when the shooting is in positioning;

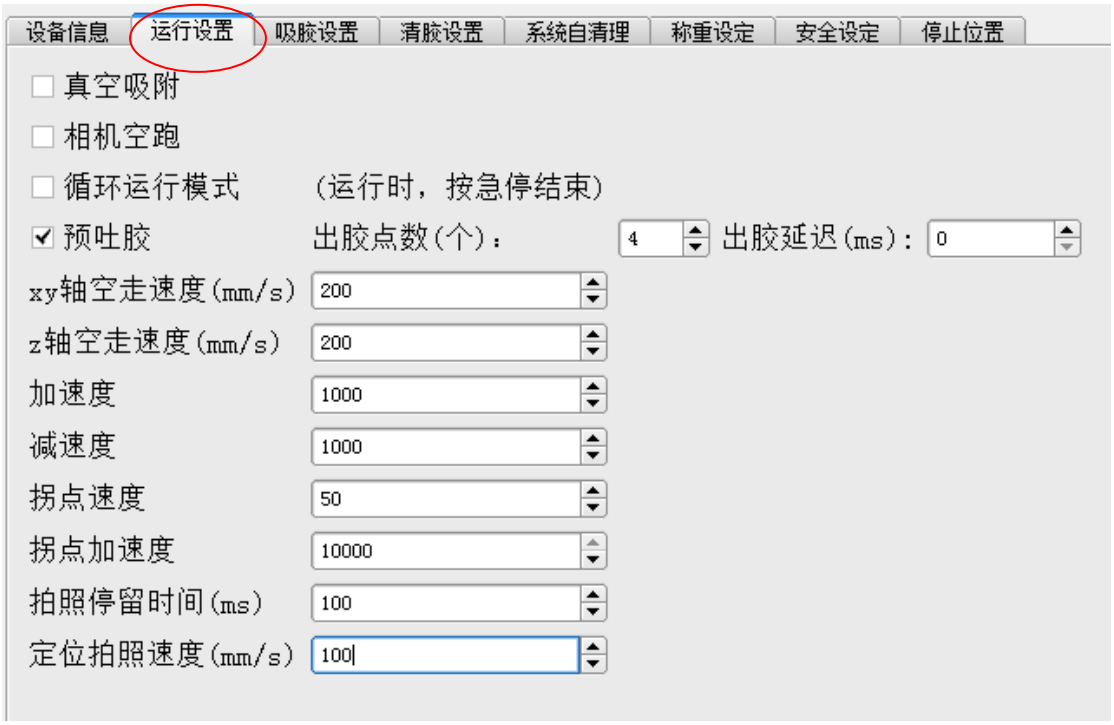

Figure 46 Running setting

4.6.2 glue intake setting

Glue intake setting refers to setting the parameters related to glue automatic intake, and the main parameters as below, shown in figure 47:

Automatic glue intake: when the option is selected, the system will automatically perform the action of glue suction after a certain number of work pieces are dispensed;

Glue intake interval: the work pieces number during interval in automatic glue intake;

Glue intake time: the time taken in automatic glue intake;

Glue intake position setting: when the platform move to the position for glue intake, click ‘glue intake position setting’ button, then set the coordinates to be automatic glue intake position;

Glue intake positioning: click the ‘glue intake positioning’ button, and the platform will move directly to the position for glue intake.

Figure 47 Glue intake postion

4.6.3 Glue-cleaning setting

Glue-cleaning setting is used for setting the position of clean glue, and the interface as shown in figure 48; move the platform to glue-cleaning position, click ‘glue-cleaning setting’ button, to set this position to be the glue-cleaning position. Click the ‘glue-cleaning positioning’ button, so that the platform can move to the set glue-cleaning position.

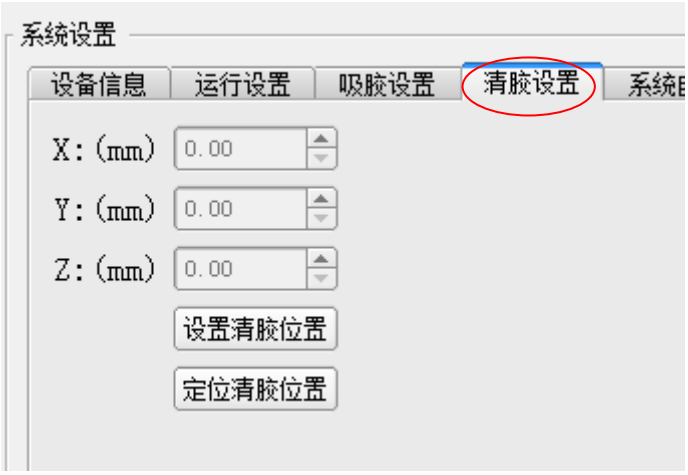

Figure 48 Glue-cleaning setting

4.6.4 system self-cleaning

Some glue may be curing when the machine is not running for a long time. In order to solve this problem, the self-cleaning function has been added into the system. System self-cleaning function is mainly for performing automatic dispensing and glue intake actions when system is not in dispensing task,and to prevent the glue from curing; the interface as shown in Figure 49 and parameters are as follows:

Cleaning interval: system self-cleaning interval time, and the unit is ms;

Cleaning break: the time when system in glue-cleaning position, and the unit is ms;

Glue-cleaning points: the dispensing points when system in glue-cleaning position;

Glue-intake time: the break time when system in self-cleaning position, and the unit is ms;

Cleaning start: click ‘cleaning start’ button, the system begin to self-clean;

Figure 49 System self-cleaning

4.7 Dispensing setting

Dispensing setting are mainly used for setting key points and the related dispensing parameters; click 'dispensing setting' button in the parameters setting area of main interface, to get the dispensing setting interface, as shown in figure 50.

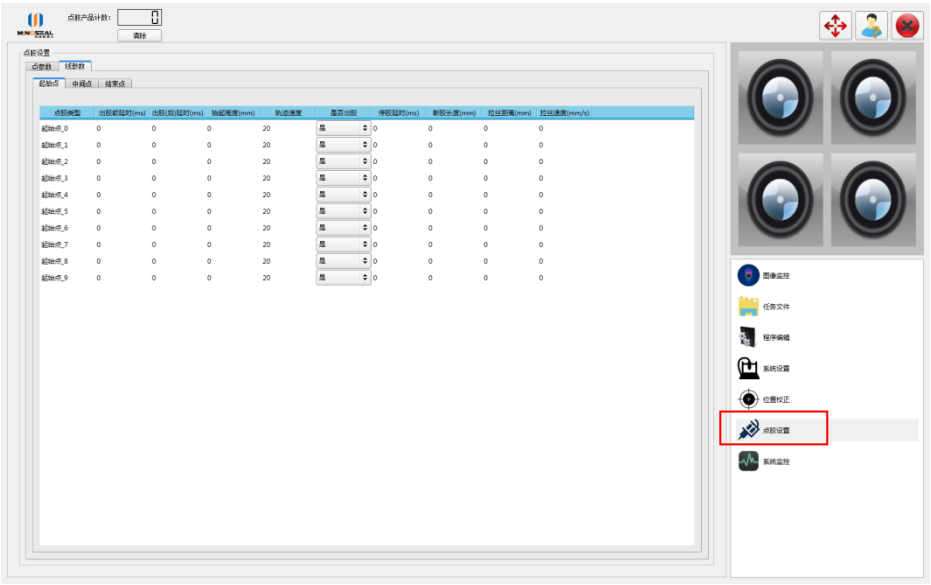

Figure 50 dispensing setting

4.7.1 points parameters

Points parameters are mainly used for setting the dispensing parameters of tasks, and the interface as shown in figure 51; parameters are follows:

Dispensing delay: the dispensing time of relevant independent point, and the unit is ms;

Dispensing pause time: the break time of dispensing of relevant independent point, and the unit is ms;

Lifting height: the needle lifting height after dispensing in relevant independent point; unit is mm;

Glue or not: dispensing with glue or not in relevant independent point;

Pause or not: stop or not after dispensing in relevant independent point;

Figure 51 Point parameters

Appendix:

Basler camera drivers install:

1. Double-click basler camer drivers‘Basler pylon x86 4.2.1.4845.exe’, and the installing interface is as shown in figure 52; then click ‘Next’ button;

Figure 52

2. Select ‘I accept the terms in the license agreement’ option, and click ‘Next’ button;

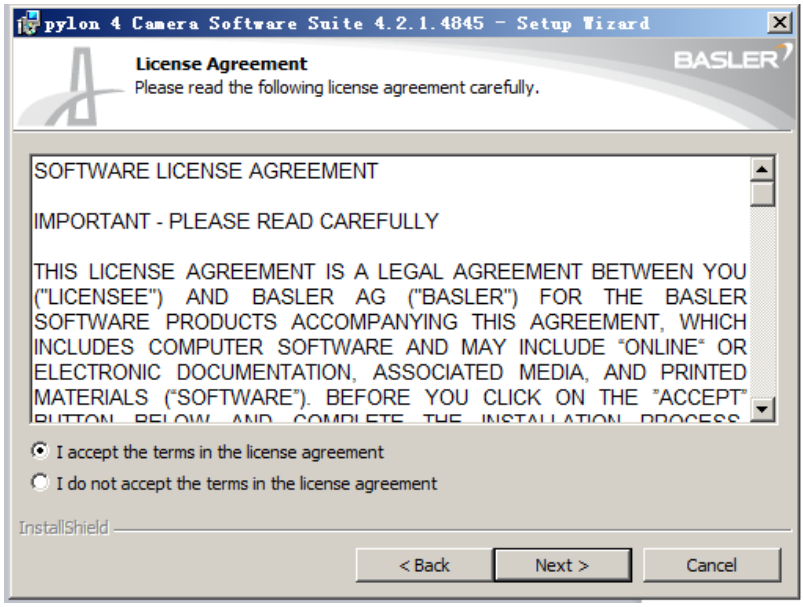

Figure 53

3. Input User Name, click ‘Next’ button;

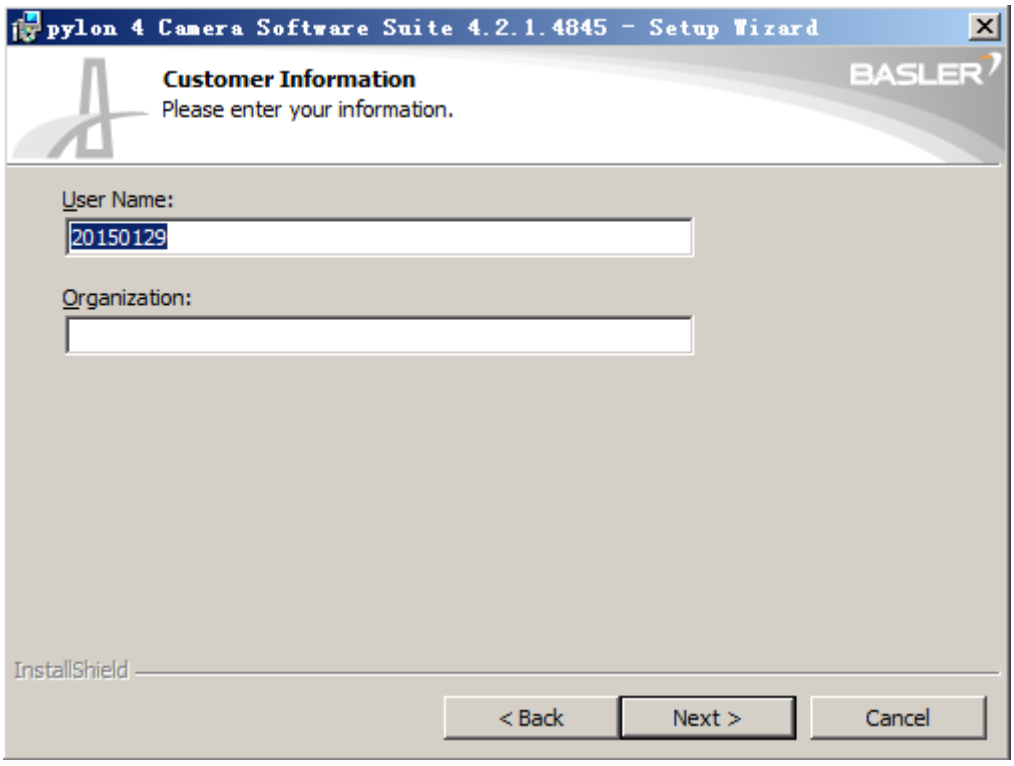

Figure 54

4. Click ‘Next’ button;

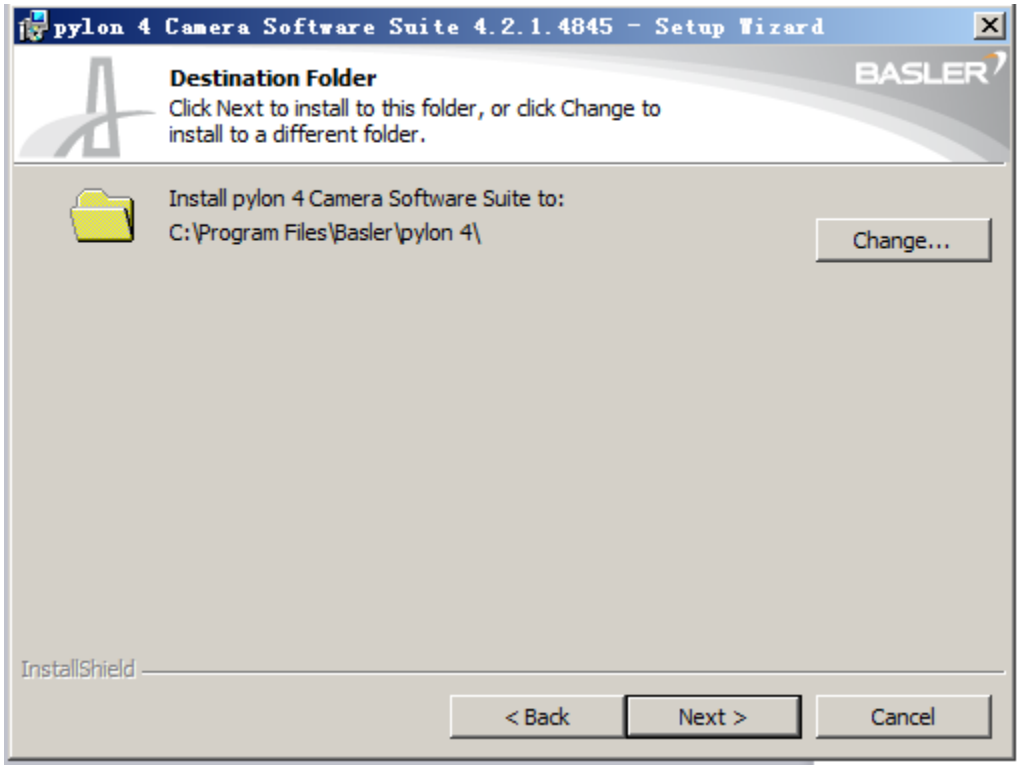

Figure 55

5. Click ‘Next’ button, according to the functions shown in figure 56 and figure 57;

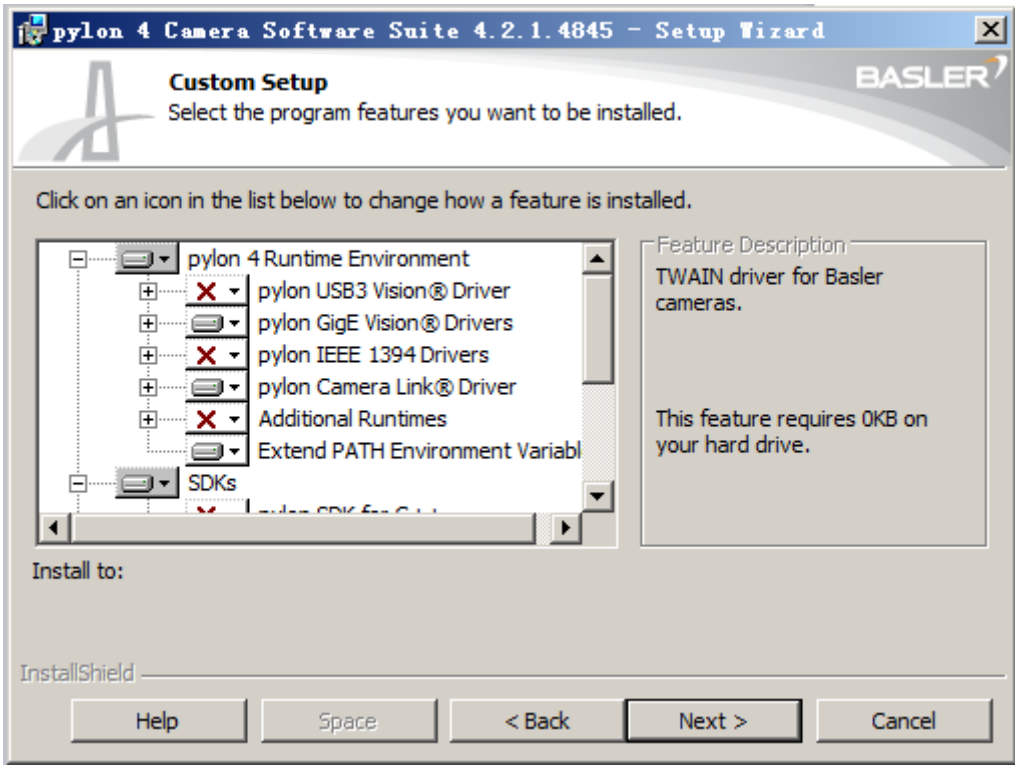

Figure 56

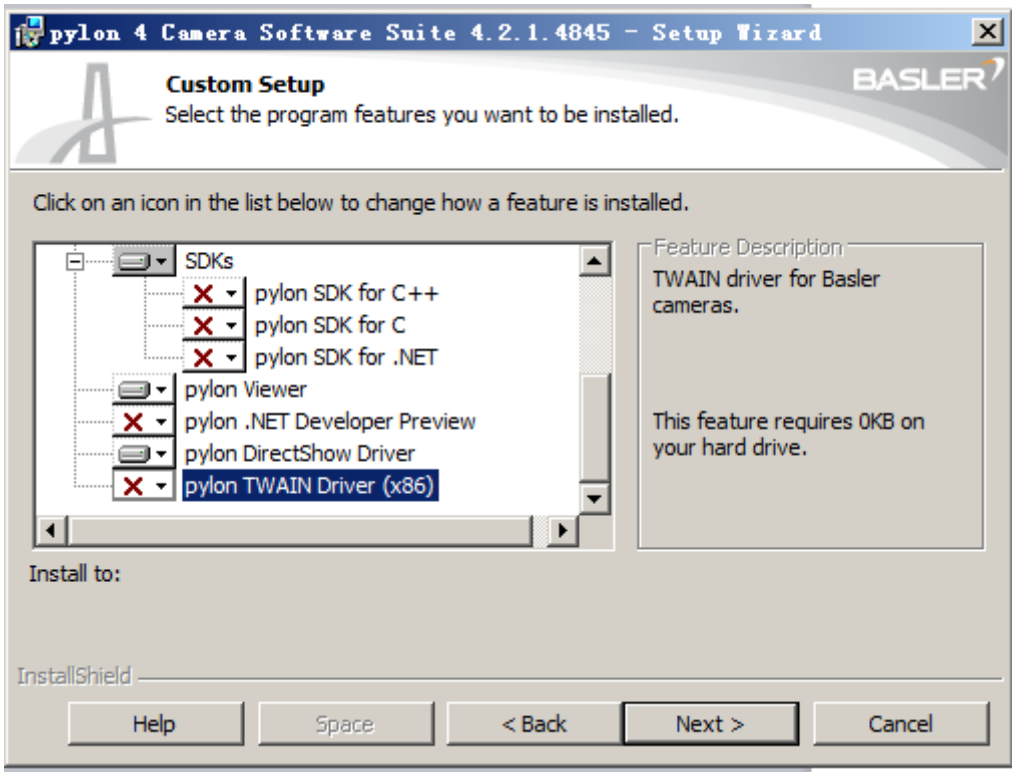

Figure 57

6. Click ‘Install’ button, waiting for the program installation to complete.

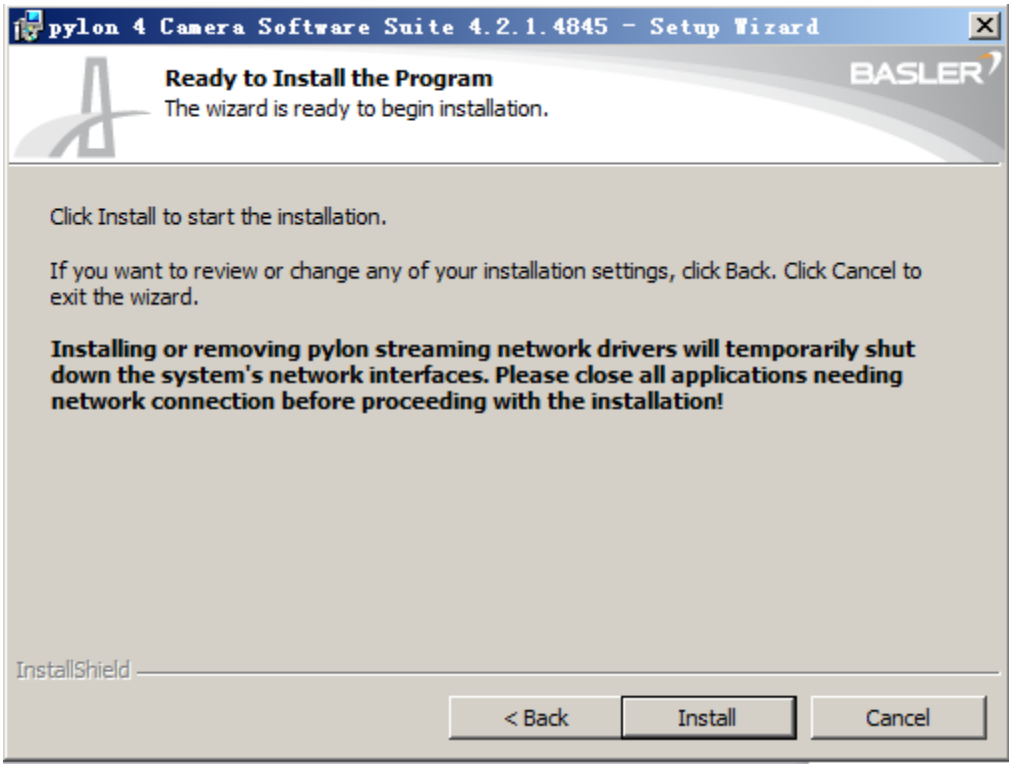

Figure 58

7. Click ‘Finish’ button, and complete the installation;

Figure 59

Set Basler camera(Taking win7 system as an example)

1. Click icon （ ） on bottom right of computer desktop, then click to open ‘network and sharing center’, as shown in figure 60(Interface will be little different);

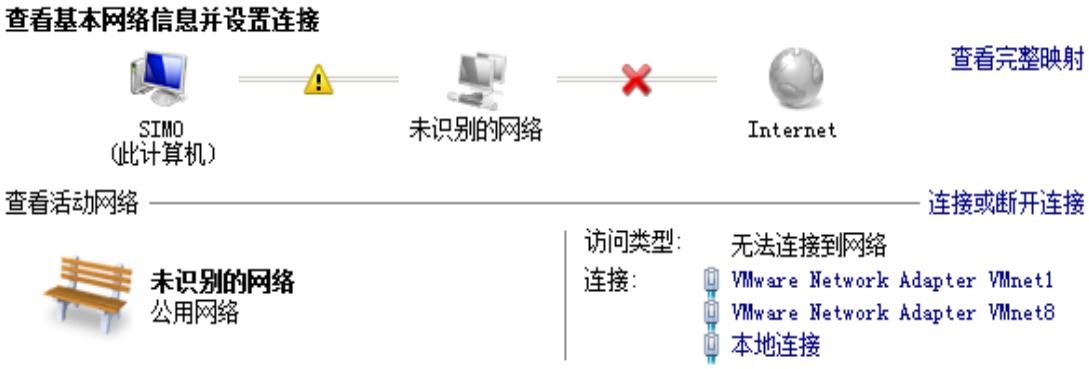

Figure 60

2. Click ‘local connection’, then click ‘attribute’ button;

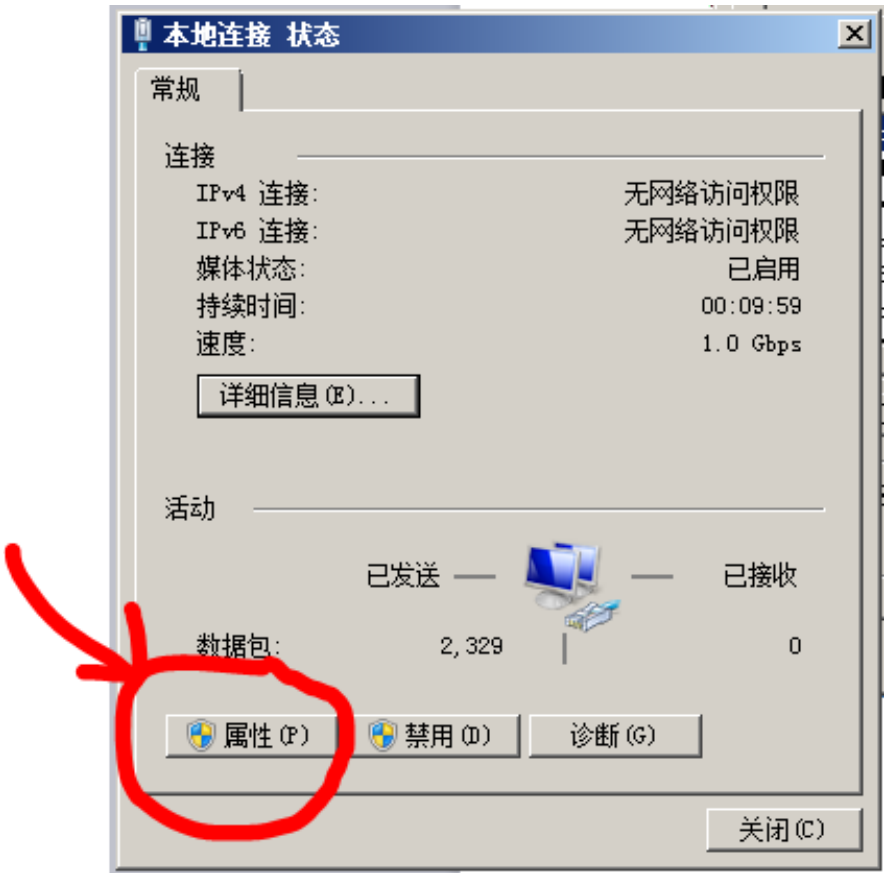

Figure 61

3. Click ‘config’ button;

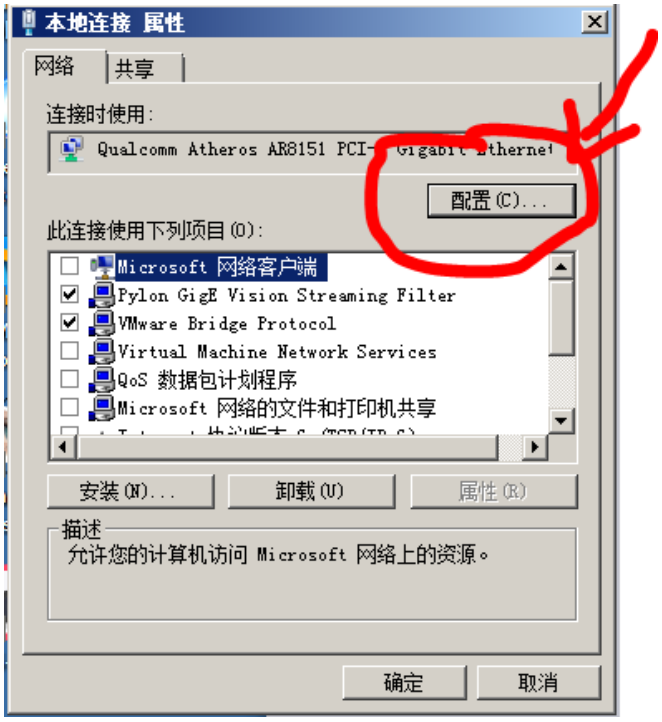

Figure 62

4. click ‘Advanced’ tab, and select the Jumbo frame (or giant frame) property to set its value to ‘9KB MTU’; click ‘confirm’ button to return to the local connection interface;

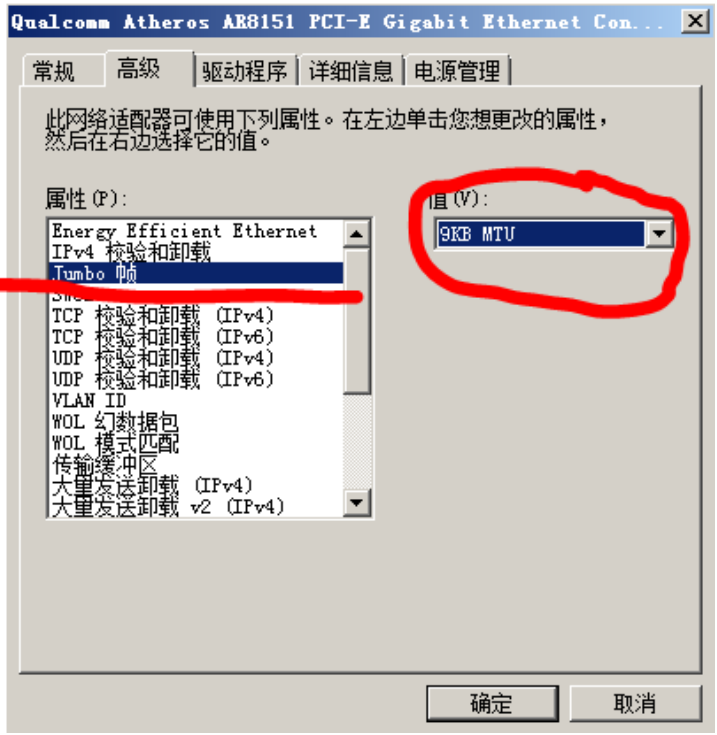

Figure 63

5. Click ‘attribute’ button;

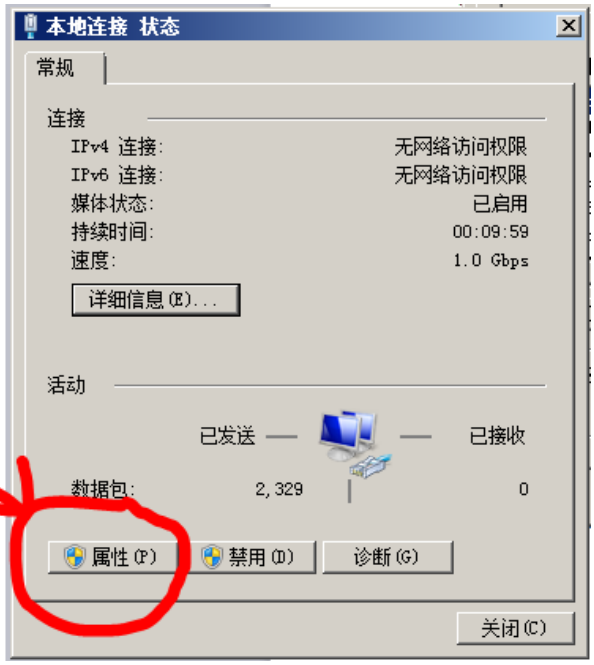

Figure 64

6. Select ‘Inrernet protocol version 4(TCP/IPv4)’ option, and click ‘attribute’ button;

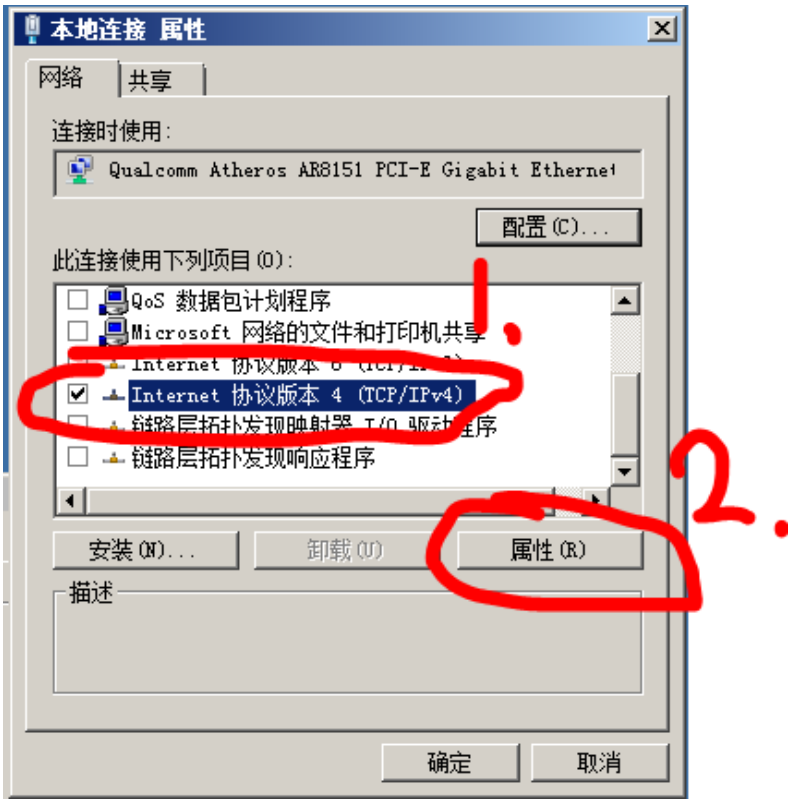

Figure 65

7. Click ‘confirm’ button to complete the Network adapter settings, according to the IP address shown in figure 66;

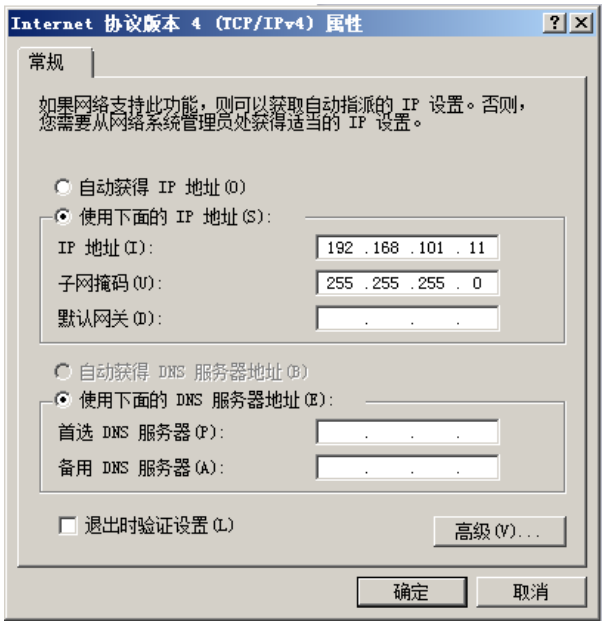

Figure 66

8. Double-click the 'pylon IP Configurator' shortcut in the desktop to open, and set camera IP address, as shown in Figure 67;

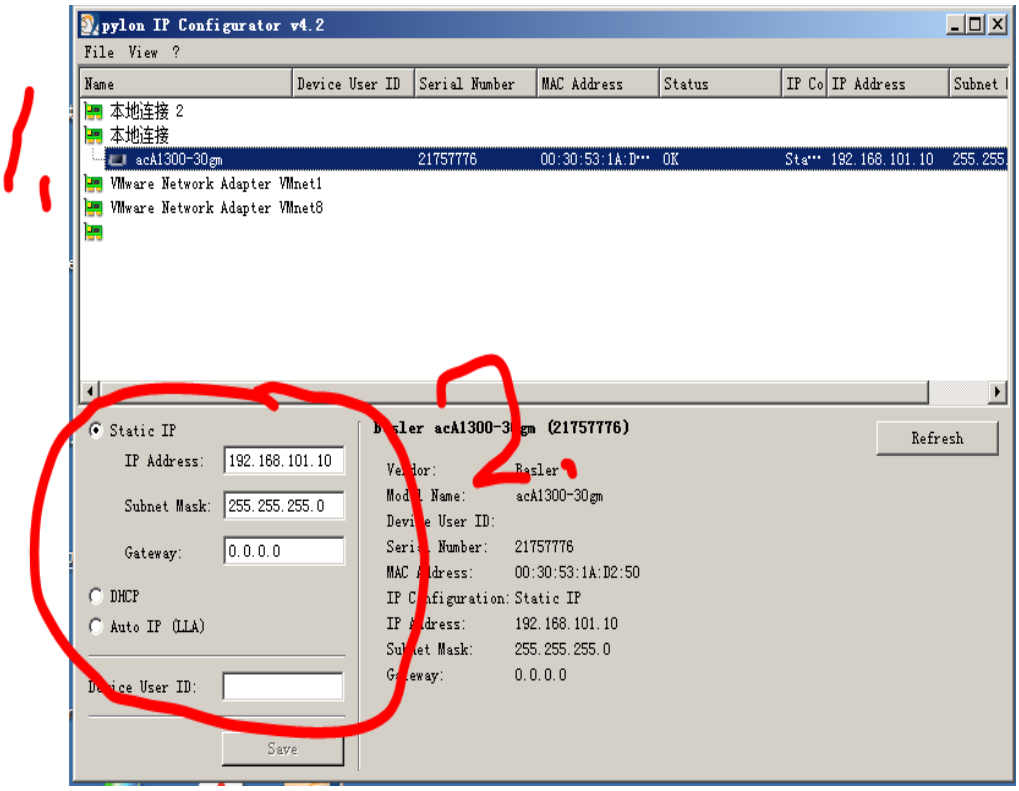

Figure 67

9. Click ‘save’ after setting completed, and click ‘Refresh’ button; if camera status is as shown in figure 68, that means camera IP address setting is completed; otherwise, pls re-check and confirm whether the local connection IP address and camera IP address are in one segment; if not, pls reset it according to the procedure above.

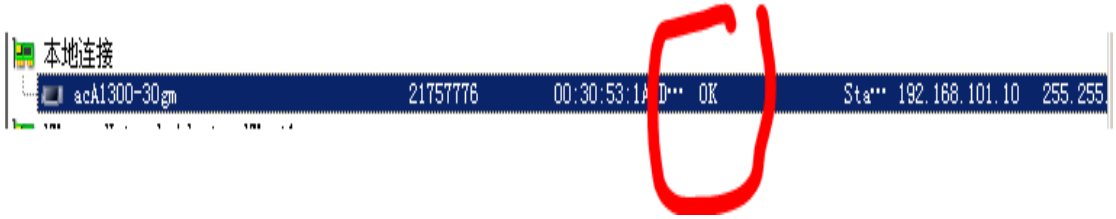

Figure 68