Fully-automatic Splicing Machine

Operating Manual

BMM08G

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Contents

1. Equipment Overview：

The equipment is an SMD automatic splicing machine (8mm paper tape, 12mm paper tape, 16mm paper tape + plastic tape). The equipment is specially developed to meet the need of replacing materials quickly without shutdown on the SMT automatic production line. The equipment can realize automatic detection of the head and tail of two strips with the same specification, precise cutting, automatic connection, adhesive film wrapping and automatic feeding after connection. Provided with an electrical device, the equipment is small and light and is applicable to many working places. The connection precision is high and its success rate is over 95%. The equipment is easy to operate, greatly improving the speed, saving labor force and improving the production efficiency.

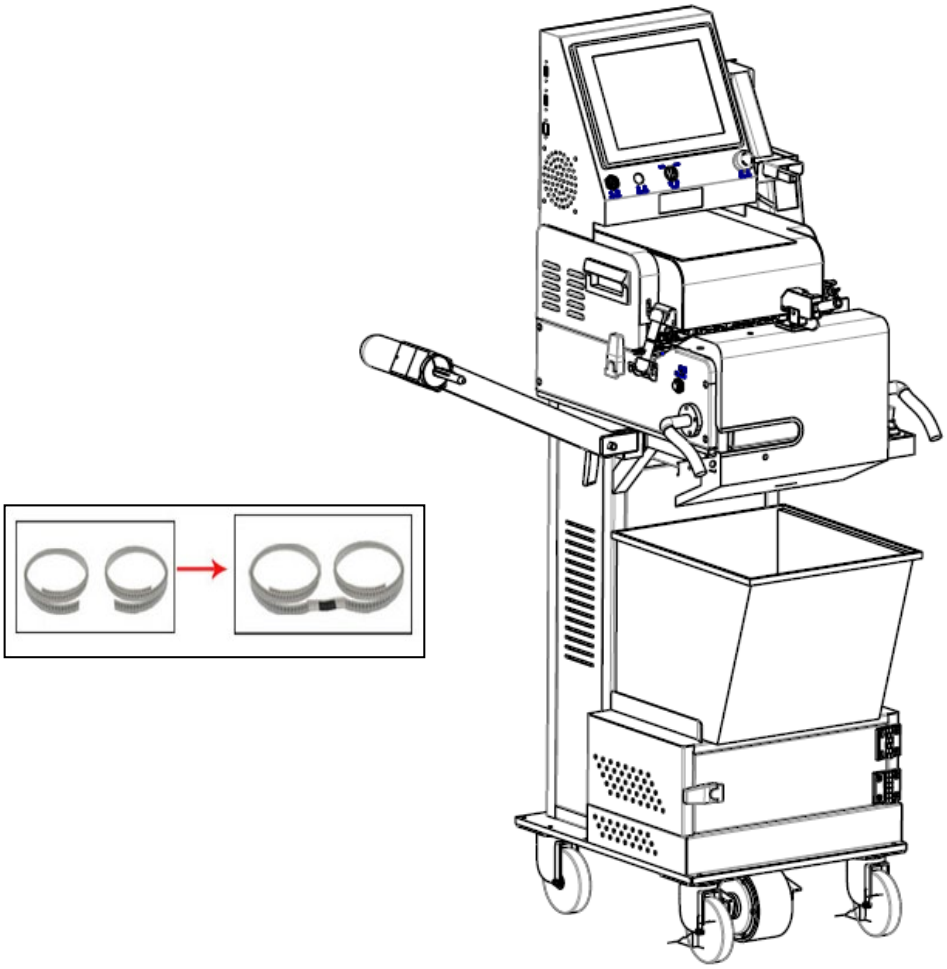


Figure 1

2. Specification:

Equipment structure	Square tube steel structure frame surface stoving varnish
Dimension	L*W*H：450mm x 560mm x H1370mm
Working height	About 920+/-20mm
Equipment weight	75KG (excluding the battery)
Applicable scope of tapes	Width 8mm\12mm\16mm,thickness 0.25~1.3mm, paper tape + plastic tape
Quantity of empty material in splicing	0-2PCS
C/T	8mm tape:6-8S/Cycle;12mm and 16mm tape:10-12S/Cycle (excluding the artificial feeding time)
Power supply duration	Over 10-12h

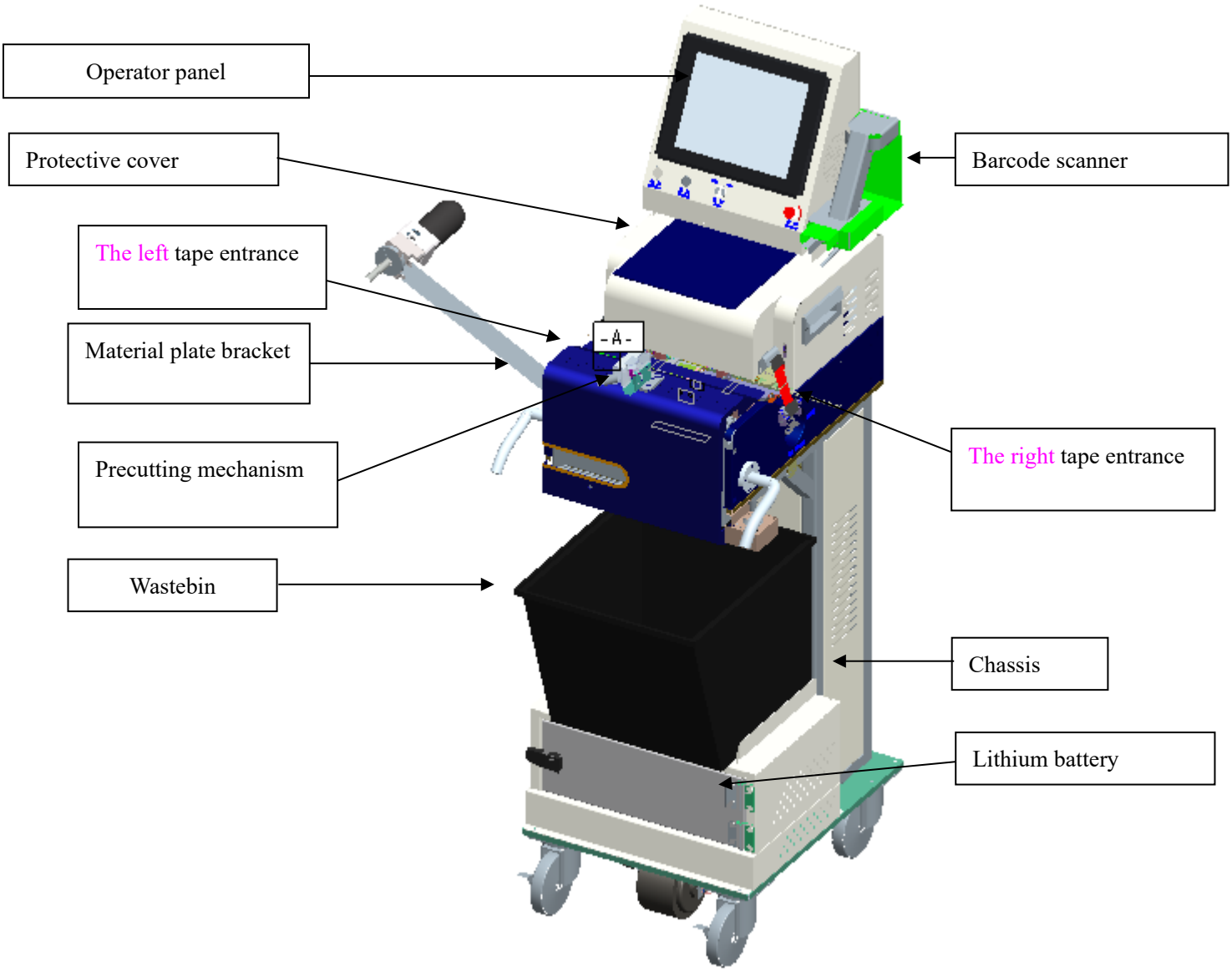

Operator panel
Protective cover
The left tape entrance
Material plate bracket
Precutting mechanism
Wastebin
Barcode scanner
The right tape entrance
Chassis
Lithium battery
-A-

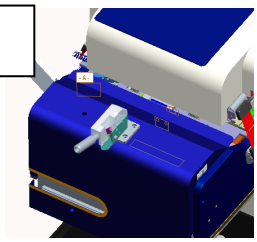
Figure 2

3. Splicing Steps：(Only four steps)

1. Precutting of material head

Cut out the front empt
the precutting mechanism

Precutting cutter



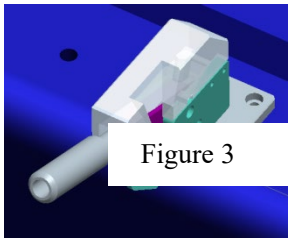


Figure 3

nsert the tape

Figure 2

0-2 empty location/s

Notes: Please ensure that there is only 0-2 empty locations on both ends of tape.

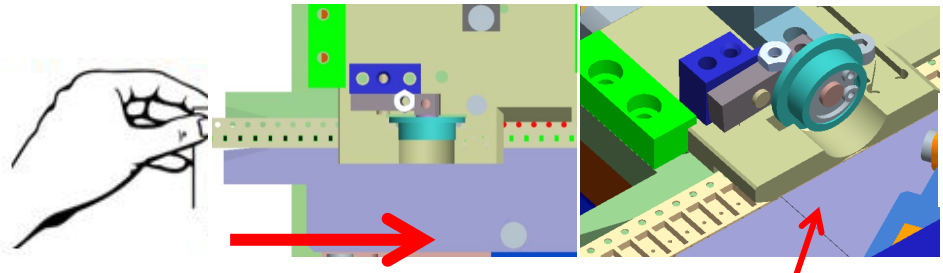
2. Insert the tape

1) Left feeding

A: Hold the tape with the left hand and feed into the left entrance.

B: After tape is detected via optical fiber in the left entrance, the motor starts to run to pull tape into the runner.

Notes: When inserting tape, please don't push the tape into the runner. The user should pull the tape slightly with fingers until the ratchet teeth hook the tape edge holes and pull tape into the runner.



Feeding direction Figure 4

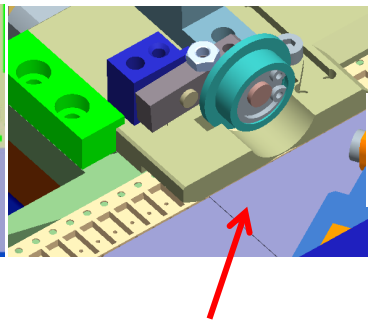


Figure 5

The tape hole should face inside of the equipment

2) Right feeding

A: Hold the tape with the right hand and feed into the right entrance.

B: After tape is detected via optical fiber in the right entrance, the motor starts to run to pull tape into the runner.

Notes: When inserting tape, please don't push the tape into the runner. The user should pull the tape slightly with fingers until the ratchet teeth hook the tape edge holes and pull tape into the runner.

3. Take out tapes

The equipment applies optical fiber sensing which enables automatic start. The left side and right side will start automatically and separately after sensing the tape to finish tape detection, precise cutting, automatic connection, automatic film wrapping and action. After tape connection is completed, the equipment will open the runner automatically. The user can take out the tape by holding tapes on both sides with both hands. After the tape is taken out, the runner cover plate will shut automatically.

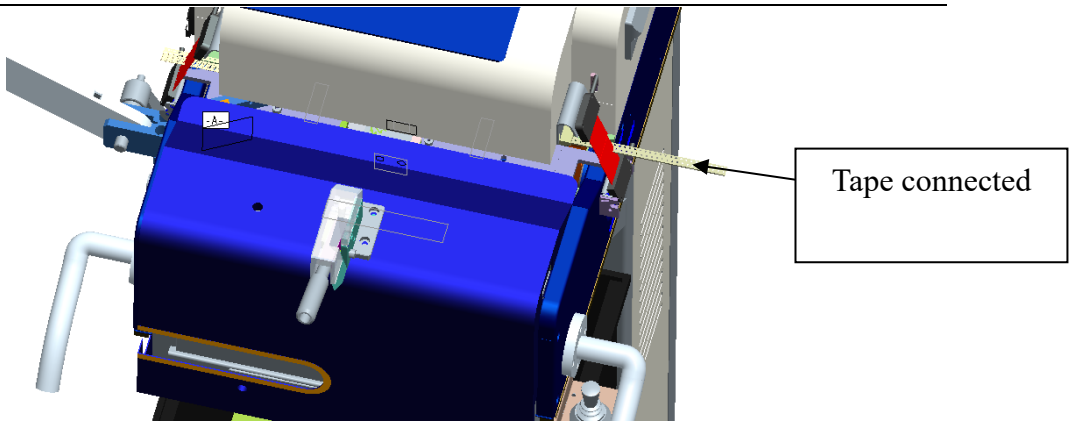


图 6 Figure 6

4. Tape feeding

1)The user can hold up the tape with one hand to pull and adjust the tape (some tapes may tie, because they are too long, so the user needs to arrange the tape during feeding).

2)The user should press the button with the other hand. By pressing the button, the motor will run. By releasing the button, the motor will stop running.

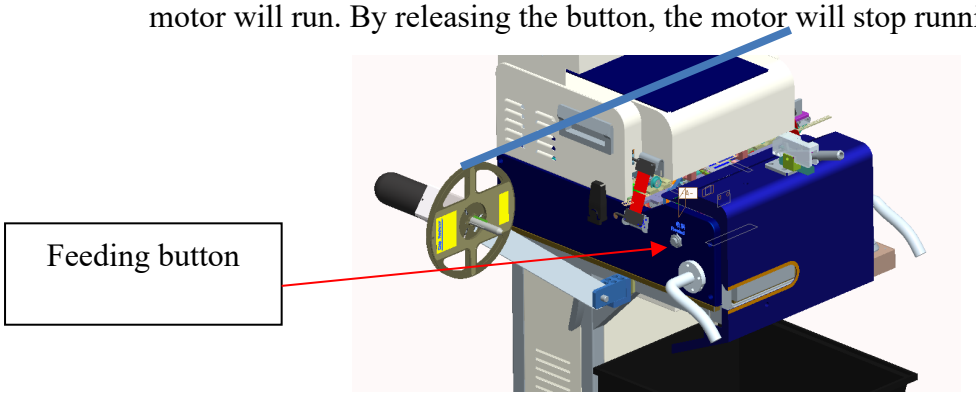


Figure 7

4. Operation Instruction:

Power on and off

1. **Powering on:**

A. Open the side door of battery of the case

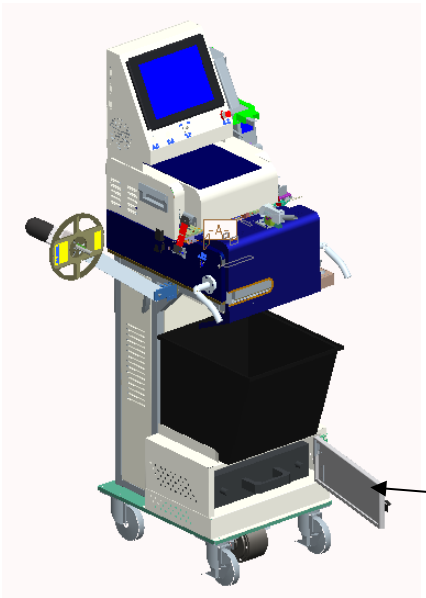


Figure 8

B. Connect any dedicated silicon wire aviation plug and the aviation socket of lithium battery, and tighten the nut. The other silicon wire is used for replacing battery when the voltage of the battery is low.

Figure 9

Notes: When a low battery alarm is given on the computer, it should be replaced with a new battery fully charged according to methods as follows:

Battery replacement: Insert one idle aviation plug into a lithium battery fully charged and then take out the fully discharged battery; After replacing a new battery, the user should power off the machine, and then start and reset the machine.

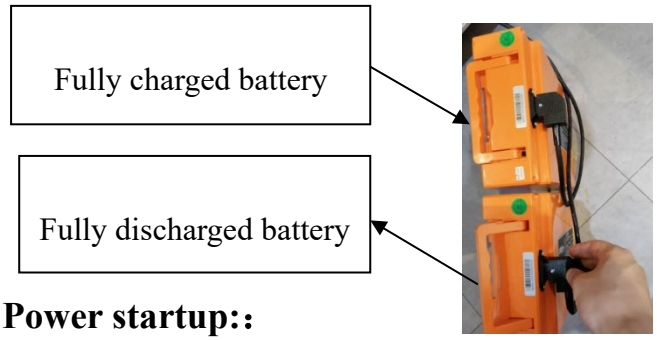


Figure 10

2. Power startup:

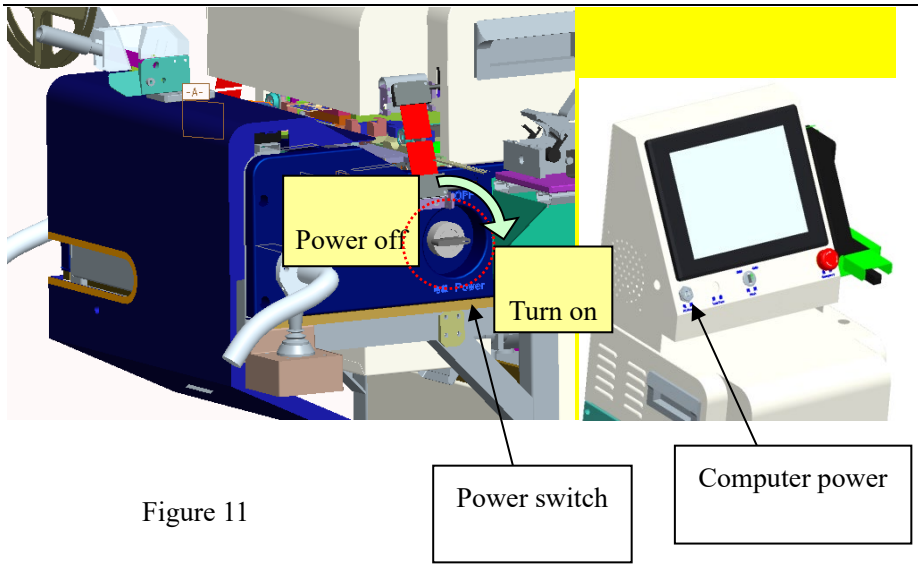


Figure 11

Notes: The user needs to press the "reset" button in the following cases.

1. Restart the power
2. Press the emergency stop button.
3. After alarm faults are removed.

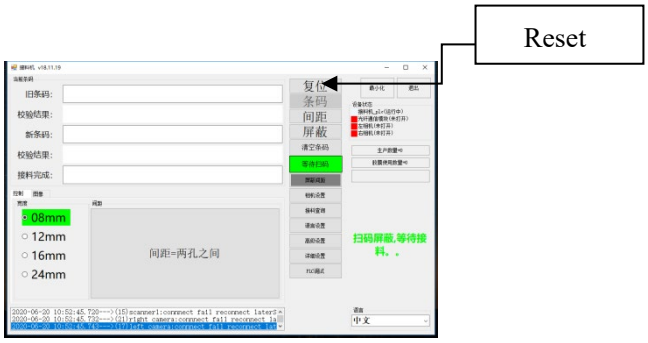


图 12 Figure 12

Introduction to shield and distance

1. There are empty materials on both sides → don't press the shielding and interval buttons

2.There are not empty materials on both sides → press the shielding button (the shielding indicator and the interval indicator are on); If the tape interval is 4mm, please move the switch to the 4mm location. If the tape interval is 2mm, please move the switch to the 2mm location.

Figure 13

1. Open the material plate bracket along the dotted line.
2. Hang the material plate on the bracket
3. Open the material plate and pull one segment of tape out.

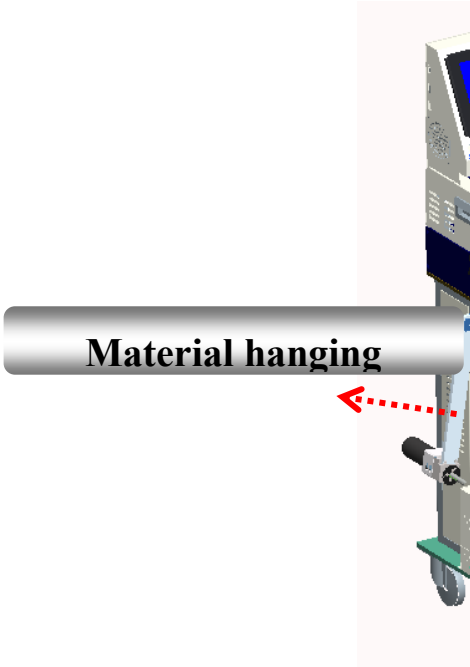


图 14 Figure 14

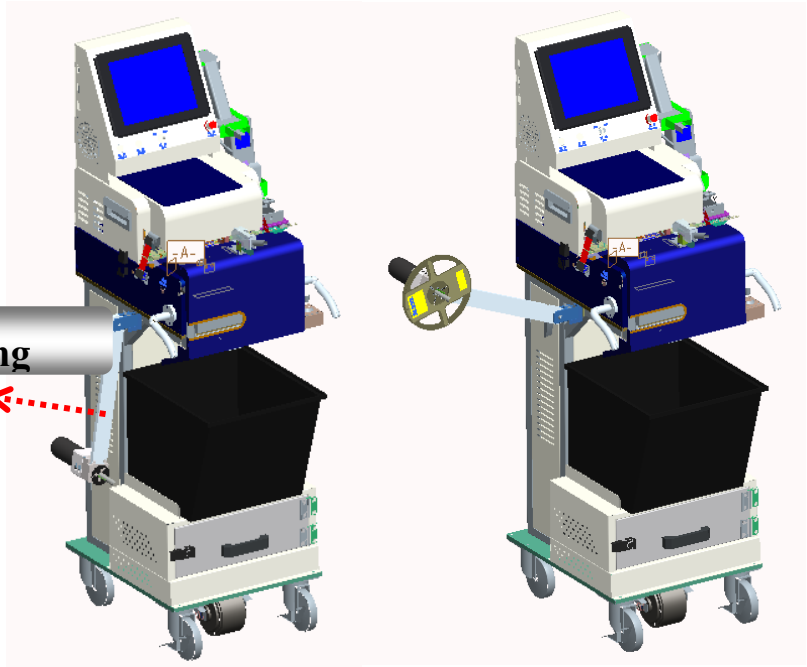


图 15 Figure 15

The first step is to install the adhesive film material plate, the second to the fifth step is to wear the adhesive film tape, the sixth step is to press the adhesive film tape.

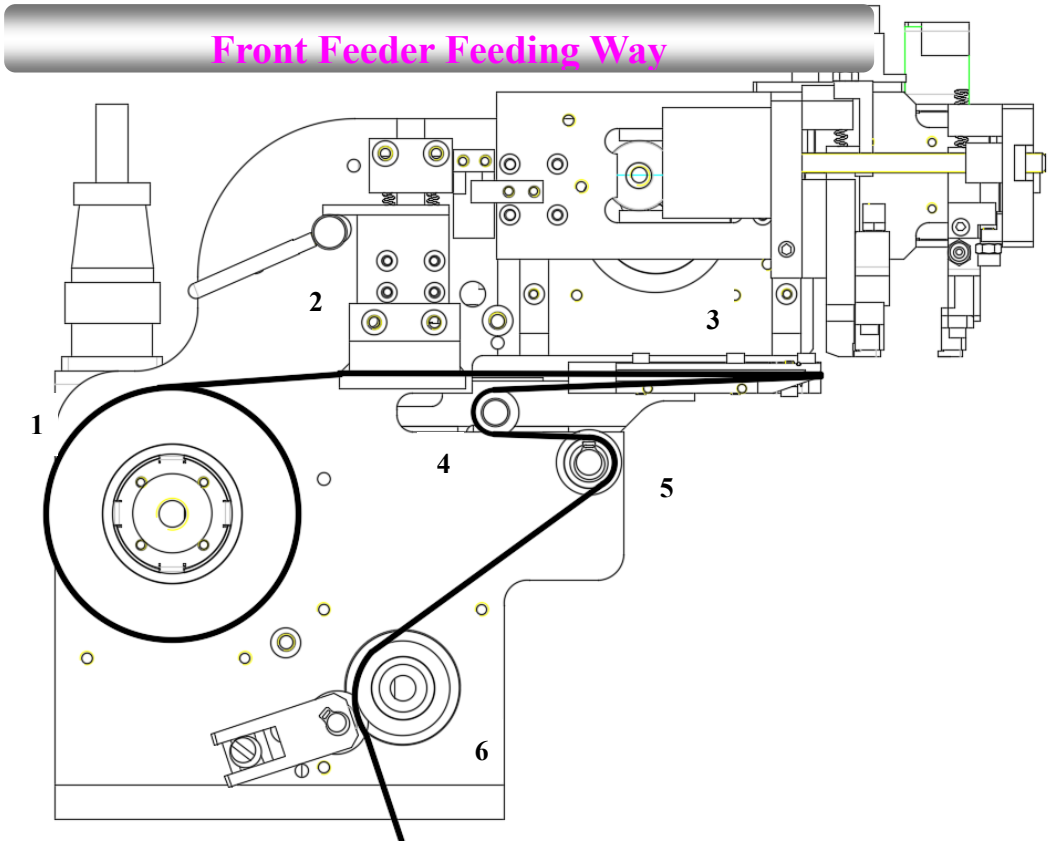


Figure 16

The first step is to install the adhesive film material plate, the second to the seventh step is to wear the adhesive film tape, the eighth step is to press the adhesive film tape.

3 4

Introduction to power wheel

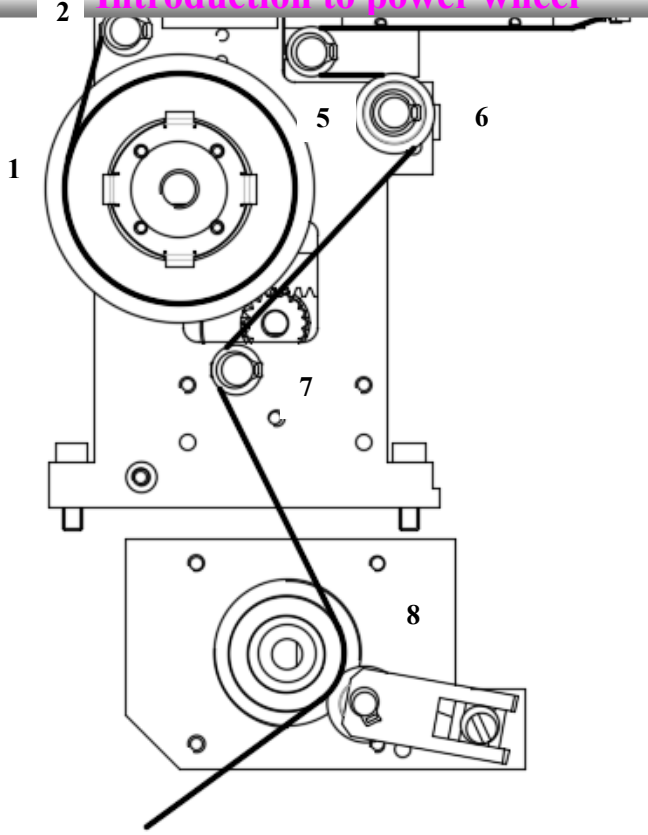


figure17

1.The rocker button is pushed forward，and the splicing machine is also moved forward.
2.Release the rocker button and the splicing machine stops moving forward

Introduction to computer

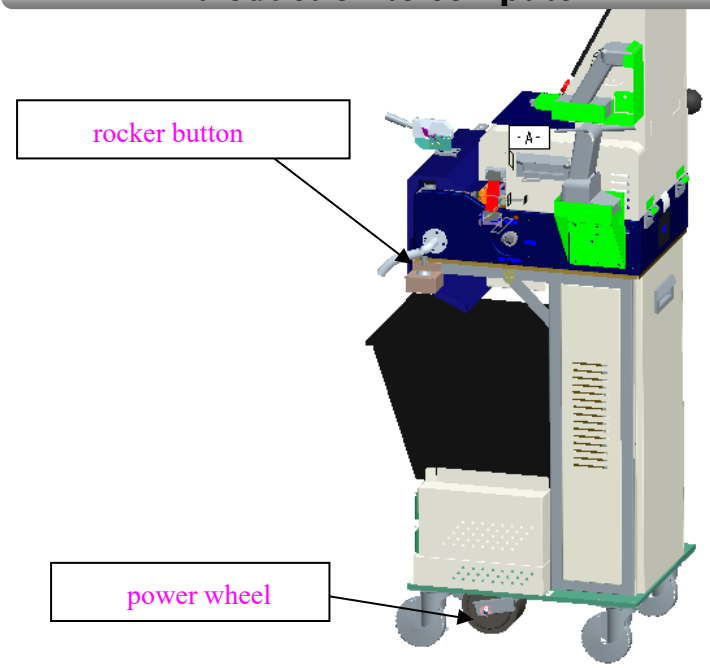


Figure18

1. Boot screen: Figure 20

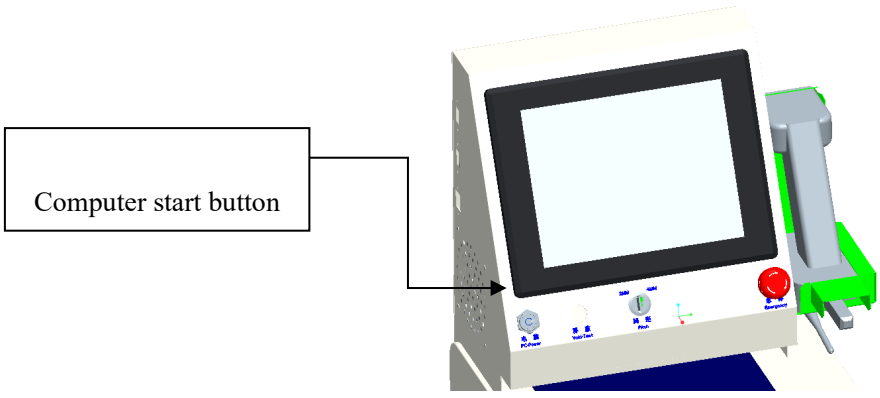


图 20

Figure 20

Camera Setting

1) Enter the splicing machine operation software: Figure 21

   Double click the icon "splicing machine" on the desktop to enter the operation software:

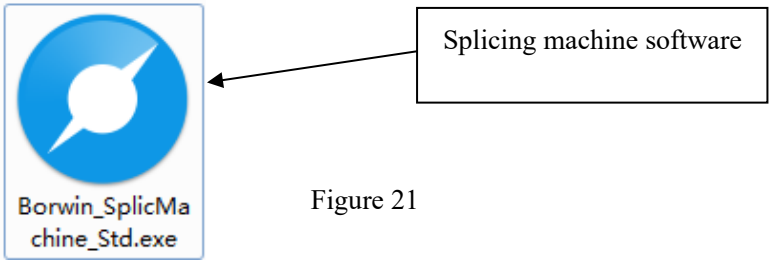
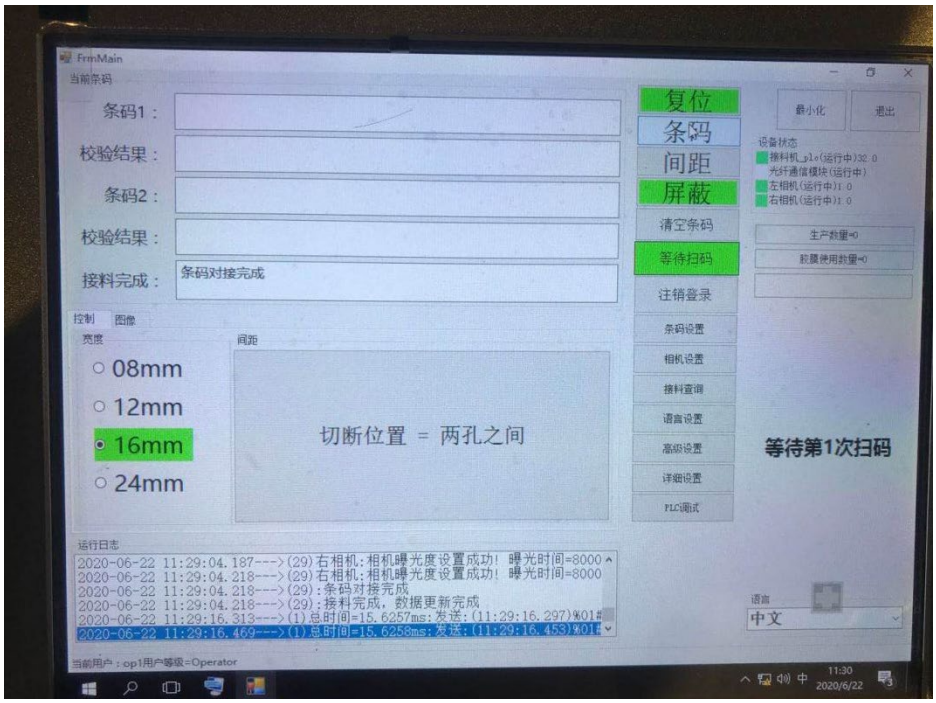


Figure 21

2) Power off: Power off the computer by following the correct shutdown order.

⚠ please don't power off the computer by pressing its ON/OFF button，otherwise the computer's hardware will be damaged.

Splicing machine operation software interface, Figure 22



Barcode 1: P/N barcodes to be used up on the material plate of feeder.
Verification result: Feedback successful barcode scanning and display the barcode content

Figure 22

Barcode 2: Compare the P/N barcode on the new material plate with the original barcode to judge whether they are the same.
Verification result: Feedback successful barcode comparison and display the barcode content.

Splicing completion: Display barcode connection completion or splicing completion.

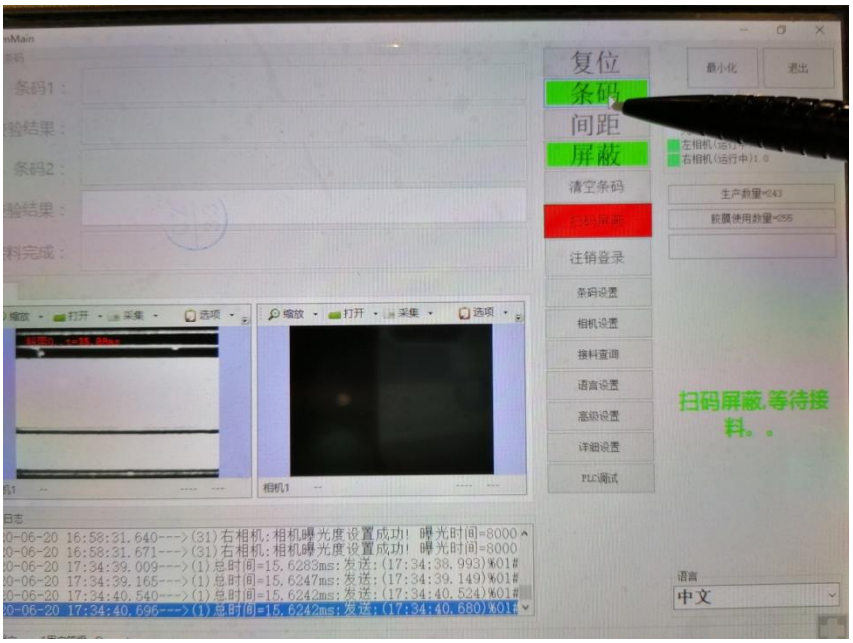
User login: Click to enter login interface

Barcode emptying: When a material plate is scanned by mistake, the user can press this button to rescan the barcode.

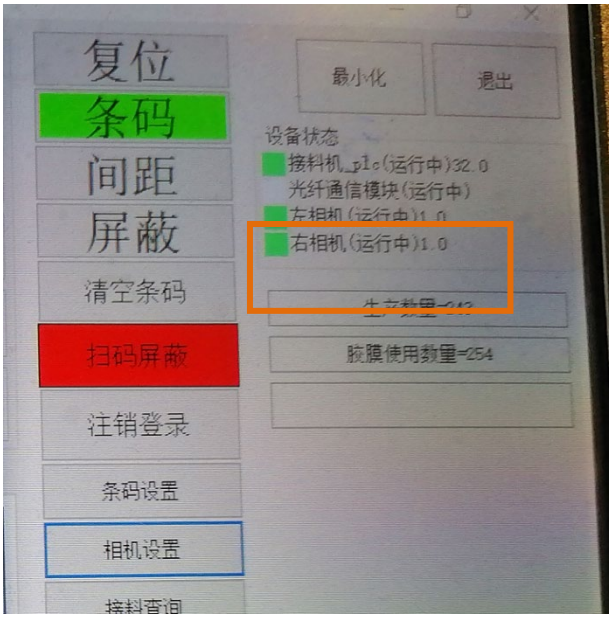
Barcode setting: Set the number of bits of barcode comparison

1. selected image setting

1) Click the "bar code" button to display green state; As shown in the figure:



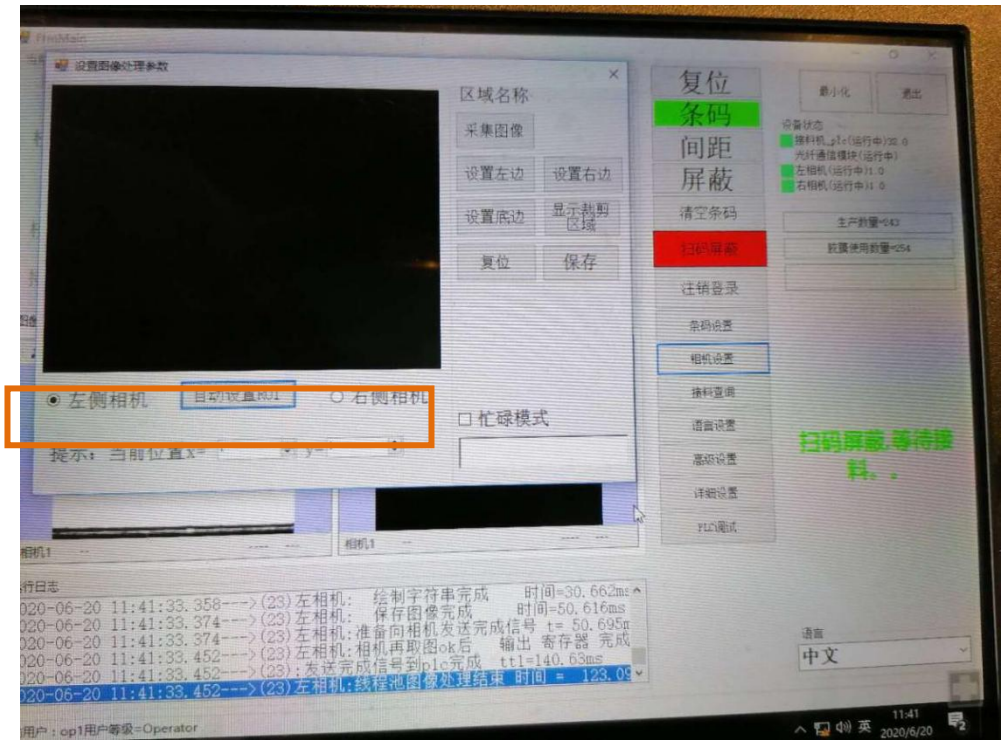
2）Confirm whether the left and right cameras are connected properly, and the green display is normal in operation; as shown in the figure:



3）.：click the camera settings button on the home screen, as shown in the following figure

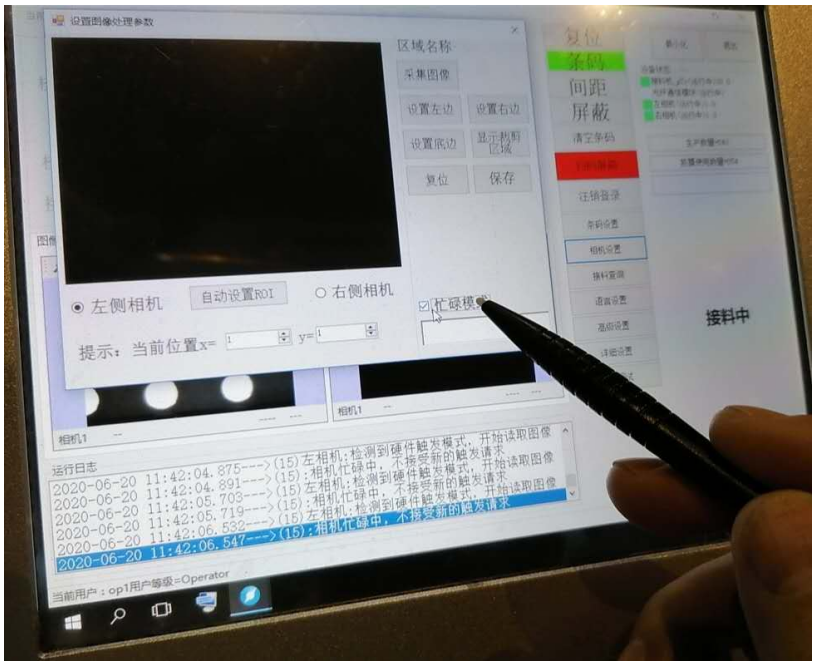
4). Click the camera setting button to pop up the password setting dialog box, please enter "123456" password; The debugging screen is displayed.as shown in the following figure:

3）. Click the "Select left or right camera" button, as shown in the following figure:

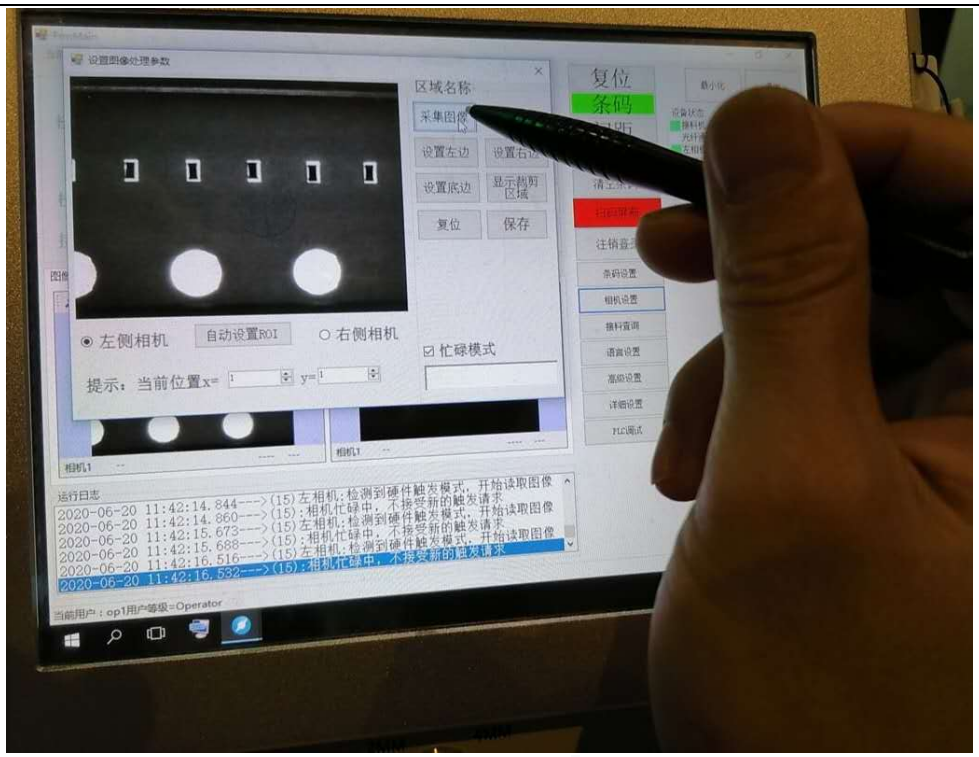


4）. The left and right flow channels are inserted into the tape, and the tape is automatically sent directly below the camera. (Normally 2mm spacing material tape, the image shows five materials)

5）.5)Select "Busy Mode" and make sure the "√" is displayed on the left, as shown in the following figure.



6）. Click the "Capture Image" button, as shown in the following figure:



7）. Click the "Show crop area" button; A red square will appear, the red square area is the image read area, as shown in the following figure:

Take the image region OK image

Take the image region NG image

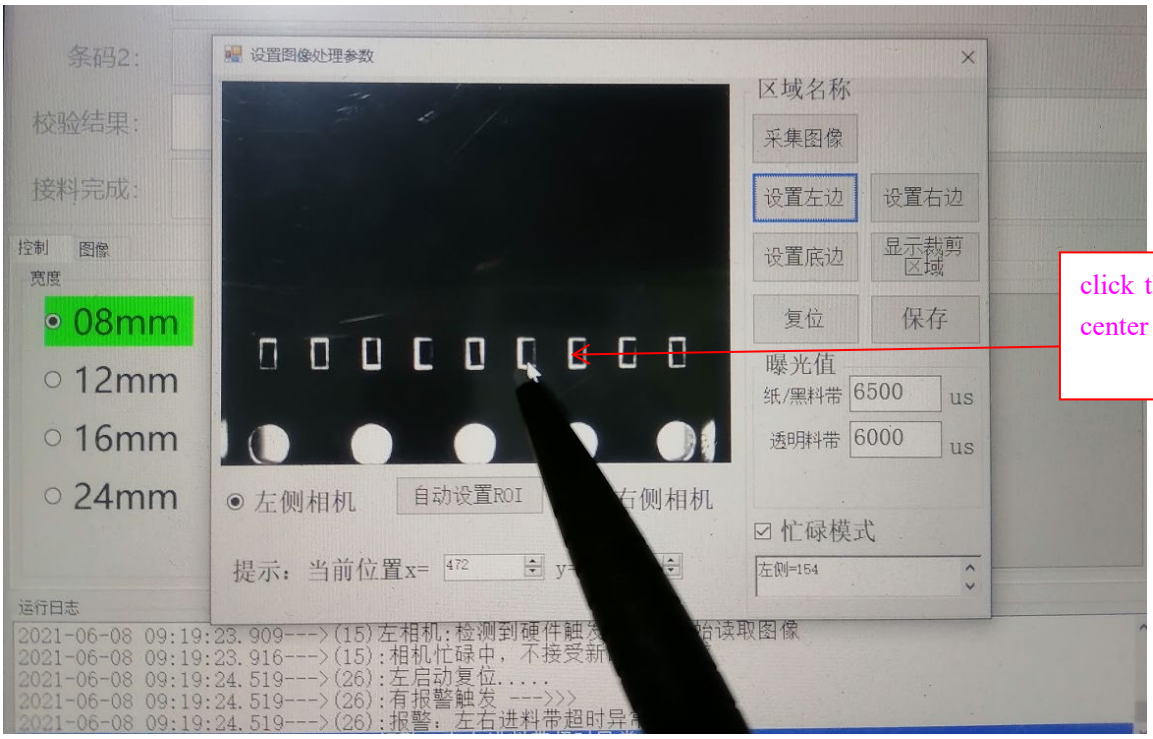
Take the image region NG, and click the capture image button again to reset the capture image area. Steps are as follows:

(1). Set the position of the left border line of the selection area, click the center position of the first material on the left, as shown in the following figure:

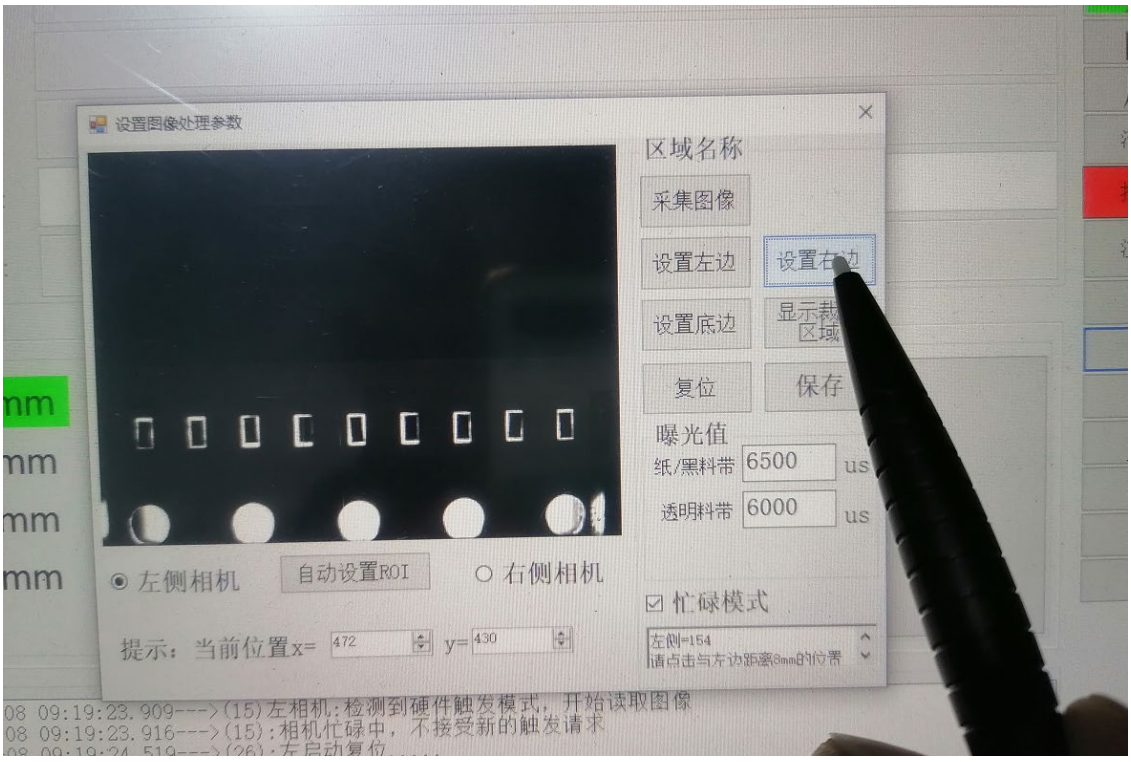
(2).click the Set Left button to set the left image location, as shown in the following figure:

(3). Set the position of the right border line of the selection area,

click the center position of the first material on the right, as shown in the following figure:

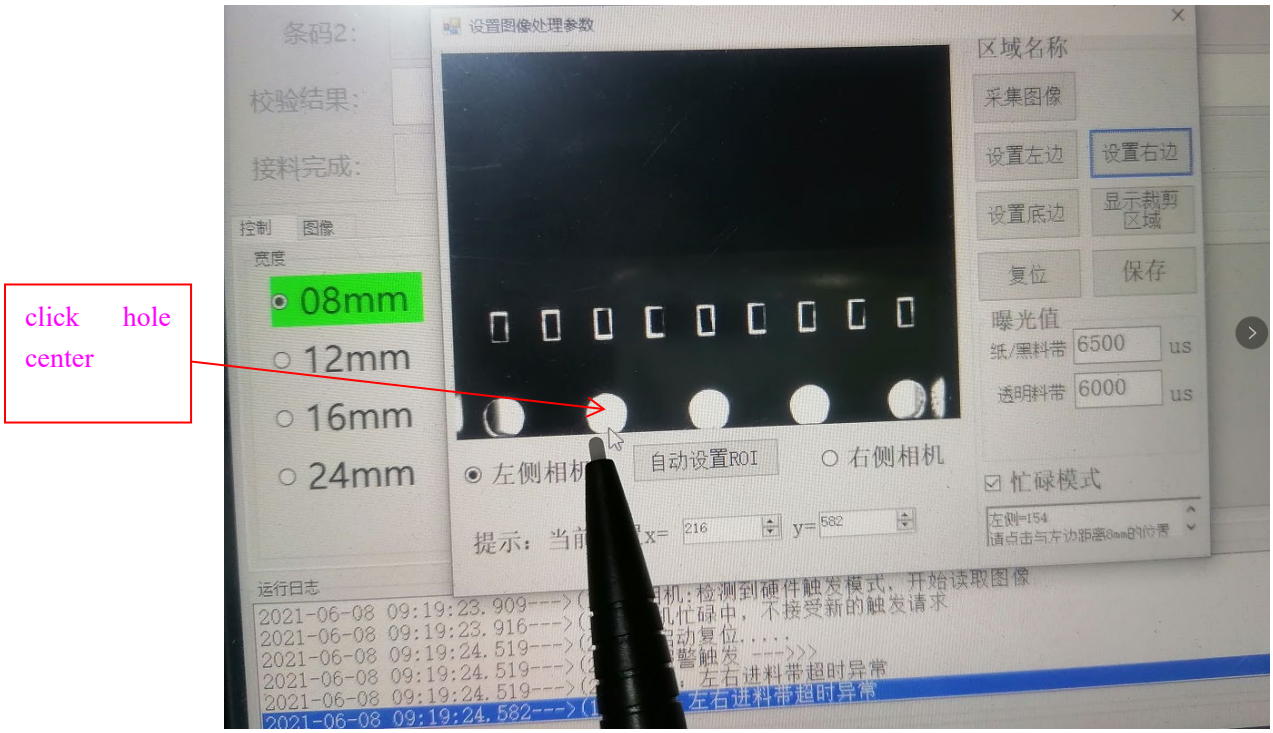


(4). click the "Set Right"button to set the right image location. As shown in the following figure:

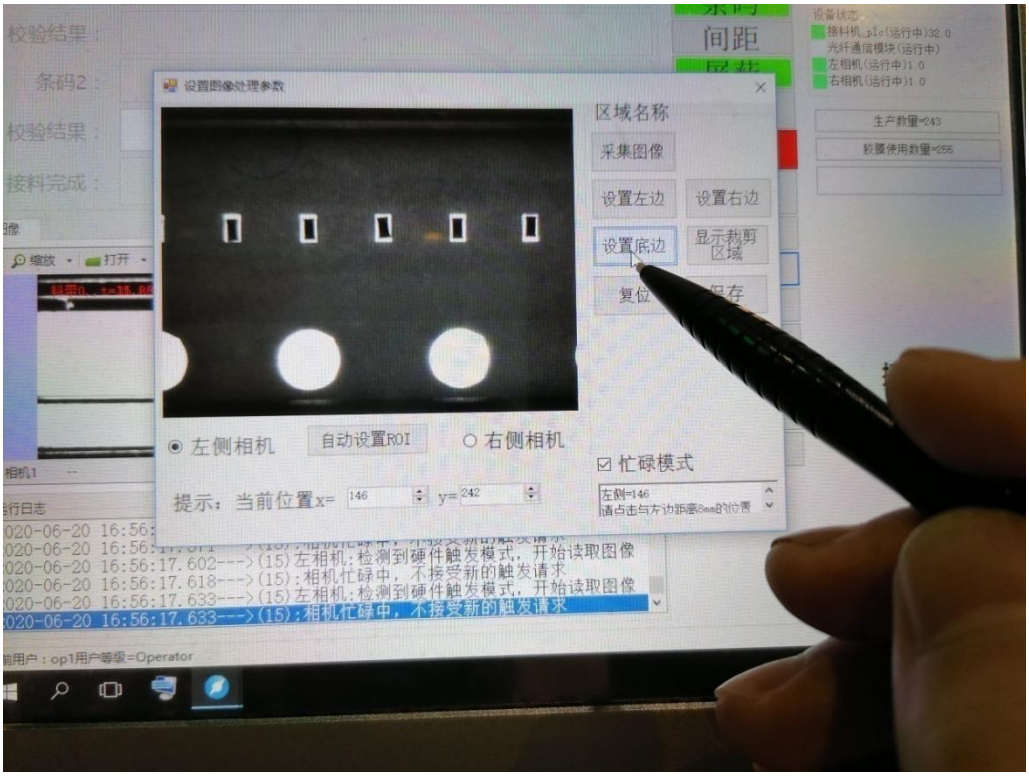


(5). Similarly, set the position of the bottom borderline of the selection area, click the center position of the edge hole of the

material tape, as shown in the following figure:

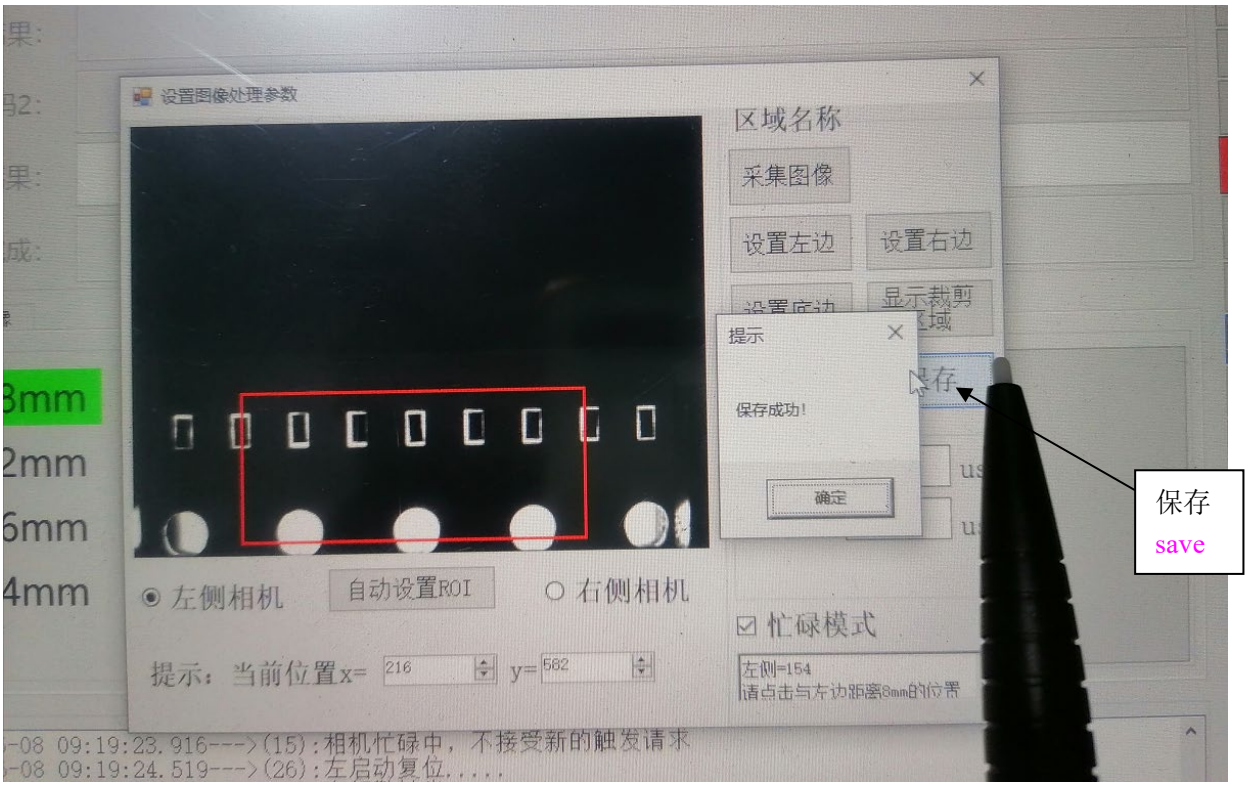


(6). Click the "set bottom"button to set bottom area, as shown the following figure:



(7). Click the"Show Cropping Area"button; confirm that the setting area is correct; the red squares are as follows:

(8). Click the "save"button to complete the camera , as shown in the following figure:



2. Camera Exposure Settings

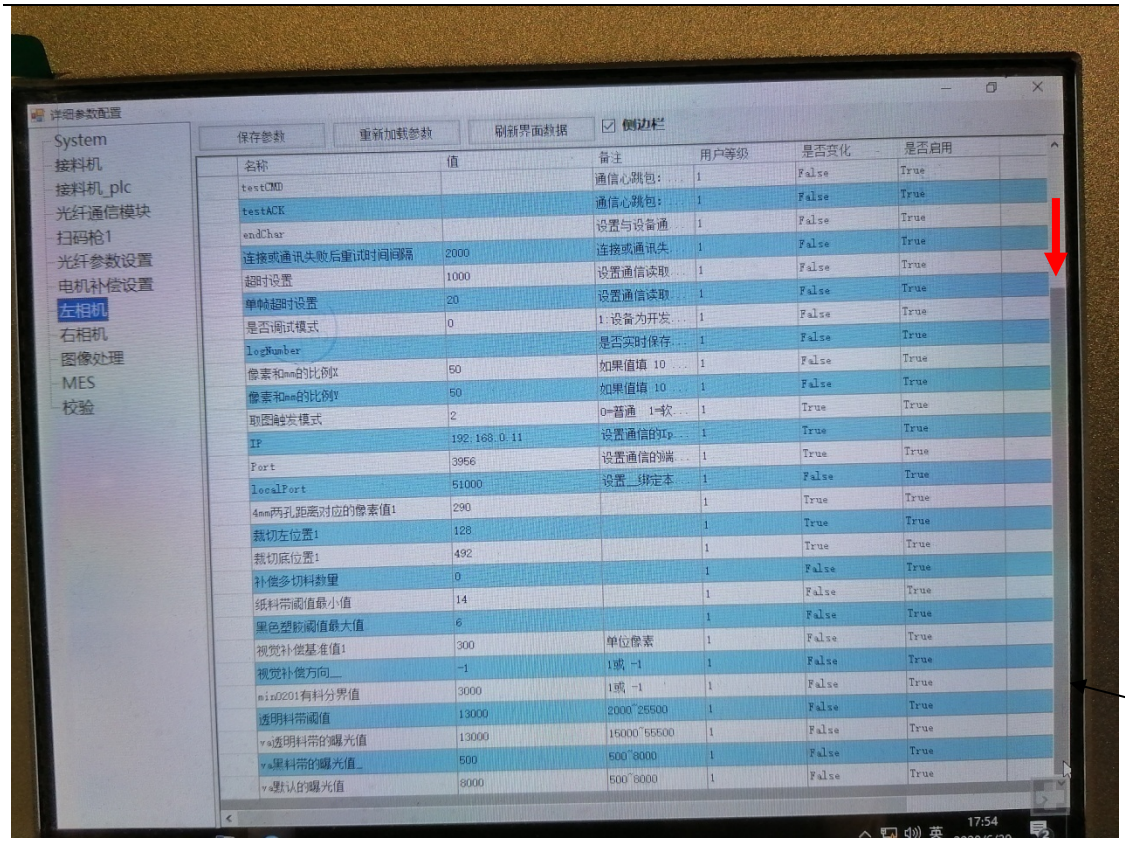
In the image capture, when the image is not clear, the sharpness of

the image can be realized by adjusting the exposure value.

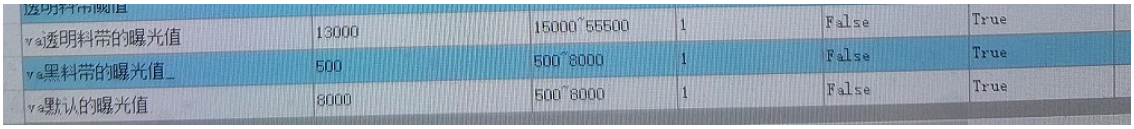
（1）Click the “detailed setting” button, as shown in the following figure:

Enter the ″ detailed parameter setting″interface, as shown in the following figure:

（3）Click the “Left or Right camera” button and bring the scroll bar button down to the bottom



（4）Adjust the exposure value of the following three sets of paraments（Va transparent tape exposure value，Aa black tape exposure value，Va default value）to make the image in clear state.



3. PLC commissioning interface: Figure 23

Click the "user login" button in Figure 22 to log in the commissioning interface

Figure23

1) The strip cutter 1：

1. Horizontal stripping mechanism: Driven by stepping motor, the strip cutter strips splicing use adhesive film.

2. Setting of four locations of horizontal stripping: As shown in Figure 24

Figure24

A. Reset point: The strip cutter moves from the front to the rear until the electro-optical sensor senses the photosensitive card.

B. To the suction location： The strip cutter moves forward to the suction location of connected adhesive films. As shown in Figure 25.

The distance between the side of the suction head and the strip cutter head is about

1.5mm. By adjusting parameters relating to the front and rear location of the strip cutter can adjust the relative location of suction heads of strip cutter. This parameter needs to be slightly adjusted in two cases:

a. The location of film suction of the suction head is deviated, which results in air leakage of the suction head hole and the adhesive film, and film suction fails.
b. After the adhesive film is pasted on the tape, the location is deviated.

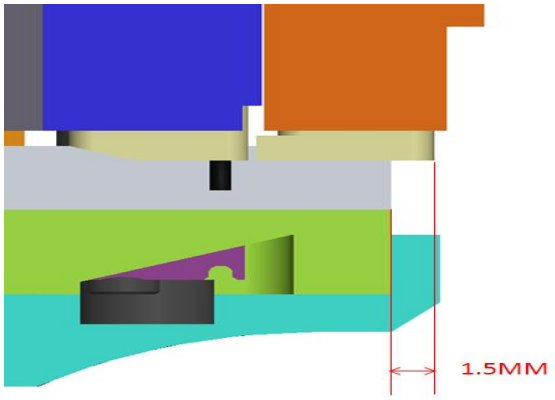


Figure25

The distance between the suction head and the strip cutter is about 1.5MM.

C. To the avoidance location: The strip cutter goes back, until the whole adhesive film is stripped

2) Horizontal suction mechanism：

①Horizontal suction mechanism: Driven by the stepping motor, the suction head and the adhesive film pressing block finish the reciprocating action of going up and down to suck adhesive film and move it to the splicing location and paste the adhesive film on the tape. And it also assists the film wrapping mechanism finishing film wrapping.

②Setting of five locations of horizontal suction: As shown in Figure 26

Figure 26

A. Reset point: The servo motor drives the horizontal suction mechanism to move counterclockwise until the electro-optical sensor senses the photosensitive card.

B. To the ready pasting location: The ready suction location refers to the location where the suction head waits for sucking the adhesive film. This location is very important. It has been fixed in the program and cannot be set on the interface. Function of this location: 1. The pressing block just presses the adhesive film; 2. The distance between the suction head and the adhesive film is at least 1mm. As shown in figure 27

C. To the ready pasting location: The ready pasting location refers to the location where the suction head waits for pasting the adhesive film. This location cannot be modified on the interface.

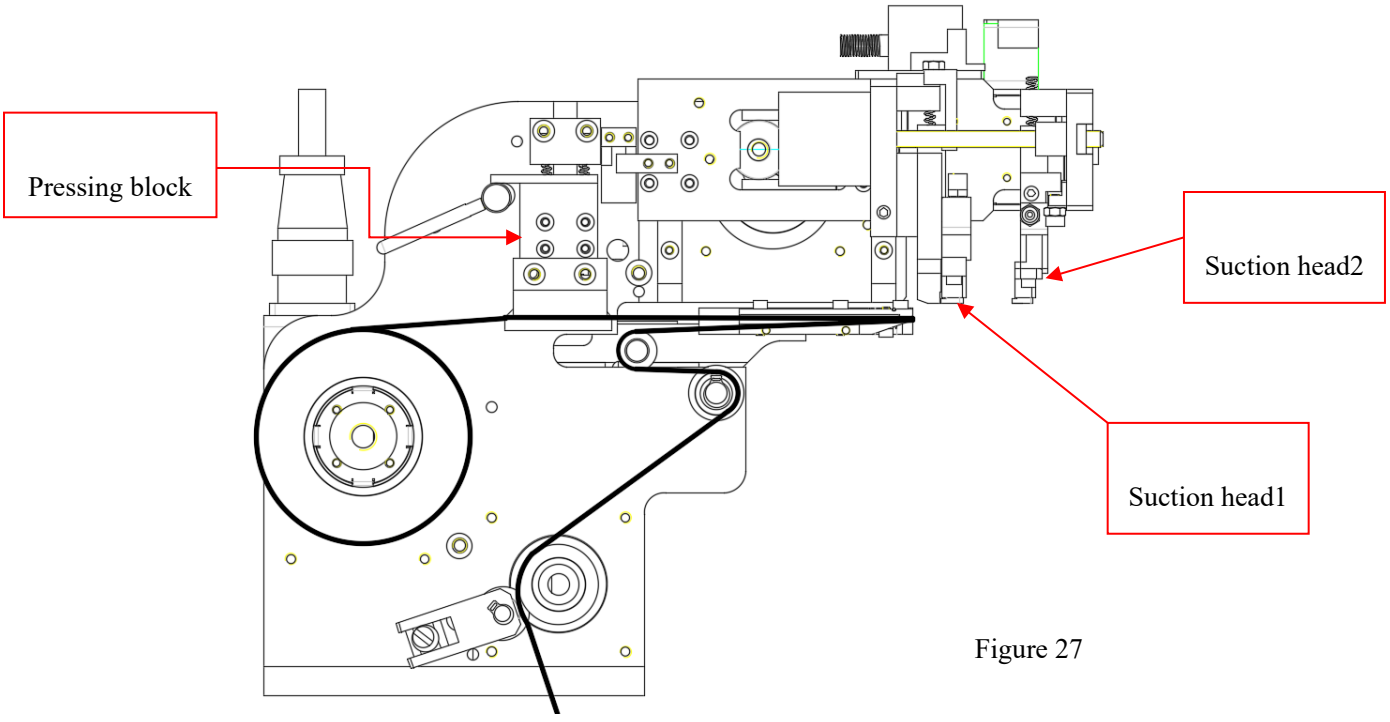


Figure 27

D. To the suction location: The suction location refers to the location where the

suction head goes down and sucks the adhesive film. This location can be adjusted on the commissioning interface. The pressing force is greater as the number is smaller, vice versa.

Notes: At this location, the pressing force should not be too great, otherwise the pressing plate will be deformed and the mechanism will be damaged.

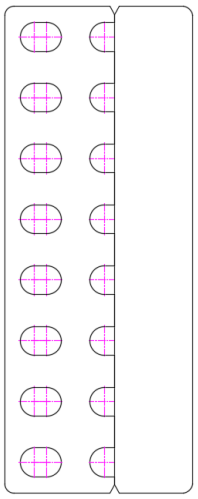
E. To the pasting location: The pasting location refers to the location where the suction head goes down and pastes the adhesive film to connected tapes. This location can be adjusted on the commissioning interface. The pressing force is greater as the number is larger, vice versa. The pasting location is very important, because it will significantly affect the film wrapping effect. Set the pasting location parameters according to the figure. As shown in Figure 28

1.Ensure that the bottom of suction head 1 is about 0.1-0.4mm lower than that of the tape.

Figure 28

F. The suction head 1 sucks the rear feeder adhesive film, the rear feeder adhesive film as shown in the following figure; the suction head 2 sucks the front feeder adhesive film, the front feeder adhesive film as shown in the following figure

rear feeder adhesive film（A film）



front feeder adhesive film（B film）

splicing tape to complete

8mm

(Past A film）

12mm

(Past A+B film）

16mm

(Past A+B film）

24mm

(Past A +2Bfilm）

3) Cam mechanism: As shown in Figure 29

①Cam mechanism: The cam transmission mechanism comprises one stepping motor, one set of synchronous wheels, seven cams and one gear. The servo motor drives the camshaft via the synchronous wheel. The camshaft drives seven cam wheels and one gear to finish left cutting, left cover plate, right cutting, right cover plate, float support and adhesive film wrapping.

②Definition of three locations of the cam wheel mechanism: As shown in Figure 29

Figure29

A. Reset point: The servo motor drives the camshaft to rotate until the gap of the photosensitive card aligns with the center of the photoelectric switch. As shown in Figure 30

Figure 30

Whether the location of the original point is correct? It should not be just subject to the location of the gap of the photosensitive card. The location adjustment method of the original point is as follows: As shown in Figure 32

a. Press the "manual" button to make the camshaft rotate slowly until the camshaft keyway goes upward. Stop rotating
b. Loosen the stop screw (two) of the photosensitive card, rotate the photosensitive card until the gap of the photosensitive card align with the center of the photoelectric switch (in such a case, the photoelectric switch indicator will be on), and then lock the stop screw.

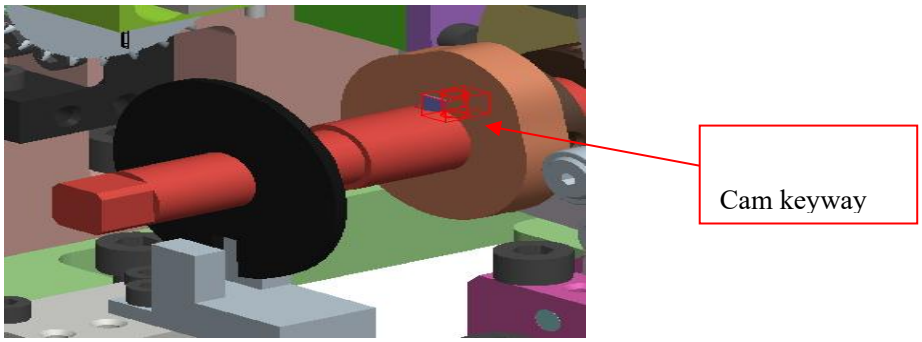


图 31 Figure 31

4）Left feeding mechanism: (Right feeding mechanism has the same principle) as shown in Figure 32
①Left feeding mechanism: The stepping motor drives feeding gear to rotate to pull tap into the equipment. Two precise locations need to be set: The cutting location and the connection location.

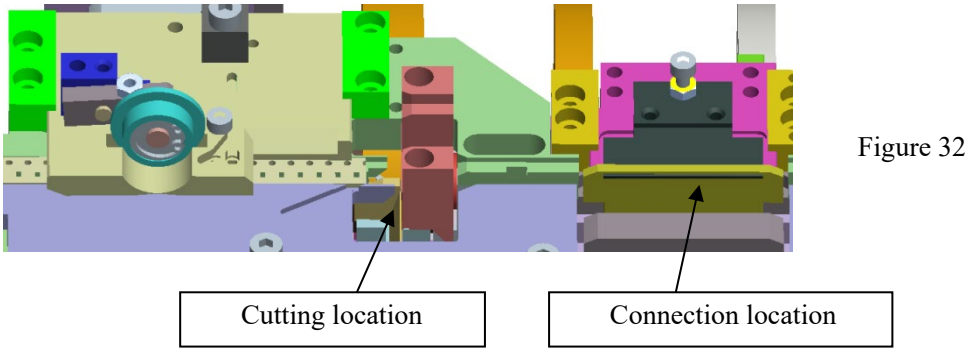


Figure 32

② Definition of left feeding location compensation: As shown in Figure 33
A. Cutting location compensation: As the input value is greater, more tape is fed. The cutting location can be adjusted by adjusting this parameter. This parameter needs to be

adjusted in the following cases:
a. The cutting location is deviated, and the material is cut as a result.
b. After the left and right materials are connected, the distance of connection edge holes is not within 3.8-4.0mm.

Figure 33

B. Connection location compensation: As the input value is greater, more tape is fed. By adjusting this parameter, the relative position between tap connection and adhesive film can be adjusted. This parameter needs to be adjusted in the following cases:

a. After completion of connection, the left and right tapes are not connected properly or connection is excessive, and the tap bulges.
b. After completion of connection of the left and right tapes, the tap location is deviated from the location of adhesive film hole.

5) Other commissioning interfaces: As shown in Figure 34:

Figure 34

A. Serial port number: Usually the communication port between PLC and computer is set as COM2.

Optical fiber module is applied to special equipment. 485 port serves as the COM port and connects with the optical fiber analog module. As shown in Figure 35

Figure 35

A. Strip: Automatically strip one splicing plate. Stripping stops after the optical fiber on the strip cutter plate detects a gap on the adhesive film edge. Figure 36

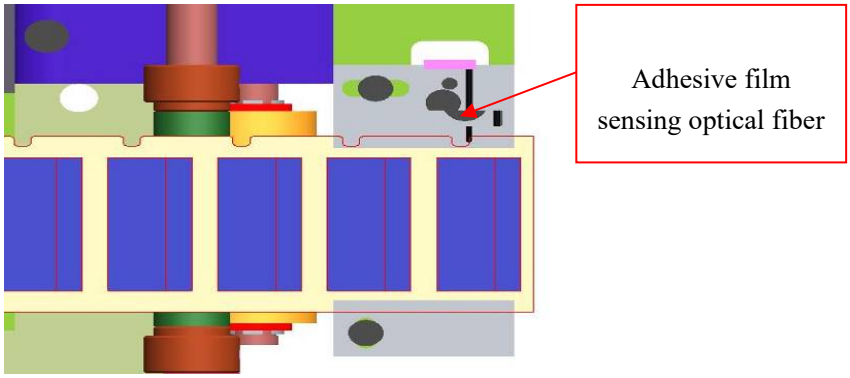


Figure 36

A. Vacuum: By controlling the vacuum solenoid valve switch, the vacuum air suction of the suction head can be controlled.
B. Vacuum pump: Control the vacuum pump switch.
C. Set the vacuum pressure sensor (negative pressure meter). As shown in Figure 37. The vacuum negative pressure meter is used for monitoring whether film suction is successful. When film suction is unsuccessful, the equipment will give an alarm reminding abnormal film suction.

Current value: It refers to the value of negative pressure between the suction head and the vacuum pump. Its normal scope is - 30~-85.

Reference value: It is a standard judgment value based on which it can be judged whether adhesive film suction is successful. When the current number is greater than the reference value, it means suction is successful; When the current number is smaller than the reference value, it means suction is failed;

Figure 37

6) Barcode setting interface: As shown in Figure 38

Click the "user login" button as shown in Figure 22 to enter the advanced password; After entering the barcode setting interface, the user should not change parameters at will.

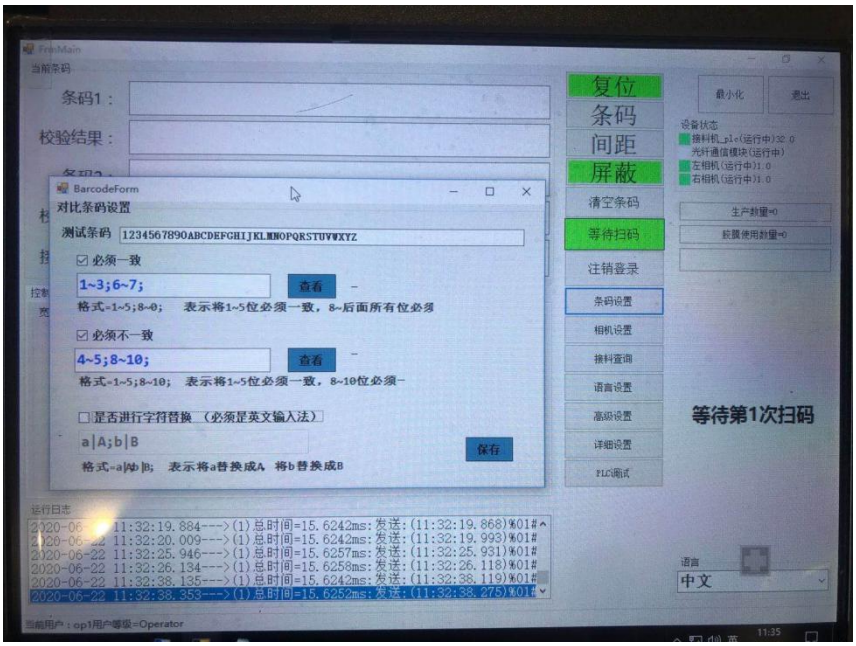

条码1：
校验结果：
复位
条码
间距
屏蔽
清空条码
等待扫码
注销登录
条码设置
相机设置
换料查询
语言设置
高级设置
详细设置
PLC调试
最小化
退出
BarcodeForm
对比条码设置
测试条码
1234567890ABCDEFGHIJKLMNOPQRSTUVWXYZ
必须一致
1~3;6~7;
查看
格式-1~5;8~0; 表示将1~5位必须一致，8~后面所有位必须
必须不一致
4~5;8~10;
查看
格式-1~5;8~10; 表示将1~5位必须一致，8~10位必须一
是否进行字符替换 （必须是英文输入法）
a|A;b|B
保存
格式-a|A;b|B; 表示将a替换成A 将b替换成B
等待第1次扫码
语言
中文

Figure 38

全自动接料机-设备日常保养记录表

年　　月

保养部位	保养内容	保养工具	检测标准	保养日期	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
设备外表/内部	清理废料盒,清洁机器内外表面	无尘布	用无尘布抹表面，无尘布不能有灰尘及污物,废料盒无废料	日保养																															
吸头	清洁吸头表面	无尘布，酒精	用无尘布粘酒精抹吸头表面，吸头不能有污物																																
铲板	清洁铲板头部	无尘布，酒精	用无尘布粘酒精抹铲板表面，铲板能有灰尘及污物																																
空料检测	清洁光纤入光口或背光源发光面	无尘布，酒精，气枪	无尘布擦式后用气枪吹洗，入光口无异物																																
裁切废料槽	气枪对准切刀口，吹气，清洁废料槽内废削	气枪	废料槽内无废削堆积																																
裁切刀	裁切刀口	目检	裁切刀口锋利，无损坏																																
送料棘轮	清洁棘轮齿面	白布，酒精	用白布粘酒精抹棘轮齿表面，不能有残胶	周保养																															
真空过滤器	更换		过滤器内部如果已经变黑（变黄），需更换过滤器	月保养																															
光栅轮	清洁光栅轮透光槽	无尘布，酒精，气枪	无尘布粘酒精擦洗后用气枪吹洗，光栅轮透光槽无异物	月保养																															
裁切刀	按下裁切刀，上下裁切刀无间隙	目检、六角扳手	按下裁切刀，上下裁切刀无间隙	月保养																															
滑动机构	添加润滑油	油枪	所有滑动配合部位滴注适量润滑油	月保养																															
异常现象：																																			
处理结果：																																			
日保养者签名																																			
组长确认																																			

注：“V”表示正常，“X”表示不正常，并在相对应的设备下面打“V”，发现异常立即处理，并注解在备注栏内。

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