SOUTHERN MACHINERY

Southern Machinery Sales and Service Co., Limited.

S7000 SERIES

S7900

www.smthelp.com

Add: Room 1806, Block 3, Jinyun COFCO, Qianjin 2nd Road,Xixiang, Baoan District,Shenzhen City, CN 518102
Website: www.smthelp.com Tel: +86-755-83203237; Fax:+86-755-23240492

Copyright

The copyright of this manual belongs to Southern Machinery Sales and Service Co.,Limited (hereinafter referred to as smthelp). It is strictly prohibited to copy and transfer without our consent.

Trademark

SOUTHERN MACHINERY. Is the registered trademark of Southern Machinery Sales and Service Co.,Limited.

Warranties and Liabilities

SMTHELP is not responsible for any problems and impacts caused by failure to use SMTHELP original accessories or incorrect use of mechanical settings or abnormal environment when using SMTHELP machinery.

Attention

Thank you for buying SMTHELP's odd-form insert machine. In order to use the device safely, you should read the relevant safety precautions and function instructions

carefully before using the device to avoid accidents. odd-form insert machine is

simulated and instead of original manual operation. The machine used multi-axis motion to insert the odd-form components into the PCB. Objects unrelated to

production are not allowed to appear in the operating area during equipment

operation ; Therefore, all safety protection devices installed in the equipment are strictly forbidden to dismantle or short connect ,etc, so please confirm whether the safety device is in place and effective before using the machine.When the safety

device malfunctions, please stop and shut down the equipment before carrying out maintenance work. Please do not remove the safety warning signs of each part of the equipment at will. If there is any damaged, please contact SMTHELP!

Catalogue

1. Device overview

1.1Structure introduction....3

1.2Precautions....4

2. Equipment operation

2.1Software operation....4

2.1.1Startup process....4

2.1.2New programming....5

1.New program name....5

2.Program editing....5

3.Parts data editing....5-7

4. PCB and MARK instruction 7-10

5 .Block and hole instruction....10-12

6 .Pickup position and parts instruction 12-16

7.Panel and bad board instruction....16

8.Insertion data with automatic learning....16-17

9.Function switches....17

10.Suction nozzle data....17

11.Insertion array editing....18-19

2.1.3The machine parameters....19

1.Shaft control parameters....19

2.Function switches....19-20

3.Basic and MES parameters....20-21

4.Machine settings....21

5.Input/output Settings....21

6.System logs....21-22

7.I/O testing....22

2.1.4 Abnormal Mark handling....23

2.2 Insertion head structure....23

2.2.1 Nozzle/gripper replacement....23

2.2.2 Feeder installation.....24

3. Additional items

3.1Maintenance 24

3.1.1 Maintenance Tools preparation.....24

3.1.2 XY Screw & sliding block maintenance..... 24-25

3.1.3 Z-axis mechanism maintenance..... 25

3.1.4 Conveyor mechanism maintenance **1**.....25

3.1.5 Conveyor mechanism maintenance **2**..... 25-26

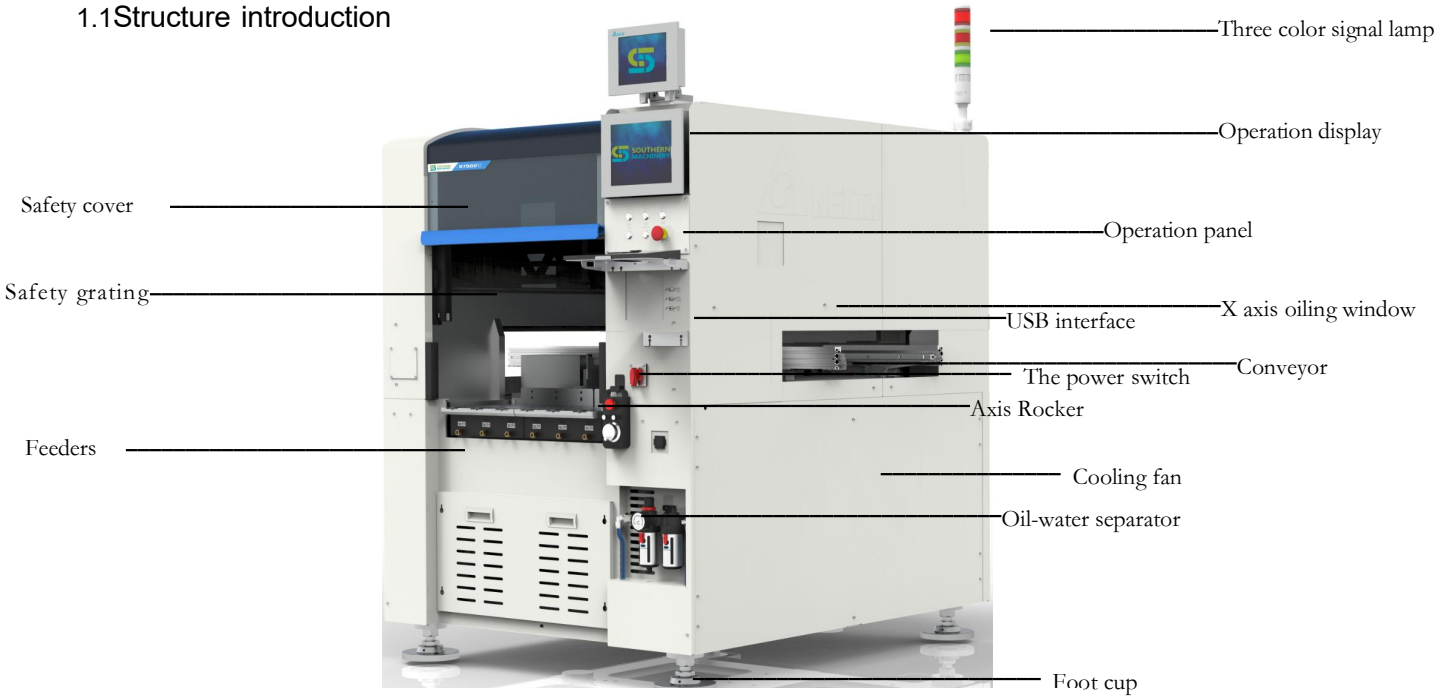
3.1.6 Conveyor width adjustment 26

3.2Device failure handling.....26-27

3.3Notes.....28

1.Device profile

1.1Structure introduction



【Three color signal lamp】Equipment alarm prompt

【Visual display】Displays Mark & Part images

【Operation display】Display software interface parameters and parameter modification

【Operation panel】Controls device running/stopping status

A Start - Device running

B Pause - Stop in the middle of running, press start to continue running

C Dot - single step, discontinuous

D Lighting - Internal light switch

E Computer - Computer start switch

f Emergency switch - very stop, for use in dangerous situations

【X axis oiling window】Easy to oil X axis screw/slide rail during maintenance

【USB interface】Mouse/keyboard and offline data transfer

【Conveyor】Transportation of products

【The power switch】Total power control of equipment

【Cooling fan】Maintain the temperature inside the electrical box of the equipment

【Axis Rocker】Manual operation controls are used to move the X/Y/Z/R axis

【Foot cup】Load bearing and level adjustment

【Oil-water separator】Air filtration/display and adjustment

【Safety cover】Avoid touching the inside of the machine when the equipment is running, safety protection

【Safety grating】Avoid touching the inside of the machine when the equipment is running, safety protection

【Feeders】Feeding parts to equipment

1.2 Precautions

① The equipment should be installed indoors in a dry and ventilated place and the humidity of the working environment should be between 30% and 80%.

② It is forbidden to open the safety cover during the automatic operation of the system. If you need to work inside the equipment, please be sure to press the emergency stop button before operating. Multiple users are prohibited to operate one equipment at the same time, so as to avoid danger.

③ Before shutting down the equipment, please send out the PCB safely, exit the operating software after confirming no error, turn off the computer, and switch off the general power supply of the equipment.

2.1Software operation

2.1.1 Startup process

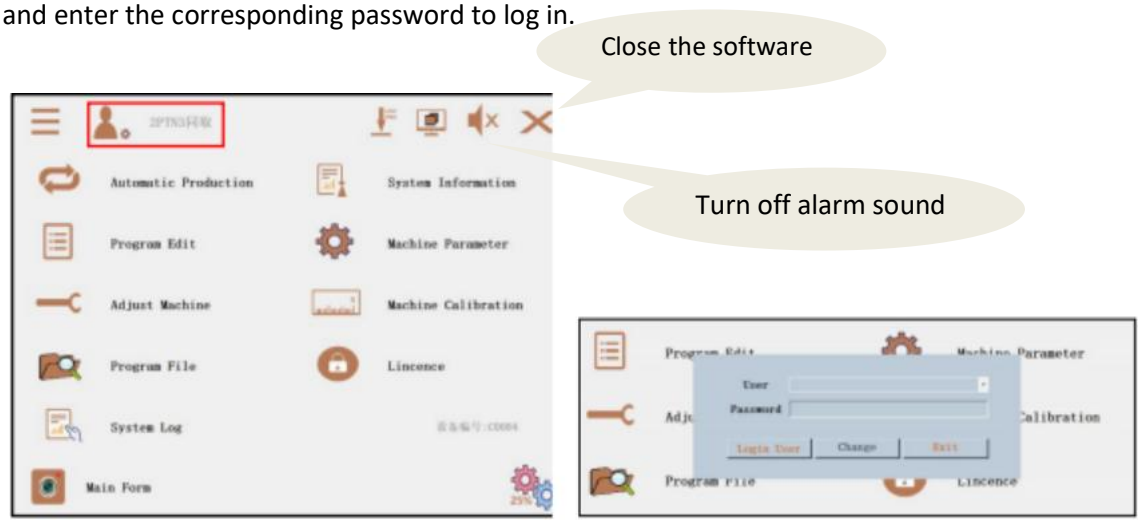
a.Ensure that the power supply /air source is connected

b.Turn on the main power switch to "**ON**"

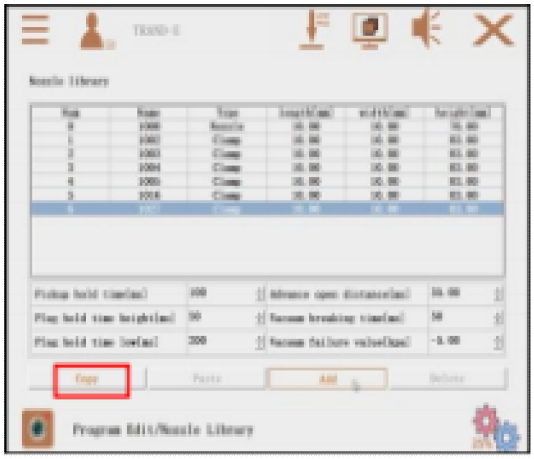
c.Press the computer startup button to start the computer.

d.Double-click the software icon on the desktop to start the operating software

e.The software default in operator grade authority. Click the operator position to pop up the user switching interface, select the user and enter the corresponding password to log in.



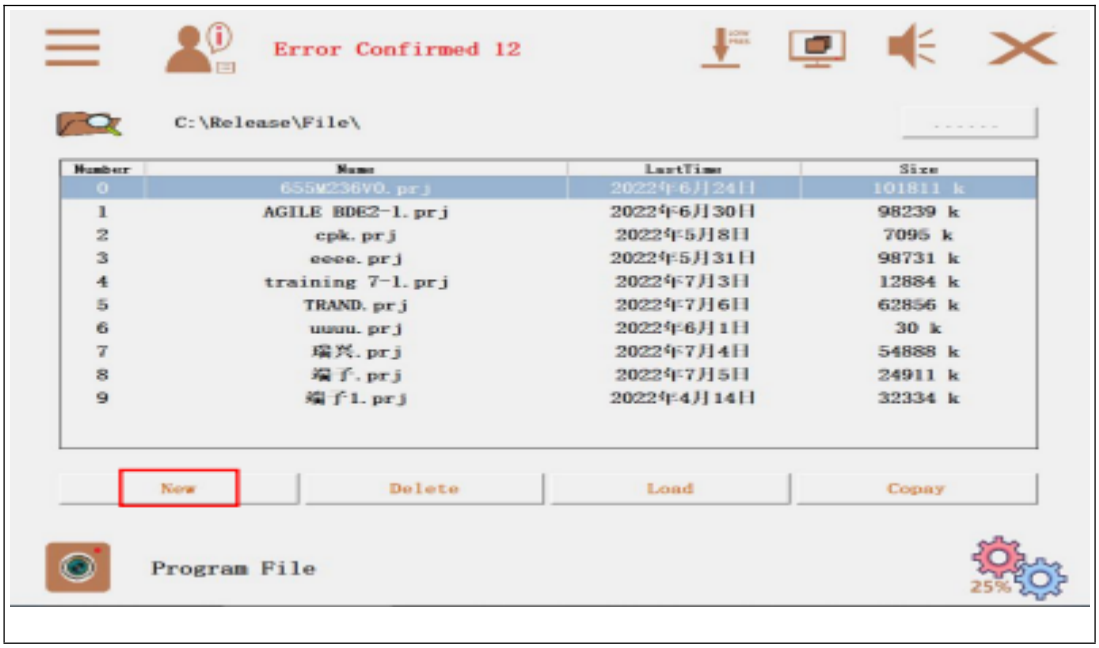
f.Click【Adjust Machine】-【Motion Control】-【Zeroing】Machine automatically return to zero position, then return to main page wait for production.



2.1.2 New programming

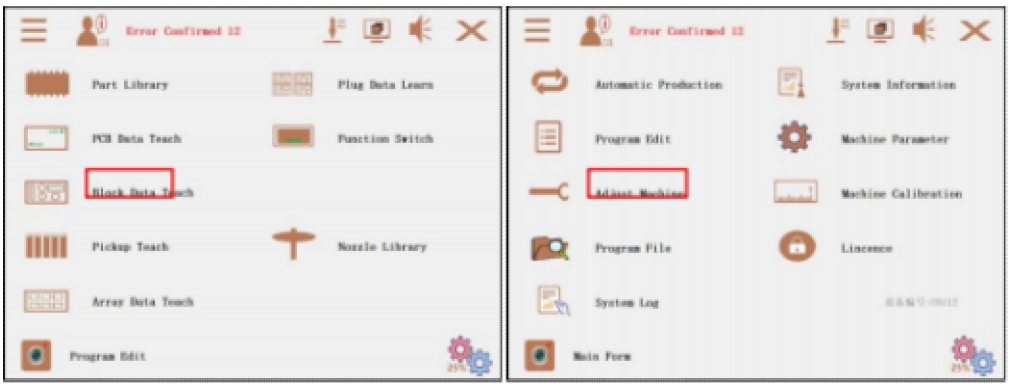
1.New program name

Open the 【Program File】 interface, click【New】 to manually enter the program name, and return to the menu interface.



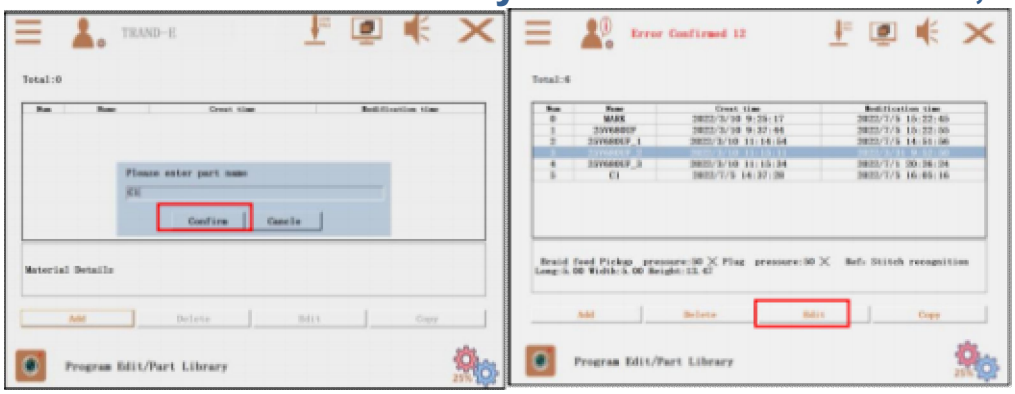
2.Program editing

Open【 Part Library】 in【 Program Edit】to add part data.



3 . Parts data and editing

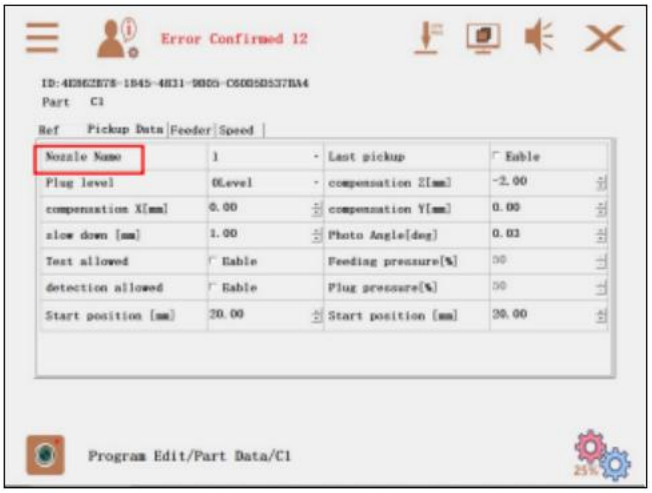
a.Click【 Add】 and enter the component name to confirm the new component name. Select the new component and click Edit or double click to enter the current component database.



b.Open the【Take and Place Data】interface, configure the following function data (it is recommended to configure the nozzle first, do not move the other changes according to the actual situation).

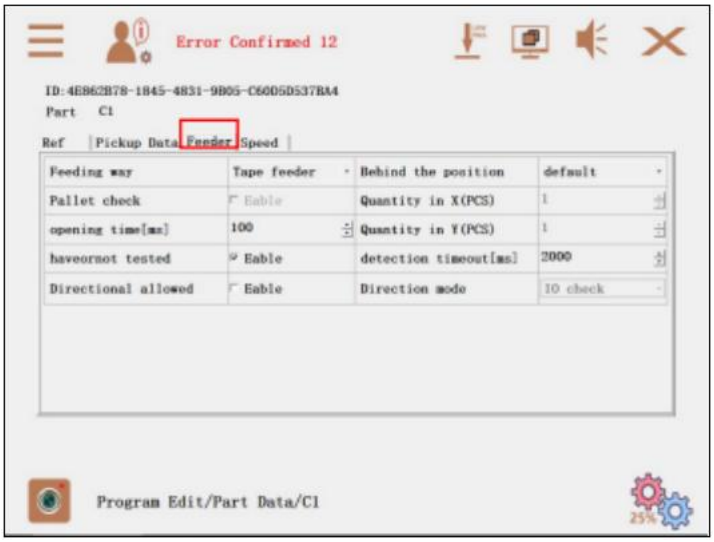
- 【suction nozzle name】 Deploy an appropriate suction nozzle.
- 【Insert level】 Divides into four levels. A larger number gives the insertion priority. If the level is the same, the program allocates it automatically.
- 【Feeder responding time】 Defaults to 100ms, and the larger the value is, the longer the taking time.
- 【Camera Angle】 The default automatic allocation.
- 【Insert compensation】 The actual insert is highly compensated.
- 【Decelerate distance】 Insert decelerates the distance between the component and the PCB. The larger the value is, the slower the insert speed. The default is **1mm.**
- 【Material confirmed or not】 Discharge alert, allows by default.
- 【Feeder delay】 Alarm time for lack of component default **2000ms** .
- 【Insert pressure detection】 Insert pressure detection - 【Insert pressure】 Default **50N**, which can be set according to the actual situation (Original manufacturer use only)
- 【Pickup pressure detection】 Take pressure detection - 【Pickup pressure】 Default **50N**, which is set according to the actual situation (Original manufacturer use only)
- 【Orientation identification】 Component orientation identification function -

【Orientation identification method】 Default to **I/O** detection (Original manufacturer use only)

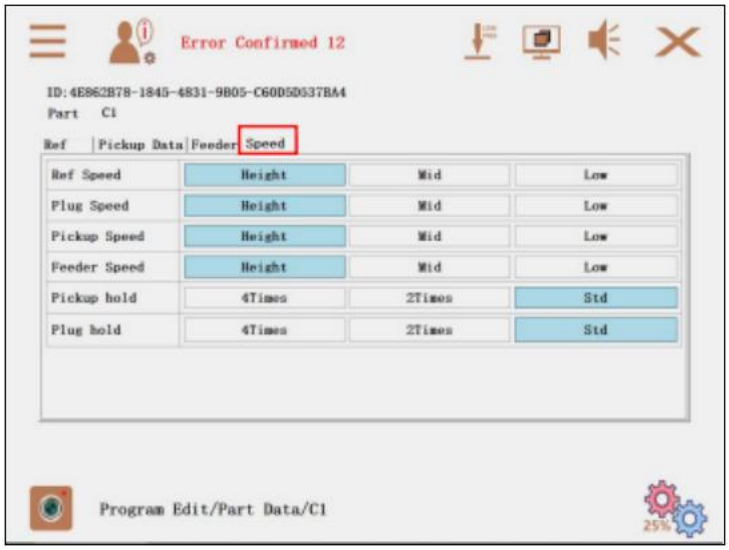


c. Open the interface of 【 Feeder】 to configure the corresponding parameters (it is recommended to select the feeding mode first)

- 【feeder type】 Select the type of feed
- 【 Quantity in **X**-direction 】 Default 1, multi-row material for tray type (vendor permission to change)
- 【 Quantity in **Y** direction】 as above.



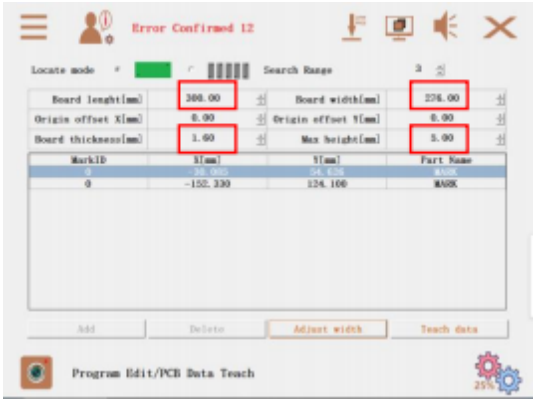
d. Open the 【 Speed】 interface, the default is high, can be changed according to the actual. The larger the multiple of the pickup hold and insert hold, the slower the speed.

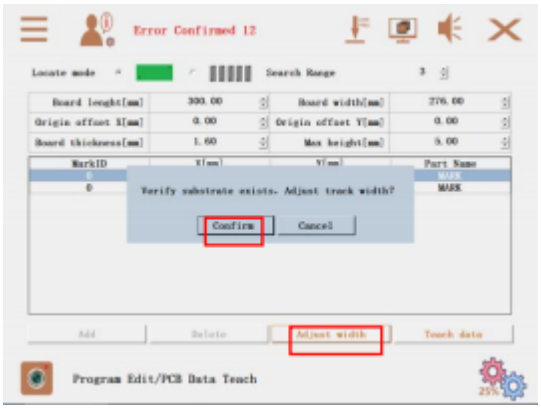


4. PCB data and MARK instruction

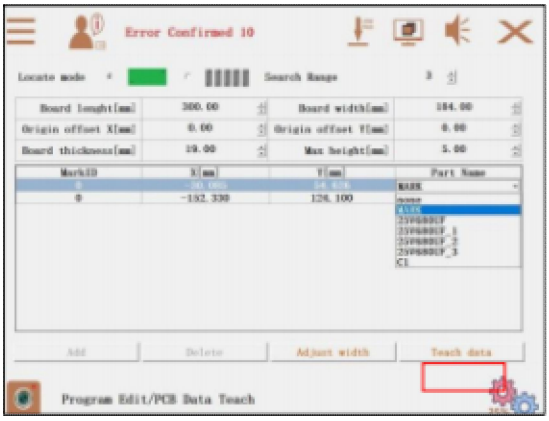
a. Open the interface of 【 PCB data Teach】 to set the **MARK** parameters

- Input board length and width (actual board width +**1mm**= conveyor width)
- Input the PCB or Fixture thickness. Irregular thickness of some PCB or Fixture will leads to clamping failure. The plate thickness can be adjusted appropriately (see step 8), Click 【 Adjust track Width 】 to pop up the confirmation dialog box. Click 【 OK 】 to automatically adjust the track to the set width.

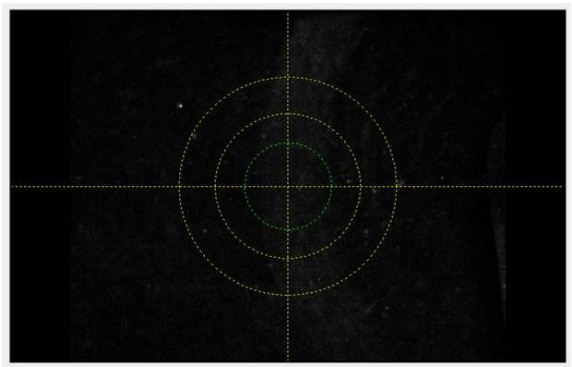




b.Select 【 Add MARK】 in the part number bar, automatically jump out of the data line, select the data line and click 【 Teaching Data】 to enter the **MARK** point teaching interface, put PCB into the conveyor, and click 【 Enter Board】 to put the PCB in place

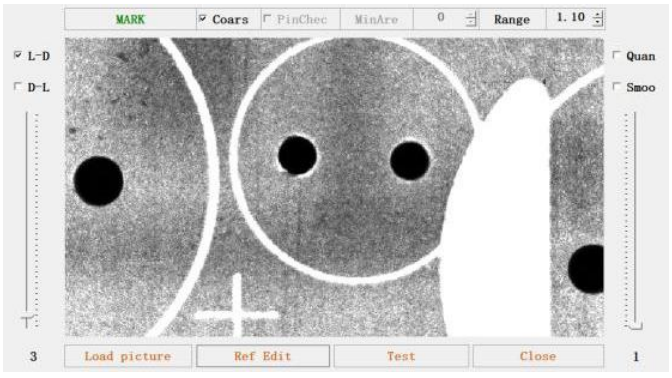


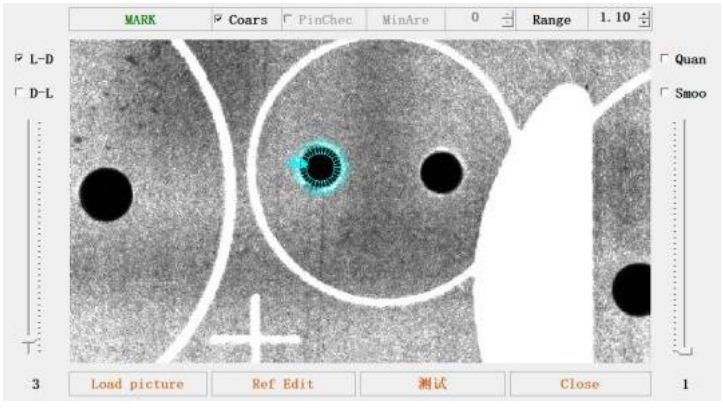
c.Press and hold down the start button and click 【 Move to photo position】 , then click the icon in the lower left corner to enter the movement interface. Click the axis of the circle to move **XY** axis. The smaller the circle , the slower the speed. After finding **MARK**, continue to click back to **MARK** teaching screen.



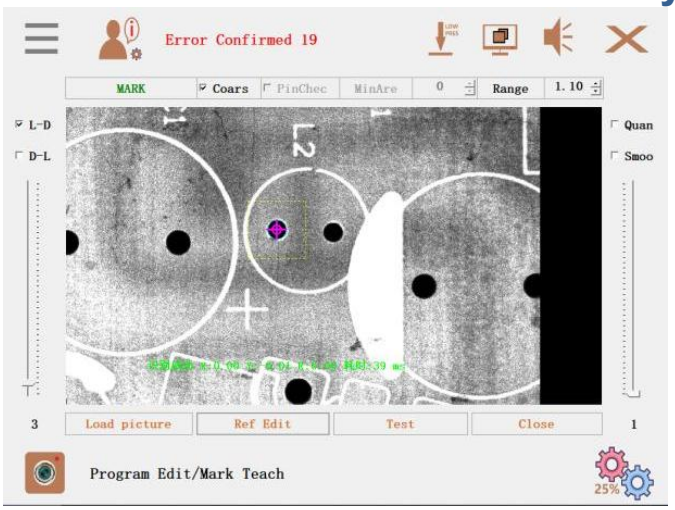
d.Return to the **MARK** teaching screen, click 【 Ref edit】 to enter the recognition editing interface

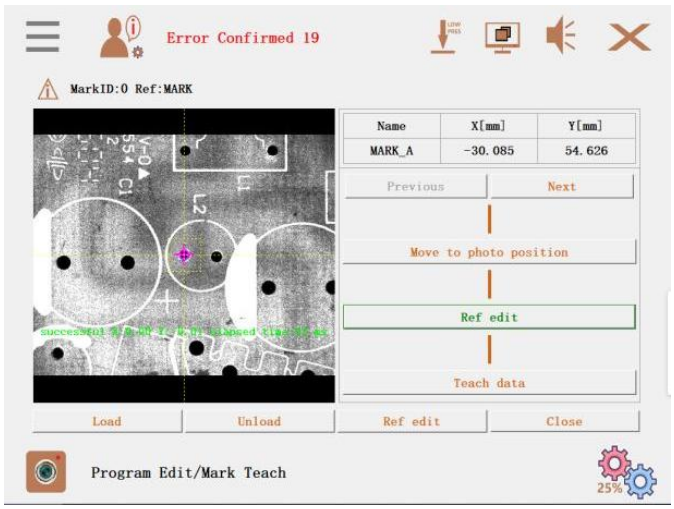
e.Enter the interface for identifying and editing the current **MARK**. Note on the left that 【white and black】 / 【black and white】 indicates the color difference between **MARK** and the PCB (for example: **MARK** is white, select white and black, **MARK** is black, select black and white) Click 【Edit Template】 and press the green text prompt, point the mouse to **MARK,** hold down the left button and drag the mouse to an appropriate size, and release the mouse template training successfully





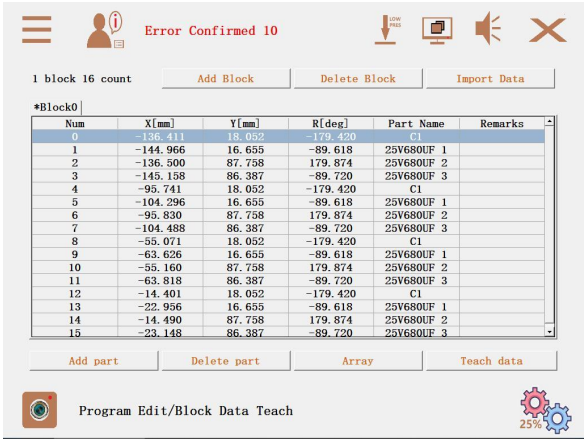
f.Click 【Test】 to identify the coordinate successfully and return to the teaching interface. Click 【Teach current data】 to pop up the confirmation dialog box to save the current MARK data. Click 【Test】 to confirm **MARK** identification again.



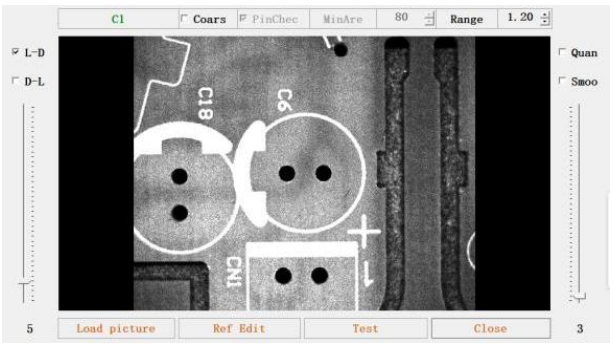


5.Block and Hole data instruction

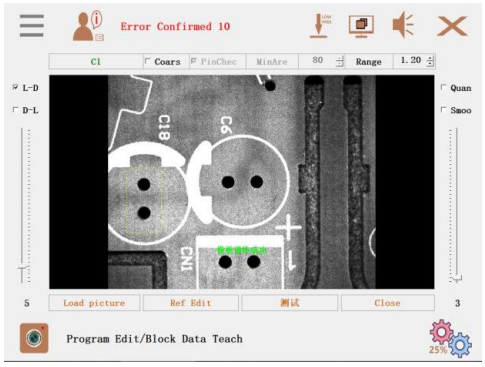
a. Click 【 Block Data Teach】 to enter the interface and add positions to be inserted



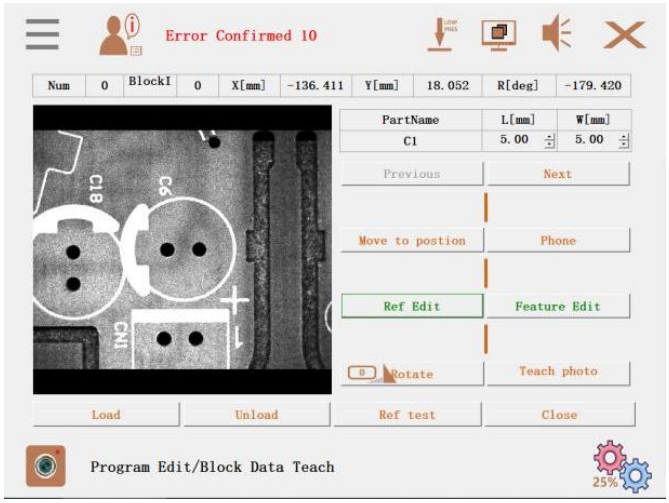
b. Click【Teach Data】to enter the block teaching interface, hold down the start button and click 【Move to target location】, click move **XY** to the insert hole, click again to exit the mobile interface, and click 【Identify edit】 for point image processing

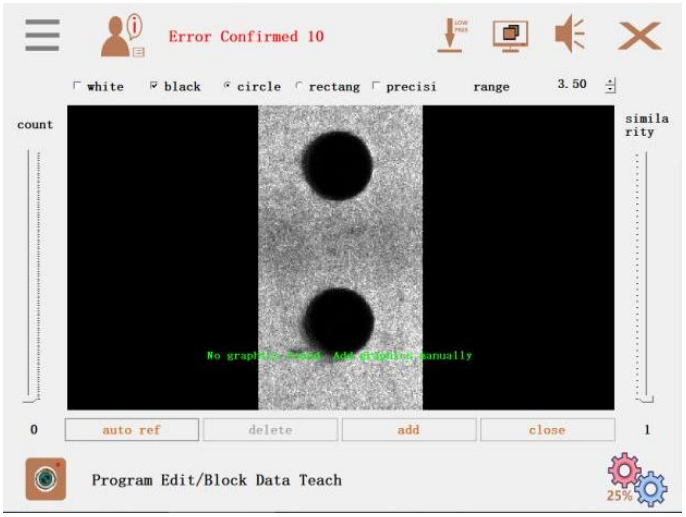


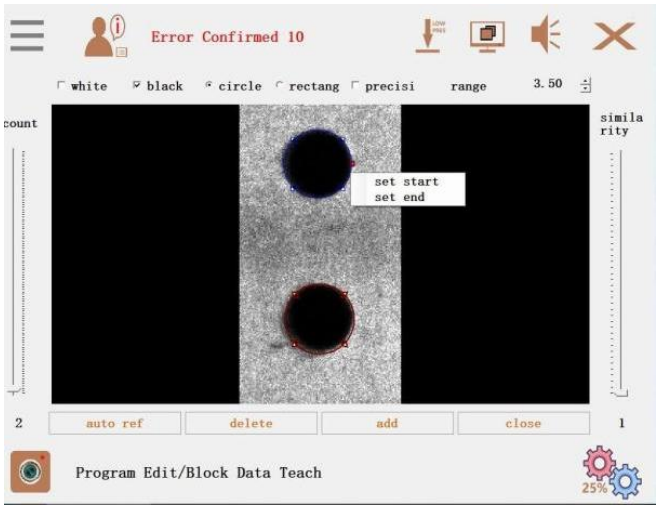
c. After entering the recognition and editing interface, click 【 Edit Template]】 to select the point box according to the green text prompt. If the message indicating that the training is successful, the recognition interface will be returned

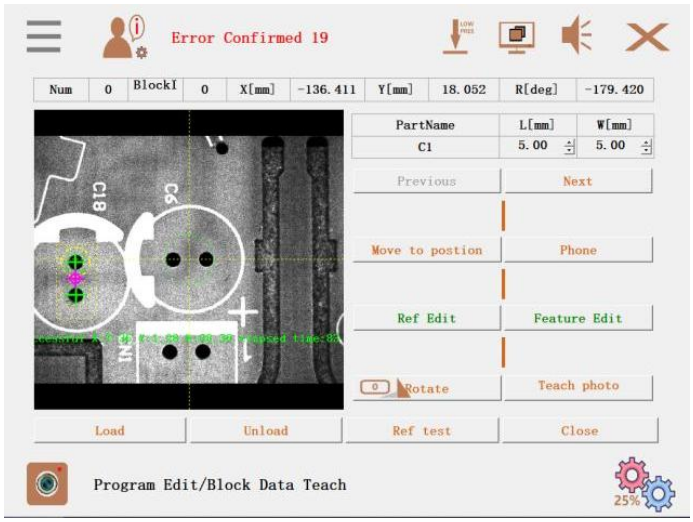


d.Click【 The edit characteristics】 into the interface, based on green text, and then the right mouse button to choose start point and end point (note: the starting point and destination choice needs corresponding element to identify the direction, so please keep in mind that the current setting), back to the main screen click【recognition test】 prompts recognition success click【 teach photograph position】 saves the current coordinates.



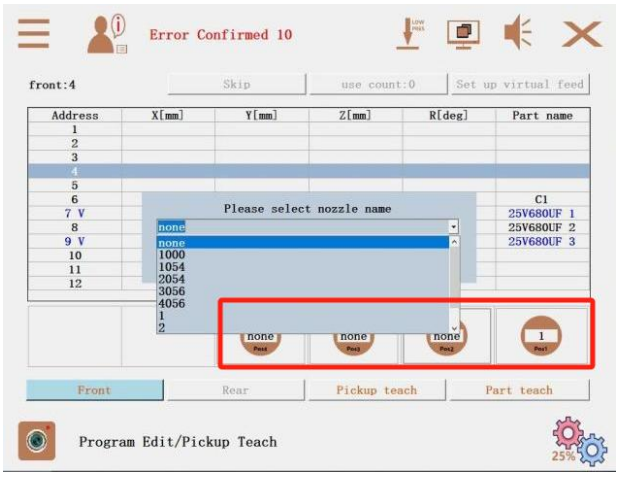




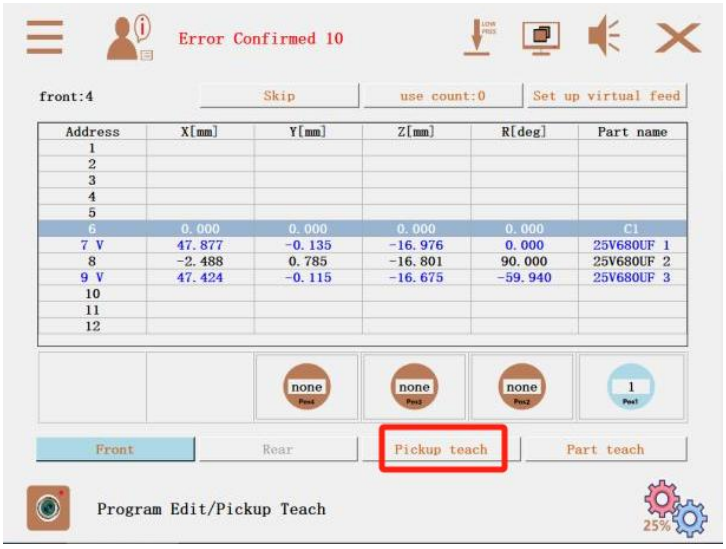


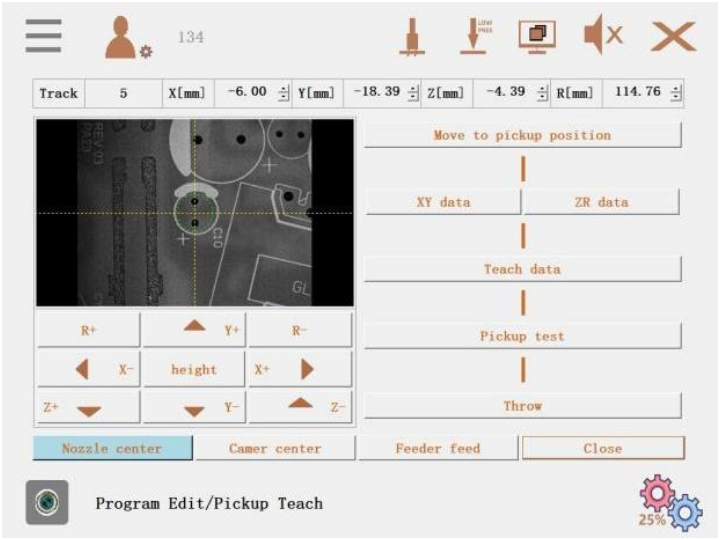
6.Feeding position and parts instruction

a. Click to configure suction nozzle and write data from right to left.

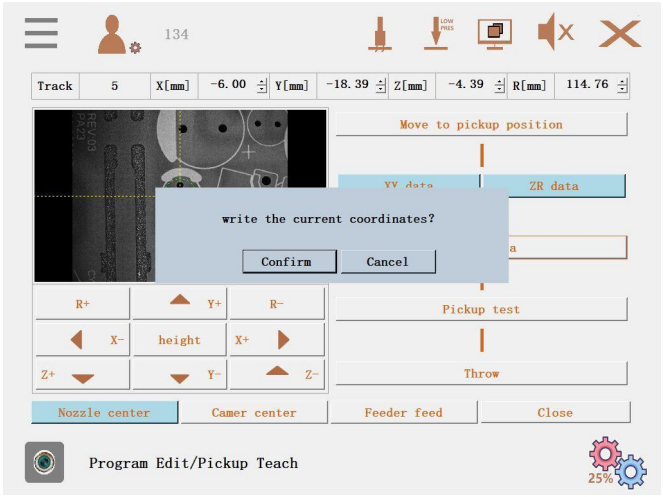


b.Corresponding choice position, choose corresponding component data click the part number column names, open【feeding position teaching 】 interface, press launch a click on the 【 move to the feeding position】 ,at the same time, the use of the direction of the panel buttons or handle the work head moves to the corresponding position (Switch the illumination mode on front panel for adjustment).

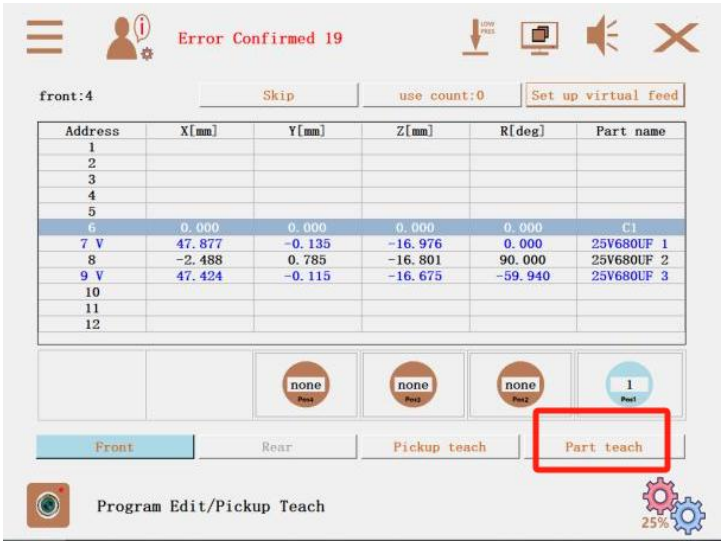


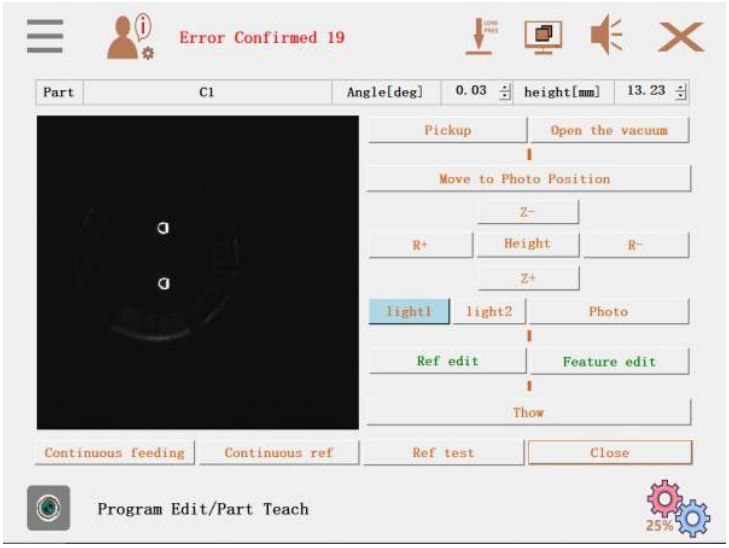


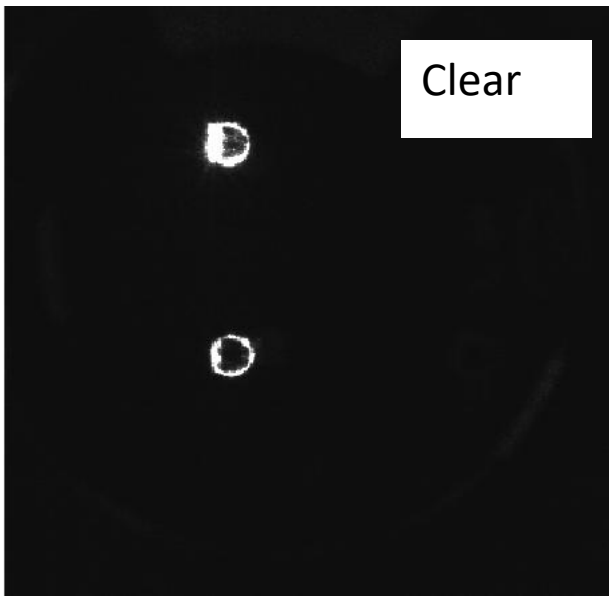
c.Adjust the material pickup position, select **XY** data and **ZR** data, and then click【 Teaching Data】 to save the current coordinate (note: before clicking 【 Teaching Data】 , you must first select XY data or ZR data, and select the axis changed. If you do not select it, no change will be made.)



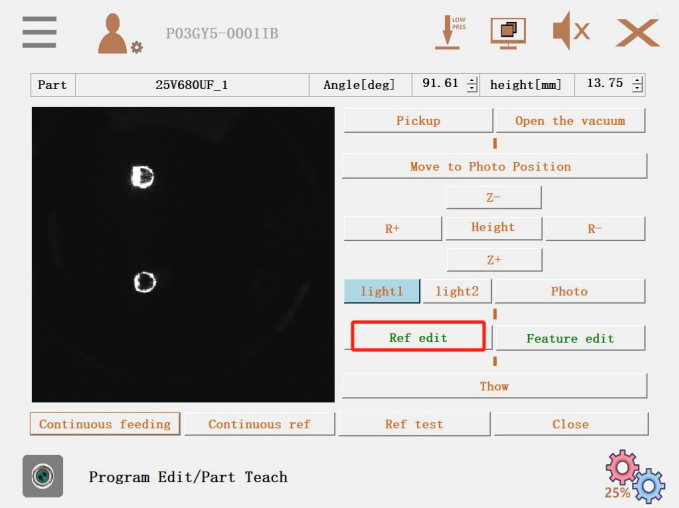
d.Click the pickup test, the machine is automatically pickup current component after confirmation, close the interface of 【 teaching material position】 .Click【 Part Identification Instruction】to edit component identification data. Press the start button and click 【 Move to Photo Position 】to adjust the image sharpness of the component using the direction key on the panel until the adjustment is clear.

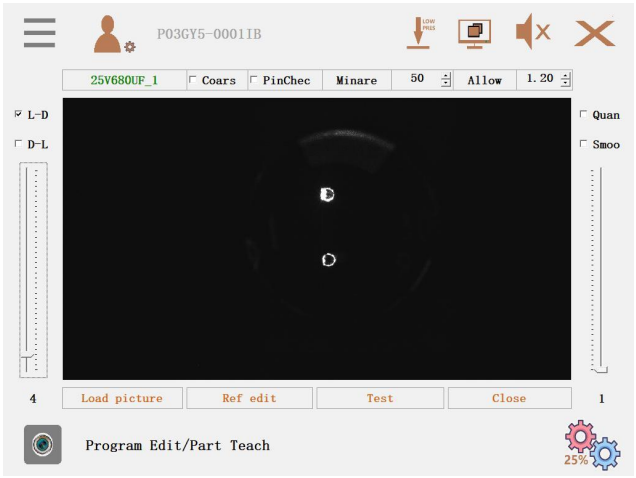




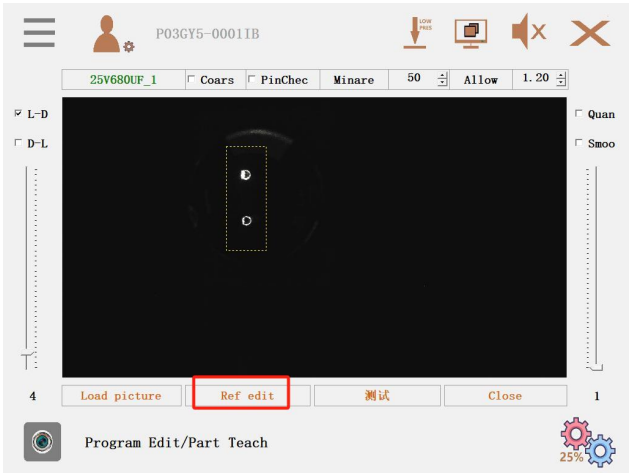


e.Click 【Identify Edit 】 to edit the component image. According to the color of the component lead, select lead detection and write in proportion to the minimum recognition area and detection range.

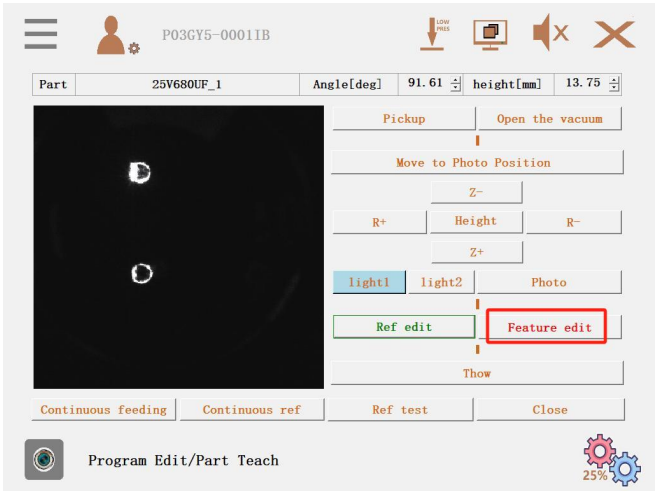


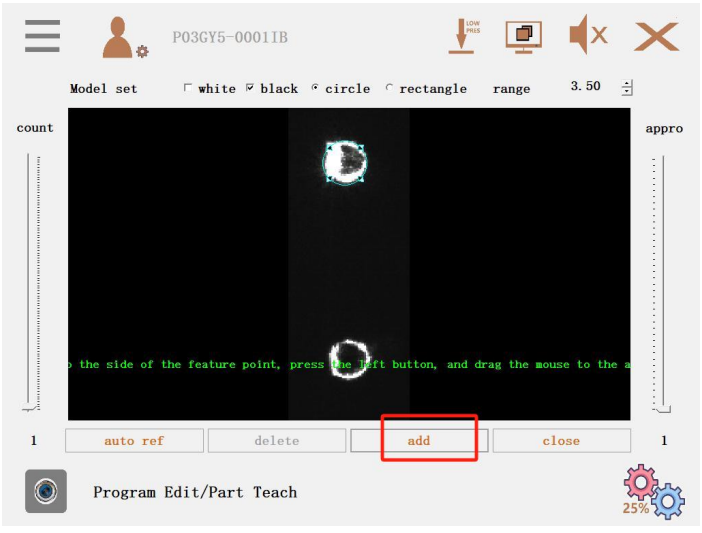


f.Click【 Edit Template】 to operate according to the green text prompt, select the lead to be identified in the box, indicating that the training is successful, and close the interface.

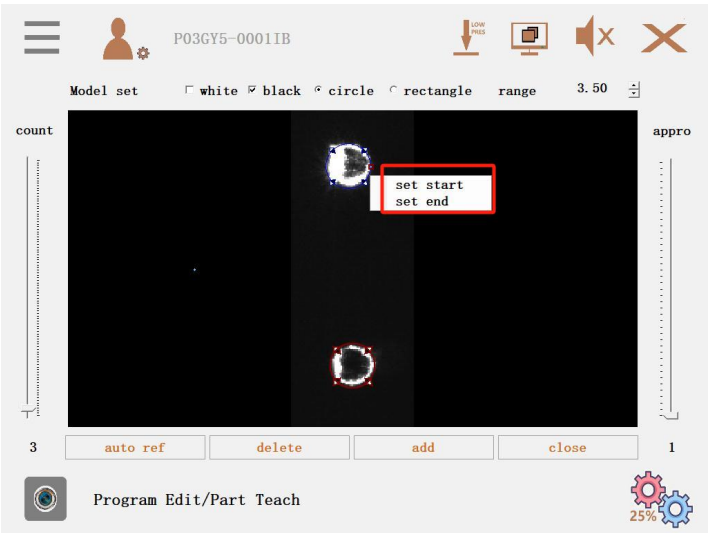


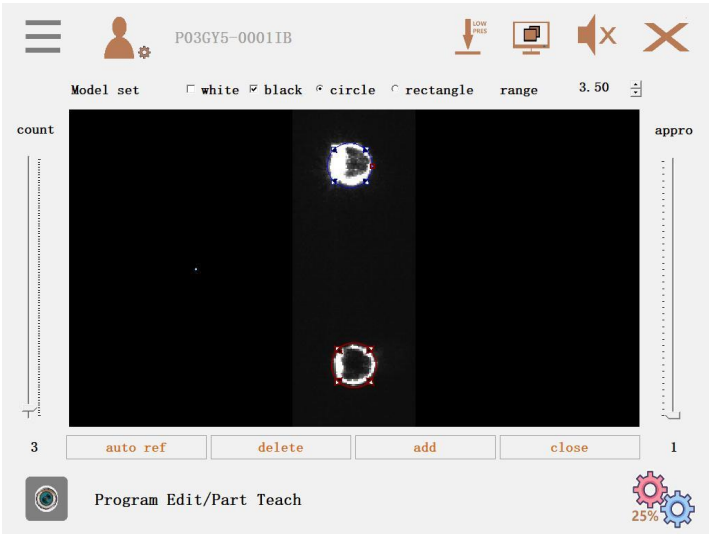
g.Click 【 Edit Features】 and to add, operating according to the green text prompts. Point the mouse to one side of the feature point, press the left button, and drag the feature point to an appropriate size.



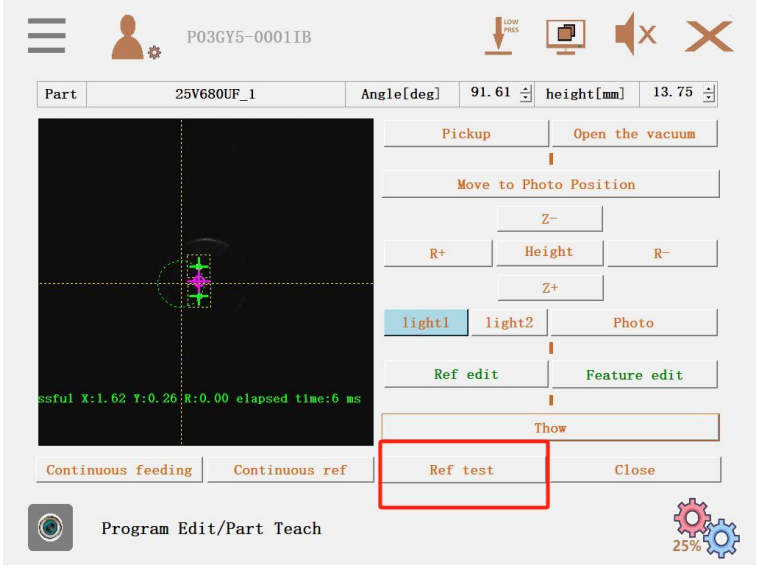


h. Select the starting point and ending point, right-click the mouse and choose 【Set Starting point】& 【Set End point】 (note: the selection needs to correspond to the starting point and end point of the insert hole in 【Block Data】). If the setting is successful, there will be change the color and the interface will be closed



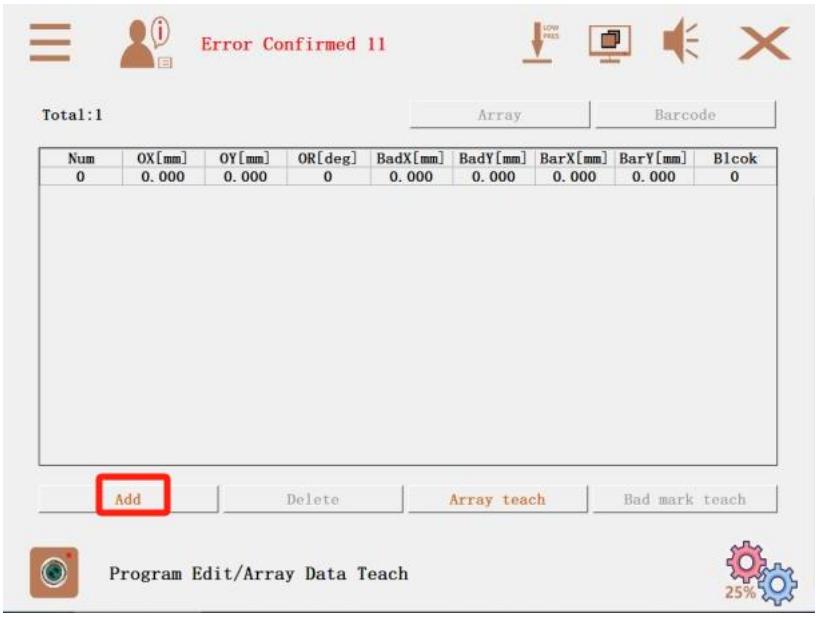


i. Click 【Identification Test】 to test the current component. If the test fails (as shown in the figure), you need to check the definition of the component or enter 【Identification Edit 】 to change the detection range until the test is OK. After the test is OK, you can 【continuous identification】test.



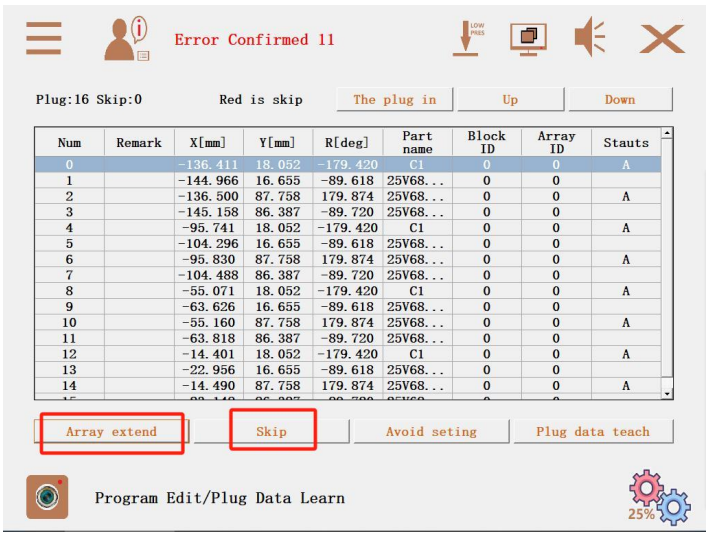
7. Panel and bad board instruction.

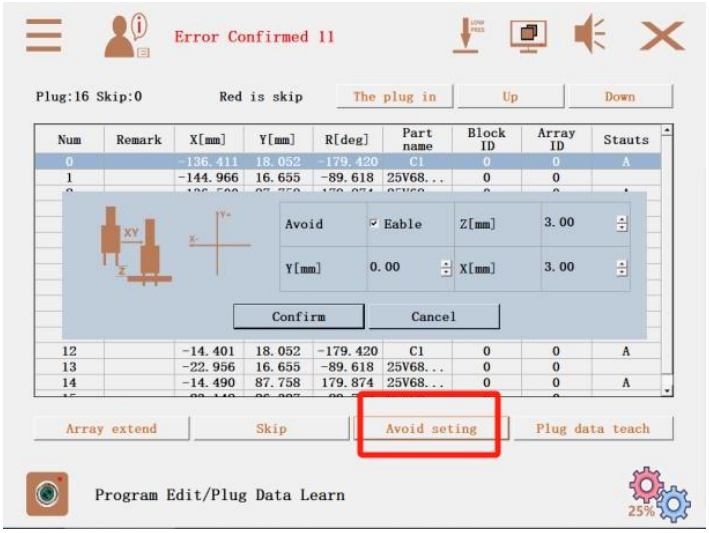
a. Add line(s) of data same as the number of the panel in PCB. Add just one line for single PCB (no panel form) (note: insert data cannot be extended without adding this item)



8.Insert data with automatic learning

a. Open the【 Plug Data Learn】interface, click the panel form extension to update the current insert location data, select the data bar and click 【 No insert】to skip the insert location. When the base board insert position has component interference and needs to dodge, click 【 Dodge Setting】to write the dodge distance according to the actual situation.



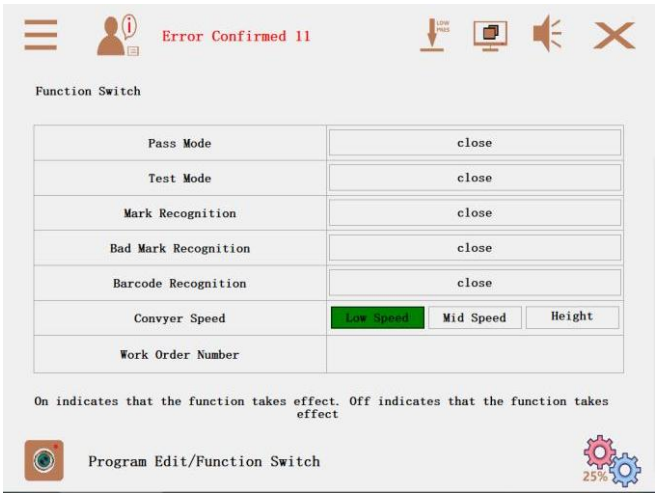


b.Select the first line of insert data to open the 【insert Data Teaching】 interface. Click

【Automatic Learning Position】 and the machine will automatically learn all insert holes. After learning, the machine will return to the interface.

9.Function switches

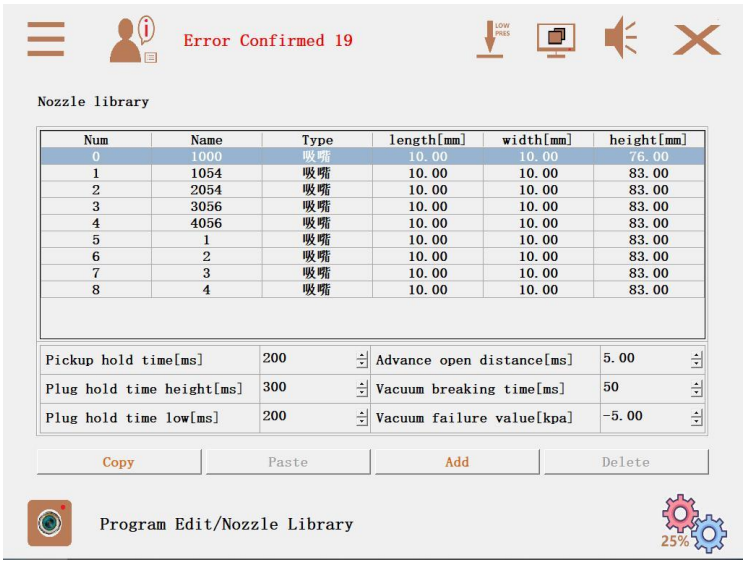
A.Machine running mode selection and track running speed (Original manufacturer use only).



10.Suction nozzle data

a.Establish nozzle/gripper database, corresponding to input actual nozzle/gripper size data (note: input data must be correct)

- 【 Pickup holding time】 the default is **100ms**. The longer the time, the slower the speed.
- 【 Vacuum/Gripper advance opening distance】 **35mm** by default. The vacuum is broken or the gripper is opened in advance to prevent the possibility of the gripper bringing material.
- 【Insert hold time high-speed】 defaults to **200ms**, the insert hold time when the machine is operating at **100%** speed.
- 【 Vacuum value】 defaults to -80kpa, do not change.
- 【 Insert hold time low speed】 the default is **200ms**, the insert hold time when the machine runs at **20%** and **50%** speed.
- 【vacuum detection failure value】 default -5kpa, the low vacuum alarm.



11.insertion array

Insert point editing can be divided into two ways: **a**. General editing (applicable to single PCB and Panel form PCB, biased to single PCB); **b**. Array editing (for panel form PCB only).

Common editing mode: a. For single PCB, add all the hole positions for insertion, assign the part number, and directly show the hole positions.

b. For panel form PCB,

1. You can select the panel form mode in the PCB positioning

   mode (Multiple **Mark** coordination can be added only in the panel form mode);

2. Add corresponding **Mark** data to the parts database;

3. Add corresponding panel blocks;

4. Add the location data of insert holes in corresponding blocks and teach them;

5. The insert data is displayed automatically, and the hole position is edited.

Array editing mode:

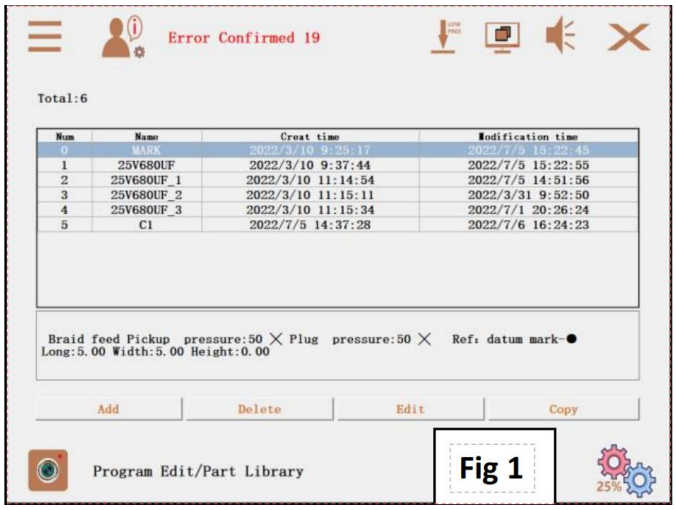
a. For example with two panel in PCB , establish two **Mark** data in the parts database (as shown in Figure 1);

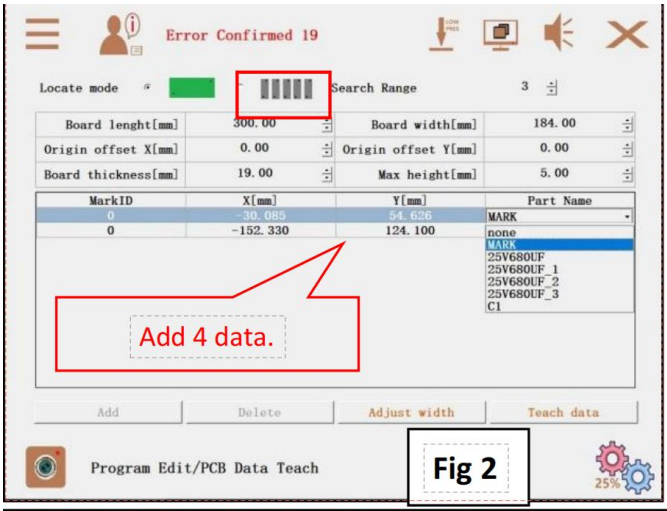
b. Select the panel form mode in the PCB positioning mode and add two groups of **Mark** coordinates (as shown in Figure 2);

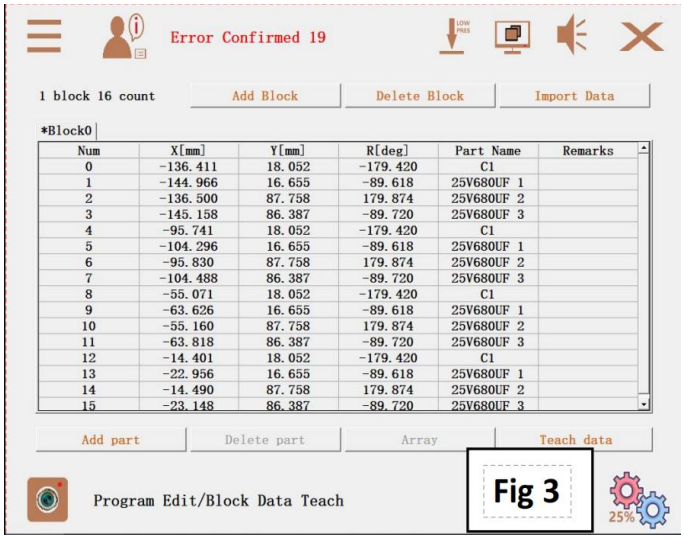
c. Add the insert position of the first panel to the block data and teach it (as shown in Figure 3);

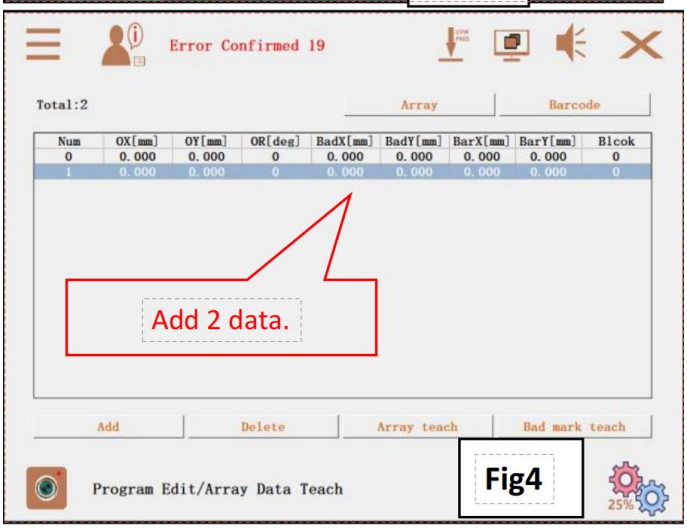
d. Add two rows of array data in the panel form demonstration, click the panel form demonstration and use **Mark** camera to locate the symmetry points of the first and second panel PCB (see Figure 4);

e. In the insert data will automatic learning and the whole PCB data will automatic done.





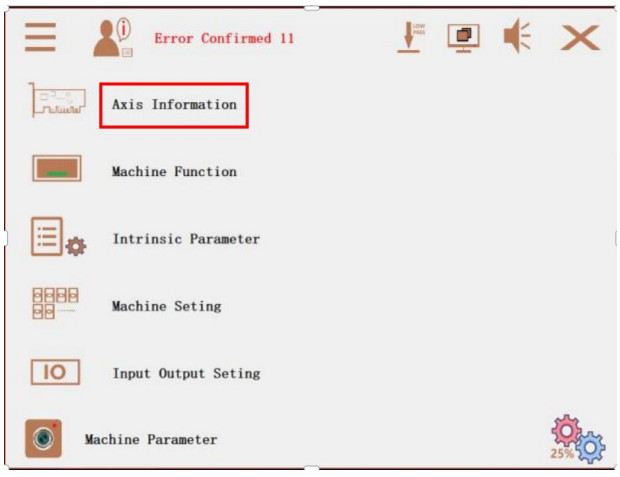


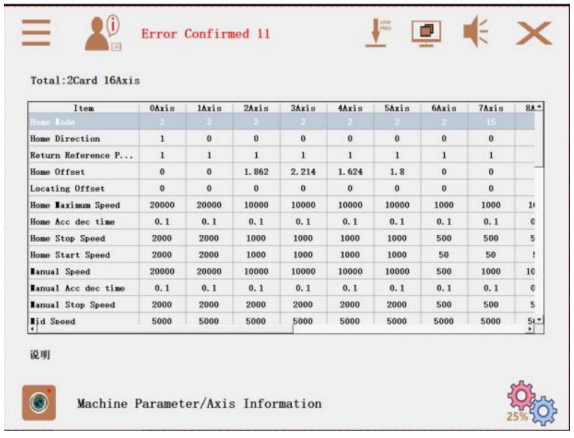


2.1.3 The machine parameters

1.Shaft control parameters

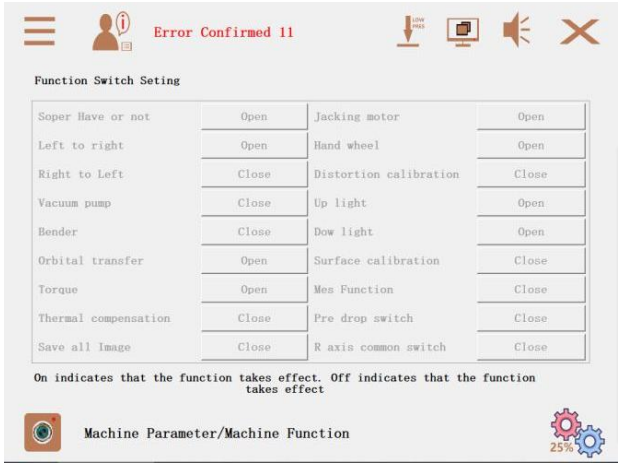
a.Click to open the【 Axis Parameters】 interface, which contains the Proper value of the axis data. (**Please do not modifv it**.)





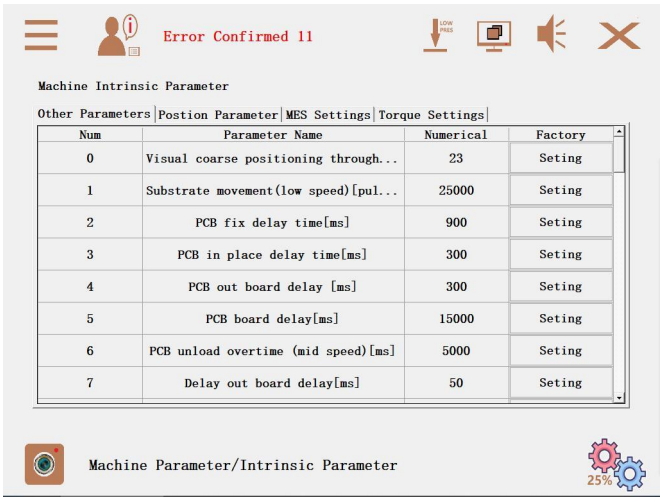
2.Function switches

a.Click to open the【 Machine Function 】 interface, and you can set related functions (Original manufacturer use only).



3. Basic and MES parameters

a. Click 【 Intrinsic Parameter】 to change the corresponding parameters (Original manufacturer use only).

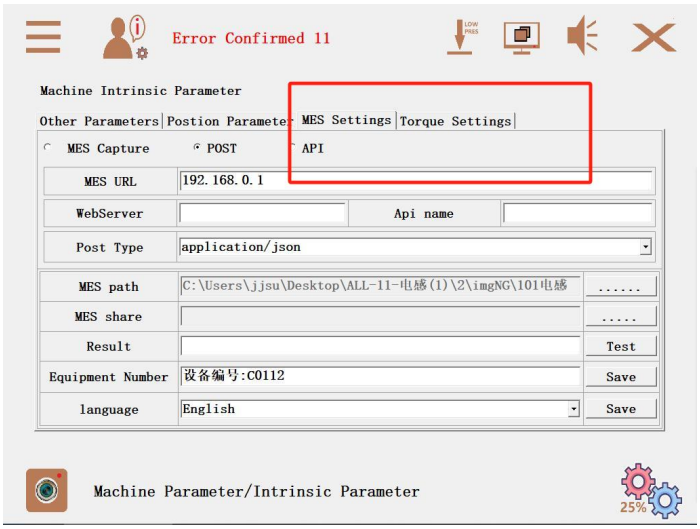


b.Click 【 Other Settings】to open MES connection and elevation detection. You can set the format and method of MES communication, and upload MES data after setting the IP and port of the communication.

- MES communication test: MES communication test, which contains test information;
- MES update path: Path where the program MES information is saved;
- MODUBUS port: component floating detection servo communication port (the red mark of below figure is the servo communication parameter setting, which is

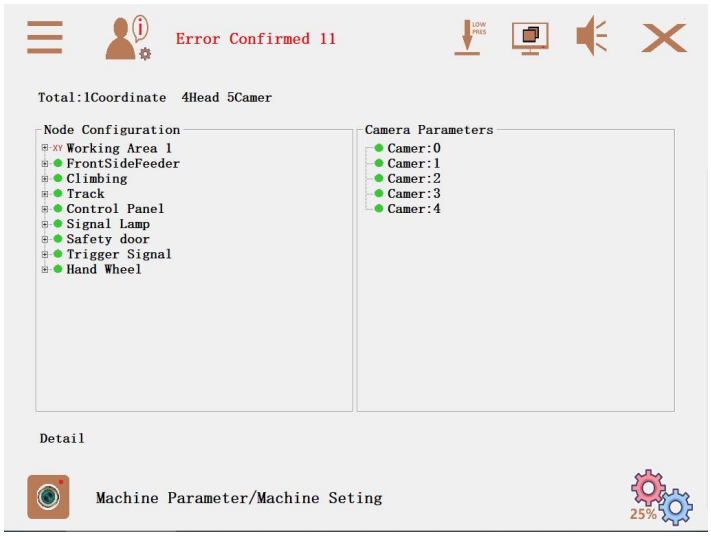
generally set as the default);

- Device number: The device number contained in MES communication.



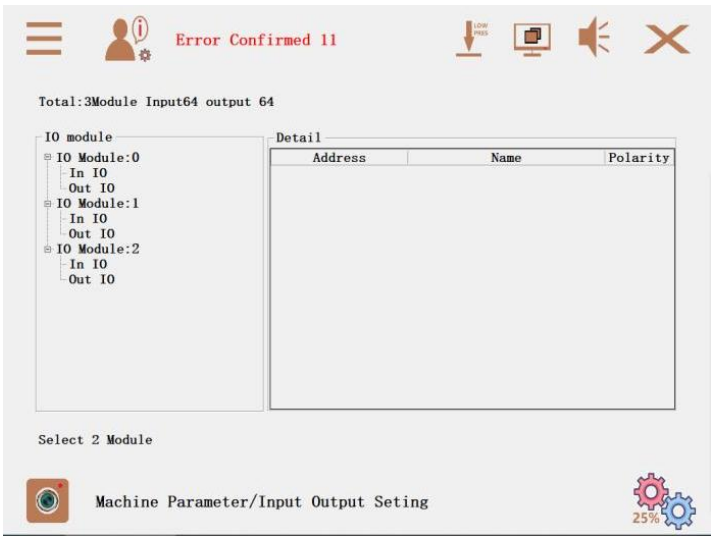
4.Machine settings

a.Click 【 Machine Settings】 to set the factory Settings of each signal node (**Please do not modify it**.)



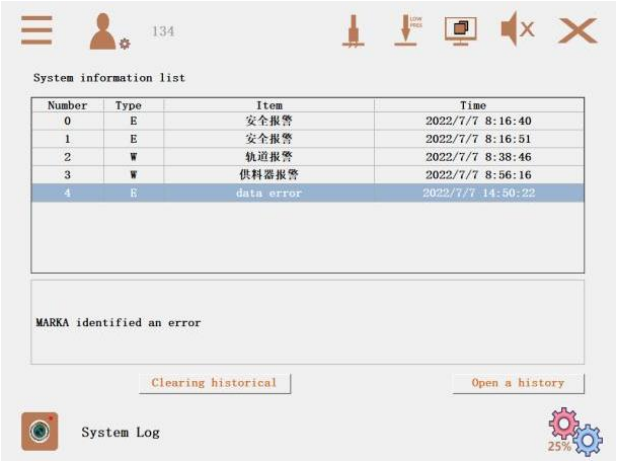
5. Input/output Settings

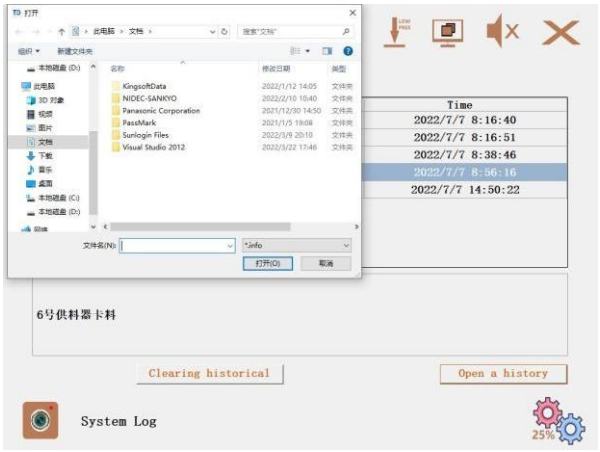
a.Click 【Input/output Settings】 to check out I/O interface.



6.System logs

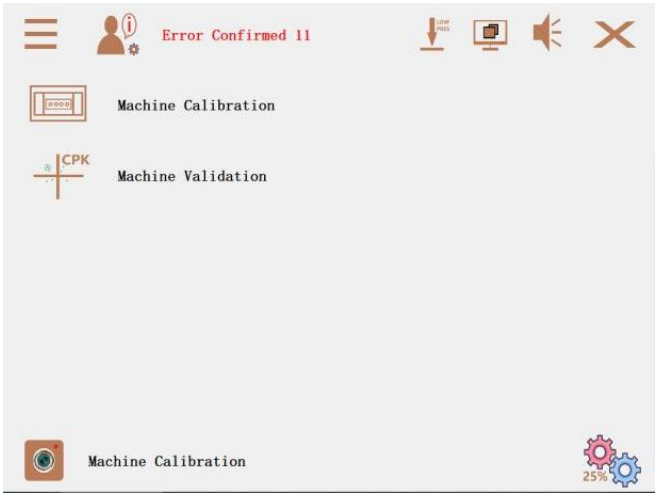
a.Click 【 System Log 】 to view the system information of the current machine, click Clear 【 Historical Document】 to delete the historical system information, and click 【 Open Historical Document】 to view the previous system log information.

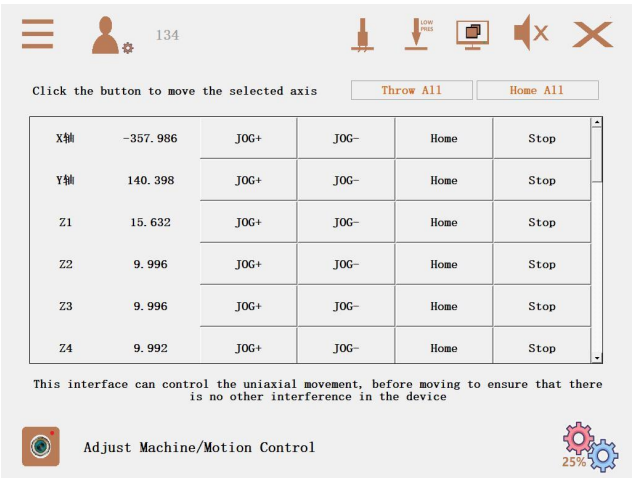




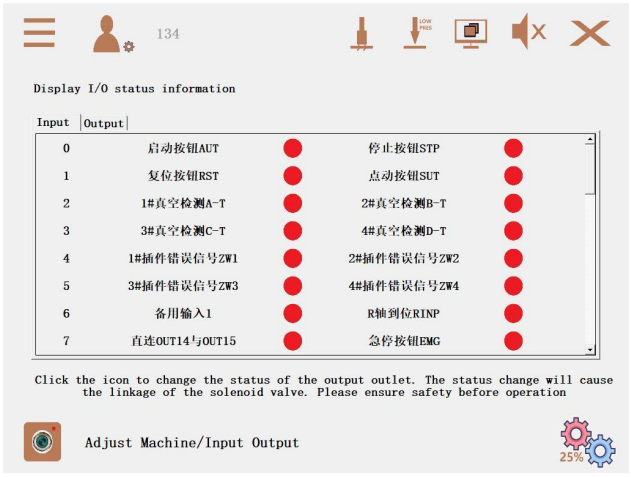
7.Machine debugging

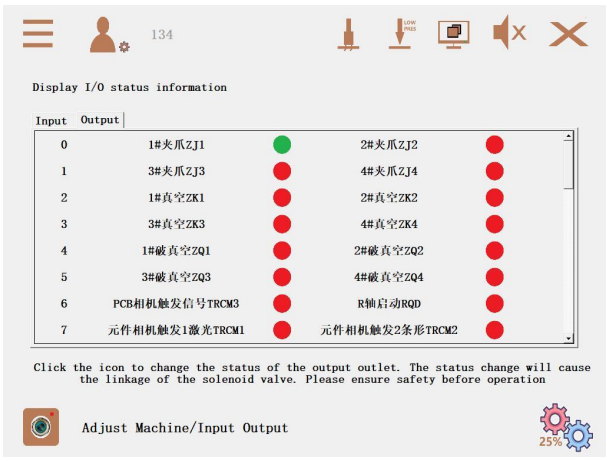
a.Click 【 Motion Control】 to open the axis debugging screen, and click **JOG+/JOG-** to move the corresponding axis;





b.Click【In-Out】 to open the I/O information screen. Click the red dot to test the corresponding I/O signal.





2.1.4 Abnormal Mark handling

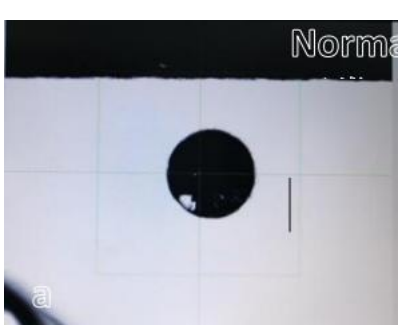
a. If PCB stuck in the conveyor, **PCB** did not reach the specified position, resulting in **Mark** position de viation;

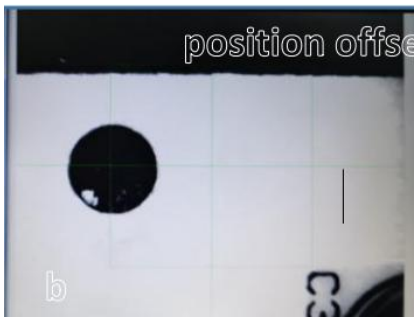
b. Flux on the conveyor causes stuck of the fixture, leading to **Mark** identification error;

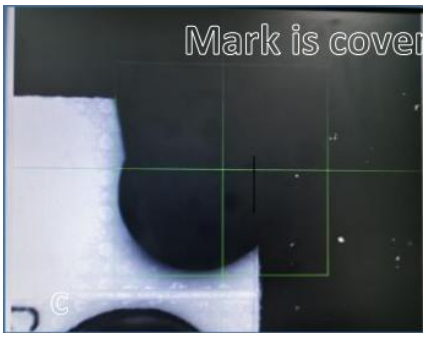
c. The **PCB** on the fixture is not properly placed, resulting in dislocation or reverse placement of the **PCB**, which also makes **Mark** failure;

d. **Mark** is blocked by foreign bodies or Mark itself is irregular, resulting in abnormal recognition.

Mark Process instance







a. Normally to lead the target in the green box ;

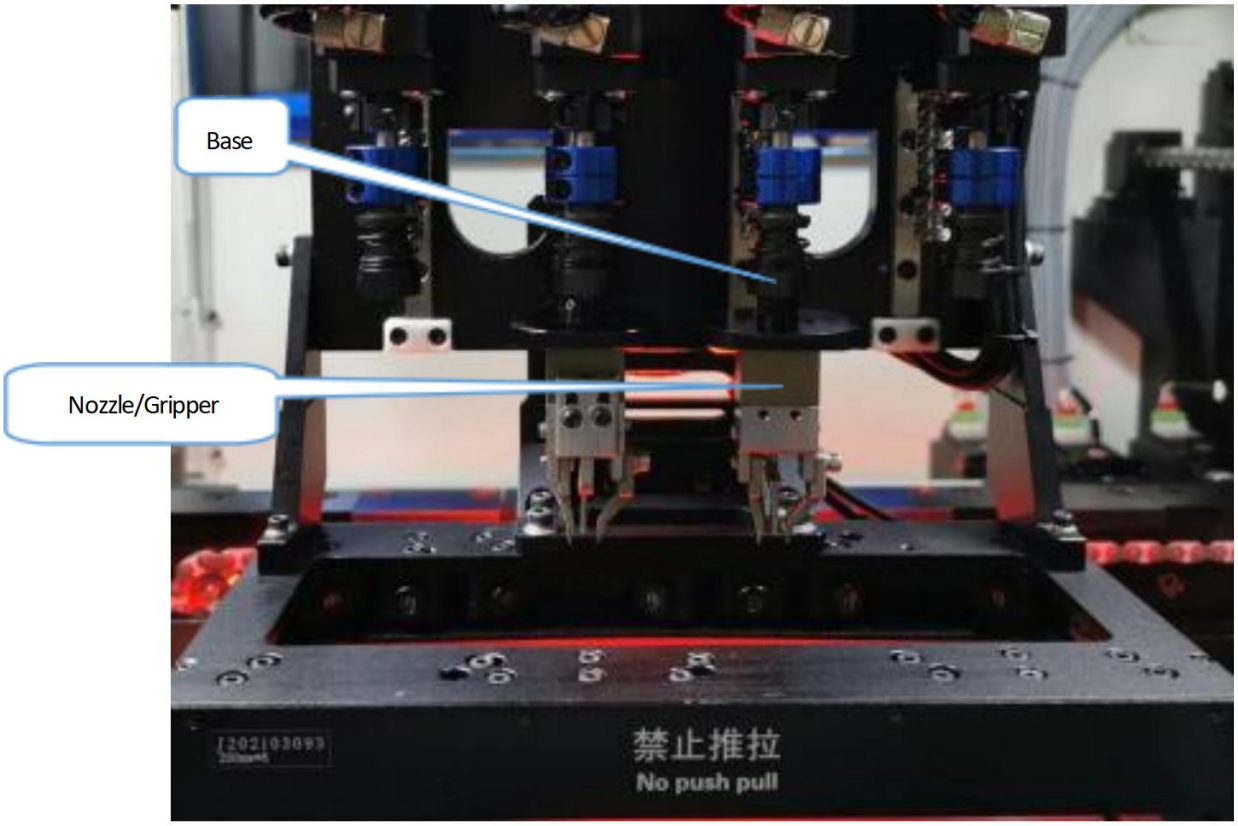
b. If **Mark** runs **half** out of the green search box, its position is offset and the camera cannot recognize it; It is necessary to exit the **PCB** from the conveyor, check and ensure the conveyor mechanism is normal, and also check whether there is foreign matter on the conveyor edge or fixture. If so, please clean it, and put the **PCB** into the conveyor again after confirmation;

c. Mark is not in the display range, blocked or **PCB** reversed, so the camera cannot recognize it; The **PCB** needs to exit the conveyor, remove the shielding or change the direction of the **PCB** return to continue production.

2.2 Insertion head structure

2.2.1 Nozzle/gripper replacement

The suction nozzle/gripper belongs to the quick disassembly mode, just need to push the base buckle, the suction nozzle/gripper will automatically disengage from the base; Also push the base buckle to attach the nozzle/gripper to the base. (No tools required)



2.2.2Feeder installation

Pull the positioning buckle to align the positioning slot and install feeder on the feeder platform (the station position should be consistent with the program station position).

4. 3.Additional items

3.1Maintenance and maintenance

3.1.1Maintenance Tools preparation

Tool

Oil gun

Syringe

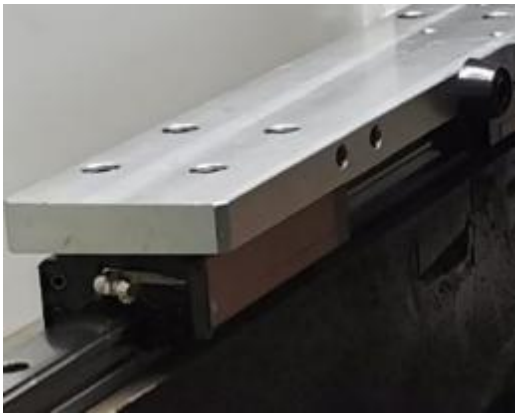
The oil gun

Tip nozzle

Flat nozzle

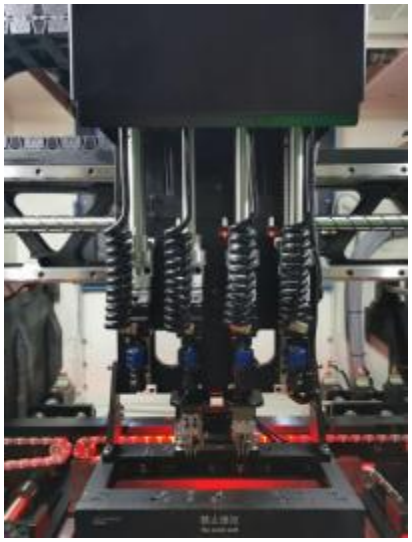
3.1.2 XY Screw & slide maintenance

XY screw & slider cleaning/refueling, add 2# butter monthly.



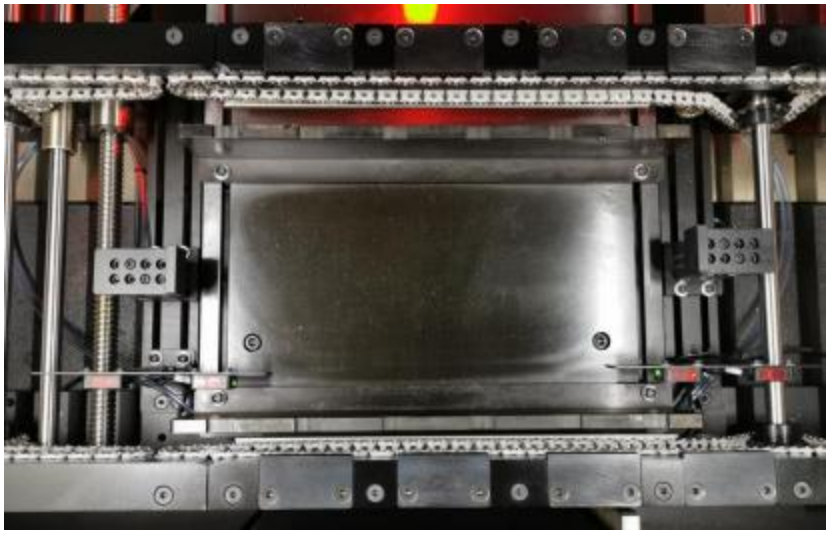
3.1.3 Z-axis mechanism maintenance

Z-axis mechanism cleaning/refueling, filling AFC or special high speed grease monthly (the protective cover of insert head needs to be removed before cleaning refueling)



3.1.4 Conveyor mechanism maintenance 1

Check whether the belt or chain is loose, clean and maintenance monthly.

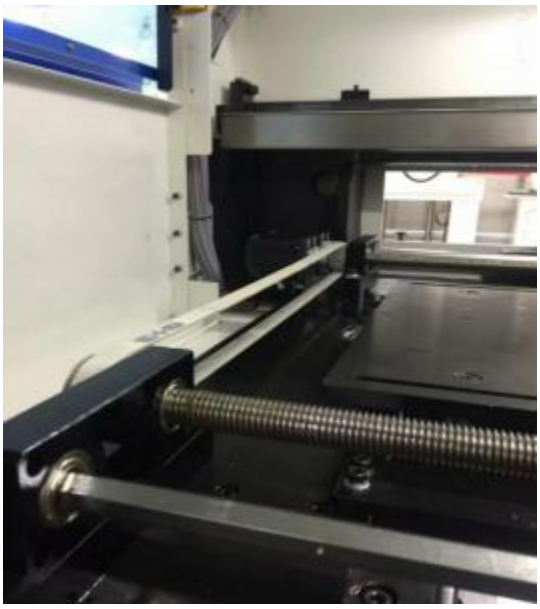


3.1.5 Conveyor mechanism maintenance **2**

Check whether the guide wheel is worn and stuck, clean and fill with chain oil monthly.

3.1.6 Conveyor width adjustment mechanism maintenance

Conveyor width adjustment mechanism/transfer mechanism cleaning/refueling, filling 2# butter monthly.



3.2. Device Failure Handling

a .The equipment alarm pressure is low, please check whether the total air input of the equipment is normal. The standard **4-6kg** anhydrous air source is normal. If the air source input is normal, the pressure controller and **I/O** control system need to be checked;

b. After starting the software, each shaft control alarms. Please check whether the emergency switch is pressed;

c. If the gripper takes abnormal material or the feeder has no material, it means that lack of the materials, the feeder need refill material;

e. **Mark** handle failure and confirm whether **PCBA** is in place. If **Mark** point is fuzzy and incomplete, you can directly click **Mark** center with the mouse;

f. When the emergency switch is pressed, the emergency switch on the operation panel or the operation handle is pressed, pull it up;

The command position of axis **W H X/Y** exceeds the limit, which can be divided into the following situations:

1. Check whether the signal of **X-Y** limit sensor is normal; 2. If the drive
& motor is abnormal, reset it back to zero;

h. The machine is not reset, please reset the machine to zero;

i. When the safety door is open during operation, it means that the front and back safety doors are opened during normal operation of the machine and the machine stops running. The safety door can be closed to reset the machine;

g. Trigger the safety grating, and the machine stops running. Confirm that there is no foreign body blocking on the front and rear safety grating, and the operator has left the machine. Press the reset button.