

Printing online quality inspection
software operation manual
(For V3.0)

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Foreword

Good Vision Control Online Quality Inspection System is specially designed for the quality control of the production process of web materials, which can be applied to the printing, laminating and coating of various web materials, as well as the quality control of various web film materials. Goode Visual Control Online Quality Inspection is mainly composed of high-brightness light source, high-precision image acquisition system, high-speed image data processing system, high-stability material display platform and defect detection software, which can cover the defect detection of film flexible packaging, cigarette bags, medicine bags, decorative paper, film and other industries.

Goode Visual Control Online Quality Inspection can be seamlessly integrated with printing and other production processes to help users control the process of printing quality and final inspection of factory quality, effectively reduce the rejection rate of printed products, improve product quality, prevent waste products from flowing into downstream users of printing enterprises, and ultimately achieve the effective improvement of enterprise quality level and profits.

"Goode Vision Control Online Printing Quality Inspection Software" is the exclusive inspection software developed by Goode Vision Control for the online quality inspection system. It adopts advanced multi-core multi-thread scheduling algorithm and image data ring buffer mechanism, and enables special edge tracking image processing algorithm. The defect detection accuracy of printed products can reach sub-millimeter level. The overall processing speed is fast, and it can run stably and reliably at high speed. The system can meet the needs of color printing and pure color printing at the same time. The system uses a single printed good product map as the template standard map, and can set the detection sensitivity in multiple levels and zones, which can meet the control requirements of printing factory customers for different product quality.

This manual is mainly applicable to the operators, maintenance personnel, quality control personnel and management personnel in the user enterprises of Goode Vision Control Quality Inspection. Goode Vision Control is responsible for providing relevant technical training on quality inspection products to the personnel in the above positions.

1. Product introduction

Good Vision Control online quality inspection can be applied to printing machine, rewinder, slitting machine, coating machine, laminating machine and other machines.

1.1 Scope of application

GVM-P-LC4096D-CFL 、 GVM-R-LC4096T-CFL 、 GVM-P-LM8192S-CFL 、
GVM-R-LM8192S-CFL

1.2 Applicable Software

This manual is only applicable to Goode Visual Control Online Printing Quality Test Software V3.0.

2. Software configuration

The detection software is mainly divided into two parts: user interface software and image acquisition front-end software.

The front-end software mainly presents the static picture of any area on the magnified template in real time, which is conducive to the magnified observation of different local areas.

The user operation interface is mainly divided into five areas, from left to right and from top to bottom: template area, product information area, defect picture presentation area, defect list area, detection sensitivity adjustment area and product function area.

2.1 Template area

The picture presented in the middle of the template area is the print that needs to be detected at present, the good print is selected as the template of this print by creating the template, the upper right corner area has five functions of zooming in, zooming out, restoring, full screen and locking, this function is associated with the front-end software, you can see that there is a red box on the template, and the picture in this box is the picture presented at the front end at present. You can zoom in, zoom out and lock through the five functions in the upper right corner. When you need to display all the template images, you can click the full screen. At the same time, the red box can be moved by dragging the mouse.



2.2 Product information area

The product information area is mainly composed of two columns: item and status. The status mainly presents the value corresponding to each item. Items include: template name, total inspection quantity, inspection quantity, total scrap rate, scrap rate, start time, stop time.

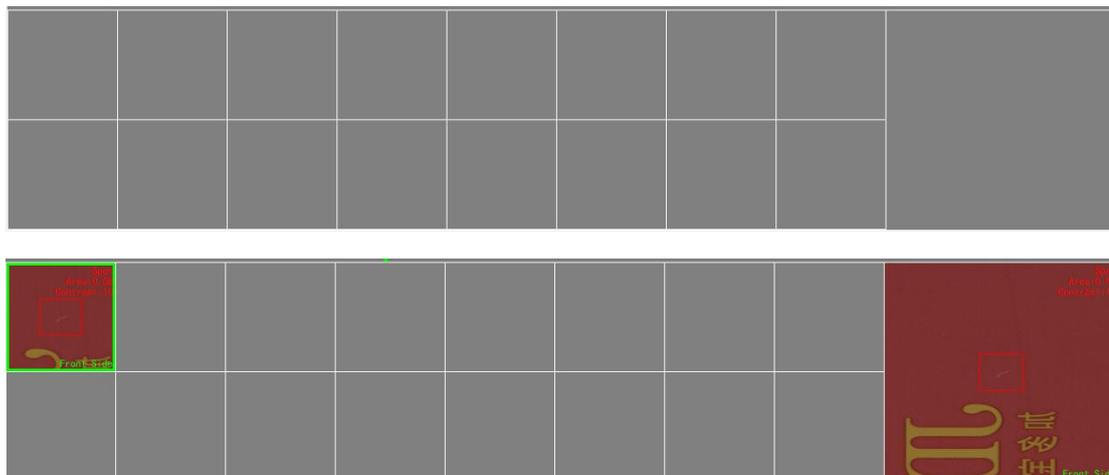
The template name is the name you enter when you create the template and is used for template storage, lookup, and reuse. The total quantity of inspection, the quantity of good products and the total rejection rate are the total rejection rate of the total number of meters inspected after using this template. The inspection quantity and scrap rate in the lower part of the product information area are calculated after clicking the Start Inspection button. If the inspection is stopped halfway and started again, these items will be counted again.

13			
1.0.0			Administrator
total production		production	
total defects rate		defects rate	
start time:		end time:	

2.3 Defect picture presentation area

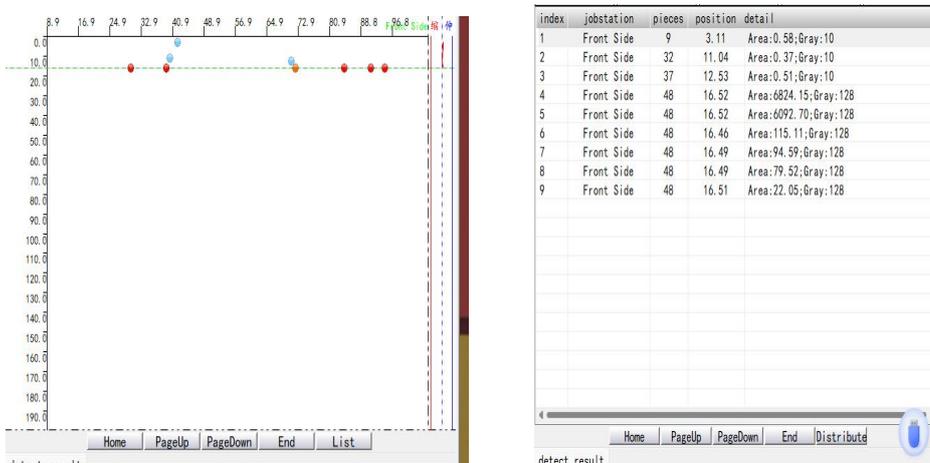
The defect picture presentation area is composed of 8 * 2 small boxes and a group of large boxes. 8 * 2 small boxes are the display of real-time defects, which will be refreshed continuously. A group of large boxes has two functions: one is to synchronously amplify and display the latest defect in real time; the other is to click the defect in the small box to display the defect diagram in the large box at the same time, which is convenient for observation.

and comparison, because the small box is displayed quickly and there is no comparison diagram.



2.4 Defect list area

The defect list area is used for the overall display of all defects detected this time. There are two interfaces: the graphic display of material range and the list display, which can be switched by clicking the "Display List" or "Defect Distribution" button below.



In the display of material range distribution, icons of different shapes and colors are used to represent various defects. The defect type is expressed by shape, and the defect severity is expressed by color. Blue is a minor defect, green is a moderate defect, orange is a less severe defect, and red is a severe defect. When the defect type is dirty spot, color block, edge, etc., the defect is displayed as a circle, and the cutter wire is displayed as a triangle. See the following table for details:



Minor defect	Moderate defect	The second most serious defect	Serious defect
			
Slight knife wire	Medium cutter wire	Sub-severe knife wire	Severe knife wire

2.5 Detection sensitivity adjustment area

The detection sensitivity adjustment area is located in the middle right of the main interface of the detection software, as shown in the figure below. It is mainly used to set the sensitivity parameter level of each defect during detection, which can be set according to the quality requirements of the printed matter before starting detection, and can also be adjusted according to the actual detection effect during the detection process. The sensitivity parameter corresponding to each type of defect can be switched to "area" or "gray scale" for setting and adjustment respectively. When each print is initially modeled on the inspection system, a default set of inspection sensitivity parameters is provided. In case of continuous false alarm or obvious underreport of certain defects, the operator shall adjust the sensitivity setting of defect detection in time. O as to ensure the quality of the printing or confirmatory test.

Front Side									
		Area		Area		Area		Area	
Edge	OverPrint	Area	Depth	Area	Depth	Area	Depth	Area	Depth
OPV		Dirty		Eage		Line		Block	
		0.273	8	0.273	8	5.271		2.045	
1.004									
	0.251						5		5

1) Sensitivity settings

In the process of detection, once an obvious defect underreport or continuous false alarm is observed, the sensitivity setting of the defect should be adjusted in time. Defects are mainly divided into four categories by the detection software: dirty point, edge, knife line and color block, and the area and gray level of each category can be modified. And that average gray level is great than the gray level setting value compare with the standard

template image, the defect is reported.

The operation method is to click the corresponding grid on the sensitivity adjustment control with the left mouse button. Taking the adjustment of dirty point defects as an example, the area or gray level is adjusted upward, so that the corresponding threshold value is increased above the area value or gray level value of the corresponding defect in the defect display image, and the defects below this level are not reported in the subsequent detection. If a miss is found, The area or the gray level can be properly adjusted downwards to improve the detection accuracy. **The precision adjustment of all defects is loose upward and strict downward!**

2) Edge accuracy (also known as "overall debounce")

Edge Precision is the first term of the Gray sensitivity, and this value is important. If there are some small text or edge missing, or the defect of dirty point near the edge is not detected, on the premise of confirming that the "overall overprint" value has been adjusted to the minimum level 0 (select the first grid), gradually reduce the "edge precision" value, and observe whether the above defects can be detected. On the contrary, If the large jitter of the printed matter causes some continuous edge false alarms, this value can be gradually adjusted to remove the edge false alarms.

It is generally recommended to set this value to level 3 (check the third cell) when you need to check the smaller text missing or text dragging. Prints with poor overprint can be set to level 4.

2.6 Software Functional Area

The functional area of the software is mainly composed of six modules, namely, the test start button, the roll change, the new configuration, the product library, the test record query and the start saving button. The new configuration is mainly used to create a print template.



1) Product library (also called "template library")

The product library saves the product templates used in previous tests, and the next test can be directly loaded from here to start the test. Double-click the file product name in the product library list to finish loading.

	productName	product height	create user	create time	adjust user	adjust time	print mode
<input type="checkbox"/>	13	600.00	Administrator	2024-02-29 12:25:21	Administrator	2024-02-29 12:25:21	Reverse Printi
<input type="checkbox"/>	12	600.00	Administrator	2024-02-29 12:21:08	Administrator	2024-02-29 12:21:08	Reverse Printi

2) Test record

The inspection record contains all the volume records generated by the previous inspection process, and the volume record contains all the detected defects. Double-click the volume record you want to view to load it to the software interface for detailed viewing.

	productName	DetectionUser	Roll	start time	end time	WorkStations	Defective rate0	Defective meters0	Total meters0
<input type="checkbox"/>	13	Administrator	0	2024-02-29 16:15:27	2024-02-29 16:15:31	1	8.33%	1.35	16.23
<input type="checkbox"/>	13	Administrator	0	2024-02-29 16:14:33	2024-02-29 16:14:35	1	11.12%	0.34	3.04

defects rate	8.77%	total	19.27
flaw	1.69	good	17.58

3) Speed

In this software function area, the working speed of the machine in the current state will also be displayed synchronously. The left side of the following figure shows that the displayed speed is 0 when the machine is stopped, and the right side shows the synchronous speed when the machine is running.

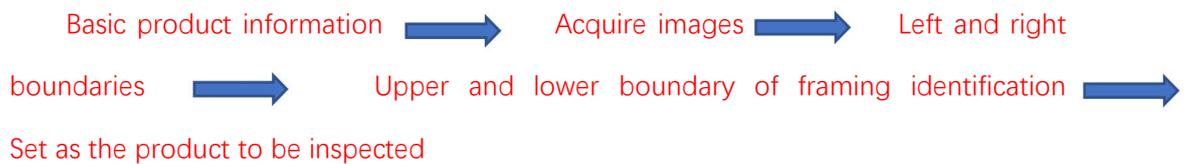


3. Template creation

First, start the user operation interface UI software QCUI. The icons are as shown in the following figure: Click to start QCUI.

After the connection is completed, you can create a new template. Click the button "New Configuration" on the UI: the operation guide in the lower left corner of the pop-up interface indicates the operation in progress.

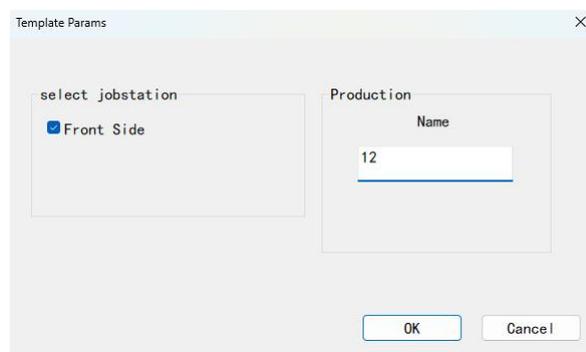
3.1 Establish a template process



3.2 Basic product information

Click the button "New Configuration" on the UI to pop up the operation wizard in the lower left corner of the interface, indicating the operation in progress, and then enter the basic information interface of the product.

Select overall product information, including station information and product name. Confirm to proceed to the next step.



Product basic information includes printing information and product information.

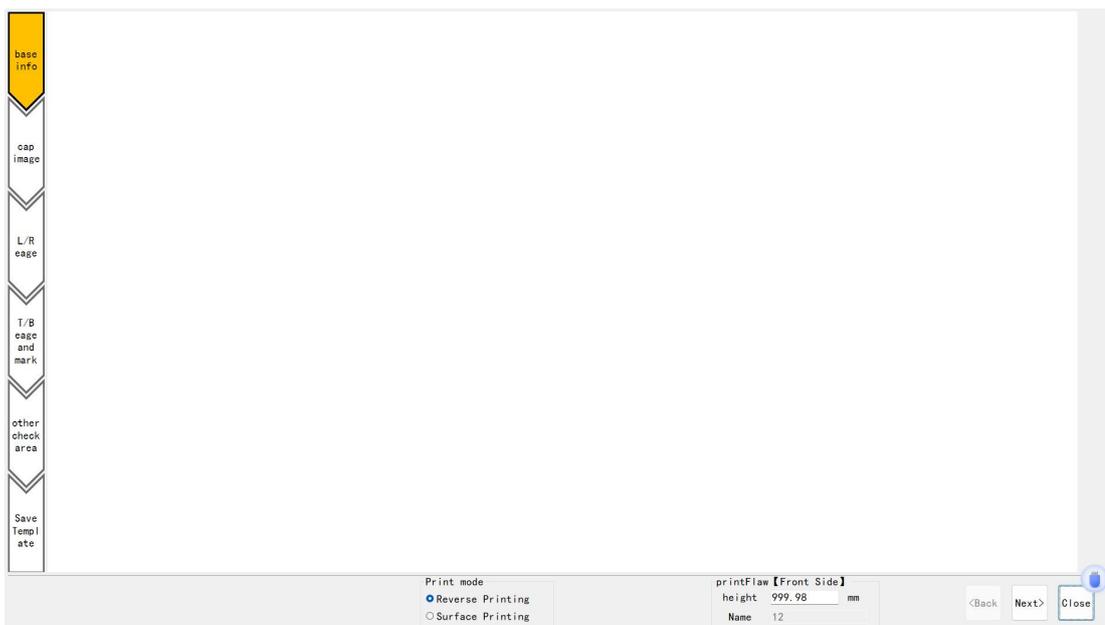
1) Fill in "product information"; product information includes product height and product name. The printing material product height needs to input the minimum repeat height or plate perimeter of the printing material, and the product height will be automatically fixed by the detection software when the printing information is selected as transparent material. The product name can be filled in according to the specific situation, and can include numbers, letters and Chinese characters.

printFlaw 【Front Side】

height mm

Name

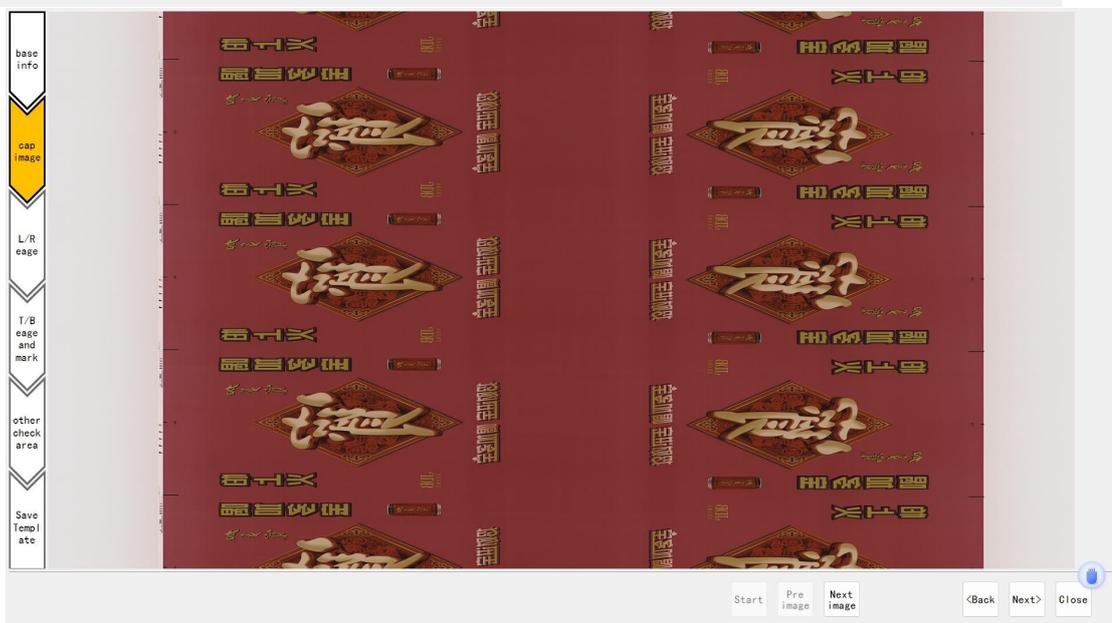
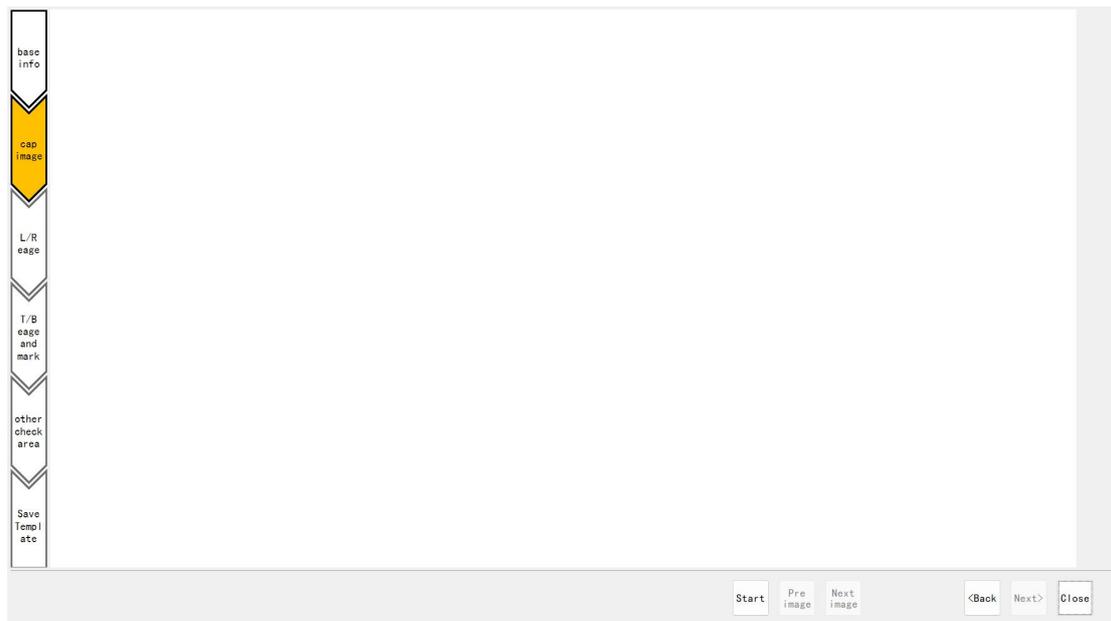
2) After filling, click the "Next" button to enter the "Image Acquisition" stage, and the printing material and transparent film material are displayed as follows:



3.3 Image acquisition

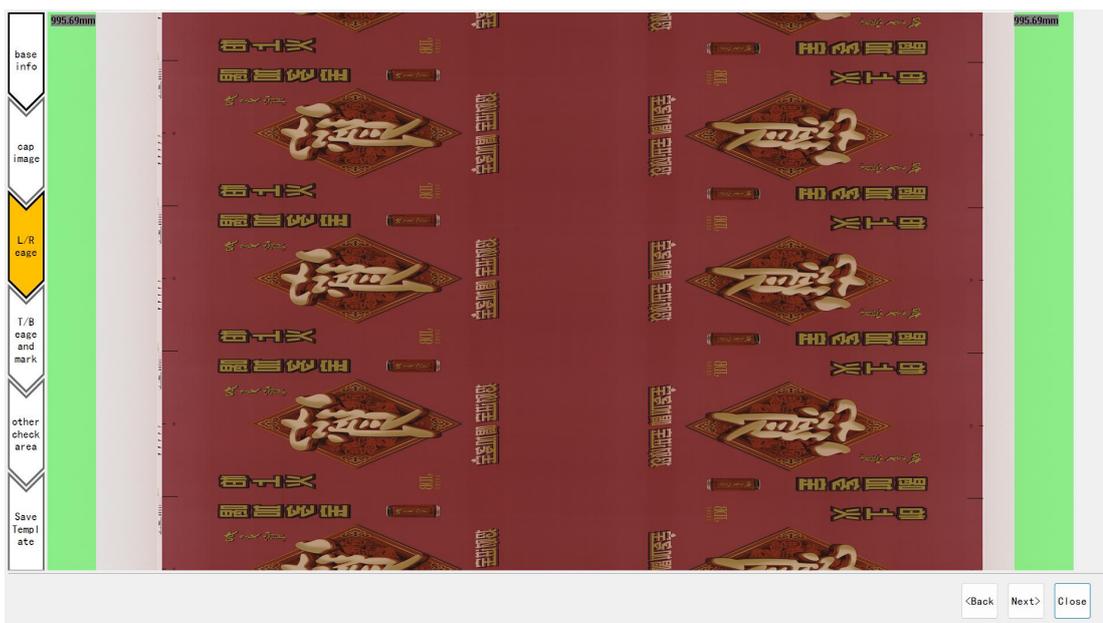
The Capture Image interface is shown in the following figure. Click the "Start" button, and the system starts to collect images. At the same time, the "Start" button turns into the "Stop" button. After the collection is completed, the "Move Down" button becomes bright, and the interface displays the first template image collected. When the "Move Down" button is highlighted, it means that an acquired image can be selected to be used as a template standard image. At this time, click "Move Up" or "Move Down" to center the selected image, so as to select a complete image.

Note: It is very important to select a perfect map as the standard map. The selection of the standard map is carried out in the last step of moving up and down! If the template drawing is not selected well, such as the standard drawing itself has defects, it will affect the final detection effect. Select the template image and click "Next".



3.4 Left and right boundaries

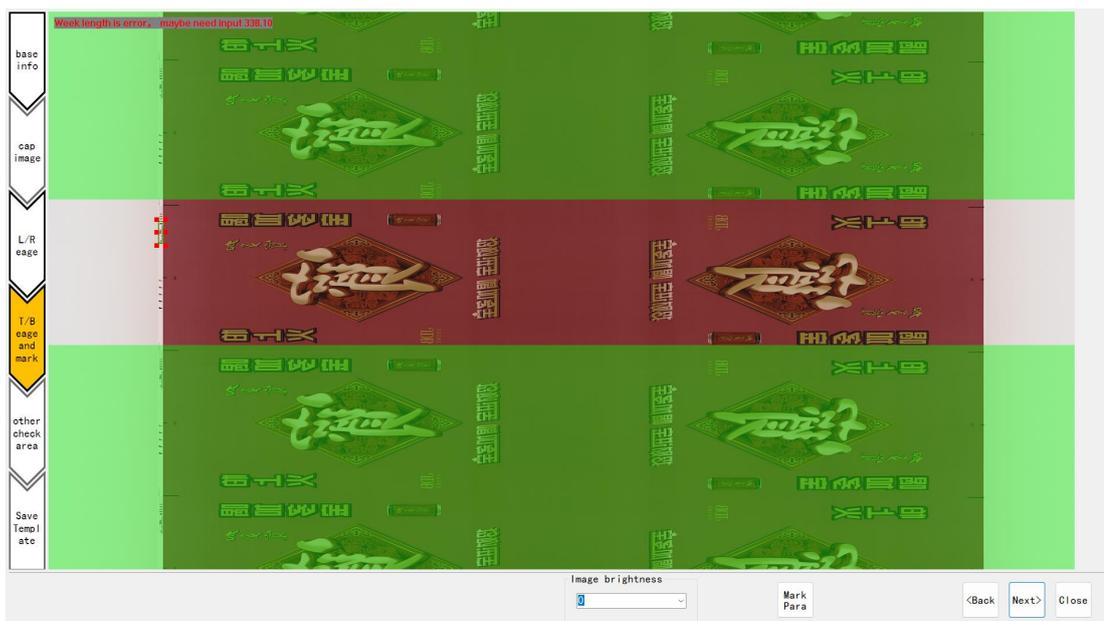
Refer to the following figure for the interface and process of setting the left and right boundaries of the template. In the green area, press and hold the left mouse button to move the mouse position to adjust the left and right boundaries. The principle of adjusting the left and right boundaries is as follows: 1) Select the printing boundary position and slightly eat into the printing pattern area; 2) The left and right boundaries shall not be tangent to the edge of the printed pattern; 3) Generally, the non-repeated overprint mark area shall be placed outside the left and right boundaries of the template. Click "Next" after confirmation.



3.5 Upper and lower boundaries of framing identification

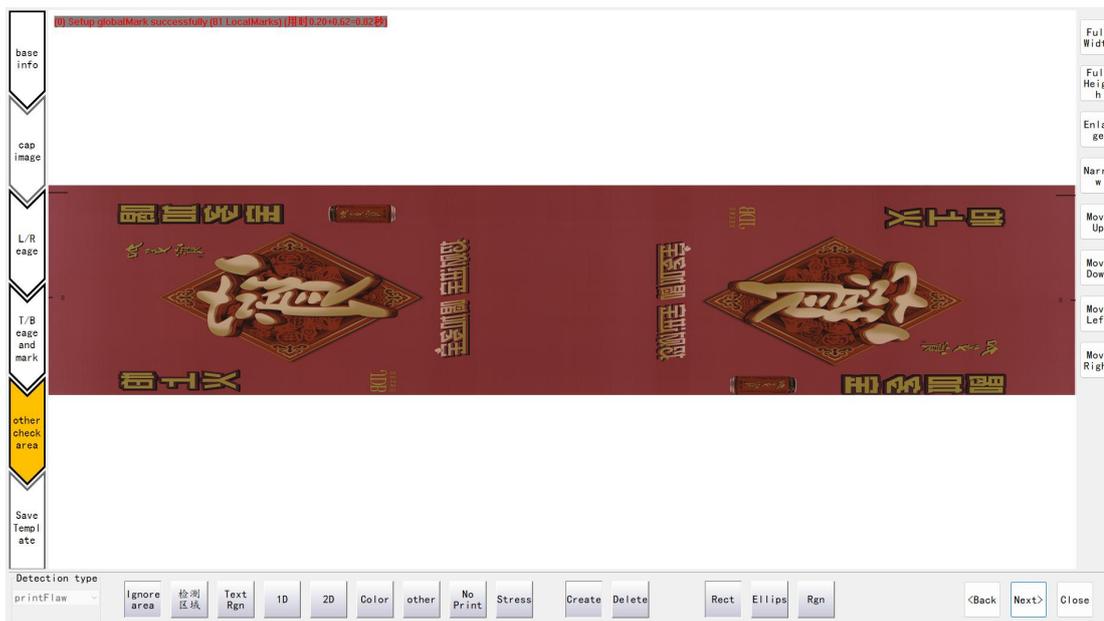
Find a local pattern unique to each version on the template picture, and use the left-click box as the global locator. The system will automatically locate the upper and lower boundaries of the template. Click "Next" after completion.

Note: The motion direction shape should be unique.



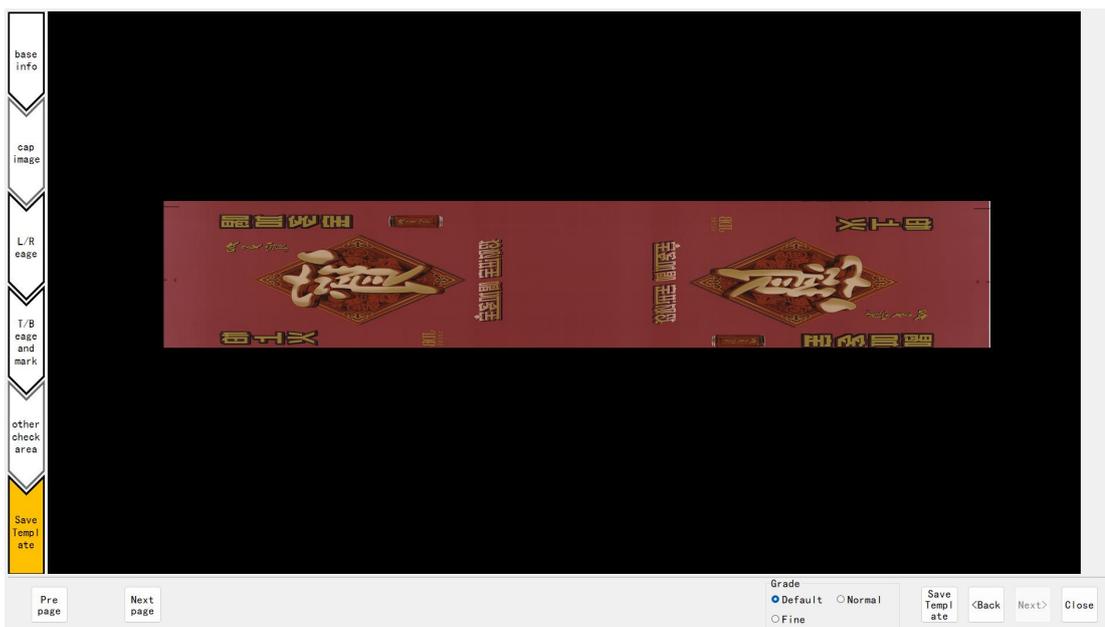
3.6 Other check area

Special areas, mainly for special materials. Usually wait for the software to complete the calculation and click "Next"



3.7 Set to be inspected (also called "set as template")

After the template is basically established, the operator shall carefully check the established template drawing, and shall comprehensively and carefully observe the picture from top to bottom and from left to right, especially the weak contrast pattern. After ensuring that there is no error with the printing requirements, click Set to be checked, that is, the template is successfully established, and then the system will automatically jump to the interface before starting the detection.



3.8 Completion of template establishment



4. Detection

4.1 Introduction to Defect Detection

Defects to be detected include: dirty spot, color block, knife line, text, edge and overprint.

1. Dirty spots are divided into bright spots and dark spots;

Dark spot: Unexpected ink mark on the blank part of the printing plate during the printing process, or the transfer or printing of the existing ink mark due to the contact and

friction between the machine and the transfer process, which is lower than the set gray level.

Highlight: The ink is not printed due to the defect of the raw material itself or the ink is not printed due to other reasons, which is higher than the set gray value. The main shape is a circular or elliptical point.

2. Color block: In the printing process, the ink accumulates on the printing plate, the ink roller and the blanket, which affects the smooth transfer of the ink. The main reasons for the formation of the printing block are that the ink viscosity is too large and the ink is unbalanced in the printing process. The block or local defects with obvious gray scale difference with the background color appear. The main shape is block.

3. Knife line: The knife line in printing is mainly produced in screen printing and intaglio printing, which refers to the wear mark formed by the ink in the blank part of the layout which is not scraped clean and transferred to the substrate. Because the doctor blade fails to scrape the ink in the blank space of the page or the ink is not printed. The main shape is elongated and linear.

4. Text defects are divided into: text missing, text pasting.

Missing characters: The Chinese characters and patterns are missing in the printing process, or the characters and patterns are not printed on the raw materials.

Text pasting: The pattern of the printed text is not clear or the ink connection between the strokes causes the overall pattern to be unclear. Primarily for text.

5. Edge: a light line next to a printed line or a silhouette next to a printed dot is called a print ghost. The appearance of ghosting makes the thin lines thick, the original dots become one and a half or two, the pictures and texts of the whole printed matter are blurred, and the clarity is obviously reduced.

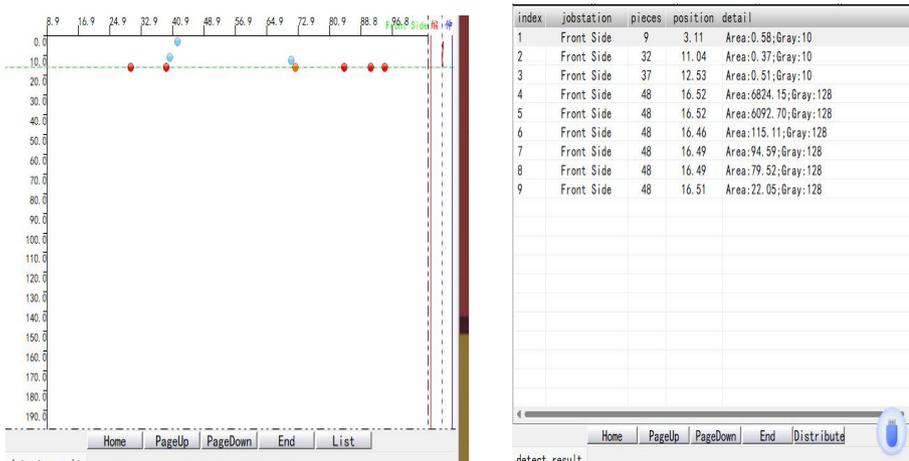
6. Overprint: In the process of chromatic printing, the overlapping of prints is called overprint. If the overlapping error exceeds the specified range, the problem of inaccurate overprint will occur. Inaccurate overprint is divided into horizontal inaccuracy and vertical inaccuracy:

Longitudinal misregister: a printing failure caused by a large error in the direction of the register reticle along the feed direction of the substrate.

Inaccurate horizontal overprint: printing failure caused by large error of the overprint reticle along the horizontal direction (cylinder axis).

4.2 Defect detection level

The defect list area is used for the overall display of all defects detected this time. There are two interfaces: the graphic display of material range and the list display, which can be switched by clicking the "Display List" or "Defect Distribution" button below.

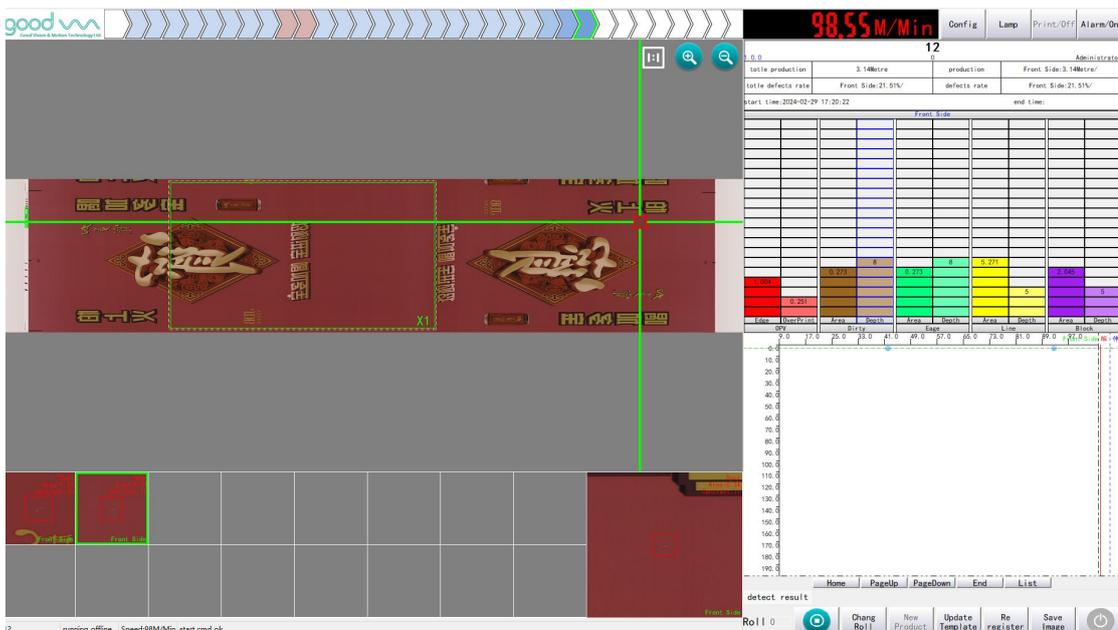
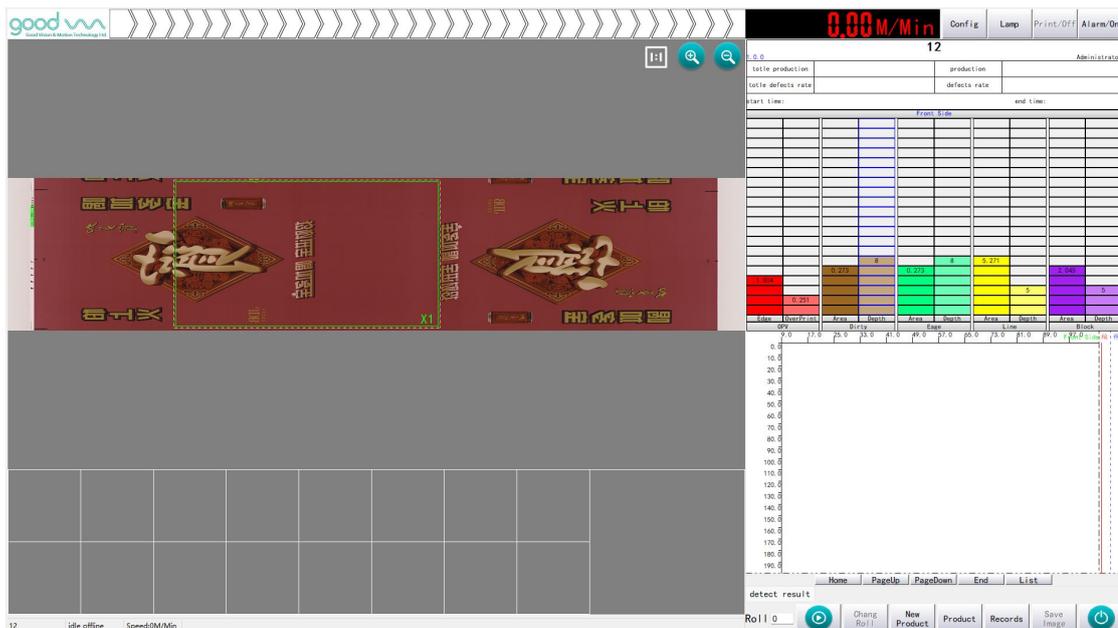


In the display of material range distribution, icons of different shapes and colors are used to represent various defects. The defect type is expressed by shape, and the defect severity is expressed by color. Blue is a minor defect, green is a moderate defect, orange is a less severe defect, and red is a severe defect. When the defect type is dirty spot, color block, edge, etc., the defect is displayed as a circle, and the cutter wire is displayed as a triangle. See the following table for details:

			
Minor defect	Moderate defect	The second most serious defect	Serious defect
			
Slight knife wire	Medium cutter wire	Sub-severe knife wire	Severe knife wire

4.3 Starting the test

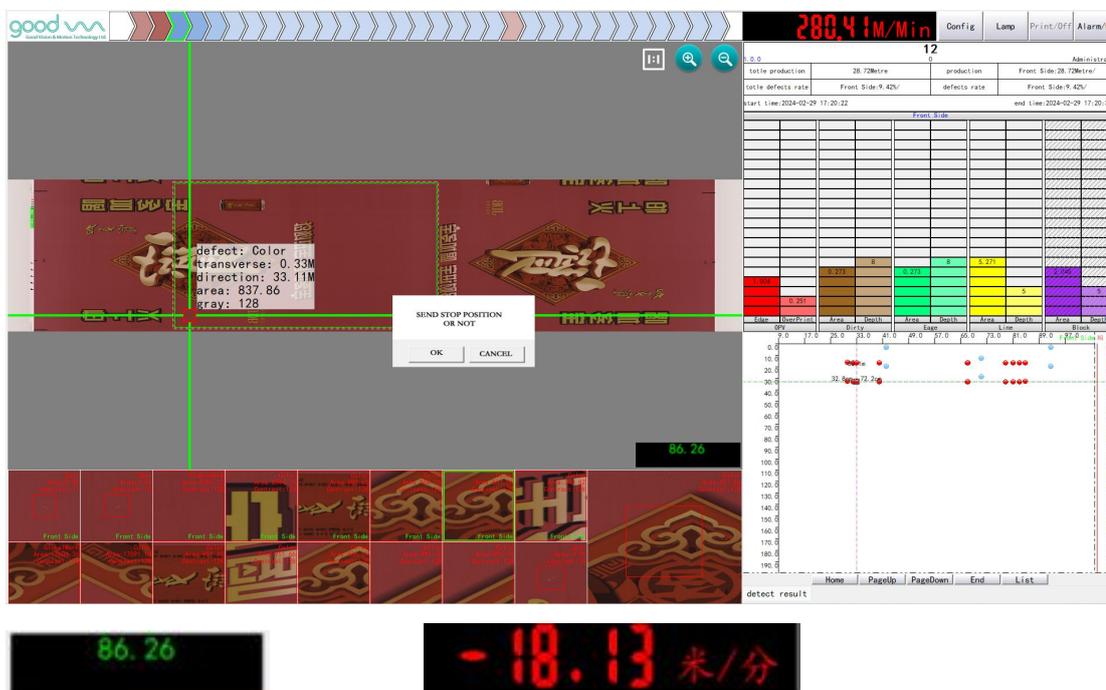
The white film and the color film were operated in the same way after the start of detection. After clicking Start, you can carry out the detection. The detection interface is as shown in the figure.



The distribution and severity of defects can be viewed in the defect list after the inspection is started. If there are more defects in the moment, the photo wall will be refreshed faster. At this time, if you need to view the defects, you can click anywhere on the photo wall, and the photo wall will be locked. In addition, defects can be viewed by turning the page. Continuous and dense defects on the defect list may be caused by inaccurate positioning or overprinting, which needs to be observed. For more false positives, you can click "Replace Template" to create a new template. The defect level can be adjusted according to the defect requirements, and the adjustment position is shown in the figure:

5.3 Execute command

At this time, the machine starts to stop automatically at the defect position, and the software will display the distance that the defect needs to be reversed; the machine will start to act according to the defect position, start, accelerate, decelerate and stop.



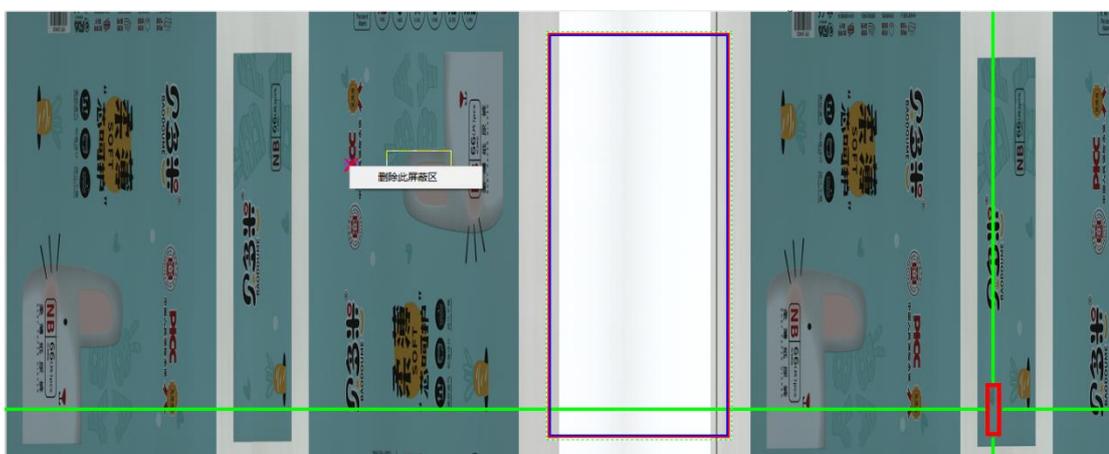
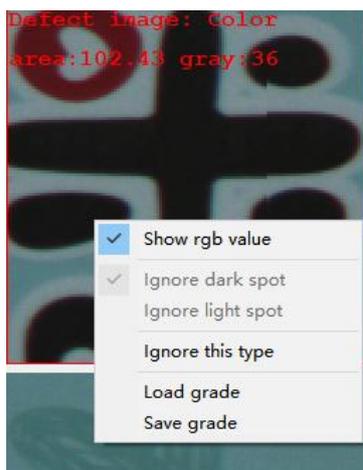
6. Other functions of the main interface

6.1 Temporary Shielding Defect Function

This function is used by the operator to shield the known and negligible defects in time, so as to reduce false alarms and ensure reliable detection of important defects. These negligible defects, such as those caused by fixed position and negligible plate damage, and those caused by slight longitudinal shaking, transverse wrinkling or curling caused by the feeding mechanism, are known to be negligible defects. In addition, sometimes, due to the poor overprint of the printed matter, although the "overall overprint" can be set to a value greater than 0 to reduce the edge false alarm, it is feared that serious false alarm will occur, so the "overall overprint" is still set to 0 during detection. In case of frequent false alarms caused by inaccurate overprint in some fixed areas, the "shielding" function can be used to eliminate them. Note that such defects will be slightly shaken. Multiple "masks" may be required to completely eliminate the frequent false positives they produce.

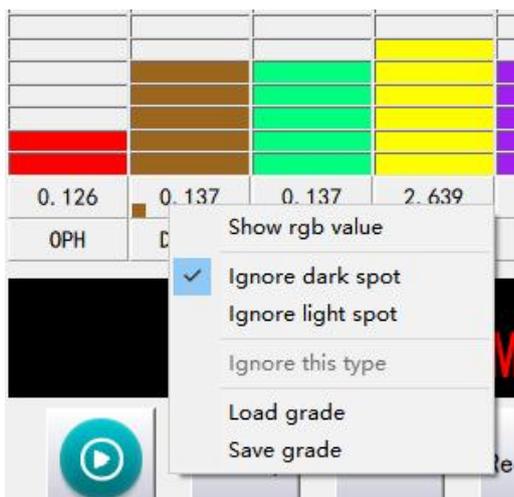
Operation process: right click on the defect drawing to pop up a menu, and select "Shield this kind of defect". A non-inspection area for this kind of defect will be added at the position of the current defect, and a frame area marked with "X" will be displayed on the corresponding standard drawing (as shown in the right figure); Right click on the area shown

in the box to pop up a menu and select "Delete this masked area".



6.2 Overall masking of dark or bright spots

In some cases, printing enterprises do not need to directly report bright or dark spots as defects, such as raw materials, varnish on the surface of materials, local bronzing, etc., so they can be uniformly shielded. As shown in the figure below, right click on the dirty point in the defect level diagram to pop up a menu, and select "Shield black point" or "Shield bright point". A square will appear in the dirty point column, representing that the corresponding black point or bright point defect has been shielded, and such defects will not be reported in the future inspection process. If you want to cancel the mask, you can click the right button on the area shown in this box to pop up a menu, and you can choose to click again to delete the mask for this kind of defect.



7. Frequently Asked Questions

7.1 Detection of weak knife wire

For the detection of weak knife line, special attention shall be paid to the settings of knife line gray level and knife line area. As shown in Fig. 6-1-1 and Fig. 6-1-2, set the knife line gray level to 0.03, and when the knife line gray level is set to 0.02. If the gray scale is lowered by one grid, the detected weak knife lines will increase a lot and be distributed in more horizontal positions. This operation can be applied to weak outline misses.

7.2 Operating skill

1. Wins + P display switching interface when dual displays are switched
2. The naming method of the product name is "the actual name of the product + the minimum version week", such as "Goode Video Control 123".
3. When the photo wall is refreshed quickly, you can click anywhere on the photo wall to lock the photo wall. If you need to view the defects, you can drag the defect list or click the "Previous Page" and "Next Page" buttons to turn the page.
4. If there are too many false positives, the template can be re-established or the parameter level of the type of false positive defects can be adjusted to a more relaxed level.
5. If there is a strip line in the collected image, which can be green, red, etc., it is possible that there is dirt on the lower light source, which affects the quality of the image, so it is necessary to wipe the lower light source with a rag to remove the dirt.
6. By looking at the type of defect, we can know what kind of problem the defect belongs to. If there is a dirty point, it means that there is a dirty point here.
7. When a new template is tested for the first time and "front-end processing exception" is reported, it is generally caused by unsuccessful intelligent positioning of the corresponding camera. At this time, it is necessary to restart all software, wait for the front-end to start, and start testing.

7.3 Solutions to common problems

1. The UI cannot connect to the network and cannot start detection

Reason 1: The front-end software is not opened.

Workaround: Restart the software and wait for the front end to open.

Cause 2: The network is abnormal.

Solution: Restart all software and even the computer.

Reason 3: The computer crashes.

Solution: Restart the computer and all software.

2. Too many false positives

Reason 1: The positioning area is not good, resulting in inaccurate positioning.

Solution: Re-establish the template drawing positioning area to the appropriate position.

Reason 2: The detection parameters are too strict.

Solution: First check to see which kind of defect has a larger false positive, and then adjust the corresponding parameters to be more relaxed.

Cause 3: There is a problem with the template.

Workaround: Recreate the template.

Reason 4: There is a problem with the tension of the material, and the collected image is seriously deformed.

Solution:

1. Adjust the tension to make the material run more smoothly, and there is no serious deformation in the image;

2. The position of the encoder measuring wheel affects the material, causing the material to be deformed during mapping;

3. The correction affects the material and causes the material to be deformed during drawing.

Reason 5: The position of the correction is incorrect or the direction of the material is opposite to the direction of the template, resulting in inaccurate positioning of each drawing.

Solution: Adjust and correct the deviation to the exact position or re-collect the drawing and redo the configuration.

3. Undetected or partially undetected

Reason 1: The detection parameters are too loose.

Solution: Adjust the inspection parameters to a more stringent level, and only adjust which defect parameters are too loose.

Cause 3: The template standard drawing is defective.

Solution: Re-collect the drawing and redo the template.

4. Inaccurate positioning or failure

Reason 1: The positioning area is not well drawn.

Solution: Re-draw the positioning area. The positioning area should be drawn in a monochrome place where there is no color overlap. In addition, the content below the positioning area must be clear, not too vague, and too small text can not be selected as the

positioning area. The location area does not need to be too large, which is not good and will prolong the detection time of the algorithm and cause the detection timeout.

Reason 2: The material is seriously deformed or the position is deviated or even the direction of the material is reversed.

Solution: adjust the tension of the material, correct the deviation, etc. To make the material not deformed or adjust the position of the material.

Reason 3: The location area is not regular.

Solution: The positioning area without regularity is not allowed. Redraw the positioning area.

5. Other issues

Solution: Restart the computer and all software. If you can't solve the problem, contact the manufacturer.