

**SHENZHEN WEIMING  
PHOTOELECTRICITY CO.,LTD**

**Microfocus X-Ray Parts Counter  
XC-01 Instruction Manual**

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# Contents

<b>1. Machine description</b> .....	3
<b>2. Parameters</b> .....	3
<b>3. Structure</b> .....	4
<b>4. Software interface</b> .....	6
<b>4.1 Control area</b> .....	6
4.1.1 Detector control .....	6
4.1.2 Tube control .....	6
4.1.3 Print labels again.....	7
4.1.4 Save wrong picture .....	7
4.1.5 Table control.....	7
4.1.6 Scan & print .....	7
4.1.7 Status.....	7
<b>4.2 Display area</b> .....	7
4.2.1 Code scanning check.....	8
4.2.2 Counting result.....	8
<b>4.3 Record area</b> .....	9
4.3.1 Counting record .....	10
4.3.2 Counting record operation .....	10
4.3.2.1 Clear .....	10
4.3.2.2 Search & save.....	10
4.3.2.3 Statistics.....	10
4.3.3 Scanning / counting status .....	11
4.3.4 Work order.....	11
4.3.5 Login / Language switch.....	11
4.3.6 Exit the software .....	12
<b>5. Standard operation procedure</b> .....	12
5.1 Power on .....	12
5.2 Start the software .....	13
5.3 Put the reel in.....	13
5.4 Auto code scanning & counting.....	14
5.5 Print the label .....	15
5.6 Database querying and saving.....	16
5.7 Power off .....	16
<b>6. Scope of application of X-ray counter</b> .....	16
6.1 Countable components .....	16
6.2 Uncountable components .....	17

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## 1. Machine description

This machine is mainly used for the counting of the reel type of material in SMT industry, based on the industrial 4.0 standard. It can be used for 7-17inch Tape Reel/JEDEC Tray/IC moisture sensitive package, etc.

This machine uses an X-ray source to launch X-rays through the reels and reach the flat panel detector to acquire images, and then count the quantity by our self-developed artificial intelligence deep learning algorithm. The software also integrates automatic code scanning, automatic printing corresponding labels, MES/ERP system docking and other functions.

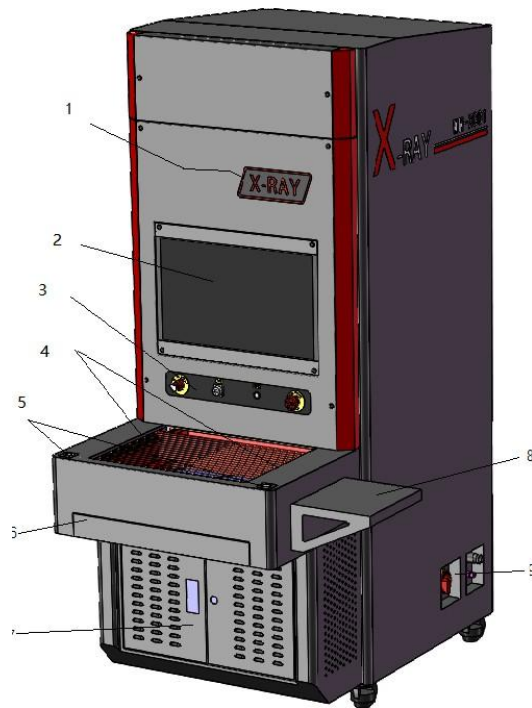
The machine adopts one-button operation, easy to use and convenient.

## 2. Parameters

<b>X-ray source</b>	Type	Integrated, microfocus
	Max tube voltage	80kV
	Max tube current	700 $\mu$ A
	Focal spot size	30 $\mu$ m
<b>Flat panel detector</b>	Type	Super definition digital FPD
	Effective area	430mm*430mm
	Pixel size	139 $\mu$ m
	Resolution	3072*3072
<b>Reel/tray counting</b>	Max size	17" (430mm)
	Max thickness	88mm
	Min parts size	01005
	Speed	7-10s
	Accuracy	01005 $\geq$ 99.98%, 0201 & above $\geq$ 99.99%
<b>Equipment</b>	Dimensions	1000mm (L) * 1300mm (W) * 1820mm (H)

	Weight	550kg
	Power supply	AC110-220V 50/60HZ
	Max power	800W
	Industrial computer	I7 CPU, 16G RAM, 256G SSD+4T HDD
	Displayer	24" HDMI LCD
<b>Other functions</b>	Auto code scanning	Barcode and QR code.
	Label printing	print the corresponding label when user takes out a reel.
	Counting record	Inquiry by time range, code, work order number.
	Management system connection	MES, ERP, WMS etc.
	Mode switching	No need to switch single/multi reel mode
	Work order no.	Support work order number recording
<b>Safety</b>	Radiation leakage	No leakage, international standard: $\leq 1\mu\text{Sv/h}$ .
	Back door safety interlock	Once users open the back door, X-ray tube will power off immediately. When the back door is open, users can't turn on the X-ray.
	Anti-pinch	Safety light curtain covers the whole drawer, the drawer will stop immediately when something enters.
	Emergency stop	In front of the operation position, press to power off.

### 3. Structure

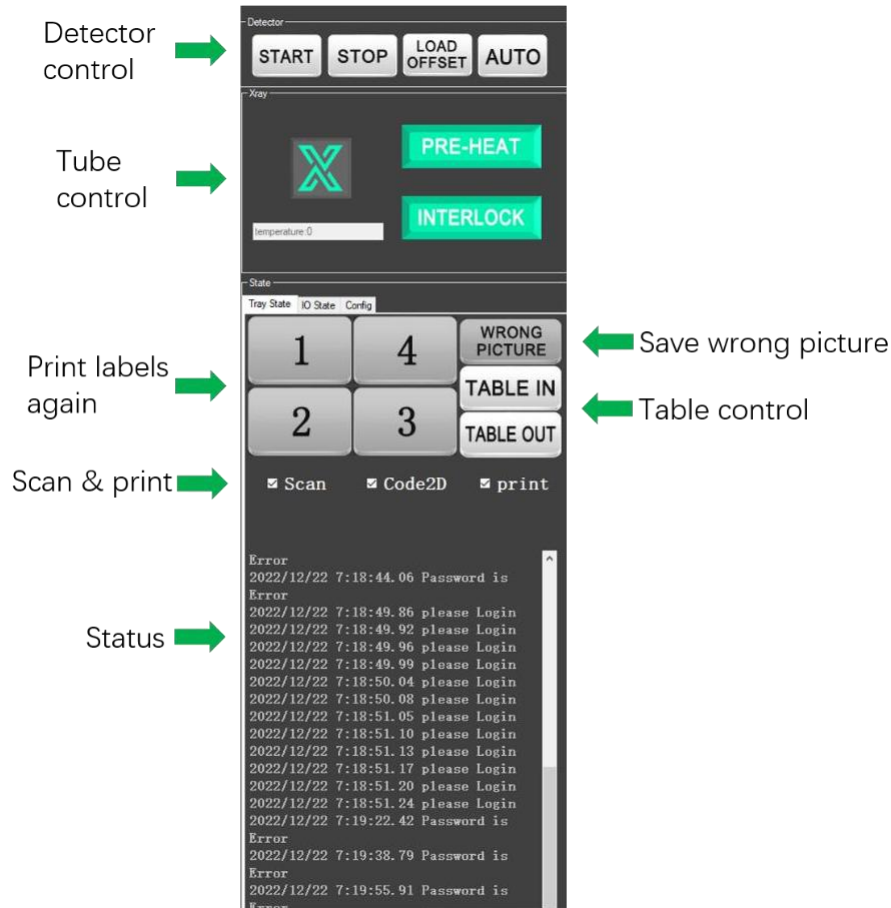


No.	Name	Function	Method of application
1	LED signal light	Show the X-ray source working condition	System control
2	Displayer	Software interface	Software control
3	Control panel	Power on, start the computer, emergency stop, USB	Manually
4	Safety light curtain	Anti-pinch	Passive trigger
5	Start button	Start to count	Press the button
6	Keyboard & mouse	Control the computer	-
7	Electrical Cabinet	Electrical component	After the manufacturer's permission can be opened
8	Printer holder	Place the printer	-
9	Main switch	Control the power supply of the whole machine	Turn right to open, left to close

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## 4. Software interface

### 4.1 Control area



#### 4.1.1 Detector control

This area is a special debugging area for manufacturers, users do not use it. If there is any problem, please contact the manufacturer for remote control.

#### 4.1.2 Tube control

Display X-ray tube status: on or off, current internal temperature, preheating or not, interlock opening or not. This area is a special debugging area for manufacturers, users do not use it.

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### **4.1.3 Print labels again**

If the label paper or ribbon are used up or the label is mislabeled, you can click the corresponding reel position number to print the label again. If there is only one reel, click button "1".

### **4.1.4 Save wrong picture**

If the result of reel is wrong, click the "Save wrong picture" button to save the picture. We suggest that users turn the reel several different angles and then save the pictures one by one. The manufacturer will collect them regularly, and then update them to users regularly after deep learning by AI.

### **4.1.5 Table control**

Separate control table in and out of the machine. This area is a special debugging area for manufacturers, users do not use it.

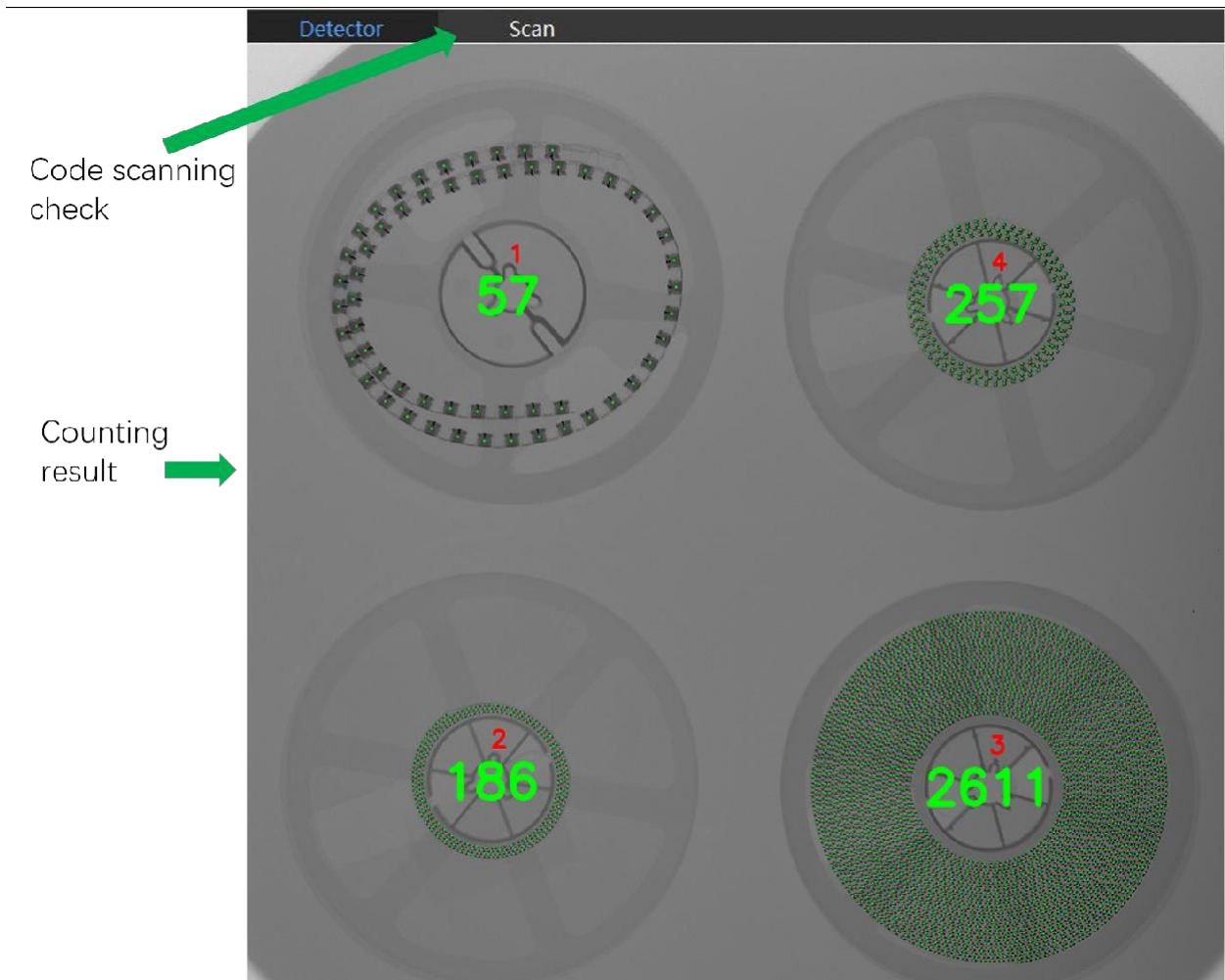
### **4.1.6 Scan & print**

After checking, you can choose to scan the code and upload the system, scan the QR code, and print the label respectively.

### **4.1.7 Status**

Users can see the latest status prompts of the machine, such as counting progress, button feedback, error prompt, etc.

## **4.2 Display area**



#### 4.2.1 Code scanning check

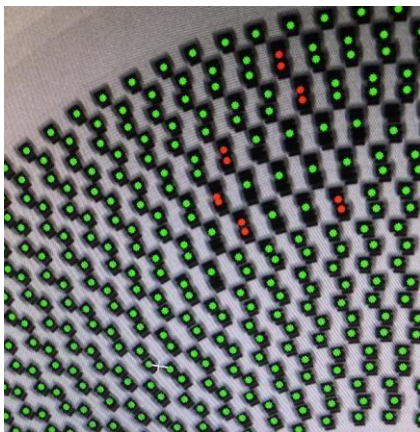
Click the “TABLE IN” button, you can check the code scanning status here.

#### 4.2.2 Counting result

The green dot on the picture of the reel represents one material, the small red number in the center of the reel is the position number, and the large green number is the quantity of the reel.

If the large number in the center of the reel is red, it is the algorithm thinks that the quantity of the reel may be inaccurate, please manually confirm the quantity.

If there are red dots in the result picture, as the picture below, it is the algorithm thinks there may be miscalculation there, please use the scroll wheel on the mouse to enlarge the picture to check. The red dot is included in the quantity of the reel.



### 4.3 Record area

Counting record →

Counting record operation →

Scanning/counting status →

Login / language switch →

Work order ←

Exit the software ←

The interface includes buttons for CLEAR, SEARCH, SAVE, login, English, Workorder Start, Workorder finish, and CLOSE. It also features input fields for Scan code, Scan number, and Machine Number, along with Test and Axis Test options. A version number 52.00.39-12.9072163 is visible at the bottom.

### 4.3.1 Counting record

Display dozens of recent counting records: code, quantity, time, etc.

### 4.3.2 Counting record operation

The screenshot shows a software window titled "Record" with a menu bar containing "Counter Record" and "Print Record". The main area is a table with the following columns: SerialNumber, WorkOrder, BarCode, Number, Date Time, ImagePath, StaffNo, and DID. The table contains 20 rows of data, with the row for SerialNumber 8144 highlighted in blue. The right side of the window features a control panel with several input fields and buttons:

- Two "Counter Record" input fields, both containing "11:32:43 AM".
- "Check" and "Save" buttons.
- A "work order" input field.
- Another "Check" and "Save" button pair.
- A "Barcode" input field.
- Another "Check" and "Save" button pair.
- "15-day statistics" and "Daily statistics" buttons.
- A "Save sum number today" button.
- Summary text: "Counter sum number 20" and "Print sum number 9".

#### 4.3.2.1 Clear

Click the "CLEAR" button to clear dozens of recent counting records above.

#### 4.3.2.2 Search & save

Users can check the corresponding counting records by time range, work order, or code, click "Save" to save the Excel table to the local computer, double-click the image address in the ImagePath bar to open the corresponding image.

#### 4.3.2.3 Statistics

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On the search page, users can click to see the statistics of today and the latest 15 days.

### 4.3.3 Scanning / counting status



The screenshot shows a dark-themed interface with four rows. Each row contains a button with a number (1, 2, 3, 4) on the left, a text input field labeled 'Scan code' in the middle, and a smaller text input field labeled 'Scan number' on the right.

After the scanning and counting, the software will automatically fill the code and quantity in the corresponding reel position.

If the auto code scanning has been set, but it fails due to the reflect light or other reasons, the software will prompt the corresponding prompt, please use the scanning gun to scan the code, and click the corresponding number to input the corresponding code.

### 4.3.4 Work order

After entering the work order number, click the “Workorder Start” button, before the user clicks the “Workorder finish” button, the results during this period will be recorded as belonging to the entered work order number.

### 4.3.5 Login / Language switch

Click the “Login” button to enter staff number and password.

Click to switch the language of the software interface. Currently, Chinese and English are supported.

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Click the "Machine Number" button to see the manufacturer code of this machine.

Click the "Test" button to automatically repeat the counting process.

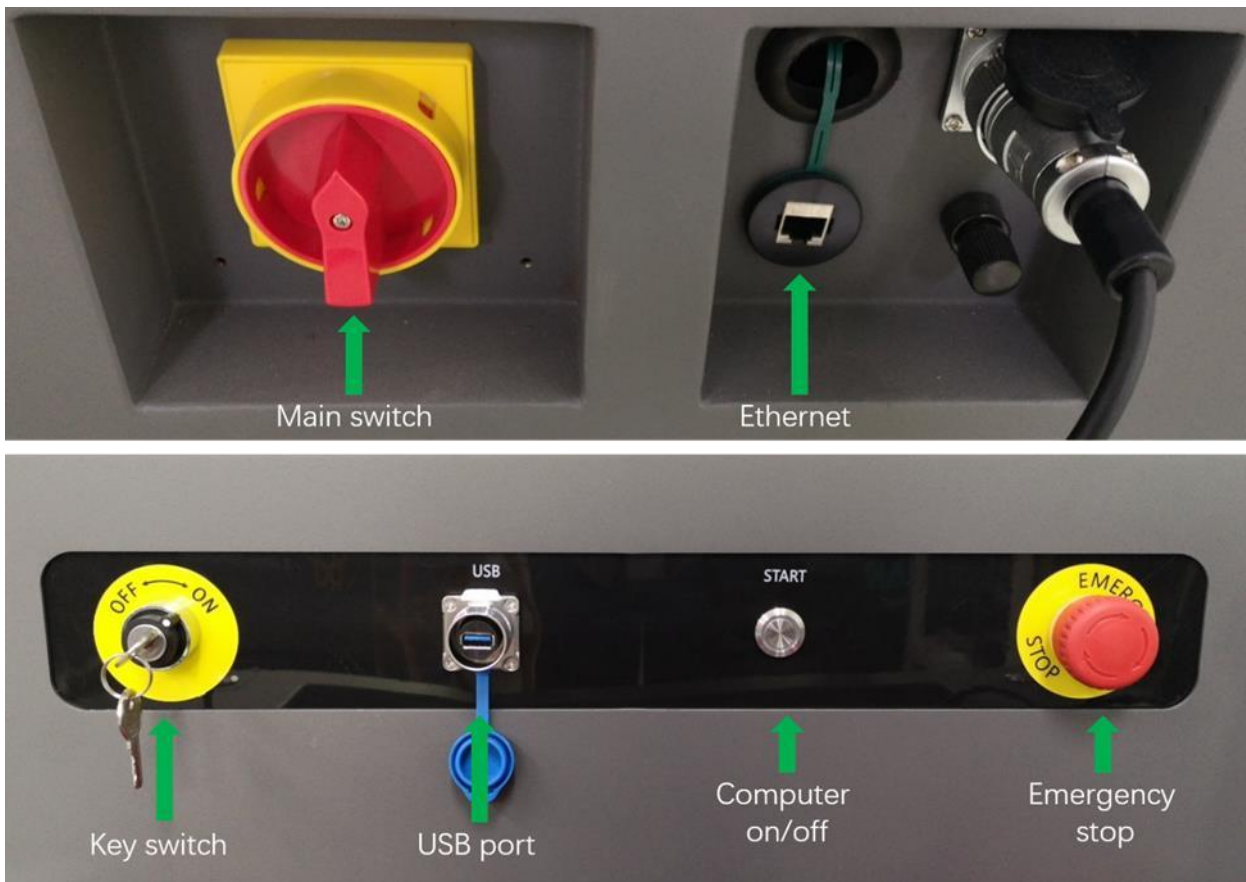
Click the "Axis Test" button, the table will automatically keep in and out, in order to test whether the axis movement is smooth.

### 4.3.6 Exit the software

Click "CLOSE" button to exit the software.

## 5. Standard operation procedure

### 5.1 Power on



**5.1.1** Make sure the machine power supply is connected.

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**5.1.2** Key switch and emergency stop control the power supply of all electrical components except the computer, make sure they are turned on.

**5.1.3** Turn the main power switch right to ON, press the computer on/off button.

## **5.2 Start the software**

**5.2.1** **After booting, wait 30 seconds for the hardware to connect to the computer**, and then double-click to open software on the desktop (generally named by the model). **After closing the software, you also need to wait 30 seconds to restart the software.**

**5.2.2** **Hold for 10 seconds without doing anything, wait for the software to connect to the hardware and prompt success.**

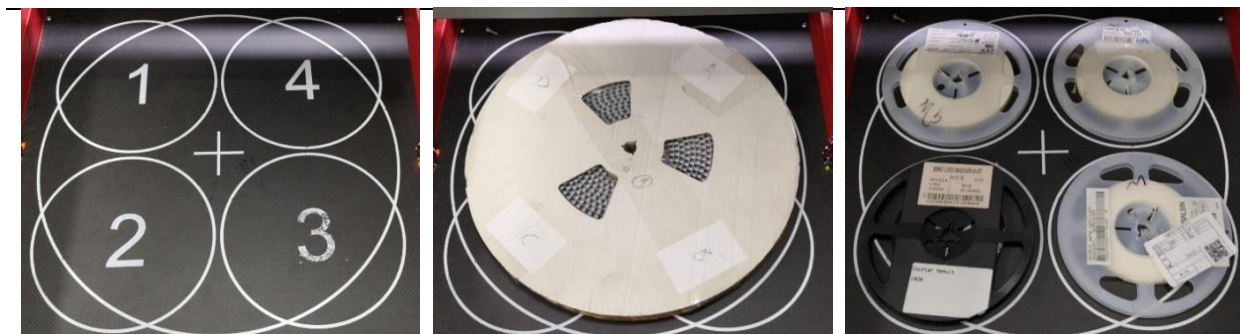
**5.2.3** If the table is in the machine, you can press the F key, or click the “TABLE OUT” on the left of the software, the table will move out.

## **5.3 Put the reel in**

**5.3.1** This machine support four 7” reels or one reel more than 7”. For one reel, please put it on the center of the table to achieve the most accurate results. As Pic 2.

**5.3.2** When putting two to four 7” reels, make sure each reel is in the small circle. As Pic 3.

**5.3.3** If you need to scan the code, make sure that the code is in the small circle and must not cross two small circles.



Pic 1

Pic 2

Pic 3

## 5.4 Auto code scanning & counting

**5.4.1** Press left or right button of the machine, the table will move into the machine, the machine will scan the code and count the materials automatically.

**5.4.2** This machine support barcode and QR code, if the customer has the unique code for each reel, you can arrange auto code scanning with the manufacturer.

**5.4.3** If the auto code scanning has been set, but it fails due to the reflect light or other reasons, the software will prompt the corresponding prompt, please use the scanning gun to scan the code, and click the corresponding number to input the corresponding code.

	Scan code	Scan number
1	<input type="text"/>	<input type="text"/>
2	<input type="text"/>	<input type="text"/>
3	<input type="text"/>	<input type="text"/>
4	<input type="text"/>	<input type="text"/>

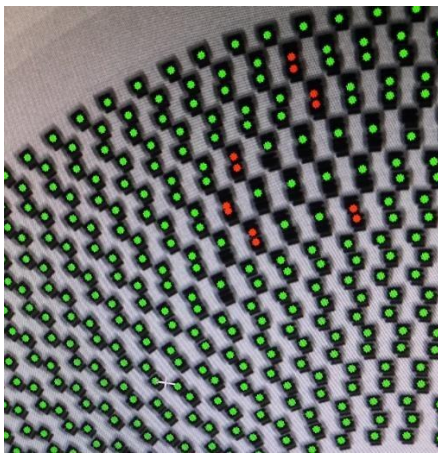
**5.4.4** After the machine scans the code and obtains the X-ray image of the reels successfully, the table will move out automatically.

**5.4.5** After the table moves out, the results will display at the same time.

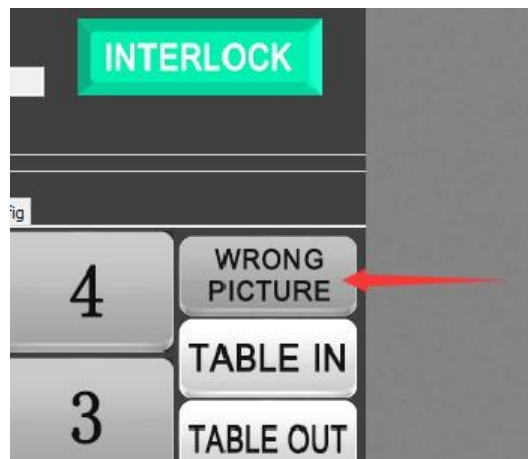
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**5.4.6** If there are red dots in the result picture, as Pic 4 below, it is the algorithm thinks there may be miscalculation there, please use the scroll wheel on the mouse to enlarge the picture to check. The red dot is included in the quantity of the reel.

**5.4.7** If the large number in the center of the reel is red, it is the algorithm thinks that the quantity of the reel may be inaccurate, please manually confirm the quantity.



Pic 4



Pic 5

**5.4.8** If the reel has been placed correctly as Pic 2 and 3, but the result is still not accurate. It is because of the new material not covered by the software algorithm, please click the “WRONG PICTURE” button on the left of the software. As Pic 5. Manufacturers will regularly collect, regularly update the algorithm to cover the material.

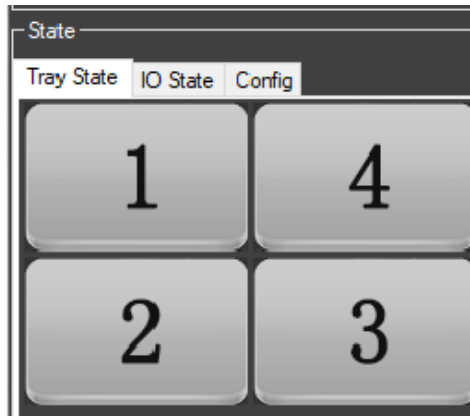
## 5.5 Print the label

**5.5.1** The table is equipped with sensors, the corresponding label will be automatically printed when the reel is taken. The user can also ask the manufacturer to print all the labels at once.

**5.5.2** If you need to print the label again, click the corresponding number on the left side

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of the software. If you only have one reel, click "1".



## 5.6 Database querying and saving



**5.6.1** CLEAR: Clear the data in the upper box.

**5.6.2** SEARCH: Check historical data and save it in a table.

**5.6.3** SAVE: Save the data in the upper box as a table.

## 5.7 Power off

**5.7.1** Click "CLOSE" button at the lower right corner of the software to exit the software.

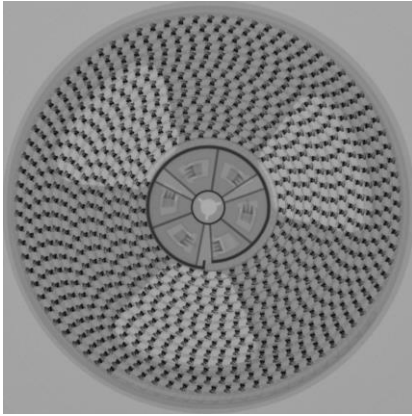
**5.7.2** Shutdown the computer and then turn the main power switch left to OFF.

# 6. Scope of application of X-ray counter

## 6.1 Countable components

Although the X-ray counter is very efficient and is not afraid of aluminum foil bags and moisture-proof bags, it is not omnipotent, and not all types of components can be counted. If the component meets the following two conditions at the same time, it can be counted:

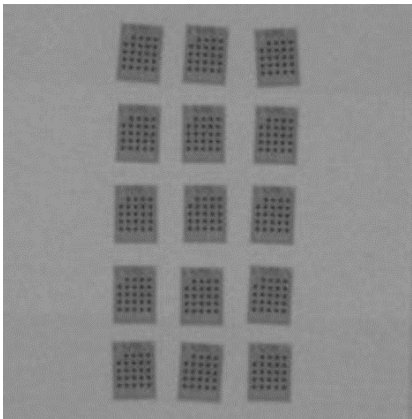
(1). Components do not overlap. (2). Component arrangement is regular. For example:



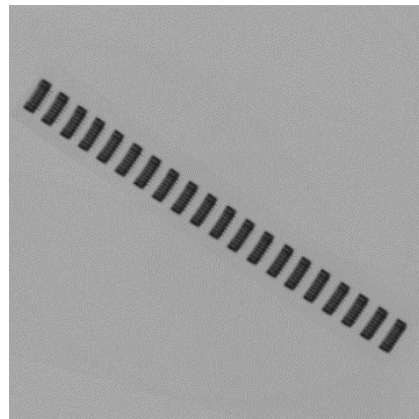
Standard reel



Simple reel

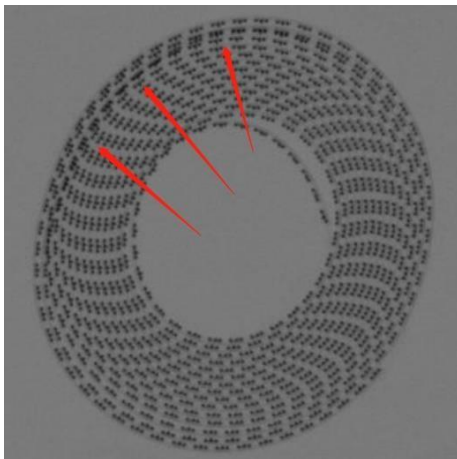


Single layer tray



Components in tube

## 6.2 Uncountable components



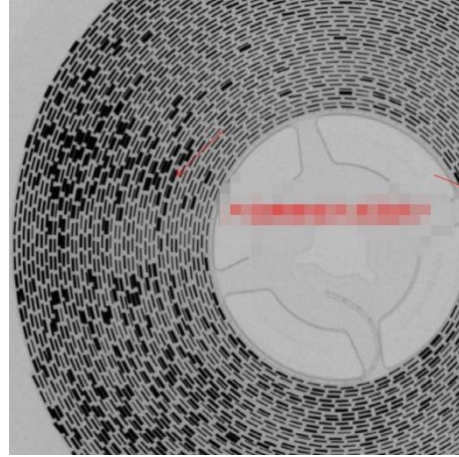
Overlapped components



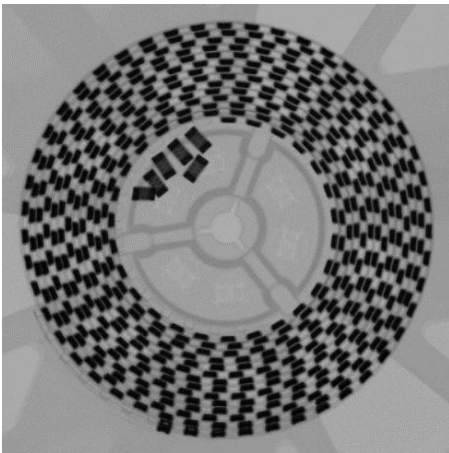
High and thin components, serious overlap



Components in bag



Internal loose reel



Serious interference



Irregular component arrangement