



# USER MANUAL

## eBS-5030A

---

# Important Safe guards and Warnings

## Safety Precautions

- Before using the Machine, operators must be trained with radiation protection knowledge according to local laws and regulations, and have basic skills in using the Machine.
- Before the Machine is supplied with power, make sure that the power supply voltage meets requirements and the power source is properly grounded. Do not allow other large devices to share the same power source.
- If the device becomes defective and components need to be replaced, contact the manufacturer or follow the instructions of a professional.
- Contact the manufacturer immediately if components become damaged, such as external cables, the conveyor belt, lead curtains, and indicators.
- Do not leave the Machine unattended when it is powered on.
- Do not put any living body parts or living animals into the tunnel when the Machine is operating.
- Do not allow liquids to flow into the Machine while it is working. Turn off the Machine immediately if any liquids spill on it.
- Keep the Machine away from dust and debris if it will not be used for a long period of time.
- Regularly perform maintenance on the Machine. For example, check lead curtains and clean the conveyor belt and the device's surface.

## X-ray Protection

The Machine is a micro dosage security inspection device. To ensure the safety of operators and inspectors:

- X-ray is only generated when the Machine is powered on and the control switch is turned on.
- To prevent X-ray leakage, the cabinet and collimator are covered with lead boards, and the tunnel entry and exit are designed with two-layer lead curtains.
- In case of an emergency, operators can press the emergency stop button to stop the conveyor belt and X-ray source.

---

# 1 Overview









The Machine inspects the baggage and items by using X-ray's penetrability without opening them. It adopts digital image processing and computer image display technologies, and has a built-in semiconductor detector. These attributes come together to make an efficient, reliable and high- quality image processing system.

This manual introduces the base functions of the Machine and provides guidance on operating and maintaining the Machine. Read this manual before you install and use the Machine.

## 2 SafetyInstructions

Before operating the Machine, you need to learn the meaning and location of the safety warning signs on the Machine.

Table 2-1 Warning sign

Sign	Meaning	Location
	Tunnel entrance	Head of the tunnel entrance
	Film safety	Entrance or exit of the tunnel
	Dangerous ionizing radiation	Entrance or exit of the tunnel
	Baggage incorrectly placed	Entrance or exit of the tunnel
	Baggage correctly placed	Entrance or exit of the tunnel
	Indicates power status	Under the power indicator
	Emergency stop	Under the emergency stop button
	Indicates X-ray status	Under the X-ray indicator

---

## 3 Structure

The Machine consists of an inspection tunnel and a tray.



The figure is for reference only. Slight differences might be found between the model and the actual product.

Figure 3-1 Model

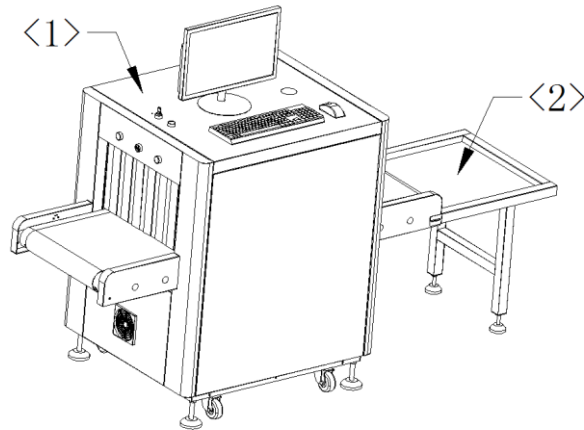


Table 3-1 Structure

No.	Description
1	The inspection tunnel. Items on the conveyor belt that are in the tunnel are scanned and then images are generated.
2	The tray that receives the items after inspection. Normally the tray is installed at the exit of the tunnel.

## 4 Power-On and Startup

### 4.1 Preparation

When you receive the Machine, check the wooden box. If the package has any abnormalities, contact the manufacturer immediately. Afterwards, open the wooden box and remove the foam from inside the package. Then you can:

- Check the operating desk.

Connect the cables of the operating desk by following the provided manual and set up the receiving tray. For the Machine without an operating desk, connect the monitor, mouse, and keyboard.

- Check the main power.

---

Make sure that it is functioning normally at 220 V and the power source is properly grounded.






- Check the emergency stop button.

The button is not pressed down by default. If it is pressed, rotate the button clockwise to return the original state.

- Check the lead curtains.  
Make sure the lead curtains hang normally. Contact the manufacturer if the lead curtain is drops down.
- Remove items from the tunnel.

## 4.2 Power-On and Startup

Table 4-1 Components

No.	Image	Name	Function
1		Power plug	Supply power.
2		Key switch	Turn on and turn off the Machine.
3		Start button	Start the Machine.
4		Emergency stop button	Immediately stop the X-ray source and conveyor belt if an emergency occurs.
5		Indicator	<ul style="list-style-type: none"><li>• Green: Power indicator.</li><li>• Red: X-ray indicator.</li></ul>

### Hardware Operation

Step 1 Connect the triangle plug to the socket.

Step 2 Turn on the Machine. Insert the key into the key switch and rotate it clockwise.

Step 3 Start the Machine by pressing the start button, and then the power indicator will turn on.

After the Machine starts normally, it goes to the operation interface.

### Software Operation

Step 1 Turn on the software system, and then the self-check starts. A prompt box will appear reminding you that the calibration is in progress. The X-ray indicator is on during the calibration and will switch off after the calibration.

---





Normally the calibration lasts 3 to 5 seconds.

Step 2 Click  to run the roller.

Step 3 Place items at the entrance of the tunnel, and scanned images will be displayed on the system interface as they pass through the tunnel.

Step 4 Turn off the software system.

- 1) Click  to stop the roller, and then click  to go to the homepage.
- 2) Click Shutdown and then in the prompt box, click Yes. The system will turn off within 60 seconds. After that, power to the device will be cut off and the power indicator will switch off.

## 4.3 Working Status

- Turned off: The Machine is not on and the power indicator is off.
- Stopped: The Machine is on and the power indicator is on, but the roller is not running.
- Running: The Machine is on, the power indicator is on, and the electric roller is running.
- Scanning: The Machine is on, and both the power and X-ray indicators are on.



To extend the device service life, put the Machine in the stopped state if no items were inspected for more than 30 minutes after startup. You can also install an automatic sensor for convenient management.

# 5 Software System Operation

## 5.1 System Main Interface

The scanned images are displayed in the center of the main interface. As items pass through the tunnel on the conveyor belt, the scanned images appear on the interface, scrolling across it. The area under the scanned images can be divided into three sections.

Figure 5-1 System main interface

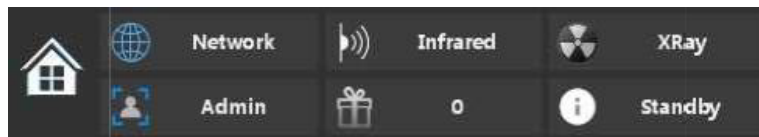




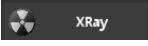
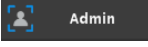

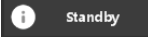
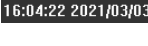

Table 5- 1 Area

No.	Description
1	Device information area
2	Device operating area
3	Image processing functions area

## 5.2 Device Information Area


Figure 5- 2 Device information




-  **Network**: Displays the connection status of the detection card. The icon is highlighted when the connection is normal.
-  **Infrared**: The icon is highlighted when IR is covering an item.
-  **XRay**: The icon is highlighted when the X-ray source is turned on.
-  **Admin**: Displays the login role, such as operator, engineer, and administrator.
-  **0**: Displays the number of scanned baggage.
-  **Standby**: Displays the current device status.
-  **16:04:22 2021/03/03**: Displays the current system date and time.
-  **Calibrate**: The system will produce low-quality images after the Machine has worked for a long period because the X-ray generator naturally undergoes minor changes over time. Click **Calibrate** to restore image quality.

### 5.2.1 Device Operating Area

### 5.2.2 Restoring Images

Click  to restore processed images to original scanned images.

### 5.2.3 Controlling Conveyor Belt



Click  to set the conveyor belt to move from right to left, stop the conveyor belt, and set the conveyor belt to move from left to right respectively.

---


## 5.2.4 Navigating Images

Click   to view previous and next images.

## 5.2.5 Image Zooming Out/In

Click  and  to zoom in and out of (maximum x8) images.

## 5.2.6 Image Processing Function Shortcut Keys

Combine image processing functions through buttons .

## 5.3 Image Processing Functions Area

In the image processing functions area, you can view and edit currently displayed images. The following image processing functions are supported and you can also combine multiple functions as needed.

Figure 5-3 Image processing functions area



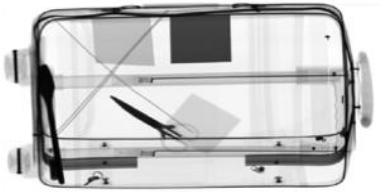
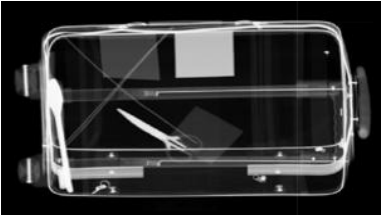
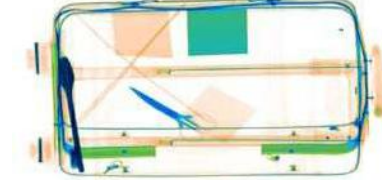

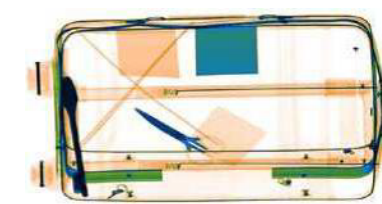

- **Super Enhancement:** Adjust image brightness and edge to enhance image effect.
- **BW:** See Table 5-3 for the comparison on the display effects.
- **High Penetration:** Increase image contrast of dark areas. These dark areas correspond with impenetrable materials with a high X-ray absorption rate, which usually have high density (such as lead and steel) or are very thick.
- **Low Penetration:** Increase image contrast of bright areas. These bright areas correspond with penetrable materials with a low X-ray absorption rate, which usually have low density or are not particularly thick (such as clothing and paper).
- **OM:** Use this function for key inspections of inorganic materials and mixtures. Usually, prohibited metal tools (such as knives and daggers) are inorganic materials, while the mixing of such prohibited items and daily necessities (such as clothing and food) affects the judgment of the operator.
- **IM:** Use this function for key inspections of organic materials and mixtures. Usually, hazardous items (such as drugs and explosives) and daily necessities (such as clothing and food) belong to organic materials, while the inspected objects mixing such organic materials and thin knives or metal electric products can be considered as mixed substances.
- **Inverse:** Check small or thin high-density threadlike objects (such as metal wires)



with an effect similar to the negative film. The function displays objects with high absorption rate in bright colors and objects with low absorption rate in dark colors without changing the current color tone.


- **Brightness Adjustment:** Increase or reduce image brightness. The grade in the system ranges from -5 to +5.
- **Image Scan:** Change the brightness of images by adjusting gray values. The image changes from bright to dark and dark to bright automatically. With this function you can see the object structure with more details.

Table 5-3 Comparison on display effects


Image	Function
	Black-and-white display
	Inverse color display
	High penetrating display
	Low penetrating display
	Super enhancement display
	Colorful display

## 5.4 System Menu Settings

### 5.4.1 System Menu Function

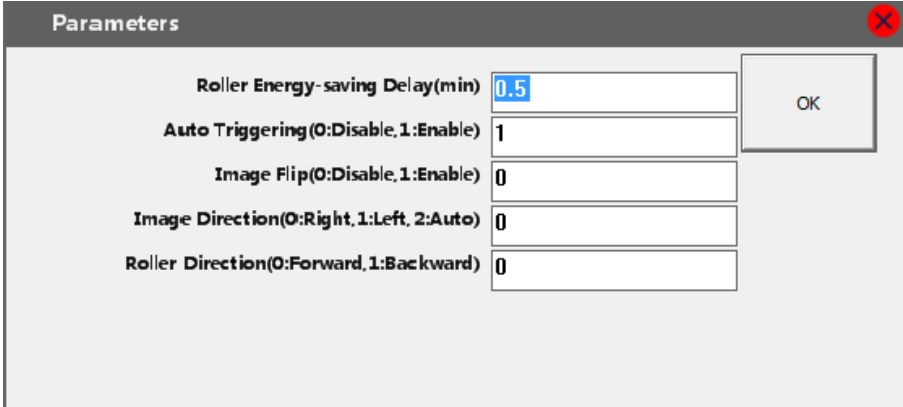
Click  to view the system menu interface, which includes user management, parameter settings, curve, image browsing, function key settings, and system information.

### 5.4.2 User Management

: Click **Account** and the prompt box for the user management is displayed.

- **Operator:** Operators have permissions to modify parameters including roller energy-saving delay, automatic triggering, and image flip, and log in without password.
- **Roller Energy-saving Delay (min):** The amount of time the roller stops for when items are not passing through the inspection tunnel.
- **Automatic Triggering (0: Disable, 1: Enable):** Indicates whether automatic sensing is set at the tunnel entrance. Set the value to 0 if you do not need the conveyor belt to run automatically.
- **Image Flip (0: Disable, 1: Enable):** Displays the image upside down.
- **Engineer:** Enter the password to access permissions. Engineers have permissions to set parameters including roller energy-saving delay, automatic triggering, image flip, image direction, and roller direction. Engineer's permissions are mainly used for changing the direction of images and the roller.
- **Image Direction (0: Right, 1: Left, 2: Auto):** Set the direction of images to scroll from left to right or from right to left on the monitor.
- **Roller Direction (0: Forward, 1: Backward):** Set the roller direction to be consistent with the directions in the device operating area.

Figure 5-4 Parameters






Parameter	Value
Roller Energy-saving Delay(min)	0.5
Auto Triggering(0:Disable,1:Enable)	1
Image Flip(0:Disable,1:Enable)	0
Image Direction(0:Right,1:Left,2:Auto)	0
Roller Direction(0:Forward,1:Backward)	0

- **Administrator:** Have permissions to set parameters that are related to device testing and device information. These permissions are currently not available.

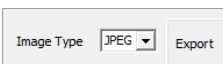
---

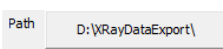
### 5.4.3 Image Browsing

- : Browse, search, and copy previously scanned images.

•  20210228  
   092322.raw : The folder name format is YYMMDD and the file name format is hhmms. You can copy the whole folder or a single file.

- : Search for previously scanned images by date.

- : Select the format of the images to be exported. We recommend selecting .JPEG.

- : Select the path to store exported files.

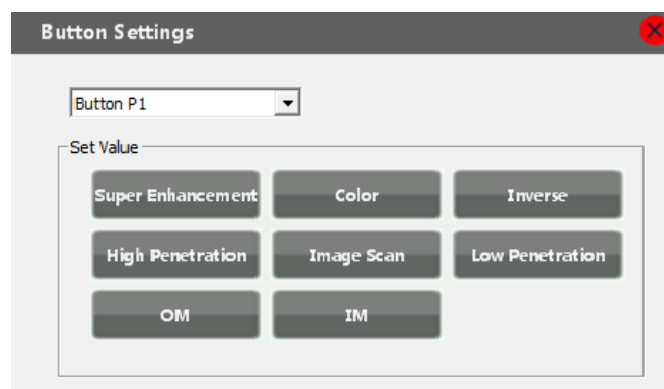
### 5.4.4 Function Combination Key

Customize image processing functions for buttons P1, P2, and P3.



Organic material removal and inorganic material removal functions are available only when the detection chip supports high energy and low energy.

Figure 5-5 Button settings



---

## 6. Routine maintenance work

In order to ensure the long-term stable operation of the equipment, the operator should pay attention to the regular inspection and daily maintenance of the equipment. During the equipment maintenance process, it can only be carried out after the power is cut off.

The basic contents of daily maintenance work are as follows:

1. The equipment should be installed in a ventilated and dry environment to prevent high temperature and humidity from affecting the operation of the equipment;
2. When the equipment is running, it is strictly forbidden to put the liquid in the semi-sealed state on the conveyor belt to avoid the liquid from being spilled.

To the inside of the device, cause a short circuit and burn out the accessories;

3. It is strictly forbidden to place overweight items on the conveyor belt to avoid overload operation and damage the electric drum;
4. It is strictly forbidden to place ultra-wide or ultra-high items on the conveyor belt to prevent items from getting stuck in the detection channel;
5. Regularly remove dust and foreign objects on the conveyor belt and lead curtain;
6. In order to extend the service life of the electric drum, the electric drum should be avoided from idling for a long time;
7. For equipment that has been stored for a long time (more than one month) and is not in operation, the user should warm up the equipment for 10 minutes after turning on the equipment before scanning.
8. Avoid sharing the power supply between the equipment and other large equipment, so as not to affect the normal operation of the equipment;

