OPERATING MANUAL

X-ray television unit

series ZKX: ZKX4233A, ZKX5030A, ZKX5030C, ZKX6040, ZKX6040A, ZKX6550A, ZKX6550, ZKX6550D, ZKX8065, ZKX8065D, ZKX10080, ZKX10080D, ZKX100100, ZKX100100D

2024

The main provisions

Statement of rights and responsibilities All rights belong to ZKTECO CO., LTD. and they are protected by the laws of the People's Republic of China. No person may use the trademark without the written permission of the company, and no person may copy or distribute this manual. 1) We are not responsible for failures caused by improper operation. Due to frequent updates, this manual may have slight differences from the actual product, please note. 2) We do not issue any additional notices if the user manual is updated.
Radiation Safety Regulations 1) The ZKX series X-ray inspection television systems meet the criteria of the internal radiation safety standard, it is harmless to humans and the environment. 2) The inspection X-ray television systems of the ZKX series guarantee the safety of the ISO1600 (33DIN) film.

Contacts Company: ZKTECO CO., LTD. Address: ZKTeco Industrial Park, 188 Industrial Avenue, Pingshan, Dongguan, Guangdong Province, China. ZKTeco office, Wuhe road, BanTian, Longgang County, Shenzhen. Website: www.zkteco.com E-mail: marketing@zkteco.com

Regulatory documents

In the manufacture of inspection X-ray television systems of the ZKX series, the following requirements are taken into account: GB 15208.1-2018 (GB15208.1-2018) Micro-dose X-ray security inspection system -- Part 1: General technical requirements; GB/T 191-2008 packaging storage and transportation icon; GB/T 2423.1-2008 Environmental testing of electric and electronic products - Part 2. Test methods Test A. Low temperature; GB/T 2423.2-2008 Environmental testing of electrical and electronic products - Part 2. Test methods Test B. High temperature; GB/T 2423.3-2016 Environmental testing - Part 2. Test method test Cab. constant damp heat test; GB/T 2423.5-1995 Environmental testing for electric and electronic products - Part 2. Test methods Test Ea and guide. Impact; GB/T 2423.10-2008 Environmental testing of electric and electronic products - Part 2. Test method test Fc. Vibration (sinusoidal); GB/T 4208-2017 enclosure protection grade (IP code); GB 4793.1-2007 Safety requirements for electrical equipment for measurement, control and laboratory - Part 1. General requirements; GB/T 9254-2008 Radio disturbance limits and methods of measurement for information technology equipment; GB/T 17626.2-2006 Electromagnetic compatibility test and measurement technology Electrostatic discharge immunity test; GB/T 17626.3-2016 Electromagnetic compatibility test and measurement technology RF electromagnetic field radiation immunity test; GB/T 17626.4-2008 Electromagnetic compatibility test and measurement technology Electrical fast transient burst immunity test; GB/T 17626.5-2008 Electromagnetic compatibility test and measurement technology Surge (impact) immunity test; GB/T 17626.6-2008 Electromagnetic compatibility test and measurement technology Conducted disturbance immunity of RF field induction; GB/T 17626.11-2008 Electromagnetic compatibility test and measurement techniques Immunity to voltage dips, short interruptions and voltage changes test; GB/T 17799.1-2017 Electromagnetic compatibility common standards Immunity in residential, commercial and light industrial environments; GB/T 17799.2-2003 Electromagnetic compatibility general standard immunity test in industrial environment; GB/T 17799.3-2012 Common standards for electromagnetic compatibility, emissions in residential, commercial and light industrial environments; GB/T 17799.4-2012 Electromagnetic compatibility general standard emission in industrial environment.

Preface

Dear customers, thank you for choosing the inspection X-ray machine. our company's system. This manual provides operating instructions, information on product safety, manufacturing, image reading processes, a description of menu options, and a frequently asked questions section. In this guide, you will learn how to operate, configure, and maintain this product, following international safety standards for X-ray equipment. Thus, it is absolutely safe for the operator and the environment.

Goal

This guide can help the operator to operate the X-ray correctly. a system manufactured by our company. Before you start, we strongly recommend that you read this guide carefully.

Application

This guide is applicable to:

1) System operators
2) System administrators
3) The service organization of the systems

GENERAL REQUIREMENTS FOR THE RECRUITMENT AND TRAINING OF PERSONNEL

The user of an ionizing radiation source (hereinafter referred to as the AI), an organization that performs work and (or) provides services to the users of the AI that may affect radiation safety, must be staffed with personnel trained in the safe operation of the AI (radiation device) in all modes prior to the start of work and during work with the AI, and also, the implementation of actions aimed at preventing a radiation accident and a radiation incident, responding in the event of a radiation accident and a radiation incident.

The requirements for the number, composition and qualifications of personnel are established by local legal acts and (or) organizational and administrative documents of the AI user, the organization performing work and (or) providing services to AI users that may affect radiation safety, taking into account the technical (operational) documentation for AI and methods (technologies) of performing work from the III.

The list of persons classified as "personnel" should be documented by the user of the AI and the organization performing work and (or) providing services to users of the AI that may affect radiation safety.

The duties of personnel in the field of radiation safety and the procedure for staff admission to work with AI are determined and documented by the AI user and the organization that performs work and/or provides services to AI users that may affect radiation safety.

Before being allowed to work and periodically, personnel must undergo occupational safety training, including radiation safety issues in accordance with the procedure established by labor protection legislation.

Content

1 Notification of safe operation.

We recommend that this manual be read by the operator before starting the system for the safest operation of the introscope.

1.1 Film safety

The imaging films used in our X-ray inspection system comply with ISO1600 safety standards.

1.2 Safety check before commissioning.

Before connecting the system to the power supply, make sure that:
1) Check the lead coating, do not start the system in case of a coating violation.
2) Check if the photovoltaic sensors are blocked.
3) Check the conveyor belt for jamming, whether there is dirt or a tear on it.
4) Check the case, monitor, panel and electrical cables for defects.
5) Make sure that the housing cover is closed.

Please note: when switching on for the first time, clause 3.1 Switching on 5 minutes after warming up, it is necessary to conduct a primary radiation monitoring check according to clause5.4. Annual inspections. Record the results of the audit in the annual audit log.

1.3 Basic safety rules.

For safe operation of the system, please follow the rules:
1) Familiarize yourself with the basic radiation safety requirements.
2) The operator is familiar with the safety requirements.
3) If the system has not been used for more than 6 months, perform a thorough check.
4) Installation and installation, connection, replacement of components are performed by the service organization.
5) Operation is prohibited if the housing, conveyor belt or electrical cable is damaged.
6) Only the maintenance company is allowed to open the case and replace the components.
7) Do not make arbitrary changes to the security system configuration.
8) It is forbidden to expose living objects to the X-ray radiation of the inspection system.
9) Do not extend any body parts inside the housing or tunnel during operation.
10) If liquid enters the system body, stop its operation immediately.
11) All connections, earthing, etc. must be made correctly.

1.4 Radiation protection.

We apply reliable radiation protection measures on our products to ensure the safety of the operator and users.:
1) Only when the generator is under high voltage, it emits X-rays. Therefore, there is no radiation during transportation or storage.
2) Lead panels are installed around the machine, the tunnel entrance and exit are equipped with a lead curtain, they protect against radiation leakage into the environment.
3) The device is equipped with an effective grounding, which protects the operator from electric shock.
4) The device has a built-in overload, overvoltage and radiation leakage prevention system.
5) Active blocking will not allow the radiation generator to start.

2 Product Presentation

2.1 Operating principles

The introscope is divided into five parts: a conveyor, a radiation generator with a control board, indicators, factory circuit boards and an electric drive.

The objects enter the inspection tunnel on a conveyor belt, which is started after the object interacts with photoelectric sensors (sensors).
When the items enter the tunnel, the sensor will signal the start of the inspection.
The control board initiates the emission of radiation by the generator.
The beam penetrates through objects and is partially absorbed by them, the beam receiver processes the residual radiation.
After that, the receiver converts it into a digital signal and sends it to a computer.
Using the detailed image algorithm, a clear image of objects will be displayed on the screen.

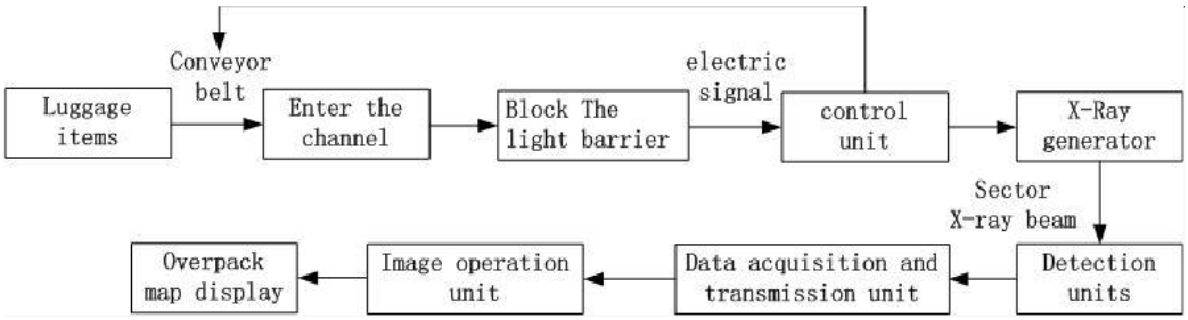


Figure 2-1 System operation process

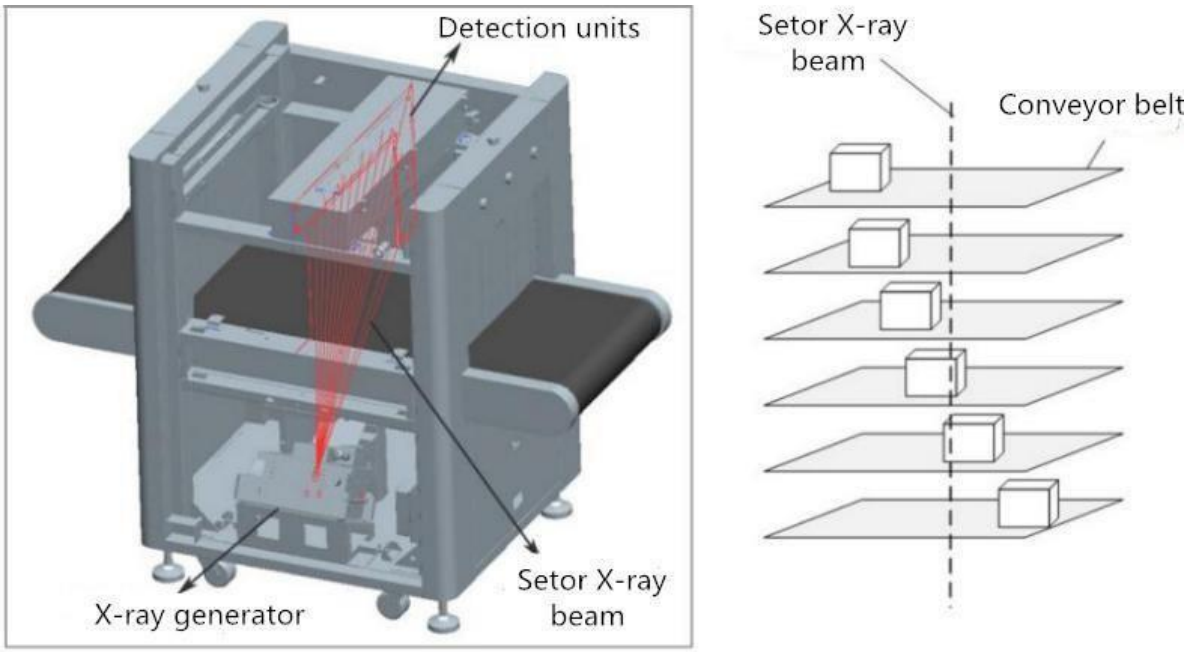


Figure 2-2 Stages of work inside

2.2 Technical index / Main parameters

Main parameters of the system models (introscopes)

Model (ZKX series)			5030A	5030C	6040	6550	8065	10080	100100
			Unit Energy system	Two. Energy system	Two. Energy system	Two. Energy system	Two. Energy system	Two. Energy system	Two. Energy system
Main parameters	Tunnel size	Width, mm	507	507	608	660	805	1004	1008
		Height, mm	305	305	405	510	660	806	1005
	Maximum distributed load weight		150	150	150	180	200	220	220
	Service life		30 000ч						
	Current strength (mA)		0.5-1.0						
	Voltage		140кV-160кV						
	Cooling method		Oil 100%						
	Limit state criteria		The amount of radiation is reduced to 80% of the required amount						
	Dose of ionizing radiation during scanning		≤1.0 μGy						
Environmental conditions	Storage temperature		-40±2℃～+60±2℃/5%～95%(No condensation)						
	Operating temperature		0℃±2℃～+40±2℃/5%～95%(No condensation)						
	Nutrition		AC220V(-15%～+10%), 50Hz±3Hz						
	Power consumption		≤0,5 kW		≤0,8 kW	≤1,0 kW	≤1,5 kW	≤1,5 kW	
	Noise level		≤55dB						
Image processing	Image processing		Pseudocolor, shades of gray, deep scan, surface scan, detailed scan, inorganic highlight, organic highlight, dynamic scan, color inversion, etc.						
	Memory		Over 100,000 images						
	System functions		High Density Warning, Drug and Explosives Check, Date/Time, Baggage Counter, User Management, Recognition, Training, etc.						

Main parameters of the models of the system (introscopes) with two generators

Model (ZKX series)			6550D	8065D	10080D	100100D
			Two. Energy system	Two. Energy system	Two. Energy system	Two. Energy system
Main parameters	Tunnel size	Width, mm	660	805	1004	1008
		Height, mm	510	660	806	1005
	Maximum distributed load weight		180	200	220	220
	Service life		30 000ч			
	Current strength (mA)		0.5-1.0			
	Voltage		140кV-160кV			
	Cooling method		Oil 100%			
	Limit state criteria		The amount of radiation is reduced to 80% of the required amount			
Environmental conditions	Storage temperature		-40±2℃～+60±2℃/5%～95%(No condensation)			
	Operating temperature		0℃±2℃～+40±2℃/5%～95%(No condensation)			
	Nutrition		AC220V(-15%～+10%), 50Hz±3Hz			
	Power consumption		≤1,0кW	≤1,3кW	≤1,6кW	≤1,6кW
	Noise level		≤55dB			
Image processing	Image processing		Pseudocolor, shades of gray, deep scan, surface scan, detailed scan, inorganic highlight, organic highlight, dynamic scan, color inversion, etc.			
	Memory		Over 100,000 images			
	System functions		High Density Warning, Drug and Explosives Check, Date/Time, Baggage Counter, User Management, Recognition, Training, etc.			

2.3 Features

Our company's introscopes have the following characteristics to provide users with greater security, convenience, and fast service.

■ Eco-friendly design: the lead-free surface of the protective curtain prevents leakage and does not pollute the environment.

Safer: radiation monitoring protects against harmful leakage.

■ Turn off by pressing: When you turn the key, the device will turn off automatically, quickly and conveniently.

Fault self-diagnosis: The system will detect the fault itself and report it to simplify troubleshooting.

■ Special keyboard: image manipulation functions, on and off, and so on.

Dynamic features: Work with both static and dynamic images.

2.4 Intended use

X-ray inspection equipment, uses the latest image processing technology, higher resolution, clearer image, higher permeability. It can quickly and efficiently detect various dangerous goods and suspicious substances with high density. It is suitable for checking small hand luggage, suitcases, bags, etc.

The introscope is used in government offices, embassies, airports, conference centers, exhibition centers, tourist destinations, post offices, shopping malls and hotels.

They can be placed in rooms providing the operating parameters of the environment. 0℃±2℃～+40±2℃/5%～95%(Non-condensing) according to the project.

3 Description and operation

3.1 Enabling

Step 1: Insert the power cable into the outlet (make sure that the network configuration and grounding are in order).

Figure 3-1 model ZKX5030

Figure 3-2 model ZKX6550

Step 2: Insert the key into the power lock and turn it to the "ON" side.

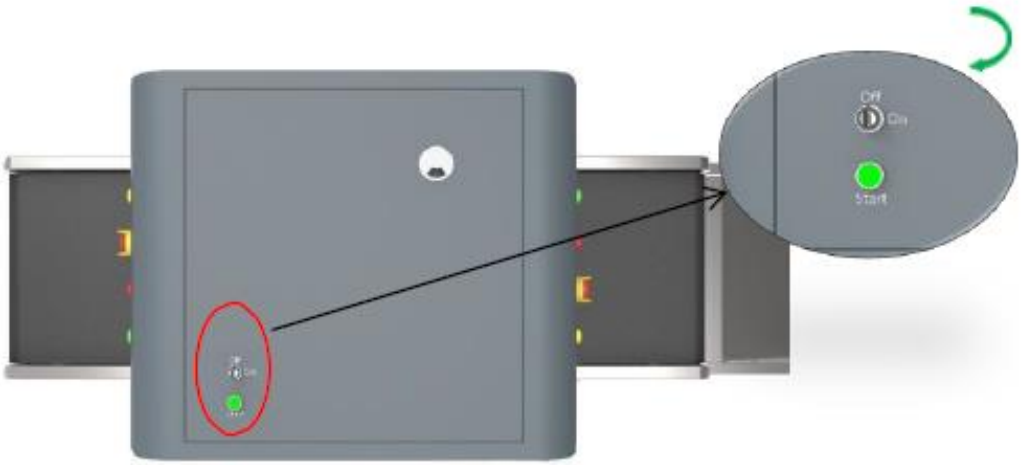


Figure 3-3 version on the case

Fig. 3-4 option on the control panel

Step 3: Press the start key next to the lock. The color will turn green.
Step 4: The system will start warming up automatically, this is necessary to protect the generator and takes from 1 to 5 minutes. After warming up, the system is fully ready for scanning processes.

Please note: when switching on for the first time, 5 minutes after warming up, it is necessary to perform an initial radiation monitoring check according to5.4. Annual inspections. Record the results of the audit in the annual audit log.

3.2 Inspection of items

Setup items: The item must be placed on a conveyor belt, as shown on the signs.
Verification: When an object enters the tunnel, its scanned image will appear on the monitor. Different colors show different materials. The directional arrows on the control panel or in the program window allow you to change the direction of the conveyor.
Step 1: Place the object in front of the tunnel entrance. Step 2: Press the Forward key.
Step 3: When the object enters the tunnel, the radiation emission indicator (red) will light up.
Step 4: Pick up the item at the exit of the tunnel.

3.3 Shutdown

Step 1: Stop the conveyor belt, turn the key to the "OFF" position, the indicator light next to it should go out (the green indicator light will go out in a minute).
Step 2: Disconnect the machine from the external power supply. Pull the key out of the lock.

3.4 Emergency stop indicator and button

Emergency stop button: In an emergency, press any emergency button to stop the emission of radiation and the conveyor belt.

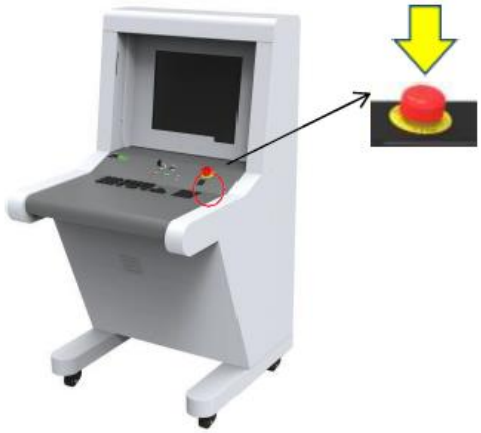


Fig. 3-5 extra. Button

Please note: When you need to be restored to normal system operation (cancel emergency mode), turn the pressed emergency button clockwise to pull it back out and press the start button to continue.

Figure 3-6 Recovery

Please note: Recovery requires pressing the start button.

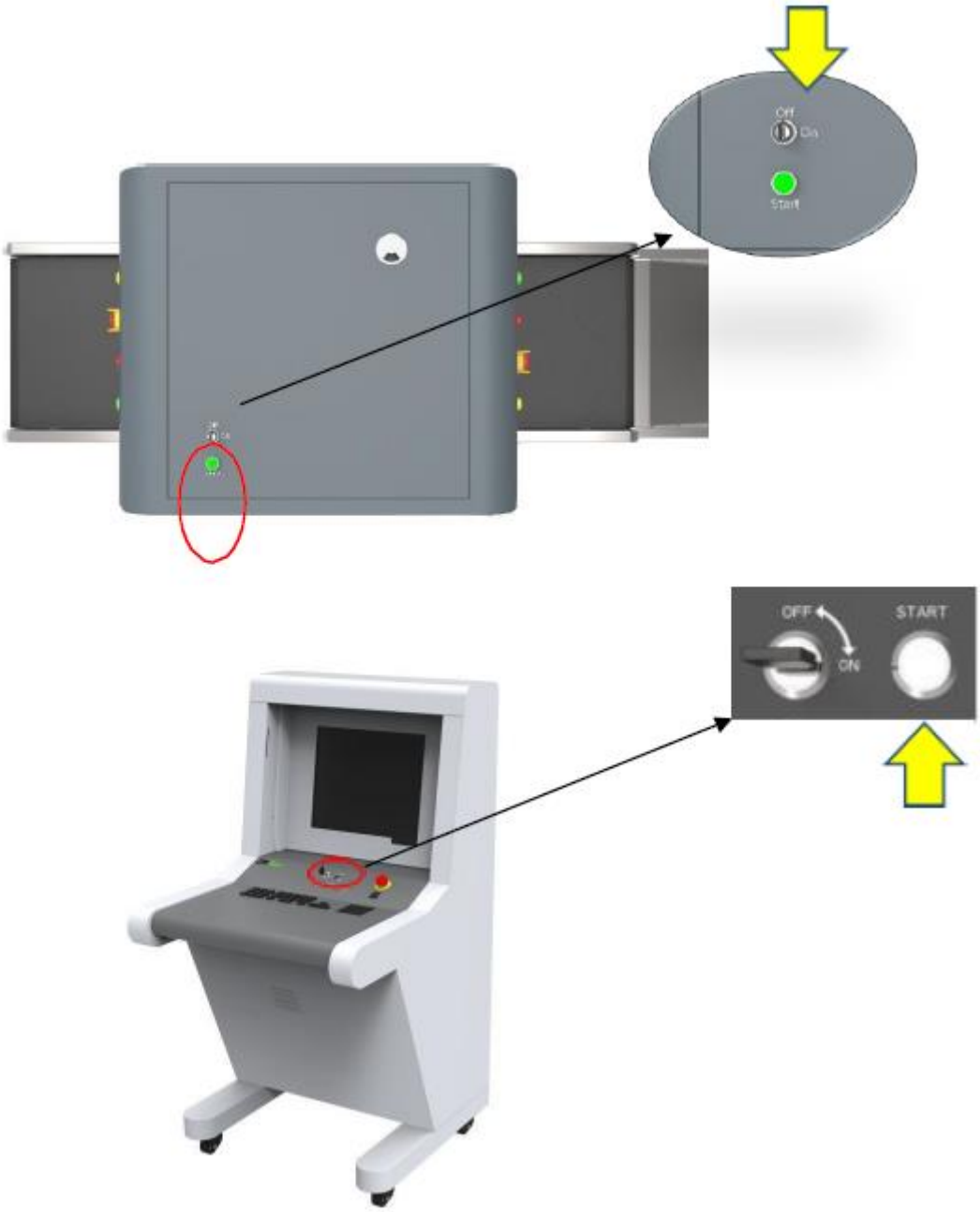


Figure 3-7 Start button

Power indicator (green): When the system is running, the green indicator is on.

Radiation indicator (red): When radiation is emitted, the red indicator lights up.

3.5 Special keyboard

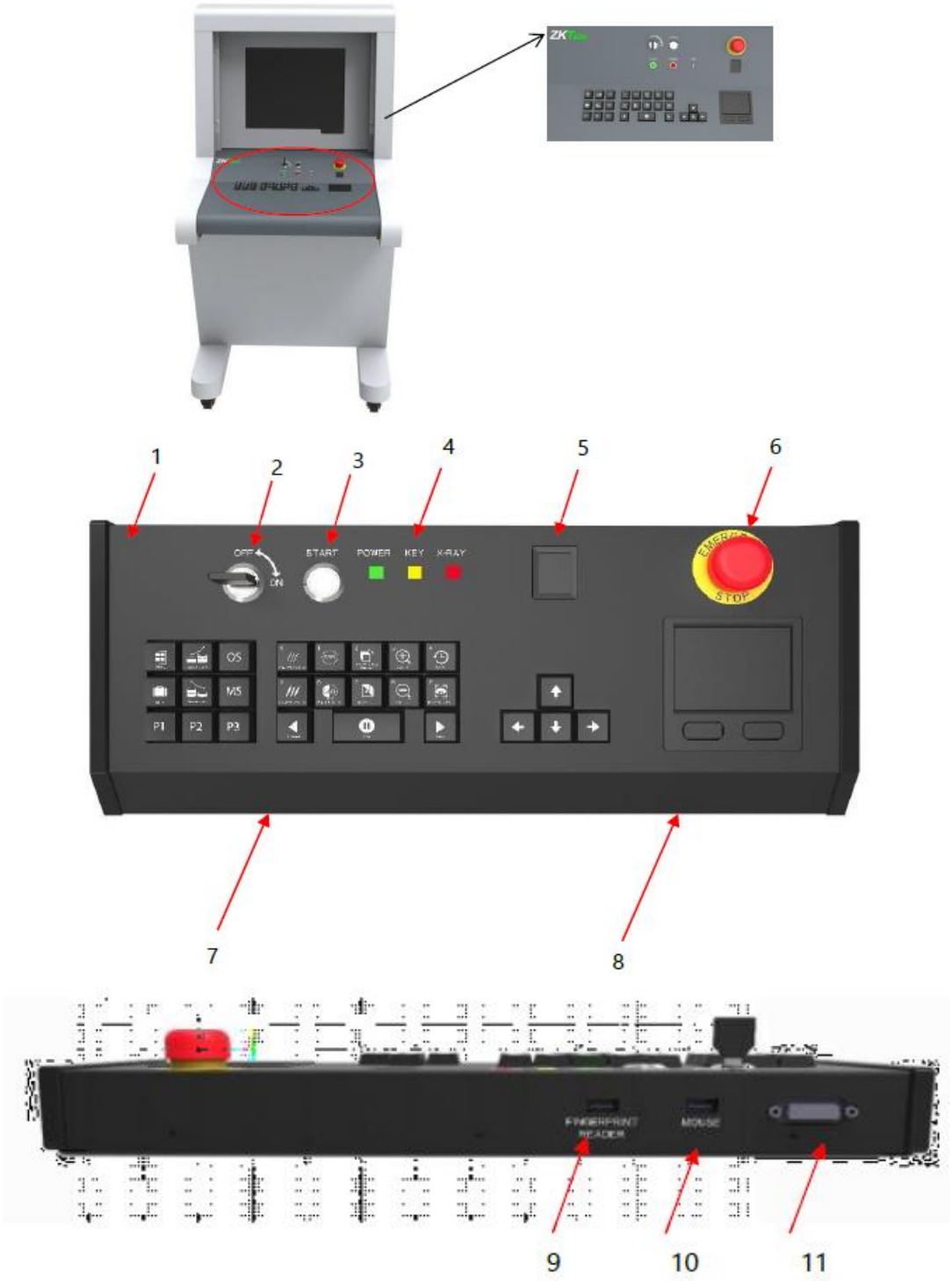
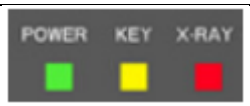


Figure 3-8 special keyboard

1- External cover of the valve, 2 - Power lock, 3 - Start button, 4 – Indicators, 5 - OTP reader. Finger, 6 - The extra button. stop., 7 - Keyboard area, 8 - Touch pad (functional mouse), 9 - USB reader socket, 10 - USB mouse socket, 11 – DB15 socket

Explanation of electrical components and keyboard

	Switch-on lock: The main lock for monitoring the power supply of the equipment. It is also necessary to restrict unauthorized access to management.
	Start button: Pressing will start the system, the green indicator will light up
	Fingerprint reader: A reader for verifying users, logging into an account, and registering new users. The green color of the indicator on the reader indicates that the fingerprint is in the database. Red indicates that the fingerprint has not been registered. The reader has its own fingerprint storage - up to a maximum of 65,535 users with 10 fingerprints each.
	Indicators: (I) Radiation (red): The emission of radiation is shown in red, the indicator goes out when the radiation stops. (ii) Power supply (green): The indicator will show when the equipment is working. A dimmed indicator means that the equipment is turned off.
	Emergency stop button: In case of an emergency , press this button immediately. The emitter and the conveyor will stop working immediately. Since the button belongs to the blockers, the restoration of normal operation is performed after removing the lock. Turning the button clockwise will reset it to its original state.

Keyboard (control, image manipulation, menu)

	(I) The conveyor control buttons: "Forward" or "Backward" will make the conveyor move in the desired direction. Pressing the Stop key will stop the conveyor.
	(II) Image Window Move/Navigation Keys: When the image is zoomed in or out, the preview window will automatically appear in the lower right corner. Click in any direction to move the window. The keys can also be used to navigate the menu.
	(III) Function presets: For presets, please refer to "4.12.2 Keyboard".
	(IV) Menu: Click "Menu" to enter into the system menu.
	(V) Mark key: Refer to "4.10 TIP image" for explanation.
	(VI) Image Interaction Keys: Refer to Section "4.5 Image Processing" for an explanation of the functionality. The keys are designed to work with the image.

3.6 PC keyboard and mouse.

Our company's inspection equipment works not only with a special keyboard, but also with a standard PC keyboard and mouse. On the 5030A and 5030C models, you can choose the interface methods.

PC presets (quick access)

Function Area（F1-F12）

F1 - P1
F2 - P2
F3 - P3
F4 - Forward
F5 - Stop
F6 - Back
F7 - Image Control
F8 - Pull Forward
F9 - Pull Back
F10 - F1-F12 Key On/Off
F11 - Zoom In
F12 - Zoom Out

Alphabet Area – Image Processing Functions

A - Black & White
B - Invert
C - Organic
D - Inorganic
H - Absorbance+
G - Absorbance-
I - Deep Scan

J - Surface Scan
K - Detail
N - Dynamic Scan
M - Menu
R - Original
P – Mark
Direction keys - When zoomed in, move the image window.
↑ - Up
↓ - Down
← - Left
→ - Right

Numeric Keypad - Accounts and Passwords are nothing more than combinations of numbers

Numbers in the range 0-9, just for entering numeric values.

4 Working with the software and image processing

4.1 Main interface

View the interface elements using example images:

Fig. 4-1 Main interface

4.2 System software

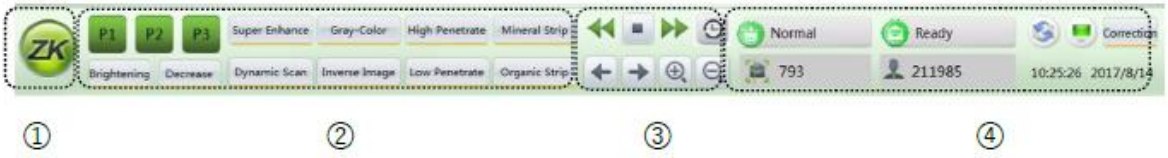


Fig. 4-2 Control panel in the software

① Main Menu (Refer to "4.6 System Options")

② Image Processing Functions

③ Image Area Management

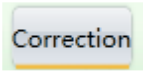
④ Information Section

4.3 Information section

Account Info: After logging in, the current account name will be automatically displayed in the information section.

Luggage Quantity: Displays the current user, the number of scans, and can also display the total number of luggage.

Date and Time: Displays the working date and time.

Image Correction：After a long time of operation, there will be slight changes in the generator, which will negatively affect the image quality. Click "Correction" 

to restore.

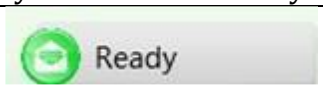
Mode: Scan mode  , training  .

Device Status: Normal status is displayed as 

.

On standby	After self-diagnosis, when no problems are detected, the system will show the status "Ready".
Scanning	During normal operation, when the radiation emission indicator is lit, the system shows the "Scanning" status.
Error	In case of malfunction or incompatibility of components, the system will show the "Error" status.

Emergency Stop Button: This button is used in dangerous situations, when pressed, the generator and conveyor will stop working immediately to ensure the safety of people.

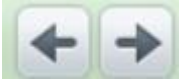
On standby	Normal condition 
Emergency situation	Status when emergency button is pressed 

4.4 Functional section

Fig. 4-3

Restore Image: The original can be restored with a keystroke. Press"  ", after image processing to return to the original image.

Conveyor control: Press "  " on the screen or the corresponding keys on the special keyboard to move the belt "Forward", "Stop", "Backward".

Pull image forward, backward: If you need to return to previous scans while working with images, use the slide functions. Clicking  allows you to work with previous images.

Zoom in and out: Press  and  , to zoom in or out. A total of 64x zoom is possible.

Multifunctional keys: Using the combinations described in section "4.12.2 Keyboard", working with the image can be made easier by presetting keys P1-P3.

Рис. 4-4

4.5 Image processing

(The following images are the images of dual-view series security monitoring system, the horizontal image is also applicable to the general series security monitoring system, the following figure is the original image used in image processing)

Horizontal image Vertical image

4.5.1 B/W and color. (Black and white and color image)

Fig. 4-5 Black and white image

All items are displayed using a 256 color palette.

Fig. 4-6 Color image

To make inspection easier, different materials have different display colors. Inorganic - blue, organic - orange, intermediate - green.

4.5.2 Deep Scan

Enhances the contrast of the dark area

Fig. 4-7 Deep scan image

4.5.3 Surface scanning

Enhances the contrast of the light area

Fig. 4-8 Surface scanning image

4.5.4 Detailed image

This function allows you to see both easily and difficultly permeable objects at once. Even if the object is hidden behind two metal plates, it can be seen.

Fig. 4-9 Detailed image

4.5.5 Organics

The function displays organic objects in black and white (excludes).

Fig. 4-10 Exclusion of organics

4.5.6 Inorganics

The function displays inorganic objects in black and white (excludes).

Fig. 4-11 Inorganic exclusion

4.5.7 Inversion

Inversion makes it easier to detect dense cables.

Fig. 4-12 Inverted image

4.5.8 Absorption Management

Adjusts the brightness of the scanned image.

Fig. 4-13 Bright image

Fig. 4-14 Faded image

4.5.9 Dynamic scanning

Images will be displayed dynamically.

4.5.10 Pseudocolor

The single-energy system initially shows images in pseudo-color. The dual-energy system initially shows the original image. All the examined objects are displayed at different color levels of the spectrogram, and the color represents the actual degree of absorption of X-rays by the object.

4.5.11 Suspect organic factor Z789 (techn.)

The atomic number of explosives and drugs is within the range of [7,9], the function of detecting suspicious organics is to highlight the substances with suspicious organics in bright red, and other substances will be displayed in gray. Applicable when inspecting suspicious substances for similarity with explosives or drugs. The Z789 function can be used by pressing the "E" key on the special keyboard or the normal keyboard.

4.6 System Options

There are two categories of users in the system: administrator and operator, with different sets of control rights. The operator can only change the image settings and change the password of his account. The administrator can change all settings, except for the "Maintenance" section.

Fig. 4-15 View of the administrator and operator menu.

4.7 Image

This section contains image settings and preview.

4.7.1 Preview

Single click will open the image list, the small image will appear on the right.
All images created after scanning (primary scanning) will be automatically saved to the hard disk of the scanning equipment. The preview interface will display the first 16 images. The storage order of image files will be arranged in chronological order.

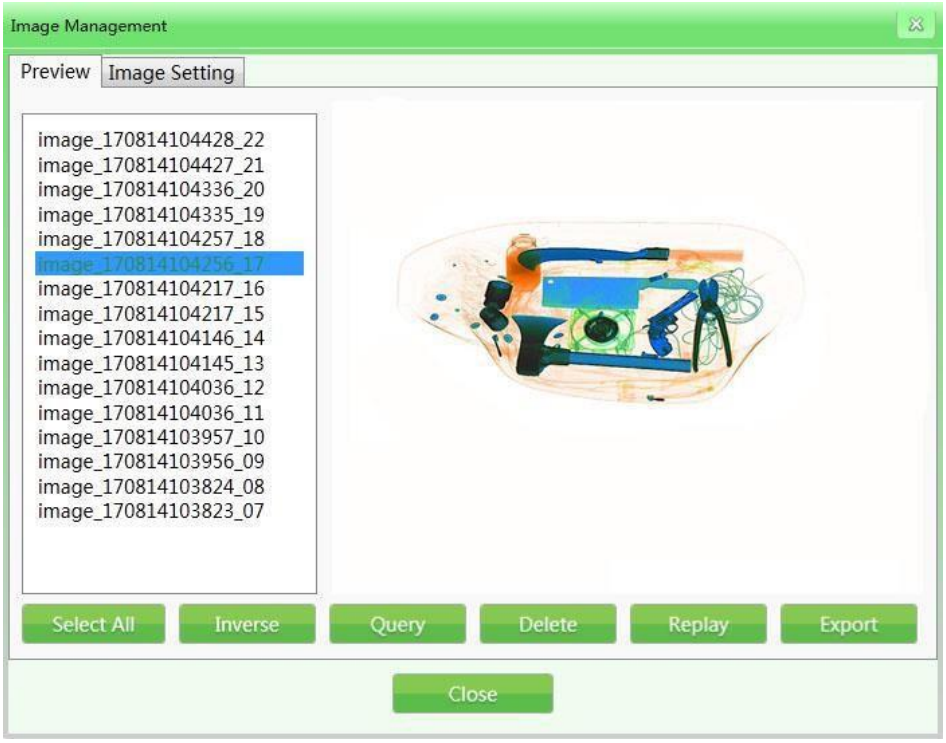


Fig. 4-16 Image Preview

(Example: The default name of the images is: image + scan time + serial number, for example - image_170814104217_16)

1) Image request: During the check, you can request previous images.

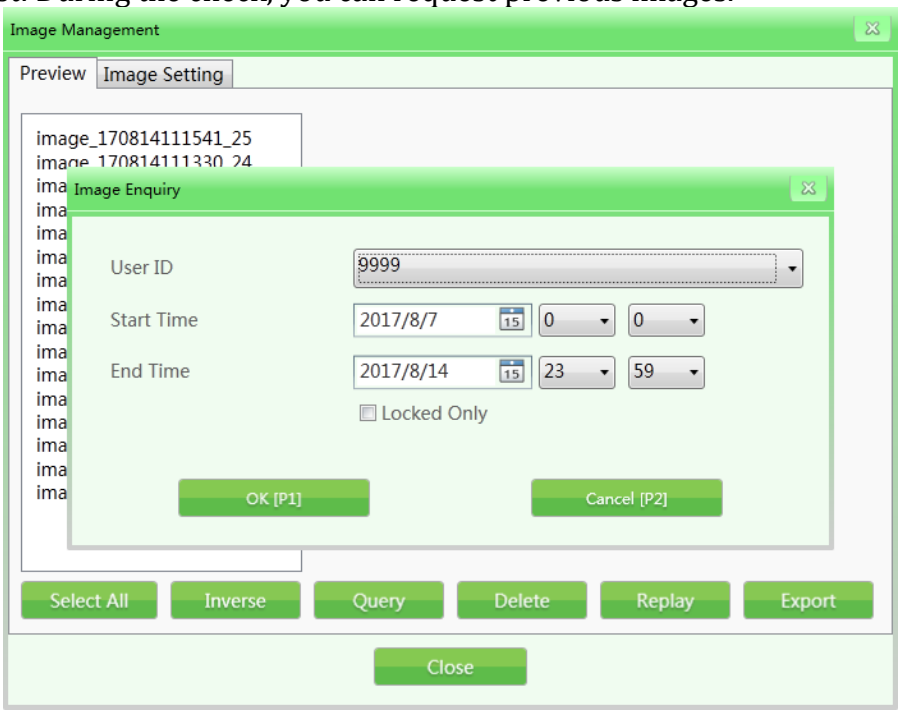


Fig. 4-17 Image request

2) Delete: Authorized user category can delete images.

3) Repeat: When selecting the function, the specified images will be displayed in the main interface.

4) Export: If you need to export images to another device, click "Export", connect the storage medium (such as USB flash drive), and specify the images to be transferred (available formats: ZKX, BMP and JPG).

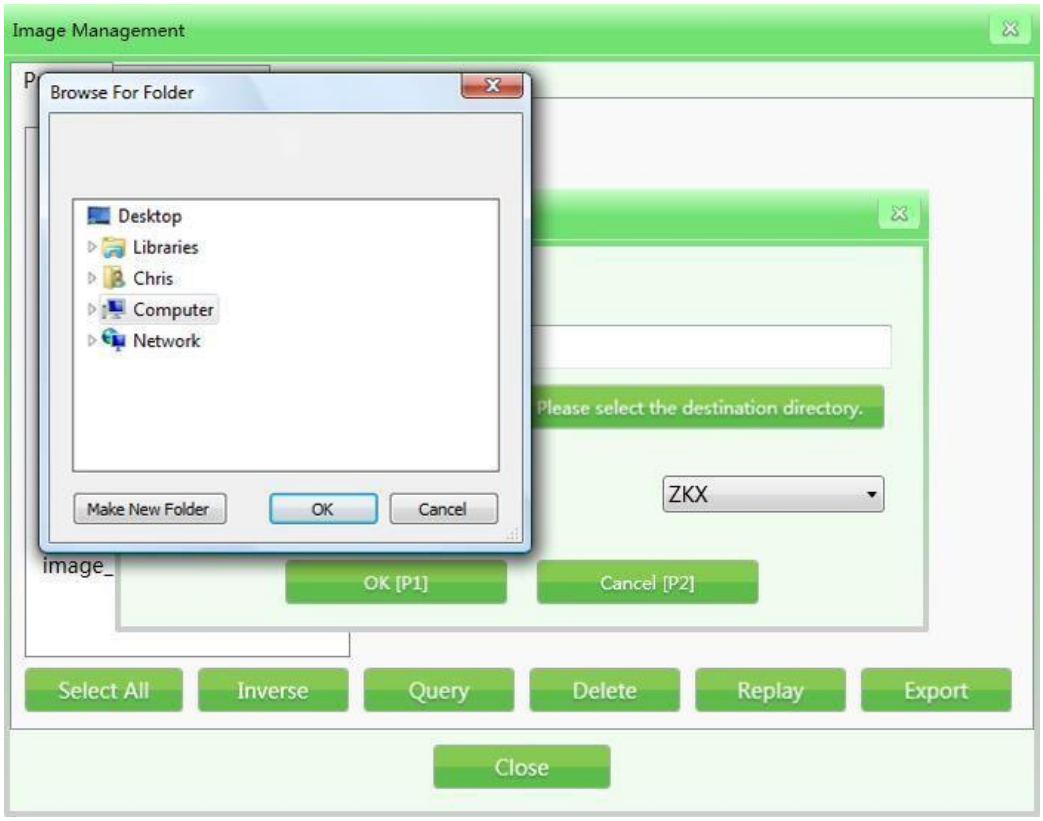


Fig. 4-18 Exporting images

Please note: Images transferred in BMP or JPG format can be opened in standard Windows applications or other software. If images are transferred in ZKX format, they can only be read by the ZKXScanner application.

4.7.2 Image settings

The selected image setting will be applied to the image in the display interface in real time. The original settings have been completed in production, it is not recommended to change them.

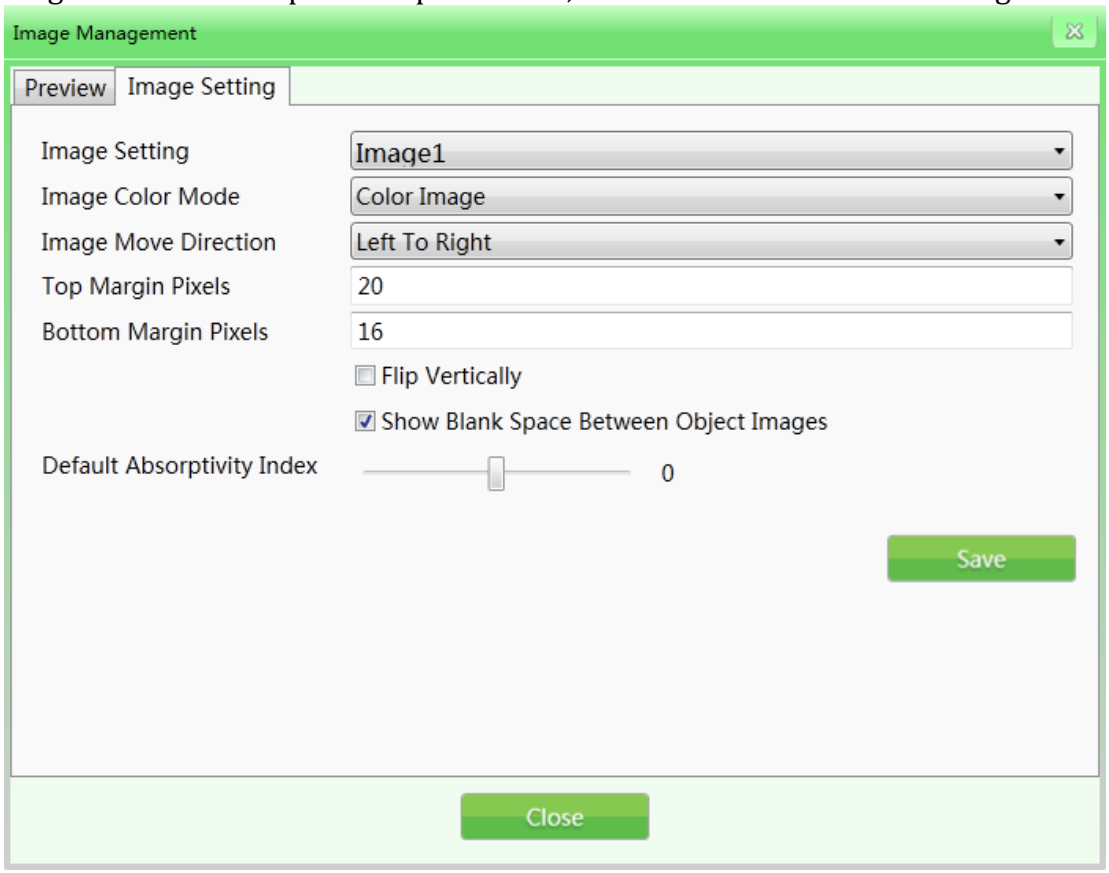


Fig. 4-19 Image adjustment

1) Image Setting: Includes Image 1 and Image 2 (for dual-screen display). You can set two images separately, which will be displayed on two different screens. If your equipment is single-screen, you can only select one image.

2) Color Mode: Image Color refers to the color mode of the display during scanning.

Including:

(I) Black and white image	(V) Organic
(II) Color image	(VI) Suspect organic factor Z7
(III) Pseudocolor 1	(VII) Suspect organic factor Z8
(IV) Inorganic	(VIII) Suspect organic factor Z9

For image effects, please refer to "4.5 Image Processing".

3) Image Flow Direction: The image of the scanned baggage can be flipped from left to right or right to left.

4) Large/Small Pixels: The setting range of pixels in the scanning area on the screen will be different for different models and configurations. The larger the setting value, the larger the pixel area of the marker (white edge).

5) Flip Vertically: Flip vertically of parcel images scanned in the main interface.

6) Gap Between Objects: Allows you to add spaces between the images of scanned objects so that the operator can clearly identify the processed images before and after.

7) Absorptivity Index: Absorptivity index reflects the ability to display details of different objects depending on the material and thickness. The function can brighten/darken the entire image (similar to fine-tuning deep/shallow scanning). The lower the absorbency level, the brighter the image will be, and increasing it will have the opposite effect. The initial level is 50, which means the working range is -25~+25. The “absorptivity-” and “absorptivity+” keys on the keyboard are responsible for decreasing and increasing the absorbency, respectively.

4.8 User Management

With this function, the administrator can add and edit operator accounts, delete, reset passwords independently. Our software uses a two-level system of user rights. Administrators have more rights, while operators are limited only to changing information within their accounts.

Please note:

The username must not exceed 6-digit numeric values, from 1 to 999999.

The password must not exceed 8-digit numeric values, from 1 to 99999999.

The default password for a new account is 123456.

4.8.1 Account settings

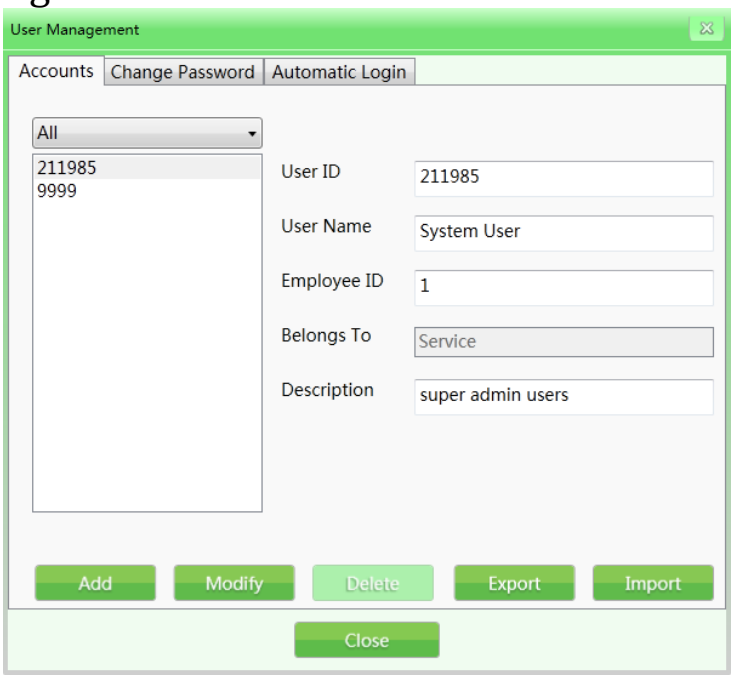


Fig. 4-20 Accounts

Add: Click on "Add" to create a new account. User ID and password can be up to 8 characters long. The fingerprint reader contains a data storage capacity of up to 65,535 users with 10 fingerprints each.

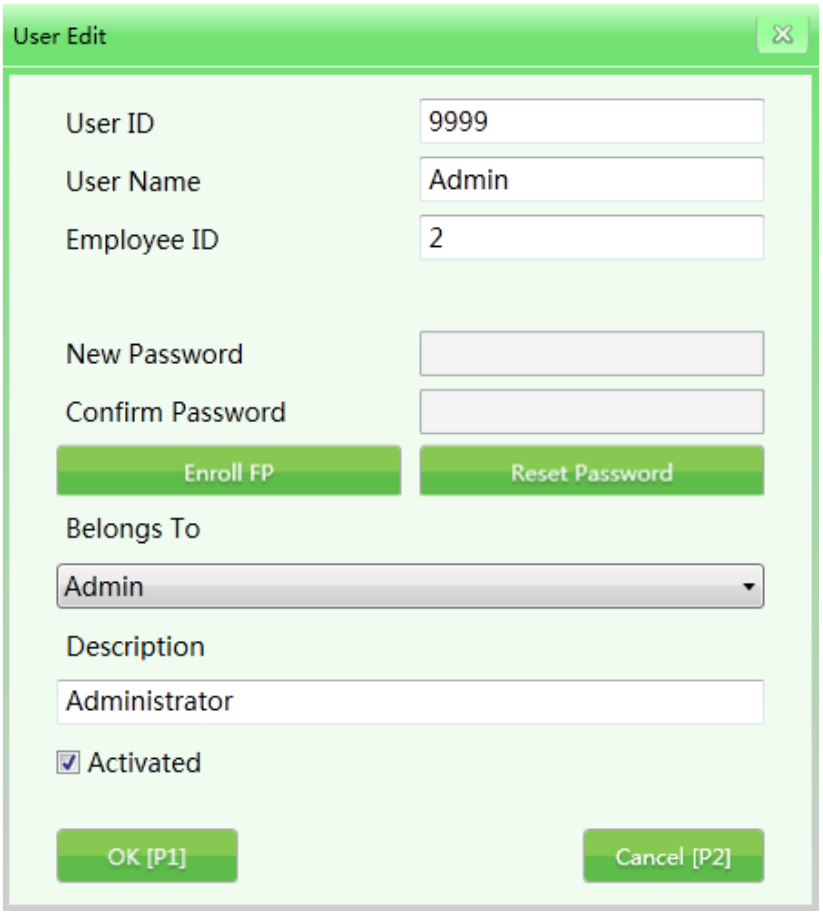


Fig. 4-21 User editing interface

Fig. 4-22 Registering a fingerprint

1) Modify: Click "Modify" to enter the editing interface and modify the user information.
2) Delete: Click "Delete" to delete the user (operator) who is no longer in the system.
3) Import/Export: This function allows the administrator to import/export data (only for ZKX series, the data is in XML format).

Please note: Once a user account is deleted, it cannot be restored in the future. Please exercise caution when deleting.

4.8.2 Change password

If you need to change your password, enter the current password and the new password twice in the required tab.

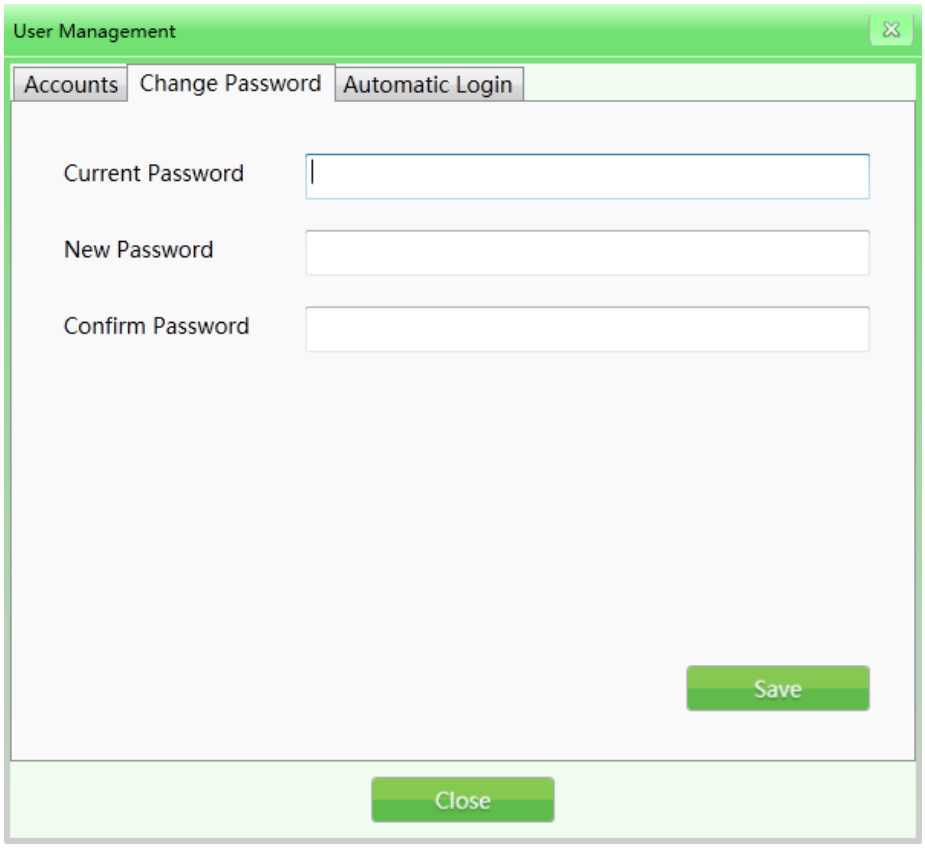


Рис. 4-23 Смена пароля

4.8.3 Auto-login

Enable/disable the automatic login to the specified account when powered on.

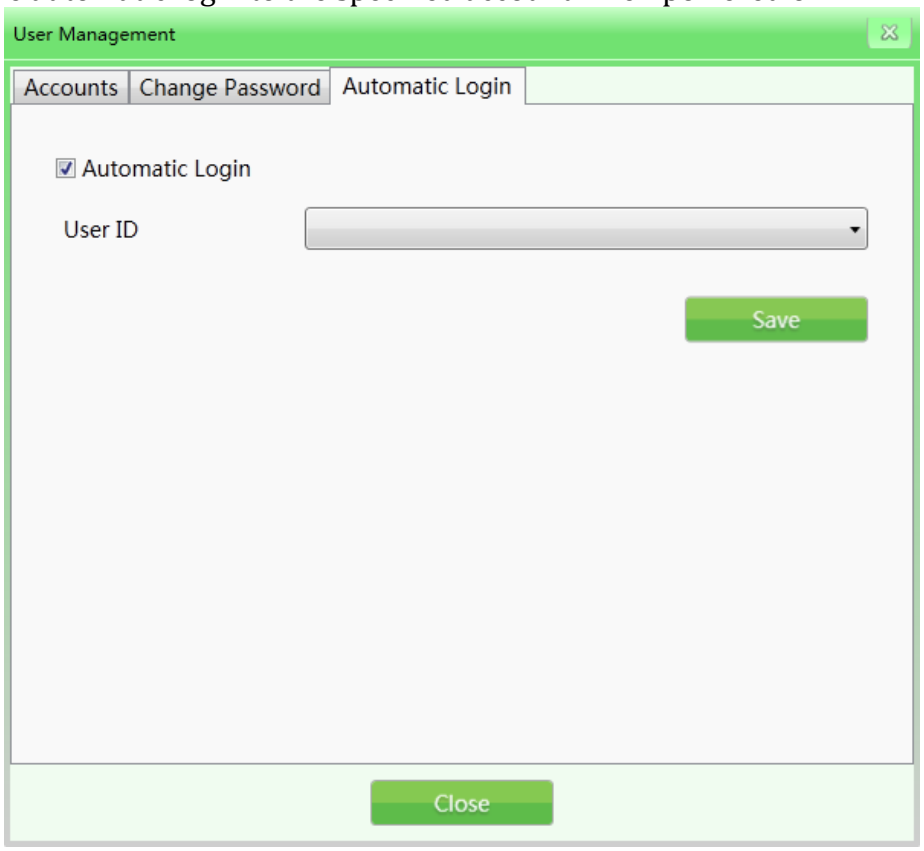


Fig. 4-24 Auto-login

4.9 Managing Logs

This function is available to administrators so that they can access reports, statistics, operator work results. Management includes: three types of logs, such as "Startup Log", "Session Log" and "Emission Log". You can request operator work data to assess compliance with work requirements.

4.9.1 Launch log

Device Operation Time Record: You can request data by week (per year), month (per year) and season (per year). Static time indicates the start time of each period.

Export Records: The user can select one or more records to export. The data will be transferred as a CSV file. Example: Enter the statistical period - day (per month), 2017-08-14, then click "Export" to get the results. See the figure below.

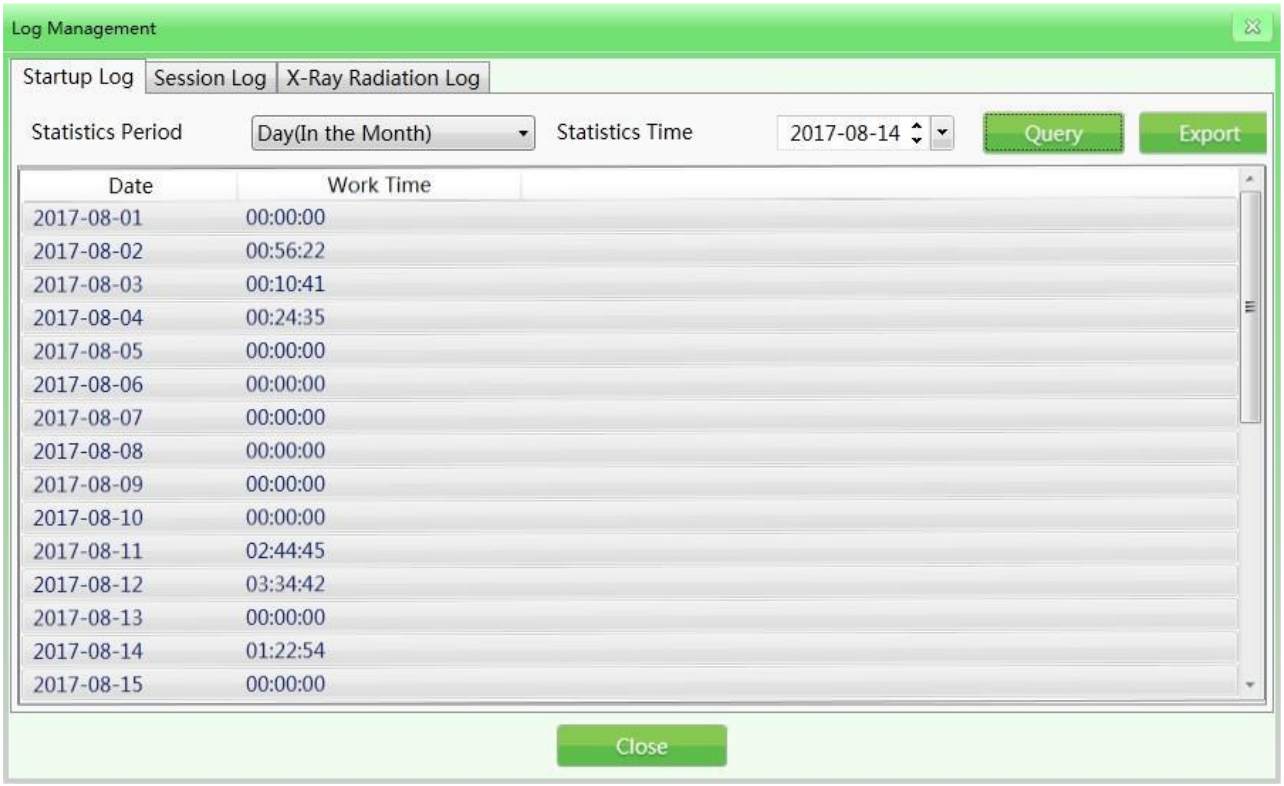


Fig. 4-25 Startup logs

4.9.2 Session log

Specify the operator as a unit, get the working time data of each operator. The system will record the start and end time of each operator's working period.

User ID: select a specific user by ID, or select all users.

Period Statistics: Same as the startup log. The work log can also be searched by day, week, month, year. (Example: 2017-08-14, select all users and time in the period statistics, click "Query" to get the results. See the figure below)

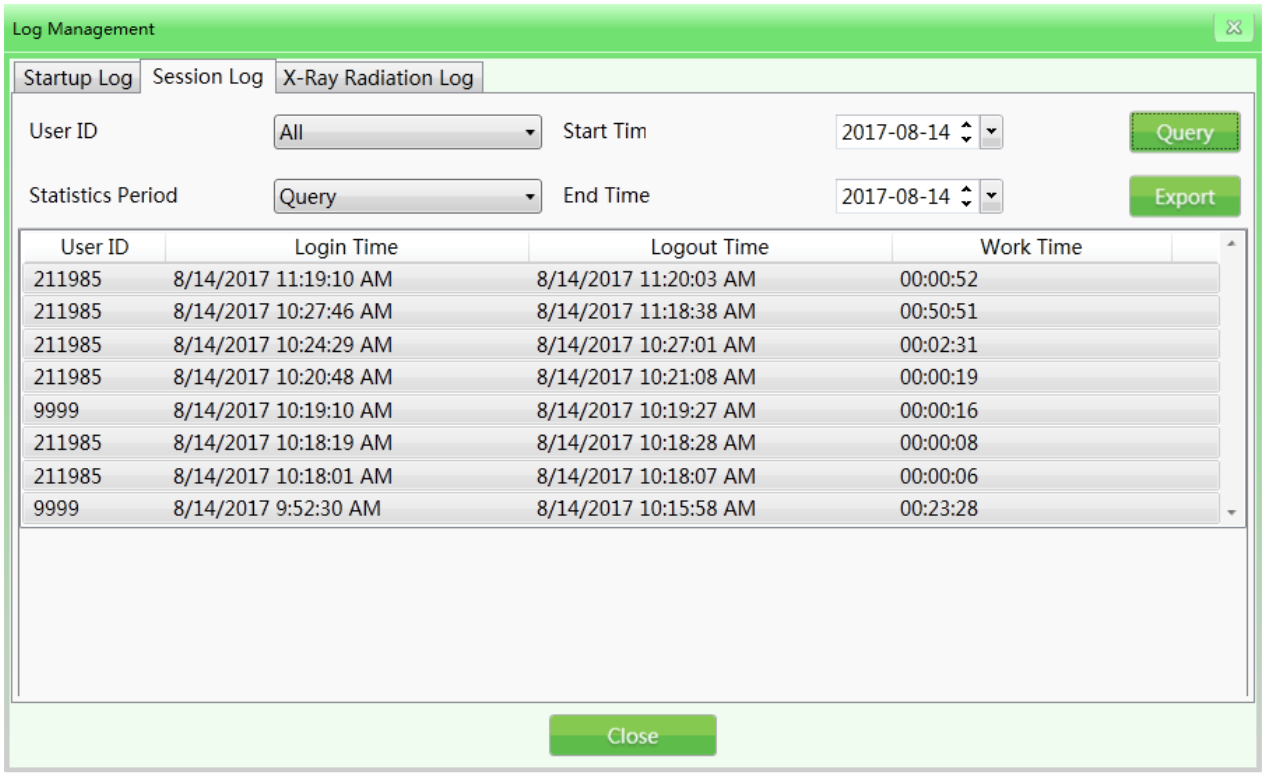


Fig. 4-26 Session Log

4.9.3 Radiation Emission Log

Concerns the operation of the radiation generator. Get records of the generator operation in a given period to track the generator operating conditions. Select the required records from the query result for export. The data export operation was described above..

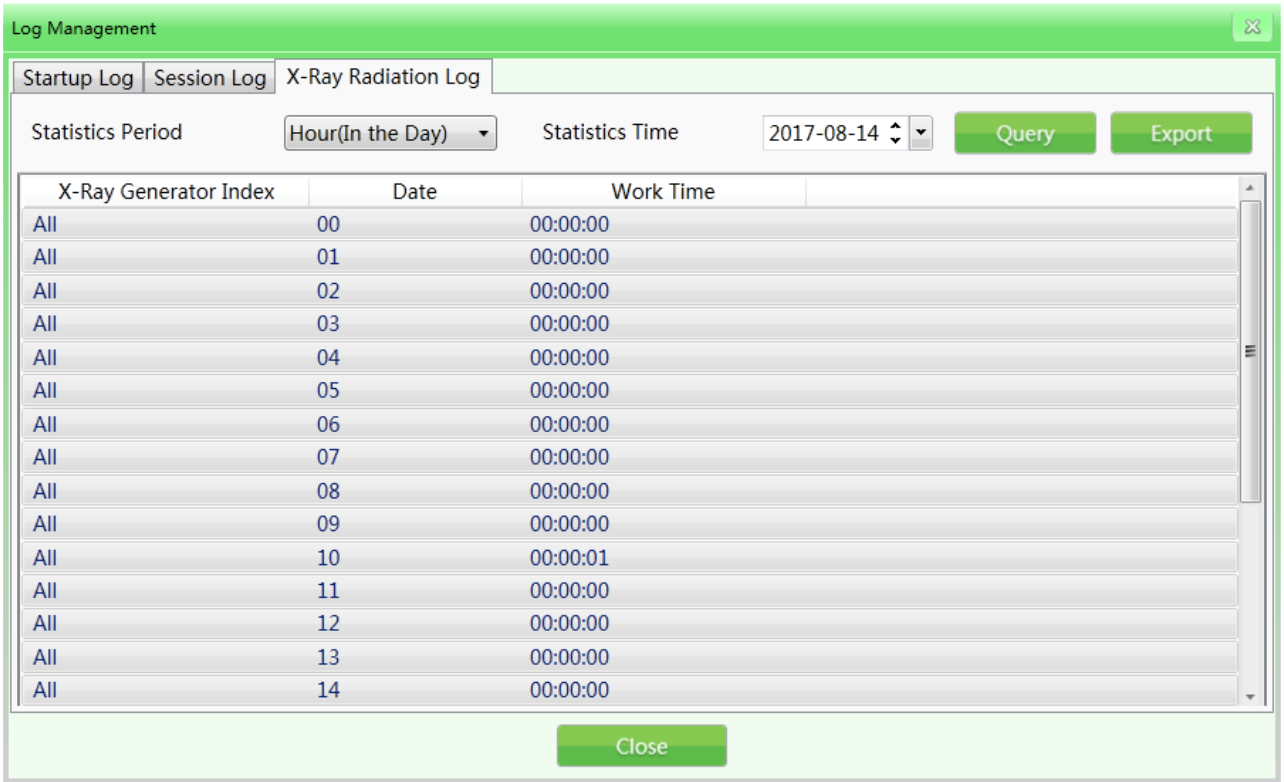


Fig. 4-27 Radiation Emission Log

4.10 TIP(Threat Imitation Training)

Based on the relevant parameters set by the administrator, the system can automatically install the images of the baggage containing dangerous goods into the images of the scanned items or install dangerous goods of different types into the real images of the checked items. Like the normal images, the TIP images will be automatically saved by the system. From the statistical report of the system, the administrator can know the exact time of identification and omission of the installed image of the dangerous goods by each operator. In this way, the administrator can track the training level and efficiency of each operator.

TIP objectives:
1) Increase the vigilance of operators, prevent operators from losing detection skills due to the absence of real dangerous objects during a long period of inspections.
2) Test the ability of operators in reading images of scanned objects.

TIP procedure:

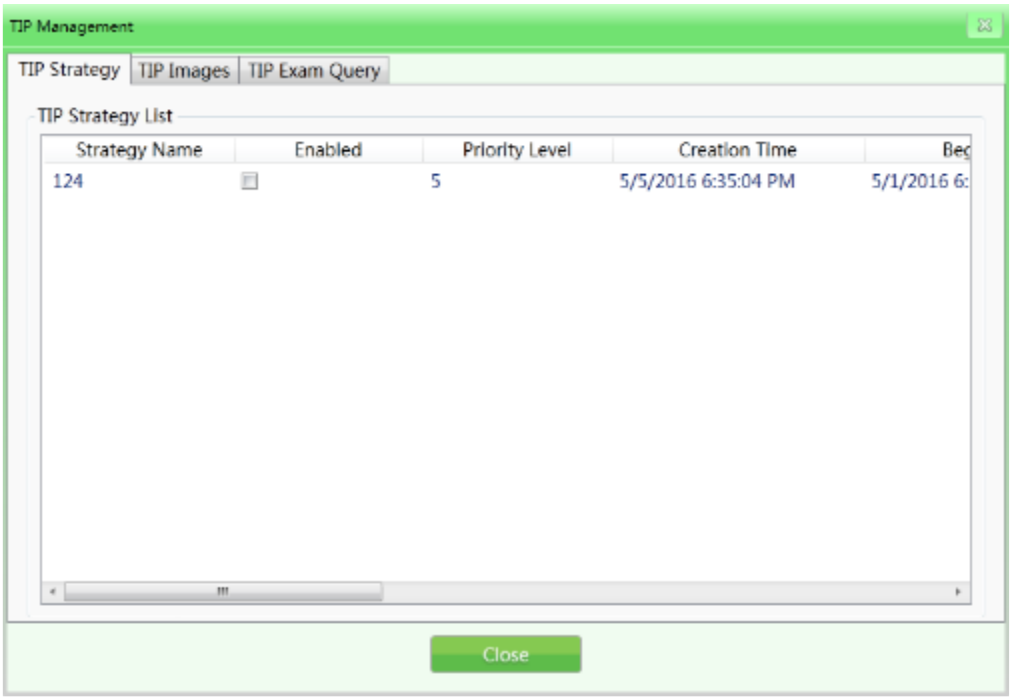


Fig. 4-28 TIP interface

Log in as administrator, set the TIP strategy and default evaluation indicators. When the operator detects a dangerous item, he should press the Stop key to stop the conveyor first, then press the Mark key on the special keyboard or the P key on the normal keyboard, then the system will record the operator's successful identification of the item. If the operator does not detect the TIP image of the dangerous item, the system will immediately prompt "You missed the test image!" This error will also be recorded. The TIP messages are shown in the figure.

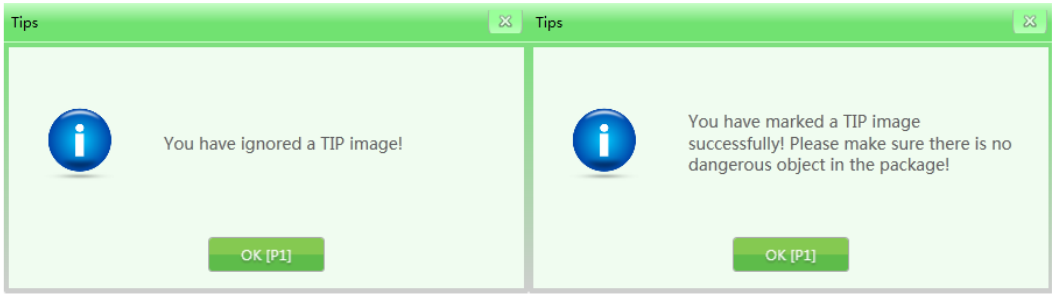


Fig. 4-29 TIP messages

4.10.1 TIP strategy

The strategy generation function helps to set the basic TIP information and simulation aspects. Basic TIP information: Strategy name, priority (1-10), start time, end time, user role, projection percentage, non-stop inspection and static inspection. As shown in the figure:

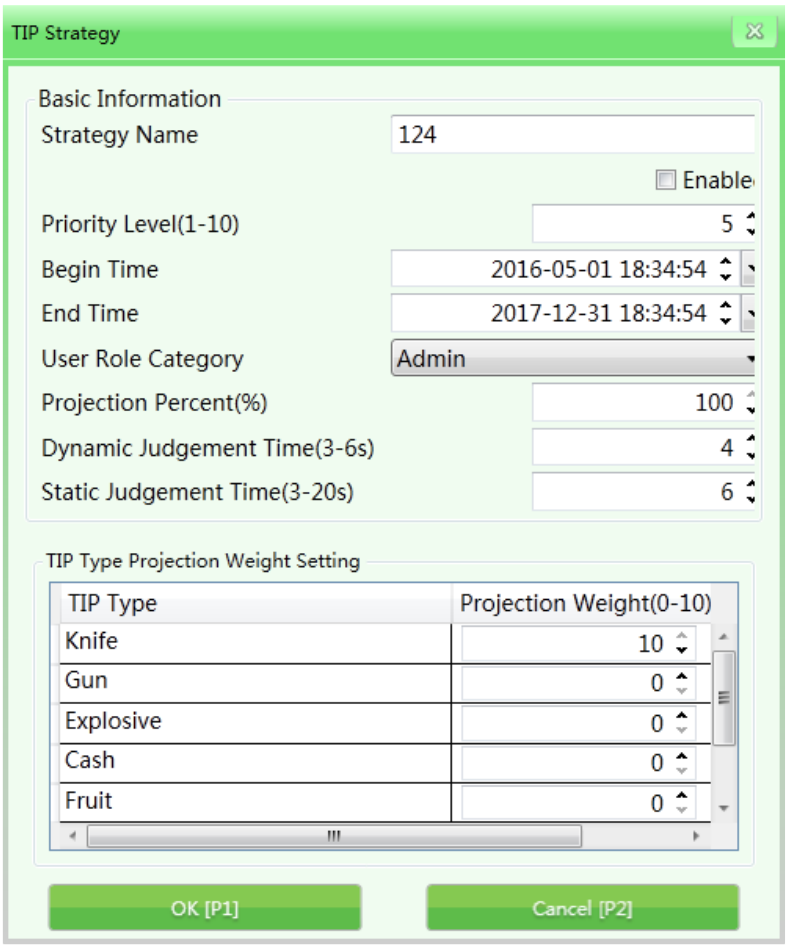


Fig. 4-30 TIP strategy

Strategy Name: Assign a strategy name according to your own requirements;
Activation: Turn on/off the strategy, the "√" checkbox will mean that the strategy is enabled, the following settings are available only when the strategy is enabled;
Priority: The administrator sets the priority levels (from 1 to 10, where 1 is the lowest priority). Items with the highest priority will be rated higher;
User Category: Select the operator or administrator;
Simulation Projection Percentage: reflects the percentage value of the TIP image implementation.
Non-stop inspection: during the movement of images, if dangerous TIP elements have been implemented, the period of time from the appearance to the disappearance of dangerous TIP elements is defined as dynamic decision making (it is necessary to determine whether the elements are dangerous within a short period of time) non-stop inspection;
Static inspection: when the images are not moving, if dangerous TIP elements have been implemented, the period of time from the appearance to the disappearance of dangerous TIP elements is defined as static decision making;
Imitation weight: It mainly distributes the weight to different types of TIP elements during use. The main types of TIP elements are: "knife", "gun", "explosives", "cash", "fruit".

4.10.2 TIP Images

TIP images are listed in the gallery from which they will be embedded in the scanned items. Open the image in the corresponding list to view the image.
Export: Users with rights can export TIP images as normal (export format - ZKX);
Import: Users with rights can import TIP images (only in ZKX format);
Delete: Users with rights can delete the selected TIP images by clicking "Delete".

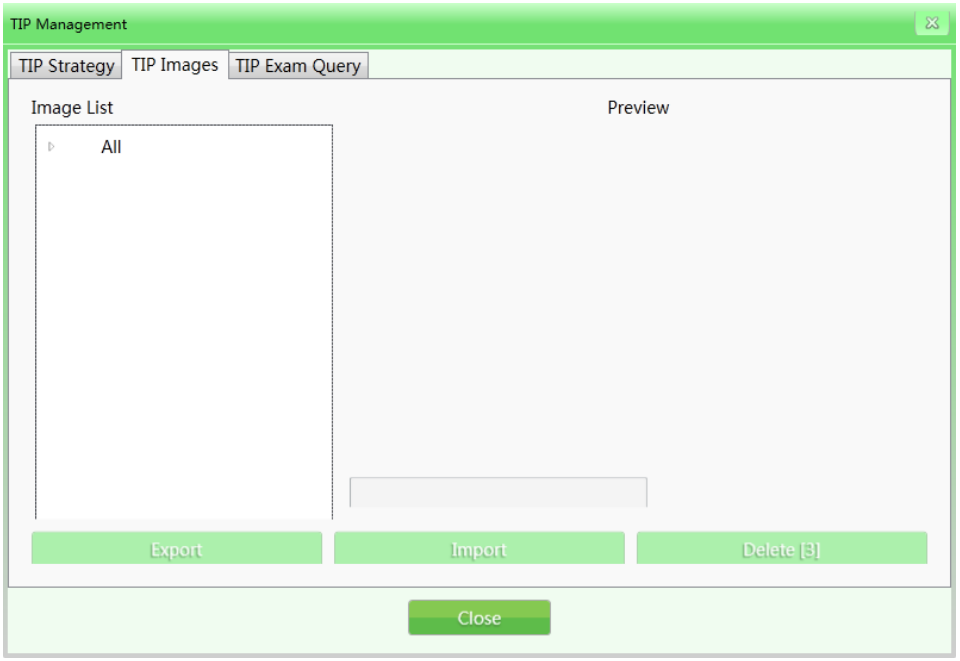


Fig. 4-31 TIP Image Interface

4.10.3 TIP Examination

The function generates a query about the TIP element implementation process, information such as “User Name”, “Date”, “Number of Scanned Baggage”, “Image Skip Time”, “Image Mark Time” and “TIP Element Implementation Time” and allows you to export this information by clicking “Export”. The result of TIP training will be displayed in the log.

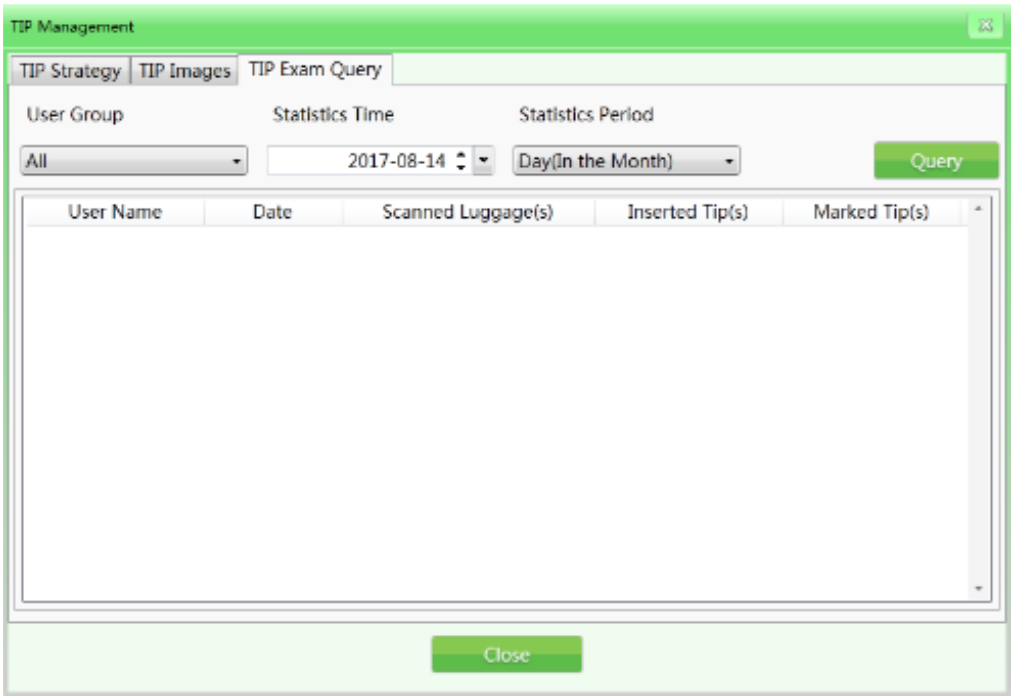


Fig. 4-32 TIP examination

4.11 Training

After running the training function, the administrator can train operators to read images. The training function is used to train and evaluate the ability of operators to detect dangerous and prohibited elements. Training does not require running the conveyor and X-ray generator, the simulation of the scanning process and displaying a series of images on the screen will be launched from among the images saved by the administrator on the disk (IPC). The interface of the Training window has the sections Setting Parameters on the left and Control Panel on the right.

4.11.1 Setting parameters

Click “Training” in the main menu to open the training interface as shown in the figure.

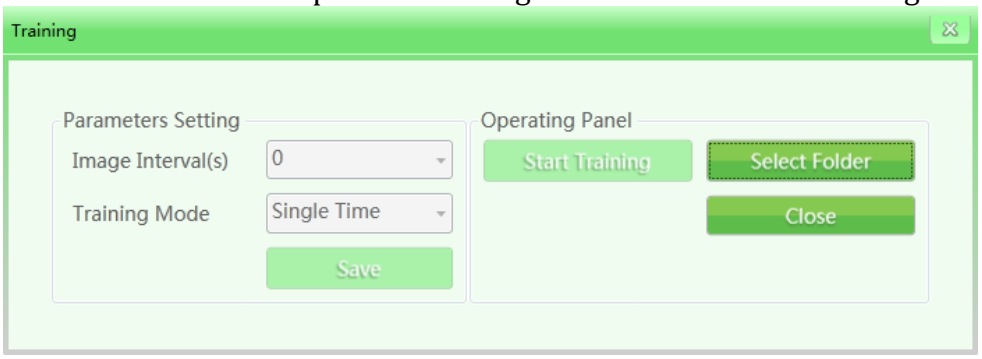


Fig. 4-33 Setting up a workout

Interval between images: Set the interval between the displayed images. Select "Image Interval" with the cursor and manually set the interval as "1", "2" or any desired interval. The intervals are possible from 1 to 120 seconds.
Training mode: To set this function, you will need to select from the drop-down list: "Single", "Cycle", "Random cycle" one of these modes. The operator can also set the training mode based on specific needs.

4.11.2 Control Panel

By clicking the "Select Folder" button, you can manually specify the image gallery for training.
Please note: If the TIP function is activated, all training results will be recorded in the system. The system will receive statistical data on the number of TIP trainings and TIP data of all users. The administrator can check this data in the TIP request.

4.11.3 Training process

Step 1: Specify the folder with the luggage images.
Step 2: Set the parameters (the "Save" button to finish the installation).
Step 3: Click "Start Training". The training window can be closed, it can be restored (the icon that shows the training process is running).
Step 4: Press any conveyor operation key (in the training mode, this action will not start the real conveyor mechanism) or the image dragging button in the center, images will appear according to the set parameters of the scanning process simulation.
Step 5: When suspicious items are detected, you need to press the "Stop" key and the "Mark" key on the special keyboard to mark the image.
Step 6: If you want to finish the training, stop the conveyor and finish the training through the menu or with the right mouse button.

4.12 System settings

The administrator has access to these functions: smart detection, keyboard settings, counter settings, and others.

4.12.1 Intelligent Detection

This section is to set “High Density Warning” and “Drug and Explosives Screening”; the initialization mode and sensitivity can be set separately (when “√” is activated, the “High Density Warning” warning frame will be red, and the “Drug and Explosives Screening” warning frame will be purple. The sensitivity can be further calibrated in the range of 1-5, where 5 is the highest sensitivity); when “Alert Frame Blinking” is set, the frame will blink continuously to give an alarm signal.

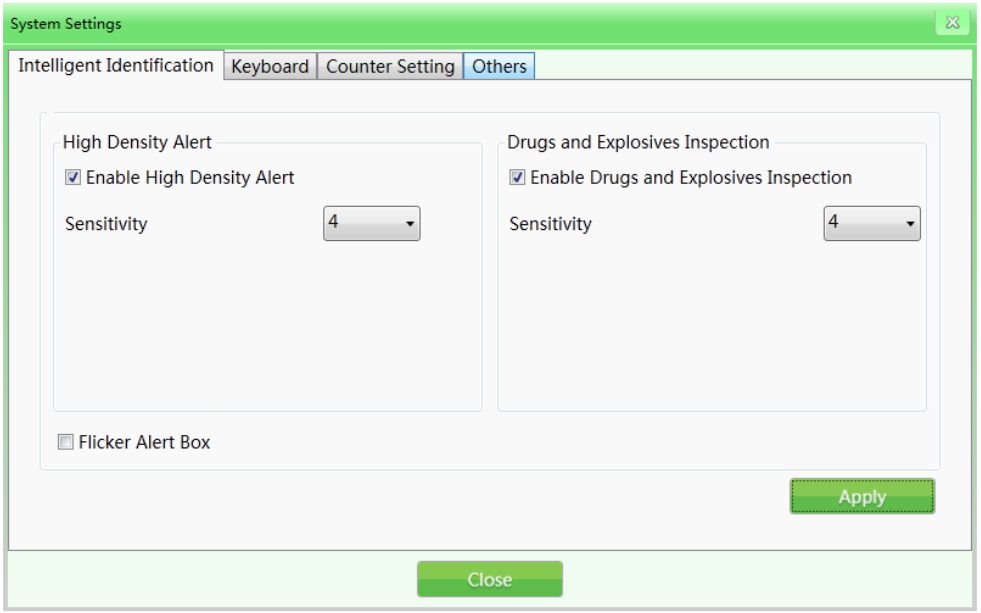


Рис. 4-34 Интеллектуальное обнаружение

4.12.2 Keyboard

Function keys (shortcuts): When you need to set the image processing combination keys, click the "Keyboard" tab in the system settings. Then select the corresponding image processing combination function from the drop-down list based on your specific needs.
Shortcut Key Options
Color + Detail
B&W + Detail
Color + Invert
B&W + Invert
Color + Deep Scan
B&W + Deep Scan
Color + Surface Scan
B&W + Surface Scan
Toggle between B&W and Color
Restore

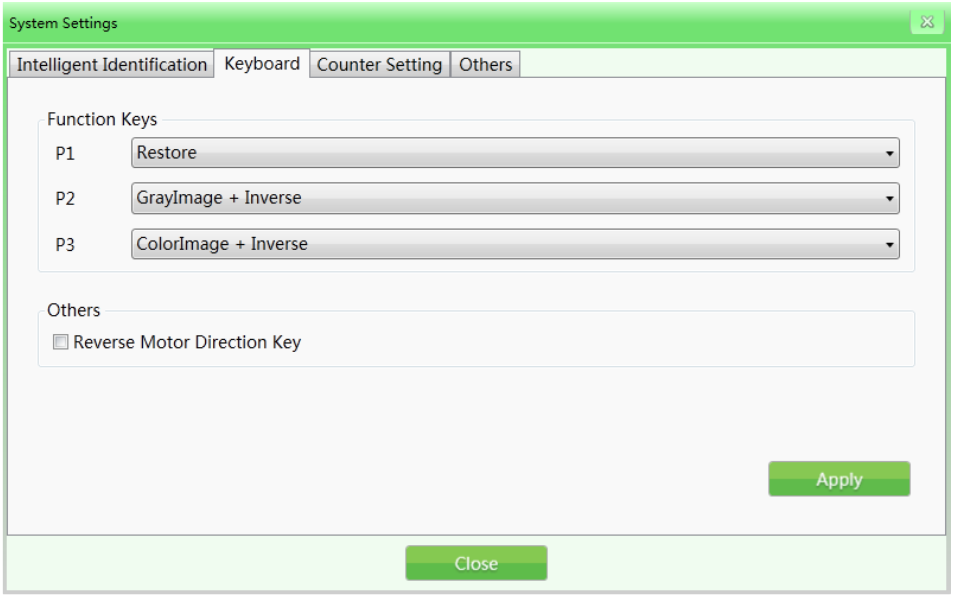


Fig. 4-35 Keyboard

Reverse Conveyor Movement: The standard installation of the equipment assumes that the conveyor operates in the forward direction (the position of the marking - the direction from "inlet" to "outlet" is the "forward direction"). The direction of the conveyor can be changed if the user requires it.

4.12.3 Setting up counters

If the operator needs to know and record the number of checked bags, he can check the "Baggage Counter" indicator in the status panel or in the "Counter Settings" tab.
Total Baggage Counter: Shows the total number of checked bags. The readings cannot be reset.
Last Baggage Counter: Shows the number of checked bags for this session since the user logged in.

Please note: The operator can choose which indicator to display in the status panel. The choice will immediately be reflected in the numerical indicator in the status panel.

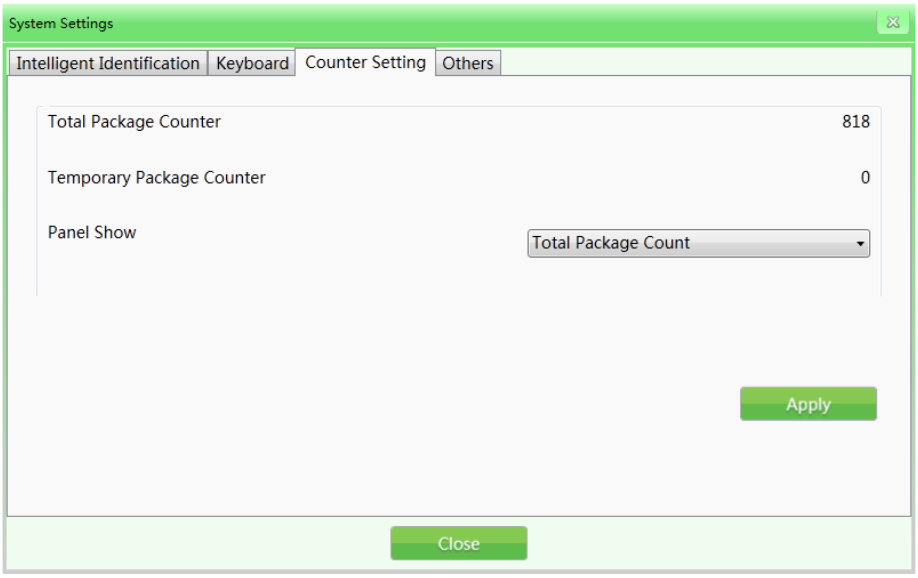


Fig. 4-36 Counter settings

4.12.4 Other

Date: When you need to set the time and date, click "Date" to set the local time. Time Zone: You can set the local time by these parameters.
Daylight Saving Time: You can set the daylight saving time parameters if applicable to your area. This function is disabled by default.
Power Saving Mode: This function allows you to set the mode when the device's motor is automatically turned off at the end of each single scan.

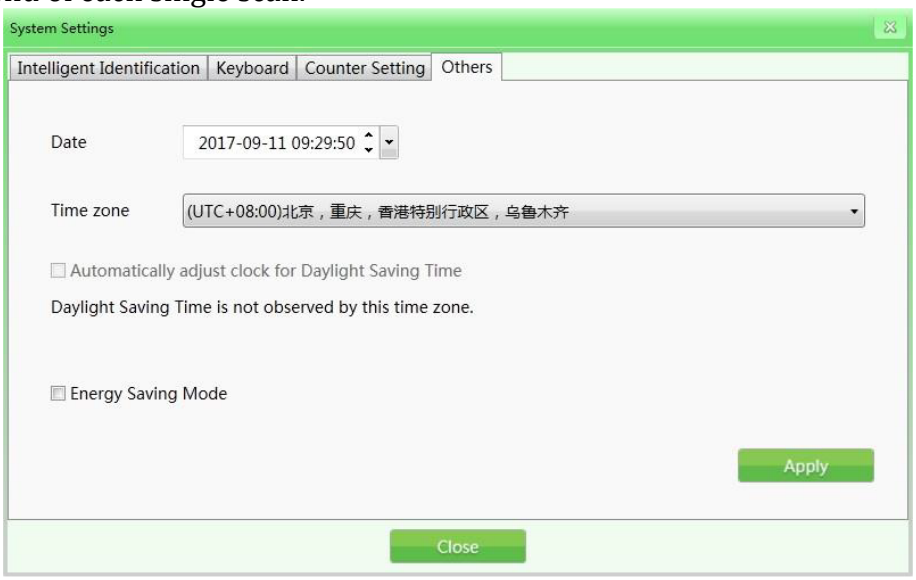


Fig. 4-37 Other

4.13 System information

Includes performance statistics and current configuration.

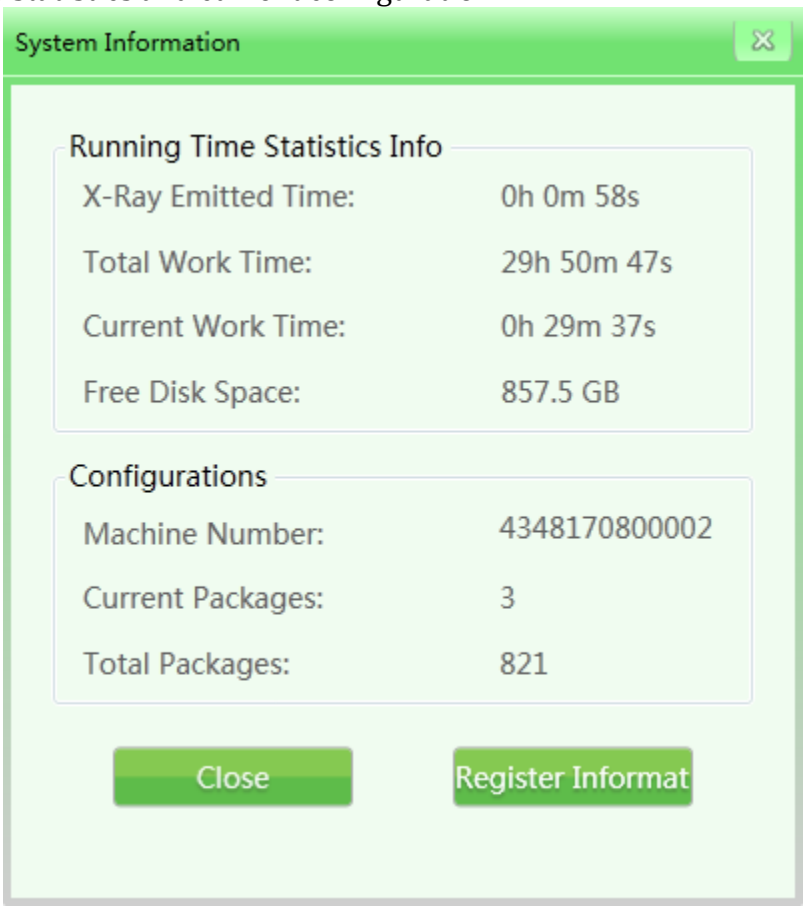


Fig. 4-38 System information

4.14 Exit and shutdown

Logout: Log out for an individual user. Power Off: Power off the device.

Please note: You need to turn the key to the “Off” position and wait until the green operation indicator goes out, which means the system is completely turned off.

5 Maintenance

The introscope is a complex mechanical and electronic product. Therefore, the user should always be guided by the principle of preventing malfunctions first. The user should not only familiarize himself with the technical characteristics, software and operating procedure of the equipment, but also effective daily, weekly, monthly, quarterly, annual maintenance, which is one of the important factors that allows you to properly operate this equipment. This section is devoted to technical maintenance.

Matters requiring attention during maintenance
1) The equipment should be installed in a ventilated, dust-free and dry place. High temperatures, high humidity and direct sunlight should be avoided.
2) Clean dust from the equipment before use.
3) If components, cables and connectors are loose or poorly connected, be sure to secure them.
4) Do not allow foreign objects or liquid to enter the equipment during maintenance to avoid electric leakage or accidents.

5.1 Daily maintenance

Please note: Disconnect the equipment from the power source during cleaning.

5.1.1 External surface of the equipment

After a long time of operation, the outer surface of the equipment, control panel, display screen and other parts may be covered with dust, stains, etc. In order to ensure the normal operation of the equipment, the outer surface of the equipment should be cleaned regularly.
Wipe the following surfaces with a damp cloth:
1) The surface of the side walls and top cover of the equipment;
2) The protective walls on both sides of the conveyor, under the conveyor itself, etc.;
3) The surface of the conveyor belt;
4) The ventilation hole;
5) The surface of the control panel.

5.1.2 Display, photoelectric sensor and control panel

1) During daily use of the equipment, the surface of the display and fingerprint reader may be covered with dust, traces that will affect the work of operators when reading images and identifying objects. The display screen (in the off state) can be cleaned with a damp cloth and detergent.
2) When the photoelectric sensor is blocked or clamped, the radiation source will always be in a state of emission. If the radiation indicator is on but no image appears on the screen, the cause of the malfunction may be the hole section of the photoelectric sensor covered with dust or dirt. In this case, you can use a brush to clean the hole, and then vacuum the part.
3) Open the back panel of the console with a triangular key and clean the dust clumps inside with a brush or vacuum cleaner.

5.1.3 Photoelectric sensor

Start the equipment and place the luggage on the conveyor for inspection. If the item images are clearly displayed on the screen, the photoelectric sensor is functioning normally.
If the item images are not displayed on the screen properly or the image is unstable, please clean the hole area and the surface of the photoelectric sensor. Check again.
If the images are still not displayed normally, please contact the service organization for consultation and repair.

5.1.4 Conveyor check

After a long period of operation, the conveyor belt may shift. Since the weight and position of the objects are uneven, this may cause the conveyor belt to deviate from its center position. In this case, consult a service organization for maintenance and repair.

5.1.5 Inspection of curtain at entrance and exit

If the gaps between the strips of lead curtain are too large or the curtain is damaged and falls off, contact a maintenance service organization for advice and repair.

5.2 Monthly Check

5.2.1 Inspection of the Emergency Button

The emergency stop buttons at the entrance and exit of the equipment tunnel and the special keyboard are extremely important safety features. When the equipment is inspecting items normally, when the emergency stop button is pressed, the conveyor stops immediately and the X-ray indicator lamp goes out, indicating that the emergency stop button works well. Later, restore the emergency button and press the start button, the screen displays the status of "normal", then the emergency stop button returns to its original position. If there is any abnormality in the emergency stop button, please contact the service organization for consultation and repair.

5.2.2 Photoelectric sensor

Start the equipment and place the luggage on the conveyor for inspection. If the item images are clearly displayed on the screen, the photoelectric sensor is functioning normally.
If the item images are not displayed on the screen properly or the image is unstable, please clean the hole area and the surface of the photoelectric sensor. Check again.
If the images are still not displayed normally, please contact the service organization for consultation and repair.

5.3 Quarterly inspection

5.3.1 Inside the equipment

The inside of the equipment is extremely important, as it includes the industrial personal computer (IPC), electrical control panel, ventilation, detection box and other important parts. When cleaning the inside daily, it is recommended to remove the dust clumps with a brush or vacuum cleaner.
1) Computer;
2) Electrical control panel (please remove the cover) and the device terminal.
3) Ventilation and switch;
4) Generator and detection box - only the surface, do not open the parts or fasteners.

5.3.2 Inspection of indicators

If the X-ray indicator (red) or power indicator (green) does not light while the equipment is operating, contact your service provider for consultation and repair.

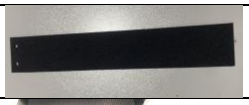
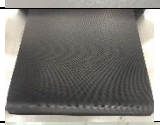
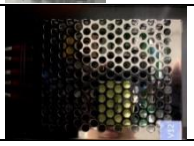
5.4 Annual inspection

At least once a year, check the radiation monitoring area: at a distance of 5 cm from the surface of the device using an external radiation dosimeter.

Place of measurement		Measurements should be taken at a distance from the surface of the device, cm	ZKTECO test result, μGy	Single dose of radiation during device inspection, μGy
At the entrance to the tunnel		5	0,39	< 5
At the exit of the tunnel		5	0,39	< 5
On 2 side surfaces		5	0,07	< 5
Console table		> 5	0,07	< 5

The results of the inspection should be recorded in the annual inspection log.
In case of problems with our equipment and hardware, please contact the service organization for consultation and repair.

5.5 Recommended periods for scheduled preventive maintenance

	Name of types of work	EPR Code for ordering	Photo	Recommended timeframes
1	General cleaning			Twice a year
2	Cleaning the photoelectric switch and through hole			Twice a year
3	Replacing the Cooling Fan Dust Shield	100003302		Twice a year
4	Replacing the cooling fan	100006967		Once every 10,000 hours.
5	Replacing the equipment mounting screws	100009192		Once a year
6	Replacing a lead curtain	100007405 100007406		Once every 10,000 hours.
7	Conveyor Belt Replacement	100007421		Once every 20,000 hours.
8	Replacing the support roller	100006961		Once every 20,000 hours..
9	Replacing the driven roller	100026287		Once every 20,000 hours..
10	Replacing the roller motor	100003906		Once every 30,000 hours.
11	Replacing the X-ray generator	100007260		Once every 30,000 hours.
12	IPC Motherboard Replacement	100004042		Once every 20,000 hours.
13	IPC Hard Drive Replacement	100021535		Once every 30,000 hours.
14	Contactor replacement	100004889		Once every 30,000 hours.
15	Replacing the relay	100004785		Once every 30,000 hours.
16	Replacing the pulse power supply	100006765		Once every 30,000 hours.

17	Replacing an air circuit breaker	100006740		Once every 30,000 hours.
18	Replacing the detection board/transmission board	100010175		Once every 30,000 hours.
19	Replacing a photoelectric switch	100001065		Once every 20,000 hours.
20	Replacing the indicator	100001067(red) 100001068(green)		Once every 30,000 hours.
21	Replacing the emergency stop and stop button	100004890(button) 100003300(button shell)		Once every 30,000 hours.

5.6 Storage conditions

1) Dismantling the equipment for transportation requires a set of actions that are the reverse of the installation process of the equipment.

2) The equipment should be stored in clean and dry places, high temperature or humidity may cause damage to the system parts. If the equipment is not used for a long time, it should be stored in special packaging.

3) The equipment that needs to be stored for a long time should be packed and stored well in a clean, dry and well-ventilated room where there should be no corrosive gases, and the relative humidity should not exceed 80%.

4) According to the Regulations on Measures to Ensure the Safe Approval of Radioisotope and Beam Devices of the People's Republic of China, this equipment belongs to Type III X-ray device. If necessary, we suggest our customers to jointly supervise the work with the local competent authorities for environmental supervision.

5) When the equipment needs to be disposed of, please contact the relevant service organization or local competent authorities for clarification of the methods.

5.7 Troubleshooting

This section presents malfunctions that may occur, their causes and troubleshooting methods. If there are problems that require a more serious solution, please contact the manufacturer for advice and repair.

Maintenance of this equipment can only be performed with the appropriate components and spare parts manufactured by our company and under specific conditions. In the event of machine failure due to improper maintenance or equipment damage caused by the use of third-party spare parts not provided by our company, our company will not bear any responsibility.

Error 1: The equipment does not start by pressing the button

1) If the equipment does not boot normally, please make sure the power cord plug is connected correctly. First check the power supply voltage (the AC power supply voltage should be 200V-240V); if there is no voltage or the voltage is abnormal (not within 200V-240V), please report it to the responsible department to solve the problem until the power voltage returns to normal.

2) If the power voltage is normal but the equipment still does not boot, please check the connection terminals 1 and 3 to see if there is 200V-240V voltage between the two terminals.

3) Check the switch on the equipment to see if it is off or not. Check the fuse, it may trip. If this happens, please replace it.

4) If the connection at the control line jack (DB15) on the dedicated keyboard is loose, please reconnect the control line and check the equipment whether it is booting normally.

Error 2: The conveyor does not move

1) If this happens, check if one of the "emergency stop" buttons (the emergency button on the machine and the control panel respectively) is pressed; if so, turn the button clockwise and release the button, then press the "Start" button to start the conveyor.

2) If the conveyor belt still does not work and the "Emergency Stop" status is displayed, check the two "micro switches" on the equipment. When the two "side panels" on the equipment are secured, the "micro switches" will operate. If
the "micro switches" do not operate due to the lack of any one of the "side panels", this will also cause the "emergency stop" to operate. Secure the side panels, then press the "Start" button to start the conveyor.

3) If the screen shows the status "Normal emergency stop", check the "anti-overload protector" DZ108-20 of the conveyor to see if it is triggered (means overcurrent to the motor cylinder, which is usually caused by excessive load (weight of luggage)). If this happens, reset it manually (press the white button on the DZ108-20), and the conveyor should start normally.

Error 3: "Self-diagnostic system error" on the screen

1) Situation 1: The system displays the status of "Receiver Connection Error".
This is usually caused by a power failure on the "transmission board" (inside the small metal box next to the "L-shaped shelf"). Check the power plug on the "transmission board", if it is loose or not connected correctly, then reconnect the power plug. Check the transmission line plug to make sure it is in good condition, reconnect this cable and the cable plug on the IPC board.

2) Situation 2: The system displays "Control Panel Communication Failure".
This is usually caused by a data line failure between the control panel and the industrial motherboard. Check the data line plug (DB9 plug) of COM1 port on the industrial motherboard and the data line plug (white plug of line 3) of J3 port on the control panel, if they are loose or not connected correctly, reconnect the data line plugs at both ends.

Error 4: Keys on the special keyboard do not work

If the equipment boots normally with the key and start button on the dedicated keyboard, but the conveyor control or image processing keys do not work, the failure is caused by a communication problem with the data line on the COM2 port. Check the data line plug (DB9 connector) on the COM2 port of the industrial motherboard.

Error 5: Incorrect radiation

If the conveyor works normally but the radiation is not projected correctly, the screen will not display images. Please check the ON / OFF XRAY_ON POWER indicators on the X-ray controller to make sure the indicators light up normally (repeat the emergency stop process). Then press the emergency stop button and check whether the connection of the INTERFACE and POWER connector is loose, if so, please reconnect the control line and check whether the equipment boots up normally.

Error 6: Power failure

First, disconnect the power line, then check the switch. Turn the switch to the "Off" position. You should wait for one minute, reconnect the power line, and then reboot the device as usual. At this point, the computer will start Windows OS, the troubleshooting procedure or normal startup may begin.
If you start the login from troubleshooting, you must use the external keyboard of the PC to enter the software interface.
In case of normal startup, go directly to the ZK software.