

VetiX P8

VETERINARY DIGITAL RADIOGRAPHY SYSTEM

Operator's Manual

Version History

Version	Revision History	Date of Implementation
V1.0	Preparation of the initial version	June 15, 2021

First of all, thank you for purchasing this product of Shenzhen Mindray Animal Medical Technology Co., Ltd. Before using the equipment, please read through this manual carefully so that you can use it correctly according to instructions. This manual is an attached document of the equipment. Please store it with the equipment, and regularly review the operation steps and safety requirements in the manual.

Product name: Veterinary Digital Radiography System

Model/specification: VetiX P8

The manual is subject to update without notice due to changes to software, system design, or technical specifications. The latest product functions, configuration, and physical object should prevail.

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-  **Danger:** indicates that the failure to pay attention to or avoid this state or situation will cause severe personal injury or even death.
-  **Warning:** indicates that the failure to pay attention to or avoid this state or situation will cause severe personal injury or severe loss of equipment or data.
-  **Caution:** indicates that the failure to pay attention to or avoid this state or situation will cause personal injury or loss of equipment or data.
-  **Note:** reminds the reader of relevant facts and situations. Notes refer to important information that should be learned, but they are not necessarily related to possible personal injury or equipment damage.

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5. Malfunction of the instrument or part which serial number is not able to be identified clearly.
6. Others not caused by instrument or part itself.

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1 Overview

1.1 Product Description

The veterinary digital radiography system (VetiX P8) is equipment that acquires X-ray images through a flat panel detector and transmits them to a computer to form data images that can be processed. It specially applies to X-ray radiography of pets, and can meet the requirements of pet hospitals for pet radiography, including dogs, cats, and small animals. Positioning operations are fast and convenient.

1.2 Applicable Scope and Contraindications

Requirements of pet hospitals for pet radiography, including dogs, cats, and small animals.

Contraindications: None.

1.3 Composition Structure

The product is composed of the main parts such as the Veterinary Portable Generator, radiography rack, radiography table, flat panel detector, and the acquisition workstation.

The following diagram shows the overall unit:

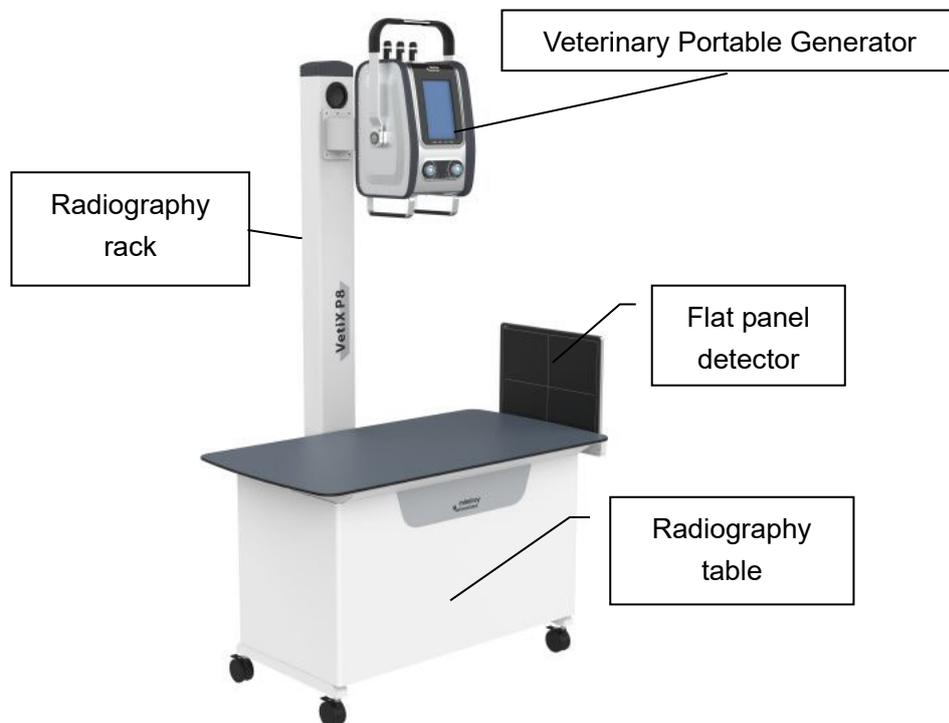


Figure 1-1 Overall Unit

The acquisition workstation is installed in the operation room outside the shield room (in a non-sick pet environment); the flat panel detector, Veterinary Portable Generator, radiography table, and the radiography rack are installed in the shield room (in a sick pet environment).

1.4 Technical Parameters

Configuration		VetiX P8
Power supply requirements	Input voltage	Single phase 220 V
	Power frequency	50/60 Hz
	Power supply capacity	≥ 3.5 kVA
Mechanical properties	Rack model	P8-J1TT
	Column height	1920 mm, with an error of ±5%
	SID	1050 mm±5%
	Table dimension	1200 mm × 650 mm, with an error of ±5%
	Table height	730 mm, with an error of ±5%
	Table movement	Separable movement of the radiography table, with four casters that can be fixed
	Nominal bearing capacity of table surface	60 kg
	Rack weight	89.4 kg
DR system	High voltage generator model	VHG-8TT
	Output power	8.0 kW
	Nominal electric power	8.0 kW (100 mA, 80 kV, 0.1s)
	Maximum output power	8.0 kW (100 mA, 80 kV)

	Tube voltage/kV	40 kV to 125 kV digital key adjustment, with the minimum adjustment step of 1 kV and a deviation $\leq \pm 10\%$
	Tube current/mA	3.2 mA to 160 mA; select a value of R'10 numerical system in GB9706.3, and press the numeric key to adjust the value by step, with a deviation $\leq \pm 20\%$
	Loading period/ms	1 ms to 10000 ms; select a value of R'10 numerical system in GB9706.3, and press the numeric key to adjust the value by step, with a deviation $\leq \pm(10\% + 1 \text{ ms})$
	Current time product/mAs	0.1 mAs to 250 mAs; select a value of R'10 numerical system in GB9706.3, and press the numeric key to adjust the value by step, with a deviation $\leq \pm(10\% + +0.2 \text{ mAs})$
	Combination at the maximum mA	40 kV, 160 mA, 50 ms
	Combination at the maximum kV	125 kV, 40 mA, 40 ms
	Weight	21 kg
	Dimensions	310 mm \times 267 mm \times 465 mm (L*W*H)
X-ray tube	Nominal tube voltage	125 kV
	Target material	Tungsten
	Target surface angle	25°
	Maximum filament current	4.5 A
	Maximum filament voltage	7.5 V to 8.5 V
	Anode heat capacity	30 kJ (42 KHU)
	Weight	1.2 kg

	Inherent filtration	0.65 mmAl (75kV)
	Focus nominal value	2.6 mm
Collimator	Power supply	DC/AC 12 V
	Positioning light	LED 10W
	Lighting delay time	30s±2s
	Minimum radiation field	0 cm × 0 cm at SID = 1000 mm
	Maximum radiation field	> 45 cm × 45 cm at SID = 1000 mm
	Inherent filtration	1.2 mmAl@75 kV
	Illuminance	≥ 100 Lux
	Weight	3.3 kg±0.3 kg
Flat panel detector	Flat panel detector model	DET-4336TT
	Image size	430 mm × 360 mm
	Acquisition matrix	2496 × 3040 pixels
	Spatial resolution	3.4 lp/mm
	Protection grade	IPX4
	Surface bearing capacity	Entire surface: 135 kg; central 40 mm-diameter area: 100 kg
Workstation	Screen size	23.8 inches
	Panel type	IPS
	Pixel spacing	0.2745 mm × 0.2745 mm
	Resolution	1920 × 1080
	Brightness	≥ 250 cd/m ² (standard value)
	Screen ratio	16:9
	Processor	Intel®Core™ i3 processor or above
	CPU dominant	≥ 1.4 GHz

	frequency	
	Memory	≥ 4 GB
	Hard disk capacity	≥ 500 GB
	Operating system	Windows 10
	Network interface	Gigabit Ethernet interface
	Image processing system: Veterinary Workstation (short name: VET-DR)	
	Network communication in compliance with the DICOM 3.0 standard	
Operating environment requirements	Relative humidity	30% to 75% (no condensation)
	Atmospheric pressure	700 hPa to 1060 hPa
	Ambient temperature	10°C to 40°C
Transportation and storage conditions	Relative humidity	30% to 93% (no condensation)
	Atmospheric pressure	700 hPa to 1060 hPa
	Ambient temperature	-20°C to 55°C

2 Safety and Regulations

This manual is intended to guide the user to use the X-ray equipment in a safe manner. The X-ray equipment must be operated in strict accordance with the safety instructions in this manual, and cannot be used for any purposes not specified in the design. The operator of X-ray equipment should and must have acquired the X-ray protection experience or knowledge and have received operation training of X-ray equipment. During installation and operation of the equipment, the user shall always undertake the responsibility for complying with relevant laws and regulations. All assembly operations, extension, readjustment, modification, or repair work shall be carried out by the maintenance personnel authorized by the manufacturer. The equipment must be used according to the instructions. Failing to follow the instructions may put the operator, maintenance personnel, and pet in an extreme danger and cause personal injury.

2.1 Operation Safety

To ensure safety of the personnel and equipment, be sure to abide by the following requirements during use and operation:

 Warning: To use the equipment continuously and safely, please store this manual with the equipment, and regularly review the operation steps and safety requirements in it.

 Do not remove the machine enclosure without permission; otherwise you may touch the high voltage circuit inside the equipment, resulting in an electric shock accident and endangering personal safety.

 Caution: Do not place any object that may hinder or restrict heat dissipation of the equipment on it.

 Caution: Always stay alert to safety when operating the equipment. You must be familiar with the equipment enough so as to identify any faults that may

cause a danger. In case of a fault or known safety problem, do not use the equipment until the fault/problem is fixed by qualified personnel.

-  **Warning:** The equipment can only be used by professionals passing the training test or under the guidance of qualified professionals.
-  **Caution:** The equipment must be used under environmental conditions that meet the normal operation requirements of the equipment. Shut down the equipment and disconnect the main power supply after use.
-  **Note:** Maintain the equipment on an a regular basis to ensure continuously safe use.
-  **Note:** The product must be fixed properly during transportation to prevent shaking in the carriage; in the case of transportation in an open wagon, it must be covered with a piece of felt. In case of finding any damage, fault, or other problems, please contact our company.
-  **Warning:** First cut off the power supply before replacing the fuse, fuse wire or other components!
-  **Warning:** To avoid affecting safety of the system, do not connect any other movable porous sockets in the system, and do not connect any non-system components to a movable porous socket.

2.2 Responsibilities

- The manufacturer shall be responsible for safety of the product provided that maintenance, repair and/or change of the equipment is carried out by the manufacturer's personnel or personnel recognized by the manufacturer;
- The manufacturer shall not be responsible for the equipment damage, failure, and hazard caused by incorrect use or improper routine maintenance of the equipment;

- The owner of the installed equipment must ensure that its operators have been trained and acquired corresponding qualifications.
- The equipment must be maintained by the manufacturer's personnel or personnel authorized by the manufacturer. If necessary, please contact the manufacturer to provide the circuit diagram, BOM list, figure legends, correction rules, etc.

2.3 Electro Magnetic Compatibility

Electro magnetic compatibility (EMC) refers to the capability of equipment or system in operating according to requirements in its electromagnetic environment without producing any unbearable electromagnetic interference to any equipment in its environment.

According to the design purpose, the equipment complies with the EMC regulations, including the allowable electromagnetic interference level and necessary electromagnetic shielding performance of electronic equipment specified by laws and regulations.

Thorough elimination of electromagnetic interference is almost impossible unless all equipment that may produce high frequency signals is excluded. Although some high frequency equipment itself meets the requirements of EMC regulations, it is impossible to determine whether the radio signal generated by its high frequency transmitter affects normal operation of the product when such high frequency equipment works with considerable power near the product.



To ensure EMC of the equipment, the equipment must be installed, debugged, and used according to requirements of the attached documents. Portable and mobile RF communication devices may affect EMC of the equipment. If such a situation occurs, please contact the personnel of our company to fix the problem.

 Note:

- VetiX P8 veterinary digital radiography system meets the relevant requirements of EMC in the YY0505 and GB9706.3 standards;
- The user needs to install and use the equipment according to the EMC information provided in the attached documents;
- Portable and mobile RF communication devices may affect performance of the VetiX P8 veterinary digital radiography system. Note to avoid strong electromagnetic interference when using the equipment, e.g., keep away from mobile phones and microwave ovens;
- For the guidelines and manufacturer's statement, see the attached table.

 Warning:

- VetiX P8 veterinary digital radiography system cannot be used close to or stacked with other equipment. If it must be used close to or stacked with other equipment, observe and verify that it can operate normally with the selected configuration;
- Class A equipment is intended to operate in an industrial environment. Due to conducted emission and radiated emission of the VetiX P8 veterinary digital radiography system, there may be potential difficulties in ensuring its EMC in other environments;
- Except the cables sold as spare parts of internal components by the manufacturer of VetiX P8 veterinary digital radiography system, using accessories and cables not specified may increase the emission or reduce the immunity of the VetiX P8 veterinary digital radiography system;
- Using accessories, transducers, or cables other than those specified together with the equipment/system may increase the emission or reduce the immunity of the equipment/system;
- Only the conducted radiated RF immunity test at the selected frequency has been performed for the VetiX P8 veterinary digital radiography system.

Attached Table 1:

Guidelines and Manufacturer's Statement– Electromagnetic Emission		
The Vetix P8 veterinary digital radiography system is expected to be used in the electromagnetic environment specified below, and the buyer or user needs to ensure that it is used in such an		
Emission Test	Compliance	Electromagnetic Environment - Guidelines
RF transmission GB 4824	Group 1	The Vetix P8 veterinary digital radiography system uses RF energy for its internal functions only. Therefore, its RF emission is very low, with little possibility of generating interference to the electronic equipment nearby.
RF transmission GB 4824	Class B	The Vetix P8 veterinary digital radiography system applies to all facilities, including home use and direct connection to a residential public low-voltage power supply network for household use.
Harmonic emission GB 17625.1	Not applicable	
Voltage fluctuation/flicker emission GB 17625.2	Not applicable	

Guidelines and Manufacturer's Statement - Electromagnetic Immunity			
The VetiX P8 veterinary digital radiography system is expected to be used in the electromagnetic environment specified below, and the buyer or user needs to ensure that it is used in such an			
Immunity Test	IEC 60601 Test Level	Coincidence Level	Electromagnetic
ESD GB/T 17626.2	±6 kV contact discharge ±8 kV air discharge	±6 kV contact discharge ±8 kV air discharge	The floor must be made of wood, concrete, or ceramic tiles. If the floor is covered with synthetic material, the relative humidity must be at least 30%.
Electrical fast transient GB/T 17626.4	±2 kV to power cord ±1 kV to input/output line	±2 kV to power cord ±1 kV to input/output line	The network power supply must meet the quality requirements for use in a typical commercial or hospital environment.
Surge GB/T 17626.5	±1 kV line to line ±2 kV line to ground	±1 kV line to line ±2 kV line to ground	The network power supply must meet the quality requirements for use in a typical commercial or hospital environment.
Voltage dips, short interruptions, and voltage variations	< 5 % U_T , lasting for 0.5 cycles (on U_T , > 95% of voltage	< 5 % U_T , lasting for 0.5 cycles (on U_T , > 95% of	The network power supply must meet the quality requirements for

<p>on the power input line</p> <p>GB/T 17626.11</p>	<p>dip)</p> <p>40 % U_T, lasting for 5 cycles</p> <p>(on U_T, 60% of voltage dip)</p> <p>70 % U_T, lasting for 25 cycles</p> <p>(on U_T, 30% of voltage dip)</p> <p>< 5 % U_T, lasting for 5s</p> <p>(on U_T, > 95% of voltage dip)</p>	<p>voltage dip)</p> <p>40 % U_T, lasting for 5 cycles</p> <p>(on U_T, 60% of voltage dip)</p> <p>70 % U_T, lasting for 25 cycles</p> <p>(on U_T, 30% of voltage dip)</p> <p>< 5 % U_T, lasting for 5s</p> <p>(on U_T, > 95% of voltage dip)</p>	<p>use in a typical commercial or hospital environment. If the user of the VetiX P8 veterinary digital radiography system requires continuous operation during power interruption, it is recommended that an UPS or battery power supply be adopted for the VetiX P8 veterinary digital radiography system.</p>
<p>Power frequency magnetic field (50/60 Hz)</p> <p>GB/T 17626.8</p>	<p>3 A/m</p>	<p>3 A/m, 50 Hz</p>	<p>The power frequency magnetic field must have the level characteristics of a power frequency magnetic field in typical sites such as a typical commercial or hospital environment.</p>
<p>Note: U_T refers to the AC network voltage before the test voltage is applied.</p>			

Guidelines and Manufacturer's Statement - Electromagnetic Immunity

The Vetix P8 veterinary digital radiography system is expected to be used in the electromagnetic environment specified below, and the buyer or user needs to ensure that it is used in such an electromagnetic environment:

Immunity Test	IEC 60601 Test Level	Coincidence Level	Electromagnetic Environment - Guidelines
<p>RF conduction GB/T 17626.6</p> <p>RF radiation GB/T 17626.3</p>	<p>3 V (effective value) 150 kHz to 80 MHz</p> <p>3 V/m 80 MHz to 2.5 GHz</p>	<p>3 V (effective value)</p> <p>3 V/m</p>	<p>Portable and mobile RF communication devices cannot be used closer to any part of the Vetix P8 veterinary digital radiography system than the recommended isolation distance, including cables. The distance needs to be calculated using the formula corresponding to the transmitter frequency.</p> <p>Recommended isolation distance</p> $d = 1.2\sqrt{P}$ <p>$d = 1.2\sqrt{P}$ 80 MHz to 800 MHz</p> $d = 2.3\sqrt{P}$ 800 MHz to 2.5 GHz <p>Wherein:</p> <p>P—According to the maximum rated output power of the transmitter provided by the transmitter manufacturer, in watts (W);</p> <p>d—Recommended isolation distance, in meters (m)^b.</p> <p>The field strength of the fixed RF transmitter is determined through the survey ^c of the electromagnetic site, and should be lower than the coincidence level in each frequency range ^d.</p>

			<p>Interference may occur near equipment marked with the following symbols.</p>
<p>Note 1: For the 80 MHz and 800 MHz frequencies, the formula of higher frequency band is adopted.</p> <p>Note 2: These guidelines may not apply to some circumstances. Electromagnetic propagation is affected by the absorption and reflection of buildings, objects, and human bodies.</p> <p>Note 3: Only the conducted radiated RF immunity test at the selected frequency has been performed for the Vetix P8 veterinary digital radiography system.</p>			
<p>a. The field strength of fixed transmitters such as base stations of wireless (cellular/cordless) telephones and ground mobile radios, amateur radios, AM and FM radio broadcasting, and television broadcasting cannot be predicted accurately in theory. To evaluate the electromagnetic environment of a fixed RF transmitter, a survey of the electromagnetic site should be considered. If the measured field strength of the site where the Vetix P8 veterinary digital radiography system is located is higher than the above applicable RF coincidence levels, the Vetix P8 veterinary digital radiography system needs to be observed to verify its normal operation. If abnormal performance is observed, additional measures may be necessary, such as readjusting the orientation or position of the Vetix P8 veterinary digital radiography system.</p> <p>b. In the entire frequency range of 150 kHz to 80 MHz, the field strength should be lower than 3 V/m.</p> <p>c. The wireless router adopts direct sequence spread spectrum (DSSS) for modulation, with a frequency of 2400 MHz.</p> <p>The mobile phone adopts quadrature phase shift keying (QPSK) for modulation, with a frequency of 800 MHz, 900 MHz, 1800 MHz, 1900 MHz, 1920 MHz, 1940 MHz, 2010 MHz, 2110 MHz, or 2130 MHz.</p> <p>The interphone adopts frequency shift keying (FSK) modulation, with a frequency of 400.1520 MHz, 435.1205 MHz, 440.1645 MHz, 441.1345 MHz, 452.5320 MHz, 453.6475 MHz, 454.7145 MHz, 455.8300 MHz, 456.9455 MHz, 462.1350 MHz, 463.2505 MHz, 464.3175 MHz, 465.4330 MHz, 469.8465 MHz, or 470.8165 MHz.</p>			

Recommended isolation distance between portable and mobile RF communication devices and the VetiX P8 veterinary digital radiography system

The VetiX P8 veterinary digital radiography system is expected to be used in an electromagnetic environment with controlled RF radiated emission. According to the maximum rated output power of communication equipment, the buyer or user can prevent electromagnetic interference by maintaining the minimum distance between portable and mobile RF communication devices (transmitter) and the equipment or system as recommended below.

Maximum rated output power W of the transmitter	Isolation distances corresponding to different frequencies of the		
	150 kHz to 80 MHz $d = 1.2\sqrt{P}$	80 MHz to 800 MHz $d = 1.2\sqrt{P}$	800 MHz to 2.5 GHz $d = 2.3\sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

For the maximum rated output power of the transmitter not listed in the above table, the recommended isolation distance d , in meters (m), can be determined using the formula in the corresponding transmitter frequency column. Here, P is the maximum rated output power of the transmitter provided by the transmitter manufacturer, in watts (W).

Note 1: For the 80 MHz and 800 MHz frequencies, the formula of higher frequency range is adopted.

Note 2: These guidelines may not apply to some circumstances. Electromagnetic propagation is affected by the absorption and reflection of buildings, objects, and human bodies.

2.4 Radiation Safety

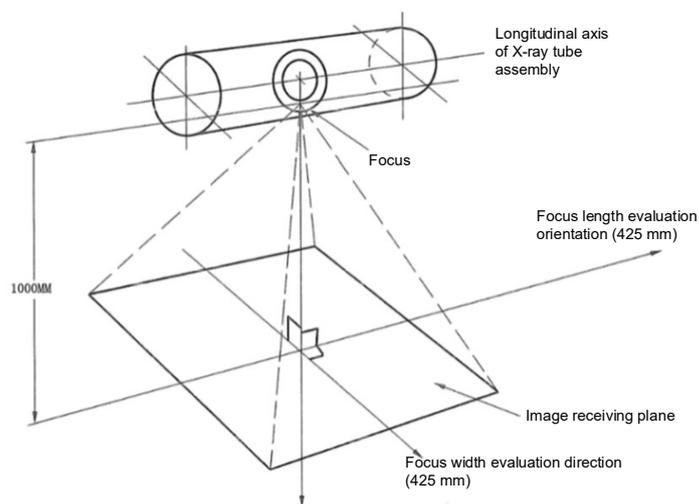


Warning: Ensure that all the necessary protective measures have been taken before each X-ray exposure.

The system generates X-rays during use. Therefore, the relevant staff using the system must take X-ray protection measures and can wear radiation protection suits for protection during work. At the same time, ensure that all the operating personnel and maintenance personnel have received relevant training and understood the protection and hazard related knowledge of X-ray radiation. The personnel responsible for the system must understand the safety requirements for X-ray operations. Please carefully study this manual and the instructions of each system component to fully understand all the safety and operation requirements.

Meanwhile, lead shielding is an effective protective measure. To minimize the risk of exposure to radiation, use the protective devices such as lead screen, lead injected gloves, lead apron, and thyroid protective collar. These protective devices must meet the national and local requirements for radiation protection.

Besides, time protection and distance protection are both effective protective measures. To reduce the absorption of X-rays, shorten the time of staying in the X-ray field as much as possible; keep away from the X-ray source as far as possible.



⚠ Warning: For the diagnostic X-ray equipment designated for use with accessories or other components, pay attention to the possible negative effects produced by substances irradiated by the X-ray beam. (See the table below for the maximum equivalent attenuation of possible substances irradiated by the X-ray beam.)

Component	Maximum equivalent attenuation mm Al	
	21 CFR	GB 9706.12 (Equivalent to IEC 60601-1-3)
Mobile pet support, without movable connections	0.3	1.7

Lead shielding is an effective protective measure. To minimize the risk of exposure to radiation, use the protective devices such as lead screen, lead injected gloves, lead apron, and thyroid protective collar. These protective devices must meet the national and local requirements for radiation protection.

⚠ Warning: When operating or repairing the X-ray equipment, always keep a certain safe distance from the focus and X-ray beam. Protect your body and do not expose your hands, wrists, arms, or any other parts of your body to the main beam.

When the X-ray equipment is in use, the personnel in the examination room must comply with the correct radiation protection regulations. Specifically, the following rules must be followed:

- Radiation workers shall acquire proficiency in professional techniques, receive training of radiation protection and relevant legal knowledge, and comply with the position requirements for radiation workers.
- Select appropriate equipment to use, radiation conditions, radiation field, and corresponding protective articles according to different examination types and needs.

- Reasonably select all kinds of operation parameters. On the premise of satisfying the conditions of medical diagnosis, ensure that the pet receives the minimum exposure dose when the expected diagnostic objectives are achieved.
- When the X-ray machine performs exposure, the door connected to the equipment room must be closed.
- All the radiation workers shall accept personal dose monitoring and comply with the requirements of relevant regulations.
- It is forbidden to improve the developing effect by increasing radiographic exposure conditions.
- Do not work in the straight direction of the ray beam. If this is inevitable, protect yourself by wearing radiation proof gloves or protective suit.
- Preferably select the focus with the largest relative distance from your skin, and minimize the absorbed dose of the pet under reasonable circumstances.

⚠ Warning: The safety circuit that can avoid starting X-ray radiation under certain circumstances cannot be cancelled or modified.

2.5 Fire Safety

⚠ Warning: Only electric or chemical fire extinguishers can be used. Water or liquid fire extinguishers may cause severe or even fatal injuries to persons.

⚠ Warning: The vent cannot be covered during operation of the equipment.

2.6 Electric Safety

Warning: The maintenance personnel not receiving training cannot dismantle the equipment without permission.

⚠ Warning: Failing to properly ground the equipment may cause a risk of electric shock. Before operation, make sure that all safety ground wires have been connected to the equipment.

- ⚠ Warning:** In case that the equipment needs to be electrically or mechanically connected to the equipment of any other manufacturers, please call the manufacturer to confirm whether it is rational. The manufacturer will not be responsible for the personal injury or equipment damage caused by connecting the equipment to other equipment without the manufacturer's consent. Please verify that the equipment complies with the GB9706.15 standard, and recheck the leakage current and other safety performance indexes of the whole system to avoid possible hazard caused by leakage current superposition of the system.
- ⚠ Danger:** A complete system can generate lethal voltages. Be sure to prevent contact with these voltages.
- ⚠ Warning:** To avoid the risk of electric shock, please disconnect the power supply and remove the power plug before maintaining the equipment.
- ⚠ Warning:** Do not use the equipment in an environment with combustible gas or anesthetic; otherwise an explosion may take place.
- ⚠ Warning:** Do not open the enclosure of the equipment without permission; otherwise a risk of electric shock may be caused.
- ⚠ Warning:** Do not allow any liquid to seep into the equipment. The liquid seeping into the electrical circuit may aggravate the leakage current or cause equipment damages.
- ⚠ Warning:** Do not use the equipment "forcibly" in case of any electrical or mechanical fault, and do not set the equipment in operating status with a fault by removing the protective circuit and protective facilities.

⚠ Warning: To ensure safety of the equipment, be sure to carry out electrical safety tests in accordance with the local safety regulations or relevant regulations.

⚠ Warning: To avoid affecting safety of the system, do not use any peripherals or accessories not provided or designated by Mindray.

⚠ Warning: Please use the peripherals and accessories provided or designated by Mindray. Failing to do so may cause safety hazards.

2.7 Mechanical Safety

Keep a sufficient safety distance between the operator/pet and the X-ray equipment, and bear in mind the following matter at all times:

⚠ Warning: Remove the objects within the moving range of the equipment, making sure that the equipment will never be stuck by any objects within the moving scope of the equipment.

2.8 Environmental Protection

Shenzhen Mindray Animal Medical Technology Co., Ltd. designs and manufactures equipment according to the requirements for safety and environmental protection. If no cover of the equipment is disassembled or the equipment has been used correctly all the time, the equipment will not cause any harm to any persons or the environment.

If it is inevitable to use materials that may cause harm to the environment provided that it is allowed by laws and regulations, the materials must be disposed of in a correct way.

⚠ Warning:

- **Waste generated from the X-ray equipment cannot be disposed of together with industrial or domestic waste.**
- **Dispose of the waste generated by the X-ray equipment in a correct way in accordance with the local environmental regulations.**

- **Reusable materials can be recycled by a qualified waste treatment company to reduce environmental pollution.**

For relevant matters, please contact the service agency of Shenzhen Mindray Animal Medical Technology Co., Ltd., or dispose of the materials properly according to the methods of local garbage collection facilities.



2.9 Connecting to Other Equipment

All the other equipment connected due to signal input and output with the equipment must meet the requirements of GB/IEC. The manufacturer shall not bear any responsibilities for data exceptions or even equipment damages that occur because the external equipment used by the customer independently fails to meet the requirements of GB/IEC.

2.10 Safety Classification and Compliance Identification

2.10.1 Safety Classification

The safety classification of VETERINARY DIGITAL RADIOGRAPHY SYSTEM in this manual is as follows:

- Type of protection against electric shock: Class I.
- Degree of protection against electric shock: Type B application part.
- Protection of the harmful liquid inlet: common equipment;
- Classification according to the disinfection and sterilization methods recommended by the manufacturer: the manufacturer needs to specify the disinfection method.
- Protection for use with the mixture of flammable anesthetic gas and air or the mixture with oxygen or nitrous oxide: the equipment cannot be used with the flammable anesthetic gas and air or the mixture with oxygen or nitrous oxide.

- Working system: intermittent loading and continuous operation.
- EMC classified according to GB 4824-2013: Class B of Group 1.
- Rated voltage and frequency of equipment: ~220 V, 50 Hz/60 Hz.
- Equipment power: 3.5 kVA.
- The applied part for defibrillation discharge effect protection is not available.

2.10.2 Symbol Identification

Symbol	Remarks
	Alternating current
	Direct current
	Ionizing radiation
	Type B applied part
	Protection ground (earth)
	Note! Refer to the attached document.
	Hazardous voltage
	Radiation warning

	Refer to the instructions
	Electrostatic sensitive device
	Serial number
	Manufacture date
	Manufacturer
	WEEE directive recycle icon
	No sitting label (Pasted on the surface of the table panel)
 <p data-bbox="592 1447 815 1570">Max. load 60 kg</p>	Load bearing label (Pasted on the surface of the table panel)

<p>Veterinary Digital Radiography System (Veterinary use only) </p> <p>Model: Vetix P8</p> <p> </p> <p>200-240 V ~ 50/60 Hz 16 A (MAX.) 3.5 kW</p> <p> Shenzhen Mindray Animal Medical Technology Co., LTD. Room 702, Tower 4, YESUN Intelligent Community III, No.1301-88 Guanguang Road, Xinlan Community, Guanlan Street, Longhua District, Shenzhen 518110, P.R. China</p> <p>    </p> <p style="writing-mode: vertical-rl; transform: rotate(180deg);">047-039001-00(1.0)</p>	<p>Overall unit label</p> <p>(Pasted on the side of the X-ray tube support arm)</p>
<p>Radiography Frame (Veterinary use only) </p> <p>Model: P8-J1TT</p> <p> </p> <p> Shenzhen Mindray Animal Medical Technology Co., LTD. Room 702, Tower 4, YESUN Intelligent Community III, No.1301-88 Guanguang Road, Xinlan Community, Guanlan Street, Longhua District, Shenzhen 518110, P.R. China</p> <p>  </p> <p style="writing-mode: vertical-rl; transform: rotate(180deg);">047-039005-00(1.0)</p>	<p>Radiography rack label</p> <p>(Pasted on the side of the X-ray tube support arm)</p>
<p>Veterinary Portable Generator (Veterinary use only) </p> <p>Model: VHG-8TT</p> <p> </p> <p>200-240 V ~ 50/60 Hz 16 A (MAX.) 3.5 kW</p> <p> Shenzhen Mindray Animal Medical Technology Co., LTD. Room 702, Tower 4, YESUN Intelligent Community III, No.1301-88 Guanguang Road, Xinlan Community, Guanlan Street, Longhua District, Shenzhen 518110, P.R. China</p> <p>   </p> <p style="writing-mode: vertical-rl; transform: rotate(180deg);">047-039003-00(1.0)</p>	<p>Veterinary Portable Generator label</p> <p>(Pasted on the back shell of Veterinary Portable Generator)</p>
<p>Digital Detector (Veterinary use only) </p> <p>Model: DET-4336TT</p> <p> </p> <p>15 V  2.67A</p> <p> Shenzhen Mindray Animal Medical Technology Co., LTD. Room 702, Tower 4, YESUN Intelligent Community III, No.1301-88 Guanguang Road, Xinlan Community, Guanlan Street, Longhua District, Shenzhen 518110, P.R. China</p> <p>   </p> <p style="writing-mode: vertical-rl; transform: rotate(180deg);">047-039004-00(1.0)</p>	<p>Flat panel detector label</p> <p>(Pasted on the back shell of flat panel detector)</p>

<p>Power Box (Veterinary use only)</p> <p>Model: DPB-15TT</p>   <p>100-240 V ~ 50/60 Hz 15 V = 3.07 A/16 V = 2.50 A</p> <p>mindray animal care</p> <p style="writing-mode: vertical-rl; transform: rotate(180deg);">047-039004-00(1.0)</p> <p>Shenzhen Mindray Animal Medical Technology Co., LTD. Room 702, Tower 4, YESUN Intelligent Community III, No.1301-88 Guanguang Road, Xinlan Community, Guanlan Street, Longhua District, Shenzhen 518110, P.R. China</p>    	<p>Flat panel detector power box label</p> <p>(Pasted on the surface of power box housing)</p>
	<p>This way up (outer package identification text)</p>
	<p>Fragile, handle with care (outer package identification text)</p>
	<p>Do not stack (outer package identification text)</p>
	<p>Keep dry (outer package identification text)</p>
	<p>Temperature limit (outer package identification text)</p>
	<p>Humidity limitation (outer package identification text)</p>
	<p>Atmospheric pressure limitation (outer package identification text)</p>

	<p>Centre of gravity (outer package identification text)</p>
	<p>Lithium metal battery label (UN3091)(outer package identification text)</p>

3 Installation

3.1 Preparations for Equipment Room

3.1.1 Equipment Room Space Requirements

- (1) Examination room area $\geq 2.5 \times 1.5 \text{ m}^2$;
- (2) Room height $\geq 2.2 \text{ m}$;
- (3) Door width $\geq 0.9 \text{ m}$.

3.1.2 Protection Requirements

- (1) Set up ionizing radiation warning signs, radiation protection precautions, and eye-catching working status indicators outside the equipment room.
- (2) Ensure a reasonable layout in the equipment room, preventing the useful X-ray beam from directly irradiating the positions of the door, window, and pipeline port; do not pile up sundries irrelevant to the diagnosis work of the equipment; equip the equipment room with a power exhaust device and maintain good ventilation.
- (3) The wall facing the main X-ray beam of the radiography equipment room must have a protective thickness of 3 mm lead equivalent, and the other side walls must have a protective thickness of 2 mm lead equivalent.
- (4) Reasonably set the positions of the doors, windows and pipeline ports of the equipment room, and ensure that the doors and windows of the equipment room have the same protective thickness as the walls where they are installed. The ceiling and floor of the equipment room (excluding the top floor) in a multi-storey building (excluding the rooms without a building below) must meet the shielding thickness requirements of the corresponding irradiation direction.

3.1.3 Ambient Requirements

- (1) Temperature: 10°C to 40°C;
- (2) Relative humidity: 30% to 75%;

(3) Atmospheric pressure: 700 hPa to 1060 hPa.

3.1.4 Floor Requirements

Flat cement floor and tile floor are acceptable. In case of a wooden floor, the position for installing the equipment must be reinforced, and the cement layer under the position for installing the base must be 100 mm deep, with a bearing capacity not less than 800 kg/m²

3.1.5 Warning Sign of Radiation Hazard

Be sure set up eye-catching warning sign and indicator of radiation hazard outside the equipment room. When the indicator is on, close the equipment room door, and do not any other persons to enter the room without permission.

3.1.6 Power Distribution Requirements

If the grid power supply used in the equipment room is not stable enough and the voltage is higher or lower than the rated voltage, configure a regulated power supply. If a power failure often occurs, configure a UPS. The output of regulated power supply or UPS must meet the power requirements of the overall unit, and the recommended rated output power is 30% higher than the rated input power of the overall unit. The grid power supply of a hospital must comply with the following conditions:

Voltage	AC220V
Frequency	50/60 Hz
Power supply capacity	3.5 kVA

3.2 Installation Tools

No.	Tool Name	Specification	Unit
1	Adjustable wrench	0 to 350 mm	Pcs
2	Open end wrench	8*10	Pcs

3	Tape measure	5M	Pcs
4	One set of hexagon wrenches	Metric system	Set
5	Phillips screwdriver	(Small, medium, and large)	Set
6	Straight screwdriver	(Small, medium, and large)	Set
7	Multimeter	Universal	Pcs
8	Diagonal pliers	Universal	Pcs
9	Sharp nose pliers	Universal	Pcs
10	Cable tie	100 mm	Pcs
11	Hammer drill	Universal	Set

3.3 Unpacking for Unloading

Before unpacking, first confirm the total number of packages and check whether any package is damaged. In case of finding any damage, inform the carrier or agent immediately.

- (1) Check whether the total quantity of items is correct, and check whether the outer package is intact without damage;
- (2) Open the outer package and check the quantities and appearances of the parts;
- (3) After the outer package is opened, place the equipment at the designated position in the equipment room and check the appearance of the rack body for damage.

3.4 Installation Instructions

3.4.1 Main Parts of the System

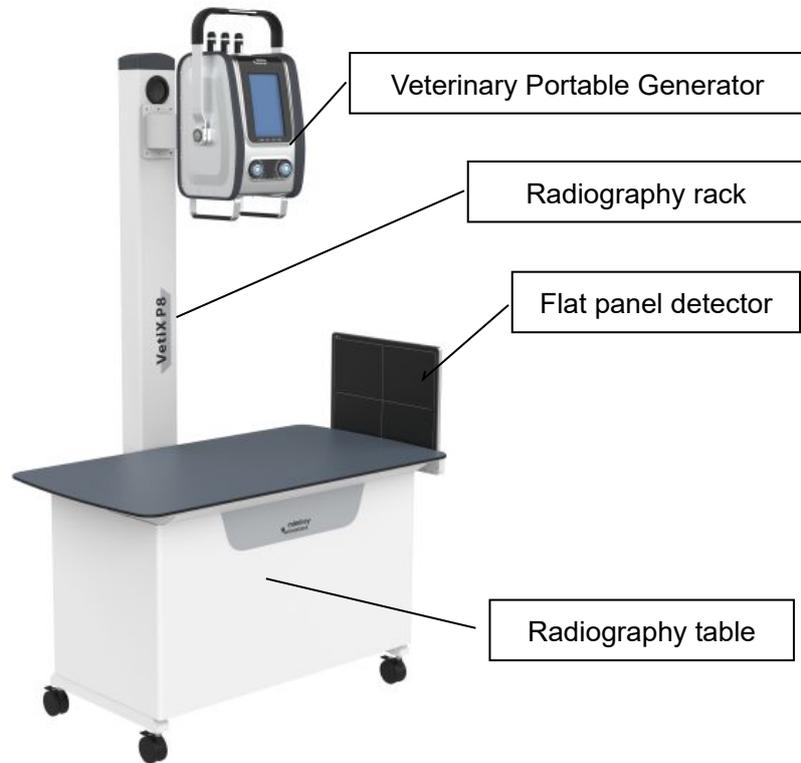


Figure 3-1 General System Diagram

3.4.2 Assembling the Column

Lift the column and place it at the installation position as aligning with the fixing holes in the column soleplate (the fixing holes need to be positioned and reserved in advance), and then lock and fix the column using expansion screws.



Figure 3-2 Column Assembling Diagram

3.4.3 Assembling the Flat Panel Detector

- (1) Take out the flat panel detector bracket and install it on the column.
- (2) Loosen the cassette fixing screw.
- (3) Take out the flat panel detector, carefully install the flat panel detector in the flat panel detector fixing block, and connect the corresponding cables (the power cord, sync cable, network cable, and trigger cable).
- (4) Adjust the position of the flat panel detector to align it with the cross of the collimator, and then lock the fixing screw of the cassette.
- (5) Adjust the level of the flat panel detector and the integrated DR, and lock the flat panel detector bracket screws.

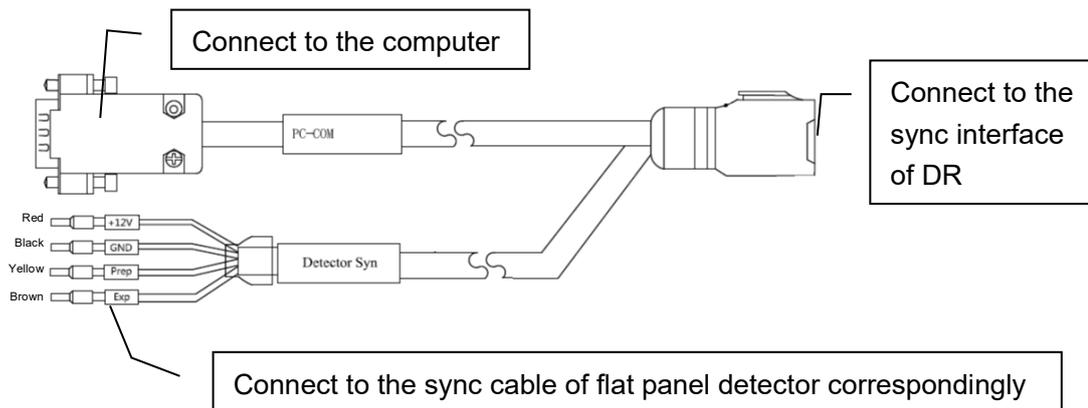
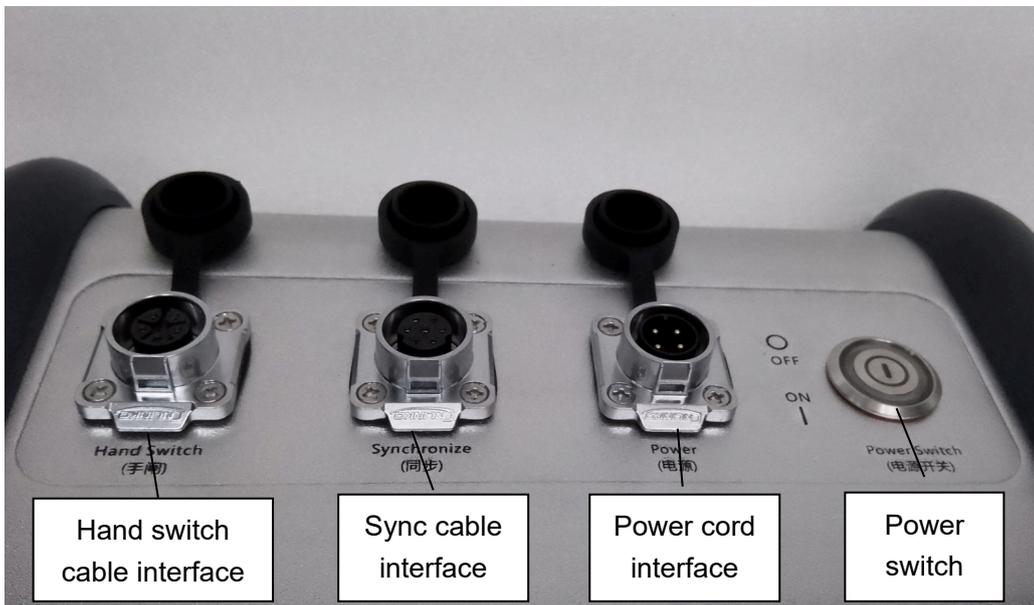
3.4.4 Connecting the Cables

3.4.4.1 Connecting the Veterinary Portable Generator Cables

Before connecting the power cord, make sure that the main power is disconnected, and pay attention to electrical safety.

- (1) Connect the working power supply of the equipment to the [Power] interface on the equipment.
- (2) Connect the sync signal cable of the detector to the [Synchronize] interface of the equipment.

- (3) Connect the hand switch communication cable of the equipment to the [Hand Switch] interface on the equipment.



3.4.4.2 Connecting the Flat Panel Detector Cables

Connect the cables of the flat panel detector to the corresponding interfaces.

4 Calibration Instructions

Before delivery, the high voltage generator and X-ray tube have been calibrated, and normally do not need to be calibrated again in a short time. If recalibration is needed during use or maintenance, please contact the service engineer.

5 Operation Instructions

5.1 Powering-on

After the 220V power cord is inserted, press the power switch button on the DR top. Then, the power indicator is turned on, the display screen starts up and enters the operation interface, and the machine is started.

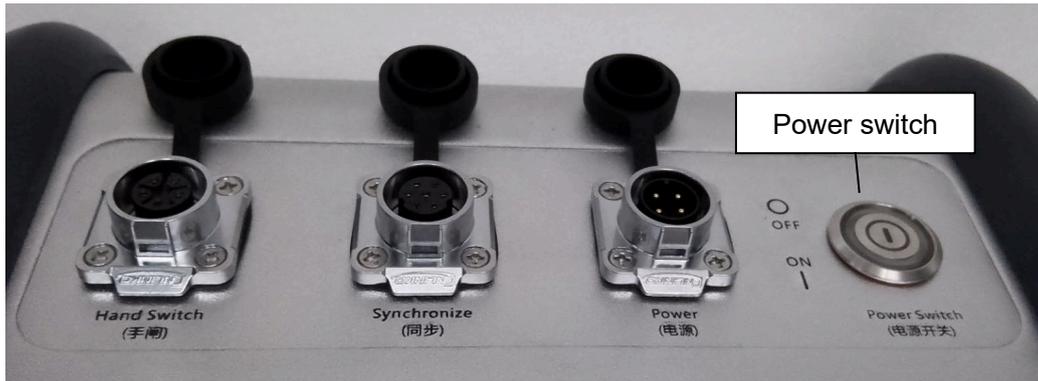


Figure 5-1 Power Switch Button

Tap the  power-on unlock button on the operation interface to unlock the operation interface of the screen.



5.2 Exposure Hand Switch

	No.	Diagram	Remarks
 <p>Wired hand switch</p>	1		<p>Normal state:</p> <p>The hand switch keys 1 and 2 are in normal state.</p>
	2		<p>Exposure state:</p> <p>The hand switch keys 1 and 2 are both pressed and the system exposure starts.</p>
 <p>Wireless hand switch</p>	<ol style="list-style-type: none"> 1. After pressing the [A] key, press the [D] key within 2s to 30s, and then the system will perform exposure; 2. After pressing the [A] key, if you press the [D] key not within the specified time, the system will not perform exposure; 		



Caution: Before pressing a key of the exposure hand switch, the operator should adjust the window size of the collimator to avoid excess X-ray radiation to the pet.



Warning: If the exposure hand switch is released before the time set by the examination program, the exposure will be interrupted unexpectedly, and the obtained image cannot be used to make diagnosis normally.

5.3 Collimator Operations

The collimator is the main part of X-ray radiation protection. During use, manually adjust the knobs in the X (transverse) and Y (longitudinal) directions to control the X-ray beam

range (which can be a little larger than the radiography range), thus adjusting the X-ray radiation field and ensuring that the pet is not exposed to excess radiation. The size of the radiation field is displayed using the size of the irradiation area illuminated by the collimator lamp (press the positioning light button in the middle of the display, and then the positioning light will reflect the irradiation range, which is marked using a center line).

Adjusting the visual field size: The sizes of the optical field of vision and radiation field can be adjusted manually using the transverse knob 1 and longitudinal knob 2. Turn the longitudinal knob 1 clockwise to close the longitudinal lead door; turn the longitudinal knob 1 counterclockwise to open the longitudinal lead door. Turn the transverse knob 2 clockwise to open the transverse lead door, and turn the transverse knob 2 counterclockwise to close the transverse lead door.

Operating the positioning light: When the positioning light switch is pressed, the light field indicator light is turned on, and it will go out automatically after a delay of 30s.

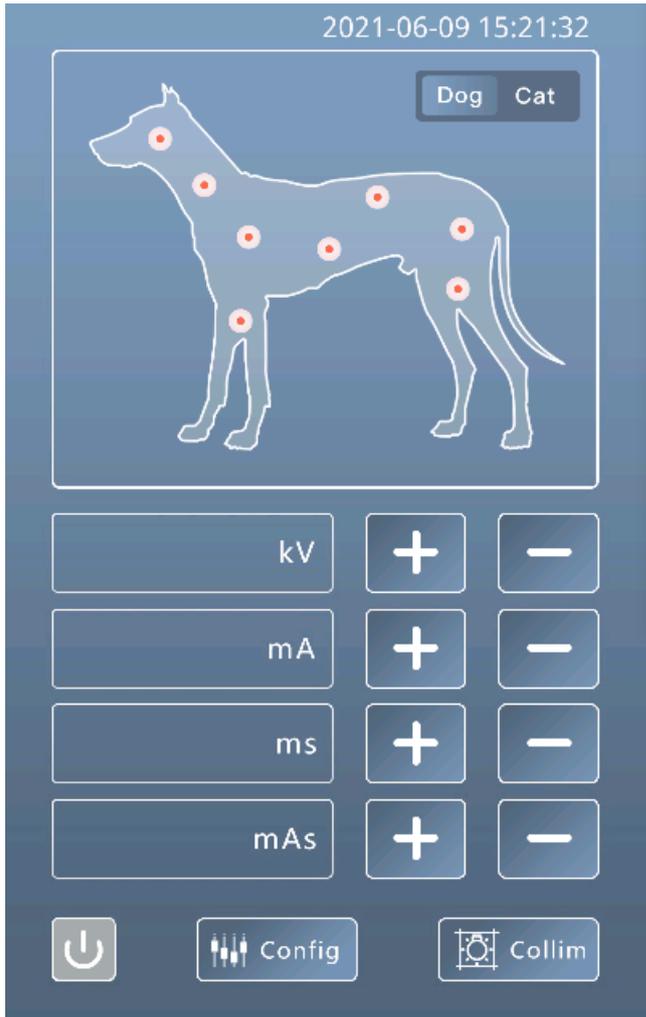


1 Transverse knob 2 Longitudinal knob 3 Light field indicator button

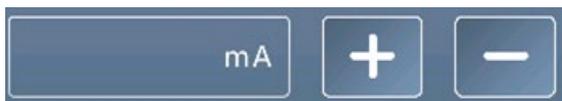
Figure 5-2 Collimator Diagram

5.4 Software Operations

After entering the interface, the system automatically matches the exposure parameters according to the selected site (the user can appropriately adjust the parameter size according to the actual condition of the pet), as shown in the following figure:



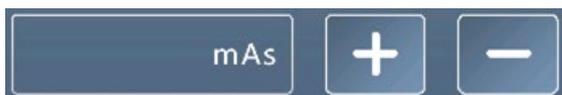
Used to increase/decrease the tube voltage;



Used to increase/decrease the tube current;



Used to increase/decrease the irradiation time;

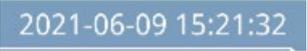


Used to increase/decrease the current time product;

Tap the  button to power on/off the machine;

Tap the  button to set the high voltage generator dose parameter;

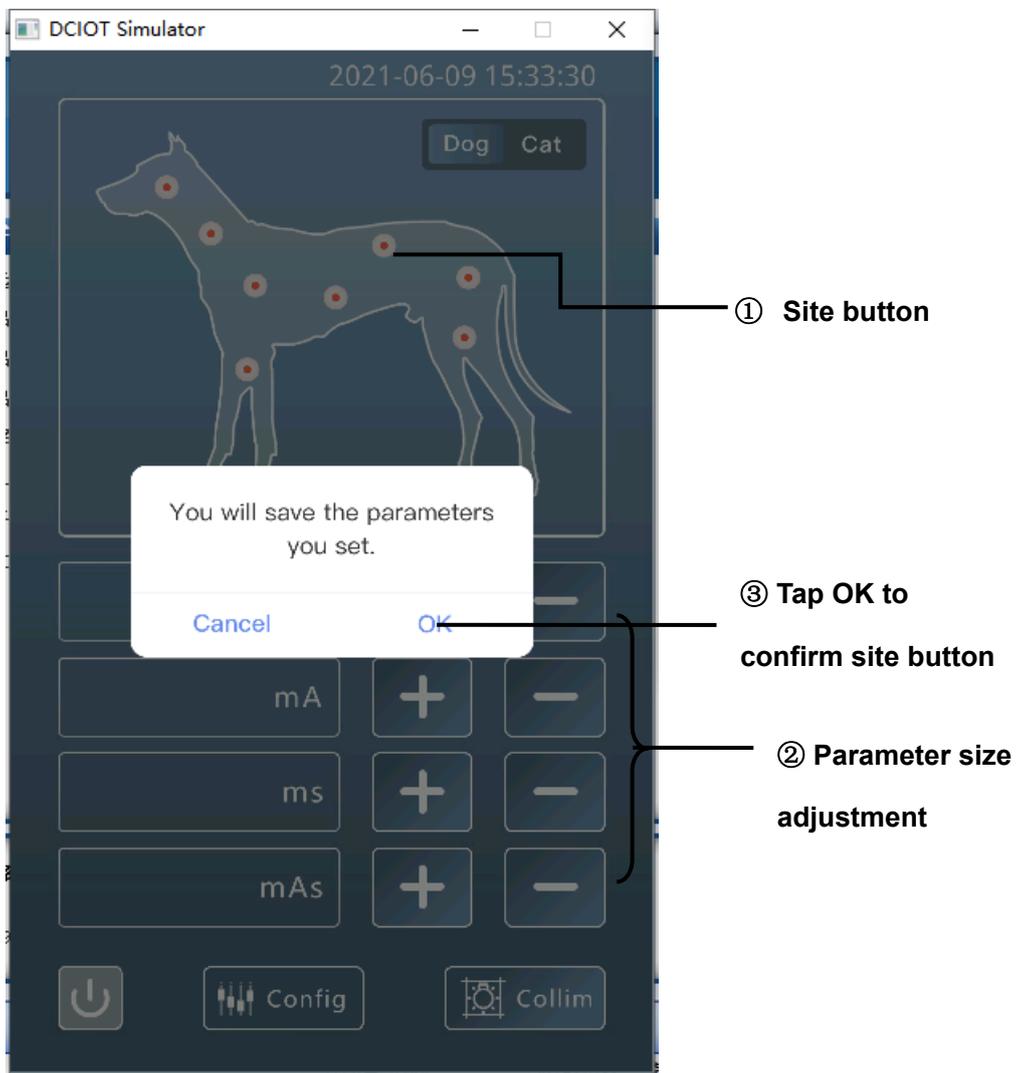
Tap the  button to indicate the radiation field;

Hold the  button to set the date and time;

Tap the  button to switch the pet type.

5.4.1 Saving Site Button Settings

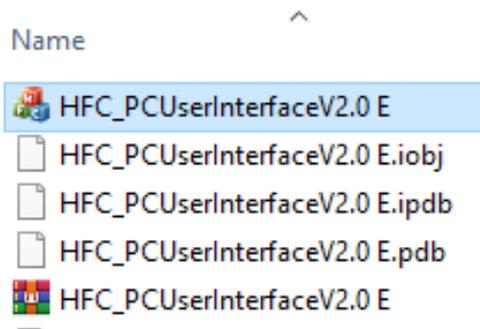
Tap the pet site button below, adjust the parameter size, tap the **Config** button, and then tap **OK** to confirm and save the site button settings.



6 High Voltage Generator Software

6.1 Overview of High Voltage Generator

1. The figure below shows the position for opening the **HFC_PCUserInterface** file of high voltage software;

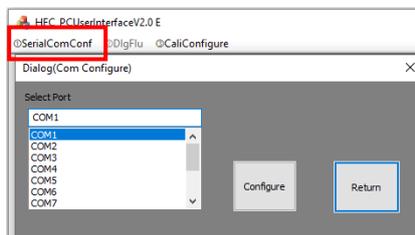
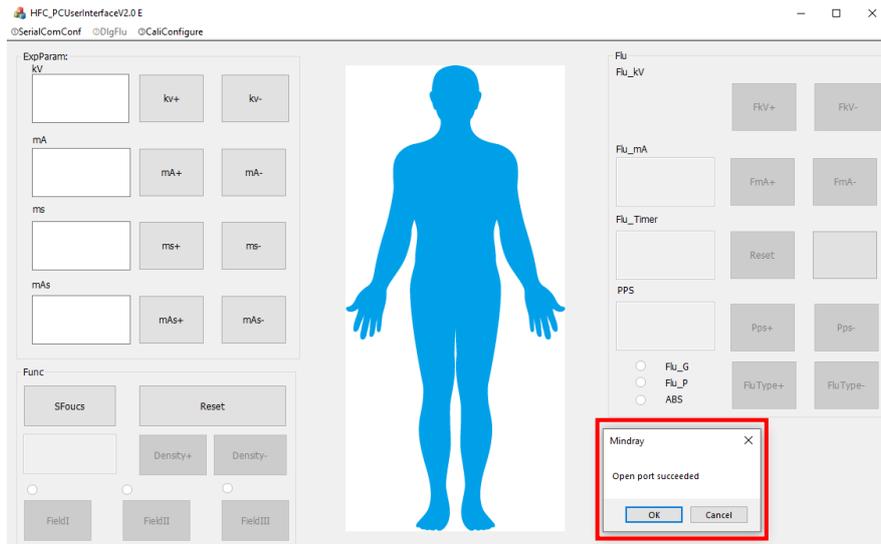


2. Click to open the high voltage software **HFC_PCUserInterface**; the interface is shown below;

If **Open port succeeded** is displayed and the parameters can be adjusted normally, the serial port is set correctly;

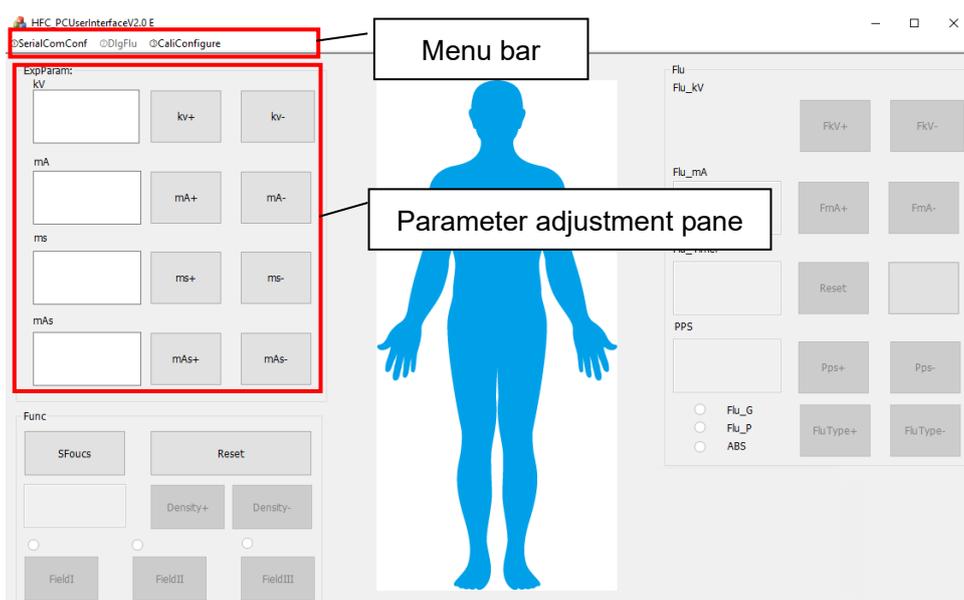
If **Open port failed** is displayed, click ①**SerialConf** in the upper left corner of the interface to set the serial port;

How to set the serial port: Right-click and select **Computer > Manage > Device Manager > Ports (COM & LPT)**, observe to verify that the communication port (COM~) of the computer is connected to the X-ray equipment, and then select the corresponding port (COM~) in ①**SerialConf** of the high voltage generator software.

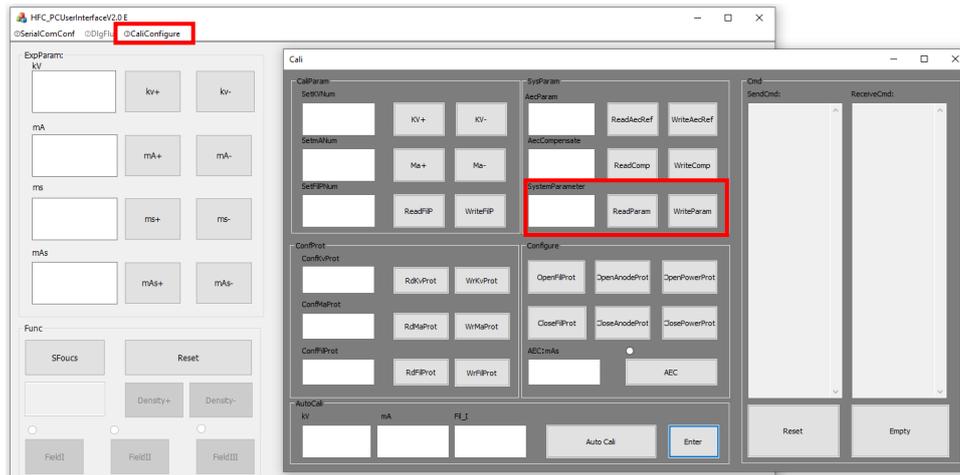


6.1.1 Overview of Software Interface

Double-click  **HFC_PCUserInterfaceV2.0 E** to open the high voltage generator software (the main interface can be divided into several parts such as the menu bar and the parameter adjustment pane), as shown below:



Click ③ **CalConfigure**, and write **247** in **SystemParameter** to indicate the hard synchronous exposure mode. The exposure operation can be performed only by connecting the sync cable of the flat panel detector. Writing **248** indicates the autonomous exposure mode, and the exposure operation can be performed without connecting the sync cable of the flat panel detector.



7 Acquisition Software

This chapter describes the configuration and operations of the system acquisition software.

Software name: Veterinary Workstation (short name: VET-DR)

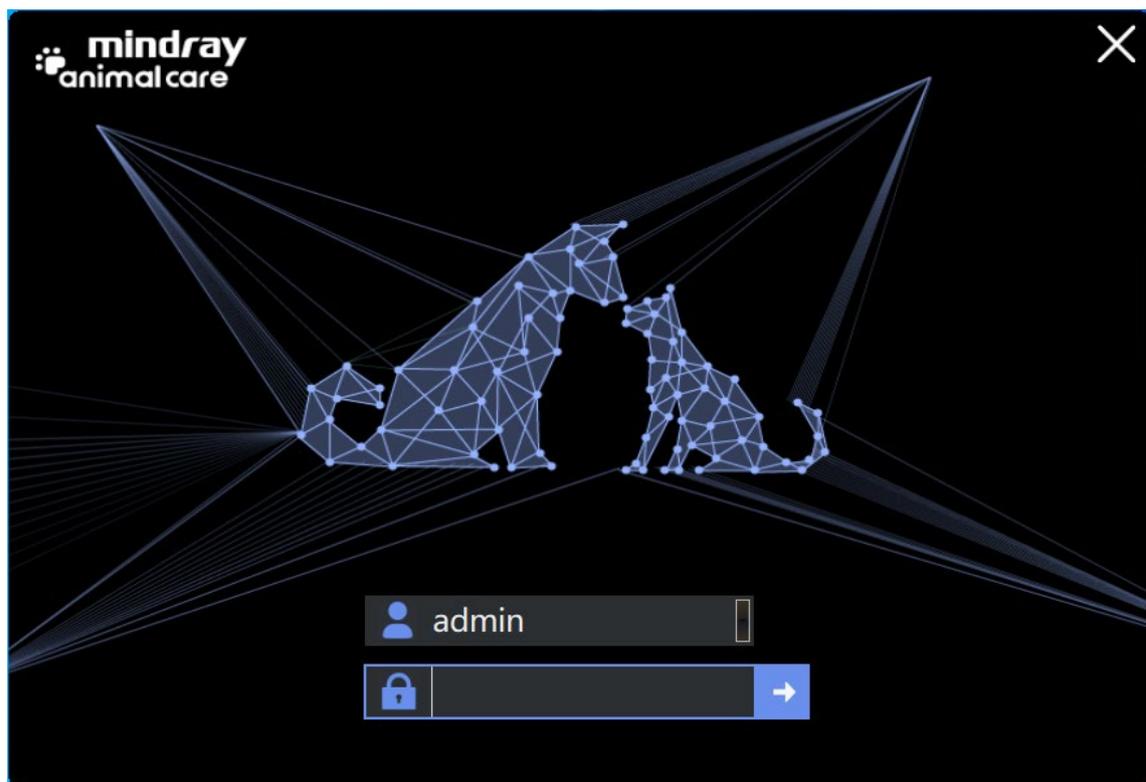
Version: V1.0

Note: You need to turn off the **System Sleep** setting of the workstation computer.

7.1 Software Operations

7.1.1 Login

Double-click the **Acquisition Workstation** icon to display the system login interface, as shown below:

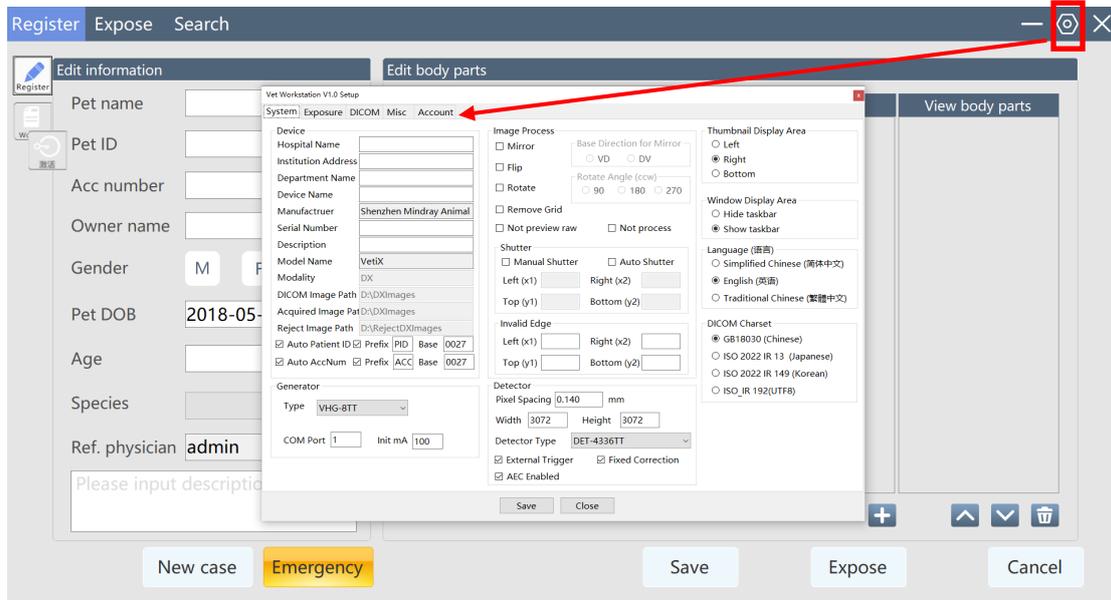


Select the login user, enter the login password, and click the login button to enter the main interface of the system.

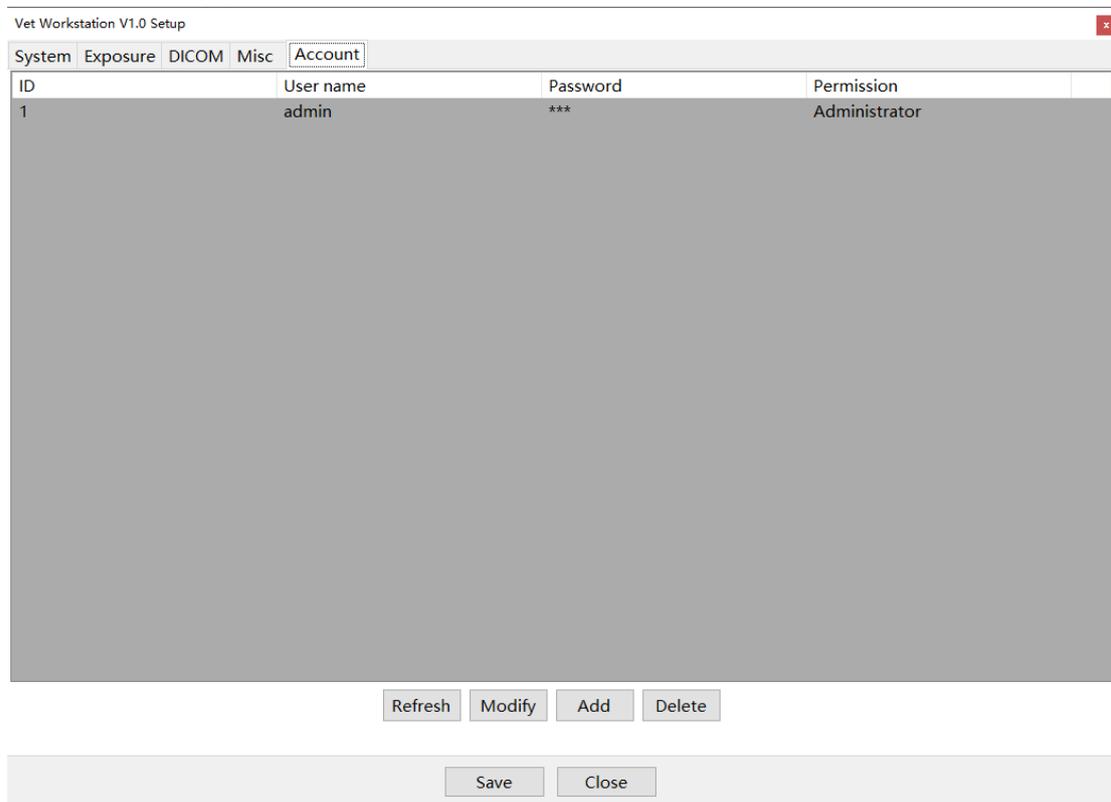
7.1.2 Account Management



After entering the main interface, and click  in the upper right corner to enter config settings, as shown below:

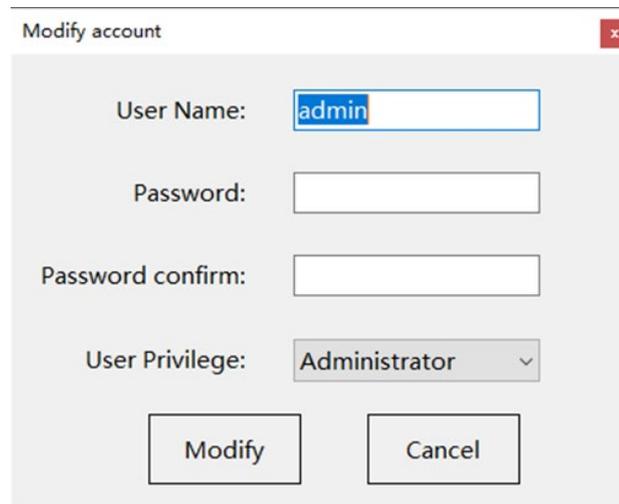


Click **Account** to enter the account management interface, as shown below:



Click **Refresh** to refresh the account management interface.

Select an account and click **Modify** to modify the account information, as shown below:



The screenshot shows a 'Modify account' dialog box. It has a title bar with the text 'Modify account' and a red close button. The dialog contains the following fields and controls:

- User Name:** A text input field containing the text 'admin'.
- Password:** An empty text input field.
- Password confirm:** An empty text input field.
- User Privilege:** A dropdown menu with 'Administrator' selected.
- Buttons:** Two buttons at the bottom, 'Modify' and 'Cancel'.

Click **Add** to add a new account.

Select an account and click **Delete** to delete the account information.

Note: You need to enter the account password manually after logging in for the first time. The system automatically records the recent five login accounts.

7.1.3 Information Registration

Click the **Register** button on the main interface to enter the registration interface, including ① the basic information editing pane and ② the examination site editing pane, as shown below:

There are four ways of registering case information: regular registration, emergency registration, search of historical incomplete cases, and worklist query, which are detailed below:

After filling in the case information, click the **Expose** button to jump to the exposure interface for examination; click the **Save** button to save the case information in the historical incomplete cases, and you can find the incomplete cases on the **Search** interface; click the **Cancel** button to cancel the case information registration and clear the filled information.

7.1.3.1 Regular Registration

Click the **New case** button to manually fill in the pet name, pet ID, account number, owner, pet gender, pet DOB, age, species, and description in the **Edit information** pane (the basic information editing pane); select the examination site in the **Edit body parts** pane (the examination site editing pane), where the pet name, pet ID, account number, pet gender, species, and body parts are required. If **Automatically generate pet ID and Acc number** is checked in the configuration program, you do not need to manually enter the pet ID and account number.

7.1.3.2 Emergency Registration

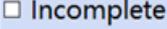
Click the **Emergency** button to automatically fill in the information in the **Edit information** pane, and manually select the examination site. If an emergency examination site has been configured in the configuration program, the examination site will be automatically selected.

7.1.3.3 Historical Search

Click the **Search** button on the main interface to jump to the **Search** interface, as shown below:

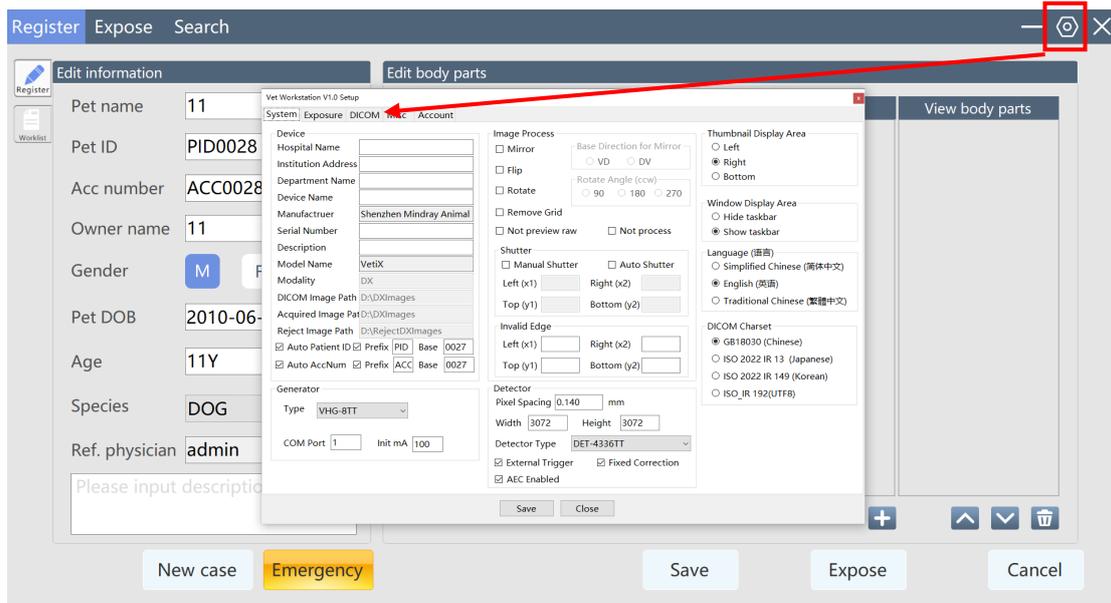
Pet ID	Pet name	Acc number	Owner name	Species	Age	Gender	View body parts	Exam date	Exam time	Image quantity	Print	Location
PID0041	EM210611174603	ACC0041	Owner2106111746	DOG	000D	O	SKULL(VD);SKULL(DV);SKULL LAT;	20210611	174603	5	Y	N
PID0040	EM210611174112	ACC0040	Owner2106111741	DOG	000D	O	SKULL(VD);SKULL(DV);SKULL LAT;	20210611	174112	15	N	N
PID0037	EM210611161346	ACC0037	Owner2106111613	DOG	0D	O	SKULL(VD);SKULL(DV);SKULL LAT;	20210611	173838	6	N	N
PID0113	EM210609181424	ACC0113	Owner2106091814	DOG	001D	O	SKULL(VD);SKULL(DV);SKULL LAT;CH...	20210611	085458	4	Y	N
PID0036	22	ACC0036	2	OTHERS	001Y	M	LEFT LAT;	20210610	160229	1	Y	N
PID0035	44	ACC0035	44	DOG	004Y	M	ABDOMEN(VD);	20210610	160148	1	N	N
PID0034	rewq	ACC0034	ewq	CAT	011Y	M	ABDOMEN(VD);	20210610	160109	1	Y	N
PID0101	5432	ACC0101	44	CAT	3Y	M	ABDOMEN(VD);	20210610	155416	2	N	N
PID0080	EM	ACC0080	Owner	DOG	000D	F	颅骨正位(VD);颅骨正位(DV);颅骨侧位;	20210610	153306	1	Y	N
PID0033	zhuo la	ACC0033	5 g	CAT	002Y	M	ABDOMEN(VD);	20210610	150827	3	Y	N
PID0116	EM210609183243	ACC0116	Owner2106091832	DOG	1D	O	SKULL(VD);SKULL(DV);SKULL LAT;	20210610	112548	2	N	N
PID0031	EM210610111839	ACC0031	Owner2106101118	DOG	000D	O	SKULL(VD);SKULL(DV);SKULL LAT;	20210610	111839	1	Y	N
PID0030	EM210609191323	ACC0030	Owner2106091913	DOG	000D	O	SKULL(VD);SKULL(DV);SKULL LAT;	20210609	191323	4	Y	N
PID0111	jerry	ACC20210...	tom	CAT	001D	F	SKULL(VD);SKULL(DV);SKULL LAT;	20210609	170432	4	Y	N
PID0099	444	ACC0099	4	DOG	4Y	M	ABDOMEN(DV);	20210609	162816	1	Y	N
asfda	asf	asf	asf	DOG	0D	F	SPINE(VD);	20210609	150454	8	N	N
PID0103	EM210609134028	ACC0103	Owner2106091340	DOG	000D	O	SKULL(VD);SKULL(DV);SKULL LAT;	20210609	134029	9	Y	N
PID0102	EM210609115120	ACC0102	Owner2106091151	DOG	000D	O	SKULL(VD);SKULL(DV);SKULL LAT;	20210609	115120	1	Y	Y
PID0092	EM210609111811	ACC0092	Owner2106091118	DOG	000D	O	颅骨正位(VD);颅骨正位(DV);颅骨侧位;	20210609	111811	3	N	N
PID0091	EM210609111504	ACC0091	Owner2106091115	DOG	000D	O	颅骨正位(VD);颅骨正位(DV);颅骨侧位;	20210609	111504	1	N	N
PID0090	EM210609111324	ACC0090	Owner2106091113	DOG	000D	O	颅骨正位(VD);颅骨正位(DV);颅骨侧位;	20210609	111324	1	N	N
PID0080	EM210609104913	ACC0080	Owner2106091049	DOG	000D	O	颅骨正位(VD);颅骨正位(DV);颅骨侧位;	20210609	104913	1	Y	N
PID0079	EM210609104232	ACC0079	Owner2106091042	DOG	000D	O	颅骨正位(VD);颅骨正位(DV);颅骨侧位;	20210609	104232	10	N	N
PID0078	newcase1	ACC0078	22	CAT	24M	M	腹部正位(VD);	20210609	103433	7	N	N
TT	TT	1	4	CAT	4Y	M	腹部正位(VD);	20210608	213555	3	N	N
PID0077	223	ACC0077	333	CAT	3Y	M	腹部正位(VD);	20210608	213332	3	N	N
PID0063	4	ACC0063	4	DOG	004Y	M	腹部正位(VD);	20210608	210735	3	N	N

Total: 85 Lock Unlock Modify Delete Export

Check the **Incomplete** button  and then the  button to query the incomplete cases. Double-click an incomplete case to jump to the registration interface and automatically fill in the case information.

7.1.3.4 Worklist Query

Click the setting button  in the upper right corner of the main interface to enter config settings, as shown below:

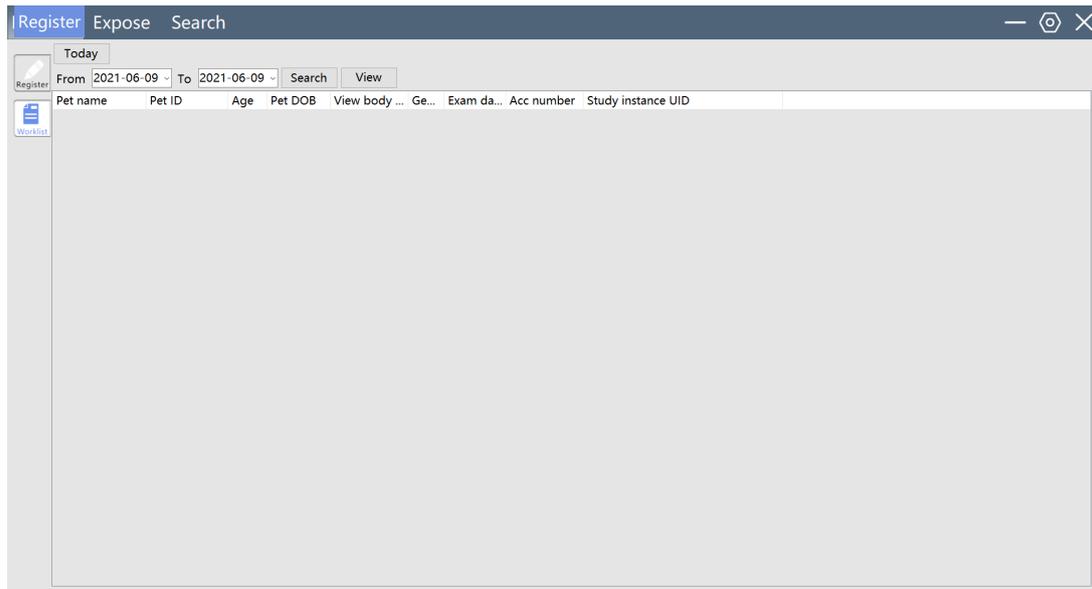


Click **DICOM** to enter the DICOM setting interface, as shown below:

DICOM Entity					
	Called AE	IP Address	Port	Calling AE	
Store1	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input checked="" type="checkbox"/> Enabled <input type="button" value="Echo"/>
Store2	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="checkbox"/> Enabled <input type="button" value="Echo"/>
Store3	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input checked="" type="checkbox"/> Enabled <input type="button" value="Echo"/>
Store4	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="checkbox"/> Enabled <input type="button" value="Echo"/>
Store5	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="checkbox"/> Enabled <input type="button" value="Echo"/>
Store6	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="checkbox"/> Enabled <input type="button" value="Echo"/>
Worklist	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input checked="" type="checkbox"/> Enabled <input type="button" value="Echo"/>
Printer1	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input checked="" type="checkbox"/> Enabled <input type="button" value="Echo"/>
Printer2	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="checkbox"/> Enabled <input type="button" value="Echo"/>

Fill in the **Called AE**, **IP Address**, **Port**, and **Calling AE** corresponding to the worklist workstation in the Worklist option, check **Enabled**, click **Echo** to test whether the worklist workstation is connected successfully, and click **Save** to restart the software. If the worklist workstation is connected successfully, click **Worklist** on the **Register** interface to jump to

the  worklist interface, as shown below:



Click the **Search** button to query the cases registered on the worklist workstation. You can query the cases registered on the worklist workstation by date: click the **Today** button

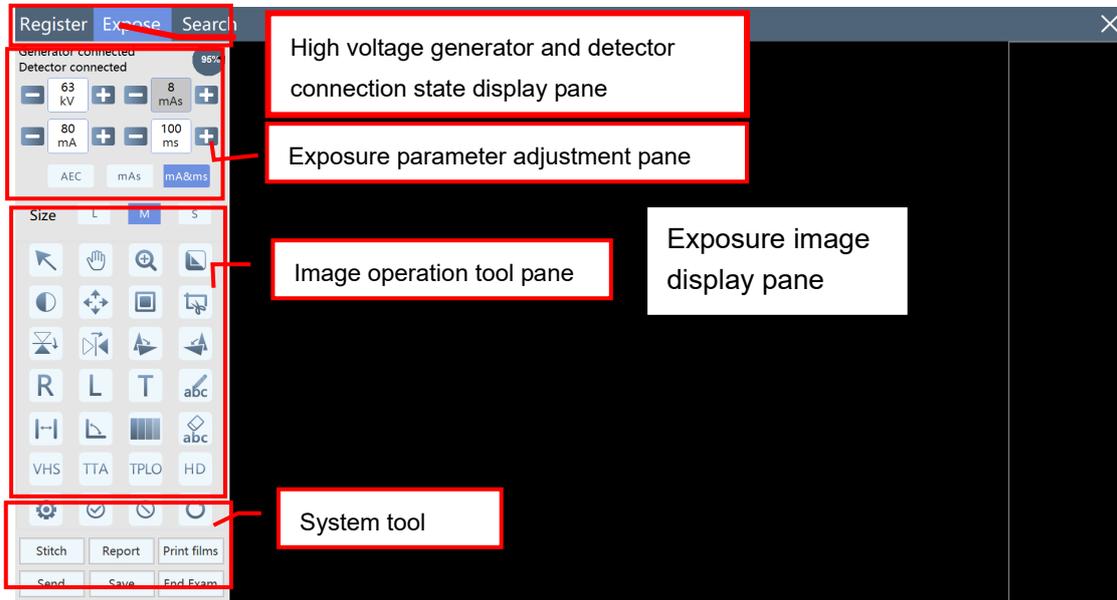
Today to display in the list all the cases registered today; select a date, and click the

Search button **Search** to display in the list the cases registered in a certain

period. Select a case, click the **View** button **View** or double-click the case to jump to the **Register** interface and automatically fill in the relevant information of the case.

7.1.4 Examination

After the case registration is completed, click **Exposure** to enter the **Exposure** interface, as shown below

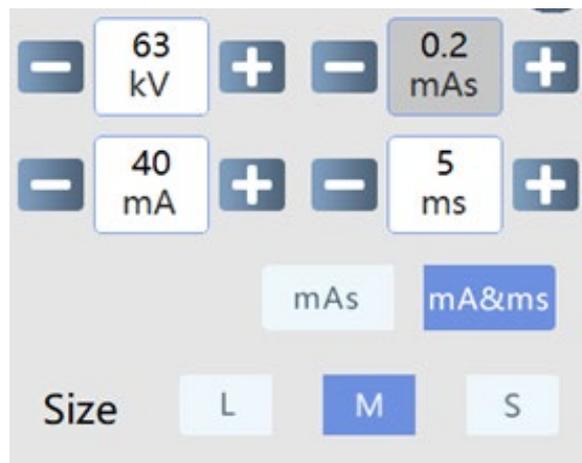


7.1.4.1 Image Acquisition

After entering the exposure interface, the system automatically matches the exposure parameters according to the selected site (the user can appropriately adjust the parameter size according to the actual condition of the pet). After the parameters are adjusted, press the hand switch key to perform exposure and image acquisition. The interface after image acquisition is shown below:



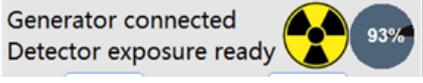
Adjust the parameters appropriately according to the pet body shape to obtain high-quality images. The exposure parameters can be adjusted as follows:



Click the **mAs** and **mA&ms** buttons to switch the mAs/mA&ms mode. When **mAs** is disabled in gray, the system is in the **mA&ms** mode, and only the mA and ms values can be adjusted; when **mA&ms** is disabled in gray, the system is in the **mAs** mode, and only the mAs value can be adjusted;

Click **L**, **M**, and **S** to switch between large, medium, and small body shapes, and the dose parameters will change accordingly;

Note: When the  icon is displayed in pane ①, exposure can be performed, as

shown below: 

7.1.4.2 Image Processing

After an image is acquired, you can process the image, including zooming-in, getting a negative image, clipping, rotating, and adding tags.



The image processing tools are shown as follows:



Scroll the mouse wheel to zoom the image; right-click to adjust the window width and level of the image.

Click the  button to drag the marks, notes, etc.;

Click the  button to drag the image;

Click the  button to zoom in and view a local area of the image;

Click the  button to adjust the window width and window level of the image;

Click the  button to perform the negative image operation;

Click the  button to select a clipping area;

Click the  button to confirm clipping;

Click the  button to remember the size of the last clipped area;

Click the  button to perform vertical mirroring of the image;

Click the  button to perform horizontal mirroring of the image;

Click the  button to rotate the image by 90° clockwise;

Click the  button to rotate the image by 90° counterclockwise;

Click the  button to add a right marker to the image;

Click the  button to add a left marker to the image;

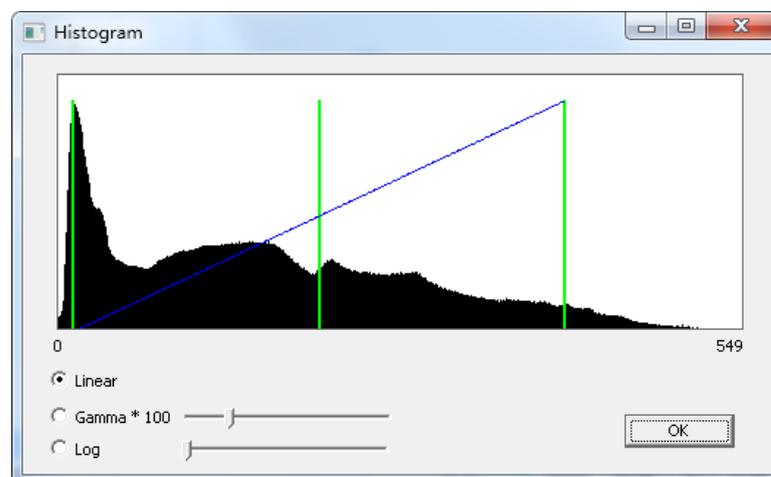
Click the  button to add text tag to the image;

Click the  button to write all the markers on the image into the image;

Click the  button to measure the length of the image;

Click the  button to measure the angle of the image;

Click the  button to display the image histogram, as shown below:



You can mark off on the image to measure the linear gray scale of the image, or adjust the image contrast through the image histogram;

Click the  button to cancel all the unwritten markers and tags from the image;

Click the  button to measure the vertebral heart scale (VHS);

Click the  button to measure the tibial tuberosity advancement (TTA);

Click the  button to measure the tibial plateau leveling osteotomy (TPLO).

Click the  button to measure the hip dysplasia (HD).

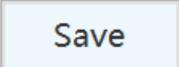
Click the  button to adjust the post-processing parameters and save the adjusted parameters in the configuration program; the post-processing parameters of this examination site will be applied to the subsequent examination;

Click the  button accept the exposure image;

Click the  button reject the exposure image;

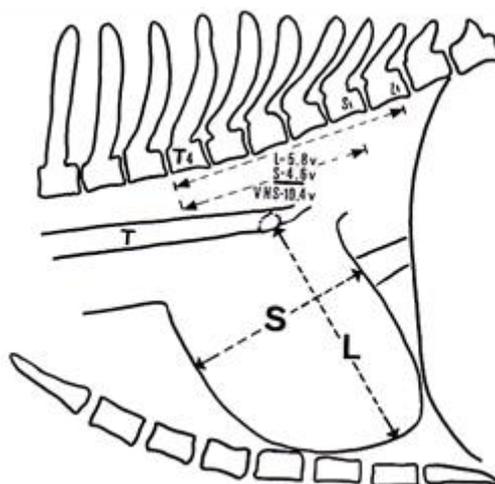
Click the  button (resetting button) to reset the processed image;

Panorama stitching function: Click the  button to stitch multiple images;

Image saving: Click the  button to save the image;

Ending examination: Click the  button to end the examination of the current case.

7.1.4.2.1 VHS Measuring Function



Measuring method:

Step 1: Click the **VHS** button on the exposure interface to display the VHS measurement tool on the image;

Step 2: Measure the long axis of the heart (L);

Put the first point pl1 on the ventral margin of the left main bronchial bifurcation, and the second point pl2 on the apex of heart (the farthest point on the ventral contour of the cardiac radiograph). The size reflects the overall size of the left atrium and left ventricle;

Step 3: Measure the short axis of the heart (S);

Draw a vertical line of the long axis from the midpoint at the intersection of the posterior edge of the heart and the posterior vena cava, and place points ps1 and ps2 at the two intersections of this vertical line and the heart contour respectively;

Step 4: Measure the distance from the fourth vertebra to the ninth vertebra.

Place the point pv1 at the front end of the fourth vertebra and the point pv2 at the end of the ninth vertebra.

Measurement result: VHS (v) = pl1-pl12 (long axis) + ps1-ps2 (short axis)

The result is expressed in the unit of vertebral length (v). The sum of the pressures on the two axes constitutes the VHS, and the data is expressed as the mean \pm SD (standard deviation). The long axis and short axis measurements are compared with the distance from the fourth vertebra to the ninth vertebra in the chest, and the result of each axis is obtained.

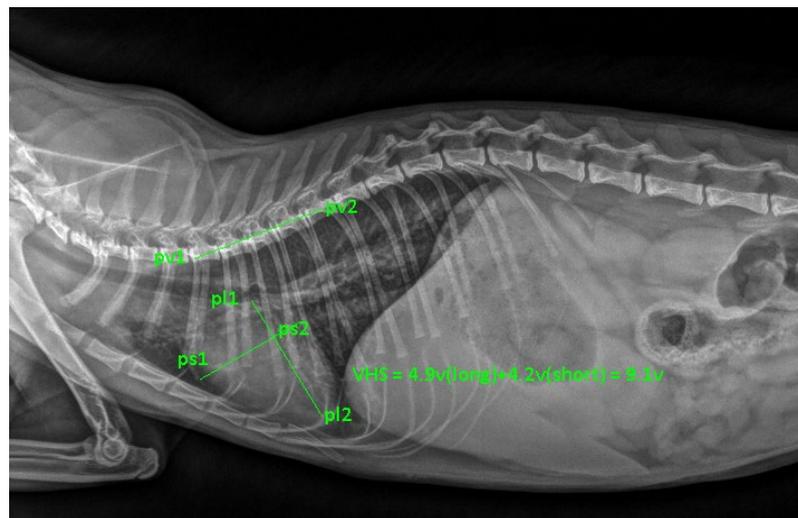
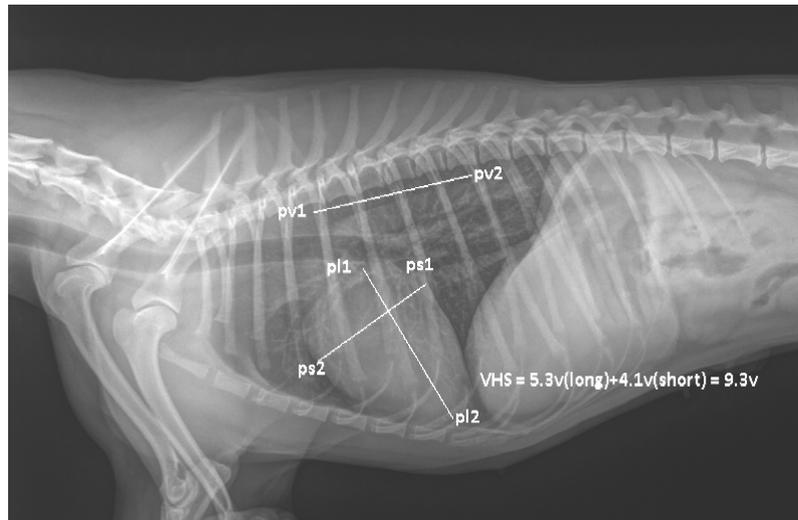
Note:

1. The image is a chest lateral position image;
2. To obtain the accurate measurement results of VHS method, the lines pl1-pl2 and ps1-ps2 should be vertical (90°) or nearly vertical to each other.

Normal range of the VHS value:

Dog: VHS = 9.7 ± 0.5 v;

Cat: VHS < 8 v.

Example:**7.1.4.2.2 TTA Measuring Function****Measuring method:**

Step 1: Click the **TTA** button on the exposure interface to display the TTA measurement tool on the image;

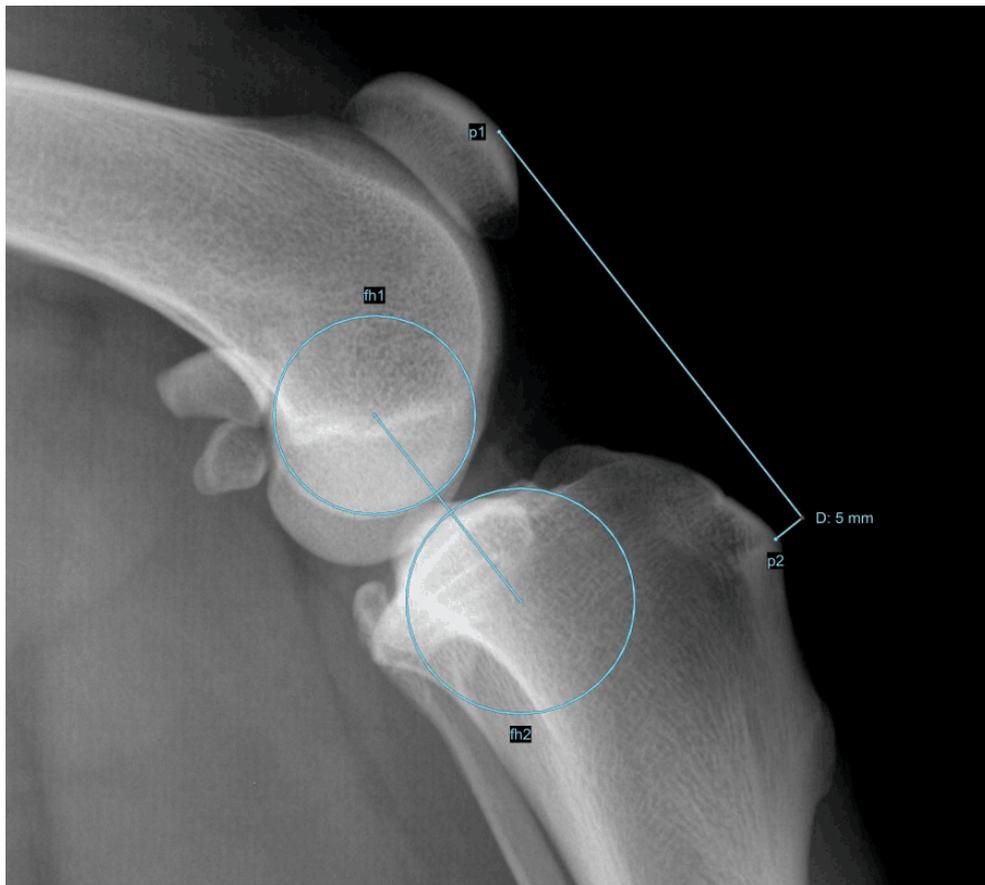
Step 2: Place the first circle, in which the center point is the center (fh1) of femoral joint;

Step 3: Place the second circle, in which the center point is the center (fh2) of tibial joint;

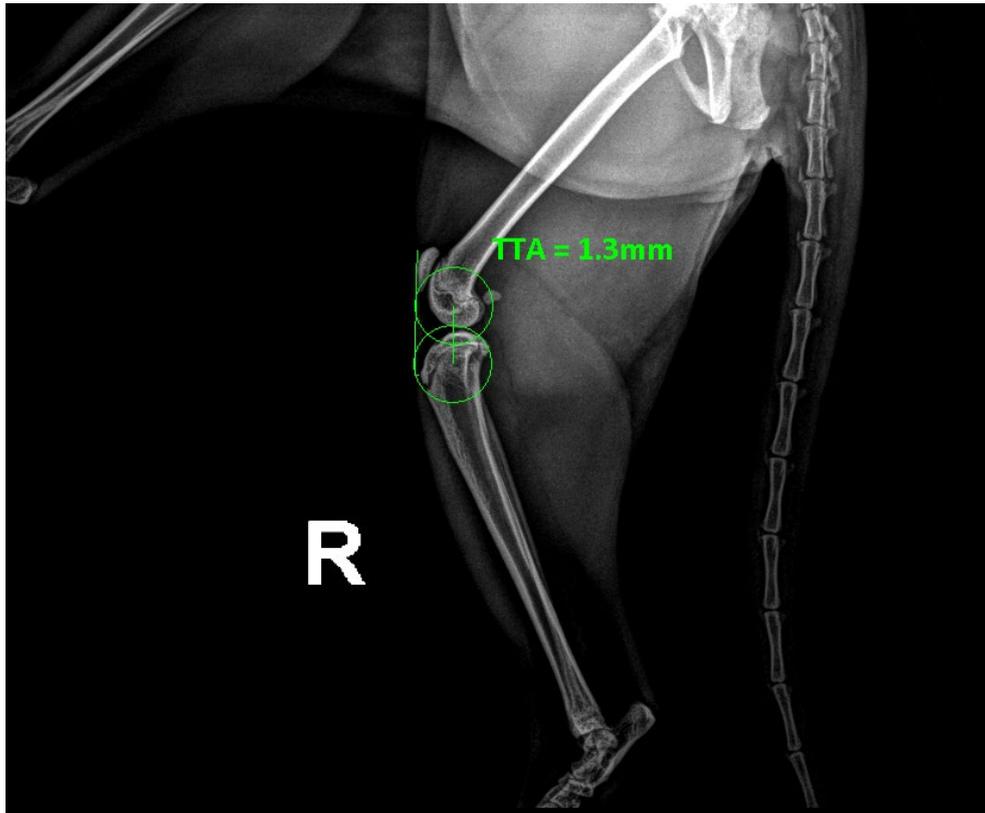
Step 4: Place the point p1 at the tip of the patella;

Step 5: Place the point p2 on the tibial tubercle.

The TTA measurement results can be obtained after you perform the above steps. See the figure below:



Example:



7.1.4.2.3 TPLO Measuring Function

The TPLO function is used to measure the tibial plateau angle and tibial inclination.

Measuring method:

Step 1: Click the **TPLO** button on the exposure interface to display the TPLO measurement tool on the image;

Step 2: Draw a line (line 1) on the head (p1) and tail (p2) of the tibial plateau;

Step 3: Draw another line (line 2) between the tibial intercondylar tubercle (p3) and the talus center (p4);

Step 4: Draw a vertical line 3 of line 2 at the intersection of the two lines.

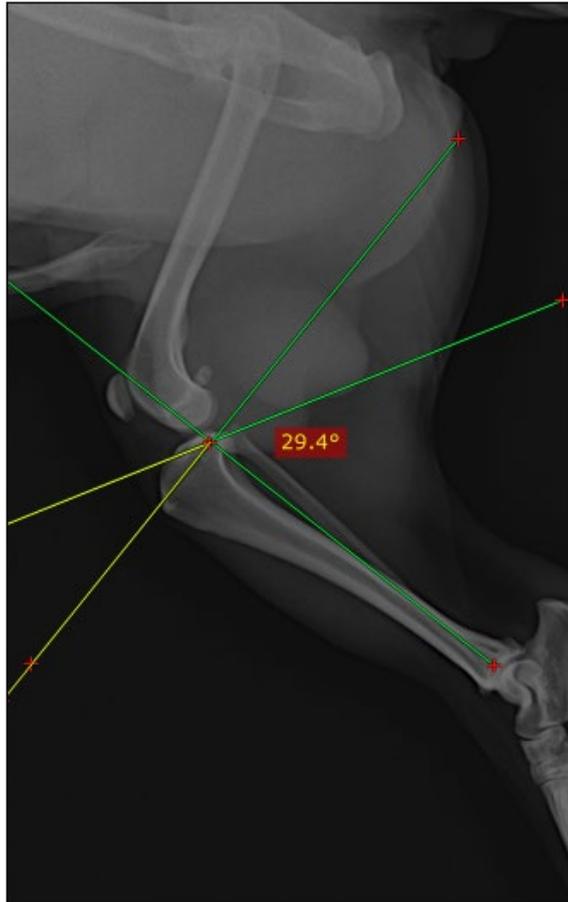
Measurement result:

The angle obtained is the included angle of line 1 and line 3, that is, the tibial plateau angle.

Note:

The image requires complete tibia so that the talus center (p4) can be obtained conveniently.





7.1.4.2.4 HD Measuring Function

Measuring method:

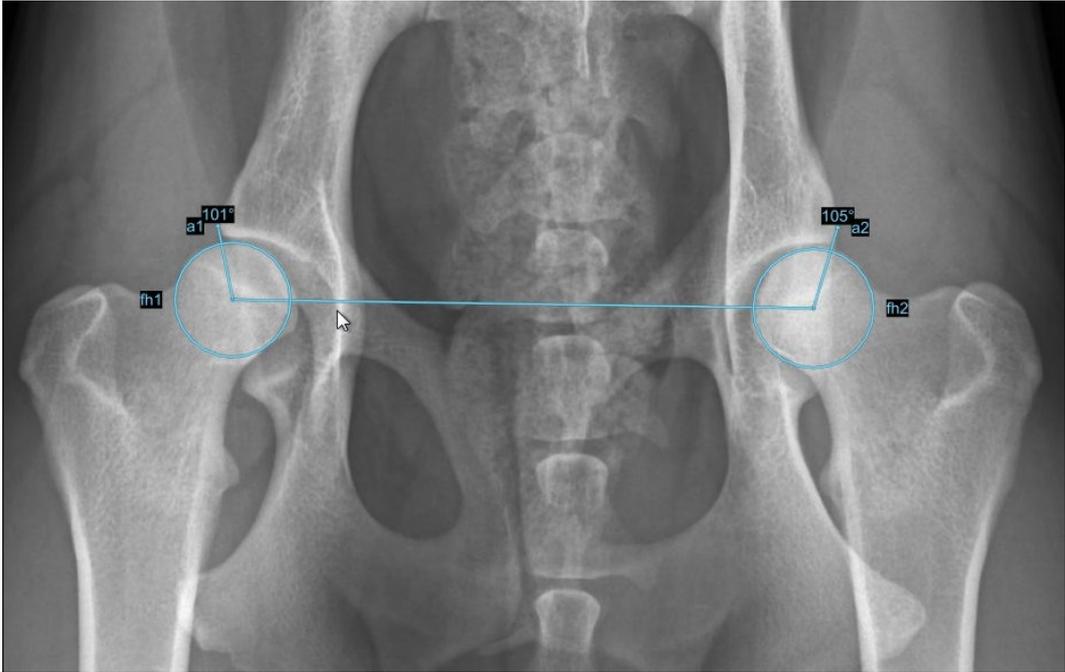
Step 1: Click the **HD** button on the exposure interface to display the HD measurement tool on the image;

Step 2: Place the centers of the two circles on the centers of the two femurs respectively;

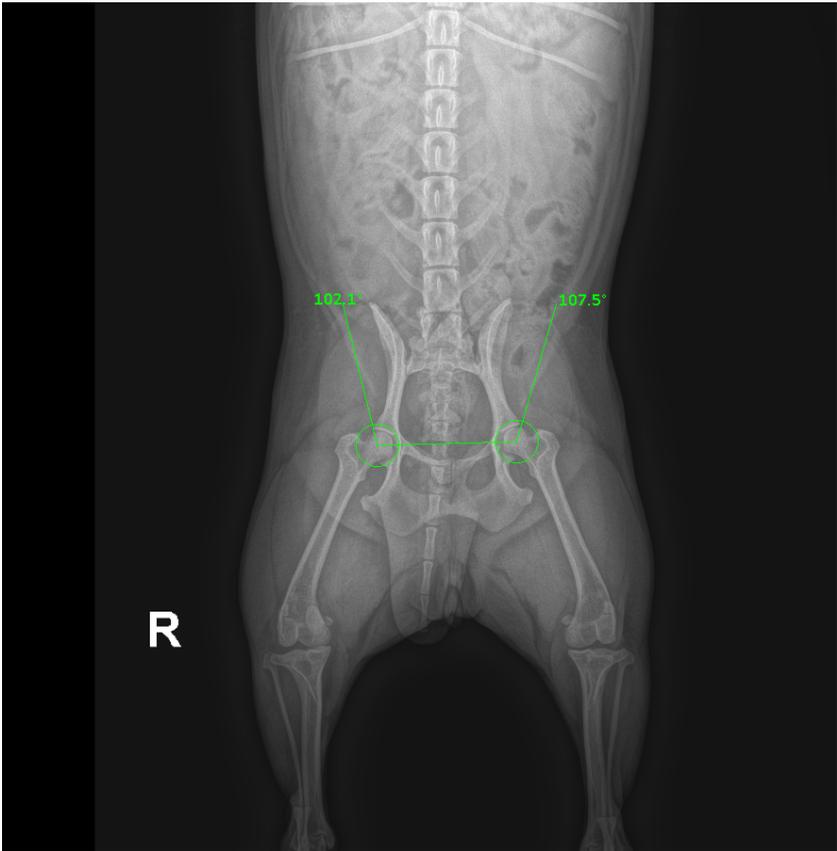
Step 3: Make a straight line from the center of the femoral head to the anterior margin of the acetabulum;

Measurement result:

The included angle between the straight line and the connecting line of the centers of two circles in step 3 is the measurement result; a smaller angle indicates more severe joint laxity.



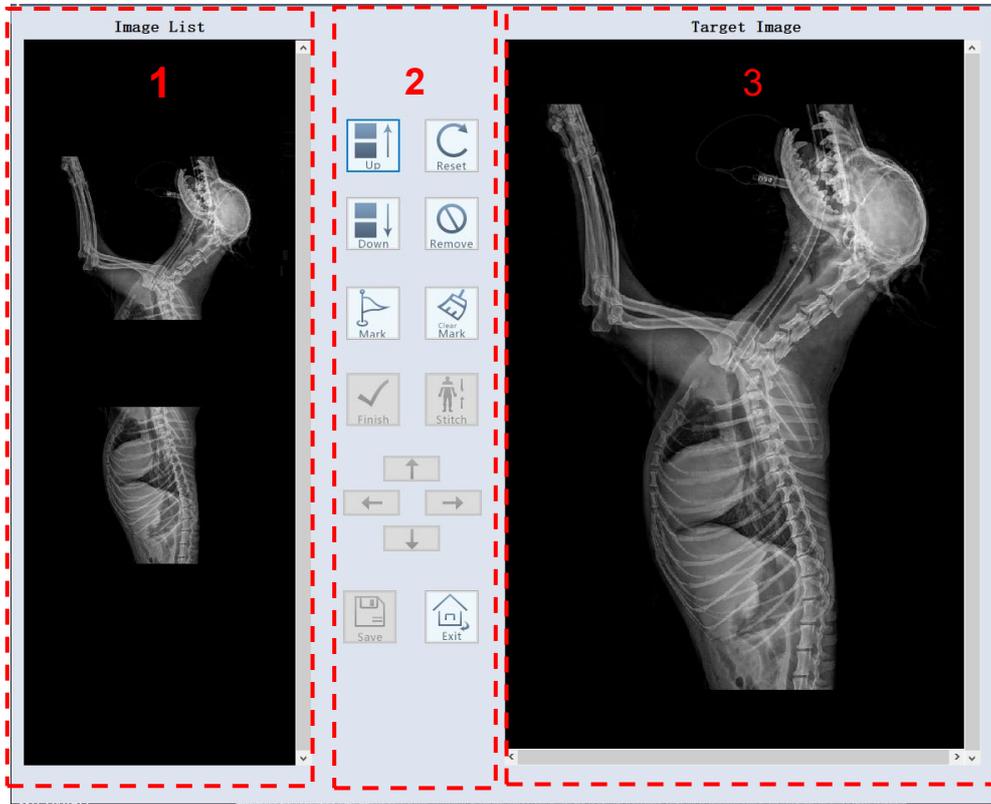
Example:



7.1.5 Stitching Function

Stitch

After the image is saved, click the  button to enter the stitching interface, as shown below:



[1] indicates the list of images to be stitched, [2] indicates the toolbar, and [3] indicates the preview box of the stitching result;

Click the  button to reset all the images to the initial state;

Click the  button to move the selected image up in the list;

Click the  button to move the selected image down in the list;

Click the  button to remove the selected image from the list;

Click the  button, and then right-click on the image to mark a stitching point;



Click the  button to delete the selected marked point (you can click to select a marked point);



Click the  button to complete the marking.



Click the  button to stitch the images in the preview box according to the positions of marked points;



Click the  button to fine tune the selected image upward in the preview box;



Click the  button to fine tune the selected image rightward in the preview box;



Click the  button to fine tune the selected image downward the preview box;



Click the  button to fine tune the selected image leftward in the preview box;



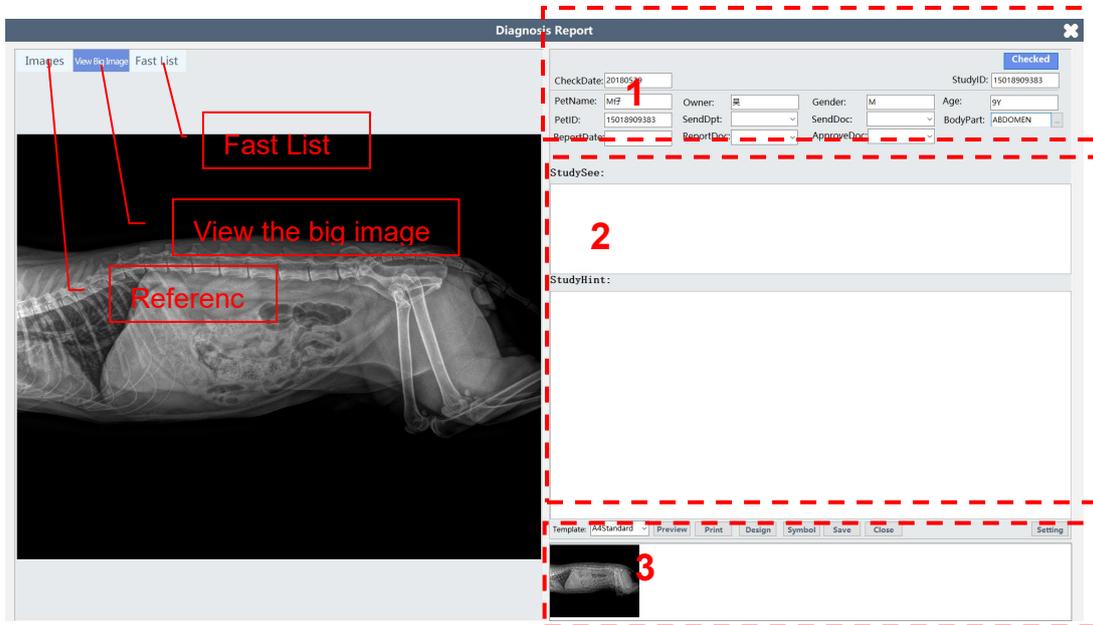
Click the  button to save the image in the preview box in the local computer;



Click the  button to exit the stitching program.

7.1.6 Report Printing Function

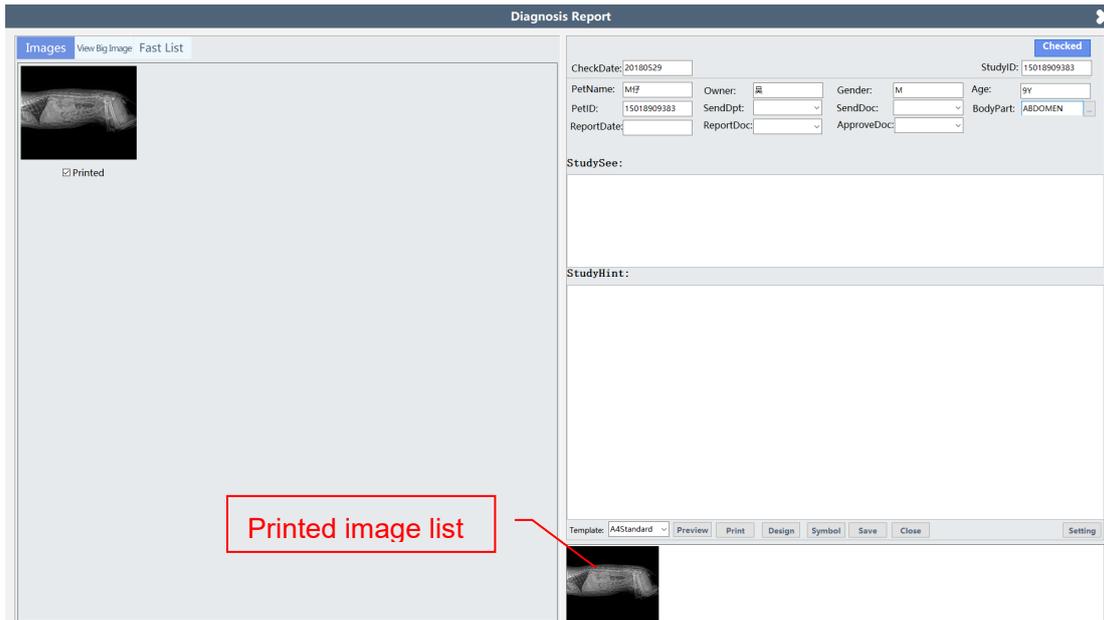
After the image is saved successfully, click the  button to enter the report interface, as shown below:



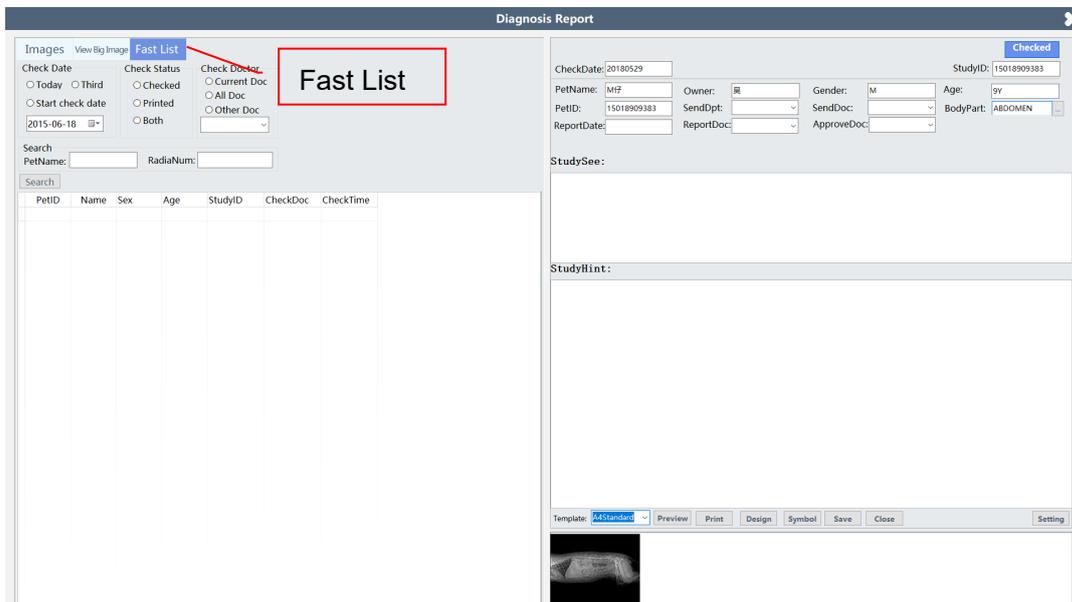
The viewing pane is on the left, including **Images**, **View Big Image**, and **Fast List**.

The editing pane is on the right, including [1] the report basic information editing pane, [2] image diagnosis editing pane, and [3] the report page editing pane.

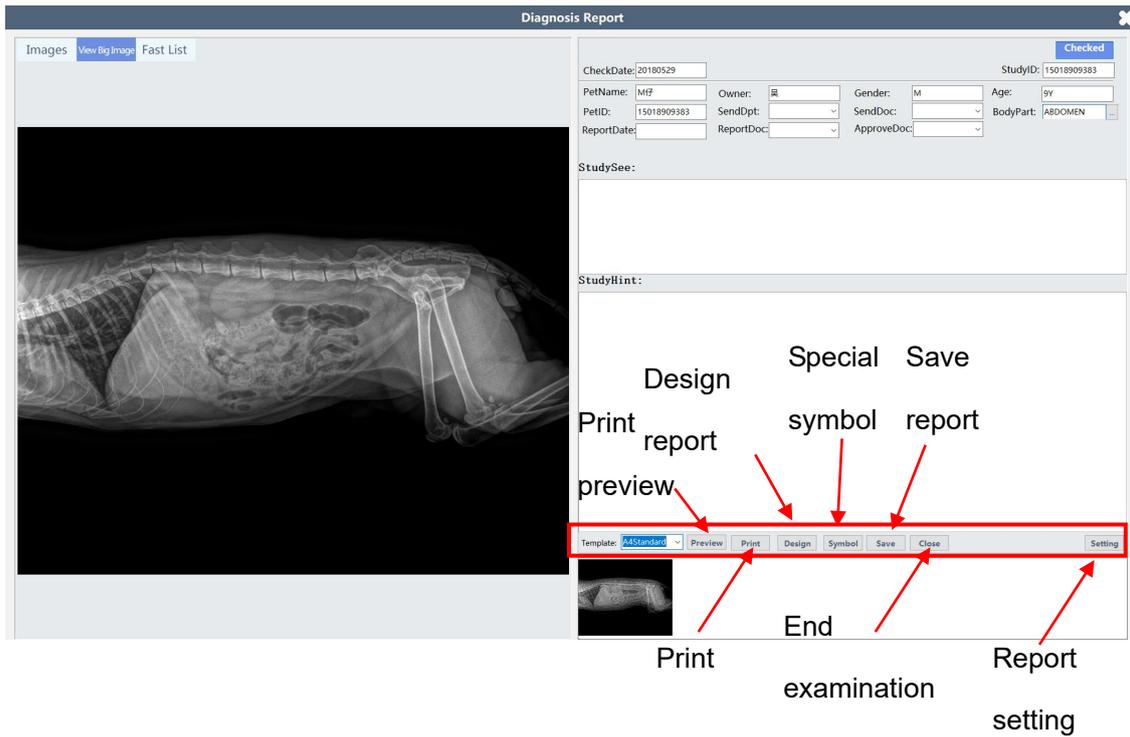
On the viewing pane, check the **Printed** check box  under the image thumbnail to add the image to the printed image list; uncheck the box to remove the image from the printed image list:



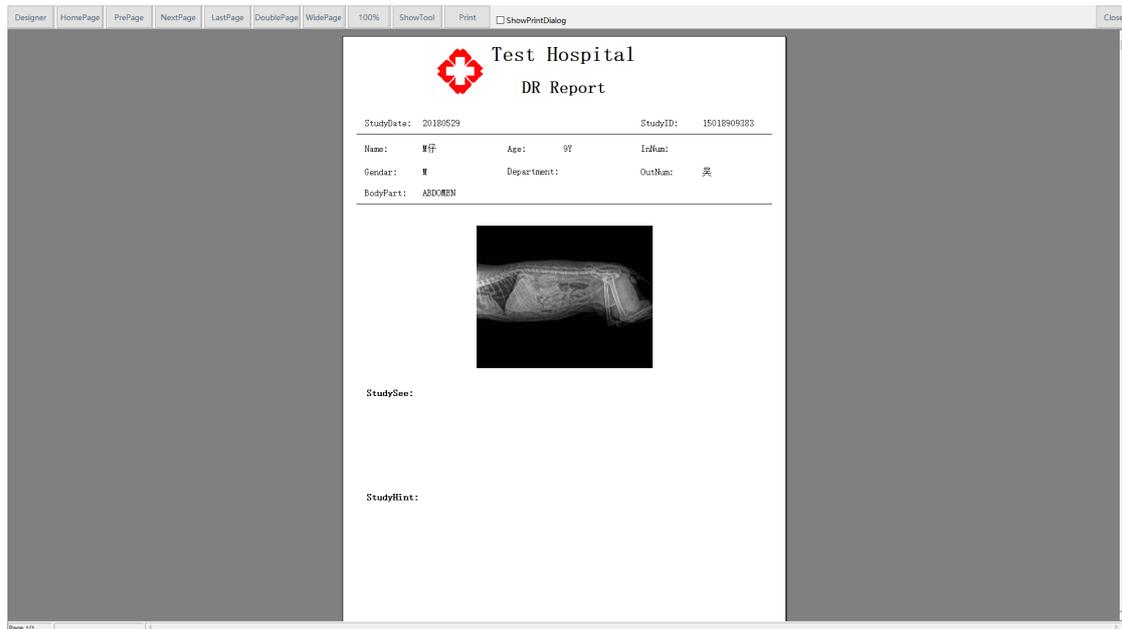
On the **Fast List** pane **Fast List**, you can search the qualified pets according to query criteria. Double-click a record in the Quick List to see the details of the pet on the report pane on the right:



The report editing pane is on the right side of the interface; the report tools are as follows in the figure: 1. **Preview** (print preview), 2. **Print**, 3. **Design** (design report), 4. **Symbol** (special symbol); 5. **Save** (save report), 6. **Close** (end examination), 7. **Setting** (report setting)

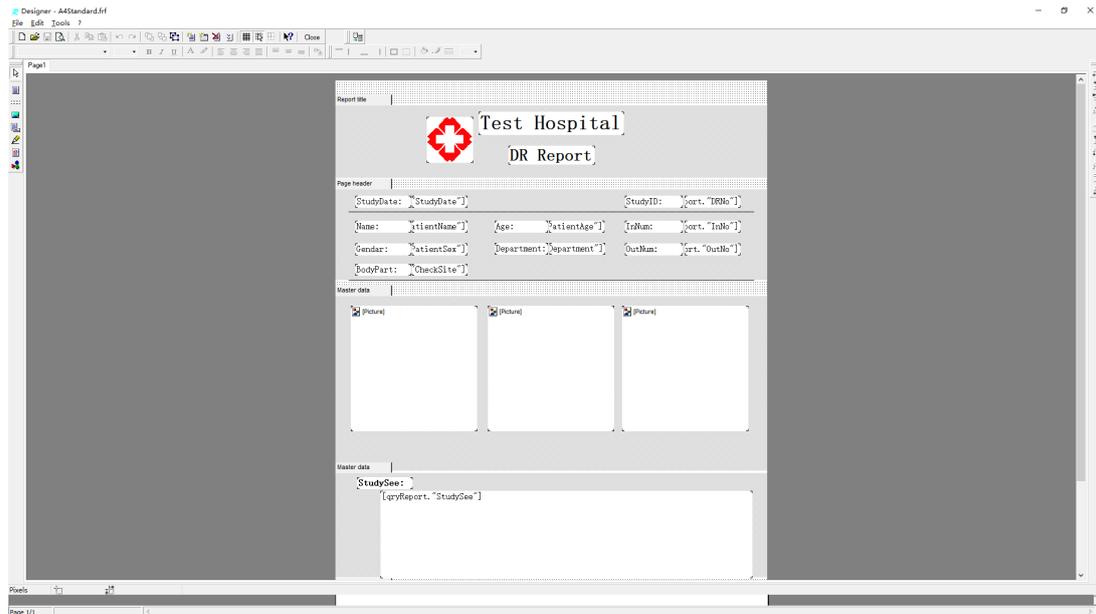


1. **Preview:** You can preview the report before printing.

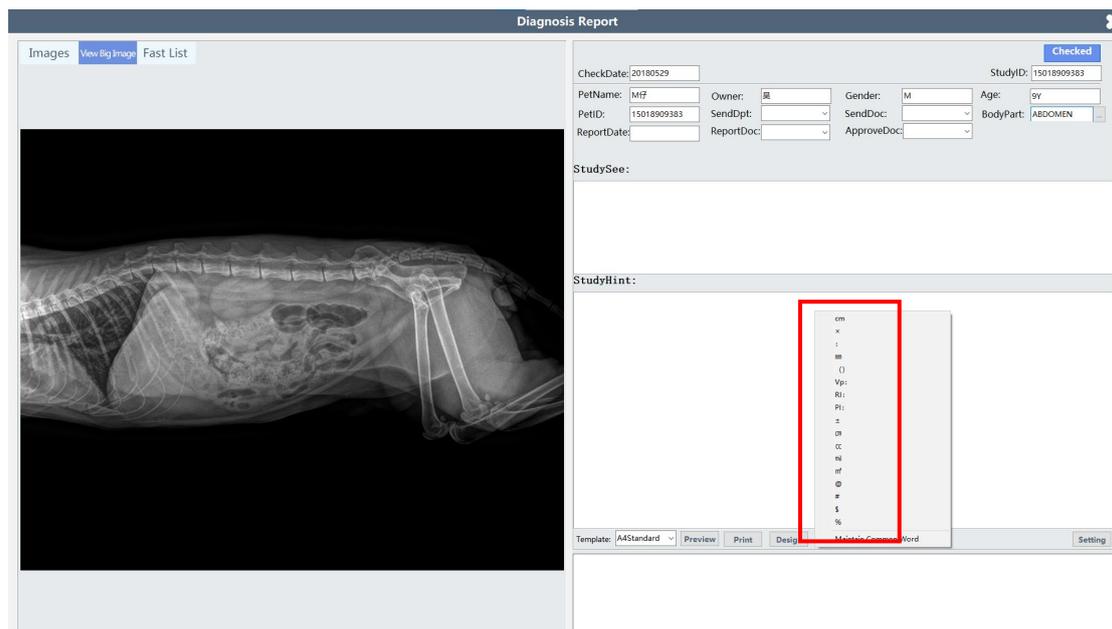


2. **Print:** Click **Print** to print the report.

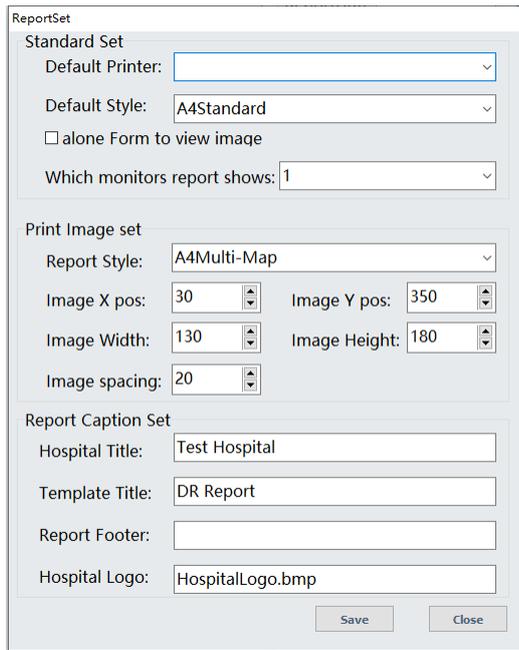
3. **Design:** To modify the report, please contact the customer service engineer.



4. **Symbol:** You can dynamically maintain some special characters and symbols commonly used when preparing a report.

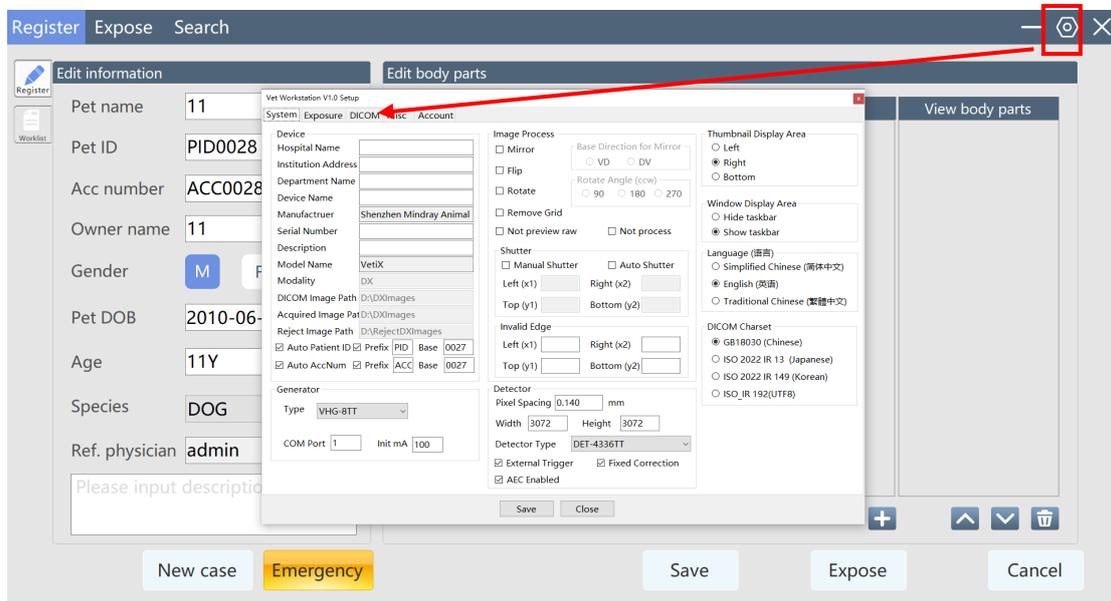


5. **Save:** Save the pet diagnosis information to the database. You can call or modify the information directly when opening the pet report next time.
6. **Close:** Click the button to exit the diagnostic report.
7. **Setting:** To modify the settings, please contact the customer service engineer.



7.1.7 Printing Films

Click the setting button  in the upper right corner of the main interface to enter config settings, as shown below:



Click **DICOM** to enter the DICOM setting interface, as shown below:

DICOM Entity						
	Called AE	IP Address	Port	Calling AE		
Store1	<input type="text" value="View"/>	<input type="text" value="127.0.0.1"/>	<input type="text" value="1043"/>	<input type="text" value="Mindray"/>	<input checked="" type="checkbox"/> Enabled	<input type="button" value="Echo"/>
Store2	<input type="text" value="DICOM_STORAGE"/>	<input type="text" value="127.0.0.1"/>	<input type="text" value="32767"/>	<input type="text" value="Mindray"/>	<input type="checkbox"/> Enabled	<input type="button" value="Echo"/>
Store3	<input type="text" value="SCP"/>	<input type="text" value="127.0.0.1"/>	<input type="text" value="104"/>	<input type="text" value="Mindray"/>	<input checked="" type="checkbox"/> Enabled	<input type="button" value="Echo"/>
Store4	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="checkbox"/> Enabled	<input type="button" value="Echo"/>
Store5	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="checkbox"/> Enabled	<input type="button" value="Echo"/>
Store6	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="checkbox"/> Enabled	<input type="button" value="Echo"/>
Worklist	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input checked="" type="checkbox"/> Enabled	<input type="button" value="Echo"/>
Printer1	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input checked="" type="checkbox"/> Enabled	<input type="button" value="Echo"/>
Printer2	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="checkbox"/> Enabled	<input type="button" value="Echo"/>

Fill in the **Called AE**, **IP Address**, **Port**, and **Calling AE** corresponding to the printer in **Printer1** or **Printer2**, check **Enabled**, click **Echo** to test whether the printer is connected successfully, and click **Save** to restart the software.



After the exposure image is saved, click the **Print films** button to enter the print preview interface, as shown below:

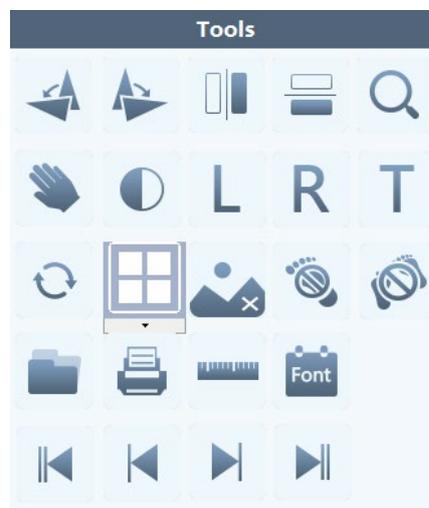


Here, [1] indicates the image preview pane, [2] indicates the **Params Setting** pane, and [3] indicates the image processing tool pane.

[2] Params Setting pane: Set the film label, type, size, orientation, etc.

Params Setting	
Film orientation	
<input checked="" type="radio"/> Portrait	<input type="radio"/> Landscape
Film session label	<input type="text"/>
Medium type	 BLUE FILM ▾
Film size id	 10INX12IN ▾
Film destination	 PROCESS ▾
Border density	 BLACK ▾
Empty image density	 BLACK ▾
Magnification type	 CUBIC ▾
<input checked="" type="checkbox"/> Trim	<input type="checkbox"/> Reverse

[3] Tools: You can use the corresponding tools to rotate, flip, zoom in, or measure the printed image, set negative image, set four corner tags, etc.



Click the  button to rotate the image by 90° to the left;

Click the  button to rotate the image by 90° to the right;

Click the  button to perform horizontal mirroring of the image;

Click the  button to perform vertical mirroring of the image;

Click the  button to zoom the image;

Click the  button to move the image;

Click the  button to turn the image to a negative image;

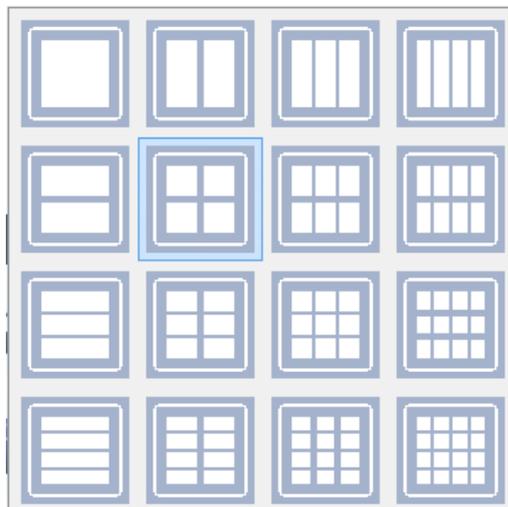
Click the  button to add a left marker to the image;

Click the  button to add a right marker to the image;

Click the  button to add a text marker to the image;

Click the  button (resetting button) to reset image;

Click the  button to start typesetting, including 16 typesetting modes: 1*1; 1*2; 1*3; 1*4; 2*1; 2*2; 2*3; 2*4; 3*1; 3*2; 3*3; 3*4; 4*1; 4*2; 4*3; 4*4, as shown below:



Click the  button to delete the selected image;

Click the  button to delete the selected marker;

Click the  button to delete all the markers;

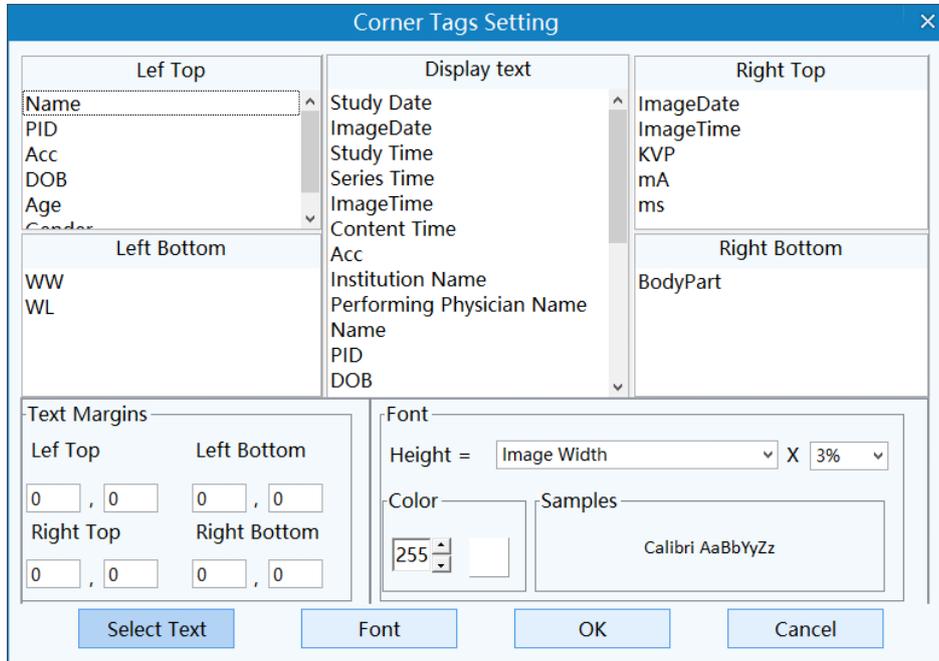
Click the  button to open an external image;



Click the button to display or hide the ruler;



Click the button to set the text tags displayed at the four corners and set the displayed font, as shown in the following figure:



Click the button to automatically preview the first image;



Click the button to preview the previous image;



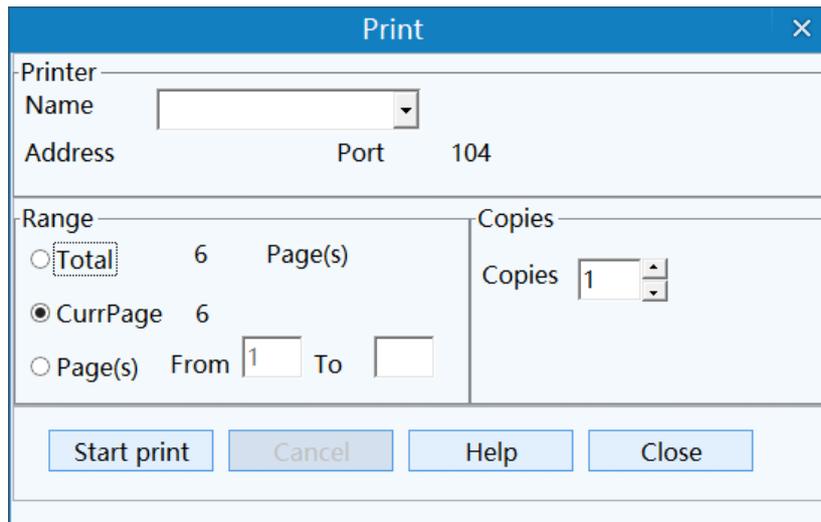
Click the button to preview the next image;



Click the button to preview the last image;



Click the button to enter the print setting interface, as shown below:

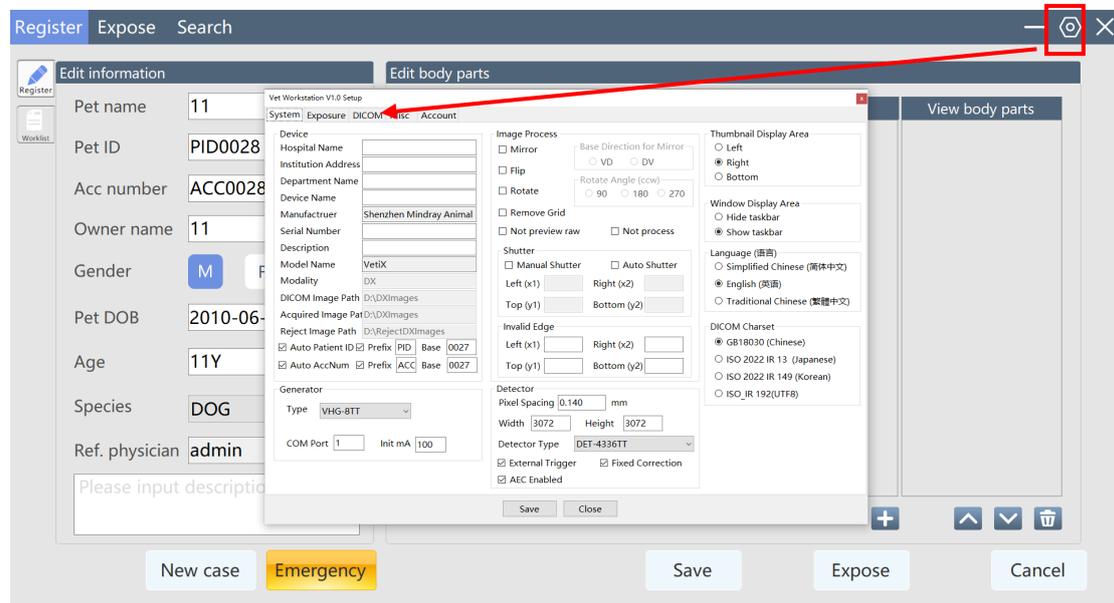


When the printer is successfully connected, select the configured printer name, printing range, and number of copies, and click the **Start print** button to start printing.

7.1.8 Sending Function



Click the setting button in the upper right corner of the main interface to enter config settings, as shown below:



Click **DICOM** to enter the DICOM setting interface, as shown below:

Vet Workstation V1.0 Setup

System Exposure DICOM Misc Account

DICOM Entity

	Called AE	IP Address	Port	Calling AE		
Store1	View	127.0.0.1	1043	Mindray	<input checked="" type="checkbox"/> Enabled	Echo
Store2					<input type="checkbox"/> Enabled	Echo
Store3					<input type="checkbox"/> Enabled	Echo
Store4					<input type="checkbox"/> Enabled	Echo
Store5					<input type="checkbox"/> Enabled	Echo
Store6					<input type="checkbox"/> Enabled	Echo
Worklist					<input checked="" type="checkbox"/> Enabled	Echo
Printer1					<input checked="" type="checkbox"/> Enabled	Echo
Printer2					<input type="checkbox"/> Enabled	Echo

Fill in the **Called AE**, **IP Address**, **Port**, and **Calling AE** corresponding to the PACS system in **Store1** or **Store2**, check **Enabled**, click **Echo** to test whether the PACS system is connected successfully, and click **Save** to restart the software. If the PACS system is successfully connected, and, after the case image on the exposure interface is saved, you click the sending button and the system prompts that the image is sent successfully, the case image can be viewed and processed in the PACS system.

7.1.9 Historical Search

Click **Search** to search or modify historical examination cases, as shown in the following figure:

Pet ID	Pet name	Acc number	Owner name	Species	Age	Gender	View body parts	Exam date	Exam time	Image quantity	Print	Lock
PID0041	EM210611174603	ACC0041	Owner2106111746	DOG	000D	O	SKULL(VD);SKULL(DV);SKULL LAT;	20210611	174603	5	Y	N
PID0040	EM210611174112	ACC0040	Owner2106111741	DOG	000D	O	SKULL(VD);SKULL(DV);SKULL LAT;	20210611	174112	15	N	N
PID0037	EM210611161346	ACC0037	Owner2106111613	DOG	0D	O	SKULL(VD);SKULL(DV);SKULL LAT;	20210611	173838	6	N	N
PID0113	EM210609181424	ACC0113	Owner2106091814	DOG	001D	O	SKULL(VD);SKULL(DV);SKULL LAT;CH...	20210611	085458	4	Y	N
PID0036	22	ACC0036	2	OTHERS	001Y	M	LEFT LAT;	20210610	160229	1	Y	N
PID0035	44	ACC0035	44	DOG	004Y	M	ABDOMEN(VD);	20210610	160148	1	N	N
PID0034	rewq	ACC0034	ewq	CAT	011Y	M	ABDOMEN(VD);	20210610	160109	1	Y	N
PID0101	5432	ACC0101	44	CAT	3Y	M	ABDOMEN(VD);	20210610	155416	2	N	N
PID0080	EM	ACC0080	Owner	DOG	000D	F	颅骨正位(VD);颅骨正位(DV);颅骨侧位;	20210610	153306	1	Y	N
PID0033	zhuo la	ACC0033	5 g	CAT	002Y	M	ABDOMEN(VD);	20210610	150827	3	Y	N
PID0116	EM210609183243	ACC0116	Owner2106091832	DOG	1D	O	SKULL(VD);SKULL(DV);SKULL LAT;	20210610	112548	2	N	N
PID0031	EM210610111839	ACC0031	Owner2106101118	DOG	000D	O	SKULL(VD);SKULL(DV);SKULL LAT;	20210610	111839	1	Y	N
PID0030	EM210609191323	ACC0030	Owner2106091913	DOG	000D	O	SKULL(VD);SKULL(DV);SKULL LAT;	20210609	191323	4	Y	N
PID0111	jerry	ACC20210...	tom	CAT	001D	F	SKULL(VD);SKULL(DV);SKULL LAT;	20210609	170432	4	Y	N
PID0099	444	ACC0099	4	DOG	4Y	M	ABDOMEN(DV);	20210609	162816	1	Y	N
asfda	asf	asf	asf	DOG	0D	F	SPINE(VD);	20210609	150454	8	N	N
PID0103	EM210609134028	ACC0103	Owner2106091340	DOG	000D	O	SKULL(VD);SKULL(DV);SKULL LAT;	20210609	134029	9	Y	N
PID0102	EM210609115120	ACC0102	Owner2106091151	DOG	000D	O	SKULL(VD);SKULL(DV);SKULL LAT;	20210609	115120	1	Y	Y
PID0092	EM210609111811	ACC0092	Owner2106091118	DOG	000D	O	颅骨正位(VD);颅骨正位(DV);颅骨侧位;	20210609	111811	3	N	N
PID0091	EM210609111504	ACC0091	Owner2106091115	DOG	000D	O	颅骨正位(VD);颅骨正位(DV);颅骨侧位;	20210609	111504	1	N	N
PID0090	EM210609111324	ACC0090	Owner2106091113	DOG	000D	O	颅骨正位(VD);颅骨正位(DV);颅骨侧位;	20210609	111324	1	N	N
PID0080	EM210609104913	ACC0080	Owner2106091049	DOG	000D	O	颅骨正位(VD);颅骨正位(DV);颅骨侧位;	20210609	104913	1	Y	N
PID0079	EM210609104232	ACC0079	Owner2106091042	DOG	000D	O	颅骨正位(VD);颅骨正位(DV);颅骨侧位;	20210609	104232	10	N	N
PID0078	newcase1	ACC0078	22	CAT	24M	M	腹部正位(VD);	20210609	103433	7	N	N
TT	TT	1	4	CAT	4Y	M	腹部正位(VD);	20210608	213555	3	N	N
PID0077	223	ACC0077	333	CAT	3Y	M	腹部正位(VD);	20210608	213332	3	N	N
PID0063	4	ACC0063	4	DOG	004Y	M	腹部正位(VD);	20210608	210735	3	N	N

Click the **Search** button to enter the historical search interface to query historical cases.

Enter a keyword in the input box to query the cases containing the keyword;

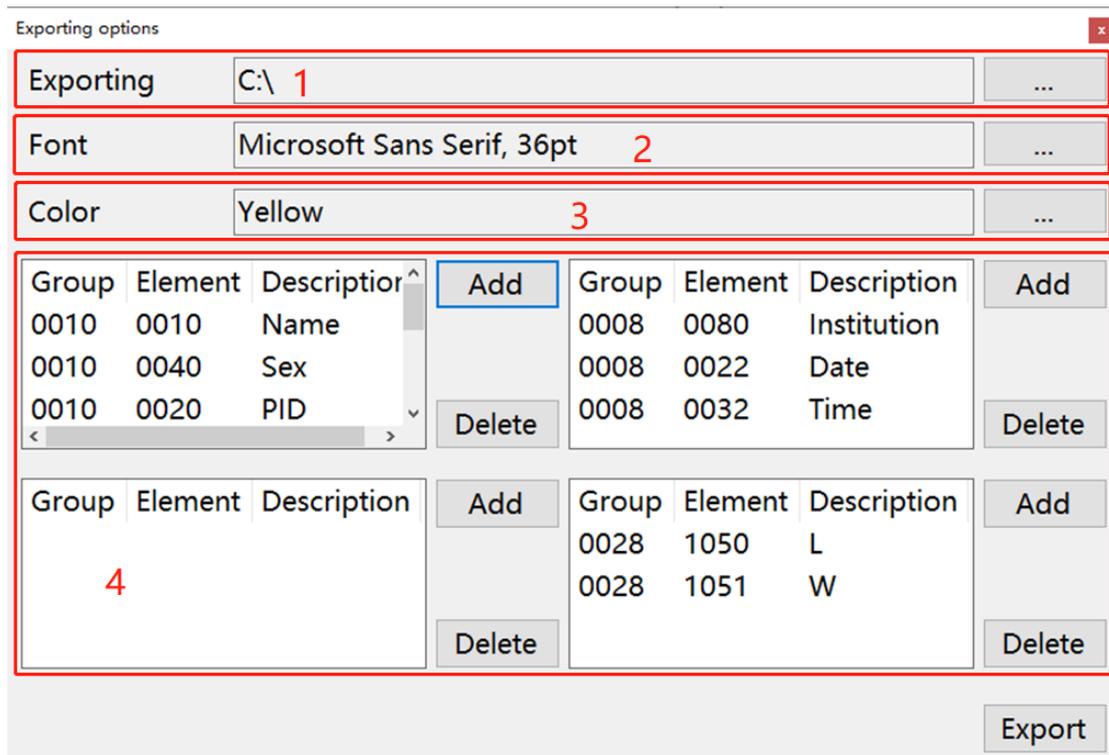
Check **Incomplete** **Incomplete**, and click **Query** to query incomplete cases;

Select a case, and click **Delete** to delete the case (the system cannot recover the deleted information after the deletion);

Select an incomplete case, and click **Modify** to jump to the login interface to modify the basic information of the case; select a completed case and click **Modify** to enter the exposure interface to view the image.

Select a completed case, and click **Lock** to lock the case, which cannot be deleted;

Select a completed case, and click **Export** to display the export interface, as shown below:



In the preceding figure:

[1] indicates the export path setting box; click the button on the right to select or change the export path;

[2] indicates the font setting box; click the button on the right to set the font and font size;

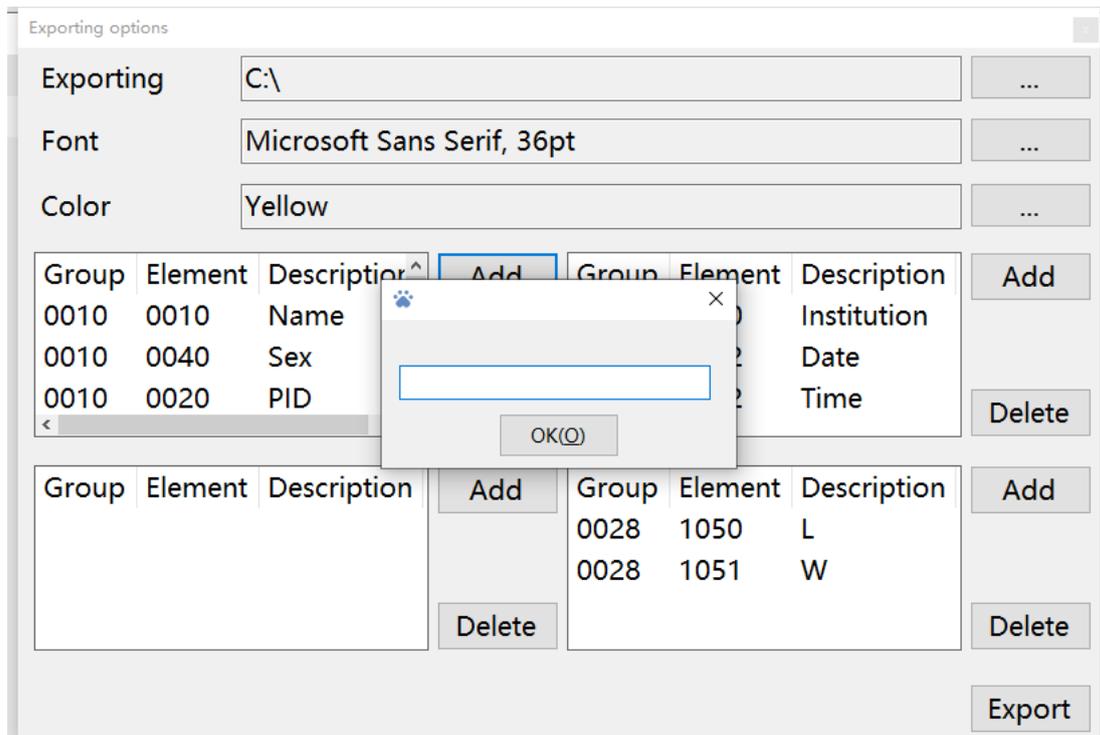
[3] indicates the font color setting box; click the button on the right to set the font color;

[4] indicates the box for setting the four corner information, and you can add or delete four corner information.

Adding four corner information: Click the **Add** button and enter content in the following format in the input box: gggg,eeee:dddd. Here, gggg indicates the group number of the DICOM tag to be displayed, eeee indicates the element number of the DICOM tag to be displayed, and dddd indicates the description, and the above information will be eventually displayed in front of the colon in front of the exported four corner information.

Example:

If you need to add a pet name to the lower left corner, click the **Add** button in the lower left box to display the input box, enter **0010,0010:Name** according to the format, and click the **OK** button to add the information successfully. See the figure below:



Exporting options

Exporting: C:\

Font: Microsoft Sans Serif, 36pt

Color: Yellow

Group	Element	Description	Add
0010	0010	Name	
0010	0040	Sex	
0010	0020	PID	Delete

Group	Element	Description	Add
0008	0080	Institution	
0008	0022	Date	
0008	0032	Time	Delete

Group	Element	Description	Add
			Delete

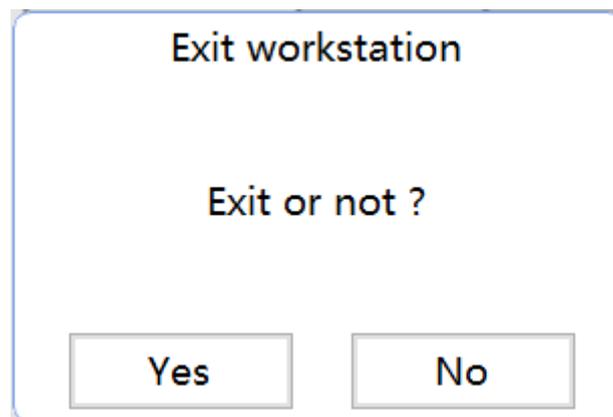
Group	Element	Description	Add
0028	1050	L	
0028	1051	W	

Export

Delete four corner information: Select a piece of four corner information and click **Delete** to delete it.

7.1.10 Exiting Software

Click the  button in the upper right corner of the main interface to display the following dialog box:



Click **Yes** to exit the system directly; click **No** to return to the main interface.

8 Operation Flow

8.1 Preparations before Radiography

- (1) Check whether the changes of power supply voltage and frequency are within the allowed ranges;
- (2) Check whether the ground wire of each part is connected well;
- (3) Check all the cables for unsafe points.

8.2 Precautions for Radiography

- (1) The equipment has the fault self-detection and indication functions. In case of a system fault, the corresponding fault code is displayed on the kV display window of the high voltage generator. The fault needs to be handled according to the measures recommended in the manual. Do not force exposure;
- (2) In case of a fault or other emergencies during system operation, please turn off the power switch immediately;
- (3) Do not modify the program or disassemble the machine without permission. Only the trained maintenance technicians can remove the generator cover. Remove the high-voltage cables from the high voltage generator and X-ray tube;
- (4) It is forbidden to use the system in an environment with explosive gas;
- (5) Do not place any objects within the moving range of the machine;
- (6) Before performing X-ray exposure, ensure that all necessary radiation protection measures have been taken;
- (7) Attach importance to the routine maintenance and regular maintenance and calibration of the equipment;
- (8) In case of a fault, record it in detail and notify the engineer to repair the equipment.

8.3 X-ray Radiography Procedure

- (1) Start and log in to the software system;
- (2) Register the basic pet information;
- (3) Select the species, examination site, and angle for exposure according to the situation;
- (4) Exposure operation: Press the exposure hand switch or wireless remote control (optional) to perform exposure. After obtaining the exposure image, you can use the software tool to process the image;
- (5) Saving: Click **Save** to save the required image.

9 Regular Maintenance

This manual involves routine maintenance only. Only trained and authorized professionals can conduct special maintenance or replace faulty components.

Note: Only trained and authorized professionals can conduct preventive and special maintenance.

9.1 Overview

Some parts of the equipment will age and wear due to the operating environment and conditions. After operation for a long term, safety of the equipment will gradually decrease. Regular inspection and maintenance of the equipment can protect pets and operators against accidental injury caused by reduced equipment safety.

9.2 Routine Maintenance

Set out below are some suggestions on routine maintenance that can be implemented by the user. The user can arrange the maintenance cycle according to the actual situation.

9.2.1 Software Maintenance

- (1) Check the error log. Clear the log file after completing analysis.
- (2) Use Windows system utilities to scan primary drive volume errors.
- (3) Verify whether the system fragmentations exceed 5%. Run the Windows defragmenter when needed.
- (4) Verify that the system is provided with the latest version of licensed software and that the licensing option has been in use.

9.2.2 Hardware Check

The operators must have been trained and learned relevant knowledge so that they can carry out the check work described in the table below. In case of a work fault or other symptoms deviating from the normal operation performance, the operators must shut down the equipment and notify the service agent. Operation of the X-ray equipment be restored only after the equipment is repaired. Using the system with faulty components may lead to safety problems, or expose the target to high radiation, resulting in unwanted radiation.

Time Interval	Check Items
Weekly	Check the signal, display, and LED Check whether each device operates normally Check whether warning and danger signs exist
Six months	Check the ground wire connection and grounding resistance value of the whole system Check the voltage value of the power supply Check connection of the external cables Check fixing and general conditions (dust, corrosion, etc.) of parts Calibrate the flat panel detector Simulate power failure and check whether the UPS can guarantee system endurance

9.3 Cleaning

⚠ Danger: Do not remove any chassis cover, and do not dismantle or process any internal components of the equipment. The above operations may cause severe personal injury and/or equipment damage.

⚠ Warning: Do not attempt to clean any equipment parts after the equipment is started. Before cleaning, always make sure that the system has been turned off and the main power supply has been disconnected.

Before operation every day, clean the parts coming into contact with patients and key parts such as the table panel, external housing of the detector, computer, and display.

Select a detergent meeting the requirements before cleaning. Pay attention to the following aspects when selecting a detergent:

Only soap and water can be used to clean the plastic surface. Using other detergents (such as a detergent with high content of alcohol) will darken the material or make it easily crack.

The selected disinfection methods must comply with the effective laws and regulations and the guidelines on disinfection and explosion protection. Never use corrosive, soluble, or gaseous disinfectants.

⚠ Note: Do not use any corrosive solvent, abrasive detergent, or polishing agent.

Observe the following requirements during cleaning:

- (1) Turn off the power supply before cleaning the X-ray equipment. The equipment is still electrified in a period of time after that. Please pay attention to electrical safety during cleaning.
- (2) Make sure that no water or other liquid can enter the X-ray equipment. This prevents short circuit in the electrical system and corrosion of components.

- (3) Be sure to use a wet cloth and neutral detergent to wipe the enamel parts and aluminum surfaces, and then wipe them clean using a dry cloth.

9.4 Disinfection

⚠ Danger: Do not remove any chassis cover, and do not dismantle or process any internal components of the equipment. The above operations may cause severe personal injury and/or equipment damage.

⚠ Warning: Do not attempt to clean any equipment parts after the equipment is started. Before cleaning, always make sure that the system has been turned off and the main power supply has been disconnected.

Before operation every day, disinfect the parts coming into contact with patients and key parts such as the table panel, external housing of the detector, computer, and display. The selected disinfection methods must comply with the effective laws and regulations and the guidelines on disinfection and explosion protection.

⚠ Never use any corrosive, soluble, or gaseous disinfectants.

⚠ If you use products that can produce gas explosion mixtures, they must evaporate completely before you turn on the X-ray equipment next time.

Follow the following requirements during disinfection:

- (1) Before sterilizing the parts coming into contact with pets, be sure to turn off the operating power supply switch of X equipment, and do not operate under electrification.
- (2) Use 75% alcohol and a lint free cloth (dust free cloth) to wipe the parts for disinfection.
- (3) All the parts of X-ray equipment, including the accessories and connecting cables, can be disinfected by wiping only.

- (4) You are not advised to spray disinfectant, because the spray may enter the X-ray equipment.
- (5) If you want to use aerosol for room disinfection, be sure to first turn off the switch of X-ray equipment. After the X-ray equipment is stopped and cools down, carefully cover it with plastic cloth and pay attention to electrical safety.

9.5 Precautions

- (1) Disconnect the power supply before installation, plug/unplug the Gigabit network card and connect the system after the power supply is turned off, and be sure to connect both ends of the cables firmly during system connection; if the connection is not reliable or the Gigabit network card is not plugged in tightly, do not perform plugging/unplugging when the system is electrified, but turn off the power supply, and then reinstall the related parts.
- (2) Be sure to cut off the power supply before cleaning.
- (3) Do not use a dry brush to brush the equipment.

9.6 Replacement Instructions

 Warning: Before replacing any components, surely confirm safety of the system, preventing unexpected involuntary movement of the equipment due to component dismantling, which endangers the people nearby. Particularly pay attention to safety of the following devices:

Replace relevant parts with new parts of the matched models. The replacing steps are as follows:

- (1) Turn off the power switch of the system and unplug the power cord.
- (2) Open the equipment enclosure and disconnect the connecting line of the part to be replaced.
- (3) Carefully remove the part to be replaced and install the spare part of corresponding specification.

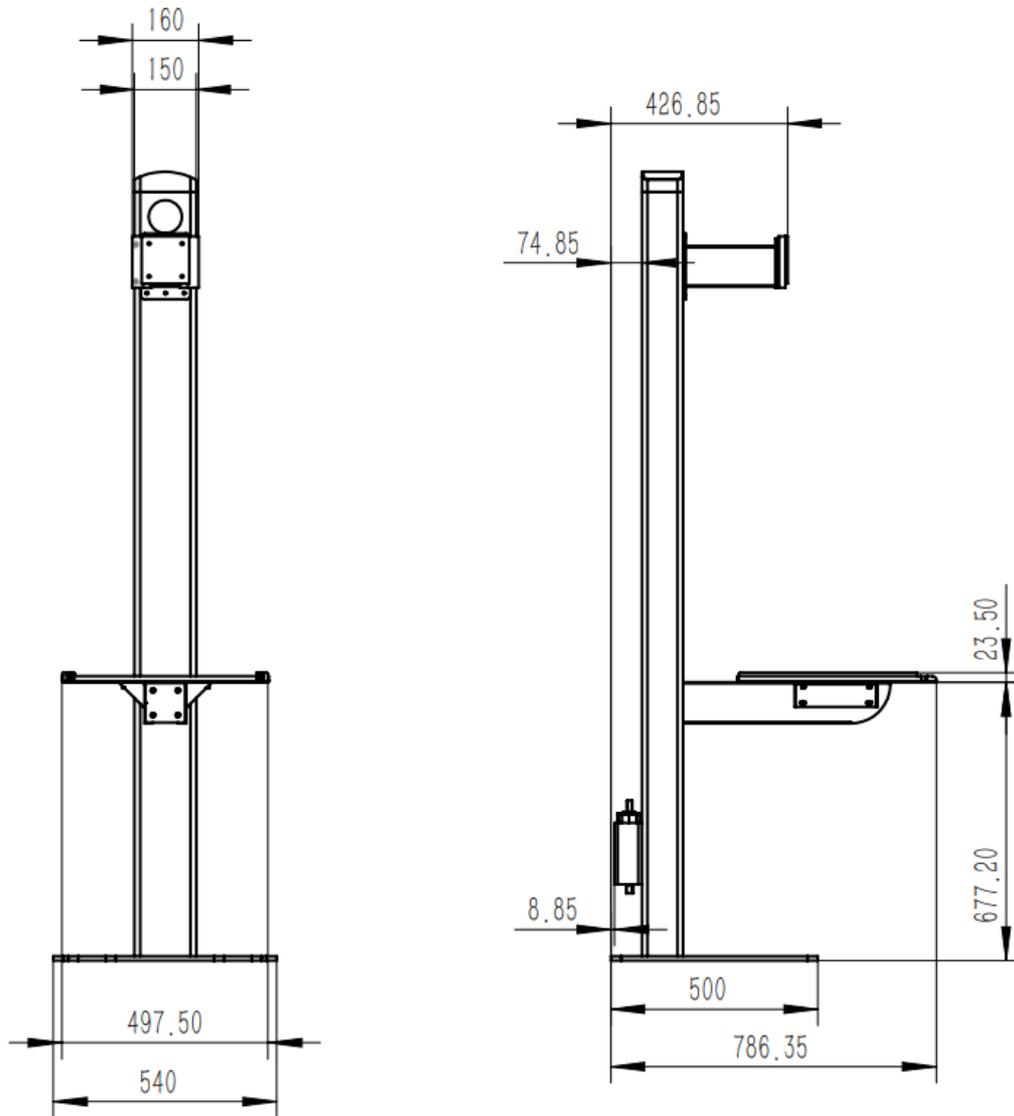
(4) Connect the line, install the equipment enclosure, turn on the power switch, and check whether the equipment performance is normal.

 Danger: Before repairing parts or replacing them with spare parts, be sure to turn off the power switch and unplug the external power cord beforehand.

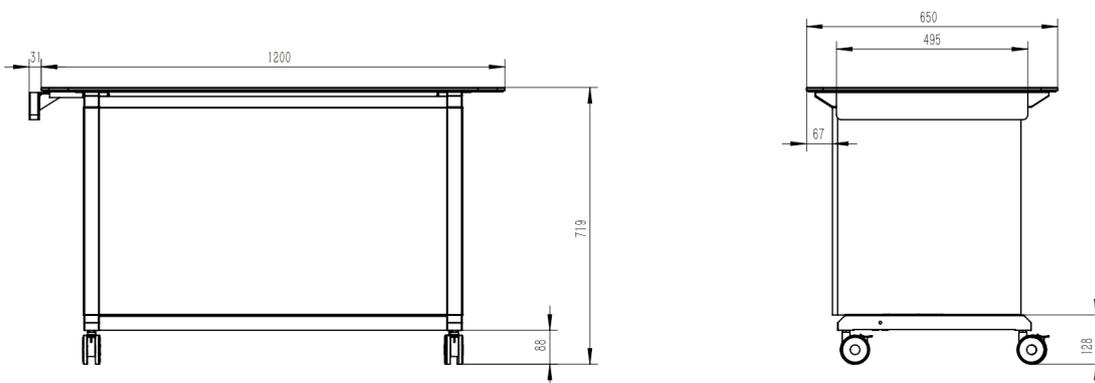
 Warning: After turning off the power switch and unplugging the external power cord, wait for several minutes until the equipment capacitor is discharged, and then open the enclosure for repair or replacement with spare parts. This aims to avoid the risk of electric shock caused by the residual voltage in the capacitor.

 Note: To ensure system performance and operation safety, the specifications of replacing parts must match the original specifications.

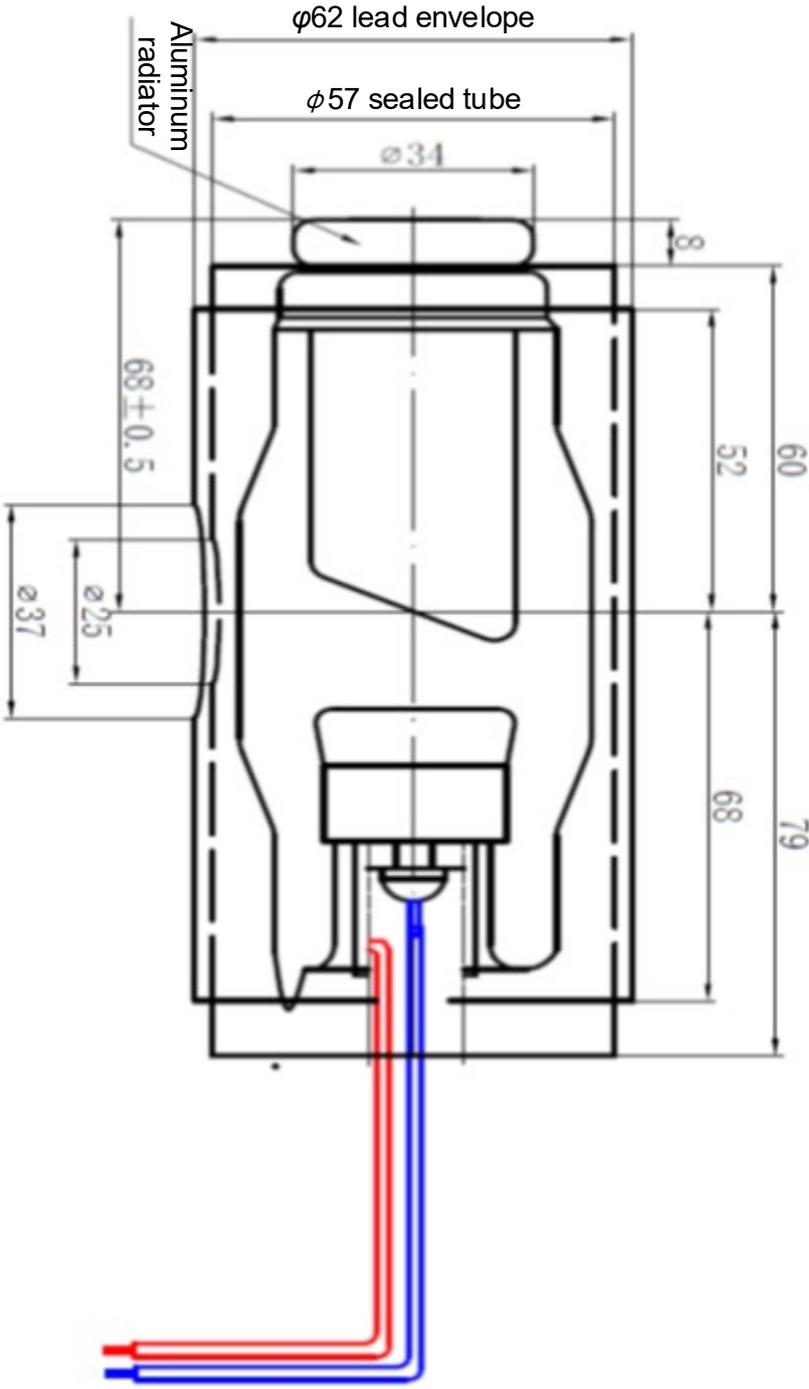
10 Attached Drawings



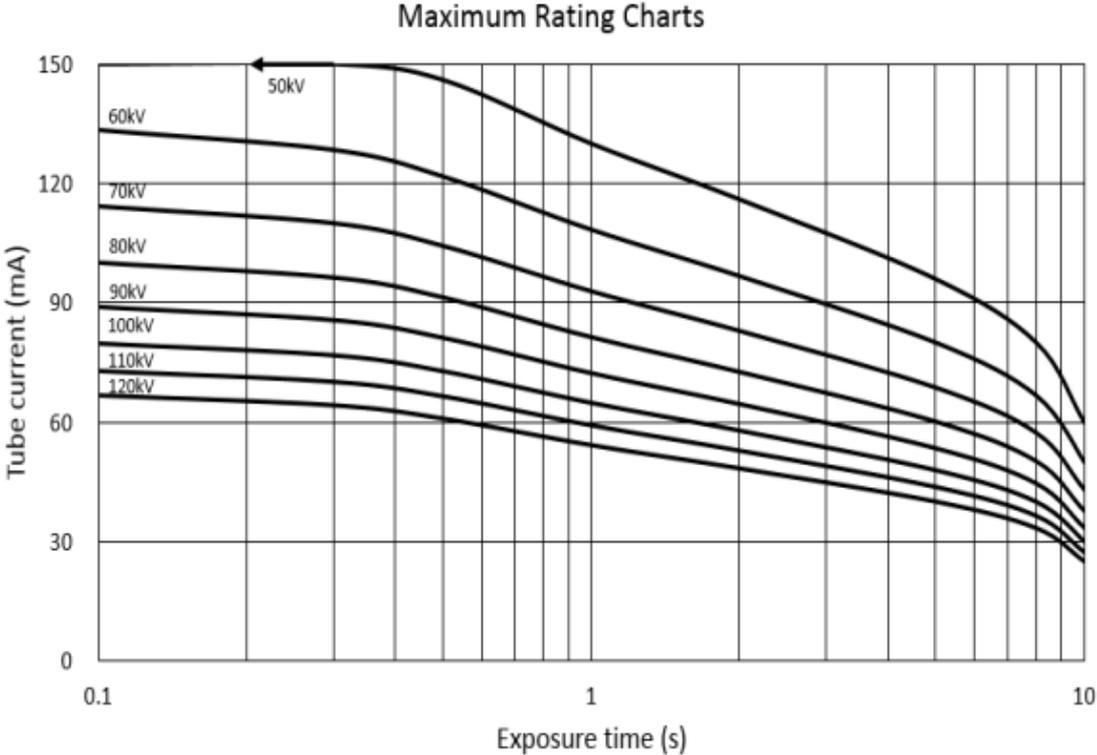
Attached Drawing 1: External Dimension Drawing of Radiography Rack (Unit: mm)



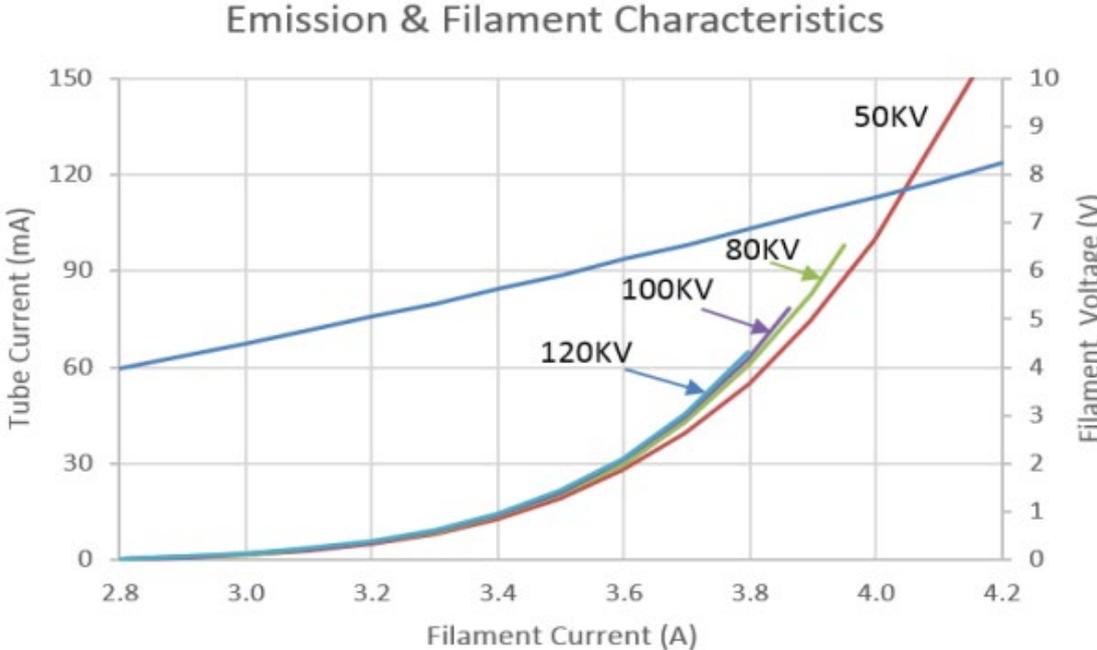
Attached Drawing 2: External Dimension Drawing of Radiography Table (Unit: mm)



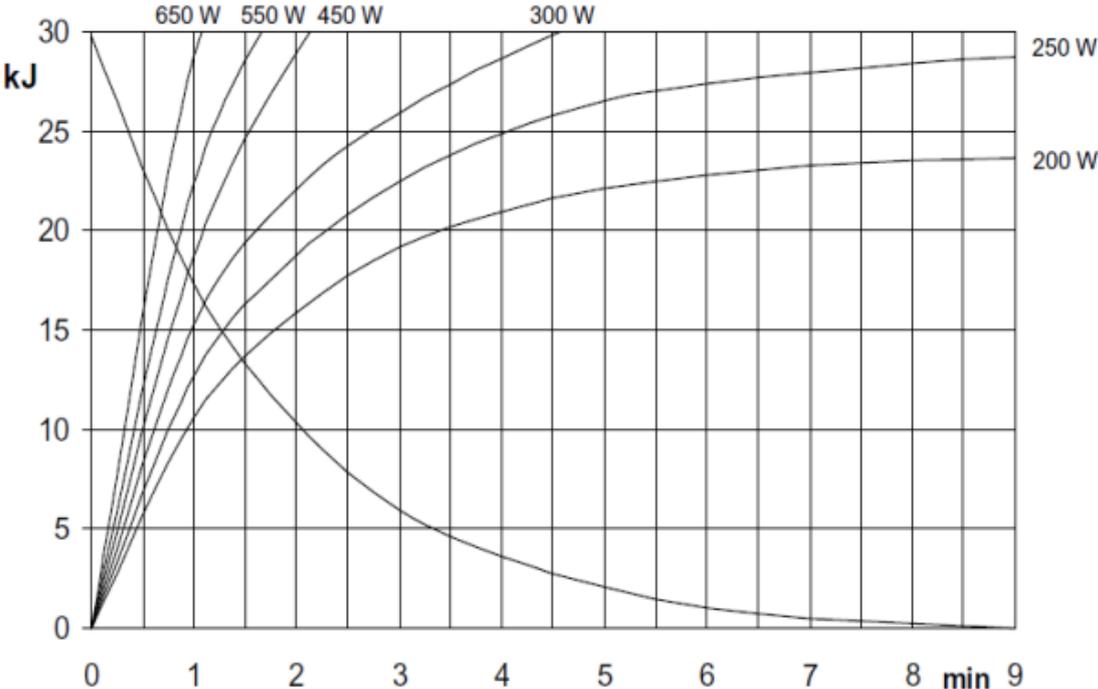
Attached Drawing 3: Outline Drawing of X-ray Tube (Unit: mm)



Attached Drawing 4: Maximum Ratings



Attached Drawing 5: Emission and Filament Characteristics



Attached Drawing 6: Anode Heating and Cooling Characteristics

