KAIXIN®

MSU1 **Full Digital Mechanical Sector Scanning Ultrasonic Diagnostic Instruments (Vet)**

User's Manual

XUZHOU KAIXIN ELECTRONIC INSTRUMENT CO., l

Information for Users

Users shall carefully read through this manual and fully understand the text before operating the equipment. This manual shall be placed easy of access for future reference; otherwise it may cause instrument damage or person injury.

Intellectual Property Information

Liability and Disclaimer Statement

1. This user's manual contains warnings for predictable dangers. Users shall also exercise care at any time to be aware of the dangers unforeseen in this manual. Kaixin shall not be liable for the damages and losses arising out of neglecting to follow the operation instructions herein described.
2. This user's manual shall be furnished with the machine so that operating and managerial personnel can refer to it any time as necessary. Once the managerial personnel of the system changes, it shall hand over this user's manual.
3. Medical personnel not qualified for the operation of medical ultrasonic equipment shall not use this machine.
4. This product is intended to provide clinical diagnostic data for the doctor. The doctor in charge of the diagnosis shall be responsible for the diagnostic process. Kaixin shall not be liable for any problems arising out of the process.
5. User shall be fully responsible for the maintenance and management of this product on purchasing the machine.
6. Deal with the exhausted product according to the local statute.
7. Kaixin shall not be liable for the safety, reliability and operational state of the product in case of the following conditions:
   (1) The machine due to assembly, extension, readjustment;
   (2) Users fail to properly operate the equipment in accordance with the requirements specified in this user's manual.
8. The maintenance and servicing of product shall be performed by the trained engnieer or by Kaixin Electronic Instrument Company Ltd.

Product Information

Issue date: September 10, 2010 Version: V1.00

Limited warranty

Repair Service

1. Kaixin offers ultrasonic diagnostic instruments lifetime warranty and charge free repair service from the day of purchasing the equipment: eighteen months for main unit, one year for typical configured probe and six months for the battery.
2. Within warranty period, the company will not be responsible for the following situation:
   1) Damage or malfunction arising from failing to comply with the instructions of the User's Manual;
   2) Damage or malfunction caused by falling during moving after purchased;
   3) Warranty is expired;
   4) Damage or malfunction due to human factors;
   5) Damage or malfunction caused by disassembling and assembling, alteration and repair without the consent of the company;
   6) Instrument losses induced by Force Majeure (like abnormal power supply, fire, flood, lightning strike, earthquake etc.);
   7) Damage or malfunction caused by use of unqualified ultrasonic coupling gel;
   8) Damage or malfunction caused by use of probe not provided by our company;
3. The company will offer repair service for instrument out of warranty, but additional fees of materials and repair service will be charged.
4. The customer can repair the instrument out of warranty by themselves, and if necessary, the company can provide circuit diagram and components under customers' request.

Return of Goods

Follow the procedure below if you need to return the purchased equipment:

To obtain the right to return the goods, contact local dealer of Kaixin Company, indicating serial number of main unit, this number is located on the nameplate of main unit. Please mark the product model, the serial number of main unit and reason to return the product.

Manufacturer's Information

Xuzhou Kaixin Electronic Instrument Co., Ltd.
Kaixin Mansion, C-01, Economic Development Zone, Xuzhou, Jiangsu, China.
Zip Code: 221004
Tel: +86-516-87732932 87733758
Fax: +86-516-87732932 87792848
Website: http://www.kxele.com
E-mail: gm01@kxele.com

Safety Cautions

1. Warning Symbols and Definitions

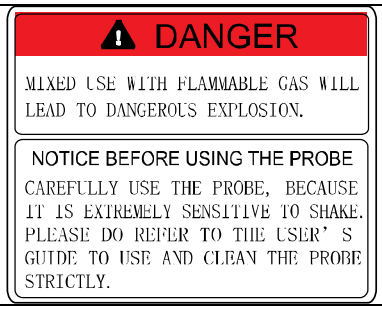
The following warning symbols are used in this manual to indicate safety level and other important items. Please remember these symbols and understand the meaning as you read this user's manual. These symbols convey specific meanings as detailed in the table below:

Symbols & Words	Connotation
⚠Danger	Indicates an imminent danger that may result in personal death or serious injury if not avoided.
⚠Warning	Indicates a potential danger that may result in personal injury if not avoided.
⚠Attention	Indicates a potential danger or unexpected use condition that may result in light injury or property loss or affecting the use if not avoided.
⚠	Indicates that make sure refer to relevant contents in this manual.

2. Safety Symbols

Symbols	Meaning	Symbols	Meaning
	Type B applied part		Fragile
	AC Power		Stacking limit by number
	DC Power		Temperature limits
	Power supply indication		Humidity limitation
	Up		Atmospheric pressure limitation
	Keep dry		Marking for the separate collection of electrical and electronic equipment

3. Labels

Label	Description
	**Danger:** 1. It may have explosion hazard if used with flammable gas. 2. Operate the probe with care. Read the probe information in the relevant manual for proper probe use.

	**Symbol for the marking of electrical and electronics devices according to Directive 2002/96/EC. The device, accessories and the packaging have to disposed of waste correctly at the end of the usage. Please follow Lo Ordinances or Regulations for disposal.**

Contents

Chapter One Technical Specifications

1.1 Technical Data

1. Gray scale: 256
2. Monitor: 5.7" LCD
3. Main power supply: 100-240V~, frequency: 50/60Hz
4. Rated power: ≤40VA
5. Main Unit Size: approx. 155×180×80mm^3 (L×W×H)
6. Weight of main unit: approx. 1.1kg (excluding accessories)

1.2 Primary Functions

1. Mode conversion function.
2. Magnification conversion function.
3. Frequency conversion function.
4. Frame correlation function.
5. Image post-process function.
6. Image freeze/unfreeze function.
7. Depth range selection function.
8. Pseudo color display function.
9. Local zooming function.
10. Adjustment of near field, far field, total gain and dynamic range.
11. Image storage function.
12. Image up/down, left/right reverses function.
13. Case information, image annotation and auto time display.
14. Body marks.
15. Measurement of distance, circumference, area, volume, slope, heart rate and cycle.
16. OB software package including 17 obstetric tables about 5 kinds of animals, automatic calculation of GA and EDC.
17. Puncture guide line and lithotripsy positioning line.
18. PAL-NTSC Conversion.
19. Energy saving.
20. Chinese-English Switch.
21. Obstetric report.

Chapter Two Product Outline

2.1 Structure composition of the instrument

MSU1 full digital mechanical sector scanning ultrasonic diagnostic instruments (Vet) are composed of main unit and probe, etc.

2.2 Name of parts and components

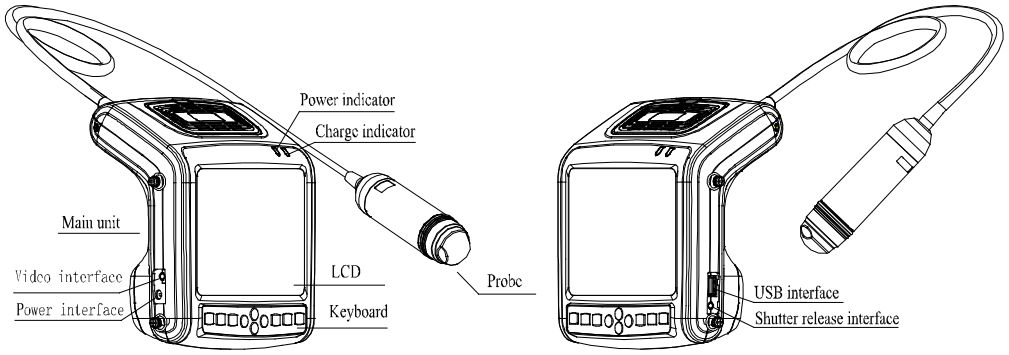


Fig. MSU1 main unit sketch map

2.3 Parts of the probe (Take 3.5MHz mechanical sector probe for example)

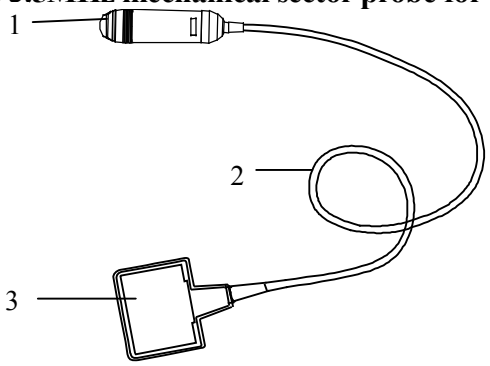


Fig. Parts name of 3.5MHz mechanical sector probe

Name	Function
(1) Acoustic lens	To convert electric signal to ultrasonic signal based on principle of converse piezoelectric effect. The ultrasonic signal, after entering the human body, is reflected as echo wave and converted to electric signal again. The acoustic lens is on the probe surface. Supply ultrasonic coupling gel to the acoustic lens surface when performing ultrasonic diagnosis.
(2) Cable	To connect the probe to the probe connector.
(3) Probe connector	To connect the probe to ultrasonic diagnostic system.

2.4 Function keys description

SN.	Function keys	Real-time mode function	Freeze mode function
1	Mode	Mode Selection	Text Input
2	Enter	Enter Confirm	
3	Menu Cine	Main-menu / Image storage and recall	
4		Freeze/Unfreeze	
5		Direction Keys	
6	Esc	Quit	
7	Power	Power switch	

Chapter Three System Configuration

3.1 Typical configuration

1. Main unit	1 unit	2. 3.5MHz mechanical sector probe	1 PC
3. Power adapter	1 PC	4. Internal battery	2 PCS
5. Charger	1 PC	6. Support bracket	1 PC
7. Arm-band	1 PC	8. Straps	2 PCS
9. Leather bag	1 PC	10. Shutter release	1 PC

3.2 Optional parts

1. Video recorder P93W-S
2. Mouse
3. Probe holder
4. Plastic seal box

Chapter Four Operation Condition

4.1 Power supply

Mains voltage: 100-240V～±10％

Mains frequency: 50/60Hz±1Hz

4.2 Operation Environment

Ambient temperature: 10℃-40℃;

Relative humidity: 30%-75% (without condensation);

Atmospheric pressure: 700hPa-1060hPa.

4.3 Storage and Transport

Ambient temperature: -20℃-55℃;

Relative humidity: 30%-93% (without condensation);

Atmospheric pressure: 700hPa-1060hPa.

⚠**Attention: The mains voltage is varies with different countries or regions.**

⚠**Warning: Avoid using this equipment with high frequency operational equipment, or danger may occur.**

⚠**Danger: Do not use this equipment where flammable gas (such as anesthetic gas, oxygen or hydrogen) or flammable liquid (such as alcohol) are present. Failure to do so may result in explosion.**

⚠**Attention: System should be avoided using in following environments:**

1. Moist	**2. Rain**	**3. Thunderstorm weather**
4. No ventilation	**5. Close to heat source**	**6. Direct sunlight**
7. Dramatic temperature change		**8. Poisonous gas**
9. Corrosive gas		**10. Strong shock**

11. Strong electromagnetic field (e.g. MRI)

12. Radiation (e.g. X-ray, CT)

13. Defibrillators or short wave therapy equipment

Chapter Five System Installation and Check

⚠Warning:

1. **Do not connect the three-core power supply cord to unprotected two-core socket, or electric shock may occur.**
2. **If breakers and fuse of the mains power socket are identical to those of this system, and they are used to control the current for equipment like life support system, the system shall not be connected to such power supply socket as it may cause breaker or fuse to trip and cut off the power supply to the entire premise in case of malfunction or over current or transient current generated at power-on with this ultrasonic system.**
3. **All plugs of instruments of this system shall be connected into the power socket with protective earth on the wall and the socket must meet the requirement of power rating of instrument. Multiple portable socket-outlets can not be used for the system.**
4. **Equipment that connects the signal input part or signal output part must only connect the accessories authorized in this manual, and connect the equipment that complies with IEC 60601-1 standard. When the instrument connects with more than 3 sets of equipment, it may cause the danger of the leakage current accumulation.**
5. **When this system is installed or used in the patient environment, try to avoid the patient touching the system. If system is with some unknown defects, it may cause danger of electric shock.**

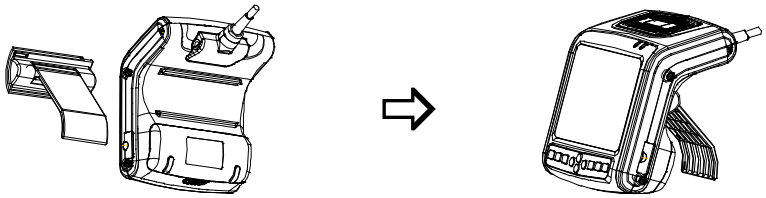
⚠Warning:

1. **When instrument works abnormally, do stop working, turn off the power and check the reason, then contacts the KAIXIN Company about it.**
2. **Turn off power and pull out of the plug from socket after each ultrasonic diagnostic operation.**
3. **It is forbidden to drag and press the power and probe cables emphatically; regularly inspect whether there is pull-apart and bareness, if there is the phenomena like this, turn off power supply immediately, stop using it and change it for new one.**
4. **It is forbidden to load and unload the probe or move the instrument in galvanic to avoid danger of safety.**
5. **Pull out of the plug from socket after operation in thunderstorm weather to avoid the instrument being damaged by lightening.**
6. **If the temperature changes greatly in short time will cause vapor recovery inside of instrument, the case may damage the instrument.**
7. **The instrument is switched completely only by disconnecting the power supply from the wall socket.**

5.1 System installation

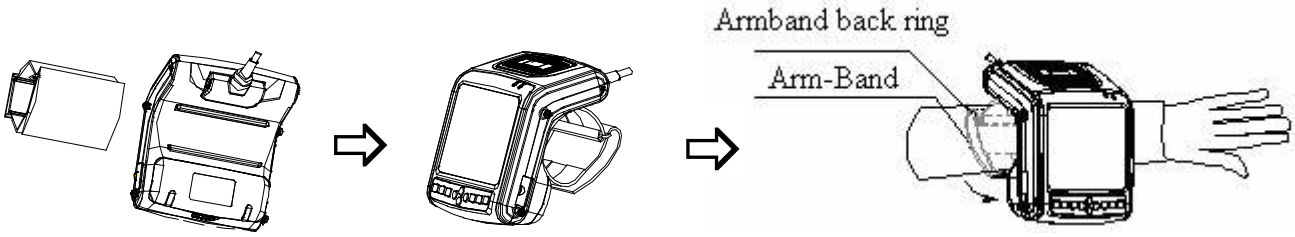
Please carefully read through and fully understand the use-method before installing the system and check the goods for its completeness according to the packing list furnished. This system provi following several usages, for the user to select:

1. Place the instrument on a desktop to use



As shown in fig, insert the support bracket from the back of the instrument, place the instrument on a desktop; adjust the angle of the support bracket to adjust the screen visual angle.

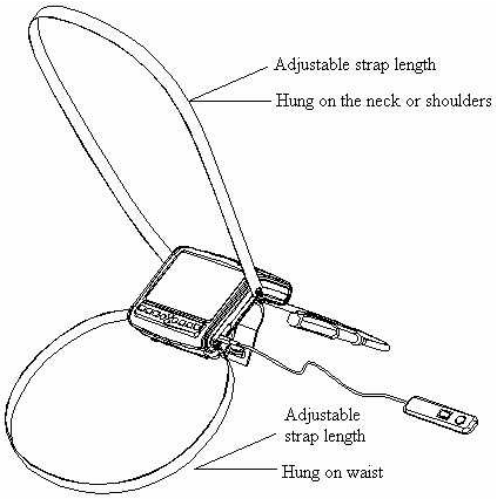
2. Instrument fixed in the arm to use



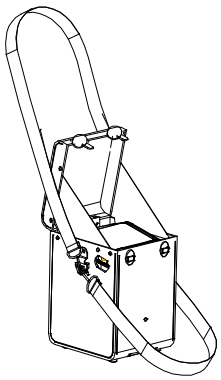
a. Lock the arm-band as figures from the back of the instrument;
b. Extend your arm into the arm-band according to arrow direction, or disconnect the arm-band to put on your arm, the long end through the back ring.
c. Strain the arm-band and stick it firmly on the Velcro.

3. Instrument hanging on the chest to use

a. Take out the attached straps; install the straps on the rings of main unit as fig shown;
b. Adjust the strap length, the front strap hung on the neck, the back strap fixed on the waist, two straps can also adjust to similar length to meet the requirements of the screen visual angle, while hanging around the neck to use.



4. Instrument places on the leather lag and hangs on the chest to use



Installation:

a. Take out the instrument and accessory, install the probe;
b. The probe passes through the oval hole of the leather bag, and put the instrument into the leather lag;
c. Install the straps on the rings of leather bag as fig shown;
d. Adjust the strap length, the one hung on the neck, the other one fixed on the waist, you can also use a strap around your neck or diagonal used in your shoulder.

The benefits of using this method:

a. Self-built darkroom for the strong-light environments.
b. The protection of leather bag can avoid collisior pollution in the use process.

5.2 Probe installation

⚠Warning:

1. The Kaixin ultrasonic probe shall be connected to the dedicated Kaixin ultrasonic system only. Select proper probe model according to the relevant instructions of ultrasonic diagnostic system.

2. Check the ultrasonic probe and connecting cable after diagnostic operation. Use of defective probe may cause electric shock.

3. Do not knock or bump the probe, or it may be damaged and cause electric shock.

4. Unauthorized disassembly of the probe shall be prohibited as it may cause electric shock hazard.

⚠Attention:

1. Turn off the ultrasonic system before disconnecting the probe. Disconnecting the probe with system power on may damage the system or probe.

2. Before disconnecting the probe, place the cable and probe on a stable and leveled position so that the probe may not be damaged or injury person by unexpected fall.

3. Freeze the instrument when instrument is start-up without operation to increase of service life of probe.

4. Repeat available machine time should be more than 5 minutes to avoid turn on/off power supply in short time.

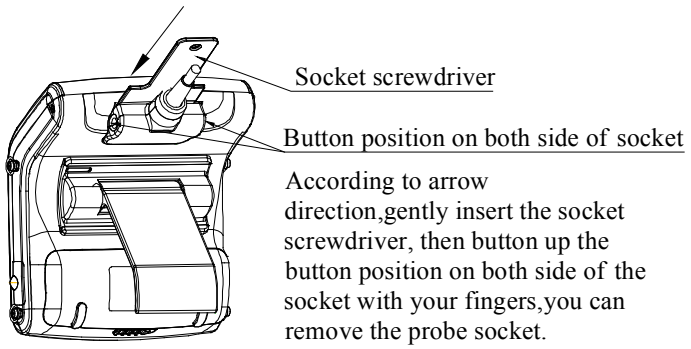
5.2.1 Probe connection

⚠Warning: Before connecting or using the probe, make sure that the probe, connecting cable and connector are in normal condition (free of cracks or drop). Use of defective probe may cause electric shock.

Insert the probe connector into the probe socket at the back of the main unit.

5.2.2 Probe disconnection

Turn off the system, and use probe screwdriver to remove the probe with figure's method and instructions.



5.3 Install/dismantle the battery

1. Install battery

Put the battery into battery storage of main unit; cover the "Upper cover of battery storage" into the corresponding position, and then toggle the push button in the opposite direction, lock the "Upper cover of battery storage".

2. Dismantle battery

According to the direction of the arrow, toggle "Push button of battery storage", removed "Up cover of battery storage" as shown in figure, take out the battery.

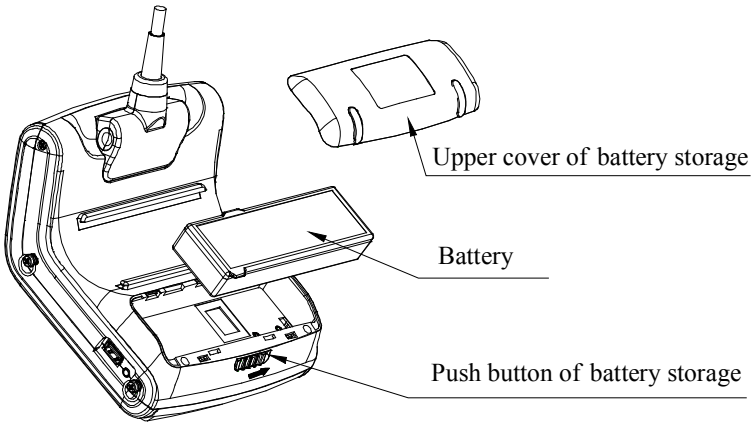
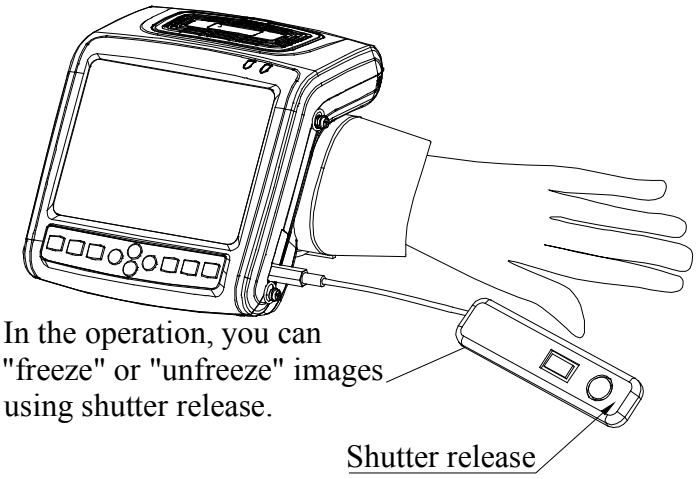


Fig. Install, dismantle the battery

5.4 Shutter release installation

Insert shutter release into shutter release interface (Freeze interface) as shown in the figure.



5.5 Video recorder installation

1. Turn off the system, connect the equipotential terminal (⏚) of the video recorder to the earthing;
2. Connect one end of the video connection line to the video recorder and the other end to the video output interface on the left of main unit;
3. Insert one end of power plug (jack) of the video recorder to the power input socket of the video recorder, the other end to the power supply socket.

5.6 Connect to the mouse

Connect the mouse to USB interface on the right side of the main unit.

5.7 Connect to power

1. Connect to the power adapter

Insert the output plug of adapter into power input interface of main unit.

2. Connect to the main power supply

Insert the power plug (jack) furnished with the machine into power input socket of the power adapter, the other end to the main power supply socket. The instrument uses three-core power supply. It connects with the protective earth line when power plug inserts into its socket.

⚠Warning:

1. Adapter has no switch. The isolation of the system with the MAINS used to unplug the adapter as the intended isolation means.
2. The device should be used only with power adapter provided by Kaixin Company.
3. To avoid damaging power adapter or harming people by unexpected fallen, make sur power adapter is placed on the leveled desk.

5.8 Probe check before and after operation

Before and after ultrasonic diagnosis to check the probe or cable jacket whether has any abnormalities, such as cracks, bulge or oil leakage, whether it be cleaned or disinfected.

5.9 Main unit check before and after operation

5.9.1 Inspection before start-up

Check the following items before starting the machine:

1. The temperature, humidity and atmospheric pressure shall meet the requirements of operation condition.
2. No condensation occurs.
3. No distortion, damage or contamination on system and peripheral. Clean the parts as specified in relevant sections, if the contaminant is present.
4. Examine the control panel, LCD screen and enclosure to ensure they are in good working condition and free of abnormity (such as cracks and loosened screws).
5. No damage on power cable, and hard up on its connection.
6. Check probe and its connections to ensure they are free of abnormity (such as scuffing, drop-off or contamination). If the contaminant is present, clean, disinfect the contaminated objects as specified in relevant sections.
7. No barriers around the intake of equipment.
8. See to it that probe has been cleaned, disinfected and sterilized; else dispose it as specified in relevant sections.
9. Check all the ports of the machine for possible damage or blockage.
10. Clean the field and environment.

5.9.2 Inspection after start-up

Check the following items after starting the machine:

1. No abnormal voice, strange smell and overheating appear.
2. Check the machine to ensure a normal start-up: The power indication light is on and startup picture is shown on the screen. The machine will be then automatically set in B mode.
3. Check the image to ensure trouble-free display (no excessive noise or flicker).
4. Check the control panel to ensure normal operation condition.
5. Check the instrument to ensure that the phenomenon of local high temperature will not appear.

> ⚠**Attention: Thoroughly clean the coupling gel on the probe surface each time after ultrasonic operation, or the coupling gel may become hardened on the acoustic lens of the probe, deteriorating quality of image.**

5.10 System reset

In case of abnormal screen display or no-working for system operation, try to restart the system by turning on/off the main unit power.

Chapter Six Functional Operation

6.1 Startup and Shutdown

In shutdown status, press Power key, machine starts up, power indicator lights.

In startup status, press Power key, machine shuts down, power indicator goes out. Please note that when shut down the machine, the time of pressing key is a rather long than normal pressing key.

6.2 System Functions Setting

6.2.1 Time Setting

1. Freeze image, press direction keys to move cursor to "Preset";
2. Press direction keys to enter setting interface;
3. Press direction keys to select "Minutes, Hours, Day, Month and Year";
4. When setting minutes, hours, day, month and year, press direction key to increase value or press direction key to decrease value;
5. Press Enter key to confirm this time setting and quit setting interface.

6.2.2 TV Mode Setting

1. Freeze image, press direction keys to move cursor to "Preset";
2. Press direction keys to enter setting interface;
3. Press direction keys to move symbol "<" to point to "TV mode";
4. Press direction keys to realize TV mode conversion between PAL and NTSC;
5. Press Enter key to quit setting interface.

6.2.3 Energy Saving Setting

1. Freeze image, press direction keys to move cursor to "Preset";
2. Press direction keys to enter setting interface;
3. Press direction keys to move symbol "<" to point to "Sleep";
4. Press direction keys to select energy saving time among 1~99 minutes or select "Off";
5. Press Enter key to quit setting interface.

6.2.4 Characters Brightness Setting

1. Freeze image, press direction keys to move cursor to "Preset";
2. Press direction keys to enter setting interface;
3. Press direction keys to move symbol "<" to point to "Font Bright";
4. Press direction keys to select characters brightness among 160, 192, 224 and 255;
5. Press Enter key to quit setting interface.

6.2.5 Hospital Name Setting

1. Freeze image, press direction keys to move cursor to "Preset";
2. Press direction keys to enter setting interface;
3. Press direction keys to move symbol "<" to point to "Hospital";
4. Press Enter key, the cursor is located above "NAME"; at the same time characters input menu will be shown at the bottom of the screen:
   Caps 0 1 2 3 4 5 6 7 8 9 a b c d e f g h
   Shift i j k l m n o p q r s t u v w x y z
   Press direction keys or operate mouse to move cursor to point to Caps, and then press Ente click left mouse to achieve capital and small letter conversion; If the cursor point t press Enter key or click left mouse again to achieve the conversion between the letter and punctu

5. Press direction keys to choose "numbers" or "characters" and press Enter key to confirm; Or operate mouse to click "numbers" or "characters" to input;
6. If need modify the content, press Mode key to quit the character input menu; press direction keys ◄ ► to delete input content; press Mode key again to retype; after the content has confirmed press Mode key again to exit input menu;
7. Press Enter key to save this setting and quit setting interface.

6.2.6 Key Sound Setting

1. Freeze image, press direction keys ▲ ▼ to move cursor to "Preset";
2. Press direction keys ◄ ► to enter setting interface;
3. Press direction keys ▲ ▼ to move symbol "<" to point to "Key Sound";
4. Press direction keys ◄ ► to select between "On" and "Off";
5. Press Enter key to quit setting interface.

6.2.7 Chinese-English Setting

1. Freeze image, press direction keys ▲ ▼ to move cursor to "Preset";
2. Press direction keys ◄ ► to enter setting interface;
3. Press Mode key to switch between Chinese and English;
4. Press Enter key to quit setting interface.

6.3 Mode Selection

In real-time mode, press Mode key repeatedly to realize mode switching of B, B/B, 4B, B/M and M.

6.3.1 B Mode

B mode is a basic operation mode after startup and a single-framed B mode image is displayed.

6.3.2 B/B Mode

1. In real-time mode, press Mode key to enter B/B mode;
2. B/B image switch. Press Menu Cine key to enter main-menu and press direction keys ▲ ▼ to move the cursor to "B/B Mode" and then press direction keys ◄ ► to switch image display; or right click mouse to switch image display, the selected image is activated and the other one is frozen;
3. In real-time mode, press Mode key to exit B/B mode.

6.3.3 4B Mode

1. In real-time mode, press Mode key to enter 4B mode;
2. 4B image switch. Press Menu Cine key to enter main-menu and press direction keys ▲ ▼ to move the cursor to "4B Mode", then press direction keys ◄ ► to switch display among four images; or right click mouse to switch display among four images, the selected image is activated and the other three are frozen;
3. In real-time mode, press Mode key to exit 4B mode.

6.3.4 B/M Mode

1. In real-time mode, press Mode key to enter B/M mode.
2. B/M image switch. Press Menu Cine key to enter main-menu and press direction keys ▲ ▼ to move cursor to "BM Mode" and then press direction keys ◄ ► to switch B mode and M mode. Or right click mouse to realize the change of above two modes;
3. In real-time mode, press Mode key to exit B/M mode.

6.3.5 M Mode

1. In real-time mode, press Mode key to enter M mode;
2. Change of M speed: Press Menu Cine key to enter main-menu and press direction keys ▲ ▼ to move to "M Speed" and then press direction keys ◄ ► to select the eight kinds of scan speed. Or l

mouse to switch M speeds;

3. In real-time mode, press Mode key to exit M mode.

6.4 Image Quality Adjustment

6.4.1 Brightness and Contrast Adjustment

In the startup default status, press Esc key to quit the current using status, press direction keys ⬅➡, the adjustment bars of brightness and contrast will be displayed on the screen, adjust them according to actual need. Press direction key ➡ to increase brightness and contrast, direction key ⬅ to decrease them; press direction keys ⬆⬇ to select brightness or contrast adjustment.

Note: If direction keys ⬅➡ cannot be adjusted when adjust brightness in normal operation mode, must be exit current operating condition of direction keys.

6.4.2 Total Gain Adjustment

In real-time mode, press Menu Cine key to enter main-menu and press direction keys ⬆⬇ to move cursor to "Gain" in the display area. Press direction key ➡ to increase image total gain and direction key ⬅ to reduce total gain so as to control the total gain of the entire image.

6.4.3 Near Field Gain Adjustment

In real-time mode, press Menu Cine key to enter main-menu and press direction keys ⬆⬇ to move cursor to "Near" in the display area. Press direction key ➡ to increase near field gain and direction key ⬅ to reduce near field gain so as to control the gain in near field region.

6.4.4 Far Field Gain Adjustment

In real-time mode, press Menu Cine key to enter main-menu and press direction keys ⬆⬇ to move cursor to "Far" in the display area. Press direction key ➡ to increase far field gain and direction key ⬅ to reduce far field gain so as to control the gain in far field region.

6.4.5 Dynamic Range Adjustment

In real-time mode, press Menu Cine key to enter main-menu and press direction keys ⬆⬇ to move cursor to "Dyn" in the display area. Press direction key ➡ to increase the value of dynamic range and direction key ⬅ to decrease the value of dynamic range so as to control the dynamic range of the entire image.

6.4.6 Frequency Adjustment

In real-time mode, press Menu Cine key to enter main-menu and press direction keys ⬆⬇ to move cursor to "Freq." in the display area. Press direction keys ⬅➡ to realize frequency conversion.

6.4.7 Frame Correlation Adjustment

In real-time mode, press Menu Cine key to enter main-menu and press direction keys ⬆⬇ to move cursor to "Frame Avg" in the display area. Press direction keys ⬅➡ to realize four levels of frame correlation.

6.4.8 Image Processing Adjustment

In real-time mode, press Menu Cine key to enter main-menu and press direction keys ⬆⬇ to move cursor to "IP" in the display area and then press direction keys ⬅➡ to obtain corrected image. System default is 2.

6.5 Image Control

6.5.1 Magnification Selection

In real-time mode, press Menu Cine key to enter main-menu and move cursor to "Zoom" and then press direction keys ⬅➡ to choose five kinds of magnification.

6.5.2 Depth Range Selection

In real-time and B mode, press Menu Cine key to enter main-menu and press direction keys ⬆⬇ to move to "Depth" in the display area and then press direction keys ⬅➡ to select depth, press Esc key to qui selection.

6.5.3 Local Zoom and Local Additive Color

In real time B mode, press Menu Clne key to enter main-menu and press direction keys ⬆⬇ to move cursor to "Local Zoom" in the display area and then press direction keys ⬅➡, a box appears, press direction keys or operate mouse to move the box to the position to be enlarged, the selected image be enlarged; Press Esc key to quit local zoom status.

In the color display, the selected image which by above mentioned operation will be enlarged and added color.

6.5.4 Image Left/right Reverse

In real-time mode and in B, B/B, 4B or B/M mode, press Menu Clne key to enter main-menu and press direction keys ⬆⬇ to move cursor to "H Rev" and then press direction keys ⬅➡ to realize image horizontal reverse. Or left click mouse also to realize image horizontal reverse. The image left/right reverse is the change of probe scanning direction. The probe scanning direction is indicated by the arrow on the upper left area of the image.

6.5.5 Image Up/down Reverse

In real-time mode, press Menu Clne key to enter main-menu and press direction keys ⬆⬇ to move cursor to "V Rev" and then press direction keys ⬅➡ to realize image vertical reverse.

6.5.6 Color Selection

In real-time mode, press Menu Clne key to enter main-menu and press direction keys ⬆⬇ to move cursor to "Color" in the display area and then press direction keys ⬅➡ to realize color conversion of eight colors (including one kind of black and white).

6.5.7 Image Freeze/Unfreeze

In real-time mode, press key or middle mouse key to freeze the image; in frozen status, press key or middle mouse key to unfreeze the image.

6.6 Puncture guide line and lithotripsy positioning line

Puncture guide line: In real-time B mode, press Menu Clne key to enter main-menu and press direction keys ⬆⬇ to move cursor to "Puncture" and then press direction keys ⬅➡ to choose line 1, press Enter key to confirm, two puncture guide lines appear on the screen, press direction keys ⬅➡ to change the angle of the first puncture guide line, press direction keys ⬆⬇ to change the start position of the first puncture guide line. Press Menu Clne key again to enter main-menu and press direction keys ⬆⬇ to move cursor to "Puncture" and then press direction keys ⬅➡ to choose line 2, press Enter key to confirm, press direction keys ⬅➡ to change the angle of the second puncture guide line, press direction keys ⬆⬇ to change the start position of the second puncture guide line. Press Esc key to quit the puncture guide status.

Lithotripsy positioning line: In real-time B mode, press Menu Clne key to enter main-menu and press direction keys ⬆⬇ to move cursor to "Puncture" and then press direction keys ⬅➡ to choose line 3, press Enter key to confirm, lithotripsy positioning line appears on the screen. Press direction keys ⬆⬇ to move the mark "+" and real-time display the relative distance between the mark "+" and the starting point. Press Esc key to quit.

6.7 Body Mark and Probe Mark

This product contains 28 body marks that are divided into two pages when display. The operation steps are as follows:

1. Freeze the image, press direction keys ⬆⬇ to move cursor to "Body Mark", press Enter key, body ı will be showed in the image area, press direction keys to change pages;
2. Press direction keys to move to the position of desired body mark, press Enter key to confirm the

selected body mark;

3. Press direction keys or operate mouse to change the probe mark position; press Mode key to change probe mark direction;
4. Press Esc key to quit body mark and probe mark status;
5. Press key to quit froze and body mark status.

6.8 Image storage and recall

6.8.1 Save image

- **Storage to main unit**

1. Freeze the image;
2. Press Menu Cine key, a "Save" prompt appears on lower right corner of the screen;
3. Press direction keys ◄ ► to select the current image code, such as choose "003";
4. Press Enter key, the current image is saved in the frame for coded "003". The saved image code is preceded with asterisk "*";
5. Press Esc key to quit saving status and press key to return to real-time status.

- **Storage to U disk**

1. Plug U disk;
2. Freeze the image;
3. Press Menu Cine key, a "Save" prompt appears on lower right corner of the screen;
4. Press Enter key to appear "Img" prompt, after the prompt disappear, the current image is saved in the folder for patient number (ID) as folder name in the U disk, and file name is arranged by the order of serial number. If user did not enter the number (ID), the folder name defaults to "USER";
6. Press Esc key to quit saving status and press key to return to real-time mode.

Explanation: The images stored in the U disk can only be read out in your computer.

6.8.2 Open image

1. Freeze the image;
2. Continuously press Menu Cine key twice, a "Read" prompt appears on lower right corner of the screen;
3. Press direction keys ◄ ► to select the image code need to be read out, such as choose "003*";
4. Press Enter key, the image stored in frame "003*" is read out;
5. Press Esc key to quit reading status and press key to return to real-time status.

Explanation: When reading images, it must choose the image code with mark "*".

6.9 Text Input

Operation steps:

1. Freeze the image;
2. Press Mode key, the cursor is located behind NAME;
3. Press Mode key again or right click mouse, at the same time characters input menu will be shown at the bottom of the screen:

   Caps 0 1 2 3 4 5 6 7 8 9 a b c d e f g h

   Shift i j k l m n o p q r s t u v w x y z

   Press direction keys or operate mouse to move cursor to point to Caps, and then press Enter key or left click mouse to achieve capital and small letter conversion; If the cursor point to Shift, press Enter key or left click mouse again to achieve the conversion between the letter and punctuation;
4. Press direction keys to choose "numbers" or "characters" and press Enter key to confirm; Or mouse to click "numbers" or "characters" to input;
5. After inputting name, press Mode key and then press direction key ► to move cursor to "I

press Mode key again to input according to Step 4, the number (ID) only be made up of numbers, letters or underlines;

6. After inputting ID, press Mode key and press direction keys to move cursor to image area and press Mode key again to input according to Step 4;
7. If need modify the content, continuously press Esc key twice to quit annotation status, press direction keys ⬆⬇ to select "Clear", at last press Enter key to clear all noted marks and retype;
8. Press Esc key to quit.

6.10 Case report processing center V3.1 software (optional)

6.10.1 Function Introduction

1. Connect computer with USB interface of main unit, ultrasonic images transmit to PC and realize images mass memory.
2. Support five types case report template edit and print.

6.10.2 Use Instruction

1. Follow the "USB Installation Instruction V3.1" of CD to install the "Case Report Processing Center V3.1" software.
2. Insert USB cable into "USB interface" of main unit, and then switch on the power of main unit.
3. Connect the other end of USB cable to "USB Interface" of computer.
4. Open the "ImageUsb.exe" file in the Case Report Processing Center V3.1, that is double click the logo  , and click  , then click "Start", the current displaying image transmitted to PC.
5. Click "Save" and then input the file name, so the image saved to PC.
6. Press the  button to exit the Case Report Processing Center V3.1.
7. A detailed use instruction sees also the "Use Instruction V3.1" in the CD.

Chapter Seven General Measurement

7.1 Distance Measurement

1. In B, B/B or B/M mode, freeze desired image, the cursor is located in the "Measure" position of display area;
2. Press Enter key, the measurement methods are showed in the lower left of the screen, press direction keys ⬅ ➡ to choose "Distance", press Enter key again, the cursor will show "+"; or click left mouse, the cursor will show "+";
3. Press direction keys or operate mouse to move the "+" mark to desired position, press Enter key or click left mouse to set the "+" mark position as the starting point of the measurement;
4. Press direction keys or operate mouse to move the"+" mark to the end point of the measurement. A lighted dotted line appears between the start and the end as the dashed locus of the measurement. The measured value is automatically displayed at the built-in mark"+: ----mm" on the right side of the screen;
5. Press Mode key or click left mouse repeatedly to exchange the starting point and end point of the measurement;
6. Press Enter key or click right mouse to finish the first measurement;
7. Repeat the steps 3~6 to complete the multi-group data measurement;
8. Continuously press Esc key twice to quit the measurement status;
9. Press direction keys ⬆ ⬇ to choose "Clear" and then press Enter key or synchronously click the left and right key of mouse to clear all marks and data;
10. Press ❄ key or click the middle mouse to unfreeze, clear all marks and data and quit the measurement status.

7.2 Circumference/Area/Volume Measurement

- **Circumference/area/volume measurement with ellipse method**

1. In B, B/B mode, freeze desired image, the cursor is located in the "Measure" position of display area;
2. Press Enter key, the measurement methods are showed in the lower left of the screen, press direction keys ⬅ ➡ to choose "Ellipse", press Enter key again, the cursor will show "+"; or click left mouse, the cursor will show "+";
3. Press direction keys or operate mouse to move the "+" mark to desired position, press Enter key or click left mouse to set the "+" mark position as the starting point of the measurement;
4. Press direction keys or operate mouse to move the"+" mark to the end point of the measurement, at the same time the elliptic curve appears; or click middle mouse to appear elliptic curve;
5. Press Menu Clrne key, the "–◁ ▷+"mark appears on the screen. Hold down ➡ or ⬅ key to change the minor axis of the ellipse so as to satisfy the test area. The measured values are displayed at the built-in characters "C: 00000mm, A: 00000mm^2, V: 00000 cm^3" on the right part of the screen automatically;
6. Press Menu Clrne key again to quit the minor axis status; Press Mode key or repeatedly click left mouse to exchange the starting point and end point;
7. Press Enter key or click right mouse to finish the first measurement;
8. Repeat the steps from 3 to 7 to complete the multi-group data measurement;
9. Continuously press Esc key twice to quit the measurement status;
10. Press direction keys ⬆ ⬇ to choose "Clear" and then press Enter key or synchronously click

and right key of mouse to clear all marks and data;

11. Press key or click the middle mouse to unfreeze, clear all marks and data and quit the measurement status.

- **Circumference/area measurement with trace method**

1. In B, B/B mode, freeze desired image, the cursor is located in the "Measure" position of display area;
2. Press Enter key, the measurement methods are showed in the lower left of the screen, press direction keys ⬅ ➡ to choose "Trace", press Enter key again, the cursor will show "+"; or click left mouse, the cursor will show "+";
3. Press direction keys or operate mouse to move the "+" mark to desired position, press Enter key or click left mouse to set the "+" mark position as the starting point of the measurement; or click right mouse to set the "+" mark position as the starting point of the measurement;
4. Press direction keys or operate mouse to move the"+" mark to the end point of the measurement. At the same time, a locus appears in the direction of operation between the two measurement marks. The measured circumference value is displayed automatically at the built-in mark "C: 00000mm" on the right part of the screen. Press Enter key or click right mouse to display at the built-in mark "A: 00000mm^2" the value of the measured area formed by measurement line enclosure;
5. Press Esc key, the measurement methods are showed in the lower left of the screen, continue to choose "Trace" to measure;
6. Repeat steps 3, 4 to complete the multi-group data measurement;
7. Continuously press Esc key twice to quit the measurement status;
8. Press direction keys ⬆ ⬇ to choose "Clear" and then press Enter key or synchronously click the left and right key of mouse to clear all marks and data;
9. Press key or click the middle mouse to unfreeze, clear all marks and data and quit the measurement status.

7.3 Slope/Heart rate/Cycle Measurement

The method to measure slope/hear rate/cycle is identical with distance measurement.

Note: In B/M mode, if both starting point and end point of the measurement mark fall into the B-mode area, the value of the "+: "refers to distance; if starting point and end point of the measurement mark fall into the M-mode area, the value of the "+: "refers to depth; if the starting point and end point are in separate areas, the "+: "will display "----"sign or invalid value.

+: denotes depth measured in mm (millimeter)

EF: denotes slope coefficient measured in mm/s (millimeter per second)

HR: denotes heart rate measured in times/minute (times per minute)

T: denotes cycle measured in ms (millisecond)

> ⚠**Attention: The accuracy of software measurement: distance measurement≤1mm; area measurement≤1mm^2; volume measurement≤1cm^3; heart rate measurement≤ 1bmp; time measurement≤1ms. Due to differences in images obtained by each user in different times, the actual object for the accuracy of the measurement may be grea than the above-mentioned values.**

Chapter Eight Obstetric Measurement

8.1 Measurement and Calculation items

Obstetric tables of the system including: 1.SWINE, 2. CANINE, 3. FELINE, 4. OVINE, 5. GOAT, which is reference for doctor.

8.2 Measurement of Gestational Age (GA) and Estimated Date of Confinement (EDC)

Follow the steps below:

1. In B, B/B mode, freeze desired image, press direction keys to choose "OB" in the display area;
2. Press Enter key to display the obstetric measurement animals on the lower part of the screen, "VETERI Select: 1.SWINE, 2.CANINE, 3.FELINE, 4.OVINE, 5.GOAT", press direction keys to select the measurement animal, press Enter key to confirm, measured parameters of this animal are showed on the lower part of the screen, (for example, select goat that is, display the types of goat);
3. Press direction keys to select the measured parameters (for example select goat, this step is to select the type of goat, press Enter key again to display the measured parameters of goat), press Enter key, the cursor will show "+";
4. Press direction keys or operate mouse to move the "+" mark to desired position, press Enter key or click left mouse to set the "+" mark position as the starting point of the measurement;
5. Press direction keys or operate mouse to move the"+" mark to the end point of the measurement. At the same time, a lighted dotted line appears between the starting point and the end point as the dashed locus of the measurement. The measured value is automatically displayed at the built-in mark"+: ----mm" on the right side of the screen; GA and EDC value to be displayed in real time in the right area of the screen;
6. Press Mode key or repeatedly click left mouse to exchange the starting point and end point;
7. Press Enter key or click right mouse to finish the first measurement;
8. Repeat the steps from 3 to 7 to complete the multi-group data measurement;
9. Press Esc key twice to quit measurement status for this animal;
10. Press Esc key to quit animal measurement status;
11. Repeat steps 2 to 10 to complete a variety of animals measurements;
12. Press direction keys to choose "Clear" and then press Enter key or synchronously click the left and right key of mouse to clear all marks and data;
13. Press key or click the middle mouse to unfreeze, clear all marks and data and quit the measurement status.

8.3 Obstetric report

In frozen status, press Menu Clre key to enter main-menu and press direction keys to move the cursor to the position "Report". Press direction keys to display obstetric report. Press Esc key to quit obstetric report status.

8.4 Measurement items

1. Items measurable in B mode: distance, circumference, area, volume, gestational age (GA) and estimated date of confinement (EDC).
2. Items measurable in B/B mode: distance, circumference, area, volume, gestational age (GA) and estimated date of confinement (EDC).
3. Items measurable in B/M mode: distance or depth, slope, heart rate and cycle.
4. Items measurable in M mode: depth, slope, heart rate and cycle.
5. If the display becomes "----", it indicates an invalid measurement value.

Chapter Nine System Maintenance

The system maintenance should be performed by the user and service engineer. Users shall be in full charge of maintenance, repair and operation of the system after purchasing the product.

9.1 Maintenance by users

9.1.1 System clean, disinfect and sterilize

> ⚠**Warning: Turn off the instrument and pull out the power supply wire before cleaning every instrument of the system. It may cause electric shock if clean the system under power is on.**

> ⚠**Warning: There is no any water-roof device in the system. Do not splash any water or liquor into the system when cleaning or maintaining; otherwise it will cause malfunction or electric shock.**

> ⚠**Attention:**
> 1. **Probe without cleaning, disinfection or sterilization may become the source of contamination, so cleaning or disinfection to the probe is very necessary after every ultrasonic diagnosis.**
> 2. **To prevent possible infection, it is advisable to wear sterilized gloves when clean, disinfect or sterilize the ultrasonic probe.**
> 3. **In the process of cleaning, disinfection or sterilization, avoid probe overheat (exceeding 60℃) as it may be deformed or damaged under excessive heat.**
> 4. **To prevent the infection or the cross infection, the probe surface should be covered with a condom every time before diagnose the cavity.**
> 5. **Do not use the probe packing box to store the probe as the box may become the source of contamination.**
> 6. **The waterproof grade of probe is IPX7.**

1. Clean the probe

(1) Wear sterilized gloves to prevent possible infection.

(2) Clean the probe with sterile water to remove all contaminants. Do not use brush as it may damage the probe.

(3) Dry the probe with sterilized cloth or gauze after cleaning. Do not dry the probe by heating it.

2. Disinfect the probe

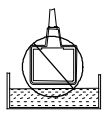
(1) Wear sterilized gloves to prevent possible infection in the process of disinfection.

(2) Clean the probe firstly before disinfection, and then wipe the probe twice with 75% alcohol.

(3) Clean the probe with sterile water to remove residual chemicals.

(4) Clean the water off the probe surface with sterilized cloth or gauze. Never dry the probe by heating it.

> ⚠**Warning:**
> **Do not place the ultrasonic probe connector into water or disinfection, sterilization liquid as it may cause electric shock.**



3. Sterilize the probe

(1) Wear sterilized gloves to prevent possible infection in the process of sterilization.

(2) Clean the probe firstly before sterilization. 2%glutaraldehyde disinfectant is recommended probe. Immerse the sound head part of the probe (See sterilization sketch map) in liquid fo than 10 hours for sterilization.

⚠Attention:

1. Please carefully read the instructions provided by disinfectant provider about the sterilization liquid concentration and sterilization method as well as the description of the dilution method.

2. Glutaraldehyde liquid should use the activator.

(3) Clean the probe with sterile water to thoroughly remove residual chemicals.

(4) Clean the water off the probe surface with sterilized cloth. Never dry the probe by heating it.

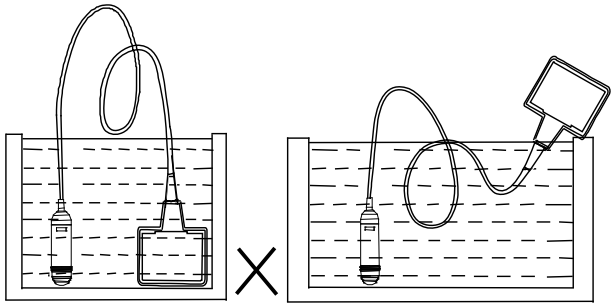


Fig. Wrong 6.5MHz probe sterilization

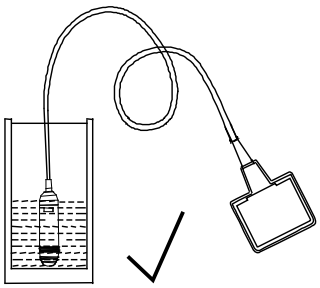


Fig. Correct 6.5MHz probe sterilization

4. Clean the probe cable and its connector

(1) Clean the probe cable and its connector with soft, dry cloth.

(2) In case of die-hard blots, clean with soft cloth dipped in moderate detergent and then air-dry it.

5. Clean the LCD screen

Clean the liquid crystal display with dry, soft flax or anti-static LCD clean cloth.

⚠Attention: Do not clean the screen with hydrocarbon detergent for example alcohol etc or OA equipment cleaning media. These kinds of liquid may degrade the internal function of the screen.

6. Clean the control panel, shell

Clean the instrument surface with soft, dry cloth or with soft cloth dipped in moderate water cleaning media to remove the blots, and then dry the instrument with soft, dry cloth or with air.

9.1.2 Use and maintenance for the charging battery

1. Only use charger and corresponding model of battery provided by KaiXin Company.
2. The output port of adapter plugs into the input port of charger to charge; the minimum charging time is 3 hours and up to 6 hours. Over-charging or discharging will shorten the battery life; the full charged battery can be used for 2 ~ 3 hours.
3. Battery is consumable; the battery cycle-life is based on the times of charge and discharge as unit. When the use time reduced significantly compared with normal conditions, the battery should be promptly replaced.
4. The excess high or low temperature will affect the charging and discharging performance, and short the battery life and capacity.

⚠Attention: Battery charger shall meet the requirements of the IEC60601-1 standard.

⚠Attention: Battery is consumable; the battery cycle-life is based on the times of cl and discharge as unit. When the use time reduced significantly compared with nc conditions, the battery should be promptly replaced.

⚠Attention: A power indicator will appear "X" and glitter continually when the electric quantity is too low. Connect the main unit to external power supply and recharge the battery, or turn off the machine to recharge.

⚠Attention: Don't throw away the exhausted battery anywhere; especially throw it in the fire. Please deal with it according to local statutes.

⚠Attention:

1. Do not throw the battery into water or be wet, which will lead to the battery leakage, explosi or fire;
2. Do not use or store the battery near the heat source, such as fire or heater, which will lead to the battery leakage, explosion or fire;
3. Do not connect the anode and cathode reversely, which will lead to the battery leakage, explosion or fire;
4. Do not heat up or throw the battery into fire, which will lead to the leakage, explosion or fire;
5. Do not connect the anode and cathode with any metal or conductor; do not transport or store the battery together with necklaces, hairpins or other metal objects, which will lead to the leakage, explosion or fire;
6. Do not hammerblow, throw or mechanically shake the battery, which will lead to the leakage, explosion or fire;
7. Do not insert the battery with nail or other spiculate objects; do not hammerblow or trample the battery, which will lead to the leakage, explosion or fire;
8. Do not weld the battery terminal directly, which will lead to the leakage, explosion or fire;
9. Do not disassemble the battery in any way, which will lead to the leakage, explosion or fire;
10. Do not charge the battery near the heat source or extra-hot environment, which will lead to the leakage, explosion or fire;
11. Do not put the battery into the microwave oven or pressure vessel, which will lead to the leakage, explosion or fire;
12. Do not mixed use the battery together with one-off battery (such as dry battery), or different capability or different model or different brand battery, which will lead to the leakage, explosion or fire;
13. Do not use the abnormal battery with particular smell or abnormal heat or distortion or turn colors or abnormal phenomena, which will lead to the leakage, explosion or fire;
14. Do stop the charge and pull out the battery from the charger at once if any abnormal phenomenon happens to the battery, such as particular smell or abnormal heat or distortion or turn colors. Otherwise, each of above will lead to the leakage, explosion or fire;
15. Do remove the battery from the near fire if any leakage or particular smell happens, which will lead to the leakage, explosion or fire;
16. If any leakage splash into eye, do not wipe the eye, instead of washing it and get help from the doctor as soon as possible. Otherwise, the eye will be injured;
17. Do not use the battery in the extremely hot environment, such as hot sunshine or in the car when it is too hot, because these will catch fire, even worsen its performance and shorten its life;
18. If use the battery beyond the listed environment on the manual, it will worsen its performance or shorten its life, even lead to extreme heat or explosion or fire.

9.2 Troubleshooting

To ensure normal operation, users are recommended to prepare a proper maintenance and examination plan to regularly check on product safety performance. If any abnormity occur, timely International Trade Dept of Kaixin for support.

If the following problems occur on starting up the machine, try to make corrections following the method in the table. If the problem remains unsolved, contact International Trade Dept of Kaixin for support.

Trouble	Correction
Power light is off and no screen display is present when starting the machine.	1. Check power supply. 2. Check power cable and connector. 3. Check power adapter.
Character and gray scale are displayed, but no ultrasonic image on the screen.	Probe is not properly connected. Turn off the power and reconnect the probe.
Intermittent stripe, snow, or far-field interference appears on screen.	1. Check power supply.(spark interference present) 2. Check environment. Interfering source of around the machine, such as electric motor, ultrasonic atomizer, automobile, computer or other interference (Electromagnetic interference present around the machine). 3. Check power plug/socket of the instrument or probe connectors. They shall be properly contacted.
Image display is not clear.	1. Adjust the total gain, near field, far field. 2. Adjust the brightness and contrast level.
Control panel malfunction	Restart the system by turning off the main unit power.

9.3 System maintenance

To ensure the system performance and safety, it must be checked after using 1 year. When check the instrument, please consult the factory-authorized distributor of Kaixin Company for service, as they need to have professional technology engineers.

Inspect sorts	Cleaning	Electrical safety	Mechanical safety	Image recording
Inspect items	System inside Peripheral equipment	Earth resistance Earth leakage current Enclosure leakage current Patient leakage current Dielectric strength	Inspect the control panel Installed device of peripheral equipment Other mechanical part Probe appearance	Images in each mode Recorded images using typical probe

Chapter Ten Storage and Transportation

Storage and Transportation

1. If the instrument is stored over 3 months, take out the instrument from the packing case, connect it to power supply for 4 hours, and then disconnect the power and place it in the case again following the direction indicated by arrows on the package. Store the case in the warehouse. Do not pile the case. The instrument case should have adequate space from ground, walls and ceiling of the warehouse.
2. Environment requirement
   Ambient temperature: -20℃－55℃; Relative humidity: 30%－93% (without condensation);
   Atmospheric pressure: 700hPa-1060hPa. The warehouse should be well ventilated and free of direct sunlight and corrosive gas.
3. Shockproof measures have been taken inside the packing case to allow for transport by air, railway, land and sea. The goods shall not be exposed to poor weather conditions like rain and snow, nor shall the goods be placed upside down, bumped, knocked or over-stacked.

Chapter Eleven Safety Classification

1. Classified according to electric shock protection type:
   Class I, internally powered equipment
2. Classified according to electric shock protection degree:
   Type B applied part
3. Classified according to the degree of protection against ingress of liquid:
   Main unit belong to IPX0 equipment
4. Classified according to operation safety in condition of existence of flammable anesthetic mixture with air or oxygen or nitrous oxide:
   It is neither of category AP equipment nor of category APG equipment
5. Classified according to mode of operation:
   Continuous operation equipment
6. Classified according to the protection of radio services:
   Group I Class A equipment

KAIXIN ELECTRONIC

XUZHOU KAIXIN ELECTRONIC INSTRUMENT CO., LTD.

Kaixin Mansion, C-01. Economic Development Zone,
Xuzhou, Jiangsu, China.

Zip Code: 221004

Tel: +86-516-87732932/87733758

Fax: +86-516-87732932/87792848

Website: http://www.kxele.com

E-mail: gm01@kxele.com

EC REP Shanghai International Holding Corp. GmbH (Europe)
Eiffestrasse 80, 20537 Hamburg, Germany

Information contained in this manual is subject to change without further notice