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Preface

Declaration

- Information in this document is not annotated to change. The manufacture shall not state nor observe any warranty based on this point, and definitely give up any implied warranty based on any special purpose of selling or making benefit.
- Information in this User's Manual may be changed at any time without notice.
- Many pictures in this manual, which are schematic diagrams for indication only, may disaccord with the real object, and then the real object should be regarded as the final.

Warranty

- We assume the responsibility for device security, reliability and performance only under the preconditions that the disassembly, assembly and maintenance of the device are all performed by its assigned professionals and the device is used strictly in compliance with the operation manual.
- We provide warranty to the original purchasers that this product will be free from defects in material, components and workmanship for a period of 1.5 years from the date of purchase (invoice date). If the product(s) is(are) defective, the purchaser may return this unit(s) to us for repair or replacement with a new one. The liability of us under this limited product warranty does not extend to any misuse or abuse. Any evidence of tampering will nullify the warranty.
- This warranty is only available for failures occurred when the device is operated in compliance with the operation manual. And the guaranteed device can only be used in the prescribed range given in manual.
- This guarantee excludes losses or damages caused by external reasons such as thunder struck, earthquake, theft, unsuitable use or abuse and refitting the device.
- We shall not be responsible for losses, damages or injuries caused by delayed service request.
- When there are problems with the products, please contact us. Tell the device model, serial number, date of purchase and the problem.

Note







- To ensure operational safety and long-term stable equipment performance, please read this operation manual

closely and understand the device functions, operation and maintenance at all points before operating the device, especially contents of "Warning", "Caution" and "Note". Misoperation or inobservance of the instructions given by manufacturer or its agents may result in device damage or personal injury.




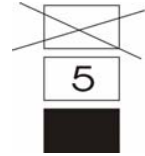


- The following convention works through this manual to lay special emphasis on some information.
 - ◆ "Warning": Meaning that neglect of it will cause severe personal injury, death or estate loss.
 - ◆ "Caution": Meaning that neglect of it will cause slight personal injury or property damage.
 - ◆ "Note": to remind user of installation, operation or maintenance information. This information is very significant but with no risk. Any warning against dangers shall not be contained in NOTE.

Safety Symbols

Device labels explanation:

	Attention! Refer to accompanying documents
	Switch on the main electrical supply
	Switch off the main electrical supply
	Signal out
	Protected against the effects of immersion
	Class II device

Packing and transportation labels explanation:

	Handle with care
	Temperature limit
	Upwards
	Limited layers of stowage
	Protect against wetness
	Protect against heat

Device safety classification:

- According to the safety degree of application in the presence of a flammable anaesthetic mixture with air or with oxygen or nitrous oxide:

The device cannot be used in situation of mixture of inflammable anaesthesia gas and air or nitrous oxide.

- Classify as per work system:

The device is continuous operation.

- Classify as per harmful liquid leakage:

The main unit of the device is a conventional device; the probe is of resistance to flooding.

- Classify according to shockproof type:

The device is Group II device powered by external adapter; and internal power device powered by battery.

- Classify according to shockproof level:

The device is Type B Applied part.

General tips for device operation

◆ In operation

1. Heat radiation holes are strictly prohibited to be covered.
2. After shutdown, do not restart the device within 2 - 3 minutes.
3. Scanning should be stopped immediately and the device be shut down if any abnormal case is found.
4. Do not touch any parts of the device excluding application part.
5. Touch the key softly.

◆ After operation

1. Power off the device.
2. Pull out the plug from power supply socket instead of pulling the cable.
3. Clean off the couplant on the probe with soft medical sterilized cotton ball.

General security information

Safety of the operator and patients and reliability of the device are taken into consideration during designing and producing, the following safety precautions must be implemented:

1. The device shall be operated by qualified operating staff or under their instructions.
2. Do not open the device and change the parameters without permission. If necessary, please turn to our authorized agents for service.
3. The device has already been regulated into its optimal performance. Do not adjust any preset control or switch unless operate as instructions in the manual.
4. If the device works failure, please shut down the device at once and contact our authorized agents.
5. If there is a need to connect the device with other company's' electronic or mechanical devices, please contact us before connection.

6. Environmental requirements on normal operation:

- 1) Environment temperature range: $+10^{\circ}\text{C}\sim+40^{\circ}\text{C}$
- 2) Relative humidity range: $30\%\sim75\%$
- 3) Atmosphere pressure range: $70\text{KPa}\sim106\text{KPa}$

Environment requirements on device storage:

- 1) Environment temperature range: $-20^{\circ}\text{C}\sim+55^{\circ}\text{C}$
- 2) Relative humidity range: $10\%\sim100\%$
- 3) Atmosphere pressure range: $50\text{KPa}\sim106\text{KPa}$

7. Do not hit the fragile TFT-LCD display. If it cracks, deal with it carefully in case the liquid crystal gets into eyes or mouths.
8. Forbid hit the inner rechargeable lithium battery nor throw it into fire in case it trigger an explosion; Do not short circuit battery output, or the battery might be damaged. Please use the original binding charger to charge the battery. Used battery will cause environment pollution, please handle the battery correctly for callback processing.
9. Forbid disassemble the power supply adapter. If malfunction happens, please handle by the professional; the charging output can only be used for charging the battery of the device, any improper use on other battery may cause explosion, fire and other unexpected hazards.
10. The short of the output of the adapter is forbidden, long time short circuit will result in adapter damage.
11. Please use standard power cord as the input line of the network power supply for the adapter to reduce risk.
12. We shall not take any responsibility for any risk resulted by propelled unauthorized re-fitment by the users.
13. Disconnect the device from the power supply network by unplug the adapter from the power supply network.

14. Ultrasound might cause hazard to human body, long time radiation should be avoided. Please refer to appendix A for sound output parameter.

ATTENTION:

This device is designed for animal only, please do not use it on human.

Contraindication:

It is suggested not to probe the part with wound or acute inflammation to avoid cross infection

Chapter One Summary

1.1 Brief Introduction

- The device adopts technologies such as microcomputer control and digital scanning converter (DSC), large dynamic broadband low-noise preamplifier, logarithmic compression, dynamic filtration, edge enhancement etc to ensure legible, stable and high resolution images.
- Four display modes: B, B+B, B+M, M; Image gray scale: 256 levels.
It can realize image real time display, frozen, zoom; remark case history number, age, sex; measuring distance, circumference, area, heart rate and gestation age;
- Combined power supply mode of AC adapter and built-in Li-ion chargeable battery, the specialized brownout mode enabling more lasting battery operation.

- 5 inches TFT-LCD display, programmable device (FPGA) and surface mounted technology (SMT) make this device compact and light in weight.
- PAL-D video output with mouse mouthpiece.
- Jet molding enclosure with hand-held structure makes it convenient for outside diagnoses.
- The device consists of mainframe, probe and adapter. 3.5MHz waterproof mechanical sector scanning probe is the standard configuration.

1.2 Range of Application

Suitable for diagnosis on swine, equines, bovines, sheep, cats and dogs and other animals.

1.3 Technical Specification

Model		
Probe		3.5 MHz Mechanical sector
Displayed Depth (mm)		60—190
Maximal detect depth (mm)		≥140
Resolution (mm)	Lateral	≤4 (depth ≤80) ≤5 (8≤depth ≤130)
	Axial	≤2 (depth ≤80)
Blind area (mm)		≤8
Geometric position Precision (%)	Horizontal	≤20
	Vertical	≤10
Monitor size(inch)		5.0 TFT-LCD
Display modes		B, B+B, B+M, M
Gray scales		256 levels
Image multiplying factor		*1.0,*1.2,*1.5,*2.0

Image storage	128-frame
Measuring functions	Distance, circumference, area, heart rate, gestation age
Battery capacity	2200mAh
Mainframe power	13W at non-charging operation / 25W at charging operation
Adapter power consumption	45W
Character display	case history number, age
Faked color display	Gray, red, yellow, blue

1.4 Block Diagram

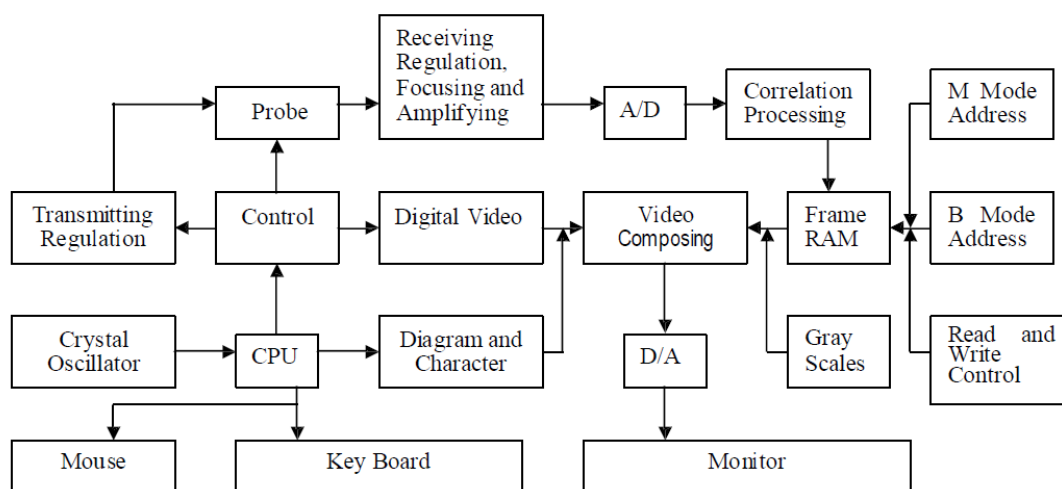


Figure 1-1 EC6100AV Electric principal block diagram

1.5 Basic Principle

EC6100AV B-ultrasound works in this following procedure: different tissues of human body possess different densities and speeds of transmission of ultrasound, i.e. different acoustic impedance (product of media density and sound speed).when Piezoelectric chip (transducer) gets certainly regulated electric impulse, it will produce ultrasound with certain frequency. when this ultrasound (sound energy) is injected into human body, different

organ

surfaces will produce reflection echo, the different size reflection is received by the transducer which emitted ultrasound and is changed into electric impulse, when this electric impulse is amplified, demodulated, digital scanned, shifted and some other handling, video standard signal is produced and organ cross-sectional images are displayed on the monitor.

1.6 Standard layout pieces

1.6.1 Standard Configuration

1. Mainframe(containing a piece of HYLB-331B Li-ion battery)
2. 3.5MHz waterproof mechanical sector scanning probe
3. Manual/ technical instructions
4. Power adapter(containing power cord)
5. Gel

1.6.2 Optional Configuration

1. 5.0 MHz waterproof mechanical sector
2. Lithium-ion battery
3. Charger
4. Adaptive input wire
5. Haversack
6. Frame

Warning

Replacement of parts that not according with specs or connection to other devices might cause unexpected EMC problems. The possibility of unexpected EMC coupling effect should be testified carefully.

1.7 Appearance

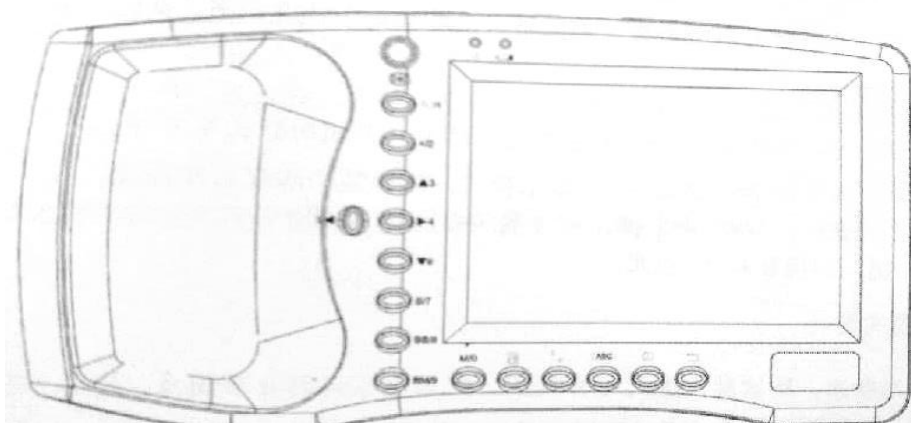


Figure 1-2 Front sketch map

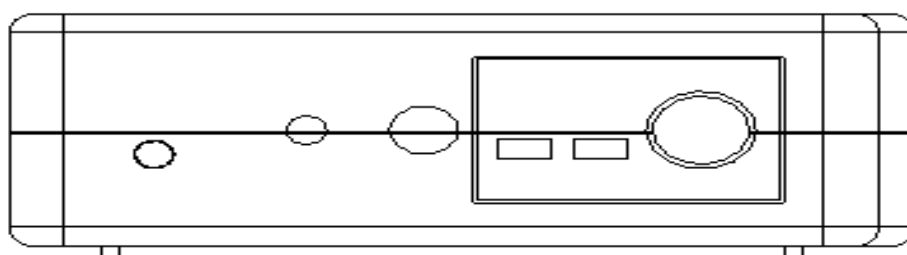


Figure 1-3 Side mouthpiece sketch map

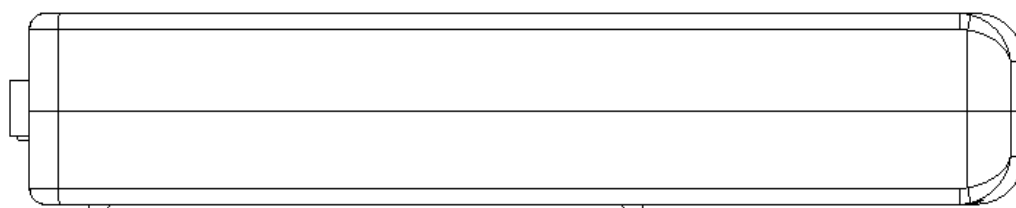


Figure 1-4 Underside sketch map

1.8 EMC statement

EC6100AV shan't affect the basic performance of radio service and other equipment, it can work well in the expected and declared electromagnetic environments.

Warning:

Images may be interfered and the diagnoses may be affected while working in intense electromagnetic environment. By this time stop operating to avoid misdiagnosis. Reuse it after the electromagnetic interference is removed.

Warning:

Working when the device is overlapped with other devices or close to others might cause unexpected EMC problems; If they have to be put together, please check each one to ensure no one is affected by unexpected EM coupling.

Warning:

Replacement of parts that not accord with specs or connection to other devices might cause unexpected EMC problems. The possibility of unexpected EM coupling effect should be testified carefully.

Chapter Two Installation

2.1 Operating environment

1. Environment temperature range :+10°C~+40°C
2. Relative humidity range: 30%~75%
3. Atmosphere pressure range: 70KPa~106KPa

When using, avoid strenuous vibration, keep it away from devices with high field, intense magnetic field or high voltage; avoid strong sunlight blazing down on the display; keep the device well-ventilated, moisture proof and dustproof.

2.2 Unpacking inspection

After unpacking, check the device according to "Packing List" and install it according to requirements and methods described in "Installation" after affirming that there is no shipping damage.

Warning:

If there is breakage at unpacking check, it is banned to use the device to ensure security.

2.3

Installation and disassembly

2.3.1 Connection between probe and main unit

Probe jack lies in the top of the right side, insert the probe into the jack correctly and turn it clockwise and wound it. There is only one probe jack which can be connected to all the supported optional probes.

Warning:

Avoid by all means unplugging or plugging the probe connector at state of log on in case the probe and main unit be damaged.

Once the probe is connected with the main unit, do not unplug nor plug it at discretion

in case poor contact happen.

Warning:

Must not touch the contact pin of the probe connector.

Warning:

The probe should be protected from falling off or crashing and the manufacturer assumes no responsibility for this kind of hazard.

Warning:

Please handle the device carefully.

2.4 Power Supply

The device provides two automatic switch-over modes to supply power: adapter and built-in battery.

2.4.1 Power supply with adapter

1. Check the input power cord plug of the adapter to see whether it matches the EPS outlet.
2. Check the EPS to see whether it is in the specified range and the power cord to see whether it is connected well.
3. Check the adapter to see whether it works well: Plug the power cord into the AC input outlet, switch on the power switch of the outlet, if the DC output indicating light turns on green, it works well.
4. Shut the power switch of the outlet.
5. Insert the DC output plug of the adapter into the DC14V outlet in the right side of the device, switch on the outlet.
6. Switch on the main unit, the device is available now.

2.4.2 Power supply with battery

1. Install the battery correctly into the main unit.
2. Push down the main unit power switch to power on the main unit, the power indicator will turn on.
3. The device can start operation.

Note:

When the main unit under-voltage indicator turns into red, it means the battery is

running up and needs charging.

Warning:

It is prohibited to use any other power supply except the standard adapter as the external power supply for the main unit.

2.5 Battery Charging

1. Install the battery correctly into the main unit.
2. Insert the plug of output DC14V/3A of the adapter into the DC14V interface on the side.
3. Connect power cord of "Input AC220V,50Hz" of the adapter to the EPS. <0.
4. No matter the main unit is power on or shut down, when the "under-voltage" indicator flickers, the adapter is charging the battery; When the "under-voltage" indicator turns off from flickering, the battery is fully charged.

Chapter Three Keyboard Operation

3.1 Display



Figure 3-1 screen

3.2 Keyboard functions

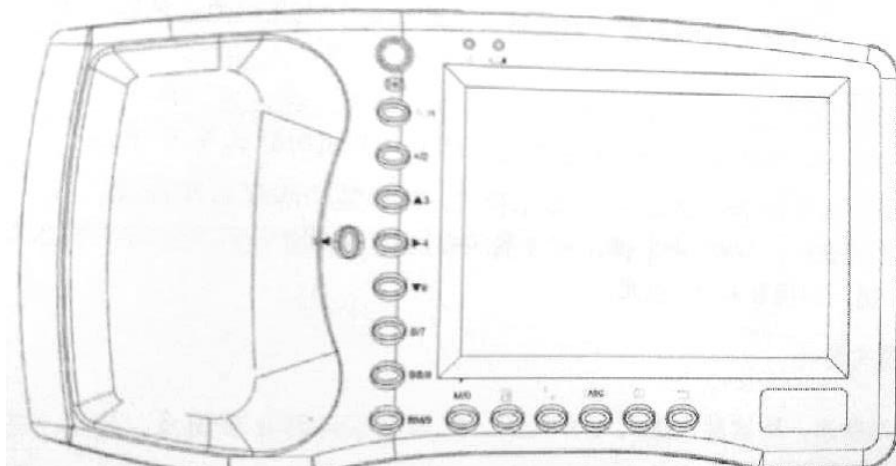


Figure 3-2 Operation panel

EC6100AV keyboard is given as below.



Image freeze






Switch frozen and real time state.

Tip:Screen right bottom appears" FREEZE", indicating image freeze.



Multi-function keys

As character key:

- In menu operation, choose submenu.
- In comment menu, input age and time.
-       in comment menu, input name, character and spacebar.

As function keys:



Single M mode display key

At B/M mode real or frozen state, press this key, enter M mode display state, display shows a M mode image.


At non B/M state, press this key, display image processing menu. Press  button, exit this function.



Image magnification key

In single B real time scanning, press this key to change image magnification. Range: 60~190, 14 levels adjustable.







Measuring mark key

At frozen state, press this key to display mark "+" which can be moved with direction key.




(For detailed operation, see distance, circumference, area measurement instructions.)



Direction keys

In measurement, press these keys to move cursor. Press   in B mode real time to change scanning display depth. Press  increase depth, press  decrease depth. Current depth is displayed right below the corner of screen.

In comment menu of name and hospital, press   to change needed display character.

Press   to activate the parameters on the right screen. Current activated parameter highlights. Press 




to adjust.



B mode display key

At real time or frozen state, press this key, enter B mode (Single B mode as default).

BB/8 Double B mode key

At real time or frozen state, press this key, enter double B mode. One is frozen image, the other is real time image. Press repeatedly, achieve switch of frozen state to real time state. Press , two images are frozen ones.

BM/9 B and M mode display key





At real time or frozen state, press this key twice, enter B/M mode. Screen displays B and M image ("B/M" or "B+M"). The left is B real time image, the right is M real time image. Press repeatedly, switch B+M and M mode real time state. On B mode image, there is a vertical line contain some dots with the same distance, called as sample line. Press , sample line moves left. Press , sample line moves right. Press again, enter M mode, screen displays one M image.





Figure 3-3 Four display modes

LIST Obstetrics list menu key

At "B" and "BB" mode frozen state, press this button, display list menu. Press number keys, do corresponding operations. For detailed operations, see the following instructions. Press , exit list menu.

 Measurement assistant operation key

Use ,  and direction keys to complete distance, circumference, area, volume and histogram measurement. For detailed operations, see the following instructions.

 Comment menu key

Press this key, display comment menu. Press number keys, enter submenu. Press , exit comment menu.

 Clear screen key



Press this key, clear measurement mark, comment, results or exit parameter adjust state. In display menu, press this key to exit menu.

 Reset key

When the device breaks down (it does not work when you press any key) due to unexpected situation or disoperation, press this key to reset the device.

Chapter Four Operation Procedure

4.1 Start the device

Switch on the power switch, the power indicator on the panel turns on, and the startup screen shows. Press any key(except  and ), enter the state of scanning. Adjust the display brightness, contrast and overall gain knob to acquire a satisfying visual effect.

Tip: LCD display effect has a high correlation with view angle, operator should adjust view angle suitably.

Caution:

The heat radiating holes cannot be covered otherwise the device would be damaged due to over hot.

4.2 Diagnosis





Apply an amount of medical ultrasound Gel to the diagnostic part of patient body, then press the acoustical window of the probe on the part closely. The cross-section acoustic image of tissues will be displayed on the screen, move the probe properly to locate the optimum position for the detecting depth; meanwhile, adjust the overall gain, near field gain, far field gain or concentrate the focus to acquire an optimal cross-section acoustic image of the diagnostic part.

Note:





- 1. When pressing the probe on patient body, do not overexert in case that the probe be broken or the patient feel discomfort.**
- 2. It is necessary to use a probe suitable for the diagnostic part and a correct frequency for diagnoses.**

4.3 Picture parameter adjust





Picture parameter adjust contains adjustment of probe frequency, focuses, frame, image smooth, gamma calibration, gain, brightness and contrast.

At real time state, press  or , one highlights, parameter can be set through  and , and displayed at right top screen.







4.3.1 Frequency set

At real time state, press  or , highlight right top frequency, adjust frequency through  and , the frequency range is 2.5MHz、 3.5MHz、 5.0MHz.


4.3.2 Gain adjust

At real time state, press  or , highlight overall gain on the right top screen, then adjust value through  or . The range is 0-60.

4.3.3 Brightness and contrast adjust

Press  or , highlight  and  on the right top screen, then adjust brightness and contrast value through  or .

4.4 Comment

At frozen state, press , screen displays comment menu as below. Through this menu, achieve functions such as name, age, sex, comment, time, hospital, language and clear.

V2.03
0. NAME
1. AGE
2. SEX
3. COMMENT
4. TIME
5. HOSPITAL
6. ERASE

7. DEFAULT SET

8. BEEP-ON

- Press , choose "0. NAME", input patient name. Input tip is as below:

PLEASE ENTER NAME:



0-A 1-B 2-C 7-D 8-E 9-F

Below the tip, there are 26 characters and space key. Press and to display other characters. Press number keys, display the number, up to 15 characters can be input. Press , delete the wrong characters. Input completed, press to exit. If abort, press straightly.

- Press , choose "1.AGE", input patient age, up to 3 figures can be input. Input screen is as below:

PLEASE ENTER AGE:



Input completed, press to exit. If abort, press straightly.

- Press , choose "2.SEX", input patient sex. Input screen is as below:

PLEASE ENTER SEX:

1.M 2.F

Press , choose "1.M"; press , choose "2.F".

- Press , choose "3.COMMENT", screen appears white cursor, then 10 comment characters appear. Press and to display other characters. Press , delete characters. Input completed, press to exit.

If abort, press straightly.

- Press , choose "4.TIME", modify system time and date. Input screen is as below:

YY-MM-DD

HH-MM-SS

For example time: 2010-10-9 15:30:28, then the input should be:

YY-MM-DD
101009
HH-MM-SS
153028

Input completed, press to exit. If abort, press straightly.

● Press

PLEASE ENTER HOSP:
■

● Press

ERASE ALL STORAGE?
1. YES 2. NO

Press

Press


Tip: Erasing not over, system hints "ERASING...", do not do any other operations.

ATTENTION


Do not try any other operations until the erasing process has done in case of the damage to device.

● Press

● Press

Tip: The device shall not provide the input of numbers while inputting NAME(0), COMMENT(3) and HOSPITAL(5). Press  to exit the comment table if needed.




4.5 Image Dispose

At frozen state, press  to display image dispose menu, and realize storage, tune out, image smooth, pseudo color, area, volume and histogram measurement function.

V2.03
0. SAVE
1. SVLOAD
2. IMAGE-SMOTH
3. COLOR
4. AREA-VOLM
5. HISTOGRAM



4.5.1 Image storage

This equipment provides at most 128 images storage even power off.

●After freezing a satisfied image, press , display function menu, then press , save current image. At the same time, screen displays current image number like "SAVING.....05". When storage completed, number disappears. Press , return to real time state.

●Up to 128 images can be stored and auto numbered as store time. If 01—20 exists, next image will be numbered 21. When the storage is full, (exist 128 images) , device will give tip as below:

STORAGE IS FULL	ERASE NO.01?
1.YES	2.NO

Overwrite current 01 image, press , press , abort current image storage.

Choose"2.NO", abort image storage. Do storage again, system hints if overwrite image 02, and so on.

Tip:

When storage is full, review one stored image, and then store image, system will hint whether erase and store from this number.

4.5.2 Image review

At real time or frozen state, press **M/O**, display function menu, then press **⊕/1**, screen displays:

PLEASE ENTER STORAGE NO. :



Enter image number like 01, then press **(ABC)** (if enter wrong, press **CLEAR** to delete characters one by one, then enter again), review the first image, the left bottom screen displays 01/128,01, which is the current image number, 128 is storage volume. Press **▲3** or **▼6**, review images one by one.

Press **⊗**, return to real time scanning mode. Repeat the above operations, review other images.

4.5.3 Image smooth

At real time state, press **M/O**, display image dispose menu. Then press **+2**, choose image smooth. Repeat this operation to change image smoothing degree, and it will be displayed on the right top screen in time. The degree range is 1M0、1M1、1M2、1M3.








Normal Image



Smooth Image

4.5.4 Pseudo color

At real time mode, press , display image processing menu, then press , light the pseudo color adjustment item



on the right screen, press  or  to choose regulate item, press  and  to adjust parameters.

IC0, IC1, IC2, IC3 for image pseudo color, on behalf of gray, red, yellow, blue.

CC0, CC1 for character color, on behalf of gray, yellow.

BC0, BC1 for background color, on behalf of gray, blue.




4.5.5 Circumference, area, volume measurement




At frozen state, press , enter image dispose menu. Press , choose "area-volume", the screen is as below:

ENTER:
1.FREEHAND
2.ELLIPSE

I. Free hand measuring method:

Key operation

1. Press , choose free hand measuring method, screen appears cursor. Press direction keys to move cursor to the start point of measured zone.
2. Press , press direction keys to move cursor following the edge to the end point of measured zone.
3. Press  again, complete circumference and area measurement.

If measure circumference and area sequence, press  and  or straightly press , repeat procedure2-3.

Up to 2 groups of data can be measured. Result will be displayed on the right screen.

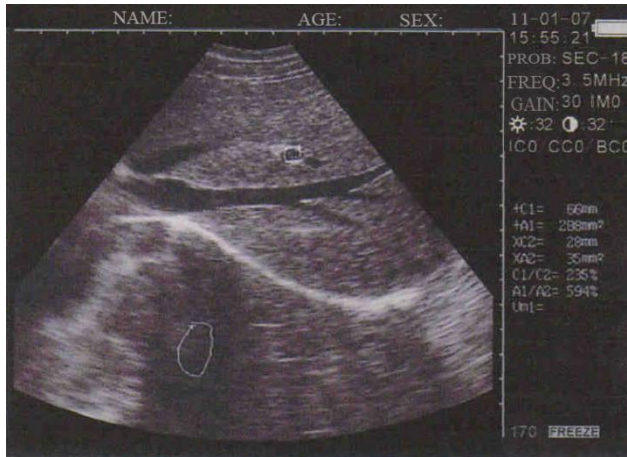


Fig 4-2 Measuring circumference and area (free hand measuring method)

C1 and A1 is the first group data of circumference and area.

C2 and A2 is the second group data of circumference and area.

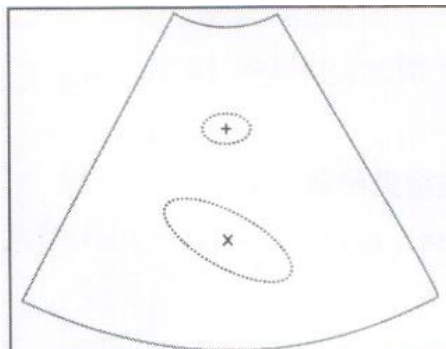
C1/C2 is the ratio of two circumferences value.

A1/A2 is the ratio of two areas value.

II. Ellipse measuring method

1. Press $\boxed{+ / 2}$, select ellipse method, the screen displays ellipse sample frame;
2. Move sample frame to the area needs measuring.
3. Press $\boxed{\text{+} \cdot \text{+}}$, adjust size by orientation button.
4. Press $\boxed{\text{+} \cdot \text{+}}$ again, change sample frame size by orientation button.
5. Press $\boxed{\text{+} \cdot \text{+}}$, repeat step 2-4, adjust sample frame again.

If continue to measure circumference and area sequence, press $\boxed{M / O}$ and $\boxed{\blacktriangleright 4}$ or straightly press $\boxed{+ / 2}$, repeat procedure 2-3. Up to 2 groups of data can be measured. Result will be displayed on the right screen.



4.5.6 Histogram statistic function

- At frozen state, press **M/O**, screen displays function menu.
- Press **5**, choose "5.HISTOGRAM", image zone displays sample window, use direction keys to move to any image display zone. Press **+**, complete statistic. Result will be displayed on the right screen as below:

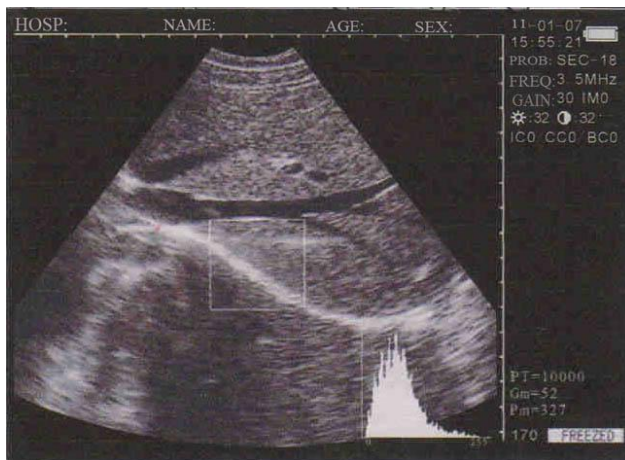


Figure 4-3 Histogram statistic

X axis is gray grade, Y axis is the number.

PT is the total pixel number.

Gm is the gray grade when the value of Y axis is at peak.

Pm is the Gm pixel number

From this image, the zone pixel number is (PT) 10000, at Gm 52, the pixel number is the biggest, 327 points.

- In process, press **+/1** or **+2** to increase or decrease sample window. Press **CLEAR**, exit this function.

4.6 Distance Measurement

• Key operation:

1. At frozen mode, press **+2** button, screen displays measuring cursor.
2. Move measuring cursor to measured start point with direction keys.
3. Press **+**, locate the start point.
4. Press direction keys, another cursor appears. Move it to the end point, press **+/1**, complete measurement. (Tip:

Press  consecutively, switch the start and end cursor) .

If you want to continue distance measurement, repeat step 1-4, up to 4 groups of distance can be measured. Results will be displayed on the right screen.

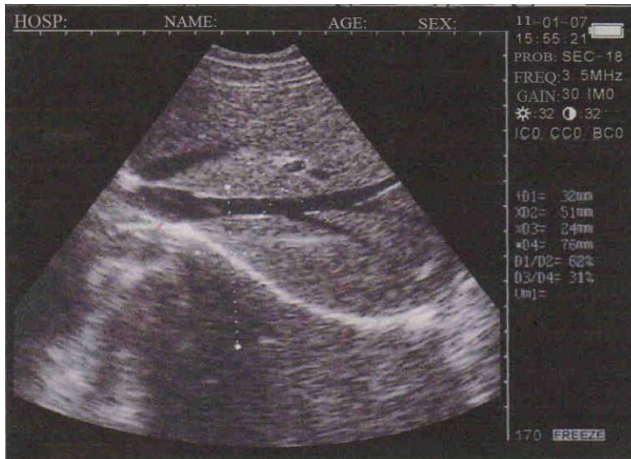


Figure 4-4 Distance Measurement

4 distances are D1、 D2、 D3、 D4.




D1/D2 is the ratio of D1 and D2.

D3/D4 is the ratio of D3 and D4.

4.7 Volume Measurement

This device measures volume through 2 methods.

1. Calculate with 3 groups of distance with 3-axes.

To complete bulk measurement, we need 3 groups of distance, then press  to achieve bulk measurement. If the distances are less than 3 groups, the press of  will not display bulk. If 4 groups of distance are measured and then press , the bulk displayed is calculated with the former three groups (D1,D2,D3).

Operation:


1. Get cross section and vertical section, freeze.
2. Measure the long and short axis of the cross section with distance measurement method.
3. Measure the diameter of the vertical section with distance measurement method.
4. Press , complete volume measurement. Result will be displayed at the right screen "Vm1" as below:



Figure 4-5 Volume Measurement(3-axes method)

2. Calculate through ellipse method use two circumference.

Operation:

1. Get cross section and vertical section, freeze.
2. Measure the circumference and area of the cross section and vertical section with circumference and area measurement method.
3. System will calculate volume automatically and display at right screen "Vm1" as below:



Figure 4-6 Volume Measurement (ellipse method)

4.8 Heart rate

1. At B/M mode, freeze one satisfied heart wave image.
2. Measure the distance between two peaks, get 3 groups data at right bottom screen, which are T, HR, EF as below:

0. EQUINE:GSD

1. BOVINE:BL

2. BOVINE:SL

3. BOVINE:HL

4. SWINE:HL

5. SHEEP:USD

0. CAT:HD

1. CAT:BD

2. DOG:GSD

3. DOG:CRL

4. DOG:HD

5. DOG:BD

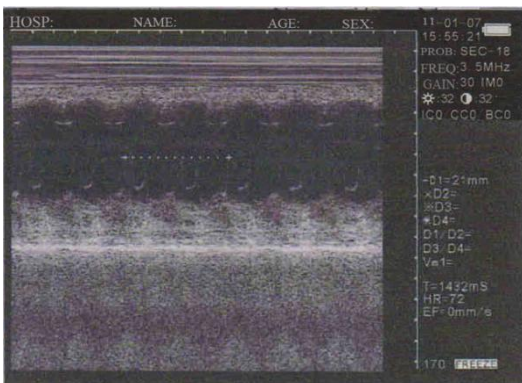
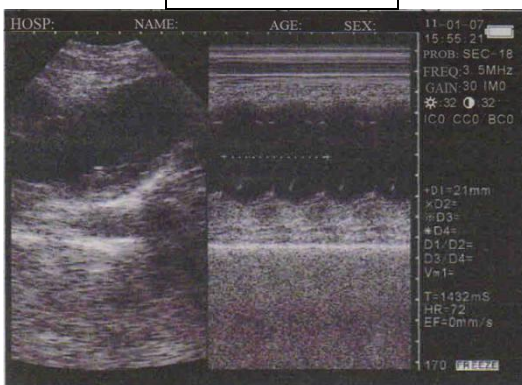


Figure 4-7 HR Measurement

4.9 Obstetrics calculation

The device provides gestation age measurement for horse, cows, sheep, pigs, cats, dogs and other animals through parameters such as GS, BL, HL, SL, USD, HD, BD, CRL, etc. to automatically display the relevant gestation age (gestation weeks).

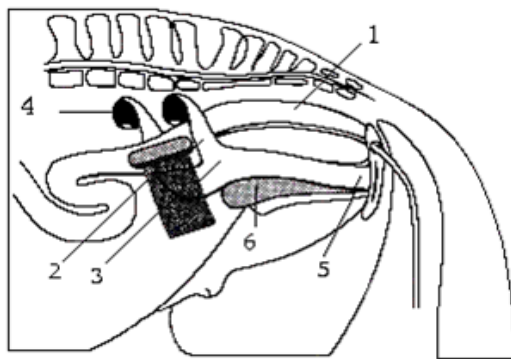
At frozen state, press **LIST**, display horse, cow, sheep and pig list menu. Then press **LIST**, display cat dog list menu, press **LIST** continuously, circularly display two menus as below. Press **CLEAR**, exit obstetrics list.

Press number keys to select the required obstetrics table circularly. Then select the distance parameter according to distance measurement method, the corresponding gestation age data will be automatically shown after "G.A=", and expected date of confinement data after "EDD=".

Details are given as below:

• **EQUINE-GSD: Estimate horse gestation age according to GS**

1. Clean out the excreta in horse's rectum.
2. Palpate by hand and preliminarily estimate the gestation state to determine the germinal tissue for B ultrasonic scanning.
3. Hold the probe, and insert it into the rectum with hand on the probe closely to ensure that your hand will feel any following situation firstly. Position your hand at the dorsal part between the rectum wall and the transducer.
4. The internal structure of horse is displayed on the screen. Bladder lies in the vertical crossed part, the following parts are cervix tissue and uterine body. Observe horizontally, uterine horn usually looks in round shape. Move the probe inside the rectum until the coupling section of uterine horn and uterine body is displayed, and then diverse the transducer to the direction of uterine horn as the following figure shows:



1 Rectum 2 Uterine horn 3 Uterine body 4 Ovary 5 Vagina 6 Bladder

Figure 4-8 Probe position in womb and ovary sketch

5. The measuring method of GS diameter is given in the following figure. It can go in horizontal direction or vertical direction with no differences.

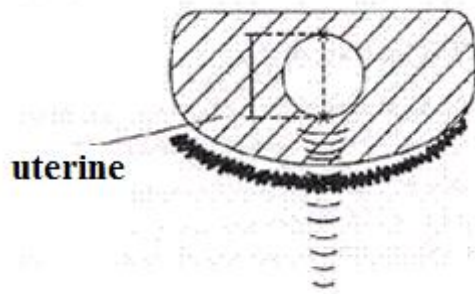
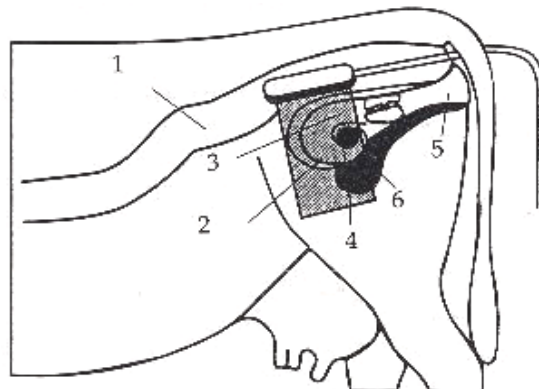


Figure 4-9 Horse's gestation age measurement sketch

6. Measure the selected parameter distance according to distance measurement method, the corresponding gestation age data will be automatically shown behind "G.A". Through measurement, a chart can be made to determine growth curve and hereby to judge the gestation age corresponding to the embryo size. Gestation age calculation begins from the copulation day instead of the impregnation day.

• **BOVINE-BL: Estimate gestation age according to cow body length.**

1. Clean out the excreta in cow's rectum.
2. Palpate by hand and preliminarily estimate the gestation state to determine the germinal tissue for B ultrasonic scanning.
3. Hold the probe, and insert it into the rectum with hand on the probe closely to ensure that your hand will feel any following situation firstly. Position your hand at the dorsal part between the rectum wall and the transducer.
4. The internal structure of cow is displayed on the screen. Bladder lies in the vertical crossed part, the following parts are cervix tissue and uterine body. Observe horizontally, uterine horn usually looks in round shape. Move the probe inside the rectum until the coupling section of uterine horn and uterine body displayed, and then diverse the transducer to the direction of uterine horn as the following figure shows:



-
1. Rectum
 2. Uterine horn
 3. Uterine body
 4. Ovary
 5. Vagina
 6. Bladder

Figure 4-10 Probe position in womb and ovary sketch

5. To measure fetal body diameter, a vertical section should be selected, that is a plane covers from both sides through fetal neck, chest cavity and abdomen. Body diameter could be measured within 60 to 150 days of gestation. Body diameter measuring method is given in the following figure:

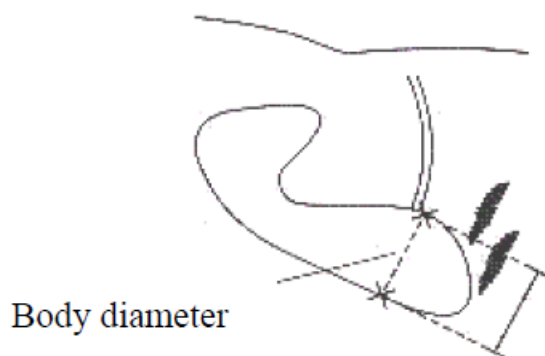


Fig 4-11. Cow's body length measurement sketch

6. Measure the selected parameter distance according to distance measurement method, the corresponding gestation age data will be automatically shown behind "G.A".

● **BOVINE-SL: Estimate gestation age according to cow stomach length.**

1. Make the cow in a state of stand.
2. Put the probe, a little bit left or right of the center, on the ventral abdominal wall closely. If there is mud on this part, clean with water first in case the abdomen pelvic structure could not be displayed accurately.
3. The screen should be big enough to display the maximum stomach longitudinal length. With the growth of gestation age, the fetal stomach macro-axis increases regularly. Measuring method of stomach maximum macro-axis is given in the following figure:

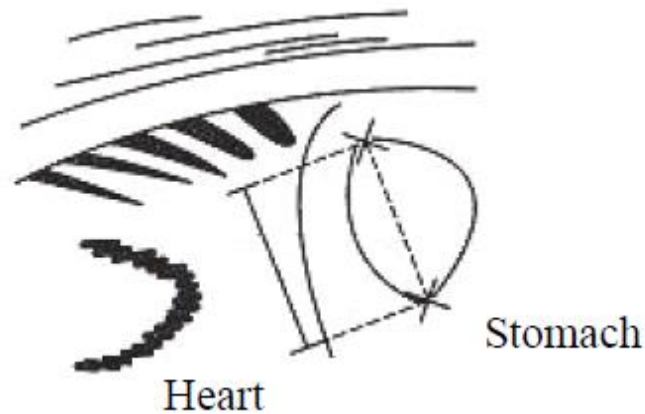


Fig 4-12. Cow's cardiac measurement sketch

4. Measure selected parameter distance according to distance measurement method, the corresponding gestation age data will be automatically shown behind "G.A".

• **BOVINE-HL: Estimate gestation age according to cow heart length.**

1. Make the cow in a state of stand.
2. Put the probe, a little bit left or right of the center, on the ventral abdominal wall closely. If there is mud on this part, clean with water first in case the abdomen pelvic structure could not be displayed accurately.
3. To measure the heart macro-axis, screen should be big enough to display the maximal longitudinal axis of heart. With the growth of gestation age, the fetal heart macro-axis grows regularly. Measuring method of maximal macro-axis of heart is given in the following figure:

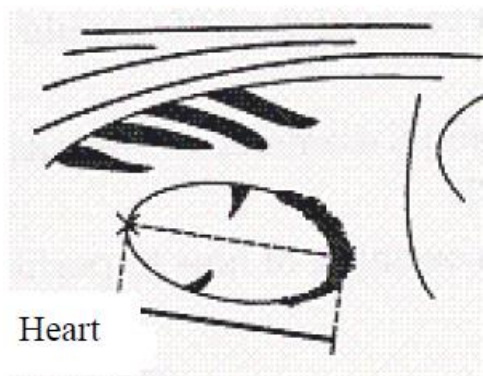


Fig 4-13. Cow's heart macro-axis measurement sketch

4. Measure selected parameter distance according to distance measurement method, the corresponding gestation age data will be automatically shown behind "G.A".

• **SHEEP-USD: Estimate gestation age according to sheep hilum-spine length.**

There are two methods to check pregnant ewe with B ultrasound:

Use convex probe or linear probe to check the abdomen, and rectal probe for rectum. These two methods are both

quite useful to diagnose pregnancy. On the base of some publication, we agree that both the methods on pregnancy diagnosis are proved to be effective.

— Within 35 days of pregnancy, result of rectal way is more precise than that of abdominal way;

— During 35 to 70 days of pregnancy, both are equally effective.

— After 70 days of pregnancy, abdominal method would be better. This way would be more practical for the bigger womb.

Abdomen check

1. Abdomen check can be done when the ewe is standing, lying or squatting. Put the probe on the middle abdomen without fur and is set to be the proper position for checking in advance.
2. If there is mud on this part, clean with water first in case the abdomen pelvic structure could not be displayed accurately.
3. Measure the hilum-spine length.
4. Measure the selected parameter distance according to distance measurement method, the corresponding gestation age data will be automatically shown behind "G.A".

● **SWINE-HL: estimate gestation age according to swine heart length**

1. Make the swine in a state of stand.
2. Put the probe, a little bit left or right of the centre, on the ventral abdominal wall closely along the side of teats and skull to rear leg. If there is mud on this part, clean with water first in case the abdomen pelvic structure could not be displayed accurately.

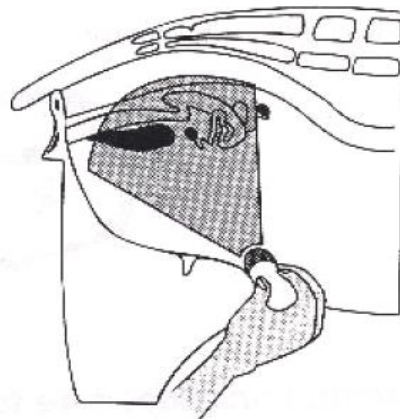


Figure 4-14 Swine's gestation age measurement position sketch

3. To measure the heart macro-axis, screen should be big enough to display the maximal longitudinal axis of heart. With the growth of gestation age, the fetal heart macro-axis increases regularly. Measuring method is given in the following figure:

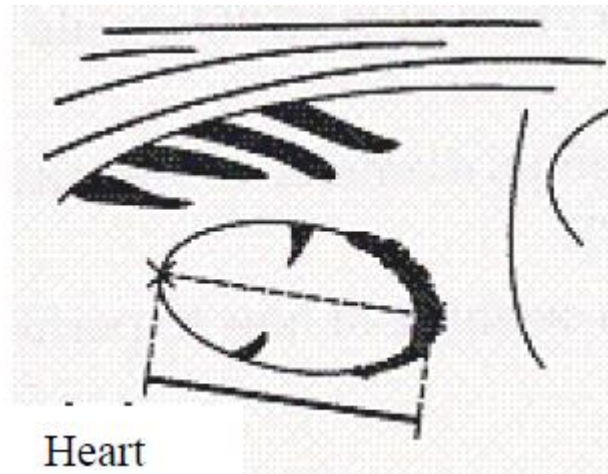


Fig 4-15. Swine heart macro-axis measurement sketch

4. Measure the selected parameter distance according to distance measurement method, the corresponding gestation age data will be automatically shown behind "G.A".

• **CAT-HD: Estimate gestation age according to cat head diameter**

To measure the head diameter is to measure the interior maximum diameter of skull between ventral and dorsal part, which could be measured within 7 months of pregnancy.

Measuring method of head diameter is given in the following figure:



Fig 4-16 Cat head diameter measurement sketch

• **CAT-BD: Calculate the gestation age according to cat BD**

After fetal head has formed, binary top diameter measurement becomes a routine in ultrasonic examination.

The measuring method is:

1. Fetal head axial plane scanning, look for BPD measuring standard plane from top to bottom.
2. Measure the distance of selected parameters according to distance measurement method, the corresponding gestation age data will be automatically shown behind "G.A".

• **DOG-GSD: Calculate the gestation age according to dog gestation saccus diameter**

The method is the same as that of horse.

- **DOG-CRL: Calculate the gestation age according to dog CRL**

The method is the same as that of cow.

- **DOG-HD: Calculate the gestation age according to dog HD**

The method is the same as that of cat.

- **DOG-BD: Calculate the gestation age according to BD**

The method is the same as that of cat.

Tip: Press **CLEAR**, exit list menu.

Note
In measuring, when the result is below these values, G.A will not be displayed.

EQUINE	D1<6mm
BOVINE-BL	D1<8mm
BOVINE-SL	D1<1mm
BOVINE-HL	D1<3mm
SHEEP	D1<15mm
SWINE	D1<31mm
CAT-HD	D1<15mm
CAT-BD	D1<17mm
DOG-GSD	D1<1mm
DOG-CRL	D1<1mm
DOG-HD	D1<14mm
DOG-BD	D1<16mm

4.10 Image print

Connect video printer to device VIDEO OUT port with video wire. Print as printer user's Manual.

4.11 Upload image to PC

Connect USB wire one to device USB port, the other to PC USB port. High speed USB2.0 interface will upload real time images to PC. For details, see CD user's Manual.

4.12 Power off

Press power off button, close the main unit.

Tip: main unit will consume power even in off state. If long time no use, remove the battery.

Note
Do not plug or unplug power connector, if there is a need to start again after its power off, wait 2-3 minutes.

Chapter Five Transportation and Storage

5.1 Environment requirements on transportation and storage

Environment temperature range: -5°C — $+40^{\circ}\text{C}$

Relative humidity range: 10%—100%

Atmosphere pressure range: 50KPa—106KPa

5.2 Transportation

Signs on the packing box conform to **Iconograph and sign of packing, storage and transportation** (GB/T191-2008). Simple shockproof establishment is fitted within the box, which applies to aviation, railway, highway or steamship transportation. Keep dry, avoid inversion and collision.

5.3 Storage

- Equipment should be taken out from the packing when storage time exceeds six months, power on it for four hours, and then pack it correctly and keep it in a warehouse. The device must not be piled, and do not place it closely against the floor, walls or roof.
- Keep it well ventilated, do not expose it to strong sunlight or caustic gases.

Chapter Six Check and Maintenance

6.1 Service life

The service life of the device is 6 years.

Note:

**Discard the device according to local law.
Do not discard it mixing with other household garbage.**

Warning:

The manufacturer shall not assume the responsibility of risks caused by using the device beyond its service life.

6.2 Check

- Check the device power cord and probe cable and waterproof cover, if find any damages or breakages, do not use the device and replace the broken one immediately.
- Check whether the probe and main unit are connected rightly.
- Check the adapter EPS regularly, when the supply voltage exceeds specified accommodation limit (AC100V-240V±10%, 50/60Hz), do not supply the main unit or charge the battery with adapter.
- Check the adapter power cord and probe cable, if find any damages or breakages, replace the broken one immediately.
- Adapter is the dedicated power of the device, it adopts omniseal insulation design, do not replace it with other adapters or attempt to open it in case there be any hazard.

6.3 Main unit maintenance

- Instrumentation environment should be according to "2.1 operation environmental requirements".
- If device enclosure needs cleaning, shutdown the device first and then wipe with alcohol sponges.
- Device should not be turn on and off frequently.
- When the device does not work for a long time, pack the device according to the instructions on the packing. Store it properly in the warehouse. The storage environment should accord to transportation and storage environmental requirements.

6.4 Probe maintenance

- Probe is an expensive part but frangible. Never hit it or drop it on floor. Please use medical ultrasound Gel during diagnoses. Do daily inspection on the probe enclosure to see whether it is cracked and to protect it from the water inrush.
- Check the probe regularly to see whether it is filled with clean medical castor oil, air in it will influence the image quality. If air bubbles appear, turn the probe oil filler hole up and screw off the sealing screw, turn the probe slowly to drive the air bubbles to the screw hole, infuse a little bit of castor oil into the screw hole with syringe with a needle (refer to figure 6-1), vent the air bubbles and fasten the sealing screw and finally clean the oil stain on the probe surface.

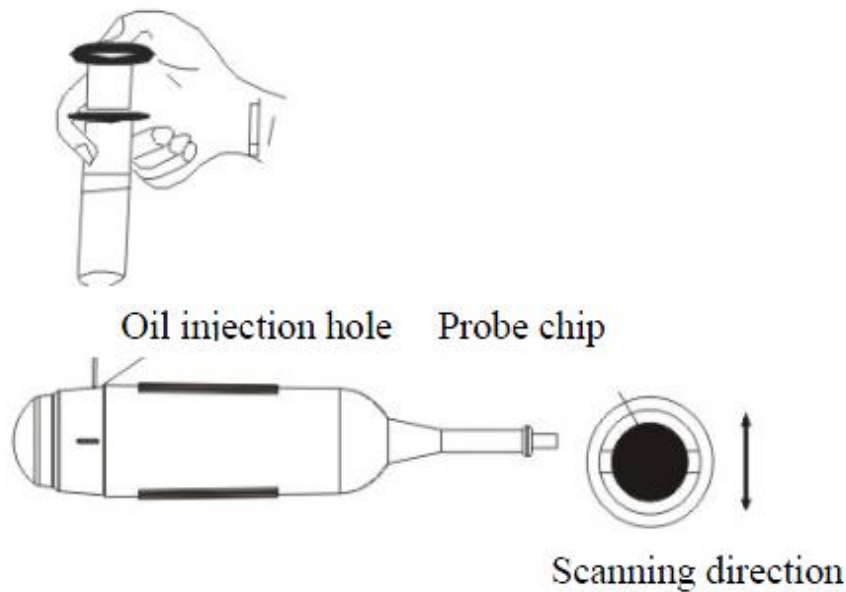


Figure 6-1 Oil injection and scanning direction of Mechanical Sector Scanning Probe

6.5 Cleaning

1. When the enclosure needs cleaning, wipe it with soft dry cloths and then wipe gently with sponge dipped with 75% medical alcohol .

Warning:

To prevent accidents, take out the battery when cleaning the main unit enclosure and separate the device from the power supply network first and then clean the adapter enclose.

Prevent all the plugs, sockets from water splash or soaking.

Warning:

Do not use extender, ethylene oxide or any other organic solvent which will deface the

probe's protective foil.

Keep the device and probe from any types of liquid infiltration.

Do not clean the device or probe by air or heating.

Caution:

Please refer to instructions prescribed by the manufacturer closely when using detergents.

Be careful with cleaning of the display. Please wipe it with dry soft cloth because it is very easy to scratch and spoil. .

Please do not clean the inner base of the device.

Please do not place the device in liquid.

Do not leave any detergent on the device surface.

Though there will be no chemical reaction between the device enclosure and most of those detergents, We still suggest no detergent in cleaning in case the device surface be spoiled.

6.6 Use of the probe

In order to prolong the probe's service life and obtain optimum performance, please follow these instructions:

1. Periodic inspection on probe cable, socket and acoustic window.
2. Shutdown the device before connecting or disconnecting the probe.
3. Do not drop the probe or flint body, and never hit the probe acoustic window, otherwise the probe will be damaged.
4. Do not attempt to heat the probe.
5. Do not attempt to bend or pull probe cable, otherwise the internal connection will be broken.
6. The Gel should be placed only on probe's header and after using it, clean with a damp cloth.
7. Inspect the probe acoustical window, enclosure and cable carefully after probe cleaning. Never use the probe again if any crack or breakage is found.

6.7 About the battery

1. The battery is rechargeable Li battery.
2. New battery needs two or three times of charging and discharging cycles to achieve best effect.
3. This battery can be charged hundred times. If the working hours shorten, replace new battery.
4. Charge with our adapter. Do not connect if do not charge. The time connect to adapter should not exceed 10 hours , or it will shorten the battery life. Long time no use, battery will discharge automatically.
5. In case battery disabled, discharge and charge battery every 3 months.
6. Extreme temperature (over hot or cold) will affect the charge. Forbid charging in over hot or close to fire. Do not use or store close to fire. If battery smells abnormal, withdraw immediately.
7. Do not use damaged battery and adapter.
8. Do not try to disassembly the battery.
9. Do not short the battery.
10. Do not drop it to fire or heat.
11. Do not drop it into water.
12. Do not connect in reverse.
13. Do not connect directly to AC outlet in wall or vehicle.
14. Do not short the battery with wire or metal materials. Do not transport or store with necklace, barrette or other metal materials.
15. Do not trans-pierce the battery. Do not hit or step on battery.
16. Do not hit, drop or shock the battery.
17. Do not jointing to battery straightly.
18. Do not put the battery in micro-wave oven or pressure vessel.
19. Do not use the battery with the combination of throwaway dry batteries and or batteries of different capacity, type, etc.
20. Do not use the battery if any peculiar smell, radiation, deformation, discolor or other anomalous phenomenon is found. If the above phenomena are found while charging, do take it out immediately from the charger or electric equipment and stop the use of it.
21. Please dispose these used batteries properly according to some related law on refuse treatment.

Chapter Seven Problem Shooting

- Simple malfunction can be solved refer to the list below. If not, contact us.

No.	Phenomenon	Trouble shooting
1	Adapter indicator light off	1. Check supply; 2. Check adapter wire and AC outlet.
2	Main indicator light off	Check main power cord and AC outlet.
3	Screen appears distortion like stria or snow interference	1. Check adapter supply 2. Check circumstance, space electromagnet interference 3. Check probe outlet
4	Image illegible	1. Adjust overall gain 2. Adjust brightness and contrast

Chapter Eight Electronic Device Pollution Control

This device belongs to electronic device ultrasound medical diagnosis device.

1. Symbol

For this device, electronic device pollution control symbol is as below:



No. 10 in symbol is the use limit(Year), meaning since the produce, in 10 years, the toxicant substance will not leak in normal use. Product will not pollute the environment and harm body seriously.

2. The name and content of toxicant substance or element:

Part name	Toxicant substance or element					
	(Pb)	(Hg)	(Cd)	[Cr(VI)]	PBB	(PBDE)
Shell	○	○	○	○	○	○
Screen	○	○	○	○	○	○
Probe	×	○	○	○	○	○
Main unit	×	○	○	○	○	○
Wrapping box	×	○	○	○	○	○
User's Manual	×	○	○	○	○	○
○: the toxicant in this part content is below the required in SJ/T11363-2006. ×: the toxicant in this part content exceeds the required in SJ/T11363-2006.						

Appendix A Sound Output

B Mode

Frequency:6.5MHz

Type:LNA40

Exponent name		MI	TIS			TIB	TIC
			scan	unscan		unscan	
				$A_{aprt} \leq 1 \text{ cm}^2$	$A_{aprt} > 1 \text{ cm}^2$		
Max exponent data		0.507	0.043	-	-	-	-
Sound parameter	P_{ra}	1.170					
	P (mW)		6.8	-		-	-
	$P_a(Z_s)$ and $I_{ta,a}(Z_s)$ min				-		
	Z_s (cm)				-		
	Z_{bp} (cm)				-		
	Z_b (cm)					-	
	Z max I	2.30					
	$d_{eq}(Z_b)$					-	
	f_{awf} (MHz)	5.33 133	5.331	-	-	-	-
	Diameter X (cm)		4.00	-	-	-	-
A_{aprt} Y (cm)		0.90	-	-	-	-	
Other information	t_d	0.334					
	Prr (Hz)	4800					
	$P_{maxI_{pi}}$	1.786					
	$d_{eqmaxI_{pi}}$ (cm)					-	
	$I_{pa, a} \text{ MAX MI}$	79.16					
Operation condition	Depth			40mm			
	Focus location			2D3			

Note 1: For TIS value not reaching the peak in this mode, do not need to provide TIS formula information.

Note 2: For subassembly not used on baby head, do not need to provide TIC information.

Note 3: If the device at the same time satisfy exemption clause 51.2aa and 51.2dd, do not need to provide MI and TI information.

Sound Output

B Mode

Frequency:2.5MHz

Type:CXA50

Exponent name		MI	TIS			TIB	TIC
			scan	unscan		unscan	
				$A_{aprt} \leq 1 \text{ cm}^2$	$A_{aprt} > 1 \text{ cm}^2$		
Max exponent data		0.463	0.063	-	-	-	Note
Sound parameter	P_{ra}	0.799					
	P (mW)		27.3	-		-	#
	$P_a(Z_s)$ and $I_{ta,a}(Z_s)$ min				-		
	Z_s (cm)				-		
	Z_{bp} (cm)				-		
	Z_b (cm)					-	
	$Z_{\max I}$ (cm)	3.80					
	$d_{eq}(Z_b)$					-	
	f_{awf}	2.982	2.982	-	-	-	#
	Diameter	X (cm)		6.16	-	-	-
A_{aprt}	Y (cm)		1.45	-	-	-	#
Other information	t_d	0.589					
	P_{rr} (Hz)	6490					
	$P_{\max I_{pi}}$	1.181					
	$d_{eq \max I_{pi}}$ (cm)					-	

	$I_{pa, a} \text{MAX MI (W/cm}^2)$	25.76					
Operation condition	Depth						
	Focus location						
<p>Note 1: For TIS value not reaching the peak in this mode, do not need to provide TIS formula information.</p> <p>Note 2: For subassembly not used on baby head, do not need to provide TIC information.</p> <p>Note 3: If the device at the same time satisfy exemption clause 51.2aa and 51.2dd, do not need to provide MI and TI information.</p>							

Sound Output

B Mode

Frequency:5.0MHz

Type:CXA20

Exponent name	MI	TIS			TIB	TIC	
		scan	unscan		unscan		
			$A_{aprt} \leq 1 \text{ cm}^2$	$A_{aprt} > 1 \text{ cm}^2$			
Max exponent data	0.349	0.042	-	-	-	Note	
Sound parameter	P_{ra}	0.732					
	P (mW)		6.3	-		#	
	$P_a(Z_s)$ and $I_{ta,a}(Z_s)$ min				-		
	Z_s (cm)				-		
	Z_{bp} (cm)				-		
	Z_b (cm)				-		
	Z max I	2.80					
	$d_{eq}(Z_b)$					-	
	f_{awf}	4.389	4.389	-	-	-	#
	Diameter X (cm)		3.12	-	-	-	#

	A_{aprt}	Y (cm)		1.00	-	-	-	#
Other information	t_d		0.312					
	Prr		4800					
	P max I_{pi}		1.119					
	d_{eq} max I_{pi} (cm)						-	
	$I_{pa, a}$ MAX MI		36.7					
operation condition	Depth							
	Focus location							
<p>Note 1: For TIS value not reaching the peak in this mode, do not need to provide TIS formula information.</p> <p>Note 2: For subassembly not used on baby head, do not need to provide TIC information.</p> <p>Note 3: If the device at the same time satisfy exemption clause 51.2aa and 51.2dd, do not need to provide MI and TI information.</p>								

Sound Output

B Mode

Frequency:5.5MHz

Type:LNA64

Exponent name	MI	TIS			TIB	TIC
		scan	unscan		unscan	
			$A_{aprt} \leq 1 \text{ cm}^2$	$A_{aprt} > 1 \text{ cm}^2$		
Max exponent data	0.378	0.029	-	-	-	Note
Sound parameter	P_{ra}	0.802				
	P (mW)		3.4	-		-
	$P_a(Z_s)$ and $I_{ta,a}(Z_s)$ min				-	
	Z_s (cm)				-	
	Z_{bp} (cm)				-	

	Z_b (cm)						-	
	Z max I		2.10					
	$d_{eq} (Z_b)$						-	
	f_{awf}		4.510	4.510	-	-	-	#
	A _{aprt} Diameter	X (cm)		2.64	-	-	-	#
		Y (cm)		0.90	-	-	-	#
Other information	t_d		0.526					
	Prr		4800					
	P max I _{pi}		1.112					
	$d_{eq} \max I_{pi}$ (cm)						-	
	I _{pa, a} maxMI		21.2					
Operation condition	Depth							
	Focus location							
<p>Note 1: For TIS value not reaching the peak in this mode, do not need to provide TIS formula information.</p> <p>Note 2: For subassembly not used on baby head, do not need to provide TIC information.</p> <p>Note 3: If the device at the same time satisfy exemption clause 51.2aa and 51.2dd, do not need to provide MI and TI information.</p>								

Appendix B Gestational Table

Gestational Table 1:Equine

Measurement(mm) (Gestational Sac Diameter)	Week	Day
6	1	4
8	1	4
10	1	5
12	1	6
14	1	6
16	2	0

18	2	0
20	2	1
22	2	2
24	2	3
26	2	5
28	4	1
30	4	2
32	4	3
34	4	4
40	5	0
42	5	2
44	5	3
46	5	4
48	5	5
50	5	6
52	6	1
54	6	2
56	6	3

All measurements \pm 3 days

Gestational Table 2: Bovine

Measurement(mm) (Body Length)	Week	Day
8	4	0
10	5	0
12	5	1
14	5	2
16	5	3
18	5	5
20	55	5
22	5	6
24	5	6
26	6	1
28	6	1
30	6	1
32	6	2
34	6	3
36	6	3

All measurements +/- 3 days

Gestational Table 3: Sheep

Measurement(mm) (Umbilicus to Spine Distance)	Week	Day
15	7	1
18	7	3
21	7	6
24	8	1
27	8	4
30	9	0
33	9	2
36	9	4
39	10	0
42	10	2
45	10	5
48	11	3
51	11	5
54	12	1
57	12	2
60	12	4
63	12	6
66	13	2
69	13	4
72	14	2
75	14	4
78	15	0
81	15	2
84	15	5
87	16	6
90	17	0
93	17	1
96	17	3

99	17	6

All measurements +/- 3 days



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