AMBIVISION

DIGITAL HANDHELD ELECTRONIC B ULTRASOUND SCANNER

AV-3000V

User Manual for Veterinary

Version 2.0

Contents

Preface

Copyright

Version: V1.0

Statement

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We preserve the right of revision on this document without notice.
Some 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.

Manufacturer's Warranty

AMBISEA Technology Corp., Ltd assumes the responsibility for equipment security, reliability and performance only under the preconditions that the disassembly, assembly and maintenance of the equipment are all performed by its assigned professionals and the equipment is used strictly in compliance with the operation manual.
AMBISEA Technology Corp., Ltd ensures a guarantee period within a year and a half of the delivery day and promises there is no problem with the new equipment's material and technology. Within the guarantee period, AMBISEA Technology Corp., Ltd will maintain the equipment and replace the parts of non-man-made damages free of charge; but will not repair or replace the equipment surface if damaged.
This guarantee is only available for failures that occurred when the equipment is operated in compliance with the operation manual; and the guaranteed equipment can only be used in the prescribed range given in the manual.
This guarantee excludes losses or damages caused by external reasons such as thunder struck, earthquake, theft, unsuitable use or abuse and refitting the equipment.
AMBISEA Technology Corp., Ltd shall not be responsible for damages caused by other devices or arbitrary connections to other devices.
AMBISEA Technology Corp., Ltd shall not be responsible for losses, damages or injuries caused by delayed service request.
When there is problem with the products, please contact AMBISEA Technology Corp., Ltd and explain the equipment model, serial number, date of purchase and the problem.

Note:

The equipment is for veterinary use only.

Matters That Need Attention

To ensure operational safety and long-term equipment stability and performance, please read this operation manual closely and understand the equipment functions, operation and maintenance at all points before operating the equipment, especially contents of "Warning", "Caution" and "Note".

Improperly operating or not observing the instructions given by manufacturer or its agents may result in equipment damage or personal injury.

The following comments are shown in this manual to lay special emphasis on some information.

"Warning": Neglecting this comment will cause severe personal injury, death, or realized property loss.

"Caution": Neglecting this comment will cause slight personal injury or property damage.

"Note": Reminder to the 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 a “NOTE”.

Safety labels

Equipment labels explanation:


Note! Refer to accompanying documents

Turn-on general supply


Disconnect general supply


Signal input


Signal output

IPX7 Protection against dripping water


Class Ⅱ equipment

Packing and transportation labels explanation:


Handle carefully


Temperature limit


Upward

Piling layer limit


Keep dry


Protect against heat

Whole Set Labels

Refer to Appendix A for equipment labels.

Equipment Safety Classification:

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

AV-3000V is not suitable for use in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide.

● According to the mode of operation:

AV-3000V is in continuous operation.

● According to the degree of protection against harmful ingress of water:

The main unit of AV-3000V is ordinary equipment; the probe is drip-proof equipment.

● According to the type of protection against electric shock:

AV-3000V is class II equipment powered by an external adapter.

● According to the degree of protection against electric shock:

AV-3000V is Type B equipment.

General Tips for Equipment Operation

◆ In operation

1. Heat radiation holes are strictly prohibited to be covered.
2. Do not switch on the equipment within 2 - 3 minutes after shutdown.
3. On scanning, if any abnormal case is found, stop scanning immediately and shut down the equipment.
4. The patient is prohibited to touch any non-applied part of the equipment.
5. When operating, do not press the keyboard panel too much, otherwise the equipment might be damaged.

◆ After operation

1. Power off the equipment.
2. Pull out the plug from the power supply socket instead of pulling the cable.
3. Clean off the couplant on the probe with a soft medical sterilized cotton ball.
4. Put the probe into the special case.

General Safety Message

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

1. The equipment shall be operated by qualified operating staff or under their instructions.
2. Do not open the equipment and change the parameters without permission. If necessary, please turn to AMBISEA Technology Corp., Ltd or its authorized agent for service.
3. The equipment has already been regulated to its optimal performance. Do not adjust any preset controls or switches unless instructed to do so by the manual.
4. If there is equipment failure, please shut down the equipment at once and contact for AMBISEA Technology Corp., Ltd or their authorized agent.

5. If it is needed to connect the equipment with other electronic or mechanical devices by other companies, please contact AMBISEA Technology Corp., Ltd before connection.
6. Equipment operation, storage and transportation environment:

   Environmental requirements on normal operation:
   Environment temperature range: +10°C～+40°C
   Relative humidity range: 30%～75%
   Atmosphere pressure range: 70kPa～106kPa

   Environment requirements on equipment storage and transportation:
   Environment temperature range: - 20°C～+55°C
   Relative humidity range: 10％～100％
   Atmosphere pressure range: 50kPa～106kPa

7. Do not hit the fragile TFT-LCD display. If it cracks, deal carefully with it in case the liquid crystal gets into eyes or mouth.
8. Do not hit the inner chargeable Li-ion battery nor throw it into fire in case of explosion. Do not short circuit the battery output electrodes in case the battery be damaged; and please use the original binding charger to charge the battery. More over, because a used battery will cause environment pollution, please recycle the battery properly.
9. Do not disassemble the power supply adapter. If failure happens, it should be handled by a professional. The charging output can only be used for charging the battery of the equipment, any improper use or use on other batteries may cause explosion, fire and other unexpected hazards.
10. Must not short circuit the output of the adapter，a long term short circuit will result in adapter damage.
11. Please use a standard power cord as the input line of the network power supply for the adapter to reduce risk.
12. AMBISEA Technology Corp., Ltd shall not take any responsibility for any risk that resulted from unauthorized re-fitment by the users.
13. Disconnect the equipment from the power supply network by unplugging the adapter from the power supply network.
14. Refer to Appendix B and C for sound output parameters.

Contraindication:

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

1 Summary

1.1 Brief Introduction

This equipment is high resolution linear/convex ultrasound scanning diagnostic equipment. It adopts micro-computer control and Digital Scan Converter (DSC), Digital Beam-Forming (DBF), Real-time Dynamic Aperture (RDA), real time dynamic receiving apodization, real time Dynamic Receiving Focusing (DRF), Digital Frequency Scan (DFS), 8 segments TGC, frame correlation technologies to endue its image with clarity, stability and high resolution.

There are five display modes: B, B+B, B+M, M and 4B, and 256 gray scale.

The system can process real time image display, freeze, save, load, flip vertically, flip horizontally, capacity cine loop; multi-level scanning depth, dynamic range, frame correlation factor regulation and focus number, focus position, etc.

Date, clock display; name, sex, age, hospital annotation; distance, circumference, area, volume, and heart rate measurement; EDD measurement for equine, bovine, sheep, dog and cat. It offers 12 body marks and multiple-choice probes for the clinic diagnosis demands.

Combined power supply mode of AC adapter and built-in chargeable battery, 3 battery charging modes and the low power consumption and advanced power management technology promise more lasting battery operation.

A 6.4 inch TFT-LCD display, Field Programmable Gate Array (FPGA), and surface mounted technology (SMT) make this equipment compact and light in weight.

PAL-D video output offers connection to an external video image printer, a large-screen display and other equipments. High speed USB port provides real time image transfer to the PC.

Jet molding enclosure with hand-held structure.

The equipment consists of a main unit, probe, and adapter. Standard configuration is with LV2-2/6.5MHz rectal probe; optional probes: C2-6/40R/3.5MHz convex probe, C2-7/20R/5.0MHz micro-convex probe, L2-5/7.5MHz HF linear probe, EC2-2/13R/6.5MHz endo-vaginal probe, and EL2-5/7.5MHz Rectal probe.

1.2 Range of Application

The equipment is suitable for diagnosis on horses, cows, sheep, pigs, cats, dogs, and other animals.

1.3 Voluntary Standards

The equipment conforms to the relevant requirements of JJG 639-98 “Medical Ultrasonic Diagnostic Equipment Ultrasound Source Inspection Regulations”, GB10152-1997 “B-Mode Ultrasonic Diagnostic Equipment”, GB9706.1-1995 “Medical Electrical Equipment Part One General Safety Requirements”, and GB9706.9-1997 “Medical Electrical Equipment: Particular Requirements for the Safety of Ultrasonic Medical Diagnostic and Monitoring Equipment”. The equipment falls into C Level B ultrasonic diagnostic equipment; and according to degree of protection against electric shock, it falls into Class II Type B.

The environment test of the equipment conforms to the requirements of climate environment test II and mechanical environment test II of GB/T14710-93 “Environmental Requirements and Test Methods for Medical Electrical

Equipment".

1.4 Technical Specifications

MODEL		AV-3000V			
Probe		LV2-2/6.5MHz rectal, L2-5/7.5MHz HF linear, EL2-5/7.5MHz rectal probe	C2-6/40R/3.5MHz convex probe	C2-7/20R/5.0MHz micro-convex probe	EC2-2/13R/6.5MHz endo-vaginal probe
Detect Depth(mm)		≥80	≥160	≥80	≥60
Resolution (mm)	Lateral	≤1 (Depth≤60)	≤2 (Depth≤80) ≤3 (80＜Depth≤130)	≤3 (Depth≤60)	≤1 (Depth≤40)
	Axial	≤1 (Depth≤80)	≤2 (Depth≤80) ≤3 (80＜Depth≤130)	≤1 (Depth≤60)	≤1 (Depth≤40)
Blind zone (mm)		≤3	≤5	≤8	≤7
Geometric position precision	Horizontal	≤5	≤15	≤15	≤10
	Vertical	≤5	≤10	≤10	≤5
Monitor size		6.4 inch			
Display mode		B、B+B、B+M、M、4B			
Image gray scale		256 scale			
Cine loop		516 pcs			
Image storage		128 pcs			
Scan depth		40mm～220mm			
Dynamic range		100dB～130dB			
Image flip		Up/down, left/right			
Focus position		Adjustable			
Measurement		Distance, circumference, area, volume, heart rate. GA, EDD			
Notation		Date, time, name, sex, age, hospital name. Full screen words edit.			
Output report		1 type			
USB port		High speed USB 2.0 (device)			
Power consumption (MAX)		45VA			

1.5 Electric principle block diagram

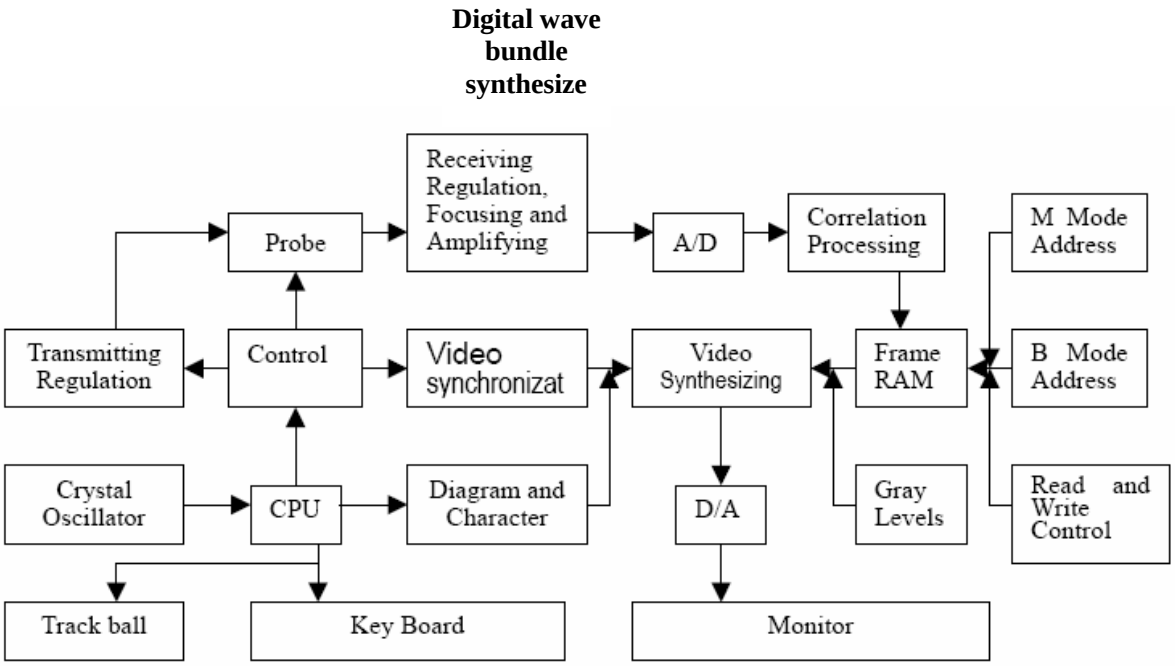


Figure 1-1. Power supply principle diagram

1.6 Equipment Constituent

1.6.1 Standard Configurations

- Main unit (containing a piece of HYLB-523 battery)
- LV2-2/6.5MHz Rectal probe
- SP-2 power adapter
- Adapter power supply cord
- Manual
- Charging adaptive line
- Trackball

1.6.2 Optional Pieces

- C2-6/40R/3.5MHz convex probe
- C2-7/20R/5.0MHz micro-convex probe
- L2-5/7.5MHz HF linear probe
- EL2-5/7.5MHz rectal probe
- EC2-2/13R/6.5MHz endo-vaginal probe
- Printer--- Sony UP-895MD
- Auto-charger
- HYLB-523 battery

Warning:
Please use the spare parts specified above. The manufacturer shall not bear the responsibility of safety problems or unexpected EMC performance drops caused by arbitrary adoption of non-specified spare parts.

1.7 Appearance

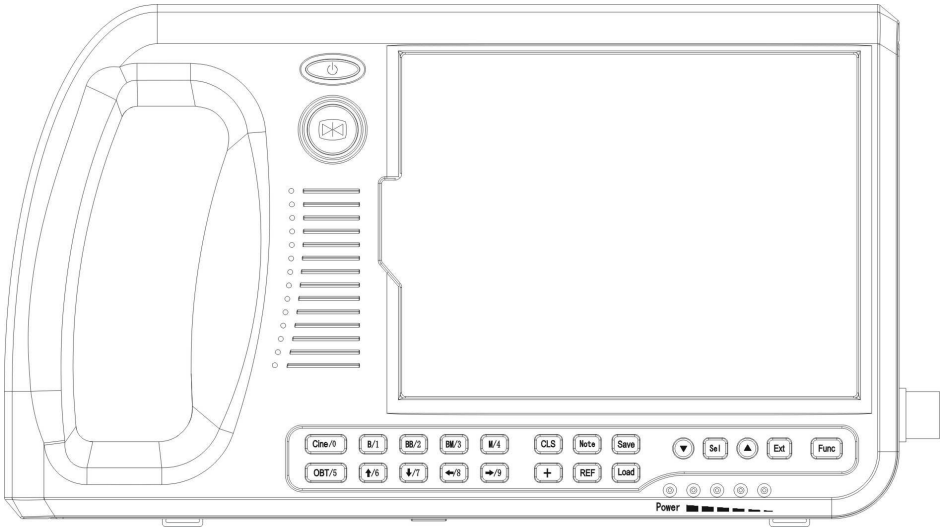


Figure 1-2. Front sketch

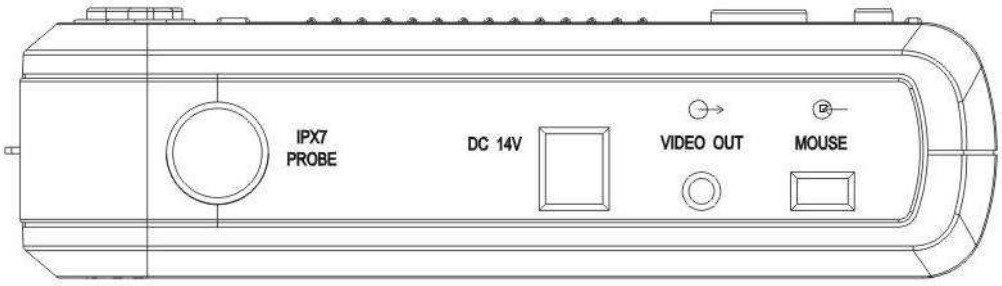


Figure 1-3. Side interfaces sketch

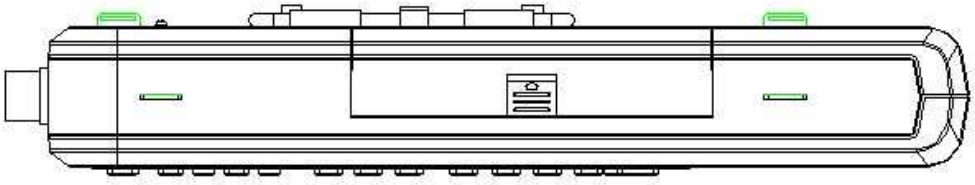


Figure 1-4. Bottom knobs sketch

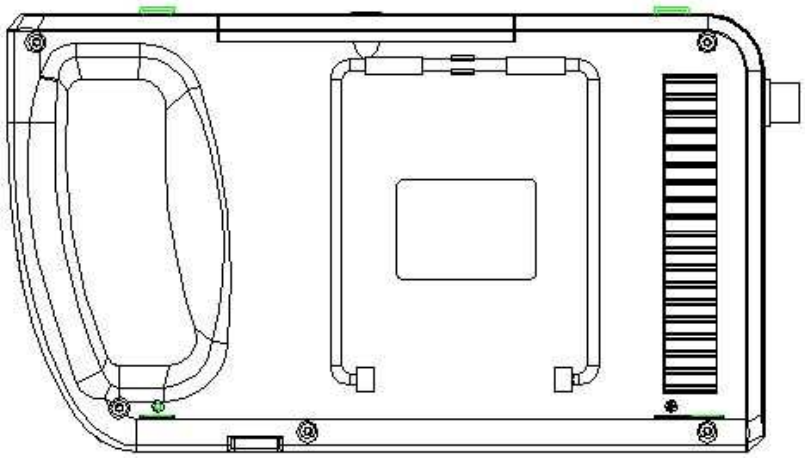


Figure 1-5. Back sketch

Warning:

When working in an intensive electromagnetic environment beyond its pre-stated one, AV-3000V's image may be interfered thus influence the diagnoses. At this time, stop the device and reuse it when the electromagnetic interference is removed.

Warning:

When AV-3000V works close to other devices, unforeseen EMC problem may appear.
If they have to work closely, observe all the devices and see if they are influenced by unexpected EM coupling.

2 Installation

2.1 Operation Environmental Requirements

a) Environment temperature range: +10℃～+40℃

b) Relative humidity range: 30%～75%

c) Atmosphere pressure range: 70kPa～106kPa

Avoid strenuous vibration during operation. Keep away from equipment with high electric fields, high magnetic fields and high voltages. Avoid direct sunlight on the display. Keep the equipment in a well-ventilated, damp proof and dustproof area.

2.2 Unpacking Inspection

Check according to the "packing list" after uncasing and make sure that there is no shipping damage, and then install the equipment according to requirements and methods described in “Installation”.

Warning:

If breakage is found with the equipment during unpacking, do not use it for safety reasons.

2.3 Installation

2.3.1 Installing and Removing Battery

Install battery: Set the battery into the battery slot and move the battery release key on its side to top till the battery is inserted completely and then release the key (refer to figure 2-1).

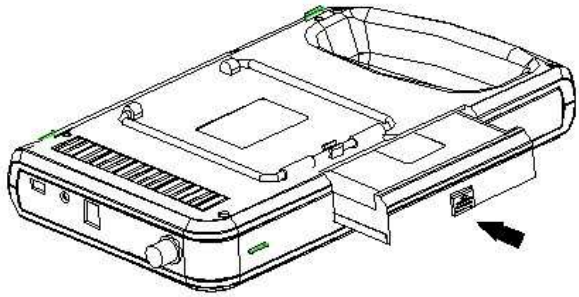


Figure 2-1. Install battery sketch

Removing battery: It is the reverse process of installation (refer to figure 2-2).

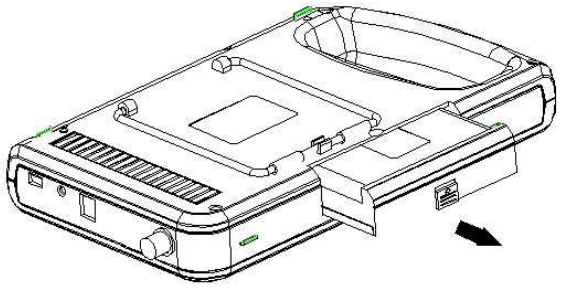


Figure 2-2. Removing battery sketch

2.3.2 Installing and Removing Probes

Install probes:

The probe jack lies near the bottom of the right side of the equipment. Adjust the probe plug mark position and insert it, turn the plug lock sleeve counter-clockwise. There is only one plug jack which is also compatible for those optional probes (refer to figure 2-3).

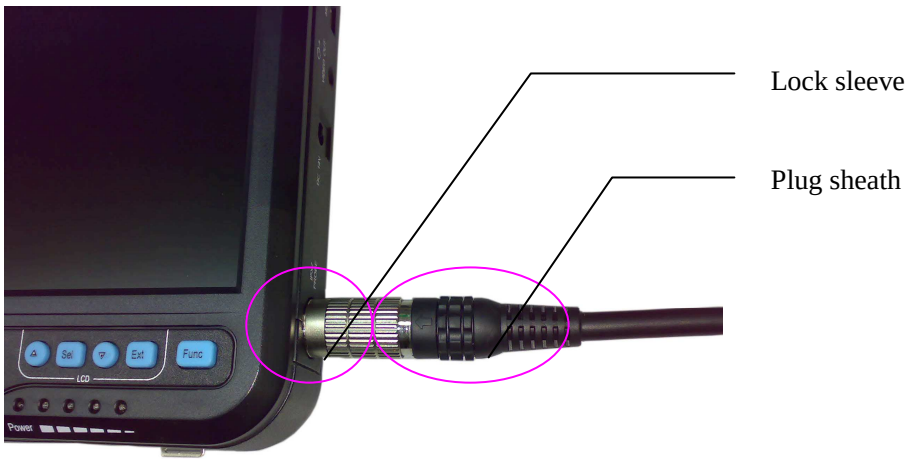


Figure 2-3. Probe connection sketch

Removing probes:

It is the reverse process of installation.

Warning:

The installation and removal of the probe must comply with the operation instructions, do not twiddle the sheath around the plug (refer to figure 2-3).

Warning:

Do not by any means unplug or plug the probe connector at state of log on to avoid damage to the probe and main unit be damaged.
2000 times of efficient connection and disconnection of the probes are guaranteed. Once the probe is connected with the main unit, do not unplug or plug it too often to avoid poor contacts.

Warning:

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

Warning:

Do not touch the contact pin in the probe connector.

Warning:

Please handle the equipment carefully.

2.4 Power Supply

The equipment 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 if it matches the EPS outlet.
2. Check the EPS to see if it is within the specified range and the power cord to see if it is connected well.
3. Check the adaptor to see if 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/3A outlet at the rear of the equipment, switch on the outlet.
6. Press the power switch, the main unit is power on and the power indicator light turns on, that means the adapter is operating well.

2.4.2 Battery Operation

1. Install the battery correctly on the main unit.
2. Switch on the power switch on the left side of the equipment. When the main unit is power on, the power indicator will turn on.
3. The equipment can start operation.

Note:

At power off state, there is still a certain power consumption with the main unit. If the main unit can not be turned on when pressing down the switch, the battery needs charging.

Note:

When the main unit charging/volume indicator light is flashing, the battery is running low and it should be charged as soon as possible.

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

There are 3 ways to charge the battery.

2.5.1 Charging through Main Unit

1. Install the battery correctly into the main unit.
2. Insert the plug of “output DC14V/3A” of the adapter into the “DC14V/3A” interface on the rear.
3. Connect power cord of “Input AC100 - 240V, 50/60Hz” of the adapter to the AC EPS.
4. Whenever the main unit is power on or off, the “Charging/Volume” indicator light turns on gradually, it means the battery is charging through the adapter. When the four lights turn on together, it means the battery is fully charged (refer to figure 2-4).

Figure 2-4. Charging through main unit

Tip: To prolong the battery operation time, please finish charging when the indicator lights show that the battery is full.

2.5.2 Charging through Adaptive Line

1. Take out the battery from the main unit or take out the spare battery.

2. Connect the round end of the adaptive line to the "Charging DC12.6V/1A" terminal of the adapter, and the flat end to the charging terminal of the battery.
3. Connect power cord of "Input AC100 - 240V, 50/60Hz" of the adapter to the AC EPS.
4. When the "Charging" indicator light on the adapter turns red, the battery is charging; when the "Charging" indicator light turns green, the battery is fully charged. (Refer to figure 2-5).

Figure 2-5. Charging through adaptive line

2.5.3 Charging through Auto-charger

1. Take out the battery from the main unit or take out the spare battery.
2. Connect the flat end marked with an arrow of the auto-charger to the charging terminal of the battery.
3. Plug the other end of the auto-charger into the cigarette lighter socket.
4. When the "Charging" indicator light on the adapter turns red, the battery is charging; when the "Charging" indicator light turns green, the battery is fully charged. (Refer to figure 2-6).

Figure 2-6. Charging through auto-charger

Tips:

1. The input voltage of the auto-charger is DC9～14V/1.5A.

2. The output voltage of the auto-charger is DC12.6V/1A.

3. The operations and storage environment are the same as those of the main unit.

3 Keyboard and Mouse

3.1 Screen Display

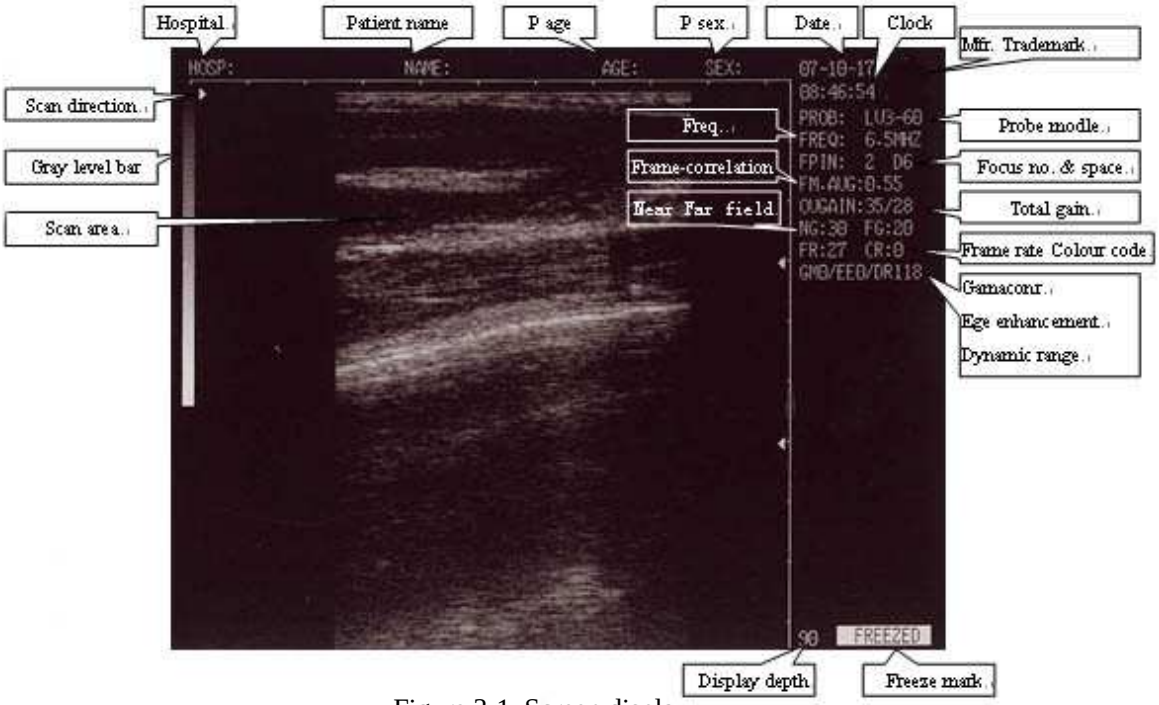


Figure 3-1. Screen display

3.2 Keyboard Function

Keyboard of AV-3000V (refer to figure 3-2)

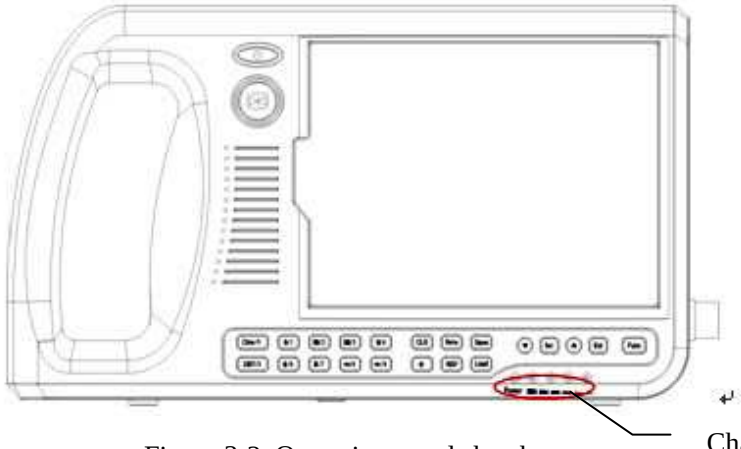
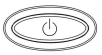


Figure 3-2. Operating panel sketch

 **Power On/Off key**

Press this key to switch on and off the device. And restart the device when the system is “dead” (no reaction while pressing any key) due to incorrect operation.

 **Image Freeze**

Press this key to freeze image and return to real time image.

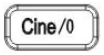
Tips: “FREEZED” displays at the bottom right to indicate the state of the image.

 **Multi-function keys**

Using as character keys:

- To select sub-menu in menu.
- To input age, time, numbers at annotation.(Refer to chapter four for detail)
-  key to input name, hospital, letters, or space at annotation. (Refer to chapter four in detail)

Using as function keys:

 **Cine loop key**

In freeze state, press to enter cine loop playback mode, refer to 4.9 for details.

 **B and 4B Mode key**

In real time or freeze state, press to enter B Mode (default single B Mode at switch-on)

Press again and then with  and  to enter 4B Mode. One is real time image and the rest are “freezed” images. Press  or  to shift between real time and freeze among these four images.

Press  repeatedly to switch among B and 4B Mode.

 **BB Mode key**

In real time or freeze state, press this key to enter BB Mode and there will be two images displayed on the screen. One of them is a "Freezed" image and the other is a "real-time” image. Press the key again to make the two images switch between the states of "Frozen" or "real-time".

BM/3 **B Mode and M Mode Display key**

In real time or freeze state, press this key to enter B/M Mode. B Mode and M Mode images will be displayed simultaneously on the screen ("BM" or "B+M" for short). The B Mode real time image is on the left and the M Mode real time image is on the right.

On the B Mode image, there is a vertical line formed by equidistant dots, which is named sampling line. Press ←/8 key to move the sampling line left and press →/9 key to move the sampling line right. (Tips: the sampling line can also be moved by controlling the tracking ball)

M/4 **M display Mode key**

In real time or freeze state, press this key to enter M Mode, screen displays one M Mode image.

Tips: To enter M Mode, enter B/M Mode first.

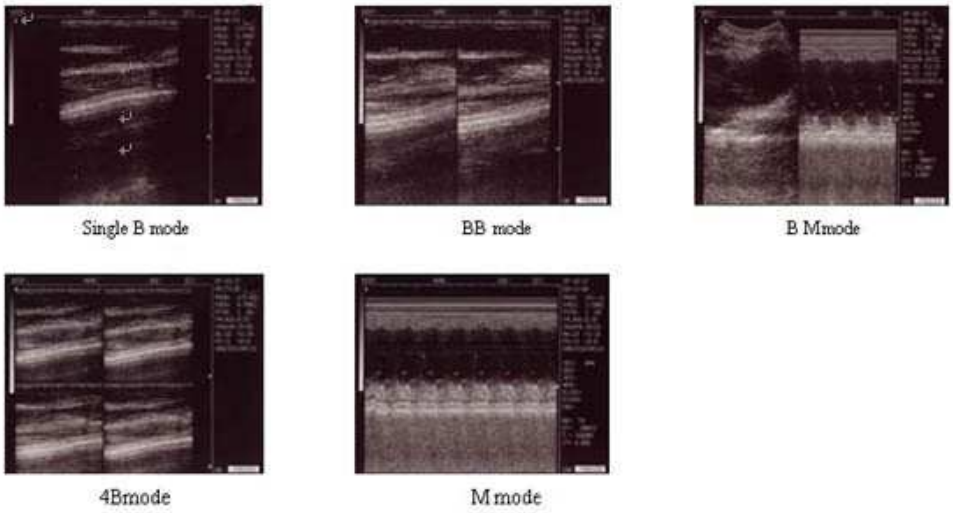


Figure 3-3. Five display modes

OBT/5 **Obstetrics Table Menu key**

AT B or BB Mode, press this key to call out the obstetrics menu on the right screen. Choose the number for corresponding operation. Refer to 4.12 for details.

↑/6 ～ →/9 **Direction key**

Direction keys are used to move the cursor during measuring. In real time "B" and "BM" Mode ↑/6, ↓/7 keys are used to change the scanning depth.

Press ↑/6 key to increase the depth and press ↓/7 key to reduce the depth. Current depth displays at the right bottom of the screen (as figure 3-1 shows). Press ←/8, →/9 keys to move sampling line left and right in BM Mode.

The penetration depth range of each probe is given below:

Probe Model	LV3-60/6.5MHz rectal probe	CR3-40/40R/3.5MHz Convex probe	LH3-40/7.5MHz HF linear or rectal probe	CR3-20/20R/5.0MHz Micro-convex probe	CR3-13/13R/6.5MHz Endocavity probe
Depth range （mm）	60～130	80～220	40～90	80～150	50～120

CLS **Screen Clear key**

Clear off the measured results, body marks, and text displayed on the screen (some current operation must be finished first otherwise it may not clear the screen).

Note **Annotation Menu key**

Press this key to display the annotation menu. Choose the number to enter sub-menu and refer to 4.4 for details. Press Ext to exit this menu.

Save **Image Saving**

In B Mode, press this key to save images; refer to 4.10 for details.

\+ **Distance Measurement Mark**

In real time of freeze state, press to display measuring cursor; refer to 4.6 for details.

REF **Measurement Assistance key**

To carry out distance, circumference, area, and histogram measurement together with +, Func, Ext, and direction keys, refer to 4.5 and 4.6 for details.

Load **Image Recall key**

In real time or freeze state, press to recall saved images. Refer to 4.11 for detailed operation

▲、Sel、▼ **Image Parameters Adjusting keys**

In real time or freeze state, to change the image parameters such as frequency, frame rate, gamma correction, edge enhancement, dynamic range, total gain, near and far field gain, etc. refer to 4.3 for details.

Exit key

Press this key to exit the annotation or function menu, or their sub-menus. Refer to the following chapters for details.

Function Menu key

Press to display function menu. Choose the number to enter the corresponding sub-menu. Refer to 4.5 for details and press 

to quit.

3.3 Mouse

As a complementary method of keyboard operation, mouse will improve the measurement work efficiency. A 3-key mouse is adopted here and each key can fulfill a certain functions:

Left key:

- At real time of freeze state, press this key to enter distance measurement and display a cursor on the screen.
- To end the distance measurement.

Middle key:

- At real time of freeze state, press this key equals to 

key in function.

Right key:

- To confirm the start and end point of a distance measurement.
- To confirm the start position and fulfill circumference and area measurement with freehand measuring method
- At circumference and area measurement, press this key equals to 

key in function.

4 Operation

4.1 Start the Device

Press  key to switch on the device, the power indicator on the panel turns on, and the start interface shows, press any key (except  Key) to enter the state of scanning. Adjust the near field gain, far field gain and overall gain to acquire a satisfying visual effect (refer to 4.3 Image parameters settings for gain control).

Figure 4-1. Start interface

Tips: Please adjust the viewing angles properly since this factor is related to LCD display effect.

4.2 Diagnosis

Apply an amount of medical ultrasound coupling gel to the diagnostic part of patient body and 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 investigation depth；Meanwhile， adjust the overall gain, near field gain, far field gain properly to acquire an optimal cross-section acoustic image of the diagnostic part.

Attention
1. When pressing the probe onto the patient body, do not apply too much pressure in case that the probe is broken and to keep the patient comfortable. **2. It is necessary to use a probe suitable for the diagnostic part and a correct frequency for diagnoses.**

4.3 Image Parameters Settings

Image parameters setting includes frequency, frame rate, gamma correction, edge enhancement, dynamic range, overall gain, near and far field gain. 

stands for select. Press it to lighten up one item and press  ,  to set the parameters and display the result on the up right screen. Press 

continuously to light up the needed parameters.

4.3.1 Frequency Settings

Work frequencies of each probe are:

LV3-60 —— 5.0MHz、6.5MHz、7.5MHz（LV3-60/6.5MHz rectal probe）

CR3-40 —— 2.5MHz、3.5MHz、5.0MHz（CR3-40/40R/3.5MHz convex probe）

CR3-20 —— 4.5MHz、5.0MHz、5.5MHz（CR3-20/20R/5.0MHz convex probe）

CR3-13 —— 5.5MHz、6.5MHz、7.5MHz（CR3-13/13R/6.5MHz endocavity probe）

LH3-40 —— 6.5MHz、7.5MHz、8.5MHz（LH3-40/7.5MHz high frequency linear or rectal probe）

4.3.2 Frame Correlation Settings

At B, BB, BM Mode, enter real time scanning and press 

to lighten up the item frame correlation on the up right screen and press  or  to set the index. There are 8 indexes such as 0.25、0.35,0.45,0.55,0.65,0.75,0.85,0.95.

4.3.3 Gamma Correction

Press 

to lighten up GM on up right screen. There are GM0, GM1, GM2, GM3 4 levels for your choice, press  or  to select the needed one circularly.

Tips: This is for video out and external video device (such as video printer). So default setting is suggested.

4.3.4 Edge Enhancement Settings

Press 

to light up EE on up right screen. There are 9 levels from EE0 to EE8 for adjustment. Press  or  to select.

Tips: Edge enhancement is only accessible in real time. It is recommended to set the device at its default state during operation.

4.3.5 Dynamic Range Settings

In real time (non 4B Mode), press Sel key to light up DR at the up right part of the screen and press ▲ and ▼ keys to adjust the dynamic range. The range is from 100dB to 130dB, a default value is suggested.

4.3.6 Total Gain Control Settings

In real time (non 4B Mode), press Sel to light up "Overall Gain" at the up right part of the screen and press ▲ and ▼ to adjust. The value displays on right screen in two segments, there are 4 levels on left: 25, 30, 35, and 40, and 0-62 on right. Every press on ▲ key will increase the right side value by 2. Every press on ▼ key will reduce the right side value by 2. When the right side value arrives 62, the value on left will shift to another level automatically. The total gain setting range is 0-248.

4.3.7 Near/far Field Settings

In real time state (non 4B Mode), press Sel to light up "Near" or "Far" at the up right part of the screen and press ▲ and ▼ to adjust the near or far field value within the range of 0-30.

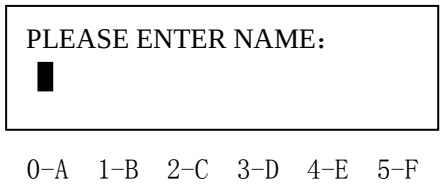
Tips: Adjust STC value properly when using different probes on diagnoses to acquire the best sonography.

4.4 Annotation

At real time or freeze state, press Note key to display the annotation menu (as shown below). With this menu, name, age, sex, annotation, time, hospital, language, screen clear, standby, and other functions can be processed.

0. NAME
1. AGE
2. SEX
3. COMMENT
4. TIME
5. HOSP
6. LANGUAGE
7. CLEAR
8. LCD-OFF

- Press Cine/0 to select "0.NAME" and put in the patient's name in the dialog box:

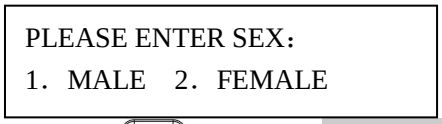


Below the dialog box there are 26 letters and space, press ▲ and ▼ for page up and down to find the needed character. And press the corresponding number key of each character (0-5) to display this character on the cursor. The maximum number is 15 characters; press CLS to delete the unwanted one. After the input, press Ext to confirm and exit, or press the Ext key directly to exit without inputting anything.

- Press B/1 to select "1.AGE" to call out the following dialogue box for patient age, the maximum input number is 3 bits.

After the input, press Ext to exit, or press Ext key directly to exit without inputting anything.

- Press BB/2 to select "2.SEX" and put in patient's sex in the below dialog box:



Press B/1 to select "1. MALE" and press BB/2 to select "2. FEMALE".

- Press BM/3 key and select "3. Comment" to comment the image. The cursor will display on the screen and 10 regular Chinese comment characters and 26 letters and a space will display at the lower part of the screen. Press ▲ and ▼ to display the rest of the characters. Move the cursor by moving the trackball or direction keys to comment any part in the image. Press the corresponding number (Cine/0 ～ OBT/5) to display the related characters. Press CLS to delete the unwanted. When finish, press Ext to confirm and exit or press Ext to exit without input.

● Press M/4 and select "4. Time" to change the system clock and date in the following format:

YY-MM-DD

HH-MM-SS

For instance, the date and time is 2006-9-22 and 9:35:30, the input number should be

YY-MM-DD
060922
HH-MM-SS
093530

When finish, press Ext to confirm and exit or press Ext to exit with input.

● Press OBT/5 and select "5.HOSP" to put in the hospital's name in the following dialog box:

PLEASE ENTER HOSP:
▌

0-A 1-B 2-C 3-D 4-E 5-F

Please refer to name input in the input method of hospital names with maximum 18 characters.

● Press ↑/6 to select "6.LANGUAGE" to select system language. The language selection box is given below:

PLEASE ENTER LANGUAGE:
1. CHINESE 2. ENGLISH

Press number key B/1 to select Chinese and BB/2 to select English.

● Press ↓/7 and select "7.CLEAR" to clear measurement marks, comments, results, name, age, and sex in images; and clear off all the information and measurement results except hospital and comments.

● Press ←/8 and select "8.LCD-off" to set the screen saver in the following dialog box.

PLEASE ENTER LCD-OFF TIME: 00

The current standby time shows in the first line and input the wanted time after the cursor (two digits), for example: 06. Press Ext to confirm and exit. Press any key to return to normal state. The maximum screen saver time is 30 minutes, system default value will be 30 minutes if the input number is bigger than 30.

Press Ext to exit without input.

Tips: When inputting 0. NAME, 3.COMMENT, 5. HOSP, numbers can not be used. Press Ext key to exit comment menu.

4.5 Function Introduction

In real time or freeze state, press the Func key to display function menu (as given below). In this menu, probe, focus number, image flip, color code, report, histogram, storage clearance, area and volume measurement, and video out format conversion can be set.

0. PROBE
1. FPIN
2. UP-DOWN
3. LEFT-RIGHT
4. COLOR
5. REPORT
6. HISTOGRAM
7. ERASE
8. AREA-VOLM
9. PALD-NTSC

4.5.1 Probe Settings

There are 4 probes available with this device. The current probe type is displayed on the upper right part of the screen. The probe types and models are listed below:

LV3-60：LV2-2/6.5MHz rectal probe

CR3-40：C2-6/40R/3.5MHz convex probe

CR3-20：C2-7/20R/5.0MHz convex probe

CR3-13：EC2-2/13R/6.5MHz endovaginal probe

LH3-40：L2-5/7.5 MHz high frequency linear or rectal probe

- In real time or freeze state, press Func key to display function menu.
- Press Cine/0 key and select 0. Probe to change probes and start scanning.

- Repeat the above mentioned steps to set different probes.

System will keep the current probe type as default when system shut down for next reboot.

4.5.2 Focus Number Settings

- In real time state (B Mode), press Func key to display function menu on the screen.
- Press B/1 and select 1. Focus Number to set the number of focus. (Tips: "Focus Number" item on the right of the screen will light up and press ▲ to move focus up and press ▼ to move focus down.)
- The maximum of focus numbers is two. Repeat the above mentioned steps to set focus position of one or two focus circularly.

4.5.3 Image Up/down Flip

- Press Func key to display function menu.
- Press BB/2 to flip over the image.
- Repeat the above steps to flip image up and down.

Figure 4-2. Image up and down flip

4.5.4 Image Left/right Flip

- Press Func key to display function menu.
- Press BM/3 to change scan direction of the probe.
- Repeat the above steps to flip image left and right.

Figure 4-3. Image left and right flip

Probe scan direction sign (in the red circle) is the left and right flip sign. The default scan direction is given as the left image shows.

4.5.5 Color Code Settings

Built-in color code processor with 4 color-code image. The color code display on the right part of the screen and the relation are given below:

CR：0---black and white

CR：1---red

CR：2---Brown

CR：3---Blue

- Press Func key to display function menu.
- Press M/4 key and select 4. Color Code to select the wanted color.
- Repeat the above steps and set the four color codes circularly.

4.5.6 Report Page

The system saves the current patient information, diagnostic comments, measurements, hospital name, date, time, etc. automatically in the report and produces a report page for different measurements such as distance, circumference, area, volume, and so on.

- In B, BB, BM, M or 4B Mode, finish patient comments, diagnosis, focus distance, circumference, area and/or volume measurement, and keep the image “freezed”.
- Press Func key to display function menu.
- Press OBT/5 key and select 5.Report to switch to report page as given below:

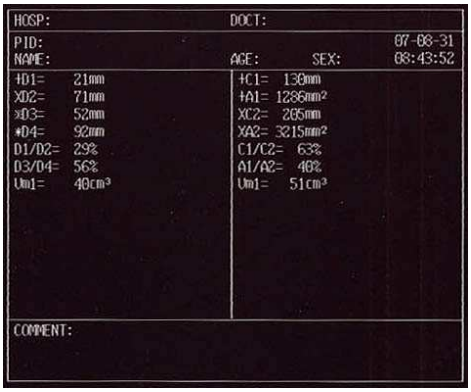


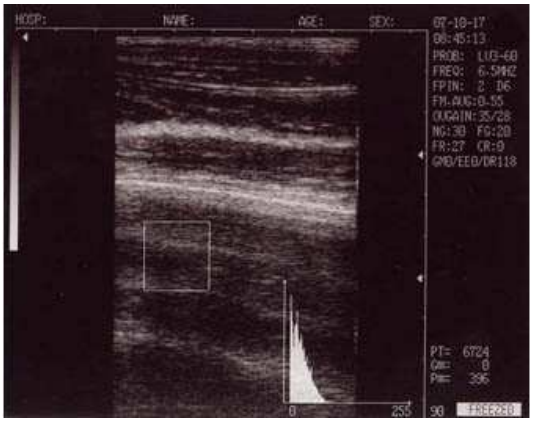
Figure 4-4. Report page

- Press Ext key to exit report page.

Tips: At the report page, press Note key and add comments. But other information can not be changed.

4.5.7 Histogram Statistics

- Freeze the image, press Func key to display function menu.
- Press ↑/6 key and select 6.Histogram , the sampling window displays in the image, move the sampling window to any image area with the direction keys or the mouse and press REF key or right click on the mouse to finish the statistics. The result will display on right part of the screen as the following figure shows:



Horizontal ordinate indicates gray scale degree, vertical ordinate indicates number.

PT indicates total quantity of pixel dots in the rectangular window.

Gm indicates the corresponding gray scale of the curve at the vertical peak.

Pm indicate the quantity of pixel dots at Gm gray scale.

From the above figure, in the rectangular area, the total number of pixel dots is 6724. At dray scale 0, there are 396 dots, the most image pixel dots.

Figure 4-5. Histogram statistics

- During statistics, press ▲ or ▼ keys to enlarge or reduce the sampling window and press CLS to exit.

4.5.8 Erase Image Storage

- Press Func key to display function menu.
- Press ↓/7 key and select 7. Erase to clear off the image storage as the following dialog box shows:

ERASE ALL STORAGE?

1. YES 2. NO

Press B/1 key to confirm the deletion of all the images. Meanwhile, a process reminder ERASING… appears at the up left part of the screen. At this time, the system stays "freezed" and do not start any other program until the reminder disappears and the storage is cleared off.

Press BB/2 key to exit.

Tips: Do not start any other operation when the storage erasing is in process (system reminds "ERASING…") to avoid system damage.

4.5.9 Circumference, Area, and Volume Measurement

There are two ways to measure circumference and area.

- Press freeze key and Func key to display function menu.
- Press ←/8 and select 8.Area-volume to call forth the flowing dialog box:

PLEASE ENTER ：
1.FREEHAND 2.ELLIPSE

Option I is freehand measurement, option 2 is ellipse measurement.

A. Freehand measurement operation:

Keyboard operation

1. Press B/1 key to select freehand measurement and the cursor will appear on the screen. Move the cursor to the expected start point of the measurement with direction keys.

2. Press REF and move it along the edge of the expected area to the end with direction keys.

3. Press REF key and finish the circumference and area measurement.

If continuing with the measurement of circumference and area, press Func key and ←/8 key and repeat step 2-3. You can measure 2 groups of data at most and the measurement result will display on the right part of the screen as the flowing picture shows:

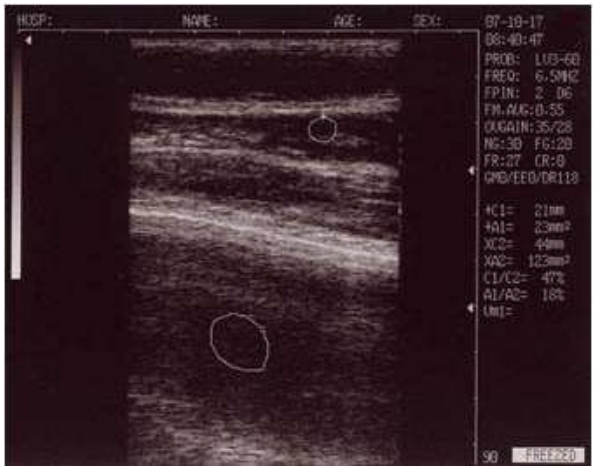


Figure 4-6. Circumference and area measurements (Freehand)

C1 and A1 are the circumference and area of the first data;

C2 and A2 are the circumference and area of the second data;

C1/C2 is the ratio of the two circumferences;

A1/A2 is the ratio of the two areas.

Tips: Measuring circumference and area with the keyboard is not as convenient as the following mouse operation.

Operation via mouse

1. Press B/1 key to select freehand and the cursor will appear on the screen, move the cursor with mouse to the start point of this measurement.
2. Press "Right" key and move the cursor along the edge of the expected area to the end with mouse.
3. Press "Right" key again to accomplish the measurement.

If continuing with the measurement of circumference and area, press Func key and ←/8 key and repeat step 2-3. You can measure 2 groups of data at most and the result will be displayed on the right part of the screen as figure 4-6 shows.

After measurement, press the "middle" key to clear the screen.

B. Ellipse measurement:

Keyboard operation

Press BB/2 key to select Ellipse measurement and an ellipse mark will appear on the image. It can be moved and changed in size and angle with the direction keys, press REF to switch between the three functions of direction keys.

1. Move the measurement mark to any image display area with direction keys.
2. Press REF key and then direction keys to change the measured area size. Press ↑/6 key and ↓/7 key to reduce or enlarge the area in the vertical direction, and press ←/8 key and →/9 key to reduce or enlarge the area in horizontal direction.
3. Press REF key and then ←/8 and →/9 key to adjust area angle. Press ←/8 to rotate the

measuring area counter-clockwise. Press →/9 key to rotate clockwise.

4. Press REF key again; the direction key can be used to move the measured area.

5. When the position, size and angle are confirmed, press Ext key to finish the measurement.

If continuing with the measurement of circumference/area, press Func key and ←/8 key and repeat step 1-5. The maximum number is two groups of data and the measurement results will display on the right part of the screen as the following figure shows:

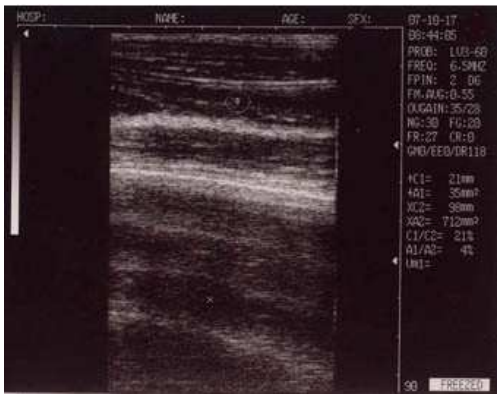


Figure 4-7. Circumference, area measurement (Ellipse)

C1 and A1 are the circumference and area of the first data;
C2 and A2 are the circumference and area of the second data;
C1/C2 is the ratio of the two circumferences;
A1/A2 is the ratio of the two areas.

Operation via mouse

Press BB/2 key to select Ellipse measurement and an ellipse mark will appear on the image. It can be moved and changed in size and angle with moving the mouse and press "Right" key to switch between the three functions of the mouse.

1. Move the measurement mark to any image display area with the mouse.
2. Press "right" key to change the measured area size. Move mouse left and right to reduce or enlarge the area in horizontal direction; move mouse up and down to reduce or enlarge the area in vertical direction.
3. Press "right" key and move mouse left and right to rotate the measuring area counter-clockwise or clockwise.
4. Press "right" key again; mouse function switches to move the measured area.
5. When the position, size and angle are confirmed, press Ext key to finish the measurement.

If continuing with the measurement of circumference/area, press Func key and ←/8 key and repeat step 1-5.

The maximum number is two groups of data and the measurement result will be displayed on the right part of the screen as figure 4-7 shows.
After the measurement, press "middle" key to clear the screen.
Volume measurement refer to 4.7

4.5.10 Video Out Format Transfer

There are two video out formats: PALD and NTSC.

- Press Func key to display the function menu.
- Press →/9 key and select 9.PALD-NTSC to change the output format of video as the following dialog box shows:

PLEASE ENTER VIDEO:
1.PALD 2.NTSC

Press B/1 key to select PALD and BB/2 key to select NTSC.

4.6 Distance Measurement

Keyboard operation

1. At freeze state, press + key to display measuring cursor.
2. Move the cursor to the start point of the measurement with direction keys.
3. Press REF key to confirm the start point.
4. Press the direction keys to call out another cursor and move this cursor to the end point of measurement and press Ext key to finish the measurement. (Tips: click on REF continuously to shift the cursor between the start and end point).

If continuing with the measurement, repeat step 1-4. The maximum number is four groups of data and the measurement results will display on the right part of the screen as the following figure shows:

Figure 4-8. Distance measurement

The four data groups are D1, D2, D3, D4

D1/D2 is the ratio of D1, D2.

D3/D4 is the ratio of D3, D4.

Operation via mouse

1. Click on mouse "left" key to display cursor.
2. Move the cursor to the start point of measurement with the mouse.
3. Right click on the mouse to confirm the start point of measurement.
4. Move the mouse to call out another cursor (end point) and move this cursor to the end point of measurement and click mouse "left" key to finish the measurement. (Note: right click on the mouse continuously will shift the cursor between the start and end point).

If continuing with the measurement, The maximum number is four groups of data and the measurement results will display on the right part of the screen as figure 4-8 shows.

When finish, press "middle" key to clear the screen.

4.7 Volume Measurement

There are two methods here for volume measurement.

1. **Use 3-axial method to get 3 groups of distance and then calculate the volume.**

First, get the three distances and press Ext key to acquire the volume value.

If there are fewer than three groups of distance values, there will be no volume value when the Ext key is pressed. If there are four distances measured and the Ext key is pressed, the displayed volume value will be the result of the first three distances.

Operation steps: (e.g. Kidney)

1. Acquire the horizontal and vertical cross section of kidney and freeze the images.

2. Measure the long and short axis's length of the horizontal cross section.

3. Measure the diameter of the vertical cross section.

4. Press Ext key to finish the measurement and the volume value will display on right part of the screen behind "Vm1" as given below:

Figure 4-9. Volume measurement (3-axis)

2. Use Ellipse method to get 3 circumferences and area and then calculate the volume.

Operation steps: (e.g. Kidney)

1. Acquire the horizontal and vertical cross section of the kidney and freeze the images.

2. Measure the circumference and area of both of the two cross-sections.

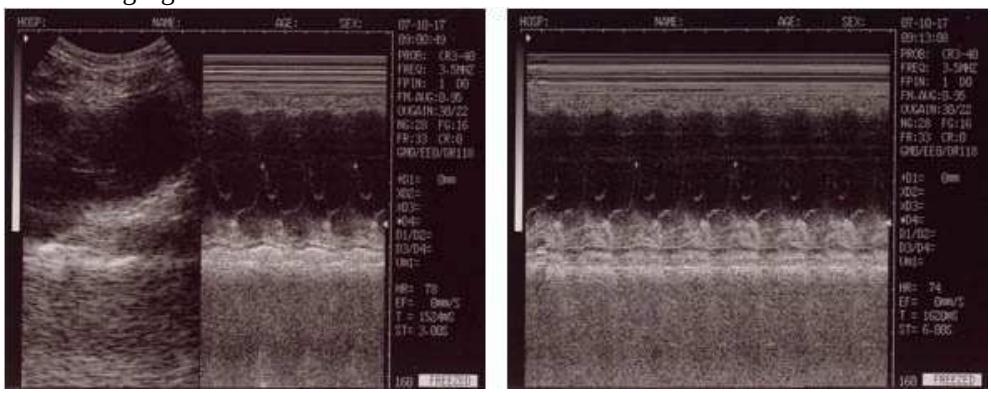
3. Press Ext key to finish the measurement, the system will calculate the volume automatically and display it on the right part of the screen behind "Vm1" as given below:

Figure 4-10. Volume measurement (ellipse)

4.8 Heart Rate Measurement (only under "B/M" Mode and "M" Mode)

1. In B/M Mode, move the track ball and change the sampling line position to acquire the best cardiac waveform first, freeze the image.

2. Measure the distance between two adjacent wave peaks, there will be 4 value groups acquired: they are HR (heart rate, unit: times/min), EF (inclination, unit: mm/s), T (time, unit: ms), ST (refresh rate, unit: s) as shown in the following figure:



B/M Mode M Mode

Figure 4-11. Heart rate measurement

4.9 Cineloop Playback

There is 516 images cineloop playback and a single frame review function.

Start the system and enter real time state, first capture images for cineloop for about 30 seconds.

● Freeze the image, press Cine/0 key to start playback.

● During playback, press ▲ and ▼ keys to enter manual play mode. Press ▲ key to go to the next image and press ▼ key to go back the previous image.

● When playing at "B/B, B″Mode, cineloop can be played in different windows when switching between "B/B″or "B" .

● Press ⊠ key to exit cineloop playback.

4.10 Image Saving

128 images permanent storage even power off.

● When a satisfying image is acquired, press Save key to save it. On the upper left area of the image, image series number will show such as "SAVING ……05". When the saving process finishes, this series number disappears. When an image is saved, the system enters freeze state automatically so press ⊠ key to return to real time state.

● Total 128 images can be stored. A number will be given in the order of time automatically, for example: 01-20 are occupied, press Save key, the currently saved image will be numbered 21. When the storage is full (with 128 images) and the Save key is pressed, the following dialog box appears:

STORAGE IS FULL. ERASE NO.01?

1. YES 2. NO

It asks if you want to replace image numbered 01; press B/1 to save the current image by replacing the old one. Press BB/2 key to cancel.

Press 2.No to not save the image.

When saving an image again, the system will ask you if you want to replace image numbered 02, and so on.

Tips:

When the storage is full, if one stored image is reviewed and you plan to save an image, the system will ask if you want to delete the stored image and save the current one.

4.11 Image Review

At real time or freeze state, press the Load key to display the following dialog box:

PLEASE ENTER STORAGE NO.:

System reminds to put in stored image no, for example 01, after input, press Ext key (if a mistaken happen, press CLS key to delete characters one by one and re-input), then the first image is reviewed and a number 01/128 displays at the screen bottom. O1 means it is the first image and 128 means the total amount of stored images. Press ▲ or ▼ key to review the rest images one by one.

Press ⋈ to return to real time state and if need to call out other images, repeat the above steps.

4.12 OB Calculation

The device is capable of calculating the GA of equine, bovine, sheep, swine, cat, dog, and so on. The GA (GW) can be acquired after measuring GS, BL, HL, SL, USD, HD, BD, CRL etc., among them, the EDD of cat and dog will be given.

Operation Process:

Freeze the image, press the OBT/5 key to display the equine, bovine, swine, sheep OB menu; Press ▼ key to display the cat and dog OB menu, press the ▼ key twice to switch between this two menus as the following figure shows:

0. EQUINE：GSD
1. BOVINE：BL
2. BOVINE：SL
3. BOVINE：HL
4. SWINE：HL
5. SHEEP：USD

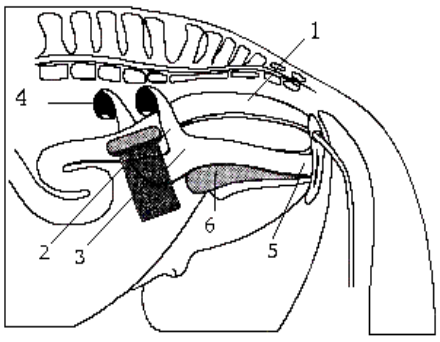
0. CAT：HD
1. CAT：BD
2. DOG：GSD
3. DOG：CRL
4. DOG：HD
5. DOG：BD

Input the number and select the related OB menu and acquire the distance as per distance measurement method. The corresponding GA result displays behind "G·A=" on the right, and the EDD displays behind "EDD=" as given below in details.

● **EQUINE-GSD：Calculate the gestation age according to horse GS**

Examination steps on equine:

1. Clear off the egesta in the rectum.
2. Feel the pregnancy with hand and give a primary estimation and confirm the organ being examined with the ultrasound.
3. Hold the probe closely and put it into rectum and ensure that your hand can feel the coming change inside the rectum. Keep hand close to the back and between the probe and rectal wall.
4. The inner construction of equine displays on the screen; the bladder lies in the portrait cross place and the behind is uterine horns and body. From the horizontal view, uterine horns are round in shape. Move the probe around to acquire a better observation on the joint of uterine horns and body, and then switch the probe to uterine horns as the following figure shows:



1 Rectum
2 Uterine horns
3 Uterine bodies
4 Ovaries
5 Vagina
6 Bladders

Figure 4-12. Probe position for uterine horns and ovaries for examination

5. The measurement method of GS diameter is given below and the measurement can be done horizontally or vertically.

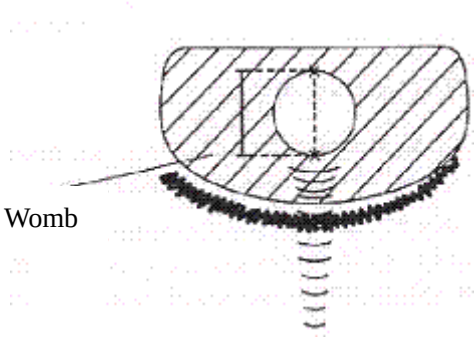


Figure 4-13. Equine GA measurement

6. Confirm the distance values according to the distance measurement methods and the corresponding data display behind "G·A". With this measurement, set up a chart to find the growth curves to estimate embryo size and GA. Here GA refers to the duration from the copulation instead of impregnation.

● **BOVINE-BL：Calculate the gestation age according to bovine BL**

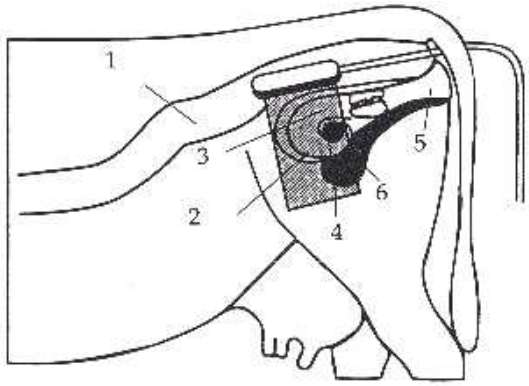
Examination steps on bovine:

1. Clear off the egesta in rectum.

2. Feel the pregnancy with hand and give a primary estimation and confirm the organ being examined with the ultrasound.

3. Hold the probe closely and put it into rectum and ensure that your hand can feel the coming change inside rectum. Keep hand close to the back and between the probe and rectal wall.

4. The inner construction of bovine displays on the screen, the bladder lies in the portrait cross place and the behind is uterine horns and body. From the horizontal view, uterine horns are round in shape. Move the probe around to acquire a better observation on the joint of uterine horns and body, and then switch the probe to uterine horns as the following figure shows:



1 Rectum
2 Uterine horns
3 Uterine bodies
4 Ovaries
5 Vaginas
6 Bladders

Figure 4-14. Probe position for uterine and ovaries examination

5. To measure the fetus body diameter, select a vertical section first, that is a section from two sides to the neck, chest and abdomen. Body diameter can be acquired when the GA is between 60 to 150 days.

The measurement method of body diameter is given below:

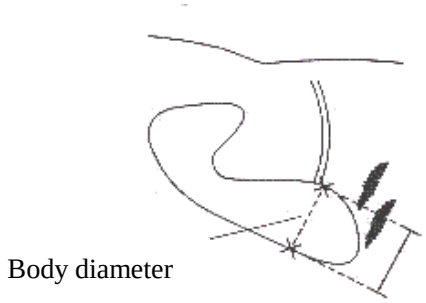


Figure 4-15. BL measurement

6. Confirm the distance value as per distance measurement methods and the corresponding data display behind "G·A".

● **BOVINE-SL：Calculate the gestation age according to bovine SL**

1. Keep the cow standing.
2. Put the probe against the abdomen side center, shift it a little bit left or right and hold it closely against the skin. Clean the abdomen skin if there is mud to ensure a clear display of the abdominal pelvic structure.
3. The maximum vertical axis of the stomach should be displayed on the screen. With the time going on, the fetus stomach long axis increases regularly. The measurement method is given below:

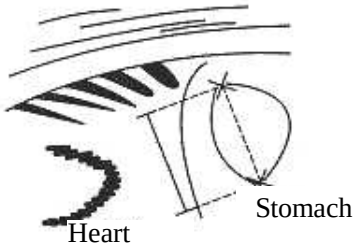


Figure 4-16. Bovine stomach measurement

4. Confirm the distance values according to the distance measurement methods and the corresponding data display behind "G·A".

● **BOVINE-HL：Calculate the gestation age according to bovine HL**

1. Keep the cow standing.
2. Put the probe against the abdomen side center, shift it a little bit left or right and hold it closely against the skin. Clean the abdomen skin if there is mud to ensure a clear display of the abdominal pelvic structure.
3. The maximum vertical axis of the heart should be displayed on the screen. With the time going on, the fetus heart long axis increases regularly. The measurement method is given below:

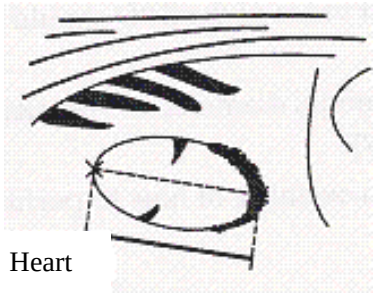


Figure 4-17. Bovine heart measurement

4. Confirm the distance values according to the distance measurement methods and the corresponding data display behind "G·A".

● **SWINE-HL：Calculate the gestation age according to swine HL**

Check routine on pigs:

1. Make the pig stand.
2. Put the probe, a little bit left or right of the centre, on the ventral abdominal wall closely along the side of the teats and fetal skull to rear leg. If there is mud on this part, clean with water first so the abdomen pelvic structure could be displayed accurately.

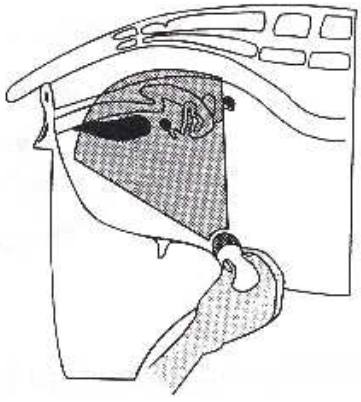


Figure 4-18. Swine GA measurement

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

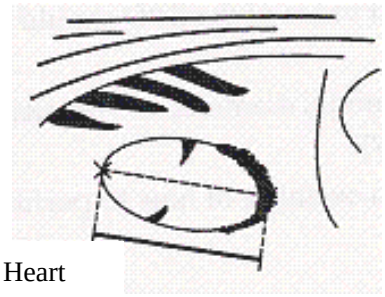


Figure 4-19. Swine heart measurement

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

● **SHEEP-USD: Estimate gestation age according to hilum-spine length of sheep**

There are two methods to exam pregnant sheep:

Use convex or linear probe to check abdomen and endo-rectal probe to check rectum. It is proven in some publications that these two methods are equally effective for pregnancy examination.

— Rectum examination is more exact than abdomen examination within first 35 days of pregnancy;

— The two methods have the same result between 35 to 70 days of pregnancy;

— After 70 days pregnancy, abdomen examination is better because it is more practical when the uterine becomes large.

Abdomen check:

1. Abdomen examination can be done when the sheep is standing, lying, or sitting. Put the probe against the appointed abdomen center where there is no fur.
2. Clean the abdomen skin if there is mud to ensure a clear display of the abdominal pelvic structure.
3. Measure the length of USD.
4. Confirm the distance values according to the distance measurement methods and the corresponding data display behind "G·A".

● **CAT-HD：Calculate the gestation age according to cat HD**

Fetal head diameter refers to the maximum inner skull diameter from the side of the abdomen to back. This value can be acquired within 8 months of pregnancy.

The HD measurement is given below:

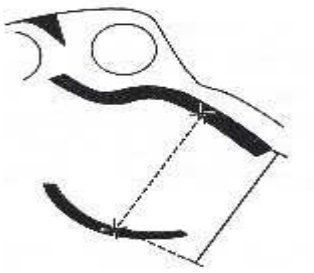


Figure 4-20. Cat HD measurement

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

After the fetal head 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. According to distance measurement method to measure distance of selected parameters, the corresponding gestation age data will automatically show behind " G·A".

- **DOG-GSD: Calculate the gestation age according to dog gestation saccus diameter**
  The method is the same as that of equine.
- **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.

Tips: After displaying the OB menu, press Ext ***key to exit.***

Note
During OB measurement, when the distance is less than the following value, the GA of this animal will not display. Refer to the following table for detailed data:

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

4.13 Image Print

Connect the VIDEO IN port of the printer with the VIDEO OUT port of the device and then operate as stated in the operation manual of the printer.

4.14 Image Upload to Computer

Connect the device and the computer with USB cable.

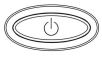
The high-speed USB2.0 port can transfer the image to computer at a high speed.

The attached CD includes USB driver, image preview program VIDCAP, and the second developing SDK file.

After installing the USB program, open VIDCAP.EXE, and finish the related settings as stated in the manual then images can be viewed.

With the SDK file, you can go on for extended development on the program.

4.15 Shut Down

Press  key to shut down the device.

Tips: At off state, there is a certain standby consumption of power. If the device is not in use for a long time, please take the battery out from the main unit.

Note
It is strictly prohibited to plug or unplug the power cord of the adapter when the device is powered-on. After switching off the device, please wait for 2-3 minutes before restarting to avoid damage.

5 Transportation and Storage

5.1 Environmental Requirements on Transportation and Storage

Environment temperature range：- 20°C～ +55°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》(GB191-2000). Simple shockproof establishment is fitted within the box, which apply to aviation, railway, and highway or steamship transportation. Keep dry and from inversion and collision.

5.3 Storage

- The equipment should be taken out from the packing when storage time exceeds six months, powered on for four hours, and then packed correctly and kept in a warehouse. The equipment must not be piled, and not placed close to the floor, wall, or roof.
- Keep it well ventilated, do not expose it to strong sunlight or caustic gases.

6 Check and Maintenance

6.1 Check

The power cord of the equipment and probe cable should be checked regularly and if there is breakage, they should not be used and be replaced.

6.2 Service Life

Based on the manufacturer's design production related files, this model's use life is six years. The product's material will gradually age, if the product is continually used over the designed use life, performance may be reduced and have an increased fault rate.

Note:

Discard the equipment according to local law.
Do not discard it with other household garbage.

Warning:

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

6.3 Main Unit Maintenance

1. Operation environment should accord with "2.1 Operation environment requirements".
2. If equipment enclosure needs cleaning, shutdown the equipment first and then wipe with alcohol sponges. When clean the interior, shutdown equipment first， open the enclosure and clean with a blower.
3. It is not proper to turn on and off the equipment frequently. Re-start the equipment two or three minutes later after shutdown.
4. Pack the equipment according to the instructions on the packing. When the equipment does not work for a long time, store it properly in the warehouse. The storage environment should accord with "5.1 Environment Requirements on Transportation and Storage ".

6.4 Probe Maintenance

The Probe is an expensive and frangible part. Never hit it or drop it on the floor. When diagnoses pauses, put the probe in its case and press  key to keep it in a state of "Frozen".

Use medical ultrasound coupling gel during diagnosis. The IPX7, LV2-2/7.5MHz probe is designed to be completely watertight. For the other probes, water should not immerge over the probe acoustic window (refer to figure 6-1, 6-2, 6-3, 6-4, 6-5). Regularly check the probe enclosure to ensure it is still sealed so liquid ingression

r components.

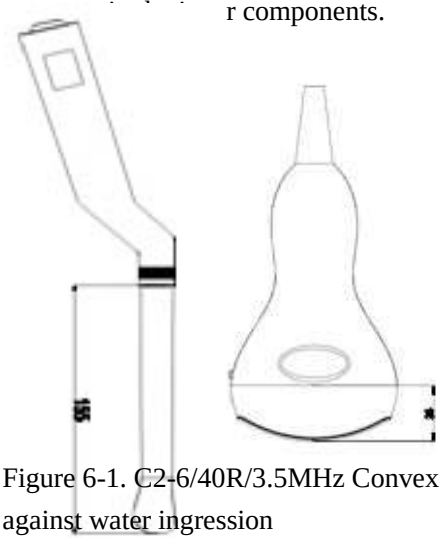


Figure 6-1. C2-6/40R/3.5MHz Convex probe protection against water ingression

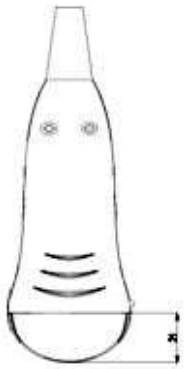


Figure 6-2. C2-7/20R/5.0MHz Convex probe protection against water ingression

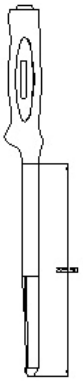


Figure 6-3. EL2-5/7.5MHz Rectal probe protection against water ingression

Figure 6-4. EC2-2/13R/6.5MHz Endo-vaginal probe protection against water ingression

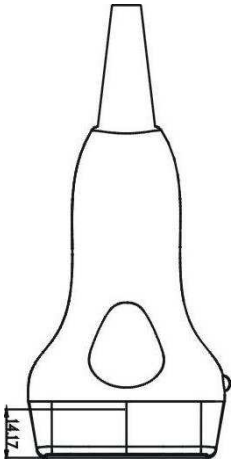


Figure 6-5. L2-5/7.5MHz HF Linear probe protection against water ingression

Do not connect/disconnect the probe from the host machine too often to preserve the probe pins and socket.

Note:

Do not press the probe on patient body for too long so the patient does not become uncomfortable.

6.5 Cleaning

1. When the enclosure needs cleaning, wipe it with soft dry cloths and then wipe gently with sponge and 75% medical alcohol.
2. When the interior parts need cleaning, power off equipment first and then open the enclosure to vacuum it.

Warning:

Power off the equipment before cleaning the equipment and probe to avoid accidents

Note:

1. **Please refer to the user manual for usage of detergent.**
2. **Be careful with cleaning the display. Since display is easily to be scratched and spoiled, wipe with soft dry cloths.**
3. **Please do not clean inner base.**
4. **Never put equipment into liquid.**
5. **Don’t leave residual detergent on equipment enclosure.**
6. **Though most detergent won't react with enclosure, it’s suggested that detergent should not be used discretionarily in case of spoiling the enclosure surface.**

Warning:

Do not use extender, ethylene oxide, or any other organic solvent which can deface the probe's protective foil.
Do not dip the probe into any type of liquid or detergent.
Keep equipment and probe away from any type of liquid's infiltration.
Do not clean equipment or probe by airing or heating.

6.6 Correct Usage of Probe

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

1. Periodic inspection on probe cable, socket, and acoustic window.
2. Shutdown the equipment first and then connect or disconnect the probe.
3. Do not drop probe or flint body, and never hit the probe acoustic window, otherwise probe could be damaged.
4. Please put the probe in its case when it is not in use..
5. Never heat the probe.
6. Never bend or pull probe cable, otherwise the internal connection could be broken.
7. Use couplant only on probe header and clean probe after use.
8. Inspect probe acoustical window, enclosure and cable thoroughly after probe cleaning. Never use the probe again if any crack or breakage is found.
9. Most probes can not be disinfected, so when it is necessary, please use aseptic probe cover.
10. It is suggested to use aseptic probe cover and aseptic couplant when using every intracavity probe but do not open the cover or couplant pack until inspection starts.

Warning:

Lattices contained in probe cover may cause someone to have an allergic reaction.

Warning:

AV-3000V can't work with high frequency surgical equipments to protect app segments from damage.

6.7 Battery Information

1. The equipment is fitted with rechargeable Li-ion battery.
2. For optimum efficiency, the new battery must be charged and discharged (regular service，not enforced discharging) two or three rounds completely.
3. The battery can be charged and discharged hundreds of times，but it will be worn-out. When the work time shortens, please replace it with a new one.
4. Be sure to use the electric charger supplied with this unit (i.e. AC adapter) to charge the battery. Do not connect the battery to the electric charger (AC adapter) when charging is not needed. Do not connect the battery to the electricity charger (AC adapter) for longer than 10 hours; otherwise the battery life may shorten. The fully charged battery will discharge by itself if it is out of use for a long time.
5. Extreme environmental temperature (overcooling or overheating) will influence battery charging effect. Do not charge the battery near an ignition source or under extremely hot conditions! Do not use or store the battery near a source of heat (such as fire or heater)! If the battery is leaking or smelling, move the battery away from the flame immediately.

6. Don’t go on using a non-serviceable battery and electric charger (AC adapter).
7. Don't try to dismantle the battery.
8. Don't short circuit the battery.
9. Do not throw the battery into a fire or heat it, otherwise it would trigger an explosion.
10. Do not souse or wet the battery.
11. Do not incorrectly connect the positive and negative polarity.
12. Do not directly connect the battery to wall outlet or car-lit socket.
13. Do not short circuit the positive and negative polarity of the battery with led or other metal objects. Do not transport nor store the battery with necklace, hair pin, or other metal objects.
14. Do not pierce battery shell with nail or other sharp objects, do not hammer nor step on the battery.
15. Do not hit, cast the battery and avoid mechanical shock on it.
16. Do not bend the battery terminals.
17. Do not decompound the battery in any way.
18. Do not place the battery in a microwave oven or pressure vessel.
19. Do not combine the battery with primary battery (such as a dry battery) or battery with different capacity, models and types.
20. Do not use the battery if it is smelling, heating, straining, discolored or with other abnormal phenomena; remove it from the current consumer or electric charger immediately and stop using it.
21. Discard the battery according to related local waste handling regulations.

7 Simple Trouble Shooting

7.1 Check

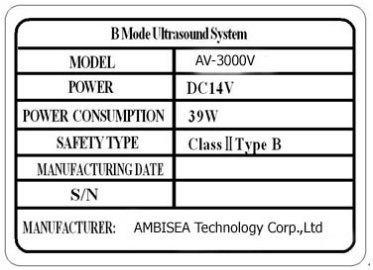
1. Check if the power supply is ok or not and if the main unit power cable is connected well or not. When the supply voltage surpasses the equipment specified voltage range (AC100V-240V, 50Hz/60Hz), do not switch on the equipment.
2. Check if the probe and main unit are connected well or not.
3. Check power cable and probe lines regularly and replace the damaged or broken one if found.

7.2 Simple Troubleshooting

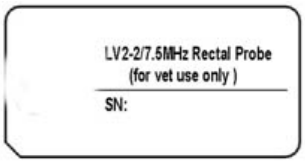
S.N.	Simple Failure	Solutions
1	When power on, PS indicator light does not turn on and no display on screen.	1. Check if 14V of adapter works well; 2. Check if battery needs charging.
2	Noisy display of image	1. Check if 14V output of the adapter is stable; 2. Check if there is electric or magnetic fiend interference around the equipment; 3. Check if the probe plug and jack are connected properly.
3	Unclear display of image	1. Adjust STC (Overall, near field, far field gain); 2. Clear the screen optical filter.

Appendix A

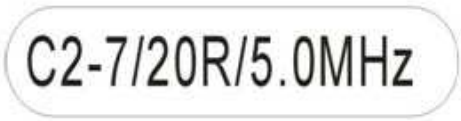
1. AV-3000V Equipment Nameplate Diagram:



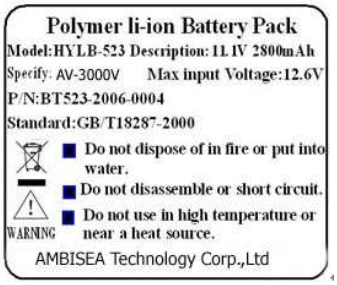
2. AV-3000V Equipment Main Probe Nameplate Diagram：



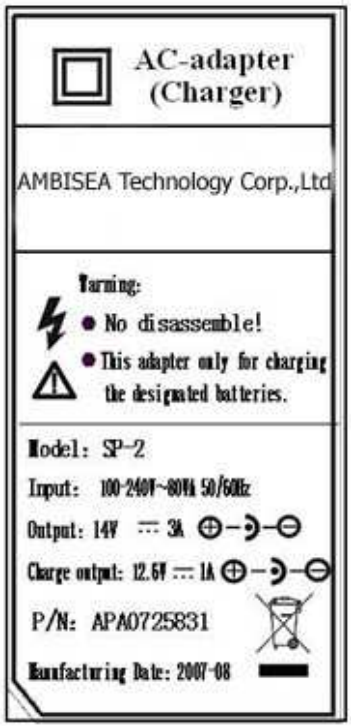
3. AV-3000V Equipment Optional Probe Nameplate Diagram：



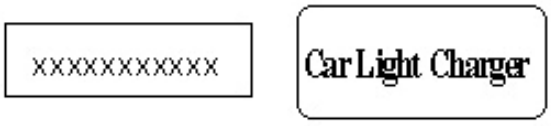
4. AV-3000V Battery Nameplate Diagram：



5. AV-3000V Adapter Nameplate Diagram：



6. Auto-charger Nameplate Diagram：



7. AV-3000V packing diagram：

Modification on the above information may not be further notified.

Appendix B Sound Output Specifications Table

TABLE: Summary of the Acoustic Quantities CR3-20 B-Mode

Test Mode: B-MODE Transducer Type: CR3-20/20R/5.0MHz Transducer No: CP0540100

No.	Test Item	Requirements and Clauses	Results	Remarks
1	Maximum power (mW)	Maximum temporal-average power output. IEC 1157 4.2.2a)	3.9	Test frequency: 5.0MHz
2	P-(MPa)	Peak-negative acoustic pressure. IEC 1157 4.2.2b)	0.77	
3	lob(mW/cm2)	Output beam intensity. IEC 1157 4.2.2c)	0.89	
4	Ispta(mW/cm2)	Spatial-peak temporal average derived intensity. IEC 1157 4.2.2d)	2.30	
5	System settings	Ultrasound instrument console settings. IEC 1157 4.2.2e)	F3 * 1.0	
6	Lp(mm)	Distance form the transducer output face to the point of maximum pulse-pressure-squared integral. IEC 1157 4.2.2f)	25	
7	Wpb6(mm)	-6dB pulse-width. IEC 1157 4.2.2g)	(II):1.99 ⊥ :3.31	
8	prr(KHz)	Pulse repetition rate. IEC 1157 4.2.2h)	33.33	
9	srr(Hz)	Scan repetition rate. IEC 1157 4.2.2h)	Not applicable	
10	Output beam dimensions(cm^2)	Dimensions parallel (□)and perpendicular(⊥) to the reference direction shall be specified. For scanning modes, these shall refer to the central scan line only. In many cases, especially contact systems, these dimensions may be taken as the geometrical dimensions of the ultrasonic transducer or ultrasonic transducer element group. IEC 1157 4.2.2i)	4.37	
11	fawf (MHz)	Arithmetic-mean acoustic-working frequency. IEC 1157 4.2.2j)	3.87	
12	APF	Acoustic power-up fraction. IEC 1157 4.2.2k)	0%	
13	Power-up mode	In system in which the user defines the power-up mode, this shall be stated as either "user defined" or "not applicable" (n/a).IEC 1157 4.2.2l)	B-Mode Freeze	
14	AIF	Acoustic initialization fraction. IEC 1157 4.2.2m)	100%	
15	Initialization mode	If appropriate. in systems in which the user defined the initialization mode, this shall be stated as either "user defined " or "not applicable "(n/a) IEC 1157 4.2.2n)	B-Mode	
16	Acoustic output freeze	If the system has acoustic output freeze then this shall be stated as "yes", otherwise it shall be stated as "no". IEC 1157 4.2.2o)	Yes	

TABLE: Summary of the Acoustic Quantities CR3-20 M-Mode

Test Mode: M-MODE Transducer Type: C1-10/20R/5.0MHz Transducer No: CP0540100

No.	Test Item	Requirements and Clauses	Results	Remarks
1	Maximum power (mW)	Maximum temporal-average power output. IEC 1157 4.2.2a)	0.070	Test freq: 5.0MHz
2	P-(MPa)	Peak-negative acoustic pressure. IEC 1157 4.2.2b)	0.71	
3	Lob(mW/cm^2)	Output beam intensity. IEC 1157 4.2.2c)	0.039	
4	I_{spta}(mW/cm^2)	Spatial-peak temporal average derived intensity. IEC 1157 4.2.2d)	1.26	
5	System settings	Ultrasound instrument console settings. IEC 1157 4.2.2e)	F3 * 1.0	
6	Lp(mm)	Distance form the transducer output face to the point of maximum pulse-pressure-squared integral. IEC 1157 4.2.2f)	25	
7	W_{pb6}(mm)	-6dB pulse-width. IEC 1157 4.2.2g)	(II):3.30 ⊥ :2.91	
8	Prr(KHz)	Pulse repetition rate. IEC 1157 4.2.2h)	0.148	
9	Srr(Hz)	Scan repetition rate. IEC 1157 4.2.2h)	Not applicable	
10	Output beam dimensions (cm^2)	Dimensions parallel (II) and perpendicular (⊥) to the reference direction shall be specified. For scanning modes, these shall refer to the central scan line only. In many cases, especially contact systems, these dimensions may be taken as the geometrical dimensions of the ultrasonic transducer or ultrasonic transducer element group. IEC 1157 4.2.2i)	1.79	
11	f_{awf}(MHz)	Arithmetic-mean acoustic-working frequency. IEC 1157 4.2.2j)	4.22	
12	APF	Acoustic power-up fraction. IEC 1157 4.2.2k)	0%	
13	Power-up mode	In system in which the user defines the power-up mode, this shall be stated as either "user defined" or "not applicable" (n/a). IEC 1157 4.2.2l)	B-Mode Freeze	
14	AIF	Acoustic initialization fraction. IEC 1157 4.2.2m)	108.45%	
15	Initialization mode	If appropriate. in systems in which the user defined the initialization mode, this shall be stated as either "user defined" or "not applicable" (n/a) IEC 1157 4.2.2n)	B-Mode	
16	Acoustic output freeze	If the system has acoustic output freeze then this shall be stated as "yes", otherwise it shall be stated as "no". IEC 1157 4.2.2o)	Yes	

TABLE: Summary of the Acoustic Quantities CR3-40 B-Mode

Index	MI	TIS	TIS	TIS	TIB	TIB	TIC
Mode	—	Scanning	Non-scanning Apart≤ 1cm^2	Non-scanning Apart> 1cm^2	Scanning	Non-scanning	—
Maximum index value	0.50	0.061			0.061		
Acoustic working frequency (MHz)	2.91	2.91			2.91		
Output power (mW)							
Bounded output Power (mW)		4.42			4.42		
Attenuated output Power (mW)							
Spatial-peak temporal-average intensity (mW/cm^2)							
Attenuated spatial-peak temporal-average intensity (mW/cm^2)							
Pulse-pressure squared integral (mj/cm^2)	0.046						
Attenuated Pulse-pressure squared integral (mj/cm^2)	0.031						
Peak-rarefaction acoustic pressure (MPa)	1.03						
Attenuated peak-rarefaction acoustic pressure (MPa)	0.85						
-1 2dB output beam area (cm^2)							
Equivalent aperture diameter (cm)							
Depth for TIS (cm)							
Depth for TIB (cm)							
Depth at max. attenuated pulse-intensity integral (cm)	5.55						
Supplementary information:							

TABLE: Summary of the Acoustic Quantities CR3-40 M-Mode

Index	MI	TIS	TIS	TIS	TIB	TIB	TIC
Mode	—	Scanning	Non-scanning Apart≤ 1cm^2	Non-scanning Apart> 1cm^2	Scanning	Non-scanning	—
Maximum index value	0.29			0.0027		0.0058	
Acoustic working frequency (MHz)	3.34			3.34		3.34	
Output power (mW)				0.29		0.29	
Bounded output Power (mW)							
Attenuated output Power (mW)				0.20		0.20	
Spatial-peak temporal-average intensity (mW/cm^2)				2.39		2.39	
Attenuated spatial-peak temporal-average intensity (mW/cm^2)				0.45		0.45	
Pulse-pressure squared integral (mj/cm^2)	0.021					0.021	
Attenuated Pulse-pressure squared integral (mj/cm^2)	0.0049					0.0049	
Peak-rarefaction acoustic pressure (MPa)	0.84						
Attenuated peak-rarefaction acoustic pressure (MPa)	0.50						
-1 2dB output beam area (cm^2)				1.33			
Equivalent aperture diameter (cm)				1.30			
Depth for TIS (cm)				1.96			
Depth for TIB (cm)						1.70	
Depth at max. attenuated pulse-intensity integral (cm)	5.55						
Supplementary information:							

TABLE: Summary of the Acoustic Quantities CR3-40 (B+M)-Mode

Index	MI	TIS	TIS	TIS	TIB	TIB	TIC
Mode	—	Scanning	Non-scanning Apart≤ 1cm^2	Non-scanning Apart> 1cm^2	Scanning	Non-scanning	—
Maximum index value	0.50	0.061			0.061		
Acoustic working frequency (MHz)	2.91	2.91		3.34	2.91	3.34	
Output power (mW)				0.29		0.29	
Bounded output Power (mW)		4.42			4.42		
Attenuated output Power (mW)				0.20		0.20	
Spatial-peak temporal-average intensity (mW/cm^2)				2.39		2.39	
Attenuated spatial-peak temporal-average intensity (mW/cm^2)				0.45		0.45	
Pulse-pressure squared integral (mj/cm^2)	0.046					0.021	
Attenuated Pulse-pressure squared integral (mj/cm^2)	0.031					0.0049	
Peak-rarefaction acoustic pressure (MPa)	1.03						
Attenuated peak-rarefaction acoustic pressure (MPa)	0.85						
-1 2dB output beam area (cm^2)				1.33			
Equivalent aperture diameter (cm)				1.30			
Depth for TIS (cm)				1.96			
Depth for TIB (cm)						1.70	
Depth at max. attenuated pulse-intensity integral (cm)	5.55						
Supplementary information:							

TABLE: Summary of the Acoustic Quantities CR3-20 B-Mode

Index	MI	TIS	TIS	TIS	TIB	TIB	TIC
Mode	—	Scanning	Non-scanning Apart≤ 1cm^2	Non-scanning Apart> 1cm^2	Scanning	Non-scanning	—
Maximum index value	0.35	0.019			0.019		
Acoustic working frequency (MHz)	3.88	3.88			3.88		
Output power (mW)							
Bounded output Power (mW)		1.05			1.05		
Attenuated output Power (mW)							
Spatial-peak temporal-average intensity (mW/cm^2)							
Attenuated spatial-peak temporal-average intensity (mW/cm^2)							
Pulse-pressure squared integral (mj/cm^2)	0.0095						
Attenuated Pulse-pressure squared integral (mj/cm^2)	0.0077						
Peak-rarefactional acoustic pressure (MPa)	0.77						
Attenuated peak-rarefaction acoustic pressure (MPa)	0.69						
-1 2dB output beam area (cm^2)							
Equivalent aperture diameter (cm)							
Depth for TIS (cm)							
Depth for TIB (cm)							
Depth at max. attenuated pulse-intensity integral (cm)	3.05						
Supplementary information:							

TABLE: Summary of the Acoustic Quantities CR3-20 M-Mode

Index	MI	TIS	TIS	TIS	TIB	TIB	TIC
Mode	—	Scanning	Non-scanning Apart≤ 1cm^2	Non-scanning Apart> 1cm^2	Scanning	Non-scanning	—
Maximum index value	0.24		0.0014			0.0030	
Acoustic working frequency (MHz)	4.23		4.23			4.23	
Output power (mW)			0.071			0.071	
Bounded output Power (mW)							
Attenuated output Power (mW)						0.05	
Spatial-peak temporal-average intensity (mW/cm^2)						1.27	
Attenuated spatial-peak temporal-average intensity (mW/cm^2)						0.52	
Pulse-pressure squared integral (mj/cm^2)	0.0085					0.0085	
Attenuated Pulse-pressure squared integral (mj/cm^2)	0.0040					0.0040	
Peak-rarefaction acoustic pressure (MPa)	0.69						
Attenuated peak-rarefaction acoustic pressure (MPa)	0.47						
-1 2dB output beam area (cm^2)			0.22				
Equivalent aperture diameter (cm)							
Depth for TIS (cm)							
Depth for TIB (cm)						2.30	
Depth at max. attenuated pulse-intensity integral (cm)	2.30						
Supplementary information:							

TABLE: Summary of the Acoustic Quantities CR3-20 (B+M)-Mode

Index	MI	TIS	TIS	TIS	TIB	TIB	TIC
Mode	—	Scanning	Non-scanning Apart≤ 1cm^2	Non-scanning Apart> 1cm^2	Scanning	Non-scanning	—
Maximum index value	0.35	0.021			0.022		
Acoustic working frequency (MHz)	3.88	3.88	4.23		3.88	4.23	
Output power (mW)			0.071			0.071	
Bounded output Power (mW)		1.05			1.05		
Attenuated output Power (mW)						0.05	
Spatial-peak temporal-average intensity (mW/cm^2)						1.27	
Attenuated spatial-peak temporal-average intensity (mW/cm^2)						0.52	
Pulse-pressure squared integral (mj/cm^2)	0.0095					0.0085	
Attenuated Pulse-pressure squared integral (mj/cm^2)	0.0077					0.0040	
Peak-rarefaction acoustic pressure (MPa)	0.77						
Attenuated peak-rarefaction acoustic pressure (MPa)	0.69						
-1 2dB output beam area (cm^2)			0.22				
Equivalent aperture diameter (cm)							
Depth for TIS (cm)							
Depth for TIB (cm)						2.30	
Depth at max. attenuated pulse-intensity integral (cm)	3.05						
Supplementary information:							

TABLE: Summary of the Acoustic Quantities CR3-13 B-Mode

Index	MI	TIS	TIS	TIS	TIB	TIB	TIC
Mode	—	Scanning	Non-scanning Apart≤ 1cm^2	Non-scanning Apart> 1cm^2	Scanning	Non-scanning	—
Maximum index value	0.49	0.021			0.021		
Acoustic working frequency (MHz)	4.36	4.36			4.36		
Output power (mW)							
Bounded output Power (mW)		1.00			1.00		
Attenuated output Power (mW)							
Spatial-peak temporal-average intensity (mW/cm^2)							
Attenuated spatial-peak temporal-average intensity (mW/cm^2)							
Pulse-pressure squared integral (mj/cm^2)	0.0097						
Attenuated Pulse-pressure squared integral (mj/cm^2)	0.0079						
Peak-rarefaction acoustic pressure (MPa)	1.08						
Attenuated peak-rarefaction acoustic pressure (MPa)	0.98						
-1 2dB output beam area (cm^2)							
Equivalent aperture diameter (cm)							
Depth for TIS (cm)							
Depth for TIB (cm)							
Depth at max. attenuated pulse-intensity integral (cm)	2.40						
Supplementary information:							

TABLE: Summary of the Acoustic Quantities CR3-13 M-Mode

Index	MI	TIS	TIS	TIS	TIB	TIB	TIC
Mode	—	Scanning	Non-scanning Apart≤ 1cm^2	Non-scanning Apart> 1cm^2	Scanning	Non-scanning	—
Maximum index value	0.24		0.0012			0.0015	
Acoustic working frequency (MHz)	4.62		4.62			4.62	
Output power (mW)			0.056			0.056	
Bounded output Power (mW)							
Attenuated output Power (mW)						0.026	
Spatial-peak temporal-average intensity (mW/cm^2)						0.48	
Attenuated spatial-peak temporal-average intensity (mW/cm^2)						0.22	
Pulse-pressure squared integral (mj/cm^2)	0.0029					0.0029	
Attenuated Pulse-pressure squared integral (mj/cm^2)	0.0014					0.0014	
Peak-rarefaction acoustic pressure (MPa)	0.70						
Attenuated peak-rarefaction acoustic pressure (MPa)	0.48						
-1 2dB output beam area (cm^2)			0.15				
Equivalent aperture diameter (cm)							
Depth for TIS (cm)							
Depth for TIB (cm)						2.35	
Depth at max. attenuated pulse-intensity integral (cm)	2.35						
Supplementary information:							

TABLE: Summary of the Acoustic Quantities CR3-13 (B+M)-Mode

Index	MI	TIS	TIS	TIS	TIB	TIB	TIC
Mode	—	Scanning	Non-scanning Apart≤ 1cm^2	Non-scanning Apart> 1cm^2	Scanning	Non-scanning	—
Maximum index value	0.49	0.022			0.022		
Acoustic working frequency (MHz)	4.36	4.36	4.62		4.36	4.62	
Output power (mW)			0.056			0.056	
Bounded output Power (mW)		1.00			1.00		
Attenuated output Power (mW)						0.026	
Spatial-peak temporal-average intensity (mW/cm^2)						0.48	
Attenuated spatial-peak temporal-average intensity (mW/cm^2)						0.22	
Pulse-pressure squared integral (mj/cm^2)	0.0097					0.0029	
Attenuated Pulse-pressure squared integral (mj/cm^2)	0.0079					0.0014	
Peak-rarefaction acoustic pressure (MPa)	1.08						
Attenuated peak-rarefaction acoustic pressure (MPa)	0.98						
-1 2dB output beam area (cm^2)			0.15				
Equivalent aperture diameter (cm)							
Depth for TIS (cm)							
Depth for TIB (cm)						2.35	
Depth at max. attenuated pulse-intensity integral (cm)	2.40						
Supplementary information:							

TABLE: Summary of the Acoustic Quantities LH3-40 B-Mode

Index	MI	TIS	TIS	TIS	TIB	TIB	TIC
Mode	—	Scanning	Non-scanning Apart≤ 1cm^2	Non-scanning Apart> 1cm^2	Scanning	Non-scanning	—
Maximum index value	0.83	0.135			0.135		
Acoustic working frequency (MHz)	5.53	5.53			5.53		
Output power (mW)							
Bounded output Power (mW)		5.12			5.12		
Attenuated output Power (mW)							
Spatial-peak temporal-average intensity (mW/cm^2)							
Attenuated spatial-peak temporal-average intensity (mW/cm^2)							
Pulse-pressure squared integral (mj/cm^2)	0.16						
Attenuated Pulse-pressure squared integral (mj/cm^2)	0.059						
Peak-rarefaction acoustic pressure (MPa)	2.72						
Attenuated peak-rarefaction acoustic pressure (MPa)	1.66						
-1 2dB output beam area (cm^2)							
Equivalent aperture diameter (cm)							
Depth for TIS (cm)							
Depth for TIB (cm)							
Depth at max. attenuated pulse-intensity integral (cm)	2.60						
Supplementary information:							

TABLE: Summary of the Acoustic Quantities LH3-40 M-Mode

Index	MI	TIS	TIS	TIS	TIB	TIB	TIC

Mode	—	Scanning	Non-scanning Apart≤ 1cm^2	Non-scanning Apart> 1cm^2	Scanning	Non-scanning	—
Maximum index value	0.98		0.0014			0.0052	
Acoustic working frequency (MHz)	5.37		5.37			5.37	
Output power (mW)			0.060			0.060	
Bounded output Power (mW)							
Attenuated output Power (mW)						0.021	
Spatial-peak temporal-average intensity (mW/cm^2)						31.34	
Attenuated spatial-peak temporal-average intensity (mW/cm^2)						11.95	
Pulse-pressure squared integral (mj/cm^2)	0.19					0.19	
Attenuated Pulse-pressure squared integral (mj/cm^2)	0.074					0.074	
Peak-rarefaction acoustic pressure (MPa)	2.83						
Attenuated peak-rarefaction acoustic pressure (MPa)	1.97						
-1 2dB output beam area (cm^2)			0.61				
Equivalent aperture diameter (cm)							
Depth for TIS (cm)							
Depth for TIB (cm)						2.40	
Depth at max. attenuated pulse-intensity integral (cm)	2.55						
Supplementary information:							

TABLE: Summary of the Acoustic Quantities LH3-40 (B+M)-Mode

Index	MI	TIS	TIS	TIS	TIB	TIB	TIC
Mode	—	Scanning	Non-scanning	Non-scanning	Scanning	Non-scanning	—

			Apart≤ 1cm^2	Apart> 1cm^2			
Maximum index value	0.98	0.136			0.140		
Acoustic working frequency (MHz)	5.37	5.53	5.37		5.53	5.37	
Output power (mW)			0.060			0.060	
Bounded output Power (mW)		5.12			5.12		
Attenuated output Power (mW)						0.021	
Spatial-peak temporal-average intensity (mW/cm^2)						31.34	
Attenuated spatial-peak temporal-average intensity (mW/cm^2)						11.95	
Pulse-pressure squared integral (mj/cm^2)	0.19					0.19	
Attenuated Pulse-pressure squared integral (mj/cm^2)	0.074					0.074	
Peak-rarefaction acoustic pressure (MPa)	2.83						
Attenuated peak-rarefaction acoustic pressure (MPa)	1.97						
-1 2dB output beam area (cm^2)			0.61				
Equivalent aperture diameter (cm)							
Depth for TIS (cm)							
Depth for TIB (cm)						2.40	
Depth at max. attenuated pulse-intensity integral (cm)	2.55						
Supplementary information:							

Appendix C 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 +/- 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	5	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