

# U60 VET

Veterinary Diagnostic Ultrasound System  
Version 1.2

## User Manual

CE



## About this Manual

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## Responsibility of the Manufacturer

EDAN only considers itself responsible for any effects on safety, reliability and performance of the equipment if:

- Assembly operations, extensions, re-adjustments, modifications or repairs are carried out by persons authorized by EDAN.
- The electrical installation of the relevant room complies with international standards, and
- The equipment is used in accordance with the instructions for use.

## Terms Used in this Manual

### WARNING

A **WARNING** label advises against certain actions or situations that could result in personal injury or death.

### CAUTION

A **CAUTION** label advises against actions or situations that could damage equipment, produce inaccurate data, or invalidate a procedure.

### NOTE

A **NOTE** provides useful information regarding a function or a procedure.

The device is for veterinary use only, and the “**VETERINARY USE ONLY**” label is stuck to the device. Please follow the instruction.

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# Chapter 1 Introduction

## 1.1. Overview

The U60 VET is a portable Veterinary Diagnostic Ultrasound System, which applies advanced technologies such as Phased Inversion Harmonic Compound Imaging (eHCI), Multi-Beam-Forming (mBeam), Speckle Resistance Imaging (eSRI), and Spatial Compounding Imaging, etc. Various image parameter adjustments, 15 inch LCD and diverse probes are configured to provide clear and stable images.

Essential Performance:

Satisfying 2D imaging and basic functions of color ultrasonic system (such as color flow imaging and spectral Doppler imaging). Please check details as below:

1. Compliant with essential performance requirements of EN60601-2-37.
2. 2D Imaging: It provides B mode and M mode imaging, and complies with requirements of GB10152-2009.
3. Color flow imaging: It complies with performance requirements of YY 0767-2009.
4. Spectral Doppler imaging: It complies with performance requirements of YY 0767-2009.

## 1.2. Features

- ◆ **Multi-language displays**

- ◆ **256 gray scale**

- ◆ **Two probe sockets**

- ◆ **Display modes:**

B, B+B, 4B, B+M, M, B+PW, B+Color, B+Color+PW, B+PDI/DPDI, B+PDI/DPDI +PW.  
B+CW, B+Color+CW, B+PDI/DPDI +CW

- ◆ **Generic Measurements and Calculations:**

a). B/Color Mode: Distance, Cir/Area (Ellipse/Trace), Volume (2-Axis/3-Axis), Ratio, % Stenosis, Angle and Histogram.

b). M Mode: Distance, Time, Slope and Hear Rate (two cycles).

c). D Mode:

In non-cardiac exam:

Velocity, Heart Rate, Time, Acceleration, Resistance Index (RI), Pulsatility Index (PI) and Auto Trace (auto trace is available only for PW mode)

In cardiac exam:

Velocity, PG, Time, Heart Rate, Slope, PHT, Trace (Manual).



### **1.3. Indications for Use/Intended Use**

The veterinary diagnostic ultrasound system (U60 VET) is applicable for animal ultrasound evaluation in pet hospitals, veterinary clinics, animal farms, zoos, horse racing centers, and animal cultivation/breeding bases. It is intended for use by or on the order of a veterinarian or similarly qualified health care professional, in abdomen, obstetrics, muscle, tendon, cardiology, and peripheral vascular exams.

### **1.4. Model**

U60 VET

### **1.5. Contraindications**

- ◆ The equipment is not intended for ophthalmic use or any use causing the acoustic beam to pass the eye.

## Chapter 2 Safety Guidance

### 2.1. Warnings and cautions

In order to use the equipment safely and effectively, and avoid possible dangers caused by improper operation, please read through the user manual and be sure to be familiar with all functions of the equipment and proper operation procedures before use. Always keep this manual with the equipment.

Please pay more attention to the following warning and caution information.

#### 2.1.1. Safety Warnings

**NOTE:**

The reliability of the device and the safety of operators and patients are considered during product design and production. The following safety and preventive measures should be carried out:

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**WARNING**

1. This equipment is not intended for treatment.
  2. This equipment is not intended for home use.
  3. The diagnosis and examination function of the ultrasonic imaging management system should be integrated with clinical situation of patients, and the diagnostic results are only for physician's reference.
  4. EXPLOSION HAZARD-Equipment is not suitable for use in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide.
  5. The device should be operated by qualified operators or under their instructions.
  6. The device should be operated appropriately to avoid mechanical damage to the transducer.
  7. The device is not waterproof. Do not use it in locations where water or any liquid leakage may occur.
  8. Do not use any fluid onto the system surface, as fluid seepage into the electrical circuitry may cause excessive leakage current or system failure.
  9. Do not spray cleansers on the system, as this may force cleaning fluid into the system and damage electronic components. It is also possible for the solvent fumes to build up and form flammable gases or damage internal components.
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**WARNING**

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10. If the device breaks down, please shut down the machine immediately and contact EDAN or authorized representatives.
  11. Only accessories supplied or recommended by EDAN can be used, the battery and probes of EDAN can be only used on EDAN's systems. Otherwise, the performance and electric shock protection can not be guaranteed. If electrical or mechanical equipment from other companies need to be connected to the device, please contact EDAN or authorized representatives before connection.
  12. The equipment should be installed by a qualified service engineer. Do not try to access the interior of the main unit. Only authorized service personnel may remove the unit cover.
  13. To avoid the risk of electric shock, this equipment must only be connected to a supply mains with protective earth.
  14. To ensure grounding reliability, only connect the system to a hospital-grade power receptacle.
  15. To ensure grounding reliability, connect the system only to an equivalent outlet.
  16. To avoid electrical shock, inspect whether the grounding wire is connected prior to powering on the system. And disconnect the grounding wire after powering off the system.
  17. If you have any questions about the grounding connection, use the battery but not the AC power supply. Prior to using AC power supply, inspection of grounding connection is recommended. If it is necessary, consult EDAN or authorized representatives for service.
  18. Equipment connected to the U60 VET and located near the patient must be powered from a medically-isolated power source or must be a medically-isolated device. Equipment powered from a non-isolated source can cause your system to exceed leakage current limits. Enclosure leakage current created by an accessory or device connected to a non-isolated outlet may add to the enclosure leakage current of the imaging system.
  19. When more than one medical device is connected to the patient, the combined leakage current must comply with IEC/EN 60601-1.
  20. SHOCK HAZARD-Do not attempt to connect or disconnect a power cord with wet hands. Make sure that your hands are clean and dry before touching a power cord.
  21. SHOCK HAZARD - Don't connect non-medical electrical equipment, which has been supplied as a part of the system, directly to the wall outlet when the non-medical equipment is intended to be supplied by a multiple portable socket-outlet with an isolation transformer.
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**WARNING**

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22. Use an extension cord or multi-socket outlet setup to provide power to the ultrasound system or to the system's peripheral devices, may compromise the system grounding and cause your system to exceed leakage current limits.
  23. Multiple portable socket-outlet is not intended for the device, anybody, who connects it to the signal input or output connector to configure a medical system, must make sure that it complies with the requirement specified in Chapter 16 of IEC 60601-1, or the multi-socket is with an isolation transformer.
  24. SHOCK HAZARD - Don't connect electrical equipment, which has not been supplied as a part of the system, to the multiple portable socket-outlets supplying the system.
  25. If a multiple socket-outlet is necessary, ensure that it is not placed on the floor.
  26. Do not exceed the maximum permitted load when using multiple portable socket-outlets to supply the system.
  27. Do not use the additional multiple portable socket-outlet or extension cord in the medical electrical system, unless it's specified as part of the system by manufacturer. And the multiple portable socket-outlets provided with the system shall only be used for supplying power to equipment which is intended to form part of the system.
  28. Do not touch accessible parts of electrical equipment and the patient simultaneously.
  29. A damaged probe can increase the risk of electric shock if conductive liquids come in contact with internal live parts. Inspect probes prior to use for cracks, openings, or other damage that could allow liquid entry.
  30. To avoid electrical shock, never modify the ultrasound system's AC power circuits.
  31. To avoid electrical shock and damage to the system, turn off and disconnect the device from the AC power source before cleaning and disinfecting.
  32. Don't touch the signal input or output connector and the patient simultaneously.
  33. To avoid the possibility of electrostatic shock and damage to the system, avoid using aerosol spray cleansers on the monitor screens.
  34. Any non-medical equipment is not allowed to be used within the patient vicinity (1.5m/6ft.).
  35. Periodically have the integrity of the system ground checked by a qualified service engineer.
  36. This device is not suitable for intracardiac use or direct cardiac contact.
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**WARNING**

37. EDAN makes every effort to manufacture safe and effective probes. You must take all necessary precautions to eliminate the possibility of exposing patients, operators, or third parties to hazardous or infectious materials. These precautions should be considered in the use of any application that may indicate the need for such care, and during endocavity scanning.
38. If the liquid crystal material leaks from the panel, it should be kept away from the eye or mouth. In case of contact with hands, skin or clothes, it has to be washed away thoroughly with soap.

**39. EMI Limitations**

Ultrasound machines are susceptible to Electromagnetic Interference (EMI) from radio frequencies, magnetic fields, and transients in the air of wiring. Ultrasound machines also generate EMI. The U60 VET complies with limits as stated on the EMC label. However, there is no guarantee that interference will not occur in a particular installation.

Possible EMI sources should be identified before the unit is installed.

Electrical and electronic equipment may produce EMI unintentionally due to one of the following defects: High frequency electrotome, Transformer, Defibrillator, Wireless LAN equipment, Medical lasers, Scanners, Cauterizing guns, Computers, Monitors, Fans, Gel warmers, Microwave ovens, Light dimmers, Portable phones

The presence of a broadcast station or broadcast van may also cause interference.

If you find strong interference shows on the screen, please check the sources.

40. Ultrasound may be harmful to patients. This device should be used for valid reasons, for the shortest period of time, and at the lowest mechanical and thermal indices necessary to produce clinically acceptable images. According to the ALARA (As Low As Reasonably Achievable) principles, acoustic output should be set to the lowest level required to satisfactorily perform the examination. Long time exposure should be avoided. For the parameters of sound output, please refer to appendix II. The U60 VET complies with the requirements of applicable International Electrotechnical Commission (IEC) standards in terms of safety and acoustic output levels.
41. Contact with natural rubber latex may lead to a severe anaphylactic reaction in persons sensitive to the natural latex protein, Sensitive users and patients must avoid contact with these items. EDAN strongly recommends that health-care professionals identify their latex-sensitive patients, and refer to the March 29, 1991 Medical Alert on Latex products. Be prepared to treat allergic reactions immediately.
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**WARNING**

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42. If a sterile probe cover becomes compromised during an intraoperative application involving a patient with transmissible spongiform encephalopathy, such as Creutzfeldt-Jakob disease, follow the guidelines of the U.S. Disease Control Center and this document from the World Health Organization: WHO/CDS/APH/2000/3, WHO Infection Control Guidelines for Transmissible Spongiform Encephalopathies. The probes for your system cannot be decontaminated using a heat process.
  43. When the device works with the mobile trolley, DO NOT place the device on slopes. It may suddenly slide, resulting in injury and/or equipment damage.
  44. To ensure safety, two persons are required to move the device across slopes when the device works with the mobile trolley.
  45. All repairs on products must be performed or approved by EDAN. Unauthorized repairs will void the warranty. In addition, whether or not covered under warranty, any product repair shall be exclusively be performed by EDAN certified service personnel.
  46. To ensure optimal imaging, begin the scan session by selecting the correct probe and application for each examination.
  47. The medical electrical equipment needs to be installed and put into service according to *Appendix IV EMC Information*.
  48. Portable and mobile RF communications equipment can affect medical electrical equipment. Refer to the recommended separation distances provided in *Appendix IV EMC Information*.
  49. The use of cables, transducers and accessories not supplied by the manufacturer may result in increased emissions or decreased immunity of the equipment.
  50. The equipment should not be used adjacent to or stacked with other equipment, refer to the recommended separation distances provided in *Appendix IV EMC Information*.
  51. The system and its accessories shall not be serviced or maintained while in use with a patient.
  52. The mains plug is used to isolate the system from main power. Position the system so that it is easy to disconnect the device.
  53. Assembly of the system and modifications during actual service life shall be evaluated based on the requirements of IEC60601-1.
  54. This system can not be used together with high-frequency surgical equipment.
  55. DO NOT perform any unauthorized modification of the equipment.
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**NOTE:**

The probe stops transmission after freezing, disconnecting, falling off, or entering sleeping mode. Main control software checks the probe connection all the time, once probe disconnects from the probe socket, the system stops transmission.

**Electromagnetic Compatibility (EMC)**

Operating the U60 VET in close proximity to sources of strong electromagnetic fields, such as radio transmitter stations or similar installations may lead to interference visible on the monitor screen. However, the device has been designed and tested to withstand such interference and will not be permanently damaged.

**2.1.2. Battery Safety**

To prevent the battery from igniting, emitting fumes, bursting, injuring personal, damaging equipment, pay attention to the following precautions.

**WARNING**

- 1 Improper operation may cause the internal li-ion battery (hereinafter called battery) to be hot, ignited or exploded, and it may lead to the decrease of the battery capacity. It is necessary to read the user manual carefully and pay more attention to warning messages.
- 2 Only qualified service engineers authorized by the manufacturer can open the battery compartment and replace the battery, and batteries of the same model and specification should be used.
- 3 **DANGER OF EXPLOSION** -- Do not reverse the anode and the cathode when installing the battery.
- 4 Charge the battery only when the ambient temperature is between 0°C and 40°C.
- 5 When the battery is out of power, please wait for 0.5-1 hours before you charge it, in order to avoid charging abnormality caused by battery cell overheating.
- 6 Do not use the battery near heat sources or when the ambient temperature is over 40°C. Do not heat or splash the battery or throw it into fire or water.
- 7 Do not destroy the battery; do not pierce battery with a sharp object such as a needle; do not hit with a hammer, step on or throw or drop to cause strong shock; do not disassemble or modify the battery. Otherwise, it may be hot, smoking, distorted or ignited and result in injury.
- 8 When leakage or foul smell is found, stop using the battery immediately. If your skin or cloth comes into contact with the leaked liquid, cleanse it with clean water at once. If the leakage liquid splashes into your eyes, do not wipe them. Irrigate them with clean water first and go to see a doctor immediately.
- 9 When the battery reaches the end of its service life, or foul smell, deformation, discoloration, or distortion is found, stop using the battery immediately, replace it with

a new one, and properly dispose of or recycle the depleted battery according to local regulations.

- 10 Only when the device is off can the battery be installed or removed.
- 11 Remove the battery from the device when the device is not used for a long time.
- 12 Periodic checks on the battery performance are required. Replace the batteries if necessary.

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**NOTE:**

1. It is recommended to charge the battery after the system is switched off, so that you can save the charging time.
2. If the battery is stored alone and not used for a long time, we recommend that the battery should be charged at least once every 6 months to prevent overdischarge.

### 2.1.3. General Cautions

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**CAUTION**

1. Before use, you must make sure that there is no visible evidence of damage on the equipment, cables and probes, which may affect patient safety or diagnostic capability. The recommended inspection interval is once per week or less. If damage is evident, replacement is recommended before use.
  2. If the power cord of the system is missing, damaged or not provided, please purchase the power cord meeting the specification requirements for the original one and complying with the local regulations.
  3. It is necessary to take the probe out of the probe bracket during moving and transporting; otherwise, the probe or probe bracket may be broken.
  4. The normal ultrasonic examination is recognized as being safe. To avoid burns, do not scan in the same area for a long period of time. Always minimize the exposure time while acquiring necessary clinical information
  5. To ensure proper grounding and leakage current levels, it is the policy of EDAN to have an authorized EDAN representative or an EDAN approved third party to perform all on-board connections of documentation and storage devices to the U60 VET.
  6. The device and accessories are to be disposed of according to local regulations after their useful lives. Alternatively, they can be returned to the dealer or the manufacturer for recycling or proper disposal. Batteries(including button cell on the main board) are hazardous waste. Do not dispose them together with house-hold garbage. At the end of their life hand the batteries over to the applicable collection points for the recycling of waste batteries. For more detailed information about recycling of this product or battery, please contact your local Civic Office, or the shop where you purchased the product.
  7. Please use the standard power cord as the input line of the network power supply for the adapter to reduce risk.
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8. Federal (U.S.) law restricts this device to sale by or on the order of a physician.
9. To avoid misdiagnosis from inaccurate measurement values, ensure that the target area of interest and image are correct, and the measurement area is valid.
10. No user serviceable parts are inside the system. All repairs on the system must be performed by EDAN certified service personnel.
11. The internal storage space of the system is limited. It is highly recommended to back up patient data and settings regularly.
12. The packaging is to be disposed of according to local or hospital's regulations; otherwise, it may cause environmental contamination. Place the packaging at a location that is inaccessible to children.
13. Properly dispose of used cleaning agents or disinfectants according to your hospital's regulations.
14. Mind your hand while closing the screen of the system.






**NOTE:**


















To avoid damaging the system, DO NOT use it in environment as below:

1. Locations exposed to direct sunlight.
2. Locations subject to sudden changes in ambient temperature.
3. Dusty locations.
4. Locations subject to vibration.
5. Locations near heat sources.
6. Locations with high humidity.

## 2.2. Labeling Symbols

Descriptions of symbols of the device are shown in [Table 2-1](#).

No.	Symbol	Definition
1.		Serial Number
2.		Part Number
3.		Date of Manufacture
4.		Manufacturer
5.		Operating instructions

6.		Warning (Background: Yellow; Symbol & outline: Black)
7.		Refer to User Manual (Background: Blue; Symbol: White)
8.		Caution
9.		Biological Risks
10.		Disposal method. It indicates that the equipment should be sent to special agencies according to local regulations for separate collection after its useful life.
11.		General Symbol for Recovery / Recyclable
12.		CE Marking
13.		Authorized Representative in the European Community
14.	<b>Rx only</b>	Caution: Federal (U.S.) law restricts this device to sale by or on the order of a physician.
15.		Type BF Applied Part
16.		Alternating Current (a.c.)
17.		Equipotential grounding
18.	VGA 	VGA output, External Monitor
19.		Video Output
20.		Fuse
21.		Transducer for sector-shaped sound field
22.		Computer network
23.		Foot switch To identify a footswitch or the connection for a foot switch.
















24.		Protective earth (ground)
25.		Recording on an information carrier
26.	<b>EDAN</b>	Trademark
27.		USB (Universal Serial Bus) Connection
28.		Dangerous voltage
29.		Running indicator
30.		Battery check
31.	IPX7	Degree of protection provided by enclosures (IP Code): temporary immersion. For the probe but not including the probe connector.
32.		Non-sterile. Indicates a medical that has not been subjected to a sterilization process.
33.	<p>ETL CLASSIFIED</p>  <p><b>Intertek</b> <b>4005997</b></p>	<p>Conforms to AAMI Std. ES 60601-1, IEC Std. 60601-2-37, IEC Std. 60601-1-6</p> <p>Certified to CSA Std. No. 60601-1, No 60601-2-37, No. 60601-1-6</p>

Table 2-1 Descriptions of Symbols

The following labels are used on the packaging:

No.	Symbol	Definition
1		This way up
2		Fragile, handle with care
3		Keep dry
4		General Symbol for Recovery / Recyclable
5		Stacking limit by number
6		Do not step on!
7		Handle with care

**NOTE:**

The user manual is printed in black and white.

## Chapter 3 System Overview

### 3.1. Appearance

#### 3.1.1. Front View



Figure 3-1 Front View

1. Display screen
2. Control panel
3. I/O ports

**NOTE:**

1. Please check details of I/O ports on [Figure 4-7 I/O Ports on the Left Panel](#).
2. The pictures and interfaces in this manual are for reference only.

### 3.1.2.Rear View

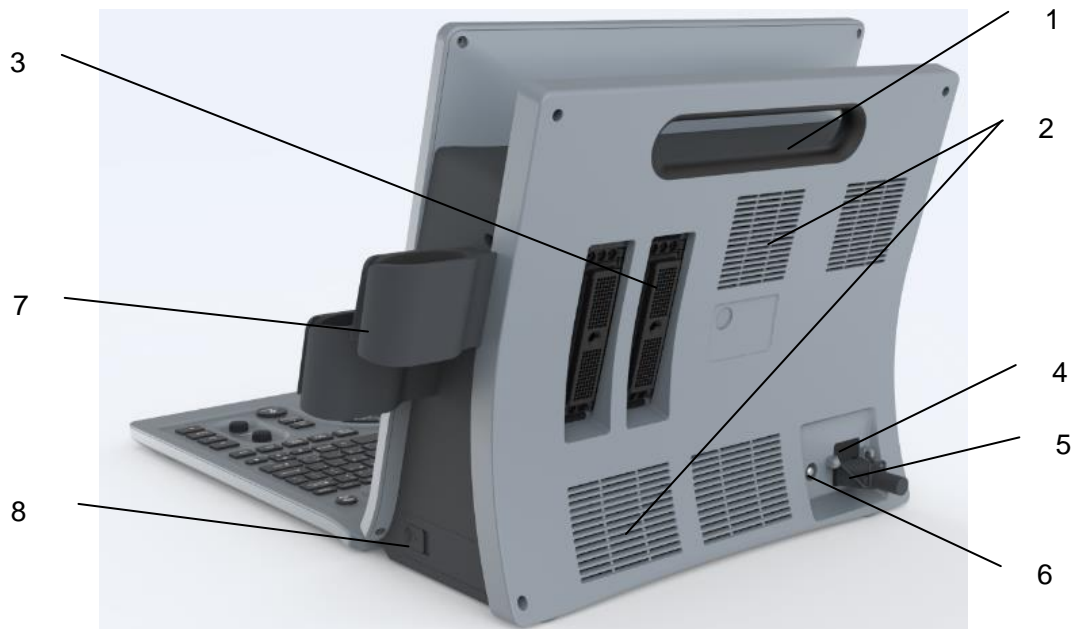


Figure 3-2 Rear View

- 1 Handle
- 2 Heat dissipation orifice
- 3 Probe sockets
- 4 Fuse-box
- 5 Appliance inlet
- 6 Equipotential terminal
- 7 Probe holder
- 8 Battery compartment door

---

**CAUTION**

---

Ensure system vents are clear and unobstructed.

---

## 3.2. Configuration

### 3.2.1. Standard Configuration

- ◆ 1 main unit
- ◆ 1 power cord
- ◆ 1 ground wire
- ◆ 2 pieces of fuse,  $\phi 5 \times 20$ , T3.15AH250V
- ◆ 2 USB disks
- ◆ 1 Hard disk
- ◆ 1 bottle of coupling gel, 250 mL
- ◆ 1 user manual
- ◆ 2 packing lists

### 3.2.2. Options

The Veterinary Diagnostic Ultrasound System supports the following options:

- ◆ Linear array probe: L1042UB/ L742UB/ L552UB/ L15-7b
- ◆ Convex array probe: C352UB/C5-2b
- ◆ Transrectal probe: V742UB/ V562-1UB
- ◆ Micro convex probe: C612UB/ C6152UB/ C422UB
- ◆ Phased array probe: P5-1b
- ◆ Rechargeable lithium-Ion battery
- ◆ Needle Guide Bracket Kit

Model	Name	Description
BGK-R50UB	R50UB Needle Guide Bracket Kit	For the probe C352UB, 4 vessels: 16G, 18G, 20G, 22G
BGK-L40UB	L40UB Needle Guide Bracket Kit	For the probe L742UB/L1042UB/L15-7b, 4 vessels: 16G, 18G, 20G, 22G
BGK-R10UB	R10UB Needle Guide Bracket Kit	For the probe C612UB, 4 vessels: 16G, 18G, 20G, 22G
BGK-R15UB	R15UB Needle Guide Bracket Kit	For the probe C6152UB, 4 vessels: 16G, 18G, 20G, 22G
BGK-R20UB	R20UB Needle Guide Bracket Kit	For the probe C422UB, 4 vessels: 16G, 18G, 20G, 22G
BGK-L50UB	L50UB Needle Guide Bracket Kit	For the probe L552UB, 4 vessels: 16G, 18G, 20G, 22G
BGK-C5-2	BGK-C5-2 Needle Guide Bracket Kit	For the probe C5-2b, 4 vessels: 16G, 18G, 20G, 22G

Table 3-1 Needle Guide Bracket Kits

- ◆ DICOM 3.0
- ◆ Freeze footswitch
- ◆ Mobile trolley MT-805
- ◆ Hand carried bag
- ◆ Dustproof cloth

### Supported Peripheral Accesories:

- ◆ Printers are as shown below.

Printer Type	Interface	Recommended Models
Black /white Video Printer	Video	SONY UP-897MD, MITSUBISHI P93W_Z
	Video/USB	SONY UP X898MD
Color Video Printer	USB	SONY UP-D25MD
Graph/text Report Printer	USB	HP2010, HP Laserjet Pro 400 M401d , HP Deskjet 1010, HP Laserjet 1510, HP DeskJet Ink Advantage Ultra 2029, HP DeskJet 1112, HP403D, HP Deskjet 2050 , HP Deskjet 1050 CANON_E518, CANON_IP_2780, EPSON_L130, EPSON_L310, EPSON_L383

Table 3-2 Printers

#### The video printer output:

Color: Paper size: 100mm\*94mm;

Print area: 96mm\*72mm

B/W: Paper size(general display:only one page): 110mm\*100mm;

Print area 99mm\*74mm

**The graph/text report printer output:** A4 paper, 210 mm×297 mm

- ◆ DVD drive: SAMSUNG SE-208, LENOVO DB75 and LITEON eBAU108



## Chapter 4 Installation Instructions

### 4.1. Environmental Requirements

Keep the device away from equipment with strong electric field, strong magnetic and high voltage field, and protect the display screen from direct exposure to strong sunlight. Keep good ventilation.

### 4.2. Unpacking Inspection

Visually examine the package prior to unpacking. If any signs of mishandling or damage are detected, contact the carrier to claim for damage. After unpacking the device, you should follow the packing list to check the product carefully and to make sure that no damage has occurred during transportation. For installation, please contact your local distributor or the EDAN service department at: support@edan.com.cn.

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#### **WARNING**

1. Do not use the device if it is found to be damaged or defective.
  2. Do not drop or collide with the probe. Otherwise you shall give up using it.
  3. Make sure the AC power supply complies with the following specifications:  
100V-240V~, 50Hz/60Hz.
- 
- 

### 4.3. Connecting Procedure

1. Take the main unit and accessories out from the package.
2. Connect the battery (if it is configured) to the main unit correctly.
3. Connect the probes to the main unit correctly.
4. Connect the printer and load the recording paper.
5. Connect the power cable
  - 1) Connect the main unit and the common earth terminal firmly via a potential equalization conductor.
  - 2) Plug one end of the power cable to the power socket of the main unit, and the other end to the special power output socket of the hospital.
6. Switch on the main unit.

Press power switch on the rear side of the main unit, and press the power on/off key on the top left of the control panel. You can operate the main unit after the main interface appears.

### 4.3.1. Installing and Uninstalling a Battery

To install a battery (if necessary):

1. Turn off the device, and take out the battery from the package.
2. Press the button on the battery compartment door and pull the door out.
3. Turn the lever counterclockwise to hide it and push the battery into place.
4. Turn the lever clockwise to keep the battery in place.
5. Replace the battery compartment door.



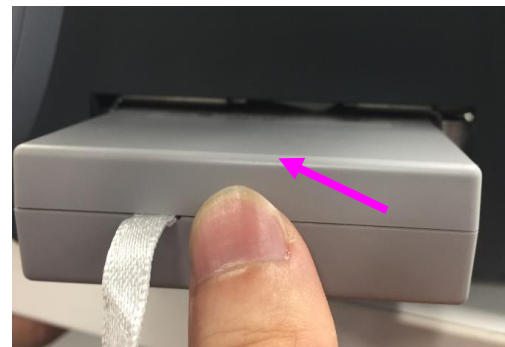
① Press the button



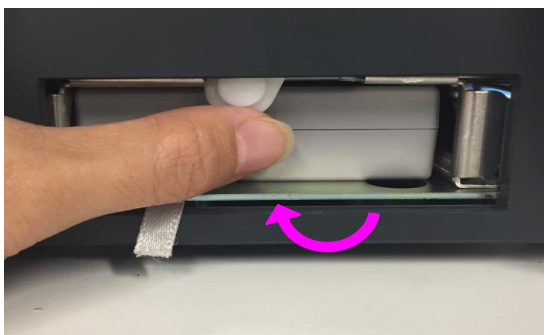
② Pull the battery compartment door out



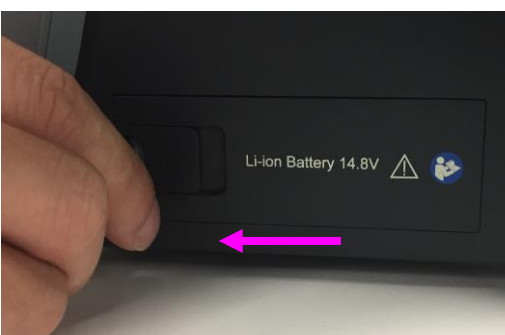
③ Turn the lever counter-clockwise to hide it



④ Push the battery into place



⑤ Turn the lever clockwise to keep the battery in place



⑥ Replace the battery compartment door

Figure 4-3 Installing Battery to Main Unit

To uninstall a battery:

1. Turn off the device, and press the button on the battery compartment door and pull the door out.
2. Turn the lever counterclockwise to hide it.
3. Pull the battery out.
4. Replace the battery compartment door.



① Press the button



② Pull the battery compartment door out



③ Turn the lever counter-clockwise to hide it



④ Pull the battery out



⑤ Replace the battery compartment door

Figure 4-4 Uninstalling Battery from Main Unit

### 4.3.2. Connecting and Disconnecting Probes

#### NOTE:

Ensure that the system is shut down, or the image is frozen, before connecting and disconnecting probes.

The scan direction mark located at the side of probe indicates the beginning direction of scanning. The scan direction mark is shown below.

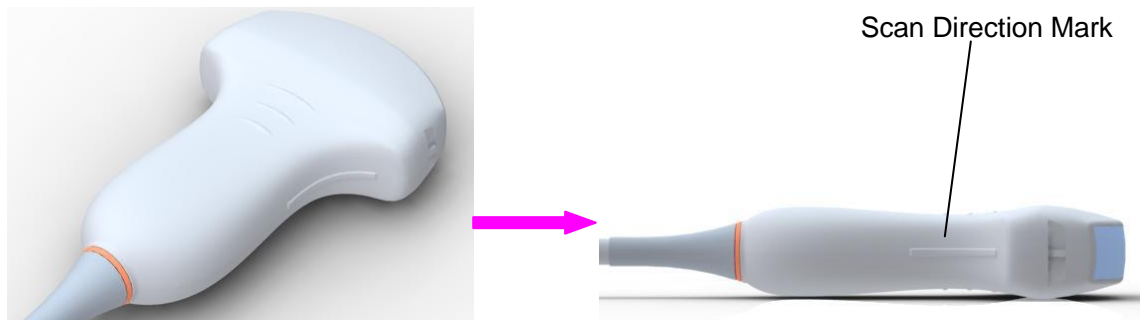


Figure 4-5 Probe Scan Direction Mark Schematic Diagram

There is information about Model and SN on the probe connector.

To connect a probe:

1. Place the probe's carrying case on a stable surface and open the case.
2. Carefully remove the probe and unwrap the probe cable.
3. Do not allow the probe head to hang free. Impact to the probe head could result in irreparable damage.
4. Turn the connector locking handle counterclockwise to the horizontal position.
5. Align the connector with the probe port and carefully push into place.
6. Turn the locking handle on the transducer connector clockwise to the vertical position. This ensures the connector in position and ensures the best possible contact.
7. Place the probe in the probe holder.

To disconnect a probe:

1. Turn the locking handle on the connector housing counterclockwise to the horizontal position.
2. Firmly grasp the probe connector and carefully remove it from the system port.
3. Store each probe in its protective carrying case.



Figure 4-6 Lock and Open Marks on Probe Connectors

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**WARNING**

Do not touch the pin of probe connector.

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**CAUTION**

Do not plug in or pull out the connector when the device is activated. This is to avoid uncontrollable damage to the probe and the main unit.

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**NOTE:**

Once the probe is connected to the main unit, please do not reinstall it frequently. This is to avoid poor contact between the probe and the main unit.

### 4.3.3. Peripheral Connections

Video connections are located on the left panel of the U60 VET.

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**WARNING**

1. Accessory equipment connected to the analog and digital interfaces must be certified according to the respective IEC/EN standards (e.g. IEC/EN 60950 for data processing equipment and IEC/EN 60601-1 for medical equipment). Furthermore, all configuration shall comply with the valid version of the standard IEC/EN 60601-1. Therefore, anybody, who connects additional equipment to the signal input or output connector to configure a medical system, must make sure that it complies with the requirements of the valid version of the system standard IEC/EN 60601-1. If in doubt, consult our technical service department or your local distributor.
  2. Parts and accessories used must meet the requirements of the applicable IEC/EN 60601 series safety standards, and/or the system configuration must meet the requirements of the IEC/EN 60601-1 medical electrical systems standard.
  3. Connecting any accessory (such as external printer) or other device (such as the computer) to this equipment makes a medical system. In that case, additional safety measures should be taken during installation of the system, and the system shall provide:
    - a) Within the patient environment, a level of safety comparable to that provided by medical electrical equipment complying with IEC/EN 60601-1;
    - b) Outside the patient environment, the level of safety appropriate for non-medical electrical equipment complying with other IEC or ISO safety standards.
  4. Parts and accessories must be connected to the I/O ports designated in *Figure 4-7*. For example, only the supplied or recommended USB device can be connected to the USB ports; DO NOT connect telephone line to the network port; DO NOT connect earphone to the footswitch port or remote port.
- 
-

**CAUTION**

To ensure proper grounding and leakage current levels, it is the policy of EDAN to have an authorized EDAN representative or EDAN approved third party perform all on-board connections of documentation and storage devices to the U60 VET.

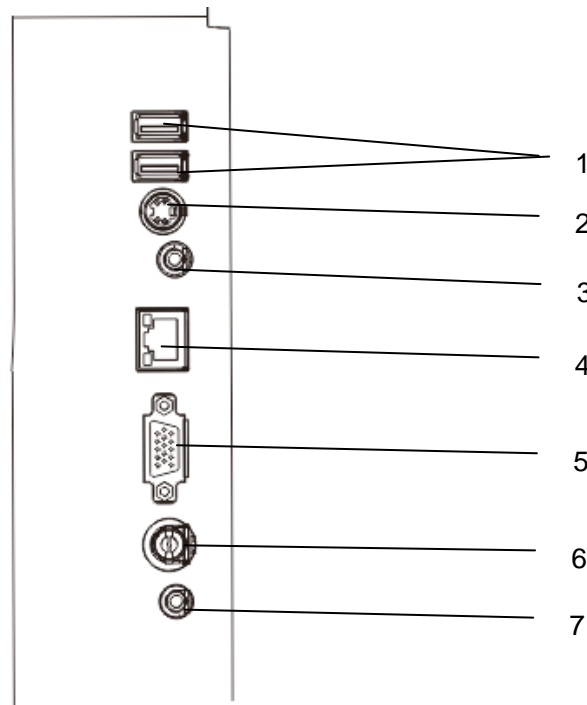


Figure 4-7 I/O Ports on the Left Panel

Peripheral ports:

- |   |                          |   |                          |
|---|--------------------------|---|--------------------------|
| 1 | USB ports                | 5 | VGA output port (15 pin) |
| 2 | S-Video output port      | 6 | Video output port        |
| 3 | Footswitch port          | 7 | Remote port              |
| 4 | Network port (DICOM 3.0) |   |                          |

### 4.3.4. Equipotential Bonding

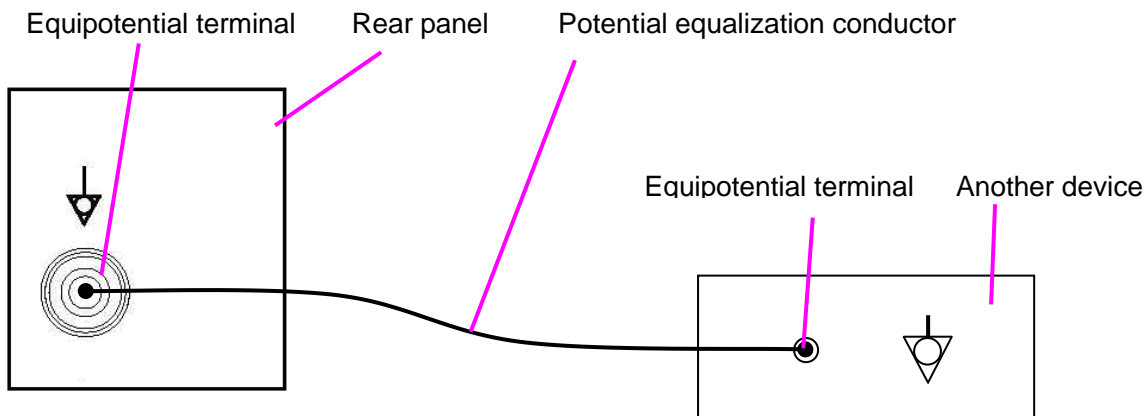


Figure 4-8 Equipotential Bonding

Any use of other devices with the system is at the user's risk and may void the system warranty. In order to fulfill IEC/EN 60601-1 requirements, connections of peripheral equipment to the U60 VET must adhere to one of the following conditions:

- ◆ The peripheral equipment itself is a medical device approved according to IEC/EN 60601-1.
- ◆ Non-medical peripheral equipment approved according to any other EN or IEC standard must use the following setup for connection:
  - Connect the equipotential connector of U60 VET to an independent protective earth terminal with a potential equalization conductor.
  - The peripheral equipment is located at least 1.5 meters (1.8 meters in Canada and the U.S.A) outside the patient environment. A patient environment is defined as the area in which medical examination, monitoring, or treatment of the patient takes place.
  - The peripheral equipment is connected to a main outlet outside the patient environment but still within the same room as the ultrasound system.

#### **WARNING**

1. Equipotential bonding: when the device is running with other instruments jointly, consideration should be given to equipotentiality.
2. Doctors and patients might be exposed to the hazardous and uncontrollable effects of compensating current caused by unbalanced equipotentiality between indoor medical device and touchable conducting parts. The safest solution is to build a unified equipotential network, to which the medical device is connected, using an angular plug.

### 4.3.5. Printer Installation

This system supports video printers and graph/text report printers. For printers connecting via USB port, select the printer model in the System Preset prior to printing, refer to section 5.7.3 for details.

To install a video printer:

1. Power off the main unit and the printer.
2. Connect the VIDEO IN (video input) of the video printer and the S-Video output/Video output/USB port of the main unit with a data cable.
3. Connect the REMOTE of the video printer with the REMOTE of the main unit.



Reference *Figure 4-7 I/O Ports on the Left Panel.*

4. Power on the main unit and run the printer.

**NOTE:**

The video printers are used in patient vicinity.

To install a graph/text report printer:

1. Power off the main unit and the printer.
2. Connect the printer with the main unit by using a USB cable.
3. Power on the main unit and run the printer.

**NOTE:**

1. Chromatic aberration, unfriendly brightness, contrast or overall appearance may occur if you print images with default presetting of video printer. To obtain good printings, please adjust video printer parameters according to the images.
2. Please check the printer user manual for details about printer installation. If the printer does not work normally, check the Report printer presetting through **System preset**, see Section *5.7.3 System Preset*.
3. To obtain good printings, EDAN recommends you to connect the color printer with the S-Video output, and connect the monochrome printer with Video output.
4. Multiple portable socket-outlet is not intended for the device, anybody, who connects it to the signal input or output connector to configure a medical system, must make sure that it complies with the requirements of the valid version of the system standard IEC/EN 60601-1. If in doubt, consult our technical service department or your local distributor.
5. If you want to use a multiple portable socket-outlet to supply power to the whole U60 VET system, you are suggested to calculate the system power consumption when building a U60 VET system so as to match the system power consumption with the power sustained by a multiple portable socket-outlet.
6. When using Video printer SONY UP X898MD, please configure the printer driver to "DRIVER: DRV 898" on the printer prior to printing.



## Chapter 5 System Control

### 5.1. Powering On/Off Device

◆ To power on the device

Before powering on this device, check as below:

1. Check the potential equalization conductor and make sure it is connected properly.
2. Check all the cables and make sure there is no scrape or crack.
3. Check the control panel and the monitor and make sure there is no crack.
4. Check the probe and the connection and make sure there is no scrape or crack.
5. Check the power socket and the switch and make sure there is no damage.

To power on:

1. Connect the device to a standard three-pin power supply socket via the power cable; Or  
Use the battery as the power supply.
2. Press the power on/off key on the top left of control panel, and a startup interface appears.  
When you use the battery as the power supply, press and hold down the power on/off key to switch on the device.

◆ To shut down the device

1. Press the power on/off key on the top left of control panel and the system displays a confirm dialog box.
2. Select **Yes** to power off the system.

Or,

If the system breaks down, long press the power on/off key on the top left of control panel to shut down the system directly.

**NOTE:**

Please unplug the AC power cord from the power socket and disconnect the battery if the device is to remain idle for a long time.

---

---

**CAUTION**

---

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1. Do not unplug the power cord before switching off the system.
  2. Wait approximately five seconds between powering the system off and then on again.  
This allows the system to complete its shutdown process.
- 
-

## Standby mode

To place the system in standby mode:

Press the power on/off key and select **Standby** from the confirmation dialog box, the system goes into the maximum power saving state: Standby Mode. But the archived patient information, measurement and images will be kept.

To wake up the system from standby mode:

Press the power on/off key to come out of Standby Mode, the system resumes working immediately.

### ◆ To restart the device

If there is any trouble described as below, please press the power on/off key to switch off the device and then press it again to restart the device.

- The device displays wrong information and it lasts a long time.
- The device displays abnormally.
- The device can not execute an operation.

## 5.2. Examining

Apply an appropriate amount of coupling gel (medical ultrasound coupling agent) to the body area to be examined, and then contact the area with the acoustic window of the probe firmly. A cross-sectional image of tissues will be displayed on the screen. Adjust **brightness, gain, TGC, focus combination**, etc properly. Adjusting the monitor's contrast and brightness is one of the most important factors for best image quality. If these controls are set incorrectly, the **gain, TGC, and focus combination** may have to be changed more often than necessary to compensate. Meanwhile, properly move the probe to obtain an optimal image of the target area. Or if necessary, adjust **sweep speed** to get satisfying images in the M mode, and adjust **D gain, sample line, Sample Volume, Base Line, Correction Angle, D WallFilter, PRF** (Pulse Repetition Frequency), etc in the PW mode.

---

### **CAUTION**

1. Please be gentle when contacting the target area with a probe. This is to avoid making the probe damage or the patient disturbed.
  2. Please choose a proper probe for the target area with an appropriate frequency to begin the diagnostic operation.
  3. Adjust the gain knob slowly.
-

### 5.3. Screen Layout

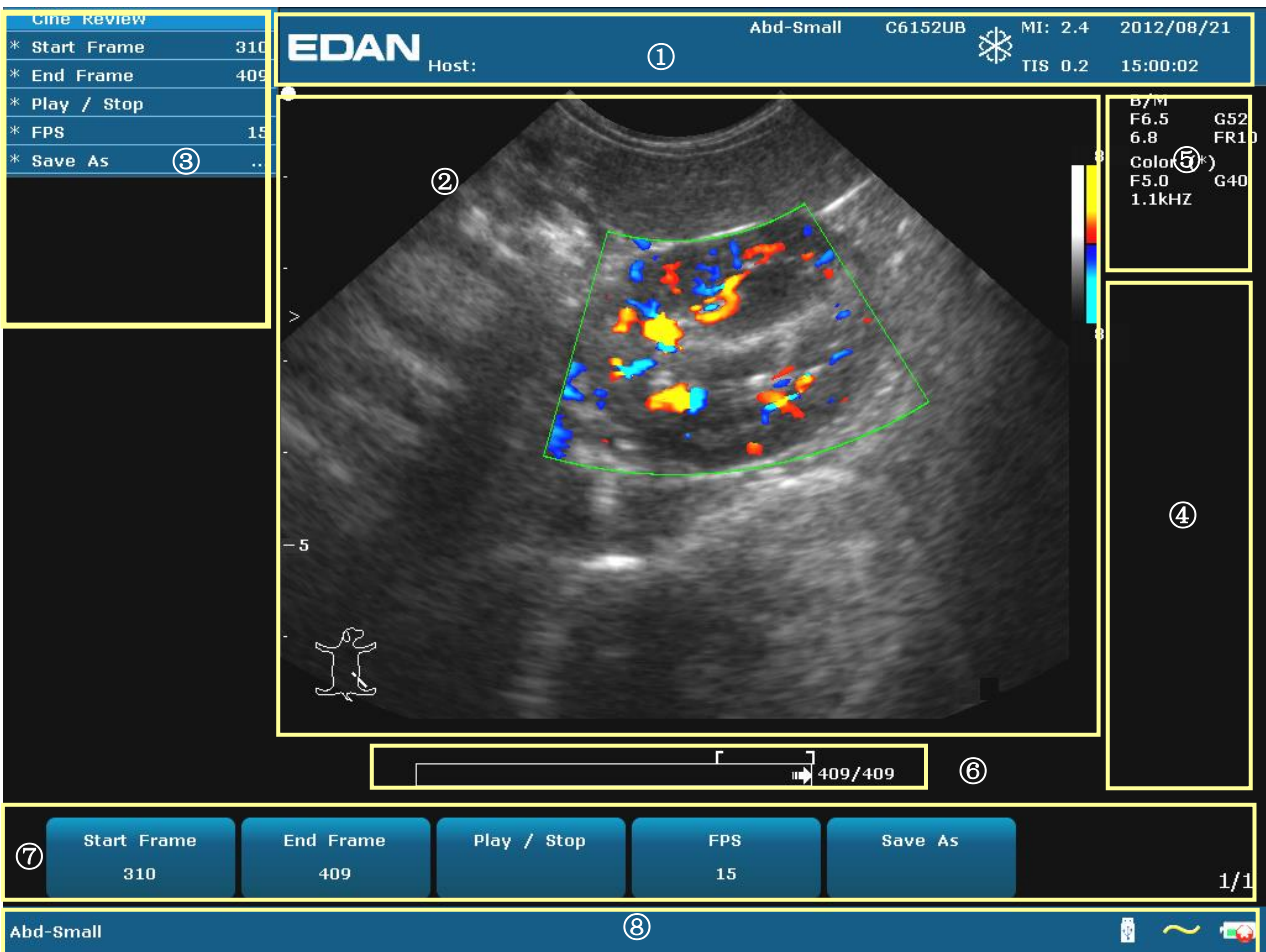


Figure 5-1 Monitor Display

- ① **Information Field:**  
 Manufacturer logo, Institution/Hospital name, Host name, Patient name, Patient ID, Current examination type, Probe model, Probe frequency, “Freeze” icon, MI, TI, System date and time, etc.
- ② **Image Field:**  
 Ultrasound image (B/Color/PDI/PW/CW/M mode), Gray map bar, Color map bar, Depth scale, Focus mark, Sample line of PW/M mode, Sample volume of PW mode, Scan area window of Color mode (also referred to as the region of interest, or ROI), Needle guide line, Probe scan direction mark, Comments (texts or arrows), Body marks, Measurement caliper, TGC curve, etc.
- ③ **Menu Field:**  
 Image control menus /control program menus. The content of menus depends on system status.
- ④ **Measurement Results Field:**  
 The field displays the measurement and calculation items and results in different rows.
- ⑤ **Parameter Field:**  
 It displays the principal image parameters of each mode. Parameters of the current active mode are marked with “\*” symbols. Parameters of B mode: Freq, Gain, Depth, and Frame Rate; Parameters of Color /PW/CW mode: Freq, Gain, and PRF.

⑥ **CINE Review Progress Bar**⑦ **Menu Controls Field:**


Image parameters adjustment/ program menus control, the items correspond to system menus in different modes or status.

⑧ **Status Prompt Field:**

The lower left side of the field displays operation prompt, examination type;

The lower right side of the field shows the state of USB, the state of power supply, input method, brightness or volume adjusting information (the icon is displayed only during adjustment)


Battery Status Icon:

: Battery capacity more than 80%.


: Battery capacity 60%-80%.


: Battery capacity 40%-60%.

: Battery capacity 20%-40%.

: Battery capacity lower than 20%, turns red.

: AC power supply, with battery connected;

: AC power supply, without battery connected.

: Battery power supply.

When the battery capacity is  $\leq 20\%$ , the battery status icon turns red.

When the battery capacity is reduced to 20%, the system displays a prompt “**Battery capacity is too low, please recharge!**”

When the battery capacity is reduced to 10%, the system displays the prompt again “**Battery capacity is too low, please recharge!**”

## 5.4. Control Panel

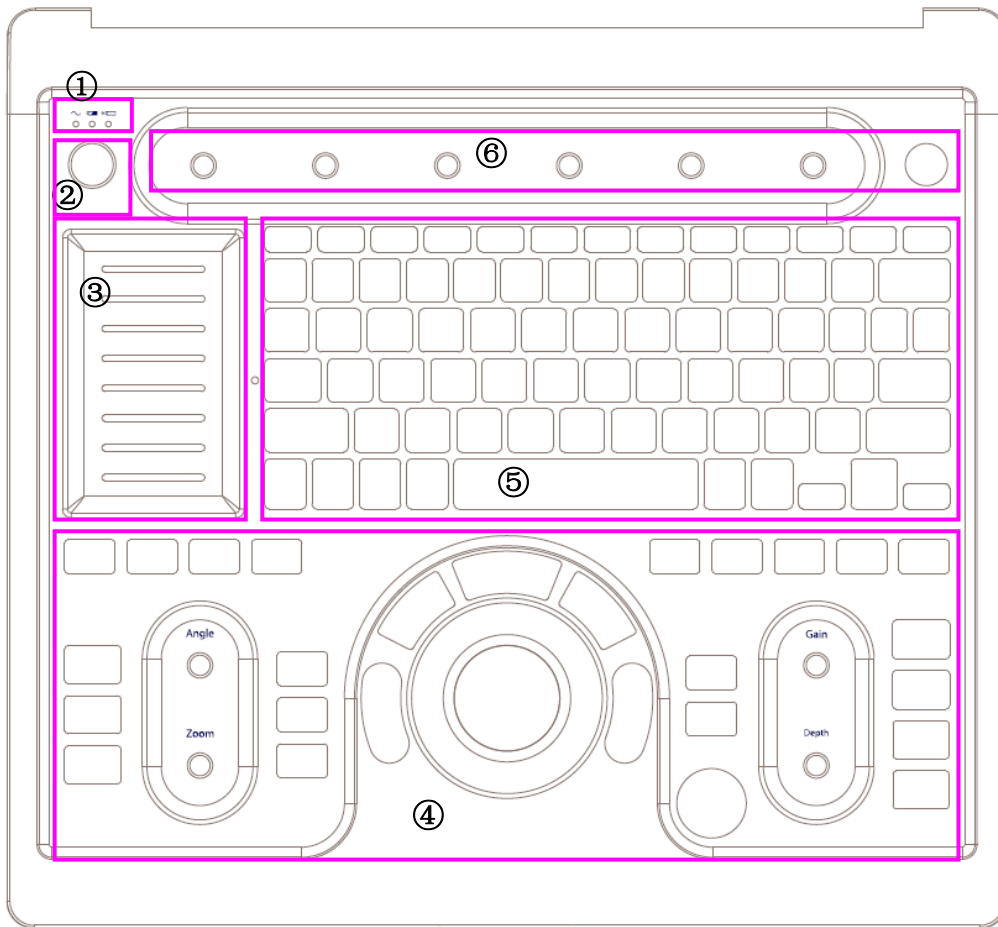


Figure 5-2 Control Panel

- |                            |                    |                 |
|----------------------------|--------------------|-----------------|
| ① Power/running indicators | ② Power on/off key | ③ TGC sliders   |
| ④ Function controls        | ⑤ PC keyboard      | ⑥ Menu Controls |

### 5.4.1. Trackball

The trackball operation is easy and convenient. It can achieve the following functions:

- ◆ Move the measurement cursor during measurement.
- ◆ Move to select menu items in menu-based operations.
- ◆ Move the comment cursor in the comment status.
- ◆ Move the M Mark in the B+M mode.
- ◆ Move the scan area of Color mode, increase or decrease the size of scan area of Color mode.
- ◆ Move the sample line in the PW mode.
- ◆ Realize single frame playback in the frame-by-frame playback status.
- ◆ Move the zoomed window in the zoom status.

**NOTE:**

1. Please be gentle when running the trackball.
2. Please keep the surface of trackball clean.

**5.4.2. “0~9” Numeric Keys**

Numbers are used for time calibrating, data setting, age notating, and comment adding etc.






**5.4.3. Alphabetic Keys**




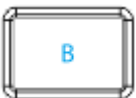







The system supports some language-specific characters through the use of SHIFT with a combination of keys on the keyboard. Press any of these keys in the annotation mode and the comment mode to display the character on the cursor position.




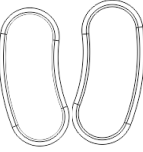


German Characters		French Characters	
Symbol	Key Combination	Symbol	Key Combination
ä	SHIFT-A	è	SHIFT-Z
ö	SHIFT-S	à	SHIFT-X
ü	SHIFT-D	ó	SHIFT-C
ß	SHIFT-F	é	SHIFT-V
ñ	SHIFT-G	ç	SHIFT-B
ø	SHIFT-H	â	SHIFT-N

Table 5-1 German and French Characters









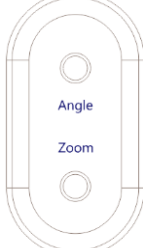
**5.4.4. Function Controls**

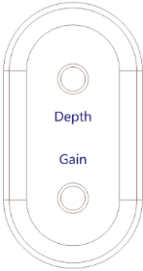
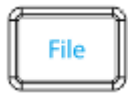


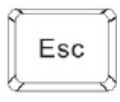



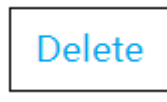

No.	Key	Name	Description
1.		Power on/off	Press to power on the system or display the shut down interface.
2.		/	Alternating Current (a.c.) indicator
3.		/	Battery charging indicator
4.		/	System working indicator
5.		/	Press to turn to next page of Menu Controls field. It will return to the first page if the current page is the last one.
6.	1-6	Menu Controls	The 6 combination rotary dials/push buttons corresponds to the items displayed in the menu controls field, and also to the items of system menu in different modes or status.

7.	TGC	TGC	Glide the slide controls to adjust the TGC, glide the upper segments to adjust the near field gain, and the lower segments to adjust the far field gain; glide rightward to increase TGC, and glide leftward to decrease.
8.		Patient Info	Patient information annotation key Press to view, edit or input the patient data.
9.		Probe	Press to display an onscreen menu for connected probe and exam type selections.
10.		End Exam	Press to erase cache memory of the last exam (including comments, measurements, calculations and reports except for archived Images) before the exam ends, begins a new exam.
11.		B Mode	Press to enter B Mode.
12.		Color Mode	press to enter or exit Color Mode
13.		PW Mode	In B mode, press to display the sample line, and press this key again to enter B+PW mode; in B+PW mode, press this key to exit PW mode and enter B mode.
14.		Continuous Wave Doppler Mode (CW Mode)	In B mode, press to display the sample line, and press this key again to enter B+CW mode; in B+CW mode, press this key to exit CW mode and enter B mode.
15.		M Mode	Press to enter M Mode.
16.		PDI	Press to enter or exit Power Doppler Imaging Mode (PDI)
17.		/	Dual Press to select Dual and switch between a live or frozen, single or multi-mode A/B split screen display.
18.		/	Quad Press to select Quad and cycle through a live or frozen A/B/C/D single or multi-mode split screen display.

19.		Active Mode	<ol style="list-style-type: none"> <li>1. Press to toggle between current image modes in duplex or triplex.</li> <li>2. After the image is frozen, the system enters Cine Review status by default. Press <b>Active Mode</b> to switch between different frozen imaging modes and Cine Review status. When switching between different frozen imaging modes, the currently available parameters are highlighted, you can use the menu controls to adjust options. (Such as Pseudo Color, and Gray Map).</li> </ol> <p><b>NOTE:</b> In measurement status, the <b>Active Mode</b> key is inactive.</p>
20.		Clear	Press to clear all the measurements, calculations, comments, and body marks displayed in the current image.
21.		Trackball	A multifunction trackball used for various system activities (increase or decrease size of ROI, position Color ROI, position Calipers, position annotations etc.)
22.		Set	<p>Set key</p> <ol style="list-style-type: none"> <li>1. Press to confirm the selection of a specific function or command.</li> <li>2. Use this key to anchor calipers, select a menu item or image graphic.</li> <li>3. Press to move the scan area of Color mode, increase or decrease size of scan area of color mode with the trackball. (In color mode, it enters ROI position adjusting status firstly, you can press trackball to move the ROI; after you press <b>Set</b>, it enters ROI size adjusting status, you can move the trackball to increase or decrease the size of ROI; if you press <b>Set</b> once again, it returns to ROI position adjusting status.)</li> <li>4. Press to move the zoomed window in the zoom status together with the trackball.</li> </ol>
23.		Cursor	Press to hide or display the cursor
24.		BodyMark	<p>Body Mark Key</p> <p>Press to activate or exit the body mark function. It is to indicate the examine position and the scan direction.</p>



25.		Generic Measurement	Generic Measurement key Press to activate or exit the generic measurement function.
26.		Update	<ol style="list-style-type: none"> <li>1. In annotation status, press to display the comment library.</li> <li>2. In measuring status, you can press <b>Update</b> once to change the settled point and the active point</li> <li>3. In unsynchronized Mode, such as B+M, B+PW, B+Color, B+PDI/DPDI, B+PDI/DPDI+PW or B+Color+PW mode, press to active real time image window.</li> </ol>
27.		Application Measurement	Application Measurement key Press to activate or exit the application measurement function.
28.		Comment	Comment key Press to activate or exit annotation function.
29.		Report	Press to activate or exit current patient report.
30.		Store Image	Press to save the current image to Local disk or USB disk according to the present saving path and image format.
31.		Store Clip	Press to save the clip to Local disk or USB disk according to the present saving path and image format.
32.		Print	Print key Press to do the video printing
33.		Angle Zoom	<ul style="list-style-type: none"> <li>◆ When an arrow is added, rotate the <b>Angle</b> button to adjust the arrow direction.</li> <li>◆ When a body mark is added, rotate the <b>Zoom</b> button to adjust the scanning direction.</li> <li>◆ Press to activate or exit zoon function.</li> </ul>

34.		Gain Depth	<ul style="list-style-type: none"> <li>◆ Rotate the <b>Gain</b> button to increase or decrease the overall gain of the current mode.</li> <li>◆ In real time mode, rotate the <b>Depth</b> button to adjust depth.</li> </ul>
35.			<p>File management key Press this key to enter or to exit the file management system.</p>  <p><u>Reference Section 6.12 File Management</u></p>
36.		Freeze	<p>Freeze key Press this key to switch between the frozen and real-time states. When an image is frozen, the system inserts “❄” next to the system time clock and the clock pauses. When unfreezing the system, all the measurements, calculations, body marks, and comments will be erased.</p>
<b>PC Keyboard</b>			
37.		ESC	<p>To return back to previous status; Or cancel current operations such as saving PDF report, sending DICOM files, etc.</p>
38.		Preset	<p>Preset key Press this to activate or to deactivate the preset function.</p>  <p><u>Reference Section 5.7 Presetting</u></p>
39.		Needle	<p>Press to activate or exit needle guide function.</p>
40.		Del	<p>In the comment status, press to delete the selected comment; When modifying a comment, press to delete by character.</p>
41.		Back	<p>In the measurement status, press to delete the generic measurement results one by one; In the comment status, press to delete the selected or editable comment by character.</p>
42.	F1-F4	F1-F4	Reserved keys/ User defined keys

43.	F5	F5	Press to decrease brightness. And the brightness symbol will be displayed at the bottom of the screen.
44.	F6	F6	Press to increase brightness. And the brightness symbol will be displayed at the bottom of the screen.
45.	F7	F7	Press to decrease volume in the PW mode. And the volume symbol will be displayed at the bottom of the screen
46.	F8	F8	Press to increase volume in the PW mode. And the volume symbol will be displayed at the bottom of the screen
47.	F9	F9	Sound muting key Press this to close the loudspeaker in the PW mode. And the mute symbol will be displayed at the bottom of the screen

Table 5-2 Function Controls

### Menu Controls:

The 6 menu controls on the control panel correspond to items in the menu controls field. The currently available items are highlighted, and unavailable items are in gray color; they also correspond to items on the system menu in different modes or status, such as the image menu, preset menu, file menu, needle guide menu, Cine Review menu, measurement menu, etc. You can press or rotate the menu control, or use the trackball and **Set** in the menu field to switch/adjust parameters, or activate a function.

### Operations of menu controls:

- To switch options/adjust parameters:

If an item of the menu has a submenu or several parameter values, press or rotate the menu control to switch between options or adjust values. (You can adjust values circularly by pressing menu controls, rather than by rotating them).

For example, in File menu, press or rotate the **FileType** menu control to switch the image format before saving it; in B mode, press or rotate the **Dyn Rng** menu control to increase or decrease the value of dynamic range.

- To activate a function:


(1) If an item of the menu has a submenu or several options, rotate the menu control to select submenu items or options, and press the menu control to activate the function.

For example, in B-generic measurement menu, rotate **Volume** menu control to select **2-Axis/3-Axis/3-Axis (LWH)**, and press the menu control to activate the option.

(2) If an item of the menu has no submenu or option, press the menu control to activate the function directly.

For example, in File menu, press **File Manager** menu control to display the **File Manager** dialog box directly.



- Page down: You can press  on menu controls panel to flip through pages of menu controls field. Press the key again, it returns to the first page circularly if the current page is the last one.

### 5.4.5. Imaging Functions



#### **B mode Imaging Control**

Press this key to enter the B mode. The system displays a single real-time B mode image.

B indicates brightness, or two-dimensional (2D) gray scale imaging.

#### **NOTE:**

To return to a real-time B mode image from any imaging mode, press B control. This also deletes all measurements, calculations, comments, or body marks that are displayed on the screen.



#### **2B mode Imaging Control**

This key has two functions:

- ◆ Press this key to enter the 2B mode.
- ◆ Press this key to activate one of the dual images. The probe direction of the activated image is brighter than that of the frozen image.



#### **4B mode Imaging Control**

Press this key to enter the 4B mode. The system divides the image area into four quadrants: the first quadrant is on the top left, the second on the top right, the third on the bottom left, and the fourth on the bottom right.

Press it repeatedly to active one of the four images. The probe direction of the activated image is brighter than the direction of the frozen images. The four images are obtained separately and only one image at a time is displayed in real time.



**Color mode Imaging Control**

Follow the same procedure as described under B Mode to locate the anatomical area of interest. After optimizing the B mode image, press **Color**, move the scan area of interest as close to the center of the image as possible; Or after entering Color mode, press **PW** to display the sample line, and press **PW** again to enter triplex mode (B+Color+PW). Optimize the Color mode image parameters.

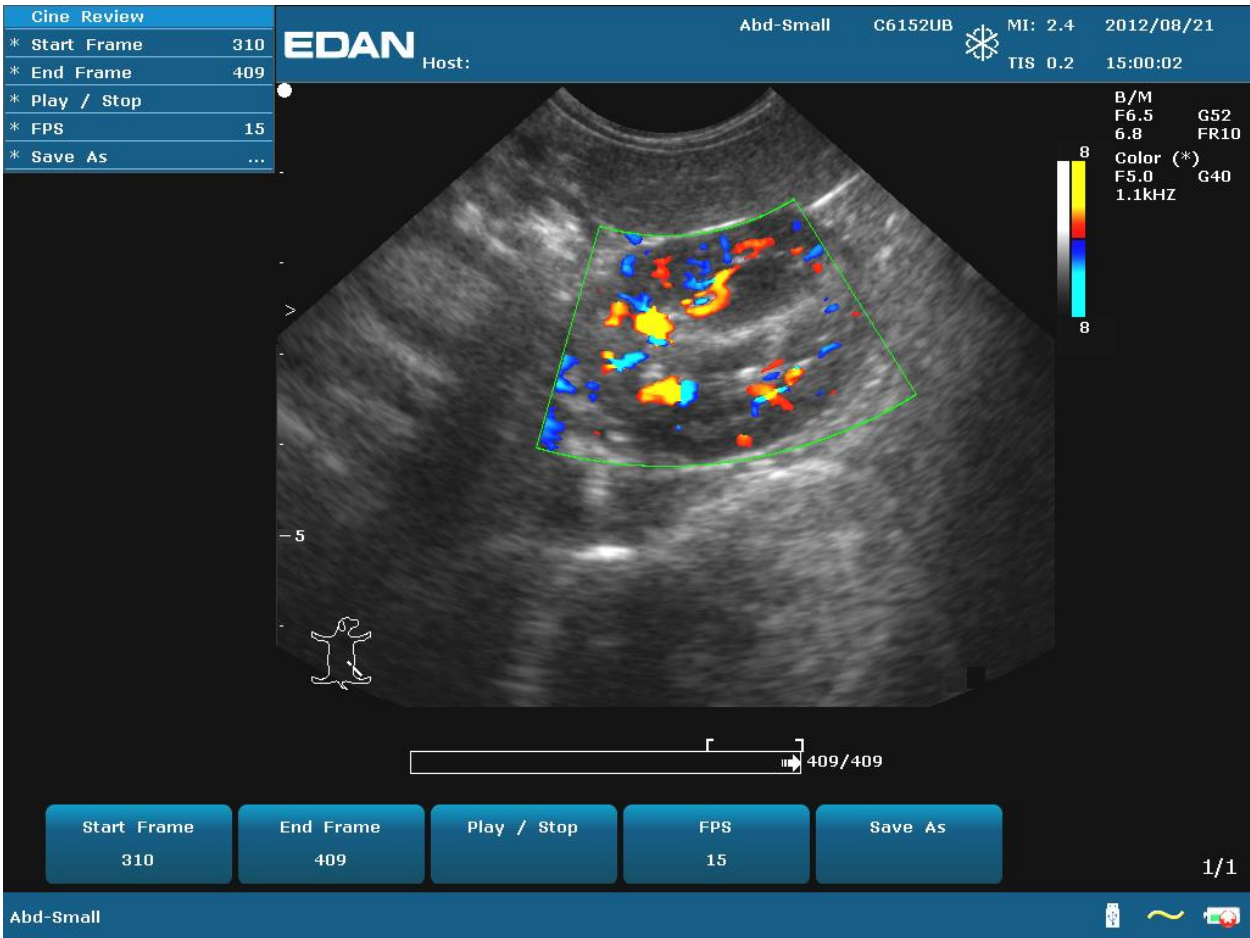




Figure 5-3 Example of B+Color Scan



**PDI mode Imaging Control**

Follow the same procedure as described under B Mode to locate the anatomical area of interest. After optimizing the B mode image, press **PDI**, move the scan area of interest as close to the center of the image as possible; Or after entering PDI mode, press **PW** to display the sample line, and press **PW** again to enter triplex mode (B+PDI+PW). Optimize the PDI mode image parameters; In PDI mode, rotate the **Map** menu control until the value is among 4-7, the system enters **Directional Power Doppler Imaging mode (DPDI)**.

Dual-split mode of B+Color/PDI:

- ✓ In dual-split mode of 2B, press **Color/PDI**, and then press  to enter dual-split mode of B+Color/PDI, the two windows are in B+Color/PDI mode.
- ✓ In single B+Color/PDI mode, press  to enter dual-split mode of B+Color/PDI, the two windows are in B+Color/PDI mode.
- ✓ In dual-split mode of B+Color/PDI, press **Color/PDI**, the currently active window exits color mode and enters 2B mode.



### **Pulsed-Wave Doppler mode Display Control**

In B mode, press this key to display the sample line, and press this key again to enter B+PW mode; in B+PW mode, press this key to exit PW mode and enter B mode.

A pulsed-wave Doppler (PW) scan produces a series of pulses used to study the motion of blood flow in a small region along a desired scan line, called the sample volume.

The X-axis of the graph represents time, and the Y-axis represents Doppler frequency shift. The shift in frequency between successive ultrasound pulses, caused mainly by moving red blood cells, can be converted into velocity and flow if an appropriate angle between the insonating beam and blood flow is known.

Shades of gray in the spectral display represent the strength of the signal. The thickness of the spectral signal is indicative of laminar or turbulent flow (laminar flow typically shows a narrow band of blood flow information).

Pulsed-Wave Doppler mode and B mode are shown together in a mixed mode display. This combination lets you monitor the exact location of the sample volume on the B image in the B Image Display window, while acquiring Pulsed-Wave Doppler data in the Time Series window.

### **Operations:**

In the B scan, the long line lets you adjust the sample line position, the two parallel lines (that look like =) let you adjust the sample volume (SV) size and depth, and the line that crosses them lets you adjust the correction angle (PW angle).

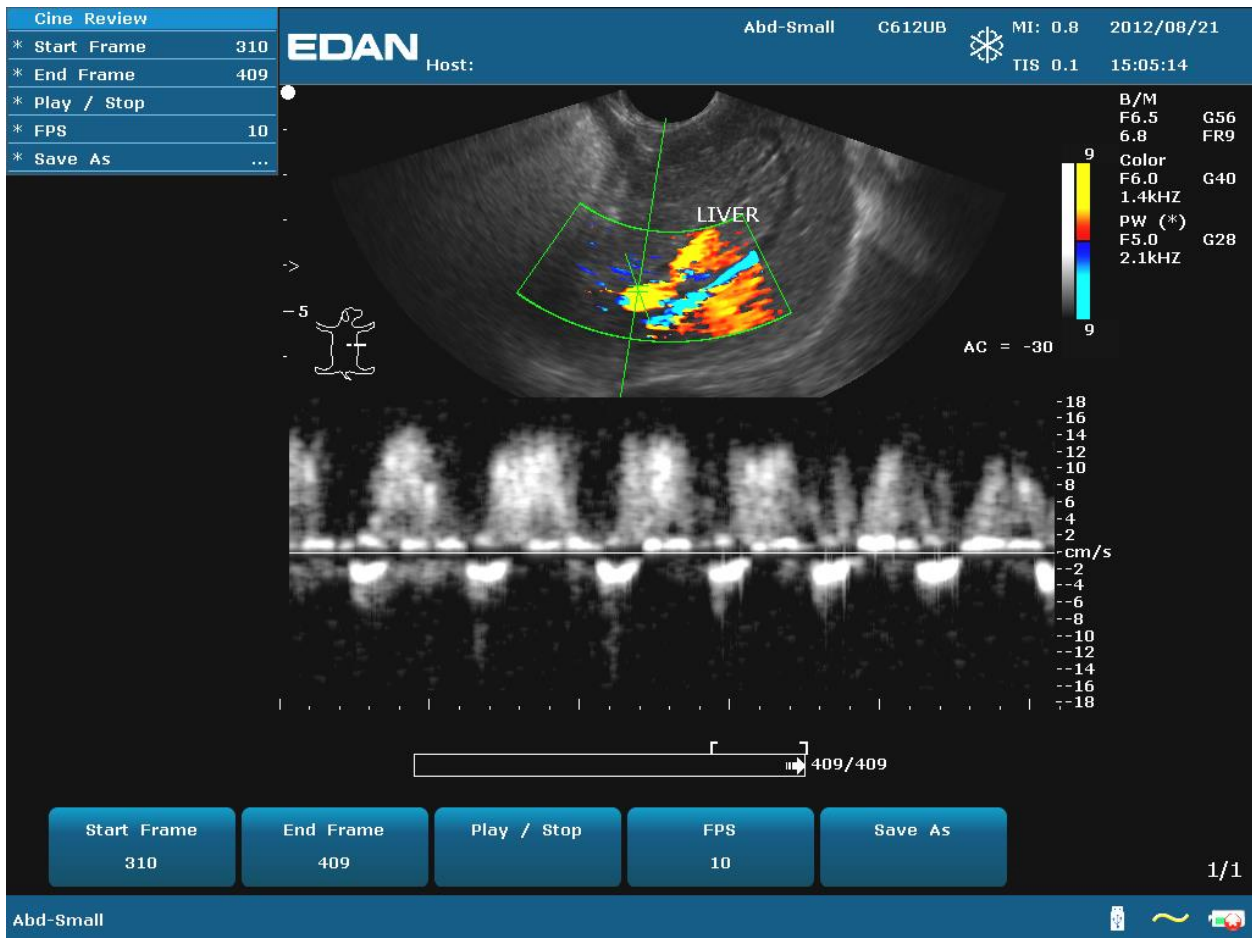


Figure 5-4 Example of B+Color+PW Scan

In B+PW mode, you can choose scanning in synchronized or unsynchronized mode by pressing **Duplex/Triplex** menu control: in unsynchronized mode, the active mode is PW; while, in synchronized mode, the B and PW mode are both active. When you are scanning in unsynchronized mode either the B or the time series window receives data. This lets you independently change the PW PRF. When scanning in simultaneous mode, both the 2D and the time series window receive data. This feature lets you define which method is used, based on the exam type.

The sample volume indicator allows you to start a scan in a B scan mode, set the sample volume, and switch to Doppler mode. The sample volume locks in position.

Switch between the frozen PW and real-time PW images

- ✓ After entering B+PW, or B+Color/PDI+PW mode, the B or B+Color/PDI image is frozen by default, and PW image is active.
- ✓ After entering B+PW, or B+Color/PDI+PW mode, in unsynchronized mode, press **Update** to switch between the frozen and real-time PW images. When PW image is frozen, move the trackball to adjust the sample line, rotate the menu controls to adjust the sample volume, and the correction angle, etc. Then press **Update** to switch to real-time PW images.

- ✓ After entering B+PW, or B+Color/PDI+PW mode, in unsynchronized mode, roll the trackball to move the sample line and sample area, the B or B+Color/PDI image is active, and PW image is frozen; when the trackball stops moving, the B or B+Color/PDI image is frozen, and PW image is active.

To enter PW mode:

1. Press **B** to enter B mode and adjust all image control settings appropriate for the current exam.
2. Place the cursor inside the vessel of interest.
3. Press **PW** to display sample line, move the trackball to adjust the sample line, rotate the menu controls to adjust the sample volume, and the correction angle, etc.
4. Press **PW** again to enter B+PW mode. The system locks the sample volume indicator and adds the Time Series window.

Or, you can scan in PW mode as follows:

1. Press **B** to enter B mode, after optimizing the B mode image, press user defined keys F1/F2/F3/F4(if the button is defined as “display or hide the sample line”is system preset ) on PC keyboard to display the sample line;
2. Move the trackball to adjust the sample line, place the sample gate inside the vessel of interest. Rotate the menu controls to adjust the sample volume, and the correction angle, etc.
3. Press **PW** to enter B+PW mode.

HPRF Mode:

HPRF (High Pulse Repetition Frequency) is a special operating mode of PW Doppler. You can activate the HPRF mode when detected velocities exceed the processing capabilities of the currently selected PW Doppler scale or when the selected anatomical site is too deep for the selected PW Doppler scale.

In order to detect the higher velocities in HPRF, the system changes the PW processing in a way that makes it ambiguous as to the location of the PW sample volume. In order to allow for proper interrogation of the target anatomy, the system will display additional sample volumes (also known as virtual gates) along the sample line. These additional sample volumes are annotated as an = sign, but without the angle correction line. The displayed Doppler signal will have information from all sample volumes included. To avoid having unexpected data included in the Doppler trace, use B or C mode to ensure that the virtual gates do not coincide with locations of potential flow.



**NOTE:**

1. The HPRF mode is possible with C5-2b, P5-1b and L15-7b probes only.
2. The HPRF mode can be activated only in real-time mode.
3. The HPRF mode is available according to the following table. At each sample volume depth, HPRF will first occur at the scale range and PRF listed. Other higher PRFs and ranges are available upto the highest listing in the table (e.g. for the C5-2b, at 270mm PRFs 9-12 would be available).

Depth (mm)	C5-2b	P5-1b	L15-7b
70			160 cm/sec PRF=15
80			160 cm/sec PRF=15
90			100 cm/sec PRF=14 160 cm/sec PRF=15
100			100 cm/sec PRF=14
150			N/A (Depth can only reach 100mm)
160	200 cm/sec PRF=12	200 cm/sec PRF=12	N/A
170	160 cm/sec PRF=11	160 cm/sec PRF=11	N/A
180	160 cm/sec PRF=11	160 cm/sec PRF=11	N/A
190	160 cm/sec PRF=11	160 cm/sec PRF=11	N/A
200	160 cm/sec PRF=11	140 cm/sec PRF=10	N/A
210	140 cm/sec PRF=10	140 cm/sec PRF=10	N/A
220	140 cm/sec PRF=10	120 cm/sec PRF=9	N/A
230	120 cm/sec PRF=9	120 cm/sec PRF=9	N/A
240	120 cm/sec PRF=9	120 cm/sec PRF=9	N/A
250	120 cm/sec PRF=9	120 cm/sec PRF=9	N/A
260	120 cm/sec PRF=9	100 cm/sec PRF=8	N/A
270	120 cm/sec PRF=9	100 cm/sec PRF=8	N/A
280	120 cm/sec PRF=9	100 cm/sec PRF=8	N/A
290	100 cm/sec PRF=8	100 cm/sec PRF=8	N/A
300	100 cm/sec PRF=8	100 cm/sec PRF=8	N/A



### **CW mode Display Control**

To enter CW mode:

1. In B or B+Color/ PDI/ DPDI mode, adjust image parameters;
2. Press **CW** to display sample line, move the trackball left or right to position the sample line in the region of interest, move the trackball up or down to adjust the depth of focus;
3. Press **CW** again to enter B+CW or B+Color/ PDI/ DPDI+PW mode, optimize the imaging with the menu controls. You can move the trackball to reposition the sample line, the B or B+Color/ PDI/ DPDI image is active and CW image is frozen; when the sample line is fixed, the B or B+Color/ PDI/ DPDI image is frozen, and CW image is active.

#### **NOTE:**

The CW mode only works with P5-1b probe.



### **M mode Display Control**

Press it to enter the B+M mode, the B mode and the M mode images are displayed on the screen at the same time (Abbreviated as B+M). A line called M Mark is displayed on B mode image. Roll the trackball to move the M Mark. Press **Set** to locate the M Mark.

Or, you can press user defined keys F1/F2/F3/F4(if the button is defined as “display or hide the sample line”is system preset ) on PC keyboard to display the M Mark, roll the trackball to move the M Mark, and press **M** to enter B+M mode. Move the trackball to move the M Mark again, and then press **Set** to locate the M Mark. Or, press **Cursor** to activate the M Mark again.

Press this key again to enter the single M mode. It displays an M mode sweep. The slope of this mode has four levels.

## **5.5. Menu**

Menus are displayed on the left of the screen. Only one menu can be activated at a time. The types are shown as follows:

#### **Imaging menu:**

In imaging menu provides information about the current imaging mode. In 2B and 4B modes, it indicates the status and parameters of the active image. In B+M mode, it indicates the status and parameters of M sweep. In the PW mode, it indicates the status and parameters of Doppler wave and 2D image. Following is the imaging menu of B mode.

B Mode Menu	
* Image Type	Detail
* eSRI	1
* Dyn Rng	110
* Freq	3
* Pseudo Color	0
* Spatial Comp	On
Focus Pos	8
Focus Num	1
Frame Persist	1
Gray Map	13
Rejection	0
ScanAngle	2
H Reverse	Off
V Reverse	Off

Figure 5-5 B Mode Imaging Menu

**Measurement and calculation menu:**

Perform an operation. For instance, begin a distance measurement, and then the measurement cursor is displayed.

The following are generic and application measurement and calculation menus.

B MEAS	
* Distance	
* Cir/Area	▶
* Volume	▶
* Ratio	
* % Stenosis	▶
* Angle	
Histogram	

Figure 5-6 B Mode Generic Measurement and Calculation Menu

OB MEAS CAN	
CRL	
GSD	
HD	
BD	
HD&BD	

Figure 5-7 OB Canine Measurement and Calculation Menu in B mode

**Submenu:**

The symbol “▶” indicates that there is a submenu associated with the menu option. Roll the trackball to highlight the menu option with “▶”, the system displays a submenu for the selected option.

Example: The submenu of **Cir/Area** contains **Ellipse** and **Trace**, shown as below.

After entering B mode, press **Caliper** to display the menu below, and highlight the option **Cir/Area**, the system will display the submenu **Ellipse** and **Trace**.



Figure 5-8 Submenu

**Other menus:**

Including preset menu, cine review menu, file menu, and needle guide menu.

### 5.6. Dialog Box Operation

The dialog box may have a few tabs, as shown below. You can select one tab at a time with trackball and **Set**. Also, you can modify the parameter following the prompt instruction, and then highlight **OK** and press **Set** to save the modified parameters and close the dialog box; or highlight **Cancel** to give up the modification and close the dialog box directly.

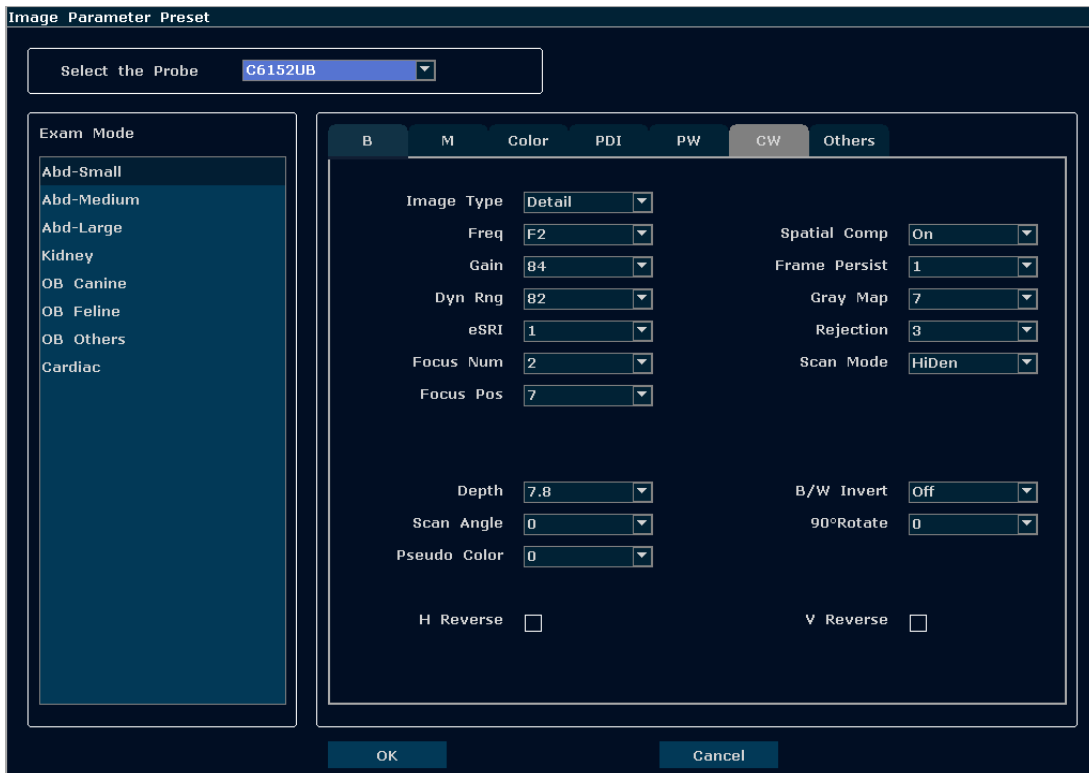


Figure 5-9 Image Parameter Preset Dialog Box

## 5.7. Presetting

### 5.7.1. Entering Presetting

Press **Set up**, and the system displays the preset menu, as shown below.

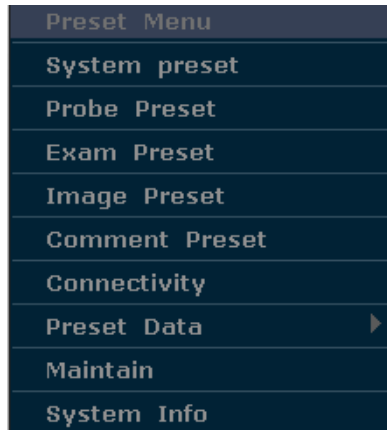


Figure 5-10 Preset Menu

### 5.7.2. Displaying / Modifying Presetting Parameters

Select a type of preset and press **Set** to display the relevant dialog box, and you can modify the parameter following the prompt instruction.



Reference Section 5.6 Dialog Box Operation.

### 5.7.3. System Preset

1. In preset menu, move the cursor to highlight **System preset** and press **Set** to display **System preset** dialog box, as shown below.
2. Roll the trackball to highlight an item and then press **Set**. Then use the keyboard to enter text.

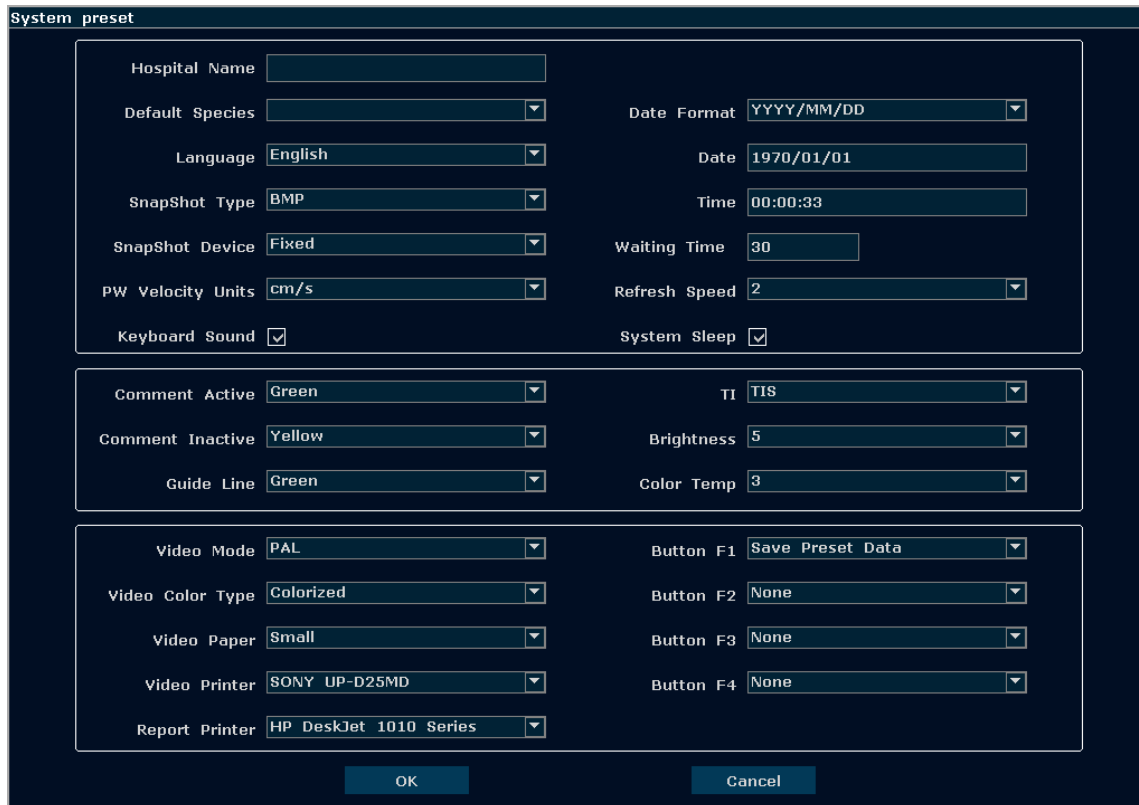


Figure 5-11 System Preset Dialog Box

Preset items	Options	Functions
Hospital Name	Input freely	Set hospital name displayed on the top left of the screen and diagnosis report.
Default Species	Canine, Feline, Equine, Bovine, Ovine, Porcine, and Others	Set the default species
Language	Chinese, English, etc.(The language options vary with language software installed.)	Set the system language
SnapShot Type	BMP/JPG/FRM/DCM (if DICOM is installed)	Set the storage file format type of snap shot.
SnapShot Device	Fixed(Local disk) or USB disk (A:\, B:\)	Set the storage device of snap shot.
PW Velocity Units	cm/s, kHz	Set the velocity units of PW spectrum
System Sleep	√/ Null	Select whether the device enters sleep mode when no operation is performed for certain minutes.
Keyboard Sound	√/ Null	Turn on or off the keyboard sound.
Date Format	Set freely	YYYY/MM/DD, MM/DD/YYY or DD/MM/YYYY.
Date	Set freely	Set the system date.
Time	Set freely	Set the system time, format: H/M/S.

Waiting time	5-60 min	Set the system waiting time to enter sleep mode (5-60 min), then screensaver is displayed and acoustic output is disabled.
Refresh Speed	1-10	Set the grade of refresh speed during system dormancy.
Comment Active	Green/ Yellow/ White/ Red/ Orange	Set the color of the comment when entering comments.
Comment Inactive	Green/ Yellow/ White/ Red/ Orange	Set the color of the comment when comments are already saved.
Guide Line	Green/ Yellow/ White/ Red/ Orange	Set the color of the needle guide line.
TI	TIS/TIB	Select the types of thermal index.
Brightness	0-14	Set the brightness of monitor
Color Temp	0-3	Set the tones of monitor color
Video Mode	PAL/NTSC	Set the output video mode
Video Color Type	Colorized/ Monochrome	Set the output video color
Video Paper	Small/Large	Set the video printer paper size.
Button F1/F2/F3/F4	None, Save Frame, Save Cine, Save AVI, File Manager, Send DCM Image (If DICOM is installed), Send Cine Images(If DICOM is installed), Save Preset Data(F1 by default), Needle guide, Show/Hide menu, Sample line	Define the F1/F2/F3/F4 keys, select one of the pull-down options.
Video Printer	SONY_UP-D25MD SONY_UP-DX898MD	Select the same video printer as that you connect with the system via the USB cable.
Report printer	HP Deskjet 1010 Series, HP DeskJet 1110 Series, HP Deskjet 1510 Series, HP Deskjet 2050 J510 Series, HP Laserjet Pro 400 M401, HP Laserjet M402n M403n, etc	Select the same report printer as that you connect with the system, or select the report printer series that your printer belongs to. Note: The software supports all the report printers in the report printer list, but only the report printers recommended in Section 3.2.2 are tested. It is suggested to only use the recommended printers.

Table 5-3 System Preset Information

You must restart the system to validate the change, including **Language** and **Keyboard Sound**. After you perform those presetting, and press **OK**, the system displays a confirm dialog box to prompt you whether to restart the system.

### 5.7.4. Probe Preset

In preset menu, move the cursor to highlight **Probe Preset** and press **Set** to display **Probe preset** dialog box, as shown below.

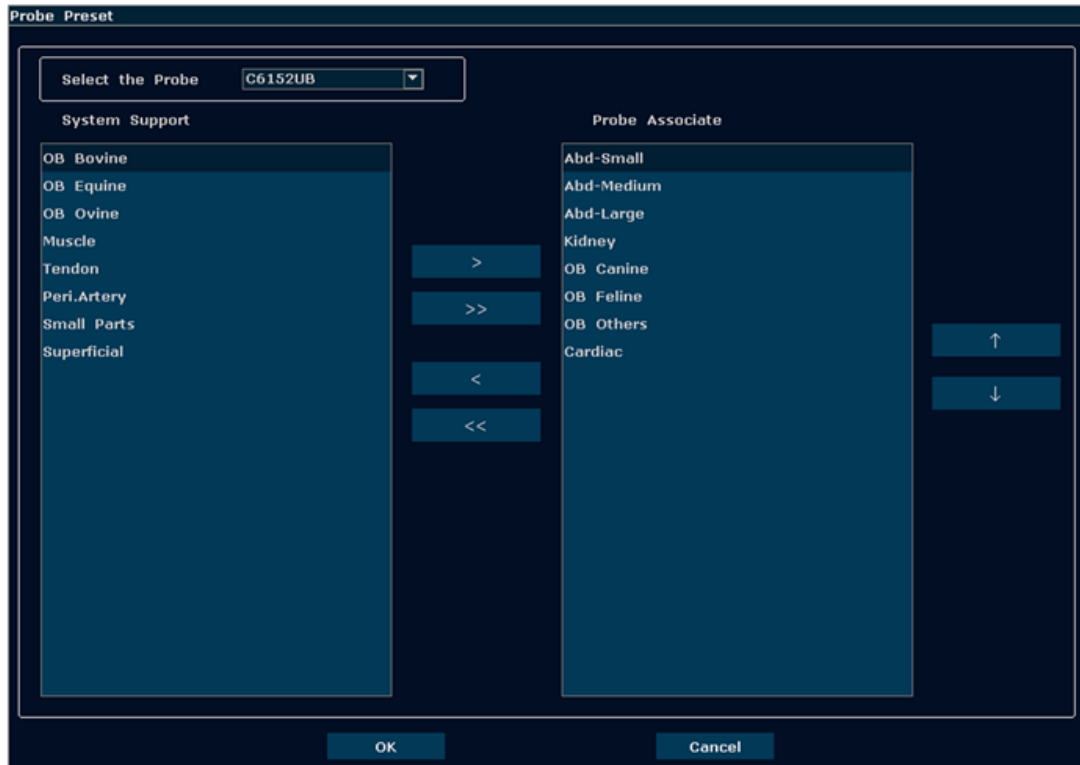

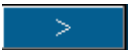









Figure 5-12 Probe Preset Dialog Box

The **Probe preset** dialog box displays probe selection and Exam mode selection. This page is used to assign an exam type to a specific probe.

Operation:

1. Select a desired probe: move the cursor onto the column “”, and select the probe model you need through the pull-down menu.
2. Select exam mode for the probe: the left side is the “System Support”, which lists all exam modes supported by the system. The right side is the “Probe Associate”, which lists exam modes already associated with the probe. To add an exam associated with the probe, select the exam from the left and click on . To add all of the different exams from the left to the right, click on . To delete an exam associated with the probe, select the exam first, and then click on . To delete all exams associated with the probe, click on .



3. Arrange the sequence of the associated exams: after the exams associated with the probe are set, you can select an exam, and click on  or  to adjust the sequence of it gradually.
4. Click on  to confirm the modification, or click on  to give up.

### 5.7.5.Exam Preset

Exam Preset is used to add exam mode, and set the application associated with the probe. Application types include abdomen, obstetric, gynecology, pediatric, small parts, urology, peripheral vascular, musculoskeletal, and cardiac.



Figure 5-13 Exam Preset Dialog Box

#### Operations:

- To get a copy of the existing exam: Select a desired exam mode, and click on **Copy**. For example, select the exam “**Peri. Artery**”, and press **Copy** to get “**C Peri. Artery**”, a copy of the exam “**Peri. Artery**”. To rename the “**C Peri. Artery**” exam, click on **Rename**.
- To delete an exam: Select a desired exam mode, click on **Delete**, the system displays a prompt “**Delete the exam?**” Click on **Yes** to delete the exam, or click on **No** to exit.
- To add an exam: Press **Add** to display the **Add new Exam Mode** dialog box, as shown below. Input an exam name in the “Exam name” blank, select an application for the exam upon you needs, and press **OK** to close the dialog box, and then the new exam mode will be displayed in the **Exam Preset** dialog box.

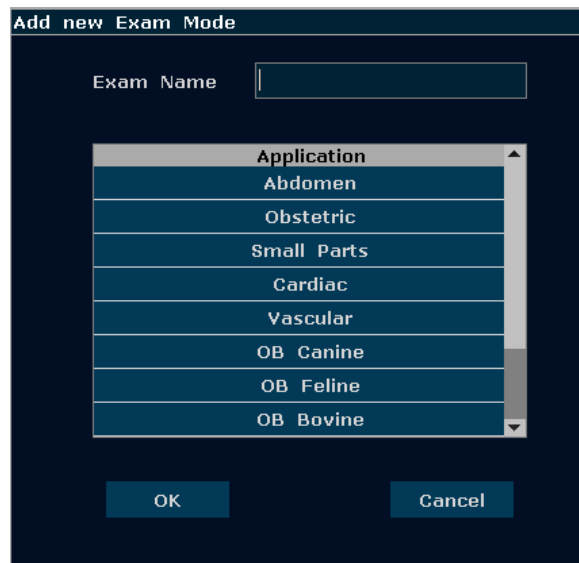


Figure 5-14 Add new Exam Mode Dialog Box

**NOTE:**

The default exam modes can not be deleted or renamed.

- To configure relevant parameters for the newly added exam mode, such as probes, or image parameters, press **Probe Preset** or **Image Preset** on preset menu.

### 5.7.6. Image Parameter Preset

**Image parameter preset:**

Press **Set up>Image Preset**, and select **Image Preset** in the submenu to open the **Image Parameter Preset** dialog box.

Image parameter preset is used to set image parameters for a specific probe in a specific exam mode. Parameters for each image mode are different, but the setting ways are similar. See the example below, the **Image Parameter Preset** dialog box for the probe C6152UB in B Mode, **Abd-Small** exam:

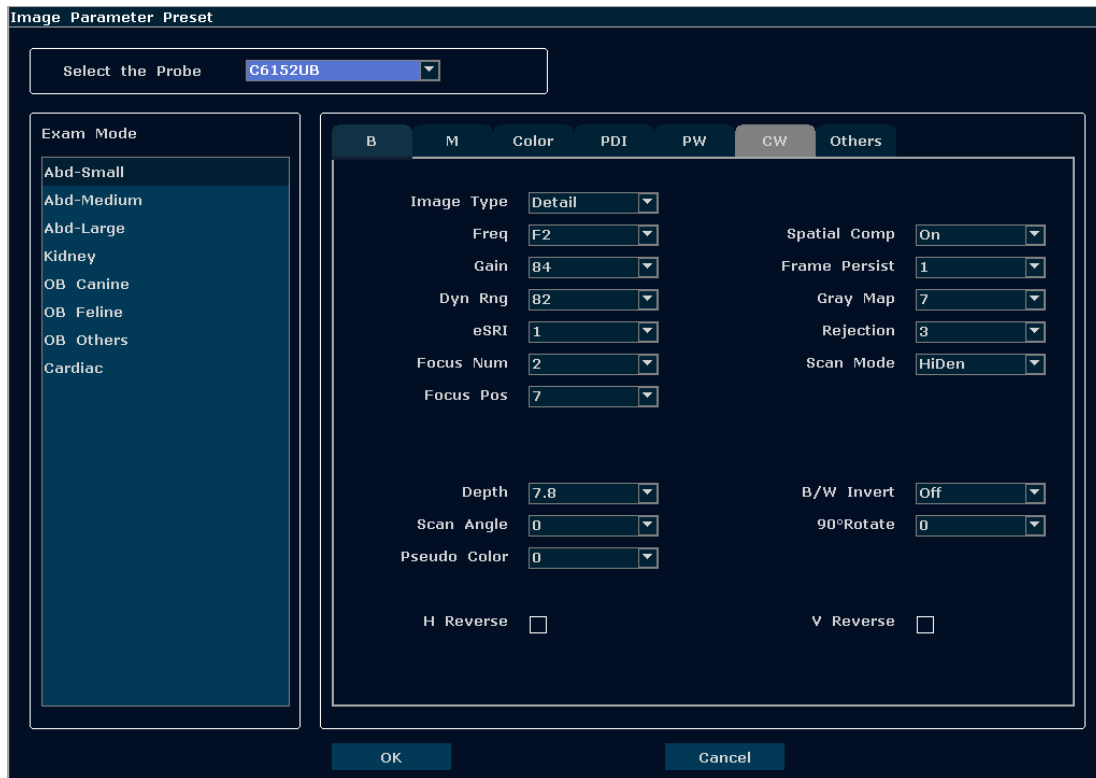


Figure 5-15 Image Parameter Preset Dialog Box

The Exam Mode field on the left side of the dialog box displays all exam modes supported by the probe. While the right side of the dialog box displays all parameter settings for the probe in different image modes.

Select probe C6152UB from the probe pull-down menu firstly. Move the trackball to highlight **Abd-Small** in the Exam Mode column and press **Set**, roll the trackball onto the **B** tab to enter B Mode image parameter presetting page for the probe C6152UB, **Abd-Small** exam. You can set the parameters by selecting an option from the pull-down menu, or ticking on the option.

Preset Items	Options	Functions
Image Type	Detail/ Soft/ HContrast/ Penetration	Set the default image type
Freq	F1/F2/F3/THI1/THI2 (5 levels of frequency)	Set the default frequency of probe, F1-THI2 represents five levels of frequencies
Gain	0-130	Set the default gain of B mode
Dyn Rng	30-150, in increments of 4	Set the default dynamic range of B mode
eSRI	0-8	Set the default eSRI (Speckle Resistance Imaging)
Focus Num	1/2/3/4	Set the default number of focuses.
Focus Pos	0-15	Set the default position of focuses
Spatial Comp	On/Off	Set if the spatial compounding is activated by default or not (This function is not available for probe P5-1b)
Frame Persist	0-7	Set the default factor of frame persist
Gray Map	0-14	Select the default post-processing gray curve map
Rejection	0-7	Set the default rejection

Scan Mode	HiDen/HiFPS	Set the default scan mode
Depth	1.9 cm-32.4 cm(C352UB)	Set the default examine depth
Scan Angle	0/1/2/3	Set the default scan angle
Pseudo Color	0-6	Set the default colorization colors
B/W Invert	On/Off	Set if the image is B/W inverted by default
90° Rotate	0/1/2/3	Set the default display direction of image
H Reverse	√/×	Set if image is inverted horizontally by default or not
V Reverse	√/×	Set if image is inverted vertically by default or not
Line Average	0-7	Set the default line average of M mode
Sweep Speed	0-3	Set the default sweeping speed of M mode
B/M Display	U/D, L/R	Set the default display layout of dual-split mode B+M: Up/Down, Left/Right.

Table 5-4 B/M Mode Image Parameter Preset Information

Preset Items	Options	Functions
Flow Type	H Flow /M Flow/ L Flow	Set the default flow type (high/ medium/ low speed)
Freq	F1/F2	Set the default frequency of probe in color mode
Gain	1-80	Set the default gain of Color mode
PRF	0-15	Set the default PRF of Color mode
WallFilter	0-7	Set the default wallfilter of Color mode
Packet Size	4 levels, 8,10,12,14	Set the default packet size
Smooth filter	0-7	Set the default smooth filter
Persist	0-7	Set the default persist
Threshold	0-15	Set the default threshold
ROI Depth	Options for this parameter depend on the depth range of each probe.	Set the default ROI depth of Color Mode
ROI Size	Small/Middle/Large	Set the default size of ROI of Color Mode
ROI Color	Yellow/Green	Set the default frame boundary color of ROI
Base Line	0~6	Set the default position of base line
Map	In Color mode:0-7 In PDI mode: 0-3 (PDI) 4-7 (DPDI)	Set the default map displayed in Color/PDI mode

Table 5-5 Color/PDI Mode Image Parameter Preset Information

Preset Items	Options	Functions
Flow Type	H Flow /M Flow/ L Flow	Set the default flow type (high/ medium/ low speed)
Freq	F1/F2	Set the default frequency of probe in PW mode
Gain	1-80, in increments of 1	Set the default gain of PW image
PRF	0-15, 0.9kHz-14.7kHz	Set the default PRF in PW mode
WallFilter	0-3	Set the default wallfilter in PW mode
Dyn Rng	30-90, in increments of 2	Set the default dynamic range of PW mode
Sample Volume	0.5-20.0	Set the default size of the sample volume

SV Depth	Options for this parameter depend on the depth range of each probe.	Set the default depth of sample volume
Pseudo Color	0-6	Set the default colorization colors
Correction Angle	-79°-79°	Set the default correction angle
Sweep Speed	0-5	Set the default sweeping speed
Base Line	0-6	Set the default position of base line
Sound Volume	0-7	Set the default volume of Doppler
Steer	-10°、 0°、 10°	Set the steering angle of the sample line (for linear array probes)
Duplex/Triplex	√/×	Set whether to scan in duplex/triplex mode by default or not
Invert	√/×	Set the default direction of PW spectrum (above/ below the base line)
HPRF	√/×	Set whether to turn on the HPRF mode by default or not (this mode only works with C5-2b, P5-1b and L15-7b probes)

Table 5-6 PW Mode Image Parameter Preset Information

Preset Items	Options	Functions
Flow Type	H Flow /M Flow/ L Flow	Set the default flow type (high/ medium/ low speed)
Gain	1-80, in increments of 1	Set the default gain of CW image
Dyn Rng	30-90, in increments of 2	Set the default dynamic range of CW mode
PRF	0-31, 0.8kHz-80kHz	Set the default measurable range of flow velocity
WallFilter	0-3	Set the default wallfilter in CW mode
Pseudo Color	0-6	Set the default colorization colors
Correction Angle	-79°-79°	Set the default correction angle
Sweep Speed	0-5	Set the default sweeping speed
Base Line	0-6	Set the default position of base line
Sound Volume	0-7	Set the default volume of Doppler
Invert	√/×	Set the default direction of CW spectrum (above/ below the base line)

Table 5-7 CW Mode Image Parameter Preset Information

**To set a default exam mode for a probe:**

1. Select a probe and an exam mode in the **Image Parameter Preset** dialog box.
2. Roll the trackball onto the “**Others**” tab and press **Set**.
3. Select a default exam mode from the **Default Image Mode** pull-down menu.
4. Click on **OK**, a hint of “Are you sure you want to permanently save changes” pops out, click **Yes** to confirm the setting, or click on **Cancel** to exit.

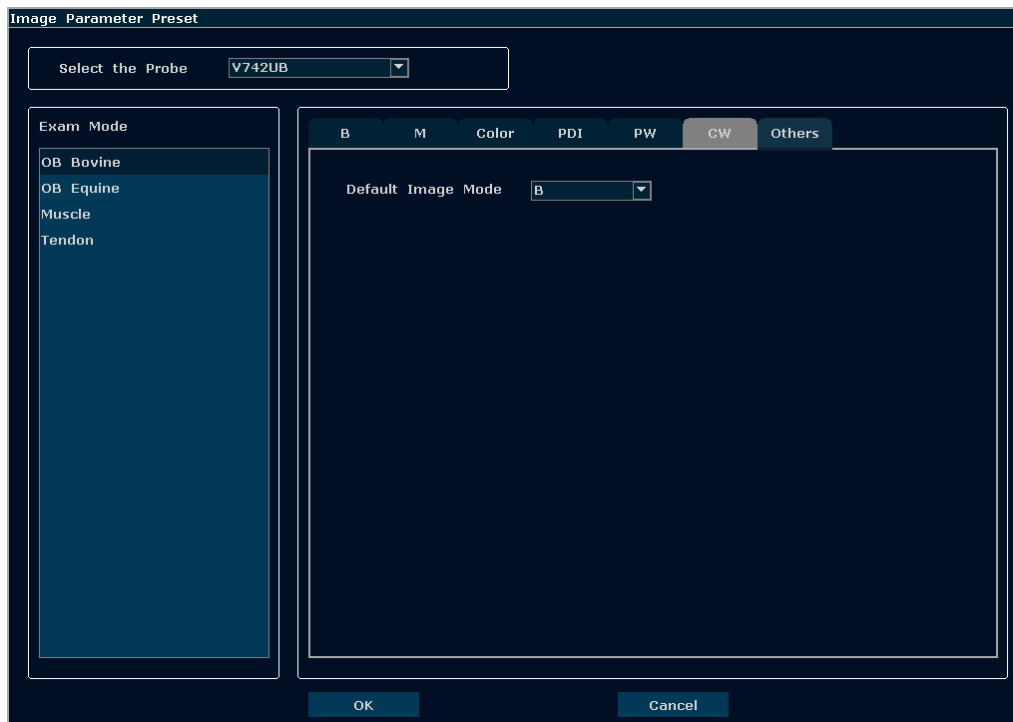


Figure 5-16 Default Image Mode Preset Dialog Box

### 5.7.7. Comment Preset

There are eight tabs of comment library: generic, abdomen 1, abdomen 2, obstetric, cardiac, small parts, lesion 1 and lesion 2. Each tab has a few sets of comments defined at factory, and you can create up to 16 user-defined comments for each tab by using the **Add** button, you can also modify or delete the user-defined comments.

#### Operations:

1. Press **Set up** on the keyboard to activate the presetting function.
2. Roll the trackball to highlight **Comment Preset** and then press **Set**. Then the **Comment Preset** dialog box is displayed, as shown below:

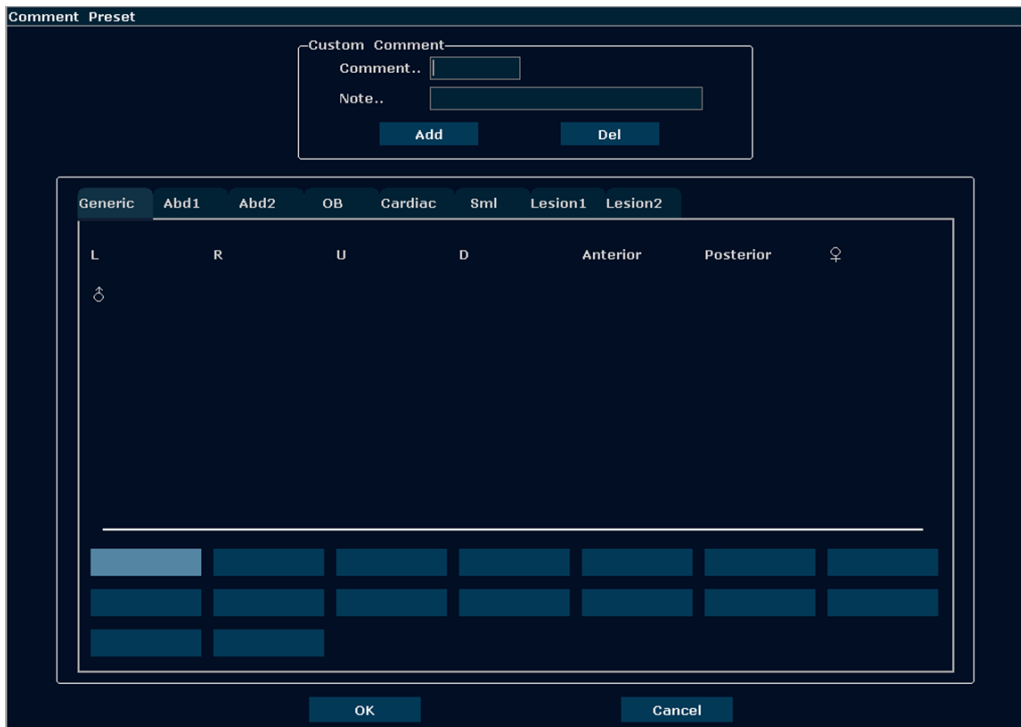


Figure 5-17 Comment Preset Dialog Box

To create user-defined comments (take **Generic** tab for instance):

1. Press **Generic** tab to open the **Generic** comment library.
2. Roll the trackball to the Comment editable filed in the Custom Comment box, and press **Set**. Then the cursor turns to “|”, as shown below. You can enter comment with the keyboard.

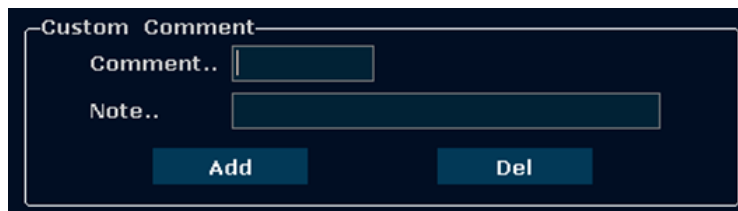


Figure 5-18 Custom Comment Library

3. Roll the trackball to the Note editable field in the Custom Comment box, and press **Set**. Then the cursor turns to “|”, as shown below. You can enter some detailed help information about the newly created comment with the keyboard.

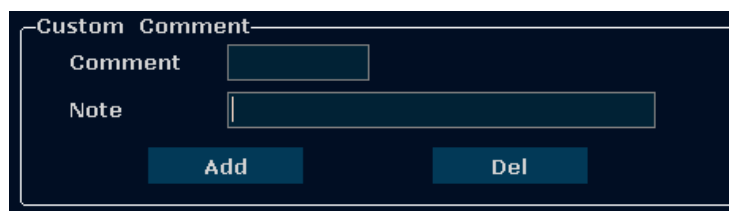


Figure 5-19 Custom Detailed Information of Comment Library

4. Roll the trackball to highlight **Add** to add the newly created comment to one of the custom comments of **Generic**. All the added user-defined comments are displayed below the System-defined Comment Library.
5. Press **OK** to save the modification, or press **Cancel** to give up and close the dialog box.

To modify user-defined comments (take **Generic** tab for instance):

1. Press **Generic** to open the **Generic** comment library.
2. Roll the trackball to highlight a user-defined comment, and press **Set**.
3. Roll the trackball to the Comment or Note editable filed in the Custom Comment box, and press **Set**. Then the cursor turns to "I", modify the name or detailed help information of the user-defined comment with the keyboard.
4. Press **OK** to save the modification, or press **Cancel** to give up and close the dialog box.

To delete user-defined comments (take **Generic** tab for instance):

1. Press **Generic** to open the **Generic** comment library.
2. Roll the trackball to highlight a user-defined comment, and press **Set**.
3. Press **Del** to delete the comment.
4. Press **OK** to save the modification, or press **Cancel** to give up and close the dialog box.

### 5.7.8. Preset Data

Press **Set up**, roll the trackball to highlight **Preset Data**, and you can view three options in Preset Data submenu: **Import**, **Export** and **Factory Default**.

#### ➤ To Export Preset Data

This function is used to save all user preset data to an USB disk for back-up.

Roll the trackball to highlight **Export** and press **Set**. The system displays a dialog "Import/export will cover the files that have the same file names! Contiunes? ". Click "OK" to continue. The preset data named "Settings" will be exported to the U50 folder in the USB disk.

#### ➤ To Import Preset Data

This function is used to import the existing preset data to the system. The system will be reset and operate according to the newly imported preset data.

Roll the trackball to highlight **Import** and press **Set**. The system displays a dialog "Preset data exists, replace it?". Click "OK" to continue. The preset data file should be named as "Settings" and put under the U50 folder of the USB disk.



**WARNING**

Be careful, if you confirm to import existing preset data, all of the previous preset will be cleared, and the system will operate according to the newly imported preset data.

➤ To Restore Factory Default Presetting

Roll the trackball to highlight **Factory Default** and press **Set**. The system will restore the factory presetting.

**WARNING**

Be careful, if you confirm to restore factory default presetting, all of the previous preset will be cleared, and the system will restore preset data at factory.

**5.7.9. Connectivity**

Press **Set up**, roll the trackball to highlight **Connectivity**, and press **Set**. Then the **Connectivity** dialog box is displayed, as shown below.

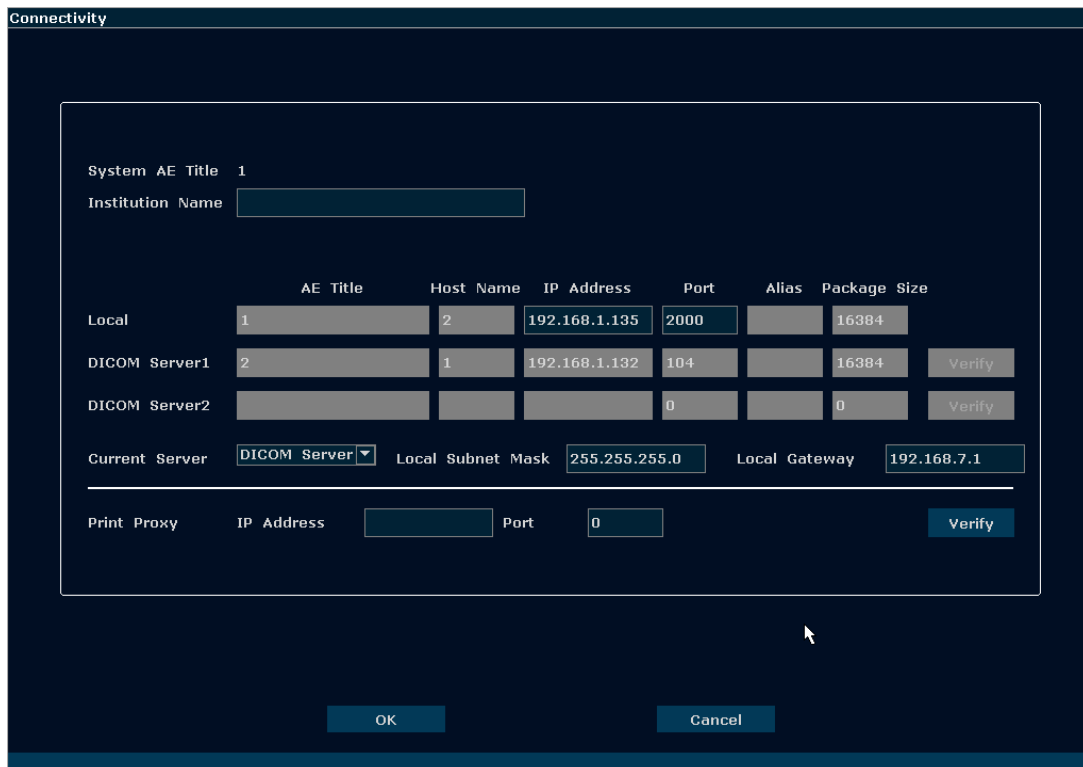


Figure 5-20 Connectivity Preset

Item	Description	
System AE Title	The same as the title set in the <b>AE Title</b> of <b>Local</b>	
Institution Name	Set the name of the institution	
Local	AE Title	Set the local AE title
	Host Name	Set the local host name

	IP Address	Set the local IP address
	Port	Set the local port
	Alias	Set the alias of the local system
	Package Size	Set the PDU transmission package size, from 4K to 64K, and the default value is <b>16K</b> .
Server 1/2	AE Title	Set the server AE title, the same as the <b>System AE Title</b> displays
	Host Name	Set the server host name
	IP Address	Set the server IP address
	Port	Set the server port
	Alias	Set the alias of the server
	Package Size	Set the PDU receiving package size, from 4K to 64K, and the default value is <b>16K</b> .
Verify	After presetting the server information, press <b>Verify</b> to verify the server's connection.	
Current Server	To choose the current server that is connected to the system.	
Local Subnet Mask	Set the local subnet mask	
Local Gateway	Set the local gateway	
Print Proxy	IP Address	Input the IP address as shown on the print proxy app installed on PC.
	Port	Input the port number as shown on the print proxy app installed on PC.
	Verify	Verify the connection with the print proxy app installed on PC.

Table 5-8 Connectivity Presetting Information

Press **OK** to save the presetting and exit, or **Cancel** to exit without saving the presetting.

**NOTE:**

1. Do not set a same IP Address for the local system and the server.
2. Ensure that you have turned on the server before verifying it.
3. The DICOM service is only available when the system is installed with DICOM software.

### 5.7.10. Maintenance

The maintenance can be only done by EDAN authorized personnel. Operations such as installing DICOM and upgrading software can be accessed on the maintenance menu.

### 5.7.11. System Information

In the preset menu, move the cursor to highlight **System Info** and press **Set** to display System information interface.

## 5.8. Printing

### To connect a video printer:

1. Connect a video printer. Refer to [4.3.5 Printer Installation](#) for details.
2. Check the printer, referring to the printer user manual.
3. If the video printer is connected via an USB cable, make sure the **Video Printer** option in the **System Preset** window is set correctly.
4. Run the printer.

### Video printing:

Press **Print** on the keyboard to print the image currently displayed.

### To connect a graph/text report printer:

1. Connect a graph/text report printer. Refer to [4.3.5 Printer Installation](#) for details.
2. Check the printer, referring to the printer user manual.
3. Check the **Report Printer** in **System Preset**.
4. Enter the desired worksheet to edit the examination and diagnosis information.
5. Run the printer.

### Graph/text report printing:

Press **Print** in the worksheet dialog box to print the report.

### Print area:

The print area includes: information field, image field, parameter field, and measurement results field.

### NOTE:

1. When using a monochrome printer, preset the video color to “monochrome” through **System Preset**; When using a color printer, EDAN recommends you to preset the video color to “Colorized”, but “monochrome” is also workable.
2. Before printing, make sure there is enough paper for printing.
3. Before printing, make sure the presetting printer type is correct.
4. Before printing, make sure the printer power cord and the USB cable are connected well.
5. Do not cut off the printer power supply or the USB cable during printing.
6. If the printer can not work normally, please restart the printer and the U60 VET.

**To use the print proxy function for graph/text report printing:**

The print proxy function allows you to connect the ultrasound system with a PC, and then all the graph/text report printing work can be done by the graph/text printers connected to the PC, which provides you wide choices of printers for graph/text report printing.

1. Install the print proxy app "Print Proxy\_Server" on a PC.
2. Connect the ultrasound system with the PC with a network cable.
3. Open the "Print Proxy\_Server" app on the PC, which will display you an IP address and a port number.
4. Press **Set up** and open the **Connectivity** page.
5. Input the IP address and port number displayed on the "Print Proxy\_Server" app at the **Print Proxy** field. Then make sure the local IP of the ultrasound system and the IP of PC are in the same network segment.
6. Press **Verify** button to verify the connection between the ultrasound system and the PC.
7. Connect a graph/text printer you've got to the PC. Make sure that the PC has been installed with the driver of the printer you connect.
8. Open the worksheet dialog box after exam, and press **Print** to print the report.

**Note:**

1. PC referred here could be a personal computer, a laptop or a mini PC module.
2. The operating system of the PC should be WindowsXP, Windows 7, Windows 8 or Windows 10.

## Chapter 6 Operation

### 6.1. Entering or Editing Patient Information

#### NOTE:

Before a patient exam, **EndExam** should be pressed. Pressing **EndExam** will automatically erase all cache memory (Including patient data, comments, measurements, calculations and reports of the last exam, except for archived Images.)

#### **CAUTION**

To avoid patient information errors, always check the information with the patient. Make sure the correct patient information appears on all the screens and reports.

Press **Patient** to display the **Patient Data Input Dialog** box, as shown below:

The screenshot shows a dark-themed dialog box titled "Patient Data Input Dialog". At the bottom, it says "Enter Information of the patient". The dialog contains the following fields:

- Host: [text input]
- Name: [text input]
- Species: [dropdown menu]
- Neutered: [dropdown menu]
- Comment: [text input]
- ID: [text input]
- Sex: [dropdown menu]
- Age: [text input] [Year dropdown menu]
- Accession#: [text input]

At the bottom of the dialog are two buttons: "OK" and "Cancel".

Figure 6-1 Patient Data Input Dialog Box

To switch the input text box: press **Enter**;

To enter the patient information, use the keyboard;

To save patient information, select **OK** or press **Enter**.

To give up the modification, press **Cancel** to exit.

To modify the patient data, press **Patient** before the exam ends, and edit in the patient input dialog box.

### 6.2. Selecting a Probe and an Examination Type

Connect a probe to the system, and press **Transducer** to open a dialog box as shown in the figure below. Roll the trackball to select a desired exam type corresponding to the probe, such as abdomen, obstetrics, muscle, tendon, cardiology, and peripheral vascular. Press **OK**, or double

click on the exam type to confirm.

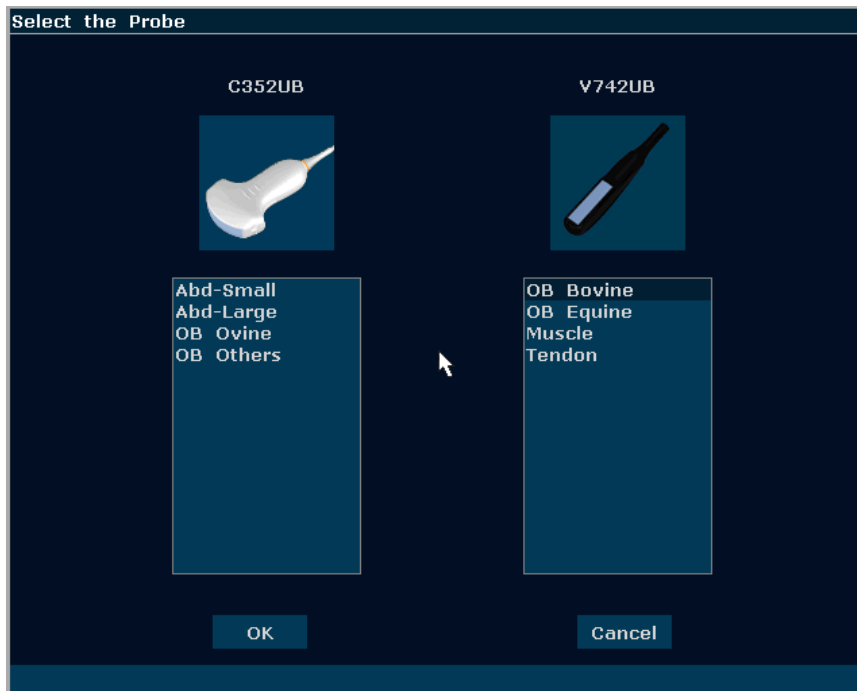



Figure 6-2 Probe and Examination Selection Menu

While multiple probes are connected to the ultrasound system, only one can be activated at a time. The model of the activated probe is displayed in the top right corner of the screen.

Press **Freeze** to activate or deactivate a probe. In frozen status, the “Freeze” icon  is displayed on the upper right part of the screen.









**NOTE:**

1. You can preset examination types for each probe in **Probe Preset**, see section [5.7.4 Probe Preset](#).
2. The maximum surface temperatures of probe L742UB and C6152UB is 42.4°C, in simulated operation.

The system limits patient contact temperature to 43°C, and the acoustic output below the maximum acoustic output limits for track 3.

### 6.3. Selecting an Imaging Mode

The system will display the default mode after it is powered on. You can select an imaging mode

by pressing , , , , , , , or  and then begin an examination.



Reference Section [5.4.5 Imaging Functions](#) and section [5.2Examining](#).

## 6.4. Image Adjustments

The U60 VET also provides the following additional control functions, which are available through status menus and Menu Controls panel.

Control Functions	Description	Parameter Range	Operations
Gain	Increases or decreases the amount of echo information. It may brighten or darken the B mode image.	0-130, in increments of 2	Gain Knob
Image Type	This function is used to optimize images quickly according to characteristics of current tissues. And values of associated parameters will be changed together with it.	Detail/Soft/ HContrast/ Penetration	Menu Controls
eSRI (Speckle Resistance Imaging)	Eliminates from the B mode image of low level echoes resulting from speckle noise. Thin image granules, enhance the image boundary layers, and reserve more details of the image.	0-8	
Dyn Rng (Dynamic Range)	Adjust the gray display range of B image. The smaller the value, the narrower gray display range and the lower contrast resolution, and vice versa.	30dB-150dB	
Focus Pos (Focus Position)	Adjust the position of focuses.	0-15	
Focus Num	Set the number of focuses.	1-4	
Freq	Set the frequency of probe.	5 levels	
Pseudo Color	Set the colorization of a conventional B/PW mode image to enhance the visibility so as to distinguish B, M and PW mode intensity.	6 types	
Spatial Comp (Spatial Compounding Imaging)	This function is used to increase target signals, weaken the speckle noises, enhance image contrast of the target area, and decrease influences of sound shadow, ultrasound loss and the occurrence of reverberation.	On/Off	



Frame Persist	Remove the bright spot noise that appears randomly in B mode image. The bigger the value the stronger the effect, but the frame rate will not be affected.	0-7	Menu Controls
Gray Map	Adjust the gray scale distribution to obtain the optimum images.	0-14	
Rejection	Eliminates from the B mode image of low level echoes resulting from flicker noise. 0 represents no Rejection. The bigger the value, the stronger the effect.	0-7	
ScanAngle (sector angle/ scan width)	Adjusts the sector angle for curve probes, and the scan width for linear probes, providing a larger field of view in the far field. The larger angle, the faster frame rate, and vice versa.	0-3	
90° Rotate	Rotate the image by 90 degrees (in B mode).	0, 1, 2, 3	Image Parameter Preset
B/W Invert	Set the color to black or white.	On/Off	
H Reverse	Set the attribute of Horizontal reversal, which means Left/Right flip.	On/Off	Menu Controls
V Reverse	Set the attribute of Vertical reversal, which means Up/Down flip.	On/Off	Menu Controls
Dual	Press to select Dual, and press it again to switch between a live or frozen, single or multi-mode A/B split screen display.	/	Press  on the control panel
Quad	Press to select Quad, and press it again to cycle through a live or frozen A/B/C/D single or multi-mode split screen display.	/	Press  on the control panel

Table 6-1 B Mode image parameters

Control Functions	Description	Parameter Range	Operations
Gain	CFM: Increase the overall strength of color flow echoes, but the color map will not be affected. PDI: Power Doppler Imaging. The larger the gain the more number of reflectors and the brighter of the PDI map.	1-80, in increments of 1	Gain knob



Scan area of Color Mode (ROI)	Size	/	The maximum height of ROI is only 1/2 of the physical height of the image field.	Trackball. By default, roll the trackball to position the ROI, and press <b>Set</b> to switch to ROI size adjusting status.
	Position	/	Within B Mode imaging area	
	Color	/	Yellow/Green	Image Parameter Preset
Flow Type	This function is used to optimize flow images quickly according to current flow state. And values of associated parameters will be changed together with it.		H Flow /M Flow / L Flow	Menu controls
Dual Live	On: the window will be automatically switched to the dual real-time status (the left one is B image, and the right one is B+Color/PDI image). Off: non-dual-live status.		On/Off	
Persist	The bigger the value, the more persistence among frames, and the more continuity of color maps.		0-7	
Smooth filter	Adjust to smooth out the color image. Similar to spatial smooth. The bigger the value, the stronger the effect.		0-7	
WallFilter	Filter out low velocity flow signals in order to hide unusable motion. It helps to get rid of motion artifacts caused from breathing and other patient motion. The bigger the value, the more signals of low velocity will be filtered out.		0-7	
PRF	Adjust to raise or lower the flow velocity range. The bigger the value, the higher the maximum velocity will be detected. Frame rate will be affected by excessive lower PRF. Aliasing may occur if low velocity range is set for high velocity flow.		0-15	
Invert	Reverse the color of blood flow. Off: Red toward (positive velocities) and Blue away(negative velocities) On: opposite to the above.		On/Off	
Base Line	Adjust the velocity range of forward flow /reverse flow. Minimize aliasing by displaying a greater range of forward flow or reverse flow.		7 levels	

Map	Each map displays velocity/power according to colors. In PDI mode, 7 kinds of maps are provided: 0-3 belongs to Power Doppler Imaging (PDI) Mode maps. While, 4-7 belong to Directional Power Doppler Imaging (DPDI) Mode maps.	In Color mode:0-7 In PDI mode: 0-3 (PDI) 4-7 (DPDI)	Menu controls
Packet Size	The bigger the value, the stabler the flow signals, but the frame rate will be decreased. Adjust properly according to practical applications.	4 levels: 8,10,12,14	
Threshold	Set the gray scale level at which strong echoes inside vessel walls will be rejected. The smaller the value, the lower the gray scale level, and the more gray scales will be recognized as echoes inside vessel walls, and the information will be rejected.	0-15	
Freq	The lower the frequency, the better the force of penetration; the higher the frequency, the better spatial resolution.	2 levels	
Steer	Adjust the ROI steering angle of the Color Flow linear image to get more information without moving the probe. The Angle steer function only applies to linear probes.	-10°,0°,10°	Menu controls, or press the left /right arrow button on PC keyboard.

Table 6-2 Color/PDI Mode image parameters

Control Functions	Description	Parameter Range	Operations
Gain	Increases or decreases the amount of echo information. It may brighten or darken the PW mode image.	1-80, in increments of 1	Gain knob
Position of sample volume	The sample volume can be positioned anywhere within B images; In B+ Color/PDI+PW mode, the sample box moves with sample volume.	/	Trackball
Flow Type	This function is used to optimize flow images quickly according to current flow state. And values of associated parameters will be changed together with it.	H Flow /M Flow / L Flow	Menu controls
Quick Angle	Adjust the correction angle faster in increments of 30°.	-79°-79°	

Correction Angle	The correction line should be set parallel to the sample vessel. Correct the PW velocity caliper to obtain accurate measurement of velocity.	-79°-79°	Menu controls
Invert	Vertically inverts the spectral trace without affecting the baseline. Off: Above the baseline (towards the probe, positive velocities) and below the baseline (away from the probe, negative velocities) On: opposite to the above.	On/Off	
Base Line	Adjust the baseline position. It helps to increase positive/negative spectral range for evaluation.	7 levels	
PRF	Adjust to raise or lower the flow velocity range. The bigger the value, the higher the maximum velocity will be detected. Frame rate will be affected by excessive lower PRF. Aliasing may occur if low velocity range is set for high velocity flow.	0-15	
HPRF	When exceeding the maximum sampling frequency at certain sample volume depth by further increasing the PRF, the HPRF mode is activated automatically; when decreasing the depth and the PRF is not limited by depth, the system exits HPRF mode; or, switch the HPRF menu control to "Off", the system exits HPRF mode.	On/Off	
Pseudo Color	Set the colorization of a conventional B/PW mode image to enhance the visibility so as to distinguish B, M and PW mode intensity.	6 types	
Sample Volume	The echoes information in the sample volume is used to evaluate spectral. Adjust the sample volume properly and keep it within the sample area.	0.5-20.0, 16 levels	
Dyn Rng (Dynamic Range)	Adjust the gray display range of PW image. The smaller the value, the narrower gray display range and the lower contrast resolution, and vice versa.	30-90dB in increments of 2	
WallFilter	Insulate the Doppler signal from excessive noise caused from vessel movement The bigger the value, the more low velocity signals will be filtered out.	0-3	

Freq	The lower the frequency, the better the force of penetration; the higher the frequency, the better spatial resolution.	2 levels	
Duplex/Triplex	Set whether B (B+Color) and PW images are displayed synchronously.	On/Off	
Sweep Speed	Adjust the scanning speed level of the PW mode image.	0-5	
Volume of PW mode	Decrease/ increase the volume of Doppler; Or mute the sound.	7 levels, or mute	Press one of the three keys on PC keyboard: F7/F8/F9
Steer	Adjust the steering angle of the sample line. The angle steer function only applies to linear probe.	-10°,0°,10°	Menu controls, or press the left /right arrow button on PC keyboard.

Table 6-3 PW Mode image parameters

Control Functions	Description	Parameter Range	Operations
Gain	Increases or decreases the amount of echo information. It may brighten or darken the CW mode image.	1-80, in increments of 1	Gain knob
Position of sample line	Within image	/	Trackball
Flow Type	This function is used to optimize flow images quickly according to current flow state. And values of associated parameters will be changed together with it.	H Flow /M Flow / L Flow	Menu controls
Quick Angle	Adjust the correction angle faster in increments of 30°.	-79°-79°	
Correction Angle	The correction line should be set parallel to the sample vessel. Correct the CW velocity caliper to obtain accurate measurement of velocity.	-79°-79°	
Invert	Vertically inverts the spectral trace without affecting the baseline. Off: Above the baseline (towards the probe, positive velocities) and below the baseline (away from the probe, negative velocities) On: opposite to the above.	On/Off	

Base Line	Adjust the baseline position. It helps to increase positive/negative spectral range for evaluation.	7 levels	Menu controls
PRF	Adjust to raise or lower the flow velocity range. The bigger the value, the higher the maximum velocity will be detected. Frame rate will be affected by excessive lower PRF. Aliasing may occur if low velocity range is set for high velocity flow.	0-31	
Pseudo Color	Set the colorization of a conventional B/CW mode image to enhance the visibility so as to distinguish CW mode intensity.	6 types	
Dyn Rng (Dynamic Range)	Adjust the gray display range of CW image. The smaller the value, the narrower gray display range and the lower contrast resolution, and vice versa.	30-90dB in increments of 2	
WallFilter	Insulate the Doppler signal from excessive noise caused from vessel movement The bigger the value, the more low velocity signals will be filtered out.	0-3	
Sweep Speed	Adjust the scanning speed level of the CW mode image.	0-5	
Volume of CW mode	Decrease/ increase the volume of Doppler; Or mute the sound.	7 levels, or mute	Press one of the three keys on PC keyboard: F7/F8/F9

Table 6-4 CW Mode image parameters

Control Functions	Description	Parameter Range	Operations
Gain	Increases or decreases the amount of echo information. It may brighten or darken the M mode image.	0-130, in increments of 2	Gain knob
M-Mark	Position the sample line.	Within B Mode image area	Trackball
Sweep Speed	Adjust the scanning speed level of the M mode image.	0-3	Menu controls
Display Layout	Set the display layout of dual-split mode of B+M: Up/Down, Left/Right.	U/D, L/R	

Rejection	Eliminates from the M mode image of low level echoes resulting from flicker noise. 0 represents no Rejection. The bigger the value, the stronger the effect.	0-7	
Dyn Rng (Dynamic Range)	Adjust the gray display range of M image. The smaller the value, the narrower gray display range and the lower contrast resolution, and vice versa.	30-150dB	
Focus Pos (Focus Position)	Adjust the position of focuses.	0-15	
Freq	Set the frequency of probe.	5 levels	
Pseudo Color	Set the colorization of a conventional M mode image to enhance the visibility so as to distinguish M mode intensity.	6 types	
Line Average	Set image line softening attribute.	0-7	
Gray Map	Adjust the gray scale distribution to obtain the optimum images.	0-14	

Table 6-5 M Mode image parameters

**Save image parameter preset:**

1. After the image parameter adjustments, press **Save Preset Data** key (user-defined key F1/F2/F3/F4).
2. Press **OK** in the “**Save current image parameters data?**” dialog box.
3. Press **OK** in the “**Overwrite the current exam preset data?**” dialog box to save the image parameter preset to the current exam mode; Or press **Cancel**, and enter a new exam name in the “**Add new Exam mode**” dialog box to save the image parameter preset to the new exam mode.

**6.5. Generic Measurements and Calculations**

Mode	Generic Measurement & Calculation Items
B/Color	Distance, Cir/Area (Ellipse/Trace), Volume (2-Axis/3-Axis), Ratio, % Stenosis, Angle and Histogram
M	Distance, Time, Slope and Hear Rate (two cycles)
D	In non-cardiac exam: Velocity, Heart Rate, Time, Acceleration, Resistance Index (RI), Pulsatility Index (PI) and Auto Trace (auto trace is available only for PW mode) In cardiac exam: Velocity, PG, Time, Heart Rate, Slope, PHT, Trace (Manual)

Table 6-6 Generic measurement &amp; calculation Items

Distance and circumference will be presented in mm or cm; area, in mm<sup>2</sup>, cm<sup>2</sup>, or dm<sup>2</sup>; volume, in mm<sup>3</sup>, cm<sup>3</sup>, dm<sup>3</sup>, mL or L; time in ms or s, and heart rate in bpm, etc.

After entering B/ Color/ PDI/ PW/ CW/ M mode, press **Caliper** to activate the B/ Color/ PDI/ PW/ CW/ M mode generic measurement function, and the light will be on.

There is one type of mark in B mode measurement: “+”.

There are three types of marks in M mode measurement: “+”, big “+”, and a line.

The measurement results will be displayed in real-time. After measurement, the outcome is displayed in measurement result window with a serial number. You can measure one to four groups of data. If you continue to measure, the earliest group will be automatically covered by the newest one.

**NOTE:**

1. When you exit measurement status, or press **EndExam/Clear**, all the measurements will be cleared.
2. During general measurement, press **Backspace** to delete the previous operation.
3. After a complete general measurement, press **Backspace** to erase a measurement at a time.

The generic measurements and calculations include four sets of measurement calipers, four sets of ellipses, four sets of measurement results at most.

**6.5.1. Generic Measurements in B Mode**

The default measurement of B mode is distance measurement. B mode measurement menus are shown as follows:

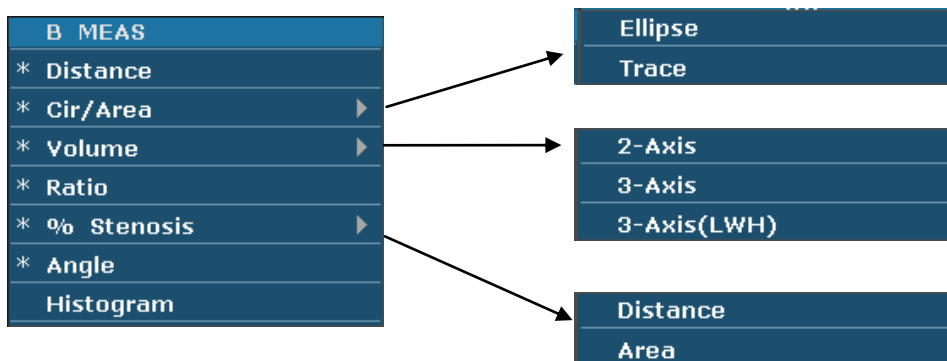


Figure 6-3 B Mode Generic Measurement and Calculation Menu

**Distance**

To measure distance:

1. Press **Caliper** to activate generic measurement function.
2. Roll the trackball to highlight **Distance**, press **Set** to activate a measurement cursor “+” on the screen.
3. Roll the trackball and press **Set** to anchor the start point.
4. Roll the trackball and press **Set** to anchor the end point.
5. Roll the trackball and press **Set** to begin a new distance measurement. You can measure a maximum of four groups of data. The outcome will be displayed in the measurement result window, as shown below.
6. Press **Caliper** to finish and exit.

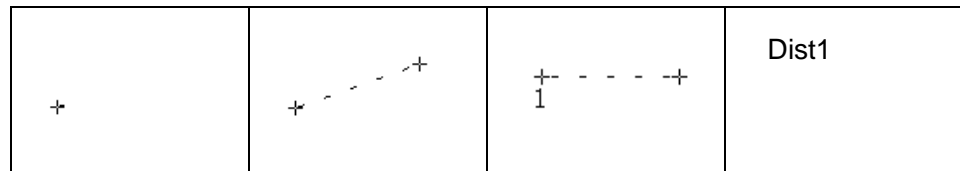


Figure 6-4 Distance Measurement and the Results

**Circumference/Area ● Ellipse Method**

To measure Circumference / Area:

1. Press **Caliper** to activate generic measurement function.
2. Roll the trackball to highlight **Cir/Area**. Then select **Ellipse**, and press **Set**.
3. Roll the trackball and press **Set** to anchor the start point of fixed axis of ellipse.
4. Roll the trackball and press **Set** to anchor the end point of fixed axis of ellipse.
5. Roll the trackball, and press **Set** to define the size of the ellipse.
6. Roll the trackball and press **Set** to begin a new circumference/area measurement. You can measure a maximum of four groups of data. The outcome will be displayed in the measurement result window, as shown below.
7. Press **Caliper** to finish and exit.



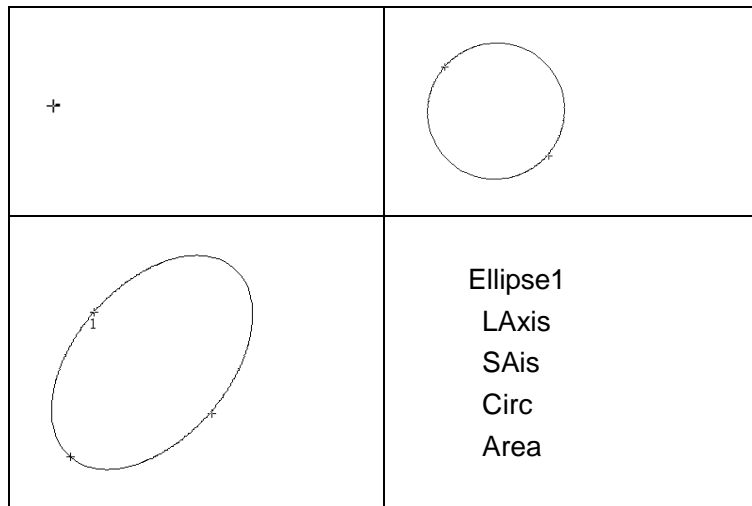


Figure 6-5 Ellipse Circumference/Area Method and the Results

● **Trace Method**

To measure Circumference / Area:

1. Press **Caliper** to activate generic measurement function.
2. Roll the trackball to highlight **Cir/Area**. Then select **Trace**, and press **Set** to activate a measurement cursor on the screen.
3. Roll the trackball and press **Set** to anchor the start point.
4. Roll the trackball to outline the region of interest. As you move the trackball, the system displays dots to outline the structure. To correct an error in the trace, press **Backspace** to move in reverse along the traced outline. Roll the trackball to move forward again. The system automatically closes the loop when the last measurement marker is moved very near to the start point. Or press **Set** to close the loop. The system draws a line from the position of the active measurement marker to the beginning of the loop.
5. Roll the trackball and press **Set** to begin a new circumference/area measurement. You can measure a maximum of four groups of data. The outcome will be displayed in the measurement result window, as shown below.
6. Press **Caliper** to finish and exit.

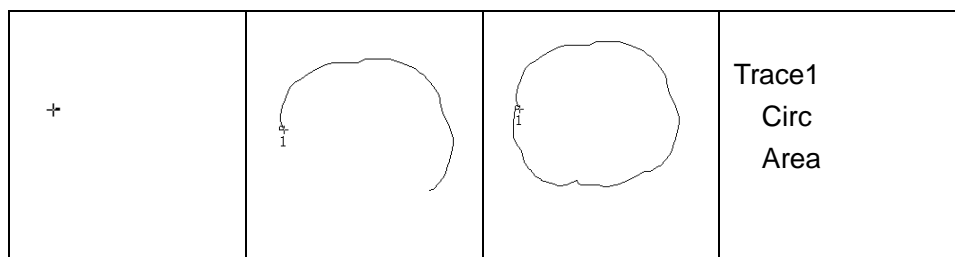


Figure 6-6 Trace Circumference/Area Method and the Results

**Volume****● 2-Axis volume method**

$V = (\pi/6) \times A \times B^2$ , (A: the length of major axis. B: the length of minor axis)

Two-axis volume method can be used to perform volume measurement by calculating only one set of measured data.

Operating Method:

The two-axis volume method is similar to the generic B mode Cir/Area measurement ellipse method. You can measure a maximum of four groups of data.

**● 3-Axis method**

$V = (\pi/6) \times A \times B \times M$ ,

(A: the length of major axis. B: the length of minor axis. M: the length of the third axis.)

Three-axis method can be used to perform volume measurement by calculating two sets of measured data, EA and the length of the third axis. To complete volume measurement, first measure EA by ellipse method, and then measure the length of the third axis with the distance measurement method, and the value of volume will be displayed automatically.

To measure volume:

In the **B mode**

1. Obtain a cross-section image and freeze the system.
2. Measure the lengths of the major axis and the minor axis of the cross section with the ellipse method.
3. Unfreeze the system to acquire a new image (vertical-section image), and then freeze it.
4. Measure the length of the third axis in the vertical section image with the distance measurement method. You can measure a maximum of one group of data. The outcome will be displayed in the measurement result window.

In the **2B mode** or **4B mode**

To measure volume:

1. Obtain the cross-section image and the vertical-section image.
2. Measure the length of the major axis and the minor axis of the cross

section with the ellipse method.

3. Roll the trackball to the next image, vertical section image, measure the length of the third axis with the distance measurement method. The outcome will be displayed in the measurement result window, as shown below.
4. Press **Caliper** to finish and exit.


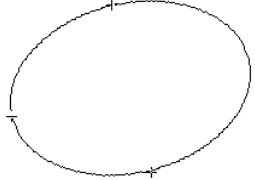
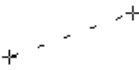
	
	LAxis SAxis 3rdAxis Volume

Figure 6-7 3-Axis Volume Method and the Results

● **3-Axis (LWH) method**

$$V = (\pi/6) \times L \times W \times H,$$

(L: the length. W: the width. H: the height.)

Three-axis (LWH) method can be used to perform volume measurement by calculating 3 sets of distance data, L, W, and H. Measure the three pieces of data by the method of B mode generic distance measurement, and then the value of volume will be displayed automatically.

To measure volume:

In the **B mode**

1. Obtain a cross-section image and freeze the system.
2. Measure the length and the width.
3. Unfreeze the system to acquire a new image (vertical-section image), and then freeze it.
4. Measure the height. You can measure a maximum of one group of data. The outcome will be displayed in the measurement result window.

In the **2B mode** or **4B mode**

1. Obtain the cross-section image and the vertical-section image.
2. Measure the length and the width.

3. Roll the trackball to the next image, vertical section image, measure the height. The outcome will be displayed in the measurement result window, as shown below.

4. Press **Caliper** to finish and exit.

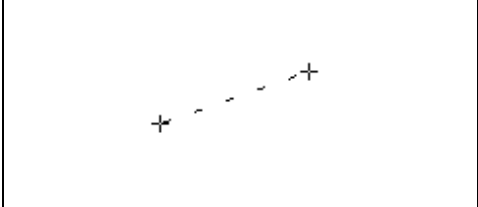
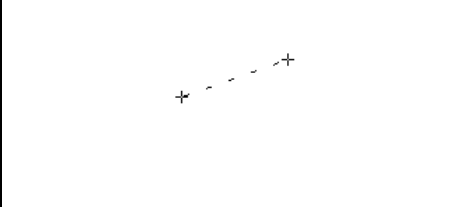
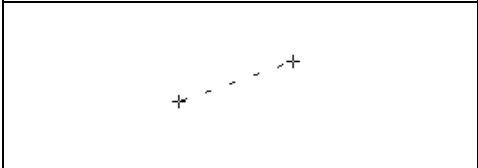
	
	Length Width Height Volume

Figure 6-8 3-Axis (LWH) Volume Method and the Results

## Ratio

To determine the ratio, perform two measurements: A and B. The system calculates the ratio: A/B or B/A.

To measure ratio:

1. Press **Caliper** to activate generic measurement function.
2. Roll the trackball to highlight **Ratio**, press **Set** to activate a measurement cursor on the screen.
3. Measure the first distance A with the distance measurement method.
4. Measure the second distance B, move the cursor and press **Set** to anchor the start point, and the mark “+” appears. Move the cursor with trackball, Measurement Results displays the real time measurement value and calculation result.
5. During measurement, you can press **Update** once to change the settled point and the active point; if you press **Update** a second time, the system interchanges the numerator and denominator.
6. Roll the trackball and press **Set** to complete the measurement, and the calculation result will be displayed in the measurement result window.
7. Roll the trackball and press **Set** to begin a new ratio measurement. You can measure a maximum of four groups of data. The outcome will be displayed in the measurement result window.
8. Press **Caliper** to finish and exit.


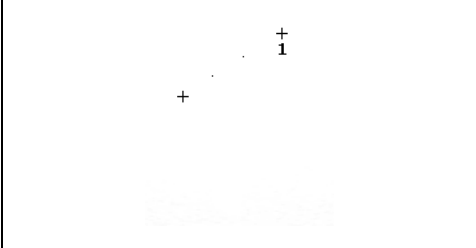
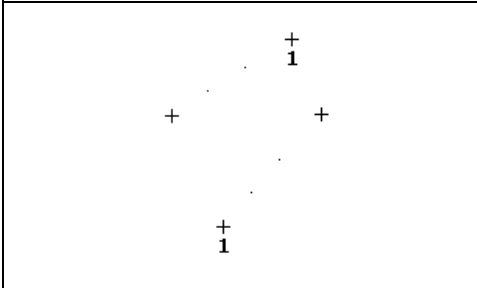
	
	<p>Dist11 Dist12 Ratio1</p>

Figure 6-9 Ratio Measurement and the Results

## % Stenosis

### ● Distance stenosis

To determine the distance stenosis, perform two distance measurements: A and B. The system calculates the stenosis:  $(A-B)/A * 100\%$ .

To measure distance stenosis:

1. Press **Caliper** to activate generic measurement function.
2. Roll the trackball to highlight **% Stenosis**, and select **Distance**, and then press **Set** to activate a measurement cursor on the screen.
3. Measure the first distance with the distance measurement method.
4. Measure the second distance, move the cursor and press **Set** to anchor the start point, and the mark “+” appears. Move the cursor with trackball, Measurement Results displays the real time measurement value and calculation result.
5. During measurement, you can press **Update** to change the start point and the end point; if you press **Update** again, the system interchanges the numerator and denominator.
6. Roll the trackball and press **Set** to complete the measurement, and the calculation result will be displayed in the measurement result window.
7. Roll the trackball and press **Set** to begin a new stenosis measurement. You can measure a maximum of four groups of data. The outcome will be displayed in the measurement result window.
8. Press **Caliper** to finish and exit.

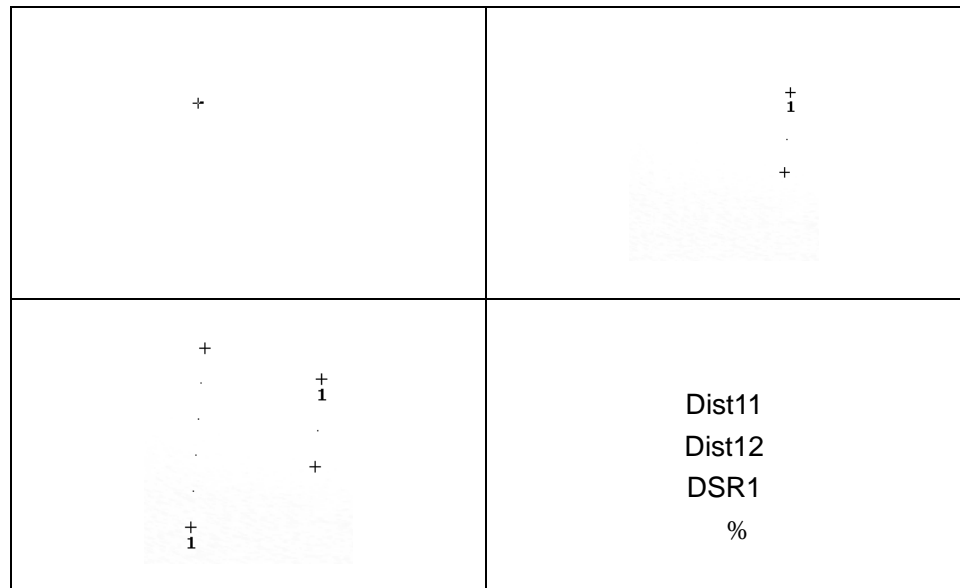


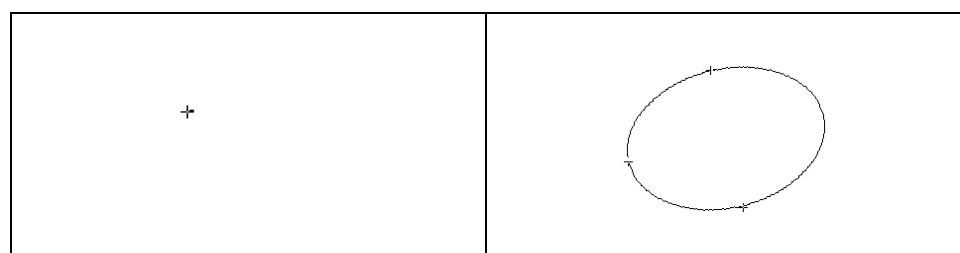
Figure 6-10 Distance Stenosis Measurement and the Results

### ● Area stenosis

To determine the area stenosis, perform two area measurements: A and B. The system calculates the stenosis:  $(A-B)/A * 100\%$ .

To measure area stenosis:

1. Press **Caliper** to activate generic measurement function.
2. Roll the trackball to highlight **% Stenosis**, and select **Area**, and then press **Set** to activate a measurement cursor on the screen.
3. Measure the first area with the ellipse method.
4. Measure the second area, move the cursor and press **Set** to anchor the start point, and the mark “+” appears. Move the cursor with trackball, Measurement Results displays the real time measurement value and calculation result.
5. During measurement, you can press **Update** to change the start point and the end point.
6. Roll the trackball and press **Set** to complete the measurement. You can measure a maximum of one group of data. The outcome will be displayed in the measurement result window.
7. Press **Caliper** to finish and exit.



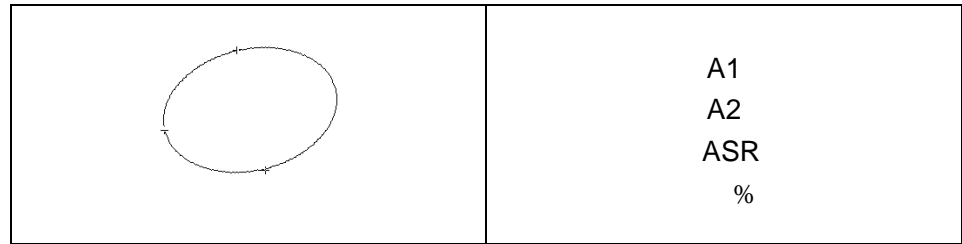


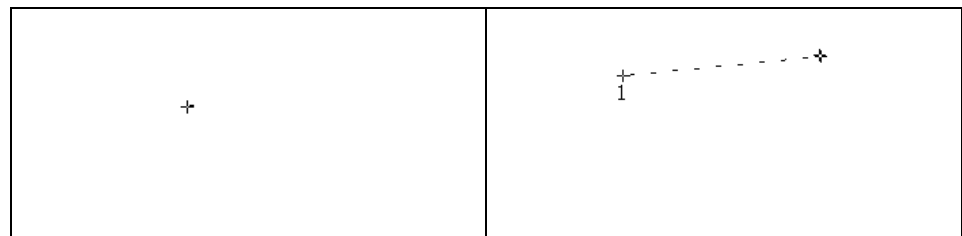
Figure 6-11 Area Stenosis Measurement and the Results

**Angle**

To determine an angle, draw two lines: A and B. The system calculates the angle.

To measure angle:

1. Press **Caliper** to activate generic measurement function.
2. Roll the trackball to highlight **Angle**, and then press **Set** to activate a measurement cursor on the screen.
3. Draw the first line A with the distance measurement method.
4. Draw the second line B, move the cursor and press **Set** to anchor the start point, and the mark “+” appears. Move the cursor with trackball, Measurement Results displays the real time measurement value and calculation result.
5. During measurement, you can press **Update** to change the start point and the end point; if you press **Update** again, the system interchanges line A and line B.
6. Roll the trackball and press **Set** to complete this measurement.
7. Roll the trackball and press **Set** again to begin a new angle measurement. You can measure a maximum of four groups of data. The angles formed by the two lines are displayed in measurement result window, in units of degrees. The outcome will be displayed in the measurement result window.
8. Press **Caliper** to finish and exit.



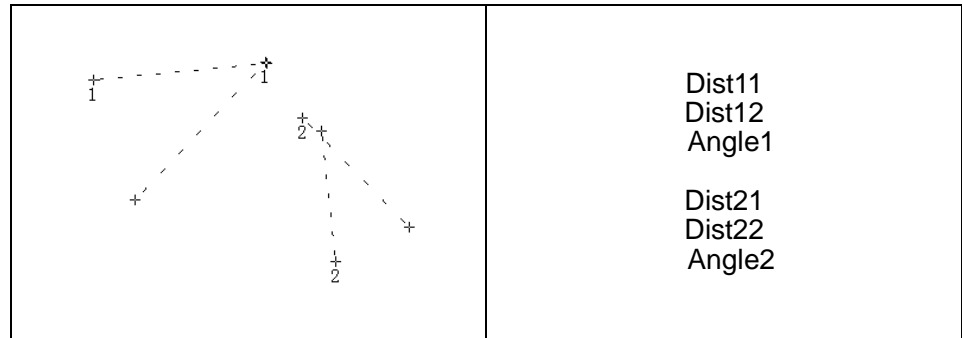


Figure 6-12 Angle measurement

**Histogram**

The image will be frozen automatically after entering histogram measurement.

1. Press **Caliper** to activate generic measurement function.
2. Roll the trackball to highlight menu **Histogram**, and then press **Set** to activate a measurement cursor on the screen.
3. Roll the trackball, press **Set** to anchor the start point.
4. Roll the trackball, adjust the position and size of the histogram, and then press **Set** to anchor the end point.
5. During measurement, you can press **Update** to change the start point and the end point.
6. Roll the trackball and press **Set** again to begin a new histogram measurement. You can measure a maximum of four groups of data. The outcome is displayed in Measured Results.
7. Press **Caliper** to finish and exit.

**6.5.2. Generic Measurements in M Mode**

M mode measurements and calculations include distance, time, slope and heart rate (2 cycles). These are for B+M and M display modes only. The default measurement of B+M and M mode is heart rate measurement. M mode measurement menus are shown as follows:

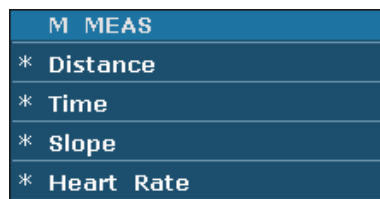


Figure 6-13 M Mode Generic Measurement and Calculation Menu



**Distance** To measure distance:

1. Press **Caliper** to activate a measurement cursor “+”.
2. Roll the trackball to highlight **Distance** and press **Set**.
3. Roll the trackball and press **Set** to anchor the start point, and a big “+” is displayed.
4. Roll the trackball and press **Set** to anchor the end point.
5. Roll the trackball and press **Set** to begin a new distance measurement. You can measure a maximum of four groups of data. The outcome will be displayed in the measurement result window, as shown below.
6. Press **Caliper** to finish and exit.

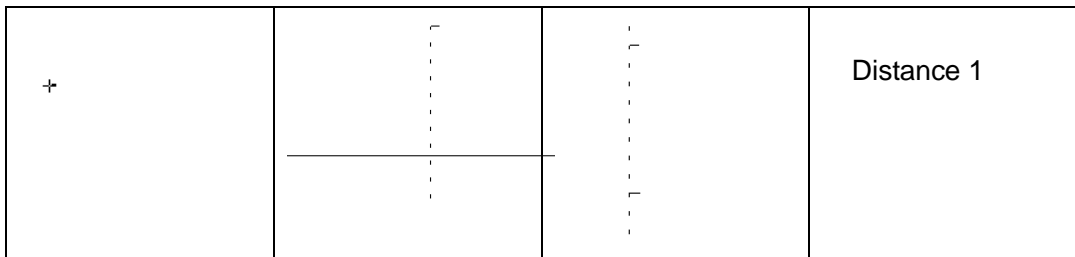


Figure 6-14 Distance Measurement and the Results

**Time** To measure time:

1. Press **Caliper** to activate a measurement cursor “+”.
2. Roll the trackball to highlight **Time** and press **Set**.
3. Roll the trackball to move the first measurement cursor at the beginning of the time interval and then press **Set**, and the measurement mark turns to a vertical line.
4. Roll the trackball to move the first measurement cursor at the end of the time interval and then press **Set**.
5. Roll the trackball and press **Set** to begin a new time measurement. You can measure a maximum of four groups of data. The outcome will be displayed in the measurement result window, as shown below.
6. Press **Caliper** to finish and exit.

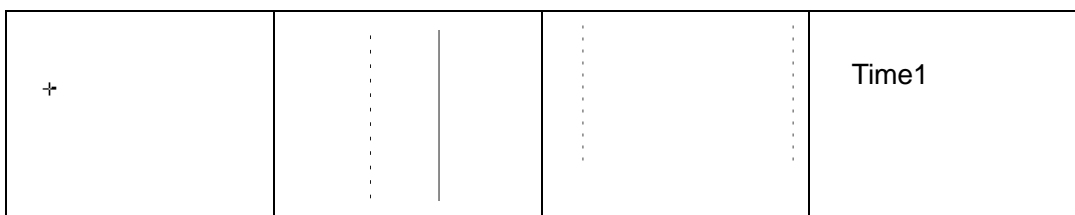


Figure 6-15 Time Measurement

**Slope** To measure slope:

1. Press **Caliper** to activate a measurement cursor “+”.
2. Roll the trackball to highlight **Slope** and press **Set** and a big “+” is displayed.
3. Roll the trackball and press **Set** to anchor the start point, and displays a big “+”.
4. Roll the trackball and press **Set** to anchor the end point.
5. Roll the trackball and press **Set** to begin a new slope measurement. You can measure a maximum of four groups of data. The outcome will be displayed in the measurement result window, as shown below.
6. Press **Caliper** to finish and exit.

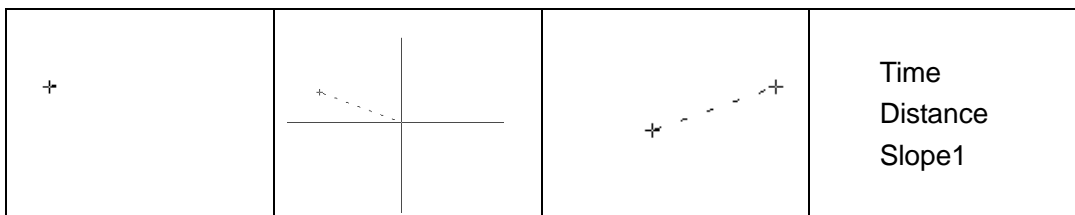


Figure 6-16 Slope Measurement and the Results

**Heart Rate** To measure heart rate:

1. In the **B+M mode**, roll the trackball to change the position of the M Mark and press **Set** to obtain a satisfying electrocardiogram, and then freeze it.
2. In the **M mode**, freeze the desired image.

Measure the distance between two peaks of cardiac cycles with the time measurement method.

1. Press **Caliper** to activate a measurement cursor “+”.
2. Roll the trackball to highlight **Heart Rate** and press **Set** and a “+” is displayed.
3. Roll the trackball to move the first measurement maker on the first peak systole and then press **Set** to anchor start position, and the measurement mark turns to a vertical line.
4. Roll the trackball to move the second measurement maker on the peak systole following two complete cycles and then press **Set** to anchor end position.
5. Roll the trackball and press **Set** to begin a new heart rate measurement. You can measure a maximum of four groups of data. The outcome will be displayed in the measurement result window.
6. Press **Caliper** to finish and exit.

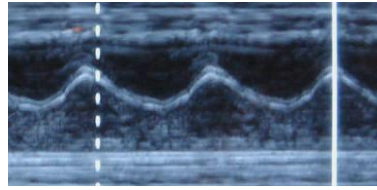


Figure 6-17 Heart Rate Measurement

**NOTE:**

1. In **B+M mode**, you should define the M Mark position, and then begin the measurement.
2. During heart rate measurement, make sure the start point and end point are exactly in two cardiac cycles. Otherwise the measurement result will be incorrect.

**6.5.3. Generic Measurements in Color/PDI Mode**

The generic measurements in Color /PDI mode are the same as those in B Mode

**6.5.4. Generic Measurements in D Mode**

**In non-cardiac exam:**

Velocity, Heart Rate, Time, Acceleration, Resistance Index (RI), Pulsatility Index (PI) and Auto Trace (auto trace is available only for PW mode).

The measurement menu is shown below.

<b>D MEAS</b>	
* Velocity	
* Heart Rate	
* Time	
* Acceleration	
* RI	
* PI	
Auto	
Trace Direction	Above
Trace Sensitivity+	6
Trace Sensitivity-	6

Figure 6-18 PW Mode Generic Measurement and Calculation Menu (In non-cardiac exam)

**NOTE:**

Heart rate and time measurement methods are the same as those in the M mode.



Reference Section 6.5.2 Generic Measurements in M Mode.

- Velocity** To measure velocity of a point on the Doppler wave:
1. Press **Caliper** to activate a measurement cursor “+”.
  2. Roll the trackball to highlight **Velocity** and press **Set** and a “+” is displayed.
  3. Roll the trackball and press **Set** to anchor the point, measuring velocity.
  4. Roll the trackball and press **Set** to begin a new velocity measurement. You can measure a maximum of four groups of data. The outcome will be displayed in the measurement result window, as shown below.
  5. Press **Caliper** to finish and exit.
- Acceleration** To measure velocities of two points on the Doppler wave, and calculate the acceleration:
- $$\text{Acceleration} = (\text{Vel1} - \text{Vel2}) / \text{Interval}$$
1. Press **Caliper** to activate a measurement cursor “+”.
  2. Roll the trackball to highlight **Acceleration** and press **Set** and a “+” is displayed.
  3. Roll the trackball and press **Set** to anchor the first point, measuring **Vel1**.
  4. Roll the trackball and press **Set** to anchor the second point, measuring **Vel2** and **Interval**, and calculating **Acceleration**.
  5. Roll the trackball and press **Set** to begin a new acceleration measurement. You can measure a maximum of four groups of data. The outcome will be displayed in the measurement result window, as shown below.
  6. Press **Caliper** to finish and exit.
- RI (Resistance Index)** To measure velocities of two peak points on the Doppler wave, and calculate RI and S/D:
- $$\text{RI} = | \text{PS} - \text{ED} | / | \text{PS} |$$
- PS: Peak systolic velocity  
ED: End diastolic velocity
1. Press **Caliper** to activate a measurement cursor “+”.
  2. Roll the trackball to highlight **RI** and press **Set** and a “+” is displayed.
  3. Roll the trackball and press **Set** to anchor the first peak point, measuring **Vel1**.
  4. Roll the trackball and press **Set** to anchor the second peak point, measuring **Vel2**, calculating **RI**.
  5. Roll the trackball and press **Set** to begin a new RI measurement. You can measure a maximum of four groups of data. The outcome will be displayed in

the measurement result window.

6. Press **Caliper** to finish and exit.

### PI (Pulsatility Index)

To measure velocities and pressure difference of two peak points on the Doppler wave, and calculate Pulsatility Index(PI):

$$PI(\text{no unit}) = |(PS - ED) / TAMAX|$$

TAMAX: Time Averaged Maximum Velocity

1. Press **Caliper** to activate a measurement cursor “+”.
2. Roll the trackball to highlight **PI** and press **Set** and a “+” is displayed.
3. Roll the trackball and press **Set** to anchor the start point. Roll the trackball to trace along the Doppler wave forward, or press **Backspace** to erase the trace backwards.
4. Press **Set** to anchor the end point, the system displays the results of PS, ED, RI, PI, etc. in measurement result window.
5. Roll the trackball and press **Set** to begin a new PI measurement. You can measure a maximum of four groups of data. The outcome will be displayed in the measurement result window.
6. Press **Caliper** to finish and exit.

### (Auto trace)

The trace in PW mode is shown below:

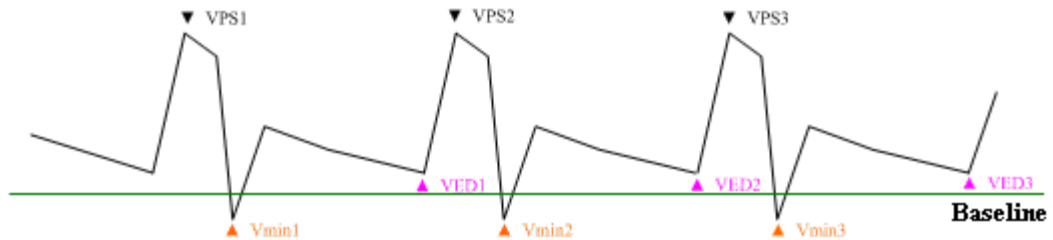


Figure 6-19 Trace Diagram

Where,

- VPS is the maximum velocity in the cycle;
- VED is the velocity at the end of diastole;
- $V_{\min}$  is the minimum velocity in the cycle.

### NOTE:

Freeze the system before performing the tracing function.

#### ● To perform Auto Trace function (automatic tracing)

1. Press **Caliper** to activate a measurement cursor “+”. Before tracing, press **Trace Direction** menu control, select **Above/Below/Both** to trace spectrum only above the baseline, or only below the baseline, or both above and below

the baseline respectively.

2. Roll the trackball to highlight **Auto** and press **Set**.
3. A big “+” is displayed, roll the trackball and press **Set** to anchor the start point.
4. Roll the trackball press **Set** to anchor the end point, the system displays the results of PS, ED, RI, PI, etc. in measurement result window.
5. After a trace measurement, press **Trace Sensitivity+** menu control to increase the identification sensitivity to the spectrum, the bigger the value the higher the sensitivity, and the less spectrum information to be removed, and the higher degree of overlapping between trace line and spectrum. Or press **Trace Sensitivity-** to decrease the sensitivity.
6. Roll the trackball and press **Set** to begin a new tracing measurement. You can measure a maximum of four groups of data. The outcome will be displayed in the measurement result window.
7. Press **Caliper** to finish and exit.

#### **In cardiac exam:**

Velocity, PG, Time, Heart Rate, Slope, PHT, Trace (Manual).

Velocity measurement method is the same as that in the non-cardiac exam of PW/CW mode.

Heart rate, time and slope measurement methods are the same as those in the M mode.

**PG** To measure PG of a point on the Doppler wave:

**(Pressure gradient)**  $PG[\text{mmHg}] = 4 \cdot v^2$   
(1mmHg=0.133kPa)

1. Press **Caliper** to activate a measurement cursor “+”.
2. Roll the trackball to highlight **PG** and press **Set** and a “+” is displayed.
3. Roll the trackball and press **Set** to anchor the point, measuring velocity.
4. Roll the trackball and press **Set** to begin a new PG measurement. You can measure a maximum of four groups of data. The outcome will be displayed in the measurement result window.
5. Press **Caliper** to finish and exit.

**PHT** PHT is defined as the time needed for the peak transvalvular pressure gradient to fall to its half value. The system also calculates MVA (mitral valve area) automatically.

**(Pressure half time)**

$MVA(\text{cm}^2) = 220 / PHT(\text{ms})$

To measure PHT:

1. Press **Caliper** to activate a measurement cursor “+”.
2. Roll the trackball to highlight **PHT** and press **Set**.
3. Roll the trackball and then press **Set** to anchor the start point.
4. Roll the trackball and then press **Set** to anchor the end point.
5. Roll the trackball and press **Set** to begin a new PHT measurement. You can measure a maximum of four groups of data. The outcome will be displayed in the measurement result window.
6. Press **Caliper** to finish and exit.

**NOTE:** When performing the PHT measurement above the baseline, ensure that the end point is lower than the start point; otherwise, the end point cannot be fixed; and when performing the PHT measurement below the baseline, ensure that the end point is higher than the start point.

## **Trace**

To trace spectrum:

### **(Manual)**

1. Press **Caliper** to activate a measurement cursor “+”.
2. Roll the trackball to highlight **Trace** and press **Set** and a “+” is displayed.
3. Roll the trackball and press **Set** to anchor the start point. Roll the trackball to trace along the Doppler wave forward, or press **Backspace** to erase the trace backwards.
4. Press **Set** to anchor the end point, the system displays the results of Mean velocity, MeanPG, and VTI (Velocity Time Integral), etc. in measurement result window.
5. Roll the trackball and press **Set** to begin a new trace. You can measure a maximum of four groups of data. The outcome will be displayed in the measurement result window.
6. Press **Caliper** to finish and exit.

## 6.6. Application Measurements and Calculations

To enter application measurements and calculations menu, select a probe and the examination type and press **Measure**, then you can choose the measurement item you need. Please find more information about application measurements and calculations in *Chapter 7~Chapter 11*.

The measurement & calculation items and results for each examination are shown in *Table 6-7*.

Examination	Application measurement & calculation items	Result
Kidney	L.Kidney, R.Kidney	Kidney worksheet
Abdomen	Gallbladder: CBD, Gallbladder, Kidney: Left Kidney, Right Kidney, Bladder	Abdominal worksheet
Obstetric	CRL, GSD, HD, BD, HD&BD, GSD-H, GSD-V, TD, and BPD NOTE: Different measurement labels depend on different examination species.	Obstetric worksheet
Cardiology	LV, RV, Mitral, Aorta, etc.	Cardiac worksheet
Peri.Vascular	PW mode: CCA, ICA, ECA, Vert A	Vascular worksheet

Table 6-7 Application measurement & calculation Items and Results

The system-defined examinations are abbreviated as follows:

Abd: Abdominal; OB: Obstetric; Car: Cardiac; Peri.Vas: Peripheral Vascular

After entering the application measurement, the first item of the measurement menu is activated by default. When you have measured the first item, and pressed **Set**, the cursor moves to the next item automatically, you can press **Set** to enter the measurement, or roll the trackball to select other items to measure.

In the application measurement menu, “√” is displayed before the item that has been measured.



## 6.7. Worksheet (Report)

The system automatically generates a graph/text worksheet (report) for each exam. The worksheet includes hospital name, patient information, application measurement results, images and doctor diagnosis. To set the hospital name in the worksheet, press **Set up>System Preset**.

Press **Report** on the keyboard to open the worksheet after an exam. Here take Abdominal Worksheet as an example, see the figure below:

### To edit the worksheet:

Move the trackball to the text box and edit the worksheet. Press OK to save.

### To add images to the report:

Press **Image** in the worksheet dialog box to add at most four images to the report.

Press  or  button or press the drop-down box on the bottom of the screen to view the images stored in current Storage device, and check the box  0/4 to select the currently displayed image. The screen will show you how many images have been added, for example,  2/4 indicates there are two images added. Maximum four images can be added into the report. Press  to exit image adding.

**To print a graph/text worksheet:**

Press **Print** in the worksheet after connecting a graph/text printer.

**To save a PDF worksheet:**

1. Press **Save PDF** in the worksheet, the system displays **Save PDF report** dialog box;
2. Select the destination drive and folder, or press **New Folder** to create a folder for storing PDF reports, and modify the file name; otherwise, the report will be saved to the default folder with a default file name.
3. Press **OK** to save the PDF report to the designated folder, or press **Esc** to give up.

## 6.8. Comment Function

The comment library is for positions and anatomical structures.

**NOTE:**

1. The entered text is in upper case by default.
2. The comments are in different colors under active/inactive status. To preset the comment colors, press **Set up>System Preset**.

**To add a comment:****➤ To add a comment by using the keyboard:**

1. Press **Comment**, and there is a cursor “I” displayed in the image area for annotating;
2. Enter text by using the keyboard;
3. Press **Set** or **Enter** to complete the comment.

**➤ To add a comment by using the comment library:**

1. Press **Comment**, and there is a cursor “I” displayed in the image area for annotating;
2. Press **Update**, the system displays the comment library of current exam by default. You can switch to other tabs by moving the trackball and pressing **Set**;
3. Highlight a comment in the comment library, and press **Set** to confirm the choice and complete the comment.

**➤ To add an arrow:**

1. Press **Comment**, and there is a cursor “I” displayed in the image area for annotating;
2. Press **Cursor** to display an arrow;
3. Move the trackball to move the position of the arrow; and the rotation function is automatically activated. Rotate the **Angle** button to adjust the arrow direction;
4. Press **Set** to set the position of the arrow.

**To move a comment:**

1. Move the cursor to a comment that needs to be moved, and a rectangle appears around the comment;
2. Press **Set** and move the cursor to a new position;
3. Press **Set** to confirm the new position.

**To modify a comment:**

1. Move the cursor to a comment that is already added, and a rectangle appears around the comment;
2. Move the cursor to a desired position within the comment, enter text with the keyboard, or press **Update** and select a comment from the comment library; or press **Backspace** or **Delete** to delete by character;
3. Press **Set** or **Enter** to confirm the modification.

**To delete a comment:**

Move the cursor to a comment that is already added, and a rectangle appears around the comment, press **Delete** to delete the comment.

Or, press **Clear** to cancel all of the comments at one time.

The comment library (**OB** tab) is shown below:

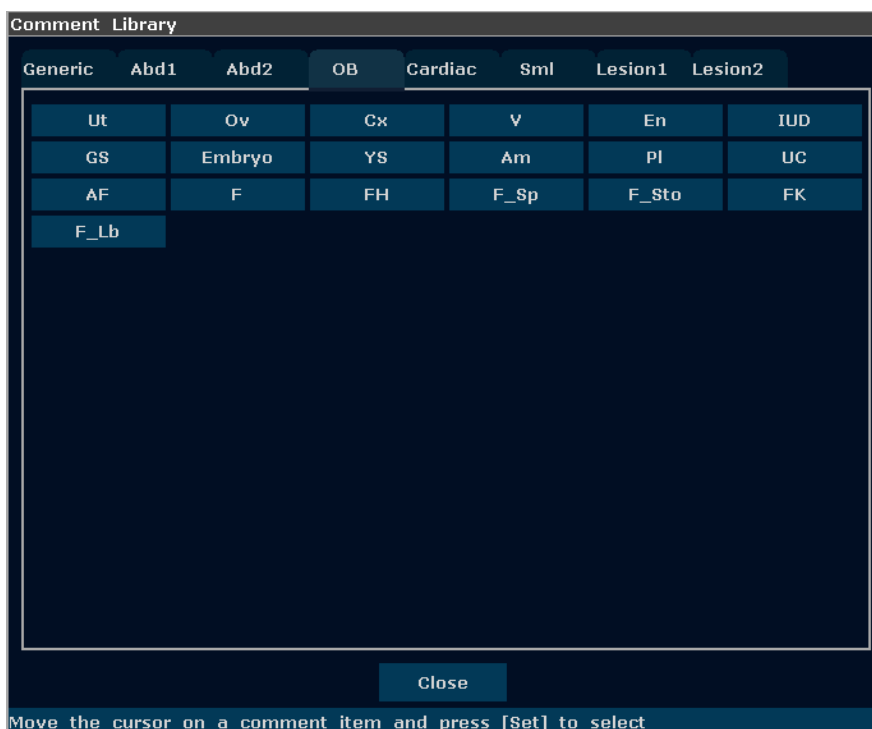


Figure 6-20 System-defined Comment Library



## 6.9. Body Mark Function

### To add a body mark:

1. Press **Body Mark**, the system displays the **Body Mark** dialog box of current exam by default. You can switch to other tabs by moving the trackball and pressing **Set**. The often-used body marks are listed under each tab, you can press **More** to enter the page of seldom-used body marks, and press **Back** to return to the page of often-used body marks.
2. Highlight a body mark in the **Body Mark** dialog box, and press **Set** to confirm the choice to add the body mark. The selected body marks are displayed in the bottom left corner of the screen.
3. After adding a body mark, use the trackball to move the position of the probe; and the rotation function of Multi-function knob is automatically activated and the rotation light is on, you can rotate this knob to adjust the probe scanning direction.
4. Press **Set** to complete adding the body mark.

### NOTE:

In dual or quad split mode, you can add a body mark to the currently active window; if you

press  or  to switch to another window, you can also add a body mark to the window.

### To move a body mark:

1. Move the cursor to a body mark that needs to be moved, and a rectangle appears around the body mark;
2. Press **Set** and move the cursor to a new position;
3. Press **Set** to confirm the new position.

### To delete a body mark:

Press **Clear** to delete all of the body marks at one time.

There are 40 types of body marks, and the **Abd-Small** tab of system body mark library is shown as below:

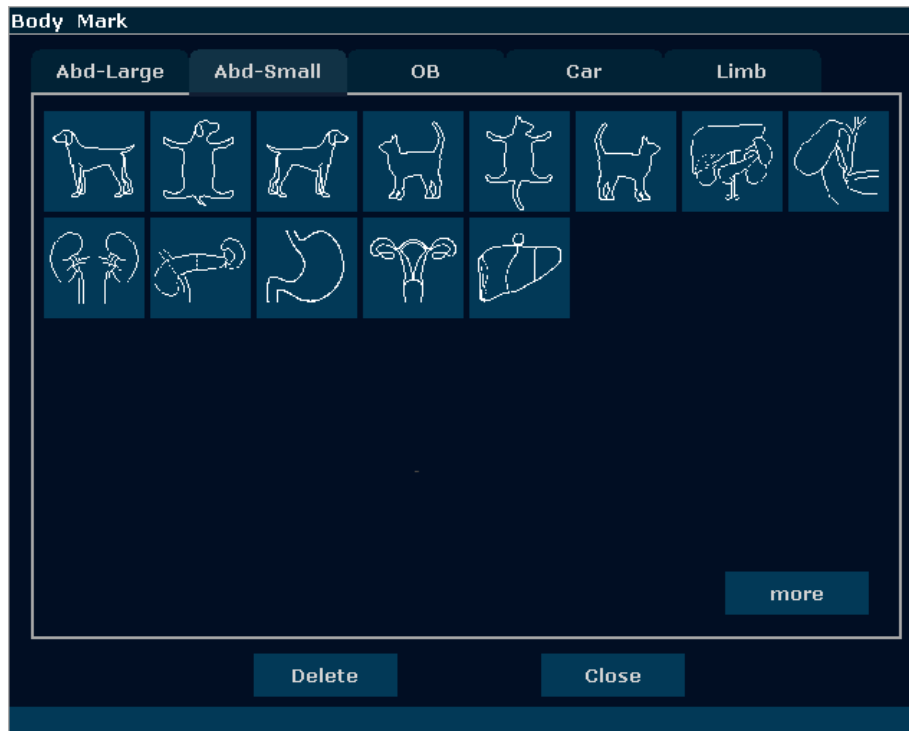


Figure 6-21 System Body Mark Library

## 6.10. Zoom

Zoom is used to magnify images for better viewing.

- ◆ To zoom in real-time/frozen B mode:

In real-time or frozen B mode, press **Zoom** knob, and the system displays a zooming window in the middle of the image; Rotate the **Zoom** knob to adjust the window of desired area and press **Zoom** again or **Set** to enter zoom state. Rotate the zoom knob to adjust magnification of the zoom window and roll the trackball to move the zoomed image, press **Set** to display the zoomed image. Press **Zoom** knob again to exit Zoom. In the zoomed B mode status, press **Color** or **PDI** to enter B+Color /PDI mode.

- ◆ To zoom in real-time 2B mode: Similar to zooming in B mode.
- ◆ To zoom in real-time B+Color/PDI mode:

After the position of ROI window (region of interest) is set, press **Zoom** knob to magnify the ROI area; in zoom status, you can rotate the zooming adjustment knob to adjust magnification factor, or roll the trackball to move and adjust the ROI window. Press **Zoom** knob again to exit Zoom; press **Color** or **PDI** again to exit zoom status and color imaging mode.

- ◆ To zoom in frozen B+Color/PDI mode:

In the frozen B+Color/PDI mode, press **Zoom** knob till the zooming light is on, the system displays a zooming window, rotate the zooming adjustment knob to adjust magnification factor, and press **Set** to enter the zoomed status. But in the zoomed B+C status, the ROI cannot be displayed or moved.

- ◆ The Zoom range is 1.14-4.0 (7 levels)

## 6.11. CINE Review

Activate the device and enter the real-time imaging mode. Enable the system to collect images before CINE Review playback. The cine function includes frame-by-frame playback (manual playback) and motion playback (automatic playback). The cine review symbol is displayed on the bottom of the screen, as shown below:

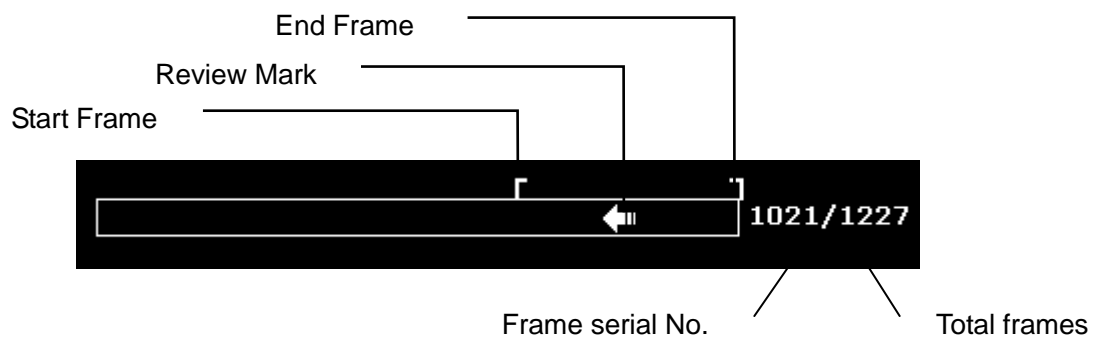


Figure 6-22 CINE Review Progress Bar

To perform the manual playback:

1. Press **Freeze** to freeze the image, and the system displays the cine menu, as shown below:

Cine Review	
* Start Frame	253
* End Frame	352
* Play / Stop	
* FPS	50
* Save As	...

Figure 6-23 Cine Review Menu



2. Roll the trackball to start playing back frame by frame. Roll the trackball to the right to advance the cine data one frame at a time, or to the left to move the data in reverse. The arrow on the CINE Review Symbol indicates the direction toward which the data is moving. The loop of data wraps around when either end is reached. As the trackball moves, the current cine number is displayed on the right of the CINE Review Symbol.
3. Press **Cine** to exit manual playback mode, or press **Freeze** to exit the CINE Review playback and enter the real-time scanning status.

To perform the automatic playback:

1. Press **Freeze** to freeze the image, and the system displays the cine menu.
2. Set the start frame: in manual playback status, roll the trackball to review frame by frame until the frame that you want to set as the start point, press **Start Frame** menu control to set it as the start frame, or rotate the **Start Frame** menu control to select a frame as the start frame.

3. Set the end frame: in manual playback status, roll the trackball to review frame by frame until the frame that you want to set as the end point, press **End Frame** menu control to set it as the end frame, or rotate the **End Frame** menu control to select a frame as the end frame.
4. Rotate the **FPS** menu control to adjust the review speed, and press **Play/Stop** menu control to start the automatic playback within the set region (Start frame-end frame).
5. In automatic playback status, press **Play/Stop** to stop.
6. Press **Cine** to go back to the manual playback status. Or, press **Freeze** to exit the CINE Review playback and enter real-time scanning status.



In dual or quad split screen status, freeze the image, and press  or  to toggle between the two or four windows, the CINE Review progress bar corresponds to the currently active image, you can perform manual/auto CINE Review for the currently active image. Only CINE images in the set region of currently active image can be saved.

In dual live mode of B and B+ (Color/PDI), freeze the image, then you can perform CINE Review and Save Cine for both images.

During playing back, press **Save As** to save the file in BMP, JPG, RFM, DCM, CIN or AVI format. You can save files to the local disk or USB disk. Or, press **File>Save Cine** to save the cine images of the set region. For details about operation method, please refer to [6.12.1 Saving Files](#).

**NOTE:**

1. Cine review can't be performed at the beginning of scanning or probe switching. You should wait until 30 seconds later.
2. The FPS (frames per second) is adjustable, from 5 to 50, in increments of 5.
3. After opening a cine file, you can perform measurements, add comments and the body mark on the image and print them in the report. See section [6.8 Comment Function](#) and section [6.9 Body Mark Function](#) for detailed operation information.

## 6.12. File Management

Press **File** to display the file menu, shown as below.

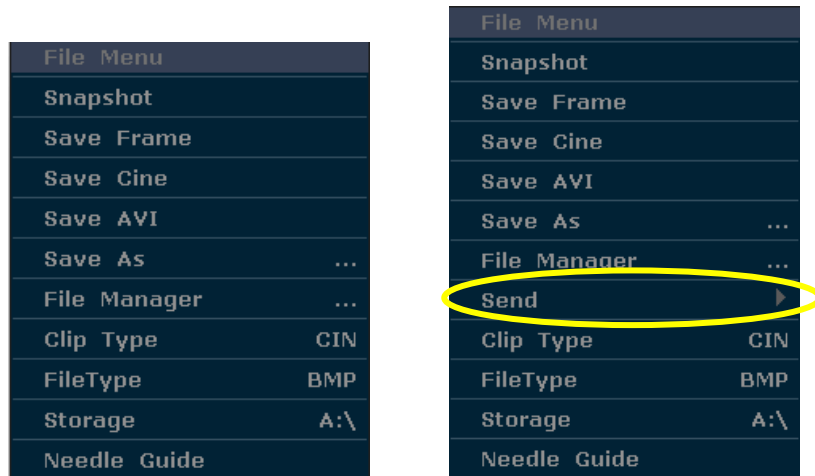


Figure 6-24 File Menu (the left—with no DICOM installed, the right—with DICOM installed)

### 6.12.1. Saving Files

#### Clip types:

The clip types include CIN and AVI.

#### File types:

The file types include BMP, JPG, DCM (if DICOM is installed) and FRM.

#### To choose a storage disk:

Highlight **Storage** in the file menu and press **Set** repeatedly to cycle between **Fixed** and USB-Disk (**A:\**, **B:\**). If no USB-disk is connected, only the **Fixed** storage disk will be available. You can set the default storage disk by using **Set up>System Preset**.

#### NOTE:

After connecting a removable disk, the interface displays a USB symbol on the bottom left corner.

#### To set a clip type:

The **Clip Type** in the file menu means the clip type for the quick saved cines.

To choose a clip type for the quick saved cines: highlight **Clip Type** in the file menu and press **Set** repeatedly to cycle between **CIN** and **AVI**.

#### To set a file type:

The **File Type** in the file menu means the file type for the quick saved images.



To choose a file type for the quick saved images: highlight **File Type** in the file menu and press **Set** repeatedly to cycle between **JPG, BMP, FRM and DCM** (if DICOM is installed).

### To save a file:

The system provides two ways to save images:

- ◆ Press **Store Image** or **Store Clip** on the control pannel;

Press **Store Image** on the control pannel to save the current displaying image in BMP, JPG, FRM or DCM (if DICOM is installed) format (set by **File Type** in the file menu, as shown above).

Press **Store Clip** on the control panel to save the clip to a required format (set by **File Type** in the file menu, as shown above).

- ◆ Use **Snapshot, Save Frame, Save Cine, Save AVI, or Save As** of the file menu to save files.

#### ➤ **Snapshot**

Highlight **Snapshot** in the file menu and press **Set** to save the current displaying image in BMP, JPG, FRM or DCM (if DICOM is installed) format (set by **File Type** in the file menu, as shown above).

#### ➤ **Save Frame**

1. Press **Freeze** to freeze the system;
2. Play back and find the desired image;
3. Press **File** to open the file menu;
4. Highlight **Save Frame** in the file menu, and press **Set** to save the current displaying image.

#### ➤ **Save Cine**

1. Press **Freeze** to freeze the system;
2. Press **File** to open the file menu;
3. Highlight **Save Cine** in the file menu, and press **Set**.

#### ➤ **Save AVI**

1. Press **Freeze** to freeze the system;
2. Press **File** to open the file menu;
3. Highlight **Save AVI** in the file menu, and press **Set**.

### **NOTE:**

The AVI files can not be viewed on this system, please use a USB disk to copy the AVI files to a PC, and view them by using video players.

### ➤ Save As

When obtaining a satisfying image:

1. Press **File** and select **Save As...** in the file menu to display the **File Save As** dialog box.
2. Select a destination drive from the **Drive** pull-down menu, and a folder from the directory on the left, or press **New Folder** to create a folder for storing files.
3. Press **Set** on the field next to **File Name**, enter a file name with the keyboard.
4. Press **OK** to save, or press **Cancel** to give up.

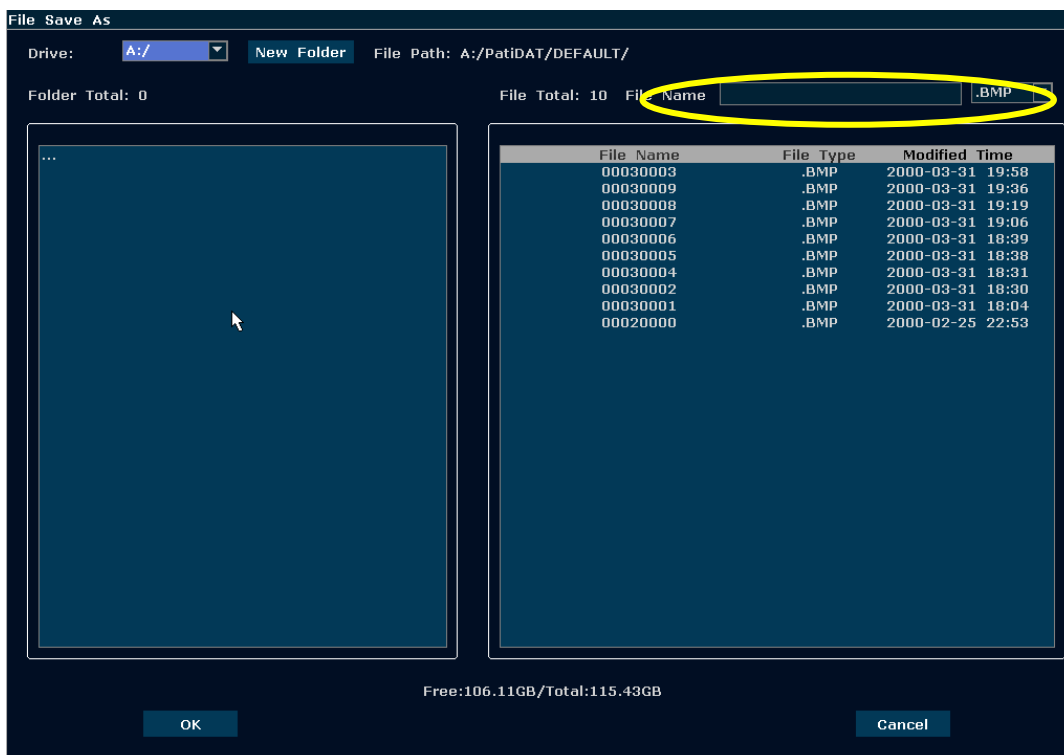


Figure 6-25 File Saving Dialog Box

### NOTE:

If you do not enter the name for the file, the system will automatically number the file in sequence. For instance, if the latest number comes to YYMM0020 (“Y” stands for “year”, and “M” stands for “month”), and if you save a file the next time, the file is numbered as YYMM0021.

When saving a file, the saving information is automatically displayed in the middle of image area.

### 6.12.2. File Manager

You can use the file manager to perform the file management or browse the images.

In real-time or frozen status, press **File** to display file menu, and select **File Manager**, the **File**

**Manager** dialog box pops up, as shown below.

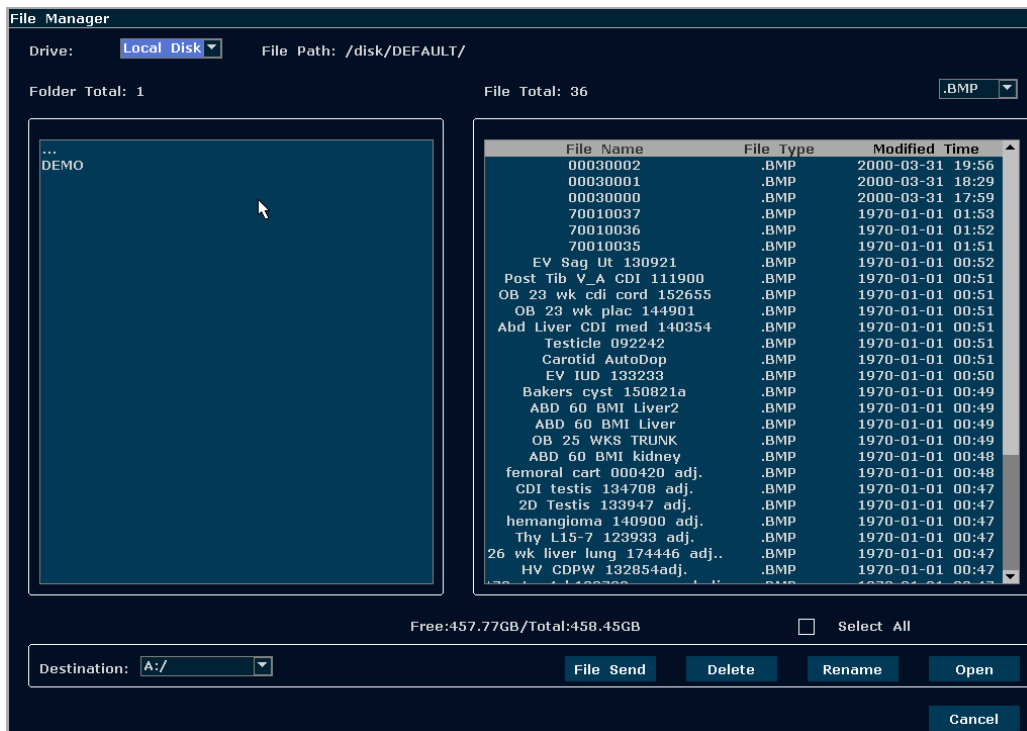



Figure 6-26 File Manager

### Basic operations:

- ◆ Select a file format from the pull-down menu , such as BMP/ JPG/ DCM/ FRM/ CIN/ AVI/PDF to display files in one type, or select \*.\* to display all files.
- ◆ Point to a file, press **Set** to select it, and press **Set** again to deselect it; the system supports multi-choice by default; check the **Select All** checkbox to select all files, and then you can perform following operations: **File Send**, **Delete** and **Open**.
- ◆ Click on the headings of the file list: **File Name**, **File Type** or **Modified Time** to rearrange the file sequence according to the file name, file type or modified time (in ascending/descending order).

### NOTE:

1. When you are sending, deleting or renaming a file, do not connect or disconnect the USB disk.
2. USB disk must be in FAT32 format, while hard disk must be in EXT2 format.
3. Do not use the USB disk for other uses, but only for this device. Otherwise the storage and the transmission function may not be stable.
4. We suggest that you use the USB disk or hard disk supplied or recommended by EDAN.

**To send files**

1. Press **File**, and select **File Manager** in the file menu.
2. Select a desired drive from the **Drive** pull-down menu and press **Set**, point to the file or folder that need to be sent and press **Set**.
3. Select a destination drive from the **Destination** pull-down menu. The destination drive includes local disk, USB-disk, DVD drive or DICOM server (If DICOM function is installed).
4. If the destination drive is DICOM server, press **File Send** to send the DICOM and CIN files to DICOM server directly.

If the destination drive is local disk or USB-disk press **File Send** to open the **File Send** dialog box, select a target folder on the left, or press **New Folder** to create a folder for storing files. Press **OK** to send files to the target directory.

If the destination drive is DVD drive, press **File Send** to burn the selected files to DVD disk directly.

**To delete a file folder/file**



1. Select a desired drive from the **Drive** pull-down menu and press **Set**.
2. Point to the file folder/file that needs to be deleted, and press **Set**.
3. Press **Delete**, and you will be prompted whether to delete the files.
4. Press **Yes** to delete the files, or **No** to give up.

**To rename a file**

1. Select a desired drive from the **Drive** pull-down menu and the file format, and then press **Set**.
2. Point to the file that needs to be renamed, and press **Set**.
3. Press **Rename** to open the **Input new name for the file** dialog box, enter a new file name with the keyboard.
4. Press **OK** to rename the file, or **Cancel** to give up.

**To open files**

1. Select a desired drive from the **Drive** pull-down menu and file format, and then press **Set**.
2. Point to the file that needs to be opened and press **Set**, press **Open** or double click on the file, a prompt *Loading file...* is displayed in the middle of the screen.
3. If the file format is FRM/CIN, cine images will be loaded. You can perform Cine review, measurements, or add comments/body marks and print them out in reports; if the file format is BMP/JPG/DCM, the system will enter image browsing status: check the multi-choice checkbox to browse the selected files in file list, uncheck the checkbox to browse all files.

Press  to open the previous image, and  to open the next image; press

Press **Play** to perform automatic browsing, and press **Stop** to stop automatic browsing; press **Exit** or **Esc** to exit.

4. Press **Open** without selecting any file will open the first file.

#### NOTE:

1. Images that have not yet been saved in the saving zone can not be loaded.
2. When saving or loading an image is still in process (prompt instruction *Saving file...* or *Loading file...*), please do not perform any other operation. This is to avoid damaging the device.
3. You should freeze the system before opening Cine images.
4. The external DVD drive is connected to the system via an USB cable. The DVD/CD disk should be a new and blank one and it only supports single burning.
5. DVD drive only supports burning. The files burned to DVD can not be read on this system.

### 6.12.3. Sending Files

If you have installed the DICOM software, and the DICOM presetting has been performed correctly, you can send images / files.

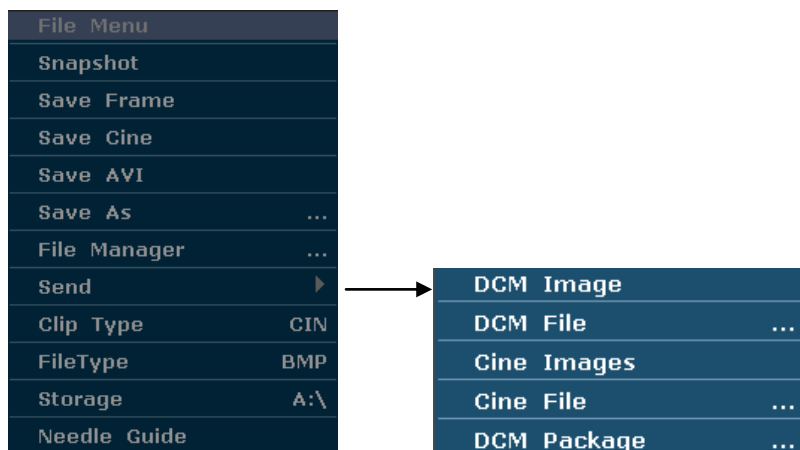


Figure 6-27 File Menu (with DICOM Function)

#### To send a DCM Image

1. Highlight the submenu **DCM Image**, and then press **Set**.
2. If the server is running normally, the current image will be sent to the server.
3. The system displays a prompt indicating the successful transmission.

**To send a DCM file**

1. Highlight the submenu **DCM File**, and then press **Set**.
2. The system displays the **File Opening** Dialog Box for selecting a DCM file to be transmitted.
3. If the server is running normally, the selected file will be sent to the server.
4. The system displays a prompt indicating the successful transmission.

**To send a DCM package**

1. Highlight the submenu **DCM package**, and then press **Set**.
2. The system displays the **File Opening** Dialog Box for selecting the drive: local disk or USB disk.
3. If the server is running normally, all the DCM files of the selected drive will be sent to the server.
4. The progress bar disappears after successful transmission.

**To send Cine Images**

1. Freeze the system.
2. Press **File** to enter the file menu.
3. Highlight the submenu **Cine Images**, and then press **Set**.
4. If the server is running normally, the current Cine images will be sent to the server.
5. The progress bar disappears after successful transmission.

**To send a Cine File**

1. Highlight the submenu **Cine File**, and then press **Set**.
2. The system displays the **File Opening** Dialog Box for selecting a cine file to be transmitted.
3. If the server is running normally, the selected file will be sent to the server.
4. The progress bar disappears after successful transmission.

## 6.13. Needle Guide Function

**NOTE:** Use proper disinfection technique at all times to perform a biopsy.

Always follow these basic precautions:

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**WARNING**

1. Sterilize the needle guide before the first use and after each use.
  2. Always handle transducers and needle guide adaptors with care. Do not use a transducer or an adaptor if it has been dropped or struck against a hard surface until it is inspected by an EDAN customer engineer.
  3. The displayed needle guide pathway on the EDAN video monitor is intended for reference during biopsy procedures. A variety of factors outside EDAN's control, such as changing tissue density, bending of the needle, off-axis pressure by the person holding the transducer, may cause deflection of a needle outside of the displayed video pathway even when the transducer, needle guide, and the system software are all performing as intended and within manufacturing specification. The specialist performing a biopsy procedure must be aware of potential external factors when executing an invasive procedure.
  4. The caliper must be placed along the needle path. If not, the displayed measurements may be incorrect.
  5. EDAN needle guides are designed and manufactured to attach firmly to designated transducers and should not require excessive force to assemble or disassemble. If it appears that excessive force or manipulation is required to assemble or disassemble needle guide components, please contact your EDAN customer engineer before using it.
- 
- 

### **6.13.1. Installing Needle Guide Bracket**

Installing needle guide bracket:

Step 1: Take needle guide bracket kit out from the package and check it carefully for any damage. Identity the appropriate needle guide bracket kit (for the unique matching needle guide bracket kit of each probe, see [Table 3-1 Needle Guide Bracket Kits](#) of the user manual). The structure of needle guide bracket kit is shown in [Figure 6-28](#).

---

---

**WARNING**

The needle guide bracket kits are not disinfected or sterilized before delivery. The operators must clean and sterilize the needle guide bracket kits before and after each use. For detailed operations, see [12.2.2 Needle Guide Bracket Cleaning and Sterilization](#)

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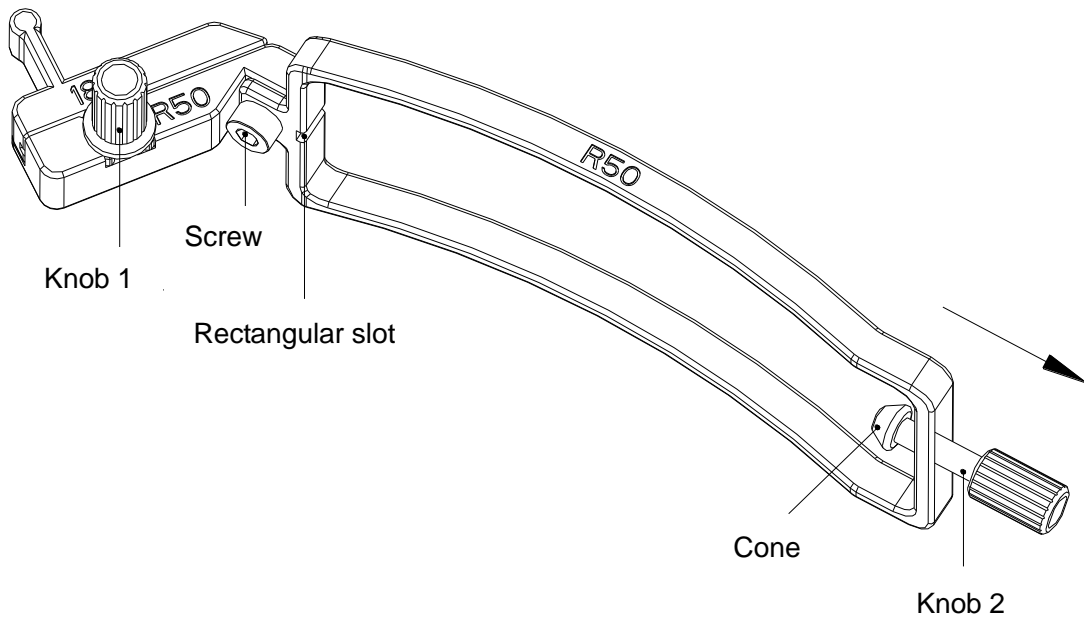


Figure 6-28 Structure of Needle Guide Bracket Kit

Step 2: Check if the screw and knob 1 come loose. If so, fasten the screw with an inner hexagon spanner, and fix the knob 1 with fingers; turn the knob 2 counterclockwise until it stops (with normal force), as the arrow direction shown in Figure 6-28.

Step 3: Attach the needle guide bracket kit to the matching probe by placing the bracket over the head of the probe until it locks in place, as shown in Figure 6-31. Ensure that the rectangular slot of the bracket catch in the convex at the probe tip; ensure that the cone of knob 2 catch in the notch at the probe tip; and then turn the knob 2 clockwise until it locks in place, as the arrow direction shown in Figure 6-32.

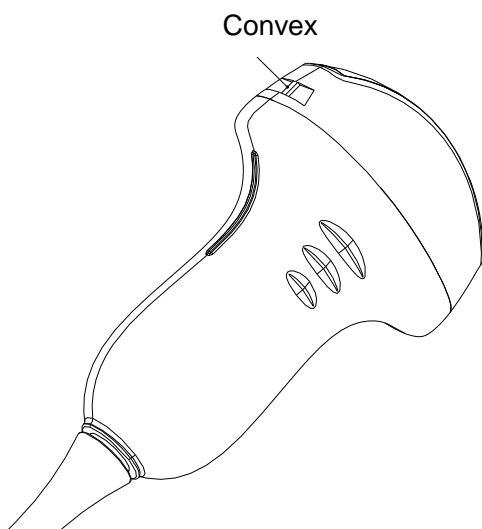


Figure 6-29 Convex of Probe

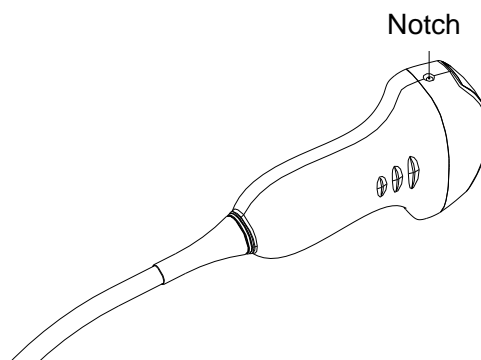


Figure 6-30 Notch of Probe



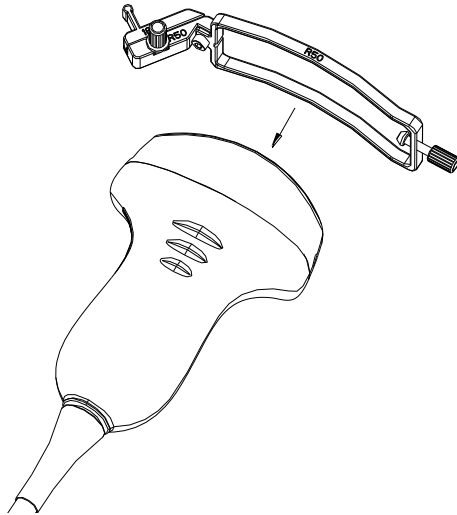


Figure 6-31 Attaching Bracket Kit to Probe

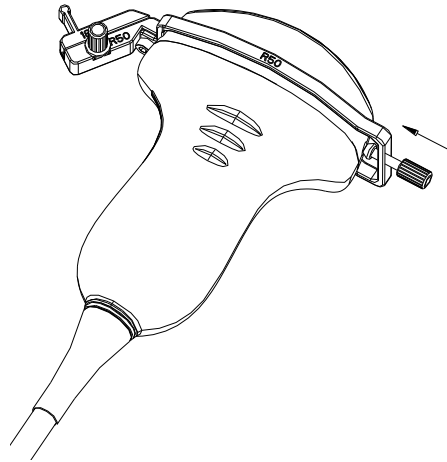


Figure 6-32 Turning Knob 2 Clockwise

Step 4: Insert the needle into the rectangular hole, as shown in *Figure 6-33*.

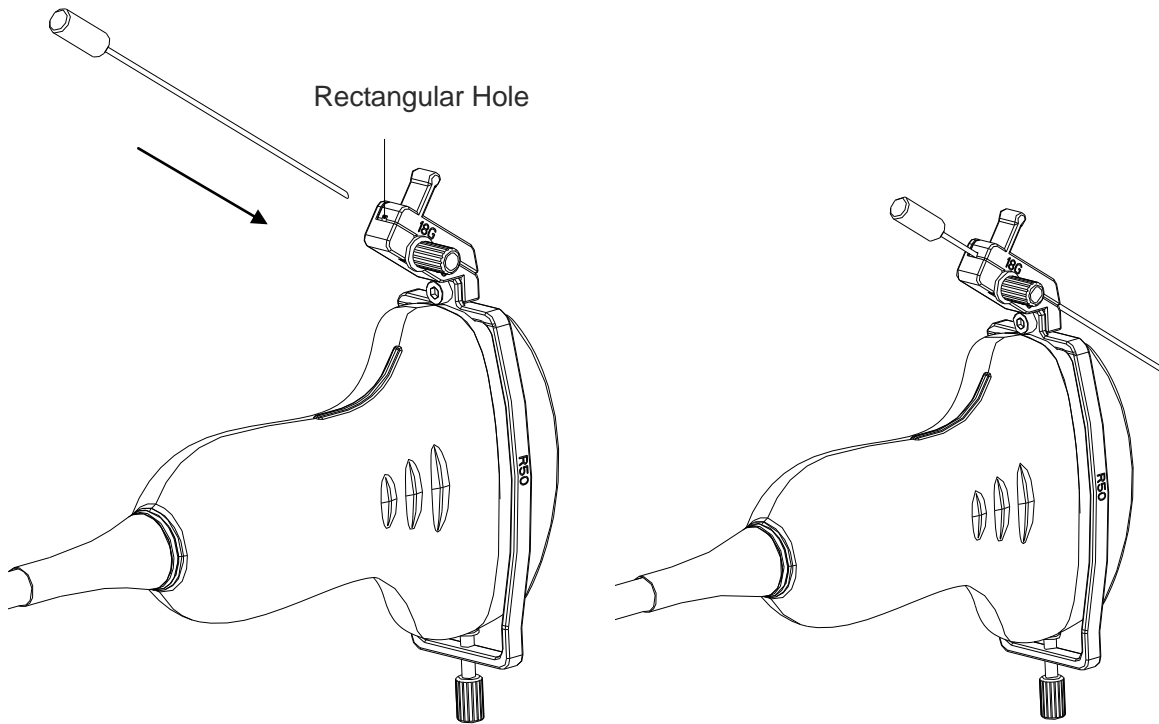


Figure 6-33 Inserting Needle into Rectangular Hole

Step 5: To replace probe, needle, vessel, or to remove bracket, turn the knob 1 counterclockwise (slightly), remove the vessel as the arrow direction shown in *Figure 6-34*, and then replace the probe, needle, vessel, or remove the bracket if necessary. To replace a vessel, perform the reverse procedures. Models of the supported vessel are shown in *Figure 6-35*.

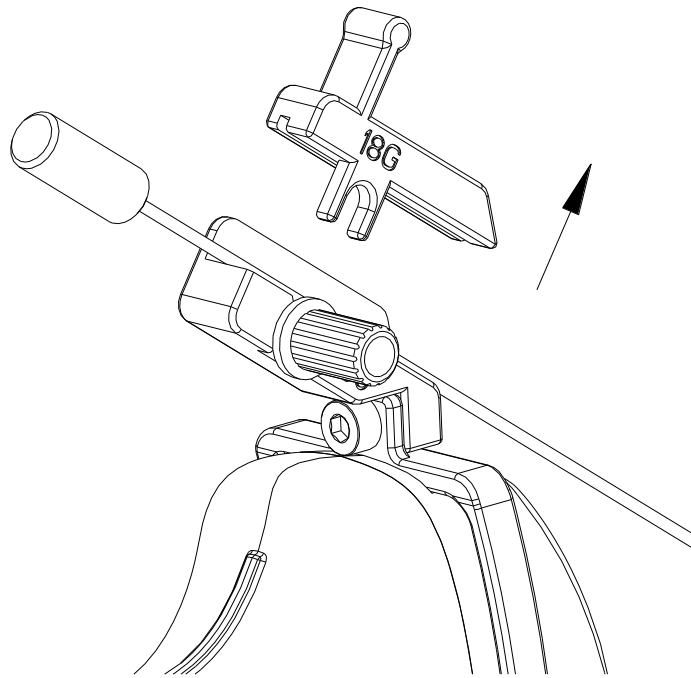


Figure 6-34 Removing the Vessel

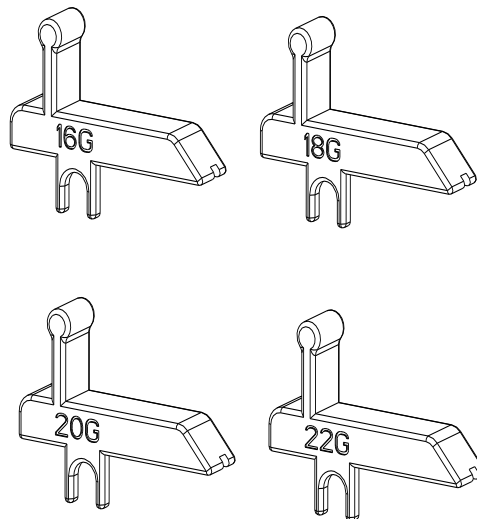


Figure 6-35 Vessel Models

### 6.13.2. Activating Needle Guide Function

To enable the needle guide function:

1. In the real-time or measurement state of B mode imaging, press **File** on the keyboard, highlight **Needle Guide** and then press the **Set** to activate Needle Guide function.

Or, press **Set up>System Preset**, and set one of the user-defined keys (**F1/F2/F3/F4**) as the Needle Guide key. In the real-time or measurement state of B mode imaging, press user defined keys **F1/F2/F3/F4** or the **Needle** key on PC keyboard to activate Needle Guide function.

2. Prompt information “**Please calibrate the needle guide line before each puncture!**” is displayed on the screen. Press **OK** and enter the needle guide function and a needle guide

menu is displayed, as shown below.

Needle Guide	
* Guide Line	A
* Display	✓
* Position	-37.2
* Angle	122.5
* Verify	
* Factory Defaults	
Bracket Sel	▶

Figure 6-36 Needle Guide Menu

### **WARNING**

DO NOT freeze the system when doing puncture.

#### **NOTE:**

There are no more than 3 needle guide lines for each puncture frame.

### **6.13.3. To Select the Angle of Needle Guide Line**

If the puncture frame has several kinds of angle, you can highlight **Guide Line** in the needle guide menu and press the **Set** to make a choice, and the system displays the angle.

### **6.13.4. To Display or To Hide the Needle Guide Line**

Highlight **Display** in the needle guide menu, and press the **Set** key repeatedly to display or to hide the needle guide line.

### **6.13.5. To Adjust the Needle Guide Line**

Needle guide line has been verified when the device is produced. The value is saved in Factory data. But after a period of use, the needle guide line needs to be adjusted since the real value may be changed.

### **WARNING**

1. Prior to each puncture, calibrate the needle guide line.
2. If the needle position is not the same as the needle guide line position, do not do the puncture.

**To calibrate the guide line (performing phantom cal):**

1. Put the assembled puncture kit, put the probe in to water phantom, and perform the water scan;
2. Adjust the position and angle of needle to comply with the guide line as shown below;
3. Select **Verify** to save the verified value.

## ◆ To verify the needle guide line:

Move the needle guide line horizontally

Highlight **Position**, and press the **Set** key to increase the value, or rotate the **Position** menu control to increase or decrease the value, and the value is displayed in the menu option.

## ◆ To adjust the angel of needle guide line:

Enter **Angle** option to adjust the angle. Operation procedure is the same as that of the **Position**.

## ◆ To save the verified value:

After verifying the position and the angle, highlight **Verify** and press the **Set** key, and the system saves the verified value. After restarting the system, the verified value is activated.

## ◆ To save the factory data:

Highlight **Factory Defaults** and press the **Set** key to load the factory data.

## ◆ To select the bracket:

If the probe has different brackets, you can use **Bracket Sel** option to select the bracket.

**6.13.6. Performing Puncture Function**

To perform puncture:

1. The needle guide line is displayed on the image of the ultrasound system, and the numbers on the right of the menu stand for the situation of puncture;
2. Align the needle guide line with the target;
3. Get the sample of the target;
4. Move the probe away from the patient carefully.

## Chapter 7 Kidney Measurements & Calculations

### 7.1. Measurements and Calculations

The kidney examination is usually performed in the B mode.

1. Press **Transducer**, select a desired probe model and the exam mode **Kidney**, and then press **OK**, or double click on the exam type.
2. Press **B** to enter the B mode.
3. Press **Measure** to activate the application measurement function. The measurement menu is displayed.

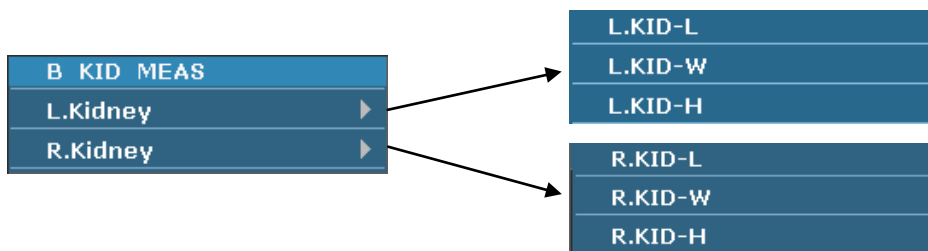


Figure 7-1 Kidney Measurement and Calculation Menu

**To measure kidney:**

1. In the kidney measurement menu, roll the trackball to highlight **L.Kidney/R.Kidney**, select **L.KID-L/L.KID-W/L.KID-H**, or **R.KID-L/R.KID-W/R.KID-H** from the submenu, and then press **Set**.
2. Measure KID-L, KID-W, or KID H, by the method of distance measurement.



[Reference](#) Section [6.5.1 Generic Measurements in B Mode](#)

3. After the measurement, the result of kidney will be displayed in the measurement result window.

### 7.2. Kidney Report

After the kidney examination, the system generates a kidney worksheet.

1. Select a desired probe model and the exam mode **Kidney**.
2. In B mode, after application measurements press **Report** to open **Kidney worksheet**, as shown below:

**Kidney worksheet**

Hospital:  2000/03/31  
 Host:  ID:  22:53:41  
 Name:  Age:  Sex:   
 Accession#  Species:  Neutered:

---

**Kidney**

	Left		Right
L.KID-L	<input type="text"/>	L.KID-L	<input type="text"/>
L.KID-W	<input type="text"/>	L.KID-W	<input type="text"/>
L.KID-H	<input type="text"/>	L.KID-H	<input type="text"/>

Diagnosis:

**Print** **Image** **Save PDF** **OK** **Cancel**

**Kidney worksheet**

Figure 7-2 Kidney Worksheet

The diagnosis editing column displays the cursor “I”, and you can enter diagnosis information.

For specific operations of editing or printing the report, please refer to Section 6.7 Worksheet(Report).

## Chapter 8 Abdominal Measurements & Calculations

### 8.1. Measurements and Calculations

The abdominal examination is usually performed in the B mode.

1. Press **Transducer**, select a desired probe model and the exam mode **Abd-Small/Abd-Medium/Abd-Large**, and then press **OK**, or double click on the exam type.
2. Press **B** to enter the B mode.
3. Press **Measure** to activate the application measurement function. The measurement menu is displayed.

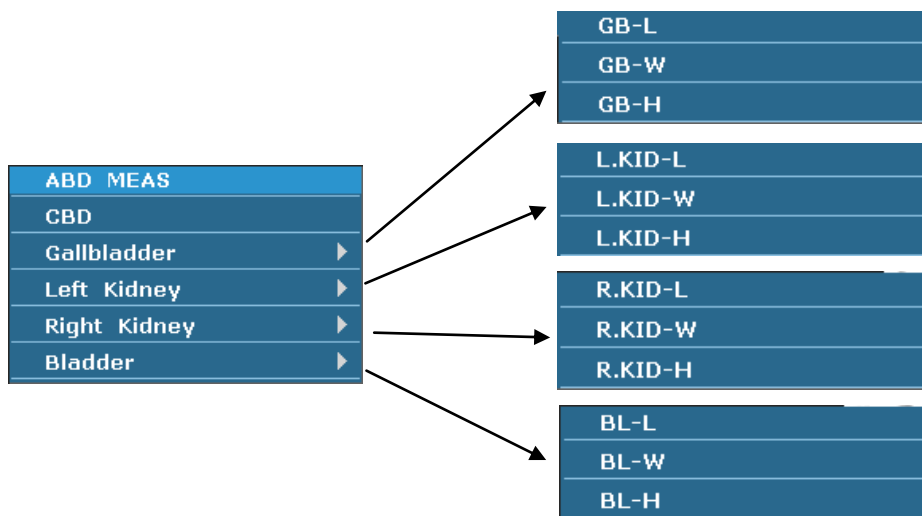


Figure 8-1 Abdominal Measurement and Calculation Menu

#### Items of Measurement and Calculation

CBD, Gallbladder, Left Kidney, Right Kidney, and Bladder.

#### 8.1.1. CBD

- 1 In the abdominal measurement menu, roll the trackball to highlight **CBD**, and then press **Set**.
- 2 Measure CBD by the method of distance measurement.



[Reference](#) Section [6.5.1 Generic Measurements in B Mode](#)

- 3 After the measurement, the result of CBD will be displayed in the measurement result window.

### 8.1.2. Gallbladder

1. In the abdominal measurement menu, roll the trackball to highlight **Gallbladder**, select **GB-L**, **GB-W** or **GB-H** from the secondary menu, and then press **Set**.
2. Measure GB-L, GB-W or GB-H by the method of distance measurement.



Reference Section 6.5.1 Generic Measurements in B Mode

3. After the measurement, the result of gallbladder will be displayed in the measurement result window.

### 8.1.3. Kidney

1. In the abdominal measurement menu, roll the trackball to highlight **Left Kidney/Right Kidney**, select **L.KID-L/L.KID-W/L.KID-H**, or **R.KID-L/R.KID-W/R.KID-H** from the secondary menu, and then press **Set**.
2. Measure KID-L, KID-W, or KID H, by the method of distance measurement.



Reference Section 6.5.1 Generic Measurements in B Mode

3. After the measurement, the result of kidney will be displayed in the measurement result window.

### 8.1.4. Bladder

1. In the abdominal measurement menu, roll the trackball to highlight **Bladder**, select **BL-L**, **BL-W**, or **BL-H** from the secondary menu, and then press **Set**.
2. Measure BL-L, BL-W, or BL-H, by the method of distance measurement.



Reference Section 6.5.1 Generic Measurements in B Mode

3. After the measurement, the result of bladder will be displayed in the measurement result window.



## 8.2. Abdominal Report

After the abdominal examination, the system generates an abdominal worksheet.

1. Select a desired probe model and the exam mode **Abd-Small/ Abd-Medium/ Abd-Large**.
2. In B mode, after application measurements press **Report** to open **Abdominal worksheet**, as shown below:

**Abdominal worksheet**

Hospital:  2000/03/31  
Host:  ID:  22:27:35  
Name:  Age:  Sex:   
Accession#:  Species:  Neutered:

GB Kidney Bladder

CBD  GB-L   
GB-W   
GB-H

Diagnosis:

Print Image Save PDF OK Cancel

abdominal worksheet

Figure 8-2 Abdominal Worksheet

The diagnosis editing column displays the cursor “I”, and you can enter diagnosis information.

For specific operations of editing or printing the report, please refer to Section 6.7 Worksheet(Report).

# Chapter 9 Obstetric Measurements and Calculations

The obstetric examination is usually performed in the B mode.

To enter B mode obstetric examination:

- 1 Press **Transducer**, select a desired probe model and the exam mode: **OB Canine**, **OB Feline**, **OB Equine**, **OB Bovine**, **OB Ovine**, or **OB Others**, and then press **OK**, or double click on the exam type.
- 2 Press **B** to enter B mode.
- 3 Press **Measure** to activate the application measurement function. The system displays the measurement menu as shown in *Figure 9-1*.

## 9.1. Obstetric Measurements and Calculations in B Mode

Items of Measurement and Calculation

CRL, GSD, GSD-H, GSD-V, HD, TD, BD, BPD and MA.

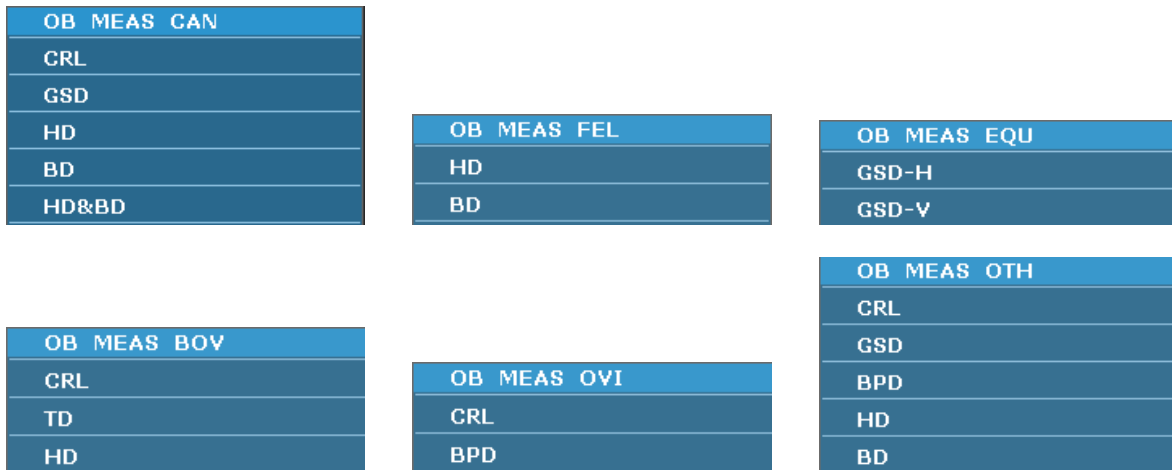


Figure 9-1 Obstetrics Measurement and Calculation Menu

Label	Description	Channel	Method	Results display
CRL	Crown Rump Length	1	Distance (mm)	The measurement results will be displayed in the result window
GSD	Gestational Sac Diameter	1		
GSD-H	Gestational Sac Diameter-Horizontal	1		
GSD-V	Gestational Sac Diameter-Vertical	1		
HD	Head Diameter	1		
TD	Trunk Diameter	1		
BD	Body Diameter	1		
BPD	Biparietal Diameter	1	According to species, described in Appendix III	
MA	Menstrual Age	1		

Table 9-1 Obstetrics Measurement & Calculation

## 9.2. Canine Obstetrics Measurements

When the exam mode **OB Canine** is selected, the **OB MEAS CAN** menu is displayed after entering the obstetrics measurement.

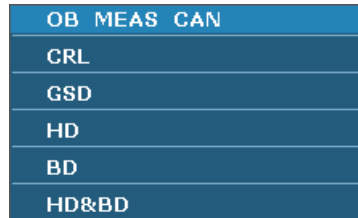


Figure 9-2 Canine Obstetrics Measurement and Calculation Menu

After measuring one or more measurement items of GSD, CRL, HD, BD, HD&BD, the system will calculate the MA automatically and display the result.

### 9.2.1. CRL

To measure CRL:

1. In the **OB MEAS CAN** menu, roll the trackball to highlight the menu **CRL**, press the **Set** key, and move the cursor to image and display “+”.
2. Measure CRL, in the method of distance measurement.

For more information on B-mode generic distance measurements, please refer to section [6.5.1 \*Generic Measurements in B Mode\*](#)

3. The result is displayed in the measured result window.
4. To begin a new CRL measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

### 9.2.2. GSD

To measure GSD:

1. In the **OB MEAS CAN** menu, roll the trackball to highlight the menu **GSD**, press the **Set** key, and move the cursor to image and display “+”.
2. Measure GSD, in the method of distance measurement.

For more information on B-mode generic distance measurements, please refer to section [6.5.1 \*Generic Measurements in B Mode\*](#).

3. The result is displayed in the measured result window.
4. To begin a new GSD measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

### 9.2.3.HD

To measure HD:

1. In the **OB MEAS CAN** menu, roll the trackball to highlight the menu **HD**, press the **Set** key, and move the cursor to image and display “+”.
2. Measure HD, in the method of distance measurement.

For more information on B-mode generic distance measurements, please refer to section [6.5.1 Generic Measurements in B Mode](#).

3. The result is displayed in the measured result window.
4. To begin a new HD measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

### 9.2.4.BD

To measure BD:

1. In the **OB MEAS CAN** menu, roll the trackball to highlight the menu **BD**, press the **Set** key, and move the cursor to image and display “+”.
2. Measure BD, in the method of distance measurement.

For more information on B-mode generic distance measurements, please refer to section [6.5.1 Generic Measurements in B Mode](#).

3. The result is displayed in the measured result window.
4. To begin a new BD measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

### 9.2.5.HD&BD

To measure HD&BD:

1. In the **OB MEAS CAN** menu, roll the trackball to highlight the menu **HD&BD**, press the **Set** key, and move the cursor to image and display “+”.
2. Measure HD&BD, in the method of distance measurement.

For more information on B-mode generic distance measurements, please refer to section [6.5.1 Generic Measurements in B Mode](#).

3. The result is displayed in the measured result window.
4. To begin a new HD&BD measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

### 9.3. Feline Obstetrics Measurements

When the exam mode **OB Feline** is selected, the **OB MEAS FEL** menu is displayed after entering the obstetrics measurement.

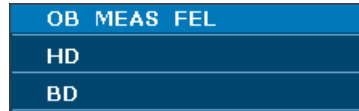


Figure 9-3 Feline Obstetrics Measurement and Calculation Menu

After measuring one or both of the two measurement items, HD, BD, the system will calculate the MA automatically and display the result.

The measurements of HD and BD are the same with those of the Canine Obstetrics Measurement; please refer to section [9.2.3 HD](#) and [9.2.4 BD](#) respectively.

### 9.4. Equine Obstetrics Measurements

When the exam mode **OB Equine** is selected, the **OB MEAS EQU** menu is displayed after entering the obstetrics measurement.



Figure 9-4 Equine Obstetrics Measurement and Calculation Menu

After measuring one or both of the two measurement items, GSD-H, GSD-V, the system will calculate the MA automatically and display the result.

#### 9.4.1. GSD-H

To measure GSD-H:

1. In the **OB MEAS EQU** menu, roll the trackball to highlight the menu **GSD-H**, press the **Set** key, and move the cursor to image and display “+”.
2. Measure GSD-H, in the method of distance measurement.

For more information on B-mode generic distance measurements, please refer to section [6.5.1 \*Generic Measurements in B Mode.\*](#)

3. The result is displayed in the measured result window.
4. To begin a new GSD-H measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

### 9.4.2. GSD-V

To measure GSD-V:

1. In the **OB MEAS EQU** menu, roll the trackball to highlight the menu **GSD-V**, press the **Set** key, and move the cursor to image and display “+”.
2. Measure GSD-V, in the method of distance measurement.

For more information on B-mode generic distance measurements, please refer to section [6.5.1 Generic Measurements in B Mode](#).

3. The result is displayed in the measured result window.
4. To begin a new GSD-V measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

## 9.5. Bovine Obstetrics Measurements

When the exam mode **OB Bovine** is selected, the **OB MEAS BOV** menu is displayed after entering the obstetrics measurement.

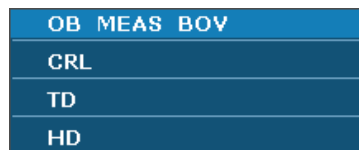


Figure 9-5 Bovine Obstetrics Measurement and Calculation Menu

After measuring one or more measurement items of CRL, TD, HD, the system will calculate the MA automatically and display the result.

The measurements of CRL and HD are the same as those of the Canine Obstetrics Measurement, please refer to section [9.2.1 CRL](#) and [9.2.3 HD](#) respectively.

To measure TD:

1. In the **OB MEAS BOV** menu, roll the trackball to highlight the menu **TD**, press the **Set** key, and move the cursor to image and display “+”.
2. Measure TD, in the method of distance measurement.

For more information on B-mode generic distance measurements, please refer to section [6.5.1 Generic Measurements in B Mode](#).

3. The result is displayed in the measured result window.
4. To begin a new TD measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

## 9.6. Ovine Obstetrics Measurements

When the exam mode **OB Ovine** is selected, the **OB MEAS OVI** menu is displayed after entering the obstetrics measurement.

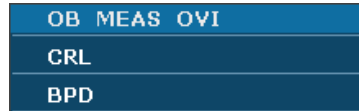


Figure 9-6 Ovine Obstetrics Measurement and Calculation Menu

After measuring one or both of the two measurement items, CRL, BPD, the system will calculate the MA automatically and display the result.

The measurement of CRL is the same as that of the Canine Obstetrics Measurement, please refer to section [9.2.1 CRL](#).

To measure BPD:

1. In the **OB MEAS OVI** menu, roll the trackball to highlight the menu **BPD**, press the **Set** key, and move the cursor to image and display “+”.
2. Measure BPD, in the method of distance measurement.

For more information on B-mode generic distance measurements, please refer to section [6.5.1 Generic Measurements in B Mode](#).

3. The result is displayed in the measured result window.
4. To begin a new BPD measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

## 9.7. Other Obstetrics Measurements

When the exam mode **OB Others** is selected, the **OB MEAS OTH** menu is displayed after entering the obstetrics measurement.

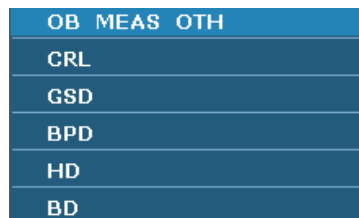


Figure 9-7 Other Obstetrics Measurements and Calculation Menu

The measurements of **CRL**, **GSD**, **HD**, and **BD** are the same as those of the Canine Obstetrics Measurement. Please refer to section [9.2.1 CRL](#), [9.2.2 GSD](#), [9.2.3 HD](#) and [9.2.4 BD](#).

The measurement of **BPD** is the same with that of Ovine Obstetrics Measurement. Please refer to section [9.6 Ovine Obstetrics Measurement](#).

## 9.8. Obstetric Report

After obstetric examination, the system generates an obstetrical diagnosis worksheet automatically, and the worksheet includes the information of the animal, the measurements and calculations, and the diagnosis.

1. Select a desired probe model and the exam mode **OB Canine**, **OB Feline**, **OB Equine**, **OB Bovine**, **OB Ovine**, or **OB Others**.
2. In B mode, after application measurements press **Report** to open **Obstetric worksheet**, as shown below:

Figure 9-8 Canine Obstetric Worksheet

The diagnosis editing column displays the cursor “I”, and you can enter diagnosis information.

### NOTE:

1. The system will display the completed measurements and calculations, the uncompleted measurements and calculations will not be displayed.
2. You can check the measured items by opening the **Obstetric worksheet** dialog box whenever you want, during measurement or after that. Then press **OK** or **Cancel** to close the dialog box, and continue to measure.

For specific operations of editing or printing the report, please refer to Section 6.7 Worksheet(Report).



## Chapter 10 Cardiac Measurements and Calculations

The cardiac examination is usually performed in the B mode, B+M mode or PW mode.

Press **Transducer**, select a desired probe model and the exam mode **Cardiac**, and then press **OK**, or double click on the exam type.

The result of ventricle volume measurement is more exact in two-dimension. You can get the two-dimension heart image of end diastolic and end systolic exactly and conveniently in the B+M mode. So we suggest that you do the cardiac measurement and calculation in the B+M mode.

### 10.1. Cardiac Measurements and Calculations in M Mode

Press **M** to enter B+M mode, or press **M** again to enter single M mode. Press **Measure** to activate the application measurement function. The system displays the measurement menu shown as below.

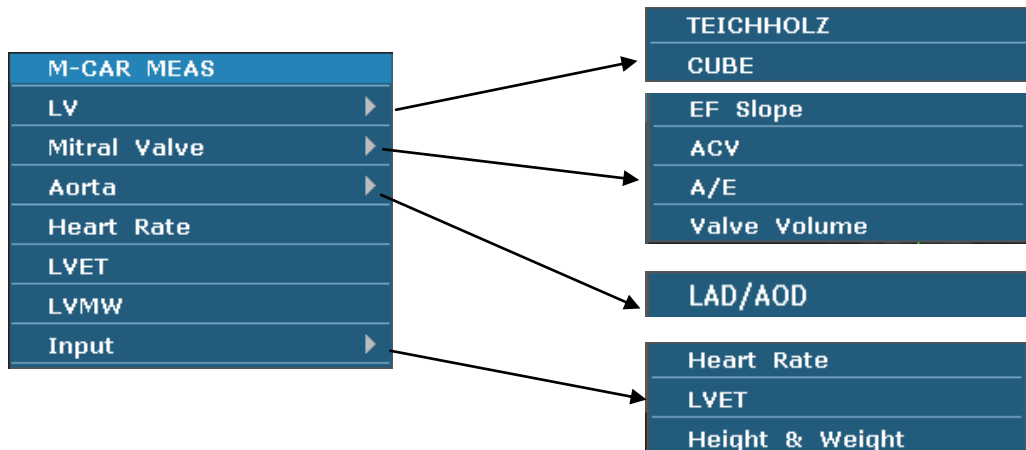


Figure 10-1 M Mode Cardiac Measurement and Calculation Menu

#### 1. Items of Measurement and Calculation

M-CARDIAC MEAS: LV, Mitral, Heart Rate, LVET, and LVMW.

#### 2. Items of input

Heart Rate, LVET, and Height &Weight.

The formulas of B+M mode and M mode cardiac LV measurement include TEICHHOLZ and CUBE, as shown below, and the default formula is TEICHHOLZ.

**1. CUBE formula:****NOTE:** d: end diastolic; s: end systolic

Label	Description	Method
LVIDd	Left Ventricle Internal Diameter	Distance (mm)
LVIDs	Left Ventricle Internal Diameter	
ET	Ejection Time	Time (ms or s)
HR	Heart Rate	M mode heart rate measurement or key in (bpm)
EDV	End Diastolic Volume	$EDV (mL) = LVIDd^3(mm)^3/1000$
ESV	End Systolic Volume	$ESV (mL) = LVIDs^3(mm)^3/1000$
SV	Stroke volume	$SV (mL) = EDV (mL) - ESV (mL)$
CO	Cardiac Output	$CO (L/min) = SV (mL) \times HR (bpm)/1000$
EF	Ejection fraction (M mode)	$EF (No\ unit) = SV (mL) / EDV (mL) \times 100\%$
FS	Fractional Shortening	$FS (No\ unit) = \{ [LVIDd (mm) - LVIDs (mm)] / LVIDd (mm) \} \times 100\%$
SI	Stroke Index	$SI (No\ unit) = SV (mL) / BSA (m^2)$
CI	Cardiac Index	$CI (No\ unit) = CO (L/min) / BSA (m^2)$
MVCF	Mean Velocity Circumferential Fiber Shortening	$MVCF (No\ unit) = \{ [LVIDd (mm) - LVIDs (mm)] / [LVIDd (mm) \times ET (ms)] \} / 1000$
BSA	Body Surface Area	Calculate by the selected formula ( $m^2$ )

Table 9-1 Measurement and Calculation Items with CUBE formula

The formulas of BSA calculation:

Canine:  $BSA = 0.112 * WT^{0.67}$ ;Feline:  $BSA = 0.098 * WT^{0.67}$ ;Equine:  $BSA = 1.09 + 0.008 * WT$ ;Bovine:  $BSA = 0.14 * WT^{0.57}$ ;Ovine:  $BSA = 0.085 * WT^{0.67}$ ;Others:  $BSA = 0.112 * WT^{0.67}$ ;

HT: height, cm;

WT: weight, kg;

BSA: Body Surface Area  $m^2$ .

## 2. TEICHHOLZ formula:

**NOTE:** d: end diastolic; s: end systolic

Label	Description	Method
LVIDd	Left Ventricle Internal Diameter	Distance (mm)
LVIDs	Left Ventricle Internal Diameter	Distance (mm)
ET	Ejection Time	Time (ms or s)
HR	Heart Rate	M mode heart rate measurement or key in (bpm)
EDV	End Diastolic Volume	$EDV (mL) = \{7 \times LVIDd^3 (cm)^3\} / \{2.4 + LVIDd\}$
ESV	End Systolic Volume	$ESV (mL) = \{7 \times LVIDs^3 (cm)^3\} / \{2.4 + LVIDs\}$
SV	Stroke volume	$SV (mL) = EDV (mL) - ESV (mL)$
CO	Cardiac Output	$CO (L/min) = SV (mL) \times HR (bpm) / 1000$
EF	Ejection fraction (M mode)	$EF (No unit) = SV (mL) / EDV (mL) \times 100\%$
FS	Fractional Shortening	$FS (No unit) = \{ [LVIDd (mm) - LVIDs (mm)] / LVIDd (mm) \} \times 100\%$
SI	Stroke Index	$SI (No unit) = SV (mL) / BSA (m^2)$
CI	Cardiac Index	$CI (No unit) = CO (L/min) / BSA (m^2)$
MVCF	Mean Velocity Circumferential Fiber Shortening	$MVCF (No unit) = \{ [LVIDd (mm) - LVIDs (mm)] / \{ LVIDd (mm) \times ET (ms) / 1000 \} \}$
BSA	Body Surface Area	Calculate by the selected formula ( $m^2$ )

Table 10-2 Measurement and Calculation Items with TEICHHOLZ formula

## 3. Other measurement items:

Label	Description	Method
AOD	Aortic root Diameter	Distance (mm)
LAD	Left Atrium Diameter	
CA	Cardiac cycle apex A	
CE	Cardiac cycle apex E	
EF SLP	Ejection Fraction Slope	Slope (mm/s)
ACV	AC Decreasing Velocity	
DEV	Deceleration Velocity	

DCT	Deceleration Time	Time (ms or s)
MAVO1	Aortic Valve Volume Opened, beginning	Distance (mm)
MAVO2	Aortic Valve Volume Opened, ending	
AA	Aortic Amplitude	
LVMW	Left Ventricular Muscle Weight	$LVMW (g) = 1.04 * \{IVSTd (cm) + LVIDd (cm) + LVPWd (cm)\}^3 - LVIDd^3 (cm)^3 - 13.6$
LVMWI	Left Ventricular Muscle Weight Index	$LVMWI (No unit) = LVMW / BSA$
A/E	The ratio of CA to CE	$A/E (No unit) = CA (mm) / CE (mm)$
LAD/AOD	Left Atrium Diameter / Aortic root Diameter	$LAD/AOD (No unit) = LAD (mm) / AOD (mm)$
QMV	Mitral Valve Flow	$QMV (mL) = 4 * DEV (cm/s) * DCT (s)$

Table 10-3 Other Measurement Items

#### 4. Calculation items:

Label	Description	Method
EDV	End Diastolic Volume	$EDV (mL) = LVIDd^3 (mm^3) / 1000$ CUBE formula
ESV	End Systolic Volume	$ESV (mL) = LVIDs^3 (mm^3) / 1000$ CUBE formula
SV	Stroke volume	$SV (mL) = EDV (mL) - ESV (mL)$
CO	Cardiac Output	$CO (L/min) = SV (mL) \times HR (bpm) / 1000$
EF	Ejection fraction (M mode)	$EF (No unit) = SV (mL) / EDV (mL) \times 100\%$
FS	Fractional Shortening	$FS (No unit) = [ \{LVIDd (mm) - LVIDs (mm)\} / LVIDd (mm) ] \times 100\%$
SI	Stroke Index	$SI (No unit) = SV (mL) / BSA (m^2)$
CI	Cardiac Index	$CI (No unit) = CO (L/min) / BSA (m^2)$
MVCF	Mean Velocity Circumferential Fiber Shortening	$MVCF (No unit) = \{ LVIDd (mm) - LVIDs (mm) \} / \{ LVIDd (mm) \times ET (ms) / 1000 \}$
BSA	Body Surface Area (m <sup>2</sup> )	Calculate by to the selected formula
LVMW	Left Ventricular Muscle Weight	$LVMW (g) = 1.04 * \{ [IVSTDd (cm) + LVIDd (cm) +$

		$LVPWd^3 (cm)^3 - LVIDd^3 (cm)^3 - 13.6$
LVMWI	Left Ventricular Muscle Weight Index	LVMWI (No unit) = LVMW/BSA
A/E	The ratio of CA to CE	A/E (No unit) = CA (mm)/CE (mm)
LAD/AOD	Left Atrium Diameter / Aortic root Diameter	LAD/AOD (No unit) = LAD (mm)/AOD (mm)
QMV	Mitral Valve Flow	QMV (mL) = 4*DEV (cm/s)*DCT (s)

Table 10-4 Calculation Items

### 10.1.1. LV

The B+M mode and M mode measurements of LV are based on EDV and ESV measurements, which are calculated by LVIDd and LVIDs measurements.

After measuring LVIDd and LVIDs and entering Heart Rate, LVET, and Height & Weight, the system calculates some physiological parameters, such as EDV, ESV, SV, EF, FS, CO, MVCF, SI, and CI.

There are two calculation formulas for heart antrum volume in the B+M mode and the M mode, as shown below.

Item	Formula
TEICHHOLZ	$EDV (mL) = \{7 \times LVIDd^3 (cm)^3\} / \{2.4 + LVIDd\}$ $ESV (mL) = \{7 \times LVIDs^3 (cm)^3\} / \{2.4 + LVIDs\}$
CUBE	$EDV (mL) = LVIDd^3 (mm)^3 / 1000$ $ESV (mL) = LVIDs^3 (mm)^3 / 1000$

Table 10-5 TEICHHOLZ and CUBE Formula

#### NOTE:

Ensure that the value of LVIDd is bigger than that of LVIDs, or the system can not display the calculation items.

SV and EF calculation is as below.

Measurement items:

LVIDd and LVIDs

To measure LV:

1. In the M-cardiac measurement menu, roll the trackball to highlight **LV**, and the submenu will be displayed. Select TEICHHOLZ or CUBE and press **Set**. Then move the cursor to the image area and a “+” is displayed.
2. Move the cursor to the end diastolic of left ventricle, and measure LVIDd The method is similar to generic M mode distance measurement. LVIDd and EDV will be displayed in the

measurement result window.

3. Move the cursor to the end systolic of the left ventricle, and then measure LVIDs. The method is the same as the generic M mode distance measurement method. LVIDs, ESV, SV, EF, and FS will be displayed in the measurement result window.

To enter HR

1. In the M-cardiac measurement menu, roll the trackball to highlight **Input**. Then select the submenu **Heart Rate** and press **Set** to display an **HR input** dialog box, as shown below.

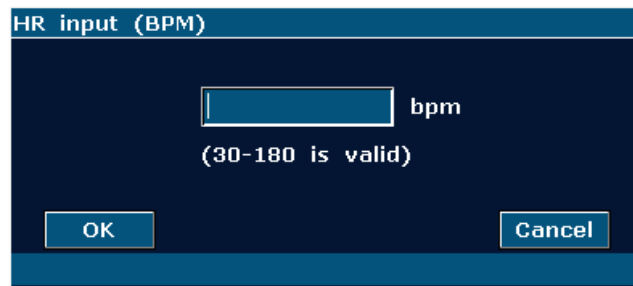


Figure 10-2 HR Input Dialog Box

2. Input a suitable value in the HR (bpm) box.
3. Roll the trackball to highlight **OK** and press **Set**, and after measuring LV, the result of CO will be displayed in the measurement result window.

To enter LVET

1. In the M-cardiac measurement menu, roll the trackball to highlight **Input**. Then select the submenu **LVET** and press **Set** to display an **ET input** dialog box, as shown below.

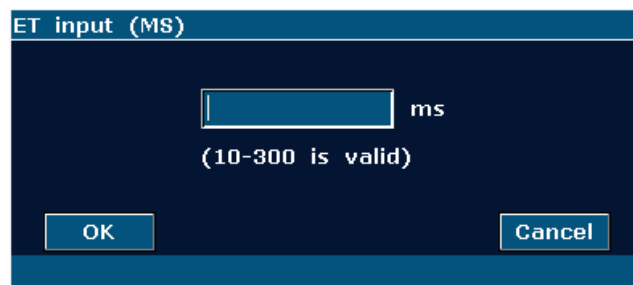


Figure 10-3 ET Input Dialog Box

2. Input a suitable value in the LVET (ms) box.
3. Roll the trackball to highlight **OK** and press **Set**.

To enter Height and Weight

1. In the M-cardiac measurement menu, roll the trackball to highlight **Input**. Then select the submenu **Height & Weight** and press **Set** to display a **Height and Weight** entering dialog box, as shown below.

Figure 10-4 Height and Weight Input Dialog Box

2. Input suitable values in the Height and Weight boxes.
3. Roll the trackball to highlight **OK** and press **Set**.

**The measurements and calculations of all the LV parameters are as below.**

Measurement or input items:

Input or measurement items: HR, LVET, and Height & Weight;

Measurement items: LVIDd and LVIDs

To calculate all the LV parameters:

1. Input or measure HR, LVET, and Height & Weight.
2. Measure LVIDd and LVIDs following the prompt instruction.
3. All the LV parameters, EDV, ESV, SV, FS, EF, CO, MVCF, SI and CI will be displayed in the measurement result window.

### 10.1.2. Mitral Valve

Measurement items of mitral valve include EF slope, ACV, A/E, DEV, and DCT.

**To measure EF slope, ACV, and A/E**

1. In the M-cardiac measurement menu, roll the trackball to highlight **Mitral Valve** to display the submenu.
2. Roll the trackball to highlight **EF Slope**, **ACV**, or **A/E**, and press **Set**.
  - a) To measure **EF Slope** and **ACV**, by the method of generic M mode slope measurement;
  - b) To measure **A/E**, measure the breadth from apex A to point C and the breadth from apex E to point C respectively, by the method of generic M mode distance measurement.
3. After the measurements, the results of EF SLP, ACV and A/E will be displayed in the measurement result window.

### To measure Valve Volume (QMV)

Calculation formula:

$$\text{QMV (mL)} = 4 * \text{DEV (cm/s)} * \text{DCT (s)}$$

Measurement operation procedure:

1. In the M-cardiac measurement menu, roll the trackball to highlight **Mitral** to display the submenu.
2. Roll the trackball to highlight **Valve Volume**, and press **Set**.
3. Measure DEV, by the method of generic M mode slope measurement.
4. Measure DCT, by the method of generic M mode time measurement.
5. After the measurement, the result of QMV will be displayed in the measurement result window.

### 10.1.3. Aorta

Aorta calculation is as below.

- Measurement items:

LAD/ AOD

- Aorta calculation

In the M-cardiac measurement menu, roll the trackball to highlight **Aorta** to display the submenu.

#### ✧ LAD/AOD measurement

1. Roll the trackball to highlight **LAD/AOD** and press **Set**.
2. Measure LAD and AOD respectively, by the method of generic M mode distance measurement.
3. The results will be displayed in the measurement result window.

### 10.1.4. LVMW, LVMWI

LVMW and LVMWI calculations are as below.

- Measurement items:

LVPWd, IVSTd and LVIDd

- The calculation formula

$$\text{LVMW (g)} = 1.04 * [ \{ \text{IVSTd (cm)} + \text{LVIDd (cm)} + \text{LVPWd (cm)} \}^3 - \text{LVIDd}^3 \text{ (cm)}^3 ] - 13.6$$

$$\text{LVMWI} = \text{LVMW (g)} / \text{BSA (m)}^2$$

- To calculate LVMW, LVMWI



1. In the M-cardiac measurement menu, roll the trackball to highlight **LVMW**, and press **Set**.
2. Measure LVPWd, IVSTd and LVIDd respectively following the prompt instruction.
3. After the measurements, the result of LVMW will be displayed in the measurement result window. The system will display LVWMI if you have keyed in Height and Weight before the measurement. If you had measured LV before, it will renovate the LV results.

## 10.2. Cardiac Measurements and Calculations in B Mode

1. Press **Probe**, select a desired probe model and the exam mode **Cardiac**, and then press **OK**, or double click on the exam type.
2. In B mode, press **Measure**, the system enters B mode cardiac measurement. The B mode cardiac measurement menus are shown as follows:

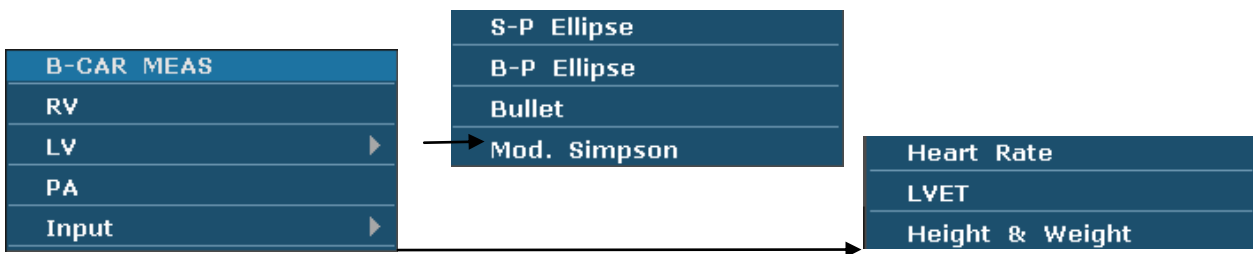


Figure 10-5 B Mode Cardiac Measurement and Calculation Menu

### 1. Items of Measurement and Calculation

B-CARDIAC MEAS: RV, LV, and PA.

### 2. Items of input

Heart Rate, LVET, and Height & Weight

The default measurements are LVLs, LVALs, LVLd, and LVALd measurements, by the method of single-plane ellipse (S-P Ellipse) measurement.

The formulas of B mode cardiac LV measurement include Single plane ellipse (S-P Ellipse), Dual plane ellipse (B-P Ellipse), Bullet, and Modified Simpson (Mod. Simpson), shown as follows:

### 1. Single plane ellipse formula:

**NOTE:** d: end diastolic; s: end systolic

Label	Description	Method
LVLd	Left Ventricle Long-axle Diameter	Distance (mm)
LVALd	Left Ventricle Area of Long-axle	Ellipse Area (mm <sup>2</sup> , cm <sup>2</sup> , or dm <sup>2</sup> )
LVLs	Left Ventricle Long-axle Diameter	Distance (mm)

LVALs	Left Ventricle Area of Long-axle	Ellipse Area (mm <sup>2</sup> , cm <sup>2</sup> , or dm <sup>2</sup> )
HR	Heart Rate	Key in (bpm)
EDV	End Diastolic Volume	EDV (mL)= (8/3π) ×{LVALd (mm <sup>2</sup> ) <sup>2</sup> /LVLd (mm) /1000
ESV	End Systolic Volume	ESV (mL)= (8/3π) ×{LVALs (mm <sup>2</sup> ) <sup>2</sup> /LVLs (mm) /1000
SV	Stroke volume	SV (mL)=EDV (mL)-ESV (mL)
CO	Cardiac Output	CO (L/min)= SV (mL) × HR (bpm)/1000
EF	Ejection fraction (B mode)	EF (No unit)= SV (mL)/ EDV (mL) × 100%
SI	Stroke Index	SI (No unit)= SV (mL)/ BSA (m <sup>2</sup> )
CI	Cardiac Index	CI (No unit)= CO (L/min)/ BSA (m <sup>2</sup> )
BSA	Body Surface Area	Calculate by the selected formula (m <sup>2</sup> )

Table 10-6 Measurement and Calculation Items with Single Plane Ellipse Formula

## 2. Dual plane ellipse formula:

**NOTE:** d: end diastolic; s: end systolic

Label	Description	Method
LVALd	Left Ventricle Area of Long-axle	Ellipse Area (mm <sup>2</sup> , cm <sup>2</sup> , or dm <sup>2</sup> )
LVAMd	Left Ventricular Fractional Area of Mitral Valve	
LVIDd	Left Ventricle Internal Diameter	Distance (mm)
LVALs	Left Ventricle Area of Long-axle	Ellipse Area (mm <sup>2</sup> , cm <sup>2</sup> , or dm <sup>2</sup> )
LVAMs	Left Ventricular Fractional Area of Mitral Valve	
LVIDs	Left Ventricle Internal Diameter	Distance (mm)
HR	Heart Rate	Key in (bpm)
EDV	End Diastolic Volume	EDV(mL)=(8/3π)×LVALd(mm <sup>2</sup> )×LVAMd(mm <sup>2</sup> )/LVIDd(mm) /1000
ESV	End Systolic Volume	ESV(mL)=(8/3π)×LVALs(mm <sup>2</sup> )×LVAMs(mm <sup>2</sup> )/LVIDs(mm) /1000
SV	Stroke volume	SV (mL)=EDV (mL)-ESV (mL)
CO	Cardiac Output	CO (L/min)= SV (mL) × HR (bpm)/1000

EF	Ejection fraction (B mode)	EF (No unit)= SV (mL)/ EDV (mL) x 100%
SI	Stroke Index	SI (No unit)= SV (mL)/ BSA (m <sup>2</sup> )
CI	Cardiac Index	CI (No unit)= CO (L/min)/ BSA (m <sup>2</sup> )
BSA	Body Surface Area	Calculate by the selected formula (m <sup>2</sup> )

Table 10-7 Measurement and Calculation Items with Dual Plane Ellipse Formula

### 3. Bullet volume formula:

**NOTE:** d: end diastolic; s: end systolic

Label	Description	Method
LVAMd	Left Ventricular Fractional Area of Mitral Valve	Ellipse Area (mm <sup>2</sup> , cm <sup>2</sup> , or dm <sup>2</sup> )
LVLd	Left Ventricular Length	Distance (mm)
LVAMs	Left Ventricular Fractional Area of Mitral Valve	Ellipse Area (mm <sup>2</sup> , cm <sup>2</sup> , or dm <sup>2</sup> )
LVLs	Left Ventricular Length	Distance (mm)
HR	Heart Rate	Key in (bpm)
EDV	End Diastolic Volume	EDV (mL)= (5/6) xLVLd (mm) xLVAMd (mm <sup>2</sup> ) /1000
ESV	End Systolic Volume	ESV (mL)= (5/6) xLVLs (mm) x LVAMs (mm <sup>2</sup> ) /1000
SV	Stroke volume	SV (mL)=EDV (mL)-ESV (mL)
CO	Cardiac Output	CO (L/min)= SV (mL) x HR (bpm)/1000
EF	Ejection fraction (B mode)	EF (No unit)= SV (mL)/ EDV (mL) x 100%
SI	Stroke Index	SI (No unit)= SV (mL)/ BSA (m <sup>2</sup> )
CI	Cardiac Index	CI (No unit)= CO (L/min)/ BSA (m <sup>2</sup> )
BSA	Body Surface Area	Calculate by the selected formula (m <sup>2</sup> )

Table 10-8 Measurement and Calculation Items with Bullet Formula

### 4. Modified SIMPSON formula:

**NOTE:** d: end diastolic; s: end systolic

Label	Description	Method
LVAMd	Left Ventricular Fractional Area of	Ellipse Area (mm <sup>2</sup> , cm <sup>2</sup> , or dm <sup>2</sup> )

	Mitral Valve	
LVLd	Left Ventricular Length	Distance (mm)
LVAPd	Left Ventricular Fractional Area of Papillary Muscles	Ellipse Area (mm <sup>2</sup> , cm <sup>2</sup> , or dm <sup>2</sup> )
LVAMs	Left Ventricular Anterior Wall	
LVLs	Left Ventricular Length	Distance (mm)
LVAPs	Left Ventricular Fractional Area of Papillary Muscles	Ellipse Area (mm <sup>2</sup> , cm <sup>2</sup> , or dm <sup>2</sup> )
HR	Heart Rate	Key in (bpm)
EDV	End Diastolic Volume	*1
ESV	End Systolic Volume	
SV	Stroke volume	SV (mL)=EDV (mL)-ESV (mL)
CO	Cardiac Output	CO (L/min)= SV (mL) x HR (bpm)/1000
EF	Ejection fraction (B mode)	EF (No unit)= SV (mL)/ EDV (mL) x 100%
SI	Stroke Index	SI (No unit)= SV (mL)/ BSA (m <sup>2</sup> )
CI	Cardiac Index	CI (No unit)= CO (L/min)/ BSA (m <sup>2</sup> )
BSA	Body Surface Area	Calculate by to the selected formula (m <sup>2</sup> )

Table 10-9 Measurement and Calculation Items with Modified SIMPSON Formula

\*1

$$EDV(mL) = LVLd(mm) / 9 \times \left\{ 4 \times LVAMd(mm^2) + 2 \times LVAPd(mm^2) + \sqrt{LVAMd(mm^2) \times LVAPd(mm^2)} \right\} / 1000$$

$$ESV(mL) = LVLs(mm) / 9 \times \left\{ 4 \times LVAMs(mm^2) + 2 \times LVAPs(mm^2) + \sqrt{LVAMs(mm^2) \times LVAPs(mm^2)} \right\} / 1000$$

### 5. Other measurement and calculation items:

Label	Description	Method
LVET	Left Ventricular Ejection Time	Time (ms)
FS	Fractional Shortening	FS (No unit)={ LVIDd (mm)- LVIDs (mm)}/ LVIDd (mm) x 100%
MVCF	Mean Velocity Circumferential Fiber Shortening	MVCF (No unit)= { LVIDd (mm)- LVIDs (mm)}/ {LVIDd (mm) x ET (ms)/1000}

Table 10-10 Other Measurement and Calculation Items

## 10.2.1. LV

LV measurement is as below.

### Single plane ellipse (**S-P Ellipse**)

- Measurement items:

LVLd, LVALd , LVLs and LVALs,

- To measure LV:

1. In the B-cardiac measurement menu, roll the trackball to highlight **LV**. Then select **S-P Ellipse** and press **Set**.
2. During end diastolic, measure LVLd and LVALd respectively. The system calculates and displays the result of EDV.
3. During end systolic, measure LVLs and LVALs respectively, by the method of generic B mode distance measurement and generic B mode ellipse area measurement respectively. The system calculates and displays the results of ESV, SV, and EF.

### Dual plane ellipse (B-P Ellipse), Bullet, and Modified Simpson (Mod. Simpson)

The operations in these methods are similar to those in the single plane ellipse method. Please refer to the relevant B mode generic measure method for details, and refer to the prompt instruction to help you.

CO calculation is as below.

- Measurement and input items:

Measure LV;

Key in: HR

- To calculate CO:

1. In the B-cardiac measurement menu, roll the trackball to highlight **Input**. Then select the submenu **Heart Rate** and press **Set** to display an **HR input** dialog box, as shown below.

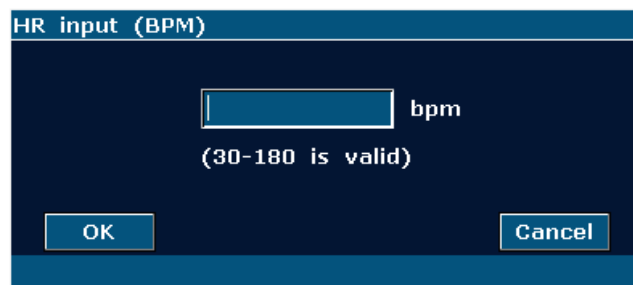


Figure 10-6 HR Input Dialog Box

2. Input a suitable value in the HR (bpm) box.
3. Roll the trackball to highlight **OK** and press **Set**. After measuring LV, CO will be displayed in the measurement result window.

MVCF calculation is as below.

- Measurement and input items:

Measure: LV;

Key in: LVET

- To calculate MVCF:

1. Move the cursor to **Input**. Then select the submenu **LVET** and press **Set** to display an **ET input** dialog box, as shown below.

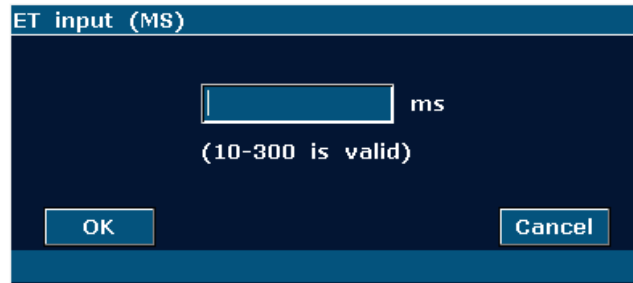


Figure 10-7 ET Input Dialog Box

2. Input a suitable value in the LVET (ms) box.
3. Roll the trackball to highlight **OK** and press **Set**. After measuring LV, MVCF will be displayed in the measurement result window.

CI and SI calculations are as below.

- Measurement and input items:

Measure: LV and HR;

Key in: Height and Weight

- To calculate CI and SI:

1. In the B-cardiac measurement menu, roll the trackball to highlight **Input**. Then select the submenu **Height & Weight** and press **Set** to display a **Height and Weight** entering dialog box, as shown below.

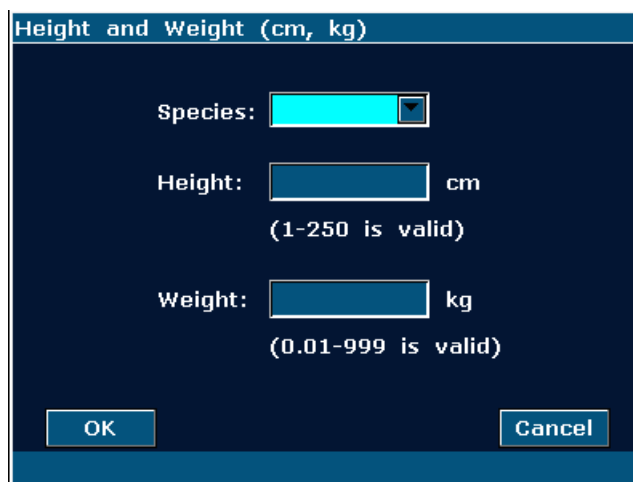


Figure 10-8 Height and Weight Input Dialog Box

2. Input suitable values in the Height (cm) and Weight (Kg) boxes.

3. Roll the trackball to highlight **OK** and press **Set**. BSA will be displayed in the measurement result window. After measuring LV and HR, SI and CI will also be displayed in measurement result window.

### 10.2.2. RV (Right Ventricle Internal Diameter)

1. In the B-cardiac measurement menu, roll the trackball to highlight **RV**.
2. Measure RV by the method of distance.
3. The result will be displayed in the measurement result window.

### 10.2.3. PA (Pulmonary Artery)

1. In the B-cardiac measurement menu, roll the trackball to highlight **PA**, and press **Set** to display a “+” in the image area.
2. Measure **PA** by the method of distance measurement.
3. The result will be displayed in the measurement result window.

#### Other parameters:

If you want to perform other cardiac parameter measurements, please enter B+M mode or M mode cardiac measurement.

## 10.3. Cardiac Report

After the cardiac examination, the system generates a cardiology examination and diagnosis worksheet.

1. Select a desired probe model and the exam mode **Cardiac**.
2. In M/B mode, after application measurements press **Report** to open **Cardiac worksheet**, as shown in *Figure 10-9*.

Figure 10-9 Cardiac Worksheet

The diagnosis editing column displays the cursor “I”, and you can enter diagnosis information.

For specific operations of editing or printing the report, please refer to Section 6.7 Worksheet(Report).



# Chapter 11 Peripheral Vascular Measurements & Calculations

The vascular examination is usually performed in the PW mode.

## 11.1. Measurements and Calculations in PW Mode

1. Press **Transducer**, select a desired probe model and the exam mode **Peri.Artery**, and then press **OK**, or double click on the exam type.
2. Press **PW** to display the sample line, and press this key again to enter the PW mode.
3. Press **Measure** to activate the application measurement function. The system displays the measurement menu as shown below.

### Items of Measurement and Calculation

Velocity, Forelimb, Hindlimb, CCA, ICA, ECA, and Vert A.



Submenu of the vascular measurement items in the PW mode:



Figure 11-1 Vascular Measurement and Calculation Menu in PW Mode

Label	Description	Channel	Method
CCA	Common Carotid Artery	1	D trace
ICA	Internal Carotid Artery	1	
ECA	External Carotid Artery	1	
Vert A	Vertebral Artery	1	

Table 11-1 Vascular Measurement and Calculation Items in PW Mode

### 11.1.1. Forelimb

#### To measure Forelimb:

1. In the PW-vascular measurement menu, select **Forelimb**.
2. Measure **Forelimb**, by the method of D trace measurement.



Reference Section 6.5.4 Generic Measurements in D Mode

3. The results are displayed in measurement result window.
4. To begin a new **Forelimb** measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

### 11.1.2. Hindlimb

#### To measure Hindlimb:

1. In the PW-vascular measurement menu, select **Hindlimb**.
2. Measure **Hindlimb** by the method of D trace measurement.



Reference Section 6.5.4 Generic Measurements in D Mode

3. The results are displayed in measurement result window.
4. To begin a new **Hindlimb** measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

### 11.1.3. CCA

#### To measure CCA:

1. In the PW-vascular measurement menu, select **CCA**.
2. Measure **CCA**, by the method of D trace measurement.



Reference Section 6.5.4 Generic Measurements in D Mode.

3. The results are displayed in measurement result window.
4. To begin a new **CCA** measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

### 11.1.4. ICA

#### To measure ICA:

1. In the PW-vascular measurement menu, select **ICA**.
2. Measure **ICA**, by the method of D trace measurement.



Reference Section 6.5.4 Generic Measurements in D Mode.

3. The results are displayed in measurement result window.
4. To begin a new **ICA** measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

### 11.1.5. ECA

**To measure ECA:**

1. In the PW-vascular measurement menu, select **ECA**.
2. Measure **ECA**, by the method of D trace measurement.



Reference Section 6.5.4 Generic Measurements in D Mode.

3. The results are displayed in measurement result window.
4. To begin a new **ECA** measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

### 11.1.6. Vert A

**To measure Vert A:**

1. In the PW-vascular measurement menu, select **Vert A**.
2. Measure **Vert A**, by the method of D trace measurement.



Reference Section 6.5.4 Generic Measurements in D Mode.

3. The results are displayed in measurement result window.
4. To begin a new **Vert A** measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

## 11.2. Vascular Report

After finishing the vascular examination, the system generates a vascular worksheet.

1. Select a desired probe model and the exam mode **Peri. Artery**.
2. In PW mode, after application measurements press **Report** to open **Vascular worksheet**, as shown below:

**Vascular worksheet**

Hospital:  2018/08/16  
 Host:  ID:  15:46:41  
 Name:  Age:  Sex:   
 Accession#  Species:  Neutered:

	Forelimb	Hindlimb	CCA	ICA	ECA	Vert A
PS	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
ED	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
S/D	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
RI	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
PI	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Diagnosis:

vascular worksheet

Figure 11-2 Vascular Worksheet

The diagnosis editing column displays the cursor “I”, and you can enter diagnosis information.

For specific operations of editing or printing the report, please refer to Section 6.7 Worksheet(Report).

## Chapter 12 Inspection and Maintenance

### **CAUTION**

The device and accessories are to be disposed of according to local regulations after their useful lives. Alternatively, they can be returned to the dealer or the manufacturer for recycling or proper disposal. Batteries are hazardous waste. Do not dispose them together with house-hold garbage. At the end of their life hand the batteries over to the applicable collection points for the recycling of waste batteries. For more detailed information about recycling of this product or battery, please contact your local Civic Office, or the shop where you purchased the product.

### **12.1. Daily Checklist**

Check before the system is switched on, if any system malfunction is experienced, eliminate the malfunction before use, or contact EDAN or authorized representatives for service if needed.

- ◆ Visually inspect all the probes. Do not use any damaged probe.
- ◆ Visually inspect all the probe assembly cables and associated connectors.
- ◆ Visually inspect all the power cords. Do not turn on the power if a cord is frayed or split, or shows signs of wear.
- ◆ Verify that the trackball and TGC slide controls are clean and free from gel or contaminants.

Check after the system is switched on:

- ◆ Visually check the on-screen display and lighting. Verify that the monitor displays the current date and time and there isn't any error message.
- ◆ Verify that the probe identification and indicated frequency on the screen are correct for the activated probe.
- ◆ Ensure that there isn't obvious abnormal noise, discontinuous image or dark area.
- ◆ Ensure that it isn't smelly or too hot.
- ◆ Ensure that the ultrasound window isn't too hot, checking with your hand.
- ◆ Verify that the buttons and knobs on the keyboard are good to operate.
- ◆ Ensure that there isn't obvious abnormal noise from the loudspeakers.
- ◆ Ensure that there isn't obvious abnormal noise from the air fan.

## 12.2. Cleaning and Disinfection

Use only the EDAN-approved substances and methods listed in this chapter to clean or disinfect your equipment. Warranty does not cover damage caused by using unapproved substances or methods.

Edan Instruments has validated the cleaning and disinfection instructions included in this User Manual. It is the responsibility of the healthcare professional to ensure that the instructions are followed so as to ensure adequate cleaning and disinfection.

### General Points:

Keep your monitor, cables and accessories free of dust and dirt. To prevent the device from damage, please follow the procedure:

- Use only recommended cleaning substances and disinfectants listed in this manual. Others may cause damage (not covered by warranty), reduce product lifetime or cause safety hazards.
- Always dilute according to the manufacturer's instructions.
- Unless otherwise specified, do not immerse any part of the equipment or any accessories in liquid.
- Do not pour liquid onto the system.
- Do not allow liquid to enter the case.
- Never use abrasive material (such as steel wool or silver polish).
- Inspect the monitor and reusable accessories after they are cleaned and disinfected.

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### CAUTION

If you spill liquid on the equipment, battery, or accessories, or they are accidentally immersed in liquid, contact your service personnel or EDAN service engineer.

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### 12.2.1. Transducer Cleaning and Disinfection

Transducers should be cleaned and/or disinfected as necessary or between use with a recommended cleanser or disinfectant. Disconnect the transducer from the system prior to cleaning and disinfecting.

### 12.2.1.1. Cleaning

The validated cleaning agents for cleaning the transducer are:

- Ethanol (75%)
- Isopropanol (70%)

Cleaning agents should be applied and removed using a clean, soft, sterile, non-abrasive cloth or paper towel.

To clean the transducers:

1. Disconnect the transducer from the system.
2. Wear sterile protective gloves to prevent infection.
3. Remove all residual foreign matters from the transducer using sterile cloth or paper towel immediately after examination. For the situation where a protective sheath is used, the protective sheath should be removed first and discarded.
4. Wipe the surface of the transducer and cable with a sterile cloth dampened with the cleaning solution until no visible contaminants remain.
5. After cleaning, wipe off the cleaning solution with a new sterile cloth or towel dampened with tap water until no visible cleaning agent remains.
6. Wipe off with a dry sterile cloth to remove residual moisture.
7. Leave the transducer to air dry.
8. If the transducer is not visually clean at the end of the cleaning steps, please repeat the cleaning steps through step 4 to step 7.
9. Inspect the transducer to ensure that there is no damage. The transducer should be disposed of properly when any damage is found.

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#### **WARNING**

1. Unplug the transducer from the system prior to cleaning or disinfecting.
  2. To avoid infection, always use protective gloves when performing cleaning and disinfecting procedures.
  3. Prohibit infiltration of any type of liquid into the device or the transducer.
- 
- 

### 12.2.1.2. Disinfection

Selecting a proper way to disinfect your transducers based on your transducer applied region:

Transducer Applied Region	Transducer Type	Disinfecting Intensity	Disinfecting Method
Contact intact body surface	Body surface	LLD	Spraying or wiping
Contact mucous membrane	Intra-cavity	HLD	Immersion
Note: LLD=Low-level Disinfection; HLD=High-level disinfection			

The validated disinfectants for transducer are:

Disinfectants	Disinfecting Intensity	Disinfecting Method
Ethanol (75%)	LLD	Spraying or wiping
Isopropanol (70%)	LLD	Spraying or wiping
Cidex OPA (0.55%)	HLD	Immersion
Glutaraldehyde(12.4%)	HLD	Immersion

### **WARNING**

1. Unplug the transducer from the system prior to cleaning or disinfecting.
2. To avoid infection, always use protective gloves when performing cleaning and disinfecting procedures.
3. To avoid infection, ensure that expiration date of the disinfecting solution has not passed.

#### **Disinfecting by spraying or wiping:**

1. Disconnect the transducer from the system.
2. Wear protective gloves to prevent infection.
3. Clean and dry the transducer according to the methods in section *12.2.1.1 Cleaning*.
4. Prepare the disinfectant solution (75% ethanol or 70% isopropanol).
5. Spray the solution to the transducer surface or wipe it with a sterile cloth dampened with the disinfectant solution. Follow the disinfectant manufacturer's recommended contact time and mode.
6. Rinse the transducer according to the disinfectant instructions. Wipe the transducer with a dry sterile cloth or leave the transducer to air dry.
7. Inspect the transducer to ensure that there is no damage.



**Note:**

If Ethanol or Isopropanol is used for both cleaning and disinfecting, then a new cloth is required for the disinfection step.

**Disinfecting by Immersion:**

1. Disconnect the transducer from the system.
2. Wear protective gloves to prevent infection.
3. Clean and dry the transducer according to the methods in section *12.2.1.1 Cleaning*.
4. Prepare the disinfectant solution (Cidex OPA 0.55% or Cidex Glutaraldehyde 2.4%). Refer to the instructions provided by the disinfectant manufacturer for the concentration of the disinfection solution, method of dilution, method of disinfection, temperature and cautions during use.
5. Place the cleaned and dried transducer in contact with the disinfectant (refers to figure 12-1 for the contacting area) for the time specified by the disinfectant manufacturer. For example, the contact time recommended by the manufacturer for soaking in Cidex Glutaraldehyde(2.4%) is at least 45 min.
6. Rinse the transducer thoroughly with sterile water to remove all chemical residues. For example, it is required to flush the transducer after soaking in Cidex Glutaraldehyde(2.4%) with plenty of sterile water (about 2 gallons) at least one time. Or, follow the complete rinsing instructions provided by the disinfectant manufacturer to rinse the transducer.
7. Wipe off the water on the transducer with a dry sterile cloth. Leave the transducer to air dry.
8. Inspect the transducer to ensure that there is no damage.

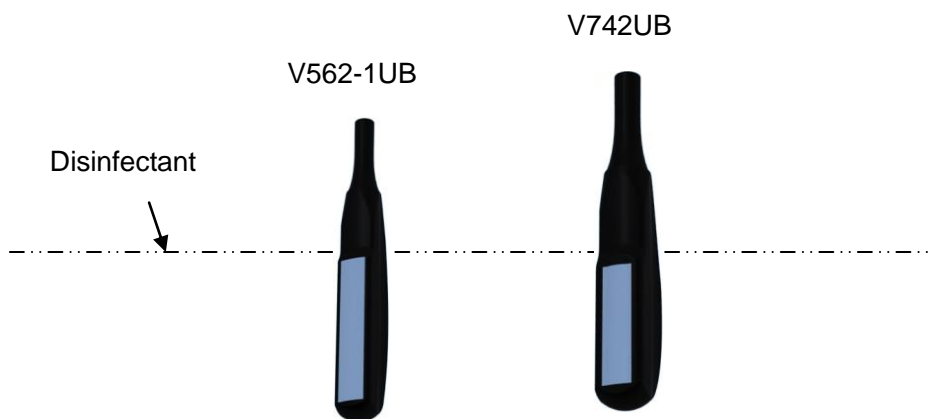


Figure 12-1 Depth of the Transducer Immersed into Disinfectant

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**WARNING**

1. Do not immerse the transducer connector. If the cable connector is immersed, do not plug the connector into the system. Rinse the connector under running water and dry it thoroughly. If necessary, contact EDAN for service.
  2. Prohibit infiltration of any type of liquid into the device or the transducer.
  3. Do not immerse the cable and connector of the transducer into solutions. Transducers can be submerged to, but not including, the strain relief of the transducer array. Do not immerse or soak any part of a transducer in any cleaning material not listed in the recommended list of disinfectant.
  4. Use the immersion method to disinfect the intra-cavitary transducer.
  5. Only non-immersion method can be used with solution of ethanol or isopropanol..
  6. The immersion time should not exceed the time that is specified by the disinfectant manufacturer.
  7. Patient contact area should be immersed into the solution while using the immersion method, but should not exceed the depth shown in figure 12-1.
  8. Do not sterilize the transducer using techniques such as autoclave, ultraviolet, gamma radiation, gas, steam, or heat. Severe damage may result.
- 
- 

**12.2.1.3. Using Transducers****Proper Use of Probes**

In order to extend the service life and to obtain optimum performance of the probe, please operate as follows:

1. Inspect the cable, socket and acoustical window of the probe periodically.
2. Shut down the machine before connecting or disconnecting the probe.
3. Do not drop the probe onto the floor or collide with hard objects. Otherwise it will be damaged easily.
4. When the probe is not used, put it in the probe holder.
5. Do not heat the probe.
6. Do not pull or bend the power cord of the probe.
7. Coupling gel can only be used on the head of the probe, and it should be wiped off after use.
8. Clean and disinfect the probe after every use.
9. The acoustical window and the shell of the probe should be examined frequently.

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**CAUTION**

1. Do not disinfect or clean transducers under high temperature. The temperature should be below 45°C.
  2. To avoid damaging the device, the disinfection method is limited to regular maintenance of devices in hospitals. Disinfecting instruments should be cleaned first.
  3. The coupling gel adapted to the transducer is a medical ultrasound coupling gel. Use only ultrasound coupling gel that complies with local regulations.
- 
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**Use of Transducer sheath****NOTE:**

The single-use sheath should be used on intra-cavitary transducer. Before cleaning the transducer, remove the sheath gently and discard it. Put on a new single-use sheath before using the transducer.

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**CAUTION**

1. Always wear gloves to perform the following steps.
  2. To minimize the disease transmission, legally marketed, sterile transducer sheath is required to be used for intra-cavitary procedures.
  3. DO NOT use an expired probe sheath. Check whether the term of validity has expired prior to using probe sheaths.
  4. The single-use sheath should comply with the local regulations.
- 
- 

To install transducer sheath:

1. Place an adequate amount of sterile coupling gel on the acoustic window of the probe;
2. Insert the probe into the sheath;
3. Pull the sheath over the probe and cable until the sheath is fully extended;
4. Secure the sheath using the bands or clips supplied with the sheath;
5. Check and eliminate bubbles between the face of the probe and the sheath. Bubbles between the face of probe and the sheath may affect the ultrasound imaging.
6. Inspect the sheath to ensure that there are no damages (i.e. holes or tears).

#### 12.2.1.4. Storage

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##### **WARNING**

1. Dry the transducer after high-level disinfection or sterilization and store it in sterile environment.
  2. Do not use the carrying case for storing the transducer, because the carrying case may become a source of infection.
- 
- 

1. Ensure the transducer is cleaned, disinfected, sterilized and completely dried before storage.
2. Store the transducer in a sterile environment or in a disposable sterile package.
3. Store the transducer under the following conditions:
  - a) Atmospheric Temp.: -20°C ~ +55°C
  - b) Relative Humidity: 15%~95% (Non-condensing)
  - c) Atmospheric Pressure: 70kPa ~ 106kPa.

#### 12.2.2. Needle Guide Bracket Cleaning and Sterilization

##### **NOTE:**

1. Use proper sterilization technique at all times when performing a biopsy.
  2. Ensure that protective gloves are worn.
- 
- 

##### **WARNING**

1. The needle guide bracket kits are not disinfected or sterilized before delivery. The operators must clean and sterilize the needle guide bracket kits before the first use and after each use.
  2. Inspect the bracket for damage such as cracks or breakage. If damage is evident, discontinue use of bracket and contact your Edan representative for disposal guidance.
  3. Sterilize the bracket before disposal or sending back to manufacturer for repair.
- 
-

### 12.2.2.1 Cleaning

1. Wear sterile protective gloves to prevent infection.
2. Disconnect the needle guide bracket from the transducer after each use, and remove all visible residues from the needle guide bracket using a small and soft-bristled brush or other similar devices. Do the cleaning quickly before the needle guide bracket dries out.
3. Soak the needle guide bracket in the cleaning solution (Ethanol 75% or Isopropanol 70%) for at least five minutes. Use a soft-bristled brush to clean the needle guide bracket during the soaking.
4. Take out the needle guide bracket from the cleanser and wipe all residues with a sterile cloth.
5. Let the bracket air dry, or dry the bracket with a sterile cloth.
6. If the bracket is not visually clean at the end of the cleaning steps, please repeat the cleaning steps through step 3 to step 5.
7. Inspect the bracket to ensure that there is no damage. The bracket should be disposed of properly when any damage is found.

### 12.2.2.2 Sterilization

1. Wear sterile protective gloves to prevent infection.
2. Disconnect the bracket from the transducer, and remove all visible residues from the bracket using sterile cloth.
3. Clean and dry the bracket according to the methods in *section 12.2.2.1 Cleaning*.
4. Sterilize the bracket assembly by dynamic air removal steam sterilizer for at least four minutes at 132°C. Dry the bracket for at least 30 min after sterilization.
5. Inspect the bracket to ensure that there is no damage.

### 12.2.2.3 Storage

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#### **WARNING**

1. Dry the bracket after sterilization and store it in sterile environment.
  2. Do not use the carrying case for storing the bracket, because the carrying case may become a source of infection.
- 
-

1. Ensure the bracket is cleaned, sterilized and completely dried before storage.
2. Store the bracket in a sterile environment or in a disposable sterile package.
3. Store the bracket under the following conditions:
  - a) Atmospheric Temp.:  $-20^{\circ}\text{C} \sim +55^{\circ}\text{C}$
  - b) Relative Humidity: 15%~95% (Non-condensing)
  - c) Atmospheric Pressure: 70kPa ~ 106kPa.

### 12.2.3. System Cleaning and Disinfection

The validated cleaning agents for cleaning the system are:

- Ethanol (75%)
- Isopropanol (70%)

To clean the system surface:

1. Switch off the system and unplug it.
2. Wear sterile protective gloves to prevent infection.
3. Remove all residual foreign matters from the system surface using sterile cloth or paper towel immediately after examination.
4. Use a sterile cloth dampened with cleaning agent to gently wipe the entire exterior surface, including the screen, of the equipment thoroughly until no visible contaminants remain.
5. After cleaning, wipe off the cleaning agent with a sterile cloth dampened with tap water until no visible cleaning agent remains.
6. Wipe off with a dry sterile cloth to remove residual moisture.
7. Leave the system to air dry.
8. If the system is not visually clean at the end of the cleaning steps, please repeat the cleaning steps through step 4 to step 7.
9. Inspect the system to ensure that there is no damage.

#### **NOTE:**

1. Make sure the system is free of gel and any other visible residue.
2. Use a soft dry cloth without chemicals for cleaning. The monitor surface is easily scratched.

To clean the trackball:

1. Remove the front panel bezel.
2. Remove the trackball as shown in *Figure 12-2*.
3. Wipe the trackball, X and Y rollers, and the auxiliary idler wheel with a soft cloth dampened with the cleaning solution until no visible contaminants remain.
4. Wipe off the cleaning solution with a fresh cloth or towel, dampened with tap water after cleaning until no visible cleaning agent remains.
5. Wipe off with a dry cloth to remove residual moisture.
6. Leave the trackball, X and Y rollers, and the auxiliary idler wheel to air dry.
7. Assemble the trackball and front panel bezel after the assembly parts completely dry.

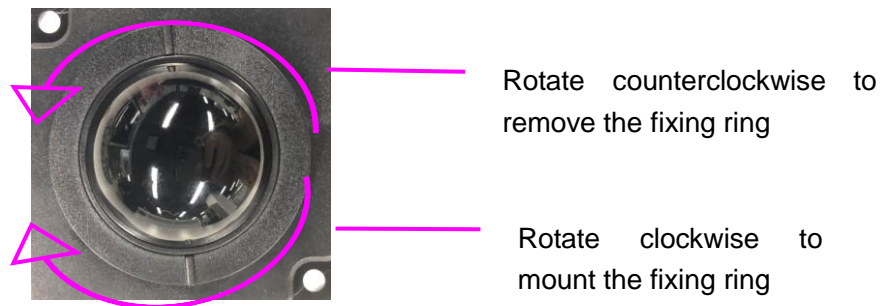


Figure 12-2 Assembling and Disassembling Trackball

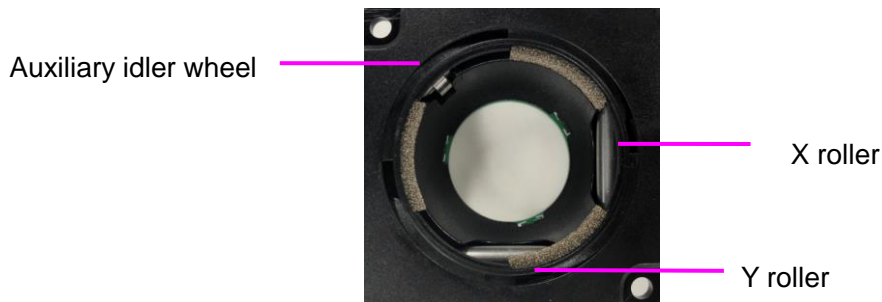


Figure 12-3 X and Y Rollers and the Auxiliary Idler Wheel

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### **CAUTION**

Do not drop or place foreign objects inside the trackball assembly or it may affect the trackball operation and damage the system.

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### **NOTE:**

Be sure to clean the X and Y rollers and the auxiliary idler wheel.

## System Surface Disinfection

The validated disinfecting agents for disinfecting the system are:

- Ethanol (75%)
- Isopropanol (70%)

To disinfect the system surface:

1. Switch off the system and unplug it.
2. Wear protective gloves to prevent infection.
3. Clean the system prior to disinfection.
4. Prepare the disinfectant solution.
5. Wipe the entire exterior surface of the equipment thoroughly with a soft sterile cloth dampened with the disinfectant solution. Follow the disinfectant manufacturer's recommended contact time and mode.
6. After disinfection, wipe off the disinfecting agent with a new sterile cloth dampened with sterile water.
7. Wipe the system with a dry sterile cloth or leave the system to air dry.
8. Inspect the system to ensure that there is no damage.

### NOTE:

After cleaning or disinfecting, check if the device, probe, cable and accessories function well. If any problem is detected, please contact the manufacturer for service before reusing them.

Check Item	Check Method
Visual	Inspect the device, probe, cable and accessories etc. for any damage.
Power On	Power on the system, check if the system boots up successfully without errors and enters the main display.
Functionality Test	After power up, check if the AC power indicator and battery status indicator in lower right of the screen are as described in <i>Section 5.3</i> . Check the control panel for any damage.
Performance	Inspect probes for cracks, openings, or other damage that could allow liquid entry.
System	Connect probes to the system, and check if the main display is as described in <i>Section 5.3</i> .



## 12.3. Replacing Fuses

You can replace the fuses if necessary.

Step 1. Pull out the fuse-box using tweezers;

Step 2. Use the tweezers to pull the fuses out through the small hole on the top of the box;

Step 3. Put new fuses ( $\phi 5 \times 20$ , T3.15AH250V) provided by EDAN in position, and reposition the fuse-box.



Step 1



Step 2



Step 3

Figure 12-4 Replacing Fuses

### **WARNING**

Ruptured fuse must only be replaced with those of the same type and rating as the original.

## 12.4. Maintenance

### **CAUTION**

Besides the maintenance requirements recommended in this manual, comply with local regulations on maintenance and measurement.

### **WARNING**

Failure on the part of the responsible individual hospital or institution employing this equipment to implement a satisfactory maintenance schedule may cause undue equipment failures and possible health hazards.

Maintenance must be performed every 12 months, including safety and functionality of the system.

The following safety checks should be performed at least every 12 months by a qualified person who has adequate training, knowledge, and practical experience to perform these tests.

- ◆ Inspect the safety-related labels for legibility.
- ◆ Inspect the fuse to verify compliance with rated current and breaking characteristics.
- ◆ Verify that the device function properly as described in the instructions for use.
- ◆ Test the protection earth resistance according to IEC/EN 60601-1 and IEC/EN 60601-2-37:  
Limit: 0 - 0.1  $\Omega$ .
- ◆ Test the earth leakage current according to IEC/EN 60601-1 and IEC/EN 60601-2-37: Limit:  
NC 500  $\mu\text{A}$ , SFC 1000  $\mu\text{A}$ .
- ◆ Test the patient leakage current according to IEC/EN 60601-1 and IEC/EN 60601-2-37:  
Limit: AC NC 100  $\mu\text{A}$ , SFC 500  $\mu\text{A}$ , DC NC 10  $\mu\text{A}$ , SFC 50  $\mu\text{A}$ .
- ◆ Test the enclosure leakage current according to IEC/EN 60601-1 and IEC/EN 60601-2-37:  
Limit: NC100  $\mu\text{A}$ , SFC 500  $\mu\text{A}$ .
- ◆ The leakage current should never exceed the limit.

The data should be recorded in an equipment log. If the device is not functioning properly or any of the above tests fail, please contact the maintenance personnel of EDAN.

## Chapter 13 Transportation and Storage

### 13.1.Moving the System

The system is designed to be portable and easily transported. Power off the system and secure all accessories before moving it to another location.

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#### **CAUTION**

- 1 Switch off the ultrasound system. Unplug the power cord from the power source and secure the power cable.
  - 2 Put the probes in the probe holder, or remove them and place them in the protective carrying cases.
  - 3 Disconnect and secure the footswitch and the connecting cable.
  - 4 Raise the brakes away from the front and back caster wheels of the mobile trolley (optional).
  - 5 Push the handle to roll the system forward and maneuver it to its new location and lock the wheel caster brakes of the mobile trolley (optional).
  - 6 Connect optional system accessories, such as the single-pedal footswitch.
  - 7 Secure the system and complete the system setup, and then perform all the daily checking before using it.
- 
- 

### 13.2.Storage

- ◆ Do not place the device near the ground, walls or the roof.
- ◆ Keep good indoor ventilation. Avoid strong and direct sunlight, and erosive gas.

### 13.3.Transportation

To prepare the system for shipment over long distances or rough terrain, repack the system in the factory packing

To prepare the system for transport over distances: load the system into a vehicle using a lift gate.

To prevent lateral movement of the system, secure the system with cargo straps. To prevent sudden jarring of the system during transport, provide anti-shock cushions beneath the system.

It is suitable for transportation by air, railway, highway and ship. Protect the system from inversion, collision, and splashing with rain and snow.

## Chapter 14 Troubleshooting

### 14.1. Checkup

- ◆ Check whether the power supply works properly and the power cord is well connected and plugged into the power socket.
- ◆ Check whether the probe is properly connected to the main unit.

### 14.2. Troubleshooting

- ◆ Changing the cartridge fuse (You can replace the fuses if necessary).
- ◆ Troubleshooting (see [Table 14-1](#) )

Item	Problem	Solution
1	When the power switch is on, there isn't any image displayed.	<ol style="list-style-type: none"> <li>1. Check power supply.</li> <li>2. Check wires and plugs.</li> <li>3. Check whether the cartridge fuse is melted.</li> <li>4. Check the brightness control knob.</li> </ol>
2	Strip-shape or snowflake-shape disturbance occurs on the display screen.	<ol style="list-style-type: none"> <li>1. Inspect the power supply.</li> <li>2. Check whether it is disturbed by the ignition action of any other device.</li> <li>3. Check the disturbance of electric or magnetic field in the surrounding environment.</li> <li>4. Check whether the plug and socket of power supply and probe are properly connected.</li> </ol>
3	Image is not displayed clearly on the screen.	<ol style="list-style-type: none"> <li>1. Adjust overall gain (Gain).</li> <li>2. Adjust eight TGC slide controls.</li> <li>3. Adjust the brightness.</li> <li>4. Adjust focus (the number and the position).</li> </ol>
4	Near-field image is not clear.	Adjust the key total gain and the upper TGC
5	Far-field image is not clear.	Adjust the key total gain and the lower TGC
6	Image window is dark.	Adjust the brightness and slide the TGC controls to the right most.

Table 14-1 Troubleshooting Examples

## Chapter 15 Warranty and Service

### 15.1. Warranty

EDAN warrants that EDAN's products meet the labeled specifications of the products and will be free from defects in materials and workmanship that occur within warranty period.

The warranty is void in cases of:

- a) Damage caused by mishandling during shipping.
- b) Subsequent damage caused by improper use or maintenance.
- c) Damage caused by alteration or repair by anyone not authorized by EDAN.
- d) Damage caused by accidents.
- e) Replacement or removal of serial number label and manufacture label.

If a product covered by this warranty is determined to be defective because of defective materials, components, or workmanship, and the warranty claim is made within the warranty period, EDAN will, at its discretion, repair or replace the defective part(s) free of charge. EDAN will not provide a substitute product for use when the defective product is being repaired.

### 15.2. Contact information

If you have any question about maintenance, technical specifications or malfunctions of devices, contact your local distributor.

Alternatively, you can send an email to EDAN service department at: [support@edan.com.cn](mailto:support@edan.com.cn).

## Appendix I: Specifications

### A1.1: Electrical Safety Classifications

According to the type of protection against electric shock	Internally powered equipment, Class I equipment
According to the degree of protection against electric shock	Type BF
According to the degree of protection against harmful ingress of liquid	Whole device: Ordinary equipment (Sealed equipment without liquid proof); Probe (not including the probe connector): IPX7; Footswitch (optional): IP68.
According to the degree of safety of application in the presence of a flammable gas	Equipment not suitable for use in the presence of a flammable gas
According to the mode of operation	Continuous operation
According to the grade of EMC	CISPR 11 Group 1, Class A
Standards Compliance	EN 60601-1:2006/A1:2013 idt IEC 60601-1: 2005/A1:2012 EN 60601-1-2: 2015 idt IEC 60601-1-2: 2014 EN 60601-2-37:2008/A1:2015 idt IEC 60601-2-37:2007/A1:2015

### A1.2: Power Supply

Operating Voltage	100 V-240 V~
Operating Frequency	50 Hz/60 Hz
Input Current	1.8A-0.8A
Lithium battery	
Capacity	5000 mAh
Voltage	14.8 VDC
Average working time	1 h
Maximum charging time	8 h
Cycle life	300 times

### A1.3: Machine Specifications

Main unit dimensions	37cm (L) x20cm (W) x35cm (H)
Net weight	8.5kg (including the Lithium battery but not including probes)

### A1.4: Display Specifications

Display	TFT-LCD
Diagonal Size	15-inch
View Angle	170°
Pixel Number	1024*768
White Luminance	Typ.: 350 cd/m <sup>2</sup>
Contrast Ratio	Typ.: 2500

### A1.5: General Technical Specifications

Display Modes	<p>B Mode:Single, Dual, Quad</p> <p>C Mode: B/C (Single, Dual);  B+B/C (Simultaneous dual mode);  B/C/PW (Triplex mode or not)</p> <p>PDI/DPDI Mode:  B/PDI(DPDI) (Single, Dual);  B+B/PDI(DPDI) (Simultaneous dual mode);  B/PDI(DPDI)/PW (Triplex mode or not)</p> <p>PW Mode:  B/PW (Duplex mode or not);  B+C/PW, B+PDI(DPDI)/PW (Duplex mode or not);  B/C/PW, B/PDI(DPDI)/PW (Triplex mode or not);</p> <p>CW Mode:  B/CW;  B+C/CW, B+PDI(DPDI)/CW;  B/C/CW, B/PDI(DPDI)/CW</p> <p>M Mode: B/M (Display layout:Up/down, Left/right,1:1)</p>
Image Gray Scale	256 levels
Image Magnification	<p>In area</p> <p>Real time:×1.2, ×1.4, ×1.6, ×2.0, ×2.4, ×3.0, ×4.0;  Frozen: ×1.14, ×1.33, ×1.6, ×2.0, ×2.67, ×3.2, ×4.0</p>
Storage	500G
Cine Review	409 frames(Color)/1227frames (Black & White)
Depth Adjustment	Adjustable in real time in all modes

Image Conversion	Up/Down flip, Left/Right flip, 90°rotate, B/W invert
Language Conversion	Chinese, English, etc. (The language options varies with language software installed.)
Focus Number	Max. 4
Software Packages	Abdomen, obstetrics, muscle, tendon, cardiology, peripheral vascular
B mode generic measurement	Distance, circumference, area, volume, ratio, % stenosis, angle, and histogram.
M mode generic measurement	Distance, time, slope, and heart rate
D mode generic measurement	In non-cardiac exam: Velocity, Heart Rate, Time, Acceleration, Resistance Index (RI), Pulsatility Index (PI) and Auto Trace (auto trace is available only for PW mode) In cardiac exam: Velocity, PG, Time, Heart Rate, Slope, PHT, Trace (Manual)
Annotations	Patient name, age, sex, time, date, hospital name, doctor name, comment (full-screen character editing)
Body Mark	55 types
USB Port	USB 2.0

## A1.6: Probe Specifications

This device can detect the probe automatically.

Model	Application
C352UB/ C5-2b	Abdomen, Obstetrics
L742UB/L1042UB	Obstetrics, Abdomen, Tendon, Small parts, Peripheral vascular, Superficial
L15-7b	Tendon, Peripheral vascular, Superficial
C612UB/C6152UB	Abdomen, Obstetrics, Cardiology
C422UB	Obstetrics, Abdomen
L552UB	Obstetrics, Abdomen, Tendon, Small parts, Peripheral vascular
P5-1b	Cardiology
V562-1UB/V742UB	Obstetrics, Muscle, Tendon
<b>NOTE:</b> Maximum endocavity transducer temperature rise during simulated operation: Less than 6 °C. Maximum temperature rise for other transducers during simulated operation: Less than 10 °C.	



## **A1.7: Operating, Storage and Transportation Environment**

### **A1.7.1.Operating Environment**

Temperature	0 °C ~ +40 °C(+32°F ~ +104°F)
Relative humidity range	15% RH ~ 95% RH (non-condensing)
Atmospheric pressure range	860 hPa ~ 1060 hPa

### **A1.7.2.Storage and Transportation Environment**

Temperature	-20 °C ~ +55 °C(-4°F ~ +131°F)
Relative humidity range	15% RH ~ 95% RH (non-condensing)
Atmospheric pressure range	700 hPa ~ 1060 hPa

## Appendix II: Ultrasound Intensity and Safety

### A2.1: Ultrasound in Medicine

The use of diagnostic ultrasound has proved to be a valuable tool in medical practice. Given its known benefits for non-invasive investigations and medical diagnosis, including investigation of the human fetus, the question of clinical safety with regards to ultrasound intensity arises.

There is no easy answer to the question of safety surrounding the use of diagnostic ultrasound equipment. Application of the ALARA (As Low As Reasonably Achievable) principle serves as a rule-of-thumb that will help you to get reasonable results with the lowest possible ultrasonic output.

The American Institute of Ultrasound in Medicine (AIUM) states that given its track record of over 25 years of use and no confirmed biological effects on patients or instrument operators, the benefits of the prudent use of diagnostic ultrasound clearly outweigh any risks.

### A2.2: Ultrasound Safety and the ALARA Principle

Ultrasound waves dissipate energy in the form of heat and can therefore cause tissue warming. Although this effect is extremely low with Transcranial Doppler, it is important to know how to control and limit patient exposure. Major governing bodies in ultrasound have issued statements to the effect that there are no known adverse effects from the use of diagnostic ultrasound, however, exposure levels should always be limited to As Low As Reasonably Achievable (the ALARA principle).

#### Imaging Functions Affecting Acoustic Output

In addition to the level of voltage transmitted, adjustment of the following imaging functions and /or controls may affect the acoustic output.

Item	Affection
Probe	Acoustic output will be changed with the change of probe.
Imaging mode	There are different parameters applied in B mode, Color mode, M mode, and PW mode, so acoustic output will be changed with the change of among B mode, Color mode, M mode, and PW mode.
Field of view (scan angle or scan width)	Frame rate may be changed with the change of the scan angle of the scan width, and the acoustic output will also be changed.
Image depth	Pulse repeated frequency will be changed with the change of the image depth, and the acoustic output will be changed.
Focus number	Frame rate and focus position will be changed with the change of the focus number, and acoustic output will also be changed.

Focus position	Acoustic output will be changed with the change of the focus position even the beam power level and the beam aperture have not been changed. Generally, the acoustic output will be higher with it gets nearer to the probe.
Freeze	When freezing the system, it will stop transmitting ultrasonic wave.
Multi-frequency	The character of the wave focus will be changed with the change of the frequency, and acoustic output will be changed.
Line density	The acoustic output will be changed with the change of the number of the scanning line (line density).
PRF	The acoustic power will be changed with the change of PRF.
Sample volume	The pulsed wave and the power will be changed with the change of the sample volume, and acoustic output will be changed.
Presets	Presets contain all the parameters above, so any change of the presetting will change acoustic output.
Restart, or power on/off	System will return to the default setting when restarting, or powering on/off the system, and acoustic output will be changed.

## A2.3: Explanation of MI/TI

### A2.3.1. MI (Mechanical Index)

Cavitations will be generated when ultrasound wave passes through and contacts tissues, resulting in instantaneous local overheating. This phenomenon is determined by acoustic pressure, spectrum, focus, transmission mode, and factors such as states and properties of the tissue and boundary. This mechanical bioeffect is a threshold phenomenon that occurs when a certain level of ultrasound output is exceeded. The threshold is related to the type of tissue. Although no confirmed adverse mechanical effects on patients or mammals caused by exposure at intensities typical of present diagnostic ultrasound instruments have ever been reported, the threshold for cavitation is still undetermined. Generally speaking, the higher the acoustic pressure, the greater the potential for mechanical bioeffects; the lower the acoustic frequency, the greater the potential for mechanical bioeffects.

The AIUM and NEMA formulate mechanical index (MI) in order to indicate the potential for mechanical effects. The MI is defined as the ratio of the peak-rarefactional acoustic pressure (should be calculated by tissue acoustic attenuation coefficient 0.3dB/cm/MHz) to the square root of acoustic frequency.

$$MI = \frac{Pr, \alpha}{\sqrt{f_{aw}} \times C_{MI}}$$

$$C_{MI} = 1 \text{ (MPa / MHz)}$$

### A2.3.2. TI (Thermal Index)

Heating of tissues is caused by absorption of ultrasound when the ultrasound energy is applied. The temperature rise is determined by the acoustic intensity, exposed area and thermophysical properties of the tissue.

In order to indicate the potential for temperature rise caused by thermal effects, the AIUM and NEMA formulate thermal index (TI). It is defined as the ratio of the total acoustic power to the acoustic power required to raise the tissue temperature by 1 °C.

According to different thermophysical properties of the tissue, TI is divided into three kinds: TIS, TIB and TIC.

TIS (Soft Tissue Thermal Index): It provides an estimate of potential temperature rise in soft or similar tissues.

TIB (Bone Thermal Index): It provides an estimate of potential temperature rise when the ultrasound beam passes through soft tissue and a focal region is in the immediate vicinity of bone.

TIC (Cranial Bone Thermal Index): It provides an estimate of potential temperature rise in the cranial bones or superficial bones.

### A2.3.3. Display of MI/TI

The system provides real-time display of MI/TI values in the upper right part of the screen. The start point of MI/TI value is 0.0. You can preset which TI item is to be displayed through **Set up>System Preset**.

The operator should monitor these values during examinations and keep the exposure time and output level at the minimum amounts needed for effective diagnosis.

The display precision is 0.1.

When tested  $MI \leq 0.6$ , the absolute display error  $< 0.39$ ;

When tested  $MI > 0.6$ , the relative display error  $< \pm 65\%$ .

TI display accuracy:

When tested  $TI \leq 1.2$ , the absolute display error  $< 0.78$ ;

When tested  $TI > 1.2$ , the relative display error  $< \pm 65\%$ .

## A2.4: Acoustic Output

### A2.4.1. Factors that Contribute to Uncertainty in the Output Display

A number of factors should be considered in display accuracy determination methods, such as:

- Transducer variability
- System variability
- Measurement variability and accuracy
- The number of operating conditions of which the system is capable and the number tested in obtaining display accuracy results
- Whether display accuracy will be determined by specific combinations of system, mode, transducer assembly and transmit patterns, or all allowed combinations of them
- Accuracy of system software MI and TI calculation algorithms.
- Engineering approximations for real-time calculations

### A2.4.2. Differences between Actual and Displayed MI/TI

Actually, many assumptions adopted in the process of measurement and calculations are relatively conservative. Over-estimation of actual in situ intensity exposure, for the majority of tissue paths, is made to the measurement and calculation process. For example, attenuation coefficient of 0.3 dB/cm·MHz, which is much lower than the actual value for most tissues of the body, is adopted. And conservative values of tissue characteristics are selected for use in TI models. Therefore, the display of MI and TI should be used as relative information to assist operator in prudent use of ultrasound system and implementation of ALARA principle, and the values should not be interpreted as the actual physical values in tissues or organs examined.

### A2.4.3. Measurement Uncertainty

The uncertainties in the measurements were predominantly systematic in origin; the random uncertainties were negligible in comparison. So the intensity and pressure measurement uncertainties were showed in table 1 and table 2. The power, the center frequency and MI measurement uncertainties were showed in table 3.

**Table 1 The intensity and pressure measurement uncertainties table**

	Total Error		Hydrophone Sensitivity		Digitizer	
	Intensity	Pressure	Intensity	Pressure	Intensity	Pressure
Uncertainty	±22.91%	±11.46%	±14%	±7%	±0.80%	±0.40%
Notes	The RMS combination of all sources of measurement uncertainty, based on all sources being independent.		Uncertainties based on the hydrophone calibration certificate.		Uncertainties based on oscilloscope calibration certificate.	

**Table 2 The intensity and pressure measurement uncertainties table**

	Temp		Spatial Ave.		Distortion	
	Intensity	Pressure	Intensity	Pressure	Intensity	Pressure
Uncertainty	±2.40%	±1.20%	±17.5%	±8.75%	±4%	±2%
Notes	Uncertainties based on temperature variation of the water bath and difference in the mean temperature between the hydrophone calibration lab and our facility.		Uncertainties based on part 7 of A2.7 and discussions with industry consultants.		Non-linear distortion estimates are based on part 7 of A2.7 and discussions with industry consultants.	

**Table 3 The power, center frequency and MI measurement uncertainties table**

	Total uncertainties		
	Power	Center frequency	MI
Uncertainty	±22.91%	±0.2%	±1.68%
Notes	Uncertainties based on the intensity uncertainties.	Uncertainties based on the oscilloscope.	Uncertainties based on the pressure and center frequency.

## A2.5: Operator Control Features

The possibility of producing mechanical/thermal biological effects can be influenced by three kinds of controls: Direct Controls, Indirect Controls, and Receiver Controls. The qualified operator may use the system controls to minimize the ultrasound output while acquiring necessary clinical information.

### ◆ Direct Controls

The acoustic output of the system can be controlled directly through the level of voltage transmitted. In this case, the maximum acoustic output never exceeds the limits in any mode of operation.

### ◆ Indirect Controls

The acoustic output of the system can be controlled indirectly through many imaging parameters, including imaging modes, probe frequency, focus number/position, depth and pulse repetition frequency (PRF).

The imaging mode determines whether the ultrasound beam is scanning or non-scanning. Thermal bioeffect is closely associated with M, PW and Color mode.

Acoustic attenuation of tissue is directly connected to probe frequency.

The focus number/position is related to active aperture of probe and beam width.

The higher PRF (pulse repetition frequency), the more output pulses occur over a period of time.

### ◆ Receiver Controls

The receiver controls (such as gain, TGC, dynamic range and image processing), which are used to improve image quality, have no effect on acoustic output. Thus these controls should be optimized before increasing acoustic output.

## **A2.6: Prudent Use Statement**

Although no confirmed bioeffects on patients caused by exposure from present diagnostic ultrasound equipment have ever been reported, the potential exists that such bioeffects may be identified in the future. Therefore, the ultrasound should be used prudently. High levels of acoustic output and long exposure time should be avoided while acquiring necessary clinical information.

## **A2.7: References for Acoustic Output and Safety**

1. "Bioeffects and Safety of Diagnostic Ultrasound" issued by AIUM in 1993
2. "Medical Ultrasound Safety" issued by AIUM in 1994
3. "Acoustic Output Measurement Standard for Diagnostic Ultrasound Equipment, Revision 3" issued by AIUM/NEMA in 2004
4. "Standard for real-time display of thermal and mechanical acoustic output indices on diagnostic ultrasound equipment, Revision 2" issued by AIUM/NEMA in 2004
5. "Information for Manufacturers Seeking Marketing Clearance of Diagnostic Ultrasound Systems and Transducers" issued in 2008.
6. IEC60601-2-37, Medical electrical equipment - Part 2-37:2007+AMD1:2015 Particular requirements for the basic safety and essential performance of ultrasonic medical diagnostic and monitoring equipment, International Electro technical Commission.
7. Roy C. Preston, David R. Bacon, and Robert A. Smith, Calibration of Medical Ultrasonic Equipment - Procedures and Accuracy Assessment, IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control, Vol. 35, No. 2, page110, March 1988.

## A2.8: Probe Acoustic Output Parameters List

### A2.8.1. Test of Probe C5-2b

Acoustic Output Reporting Table for IEC60601-2-37

Operating Mode: B mode

Transducer: C5-2b

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.84	1.01		1.01		N/A
Index Component Value			1.01	1.01	1.01	1.01	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.34					
	$P$ (mW)		116.39		116.39		N/A
	$P_{IXI}$ (mW)		89.53		89.53		
	$z_s$ (cm)			3.76			
	$z_b$ (cm)					3.76	
	$z_{MI}$ (cm)	5.40					
	$z_{PII,a}$ (cm)	5.40					
	$f_{awf}$ (MHz)	2.53	2.37	2.37	2.37	2.37	N/A
Other Information	$p_{rr}$ (Hz)	-					
	$S_{rr}$ (Hz)	64.14					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	57.02					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SI,a}$ ( $mW/cm^2$ )	27.54					
	$I_{spta}$ at $z_{PII}$ OR $z_{SI}$ ( $mW/cm^2$ )	70.90					
	$pr$ at $z_{PII}$ (MPa)	2.15					
Operating control conditions	Focus Depth(mm)	60	30	30	30	30	N/A
	Display Depth(mm)	68	39	39	39	39	N/A
	Frequency Index	H6.0	H5.0	H5.0	H5.0	H5.0	N/A
	ScanAngle	0 level	0 level	0 level	0 level	0 level	N/A



**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: M mode

Transducer: C5-2b

Index label	MI	TIS		TIB		TIC	
		At surface	Below surface	At surface	Below surface		
Maximum index value	0.69	0.04		0.11		N/A	
Index Component Value		0.04	0.02	0.03	0.11		
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.06					
	$P$ (mW)		4.01		3.56		N/A
	$P_{IXI}$ (mW)		3.08		2.74		
	$z_s$ (cm)			3.31			
	$z_b$ (cm)					3.64	
	$z_{MI}$ (cm)	4.74					
	$z_{PII,a}$ (cm)	4.74					
	$f_{awf}$ (MHz)	2.39	2.39	2.39	2.38	2.38	N/A
Other Information	$p_{rr}$ (Hz)	148.44					
	$S_{rr}$ (Hz)	-					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	57.94					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	7.05					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	15.47					
	$p_r$ at $z_{PII}$ (MPa)	1.57					
Operating control conditions	Focus Depth(mm)	60	40	40	50	50	N/A
	Display Depth(mm)	68	49	49	58	58	N/A
	Frequency Index	H5.0	H5.0	H5.0	H5.0	H5.0	N/A
	ScanAngle	/	/	/	/	/	N/A
	Speed	level 3	level 3	level 3	level 3	level 3	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: B+M mode

Transducer: C5-2b

Index label	MI	TIS		TIB		TIC	
		At surface	Below surface	At surface	Below surface		
Maximum index value	0.69	1.05		1.12		N/A	
Index Component Value		1.05	1.03	1.04	1.12		
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.06					
	$P$ (mW)		120.40		119.95		N/A
	$P_{IXI}$ (mW)		92.61		92.27		
	$z_s$ (cm)			3.76			
	$z_b$ (cm)					3.76	
	$z_{MI}$ (cm)	4.74					
	$z_{PII,a}$ (cm)	4.74					
	$f_{awf}$ (MHz)	2.39	2.37	2.37	2.37	2.37	N/A
Other Information	$p_{rr}$ (Hz)	148.44					
	$S_{rr}$ (Hz)	64.14					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	57.94					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	7.05					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	15.47					
	$p_r$ at $z_{PII}$ (MPa)	1.57					
Operating control conditions	Focus Depth(mm)	60	40	40	50	50	N/A
	Display Depth(mm)	68	49	49	58	58	N/A
	Frequency Index	H5.0	H5.0	H5.0	H5.0	H5.0	N/A
	ScanAngle	/	/	/	/	/	N/A
	Speed	level 3	level 3	level 3	level 3	level 3	N/A

## Acoustic Output Reporting Table for IEC60601-2-37

Operating Mode: PW mode

Transducer: C5-2b

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		1.28	1.07		1.07		N/A
Index Component Value			1.07	0.74	1.07	0.64	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	2.03					
	$P$ (mW)		96.28		96.28		N/A
	$P_{IXI}$ (mW)		74.06		74.06		
	$z_s$ (cm)			1.74			
	$z_b$ (cm)					1.79	
	$z_{MI}$ (cm)	4.90					
	$z_{PII,a}$ (cm)	4.90					
	$f_{awf}$ (MHz)	2.50	3.03	3.03	3.03	3.03	N/A
Other Information	$p_{rr}$ (Hz)	900.00					
	$S_{rr}$ (Hz)	-					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	205.20					
	$I_{spta,a}$ at $z_{PII,a}$ or $z_{SII,a}$ ( $mW/cm^2$ )	275.17					
	$I_{spta}$ at $z_{PII}$ or $z_{SII}$ ( $mW/cm^2$ )	637.57					
	$p_r$ at $z_{PII}$ (MPa)	3.09					
Operating control conditions	Focus Depth(mm)	60	30	30	30	30	N/A
	Display Depth(mm)	68	39	39	39	39	N/A
	Frequency Index	2.5	3	3	3	3	N/A
	ScanAngle	/	/	/	/	/	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: B+PW mode

Transducer: C5-2b

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		1.28	2.08		2.08		N/A
Index Component Value			2.08	1.75	2.08	1.65	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	2.03					
	$P$ (mW)		212.67		212.67		N/A
	$P_{IXI}$ (mW)		163.59		163.59		
	$z_s$ (cm)			3.76			
	$z_b$ (cm)					1.79	
	$z_{MI}$ (cm)	4.90					
	$z_{PII,a}$ (cm)	4.90					
	$f_{awf}$ (MHz)	2.50	3.03	2.37	2.37	3.03	N/A
Other Information	$p_{rr}$ (Hz)	900.00					
	$S_{rr}$ (Hz)	64.14					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	205.20					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SI,a}$ ( $mW/cm^2$ )	275.17					
	$I_{spta}$ at $z_{PII}$ OR $z_{SI}$ ( $mW/cm^2$ )	637.57					
	$p_r$ at $z_{PII}$ (MPa)	3.09					
Operating control conditions	Focus Depth(mm)	60	30	30	30	30	N/A
	Display Depth(mm)	68	39	39	39	39	N/A
	Frequency Index	2.5	3	3	3	3	N/A
	ScanAngle	level 0	level 0	level 0	level 0	level 0	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: B+C/B+PDI/B+DPDI mode

Transducer: C5-2b

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		1.04	0.13		0.13		N/A
Index Component Value			0.13	0.13	0.13	0.13	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.65					
	$P$ (mW)		11.17		11.17		N/A
	$P_{IXI}$ (mW)		8.59		8.59		
	$z_s$ (cm)			4.96			
	$z_b$ (cm)					3.89	
	$z_{MI}$ (cm)	5.00					
	$z_{PII,a}$ (cm)	5.00					
	$f_{awf}$ (MHz)	2.51	3.04	3.43	3.43	3.04	N/A
Other Information	$p_{rr}$ (Hz)	-					
	$S_{rr}$ (Hz)	64.14					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	141.40					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	56.20					
	$I_{spta}$ at $z_{PII}$ OR $z_{SI}$ ( $mW/cm^2$ )	133.18					
	$p_r$ at $z_{PII}$ (MPa)	2.54					
Operating control conditions	Focus Depth(mm)	60	40	40	40	40	N/A
	Display Depth(mm)	78	49	49	49	49	N/A
	Frequency Index	2.5	3	3	3	3	N/A
	ScanAngle	level 0	level 0	level 0	level 0	level 0	N/A

## Acoustic Output Reporting Table for IEC60601-2-37

Operating Mode: B+C+PW/B+PDI+PW/B+DPDI+PW mode

Transducer: C5-2b

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		1.28	1.20		1.20		N/A
Index Component Value			1.20	0.87	1.20	0.77	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	2.03					
	$P$ (mW)		107.45		107.45		N/A
	$P_{IXI}$ (mW)		82.65		82.65		
	$z_s$ (cm)			1.74			
	$z_b$ (cm)					1.79	
	$z_{MI}$ (cm)	4.90					
	$z_{PII,a}$ (cm)	4.90					
	$f_{awf}$ (MHz)	2.50	3.03	3.03	3.03	3.03	N/A
Other Information	$p_{rr}$ (Hz)	900.00					
	$S_{rr}$ (Hz)	-					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	205.20					
	$I_{spta,a}$ at $z_{PII,a}$ or $z_{SII,a}$ ( $mW/cm^2$ )	275.17					
	$I_{spta}$ at $z_{PII}$ or $z_{SII}$ ( $mW/cm^2$ )	637.57					
	$p_r$ at $z_{PII}$ (MPa)	3.09					
Operating control conditions	Focus Depth(mm)	60	30	30	30	30	N/A
	Display Depth(mm)	68	39	39	39	39	N/A
	Frequency Index	2.5	3	3	3	3	N/A
	ScanAngle	/	/	/	/	/	N/A

## A2.8.2. Test of Probe P5-1b

Acoustic Output Reporting Table for IEC60601-2-37

Operating Mode: B mode

Transducer: P5-1b

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		1.12	0.52		0.52		N/A
Index Component Value			0.52	0.52	0.52	0.52	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.65					
	$P$ (mW)		71.95		71.95		N/A
	$P_{IXI}$ (mW)		49.18		49.18		
	$z_s$ (cm)			4.06			
	$z_b$ (cm)					4.06	
	$z_{MI}$ (cm)	4.39					
	$z_{PII,a}$ (cm)	4.39					
$f_{awf}$ (MHz)	2.17	2.21	2.21	2.21	2.21	N/A	
Other Information	$p_{rr}$ (Hz)	-					
	$S_{rr}$ (Hz)	64.14					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	118.40					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	15.30					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	29.47					
	$pr$ at $z_{PII}$ (MPa)	2.29					
Operating control conditions	Focus Depth(mm)	60	60	60	60	60	N/A
	Display Depth(mm)	68	68	68	68	68	N/A
	Frequency Index	H5.0	2.5	2.5	2.5	2.5	N/A
	ScanAngle	level 0	level 0	level 0	level 0	level 0	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: M mode

Transducer: P5-1b

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		1.12	0.02		0.09		N/A
Index Component Value			0.02	0.02	0.02	0.09	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.65					
	$P$ (mW)		2.29		2.29		N/A
	$P_{IXI}$ (mW)		1.88		1.88		
	$z_s$ (cm)			3.09			
	$z_b$ (cm)					3.39	
	$z_{MI}$ (cm)	4.39					
	$z_{PII,a}$ (cm)	4.39					
	$f_{awf}$ (MHz)	2.17	2.40	2.40	2.40	2.40	N/A
Other Information	$pr_r$ (Hz)	183.76					
	$Srr$ (Hz)	-					
	$npps$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	118.40					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	12.62					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	24.31					
	$pr$ at $z_{PII}$ (MPa)	2.29					
Operating control conditions	Focus Depth(mm)	60	60	60	60	60	N/A
	Display Depth(mm)	68	68	68	68	68	N/A
	Frequency Index	H5.0	2.5	2.5	2.5	2.5	N/A
	ScanAngle	/	/	/	/	/	N/A
	Speed	level 3	level 3	level 3	level 3	level 3	N/A



## Acoustic Output Reporting Table for IEC60601-2-37

Operating Mode: B+M mode

Transducer: P5-1b

Index label	MI	TIS		TIB		TIC	
		At surface	Below surface	At surface	Below surface		
Maximum index value	1.12	0.54		0.54		N/A	
Index Component Value		0.54	0.02	0.54	0.09		
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.65					
	$P$ (mW)		74.24	74.24		N/A	
	$P_{IXI}$ (mW)		51.06		51.06		
	$z_s$ (cm)			4.06			
	$z_b$ (cm)					4.06	
	$z_{MI}$ (cm)	4.39					
	$z_{PII,a}$ (cm)	4.39					
$f_{awf}$ (MHz)	2.17	2.21	2.21	2.21	2.21	N/A	
Other Information	$pr_r$ (Hz)	183.76					
	$Srr$ (Hz)	64.14					
	$npps$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	118.40					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	12.62					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	24.31					
	$pr$ at $z_{PII}$ (MPa)	2.29					
Operating control conditions	Focus Depth(mm)	60	60	60	60	60	N/A
	Display Depth(mm)	68	68	68	68	68	N/A
	Frequency Index	H5.0	2.5	2.5	2.5	2.5	N/A
	ScanAngle	/	/	/	/	/	N/A
	Speed	level 3	level 3	level 3	level 3	level 3	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: PW mode

Transducer: P5-1b

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		1.14	0.74		0.74		N/A
Index Component Value			0.74	0.32	0.74	0.66	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.79					
	$P$ (mW)		76.25		76.25		N/A
	$P_{IXI}$ (mW)		63.54		63.54		
	$z_s$ (cm)			1.32			
	$z_b$ (cm)					1.39	
	$z_{MI}$ (cm)	1.50					
	$z_{PII,a}$ (cm)	1.50					
	$f_{awf}$ (MHz)	2.45	2.45	2.45	2.45	2.45	N/A
Other Information	$pr_r$ (Hz)	900.00					
	$Srr$ (Hz)	-					
	$npps$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	109.70					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	148.10					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	190.47					
	$pr$ at $z_{PII}$ (MPa)	2.03					
Operating control conditions	Focus Depth(mm)	20	20	20	20	20	N/A
	Display Depth(mm)	29	29	29	29	29	N/A
	Frequency Index	2.5	2.5	2.5	2.5	2.5	N/A
	ScanAngle	/	/	/	/	/	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: B+PW mode

Transducer: P5-1b

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		1.14	1.26		1.26		N/A
Index Component Value			1.26	0.84	1.26	1.17	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.79					
	$P$ (mW)		148.20		148.20		N/A
	$P_{IXI}$ (mW)		112.72		112.72		
	$z_s$ (cm)			4.06			
	$z_b$ (cm)					1.39	
	$z_{MI}$ (cm)	1.50					
	$z_{PII,a}$ (cm)	1.50					
	$f_{awf}$ (MHz)	2.45	2.45	2.21	2.21	2.45	N/A
Other Information	$p_{rr}$ (Hz)	900.00					
	$S_{rr}$ (Hz)	64.14					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	109.70					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	148.10					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	190.47					
	$p_r$ at $z_{PII}$ (MPa)	2.03					
Operating control conditions	Focus Depth(mm)	20	20	20	20	20	N/A
	Display Depth(mm)	29	29	29	29	29	N/A
	Frequency Index	2.5	2.5	2.5	2.5	2.5	N/A
	ScanAngle	/	level 0	level 0	level 0	level 0	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: B+C/B+PDI/B+DPDI mode

Transducer: P5-1b

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.77	0.05		0.05		N/A
Index Component Value			0.05	0.05	0.05	0.05	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.12					
	$P$ (mW)		5.81		5.81		N/A
	$P_{IXI}$ (mW)		4.84		4.84		
	$z_s$ (cm)			1.34			
	$z_b$ (cm)					1.62	
	$z_{MI}$ (cm)	1.62					
	$z_{PII,a}$ (cm)	1.62					
	$f_{awf}$ (MHz)	2.15	2.15	2.27	2.27	2.15	N/A
Other Information	$pr_r$ (Hz)	-					
	$Srr$ (Hz)	18.82					
	$npps$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	42.16					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	71.25					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	91.61					
	$pr$ at $z_{PII}$ (MPa)	1.27					
Operating control conditions	Focus Depth(mm)	30	30	30	30	30	N/A
	Display Depth(mm)	39	39	39	39	39	N/A
	Frequency Index	2	2	2	2	2	N/A
	ScanAngle	level 0	level 0	level 0	level 0	level 0	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: B+C+PW/B+PDI+PW/B+DPDI+PW mode

Transducer: P5-1b

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		1.14	0.79		0.79		N/A
Index Component Value			0.79	0.37	0.79	0.71	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.79					
	$P$ (mW)		82.06		82.06		N/A
	$P_{IXI}$ (mW)		68.38		68.38		
	$z_s$ (cm)			1.32			
	$z_b$ (cm)					1.39	
	$z_{MI}$ (cm)	1.50					
	$z_{PII,a}$ (cm)	1.50					
	$f_{awf}$ (MHz)	2.45	2.45	2.45	2.45	2.45	N/A
Other Information	$p_{rr}$ (Hz)	900.00					
	$S_{rr}$ (Hz)	-					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	109.70					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	148.10					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	190.47					
	$pr$ at $z_{PII}$ (MPa)	2.03					
Operating control conditions	Focus Depth(mm)	20	20	20	20	20	N/A
	Display Depth(mm)	29	29	29	29	29	N/A
	Frequency Index	2.5	2.5	2.5	2.5	2.5	N/A
	ScanAngle	/	/	/	/	/	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: CW mode

Transducer: P5-1b

Index label	MI	TIS		TIB		TIC	
		At surface	Below surface	At surface	Below surface		
Maximum index value	0.04	0.24		1.24		N/A	
Index Component Value		0.24	0.01	0.24	1.24		
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	0.06					
	$P$ (mW)		30.39		30.39		N/A
	$P_{IXI}$ (mW)		25.32		25.32		
	$z_s$ (cm)			1.56			
	$z_b$ (cm)					1.56	
	$z_{MI}$ (cm)	1.61					
	$z_{PII,a}$ (cm)	1.61					
Other Information	$f_{awf}$ (MHz)	2.00	2.00	2.00	2.00	2.00	N/A
	$p_{rr}$ (Hz)	200000.00					
	$S_{rr}$ (Hz)	-					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	0.02					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	0.55					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	0.69					
$pr$ at $z_{PII}$ (MPa)	0.07						
Operating control conditions	Focus Depth(mm)	50	50	50	50	50	N/A
	Display Depth(mm)	58	58	58	58	58	N/A
	Frequency Index	2	2	2	2	2	N/A
	ScanAngle	/	/	/	/	/	N/A

### A2.8.3. Test of Probe L15-7b

Acoustic Output Reporting Table for IEC60601-2-37

Operating Mode: B mode

Transducer: L15-7b

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.88	0.22		0.22		N/A
Index Component Value			0.22	0.22	0.22	0.22	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	2.42					
	$P$ (mW)		4.98		4.98		N/A
	$P_{IXI}$ (mW)		4.98		4.98		
	$z_s$ (cm)			1.00			
	$z_b$ (cm)					1.00	
	$z_{MI}$ (cm)	1.34					
	$z_{PII,a}$ (cm)	1.34					
	$f_{awf}$ (MHz)	7.54	9.30	9.30	9.30	9.30	N/A
Other Information	$p_{rr}$ (Hz)	-					
	$S_{rr}$ (Hz)	59.27					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	230.10					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	24.53					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	49.28					
	$pr$ at $z_{PII}$ (MPa)	3.43					
Operating control conditions	Focus Depth(mm)	15	15	15	15	15	N/A
	Display Depth(mm)	19	19	19	19	19	N/A
	Frequency Index	H14.4	10	10	10	10	N/A
	ScanAngle	level 3	level 0	level 0	level 0	level 0	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: M mode

Transducer: L15-7b

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.88	0.003		0.01		N/A
Index Component Value			0.003	0.001	0.003	0.01	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	2.42					
	$P$ (mW)		0.07		0.07		N/A
	$P_{IXI}$ (mW)		0.07		0.07		
	$z_s$ (cm)			0.86			
	$z_b$ (cm)					1.01	
	$z_{MI}$ (cm)	1.34					
	$z_{PII,a}$ (cm)	1.34					
	$f_{awf}$ (MHz)	7.54	9.30	9.30	9.30	9.30	N/A
Other Information	$p_{rr}$ (Hz)	292.59					
	$S_{rr}$ (Hz)	-					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	230.10					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	14.81					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	29.75					
	$pr$ at $z_{PII}$ (MPa)	3.43					
Operating control conditions	Focus Depth(mm)	15	15	15	15	15	N/A
	Display Depth(mm)	19	19	19	19	19	N/A
	Frequency Index	H14.4	10	10	10	10	N/A
	ScanAngle	/	/	/	/	/	N/A
	Speed	level 3	level 3	level 3	level 3	level 3	N/A



**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: B+M mode

Transducer: L15-7b

Index label	MI	TIS		TIB		TIC	
		At surface	Below surface	At surface	Below surface		
Maximum index value	0.88	0.22		0.23		N/A	
Index Component Value		0.22	0.22	0.22	0.23		
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	2.42					
	$P$ (mW)		5.05		5.05		N/A
	$P_{IXI}$ (mW)		5.05		5.05		
	$z_s$ (cm)			1.00			
	$z_b$ (cm)					1.00	
	$z_{MI}$ (cm)	1.34					
	$z_{PII,a}$ (cm)	1.34					
$f_{awf}$ (MHz)	7.54	9.30	9.30	9.30	9.30	N/A	
Other Information	$pr_r$ (Hz)	292.59					
	$Srr$ (Hz)	59.27					
	$npps$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	230.10					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	14.81					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	29.75					
	$pr$ at $z_{PII}$ (MPa)	3.43					
Operating control conditions	Focus Depth(mm)	15	15	15	15	N/A	
	Display Depth(mm)	19	19	19	19	N/A	
	Frequency Index	H14.4	10	10	10	N/A	
	ScanAngle	/	/	/	/	N/A	
	Speed	level 3	level 3	level 3	level 3	level 3	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: PW mode

Transducer: L15-7b

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		1.16	0.31		0.55		N/A
Index Component Value			0.31	0.08	0.55	0.28	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	3.3					
	$P$ (mW)		7.94		18.69		N/A
	$P_{IXI}$ (mW)		7.94		14.16		
	$z_s$ (cm)			0.81			
	$z_b$ (cm)					1.38	
	$z_{MI}$ (cm)	0.77					
	$z_{PII,a}$ (cm)	0.77					
	$f_{awf}$ (MHz)	8.11	8.13	8.13	8.12	8.12	N/A
Other Information	$p_{rr}$ (Hz)	900					
	$S_{rr}$ (Hz)	-					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	412.80					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	174.61					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	268.22					
	$pr$ at $z_{PII}$ (MPa)	4.09					
Operating control conditions	Focus Depth(mm)	10	60	60	15	15	N/A
	Display Depth(mm)	19	68	68	19	19	N/A
	Frequency Index	8	8	8	8	8	N/A
	ScanAngle	/	/	/	/	/	N/A

## Acoustic Output Reporting Table for IEC60601-2-37

Operating Mode: B+PW mode

Transducer: L15-7b

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		1.16	0.53		0.77		N/A
Index Component Value			0.53	0.30	0.77	0.50	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	3.30					
	$P$ (mW)		12.92		23.67		N/A
	$P_{IXI}$ (mW)		12.92		19.14		
	$z_s$ (cm)			1.00			
	$z_b$ (cm)					1.38	
	$z_{MI}$ (cm)	0.77					
	$z_{PII,a}$ (cm)	0.77					
	$f_{awf}$ (MHz)	8.11	8.13	9.30	9.30	8.12	N/A
Other Information	$p_{rr}$ (Hz)	900.00					
	$S_{rr}$ (Hz)	59.27					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	412.80					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	174.61					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	268.22					
	$p_r$ at $z_{PII}$ (MPa)	4.09					
Operating control conditions	Focus Depth(mm)	10	60	60	15	15	N/A
	Display Depth(mm)	19	68	68	19	19	N/A
	Frequency Index	8	8	8	8	8	N/A
	ScanAngle	level 0	level 0	level 0	level 0	level 0	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: B+C/B+PDI/B+DPDI mode

Transducer: L15-7b

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		1.11	0.06		0.06		N/A
Index Component Value			0.06	0.06	0.06	0.06	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	3.17					
	$P$ (mW)		1.79		1.79		N/A
	$P_{IXI}$ (mW)		1.46		1.46		
	$z_s$ (cm)			1.57			
	$z_b$ (cm)					1.35	
	$z_{MI}$ (cm)	0.92					
	$z_{PII,a}$ (cm)	0.92					
	$f_{awf}$ (MHz)	8.07	8.07	10.91	10.91	8.07	N/A
Other Information	$p_{rr}$ (Hz)	-					
	$S_{rr}$ (Hz)	6.02					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	364.90					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	34.25					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	57.01					
	$pr$ at $z_{PII}$ (MPa)	4.09					
Operating control conditions	Focus Depth(mm)	10	80	80	80	80	N/A
	Display Depth(mm)	19	88	88	88	88	N/A
	Frequency Index	8	8	8	8	8	N/A
	ScanAngle	level 0	level 0	level 0	level 0	level 0	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: B+C+PW/B+PDI+PW/B+DPDI+PW mode

Transducer: L15-7b

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		1.16	0.37		0.61		N/A
Index Component Value			0.37	0.14	0.61	0.34	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	3.30					
	$P$ (mW)		9.73		20.48		N/A
	$P_{IXI}$ (mW)		9.40		15.62		
	$z_s$ (cm)			0.81			
	$z_b$ (cm)					1.38	
	$z_{MI}$ (cm)	0.77					
	$z_{PII,a}$ (cm)	0.77					
	$f_{awf}$ (MHz)	8.11	8.13	8.13	8.12	8.12	N/A
Other Information	$p_{rr}$ (Hz)	900.00					
	$S_{rr}$ (Hz)	-					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	412.80					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	174.61					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	268.22					
	$p_r$ at $z_{PII}$ (MPa)	4.09					
Operating control conditions	Focus Depth(mm)	10	60	60	15	15	N/A
	Display Depth(mm)	19	68	68	19	19	N/A
	Frequency Index	8	8	8	8	8	N/A
	ScanAngle	/	/	/	/	/	N/A

### A2.8.4. Test of Probe C352UB

Acoustic Output Reporting Table for IEC60601-2-37

Operating Mode: B mode

Transducer: C352UB

Index label	MI	TIS		TIB		TIC	
		At surface	Below surface	At surface	Below surface		
Maximum index value	0.53	0.36		0.36		N/A	
Index Component Value		0.36	0.36	0.36	0.36		
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	0.90					
	$P$ (mW)		66.67		66.67		N/A
	$P_{IXI}$ (mW)		27.10		27.10		
	$z_s$ (cm)			6.35			
	$z_b$ (cm)					5.65	
	$z_{MI}$ (cm)	5.78					
	$z_{PII,a}$ (cm)	5.78					
$f_{awf}$ (MHz)	2.84	2.80	2.86	2.86	2.80	N/A	
Other Information	$p_{rr}$ (Hz)	-					
	$S_{rr}$ (Hz)	58.40					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	81.10					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	15.20					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	47.44					
	$pr$ at $z_{PII}$ (MPa)	1.59					
Operating control conditions	Focus Depth(mm)	70	70	70	70	70	N/A
	Display Depth(mm)	78	78	78	78	78	N/A
	Frequency Index	H5.0	H5.0	H5.0	H5.0	H5.0	N/A
	ScanAngle	level 0	level 0	level 0	level 0	level 0	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: M mode

Transducer: C352UB

Index label	MI	TIS		TIB		TIC	
		At surface	Below surface	At surface	Below surface		
Maximum index value	0.54	0.01		0.10		N/A	
Index Component Value		0.01	0.01	0.01	0.10		
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	0.92					
	$P$ (mW)		2.39		2.39		N/A
	$P_{IXI}$ (mW)		0.97		0.97		
	$z_s$ (cm)			5.15			
	$z_b$ (cm)					5.35	
	$z_{MI}$ (cm)	5.88					
	$z_{PII,a}$ (cm)	5.88					
	$f_{awf}$ (MHz)	2.86	2.80	2.86	2.86	2.86	N/A
Other Information	$p_{rr}$ (Hz)	125.47					
	$S_{rr}$ (Hz)	-					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	82.87					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	5.51					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	15.64					
	$pr$ at $z_{PII}$ (MPa)	1.55					
Operating control conditions	Focus Depth(mm)	70	70	70	70	70	N/A
	Display Depth(mm)	78	78	78	78	78	N/A
	Frequency Index	H5.0	H5.0	H5.0	H5.0	H5.0	N/A
	ScanAngle	/	/	/	/	/	N/A
	Speed	level 3	level 3	level 3	level 3	level 3	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: B+M mode

Transducer: C352UB

Index label	MI	TIS		TIB		TIC	
		At surface	Below surface	At surface	Below surface		
Maximum index value	0.54	0.37		0.46		N/A	
Index Component Value		0.37	0.37	0.37	0.46		
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	0.92					
	$P$ (mW)		69.06		69.06		N/A
	$P_{IXI}$ (mW)		28.07		28.07		
	$z_s$ (cm)			6.35			
	$z_b$ (cm)					5.65	
	$z_{MI}$ (cm)	5.88					
	$z_{PII,a}$ (cm)	5.88					
$f_{awf}$ (MHz)	2.86	2.80	2.86	2.86	2.80	N/A	
Other Information	$p_{rr}$ (Hz)	125.47					
	$S_{rr}$ (Hz)	58.40					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	82.87					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	5.51					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	15.64					
	$pr$ at $z_{PII}$ (MPa)	1.55					
Operating control conditions	Focus Depth(mm)	700	70	70	70	70	N/A
	Display Depth(mm)	78	78	78	78	78	N/A
	Frequency Index	H5.0	H5.0	H5.0	H5.0	H5.0	N/A
	ScanAngle	/	/	/	/	/	N/A
	Speed	level 3	level 3	level 3	level 3	level 3	N/A



**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: PW mode

Transducer: C352UB

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.54	0.45		0.45		N/A
Index Component Value			0.45	0.23	0.45	0.38	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	0.88					
	$P$ (mW)		76.76		76.76		N/A
	$P_{IXI}$ (mW)		34.87		34.87		
	$z_s$ (cm)			5.01			
	$z_b$ (cm)					5.33	
	$z_{MI}$ (cm)	5.60					
	$z_{PII,a}$ (cm)	5.60					
	$f_{awf}$ (MHz)	2.71	2.71	2.71	2.71	2.71	N/A
Other Information	$pr_r$ (Hz)	4885.20					
	$S_{rr}$ (Hz)	-					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	62.53					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	418.50					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	1265.05					
	$pr$ at $z_{PII}$ (MPa)	1.53					
Operating control conditions	Focus Depth(mm)	70	70	70	70	70	N/A
	Display Depth(mm)	78	78	78	78	78	N/A
	Frequency Index	2.5	2.5	2.5	2.5	2.5	N/A
	ScanAngle	/	/	/	/	/	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: B+PW mode

Transducer: C352UB

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.54	0.81		0.81		N/A
Index Component Value			0.81	0.59	0.81	0.74	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	0.88					
	$P$ (mW)		143.43		143.43		N/A
	$P_{IXI}$ (mW)		61.97		61.97		
	$z_s$ (cm)			6.35			
	$z_b$ (cm)					5.33	
	$z_{MI}$ (cm)	5.60					
	$z_{PII,a}$ (cm)	5.60					
	$f_{awf}$ (MHz)	2.71	2.71	2.86	2.86	2.71	N/A
Other Information	$pr_r$ (Hz)	4885.20					
	$Sr_r$ (Hz)	58.40					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	62.53					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	418.50					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	1265.05					
	$pr$ at $z_{PII}$ (MPa)	1.53					
Operating control conditions	Focus Depth(mm)	70	70	70	70	70	N/A
	Display Depth(mm)	78	78	78	78	78	N/A
	Frequency Index	2.5	2.5	2.5	2.5	2.5	N/A
	ScanAngle	level 0	level 0	level 0	level 0	level 0	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: B+C/B+PDI/B+DPDI mode

Transducer: C352UB

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.67	0.04		0.04		N/A
Index Component Value			0.04	0.04	0.04	0.04	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.10					
	$P$ (mW)		7.78		7.78		N/A
	$P_{IXI}$ (mW)		2.74		2.74		
	$z_s$ (cm)			4.88			
	$z_b$ (cm)					5.79	
	$z_{MI}$ (cm)	6.68					
	$z_{PII,a}$ (cm)	6.68					
	$f_{awf}$ (MHz)	2.71	2.71	3.59	3.59	2.71	N/A
Other Information	$pr_r$ (Hz)	3205.10					
	$Sr_r$ (Hz)	7.79					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	114.67					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	63.21					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	202.74					
	$pr$ at $z_{PII}$ (MPa)	1.97					
Operating control conditions	Focus Depth(mm)	70	70	70	70	70	N/A
	Display Depth(mm)	88	88	88	88	88	N/A
	Frequency Index	2.5	2.5	2.5	2.5	2.5	N/A
	ScanAngle	level 0	level 0	level 0	level 0	level 0	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: B+C+PW/B+PDI+PW/B+DPDI+PW mode

Transducer: C352UB

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.54	0.49		0.49		N/A
Index Component Value			0.49	0.27	0.49	0.42	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	0.88					
	$P$ (mW)		84.54		84.54		N/A
	$P_{IXI}$ (mW)		37.61		37.61		
	$z_s$ (cm)			5.01			
	$z_b$ (cm)					5.33	
	$z_{MI}$ (cm)	5.60					
	$z_{PII,a}$ (cm)	5.60					
	$f_{awf}$ (MHz)	2.71	2.71	2.71	2.71	2.71	N/A
Other Information	$p_{rr}$ (Hz)	4885.20					
	$S_{rr}$ (Hz)	-					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	62.53					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	418.50					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	1265.05					
	$pr$ at $z_{PII}$ (MPa)	1.53					
Operating control conditions	Focus Depth(mm)	70	70	70	70	70	N/A
	Display Depth(mm)	78	78	78	78	78	N/A
	Frequency Index	2.5	2.5	2.5	2.5	2.5	N/A
	ScanAngle	/	/	/	/	/	N/A

### A2.8.5. Test of Probe L742UB

Acoustic Output Reporting Table for IEC60601-2-37

Operating Mode: B mode

Transducer: L742UB

Index label	MI	TIS		TIB		TIC	
		At surface	Below surface	At surface	Below surface		
Maximum index value	0.46	0.23		0.23		N/A	
Index Component Value		0.23	0.23	0.23	0.23		
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.03					
	$P$ (mW)		9.81		9.81		N/A
	$P_{IXI}$ (mW)		9.81		9.81		
	$z_s$ (cm)			1.81			
	$z_b$ (cm)					1.81	
	$z_{MI}$ (cm)	1.78					
	$z_{PII,a}$ (cm)	1.78					
	$f_{awf}$ (MHz)	4.99	5.00	5.00	5.00	5.00	N/A
Other Information	$p_{rr}$ (Hz)	-					
	$S_{rr}$ (Hz)	79.33					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	107.89					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	28.05					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	55.59					
	$p_r$ at $z_{PII}$ (MPa)	1.45					
Operating control conditions	Focus Depth(mm)	25	25	25	25	25	N/A
	Display Depth(mm)	29	29	29	29	29	N/A
	Frequency Index	H9.0	H9.0	H9.0	H9.0	H9.0	N/A
	ScanAngle	level 0	level 0	level 0	level 0	level 0	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: M mode

Transducer: L742UB

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.51	0.01		0.05		N/A
Index Component Value			0.01	0.002	0.01	0.05	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.16					
	$P$ (mW)		0.35		0.35		N/A
	$P_{IXI}$ (mW)		0.35		0.35		
	$z_s$ (cm)			1.41			
	$z_b$ (cm)					1.57	
	$z_{MI}$ (cm)	1.70					
	$z_{PII,a}$ (cm)	1.70					
$f_{awf}$ (MHz)	5.00	5.00	5.00	5.00	5.00	5.00	N/A
Other Information	$p_{rr}$ (Hz)	227.48					
	$S_{rr}$ (Hz)	-					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	129.38					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	7.65					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	14.56					
	$p_r$ at $z_{PII}$ (MPa)	1.60					
Operating control conditions	Focus Depth(mm)	25	25	25	25	25	N/A
	Display Depth(mm)	29	29	29	29	29	N/A
	Frequency Index	H9.0	H9.0	H9.0	H9.0	H9.0	N/A
	ScanAngle	/	/	/	/	/	N/A
	Speed	level 3	level 3	level 3	level 3	level 3	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: B+M mode

Transducer: L742UB

Index label	MI	TIS		TIB		TIC	
		At surface	Below surface	At surface	Below surface		
Maximum index value	0.51	0.24		0.28		N/A	
Index Component Value		0.24	0.23	0.24	0.28		
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.16					
	$P$ (mW)		10.16		10.16		N/A
	$P_{IXI}$ (mW)		10.16		10.16		
	$z_s$ (cm)			1.81			
	$z_b$ (cm)					1.81	
	$z_{MI}$ (cm)	1.70					
	$z_{PII,a}$ (cm)	1.70					
$f_{awf}$ (MHz)	5.00	5.00	5.00	5.00	5.00	N/A	
Other Information	$pr_r$ (Hz)	227.48					
	$Srr$ (Hz)	79.33					
	$npps$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	129.38					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	7.65					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	14.56					
	$pr$ at $z_{PII}$ (MPa)	1.60					
Operating control conditions	Focus Depth(mm)	25	25	25	25	25	N/A
	Display Depth(mm)	29	29	29	29	29	N/A
	Frequency Index	H9.0	H9.0	H9.0	H9.0	H9.0	N/A
	ScanAngle	/	/	/	/	/	N/A
	Speed	level 3	level 3	level 3	level 3	level 3	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: PW mode

Transducer: L742UB

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.55	0.35		0.49		N/A
Index Component Value			0.35	0.06	0.35	0.49	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.32					
	$P$ (mW)		13.16		13.16		N/A
	$P_{IXI}$ (mW)		13.16		13.16		
	$z_s$ (cm)			1.57			
	$z_b$ (cm)					1.69	
	$z_{MI}$ (cm)	1.80					
	$z_{PII,a}$ (cm)	1.80					
	$f_{awf}$ (MHz)	5.63	5.63	5.63	5.63	5.63	N/A
Other Information	$p_{rr}$ (Hz)	9789.30					
	$S_{rr}$ (Hz)	-					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	99.76					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SI,a}$ ( $mW/cm^2$ )	634.78					
	$I_{spta}$ at $z_{PII}$ OR $z_{SI}$ ( $mW/cm^2$ )	1329.05					
	$pr$ at $z_{PII}$ (MPa)	1.91					
Operating control conditions	Focus Depth(mm)	25	25	25	25	25	N/A
	Display Depth(mm)	29	29	29	29	29	N/A
	Frequency Index	5.5	5.5	5.5	5.5	5.5	N/A
	ScanAngle	/	/	/	/	/	N/A



**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: B+PW mode

Transducer: L742UB

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.55	0.58		0.72		N/A
Index Component Value			0.58	0.29	0.58	0.72	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.32					
	$P$ (mW)		22.97		22.97		N/A
	$P_{IXI}$ (mW)		22.97		22.97		
	$z_s$ (cm)			1.81			
	$z_b$ (cm)					1.69	
	$z_{MI}$ (cm)	1.80					
	$z_{PII,a}$ (cm)	1.80					
	$f_{awf}$ (MHz)	5.63	5.63	5.00	5.00	5.63	N/A
Other Information	$p_{rr}$ (Hz)	9789.30					
	$S_{rr}$ (Hz)	79.33					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	99.76					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SI,a}$ ( $mW/cm^2$ )	634.78					
	$I_{spta}$ at $z_{PII}$ OR $z_{SI}$ ( $mW/cm^2$ )	1329.05					
	$pr$ at $z_{PII}$ (MPa)	1.91					
Operating control conditions	Focus Depth(mm)	25	25	25	25	25	N/A
	Display Depth(mm)	29	29	29	29	29	N/A
	Frequency Index	5.5	5.5	5.5	5.5	5.5	N/A
	ScanAngle	level 0	level 0	level 0	level 0	level 0	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: B+C/B+PDI/B+DPDI mode

Transducer: L742UB

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.68	0.05		0.05		N/A
Index Component Value			0.05	0.05	0.05	0.05	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.59					
	$P$ (mW)		1.79		1.79		N/A
	$P_{IXI}$ (mW)		1.79		1.79		
	$z_s$ (cm)			2.00			
	$z_b$ (cm)					2.00	
	$z_{MI}$ (cm)	2.05					
	$z_{PII,a}$ (cm)	2.05					
	$f_{awf}$ (MHz)	5.60	5.60	5.60	5.60	5.60	N/A
Other Information	$p_{rr}$ (Hz)	-					
	$S_{rr}$ (Hz)	15.76					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	153.30					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SIU,a}$ ( $mW/cm^2$ )	24.35					
	$I_{spta}$ at $z_{PII}$ OR $z_{SIU}$ ( $mW/cm^2$ )	53.19					
	$p_r$ at $z_{PII}$ (MPa)	2.35					
Operating control conditions	Focus Depth(mm)	25	25	25	25	25	N/A
	Display Depth(mm)	29	29	29	29	29	N/A
	Frequency Index	5.5	5.5	5.5	5.5	5.5	N/A
	ScanAngle	level 0	level 0	level 0	level 0	level 0	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: B+C+PW/B+PDI+PW/B+DPDI+PW mode

Transducer: L742UB

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.55	0.40		0.54		N/A
Index Component Value			0.40	0.11	0.40	0.54	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.32					
	$P$ (mW)		14.95		14.95		N/A
	$P_{IXI}$ (mW)		14.95		14.95		
	$z_s$ (cm)			1.57			
	$z_b$ (cm)					1.69	
	$z_{MI}$ (cm)	1.80					
	$z_{PII,a}$ (cm)	1.80					
	$f_{awf}$ (MHz)	5.63	5.63	5.63	5.63	5.63	N/A
Other Information	$pr_r$ (Hz)	9789.30					
	$Srr$ (Hz)	-					
	$npps$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	99.76					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	634.78					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	1329.05					
	$pr$ at $z_{PII}$ (MPa)	1.91					
Operating control conditions	Focus Depth(mm)	25	25	25	25	25	N/A
	Display Depth(mm)	29	29	29	29	29	N/A
	Frequency Index	5.5	5.5	5.5	5.5	5.5	N/A
	ScanAngle	/	/	/	/	/	N/A

### A2.8.6. Test of Probe L1042UB

Acoustic Output Reporting Table for IEC60601-2-37

Operating Mode: B mode

Transducer: L1042UB

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.48	0.25		0.25		N/A
Index Component Value			0.25	0.25	0.25	0.25	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.22					
	$P$ (mW)		8.28		8.28		N/A
	$P_{IXI}$ (mW)		8.28		8.28		
	$z_s$ (cm)			1.73			
	$z_b$ (cm)					2.00	
	$z_{MI}$ (cm)	1.83					
	$z_{PII,a}$ (cm)	1.83					
	$f_{awf}$ (MHz)	6.47	6.39	6.55	6.55	6.39	N/A
Other Information	$p_{rr}$ (Hz)	-					
	$S_{rr}$ (Hz)	79.33					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	116.77					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	22.19					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	62.64					
	$pr$ at $z_{PII}$ (MPa)	2.05					
Operating control conditions	Focus Depth(mm)	25	25	25	25	25	N/A
	Display Depth(mm)	29	29	29	29	29	N/A
	Frequency Index	H13.0	H13.0	H13.0	H13.0	H13.0	N/A
	ScanAngle	level 0	level 0	level 0	level 0	level 0	N/A

## Acoustic Output Reporting Table for IEC60601-2-37

Operating Mode: M mode

Transducer: L1042UB

Index label	MI	TIS		TIB		TIC	
		At surface	Below surface	At surface	Below surface		
Maximum index value	0.51	0.01		0.03		N/A	
Index Component Value		0.01	0.002	0.01	0.03		
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.30					
	$P$ (mW)		0.30		0.30		N/A
	$P_{IXI}$ (mW)		0.30		0.30		
	$z_s$ (cm)			1.33			
	$z_b$ (cm)					1.59	
	$z_{MI}$ (cm)	1.80					
	$z_{PII,a}$ (cm)	1.80					
$f_{awf}$ (MHz)	6.48	6.39	6.55	6.55	6.39	N/A	
Other Information	$p_{rr}$ (Hz)	227.48					
	$S_{rr}$ (Hz)	-					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	122.65					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	5.30					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	13.18					
	$pr$ at $z_{PII}$ (MPa)	2.05					
Operating control conditions	Focus Depth(mm)	25	25	25	25	25	N/A
	Display Depth(mm)	29	29	29	29	29	N/A
	Frequency Index	H13.0	H13.0	H13.0	H13.0	H13.0	N/A
	ScanAngle	/	/	/	/	/	N/A
	Speed	level 3	level 3	level 3	level 3	level 3	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: B+M mode

Transducer: L1042UB

Index label	MI	TIS		TIB		TIC	
		At surface	Below surface	At surface	Below surface		
Maximum index value	0.51	0.26		0.28		N/A	
Index Component Value		0.26	0.252	0.26	0.28		
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.30					
	$P$ (mW)		8.58	8.58		N/A	
	$P_{IXI}$ (mW)		8.58		8.58		
	$z_s$ (cm)			1.73			
	$z_b$ (cm)					2.00	
	$z_{MI}$ (cm)	1.80					
	$z_{PII,a}$ (cm)	1.80					
$f_{awf}$ (MHz)	6.48	6.39	6.55	6.55	6.39	N/A	
Other Information	$pr_r$ (Hz)	227.48					
	$Srr$ (Hz)	79.33					
	$npps$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	122.65					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	5.30					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	13.18					
	$pr$ at $z_{PII}$ (MPa)	2.05					
Operating control conditions	Focus Depth(mm)	25	25	25	25	25	N/A
	Display Depth(mm)	29	29	29	29	29	N/A
	Frequency Index	H13.0	H13.0	H13.0	H13.0	H13.0	N/A
	ScanAngle	/	/	/	/	/	N/A
	Speed	level 3	level 3	level 3	level 3	level 3	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: PW mode

Transducer: L1042UB

Index label	MI	TIS		TIB		TIC	
		At surface	Below surface	At surface	Below surface		
Maximum index value	0.46	0.31		0.47		N/A	
Index Component Value		0.31	0.04	0.31	0.47		
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.12					
	$P$ (mW)		11.03		11.03		N/A
	$P_{IXI}$ (mW)		11.03		11.03		
	$z_s$ (cm)			1.63			
	$z_b$ (cm)					1.75	
	$z_{MI}$ (cm)	2.05					
	$z_{PII,a}$ (cm)	2.05					
	$f_{awf}$ (MHz)	5.84	5.87	5.87	5.87	5.87	N/A
Other Information	$p_{rr}$ (Hz)	9789.3					
	$S_{rr}$ (Hz)	-					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	58.19					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SI,a}$ ( $mW/cm^2$ )	370.27					
	$I_{spta}$ at $z_{PII}$ OR $z_{SI}$ ( $mW/cm^2$ )	793.90					
	$pr$ at $z_{PII}$ (MPa)	1.64					
Operating control conditions	Focus Depth(mm)	25	25	25	25	25	N/A
	Display Depth(mm)	29	29	29	29	29	N/A
	Frequency Index	5.5	5.5	5.5	5.5	5.5	N/A
	ScanAngle	/	/	/	/	/	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: B+PW mode

Transducer: L1042UB

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.46	0.56		0.73		N/A
Index Component Value			0.56	0.30	0.56	0.73	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.12					
	$P$ (mW)		19.31		19.31		N/A
	$P_{IXI}$ (mW)		19.31		19.31		
	$z_s$ (cm)			1.73			
	$z_b$ (cm)					1.75	
	$z_{MI}$ (cm)	2.05					
	$z_{PII,a}$ (cm)	2.05					
	$f_{awf}$ (MHz)	5.84	5.87	6.55	6.55	5.87	N/A
Other Information	$pr_r$ (Hz)	9789.30					
	$Sr_r$ (Hz)	79.33					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	58.19					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	370.27					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	793.90					
	$pr$ at $z_{PII}$ (MPa)	1.64					
Operating control conditions	Focus Depth(mm)	25	25	25	25	25	N/A
	Display Depth(mm)	29	29	29	29	29	N/A
	Frequency Index	5.5	5.5	5.5	5.5	5.5	N/A
	ScanAngle	level 0	level 0	level 0	level 0	level 0	N/A



**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: B+C/B+PDI/B+DPDI mode

Transducer: L1042UB

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.58	0.04		0.04		N/A
Index Component Value			0.04	0.04	0.04	0.04	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.42					
	$P$ (mW)		1.25		1.25		N/A
	$P_{IXI}$ (mW)		1.25		1.25		
	$z_s$ (cm)			2.00			
	$z_b$ (cm)					2.00	
	$z_{MI}$ (cm)	2.20					
	$z_{PII,a}$ (cm)	2.20					
	$f_{awf}$ (MHz)	5.83	5.86	6.43	6.43	5.86	N/A
Other Information	$pr_r$ (Hz)	-					
	$S_{rr}$ (Hz)	17.38					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	101.56					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	66.01					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	148.53					
	$pr$ at $z_{PII}$ (MPa)	2.13					
Operating control conditions	Focus Depth(mm)	25	25	25	25	25	N/A
	Display Depth(mm)	29	29	29	29	29	N/A
	Frequency Index	5.5	5.5	5.5	5.5	5.5	N/A
	ScanAngle	level 0	level 0	level 0	level 0	level 0	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: B+C+PW/B+PDI+PW/B+DPDI+PW mode

Transducer: L1042UB

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.46	0.35		0.51		N/A
Index Component Value			0.35	0.08	0.35	0.51	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.12					
	$P$ (mW)		12.28		12.28		N/A
	$P_{IXI}$ (mW)		12.28		12.28		
	$z_s$ (cm)			1.63			
	$z_b$ (cm)					1.75	
	$z_{MI}$ (cm)	2.05					
	$z_{PII,a}$ (cm)	2.05					
	$f_{awf}$ (MHz)	5.84	5.87	5.87	5.87	5.87	N/A
Other Information	$p_{rr}$ (Hz)	9789.3					
	$S_{rr}$ (Hz)	-					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	58.19					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	370.27					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	793.90					
	$pr$ at $z_{PII}$ (MPa)	1.64					
Operating control conditions	Focus Depth(mm)	25	25	25	25	25	N/A
	Display Depth(mm)	29	29	29	29	29	N/A
	Frequency Index	5.5	5.5	5.5	5.5	5.5	N/A
	ScanAngle	/	/	/	/	/	N/A

### A2.8.7. Test of Probe C612UB

Acoustic Output Reporting Table for IEC60601-2-37

Operating Mode: B mode

Transducer: C612UB

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.64	0.30		0.30		N/A
Index Component Value			0.30	0.30	0.30	0.30	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.60					
	$P$ (mW)		10.15		10.15		N/A
	$P_{IXI}$ (mW)		10.15		10.15		
	$z_s$ (cm)			1.50			
	$z_b$ (cm)					1.50	
	$z_{MI}$ (cm)	1.63					
	$z_{PII,a}$ (cm)	1.63					
	$f_{awf}$ (MHz)	6.25	6.19	6.19	6.19	6.19	N/A
Other Information	$p_{rr}$ (Hz)	-					
	$S_{rr}$ (Hz)	138.22					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	164.90					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	32.98					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	72.97					
	$p_r$ at $z_{PII}$ (MPa)	2.38					
Operating control conditions	Focus Depth(mm)	20	20	20	20	20	N/A
	Display Depth(mm)	29	29	29	29	29	N/A
	Frequency Index	6.5	6.5	6.5	6.5	6.5	N/A
	ScanAngle	level 0	level 0	level 0	level 0	level 0	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: M mode

Transducer: C612UB

Index label	MI	TIS		TIB		TIC	
		At surface	Below surface	At surface	Below surface		
Maximum index value	0.68	0.01		0.03		N/A	
Index Component Value		0.01	0.001	0.01	0.03		
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.69					
	$P$ (mW)		0.24	0.24		N/A	
	$P_{IXI}$ (mW)		0.24	0.24			
	$z_s$ (cm)		1.30				
	$z_b$ (cm)				1.42		
	$z_{MI}$ (cm)	1.58					
	$z_{PII,a}$ (cm)	1.58					
$f_{awf}$ (MHz)	6.21	6.19	6.19	6.19	6.19	N/A	
Other Information	$pr_r$ (Hz)	264.11					
	$S_{rr}$ (Hz)	-					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	1.05					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	0.06					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	0.10					
	$pr$ at $z_{PII}$ (MPa)	2.29					
Operating control conditions	Focus Depth(mm)	20	20	20	20	20	N/A
	Display Depth(mm)	29	29	29	29	29	N/A
	Frequency Index	6.5	6.5	6.5	6.5	6.5	N/A
	ScanAngle	/	/	/	/	/	N/A
	Speed	level 3	level 3	level 3	level 3	level 3	N/A

## Acoustic Output Reporting Table for IEC60601-2-37

Operating Mode: B+M mode

Transducer: C612UB

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.68	0.31		0.33		N/A
Index Component Value			0.31	0.30	0.31	0.33	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.69					
	$P$ (mW)		10.39		10.39		N/A
	$P_{IXI}$ (mW)		10.39		10.39		
	$z_s$ (cm)			1.50			
	$z_b$ (cm)					1.50	
	$z_{MI}$ (cm)	1.58					
	$z_{PII,a}$ (cm)	1.58					
	$f_{awf}$ (MHz)	6.21	6.19	6.19	6.19	6.19	N/A
Other Information	$pr_r$ (Hz)	264.11					
	$Srr$ (Hz)	138.22					
	$npps$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	1.05					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	0.06					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	0.10					
	$pr$ at $z_{PII}$ (MPa)	2.29					
Operating control conditions	Focus Depth(mm)	20	20	20	20	20	N/A
	Display Depth(mm)	29	29	29	29	29	N/A
	Frequency Index	6.5	6.5	6.5	6.5	6.5	N/A
	ScanAngle	/	/	/	/	/	N/A
	Speed	level 3	level 3	level 3	level 3	level 3	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: PW mode

Transducer: C612UB

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.54	0.36		0.56		N/A
Index Component Value			0.36	0.07	0.36	0.56	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.30					
	$P$ (mW)		13.12		13.12		N/A
	$P_{IXI}$ (mW)		13.12		13.12		
	$z_s$ (cm)			1.30			
	$z_b$ (cm)					1.46	
	$z_{MI}$ (cm)	1.78					
	$z_{PII,a}$ (cm)	1.78					
	$f_{awf}$ (MHz)	5.68	5.69	5.69	5.69	5.69	N/A
Other Information	$pr_r$ (Hz)	9789.30					
	$Srr$ (Hz)	-					
	$npps$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	106.79					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	669.06					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	1399.24					
	$pr$ at $z_{PII}$ (MPa)	1.88					
Operating control conditions	Focus Depth(mm)	20	20	20	20	20	N/A
	Display Depth(mm)	29	29	29	29	29	N/A
	Frequency Index	6	6	6	6	6	N/A
	ScanAngle	/	/	/	/	/	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: B+PW mode

Transducer: C612UB

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.54	0.65		0.86		N/A
Index Component Value			0.65	0.37	0.65	0.86	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.30					
	$P$ (mW)		23.27		23.27		N/A
	$P_{IXI}$ (mW)		23.27		23.27		
	$z_s$ (cm)			1.50			
	$z_b$ (cm)					1.46	
	$z_{MI}$ (cm)	1.78					
	$z_{PII,a}$ (cm)	1.78					
	$f_{awf}$ (MHz)	5.68	5.69	6.19	6.19	5.69	N/A
Other Information	$p_{rr}$ (Hz)	9789.30					
	$S_{rr}$ (Hz)	138.44					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	106.79					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SI,a}$ ( $mW/cm^2$ )	669.06					
	$I_{spta}$ at $z_{PII}$ OR $z_{SI}$ ( $mW/cm^2$ )	1399.24					
	$pr$ at $z_{PII}$ (MPa)	1.88					
Operating control conditions	Focus Depth(mm)	20	20	20	20	20	N/A
	Display Depth(mm)	29	29	29	29	29	N/A
	Frequency Index	6	6	6	6	6	N/A
	ScanAngle	level 0	level 0	level 0	level 0	level 0	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: B+C/B+PDI/B+DPDI mode

Transducer: C612UB

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.62	0.03		0.03		N/A
Index Component Value			0.03	0.03	0.03	0.03	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.48					
	$P$ (mW)		1.13		1.13		N/A
	$P_{IXI}$ (mW)		1.13		1.13		
	$z_s$ (cm)			1.50			
	$z_b$ (cm)					1.50	
	$z_{MI}$ (cm)	1.63					
	$z_{PII,a}$ (cm)	1.63					
	$f_{awf}$ (MHz)	5.69	5.69	6.53	6.53	5.69	N/A
Other Information	$pr_r$ (Hz)	-					
	$Srr$ (Hz)	18.29					
	$npps$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	142.35					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	31.00					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	64.21					
	$pr$ at $z_{PII}$ (MPa)	2.13					
Operating control conditions	Focus Depth(mm)	20	20	20	20	20	N/A
	Display Depth(mm)	29	29	29	29	29	N/A
	Frequency Index	6	6	6	6	6	N/A
	ScanAngle	level 0	level 0	level 0	level 0	level 0	N/A



**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: B+C+PW/B+PDI+PW/B+DPDI+PW mode

Transducer: C612UB

Index label	MI	TIS		TIB		TIC	
		At surface	Below surface	At surface	Below surface		
Maximum index value	0.54	0.39		0.59		N/A	
Index Component Value		0.39	0.10	0.39	0.59		
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.30					
	$P$ (mW)		14.25		14.25		N/A
	$P_{IXI}$ (mW)		14.25		14.25		
	$z_s$ (cm)			1.30			
	$z_b$ (cm)					1.46	
	$z_{MI}$ (cm)	1.78					
	$z_{PII,a}$ (cm)	1.78					
	$f_{awf}$ (MHz)	5.68	5.69	5.69	5.69	5.69	N/A
Other Information	$p_{rr}$ (Hz)	9789.30					
	$S_{rr}$ (Hz)	-					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	106.79					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SI,a}$ ( $mW/cm^2$ )	669.06					
	$I_{spta}$ at $z_{PII}$ OR $z_{SI}$ ( $mW/cm^2$ )	1399.24					
	$pr$ at $z_{PII}$ (MPa)	1.88					
Operating control conditions	Focus Depth(mm)	20	20	20	20	20	N/A
	Display Depth(mm)	29	29	29	29	29	N/A
	Frequency Index	6	6	6	6	6	N/A
	ScanAngle	/	/	/	/	/	N/A

### A2.8.8. Test of Probe C6152UB

Acoustic Output Reporting Table for IEC60601-2-37

Operating Mode: B mode

Transducer: C6152UB

Index label	MI	TIS		TIB		TIC	
		At surface	Below surface	At surface	Below surface		
Maximum index value	0.62	0.46		0.46		N/A	
Index Component Value		0.46	0.46	0.46	0.46		
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.33					
	$P$ (mW)		20.38		20.38		N/A
	$P_{IXI}$ (mW)		20.38		20.38		
	$z_s$ (cm)			2.00			
	$z_b$ (cm)					2.00	
	$z_{MI}$ (cm)	1.83					
	$z_{PII,a}$ (cm)	1.83					
$f_{awf}$ (MHz)	4.71	4.72	4.72	4.72	4.72	N/A	
Other Information	$p_{rr}$ (Hz)	-					
	$S_{rr}$ (Hz)	79.33					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	137.59					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	24.65					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	52.99					
	$pr$ at $z_{PII}$ (MPa)	1.95					
Operating control conditions	Focus Depth(mm)	25	25	25	25	25	N/A
	Display Depth(mm)	29	29	29	29	29	N/A
	Frequency Index	H9.4	H9.4	H9.4	H9.4	H9.4	N/A
	ScanAngle	level 0	level 0	level 0	level 0	level 0	N/A

## Acoustic Output Reporting Table for IEC60601-2-37

Operating Mode: M mode

Transducer: C6152UB

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.63	0.01		0.06		N/A
Index Component Value			0.01	0.003	0.01	0.06	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.82					
	$P$ (mW)		0.49		0.49		N/A
	$P_{IXI}$ (mW)		0.49		0.49		
	$z_s$ (cm)			1.54			
	$z_b$ (cm)					1.72	
	$z_{MI}$ (cm)	1.90					
	$z_{PII,a}$ (cm)	1.90					
	$f_{awf}$ (MHz)	4.62	4.72	4.72	4.72	4.72	N/A
Other Information	$p_{rr}$ (Hz)	151.65					
	$S_{rr}$ (Hz)	-					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	154.25					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	6.78					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	12.60					
	$p_r$ at $z_{PII}$ (MPa)	2.48					
Operating control conditions	Focus Depth(mm)	25	25	25	25	25	N/A
	Display Depth(mm)	29	29	29	29	29	N/A
	Frequency Index	H9.4	H9.4	H9.4	H9.4	H9.4	N/A
	ScanAngle	/	/	/	/	/	N/A
	Speed	level 3	level 3	level 3	level 3	level 3	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: B+M mode

Transducer: C6152UB

Index label	MI	TIS		TIB		TIC	
		At surface	Below surface	At surface	Below surface		
Maximum index value	0.63	0.47		0.52		N/A	
Index Component Value		0.47	0.46	0.47	0.52		
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.82					
	$P$ (mW)		20.87	20.87		N/A	
	$P_{IXI}$ (mW)		20.87	20.87			
	$z_s$ (cm)			2.00			
	$z_b$ (cm)					2.00	
	$z_{MI}$ (cm)	1.90					
	$z_{PII,a}$ (cm)	1.90					
$f_{awf}$ (MHz)	4.62	4.72	4.72	4.72	4.72	N/A	
Other Information	$pr_r$ (Hz)	151.65					
	$Srr$ (Hz)	79.33					
	$npps$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	154.25					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	6.78					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	12.60					
	$pr$ at $z_{PII}$ (MPa)	2.48					
Operating control conditions	Focus Depth(mm)	25	25	25	25	25	N/A
	Display Depth(mm)	29	29	29	29	29	N/A
	Frequency Index	H9.4	H9.4	H9.4	H9.4	H9.4	N/A
	ScanAngle	/	/	/	/	/	N/A
	Speed	level 3	level 3	level 3	level 3	level 3	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: PW mode

Transducer: C6152UB

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.64	0.47		0.49		N/A
Index Component Value			0.47	0.10	0.47	0.49	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.41					
	$P$ (mW)		20.04		20.04		N/A
	$P_{IXI}$ (mW)		20.04		20.04		
	$z_s$ (cm)			1.93			
	$z_b$ (cm)					2.01	
	$z_{MI}$ (cm)	2.13					
	$z_{PII,a}$ (cm)	2.13					
	$f_{awf}$ (MHz)	4.98	4.98	4.98	4.98	4.98	N/A
Other Information	$p_{rr}$ (Hz)	7344.90					
	$S_{rr}$ (Hz)	-					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	131.78					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	706.57					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	1627.60					
	$pr$ at $z_{PII}$ (MPa)	2.14					
Operating control conditions	Focus Depth(mm)	25	25	25	25	25	N/A
	Display Depth(mm)	29	29	29	29	29	N/A
	Frequency Index	5	5	5	5	5	N/A
	ScanAngle	/	level 0	level 0	level 0	level 0	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: B+PW mode

Transducer: C6152UB

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.64	0.93		0.95		N/A
Index Component Value			0.93	0.56	0.93	0.95	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.41					
	$P$ (mW)		40.43		40.43		N/A
	$P_{IXI}$ (mW)		40.43		40.43		
	$z_s$ (cm)			2.00			
	$z_b$ (cm)					2.01	
	$z_{MI}$ (cm)	2.13					
	$z_{PII,a}$ (cm)	2.13					
	$f_{awf}$ (MHz)	4.98	4.98	4.72	4.72	4.98	N/A
Other Information	$p_{rr}$ (Hz)	7344.90					
	$S_{rr}$ (Hz)	79.33					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	131.78					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SI,a}$ ( $mW/cm^2$ )	706.57					
	$I_{spta}$ at $z_{PII}$ OR $z_{SI}$ ( $mW/cm^2$ )	1627.60					
	$pr$ at $z_{PII}$ (MPa)	2.14					
Operating control conditions	Focus Depth(mm)	25	25	25	25	25	N/A
	Display Depth(mm)	29	29	29	29	29	N/A
	Frequency Index	5	5	5	5	5	N/A
	ScanAngle	level 0	level 0	level 0	level 0	level 0	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: B+C/B+PDI/B+DPDI mode

Transducer: C6152UB

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.65	0.05		0.05		N/A
Index Component Value			0.05	0.05	0.05	0.05	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.44					
	$P$ (mW)		1.90		1.90		N/A
	$P_{IXI}$ (mW)		1.90		1.90		
	$z_s$ (cm)			2.00			
	$z_b$ (cm)					2.00	
	$z_{MI}$ (cm)	2.20					
	$z_{PII,a}$ (cm)	2.20					
	$f_{awf}$ (MHz)	4.98	4.99	6.07	6.07	4.99	N/A
Other Information	$p_{rr}$ (Hz)	-					
	$S_{rr}$ (Hz)	15.89					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	135.86					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	25.96					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	58.41					
	$p_r$ at $z_{PII}$ (MPa)	2.16					
Operating control conditions	Focus Depth(mm)	25	25	25	25	25	N/A
	Display Depth(mm)	29	29	29	29	29	N/A
	Frequency Index	5	5	5	5	5	N/A
	ScanAngle	level 0	level 0	level 0	level 0	level 0	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: B+C+PW/B+PDI+PW/B+DPDI+PW mode

Transducer: C6152UB

Index label	MI	TIS		TIB		TIC	
		At surface	Below surface	At surface	Below surface		
Maximum index value	0.64	0.52		0.54		N/A	
Index Component Value		0.52	0.15	0.52	0.54		
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.41					
	$P$ (mW)		21.94		21.94		N/A
	$P_{IXI}$ (mW)		21.94		21.94		
	$z_s$ (cm)			1.93			
	$z_b$ (cm)					2.01	
	$z_{MI}$ (cm)	2.13					
	$z_{PII,a}$ (cm)	2.13					
	$f_{awf}$ (MHz)	4.98	4.98	4.98	4.98	4.98	N/A
Other Information	$p_{rr}$ (Hz)	7344.9					
	$S_{rr}$ (Hz)	-					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	131.78					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SI,a}$ ( $mW/cm^2$ )	706.57					
	$I_{spta}$ at $z_{PII}$ OR $z_{SI}$ ( $mW/cm^2$ )	1627.60					
	$pr$ at $z_{PII}$ (MPa)	2.14					
Operating control conditions	Focus Depth(mm)	25	25	25	25	25	N/A
	Display Depth(mm)	29	29	29	29	29	N/A
	Frequency Index	5	5	5	5	5	N/A
	ScanAngle	/	level 0	level 0	level 0	level 0	N/A



### A2.8.9. Test of Probe C422UB

Acoustic Output Reporting Table for IEC60601-2-37

Operating Mode: B mode

Transducer: C422UB

Index label	MI	TIS		TIB		TIC	
		At surface	Below surface	At surface	Below surface		
Maximum index value	0.58	0.41		0.41		N/A	
Index Component Value		0.41	0.41	0.41	0.41		
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.08					
	$P$ (mW)		33.49		33.49		N/A
	$P_{IXI}$ (mW)		25.76		25.76		
	$z_s$ (cm)			4.00			
	$z_b$ (cm)					4.00	
	$z_{MI}$ (cm)	3.83					
	$z_{PII,a}$ (cm)	3.83					
	$f_{awf}$ (MHz)	3.34	3.34	3.34	3.34	3.34	N/A
Other Information	$pr_r$ (Hz)	-					
	$Srr$ (Hz)	84.06					
	$npps$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	81.20					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	24.35					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	58.22					
	$pr$ at $z_{PII}$ (MPa)	1.67					
Operating control conditions	Focus Depth(mm)	60	60	60	60	60	N/A
	Display Depth(mm)	68	68	68	68	68	N/A
	Frequency Index	3	3	3	3	3	N/A
	ScanAngle	level 0	level 0	level 0	level 0	level 0	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: M mode

Transducer: C422UB

Index label	MI	TIS		TIB		TIC	
		At surface	Below surface	At surface	Below surface		
Maximum index value	0.57	0.01		0.13		N/A	
Index Component Value		0.01	0.004	0.01	0.13		
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.03					
	$P$ (mW)		1.20	1.20		N/A	
	$P_{IXI}$ (mW)		0.92		0.92		
	$z_s$ (cm)			2.97			
	$z_b$ (cm)					3.54	
	$z_{MI}$ (cm)	3.90					
	$z_{PII,a}$ (cm)	3.90					
$f_{awf}$ (MHz)	3.34	3.34	3.34	3.34	3.34	N/A	
Other Information	$pr_r$ (Hz)	240.62					
	$S_{rr}$ (Hz)	-					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	91.27					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	9.88					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	27.24					
	$pr$ at $z_{PII}$ (MPa)	1.71					
Operating control conditions	Focus Depth(mm)	60	60	60	60	60	N/A
	Display Depth(mm)	68	68	68	68	68	N/A
	Frequency Index	3	3	3	3	3	N/A
	ScanAngle	/	/	/	/	/	N/A
	Speed	level 3	level 3	level 3	level 3	level 3	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: B+M mode

Transducer: C422UB

Index label	MI	TIS		TIB		TIC	
		At surface	Below surface	At surface	Below surface		
Maximum index value	0.57	0.42		0.54		N/A	
Index Component Value		0.42	0.41	0.42	0.54		
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.03					
	$P$ (mW)		34.69		34.69		N/A
	$P_{IXI}$ (mW)		26.68		26.68		
	$z_s$ (cm)			4.00			
	$z_b$ (cm)					4.00	
	$z_{MI}$ (cm)	3.90					
	$z_{PII,a}$ (cm)	3.90					
$f_{awf}$ (MHz)	3.34	3.34	3.34	3.34	3.34	N/A	
Other Information	$pr_r$ (Hz)	240.62					
	$Srr$ (Hz)	84.06					
	$npps$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	91.27					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	9.88					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	27.24					
	$pr$ at $z_{PII}$ (MPa)	1.71					
Operating control conditions	Focus Depth(mm)	60	60	60	60	60	N/A
	Display Depth(mm)	68	68	68	68	68	N/A
	Frequency Index	3	3	3	3	3	N/A
	ScanAngle	/	/	/	/	/	N/A
	Speed	level 3	level 3	level 3	level 3	level 3	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: PW mode

Transducer: C422UB

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.62	0.60		0.60		N/A
Index Component Value			0.60	0.28	0.60	0.47	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.09					
	$P$ (mW)		67.95		67.95		N/A
	$P_{IXI}$ (mW)		41.32		41.32		
	$z_s$ (cm)			3.67			
	$z_b$ (cm)					4.07	
	$z_{MI}$ (cm)	4.43					
	$z_{PII,a}$ (cm)	4.43					
	$f_{awf}$ (MHz)	3.08	3.07	3.07	3.07	3.07	N/A
Other Information	$pr_r$ (Hz)	4885.10					
	$Srr$ (Hz)	-					
	$npps$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	105.23					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	601.45					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	1556.32					
	$pr$ at $z_{PII}$ (MPa)	1.75					
Operating control conditions	Focus Depth(mm)	60	60	60	60	60	N/A
	Display Depth(mm)	68	68	68	68	68	N/A
	Frequency Index	3	3	3	3	3	N/A
	ScanAngle	/	/	/	/	/	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: B+PW mode

Transducer: C422UB

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.62	1.01		1.01		N/A
Index Component Value			1.01	0.69	1.01	0.88	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.09					
	$P$ (mW)		101.44		101.44		N/A
	$P_{IXI}$ (mW)		67.08		67.08		
	$z_s$ (cm)			4.00			
	$z_b$ (cm)					4.07	
	$z_{MI}$ (cm)	4.43					
	$z_{PII,a}$ (cm)	4.43					
	$f_{awf}$ (MHz)	3.08	3.07	3.34	3.34	3.07	N/A
Other Information	$pr_r$ (Hz)	4885.10					
	$Sr_r$ (Hz)	84.05					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	105.23					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	601.45					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	1556.32					
	$pr$ at $z_{PII}$ (MPa)	1.75					
Operating control conditions	Focus Depth(mm)	60	60	60	60	60	N/A
	Display Depth(mm)	68	68	68	68	68	N/A
	Frequency Index	3	3	3	3	3	N/A
	ScanAngle	level 0	level 0	level 0	level 0	level 0	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: B+C/B+PDI/B+DPDI mode

Transducer: C422UB

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.80	0.07		0.07		N/A
Index Component Value			0.07	0.07	0.07	0.07	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.39					
	$P$ (mW)		7.31		7.31		N/A
	$P_{IXI}$ (mW)		4.74		4.74		
	$z_s$ (cm)			4.69			
	$z_b$ (cm)					4.67	
	$z_{MI}$ (cm)	4.23					
	$z_{PII,a}$ (cm)	4.23					
	$f_{awf}$ (MHz)	3.06	3.06	3.42	3.42	3.06	N/A
Other Information	$p_{rr}$ (Hz)	-					
	$S_{rr}$ (Hz)	8.78					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	168.11					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	65.34					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	160.72					
	$pr$ at $z_{PII}$ (MPa)	2.18					
Operating control conditions	Focus Depth(mm)	60	60	60	60	60	N/A
	Display Depth(mm)	78	78	78	78	78	N/A
	Frequency Index	3	3	3	3	3	N/A
	ScanAngle	level 0	level 0	level 0	level 0	level 0	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: B+C+PW/B+PDI+PW/B+DPDI+PW mode

Transducer: C422UB

Index label	MI	TIS		TIB		TIC	
		At surface	Below surface	At surface	Below surface		
Maximum index value	0.62	0.67		0.67		N/A	
Index Component Value		0.67	0.35	0.67	0.54		
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.09					
	$P$ (mW)		75.26		75.26		N/A
	$P_{IXI}$ (mW)		46.06		46.06		
	$z_s$ (cm)			3.67			
	$z_b$ (cm)					4.07	
	$z_{MI}$ (cm)	4.43					
	$z_{PII,a}$ (cm)	4.43					
	$f_{awf}$ (MHz)	3.08	3.07	3.07	3.07	3.07	N/A
Other Information	$p_{rr}$ (Hz)	4885.10					
	$S_{rr}$ (Hz)	-					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	105.23					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SI,a}$ ( $mW/cm^2$ )	601.45					
	$I_{spta}$ at $z_{PII}$ OR $z_{SI}$ ( $mW/cm^2$ )	1556.32					
	$pr$ at $z_{PII}$ (MPa)	1.75					
Operating control conditions	Focus Depth(mm)	60	60	60	60	60	N/A
	Display Depth(mm)	68	68	68	68	68	N/A
	Frequency Index	3	3	3	3	3	N/A
	ScanAngle	/	/	/	/	/	N/A

### A2.8.10. Test of Probe L552UB

Acoustic Output Reporting Table for IEC60601-2-37

Operating Mode: B mode

Transducer: L552UB

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.71	0.60		0.60		N/A
Index Component Value			0.60	0.60	0.60	0.60	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.53					
	$P$ (mW)		26.58		26.58		N/A
	$P_{IXI}$ (mW)		26.58		26.58		
	$z_s$ (cm)			2.00			
	$z_b$ (cm)					2.00	
	$z_{MI}$ (cm)	2.05					
	$z_{PII,a}$ (cm)	2.05					
	$f_{awf}$ (MHz)	4.71	4.74	4.74	4.74	4.74	N/A
Other Information	$pr_r$ (Hz)	-					
	$Srr$ (Hz)	110.98					
	$npps$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	157.30					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	20.45					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	44.23					
	$pr$ at $z_{PII}$ (MPa)	2.25					
Operating control conditions	Focus Depth(mm)	25	25	25	25	25	N/A
	Display Depth(mm)	29	29	29	29	29	N/A
	Frequency Index	4.5	4.5	4.5	4.5	4.5	N/A
	ScanAngle	level 0	level 0	level 0	level 0	level 0	N/A



**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: M mode

Transducer: L552UB

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.76	0.02		0.13		N/A
Index Component Value			0.02	0.01	0.02	0.13	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.64					
	$P$ (mW)		0.95		0.95		N/A
	$P_{IXI}$ (mW)		0.95		0.95		
	$z_s$ (cm)			1.50			
	$z_b$ (cm)					1.48	
	$z_{MI}$ (cm)	1.93					
	$z_{PII,a}$ (cm)	1.93					
	$f_{awf}$ (MHz)	4.71	4.74	4.74	4.74	4.74	N/A
Other Information	$pr_r$ (Hz)	317.88					
	$Srr$ (Hz)	-					
	$npps$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	170.70					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	14.11					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	28.72					
	$pr$ at $z_{PII}$ (MPa)	2.34					
Operating control conditions	Focus Depth(mm)	25	25	25	25	25	N/A
	Display Depth(mm)	29	29	29	29	29	N/A
	Frequency Index	4.5	4.5	4.5	4.5	4.5	N/A
	ScanAngle	/	/	/	/	/	N/A
	Speed	level 3	level 3	level 3	level 3	level 3	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: B+M mode

Transducer: L552UB

Index label	MI	TIS		TIB		TIC	
		At surface	Below surface	At surface	Below surface		
Maximum index value	0.76	0.62		0.73		N/A	
Index Component Value		0.62	0.61	0.62	0.73		
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.64					
	$P$ (mW)		27.53		27.53		N/A
	$P_{IXI}$ (mW)		27.53		27.53		
	$z_s$ (cm)			2.00			
	$z_b$ (cm)					2.00	
	$z_{MI}$ (cm)	1.93					
	$z_{PII,a}$ (cm)	1.93					
$f_{awf}$ (MHz)	4.71	4.74	4.74	4.74	4.74	N/A	
Other Information	$p_{rr}$ (Hz)	317.88					
	$S_{rr}$ (Hz)	110.98					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	170.70					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SI,a}$ ( $mW/cm^2$ )	14.11					
	$I_{spta}$ at $z_{PII}$ OR $z_{SI}$ ( $mW/cm^2$ )	28.72					
	$p_r$ at $z_{PII}$ (MPa)	2.34					
Operating control conditions	Focus Depth(mm)	25	25	25	25	25	N/A
	Display Depth(mm)	29	29	29	29	29	N/A
	Frequency Index	4.5	4.5	4.5	4.5	4.5	N/A
	ScanAngle	/	/	/	/	/	N/A
	Speed	level 3	level 3	level 3	level 3	level 3	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: PW mode

Transducer: L552UB

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.73	0.54		0.56		N/A
Index Component Value			0.54	0.16	0.54	0.56	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.45					
	$P$ (mW)		28.32		28.32		N/A
	$P_{IXI}$ (mW)		28.32		28.32		
	$z_s$ (cm)			1.71			
	$z_b$ (cm)					1.95	
	$z_{MI}$ (cm)	2.23					
	$z_{PII,a}$ (cm)	2.23					
	$f_{awf}$ (MHz)	3.97	3.98	3.98	3.98	3.98	N/A
Other Information	$p_{rr}$ (Hz)	4885.10					
	$S_{rr}$ (Hz)	-					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	115.40					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SI,a}$ ( $mW/cm^2$ )	518.64					
	$I_{spta}$ at $z_{PII}$ OR $z_{SI}$ ( $mW/cm^2$ )	957.33					
	$pr$ at $z_{PII}$ (MPa)	1.97					
Operating control conditions	Focus Depth(mm)	25	25	25	25	25	N/A
	Display Depth(mm)	29	29	29	29	29	N/A
	Frequency Index	4	4	4	4	4	N/A
	ScanAngle	/	/	/	/	/	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: B+PW mode

Transducer: L552UB

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.73	1.14		1.16		N/A
Index Component Value			1.14	0.76	1.14	1.16	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.45					
	$P$ (mW)		54.89		54.89		N/A
	$P_{IXI}$ (mW)		54.89		54.89		
	$z_s$ (cm)			2.00			
	$z_b$ (cm)					2.00	
	$z_{MI}$ (cm)	2.23					
	$z_{PII,a}$ (cm)	2.23					
	$f_{awf}$ (MHz)	3.97	4.74	4.74	4.74	4.74	N/A
Other Information	$p_{rr}$ (Hz)	4885.10					
	$S_{rr}$ (Hz)	102.77					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	115.40					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SIU,a}$ ( $mW/cm^2$ )	518.64					
	$I_{spta}$ at $z_{PII}$ OR $z_{SIU}$ ( $mW/cm^2$ )	957.33					
	$p_r$ at $z_{PII}$ (MPa)	1.97					
Operating control conditions	Focus Depth(mm)	25	25	25	25	25	N/A
	Display Depth(mm)	29	29	29	29	29	N/A
	Frequency Index	4	4	4	4	4	N/A
	ScanAngle	level 0	level 0	level 0	level 0	level 0	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: B+C/B+PDI/B+DPDI mode

Transducer: L552UB

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.73	0.05		0.05		N/A
Index Component Value			0.05	0.05	0.05	0.05	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.47					
	$P$ (mW)		2.27		2.27		N/A
	$P_{IXI}$ (mW)		2.27		2.27		
	$z_s$ (cm)			2.00			
	$z_b$ (cm)					2.00	
	$z_{MI}$ (cm)	2.23					
	$z_{PII,a}$ (cm)	2.23					
	$f_{awf}$ (MHz)	3.97	3.97	4.92	4.92	3.97	N/A
Other Information	$p_{rr}$ (Hz)	-					
	$S_{rr}$ (Hz)	11.00					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	116.68					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SI,a}$ ( $mW/cm^2$ )	34.56					
	$I_{spta}$ at $z_{PII}$ OR $z_{SI}$ ( $mW/cm^2$ )	60.19					
	$pr$ at $z_{PII}$ (MPa)	1.94					
Operating control conditions	Focus Depth(mm)	25	25	25	25	25	N/A
	Display Depth(mm)	29	29	29	29	29	N/A
	Frequency Index	4	4	4	4	4	N/A
	ScanAngle	level 0	level 0	level 0	level 0	level 0	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: B+C+PW/B+PDI+PW/B+DPDI+PW mode

Transducer: L552UB

Index label	MI	TIS		TIB		TIC	
		At surface	Below surface	At surface	Below surface		
Maximum index value	0.73	0.59		0.61		N/A	
Index Component Value		0.59	0.21	0.59	0.61		
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.45					
	$P$ (mW)		30.59		30.59		N/A
	$P_{IXI}$ (mW)		30.59		30.59		
	$z_s$ (cm)			1.71			
	$z_b$ (cm)					1.95	
	$z_{MI}$ (cm)	2.23					
	$z_{PII,a}$ (cm)	2.23					
	$f_{awf}$ (MHz)	3.97	3.98	3.98	3.98	3.98	N/A
Other Information	$p_{rr}$ (Hz)	4885.10					
	$S_{rr}$ (Hz)	-					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	115.40					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SI,a}$ ( $mW/cm^2$ )	518.64					
	$I_{spta}$ at $z_{PII}$ OR $z_{SI}$ ( $mW/cm^2$ )	957.33					
	$pr$ at $z_{PII}$ (MPa)	1.97					
Operating control conditions	Focus Depth(mm)	25	25	25	25	25	N/A
	Display Depth(mm)	29	29	29	29	29	N/A
	Frequency Index	4	4	4	4	4	N/A
	ScanAngle	/	/	/	/	/	N/A

## A2.8.11. Test of Probe V562-1UB

Acoustic Output Reporting Table for IEC60601-2-37

Operating Mode: B mode

Transducer: V562-1UB

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.72	0.16		0.16		N/A
Index Component Value			0.16	0.16	0.16	0.16	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.43					
	$P$ (mW)		23.03		23.03		N/A
	$P_{IXI}$ (mW)		8.00		8.00		
	$z_s$ (cm)			2.91			
	$z_b$ (cm)					2.91	
	$z_{MI}$ (cm)	3.30					
	$z_{PII,a}$ (cm)	3.30					
$f_{awf}$ (MHz)	3.94	4.12	4.12	4.12	4.12	N/A	
Other Information	$p_{rr}$ (Hz)	-					
	$S_{rr}$ (Hz)	1000.00					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	290.38					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SI,a}$ ( $mW/cm^2$ )	13.40					
	$I_{spta}$ at $z_{PII}$ OR $z_{SI}$ ( $mW/cm^2$ )	30.57					
	$pr$ at $z_{PII}$ (MPa)	2.16					
Operating control conditions	Focus Depth(mm)	58	58	58	58	58	N/A
	Display Depth(mm)	50	50	50	50	50	N/A
	Frequency Index	4	4	4	4	4	N/A
	ScanAngle	level 0	level 0	level 0	level 0	level 0	N/A

Acoustic Output Reporting Table for IEC60601-2-37

Operating Mode: M mode

Transducer: V562-1UB

Index label	MI	TIS		TIB		TIC	
		At surface	Below surface	At surface	Below surface		
Maximum index value	0.72	0.02		0.30		N/A	
Index Component Value		0.02	0.01	0.02	0.30		
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.42					
	$P$ (mW)		2.80		2.80		N/A
	$P_{IXI}$ (mW)		0.97		0.97		
	$z_s$ (cm)			2.55			
	$z_b$ (cm)					2.75	
	$z_{MI}$ (cm)	3.30					
	$z_{PII,a}$ (cm)	3.30					
$f_{awf}$ (MHz)	3.92	4.12	4.12	4.12	4.12	N/A	
Other Information	$pr_r$ (Hz)	8240.40					
	$Srr$ (Hz)	-					
	$npps$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	313.61					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	34.15					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	79.02					
	$pr$ at $z_{PII}$ (MPa)	2.16					
Operating control conditions	Focus Depth(mm)	58	58	58	58	58	N/A
	Display Depth(mm)	50	50	50	50	50	N/A
	Frequency Index	4	4	4	4	4	N/A
	ScanAngle	/	/	/	/	/	N/A
	Speed	level 3	level 3	level 3	level 3	level 3	N/A



**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: B+M mode

Transducer: V562-1UB

Index label	MI	TIS		TIB		TIC	
		At surface	Below surface	At surface	Below surface		
Maximum index value	0.72	0.18		0.46		N/A	
Index Component Value		0.18	0.17	0.18	0.46		
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.42					
	$P$ (mW)		25.83		25.83		N/A
	$P_{IXI}$ (mW)		8.97		8.97		
	$z_s$ (cm)			2.91			
	$z_b$ (cm)					2.91	
	$z_{MI}$ (cm)	3.30					
	$z_{PII,a}$ (cm)	3.30					
$f_{awf}$ (MHz)	3.92	4.12	4.12	4.12	4.12	N/A	
Other Information	$pr_r$ (Hz)	8240.40					
	$Srr$ (Hz)	1000.00					
	$npps$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	313.61					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	34.15					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	79.02					
	$pr$ at $z_{PII}$ (MPa)	2.16					
Operating control conditions	Focus Depth(mm)	58	58	58	58	58	N/A
	Display Depth(mm)	50	50	50	50	50	N/A
	Frequency Index	4	4	4	4	4	N/A
	ScanAngle	/	/	/	/	/	N/A
	Speed	level 3	level 3	level 3	level 3	level 3	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: PW mode

Transducer: V562-1UB

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.53	0.20		0.37		N/A
Index Component Value			0.20	0.12	0.20	0.37	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.16					
	$P$ (mW)		30.48		30.48		N/A
	$P_{IXI}$ (mW)		10.58		10.58		
	$z_s$ (cm)			2.85			
	$z_b$ (cm)					3.13	
	$z_{MI}$ (cm)	3.70					
	$z_{PII,a}$ (cm)	3.70					
	$f_{awf}$ (MHz)	4.70	3.96	3.96	3.96	3.96	N/A
Other Information	$p_{rr}$ (Hz)	4186.70					
	$S_{rr}$ (Hz)	-					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	110.55					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SI,a}$ ( $mW/cm^2$ )	62.18					
	$I_{spta}$ at $z_{PII}$ OR $z_{SI}$ ( $mW/cm^2$ )	184.85					
	$pr$ at $z_{PII}$ (MPa)	2.00					
Operating control conditions	Focus Depth(mm)	58	58	58	58	58	N/A
	Display Depth(mm)	50	50	50	50	50	N/A
	Frequency Index	4	4	4	4	4	N/A
	ScanAngle	/	/	/	/	/	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: B+PW mode

Transducer: V562-1UB

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.53	0.36		0.53		N/A
Index Component Value			0.36	0.28	0.36	0.53	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.16					
	$P$ (mW)		53.5		53.5		N/A
	$P_{IXI}$ (mW)		18.58		18.58		
	$z_s$ (cm)			2.91			
	$z_b$ (cm)					3.13	
	$z_{MI}$ (cm)	3.70					
	$z_{PII,a}$ (cm)	3.70					
	$f_{awf}$ (MHz)	4.70	3.96	4.12	4.12	3.96	N/A
Other Information	$p_{rr}$ (Hz)	4186.70					
	$S_{rr}$ (Hz)	102.77					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	110.55					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SI,a}$ ( $mW/cm^2$ )	62.18					
	$I_{spta}$ at $z_{PII}$ OR $z_{SI}$ ( $mW/cm^2$ )	184.85					
	$pr$ at $z_{PII}$ (MPa)	2.00					
Operating control conditions	Focus Depth(mm)	58	58	58	58	58	N/A
	Display Depth(mm)	50	50	50	50	50	N/A
	Frequency Index	4	4	4	4	4	N/A
	ScanAngle	/	/	/	/	/	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: B+C/B+PDI/B+DPDI mode

Transducer: V562-1UB

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.72	0.02		0.02		N/A
Index Component Value			0.02	0.02	0.02	0.02	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.43					
	$P$ (mW)		3.31		3.31		N/A
	$P_{IXI}$ (mW)		1.15		1.15		
	$z_s$ (cm)			3.00			
	$z_b$ (cm)					3.39	
	$z_{MI}$ (cm)	3.30					
	$z_{PII,a}$ (cm)	3.30					
	$f_{awf}$ (MHz)	3.94	3.95	4.62	4.62	3.95	N/A
Other Information	$pr_r$ (Hz)	-					
	$Srr$ (Hz)	12.56					
	$npps$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	290.38					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	29.73					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	67.84					
	$pr$ at $z_{PII}$ (MPa)	2.16					
Operating control conditions	Focus Depth(mm)	58	58	58	58	58	N/A
	Display Depth(mm)	50	50	50	50	50	N/A
	Frequency Index	4	4	4	4	4	N/A
	ScanAngle	level 0	level 0	level 0	level 0	level 0	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: B+C+PW/B+PDI+PW/B+DPDI+PW mode

Transducer: V562-1UB

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.53	0.22		0.39		N/A
Index Component Value			0.22	0.14	0.22	0.39	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.16					
	$P$ (mW)		33.79		33.79		N/A
	$P_{IXI}$ (mW)		11.73		11.73		
	$z_s$ (cm)			2.85			
	$z_b$ (cm)					3.13	
	$z_{MI}$ (cm)	3.70					
	$z_{PII,a}$ (cm)	3.70					
	$f_{awf}$ (MHz)	4.70	3.96	3.96	3.96	3.96	N/A
Other Information	$p_{rr}$ (Hz)	4186.70					
	$S_{rr}$ (Hz)	-					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	110.55					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SI,a}$ ( $mW/cm^2$ )	62.18					
	$I_{spta}$ at $z_{PII}$ OR $z_{SI}$ ( $mW/cm^2$ )	184.85					
	$pr$ at $z_{PII}$ (MPa)	2.00					
Operating control conditions	Focus Depth(mm)	58	58	58	58	58	N/A
	Display Depth(mm)	50	50	50	50	50	N/A
	Frequency Index	4	4	4	4	4	N/A
	ScanAngle	/	/	/	/	/	N/A

## A2.8.12. Test of Probe V742UB

Acoustic Output Reporting Table for IEC60601-2-37

Operating Mode: B mode

Transducer: V742UB

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.46	0.17		0.17		N/A
Index Component Value			0.17	0.17	0.17	0.17	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.03					
	$P$ (mW)		7.04		7.04		N/A
	$P_{IXI}$ (mW)		7.04		7.04		
	$z_s$ (cm)			1.21			
	$z_b$ (cm)					1.53	
	$z_{MI}$ (cm)	1.78					
	$z_{PII,a}$ (cm)	1.78					
$f_{awf}$ (MHz)	4.99	5.17	5.21	5.21	5.17	N/A	
Other Information	$p_{rr}$ (Hz)	-					
	$S_{rr}$ (Hz)	102.77					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	414.96					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SI,a}$ ( $mW/cm^2$ )	28.05					
	$I_{spta}$ at $z_{PII}$ OR $z_{SI}$ ( $mW/cm^2$ )	55.59					
	$pr$ at $z_{PII}$ (MPa)	1.45					
Operating control conditions	Focus Depth(mm)	29	29	29	29	29	N/A
	Display Depth(mm)	25	25	25	25	25	N/A
	Frequency Index	H9.0	H9.0	H9.0	H9.0	H9.0	N/A
	ScanAngle	level 0	level 0	level 0	level 0	level 0	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: M mode

Transducer: V742UB

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.51	0.01		0.04		N/A
Index Component Value			0.01	0.001	0.01	0.04	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.16					
	$P$ (mW)		0.25		0.25		N/A
	$P_{IXI}$ (mW)		0.25		0.25		
	$z_s$ (cm)			1.07			
	$z_b$ (cm)					1.17	
	$z_{MI}$ (cm)	1.70					
	$z_{PII,a}$ (cm)	1.70					
	$f_{awf}$ (MHz)	5.00	5.17	5.21	5.21	5.17	N/A
Other Information	$pr_r$ (Hz)	227.48					
	$Srr$ (Hz)	-					
	$npps$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	497.62					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	33.64					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	64.00					
	$pr$ at $z_{PII}$ (MPa)	1.60					
Operating control conditions	Focus Depth(mm)	29	29	29	29	29	N/A
	Display Depth(mm)	25	25	25	25	25	N/A
	Frequency Index	H9.0	H9.0	H9.0	H9.0	H9.0	N/A
	ScanAngle	/	/	/	/	/	N/A
	Speed	level 3	level 3	level 3	level 3	level 3	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: B+M mode

Transducer: V742UB

Index label	MI	TIS		TIB		TIC	
		At surface	Below surface	At surface	Below surface		
Maximum index value	0.51	0.18		0.21		N/A	
Index Component Value		0.18	0.17	0.18	0.21		
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.16					
	$P$ (mW)		7.29		7.29		N/A
	$P_{IXI}$ (mW)		7.29		7.29		
	$z_s$ (cm)			1.21			
	$z_b$ (cm)					1.53	
	$z_{MI}$ (cm)	1.70					
	$z_{PII,a}$ (cm)	1.70					
$f_{awf}$ (MHz)	5.00	5.17	5.21	5.21	5.17	N/A	
Other Information	$pr_r$ (Hz)	227.48					
	$Srr$ (Hz)	102.77					
	$npps$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	497.62					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SII,a}$ ( $mW/cm^2$ )	33.64					
	$I_{spta}$ at $z_{PII}$ OR $z_{SII}$ ( $mW/cm^2$ )	64.00					
	$pr$ at $z_{PII}$ (MPa)	1.60					
Operating control conditions	Focus Depth(mm)	29	29	29	29	29	N/A
	Display Depth(mm)	25	25	25	25	25	N/A
	Frequency Index	H9.0	H9.0	H9.0	H9.0	H9.0	N/A
	ScanAngle	/	/	/	/	/	N/A
	Speed	level 3	level 3	level 3	level 3	level 3	N/A



**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: PW mode

Transducer: V742UB

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.55	0.23		0.44		N/A
Index Component Value			0.23	0.05	0.23	0.44	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.32					
	$P$ (mW)		8.59		8.59		N/A
	$P_{IXI}$ (mW)		8.59		8.59		
	$z_s$ (cm)			1.39			
	$z_b$ (cm)					1.53	
	$z_{MI}$ (cm)	1.80					
	$z_{PII,a}$ (cm)	1.80					
	$f_{awf}$ (MHz)	5.63	5.67	5.67	5.67	5.67	N/A
Other Information	$p_{rr}$ (Hz)	9789.30					
	$S_{rr}$ (Hz)	-					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	153.48					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SI,a}$ ( $mW/cm^2$ )	64.84					
	$I_{spta}$ at $z_{PII}$ OR $z_{SI}$ ( $mW/cm^2$ )	135.77					
	$p_r$ at $z_{PII}$ (MPa)	1.91					
Operating control conditions	Focus Depth(mm)	29	29	29	29	29	N/A
	Display Depth(mm)	25	25	25	25	25	N/A
	Frequency Index	5	5.5	5.5	5.5	5.5	N/A
	ScanAngle	/	/	/	/	/	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: B+PW mode

Transducer: V742UB

Index label	MI	TIS		TIB		TIC	
		At surface	Below surface	At surface	Below surface		
Maximum index value	0.55	0.41		0.62		N/A	
Index Component Value		0.41	0.22	0.41	0.62		
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.32					
	$P$ (mW)		15.63		15.63		N/A
	$P_{IXI}$ (mW)		15.63		15.63		
	$z_s$ (cm)			1.21			
	$z_b$ (cm)					1.53	
	$z_{MI}$ (cm)	1.80					
	$z_{PII,a}$ (cm)	1.80					
	$f_{awf}$ (MHz)	5.63	5.67	5.21	5.21	5.67	N/A
Other Information	$p_{rr}$ (Hz)	9789.30					
	$S_{rr}$ (Hz)	102.77					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	153.48					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SI,a}$ ( $mW/cm^2$ )	64.84					
	$I_{spta}$ at $z_{PII}$ OR $z_{SI}$ ( $mW/cm^2$ )	135.77					
	$p_r$ at $z_{PII}$ (MPa)	1.91					
Operating control conditions	Focus Depth(mm)	29	29	29	29	29	N/A
	Display Depth(mm)	25	25	25	25	25	N/A
	Frequency Index	5.5	5.5	5.5	5.5	5.5	N/A
	ScanAngle	level 0	level 0	level 0	level 0	level 0	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: B+C/B+PDI/B+DPDI mode

Transducer: V742UB

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.68	0.02		0.02		N/A
Index Component Value			0.02	0.02	0.02	0.02	
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.59					
	$P$ (mW)		0.77		0.77		N/A
	$P_{IXI}$ (mW)		0.77		0.77		
	$z_s$ (cm)			1.61			
	$z_b$ (cm)					2.00	
	$z_{MI}$ (cm)	2.05					
	$z_{PII,a}$ (cm)	2.05					
	$f_{awf}$ (MHz)	5.60	5.67	5.67	5.67	5.67	N/A
Other Information	$p_{rr}$ (Hz)	-					
	$S_{rr}$ (Hz)	13.32					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	232.27					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SIU,a}$ ( $mW/cm^2$ )	35.65					
	$I_{spta}$ at $z_{PII}$ OR $z_{SIU}$ ( $mW/cm^2$ )	77.88					
	$p_r$ at $z_{PII}$ (MPa)	2.35					
Operating control conditions	Focus Depth(mm)	29	29	29	29	29	N/A
	Display Depth(mm)	25	25	25	25	25	N/A
	Frequency Index	5.5	5.5	5.5	5.5	5.5	N/A
	ScanAngle	level 0	level 0	level 0	level 0	level 0	N/A

**Acoustic Output Reporting Table for IEC60601-2-37**

Operating Mode: B+C+PW/B+PDI+PW/B+DPDI+PW mode

Transducer: V742UB

Index label	MI	TIS		TIB		TIC	
		At surface	Below surface	At surface	Below surface		
Maximum index value	0.55	0.25		0.46		N/A	
Index Component Value		0.25	0.07	0.25	0.46		
Associated acoustic parameters	$p_{r,a}$ at $z_{MI}$ (MPa)	1.32					
	$P$ (mW)		9.36		9.36		N/A
	$P_{IXI}$ (mW)		9.36		9.36		
	$z_s$ (cm)			1.39			
	$z_b$ (cm)					1.53	
	$z_{MI}$ (cm)	1.80					
	$z_{PII,a}$ (cm)	1.80					
Other Information	$f_{awf}$ (MHz)	5.63	5.67	5.67	5.67	5.67	N/A
	$p_{rr}$ (Hz)	9789.30					
	$S_{rr}$ (Hz)	-					
	$n_{pps}$	1.00					
	$I_{pi,a}$ at $z_{PII,a}$ ( $W/cm^2$ )	153.48					
	$I_{spta,a}$ at $z_{PII,a}$ OR $z_{SI,a}$ ( $mW/cm^2$ )	64.84					
	$I_{spta}$ at $z_{PII}$ OR $z_{SI}$ ( $mW/cm^2$ )	135.77					
$pr$ at $z_{PII}$ (MPa)	1.91						
Operating control conditions	Focus Depth(mm)	29	29	29	29	29	N/A
	Display Depth(mm)	25	25	25	25	25	N/A
	Frequency Index	5.5	5.5	5.5	5.5	5.5	N/A
	ScanAngle	/	/	/	/	/	N/A

**WARNING**

The device is not intended for ophthalmic use. Do not use it for examining ophthalmic vessels, or any other procedures which may cause the ultrasound beam to pass through the eye.

## Appendix III: Measurement Accuracy

Parameter	Range	Accuracy
Two-dimension Measurement		
Distance/depth	Full Screen	< $\pm 5\%$
Area (Trace)	Full Screen	< $\pm 10\%$
Area (Ellipse)	Full Screen	< $\pm 10\%$
Angle	Full Screen	< $\pm 3\%$
Time Motion (TM) Measurement		
Depth	Full Screen	< $\pm 5\%$
Time	Timeline display	< $\pm 5\%$
Heart rate	Timeline display	< $\pm 5\%$
Volume Measurement		
Volume	Full Screen	< $\pm 15\%$
PW measurement		
Velocity	10-200cm/s	When angle $\leq 60^\circ$ , < $\pm 10\%$
CW measurement		
Velocity	10-200cm/s	When angle $\leq 60^\circ$ , < $\pm 10\%$

## Appendix IV: EMC Information-Guidance and Manufacture's Declaration

### Electromagnetic Emissions

<b>Guidance and manufacture's declaration – electromagnetic emission</b>		
U60 VET is intended for use in the electromagnetic environment specified below. The customer or the user of U60 VET should assure that they are used in such an environment.		
<b>Emission test</b>	<b>Compliance</b>	<b>Electromagnetic environment – guidance</b>
RF emissions CISPR 11	Group 1	U60 VET uses RF energy only for their internal function. Therefore, their RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emission CISPR 11	Class A	U60 VET is suitable for use in all establishments, other than domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC/EN 61000-3-2	Class A	
Voltage fluctuations/ flicker emissions IEC/EN 61000-3-3	Complies	

#### **NOTE:**

The EMISSIONS characteristics of U60 VET make it suitable for use in industrial areas and hospitals (CISPR 11 class A). If it is used in a residential environment (for which CISPR 11 class B is normally required) U60 VET might not offer adequate protection to radio-frequency communication services. The user might need to take mitigation measures, such as relocating or re-orienting the equipment.

### Electromagnetic Immunity


<b>Guidance and manufacture's declaration – electromagnetic immunity</b>			
U60 VET is intended for use in the electromagnetic environment specified below. The customer or the user of U60 VET should assure that they are used in such an environment.			
Immunity test	IEC/EN 60601 test level	Compliance level	Electromagnetic environment - guidance
Electrostatic discharge (ESD) IEC/EN 61000-4-2	± 8 kV contact ± 15 kV air	± 8 kV contact ± 15 kV air	Floors should be wood, concrete or ceramic tile. If floor are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/burst IEC/EN 61000-4-4	±2 kV for power supply lines	±2kV for power supply lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC/EN 61000-4-5	±1 kV for line to line ±2 kV for line to ground	±1 kV for line to line ±2 kV for line to ground	Mains power quality should be that of a typical commercial or hospital environment.
Power frequency (50/60Hz) magnetic field IEC/EN 61000-4-8	30 A/m	30 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC/EN 61000-4-11	0 % UT; 0.5 cycle At 0°, 45°, 90°, 135°, 180°, 225°, 270° and 315°  0 % UT; 1 cycle and 70 % UT; 25/30 cycles ) Single phase: at 0°  0 % UT; 250/300 cycle	0 % U <sub>T</sub> ; 0.5 cycle At 0°, 45°, 90°, 135°, 180°, 225°, 270° and 315°  0 % U <sub>T</sub> ; 1 cycle and 70 % U <sub>T</sub> ; 25/30 cycles Single phase: at 0°  0 % U <sub>T</sub> ; 250/300 cycle	Mains power quality should be that of a typical commercial or hospital environment. If the user of U60 VET requires continued operation during power mains interruptions, it is recommended that U60 VET be powered from an uninterruptible power supply or a battery.

**NOTE**  $U_T$  is the a.c. mains voltage prior to application of the test level.

### Electromagnetic Immunity

<b>Guidance and manufacture's declaration – electromagnetic immunity</b>			
U60 VET is intended for use in the electromagnetic environment specified below. The customer or the user of U60 VET should assure that they are used in such an environment.			
Immunity test	IEC/EN 60601 test level	Compliance level	Electromagnetic environment - guidance
Conducted RF IEC/EN 61000-4-6  Radiated RF IEC/EN 61000-4-3	$3 V_{rms}$ 150 kHz to 80 MHz $6V_{rms}^c$ in ISM bands between 0.15 MHz and 80 MHz  $3 V/m$ 80 MHz to 2.7 GHz  See table 1	$3 V_{rms}$ 150 kHz to 80 MHz $6V_{rms}^c$ in ISM bands between 0.15 MHz and 80 MHz  $3 V/m$ 80 MHz to 2.7 GHz  Comply with table 1	Portable and mobile RF communications equipment should be used no closer to any part of U60 VET, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter.  <b>Recommended separation distance</b>  $d = 1.2\sqrt{P}$ 150KHz to 80MHz  $d = 1.2\sqrt{P}$ 80 MHz to 800 MHz  $d = 2.3\sqrt{P}$ 800 MHz to 2.7 GHz  $d=6 \quad /E$ at RF wireless communications equipment bands (Portable RF communications equipment (including peripherals such as antenna cables and external antennas) should be used no closer than 30 cm (12 inches) to any part of the U60 VET, including cables specified by the manufacturer).  Where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter



			<p>manufacturer and d is the recommended separation distance in meters (m).</p> <p>Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey,<sup>a</sup> should be less than the compliance level in each frequency range.<sup>b</sup></p> <p>Interference may occur in the vicinity of equipment marked with the following symbol:</p> 
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**NOTE 1** At 80 MHz and 800 MHz, the higher frequency range applies.

**NOTE 2** These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

<sup>a</sup> Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which U60 VET is used exceeds the applicable RF compliance level above, U60 VET should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating U60 VET.

<sup>b</sup> Over the frequency range 150kHz to 80MHz, field strengths should be less than 3V/m.

<sup>c</sup> The ISM (industrial, scientific and medical) bands between 0.15 MHz and 80 MHz are 6.765 MHz to 6.795 MHz; 13.553 MHz to 13.567 MHz; 26.957 MHz to 27.283 MHz; and 40.66 MHz to 40.70 MHz. The amateur radio bands between 0.15 MHz and 80 MHz are 1.8 MHz to 2.0 MHz, 3.5 MHz to 4.0 MHz, 5.3 MHz to 5.4 MHz, 7 MHz to 7.3 MHz, 10.1 MHz to 10.15 MHz, 14 MHz to 14.2 MHz, 18.07 MHz to 18.17 MHz, 21.0 MHz to 21.4 MHz, 24.89 MHz to 24.99 MHz, 28.0 MHz to 29.7 MHz and 50.0 MHz to 54.0 MHz.

**Table 1 Test specifications for ENCLOSURE PORT IMMUNITY to RF wireless communications equipment**

Test frequency (MHz)	Band <sup>a)</sup> (MHz)	Service <sup>a)</sup>	Modulation <sup>b)</sup>	Maximum power (W)	Distance (m)	Immunity test level (V/m)
385	380-390	TETRA 400	Pulse modulation <sup>b)</sup> 18 Hz	1.8	0.3	27
450	430-470	GMRS 460, FRS 460	FM <sup>c)</sup> ± 5 kHz deviation 1 kHz sine	2	0.3	28
710	704-787	LTE Band 13, 17	Pulse modulation <sup>b)</sup> 217 Hz	0.2	0.3	9
745						
780						
810	800-960	GSM 800/900, TETRA 800, iDEN 820, CDMA 850, LTE Band 5	Pulse modulation <sup>b)</sup> 18 Hz	2	0.3	28
870						
930						
1720	1700-1990	GSM 1800; CDMA 1900; GSM 1900; DECT; LTE Band 1, 3, 4, 25; UMTS	Pulse modulation <sup>b)</sup> 217 Hz	2	0.3	28
1845						
1970						
2450	2400-2570	Bluetooth, WLAN, 802.11 b/g/n, RFID 2450, LTE Band 7	Pulse modulation <sup>b)</sup> 217 Hz	2	0.3	28
5240	5100-5800	WLAN 802.11 a/n	Pulse modulation <sup>b)</sup> 217 Hz	0.2	0.3	9
5500						
5785						
NOTE If necessary to achieve the IMMUNITY TEST LEVEL, the distance between the transmitting antenna and the ME EQUIPMENT or ME SYSTEM may be reduced to 1 m. The 1 m test distance is permitted by IEC 61000-4-3.						

- a) For some services, only the uplink frequencies are included.
- b) The carrier shall be modulated using a 50 % duty cycle square wave signal.
- c) As an alternative to FM modulation, 50 % pulse modulation at 18 Hz may be used because while it does not represent actual modulation, it would be worst case.

### Recommended Separation Distances

**Recommended separation distances between  
portable and mobile RF communications equipment and U60 VET**

U60 VET is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of U60 VET can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and U60 VET as recommended below, according to the maximum output power of the communications equipment.

Rated maximum output power of transmitter  (W)	Separation distance according to frequency of transmitter(m)		
	150 kHz to 80 MHz  $d = 1.2\sqrt{P}$	80 MHz to 800 MHz  $d = 1.2\sqrt{P}$	800 MHz to 2.7 GHz  $d = 2.3\sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

For transmitters rated at a maximum output power not listed above, the recommended separation distance  $d$  in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where  $P$  is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

**NOTE 1** At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.

**NOTE 2** These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

## Appendix V: Order List

The following accessories are recommended to be used on the U60 VET.

### **WARNING**

Only accessories supplied or recommended by EDAN can be used, the battery and probes of EDAN can be only used on EDAN's systems. Otherwise, the performance and electric shock protection can not be guaranteed. If electrical or mechanical equipment from other companies need to be connected to the device, please contact EDAN or authorized representatives before connection.

<b>Part Name</b>	<b>Part Number</b>
Probe C352UB	02.01.214604
Probe L1042UB	02.01.214607
Probe L742UB	02.01.214606
Probe C612UB	02.01.214608
Probe C6152UB	02.01.214609
Probe C422UB	02.01.214610
Probe L552UB	02.01.214611
Probe C5-2b	02.01.214612
Probe P5-1b	02.01.214614
Probe L15-7b	02.01.214613
Probe V742UB	02.01.214616
Probe V562-1UB	02.01.214615
BGK-R50UB Needle Guide Bracket Kit	02.01.210406
BGK-L40UB Needle Guide Bracket Kit	02.01.210407
BGK-R10UB Needle Guide Bracket Kit	02.01.210617
BGK-R15UB Needle Guide Bracket Kit	02.01.210618
BGK-R20UB Needle Guide Bracket Kit	02.01.210619
BGK-L50UB Needle Guide Bracket Kit	02.01.210620
BGK-C5-2 Needle Guide Bracket Kit	02.01.211006

Ultrasound gel	01.57.078008
Freeze footswitch	21.10.027169
MT-805 Mobile trolley	83.63.560344
Rechargeable Lithium-Ion battery	01.21.064143
Hand carried bag	01.56.466571
Dustproof cloth	01.57.471026
USB Disk	01.18.052245

**NOTE:**

The part name may vary depending on context, but the part number is constant.

## Appendix VI: Glossary

Abbreviated	Description
<b>Obstetrics</b>	
EDC	Estimated Date of Confinement
MA	Menstrual Age
CRL	Crown Rump Length
GSD	Gestational Sac Diameter
GSD-H	Gestational Sac Diameter-Horizontal
GSD-V	Gestational Sac Diameter-Vertical
<b>Cardiology</b>	
LVIDd	Left Ventricle Internal Diameter (end diastolic)
LVIDs	Left Ventricle Internal Diameter (end systolic)
HR	Heart Rate
ESV	End Systolic Volume
SV	Stroke volume
CO	Cardiac Output
EF	Ejection fraction (M mode)
FS	Fractional Shortening
SI	Stroke Index
CI	Cardiac Index
MVCF	Mean Velocity Circumferential Fiber Shortening
BSA	Body Surface Area
AOD	Aortic root Diameter
LAD	Left Atrium Diameter
LAD/AOD	Left Atrium Diameter / Aortic root Diameter
CA	Cardiac cycle apex A
CE	Cardiac cycle apex E
CA/CE	The ratio of CA to CE
EF SLP	Ejection Fraction Slope
ACV	AC Decreasing Velocity
DEV	Deceleration Velocity
DCT	Deceleration Time
MAVO1	Aortic Valve Volume Opened, beginning
MAVO2	Aortic Valve Volume Opened, ending
AA	Aortic Amplitude
LVMW	Left Ventricular Muscle Weight
AVSV	Aortic Valve Stoma Valve flow
QMV	Mitral Valve Flow
LVLd	Left Ventricle Long-axle Diameter (end diastolic)
LVALd	Left Ventricle Area of Long-axle (end diastolic)
LVLs	Left Ventricle Long-axle Diameter (end systolic)

LVALs	Left Ventricle Area of Long-axle (end systolic)
LVET	Left Ventricular Ejection Time
<b>Vascular</b>	
CCA	Common Carotid Artery
ICA	Internal Carotid Artery
ECA	External Carotid Artery
Vert A	Vertebral Artery
<b>Others</b>	
TI	Thermal Index
MI	Mechanical Index
TIS	Soft-tissue thermal index
TIB	Bone thermal index
TIC	Cranial-bone thermal index

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