User Manual

EDANUSA

DUS 6

Digital Ultrasonic Diagnostic Imaging System

Release 1.5

CE 0123

About this Manual

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Statement

This manual will help you understand the operation and maintenance of the product better. It is reminded that the product shall be used strictly complying with this manual. User's operation failing to comply with this manual may result in malfunction or accident for which Edan Instruments, Inc. (hereinafter called EDAN) can not be held liable.

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EDAN holds the rights to modify, update, and ultimately explain this manual.

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, and

The electrical installation of the relevant room complies with international standards, and

The equipment is used in accordance with the instructions for use.

Upon request, EDAN may provide, with compensation, necessary circuit diagrams, and other information to help qualified technician to maintain and repair some parts, which EDAN may define as user serviceable.

Terms Used in this Manual

This guide is designed to give key concepts on safety precautions.

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.

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Chapter 1 Introduction

1.1. Intended Use

The DUS 6 Digital Ultrasonic Diagnostic Imaging System is intended for diagnostic ultrasound imaging analysis in gynecology rooms, obstetrics rooms, examination rooms, intensive care units, and emergency rooms. The DUS 6 is intended for use by or on the order of a physician or similarly qualified health care professional for ultrasound evaluation of Fetus; Abdomen; Pediatrics; Small Organ; Neonatal head; Cardiology; Peripheral Vessel; Musculo-skeleton (both Conventional and Superficial); Urology (including prostate); Transrecta and Transvagina.

1.2. Features

This portable device, Digital Ultrasonic Diagnostic Imaging System (DUS 6), is a high-resolution linear/convex scanning diagnostic apparatus.

Applied technologies:

Tissue Specific Imaging (TSI), Tissue Harmonic Image (THI), Digital Beam-Forming (DBF), Dynamic Receiving Focusing (DRF), Real-time Dynamic Aperture (RDA), Dynamic Frequency Scanning (DFS), and Dynamic Apodization.

Display modes:

B, B+B, 4B, B+M, and M.

Measurement and calculation functions:

B-mode generic measurement and calculation: Distance, circumference, area, volume, ratio, % stenosis, and angle;

M-mode generic measurement and calculation: Time, slope, and heart rate.

File management:

It supports local disk and removable disk storage. USB 1.1 interface enables fast image uploading to your computer in the real-time mode. It has a 56 MB storage capacity.

Operation:

The folding keyboard designed with trackball is easy and convenient for various types of operation.

In addition, 10" non-interlaced progressive display and diverse probes are adopted to provide a clear and stable image.

1.3. Model

DUS 6

1.4. Contraindication

- The equipment is not applicable to the diagnosis of the pneumatic organs that contain gas such as lung, stomach, intestines, etc.
- It is recommended not to examine the parts with wounds or acute inflammation to avoid cross infection.
- Patients in the following situations are not allowed to be examined with E613 probe: vaginal infection (such as trichomonal vaginitis, colpomycosis, venereal disease etc.), the unmarried, vagina deformity, menstrual period, postmenopausal vagina atrophy, difficulty in per vagina ultrasonic examination, colporrhagia, Pyrilamine placenta previa, etc.

1.5. General Safety Precaution Information

1.5.1. General Information

CAUTION

Federal (U.S.) law restricts this device to sale by or on the order of a physician.

NOTE:

1. This equipment is not intended for home use.
2. The pictures and interfaces in this manual are for reference only.

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:

1. The device should be operated by qualified operators or under their instructions.
2. DO NOT alter parameters of the device at will. If it is necessary, please consult EDAN or authorized representatives for service.
3. The device has already been adjusted to its optimum performance. DO NOT adjust any pre-set control or switch, unless it is listed in this manual.
4. If the device breaks down, please shut down the machine immediately and contact EDAN or authorized representatives.
5. Only accessories supplied or recommended by EDAN can be used. 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.

6. **EXPLOSION HAZARD**-Equipment is not suitable for use in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide.

1.5.2. Biohazard Considerations

WARNING

1. This equipment is not intended for treatment.
2. This device is not suitable for intracardiac use or direct cardiac contact.
3. For neonatal head imaging, EDAN recommends that you exercise special care during neonatal cephalic scanning to avoid possible damage to the posterior region of the eye. The ultrasound energy emitted by the transducer easily penetrates the fontanels of the infant.
4. EDAN makes every effort to manufacture safe and effective transducers. 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; or when scanning patients with open wounds.

 Ultrasound may be harmful to human body. 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 A.

The DUS 6 complies with the requirements of applicable International Electrotechnical Commission (IEC) standards in terms of safety and acoustic output levels.

1.5.3. Electrical Safety

WARNING

1. To ensure grounding reliability, only connect the system to a hospital-grade power receptacle.
2. The AC power connector plug for the ultrasound system is a three-prong grounded plug and should never be adapted to any two-prong (non-grounded) outlet, either by modifying the plug or by using an adapter.
3. To avoid electrical shock, never modify the ultrasound system's AC power circuits. To ensure grounding reliability, connect the system only to an equivalent outlet.
4. **SHOCK HAZARD-**Do not attempt to connect or disconnect a power cord with wet hands. Make certain that your hands are clean and dry before touching a power cord.
5. 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 could remove the unit cover.
6. 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.
7. Equipment connected to the DUS 6 and located in the patient zone 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.
8. 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.
9. To avoid electrical shock and damage to the system, turn off and disconnect the device from the AC power source before cleaning and disinfecting.
10. When more than one medical device is connected to the patient, leakage current of the devices is summed together. Take caution.
11. Don't touch the signal input or output connector and the patient simultaneously.
12. Periodically have the integrity of the system ground checked by a qualified service engineer.

CAUTION

1. To avoid the possibility of electrostatic shock and damage to the system, avoid using aerosol spray cleaners on the monitor screens.
2. DO NOT use spray cleaners 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.
3. DO NOT use any fluid onto the system surface, as fluid seepage into the electrical circuitry may cause excessive leakage current or system failure.
4. 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 performs all on-board connections of documentation and storage devices to the DUS 6.
5. 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.

NOTE:

Please use the standard power cord as the input line of the network power supply for the adapter to reduce risk.

Electromagnetic Compatibility (EMC)

Operating the DUS 6 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.

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 DUS 6 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.

1.6. Labeling Symbols

Descriptions of symbols of the device are shown in table 1-1.

No.	Symbol	Definition
1	SN	Serial Number
2	P/N	Part Number
3		Date of Manufacture
4		Manufacturer
5		Consult Instructions for Use
6		Symbol for “Caution”
7		Biological Risks
8		It indicates that the equipment should be sent to special agencies according to local regulations for separate collection after its useful life.
9		General Symbol for Recovery / Recyclable
10	Rx only (U.S.)	Federal (U.S.) law restricts this device to sale by or on the order of a physician.

11	EC REP	Authorized Representative in the European Community
12	CE 0123	The symbol indicates that the device complies with the European Council Directive 93/42/EEC concerning medical devices.
13		Type B, Applied Part
14		Alternating Current (a.c.)
15		ON (AC power supply)
16		OFF (AC power supply)
17		Equipotentiality
18	VGA	VGA output, External Monitor
19		Fuse
20		Probe socket
21		Net work port
22		Foots witch To identify a foot switch or the connection for a foot switch.
23		Protective earth (ground)
24		Recording on an information carrier
25	EDAN	Trademark
26		USB (Universal Serial Bus) Connection
27		Dangerous voltage
28		Variability, for rotating movement Rotate clockwise to increase the value, and counterclockwise to decrease the value.
29		Variability Adjust right to increase the value, and left to decrease the value.

Table 1-1 Descriptions of Symbols

Chapter 2 System Overview

2.1. Appearance

2.1.1. Front Panel

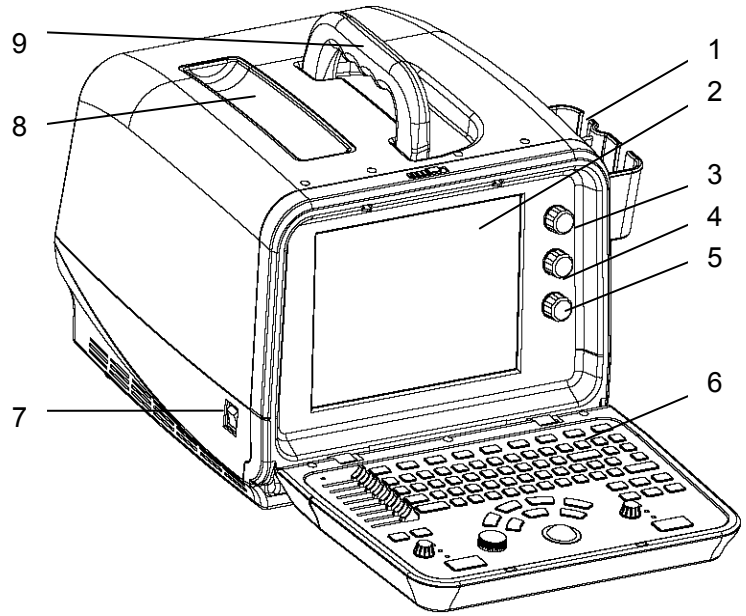


Figure 2-1 Front Panel Schematic Diagram

1. Probe holders
2. Display screen
3. Contrast adjustment knob
4. Brightness adjustment knob
5. Acoustic power adjustment knob
6. Control panel
7. Power switch
8. Trough for the coupling gel
9. Handle

2.1.2. Rear Panel

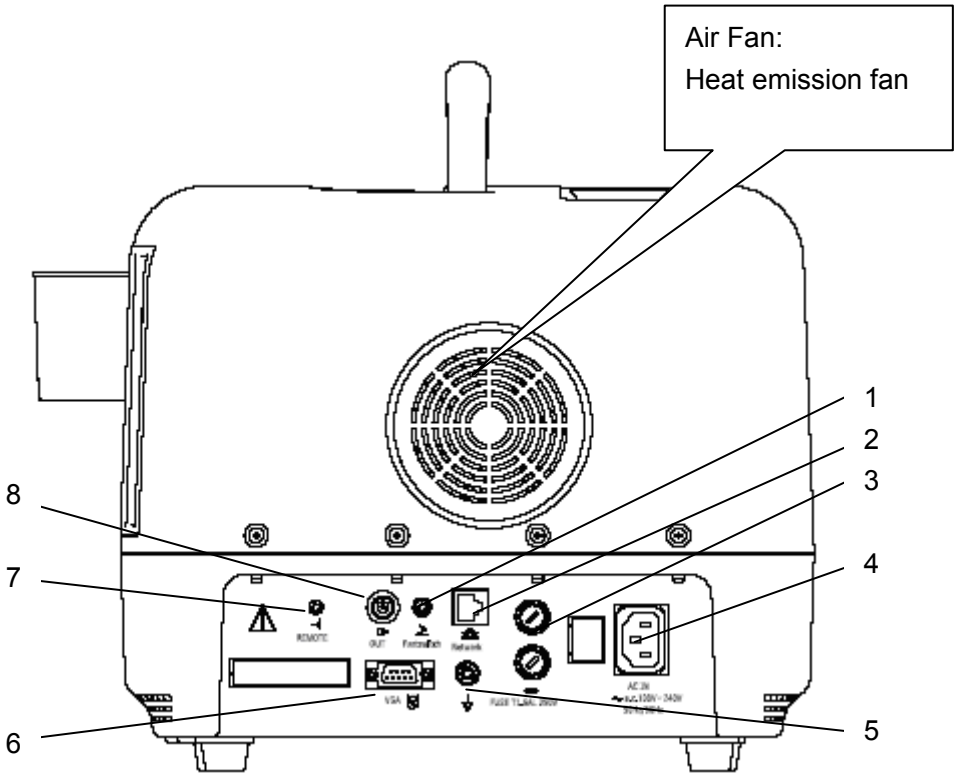


Figure 2-2 Rear Panel Schematic Diagram

1 Footswitch port

2 Network port

3 Fuse

4 Power supply input port

5 Equipotential earth terminal

6 VGA output port

7 Remote port

8 Video output port

CAUTION

To have good aeration performance and be able to operate normally, please don't cover or plug the air fan or heat dissipation orifice partly or wholly by using any object.

2.1.3. Right View

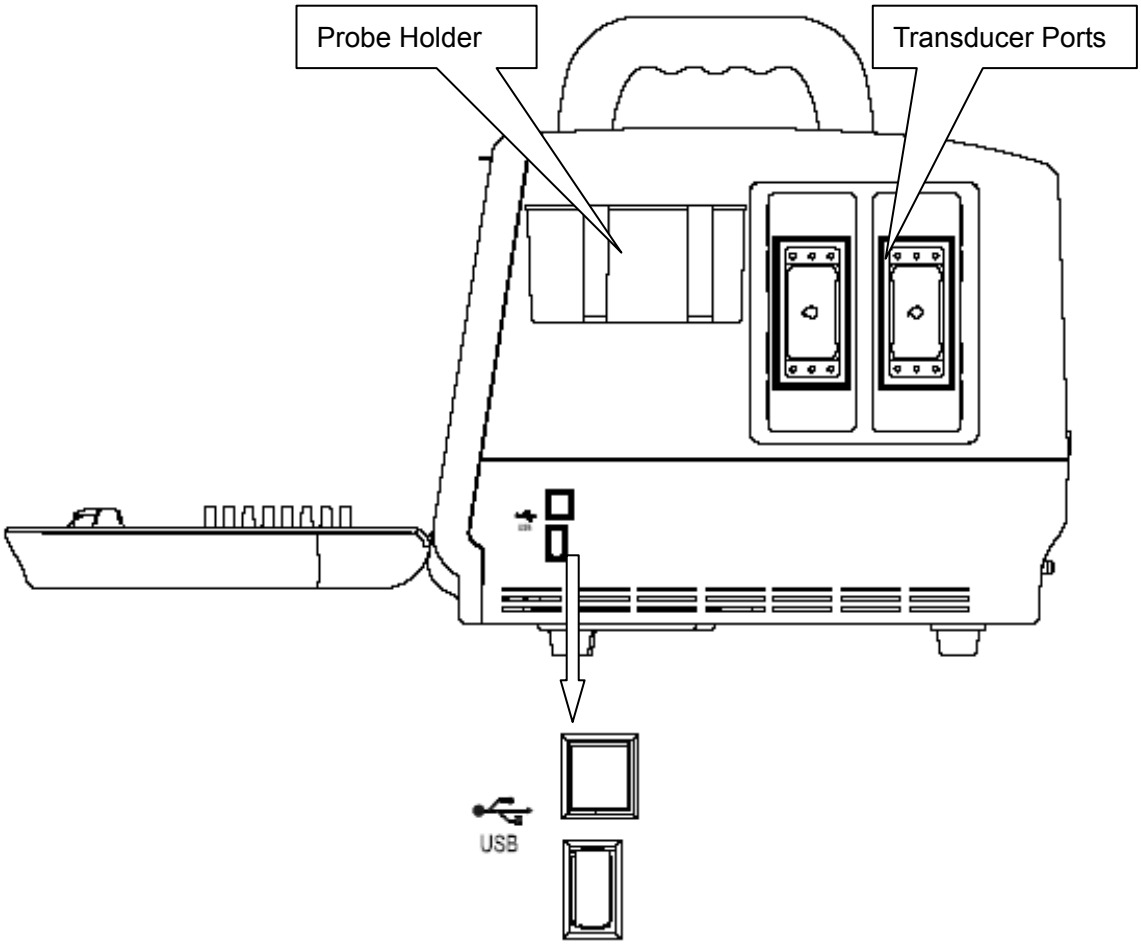


Figure 2-3 Right View Schematic Diagram

Peripheral ports:

2 transducer ports (dual sockets)

2 USB ports

1 probe holder (for two probes)

2.2. Configuration

2.2.1. Standard Configuration

- 1 DUS 6 main unit
- 1 convex array transducer: C363-1
- 1 power cord (European Standard)
- 1 ground wire
- 1 probe holder
- 1 cable holder
- 2 pieces of fuse, φ5×20, T1.6AL/250V
- 1 bottle of coupling gel 250mL
- 1 user manual
- 2 packing lists
- 2 silicone pads

2.2.2. Options

The Digital Ultrasonic Diagnostic Imaging System supports the following options:

(1) Transducers

- Convex array transducer: C343-1;
- Linear array transducer: L743;
- Endorecta transducer: E743;
- Endocavity transducer: E613;
- Micro-convex array transducer: C321.

(2) Others

- Ultrasonic Imaging Management System software specifications

  Operating system: support WINDOWS XP, WINDOWS VISTA and WINDOWS 7.
- Video printer and USB printer are as shown in table 2-1.

Options	Recommended Models
Video printer	SONY UP-895MD, SONY UP-897MD, MITSUBISHI P93W
USB printer	HP DeskJet D2368, HP DeskJet D2468, HP DeskJet D2568 HP DeskJet D4368, HP LaserJet P2015, HP LaserJet P2035 HP deskjet f2418*, HP deskjet f2488*, HP2668, HP109A, HP D5568, HP2010, HP2050, HP1050

Table 2-1 Printers

NOTE：Calibration should be performed because HP2010, HP2050, HP1050, HP2418* and HP2488* printers will print out calibration paper every time after replacing jet box. Please perform the calibration according to the operation method on the calibration paper.

Video printer output: 110 mm× 82 mm; USB printer output: A4 paper, 210 mm× 297 mm.

- Puncture frames

Model	Name	Description
BGK-CR60	Needle Guide Bracket Kit	For the R60 probe, 4 vessels: 14G, 18G, 20G, 22G
BGK-CR40	Needle Guide Bracket Kit	For the R40 probe, 4 vessels: 14G, 18G, 20G, 22G
BGK-CR20	Needle Guide Bracket Kit	For the R20 probe, 4 vessels: 14G, 18G, 20G, 22G
BGK-CR10	Needle Guide Bracket Kit	For the R10 probe, 4 vessels: 14G, 18G, 20G, 22G
BGK-LA40	Needle Guide Bracket Kit	For the L40 probe, 4 vessels: 14G, 18G, 20G, 22G

Table 2-2 Needle Guide Bracket Kits

- DICOM 3.0
- Single-pedal footswitch
- MT-802 Mobile trolley

  The mobile trolley has a compact and mobile console with four wheels and four brakes for safe and convenient transport. It can be assembled or disassembled easily, refer to MT-802 Trolley Assembling Instruction. The external structure complies with usability engineering. It has two holders for the probes and one holder for the coupling gel.

- Hand carried bag

  The bag is portable and it can be carried over the shoulder. It can contain not only the main unit but also two probes (an array transducer R60/3.5MHz and an endocavity transducer R10/6.5MHz) and one bottle of coupling gel. It is watertight.

- Netac U disk: U180 (2G).
- USB mouse is supported. After connecting the mouse to the DUS 6 via the USB port, you can operate the system by the mouse. The left button responnds to the **Set** key while the right button responds to the **Back** key.

Chapter 3 Transportation and Storage

3.1. Moving the System

Digital Ultrasonic Diagnostic Imaging System is designed to be portable and easily transported between sites. Power off the system and secure all accessories before moving it to another location.

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 foot switch and the connecting cable.
4. Raise the brakes away from the front and back caster wheels.
5. Push the handle to roll the system forward and maneuver it to its new location and lock the wheel caster brakes.
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 checklist items before using it.

3.2. Storage

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

3.3. Transportation

To prepare the system for shipment over long distance or rough terrain, repack the system in the factory packing and crate.

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 shock cushions beneath the system.

It is suitable for transportation by air, railway, highway and ship. Avoid splashing with rain and snow, inversion, and collision.

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, customers should follow the PACKING LIST to check the product carefully and to make sure that no damage has occurred during transportation. Then, install the device according to the installation requirement and method.

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.

4.3. Connecting Procedure

1. Take the main unit and accessories out of the package.
2. Connect the cable holder, stick the silicone pads (if necessary), and connect the transducers to the main unit correctly.
3. Connect the printer and load the recording paper.
4. Connect the power cable
   1) Connect the main unit and the common earth terminal firmly via a ground wire.
   2) Plug one end of the power cable to the power socket of the main unit, the other end to the special power output socket of the hospital.
5. Switch on the main unit.

   Press power switch on the left side of the main unit. You can operate the main unit after the main interface appears.

4.4. Connecting a Cable Holder

To connect a cable holder:

1. Find the cable holder, three screws (M3×12) and the packing foam in the package box.
2. To avoid scraping the main unit, put one piece of packing foam from the packing box below the main unit, and place it on a flat ground.
3. Carefully turn the main unit upside down on the packing foam and assemble the screws to the main unit with a cross-head screw driver as shown in figure 4-1.
4. Carefully turn the main unit with a cable holder to the normal state as shown in figure 4-2.

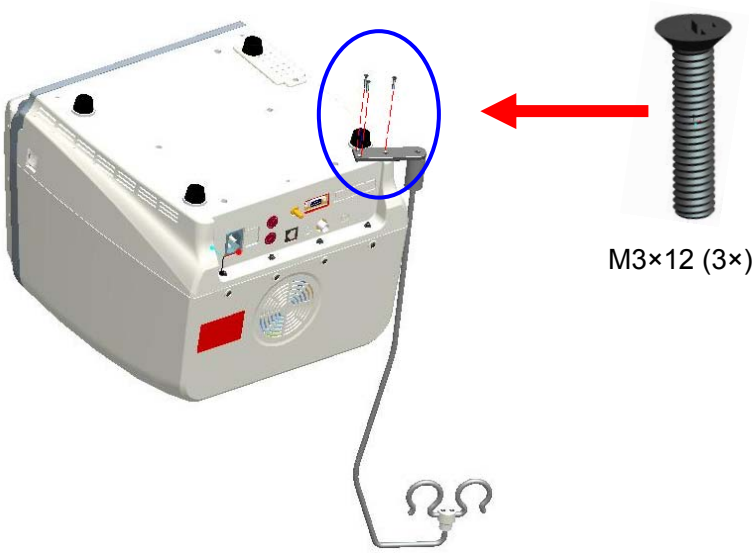


Figure 4-1 Assembling Position of Cable Holder

Figure 4-2 Main Unit with Cable Holder

4.5. Sticking Silicone Pads

NOTE:

There are two standby silicone pads for the system. If necessary, stick them on the rear

surface of the keyboard to avoid abrasion, as shown below.

Figure 4-3 Position of Silicone Pads

4.6. Connecting or Disconnecting Transducers

NOTE:

Ensure that the system is shut down before connecting and disconnecting transducers.

Flip images horizontally to change the scan direction or vertically to change the image orientation. The scan direction mark located at the side of probe indicates the beginning direction of scanning. The scan direction mark is shown in figure 4-4.

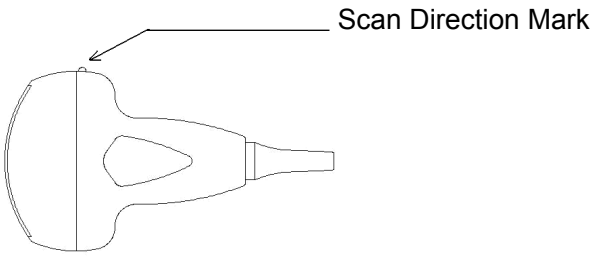


Figure 4-4 Probe Scan Direction Mark Schematic Diagram

There is information about Model and SN on the probe.

To connect a transducer:

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

7. Place the transducer in the transducer holder.

To disconnect a transducer:

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

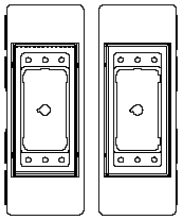


Figure 4-5 Transducer Ports

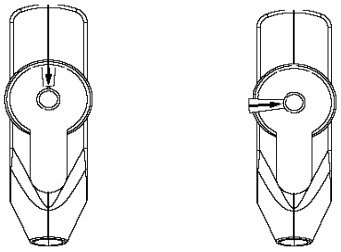


Figure 4-6 Locked and Unlocked Positions of the Probe Connectors

WARNING

DO NOT touch the pin of probe connector.

CAUTION

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

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.

4.7. Rear Panel Connections

Video connections are located on the rear panel of the DUS 6.

WARNING

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 60601-1-1. 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 60601-1-1. If in doubt, consult our technical service department or your local distributor.

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 DUS 6.

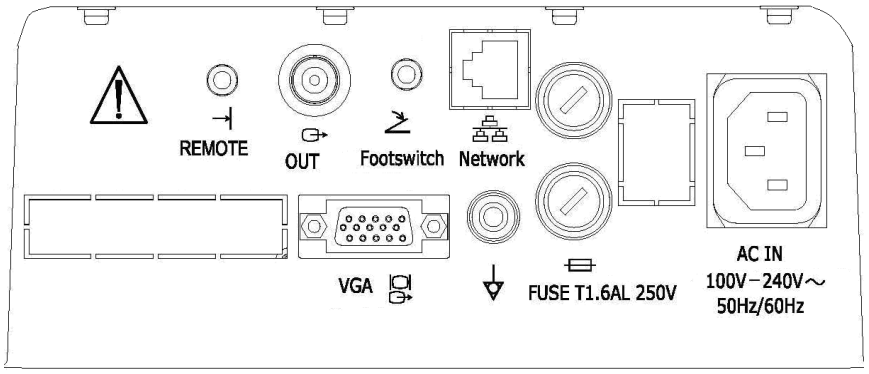


Figure 4-7 Rear Panel Ports

Peripheral ports:

1 remote port	1 Network port (DICOM 3.0)
1 video output port	1 power supply input port
1 footswitch port	2 fuses, φ5×20, T1.6AL/250V
1 VGA output port (15 pin)	1 equipotential earth terminal

Equipotential Bonding

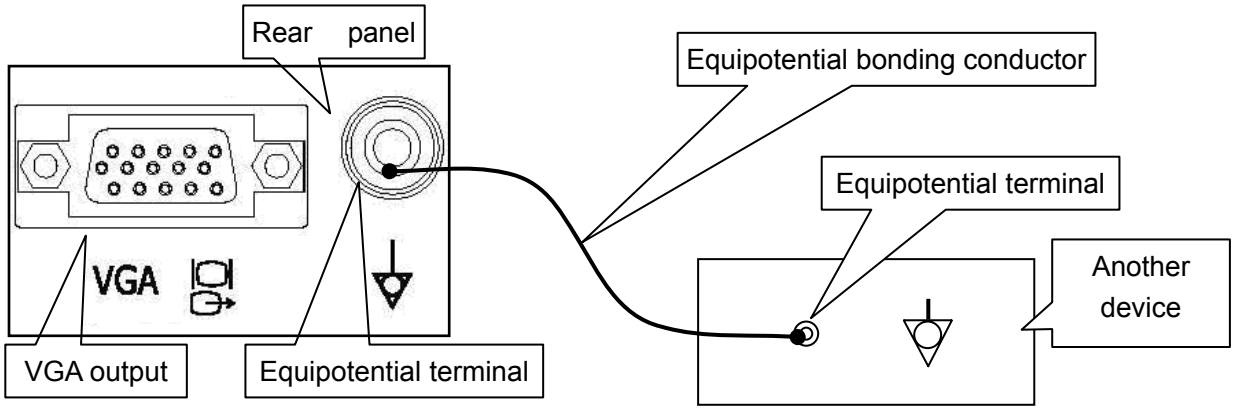


Figure 4-8 Equipotential Bonding

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 60601-1-1 requirements, connections of peripheral equipment to the DUS 6 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 DUS 6 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.

Printer Installation

This system supports video printer and USB printer.

To install the video printer:

1. Power off the main unit and the printer.
2. Connect the VIDEO IN (video input) of the video printer with the VIDEO OUT (video output) of the main unit.
3. Connect the REMOTE of the video printer with the REMOTE of the main unit.

Reference Figure 4-7 Rear Panel Ports

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

To install the USB 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.

If the printer can not work normally, check the printer presetting, see Section *5.7.3, General Presetting*.

NOTE:

1. DUS 6 can identify printers that are supported by the system automatically and the printer can work normally after it is successfully connected.
2. If you want to use a multiple portable socket-outlet to supply power to the whole DUS 6 system, you are suggested to calculate the system power consumption when building a DUS 6 system so as to match the system power consumption with the power sustained by the multiple portable socket-outlet.

Chapter 5 System Control

5.1. Powering On/Off the Device

◆ To power on the device

Before powering on this device, check as below:

1. Check all the cables and make sure there is no scrape or crack.
2. Check the control panel and the monitor and make sure there is no crack.
3. Check the probe and the connection and make sure there is no scrape or crack.
4. Check the power socket and the switch and make sure there is no damage.

To power on:

1. Connect one end of power cable at the rear panel of the device, and the other end to the standard three-pin power supply socket.
2. Switch on, and then the backlit keys on the panel will be on, and a startup interface will appear.

◆ To shut down the device

After using it, switch off the power supply.

NOTE:

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

CAUTION

1. You are forbidden to unplug or plug 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 sequence.

◆ To restart the device

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

- 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, contrast, gain, TGC, acoustic output, dynamic range, and focus combination** properly. Adjusting the monitor's contrast and brightness is one of the most important factors for good image quality. If theses controls are set incorrectly, the **gain, TGC, dynamic range, focus combination and even acoustic output** 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 **sweeping speed** to get satisfying images in the M-mode.

CAUTION

1. Please be gentle when contacting the target area with a probe. This is to avoid making the probe damaged 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 key total gain (Gain) knob slowly.

5.3. Screen Layout

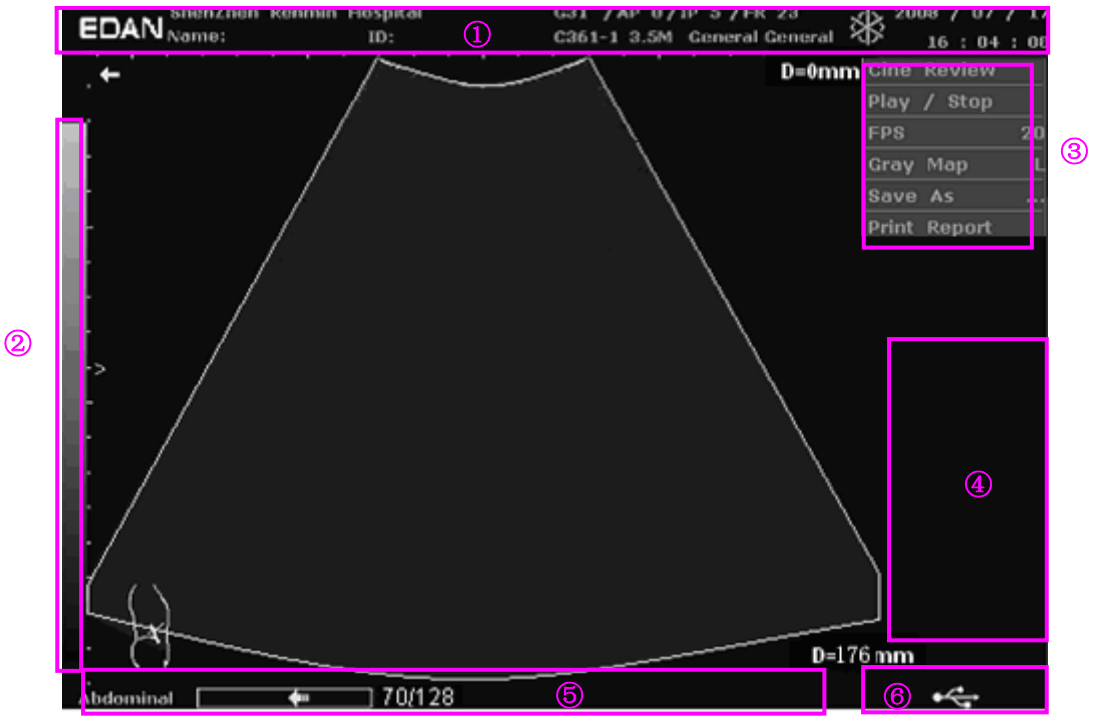


Figure 5-1 Typical Image Screen

①. Top status bar: logo image, hospital name, patient Information, system date and time, major parameter such as, G (gain), AP (acoustic power), FR (frame rate), probe model,

probe frequency, THI, TSI, etc.

②.Gray map bar

③.System menu

④.Result area

⑤.Bottom status bar: examination type, operation prompt, etc.

⑥.Bottom right corner: display the state of USB

5.4. Control Panel

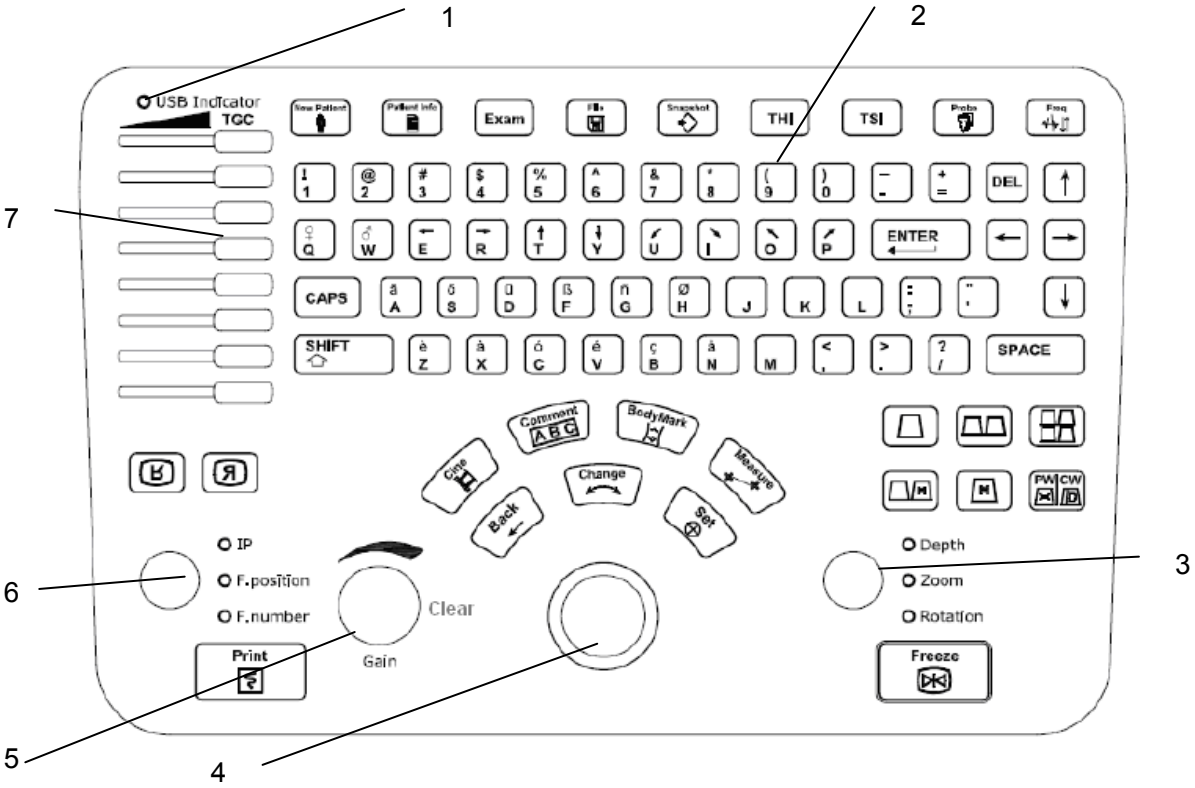


Figure 5-2 Control Panel Schematic Diagram

1. USB Indicator 2. Backlit control keys 3. Multiple-function knob 1
4. Trackball 5. Gain knob 6. Multiple-function knob 2
7. TGC sliders

5.4.1. Trackball

The trackball is easy and convenient to operate. 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 reference line in the B 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 calibration, data settings, age notation, 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 corresponding character on the cursor position.

German Characters

Symbol	Key Combination
ä	SHIFT-A
ö	SHIFT-S
ü	SHIFT-D
β	SHIFT-F
ñ	SHIFT-G
ø	SHIFT-H

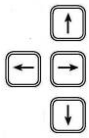
French Characters

Symbol	Key Combination
è	SHIFT-Z
à	SHIFT-X
ó	SHIFT-C
é	SHIFT-V
ç	SHIFT-B
å	SHIFT-N

Table 5-1 German and French Characters

5.4.4. Function Controls

Key	Description
SPACE	Space key Press this key in the annotation mode and comment mode to introduce a blank space on the cursor position.
SHIFT + Alphabetic key combination Press **SHIFT** and an alphabetic key corresponding to the language's special character.	
CAPS	Alphabetic Shift key It is used to shift the characters between lowercase and uppercase.
ENTER	Entering key In annotation mode and comment mode, press this key to move the cursor to insert a blank line.
DEL	Delete key In annotation mode and comment mode, press this key to delete text word by word.

<table>
<tr><td>  </td><td>Arrow key
In annotation mode and comment mode, press the arrow keys to move the comment cursor.</td></tr>
<tr><td> 
</td><td>New Patient key
Press this key to cancel all the recent patient data, comments, measurements, calculations and worksheet, except saved images.</td></tr>
<tr><td> 
</td><td>Patient information annotation key
Press this key to open or to close the Patient Data Input Dialog box.</td></tr>
<tr><td> 
</td><td>Examine Menu key
Press this key to display or to exit the examination type menu.</td></tr>
<tr><td rowspan="3"> 
</td><td colspan="2">System Control key</td></tr>
<tr><td>Press this key to enter or to exit the file management system;
 
Reference
Section 6.8, File Management.</td><td>Or to do the presetting.
 
Reference
Section 5.7, Presetting.</td></tr>
<tr><td colspan="2">When entering the presetting menu, you can not use other function keys.</td></tr>
<tr><td> 
</td><td>Snapshot key
Press this key to save the current image. But after entering the file menu, you can’t use this key to save the current image.
 
Reference Section 6.8.1, Saving Files.</td></tr>
<tr><td> 
</td><td>Tissue Harmonic Imaging Processing key
Press this key to do the image processing, shifting between tissue harmonic imaging and general in real time.</td></tr>
<tr><td> 
</td><td>Tissue Specific Imaging Processing key
Press this key to switch among general, muscle, fatty and fluid in real time, adjust the acoustic speed to get the most satisfying image.</td></tr>
<tr><td> 
</td><td>Probe Switch key
Diverse probes are available for this device. Press this key to select a proper type of connected probe with the corresponding information in the top right corner.
 
Reference Figure 5-1 Typical Image Screen.</td></tr>
<tr><td> 
</td><td>Frequency Shift Key
Press this key to switch to the proper operating frequency for the to activated probe.</td></tr>
</table>

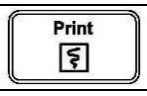
	When you change the frequency, the G will change simultaneously.
	Image up/down Flip key Press this key flip the image vertically.
	Image left/right Flip key Press this key to flip the image horizontally.
	Cine key In freeze mode, press this key to enter or exit the frame-by-frame cine mode.
	Comment key Press this key to activate or to exit annotation function.
	Body Mark Key Press this key to activate or exit the body mark function. It is to indicate the examine position and the scan direction.
	Measure key Press this key to activate or exit the measurement function.
	Back key In generic measurement status, press this key return to the previous operation. In comment mode, press the key to delete the entered text one by one. In parameter setting status, press the key decrease the parameter value.
	Change key This key has dual functions. In measuring status, you can press **Change** once to change the settled point and the active point. During ellipse measurement, you can press it to change the long axis and short axis. In annotation status, press this key display the comment library.
	Set key Press this key confirm the selection of a specific function or command. Use this key anchor calipers, select a menu item or image graphic. Or press it to increase the parameter value in parameter setting status.
	Freeze key Press this key 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.
	Print key Press this key do the video printing.
/	Footswitch Pedaling on the footswitch is equivalent to pressing **Freeze**.

Table 5-2 Function Controls

5.4.5. Comment Function

The comment library is for positions and anatomical structures.

To add a comment:

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

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

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

1. Press **Comment**, and there is a cursor "l" displayed in the image area for annotating;
2. Press **Change** to display the comment library;
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 "l" displayed in the image area for annotating;
2. Press **Set** to display an arrow;
3. Move the trackball to move the position of the arrow; and the rotation function is automatically activated and the rotation light is on, you can rotate this button to adjust the arrow direction;
4. Press **Set** to set the position of the arrow.

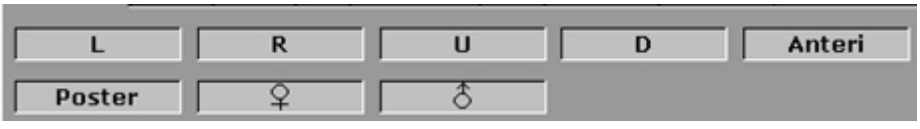
To move a comment:

1. Move the cursor to a comment, and there is a pane around the comment;
2. Press **Set** and move the cursor to a new position;
3. Press **Set** to confirm the new position.

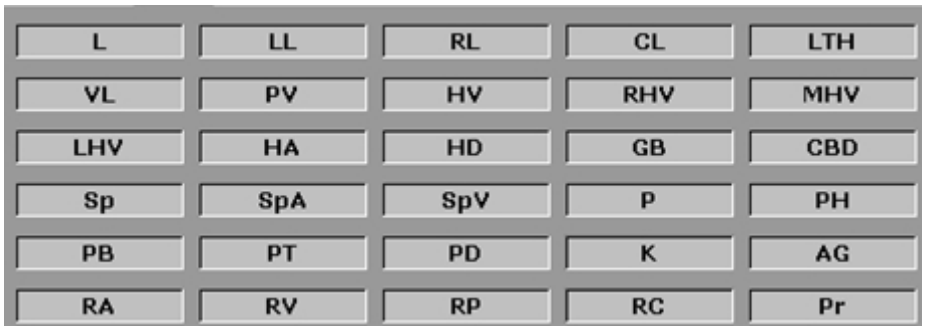
To delete a comment:

During commenting, you can use **DEL** to cancel the undesired text word by word, or you can use **Back** to cancel the undesired text one by one.

The comment library is shown below:



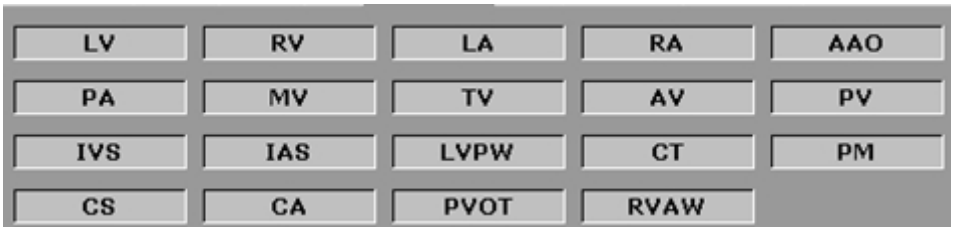
Generic



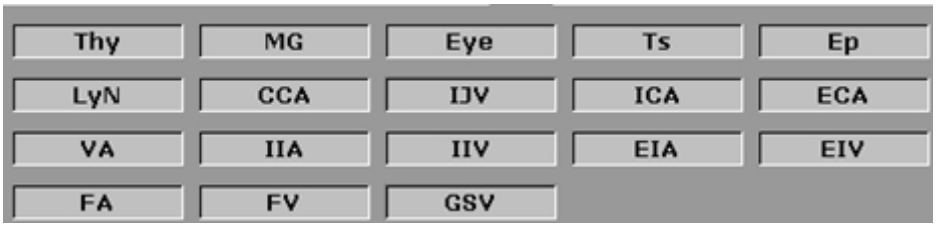
Abd 1

Abd 2

OB

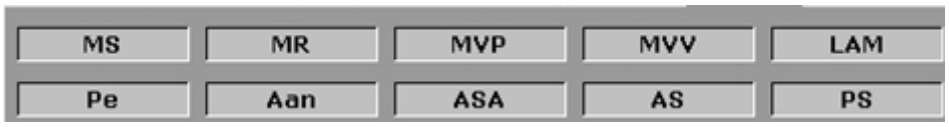


Cardiac



Sml

Lesion 1



Lesion 2

Figure 5-3 System-defined Comment Library

5.4.6. Body Mark Function

To add a body mark:

1. Press **Body Mark**, to display the body mark dialog box;
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;

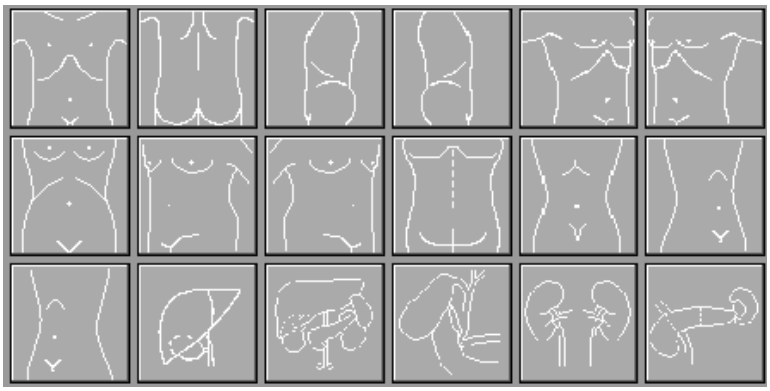
Reference *Figure 5-1 Typical Image Screen.*

3. After adding a body mark, use the trackball to move the position of the probe; and the rotation function is automatically activated and the rotation light is on, you can rotate this button to adjust the probe scanning directions;
4. Press **Set** to complete adding the body mark.

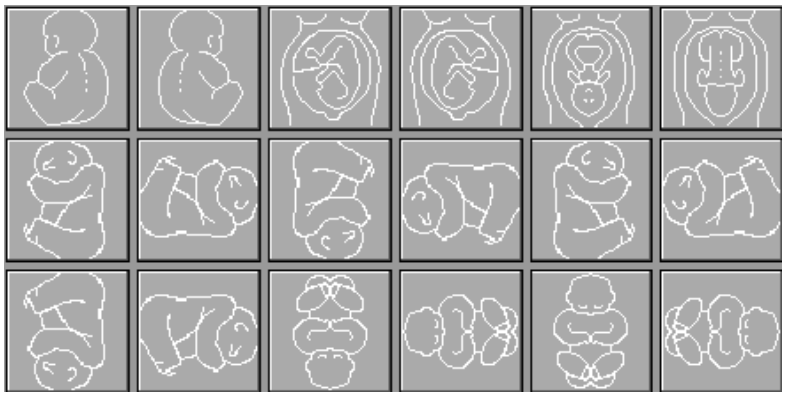
To move a body mark:

1. Move the cursor to a body mark, and there is a pane around the body mark;
2. Press **Set** and move the cursor to a new position;
3. Press **Set** to confirm the new position.

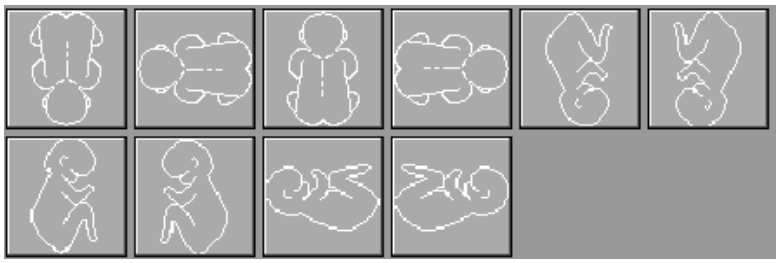
There are 130 types of body marks, as shown below:



Abdomen

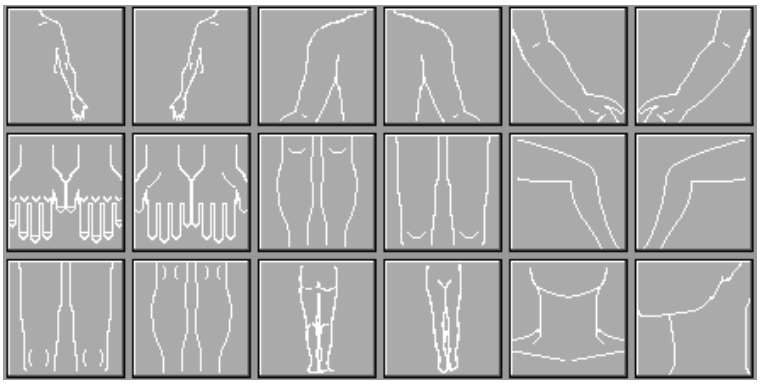


Obstetric 1

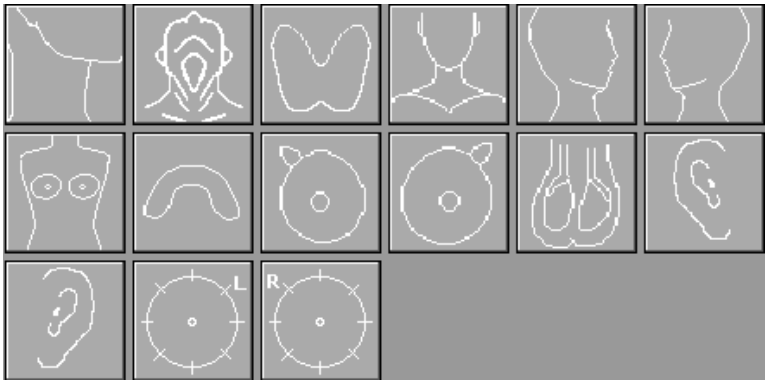


Obstetric 2

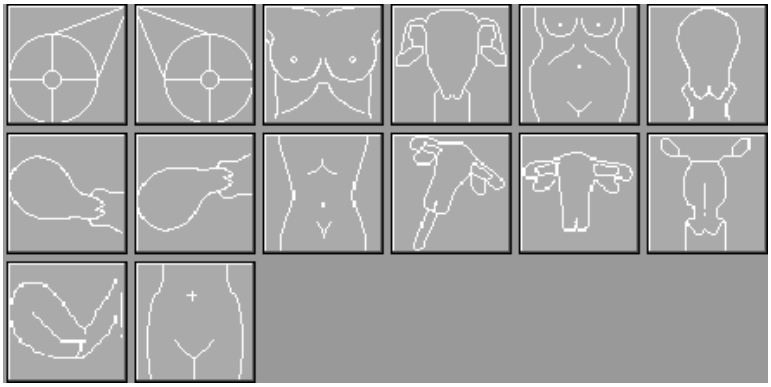
Twins



Small parts 1

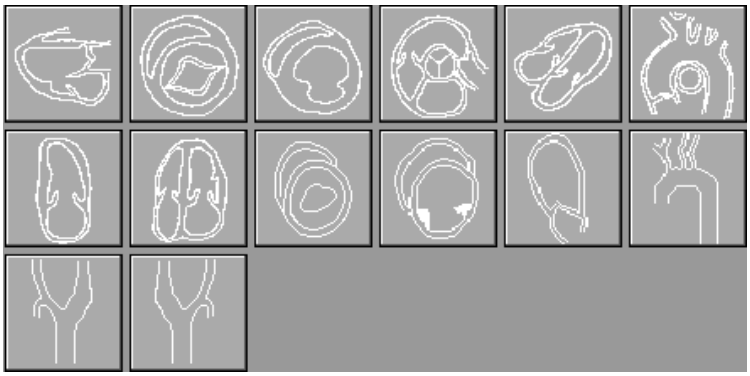


Small parts 2



Gynecology

Orthopedics

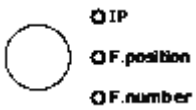


Cardiology

Urology

Figure 5-4 Body Marks

5.4.7. Adjustment Controls



Multi-function knob 1

Press this knob repeatedly to cycle among IP, F. position and F. number functions. When one of the functions is to activated, rotate the knob to adjust the value.

- When the light of IP is on, rotate the knob to adjust the value of IP.
- In B, B/B, and 4B mode, 4 focuses and 16 segments of adjustable electronic focus are provided by the device. By adjusting focal point combination, a clear image can be obtained. The current focal point combination is shown in the FOCUS position on the left of the screen.
- When the light of focus position is on, rotate the knob to shift the position of the current focus, clockwise toward far field, and counterclockwise toward near field.
- When the light of focus number is on, rotate the knob clockwise to increase the focus number and counterclockwise to decrease the focus number.

Multi-function knob 2

Press this knob repeatedly to cycle among Depth and Zoom. When one of the functions is to

activated, rotate the knob to adjust the value. The rotation function is automatically to activated when a body mark is added.

- When the light of Depth is on, rotate the knob to adjust scanning depth, in increments of 10mm, and the current depth is displayed in the bottom right corner of the image.
- In real-time mode or frozen mode, press **Multi-function knob 2** till the zooming light is on, and the system displays a zooming window in the middle of the image; you can roll the trackball to move the zoom window to the desired area and rotate the zooming adjustment knob to adjust magnification of the zoom window. In frozen mode, 4 magnification levels are available: 100%, 178%, 400%, 1600%. In real-time mode, 8 magnification levels are available: 100%, 144%, 196%, 256%, 400%, 576%, 900%, 1600%. Press **Set** display the zoomed image, and then roll the trackball to move the zoomed image.

  NOTE: Magnification function is only available in B-mode and 2B-mode.
- When a body mark is added, the rotation function is automatically activated and the rotation light is on. You can rotate this button to adjust the scanning direction.
- When an arrow is added, the rotation function is automatically activated and the rotation light is on. You can rotate this button to adjust the arrow direction.

Multi-function knob 3

- Rotate it to do the key total gain adjustment (overall gain), 0 ~ 130, in increments of 2.
- Press it to clear all the measurements, calculations, comments, and body marks those are displayed on the screen.

Adjustment knobs near the screen:

Contrast: rotate this knob to adjust the contrast.

Brightness: rotate this knob to adjust the brightness.

POWER: rotate this knob to adjust the acoustic power, 16 levels, 0 ~ 15 (by the way of changing power supply).

Time Gain Compensation (TGC) slide controls:

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 right to increase TGC, and glide left to decrease TGC.

The system displays a graphics representing the TGC curve on the image screen, as shown in figure 5-5.

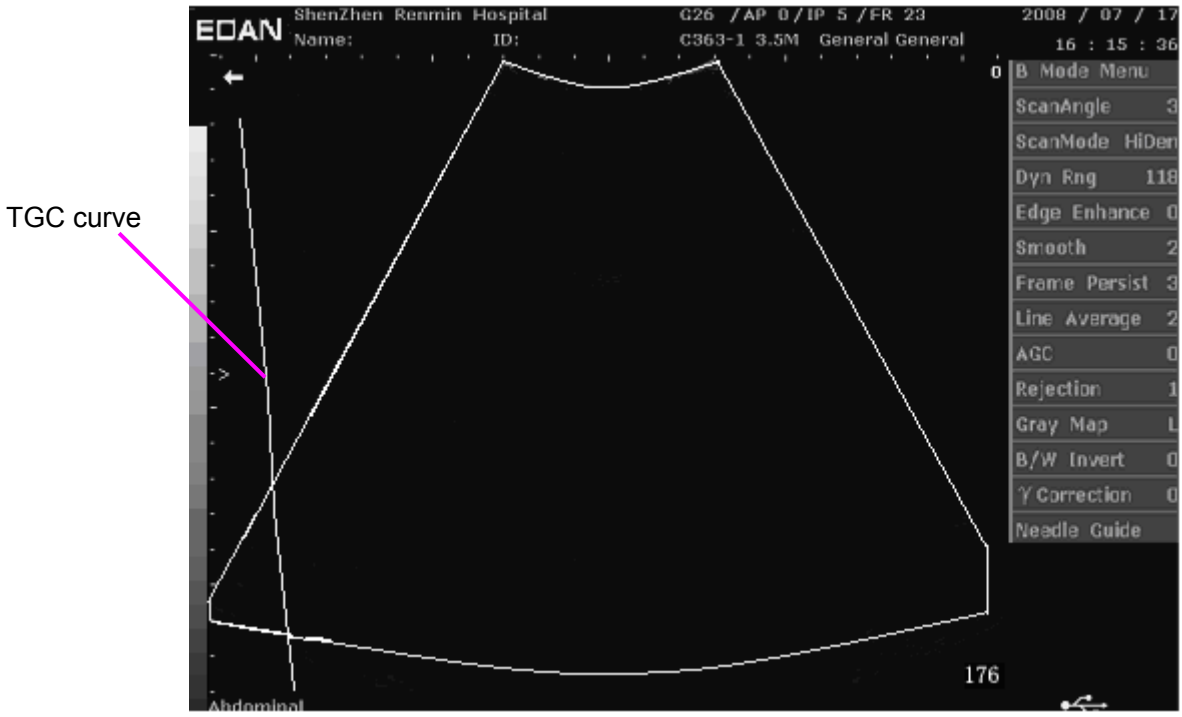


Figure 5-5 TGC Curve

5.4.8. 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.

To access B-mode from another imaging mode:

Press B control, and the system displays a single real-time B-mode image.

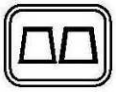
NOTE:

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 those are display on the screen.

There is a reference line in the single B mode. Press **SHIFT+CAPS** to display or to hide the reference line. When the reference line is displayed, press **Set** to locate it.

NOTE: The reference line will not be displayed after 90°rotatation or magnification.

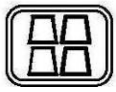
To exit B-mode, press any other mode control.



2B-mode Imaging Control

This key has two functions:

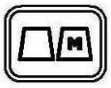
- Press this key enter the **2B-mode**.
- Press this key active one of the dual images. The probe direction of the activated image is brighter than that of the frozen image.



4B-mode Imaging Control

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

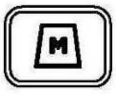
Press it repeatedly to active one of the four images. The probe direction of the activated image is brighter than the direction of the frozen images. The four images are obtained separately and only one image at a time is displayed in real-time.



B/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** or **B+M**). There are four display modes available: The left image is a real-time image of B mode, while the right image is a real-time image of M mode; The left image is a real-time image of M mode, while the right image is a real-time image of B mode; The upper image is a real-time image of B mode, while the down image is a real-time image of M mode; The down image is a real-time image of B mode, while the upper image is a real-time image of M mode. You can select the display modes on general presetting interface.

There is a line constituted by points with regular spacing on **B-mode** image, which is called the M Mark. Roll the trackball to move the M Mark. Press **Set** to locate the M Mark.



M-mode Display Control

Press this key enter the **M-mode**. It displays an M-mode sweep.

The slope of this mode has four options: 0, 1, 2 and 3.

5.4.9. Additional Control Functions

The DUS 6 also provides the following additional control functions, which are available through status menus.

Control function	Description
Scan Angle (sector angle/ scan width)	Adjust the sector angle for curve transducers, and the scan width for linear transducers.
Scan Mode	Select the scan mode, High density or High FPS (frame rate, in frames per second)
Dynamic Range	Control the overall contrast resolution of B-mode and M-mode images.
Edge Enhance	Improve the contour enhancement of the image for distinguishing the edges of a structure in B-mode.
Smooth	Adjust the smooth level.
Frame Persist	Select the number of frames for frame averaging.
Line Persist	Adjust the line persist level.
Line Average	Adjust the line average level.
AGC	Adjust auto gain control.
Rejection	Adjust the rejection level.
Gray Map	Select the post-processing gray curve map.
B/W Invert	Set the color to black or white.
90° Rotate	Rotate the image by 90 degrees.
γ Correction	Adjust γ correction.
Sweep Speed	Adjust the scrolling speed level of the M-mode sweep.
M Mark	In B/M mode, click it to activate the M mark after fixing the M mark.

Table 5-3 Additional Control Functions

These functions can be set using the **Set** and the **Back** key.

5.5. Menu

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

System status menu

In B-mode or B/M-mode, the system status menu provides information about the current imaging

mode. In 2B and 4B-mode, it indicates the status and parameters of the active image. In M-mode, it indicates the status and parameters of M sweep. The following are the system status menus of B-mode, B/M-mode, and M-mode respectively.

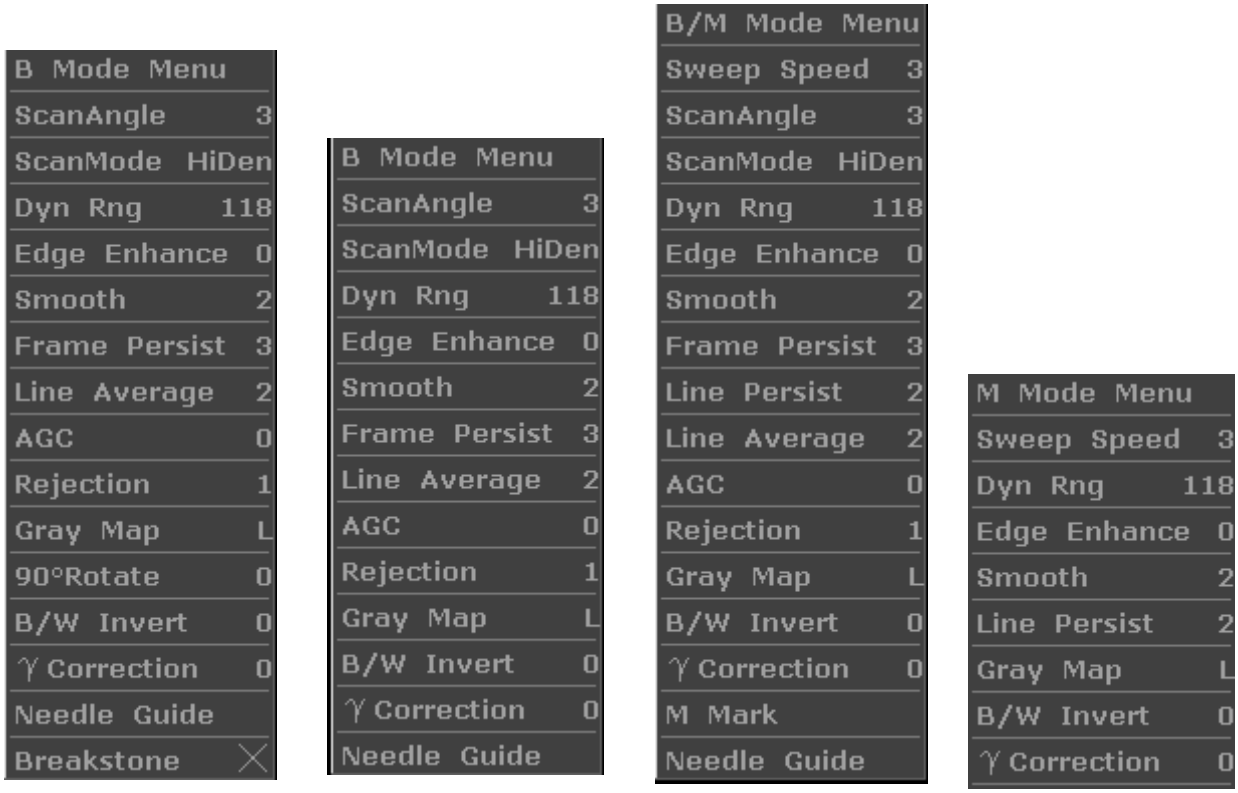


Figure 5-6 System Status Menu

Measurement and calculation menu

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

After entering B-mode, press **Measure** display the menu below.

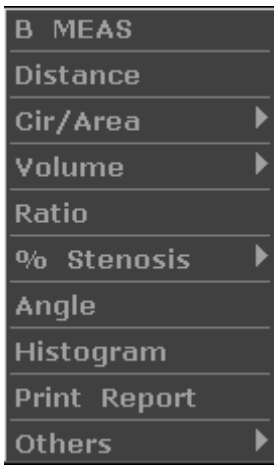


Figure 5-7 B Mode Generic Measurement and Calculation Menu

Secondary menu

The symbol "►" indicates that there is a secondary menu associated with the menu option. Roll the trackball to highlight the menu option with "►", the system displays a secondary menu for the selected option.

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

After entering B-mode, press **Measure** display the menu below, and highlight the option **Cir/Area**, the system will display the secondary menu **Ellipse** and **Trace**.

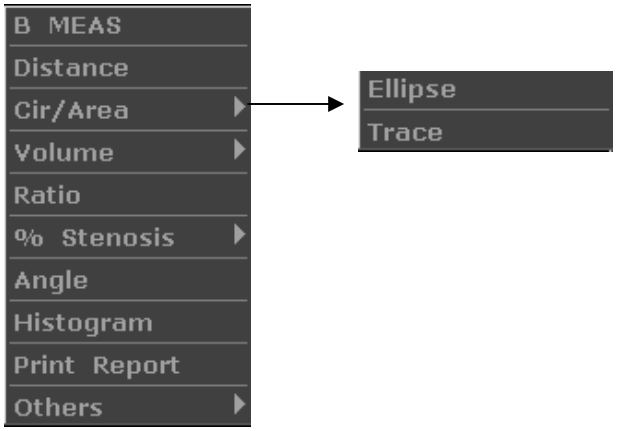


Figure 5-8 Secondary Menu

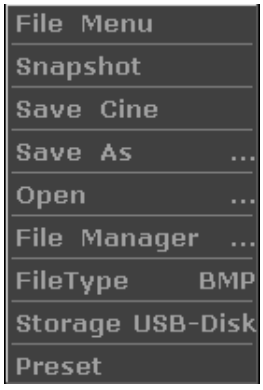


Figure 5-9 File Menu

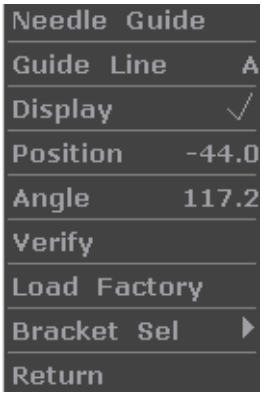


Figure 5-10 Needle Guide Menu

Hiding and revealing the Menu

Press the **Shift** and **M** buttons at the same time, the current menu will be hidden (except the presetting menu). Press **Shift** and **M** again, the menu will be revealed.

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.

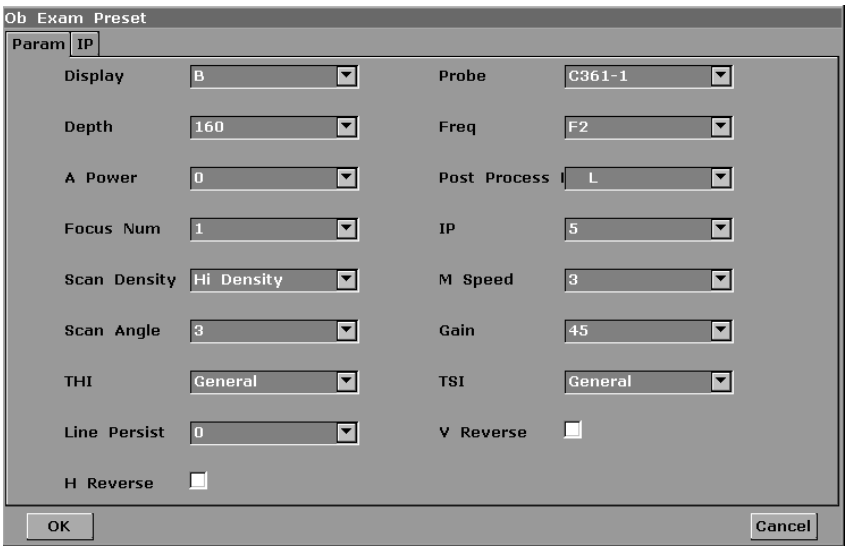


Figure 5-11 Obstetric Examination Preset Dialog Box

5.7. Presetting

5.7.1. Entering and Exiting

To enter presetting:

1. Press **File**, highlight **Preset**, and then press **Set** to display the preset menu, as shown below.

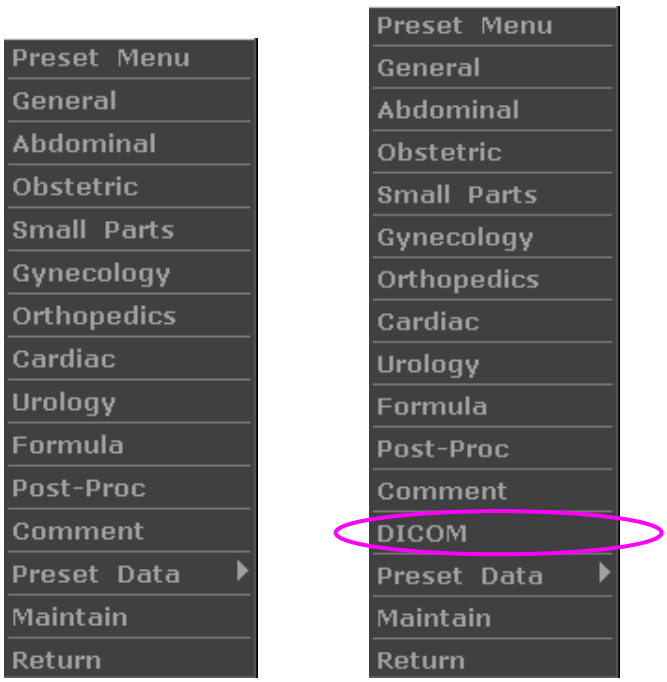


Figure 5-12 Preset Menus (the left—with no DICOM installed, and the right—with DICOM installed)

2. Roll the trackball to highlight one of the options and then press **Set** to display the menu of the corresponding option.

To exit presetting:

Highlight **Return** and press **Set**, the system exits the presetting mode and runs with the new modified parameters. Or the system runs with the new modified parameters after being restarted..

5.7.2. Displaying / Modifying the Preset Parameter

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

Reference Section *5.6, Dialog box operation.*

5.7.3. General Presetting

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

2. Roll the trackball to highlight an item and then press **Set**. Then use the keyboard to enter text.

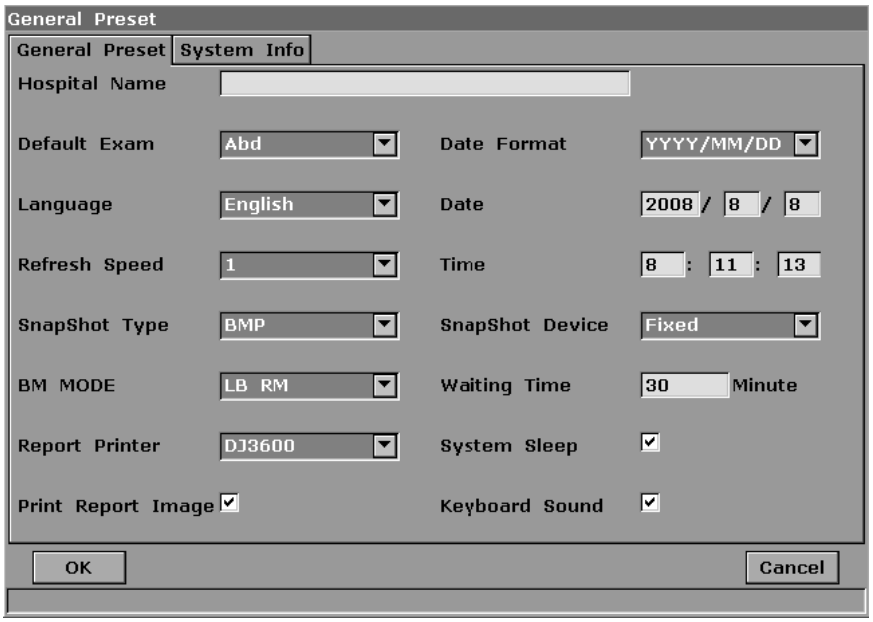


Figure 5-13 General Presetting Dialog Box

Item	Setting	Allows you to
Hospital Name	Input freely	Set hospital name displayed on the key top left of the screen and diagnosis report, with a maximum of 32 characters.

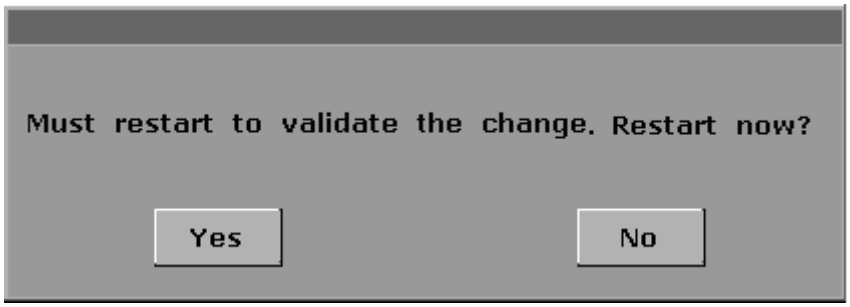
Default Exam	Abdomen, obstetric, small parts, gynecology, orthopedics, cardiology, or urology.	Preset the examination type.
Language	Chinese, English, French, German, Spanish, Italian, Polish, Russian, Romanian, etc. (The language options varies with language software installed.)	Set the overlay language
SnapShot Type	BMP/JPG/FRM/DCM (if DICOM is installed)	Set the storage file format type of snap shot.
BM Mode	LB RM/LM RB/UB DM/UM DB	Set the display mode of BM mode images
Keyboard Sound	√ / Null	Turn on or off the keyboard sound.
Report Printer	DJ 3600, DJ4100, DJ Generic VIP, LJ Mono, DJD2600	Select the printer type, see table 5-5 for the corresponding printer model.
Print Report Image	Select whether to print image in report.	Select whether to print image in report when printing by USB printer.
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.
SnapShot Device	USB-Disk/Fixed	Set the storage device of snap shot.
System Sleep	√ / Null	Select whether the device enters sleep mode when no operation is done for certain minutes.
Waiting time	Set freely	Set the system waiting time to enter sleep mode (5-60 min).
Refresh Speed	1~10	Set the grade of glint speed of system dormancy.

Table 5-4 General Presetting Information

Priter type	Printer model
DJ 3600	HP DeskJet D2368, HP DeskJet D2468
DJ 4100	HP DeskJet D4368
DJ Generic VIP	HP DeskJet D2568 HP DeskJet F2418 HP DeskJet F2488 HP D5568 HP2010 HP2050 HP1050
DJD2600	HP2668 HP109A
LJ Mono	HP LaserJet P2015, HP LaserJet P2035

Table 5-5 Presetting a Report Printer

You must restart the system to validate the change, including **Language**, **Keyboard Sound**, and **Report Printer**. After you perform those presets, and press **Return**, the system displays a dialog box to prompt you whether to restart the system, as shown below.



5.7.4. Presetting Examination

Examination types include abdomen, obstetric, small parts, gynecology, orthopedics, cardiology, and urology.

Take obstetric examination preset for example, in the preset menu, move the cursor to highlight **Obstetric** and press **Set** to display obstetric examination presetting dialog box.

Parameter Tab

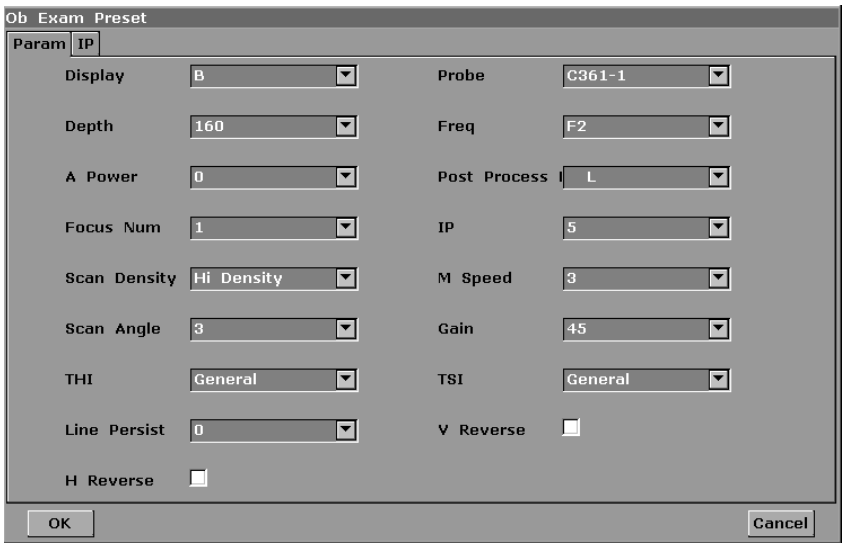


Figure 5-14 Obstetric Presetting -- Parameter Tab

Item	Setting	Allows you to
Display	B, M, B+B, 4B, B+M	Set display mode type.
Depth	19 mm ~ 245 mm (C363-1)	Set examine depth.
A Power	0~15	Set acoustic power, 16 levels.
Focuses Num	1/2/3/4	Set the number of focuses.
Scan Density	High density/high frequency	Set scanning density.
Scan Angle	0/1/2/3	Set scanning angle.
THI	Tissue harmonic imaging / General	Set THI.
Line Persist	0~7	Set image line correlation.
H Reverse	√ / Null	Set the attribute of Horizontal reversal.
Probe	Display all the probe type this device supports	Set the probe type to use.
Freq	F1/F2/F3/F4/F5	Set the frequency of probe.
Post Process	Gray map (L, A, B, C, D, S)	Select a default gray map.
IP	0~7	Set the image parameter.
M speed	1/2/3/4	Set the M-mode sweeping speed.
Gain	0~130	Set the gain of image, in 2 increments.
TSI	General/muscle/fatty/fluid	Set the type of TSI.
V Reverse	√ / Null	Set the attribute of Vertical reversal.

Table 5-6 Obstetric Presetting Information – Parameter

IP Tab

NOTE: IP----Image Parameter

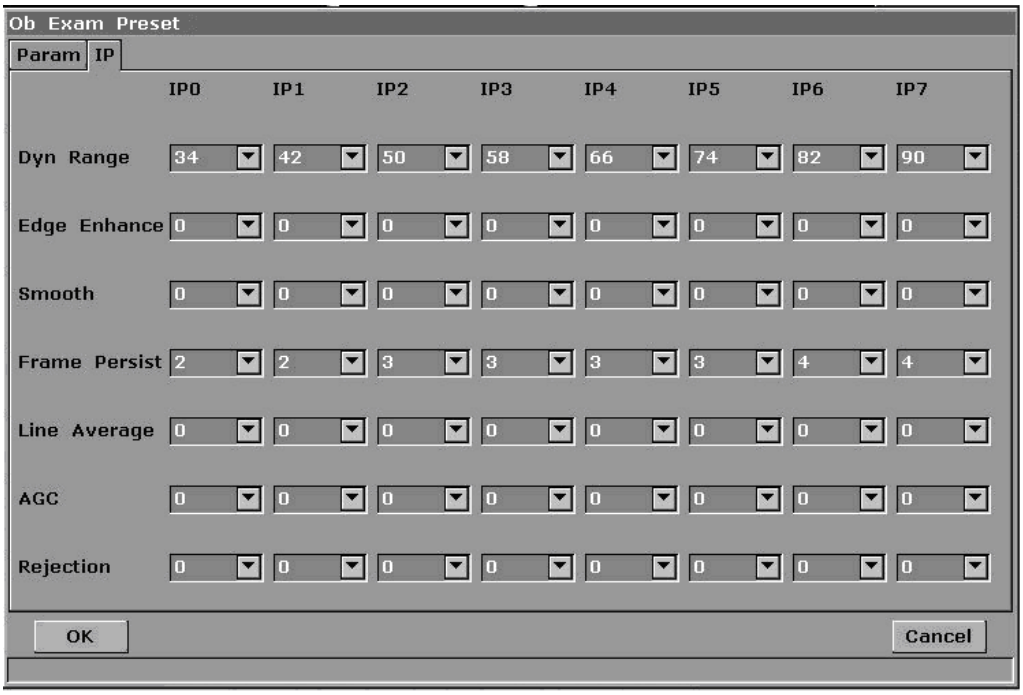


Figure 5-15 Obstetric Presetting -- IP Tab

Item	Setting	Allows you to
Dynamic Range	30~150	Select the default dynamic range for the examination, in decibels (dB). During imaging, the dynamic range can be adjusted in 4 dB increments to the image.
Edge Enhancement	0~7	Select the default amount of edge enhancement to be applied to the image.
Smooth	0~7	Set image smoothing.
Frame Persist	0~7	Set image frame correlation.
Line Average	0~7	Set image line softening attribute.
AGC	0~3	Set Automatic Gain Control.
Rejection	0~7	Set image noise restrain attribute.

Table 5-7 Obstetric Presetting Information – IP

5.7.5. Presetting Formula

In the preset menu, move the cursor to highlight **Formula** and press **Set** to display formula presetting dialog box, as shown below:

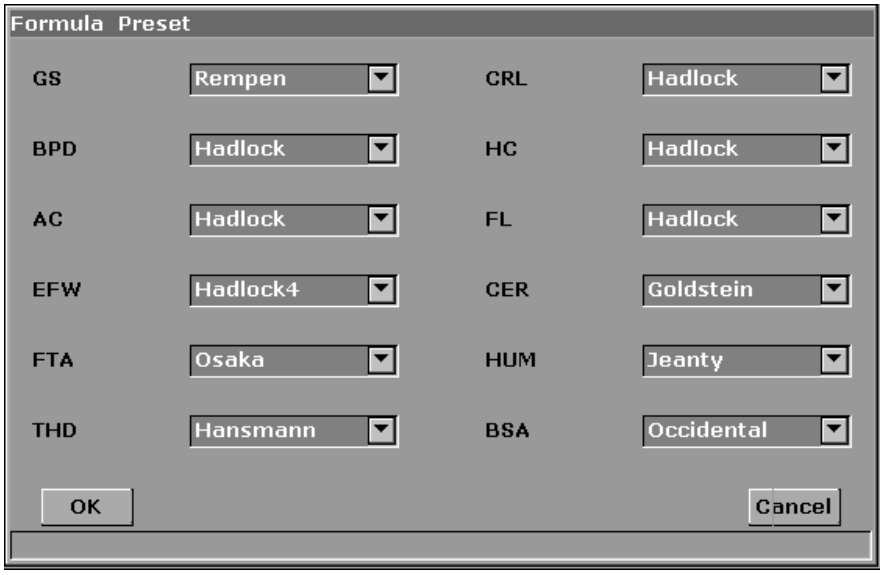


Figure 5-16 Formula Presetting

Parameter	References	Parameter	References
GS	Tokyo Hellman Rempen China	CRL	Tokyo Hadlock Hansmann China Robinson
BPD	Tokyo Hadlock Merz Rempen Osaka China	EFW	Tokyo Hadlock1 Hadlock2 Hadlock3 Hadlock4 Shepard Campbell Merz1 Merz2 Hansmann Osaka
AC	Hadlock Merz	FL	Tokyo Hadlock China Jeanty Merz Osaka
HC	Hadlock, Merz	HUM	Jeanty
FTA	Osaka	CER	Goldstein
THD	Hansmann	BSA	Oriental, Occidental

Table 5-8 Formula Presetting Information

5.7.6. Presetting Post Processing

The preset items include gray map, rejection and gamma correction.

In the preset menu, roll the trackball to highlight menu **Post-Proc** and press **Set**, and then display post processing presetting dialog box, as shown below:

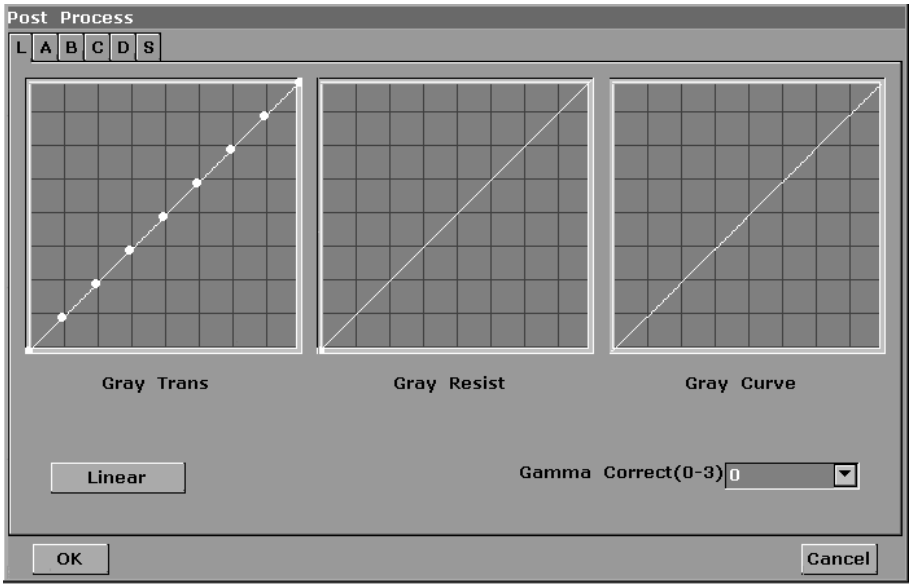


Figure 5-17 Post Processing Presetting

Gray transformation presetting

The gray transformation (Gray Trans) curve has nine infection round nodes. You can reposition them within a specific range to recalculate the curve and update the image.

To preset gray map (take map L for instance):

1. Move the cursor to one of the nine round nodes. Press **Set**, move the node with trackball to adjust the curve.
2. Press **Set** complete the adjustment, and the Gray Curve is renewed simultaneously.
3. Adjust other nodes using the same method.
4. Roll the trackball to **Linear** and press **Set**. Then the gray map curve turns a 45° line, and the Gray Curve is renewed simultaneously.

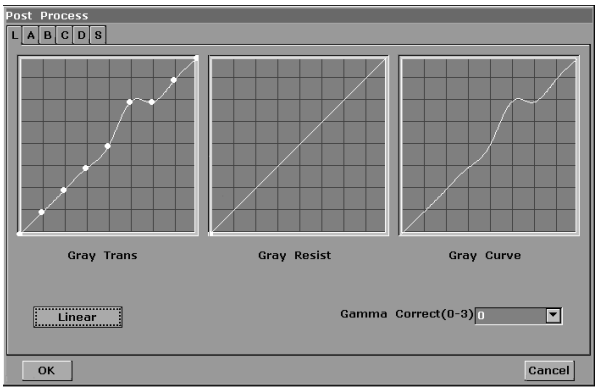


Figure 5-18 Gray Transformation Presetting

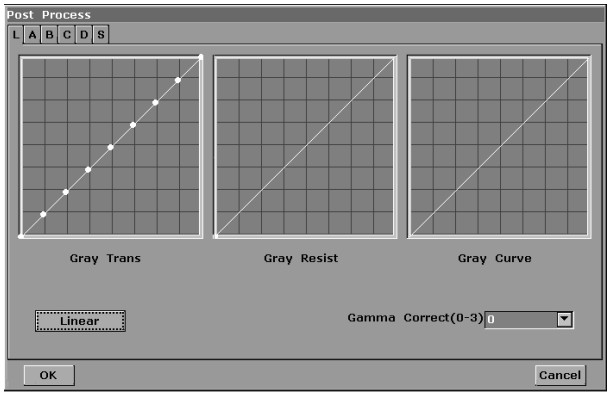


Figure 5-19 Gray Transformation Presetting ---Linear

5. Press **OK** to save the modification, or press **Cancel** to give up. At the same time, the dialog box is closed.

NOTE:

Linear is effective for changing the gray transformation curve only, having no effect on the resistance or gamma correction.

Gray resistance presetting

The gray resistance (Gray Resist) curve has one round node. You can reposition it within a specific range to recalculate the curve and update the image.

To preset rejection (take map L for instance):

Move the cursor to the node. Press **Set**, and move the node with trackball to adjust the gray resistance curve.

Press **Set** complete the adjustment, and the result curve is renewed simultaneously.

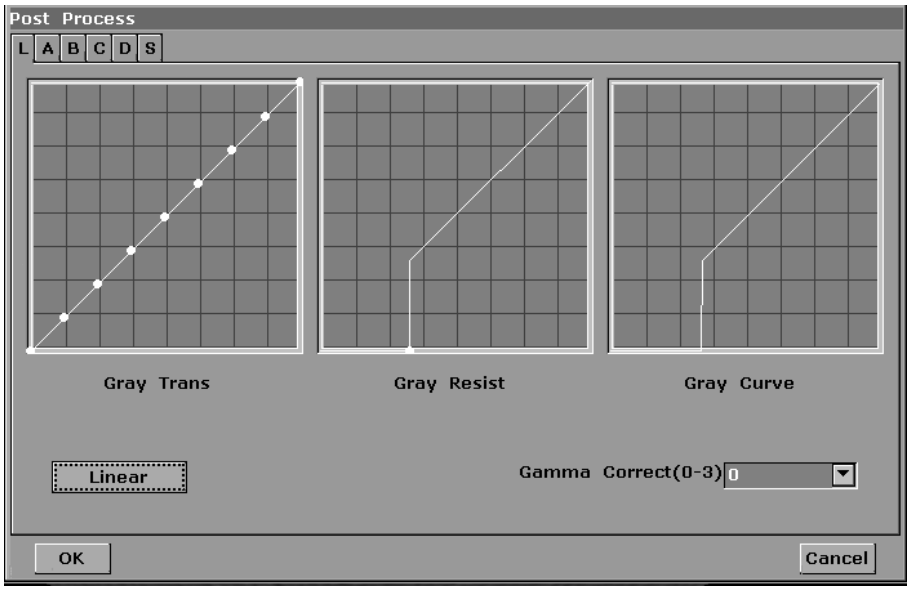


Figure 5-20 Gray Resistance Presetting

Press he **OK** to save the modification, or **Cancel** to give up. At the same time, the dialog box is closed.

Gamma correction presetting (γ correction):

γ correction has four levels: 0, 1, 2 and 3. you can select any one of the four levels.

5.7.7. Editing Comment Library

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 6 items user-defined comments for each tab. Creating a comment library for a patient report saves your time, especially for recurring examinations. You can quickly add a comment by using the comment library.

Operation procedure:

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

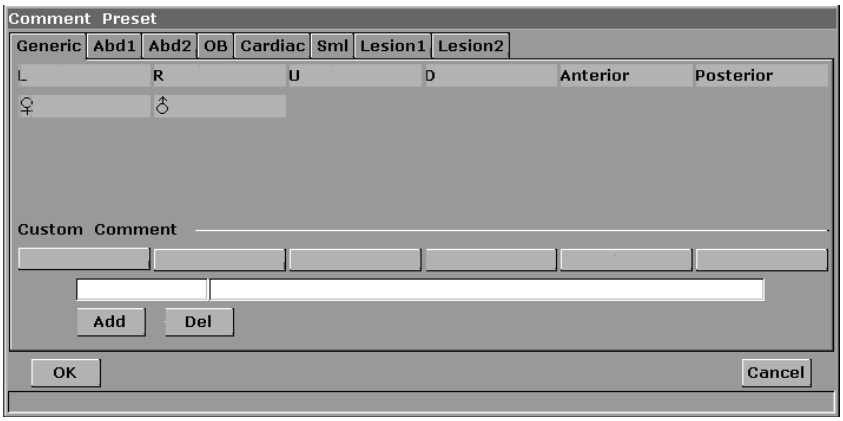


Figure 5-21 Comment Library Presetting

To create text for text list:

Take **Generic** for instance:

1. Press **Generic** to open the **Generic comment library**.
2. Roll the trackball to highlight one of the custom comments, and press **Set**.
3. Roll the trackball to highlight the left side frame of User-defined, and press **Set**. Then the cursor turns to "I", as shown below. You can enter comment with the keyboard.

Figure 5-22 User-defined Comment Library

4. Roll the trackball to highlight the right side frame of User-defined, and press **Set**. Then the cursor turns to "I", as shown below. You can enter some detailed help information about the new created comment with the keyboard.

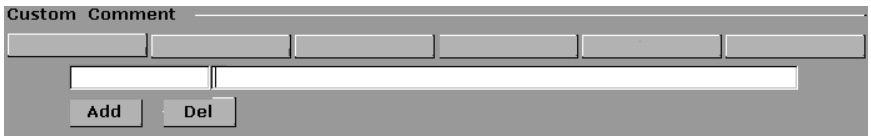


Figure 5-23 User-defined Detailed Information of Comment Library

5. Roll the trackball to highlight **Add** to add the new created comment to Generic.
6. Press **OK** to save the modification, or press **Cancel** to give up and close the dialog box.

To delete text from text list:

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

5.7.8. Presetting Data

The secondary menu of preset data is shown below: 

You can use this option to return to the factory default data.

5.7.9. Presetting DICOM

If you have installed the DICOM software, roll the trackball to highlight DICOM, the DICOM presetting window displays, perform the DICOM presetting as shown below.

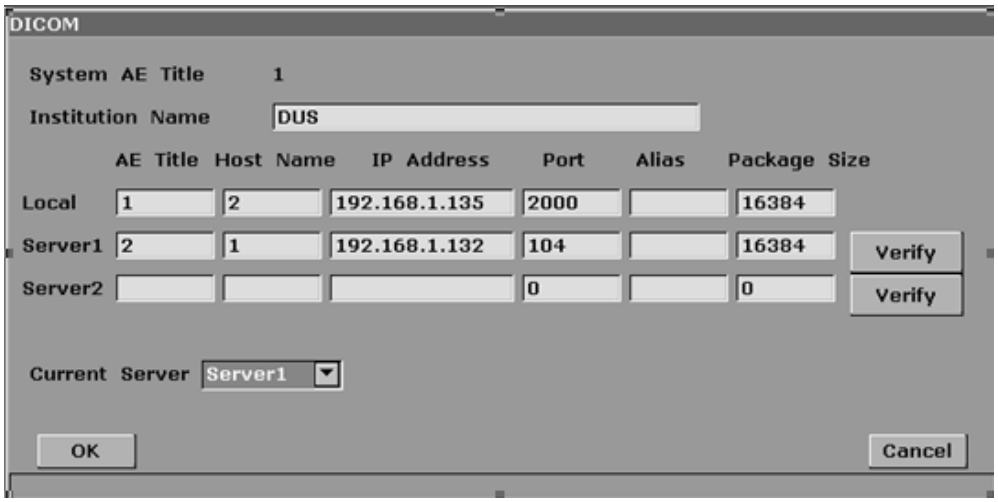


Figure 5-24 DICOM Presetting

Item	Description	
System AE Title	The same as the title set in the **AE Title** of **Local**	
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 **16K**.
Server 1/2	AE Title	Set the server AE title, the same as the **System AE Title** 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 **16K**.
Verify	After presetting the server information, press **Verify** to verify the server's connection.	
Current Server	Choose the current server that is connected to the system	

Table 5-9 DICOM Presetting Information

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

NOTE:

Do not set a same IP Address for the local system and the server.

Ensure that you have turned on the server before verifying it.

5.7.10. Maintenance

The maintenance can be only done by EDAN authorized personnel.

5.8. Printing

To connect a video printer:

1. Connect the VIDEO IN (video input) of the video printer to the VIDEO OUT (video output) of the main unit.
2. Connect the REMOTE of the video printer to the REMOTE of the main unit.

3. Check the printer, referring to the printer user manual.
4. Make sure the **Report Printer** and **Print Report Image** options in the **General Presetting** window are set correctly.
5. Run the printer.

To print an image:

1. Open and edit the report which is to be printed.
2. Press **Print** on the keyboard to print the image.

To connect a USB printer:

1. Connect the USB printer via the USB port.
2. Check the printer, referring to the printer user manual.
3. Check the **Report Printer** and **Print Report Image** in general preset.
4. Enter the desired worksheet to edit the examination and diagnosis information.
5. Run the printer.

To print a report:

Press **Print** of the worksheet dialog box. Printer begins to print.

NOTE:

1. Before printing, make sure there is enough paper for printing.
2. Before printing, make sure the presetting printer type is correct.
3. Before printing, make sure the printer power cord and the USB cable are connected well.
4. DO NOT cut off the printer power supply or the USB cable during printing.
5. If the printer can not work normally, please restart the printer and the DUS 6.

Chapter 6 Operation

6.1. Selecting an Examination Type

Press **Exam** to select an examination type. You can change the examination type at any time by making a selection from the Exam Type menu list, as shown below. Roll the trackball to highlight an examination type and press **Set** to select.

Figure 6- 1 Examination Type Menu

6.2. Entering New Patient

Press **New Patient** clear all the information, and then begin a new patient examination.

NOTE:

When you press **New Patient**, system cancels all the recent patient data, comment, measurement, calculation and worksheet, except saved images.

6.3. Entering or Editing Patient Information

Press **Patient Info.** to activate the patient data annotation function, and then enter or edit the patient data, as shown below:

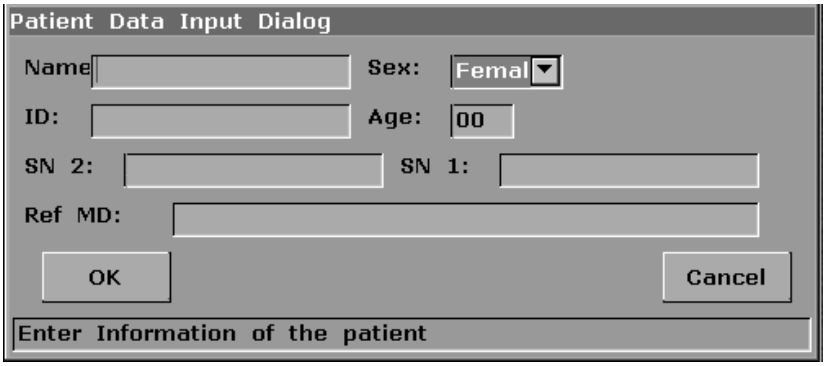


Figure 6- 2 Patient Data Input Dialog Box

To switch the input focus: press **Enter**;

To enter the patient information, use the keyboard;

To exit: focus on **OK** or **Cancel**, and then press **Enter** or **Set**.

6.4. Activating a Transducer

While multiple transducers can be connected to the ultrasound system, only one can be to activated at a time.

Press **Probe** repeatedly to cycle through the transducers currently connected to the system. The type of the activated transducer is displayed in the key top right corner of the screen.

WARNING

For TRANSDUCER ASSEMBLIES intended for intra-corporeal use (e.g.: E743, E613), DO NOT to activate the transducers outside the patient's body.

NOTE:

You can use the preset menu to determine which transducer is to activated for the corresponding examination type.

6.5. Selecting an Imaging Mode

You can select an imaging mode by pressing  ,  ,  ,  , or  , and then begin an examination.

 Reference Section *5.4.8, Imaging functions*.  Reference Section *5.2, Examining*.

6.6. Measurement and Calculation

Measurement and calculation functions are contained in each examination type and imaging mode. B-mode generic measurements include distance, trace circumference, ellipse circumference, trace area, ellipse area, two-axis volume, three-axis volume, % stenosis, and angle measurements. M-mode generic measurements include distance, time, slope, and heart rate (2 cycles). You can perform the measurement and calculation in real-time/freezing/zooming/CINE Review playback state. Distance and circumference will be presented in mm; area, in mm^2, cm^2, or dm^2; volume, in mm^3, cm^3, dm^3, mL or L; time in ms or s, and heart rate in bpm, etc.

To activate the measurement function, press **Measure**, 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 Measured Results 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. If you perform the measurement in the frozen status, all the measurements will be canceled when you unfreeze the image.
2. During measurement, press **Back** delete the former operation.
3. After a complete generic measurement (such as Distance), press **Back** to erase a measurement at a time.
4. After a complete application measurement (such as MA), the **Back** key doesn’t work.

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

The examinations and results are shown in table 6-1.

Examination	**Specific measurement labels**	**Result**
Obstetric	GS, CRL, BPD, HC, AC, FL, AFI, TAD, APAD, CER, FTA, HUM, OFD, THD, and EFW	Fetus growth analysis curve and standard obstetric report
Cardiology	LV, RV, Mitral, Aorta, etc.	Cardiac report
Gynecology	UT, Endo, OV-Vol, FO, CX-L, UT-L/CX-L	Gynecology report
Small parts	THY	THY report
Urology	RUV and PV	Urology report
Orthopedics	HIP	HIP report
Abdominal	None	General report

Table 6-1 Examination Items and Results

The system-defined examinations are abbreviated as follows:

Abd: Abdominal

OB: Obstetric

Sml: Small Parts

Gyn: Gynecology

Ortho: Orthopedics

Urol: Urology

6.6.1. 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 **Measure** to activate measurement function.
2. Roll the trackball to highlight menu **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 Measured Results, as shown below.
6. Press **Measure** to finish and exit.

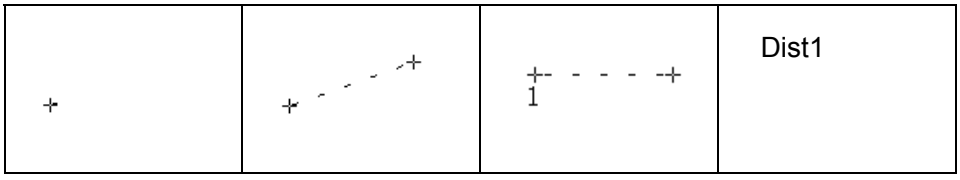


Figure 6- 4 Distance Measurement and the Results

Circumference/Area

- **Ellipse Method**

To measure Circumference / Area:

1. Press **Measure** to activate measurement function.
2. Roll the trackball to highlight menu **Cir/Area**. Then select **Ellipse**,

and press **Set** to activate a measurement cursor "+" on the screen.

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 Measured Results, as shown below.
7. Press **Measure** to finish and exit.

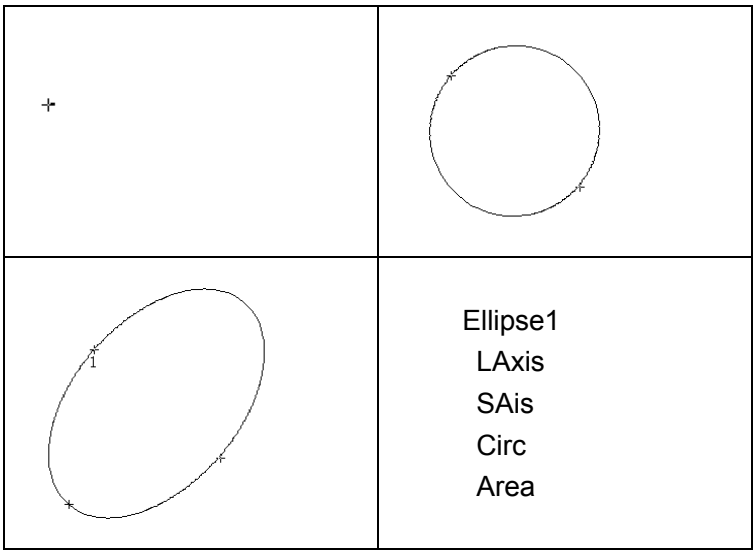


Figure 6- 5 Ellipse Circumference/Area Method and the Results

- **Trace Method**

To measure Circumference / Area:

1. Press **Measure** to activate measurement function.
2. Roll the trackball to highlight menu **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 **Back** 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 Measured Results, as shown below.
6. Press **Measure** to finish and exit.

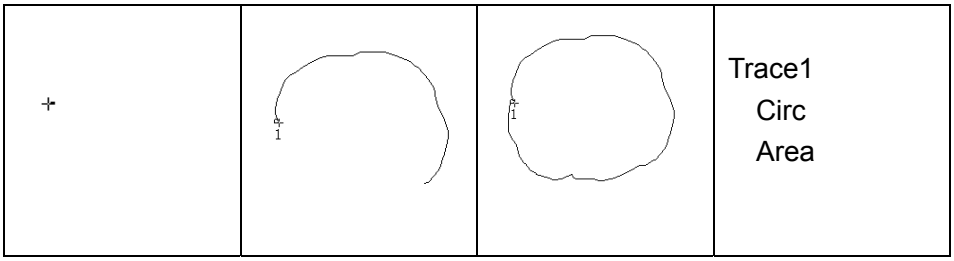


Figure 6- 6 Trace Circumference/Area Method and the Results

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 1 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 2 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 Measured Results.

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 Measured Results, as shown below.
4. Press **Measure** to finish and exit.

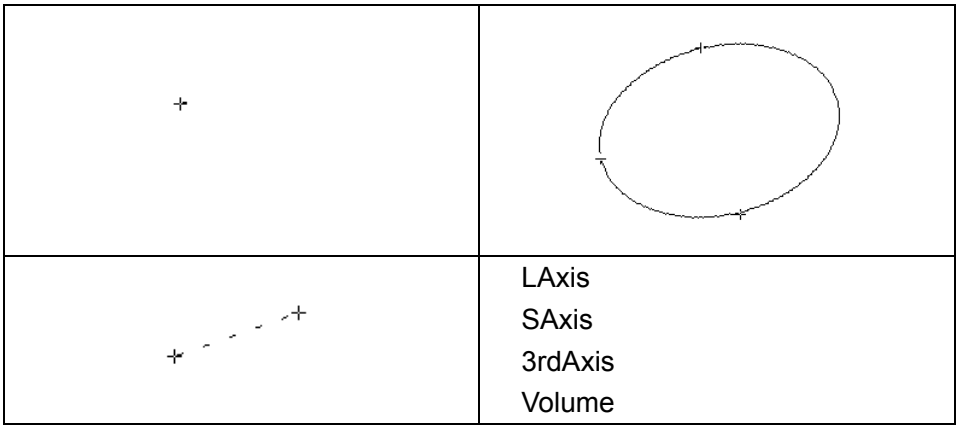


Figure 6- 7 3-Axis Volume Method and the Results

- **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 data in 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 Measured Results.

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 Measured Results, as shown below.
4. Press **Measure** to finish and exit.

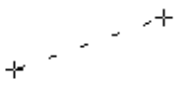
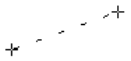
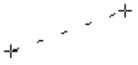
<table>
<tr><td>  </td><td>  </td></tr>
<tr><td>  </td><td>Length
Width
Height
Volume</td></tr>
</table>

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

Ratio

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

To measure ratio:

1. Press **Measure** to activate measurement function.
2. Roll the trackball to highlight menu **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 **Change** once to change the settled point and the active point; if you press **Change** 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 Measured Results.

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 Measured Results.
8. Press **Measure** to finish and exit.

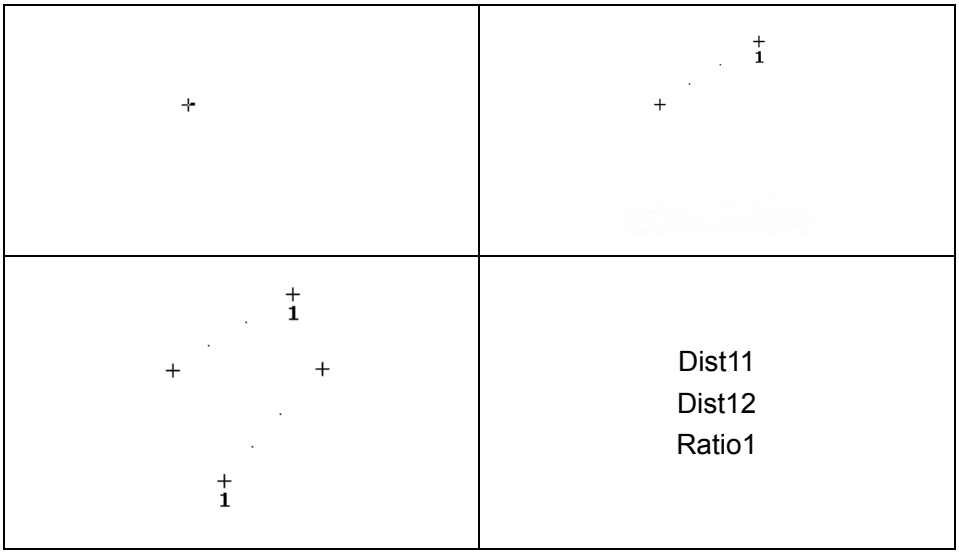


Figure 6- 9 Ratio Measurement and the Results

% Stenosis

- **Distance stenosis**

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

To measure distance stenosis:

1. Press **Measure** to activate measurement function.
2. Roll the trackball to highlight menu **% 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 **Change** to change the start point and the end point; if you press **Change** 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 Measured Results.
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 Measured Results.

8. Press **Measure** to finish and exit.

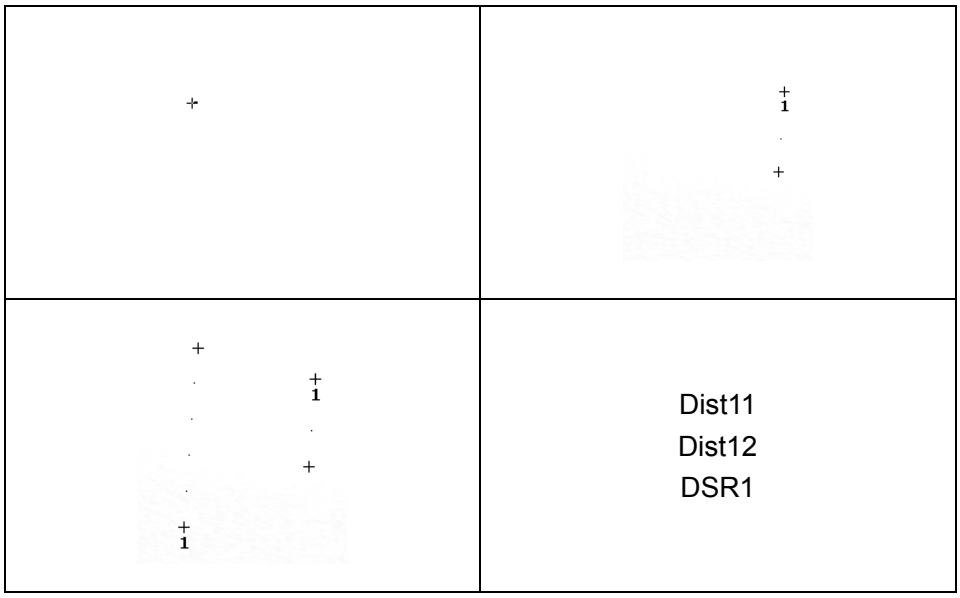


Figure 6- 10 Distance Stenosis Measurement and the Results

- **Area stenosis**

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

To measure area stenosis:

1. Press **Measure** to activate measurement function.
2. Roll the trackball to highlight menu **% 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 **Change** 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 Measured Results.
7. Press **Measure** to finish and exit.

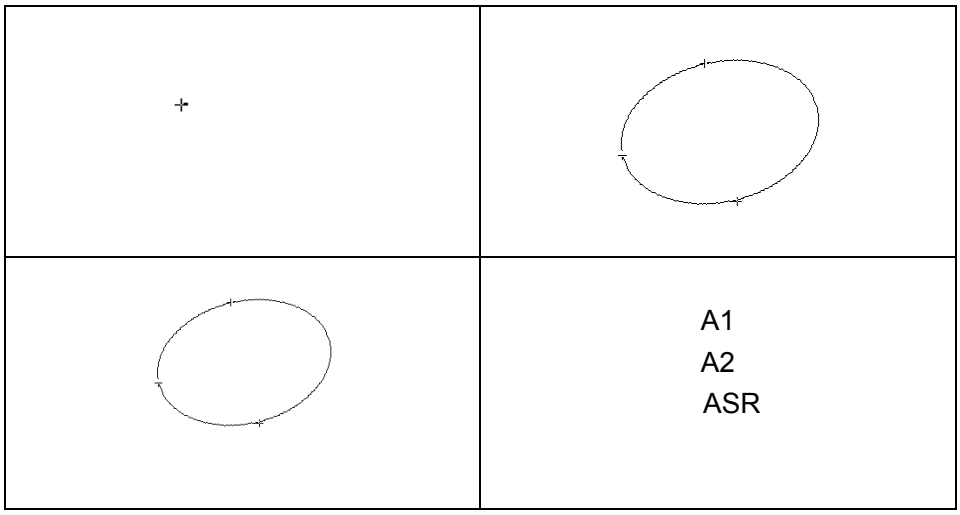


Figure 6- 11 Area Stenosis Measurement and the Results

Angle

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

To measure angle:

1. Press **Measure** to activate measurement function.
2. Roll the trackball to highlight menu **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 **Change** to change the start point and the end point; if you press **Change** to 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** to again 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 Measured Results, in units of degrees. The outcome will be displayed in Measured Results.
8. Press **Measure** to finish and exit.

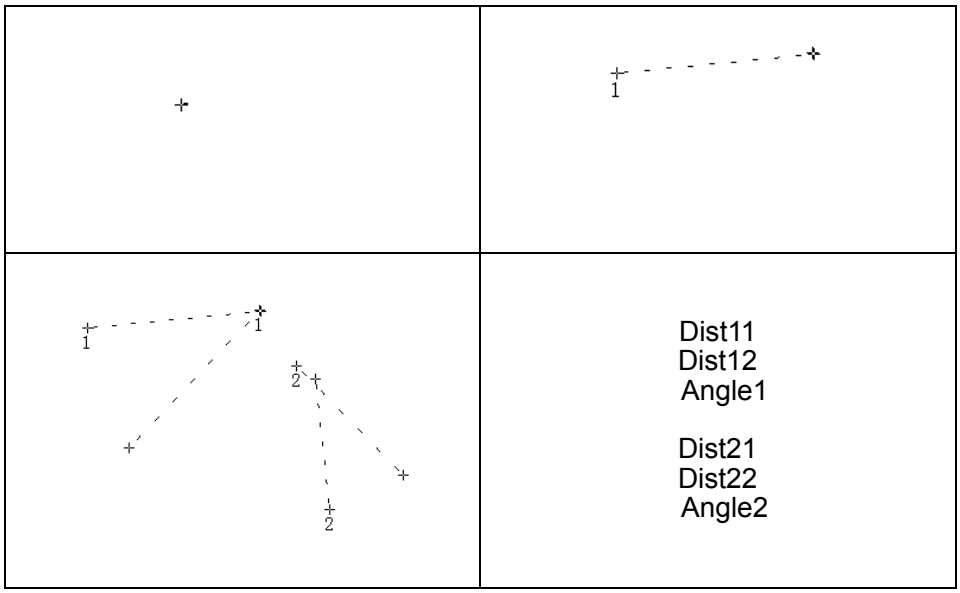


Figure 6- 12 Angle measurement

Histogram	Freeze the image first before histogram measurement, otherwise the prompt "Image is not frozen, please freeze and retry!" will pop up. 1. Press **Measure** to activate 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 **Change** 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 **Measure** to finish and exit.

Others

Roll the trackball to highlight **Others** to select a desired measurement item.

6.6.2. Generic Measurements in M Mode

M-mode measurement and calculation 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 **Measure** 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 Measured Results, as shown below.
6. Press **Measure** to finish and exit.

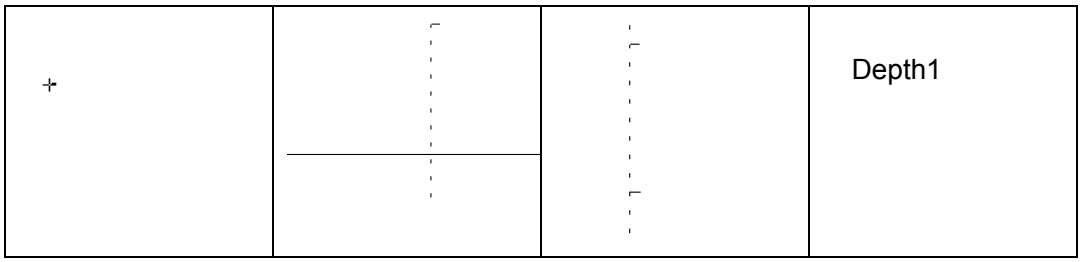


Figure 6- 14 Distance Measurement and the Results

Time To measure time:

1. Press **Measure** 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 and 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 Measured Results, as shown below.

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

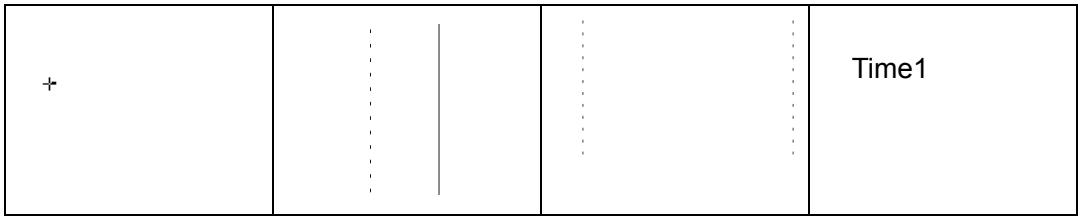


Figure 6- 15 Time Measurement

Slope To measure slope:

1. Press **Measure** 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 Measured Results, as shown below.
6. Press **Measure** to finish and exit.

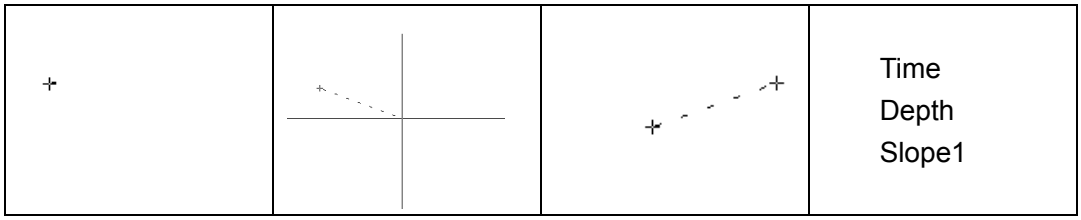


Figure 6- 16 Slope Measurement and the Results

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 **Measure** 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 Measured Results.
6. Press **Measure** to finish and exit.

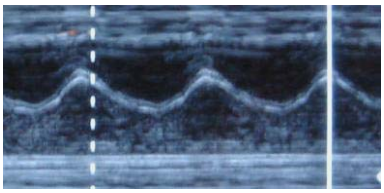


Figure 6- 17 Heart Rate Measurement

NOTE:

In **B/M-mode**, you should define the M Mark position, and then begin the measurement.

Others

Roll the trackball to highlight **Others** in the M Mode Generic Measurement and Calculation Menu to select a measurement item.

6.6.3. General Report

To print the general ultrasound report:

Highlight **Print Report** in the B Mode Generic Measurement and Calculation Menu, and press **Set** to display the **general worksheet** dialog box, as shown below:

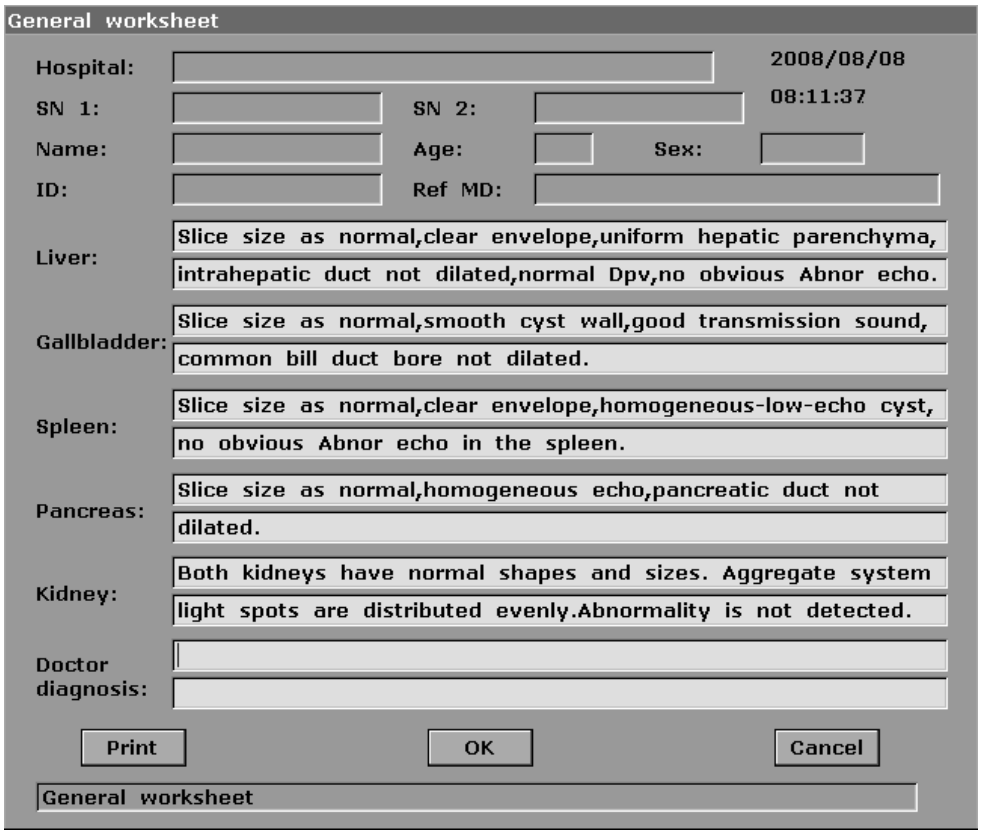


Figure 6- 18 General Worksheet Dialog Box

To print the report:
Press **Print** in the General Worksheet.

Printing reference section *5.8, Printing*.

6.7. CINE Review

The system provides a storage capacity of 256 frames for CINE Review playback.

Activate the device and enter the real-time B, B/B, 4B, or B/M scanning mode. Enable the system to collect images before CINE Review playback, press **Freeze** to start frame-by-frame playback automatically. The cine function includes frame-by-frame playback and motion playback. Press **Cine** to switch between these two modes. The cine review symbol is displayed on the bottom of the screen, as shown below:

Figure 6- 19 CINE Review Symbol

To perform the CINE Review playback:

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

Figure 6- 20 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 is moved, the current cine number is displayed on the right of the CINE Review Symbol.
3. Press **Cine** to stop playing back, and then roll the trackball to highlight **Play/Stop** and press **Set** to enter the motion playback mode.
4. During playing back, press **Play/Stop** to play or to stop.
5. 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 U disk. For details about operation method, please refer to 6.8.1 “Saving Files”.

6. Press **Cine** to go back to the frame-by-frame mode.

7. Press **Freeze** to exit the CINE Review playback.

The default setting is to load images by serial numbers forward. When the number reaches 256, it will return to 1.

NOTE:

1. Cine review is unavailable in B-mode.
2. The FPS (frames per second) is adjustable, from 5 to 50, in increments of 5.
3. After opening a cine file, you can do some measurements, add comments and a body mark on the image and print it in the report. See section *5.4.5 Comment function* and section *5.4.6. Body mark function* for detailed operation information.

6.8. File Management

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

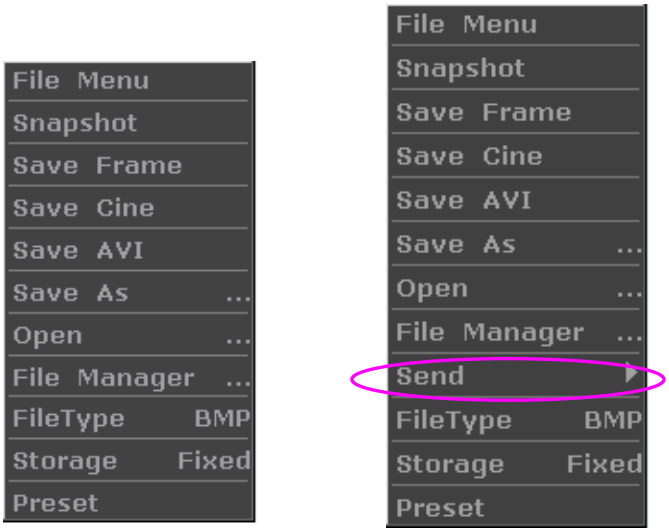


Figure 6- 21 File Menu (the left—with no DICOM installed, the right—with DICOM installed)

6.8.1. Saving Files

File types:

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

To choose a storage disk:

The storage disk can be set to **Fixed** or **USB-Disk** by the **Storage** option in the file menu.

To choose a storage disk: highlight **Storage** in the file menu and press **Set** repeatedly to cycle between **Fixed** and **USB-Disk**.

NOTE:

After connecting the removable disk, the interface displays a USB symbol on the bottom right corner and the USB indicator on the panel is on.

To set a file type:

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

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

To save a file:

The system provides two ways to save images:

- Press **Snapshot** on the keyboard;

  Press **Snapshot** on the keyboard to save the current displaying image in BMP, JPG, FRM or DCM (if DICOM is installed) formats, (set by **FileType** in the file menu, as shown above).

- Use **Snapshot**, **Save Cine**, **Save As**, **Save Frame** or **Save AVI** 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 or FRM(set by **FileType** in the file menu, as shown above).

  - **Save Frame**

    1. Press **Freeze** to freeze the system;
    2. Press **File** to open the file menu;
    3. 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 view on this system, please use a U disk to copy the AVI files to a PC, and view the AVI files by using the WINDOWS RealPlayer.

➢ **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. Choose the driver and the file type.
3. Press **Set** on the pane next to File Name, and use the keyboard to enter a file name with a maximum of ten characters.
4. Press **OK** to save.

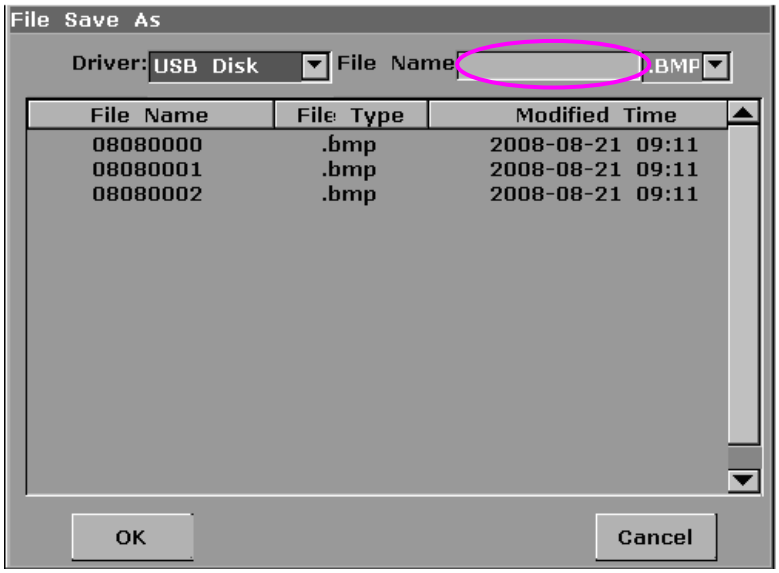


Figure 6- 22 File Saving Dialog Box

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

These files are automatically numbered in sequence. For instance, if the latest number comes to YYMM0020, and if you save a file the next time, the file is numbered YYMM0021.

6.8.2. Opening Files

Press **File** in the real-time/freezing mode, and the system displays the file menu. Then select **Open** and press **Set** to display an **Open File** dialog box, as shown below.

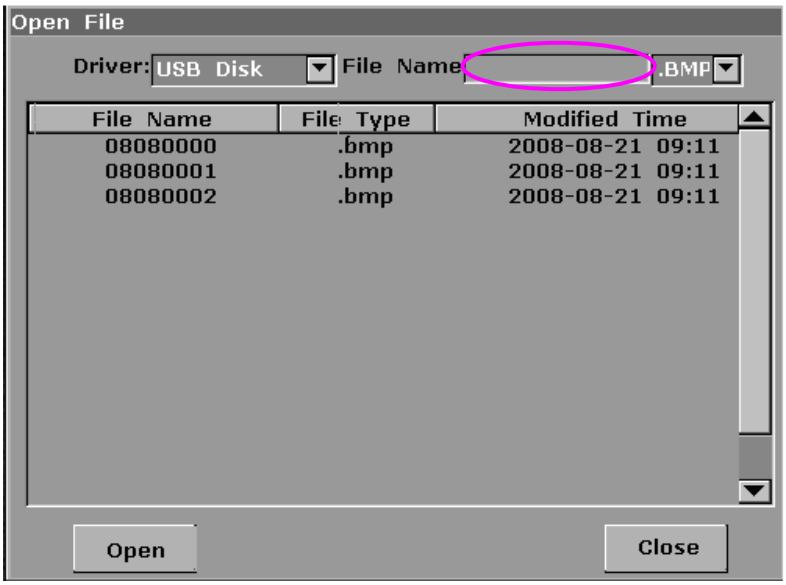


Figure 6- 23 File Opening Dialog Box

The default driver is the local disk, and the default file type is **.BMP**. The file types include BMP, JPG, FRM, DCM, and CIN. Pressing the symbol "▼" to display the driver or the file type, and then roll the trackball to choose the type.

Select a desired file name and press **Open**; or double-click on a file name, the system begins to load the corresponding image. A prompt instruction **Loading file…** is displayed in the middle of the screen. Then the prompt instruction disappears and the system displays the designated image.

NOTE:

1. Images that have not yet been saved in the saving zone can not be loaded.
2. When saving or loading 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 and FRM files.
4. After opening a FRM file, you can do some measurements, add comments and a body mark on the image and print it in the report. See section *5.4.5 Comment function* and section *5.4.6. Body mark function* for detailed operation information.

6.8.3. Browsing Images

After you open an image, press << to open the previous image, and >> to open the next image; Press **Play** to start playing all the images automatically and the **Play** key changes into the **Stop** key; Press **Stop** to stop playing images; press Exit to exit the browsing.

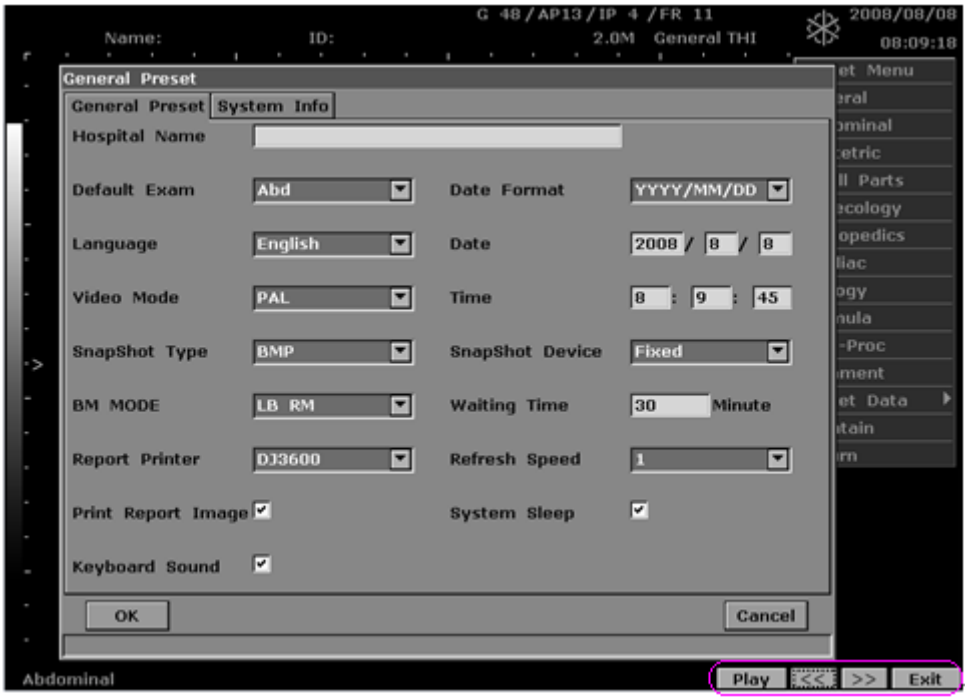


Figure 6- 24 Image Browsing Dialog Box

NOTE:

The JPG, BMP, and DCM (if DICOM is installed) images are available to the browsing function.

6.8.4. File Manager

The file manager dialog box is shown as below.

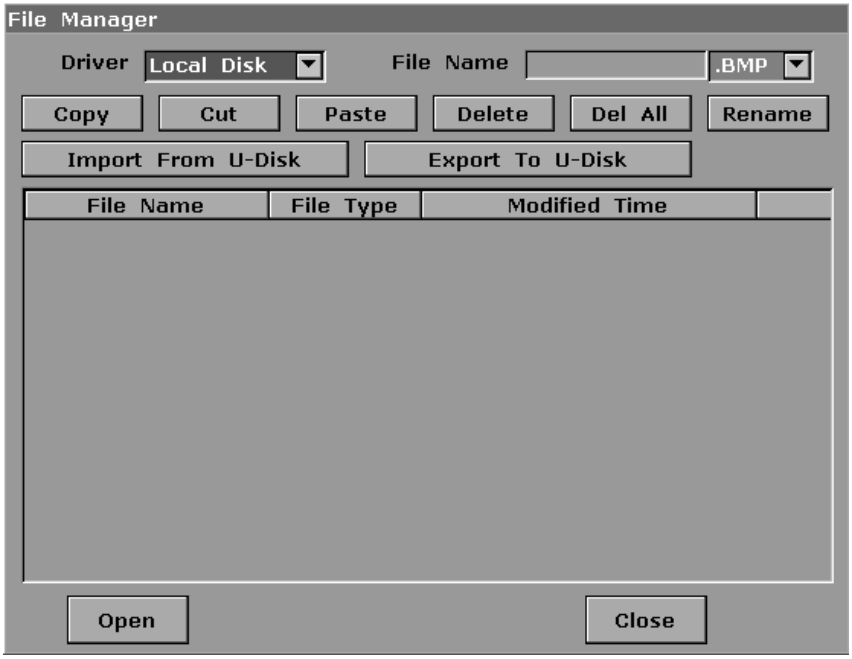


Figure 6- 25 File Manager Dialog Box

You can use the file manager to do the file management. After you open an image, you can browse the images as shown in section 6.8.3.

NOTE:

1. When you are copying & pasting a file, cutting & pasting a file, importing a file or exporting a file, do not pull in or pull out the U disk.
2. USB disk must be in FAT32 format.
3. Do not use the u-disk for other use, but only for this device. Otherwise the storage and the transmission function may not be stable.
4. We suggest that you use the Netac U disk: Netac U180 (2G).

To copy & paste a file:

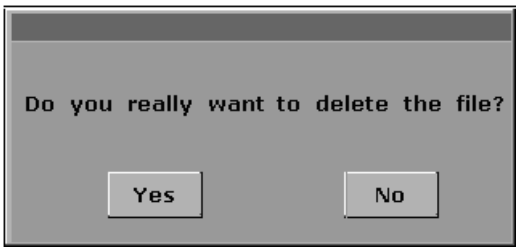
1. Roll the trackball to select the source driver and the type of file, and then press **Set**.
2. Roll the trackball to highlight the source file, and press **Set**, and then press **Copy**.
3. Roll the trackball to select the destination driver and press **Set**.
4. Press **Paste**.

To cut & paste a file:

1. Roll the trackball to select the driver and the type of file, and then press **Set**.
2. Roll the trackball to highlight the file that will be cut, and press **Set**, and then press **Cut**.
3. Roll the trackball to select the destination driver and press **Set**.
4. Press **Paste**.

To delete a file:

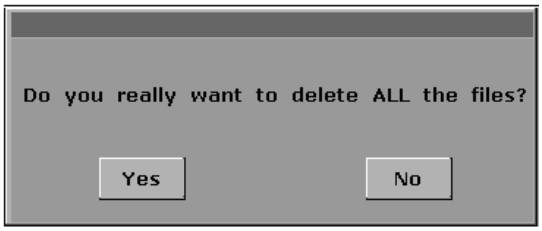
1. Roll the trackball to select the driver and the type of file, and then press **Set**.
2. Roll the trackball and then press **Set** to select the file you want to delete.
3. Press **Delete**, and a prompt instruction is displayed in the middle of the screen, as shown below:



4. Press **Yes** to delete the designated file, or **No** to give up the deleting operation.

To delete all:

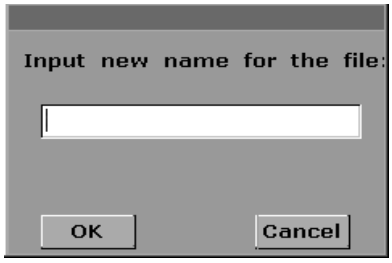
1. Roll the trackball to select the driver and the type of file, and then press **Set**.
2. Press **Del All**, and a prompt instruction is displayed in the middle of the screen, as shown below:



3. Press **Yes** to delete the all the files, or **No** to give up the deleting operation.

To rename a file:

1. Roll the trackball to select the driver and the type of file, and then press **Set**
2. Roll the trackball and press **Set** select the file you want to rename.
3. Press **Rename** to open the dialog box, as shown below, and enter the new name of the file using the keyboard, with a maximum of eight characters.



4. Press **OK** to rename the designated file, or **Cancel** to give up the renaming operation.

To import from U-disk:

You can use the **Import From U-Disk** button to import all the files from U-disk to the local disk.

To export to U-disk:

You can use the **Export To U-Disk** button to export all the files from local disk to U-disk.

6.8.5. Sending Files

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

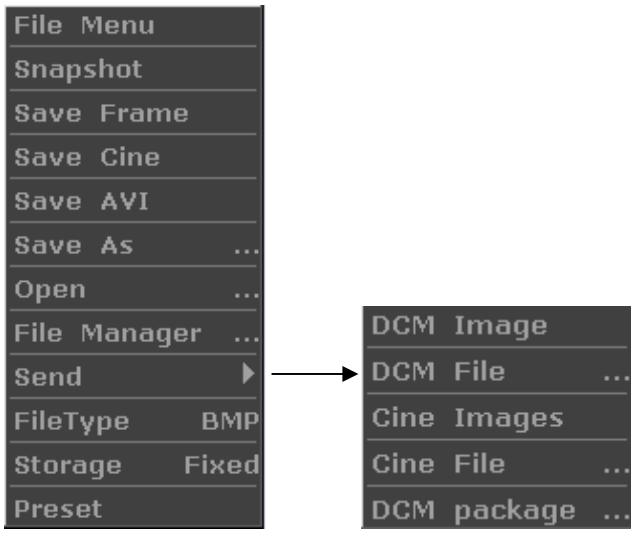


Figure 6- 26 File Menu (with DICOM Function)

To send a DCM Image

1. Highlight the secondary menu **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 secondary menu **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 Cine Images

1. Freeze the system.
2. Press **File** to enter the file menu.
3. Highlight the secondary menu **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 secondary menu **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.

To send DCM package

1. Highlight the secondary menu DCM package, and then press **Set**.
2. The system displays the File Opening Dialog Box, press **OK** to send all the saved DCM files to the server.
3. The progress bar disappears after successful sending.

6.9. Puncture Function

NOTE:

Use proper disinfection techniques at all times to perform a biopsy.

Always follow these basic precautions:

WARNING

1. Disinfect the needle guide before the first use and after each subsequent 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.

To enable the puncture function:

In real-time B mode imaging, highlight **Needle Guide** and then press **Set**. Prompt information **Needle guide line must be calibrated prior to each puncture** will be displayed on the screen. Press **Close** and enter the puncture function and a needle guide menu is displayed, as shown below:

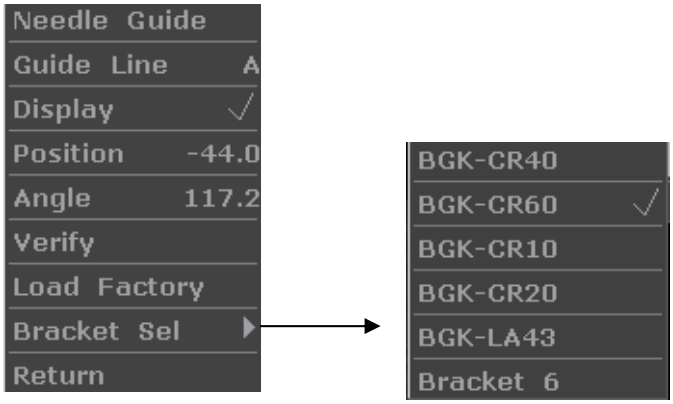


Figure 6- 27 Needle Guide Menu

To exit puncture function:

Press **Return** of the needle guide menu to exit puncture function, the needle guide menu will be closed and the needle guide line in image will disappear.

WARNING

DO NOT freeze the system when doing puncture.

NOTE:

- There are no more than 3 needle guide lines for each puncture frame.
- If image depth ≤ 8 cm, the distance between the two nods of the needle guide line indicates 0.5 cm.
- If image depth > 8 cm, the distance between the two nods of the needle guide line indicates 1 cm.

6.9.1. To Select the Angle of Needle Guide Line

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

6.9.2. To Display or To Hide the Needle Guide Line

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

6.9.3. 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**, press **Set** to increase the value and press **Back** to 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 **Set**, and the system will save the verified value. After restarting the system, the verified value is activated.

◆ To save the factory data:

Highlight **Load Factory** and press **Set** load the factory data.

◆ To select the bracket:

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

6.9.4. Reference Line

In the single B mode, press **SHIFT+CAPS** to display or to hide the reference line. When the reference line is displayed, roll the trackball to adjust its position, and press **Set** to set its position.

NOTE:

The reference line is not displayed after 90° rotation or magnification.

6.10. Breakstone Guide

Highlight **Breakstone** in the B mode menu, and press **Set** to display the breakstone guide line in the middle of the screen.

NOTE:

The breakstone guide is not displayed after 90° rotation or magnification

Chapter 7 Obstetric Measurement and Calculation

The obstetric examination is usually in the B-mode.

To enter B-mode obstetric examination:

1. Press **Exam** and select **Obstetric**, and then press **Set**.
2. Press  to enter B-mode.
3. Press **Measure** to activate the measurement function. The measurement menu will be displayed.

7.1. Abbreviations

The abbreviations used in this manual are shown as below:

- EDC: Estimated Date of Confinement
- MA: Menstrual Age
- LMP: Last Menstrual Period
- BBT: Basal Body Temperature
- EFW: Estimated Fetal Weight

7.2. Obstetric Measurement and Calculation

1. Items of Measurement and Calculation

B-OB MEAS: GS, CRL, BPD, HC, AC, FL, EFW, and AFI.

B-OB MEAS 2: TAD, APAD, CER, FTA, HUM, OFD, THD and FBP.

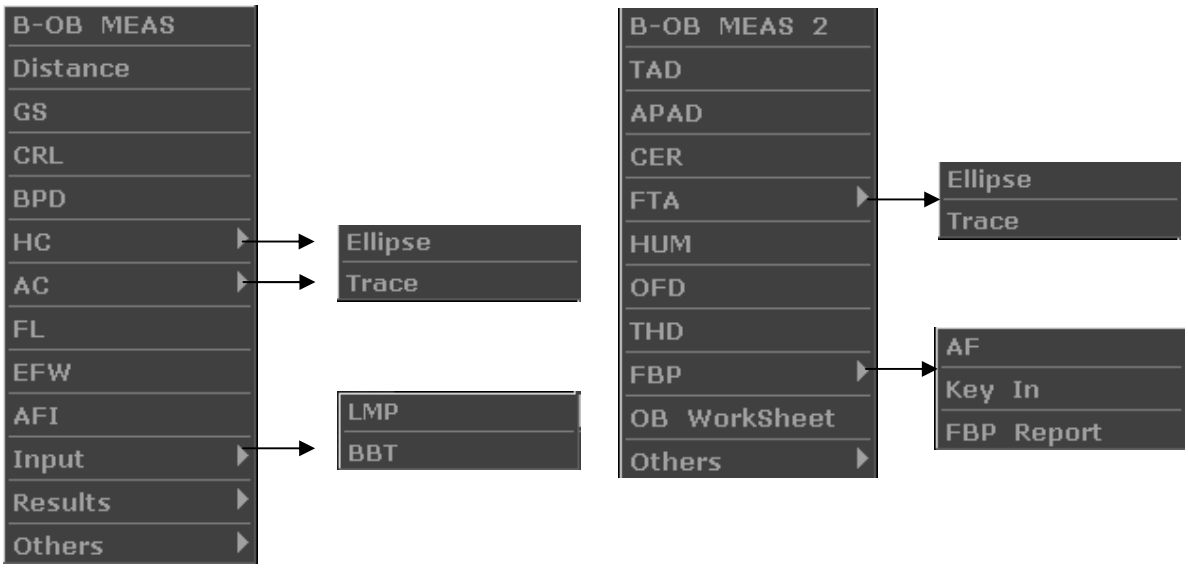


Figure 7-1 Obstetric Measurement and Calculation Menu

2. Items of input: LMP and BBT

7.3. Fetus Growth Measurement

Fetus growth is usually measured by the following parameters.

B-OB MEAS: the default measurement is distance measurement.

Label	Description	Channel	Method	Results display
GS	Gestational Sac Diameter	1	Distance (mm)	Results are displayed in the result window.
CRL	Crown Rump Length	1		
BPD	Biparietal Diameter	1		
HC	Head Circumference	1	Ellipse or Trace Circumference (mm)	
AC	Abdominal Circumference	1		
FL	Femur Length	1	Distance (mm)	
AFI	Amniotic Fluid Index	1	Calculating AFI requires 4 sets of distance measurement data, AF1, AF2, AF3, and AF4.	
EFW	Estimated Fetal Weight	1	According to the selected formula, described as follows. (g or kg)	

Table 7-1 Obstetric Measurement 1

B-OB MEAS 2: the default measurement is TAD measurement.

Label	Description	Channel	Method	Results display
TAD	Transverse Abdominal Diameter	1	Distance (mm)	The measured results are displayed in the result window.
APAD	Antero Posterior Diameter of the Abdomen	1		
CER	Cerebellum Diameter	1		
FTA	Fetus Trunk cross section Area	1	Ellipse or Trace Area (mm^2 or dm^2)	
HUM	Humerus Length	1	Distance (mm)	
OFD	Occipital Frontal Diameter	1		
THD	Thorax Diameter	1		
FBP	Fetal Biophysical Profile	1	Distance (mm)	

Table 7-2 Obstetric Measurement 2

The system will calculate AVE MA and AVE EDC automatically after measuring each parameter.

7.3.1. GS

To measure GS (use the Maximum diameter method):

1. Press **Measure** to activate obstetric measurement.
2. In the obstetric menu, roll the trackball to highlight the menu **GS**, press **Set**, and move the cursor to image and display "+".
3. Measure GS, in the method of distance measurement.

 Reference Section *6.6.1, Generic Measurements in B Mode*

4. The results are displayed in Measured Results.
5. To begin a new GS measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

7.3.2. CRL

To measure CRL:

1. Press **Measure** to activate obstetric measurement.
2. In the obstetric menu, roll the trackball to highlight the menu **CRL**, press **Set**, and move the cursor to image and display "+".
3. Measure CRL, in the method of distance measurement.

 Reference Section *6.6.1, Generic Measurements in B Mode*

4. The results are displayed in Measured Results.
5. To begin a new CRL measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

7.3.3. BPD

To measure BPD:

1. Press **Measure** to activate obstetric measurement.
2. In the obstetric menu, roll the trackball to highlight the menu **BPD**, press **Set**, and move the cursor to image and display "+".

3. Measure BPD, in the method of distance measurement.

 Reference Section *6.6.1, Generic Measurements in B Mode*

4. The results are displayed in Measured Results.
5. To begin a new BPD measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

7.3.4. HC

To measure HC:

1. Press **Measure** to activate obstetric measurement.
2. In the obstetric menu, roll the trackball to highlight the menu **HC**, press **Set**, and move the cursor to image and display "+".
3. Measure HC, in the method of ellipse or trace circumference measurement.

 Reference Section *6.6.1, Generic Measurements in B Mode*

4. The results are displayed in Measured Results.
5. To begin a new HC measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

7.3.5. AC

To measure AC:

1. Press **Measure** to activate obstetric measurement.
2. In the obstetric menu, roll the trackball to highlight the menu **AC**, press **Set**, and move the cursor to image and display "+".
3. Measure AC, in the method of ellipse or trace circumference measurement.

 Reference Section *6.6.1, Generic Measurements in B Mode*

4. The results are displayed in Measured Results.
5. To begin a new AC measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

7.3.6. FL

To measure FL:

1. Press **Measure** to activate obstetric measurement.
2. In the obstetric menu, roll the trackball to highlight the menu **FL**, press **Set**, and move the cursor to image and display "+".
3. Measure FL, in the method of distance measurement.

 Reference Section *6.6.1, Generic Measurements in B Mode*

4. The results are displayed in Measured Results.
5. To begin a new FL measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

7.3.7. AFI

To measure AFI:

1. Press **Measure** to activate obstetric measurement.
2. In the obstetric menu, roll the trackball to highlight the menu **AFI**, press **Set**, and move the cursor to image and display "+".
3. Measure four groups of AF, in the method of distance measurement.

 Reference Section *6.6.1, Generic Measurements in B Mode*

4. The results, AF1, AF2, AF3, AF4, and AFI are displayed in Measured Results.
5. To begin a new AFI measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

7.3.8. TAD

To measure TAD:

1. Press **Measure** to activate obstetric measurement.
2. In the obstetric menu, roll the trackball to highlight the menu **TAD**, press **Set**, and move the cursor to image and display "+".
3. Measure TAD, in the method of distance measurement.

 Reference Section *6.6.1, Generic Measurements in B Mode*

4. The results are displayed in Measured Results.
5. To begin a new TAD measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

7.3.9. APAD

To measure APAD:

1. Press **Measure** to activate obstetric measurement.
2. In the obstetric menu, roll the trackball to highlight the menu **APAD**, press **Set**, and move the cursor to image and display "+".
3. Measure APAD, in the method of distance measurement.

 Reference Section *6.6.1, Generic Measurements in B Mode*

4. The results are displayed in Measured Results.
5. To begin a new APAD measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

7.3.10. CER

To measure CER:

1. Press **Measure** to activate obstetric measurement.
2. In the obstetric menu, roll the trackball to highlight the menu **CER**, press **Set**, and move the cursor to image and display "+".
3. Measure CER, in the method of distance measurement.

 Reference Section *6.6.1, Generic Measurements in B Mode*

4. The results are displayed in Measured Results.
5. To begin a new CER measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

7.3.11. FTA

To measure FTA:

1. Press **Measure** to activate obstetric measurement.
2. In the obstetric menu, roll the trackball to highlight the menu **FTA**, press **Set**, and move the cursor to image and display "+".
3. Measure FTA, in the method of ellipse or trace area measurement.

 Reference Section *6.6.1, Generic Measurements in B Mode*

4. The results are displayed in Measured Results.
5. To begin a new FTA measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

7.3.12. HUM

To measure HUM:

1. Press **Measure** to activate obstetric measurement.
2. In the obstetric menu, roll the trackball to highlight the menu **HUM**, press **Set**, and move the cursor to image and display "+".
3. Measure HUM, in the method of distance measurement.

 Reference Section *6.6.1, Generic Measurements in B Mode*

4. The results are displayed in Measured Results.
5. To begin a new HUM measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

7.3.13. OFD

To measure OFD:

1. Press **Measure** to activate obstetric measurement.
2. In the obstetric menu, roll the trackball to highlight the menu **OFD**, press **Set**, and move the cursor to image and display "+".
3. Measure OFD, in the method of distance measurement.

 Reference Section *6.6.1, Generic Measurements in B Mode*

4. The results are displayed in Measured Results.
5. To begin a new OFD measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

7.3.14. THD

To measure THD:

1. Press **Measure** to activate obstetric measurement.
2. In the obstetric menu, roll the trackball to highlight the menu **THD**, press **Set**, and move the cursor to image and display "+".
3. Measure THD, in the method of distance measurement.

 Reference Section *6.6.1, Generic Measurements in B Mode*

4. The results are displayed in Measured Results.
5. To begin a new THD measurement, repeat steps 1 through 3. You can measure a maximum of one group of data.

7.3.15. FBP

To measure AF

1. Press **Measure** to activate obstetric measurement.
2. In the obstetric menu, roll the trackball to highlight the menu **FBP**, select **AF** and press **Set**.
3. Measure AF, in the method of distance measurement.

 Reference Section *6.6.1, Generic Measurements in B Mode*

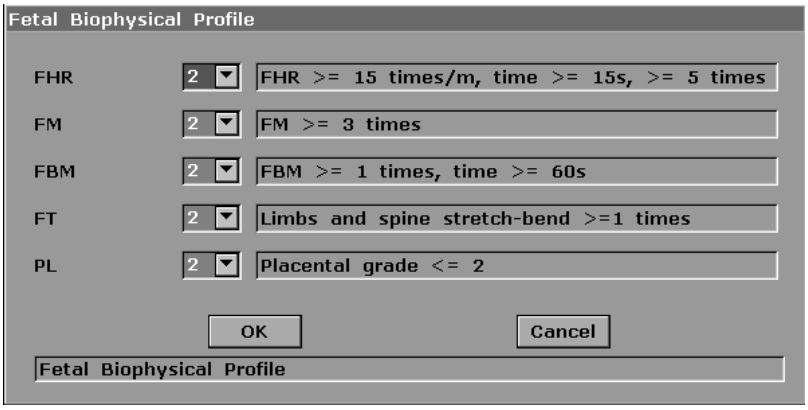
4. The results are displayed in Measured Results window.
5. To begin a new AF measurement, repeat steps 1 through 3. Otherwise the system will return to the default measurement of TAD.

Fetal Biophysical Profile

1. Press **Measure** to activate obstetric measurement.
2. In the obstetric menu, roll the trackball to highlight the menu **FBP**, select **Key In** and press

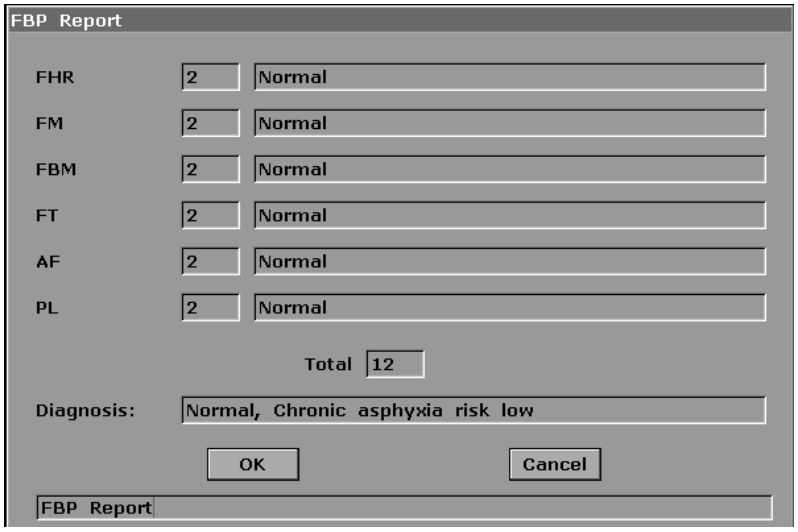
Set.

3. The Fetal Biophysical Profile window displays as the following figure shows. Select the parameters from the pull-down menu of FHR, FM, FBM, FT and PL, and then press **OK** to confirm, the biophysical evaluation result will be displayed in the FBP Report.



FBP Report

1. In the obstetric menu, roll the trackball to highlight the menu **FBP**, select **FBP Report** and press **Set** to get the FBP report window.



2. Press **Cancel** to exit.

NOTE: To get the Total result in the FBP report, you have to measure the AF and input the fetal biophysical profile and save them.

7.4. EDC Calculation

7.4.1. EDC Calculation by Entering LMP

To calculate EDC according to LMP

1. In the obstetric menu, roll the trackball to highlight the menu **Input**, and it will display secondary menu automatically, as shown below:

Figure 7-2 Obstetric Input Items

Select **LMP** and press **Set**, and the **LMP input** dialog box will be displayed on the screen.

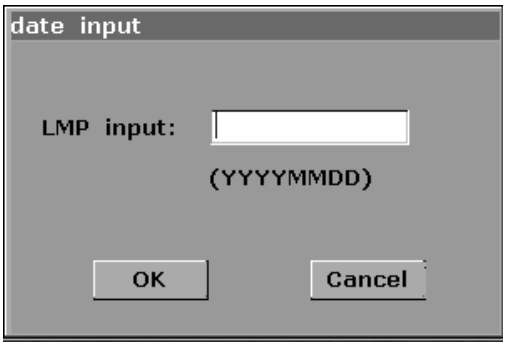


Figure 7-3 LMP Input Dialog Box

2. Enter LMP.
3. Select **OK** and press **Set** do the calculation automatically, or **Cancel** to give up the calculation.

7.4.2. EDC Calculation by Entering BBT

To calculate EDC according to BBT

1. In the obstetric menu, roll the trackball to highlight the menu **Input**, and it will display secondary menu automatically.
2. Select BBT in the list of input items and press **Set**, and the **BBT input** dialog box will be displayed on the screen.

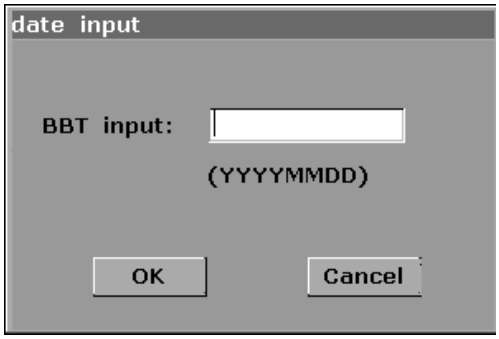


Figure 7-4 BBT Input Dialog Box

3. Enter BBT.
4. Select **OK** and press **Set** do the calculation automatically, or **Cancel** to give up the calculation.

NOTE:

1. In EDC calculation, make sure that the system date is correct. The default standard

pregnancy period in the system is 40 weeks. In the LMP method measuring, if the interval between the input date and the current system date exceeds 40 weeks, the input date will be invalid. In the BBT method measuring, if the interval between the input date and the current system date exceeds 266 days, the input date will be invalid.

2. The date format of EDC here accords with what you have set in General Presetting window.

7.5. EFW Calculation

This system can calculate EFW according to the measured data.

7.5.1. Select a Formula in Preset

This system provides eleven types of EFW formula, as shown below.

Options	Formula	
Tokyo	EFW = 1.07* (BPD^3)+3.42*APTD*TTD*FL EFW: g; Others: cm	
Osaka	EFW = 1.25674* (BPD^3)+3.50665*FTA*FL+6.3 EFW: g; FTA: cm^2; Others: cm	
HADLOCK1	EFW = 10^{1.304+ (0.05281*AC)+ (0.1938*FL)- (0.004*FL*AC)}	EFW: g; Others: cm
HADLOCK2	EFW = 10^{1.335- (0.0034*AC*FL)+ (0.0316*BPD)+ (0.0457*AC) + (0.1623*FL) }	
HADLOCK3	EFW = 10^{1.326- (0.00326*AC*FL)+ (0.0107*HC)+ (0.0438*AC) + (0.158*FL) }	
HADLOCK4	EFW = 10^{1.3596- (0.00386*AC*FL)+ (0.0064*HC)+ (0.00061*BPD*AC) + (0.0424*AC)+ (0.174*FL) }	
Shepard	EFW = 10^{-1.7492+ (0.166*BPD)+ (0.046*AC) - (2.646*AC*BPD/1000)} EFW: kg; Others: cm	
Merz1	EFW = (-3200.40479+ (157.07186*AC)+{15.90391* (BPD^2)}	EFW: g; Others: cm
Merz2	EFW = 0.1* (AC^3)}	
Hansmann	EFW = (-1.05775*BPD+0.0930707* (BPD^2) + {0.649145*THD) - 0.020562* (THD^2) +0.515263	EFW: kg; Others: cm
Campbell	EFW = EXP{-4.564+ (0.282*AC)-[0.00331* (AC^2)]}	

Table 7-3 Obstetric Calculation Formula

7.5.2. Measurement Items

Different measurement items go with different formula. So you can select suitable formula according to the measurement item.

Take Osaka formula for instance, to calculate EFW:

1. In the obstetric menu, roll the trackball to highlight menu **EFW**, and then press **Set**.
2. Use the distance measurement method to measure **BPD** and **FL**, use the ellipse method to measure **FTA**.
3. The result of EFW will be displayed in Measured Results.

7.6. Results

Obstetric results include **Growth Curve** and **OB Worksheet**.

7.6.1. Growth Curve

You can define the fetus growth by comparing the measured parameter value with the fetus growth curve.

Operation procedure:

1. Measure one or more fetus growth parameter (GS, CRL, BPD, FL, AC, HC, APAD, TAD, CER, FTA, HUM, OFD, or THD).
2. Enter LMP or BBT.
3. In the obstetric menu, roll the trackball to highlight menu **Results**, and the secondary menu will be displayed. Then select **Growth Curve** and press **Set**, and the Fetus Growth Analysis dialog box will be displayed in the middle of the screen.
4. The default tab is GS and the corresponding formula of the current growth curve. Move the cursor to another formula in the pull-down menu, and press **Set** display the normal growth curve based on the selected formula, which can define how the fetus grows.
5. Move the cursor to another tab in the pull-down menu,, and press **Set** to display the growth curve of another measurement item and the phase of the growth corresponding to the measured data.

The signification of the growth curves is shown below and the x-coordinate shows the phase of the growth corresponding to the entered LMP or BBT, and the y-coordinate shows the measured data.

Move the cursor to **Close**, and press **Set** to exit.

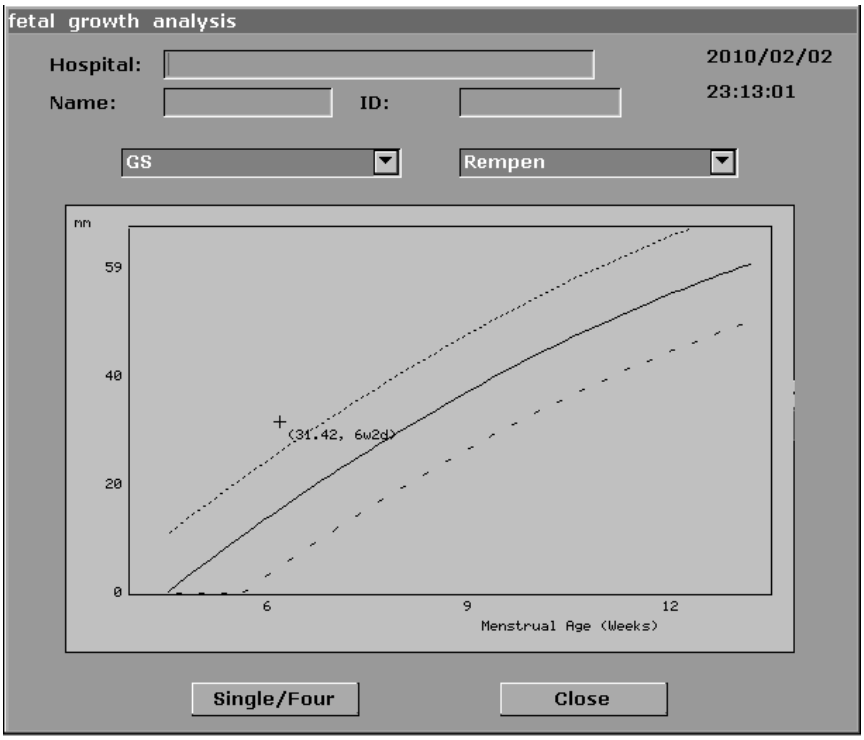


Figure 7-5 Fetal Growth Curve (Single)

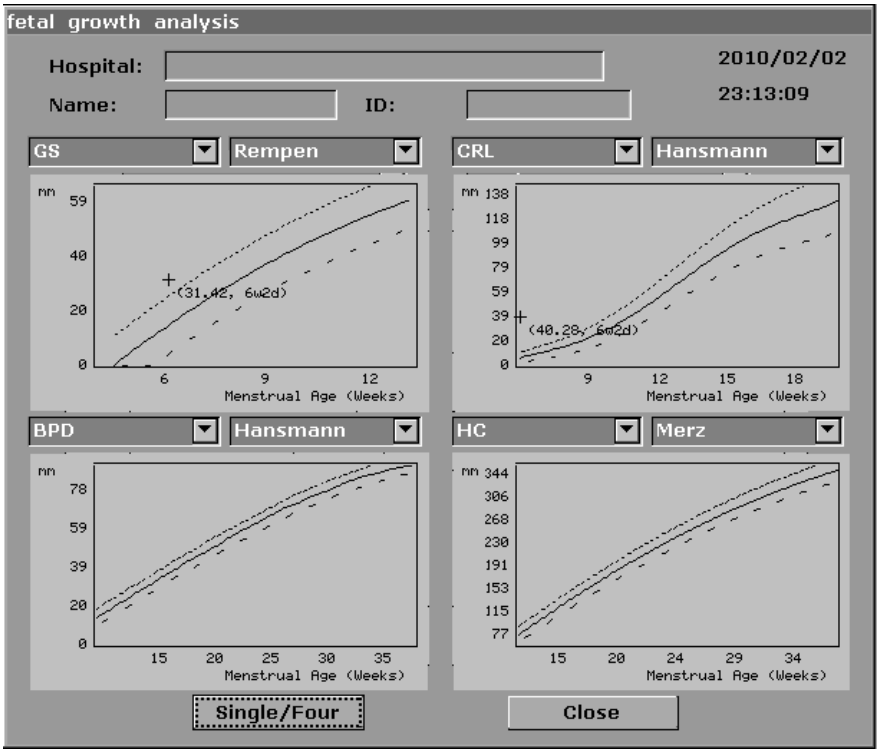


Figure 7-6 Fetal Growth Curve (Four)

NOTE:

Press **Single/Four** to display single growth graphics or four growth graphics.

7.6.2. Obstetric Report

After obstetric examination, the system will generate an obstetrical diagnosis worksheet automatically.

1. In the obstetric menu, roll the trackball to highlight **Results**, and it will display secondary menu automatically.
2. Select **OB Worksheet** and press **Set** open **Obstetric Worksheet**, as shown below:

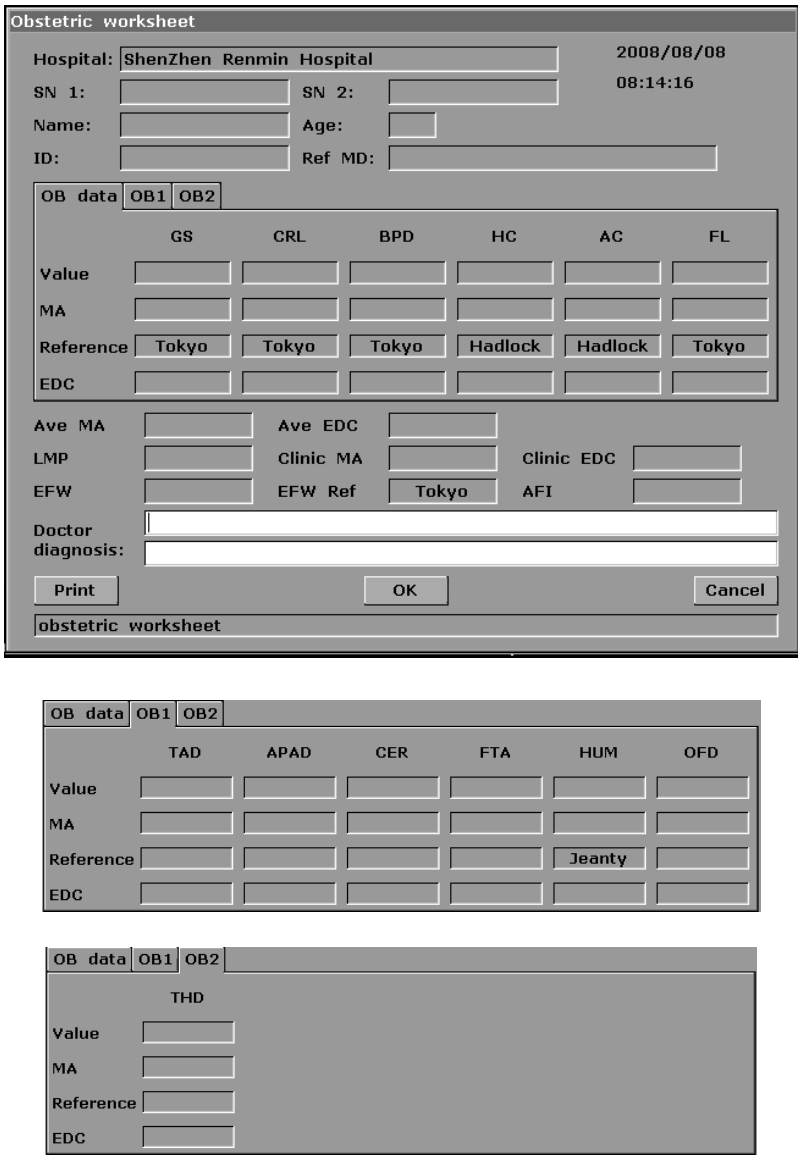


Figure 7-7 Obstetric Worksheet

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

NOTE:

1. The system will display the completed measurement and calculation, the uncompleted measurement and calculation 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.

To print the report:

Press **Print** in the Obstetric Worksheet.

 Printing reference Section *5.8, Printing.*

7.7. Others

If you want to begin other measurements, you can switch through the menu by selecting **Others**.

Chapter 8 Cardiology Measurement and Calculation

The cardiology examination is usually in the B-mode, the B/M-mode or the M-mode.

Press **Exam** and select **Cardiac**, and then press **Set**.

8.1. M-mode Cardiac Measurement and Calculation

Press  to enter the M-mode, or press  to enter the B/M mode, and then press **Measure** to activate the measurement function. The measurement menu will be displayed.

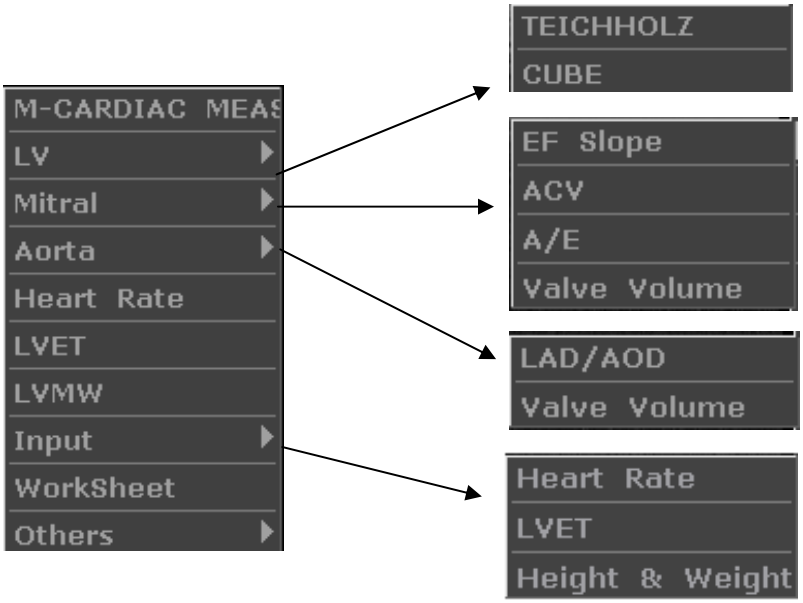


Figure 8-1 M Mode Cardiac Measurement and Calculation Menu

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) x HR (bpm)/1000
EF	Ejection fraction (M-mode)	EF (No unit) = SV (mL)/ EDV (mL) x 100%
FS	Fractional Shortening	FS (No unit) = [{ LVIDd (mm)- LVIDs (mm)}/ LVIDd (mm)]x 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) x ET (ms)/1000}
BSA	Body Surface Area	Calculate by the selected formula (m^2)

Table 8-1 Measurement and Calculation Items with CUBE formula

The formulas of BSA calculation:

Oriental: $BSA(m^2) = WT^{0.425}(kg) \times HT^{0.725}(cm) \times 73.58 \div 10000$

Occidental: $BSA(m^2) = WT^{0.425}(kg) \times HT^{0.725}(cm) \times 71.84 \div 10000$

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	
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 × LVIDd ^{3} (cm)^3}/{2.4+ LVIDd (cm)}
ESV	End Systolic Volume	ESV (mL) = {7 × LVIDs ^{3} (cm)^3}/{2.4+ LVIDs (cm)}
SV	Stroke volume	SV (mL) = EDV (mL)-ESV (mL)
CO	Cardiac Output	CO (L/min) = SV (mL) × HR (bpm)/1000
EF	Ejection fraction (M-mode)	EF (No unit) = SV (mL)/ EDV (mL) ×100%
FS	Fractional Shortening	FS (No unit) = [{ LVIDd (mm)- LVIDs (mm)}/ LVIDd (mm)] ×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) x ET (ms)/1000}
BSA	Body Surface Area	Calculate by the selected formula (m^2)

Table 8-2 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)
AVSV	Aortic Valve Stroke Volume	AVSV (mL) = MAVO1 (cm)+MAVO2 (cm)* ET (s)*50+AA (cm)
QMV	Mitral valve instantaneous flow rate	QMV (mL) = 4*DEV (cm/s)*DCT (s)

Table 8-3 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) × HR (bpm)/1000
EF	Ejection fraction (M-mode)	EF (No unit) = SV (mL)/ EDV (mL) × 100%
FS	Fractional Shortening	FS (No unit) =[{LVIDd (mm)- LVIDs (mm)}/ LVIDd (mm)]x 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) × ET (ms)/1000}
BSA	Body Surface Area (m^2)	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)
AVSV	Aortic Valve Stroke Volume	AVSV (mL)=MAVO1 (cm)+MAVO2 (cm)* ET (s)*50+AA (cm)
QMV	Mitral valve instantaneous flow rate	QMV (mL)=4*DEV (cm/s)*DCT (s)

Table 8-4 Calculation Items

8.1.1. LV

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

After measuring LVIDs and LVIDd and entering Heart Rate, LVET, and Height & Weight, the system can calculate some physiological parameters, such as ESV, EDV, 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 x $LVIDd^3$ (cm^3)/{2.4 + LVIDd (cm)} ESV (mL)= 7 x $LVIDs^3$ (cm^3)/{2.4 + LVIDs (cm)}
CUBE	EDV (mL) = $LVIDd^3$ $(mm)^3$ / 1000 ESV (mL) = $LVIDs^3$ $(mm)^3$ / 1000

Table 8-5 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:

LVIDs and LVIDd

To measure LV:

In the M-cardiac measurement menu, roll the trackball to highlight **LV**, and the secondary menu will be displayed. Select TEICHHOLZ or CUBE and press **Set**. Then move the cursor to the image area and a "+" is displayed.

Move the cursor to the end systolic of left ventricle, and measure LVIDs. The method is similar to generic M-mode distance measurement. LVIDs and ESV will be displayed in Measured Results.

Move the cursor to the end diastolic of the left ventricle, and then measure LVIDd. The method is the same as the generic M-mode distance measurement method. LVIDd, EDV, SV, EF, and FS will be displayed in Measured Results.

To enter HR

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

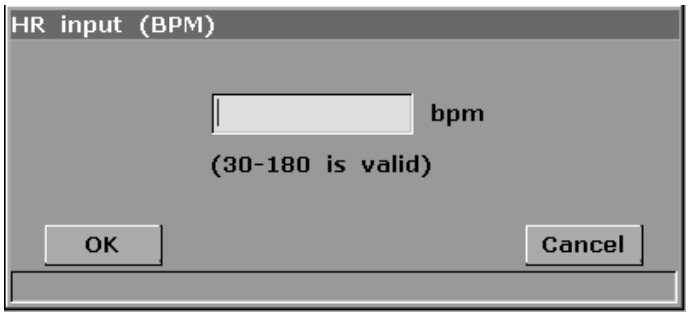


Figure 8-2 HR Input Dialog Box

Input a suitable value in the HR (bpm) box.

Roll the trackball to highlight **OK** and press **Set**, and after measuring LV, the result of CO will be displayed in Measured Results.

To enter LVET

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

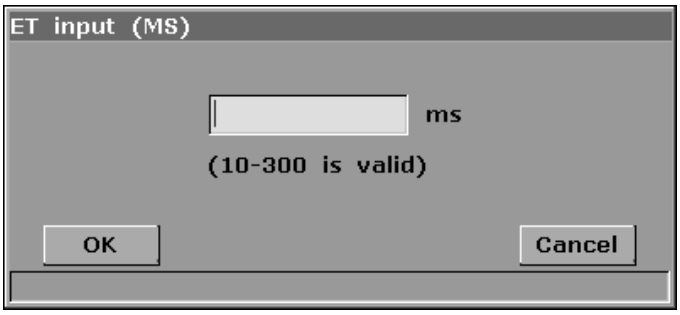


Figure 8-3 ET Input Dialog Box

1. Input a suitable value in the LVET (ms) box.
2. 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 secondary menu **Height & Weight** and press **Set** to display a **Height and Weight** entering dialog box, as shown below.

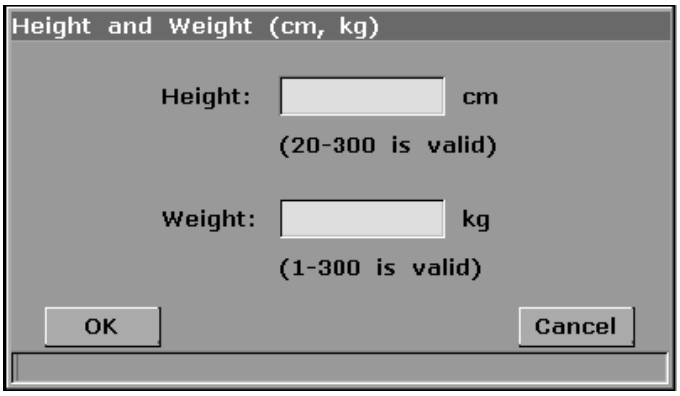


Figure 8-4 Height and Weight Input Dialog Box

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: HR, LVET and patient's Height & Weight;

Measurement: LVIDs and LVIDd

To calculate all the LV parameters:

Input or measure HR, LVET, and Height & Weight.

Measure LVIDs and LVIDd following the prompt instruction.

All the LV parameters, ESV, EDV, SV, FS, EF, CO, MVCF, SI and CI will be displayed in Measured Results.

8.1.2. Mitral Valve

Mitral Valve calculation is as below.

- Measurement items:

EF slope, ACV, A/E, DEV, and DCT

Mitral Valve measurement:

In the M-cardiac measurement menu, roll the trackball to highlight **Mitral** to display the secondary menu.

To measure EF slope, ACV, and A/E

Roll the trackball to highlight **EF Slope**, **ACV**, or **A/E**, and press **Set**.

The method of measuring **EF Slope** and **ACV** is similar to the generic M-mode slope measurement method.

To measure **A/E**, measure the breadth from apex A to point C and the breadth from apex E to point C respectively. The method is similar to the generic M-mode distance measurement method.

After the measurement the result of EF SLP, ACV and A/E will be displayed in Measured Results respectively.

To measure Valve Volume (QMV)

Calculation formula:

QMV (mL) = 4*DEV (cm/s)*DCT (s)

Measurement operation procedure:

Roll the trackball to highlight **Valve Volume**, and press **Set**.

Measure DEV. The method is similar to the generic M-mode slope measurement method.

Measure DCT. The method is similar to the generic M-mode time measurement method.

After the measurement, the result of QMV will be displayed in Measured Results.

8.1.3. Aortia

Aortia calculation is as below.

- Measurement items:

LAD/ AOD and Valve Volume

- Aortia calculation

In the M-cardiac measurement menu, roll the trackball to highlight **Aortia** to display the secondary menu.

✧ **LAD/AOD measurement**

1. Roll the trackball to highlight **LAD/AOD** and press **Set**.
2. Measure LAD and AOD respectively. The method is similar to the generic M-mode distance measurement method.
3. The result will be displayed in Measured Results.

✧ **AVSV measurement**

The calculation formula:

AVSV (mL) = MAVO1 (cm)+MAVO2 (cm)*ET (s)*50+AA (cm)

The measurement operation procedure:

1. Roll the trackball to highlight **Valve Volume** and press **Set**.
2. Measure MAVO1. The method is similar to the generic M-mode distance measurement method.
3. Measure MAVO2. The method is similar to the generic M-mode distance measurement method.
4. Measure AA. The method is similar to the generic M-mode distance measurement method.

5. Measure LVET. The method is similar to the generic M-mode time measurement method.
6. After the measurement, the result of AVSV will be displayed in Measured Results.

8.1.4. LVMW, LVMWI

LVMW and LVMWI calculations are as below.

- Measurement items:

LVPWd, IVSTd and LVIDd

- The calculation formula

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

LVMWI = LVMW (g)/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 Measured Results. System will display LVWMI if you have keyed in Height and Weight before the measurement. If you measured LV before, it will renovate the LV results.

8.2. B-mode Cardiac Measurement and Calculation

Press **Exam** select cardiology and press **Set**.

In B-mode, press **Measure**, the system will enter B-mode cardiac measurement. The B-mode cardiac measurement menus are shown as follows:

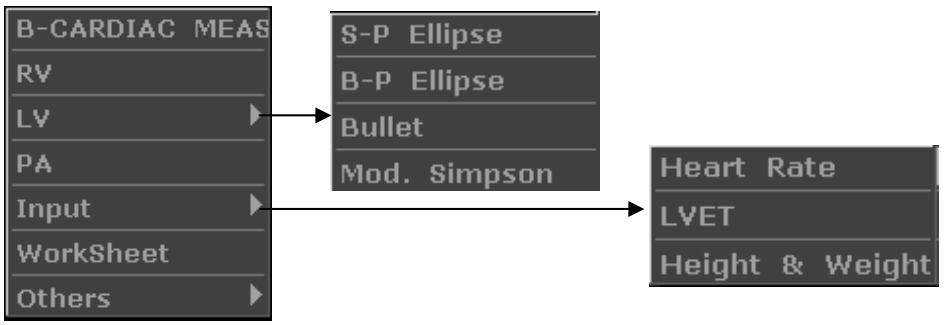


Figure 8-5 B Mode Cardiac Measurement and Calculation Menu

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 with single-plane ellipse.

The formulas of B-mode cardiac LV measurement include Single plane ellipse, Dual plane ellipse, Bullet, and Modified 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^2, cm^2, or dm^2)
LVLs	Left Ventricle Long-axle Diameter	Distance (mm)
LVALs	Left Ventricle Area of Long-axle	Ellipse Area (mm^2, cm^2, or dm^2)
HR	Heart Rate	Key in (bpm)
EDV	End Diastolic Volume	EDV (mL)= $(8/3/\pi)\times\{\text{LVALd } (mm^2)\}^2/\text{LVLd}$ (mm) /1000
ESV	End Systolic Volume	ESV (mL)= $(8/3/\pi)\times\{\text{LVALs } (mm^2)\}^2/\text{LVLs}$ (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) x 100%
SI	Stroke Index	SI (No unit)= SV (mL)/ BSA (m^2)
CI	Cardiac Index	CI (No unit)= CO (L/min)/ BSA (m^2)
BSA	Body Surface Area	Calculate by the selected formula (m^2)

Table 8-6 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^2, cm^2, or dm^2)
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^2, cm^2, or dm^2)
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)= $(8/3/\pi)\times\{LVALd\ (mm^2)\}^2/LVLd$ (mm) /1000
ESV	End Systolic Volume	ESV (mL)= $(8/3/\pi)\times\{LVALs\ (mm^2)\}^2/LVLs$ (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) x 100%
SI	Stroke Index	SI (No unit)= SV (mL)/ BSA (m^2)
CI	Cardiac Index	CI (No unit)= CO (L/min)/ BSA (m^2)
BSA	Body Surface Area	Calculate by the selected formula (m^2)

Table 8-7 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^2, cm^2, or dm^2)
LVLd	Left Ventricular Length	Distance (mm)
LVAMs	Left Ventricular Fractional Area of Mitral Valve	Ellipse Area (mm^2, cm^2, or dm^2)
LVLs	Left Ventricular Length	Distance (mm)
HR	Heart Rate	Key in (bpm)
EDV	End Diastolic Volume	EDV (mL)= (5/6)×LVLd (mm)×LVAMd (mm^2) /1000
ESV	End Systolic Volume	ESV (mL)= (5/6)×LVLs (mm)× LVAMs (mm^2) /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^2)
CI	Cardiac Index	CI (No unit)= CO (L/min)/ BSA (m^2)
BSA	Body Surface Area	Calculate by the selected formula (m^2)

Table 8-8 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 Mitral Valve	Ellipse Area (mm^2, cm^2, or dm^2)
LVLd	Left Ventricular Length	Distance (mm)
LVAPd	Left Ventricular Fractional Area of Papillary Muscles	Ellipse Area (mm^2, cm^2, or dm^2)
LVAMs	Left Ventricular Anterior Wall	
LVLs	Left Ventricular Length	Distance (mm)
LVAPs	Left Ventricular Fractional Area of Papillary Muscles	Ellipse Area (mm^2, cm^2, or dm^2)
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^2)
CI	Cardiac Index	CI (No unit)= CO (L/min)/ BSA (m^2)
BSA	Body Surface Area	Calculate by to the selected formula (m^2)

Table 8-9 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 8-10 Other Measurement and Calculation Items

8.2.1. LV

LV measurement is as below.

Single plane ellipse

- Measurement items:

  LVLs, LVALs, LVLd, and LVALd.

- 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 systolic, measure LVLs and LVALs respectively. The system calculates and displays ESV value.
3. During end diastolic, measure LVLd and LVALd respectively, the method of former one is similar to the generic B-mode distance measurement method and the second one, the generic B-mode ellipse area measurement method. The system calculates and displays EDV, SV, and EF.

Dual plane ellipse, Bullet, and Modified SIMPSON

The operations in these methods are similar to those in the single plane ellipse method. Please refer to the corresponding B-mode generic measure method for details, and you can use 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 secondary menu **Heart Rate** and press **Set** to display a **HR input** dialog box, as shown below.

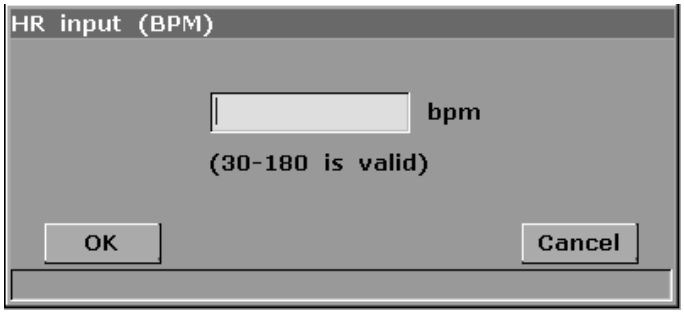


Figure 8-6 HR Input Dialog Box

  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 Measured Results.

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 secondary menu **LVET** and press **Set** to display an **ET input** dialog box, as shown below.

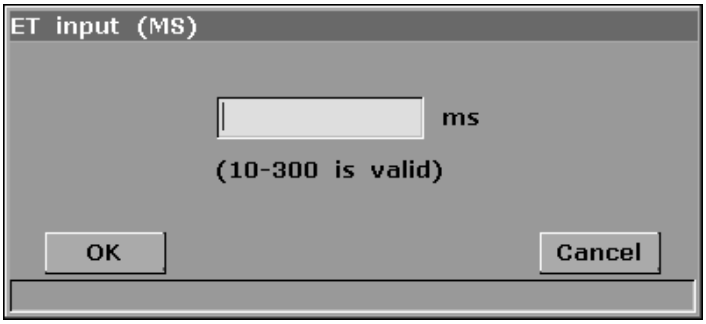


Figure 8-7 ET Input Dialog Box

  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 Measured Results.

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 secondary menu **Height & Weight** and press **Set** to display a **Height and Weight** entering dialog box, as shown below.

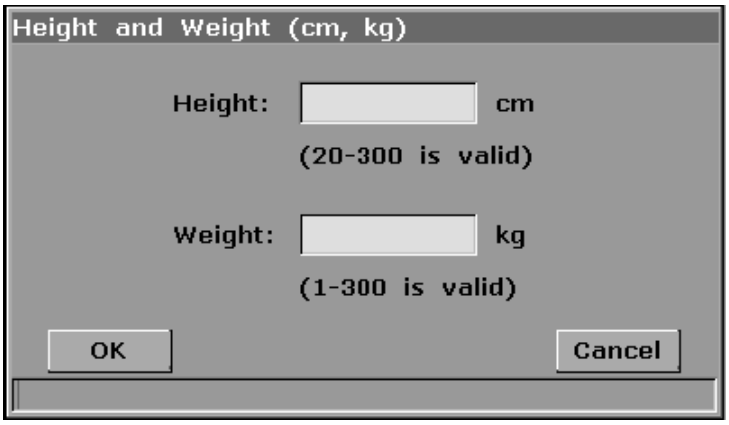


Figure 8-8 Height and Weight Input Dialog Box

  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 Measured Results. After measuring LV and HR, SI and CI will be also displayed in Measured Results.

8.2.2. RV (Right ventricle internal diameter)

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

8.2.3. PA (Aortic Pulmonary Artery)

1. In the B-cardiac measurement menu, roll the trackball to highlight **PA**, and press **Set** display a "+" in the image area.
2. Measure **PA** with distance measurement method.
3. The result will be displayed in Measured Results.

Other parameters:

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

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 can do the cardiac measurement and calculation in the B/M-mode.

8.3. Cardiac Report

After the cardiac examination, the system generates a cardiology examination and diagnosis worksheet. Roll the trackball to highlight **Worksheet**, and press **Set** display **Cardiac Worksheet** dialog box shown as below.

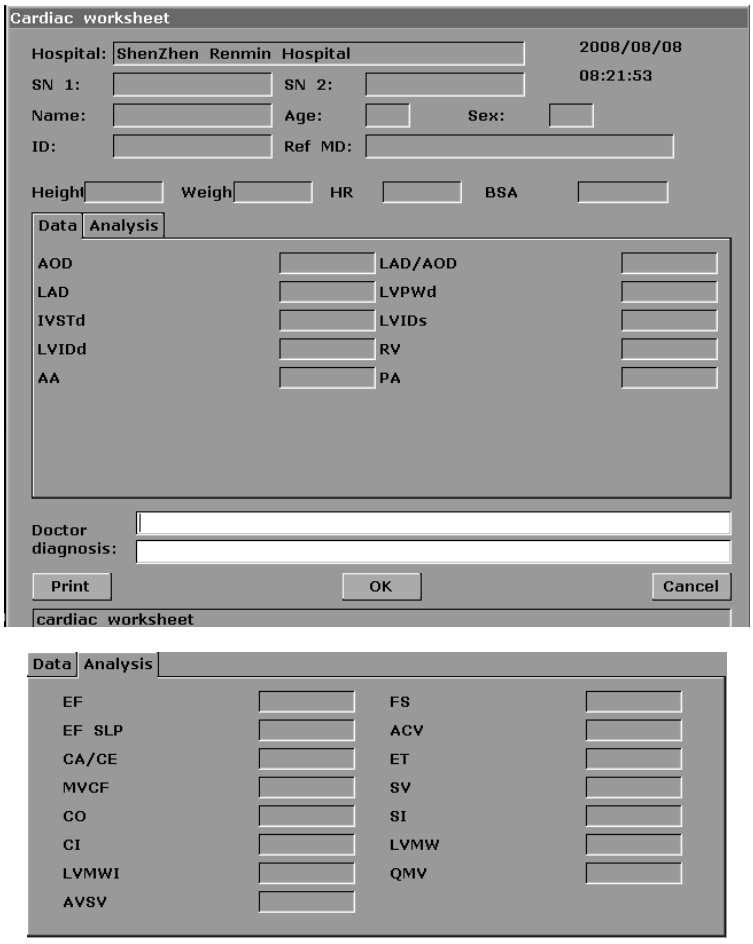


Figure 8-9 Cardiac Worksheet

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

To print the report:

Press **Print** in the Cardiac Worksheet.

Printing reference *Section 5.8, Printing.*

8.4. Others

If you want to begin other measurements, you can switch through the menu by selecting **Others**.

Chapter 9 Gynecology Measurement and Calculation

9.1. Measurement and Calculation

The gynecology examination is usually in the B-mode.

1. Press **Exam** and select **Gynecology**, and then press **Set**.
2. Press  to enter the B-mode.
3. Press **Measure** to activate the measurement function. The measurement menu will be displayed.

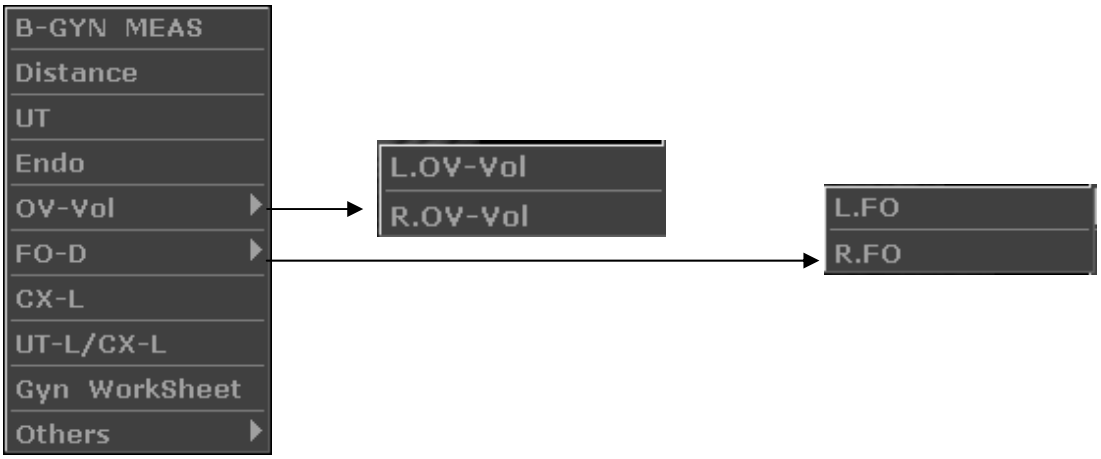


Figure 9-1 Gynecology Measurement and Calculation Menu

To determine the volume of right ovary or left ovary, take three measurements: length, width, and height. The system calculates the volume.

The gynecology measurement items of B-mode are as follows.

Label	Description	Method
UT	Uterus	UT (mm) = UT-L (mm)+UT-W (mm)+UT-H (mm)
UT-L UT-W UT-H	Uterus Length Uterus width Uterus Height	Distance (mm)
Endo	Uterus Endo- membrane Thickness	Distance (mm)
L. OV-Vol	Left Ovary Volume	L. OV-V (mL) = 0.523 x L. OV-L (mm) x L. OV-W (mm) x L. OV-H (mm)/1000
L. OV-L L. OV-W L. OV-H	Left Ovary Length Left Ovary Width Left Ovary Height	Distance (mm)
R. OV-Vol	Right Ovary Volume	R. OV-V (mL) = 0.523 x R. OV-L (mm) x R. OV-W (mm) x R. OV-H (mm)/1000

R. OV-L R. OV-W R. OV-H	Right Ovary Length Right Ovary Width Right Ovary Height	Distance (mm)
L. FO-L L. FO-W	Left Follicle Length Left Follicle Width	
R. FO-L R. FO-W	Right Follicle Length Right Follicle Width	
CX-L	Cervix Length	
UT-L/CX-L	The ratio of Uterus Length and Cervix Length	UT-L/CX-L Ratio

Table 9-1 Gynecology Measurement and Calculation Items

9.1.1. UT

To measure UT:

1. In the gynecology menu, roll the trackball to highlight **UT** and press **Set**.
2. Measure the three data, UT-L, UT-W and UT-H, in the method of distance measurement.
3. After the three data are measured, the result of UT will be displayed in Measured Results. You can measure a maximum of one group of data.

9.1.2. Endo

To measure endometrium:

1. In the gynecology menu, roll the trackball to highlight **Endo** and press **Set**.
2. Measure Endo, in the method of distance measurement.
3. The result of Endo will be displayed in Measured Results. You can measure a maximum of one group of data.

9.1.3. OV-V

The measurement of OV-Vol includes L.OV-Vol and R.OV-Vol.

To measure L.OV-Vol:

In the gynecology menu, roll the trackball to highlight **OV-Vol**, and then highlight the secondary menu **L.OV-Vol**, press **Set**.

Measure the three data, L.OV-L, L.OV-W and L.OV-H, in the method of distance measurement.

After the three data are measured, the result of L.OV-Vol will be displayed in Measured Results.

To measure R.OV-Vol:

The method is similar to the L.OV-Vol measurement method.

9.1.4. FO

The measurement of FO includes L. FO and R. FO.

To measure L. FO:

1. In the gynecology menu, roll the trackball to highlight **FO**, and then highlight the secondary menu **L. FO**, press **Set**.
2. Measure the two data, L. FO-L and L. FO-W, in the method of distance measurement.
3. After the two data are measured, the result of **L. FO** will be displayed in Measured Results.

To measure R. FO:

The method is similar to the L. FO measurement method.

9.1.5. CX-L

To measure CX-L:

1. In the gynecology menu, roll the trackball to **CX-L**, and press **Set**.
2. Measure **CX-L** with distance method.
3. The result will be displayed in Measured Results, if you have already measured UT-L, the UT-L/CX-L will also be displayed.

9.1.6. UT-L/CX-L

To measure UT-L/CX-L:

1. In the gynecology menu, roll the trackball to highlight **UT-L/CX-L**, and press **Set**.
2. UT-L/CX-L measurement includes two data: UT-L and CX-L, in the method of distance measurement.
3. The result will be displayed in Measured Results.

NOTE:

During measurement, if you have already measured any one of the items, UT-L or CX-L, when you finished the other one, the UT-L/CX-L will be displayed automatically.

9.2. Gynecologic Report

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

Roll the trackball to highlight **Worksheet**, and press **Set** display **Gynecologic Worksheet** dialog box. Gynecologic worksheet has three tabs, uterus, ovary, and follicle, as shown in figure 9-2.

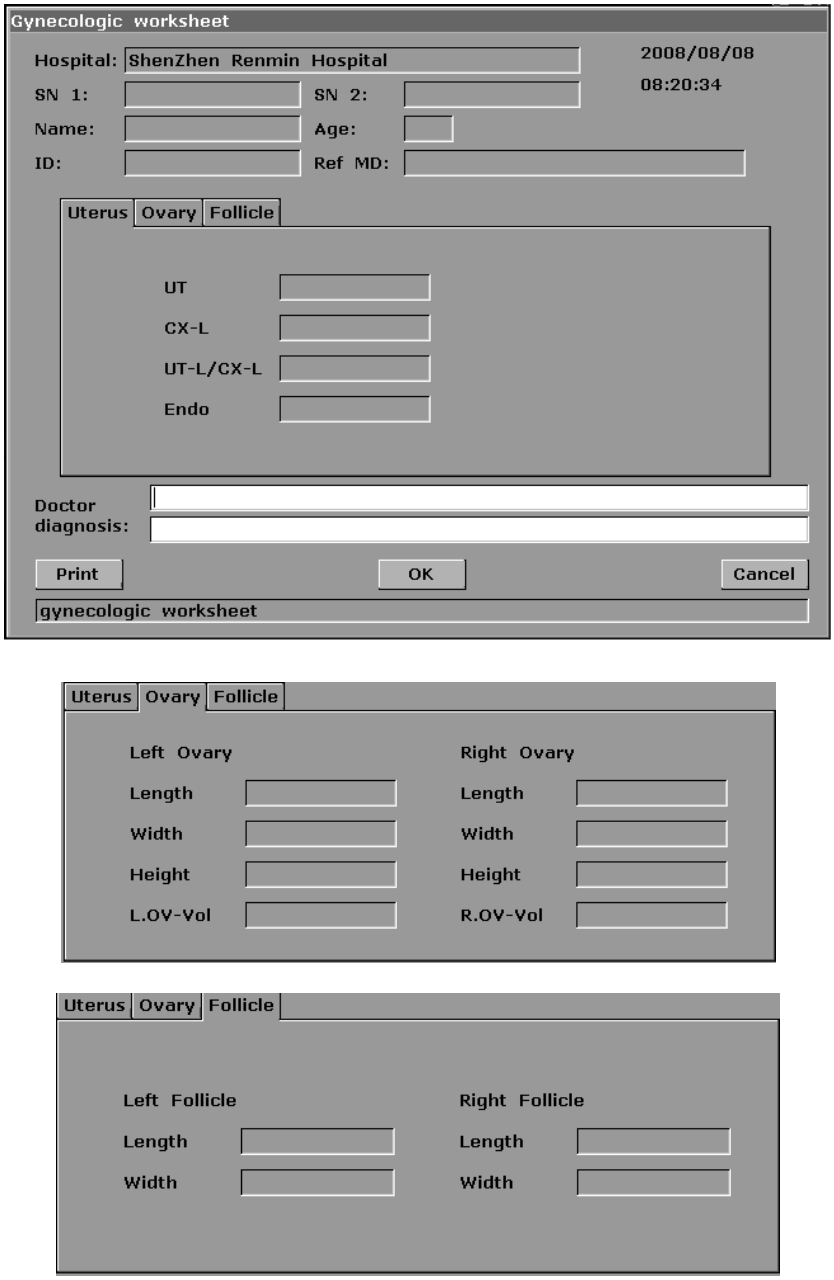


Figure 9-2 Gynecology Worksheet

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

To print the report:

Press **Print** in the Gynecology Worksheet.

Printing reference *Section 5.8, Printing.*

9.3. Others

If you want to begin other measurements, you can switch through the menu by selecting **Others**.

Chapter 10 Small Parts Measurement and Calculation

The abbreviations used in this manual are as shown below:

THY: Thyroid gland

THY-V: Thyroid gland Volume

10.1. Measurement and Calculation

The small parts examination is usually in the B-mode.

1. Press **Exam** and select **Small Parts**, and then press **Set**.
2. Press  to enter the B-mode.
3. Press **Measure** to activate the measurement function. The measurement menu will be displayed in Measured Results. The default measurement is distance measurement.

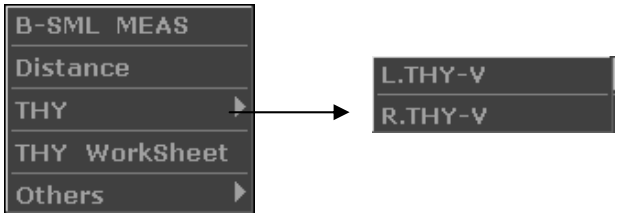


Figure 10-1 Small Parts Measurement and Calculation Menu

To determine the right thyroid gland volume or left thyroid gland volume, take three measurements: length, width, and height. The system calculates the volume.

The measurement items of small parts of B-mode are as follows.

Label	Description	Method
THY	Thyroid Gland	/
L. THY-V	Left Thyroid Gland Volume	L. THY-V (mm^3) = 0.497 × L. THY-L (mm) × L. THY-W (mm) × L. THY-H (mm)
L. THY-L L. THY-W L. THY-H	Left Thyroid Gland Length Left Thyroid Gland Width Left Thyroid Gland Height	Distance (mm)
R. THY-V	Right Thyroid Gland Volume	R. THY-V (mm^3) = 0.497 x R. THY-L (mm) × R. THY-W (mm) × R. THY-H (mm)
R. THY-L R. THY-W R. THY-H	Right Thyroid Gland Length Right Thyroid Gland Width Right Thyroid Gland Height	Distance (mm)

Table 10-1 Small Parts Measurement and Calculation Items

The measurements of THY include L.THY-V and R.THY-V.

To measure L.THY-V:

1. In the small parts menu, roll the trackball to highlight **THY-V**, and then highlight the

secondary menu **L.THY-V**, press **Set**.

2. Measure the threes data: L.THY-L, L.THY-W and L.THY-H, in the method of distance measurement.
3. After the three data are measured, the result of L.THY-V will be displayed in Measured Results.

To measure R. THY-V:

The method is similar to the L.THY-V measurement method.

10.2. Small Parts Report

After the small parts examination, the system generates a THY worksheet.

Roll the trackball to highlight **THY Worksheet**, and press **Set** display **Small Parts Worksheet** dialog box, as shown below:

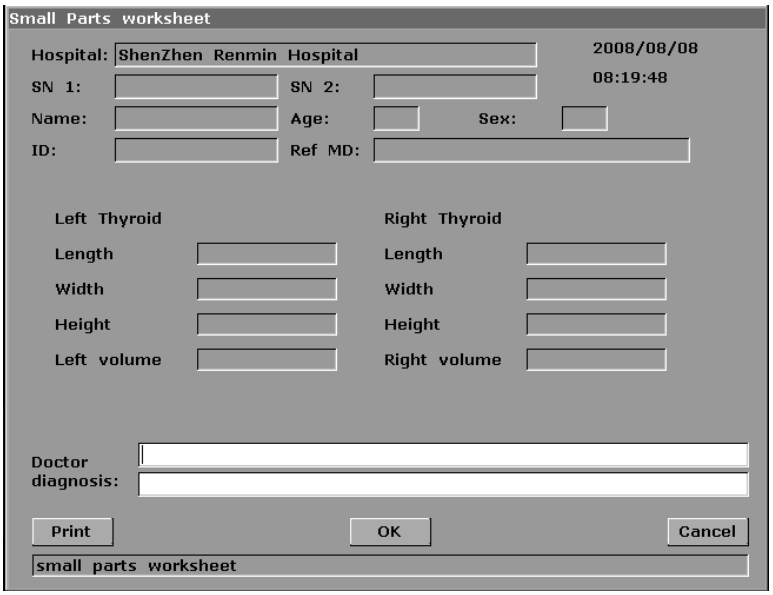


Figure 10-2 Small Parts Worksheet

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

To print the report:

Press **Print** in the Small Parts Worksheet.

Printing reference Section *5.8, Printing.*

10.3. Others

If you want to begin other measurements, you can switch through the menu by selecting **Others**.

Chapter 11 Urology Measurement and Calculation

The abbreviations used in this manual are as shown below:

RUV: Residual urine volume

PV: prostate volume

11.1. Measurement and Calculation

The urology examination is usually in the B-mode.

1. Press **Exam** and select **Urology**, and then press **Set**.
2. Press  to enter the B-mode.
3. Press **Measure** to activate the measurement function. The measurement menu will be displayed.

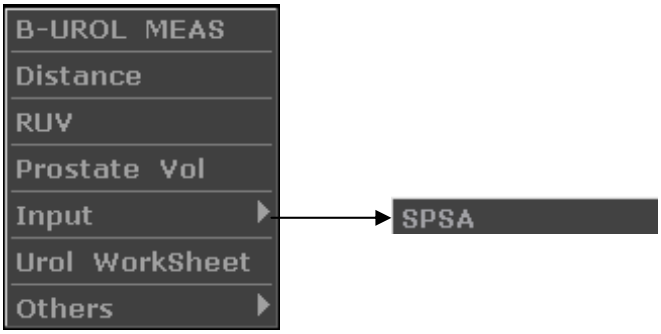


Figure 11-1 Urology Measurement and Calculation Menu

Label	Description	Method
RUV	Residual Urine Volume (mL or L)	RUV (mL) = 0.7x RUV-L (mm) × RUV-W (mm) × RUV-H (mm) /1000
RUV-L RUV-W RUV-H	Residual Urine Length Residual Urine Width Residual Urine Height	Distance (mm)
PV	Prostate Volume (mm^3, cm^3, or dm^3)	PV (mm^3) = 0.52 x PV-L (mm) × PV-W (mm) × PV-H (mm) /1000
PV-L PV-W PV-H	Prostate Length Prostate Width Prostate Height	Distance (mm)
PPSA	Predicted Prostate Specific Antigen Density	PPSA (ng/mL) = 0.12 × PV
SPSA	Serum of Prostate Specific Antigen	Key in SPSA (ng)
PSAD	Prostate Specific Antigen Density	PSAD (ng/mL) = SPSA (ng)/ PV (mL), (0.01ng ≤SPSA≤100ng)

Table 11-1 Urology Measurement and Calculation Items

To determine the residual urine volume or prostate volume, take three measurements: length, width, and height. The system calculates the volume.

To measure RUV:

1. In the urology menu, roll the trackball to highlight **RUV**, and then press **Set**.
2. Measure the threes data: RUV-L, RUV-W and RUV-H, in the method of distance measurement.
3. After the three data are measured, the result of RUV will be displayed in Measured Results.

To measure PV:

The method is similar to the RUV measurement method.

To measure PSAD:

Measure PV and input SPSA. The SPSA input dialog box is as shown below. Input the SPSA with the keyboard.

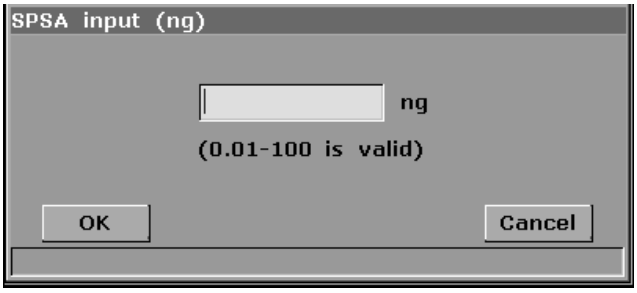


Figure 11-2 SPSA Input Dialog Box

11.2. Urologic Report

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

Roll the trackball to highlight **Urol Worksheet**, and press **Set** display **Urologic Worksheet** dialog box, as shown below:

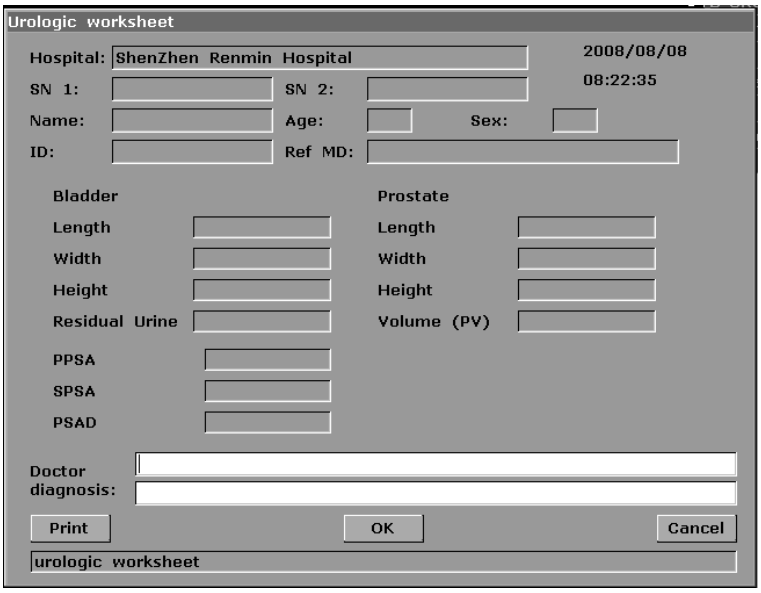


Figure 11-3 Urology Worksheet

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

To print the report:

Press **Print** in the Urology Worksheet.

Printing reference Section *5.8, Printing.*

11.3. Others

If you want to begin other measurements, you can switch through the menu by selecting **Others**.

Chapter 12 Orthopedics Measurement & Calculation

The orthopedics measurement includes distance and HIP.

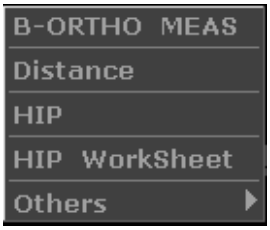


Figure 12-1 Orthopedics Measurement and Calculation Menu

12.1. Measurement and Calculation

The abbreviations used in this manual are as shown in table 12-1.

Label	Description	Method
HIP	The Angle of Hipbone (/)	HIP
α	The Angle of BL and ARL (°)	
β	The Angle of BL and IL (°)	

Table 12-1 Orthopedics Measurement and Calculation Items

12.2. Orthopedics Report

After the orthopedics examination, the system generates a HIP worksheet.

Roll the trackball to highlight **HIP Worksheet**, and press **Set** to display **HIP Worksheet** dialog box, as shown below:

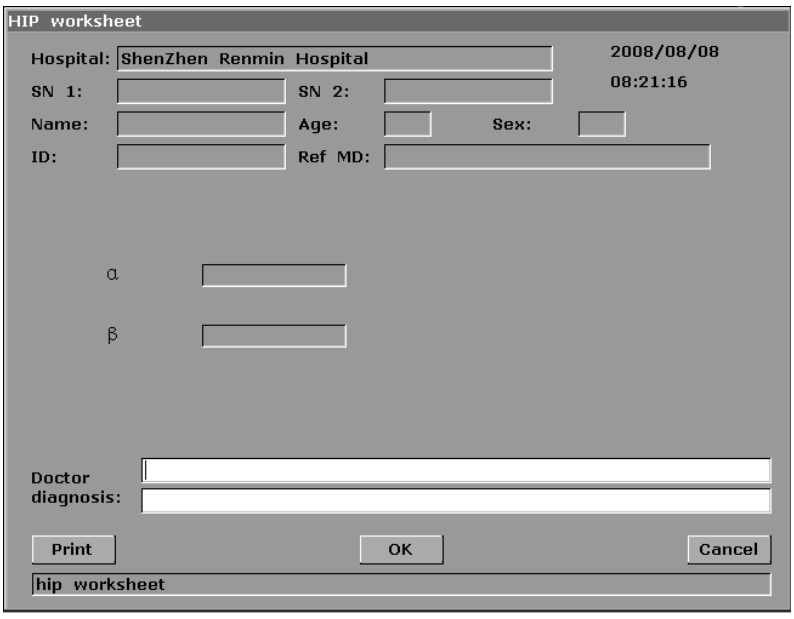


Figure 12-2 HIP Worksheet

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

To print the report:

Press **Print** in the HIP Worksheet.


Printing reference Section *5.8, Printing.*

12.3. Others

If you want to begin other measurements, you can switch through the menu by selecting **Others**.

Chapter 13 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.

13.1. Daily Checklist

Check before the system is switched on:

- Visually inspect all the transducers. DO NOT use any damaged transducer.
- Visually inspect all the transducer 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. There isn't any error message.
- Verify that the transducer identification and indicated frequency on the screen are correct for the to activated transducer.
- 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 you hand.
- Verify that the buttons and knobs on the keyboard are good to operate.

13.2. Cleaning and Disinfection

All exterior parts of the device, including the control panel, probes, and puncture needle, should be cleaned and/or disinfected as necessary or between uses with a recommended cleaner or

disinfectant. Clean each part to remove any surface particles. Disinfect the parts to kill vegetative organisms and viruses.

You must take all necessary precautions to eliminate the possibility of exposing patients, operators or third parties to hazardous or infectious materials. Use universal precautions during cleaning and disinfection. You should treat all parts of the device that come in contract with human blood or other body fluids as they were known to be infectious.

After use, clean the outer shell of the device with soft and dry cloth gently. Medical cotton ball immerged with a 75% medical alcohol solution should be used to wipe probes gently and thoroughly.

The cleaning of internal components of the device should be performed by authorized and qualified personnel.

WARNING

1. To avoid electrical shock and damage to the system, always shut down and disconnect the device from the AC power source before cleaning and disinfection.
2. To avoid infection, always use protective gloves when performing cleaning and disinfecting procedures.
3. To avoid infection, ensure that the solution expiration date has not passed.

CAUTION

1. Be careful when cleaning the display screen. Since the display screen is easily scratched or damaged, we should wipe it with a soft and dry cloth.
2. To avoid the possibility of electrostatic shock and damage to the system, avoid the use of aerosol spray cleaners on the monitor.
3. DO NOT clean the internal base of the device.
4. DO NOT clean the system with chlorinated or aromatic solvents, acidic or basic solutions, isopropyl alcohol or strong detergents such as ammoniated products as they may damage the surface of the system.
5. DO NOT use spray detergents on the system or it may force cleaning fluid into the system and damage electronic parts. Solvent fumes build up and form flammable gases or damage internal parts.
6. DO NOT pour any fluid onto the system surface, as fluid seepage into the electrical circuitry may cause excessive leakage current or system failure.
7. DO NOT leave residual detergent on the surface of the device.

13.2.1. System Surface Cleaning

To clean the system surface:

1. Power off the system and disconnect it from power supply.
2. Use a clean gauze pad or lint-free cloth, moistened lightly with a mild detergent, to wipe the surface.
3. After cleaning, reconnect the system to power source.

CAUTION

Make sure the cleaning solution does not seep into the control panel or any other openings.

NOTE:

Take particular care when cleaning the areas near track ball and the slide controls. Make sure they are free of gel and any other visible residue.

13.2.2. Probe and Probe Holder Cleaning and Disinfection

To clean probe holder:

1. Turn the probe holder upwards and then lift the holder out of the system enclosure.
2. Wash the holder with flowing water, using a mild detergent.
3. After cleaning and drying, turn the holder downwards to lock it.

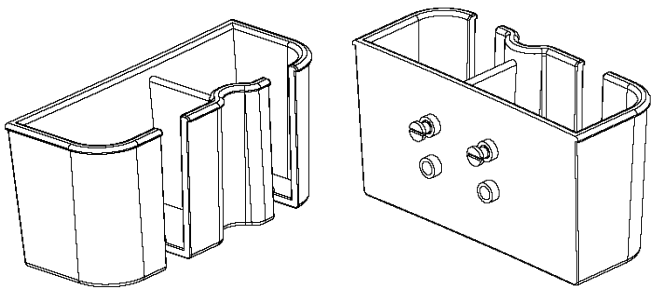


Figure 13-1 Probe Holder

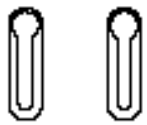


Figure 13-2 Probe Holder Pothook

Probe cleaning and/or disinfection:

◆ C363-1, L743, C321, and C343-1:

Every time before using it, layer of medical ultrasound coupling gel should be applied evenly on the area of the acoustical window of the probe, and the instrument is ready for operation. Be careful not to generate any air bubble. Disinfection should be performed each time after

use.

1) Wipe off the residual coupling gel gently.

2) Use a medical cotton ball immerged with 75% medical alcohol to wipe the probe gently and thoroughly.

3) Wipe the probe with a soft cloth soaked with distilled water.

◆ E743 and E613:

The single-use sheath should be used on E743 and E613 probe.

CAUTION

We recommend that the single-use sheath should be CE marked or FDA 510(k) cleared.

Every time before using it, layer of medical ultrasound coupling gel should be applied evenly on the area of the acoustical window of the probe. Then put on a single-use sheath, and the instrument is ready for operation. Be careful not to generate any air bubble. Disinfection should be performed each time after use.

1) Remove the sheath gently, and discard it.

2) Wipe off the residual coupling gel gently.

3) Use a medical cotton ball immerged with 75% medical alcohol to wipe the probe gently and thoroughly.

4) Wipe the probe with a soft cloth soaked and distilled water.

Prohibition

The use of diluent paint, vinyl oxide or other organic solvents is prohibited. These solvents will damage the protective film of the probe surface.

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.

Prohibit infiltration of any type of liquid into the device or the probe.

WARNING

1. Do not sterilize the transducer using techniques such as autoclave, ultraviolet, gamma radiation, gas, steam, or heat. Otherwise, severe damage will result.
2. The coupling gel adapted to the probe is a medial ultrasound coupling gel.

WARNING

3. DO NOT immerse the power cord and connector of the probe 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 disinfectants. The following figure defines how much of the transducer can be submerged.

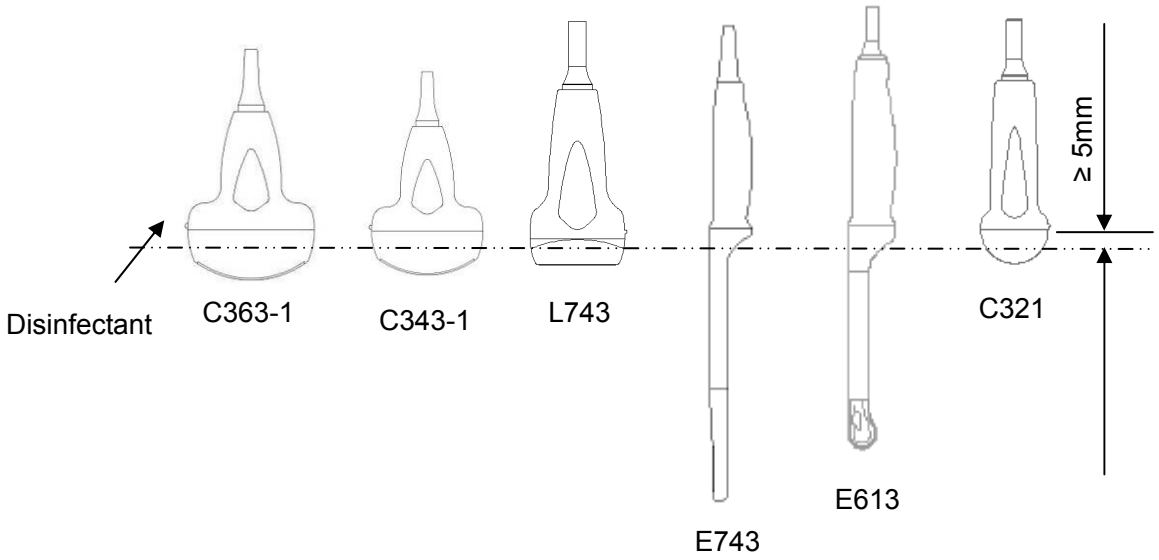


Figure 13-3 Depth of the Probe Immerged into Disinfectant

Proper Use of Probes

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

Inspect power cord, socket and acoustical window of the probe periodically.

Shut down the machine before connecting or disconnecting the probe.

DO NOT drop the probe onto the floor or collide with hard objects. Otherwise it will be damaged easily.

When the probe is not used, put it in the probe holder.

Heating the probe is strictly forbidden.

Pulling or bending the power cord of the probe is strictly forbidden; otherwise internal connecting lines of the power cord may rupture.

Coupling gel can only be used on the head of the probe, and it should be wiped off after use.

Each time after use, clean and disinfect the probe.

The acoustical window and the shell of the probe should be examined frequently.

WARNING

The DUS 6 cannot be used together with high-frequency surgical equipment.

CAUTION

1. DO NOT disinfect or clean probes under high temperature, and the temperature should be below 45 °C.
2. In order to avoid damaging the device, the disinfection method is limited to regular maintenance of devices in hospitals. Disinfecting instruments should be cleaned first.

13.2.3. Needle Guide Cleaning and Disinfecting

NOTE:

1. Use proper disinfection techniques at all times to perform a biopsy.
2. Disinfect the needle guide before the first use and after each subsequent use.

Cleaning

You should preclean a Needle Guide before disinfecting.

To clean a Needle Guide, use a brush or cloth that has been damped with soap and water or with a specialized soap and precleaner.

Disinfecting

Always disinfect the Needle Guide after use.

13.2.4. Trackball Cleaning

To clean the trackball:

1. Remove the front panel bezel.
2. Remove the trackball as shown in figure 13-4.
3. Clean trackball with a tissue and isopropyl alcohol.
4. Clean the inside of the trackball assembly with a cotton swab and isopropyl alcohol.
5. Assemble the trackball and front panel bezel till the assembly parts completely dry.

Figure 13-4 Assembling and Disassembling Trackball

CAUTION

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

NOTE:

Be sure to clean the X and Y encoders and the idler wheel.

13.2.5. Disinfectants

Probe: 75% medical alcohol, Cidex (2.4%), Cidex OPA (0.55%).

Needle guide: 75% medical alcohol, Cidex (2.4%).

WARNING

Be sage to choose the cleaners and disinfectants. The concentration in the air must not exceed an applicable specified limit. Comply with the manufacturer's instructions when using the cleaners and disinfectants.

13.3. Maintenance

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: Limit: 0 ~ 0.1 Ω.
- Test the earth leakage current according to IEC/EN 60601-1: Limit: NC 500 μA ~ SFC 1000 μA.
- Test the patient leakage current according to IEC/EN 60601-1: Limit: NC 100 μA ~SFC 500 μA.

- Test the Covers leakage current according to IEC/EN 60601-1: Limit: NC100 μA ~ SFC 500 μA.
- 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 person of EDAN.

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 (by the professional personnel of EDAN).
- Troubleshooting (see table 14-1)

Item	Problem	Solution
1	When the power switch is on, there isn't any image displayed.	1. Check power supply. 2. Check wires and plugs. 3. Check whether the cartridge fuse is melted. 4. Check the brightness control knob.
2	Strip-shape or snowflake-shape disturbance occurs on the display screen.	1. Inspect the power supply. 2. Check whether it is disturbed by the ignition action of any other device. 3. Check the disturbance of electric or magnetic field in the surrounding environment. 4. Check whether the plug and socket of power supply and probe are properly connected.
3	Image is not displayed clearly on the screen.	1. Adjust overall gain (Gain). 2. Adjust eight TGC slide controls. 3. Adjust the brightness and contrast potentiometer. 4. Adjust focus (the number and the position). 5. Clean the light filter of the display screen.
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 contrast knobs.

Table 14-1 Troubleshooting Examples

Chapter 15 Warranty and Service Policy

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 period begins on the date the products are shipped to distributors.

The warranty is void in cases of:

- Damage caused by handling during shipping.
- Subsequent damage caused by improper use or maintenance.
- Damage caused by alteration or repair by anyone not authorized by EDAN.
- Damage caused by accidents.
- 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. Service Policy

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.

If the product fails to function properly — or if you need assistance, service, or spare parts — contact EDAN's service center. A representative will assist you in troubleshooting the problem and will make every effort to solve it over the phone or Email, avoiding potential unnecessary returns.

In case a return can not be avoided, the representative will record all necessary information and will provide a Return Material Authorization (RMA) form that includes the appropriate return address and instructions. An RMA form must be obtained prior to any return.

Freight policy:

Under warranty: the service claimer is responsible for freight & insurance charges when a retrun is shipped to EDAN for service including custom charges. EDAN is responsible for freight, insurance & custom charges from EDAN to service claimer.

Out of warranty: the service claimer is responsible for any freight, insurance & custom charges for product.

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.

Appendix I: Specifications

A1.1: Electrical Safety Classifications

According to the type of protection against electric shock	Equipment without internal power source, Class I equipment
According to the degree of protection against electric shock	Type B
According to the degree of protection against harmful ingress of liquid	Whole device: IPX0 (general device); Probes: IPX7, waterproof.
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	Group I, Class A

A1.2: Standards Compliance

Standard	**Description**
IEC 60601-1:2005+A1+A2 EN 60601-1:2006+A1+A2	Medical electrical equipment; Part 1: General requirements for safety
IEC/EN 60601-1-2:2001+A1	Medical electrical equipment-Part 1-2: General requirements for safety-Collateral standard: Electromagnetic compatibility -Requirements and tests
IEC/EN 60601-1-4	Medical electrical equipment - Part 1-4: General requirements for safety - Collateral standard: Programmable electrical medical systems
IEC/EN 60601-2-37	Medical electrical equipment-Part 2-37: Particular requirements for the safety of ultrasonic medical diagnostic and monitoring equipment
IEC/EN 61157	Requirements for the declaration of the acoustic output of medical diagnostic ultrasonic equipment

A1.3: Power Supply

Operating Voltage	100 V-240 V~
Operating Frequency	50 Hz/60 Hz
Input Power	110 VA

A1.4: Machine Specifications

Main unit dimensions	353 mm (W) × 315 mm (L) × 253 mm (H)
Packaging dimensions	500 mm (W) × 460 mm (L) × 465 mm (H)
Net weight	11.5 kg

A1.5: General Technical Specifications

Monitor	10-inch non-interlaced progressive scanning black and white monitor
Resolution	800×575 pixels
Display Modes	B, B+B, 4B, B+M, and M
Image Gray Scale	256 levels
Image Magnification	In area Real time: 100%、144%、196%、256%、400%、576%、900%、1600% Frozen (only available in B mode): 100%、178%、400%、1600%
Storage	56 MB
Depth Shift	B, B+B, 4B, B+M, M-modes in real time, in increments of 10 mm
Frame Correlation Coefficient	8 levels to adjust (0~7), (B, B+B, 4B, B+M-modes, ineffective when freezing)
Image Conversion	Up/Down flip, Left/Right flip, 90°Rotate
Language Conversion	Chinese, English, French, German, Spanish, Italian, Polish, Russian, Romanian, etc. (The language options varies with language software installed.)
Focus position	16 levels to adjust
Focus number	Max. 4
Software packages	Abdomen, obstetric, small parts, gynecology, orthopedics, cardiology, and urology
B-mode Measurement	Distance, circumference, area, volume, ratio, % stenosis, histogram and angle
M-mode Measurement	Distance, time, slope, heart rate (2 cycles)
Body Mark	130 types
USB port	USB 1.1

A1.6: Probe Specifications

Supported probe type: convex, linear, micro-convex, endocavity (transvaginal, endorectal).

This device can detect the probe automatically.

The applications of the probes:

C363-1	Abdomen, Gynecology, Fetal / Obstetrics, and Pediatrics
C343-1	Abdomen, Gynecology, Fetal / Obstetrics, and Pediatrics
C321	Abdomen, Gynecology, Fetal / Obstetrics, Pediatrics and Cardiology
E613	(Transvaginal): Gynecology, Fetal / Obstetrics, and Urology
E743	(Transrectal): Rectum and the surrounding viscera, uterus, ovary and prostate
L743	Small parts (galactophore, thyroid gland, prostate), Neonatal Cephalic, Peripheral Vascular, Musculo-skeletal (both Conventional and Superficial)

The probe specifications are as follows.

Probe	R60	L40	R20	R10	R40
	C363-1	L743, E743	C321	E613	C343-1
Central frequency	3.5 MHz	7.5 MHz	3.5 MHz	6.5 MHz	3.5 MHz
Frequencies	(2.0 MHz/ 3.0 MHz/ 4.0 MHz/ 5.0 MHz/ 6.0 MHz)	(6.0 MHz/ 7.0 MHz/ 8.0 MHz/ 9.0 MHz/ 10.0 MHz)	(2.0 MHz/ 3.0 MHz/ 4.0 MHz/ 5.0 MHz/ 6.0 MHz)	(4.5 MHz/ 5.5 MHz/ 6.5 MHz/ 7.5 MHz/ 8.5 MHz)	(2.0 MHz/ 3.0 MHz/ 4.0 MHz/ 5.0 MHz/ 6.0 MHz)
Length of probe cable	2 m				

A1.7: Operating, Storage and Transportation Environment

A1.7.1. Operating Environment:

Temperature	+5 °C ~ +40 °C
Relative humidity range	25% RH ~ 80% RH
Atmospheric pressure range	860 hPa ~ 1060 hPa
Maximum altitude	2 km
Note: Don't power on the machine immediately after it's moved to another place where the temperature is lower than 5℃ or higher than 40℃. Wait about one hour every 5℃ increased or decreased.	

A1.7.2. Storage and Transportation Environment:

Temperature	-40 °C ~ +55 °C
Relative humidity range	25% RH ~ 93% RH
Atmospheric pressure range	700 hPa ~ 1060 hPa
Maximum altitude	3 km

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). You can control the ultrasonic power or patient exposure to ultrasound in any of the following three ways:

- Adjust the pulse strength (amplitude)
- Adjust the duration of the pulse (pulse duration)
- Adjust the pulse rate (pulse repetition frequency or PRF)

To change these settings for your system, use the following controls:

Amplitude

The power setting directly influences the amplitude of the pulse burst. A higher setting increases the amplitude, resulting in a higher ultrasound output at the transducer.

Sample Volume

The Sample volume is the axial length of the area from which the Doppler signals are obtained. The larger the sample volume, the longer the duration of the pulse burst, and consequently the higher the ultrasound output and power.

Spectrum Velocity Scale

The higher the scale setting, the higher the pulse repetition frequency (number of pulses per

second), and consequently higher ultrasound output. More pulses per second are equivalent to a higher power output.

Proper use of these instrument settings can minimize patient exposure, and optimize the results and efficiency of the equipment.

Always apply the ALARA principle; use power levels that are: As Low As Reasonably Achievable.

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 as changing probes.
Imaging mode	There are different parameters applied in B mode and M mode, so acoustic output will be changed as changing between B mode and M mode. Generally, the acoustic output of M mode is lower than the B mode.
Field of view (scan angle or scan width)	Frame rate may be changed as changing the scan angle of the scan width, and the acoustic output will be changed.
Image depth	Pulse repeated frequency will be changed as changing the image depth, and the acoustic output will be changed.
Focus number	Frame rate and focus position will be changed as changing the focus number, and acoustic output will be changed.
Focus position	Acoustic output will be changed as changing the focus position even the beam power level and the beam aperture have not been changed. Generally, the acoustic output will be higher as getting nearer to probe.
Freeze	When freezing the system, it will stop transmitting ultrasonic wave.
Transmission power	The output of probe will be changed as changing the transmission power, and acoustic output will be changed.
Multi-frequency	The character of the wave focus will be changed as changing the frequency, and acoustic output will be changed.
Line density	The acoustic output will be changed as changing the number of the scanning line (line density).
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 set when restarting, or powering on/off the system, and acoustic output will be changed.

A2.3: Probe Acoustic Output Parameters List

A2.3.1: Test of Probe C363-1

Test Item	B (4 MHz)	B+M (4 MHz)
p-, MPa	1.455	1.455
$I_{spta,}$ mW/cm^2	24.2641	27.1613
MI	0.2957	0.2957
System settings	Control1	Control2
$Z_{p,}$ mm	30.08	30.08
$W_{pb6,}$ (∥), mm (⊥), mm	7.019 3.0	7.019 3.0
prr, kHz	4.687	2.736
srr, Hz	67	39
Output beam Dimensions, cm^2	3.168	3.168
$f_{awf,}$ MHz	3.342	4.0
APF, %	88.9	88.9
AIF, %	88.9	88.9
Maximum power, mW	53.59	35.11
$I_{ob,}$ mW/cm^2	16.916	11.08
Power-up mode	B mode	B mode
Initialization mode	B mode	B mode
Acoustic output freeze	Yes	Yes
Z_{tt} (mm)	--	--
Z_{ts} (mm)	contact	
Inclusive modes	--	--

NOTE:

APF: Acoustic power-up fraction, AIF: Acoustic initialization fraction;

Control1: AP=15; Depth=90 mm; single focus=90 mm; Angle=30°;

Control2: AP=15; Depth=80 mm; single focus=70 mm.

A2.3.2: Test of Probe L743/E743

Test Item	B (6 MHz)	B+M (6 MHz)
p-, MPa	2.036	2.036
$I_{spta,}$ mW/cm^2	25.9419	29.0394
MI	2.036	2.036
System settings	Control1	Control2a
$Z_{p,}$ mm	15.18	15.18
$W_{pb6,}$ (∥), mm (⊥), mm	1.791 2.097	1.791 2.097
prr, kHz	4.686	2.736
srr, Hz	67	39
Output beam Dimensions, cm^2	0.8064	0.8064
$f_{awf,}$ MHz	5.8216	5.8216
APF, %	96.9	96.9
AIF, %	96.9	96.9
Maximum power, mW	10.1	6.3474
$I_{ob,}$ mW/cm^2	12.52	7.87
Power-up mode	B mode	B mode
Initialization mode	B mode	B mode
Acoustic output freeze	Yes	Yes
Z_{tt} (mm)	--	--
Z_{ts} (mm)	contact	contact
Inclusive modes	--	--

NOTE:

APF: Acoustic power-up fraction, AIF: Acoustic initialization fraction;

Control1: AP=15; Depth=70 mm; single focus=80 mm;

Control2: AP=15; Depth=70 mm; single focus=80 mm.

A2.3.3: Test of Probe C321

Test Item	B (4.0 MHz)	B+M (4.0 MHz)
p-, MPa	1.316	1.316
$I_{spta,}$ mW/cm^2	18.3424	21.8548
MI	0.463	0.463
System settings	Control1	Control2
$Z_{p,}$ mm	23.42	23.42
$W_{pb6,}$ (∥), mm (⊥), mm	2.64 4.604	2.64 4.604
prr, kHz	7.535	2.736
srr, Hz	47	29
Output beam Dimensions, cm^2	1.92	1.92
$f_{awf,}$ MHz	3.569	4.0
APF, %	61.1	61.1
AIF, %	61.1	61.1
Maximum power, mW	23.51	9.1901
$I_{ob,}$ mW/cm^2	12.24	4.79
Power-up mode	B mode	B mode
Initialization mode	B mode	B mode
Acoustic output freeze	Yes	Yes
Z_{tt} (mm)	--	--
Z_{ts} (mm)	contact	contact
Inclusive modes	--	--

NOTE:

APF: Acoustic power-up fraction, AIF: Acoustic initialization fraction;

Control1: AP=15; Depth=40 mm; single focus=30 mm; Angle=46°;

Control2: AP=15; Depth=40 mm; single focus=30 mm.

A2.3.4: Test of Probe E613

Test Item	B (6.5 MHz)	B+M (6.5 MHz)
p-, MPa	2.136	2.136
$I_{spta,}$ mW/cm^2	9.027	9.6369
MI	0.4285	0.4285
System settings	Control1	Control2
$Z_{p,}$ mm	15.9971	15.9971
$W_{pb6,}$ (∥), mm (⊥), mm	1.993 1.714	1.993 1.714
prr, kHz	4.686	2.736
srr, Hz	74	43
Output beam Dimensions, cm^2	0.896	0.896
$f_{awf,}$ MHz	7.7504	6.5
APF, %	79.26	79.26
AIF, %	79.26	79.26
Maximum power, mW	4.329	2.722
$I_{ob,}$ mW/cm^2	4.83	3.04
Power-up mode	B mode	B mode
Initialization mode	B mode	B mode
Acoustic output freeze	Yes	Yes
Z_{tt} (mm)	--	--
Z_{ts} (mm)	contact	contact
Inclusive modes	--	--

NOTE:

APF: Acoustic power-up fraction, AIF: Acoustic initialization fraction;

Control1: AP=15; Depth=30 mm; single focus=25 mm; Angle=76°;

Control2: AP=15; Depth=30 mm; single focus=20 mm.

A2.3.5: Test of Probe C343-1

Test Item	B (3 MHz)	B+M (3 MHz)
p-, MPa	1.731	1.731
$I_{spta,}$ mW/cm^2	28.0603	32.0063
MI	0.4817	0.4817
System settings	Control1	Control2
$Z_{p,}$ mm	29.3885	29.3885
$W_{pb6,}$ (∥), mm (⊥), mm	2.879 3.136	2.879 3.136
prr, kHz	4.686	2.736
srr, Hz	64	37
Output beam Dimensions, cm^2	3.024	3.024
$f_{awf,}$ MHz	3.1335	3.1335
APF, %	71.63	71.63
AIF, %	71.63	71.63
Maximum power, mW	44.99	28.286
$I_{ob,}$ mW/cm^2	14.88	9.35
Power-up mode	B mode	B mode
Initialization mode	B mode	B mode
Acoustic output freeze	Yes	Yes
Z_{tt} (mm)	--	--
Z_{ts} (mm)	contact	contact
Inclusive modes	--	--

NOTE:

APF: Acoustic power-up fraction, AIF: Acoustic initialization fraction;

Control1: AP=15; Depth=70 mm; single focus=60 mm; Angle=34°;

Control2: AP=15; Depth=70 mm; single focus=60 mm.

A2.4: Transducer Power Values

Measurement uncertainties

Measurement uncertainty for ultrasonic power: ±26.6%

Measurement uncertainty for pressure: ±13.7%

Measurement uncertainty for intensities: ±26.6%

Measurement uncertainty for central frequency: ±2%

Derated, and water value intensities

All intensity parameters are measured in water. Since water does not absorb acoustic energy, these water measurements represent a worst case value. Biological tissue does absorb acoustic energy. The true value of the intensity at any point depends on the amount, type of tissue, and the frequency of the ultrasound passing through the tissue. The intensity value in the tissue, has been estimated by using the following formula:

Since this value is not the true In Situ intensity, the term “derated” is used to qualify it.

$$\text{Derated} = \text{Water}\,[e^{-0.069 f_c z}]$$

Where:

Water = Water intensity value

e = 2.1783

z = skinline to measurement depth in cm

fc = center frequency of the transducer of the transducer/system/mode combination in MHz

Transducer type: C363-1 Operating mode: B Mode

Acoustic Output			MI	$I_{SPTA.3}$ (mW/cm^2)	$I_{SPPA.3}$ (W/cm^2)
Global Maximum Value			0.2957	7.3707	21.98
Associated Acoustic Parameter	pr.3 (MPa)		0.7384		
	W0 (mW)			53.59	53.59
	Fc (MHz)		3.342	3.342	3.342
	Zsp (cm)		6.5	6.5	6.5
	Beam dimensions	x-6 (cm)		0.7019	0.7091
		y-6 (cm)		0.3	0.3
	PD (μsec)		0.4904		0.4904
	SRF (Hz)		67		67
	EBD	Az. (cm)		2.112	
		Ele. (cm)		1.5	
Operating Control Conditions	AP=15; Depth=90 mm; Single focus=90 mm; Angle=30°; Frequency=4.0 MHz				

Transducer type: C363-1 Operating mode: B+M Mode

Acoustic Output			MI	$I_{SPTA.3}$ (mW/cm^2)	$I_{SPPA.3}$ (W/cm^2)
Global Maximum Value			0.2957	8.2508	21.98
Associated Acoustic Parameter	pr.3 (MPa)		0.7384		
	W0 (mW)			35.11	35.11
	Fc (MHz)		4.0	4.0	4.0
	Zsp (cm)		6.5	6.5	6.5
	Beam dimensions	x-6 (cm)		0.7019	0.7019
		y-6 (cm)		0.3	0.3
	PD (μsec)		0.4904		0.4904
	SRF (Hz)		39		39
	EBD	Az. (cm)		2.112	
		Ele. (cm)		1.5	
Operating Control Conditions	AP=15; Depth=80 mm; single focus=70 mm; Frequency=4.0 MHz				

Transducer type: L743/E743 Operating mode: B Mode

Acoustic Output			MI	$I_{SPTA.3}$ (mW/cm^2)	$I_{SPPA.3}$ (W/cm^2)
Global Maximum Value			0.5742	13.5833	80.6
Associated Acoustic Parameter	pr.3 (MPa)		1.8135		
	W0 (mW)			10.1	10.1
	Fc (MHz)		5.8216	5.8216	5.8216
	Zsp (cm)		1.55	1.55	1.55
	Beam dimensions	x-6 (cm)		0.1791	0.1791
		y-6 (cm)		0.2097	0.2097
	PD	(μsec)	0.2922		0.2922
	SRF	(Hz)	4686		4686
	EBD	Az. (cm)		1.344	
		Ele. (cm)		0.6	
Operating Control Conditions	AP=15; Depth=70 mm; Single focus=80 mm; Frequency=6.0 MHz				

Transducer type: L743/E743 Operating mode: B+M Mode

Acoustic Output			MI	$I_{SPTA.3}$ (mW/cm^2)	$I_{SPPA.3}$ (W/cm^2)
Global Maximum Value			0.5742	15.2052	80.6
Associated Acoustic Parameter	1.8135		1.8135		
	W0 (mW)			6.3474	6.3474
	Fc (MHz)		5.8216	5.8216	5.8216
	Zsp (cm)		1.55	1.55	1.55
	Beam dimensions	x-6 (cm)		0.1791	0.1791
		y-6 (cm)		0.2097	0.2097
	PD	(μsec)	0.2922		0.2922
	SRF	(Hz)	39		39
	EBD	Az. (cm)		1.344	
		Ele. (cm)		0.6	
Operating Control Conditions	AP=15; Depth=70 mm; single focus=30 mm; Frequency=6.0 MHz				

Transducer type: C321 Operating mode: B Mode

Acoustic Output			MI	$I_{SPTA.3}$ (mW/cm^2)	$I_{SPPA.3}$ (W/cm^2)
Global Maximum Value			0.463	9.2765	36.63
Associated Acoustic Parameter	pr.3 (MPa)		0.9762		
	W0 (mW)			23.51	23.51
	Fc (MHz)		3.569	3.569	3.569
	Zsp (cm)		2.75	2.75	2.75
	Beam dimensions	x-6 (cm)		0.264	0.264
		y-6 (cm)		0.4604	0.4604
	PD (μsec)		0.1514		0.1514
	SRF (Hz)		47		47
	EBD	Az. (cm)		1.28	
		Ele. (cm)		1.5	
Operating Control Conditions	AP=15; Depth=40 mm; Focus=30 mm; Angle=46°; Frequency=4.0 MHz				

Transducer type: C321 Operating mode: B+M Mode

Acoustic Output			MI	$I_{SPTA.3}$ (mW/cm^2)	$I_{SPPA.3}$ (W/cm^2)
Global Maximum Value			0.463	9.2765	36.63
Associated Acoustic Parameter	pr.3 (MPa)		0.9762		
	W0 (mW)			23.51	23.51
	Fc (MHz)		3.569	3.569	3.569
	Zsp (cm)		2.75	2.75	2.75
	Beam dimensions	x-6 (cm)		0.264	0.264
		y-6 (cm)		0.4604	0.4604
	PD (μsec)		0.1514		0.1514
	SRF (Hz)		47		47
	EBD	Az. (cm)		1.28	
		Ele. (cm)		1.5	
Operating Control Conditions	AP=15; Depth=40 mm; single focus=30 mm; Angle=46°; Frequency=4.0 MHz				

Transducer type: E613 Operating mode: B Mode

Acoustic Output			MI	$I_{SPTA.3}$ (mW/cm^2)	$I_{SPPA.3}$ (W/cm^2)
Global Maximum Value			0.4285	3.5091	73.93
Associated Acoustic Parameter	pr.3 (MPa)		1.4433		
	W0 (mW)			4.329	4.329
	Fc (MHz)		7.7504	7.7504	7.7504
	Zsp (cm)		1.75	1.75	1.75
	Beam dimensions	x-6 (cm)		0.1993	0.1993
		y-6 (cm)		0.1714	0.1714
	PD	(μsec)	0.2212		0.2212
	SRF	(Hz)	74		74
	EBD	Az. (cm)		0.896	
		Ele. (cm)		1.0	
Operating Control Conditions	AP=15; Depth=70 mm; single focus=80 mm; Angle=76°; Frequency=6.5 MHz				

Transducer type: E613 Operating mode: B+M Mode

Acoustic Output			MI	$I_{SPTA.3}$ (mW/cm^2)	$I_{SPPA.3}$ (W/cm^2)
Global Maximum Value			0.4285	3.7462	73.93
Associated Acoustic Parameter	pr.3 (MPa)		1.4433		
	W0 (mW)			2.722	2.722
	Fc (MHz)		6.5	6.5	6.5
	Zsp (cm)		1.75	1.75	1.75
	Beam dimensions	x-6 (cm)		0.1993	0.1993
		y-6 (cm)		0.1714	0.1714
	PD	(μsec)	0.2212		0.2212
	SRF	(Hz)	43		43
	EBD	Az. (cm)		0.896	
		Ele. (cm)		1.0	
Operating Control Conditions	AP=15; Depth=30 mm; Focus=20 mm; Frequency=6.5 MHz				

Transducer type: C343-1 Operating mode: B Mode

Acoustic Output			MI	$I_{SPTA.3}$ (mW/cm^2)	$I_{SPPA.3}$ (W/cm^2)
Global Maximum Value			0.4817	8.1745	66.7
Associated Acoustic Parameter	pr.3 (MPa)		0.9893		
	W0 (mW)			44.99	44.99
	Fc (MHz)		3.1335	3.1335	3.1335
	Zsp (cm)		6.0	6.0	6.0
	Beam dimensions	x-6 (cm)		0.2879	0.2879
		y-6 (cm)		0.3136	0.3136
	PD	(μsec)	0.5361		0.5361
	SRF	(Hz)	64		64
	EBD	Az. (cm)		2.016	
		Ele. (cm)		1.5	
Operating Control Conditions	AP=15; Depth=70mm; single focus=60 mm; Angle=34°; Frequency=3.0 MHz				

Transducer type: C343-1 Operating mode: B+M Mode

Acoustic Output			MI	$I_{SPTA.3}$ (mW/cm^2)	$I_{SPPA.3}$ (W/cm^2)
Global Maximum Value			0.4817	9.3241	66.7
Associated Acoustic Parameter	pr.3 (MPa)		0.9893		
	W0 (mW)			28.286	28.286
	Fc (MHz)		3.1335	3.1335	3.1335
	Zsp (cm)		6.0	6.0	6.0
	Beam dimensions	x-6 (cm)		0.2879	0.2879
		y-6 (cm)		0.3136	0.3136
	PD	(μsec)	0.5361		0.5361
	SRF	(Hz)	37		37
	EBD	Az. (cm)		2.016	
		Ele. (cm)		1.5	
Operating Control Conditions	AP=15; Depth=70 mm; single focus=60mm; Frequency=3.0 MHz				

A2.5: Low Output Summary Table

Low Output Summary Table

(for systems with no transducers having global maximum index values exceeding 1.0)

System: DUS 6 Digital Ultrasonic Diagnostic Imaging System

Transducer Model	$I_{spta.3}$ (mW/cm^2)	TI Type	TI Value	MI	Ipa .3@MI_{max} (W/cm^2)
C363-1	7.3707	TIS	0.2019	0.2957	29.6
		TIB	0.2019		
C343-1	8.1745	TIS	0.1665	0.4817	50
		TIB	0.1665		
C321	9.2765	TIS	0.2081	0.463	35.5
		TIB	0.2081		
E613	3.5091	TIS	0.0892	0.4285	78.2
		TIB	0.0892		
L743	13.5833	TIS	0.1054	0.5742	135.8
		TIB	0.1054		
		TIC	0.2492		
E743	13.5833	TIS	0.1054	0.5742	135.8
		TIB	0.1054		

Appendix III: Obstetrical References

A3.1: Application Table of Obstetrical Reference Formulas

Parameter	Formula	Measurement range (mm)	MA range	±2 SD
GS	Tokyo	[10, 68]	4w0d ~ 12w1d	See table GS, Tokyo
	Hellman	[17, 60]	6w0d ~ 12w1d	0
	Rempen	[2, 73]	4w6d ~ 14w1d	±12 days See table GS, Rempen for details
	China	[10, 68]	5w0d ~ 12w0d	See table GS, China
CRL	Tokyo	[6, 100]	6w3d ~ 16w0d	See table CRL, Tokyo
	Hadlock	[2, 121.1]	5w5d ~ 18w0d	8.826%
	Robinson	[6.7, 82.4]	6w3d ~ 13w6d	±5 days
	Hansmann	[6, 150]	6w1d ~ 21w3d	See table CRL, Hansmann
	China	[9, 105]	7w0d ~ 17w0d	See table CRL, China
BPD	Tokyo	[16, 92]	11w3d ~ 40w0d	See table BPD, Tokyo
	Hadlock	[15, 102]	12w1d ~ 42w1d	12-18 wk ± 1.19 wk (8 days) 18-24 wk ± 1.73 wk (12 days) 24-30 wk ± 2.18 wk (15 days) 30-36 wk ± 3.08 wk (22 days) 36-42 wk ± 3.20 wk (22 days)
	Merz	[21, 102]	12w1d ~ 40w2d	See table BPD, Merz
	Rempen	[3, 27]	6w6d ~ 13w5d	±10 days See table BPD, Rempen for details
	Osaka	[13.3, 93.6]	10w0d ~ 40w0d	See table BPD, Osaka
	China	[19, 94]	12w0d ~ 40w0d	See table BPD, China
HC	Hadlock	[56, 358]	12w0d ~ 41w6d	12-18 wk ± 1.19 wk (8 days) 18-24 wk ± 1.48 wk (10 days) 24-30 wk ± 2.06 wk (14 days) 30-36 wk ± 2.98 wk (21 days) 36-42 wk ± 2.70 wk (19 days)
	Merz	[72, 364]	12w1d ~ 40w4d	See table HC, Merz
AC	Hadlock	[50, 381]	11w6d ~ 41w6d	12-18 wk ± 1.66 wk (12 days)

				18-24 wk ± 2.06 wk (14 days) 24-30 wk ± 2.18 wk (15 days) 30-36 wk ± 2.96 wk (21 days) 36-42 wk ± 3.04 wk (19 days)
	Merz	[56, 348]	12w1d ~ 39w6d	See table AC, Merz
FL	Tokyo	[8, 72]	12w3d ~ 40w2d	See table FL, Tokyo
	Hadlock	[7, 82]	12w1d ~ 42w0d	12-18 wk ± 1.38 wk (10 days) 18-24 wk ± 1.80 wk (13 days) 24-30 wk ± 2.08 wk (15 days) 30-36 wk ± 2.96 wk (21 days) 36-42 wk ± 3.12 wk (22 days)
	Jeanty	[10, 80]	12w4d ~ 40w0d	±19 days
	Merz	[10, 80]	12w2d ~ 40w1d	See table FL, Merz
	Osaka	[9.4, 71.2]	13w0d ~ 40w0d	See table FL, Osaka
	China	[6, 75]	12w4d ~ 40w2d	See table FL, China
HUM	Jeanty	[9, 69]	12w0d ~ 40w0d	±23 days (±3.3104 wks)
FTA	Osaka	[5.6, 86.6] (cm^2)	14w0d ~ 40w0d	See table FTA, Osaka
CER	Goldstein	[14, 52] mm	/	/
THD	Hansmann	[20, 130] mm	/	/

A3.2: GS

Hellman:

Hellman LM, Kobayashi M, Fillisti L etc. “Growth and development of the human fetus prior to the 20th week of gestation.” Am J Obstetrics Gynecology 103:789, 1969

MA (GS mm) = (GS+25.43)/7.02

Rempen:

Rempen A. “Biometrie in der Frühgravidität” (I. Trimenon) (Biometry in Early Pregnancy (1st Trimester)).” Der Frauenarzt 32:425, 1991

Table GS, **Rempen**

GS mm	MA	+/- 2SD	GS mm	MA	+/- 2SD	GS mm	MA	+/- 2SD	GS mm	MA	+/- 2SD
02.0	4w6d	12	20.0	6w6d	12	38.0	9w1d	12	56.0	11w4d	12
03.0	5w0d	12	21.0	7w0d	12	39.0	9w2d	12	57.0	11w5d	12
04.0	5w1d	12	22.0	7w1d	12	40.0	9w3d	12	58.0	11w6d	12
05.0	5w1d	12	23.0	7w2d	12	41.0	9w4d	12	59.0	12w0d	12
06.0	5w2d	12	24.0	7w3d	12	42.0	9w5d	12	60.0	12w1d	12
07.0	5w3d	12	25.0	7w4d	12	43.0	9w6d	12	61.0	12w2d	12

08.0	5w4d	12	26.0	7w4d	12	44.0	9w6d	12	62.0	12w3d	12
09.0	5w5d	12	27.0	7w5d	12	45.0	10w0d	12	63.0	12w4d	12
10.0	5w5d	12	28.0	7w6d	12	46.0	10w1d	12	64.0	12w5d	12
11.0	5w6d	12	29.0	8w0d	12	47.0	10w2d	12	65.0	12w6d	12
12.0	6w0d	12	30.0	8w1d	12	48.0	10w3d	12	66.0	13w0d	12
13.0	6w1d	12	31.0	8w2d	12	49.0	10w4d	12	67.0	13w1d	12
14.0	6w2d	12	32.0	8w3d	12	50.0	10w5d	12	68.0	13w2d	12
15.0	6w2d	12	33.0	8w3d	12	51.0	10w6d	12	69.0	13w3d	12
16.0	6w3d	12	34.0	8w4d	12	52.0	11w0d	12	70.0	13w4d	12
17.0	6w4d	12	35.0	8w5d	12	53.0	11w1d	12	71.0	13w5d	12
18.0	6w5d	12	36.0	8w6d	12	54.0	11w2d	12	72.0	14w0d	12
19.0	6w6d	12	37.0	9w0d	12	55.0	11w3d	12	73.0	14w1d	12

Tokyo:

Studies on Fetal Growth and Functional Developments, Takashi Okai, Department of Obstetrics and Gynecology, Faculty of Medicine, University of Tokyo

Table GS, **Tokyo**

GS cm	MA	+/- 2SD	GS cm	MA	+/- 2SD	GS cm	MA	+/- 2SD	GS cm	MA	+/- 2SD
1	4w0d	7	2.6	6w6d	12	4.2	9w1d	14	5.8	11w1d	16
1.2	4w1d	7	2.8	7w1d	12	4.4	9w3d	14	6	11w3d	16
1.4	4w4d	7	3	7w3d	12	4.6	9w4d	14	6.2	11w4d	16
1.6	5w0d	8	3.2	7w4d	12	4.8	10w0d	15	6.4	11w6d	16
1.8	5w1d	8	3.4	8w0d	13	5	10w1d	15	6.6	11w6d	16
2	5w4d	8	3.6	8w1d	13	5.2	10w3d	15	6.8	12w1d	17
2.2	6w0d	11	3.8	8w3d	13	5.4	10w4d	15			
2.4	6w1d	11	4	8w6d	13	5.6	10w6d	15			

China:

Wu Zhongyu, “Ultrasound Diagnosis in Obstetrics and Gynecology”, Tianjin Science and Technology Publisher, 1995

Table GS, **China**

GS cm	MA	+/- 2SD	GS cm	MA	+/- 2SD	GS cm	MA	+/- 2SD	GS cm	MA	+/- 2SD
1	5w0d	4	2.5	6w6d	7	4	8w3d	11	5.5	10w3d	12
1.1	5w1d	5	2.6	7w0d	7	4.1	8w4d	11	5.6	10w4d	12
1.2	5w2d	5	2.7	7w0d	7	4.2	8w5d	11	5.7	10w5d	12
1.3	5w3d	5	2.8	7w1d	8	4.3	8w6d	12	5.8	10w5d	12
1.4	5w4d	5	2.9	7w2d	8	4.4	9w0d	12	5.9	10w6d	12
1.5	5w5d	5	3	7w3d	8	4.5	9w1d	12	6	11w0d	12
1.6	5w6d	5	3.1	7w4d	8	4.6	9w2d	12	6.1	11w1d	12
1.7	6w0d	6	3.2	7w4d	9	4.7	9w3d	12	6.2	11w2d	13

1.8	6w0d	6	3.3	7w5d	9	4.8	9w4d	12	6.3	11w3d	13
1.9	6w1d	6	3.4	7w6d	9	4.9	9w4d	12	6.4	11w4d	13
2	6w2d	6	3.5	8w0d	9	5	9w5d	12	6.5	11w5d	13
2.1	6w3d	6	3.6	8w0d	10	5.1	9w6d	12	6.6	11w5d	13
2.2	6w4d	6	3.7	8w1d	10	5.2	10w0d	12	6.7	11w6d	13
2.3	6w4d	6	3.8	8w2d	10	5.3	10w1d	12	6.8	12w0d	13
2.4	6w5d	7	3.9	8w3d	10	5.4	10w2d	12			

A3.3: CRL

Hadlock:

Hadlock FP, Shah YP, Kanon DJ etc. “Fetal Crown-Rump Length: Reevaluation of Relation to Menstrual Age (5-18 weeks) with High-Resolution Real-Time US.” Radiology 182(2):501, 1992

MA (CRL mm) = 1.684969 + (0.315646*CRL) - (0.049306*CRL^2) + (0.004057*CRL^3) - (0.000120456*CRL^4)

Robinson:

Robinson HP and Fleming JEE. “A critical evaluation of sonar ‘crown-rump length’ measurements.” British Journal of Obstetrics and Gynecology 82:702, 1975

MA = (8.**052***$CRL^{1/2}$ + 23.73) / 7

Hansmann:

Hansmann M, Hackelöer B-J, Staudach A. Ultrasound Diagnosis in Obstetrics and Gynecology. New York: Spring-Verlag, 1985, P. 439

Table CRL, **Hansmann**

CRL mm	MA	+/- 2SD	CRL mm	MA	+/- 2SD	CRL mm	MA	+/- 2SD	CRL mm	MA	+/- 2SD
6.0	6w1d	6	22.0	9w1d	7	52.0	12w2d	9	100.0	15w5d	12
7.0	6w2d	7	23.0	9w2d	7	54.0	12w3d	9	103.0	16w0d	13
8.0	6w4d	6	24.0	9w3d	7	56.0	12w4d	9	106.0	16w2d	13
9.0	6w6d	7	26.0	9w5d	7	58.0	12w5d	9	110.0	16w4d	14
10.0	7w0d	7	28.0	10w0d	7	60.0	12w6d	9	113.0	17w0d	14
11.0	7w2d	6	30.0	10w2d	7	63.0	13w0d	10	116.0	17w2d	14
12.0	7w3d	7	32.0	10w3d	8	66.0	13w2d	10	120.0	17w4d	14
13.0	7w4d	7	34.0	10w5d	7	70.0	13w3d	11	123.0	18w0d	14
14.0	7w6d	7	36.0	10w6d	8	73.0	13w5d	10	126.0	18w2d	15
15.0	8w0d	7	38.0	11w1d	8	76.0	13w6d	11	130.0	18w6d	14
16.0	8w2d	6	40.0	11w2d	8	80.0	14w1d	11	133.0	19w1d	15
17.0	8w3d	6	42.0	11w3d	8	83.0	14w2d	12	136.0	19w4d	16
18.0	8w4d	7	44.0	11w4d	9	86.0	14w4d	12	140.0	20w0d	16
19.0	8w5d	7	46.0	11w6d	8	90.0	14w6d	12	143.0	20w3d	16
20.0	8w6d	7	48.0	12w0d	9	93.0	15w1d	12	146.0	20w6d	16

21.0	9w0d	7	50.0	12w1d	9	96.0	15w3d	12	150.0	21w3d	16

Tokyo:

Studies on Fetal Growth and Functional Developments, Takashi Okai, Department of Obstetrics and Gynecology, Faculty of Medicine, University of Tokyo

Table CRL, Tokyo

CRL cm	MA	+/- 2SD	CRL cm	MA	+/- 2SD	CRL cm	MA	+/- 2SD	CRL cm	MA	+/- 2SD
0.6	6w3d	7	3	10w3d	7	5.4	12w4d	7	7.8	14w3d	8
0.8	6w6d	7	3.2	10w4d	7	5.6	12w5d	7	8	14w4d	8
1	7w1d	7	3.4	10w6d	7	5.8	13w0d	7	8.2	14w5d	8
1.2	7w4d	7	3.6	11w0d	7	6	13w1d	7	8.4	14w6d	8
1.4	7w6d	7	3.8	11w1d	7	6.2	13w2d	7	8.6	15w0d	14
1.6	8w1d	7	4	11w3d	7	6.4	13w3d	7	8.8	15w1d	14
1.8	8w4d	7	4.2	11w4d	7	6.6	13w4d	7	9	15w2d	14
2	9w1d	7	4.4	11w6d	7	6.8	13w5d	7	9.2	15w3d	14
2.2	9w2d	7	4.6	12w0d		7	13w6d	7	9.4	15w4d	14
2.4	9w4d	7	4.8	12w1d		7.2	14w0d	7	9.6	15w5d	14
2.6	9w6d	7	5	12w2d		7.4	14w1d	7	9.8	15w6d	14
2.8	10w2d	7	5.2	12w3d		7.6	14w2d	7	10	16w0d	14

China:

Wu Zhongyu, “Ultrasound Diagnosis in Obstetrics and Gynecology”, Tianjin Science and Technology Publisher, 1995

Table CRL, **China**

CRL cm	MA	+/- 2SD	CRL cm	MA	+/- 2SD				CRL cm	MA	+/- 2SD
0.9	7w0d	6	3.4	10w3d	7	5.9	12w6d	10	8.4	15w1d	12
1	7w1d	6	3.5	10w4d	7	6	13w0d	10	8.5	15w1d	13
1.1	7w2d	6	3.6	10w5d	7	6.1	13w0d	10	8.6	15w2d	13
1.2	7w3d	6	3.7	10w5d	7	6.2	13w1d	10	8.7	15w2d	13
1.3	7w4d	6	3.8	10w6d	7	6.3	13w2d	11	8.8	15w3d	13
1.4	7w5d	6	3.9	11w0d	7	6.4	13w2d	11	8.9	15w4d	13
1.5	7w6d	6	4	11w1d	8	6.5	13w3d	11	9	15w4d	13
1.6	8w0d	6	4.1	11w1d	8	6.6	13w3d	11	9.1	15w5d	13
1.7	8w1d	6	4.2	11w2d	8	6.7	13w4d	11	9.2	15w6d	13
1.8	8w2d	6	4.3	11w3d	8	6.8	13w5d	11	9.3	15w6d	13
1.9	8w3d	6	4.4	11w4d	8	6.9	13w5d	11	9.4	16w0d	13
2	8w4d	6	4.5	11w4d	8	7	13w6d	11	9.5	16w1d	13
2.1	8w5d	6	4.6	11w5d	8	7.1	14w0d	11	9.6	16w1d	13
2.2	8w6d	6	4.7	11w6d	9	7.2	14w0d	12	9.7	16w2d	14
2.3	9w0d	6	4.8	11w6d	9	7.3	14w1d	12	9.8	16w3d	14
2.4	9w1d	6	4.9	12w0d	9	7.4	14w1d	12	9.9	16w3d	14

2.5	9w2d	6	5	12w0d	9	7.5	14w2d	12	10	16w4d	14
2.6	9w3d	6	5.1	12w1d	9	7.6	14w3d	12	10.1	16w5d	14
2.7	9w4d	7	5.2	12w2d	9	7.7	14w3d	12	10.2	16w6d	14
2.8	9w5d	7	5.3	12w2d	9	7.8	14w4d	12	10.3	16w6d	14
2.9	9w6d	7	5.4	12w3d	9	7.9	14w5d	12	10.4	17w0d	14
3	10w0d	7	5.5	12w3d	9	8	14w5d	12	10.5	17w0d	14
3.1	10w1d	7	5.6	12w4d	9	8.1	14w6d	12			
3.2	10w2d	7	5.7	12w5d	10	8.2	15w0d	12			
3.3	10w3d	7	5.8	12w5d	10	8.3	15w0d	12			

A3.4: BPD

Hadlock:

Hadlock FP, Deter RL etc. “Estimationg Fetal Age: Computer-Assisted Analysis of Multiple Fetal Growth Parameters.” Radilolgy 152:497, 1984

MA (BPD cm)= 9.54 + 1.482*(BPD) + 0.1676 * (BPD^2)

Merz:

Merz E. Ultrasound in Gynexology and Obstetrics. Stuttgart and New York: Thieme Medical Publishers, Inc., 1991, p. 326

Table **BPD**, Merz

BPD mm	MA	+/- 2SD	BPD mm	MA	+/- 2SD	BPD mm	MA	+/- 2SD	BPD mm	MA	+/- 2SD
21.0	12w1d	13	41.0	17w5	16	61.0	23w6d	17	82.0	31w2d	19
22.0	12w3d	12	42.0	18w0	16	62.0	24w1d	17	83.0	31w5d	18
23.0	12w5d	12	43.0	18w2	16	63.0	24w4d	17	84.0	32w1d	18
24.0	13w0d	13	44.0	18w4	16	64.0	24w6d	17	85.0	32w4d	18
25.0	13w1d	13	45.0	18w6	16	65.0	25w1d	17	86.0	32w6d	19
26.0	13w4d	12	46.0	19w1	13	66.0	25w4d	17	87.0	33w2d	19
27.0	13w6d	13	47.0	19w3	15	67.0	25w6d	17	89.0	34w1d	21
28.0	14w1d	13	48.0	19w5	16	68.0	26w1d	18	90.0	34w4d	19
29.0	14w2d	13	49.0	20w0	16	69.0	26w4d	17	91.0	35w1d	19
30.0	14w4d	13	50.0	20w3	15	70.0	26w6d	17	92.0	35w4d	19
31.0	14w6d	15	51.0	20w5	16	71.0	27w1d	18	93.0	35w6d	19
32.0	15w1d	15	52.0	21w0	16	72.0	27w4d	18	94.0	36w3d	21
33.0	15w3d	13	53.0	21w2	16	73.0	27w6d	18	95.0	36w6d	21
34.0	15w5d	15	54.0	21w4	17	74.0	28w2d	18	96.0	37w2d	21
35.0	16w0d	15	55.0	21w6	17	75.0	28w4d	18	97.0	37w6d	19
36.0	16w2d	15	56.0	22w1	17	76.0	29w0d	18	98.0	38w2d	21
37.0	16w4d	13	57.0	22w3	16	77.0	29w3d	18	99.0	38w6d	19
38.0	16w6d	15	58.0	22w6	16	78.0	29w6d	18	100.0	39w2d	22

39.0	17w1d	15	59.0	23w1	17	79.0	30w1d	18	101.0	39w6d	21
40.0	17w3d	15	60.0	23w4	17	81.0	30w6d	19	102.0	40w2d	22

Rempen:

Rempen A. “Biometrie in der Frühgravidität” (I. Trimenon) (Biometry in Early Pregnancy (1st Trimester)).” Der Frauenarzt 32:425, 1991

Table **BPD**, Rempen

BPD mm	MA	+/- 2SD	BPD mm	MA	+/- 2SD	BPD mm	MA	+/- 2SD	BPD mm	MA	+/- 2SD
03.0	6w6d	10	10.0	8w6d	10	17.0	10w6d	10	24.0	12w6d	10
04.0	7w1d	10	11.0	9w1d	10	18.0	11w1d	10	25.0	13w1d	10
05.0	7w3d	10	12.0	9w3d	10	19.0	11w3d	10	26.0	13w3d	10
06.0	7w5d	10	13.0	9w5d	10	20.0	11w5d	10	27.0	13w5d	10
07.0	8w0d	10	14.0	10w0d	10	21.0	12w0d	10			
08.0	8w2d	10	15.0	10w2d	10	22.0	12w2d	10			
0.90	8w4d	10	16.0	10w4d	10	23.0	12w4d	10			

Osaka:

Fetal Growth Chart Using the Ultrasonotomographic Technique, Keiichi Kurachi, Mineo Aoki, Department of Obstetrics and Gynecology, Osaka University Medical School Revision 3 (September 1983)

Table **BPD**, Osaka

BPD cm	MEAN	MIN	MAX	BPD cm	MEAN	MIN	MAX	BPD cm	MEAN	MIN	MAX
1.33	10w0d	9w4d	10w3d	4.94	20w2d	19w3d	21w1d	7.88	30w4d	29w0d	32w1d
1.44	10w2d	9w6d	10w5d	5.03	20w4d	19w5d	21w3d	7.95	30w6d	29w2d	32w3d
1.55	10w4d	10w0d	11w0d	5.12	20w6d	20w0d	21w5d	8.02	31w1d	29w4d	32w5d
1.66	10w6d	10w2d	11w2d	5.21	21w1d	20w1d	22w0d	8.08	31w3d	29w6d	33w0d
1.77	11w1d	10w4d	11w4d	5.30	21w3d	20w3d	22w2d	8.15	31w5d	30w1d	33w3d
1.88	11w3d	10w6d	11w6d	5.39	21w5d	20w5d	22w4d	8.21	32w0d	30w3d	33w5d
1.99	11w5d	11w1d	12w2d	5.48	22w0d	21w0d	22w6d	8.27	32w2d	30w4d	34w0d
2.09	12w0d	11w3d	12w3d	5.57	22w2d	21w2d	23w2d	8.34	32w4d	30w6d	34w3d
2.20	12w2d	11w5d	12w6d	5.66	22w4d	21w4d	23w4d	8.40	32w6d	31w1d	34w5d
2.31	12w4d	12w0d	13w1d	5.74	22w6d	21w5d	23w6d	8.46	33w1d	31w3d	35w1d
2.41	12w6d	12w1d	13w3d	5.83	23w1d	22w1d	24w1d	8.51	33w3d	31w4d	35w3d
2.52	13w1d	12w3d	13w5d	5.92	23w3d	22w3d	24w3d	8.57	33w5d	31w6d	35w6d
2.62	13w3d	12w5d	14w0d	6.00	23w5d	22w4d	24w5d	8.62	34w0d	32w1d	36w1d
2.72	13w5d	13w0d	14w2d	6.09	24w0d	22w6d	25w0d	8.68	34w2d	32w3d	36w4d
2.82	14w0d	13w2d	14w4d	6.17	24w2d	23w1d	25w2d	8.73	34w4d	32w4d	37w0d
2.93	14w2d	13w4d	14w6d	6.26	24w4d	23w3d	25w4d	8.78	34w6d	32w6d	37w3d
3.03	14w4d	13w6d	15w1d	6.34	24w6d	23w5d	25w6d	8.83	35w1d	33w0d	38w0d
3.13	14w6d	14w1d	15w3d	6.43	25w1d	24w0d	26w2d	8.87	35w3d	33w2d	38w2d

3.23	15w1d	14w3d	15w6d	6.51	25w3d	24w2d	26w4d	8.92	35w5d	33w4d	39w0d
3.33	15w3d	14w5d	16w1d	6.59	25w5d	24w4d	26w6d	8.96	36w0d	33w5d	39w4d
3.42	15w5d	14w6d	16w3d	6.67	26w0d	24w6d	27w1d	9.00	36w2d	34w0d	40w0d
3.52	16w0d	15w1d	16w5d	6.75	26w2d	25w0d	27w3d	9.04	36w4d	34w1d	40w1d
3.62	16w2d	15w3d	17w0d	6.84	26w4d	25w3d	27w5d	9.08	36w6d	34w3d	40w2d
3.72	16w4d	15w6d	17w2d	6.92	26w6d	25w4d	28w0d	9.12	37w1d	34w4d	40w3d
3.81	16w6d	16w0d	17w4d	6.99	27w1d	25w6d	28w2d	9.15	37w3d	34w5d	40w4d
3.91	17w1d	16w2d	17w6d	7.07	27w3d	26w1d	28w4d	9.18	37w5d	35w0d	40w5d
4.01	17w3d	16w4d	18w1d	7.15	27w5d	26w3d	29w0d	9.21	38w0d	35w1d	40w6d
4.10	17w5d	16w6d	18w3d	7.23	28w0d	26w5d	29w2d	9.24	38w2d	35w2d	41w0d
4.20	18w0d	17w1d	18w5d	7.30	28w2d	27w0d	29w5d	9.27	38w4d	35w3d	41w0d
4.29	18w2d	17w3d	19w0d	7.38	28w4d	27w2d	29w6d	9.29	38w6d	35w4d	41w0d
4.39	18w4d	17w5d	19w2d	7.45	28w6d	27w3d	30w1d	9.31	39w1d	35w5d	41w0d
4.48	18w6d	18w0d	19w5d	7.53	29w1d	27w5d	30w4d	9.33	39w3d	35w6d	41w0d
4.57	19w1d	18w2d	20w0d	7.60	29w3d	28w0d	30w6d	9.35	39w5d	36w0d	41w0d
4.67	19w3d	18w4d	20w2d	7.67	29w5d	28w2d	31w1d	9.36	40w0d	36w0d	41w0d
4.76	19w5d	18w6d	20w4d	7.74	30w0d	28w4d	31w3d				
4.85	20w0d	19w1d	20w6d	7.81	30w2d	28w6d	31w5d				

Tokyo:

Studies on Fetal Growth and Functional Developments, Takashi Okai, Department of Obstetrics and Gynecology, Faculty of Medicine, University of Tokyo

Table **BPD**, Tokyo

BPD cm	MA	+/- 2SD	BPD cm	MA	+/- 2SD	BPD cm	MA	+/- 2SD	BPD cm	MA	+/- 2SD
1.6	11w3d	7	3.6	16w3d	8	5.6	23w0d	11	7.6	30w1d	15
1.8	11w6d	7	3.8	17w0d	8	5.8	23w5d	11	7.8	31w0d	16
2	12w0d	7	4	17w5d	8	6	24w2d	12	8	32w0d	16
2.2	12w4d	7	4.2	18w2d	9	6.2	25w0d	12	8.2	33w0d	16
2.4	13w0d	7	4.4	19w0d	9	6.4	25w6d	12	8.4	34w0d	20
2.6	13w6d	7	4.6	19w5d	10	6.6	26w3d	13	8.6	35w5d	25
2.8	14w2d	7	4.8	20w2d	10	6.8	27w3d	13	8.8	37w0d	25
3	14w6d	7	5	21w0d	10	7	28w0d	13	9	39w0d	25
3.2	15w2d	7	5.2	21w4d	10	7.2	29w0d	14	9.2	40w0d	25
3.4	16w0d	8	5.4	22w2d	10	7.4	29w5d	14			

China:

Wu Zhongyu, “Ultrasound Diagnosis in Obstetrics and Gynecology”, Tianjin Science and Technology Publisher, 1995

Table **BPD**, China

BPD cm	MA	+/- 2SD	BPD cm	MA	+/- 2SD	BPD cm	MA	+/- 2SD	BPD cm	MA	+/- 2SD
1.9	12w0d	7	3.8	17w3d	9	5.7	23w1d	13	7.6	30w0d	20
2	12w2d	7	3.9	17w5d	9	5.8	23w3d	14	7.7	30w3d	20
2.1	12w4d	7	4	18w0d	9	5.9	23w5d	14	7.8	30w6d	21
2.2	12w6d	7	4.1	18w2d	9	6	24w0d	14	7.9	31w3d	21
2.3	13w1d	7	4.2	18w4d	9	6.1	24w2d	15	8	31w6d	21
2.4	13w3d	7	4.3	18w6d	10	6.2	24w5d	15	8.1	32w3d	22
2.5	13w5d	7	4.4	19w1d	10	6.3	25w0d	15	8.2	32w6d	22
2.6	14w0d	7	4.5	19w4d	10	6.4	25w2d	15	8.3	33w2d	23
2.7	14w2d	7	4.6	19w6d	10	6.5	25w5d	16	8.4	33w6d	23
2.8	14w4d	7	4.7	20w1d	11	6.6	26w0d	16	8.5	34w3d	23
2.9	14w6d	8	4.8	20w3d	11	6.7	26w3d	16	8.6	34w6d	24
3	15w1d	8	4.9	20w5d	11	6.8	26w5d	16	8.7	35w4d	24
3.1	15w3d	8	5	21w0d	11	6.9	27w1d	18	8.8	36w1d	24
3.2	15w5d	8	5.1	21w2d	11	7	27w3d	18	8.9	36w5d	24
3.3	16w0d	8	5.2	21w4d	12	7.1	27w6d	18	9	37w1d	25
3.4	16w2d	8	5.3	21w6d	12	7.2	28w1d	18	9.1	37w1d	25
3.5	16w4d	8	5.4	22w1d	12	7.3	28w4d	19	9.2	38w4d	25
3.6	16w6d	8	5.5	22w3d	13	7.4	29w1d	19	9.3	39w2d	25
3.7	17w1d	8	5.6	22w5d	13	7.5	29w4d	20	9.4	40w0d	25

A3.5: HC

Hadlock:

Hadlock FP, Deter RL etc. “Estimationg Fetal Age: Computer-Assisted Analysis of Multiple Fetal Growth Parameters.” Radilolgy 152:497, 1984

MA(HC cm) = 8.96 + 0.540 * (HC) + 0.0003 * (HC^3)

Merz:

Merz E. Ultrasound in Gynexology and Obstetrics. Stuttgart and New York: Thieme Medical Publishers, Inc., 1991, p. 326

Table **HC**, Merz

HC mm	MA	+/- 2SD	HC mm	MA	+/- 2SD	HC mm	MA	+/- 2SD	HC mm	MA	+/- 2SD
72	12w1	9	146	17w2	12	220	23w2	15	294	30w5	16
74	12w2	11	148	17w4	12	222	23w4	15	296	30w6	17
76	12w3	10	150	17w4	13	224	23w4	15	298	31w1	16
78	12w4	10	152	17w6	12	226	23w6	15	300	31w3	17
80	12w5	10	154	17w6	13	228	24w0	16	302	31w4	17

82	12w6	10	156	18w1	12	230	24w1	16	304	31w6	17
84	12w6	11	158	18w1	13	232	24w3	15	306	32w1	17
86	13w1	10	160	18w3	12	234	24w4	15	308	32w2	17
88	13w1	11	162	18w4	12	236	24w4	15	310	32w4	17
90	13w2	11	164	18w5	12	238	24w6	16	312	32w6	17
92	13w4	10	166	18w6	12	240	25w1	15	314	33w1	17
94	13w4	11	168	19w0	13	242	25w2	16	316	33w3	17
96	13w5	10	170	19w1	12	244	25w4	15	318	33w4	17
98	13w6	11	172	19w2	13	246	25w5	16	320	33w6	18
100	14w0	10	174	19w3	12	248	25w6	16	322	34w1	17
102	14w1	12	176	19w4	13	250	26w0	16	324	34w3	18
104	14w2	11	178	19w6	13	252	26w1	16	326	34w5	18
106	14w3	11	180	19w6	15	254	26w3	15	328	34w6	18
108	14w4	11	182	20w1	13	256	26w4	16	330	35w1	18
110	14w5	11	184	20w1	15	258	26w6	15	332	35w4	18
112	14w6	11	186	20w3	13	260	27w0	16	334	35w6	18
114	15w0	11	188	20w4	13	262	27w1	16	336	36w1	18
116	15w1	11	190	20w5	13	264	27w3	15	338	36w3	18
118	15w2	11	192	20w6	15	266	27w4	16	340	36w4	19
120	15w3	11	194	21w1	13	268	27w6	15	342	36w6	19
122	15w4	12	196	21w1	15	270	28w1	16	344	37w1	19
124	15w5	12	198	21w3	13	272	28w2	16	346	37w4	18
126	15w6	11	200	21w4	15	274	28w4	16	348	37w6	19
128	16w0	12	202	21w5	15	276	28w5	16	350	38w1	21
130	16w1	12	204	21w6	15	278	28w6	17	352	38w4	19
132	16w2	12	206	22w1	15	280	29w1	16	354	38w6	19
134	16w3	12	208	22w1	15	282	29w2	16	356	39w1	19
136	16w4	12	210	22w3	15	284	29w4	17	358	39w4	19
138	16w5	12	212	22w3	15	286	29w6	16	360	39w6	19
140	16w6	12	214	22w5	15	288	30w0	16	362	40w1	19
142	17w0	12	216	22w6	15	290	30w1	17	364	40w4	19
144	17w1	12	218	23w1	15	292	30w4	16			

A3.6: AC

Hadlock:

Hadlock FP, Deter RL etc. “Estimationg Fetal Age: Computer-Assisted Analysis of Multiple Fetal Growth Parameters.” Radilolgy 152:497, 1984

MA (AC cm) = 8.14 + 0.753 * (AC) + 0.0036 * (AC^2)

Merz:

Merz E. Ultrasound in Gynexology and Obstetrics. Stuttgart and New York: Thieme Medical

Publishers, Inc., 1991, p. 326

Table AC, Merz

AC mm	MA	+/- 2SD	AC mm	MA	+/- 2SD	AC mm	MA	+/- 2SD	AC mm	MA	+/- 2SD
56	12w1	10	130	19w1	12	206	26w3	15	280	33w3	17
58	12w2	11	132	19w2	12	208	26w4	15	282	33w4	17
60	12w4	10	134	19w3	12	210	26w6	15	284	33w6	17
62	12w5	10	136	19w5	12	212	27w0	15	286	34w0	17
64	12w6	11	138	19w6	12	214	27w1	15	288	34w1	18
66	13w1	11	140	20w1	12	216	27w2	15	290	34w3	18
68	13w2	11	142	20w2	13	218	27w4	15	292	34w4	18
70	13w4	11	144	20w4	12	220	27w5	16	294	34w5	18
72	13w4	11	146	20w5	12	222	27w6	16	296	34w6	19
74	13w6	11	148	20w6	13	224	28w1	15	298	35w1	17
76	14w0	11	150	21w1	15	226	28w2	16	300	35w2	18
78	14w1	12	152	21w1	15	228	28w4	16	302	35w4	17
80	14w3	11	154	21w3	15	230	28w5	16	304	35w5	18
82	14w4	11	156	21w4	13	232	28w6	16	306	35w6	18
84	14w6	11	158	21w6	13	234	29w0	16	308	36w1	17
86	15w0	11	160	22w0	13	236	29w1	17	310	36w2	18
88	15w1	11	162	22w1	15	238	29w3	16	312	36w4	17
90	15w3	11	164	22w3	13	240	29w4	17	314	36w4	19
92	15w4	11	168	22w6	13	242	29w6	16	316	36w6	18
94	15w5	12	170	23w0	13	244	30w0	16	318	37w0	18
96	15w6	12	172	23w1	15	246	30w1	17	320	37w1	18
98	16w1	12	174	23w2	15	248	30w3	16	322	37w3	18
100	16w2	12	176	23w4	13	250	30w4	17	324	37w4	19
102	16w4	11	178	23w5	15	252	30w6	16	326	37w6	18
104	16w5	12	180	23w6	15	254	30w6	17	328	38w0	18
106	16w6	12	182	24w1	15	256	31w1	17	330	38w1	18
108	17w1	11	184	24w2	15	258	31w2	17	332	38w3	18
110	17w2	11	186	24w4	15	260	31w4	17	334	38w4	18
112	17w3	12	188	24w5	15	262	31w5	17	336	38w5	18
114	17w4	12	190	24w6	16	264	31w6	17	338	38w6	19
116	17w6	12	192	25w0	16	266	32w1	17	340	39w1	19
118	18w0	12	194	25w1	16	268	32w2	17	342	39w2	19
120	18w1	12	196	25w3	15	270	32w4	17	344	39w4	19
122	18w3	12	198	25w4	16	272	32w5	17	346	39w5	19
124	18w4	12	200	25w6	15	274	32w6	17	348	39w6	19
126	18w6	12	202	26w0	16	276	33w0	17			
128	19w0	12	204	26w1	15	278	33w1	17			

A3.7: FL

Hadlock:

Hadlock FP, Deter RL etc. “Estimationg Fetal Age: Computer-Assisted Analysis of Multiple Fetal Growth Parameters.” Radilolgy 152:497, 1984

MA (FL cm) = 10.35 + 2.460 * (FL) + 0.170 * (FL^2)

Merz:

Merz E. Ultrasound in Gynexology and Obstetrics. Stuttgart and New York: Thieme Medical Publishers, Inc., 1991, p. 326

Table FL, Merz

FL mm	MA	+/- 2SD	FL mm	MA	+/- 2SD	FL mm	MA	+/- 2SD	FL mm	MA	+/- 2SD
10	12w2d	11	28	18w4d	13	47	25w6d	15	65	33w1d	17
11	12w5d	10	29	19w0d	12	48	26w1d	16	66	33w4d	17
12	13w2d	10	30	19w3d	12	49	26w4d	15	68	34w4d	17
13	13w4d	11	31	19w5d	12	50	26w6d	16	69	35w0d	18
14	13w5d	11	32	20w1d	12	51	27w2d	16	70	35w3d	18
15	14w0d	11	33	20w4d	13	52	27w5d	16	71	35w6d	18
16	14w3d	11	34	20w6d	13	53	28w1d	16	72	36w2d	18
17	14w5d	11	35	21w1d	15	54	28w4d	17	73	36w6d	18
18	15w1d	11	36	21w4d	13	55	29w0d	17	74	37w2d	19
19	15w3d	11	37	21w6d	15	56	29w3d	17	75	37w5d	18
20	15w6d	11	38	22w2d	13	57	29w6d	17	76	38w1d	19
21	16w1d	11	40	23w1d	15	58	30w1d	17	77	38w5d	19
22	16w4d	11	41	23w3d	15	59	30w4d	17	78	39w1d	19
23	16w4d	11	42	23w5d	15	60	31w0d	17	79	39w4d	19
24	17w1d	12	43	24w1d	15	61	31w4d	17	80	40w1d	18
25	14w7d	13	44	24w4d	16	62	31w6d	17			
26	17w6d	13	45	25w0d	16	63	32w2d	17			
27	18w2d	13	46	25w3d	15	64	32w6d	17			

Jeanty:

Jeanty P, Rodesch F etc. “Estimation of Gestational Age from measurement of Fetal Long Bones.” Journal of Ultrasound in Medicine 3:75, 1984

MA (FL mm) = (9.5411757+0.2977451 * FL) + (0.0010388013 * FL^2)

Tokyo:

Studies on Fetal Growth and Functional Developments, Takashi Okai, Department of Obstetrics and Gynecology, Faculty of Medicine, University of Tokyo

Table **FL**, Tokyo

FL cm	MA	+/- 2SD	FL cm	MA	+/- 2SD	FL cm	MA	+/- 2SD	FL cm	MA	+/- 2SD
0.8	12w3d	10	2.6	17w6d	10	4.4	25w2d	25	6.2	34w0d	42
1	13w0d	10	2.8	18w4d	14	4.6	26w0d	25	6.4	35w0d	46
1.2	13w4d	10	3	19w2d	17	4.8	27w0d	25	6.6	36w0d	50
1.4	14w1d	10	3.2	20w5d	17	5	28w0d	25	6.8	38w0d	57
1.6	14w5d	10	3.4	21w5d	18	5.2	29w0d	30	7	40w0d	64
1.8	15w2d	10	3.6	22w3d	19	5.4	29w5d	30	7.2	40w2d	64
2	16w0d	10	3.8	23w0d	21	5.6	30w2d	30			
2.2	16w4d	10	4	24w0d	22	5.8	31w3d	32			
2.4	17w1d	10	4.2	24w5d	24	6	33w0d	38			

China:

Wu Zhongyu, “Ultrasound Diagnosis in Obstetrics and Gynecology”, Tianjin Science and Technology Publisher, 1995

Table **FL**, China

FL cm	MA	+/- 2SD	FL cm	MA	+/- 2SD	FL cm	MA	+/- 2SD	FL cm	MA	+/- 2SD
0.6	12w4d	7	2.4	18w0d	9	4.2	24w0d	16	6	33w0d	18
0.7	12w5d	7	2.5	18w2d	9	4.3	24w3d	16	6.1	33w3d	18
0.8	13w0d	8	2.6	18w4d	10	4.4	24w6d	16	6.2	34w0d	18
0.9	13w2d	8	2.7	18w6d	10	4.5	25w2d	16	6.3	34w3d	19
1	13w5d	8	2.8	19w2d	11	4.6	25w6d	16	6.4	35w0d	20
1.1	14w0d	8	2.9	19w4d	11	4.7	26w3d	16	6.5	35w3d	20
1.2	14w2d	8	3	19w6d	12	4.8	26w6d	16	6.6	35w6d	20
1.3	14w4d	8	3.1	20w1d	13	4.9	27w4d	17	6.7	36w3d	20
1.4	14w6d	8	3.2	20w3d	13	5	27w6d	17	6.8	37w0d	21
1.5	15w1d	8	3.3	20w5d	14	5.1	28w3d	17	6.9	37w3d	22
1.6	15w3d	8	3.4	21w1d	14	5.2	28w6d	17	7	38w0d	23
1.7	15w5d	8	3.5	21w3d	15	5.3	29w3d	17	7.1	38w3d	23
1.8	16w0d	8	3.6	21w6d	15	5.4	29w6d	17	7.2	38w6d	23
1.9	16w3d	8	3.7	22w2d	15	5.5	30w3d	17	7.3	39w3d	23
2	16w5d	8	3.8	22w4d	15	5.6	30w6d	17	7.4	39w6d	23
2.1	17w0d	8	3.9	23w0d	15	5.7	31w3d	17	7.5	40w2d	23
2.2	17w2d	8	4	23w2d	16	5.8	31w6d	18			
2.3	17w4d	8	4.1	23w4d	16	5.9	32w3d	18			

Osaka:

Osaka University (2002/April/08)

Table FL, Osaka

FL cm	Mean	Min	Max	FL cm	Mean	Min	Max	FL cm	Mean	Min	Max
0.94	13w0d	12w3d	13w4d	3.61	22w1d	21w1d	23w1d	5.69	31w2d	29w6d	32w5d
1.03	13w2d	12w5d	13w6d	3.68	22w3d	21w3d	23w3d	5.74	31w4d	30w1d	33w0d
1.12	13w4d	12w6d	14w1d	3.75	22w5d	21w5d	23w4d	5.80	31w6d	30w2d	33w3d
1.21	13w6d	13w1d	14w3d	3.83	23w0d	22w0d	24w0d	5.85	32w1d	30w4d	33w5d
1.30	14w1d	13w3d	14w5d	3.90	23w2d	22w2d	24w2d	5.90	32w3d	30w6d	34w0d
1.39	14w3d	13w5d	15w1d	3.97	23w4d	22w4d	24w4d	5.96	32w5d	31w1d	34w2d
1.48	14w5d	14w0d	15w3d	4.04	23w6d	22w6d	24w6d	6.01	33w0d	31w3d	34w4d
1.57	15w0d	14w2d	15w5d	4.11	24w1d	23w0d	25w1d	6.06	33w2d	31w5d	34w6d
1.66	15w2d	14w4d	16w0d	4.18	24w3d	23w2d	25w3d	6.11	33w4d	32w0d	35w1d
1.75	15w4d	14w6d	16w2d	4.25	24w5d	23w4d	25w5d	6.16	33w6d	32w1d	35w3d
1.83	15w6d	15w1d	16w4d	4.32	25w0d	23w6d	26w0d	6.21	34w1d	32w3d	35w6d
1.92	16w1d	15w3d	16w6d	4.39	25w2d	24w1d	26w3d	6.26	34w3d	32w5d	36w1d
2.01	16w3d	15w4d	17w1d	4.45	25w4d	24w3d	26w4d	6.31	34w5d	33w0d	36w3d
2.09	16w5d	15w6d	17w3d	4.52	25w6d	24w5d	27w0d	6.36	35w0d	33w2d	36w6d
2.18	17w0d	16w1d	17w5d	4.59	26w1d	25w0d	27w2d	6.41	35w2d	33w4d	37w1d
2.26	17w2d	16w3d	18w0d	4.65	26w3d	25w2d	27w4d	6.46	35w4d	33w6d	37w3d
2.34	17w4d	16w5d	18w2d	4.72	26w5d	25w4d	27w6d	6.50	35w6d	34w0d	37w5d
2.43	17w6d	17w0d	18w4d	4.78	27w0d	25w5d	28w1d	6.55	36w1d	34w2d	38w0d
2.51	18w1d	17w2d	18w6d	4.85	27w2d	26w0d	28w3d	6.60	36w3d	34w4d	38w3d
2.59	18w3d	17w4d	19w1d	4.91	27w4d	26w2d	28w5d	6.64	36w5d	34w6d	38w5d
2.67	18w5d	17w6d	19w3d	4.97	27w6d	26w4d	29w0d	6.69	37w0d	35w0d	39w1d
2.75	19w0d	18w1d	19w6d	5.04	28w1d	26w6d	29w3d	6.73	37w2d	35w2d	39w3d
2.83	19w2d	18w3d	20w1d	5.10	28w3d	27w1d	29w5d	6.77	37w4d	35w4d	39w5d
2.91	19w4d	18w5d	20w3d	5.16	28w5d	27w3d	30w0d	6.82	37w6d	35w6d	40w0d
2.99	19w6d	19w0d	20w5d	5.22	29w0d	27w5d	30w2d	6.86	38w1d	36w1d	40w1d
3.07	20w1d	19w2d	21w0d	5.28	29w2d	27w6d	30w4d	6.90	38w3d	36w2d	40w2d
3.15	20w3d	19w4d	21w2d	5.34	29w4d	28w1d	30w6d	6.94	38w5d	36w4d	40w3d
3.23	20w5d	19w6d	21w4d	5.40	29w6d	28w3d	31w1d	6.98	39w0d	36w6d	40w4d
3.30	21w0d	20w0d	21w6d	5.46	30w1d	28w5d	31w4d	7.02	39w2d	37w1d	40w5d
3.38	21w2d	20w2d	22w1d	5.52	30w3d	29w0d	31w6d	7.06	39w4d	37w2d	40w6d
3.46	21w4d	20w4d	22w3d	5.57	30w5d	29w2d	32w1d	7.10	39w6d	37w4d	41w0d
3.53	21w6d	20w6d	22w5d	5.63	31w0d	29w4d	32w3d	7.12	40w0d	37w5d	41w0d

A3.8: FTA

Osaka:

Osaka University (2002/April/08)

Table FTA, Osaka

FTA cm^2	MEAN	MIN	MAX	FTA cm^2	MEAN	MIN	MAX	FTA cm^2	MEAN	MIN	MAX
5.6	14w0d	13w2d	14w5d	26.4	22w6d	21w5d	23w6d	57.2	31w5d	29w6d	33w3d
6.0	14w2d	13w4d	14w6d	27.2	23w1d	22w0d	24w1d	58.3	32w0d	30w1d	33w5d
6.5	14w4d	13w6d	15w2d	28.1	23w3d	22w1d	24w3d	59.4	32w2d	30w3d	34w0d
7.1	14w6d	14w1d	15w4d	29.0	23w5d	22w3d	24w6d	60.4	32w4d	30w5d	34w2d
7.6	15w1d	14w2d	15w6d	29.9	24w0d	22w5d	25w1d	61.5	32w6d	31w0d	34w5d
8.1	15w3d	14w4d	16w1d	30.8	24w2d	23w0d	25w3d	62.6	33w1d	31w1d	35w0d
8.7	15w5d	14w6d	16w3d	31.7	24w4d	23w2d	25w5d	63.7	33w3d	31w3d	35w2d
9.2	16w0d	15w1d	16w5d	32.6	24w6d	23w4d	26w0d	64.7	33w5d	31w5d	35w4d
9.8	16w2d	15w3d	17w0d	33.6	25w1d	23w6d	26w2d	65.8	34w0d	32w0d	36w0d
10.4	16w4d	15w5d	17w2d	34.5	25w3d	24w1d	26w5d	66.9	34w2d	32w1d	36w2d
11.0	16w6d	16w0d	17w5d	35.5	25w5d	24w2d	26w6d	67.9	34w4d	32w3d	36w5d
11.6	17w1d	16w2d	17w6d	36.5	26w0d	24w4d	27w2d	69.0	34w6d	32w5d	37w0d
12.2	17w3d	16w3d	18w2d	37.4	26w2d	24w6d	27w4d	70.1	35w1d	33w0d	37w2d
12.8	17w5d	16w5d	18w4d	38.4	26w4d	25w1d	27w6d	71.1	35w3d	33w1d	37w5d
13.5	18w0d	17w0d	18w6d	39.4	26w6d	25w3d	28w1d	72.2	35w5d	33w3d	38w0d
14.1	18w2d	17w2d	19w1d	40.4	27w1d	25w5d	28w3d	73.2	36w0d	33w5d	38w3d
14.8	18w4d	17w4d	19w3d	41.4	27w3d	26w0d	28w5d	74.2	36w2d	33w6d	38w5d
15.5	18w6d	17w6d	19w5d	42.4	27w5d	26w2d	29w1d	75.2	36w4d	34w1d	39w1d
16.2	19w1d	18w1d	20w0d	43.4	28w0d	26w3d	29w2d	76.2	36w6d	34w3d	39w3d
16.9	19w3d	18w3d	20w2d	44.5	28w2d	26w5d	29w5d	77.3	37w1d	34w4d	39w6d
17.6	19w5d	18w4d	20w4d	45.5	28w4d	27w0d	30w0d	78.2	37w3d	34w6d	40w0d
18.4	20w0d	19w0d	20w6d	46.6	28w6d	27w2d	30w2d	79.2	37w5d	35w0d	40w1d
19.1	20w2d	19w1d	21w1d	47.6	29w1d	27w4d	30w4d	80.2	38w0d	35w2d	40w2d
19.9	20w4d	19w3d	21w4d	48.7	29w3d	27w6d	30w6d	81.1	38w2d	35w3d	40w3d
20.6	20w6d	19w5d	21w6d	49.7	29w5d	28w1d	31w1d	82.1	38w4d	35w5d	40w4d
21.4	21w1d	20w0d	22w1d	50.8	30w0d	28w3d	31w3d	83.0	38w6d	36w0d	40w5d
22.2	21w3d	20w2d	22w3d	51.8	30w2d	28w4d	31w6d	83.9	39w1d	36w1d	40w6d
23.0	21w5d	20w4d	22w5d	52.9	30w4d	28w6d	32w1d	84.8	39w3d	36w3d	41w0d
23.8	22w0d	20w6d	23w0d	54.0	30w6d	29w1d	32w3d	85.7	39w5d	36w4d	41w0d

24.7	22w2d	21w1d	23w2d	55.0	31w1d	29w3d	32w5d	86.6	40w0d	36w6d	41w0d
25.5	22w4d	21w3d	23w4d	56.1	31w3d	29w5d	33w0d				

A3.9: HUM

Jeanty:

Jeanty P, Rodesch F etc. “Estimation of Gestational Age from measurement of Fetal Long Bones.” Journal of Ultrasound in Medicine 3:75, 1984

MA (HUM mm) = 9.6519438 + (0.26200391 * HUM) + (0.0026105367 * HUM^2)

A3.10: CER

Goldstein:
MA（CERmm）=6.329+4.807*(CER)/10+1.484*(CER/10)²-0.2474*(CER/10)³

A3.11: THD

Hansmann:
MA（THDmm）=6.963496+3.829853*(THD/10)-0.443065*$(THD/10)^2$+0.1010238*$(THD/10)^3$-0.0099702*$(THD/10)^4$+ 0.0003773$(THD/10)^5$

A3.12: Estimated Fetal Weight

Merz E. Werner G. & llan E. T., 1991, Ultrasound in Gynecology and Obstetrics Textbook and Atlas 312, 326-336.

Hansmann M, Hackelöer B-J, Staudach A, Ultraschalldiagostik in Geburtshilfe und Gynäkologie 1995.

Campbell S, Wilkin D. “Ultrasonic Measurement if Fetal Abdomen Circumference in the Estimation of Fetal Weight.” Br J Obstetrics and Gynecology September 82 (9):689-697, 1975.

Hadlock F, Harrist R, et al. Estimation of fetal weight with the use of head, body, and femur measurement – a prospective study. American Journal of Obstetrics and Gynecology February 1, 151 (3): 333-337, 1985.

Shepard M, Richards V, Berkowitz R, Warsof S, Hobbins J. An Evallluation of Two Equations for Predicting Fetal Weight by Ultrasound. American Journa of f Obstetrics and Gynecology January 142 (1): 47-54, 1982.

Fetal Growth Chart Using the Ultrasonotomographic Technique, Keiichi Kurachi, Mineo Aoki, Department of Obstetrics and Gynecology, Osaka University Medical School Revision 3 (September 1983)

Studies on Fetal Growth and Functional Developments, Takashi Okai, Department of Obstetrics and Gynecology, Faculty of Medicine, University of Tokyo

A3.13: FBP Criterion

FBP is a method to estimate fetus physiological condition through fetus response experiment, placental level and indexes such as amniotic fluid.

The score criterion provided by the system is based on Vintzileos formula, as shown in the following table.

Fetus Index		0	1	2	Observation Time	Note
FHR	FHR	FHR≤1 time	FHR≥15 times/m，time≥15S，1~4 次	FHR≥15 times/m，time≥15S，≥5 times	20m	Scores obtained through fetus response experiment can be input into the system on report interface.
Fetal Movement	FM	No FM	1~2 times FM	FM≥3 times	30m	
Fetal Breath Movement	FBM	No FBM，or time≤30S	FBM≥1 time，time 30-60S	FBM≥1 time，time≥60S	30m	
Fetal Tonicity	FT	Limbs stretched, no bending, fingers loose	Limbs or spine stretch-bend >=1 time	Limbs or spine stretch-bend >=1 time	30m	
Amniotic Fluid	AF	AF＜1cm	1cm≤AF≤2cm	AF＞2cm	Obtained by image measurement	
Placental Level	PL	Placental grade is 3.	Placental on posterior wall, no grade	Placental grade is 2.	Placental level includes 0, 1, 2 and 3 according to the fetal acoustic image.	

FBP criterion is as follows:

Total Score	Condition
7-12	Normal, Chronic asphyxia risk low
3-6	Chronic asphyxia suspicious
0-2	Chronic asphyxia risk high

Appendix IV: Measurement Accuracy

Parameter	Range	Accuracy
Image depth range	3.5MHz/R60,2.0MHz/3.0 MHz/4.0MHz/5.0MHz/6. 0MHz: 19mm~245mm 3.5MHz/R40,2.0MHz/3.0 MHz/4.0MHz/5.0MHz/6. 0MHz: 19mm~245mm 7.5MHz/L40,6.0MHz/7.0 MHz/8.0MHz/9.0MHz/10 .0MHz: 29mm~108mm 6.5MHz/R10,4.5MHz/5.5 MHz/6.5MHz/7.5MHz/8. 5MHz: 29mm~167mm 3.5MHz/R20,2.0MHz/3.0 MHz/4.0MHz/5.0MHz/6. 0MHz 19mm~245mm	<±5% of full scale
Two-dimension Measurement		
Distance/depth	up to 250 mm	< ±5% or < 2 mm, if below 40 mm
Area (Trace)	up to 720 cm^2	< ±8% or < 130 mm^2, if below 1600 mm^2
Angle	0º to 180º	< ±3% on 1/2 segment
Ratio (A>B)		
-Result B/A and (A-B)/A -Result A/B	up to 1.0 1.0 to 99.9	< ±10% of A < ±10% of A
Time Motion (TM) Measurement		
Depth	up to 250 mm	< ±5% or < 2 mm, if below 40 mm
Time	up to 25 sec	< ± 5%
Heart rate	15 to 999 bpm	< ±5%
Velocity (ratio)	up to 999 mm/sec	< ±5%
Volume Measurement		
Volume (area, length, diameter)	up to 999 cm^3	< ±12% or <8000 mm^3, if below 64000 mm^3
Thyroid gland volume	up to 999 cm^3	< ±12% or <8000 mm^3, if below 64000 mm^3
Residual urine volume	up to 999 mL	< ±12% or <8000 mm^3, if below 64000 mm^3
Prostate volume	up to 999 cm^3	< ±12% or <8000 mm^3, if below 64000 mm^3

Probe / Index	C363-1	L743	E743	C321	E613	C343-1	C362
Nominal frequency, MHz	2/3/4/5/6MHz	6/7/8/9/10MHz	6/7/8/9/10 MHz	2/3/4/5/6 MHz	4.5/5.5/6.5/7.5/8.5MHz	2/3/4/5/6 MHz	2/3/4/5/6MHz
Lateral resolution, mm	2.0/3.0MHz：≤2（depth≤80） 4.0/5.0/6.0MHz：≤1（depth≤60） 2.0/3.0/MHz：≤3（80＜depth≤130） 4.0MHz：≤2（60＜depth≤80）	≤1（depth≤60）	≤1（depth≤60）	2.0/3.0MHz：≤2（depth≤80） 4.0/5.0MHz：≤1（depth≤60） 2.0/3.0/MHz：≤4（80＜depth≤130） 4.0MHz：≤2（60＜depth≤80） 6.0 MHz：≤1（depth≤40）	4.5/5.5MHz：≤2（depth≤50） 6.5/7.5/8.5MHz：≤1（depth≤30）	2.0/3.0MHz：≤2（depth≤80） 4.0/5.0/6.0MHz：≤1（depth≤60） 2.0/3.0MHz：≤3（80＜depth≤130） 4.0MHz：≤2（60＜depth≤80）	2.0/3.0MHz：≤2（depth≤80） 2.0/3.0MHz：≤3（80＜depth≤130） 4.0/5.0/6.0MHz：≤1（depth≤60） 4.0/5.0/6.0MHz：≤2（60＜depth≤80）
Axial resolution, mm	2.0/3.0/MHz：≤1（depth≤170） 4.0/5.0/6.0MHz：≤1（depth≤130）	≤0.5（depth≤60） ≤1（60＜depth≤80）	≤0.5（depth≤60） ≤1（60＜depth≤80）	2.0MHz:≤1（depth≤170） 3.0/4.0/5.0/6.0MHz：≤1（depth≤130） 3.0/4.0MHz：≤2（130＜depth≤170）	4.5/5.5/6.5/7.5/8.5MHz：≤0.5（depth≤60）	2.0MHz:≤1（depth≤170） 3.0/4.0/5.0/6.0MHz：≤1（depth≤130） 3.0/4.0/5.0MHz：≤2（130＜depth≤170）	2.0/3.0MHz：≤1（depth≤170） 4.0MHz：≤1（depth≤130） 4.0MHz：≤2（130＜depth≤170） 5.0/6.0MHz：≤1（depth≤130）

Dead zone，mm	≤3	6.0/7.0/8.0MHz：≤3 9.0/10.0MHz：≤2	6.0/7.0/8.0MHz：≤3 9.0/10.0MHz：≤2	≤3	≤3	≤3	≤3
Maximum depth of penetration，mm	2.0/3.0MHz：≥210 4.0/5.0MHz：≥180 6.0MHz：≥170	6.0MHz≥90 7.0/8.0/9.0MHz: ≥80 10.0MHz:≥70	6.0MHz≥90 7.0/8.0/9.0MHz: ≥80 10.0MHz:≥70	2.0/3.0MHz：≥170 4.0/5.0/6.0MHz：≥150	4.5/5.5MHz：≥80 6.5/7.5MHz：≥60 8.5MHz：≥50(	2.0MHz：≥200 3.0MHz：≥190 4.0/5.0MHz：≥180 6.0MHz：≥160	2.0/3.0MHz：≥190 4.0/5.0MHz：≥170 6.0MHz：≥160
Geometric position accuracy，%	lateral≤3 axial≤3	lateral≤4 axial≤3	lateral≤4 axial≤3	lateral≤5 axial≤4	lateral≤5 axial≤5	lateral≤5 axial≤5	lateral≤4 axial≤4
Calculation error，%	perimeter≤1.5 area≤3	perimeter≤1.5 area≤3	perimeter≤2.5 area≤4	perimeter≤2 area≤4	perimeter≤2.5 area≤3	perimeter≤3 area≤5	perimeter≤1.5 area≤3
Slice thickness, mm	≤9	≤6	≤6	≤8	≤5	≤9	≤9

Appendix V: EMC Information-Guidance and Manufacture's Declaration

Guidance and manufacture's declaration-electromagnetic emissions-
For all EQUIPMENT and SYSTEMS

<table>
<tr><th colspan="3">Guidance and manufacture's declaration-electromagnetic emission</th></tr>
<tr><td colspan="3">The DUS 6 is intended for use in the electromagnetic environment specified below; The customer or the user of the DUS 6 should assure that it is used in such and environment.</td></tr>
<tr><th>Emission test</th><th>Compliance</th><th>Electromagnetic environment-guidance</th></tr>
<tr><td>RF emissions
CISPR 11</td><td>Group 1</td><td>The DUS 6 uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.</td></tr>
<tr><td>RF emissions
CISPR 11</td><td>Class A</td><td rowspan="3">The DUS 6 is suitable for use in all establishments, other than domestic and those directly connected to the public low-voltage power supply network that supplies building used for domestic purposes.</td></tr>
<tr><td>Harmonic emissions
IEC 61000-3-2</td><td>Class A</td></tr>
<tr><td>Voltage fluctuations/flicker emissions
IEC 61000-3-3</td><td>Complies</td></tr>
</table>

Guidance and manufacture's declaration – electromagnetic immunity – for all EQUIPMENT and SYSTEMS

Guidance and manufacture's declaration – electromagnetic immunity			
The DUS 6 is intended for use in the electromagnetic environment specified below. The customer or the user of DUS 6 should assure that it is used in such an environment.			
Immunity test	**IEC 60601 test level**	**Compliance level**	**Electromagnetic environment -guidance**
Electrostatic discharge (ESD) IEC 61000-4-2	±6 kV contact ±8 kV air	±6 kV contact ±8 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 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 61000-4-5	±1 kV line to line ±2 kV line to earth	±1 kV line to line ±2 kV line to earth	Mains power quality should be that of a typical commercial or hospital environment.
Power frequency (50/60Hz) magnetic field IEC 61000-4-8	3A/m	3A/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 61000-4-11	<5% UT (>95% dip in UT) for 0.5 cycle 40% UT (60% dip in UT) for 5 cycles 70% UT (30% dip in UT) for 25 cycles <5% UT (>95% dip in UT) for 5 sec	<5% UT (>95% dip in UT) for 0.5 cycle 40% UT (60% dip in UT) for 5 cycles 70% UT (30% dip in UT) for 25 cycles <5% UT (>95% dip in UT) for 5 sec	Mains power quality should be that of a typical commercial or hospital environment. If the user of the DUS 6 requires continued operation during power mains interruptions, it is recommended that the DUS 6 be powered from an uninterruptible power supply or a battery.
NOTE UT is the a.c. mains voltage prior to application of the test level.			

Guidance and manufacture's declaration – electromagnetic immunity – for EQUIPMENT and SYSTEMS that are not LIFE-SUPPORTING

Guidance and manufacture's declaration – electromagnetic immunity

The DUS 6 is intended for use in the electromagnetic environment specified below. The customer or the user of the DUS 6 should assure that it is used in such an environment.

Immunity test	**IEC 60601 test level**	**Compliance level**	**Electromagnetic environment -guidance**
Conducted RF IEC 61000-4-6 Radiated RF IEC 61000-4-3	3 Vrms 150 kHz to 80 MHz 3 V/m 80 MHz to 2.5 GHz	1Vrms 1 V/m	Portable and mobile RF communications equipment should be used no closer to any part of the DUS 6, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. **Recommended separation distance** $d = \left[\frac{3.5}{V_1}\right]\sqrt{P}$ $d = \left[\frac{3.5}{E_1}\right]\sqrt{P}$ 80 MHz to 800 MHz $d = \left[\frac{7}{E_1}\right]\sqrt{P}$ 800 MHz to 2.5 GHz Where *P* is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and *d* is the recommended separation distance in metres (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey,[a] should be less than the compliance level in each frequency range.[b] Interference may occur in the vicinity of equipment marked with the following symbol: 

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.

[a] 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 the DUS 6 is used exceeds the applicable RF compliance level above, the DUS 6 should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the DUS 6

[b] Over the frequency range 150 kHz to 80 MHz, field strengths should be less than *3 V/m*.

Recommended separation distances between portable and mobile RF communication equipment and the EQUIPMENT or SYSTEM- For EQUIPMENT or SYSTEM that are not LIFE-SUPPORTING

Recommended separation distances between portable and mobile RF communications equipment and the DUS 6

The DUS 6 is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the DUS 6 can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the DUS 6 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 $d = \left[\frac{3.5}{V_1}\right]\sqrt{P}$	**80 MHz to 800 MHz** $d = \left[\frac{3.5}{E_1}\right]\sqrt{P}$	**800 MHz to 2.5 GHz** $d = \left[\frac{7}{E_1}\right]\sqrt{P}$
0.01	0.35	0.35	0.7
0.1	1.1	1.1	2.2
1	3.5	3.5	7
10	11	11	22
100	35	35	70

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 VI: Order List

The following accessories are recommended to be used on the DUS 6.

WARNING

Probes and other accessories used on the DUS 6 must be provided or recommended by EDAN. Otherwise, the device may be damaged.

Part Name	Part Number
Probe C363-1	MS3-19518
Probe L743	MS3-102351
Probe E613	MS3-102588
Probe C321	MS3-102376
Probe E743	MS3-102384
Probe C343-1	MS3-102573
Needle Guide Bracket Kit BGK-CR60	MS3-102338
Needle Guide Bracket Kit BGK-CR40	MS3-102346
Needle Guide Bracket Kit BGK-CR20	MS3-102380
Needle Guide Bracket Kit BGK-CR10	MS3-102364
Needle Guide Bracket Kit BGK-LA43	MS3-102355
Coupling gel	M50-78001
Foot switch	MS3R-102414
Probe Holder	MS4-102422
MT-802 Mobile Trolley	MS9-102423
Hand Carried Bag	MS1-102424
Video Printer (SONY UP-897MD)	M18-520146
Video Printer (MITSUBISHI P93W)	M18-52147
Silicone Pads	MS1R-109693
Cable Holder	MS1R-102833
Screw (M3×12)	M19-057154
U disk / Netac, U180 (2G)	11.18.052245-10

Appendix VII: Glossary

Abbreviated	Description
Obstetrics	
EDC	Estimated Date of Confinement
MA	Menstrual Age
LMP	Last Menstrual Period
BBT	Basal Body Temperature
EFW	Estimated Fetal Weight
GS	Gestational Sac Diameter
CRL	Crown Rump Length
BPD	Biparietal Diameter
HC	Head Circumference
AC	Abdominal Circumference
FL	Femur Length
AFI	Amniotic Fluid Index
TAD	Transverse Abdominal Diameter/Transverse Trunk Diameter
APAD	Antero Posterior Abdominal Diameter
CER	Cerebellum Diameter
FTA	Fetus Trunk cross section Area
HUM	Humerus Length
OFD	Occipital Frontal Diameter
THD	Thorax Diameter
FBP	Fetal Biophysical Profile
Cardiology	
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 Stroke Volume
QMV	Mitral valve instantaneous flow rate
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
Gynecology	
UT	Uterus
UT-L	Uterus Length
UT-W	Uterus width
UT-H	Uterus Height
Endo	Uterus Endo-membrane Thickness / Endometrium
L. OV-Vol	Left Ovary Volume
L. OV-L	Left Ovary Length
L. OV-W	Left Ovary Width
L. OV-H	Left Ovary Height
R. OV-Vol	Right Ovary Volume
R. OV-L	Right Ovary Length
R. OV-W	Right Ovary Width
R. OV-H	Right Ovary Height
L. FO-L	Left Follicle Length
L. FO-W	Left Follicle Width
R. FO-L	Right Follicle Length
R. FO-W	Right Follicle Width
CX-L	Cervix Length
UT-L/CX-L	Uterus Length / Cervix Length
Small Parts	
THY	Thyroid Gland
L. THY-V	Left Thyroid Gland Volume
L. THY-L	Left Thyroid Gland Length
L. THY-W	Left Thyroid Gland Width
L. THY-H	Left Thyroid Gland Height
R. THY-V	Right Thyroid Gland Volume

R. THY-L	Right Thyroid Gland Length
R. THY-W	Right Thyroid Gland Width
R. THY-H	Right Thyroid Gland Height
Urology	
RUV	Residual Urine Volume (mL or L)
RUV-L	Residual Urine Length
RUV-W	Residual Urine Width
RUV-H	Residual Urine Height
PV	Prostate Volume (mm3, cm3, or dm3)
PV-L	Prostate Length
PV-W	Prostate Width
PV-H	Prostate Height
SPSA	Serum of Prostate Specific Antigen
PPSA	Predicted Prostate Specific Antigen Density
PSAD	Prostate Specific Antigen Density
Orthopedics	
HIP	Hip joint

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