

HUMAN FULL DIGITAL
ULTRASONIC DIAGNOSTIC INSTRUMENT (LED)
USER MANUAL MT128V

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Foreword

Thank you for purchasing The -type ultrasonic diagnostic apparatus

In order to make sure that you can be a safe and effective use of the instrument, please read this manual carefully.

After reading, please keep this manual, so that can check at any time when you needed.

This manual contains the product user manual and technical specifications.

Manufacturer statement

This manual is only for operation and maintenance of the instrument.

The schematic diagram in this instruction manual is only for reference.

In reading this manual instruction should be paid attention to such words "warning", "careful" and "attention" particularly.

Manufacturer ensure

The manufacturer ensure, the instrument effectively guarantee since 1 year from the date of purchase(not including attachments),under normal use, when it break down, without repairing, the manufacturer can provide for a period of one year free warranty service. Other artificial damage, like user tear up the seals, faulty operation, etc, the manufacture do not provide free maintenance service.

This guarantee applies only in accordance with the instructions specified conditions of operation instrument of fault, to ensure the using range specified in the instrument can only be used for random manual.

This warranty does not include the damage caused by the external causes, such as lightning, earthquake, theft, misuse, or modified equipment damage.

The manufacturer is not responsible for by other equipment or other devices to connect damage caused.

The manufacturer is not responsible for by delay service request is responsible for the loss, damage or injury.



Safety symbol

In this manual, safety precautions are classified into "warning", "careful" and "attention" at three levels.

Used to represent important about safety, Specific meaning are shown in form 1. Before reading this manual, please carefully to understand and remember the meaning of these symbols and words.

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Form 1 Safety symbol table

NO.	Graphics, Symbols, Words	Name	Meaning
1	 Warning	Warning	Used to indicate if you ignore it will result in serious personal injury, death or actual damage to property.
2	 Careful	Careful	Used to indicate if you ignore it will produce slight personal injury or property damage.
3	Attention	Attention	Used to prompt the user installation, operation and maintenance information, this information is important, however, there is no danger, danger warning not included in the note content.


Graphics, symbols, abbreviations

In the instrument(or in the manual), used in the graphics, symbols, abbreviations listed instructions are shown in form 2, They are used to indicate when transportation, loading and unloading, and storage in the assignments need to pay attention to, to ensure the safety of the instrument

Form 2 the Description of Graphics, symbols, abbreviations

NO.	Graphics, Symbols, Abbreviations	Name	Meaning	Identification of Position
1		Power Ready	Connected (main power)	On the power button
2	○	Power off	Off (main power)	On the power button
3		Power switch	Power switch position	By the power switch
4		Intensity control	Adjust image brightness	Beside the display
5		Contrast control	Adjust image contrast	Beside the display
6		Driving direction	Open the control panel lock hook	Before the box at the top of the
7		B-type	Type B applied part	Operation panel
8		Adjust direction	Brightness, contrast, the total gain, the direction in which the focal point	Adjust knob on/near
9	GAIN	Total gain	The total gain adjustment knob	Beside the total gain adjustment knob
10	FOCUS	Focus point	The focus knob	Beside the focus knob
11	+	Enlargement	Increasing/to increase	On the panel






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NO.	Graphics, Symbols, Abbreviations	Name	Meaning	Identification of Position
12	—	Reduce	Reduce/decrease	On the panel
13	TGC	Time gain	Time gain control	On the panel
14	VIDEO OUT	Output interface	PAL video output	At the back of the panel
15	VGA OUT	Output interface	SVGA video output	At the back of the panel
16		Protective grounding	Protective grounding	At the back of the panel
17	F1. 5L250V Φ5×20	Protective tube	Insurance tube type and specification	At the back of the panel
18	AC110V~240V	Power input	110V~240V AC input	At the back of the panel
19	IPX7	Shell protection class	In a short time, prevent water into the instrument	Outside of the probe

Package indicative mark

On the packing cases are listed in form 3 packaging storage and transportation, it is used to indicate when transportation, loading and unloading, and storage in the assignments need to pay attention, to ensure the safety of the instrument.

Form 3 Packaging symbol table

NO.	Mark name	Mark	Meaning	Identification of Position
1	Upward		Indicates that the transportation package transportation should be vertical	Outside surface
2	Fragile		Means the package within a fragile goods, to handle with care when handling	Outside surface
3	No rain		Indicates that the transport packing room was afraid of the rain	Outside surface
4	No sun		Means that the transport package is can not direct sun	Outside surface
5	Stacking layer limit		Show that the maximum number of layers can be stacking the same transport package is 4 layers	Outside surface

Safety precautions

In order to prevent the damage caused by improper use, please observe the following safety precautions.

Safety precautions



Warning

1. The user should according to the provisions in this manual operation, the manufacturer does not assume in violation of the instructions may cause a variety of security risks.
2. The medical device is not for family using, it can be used by a qualified physician only.
3. Do not use the probe to scan the patient's eyes or cause the beam through the eyes in any way.
4. Ultrasound under the condition of low power is safe, in the case of high power or irradiation for a long time, its security has not been fully confirmed. So, Use the instrument physicians should use the lowest possible sound power, reasonable choose detection parts and controls the scanning time, only to make a diagnosis required time is limited, to avoid damaging on the patients.
5. In the embryo or fetus examine, scanning should pay special attention to reduce the radiation sound power and irradiation time. Avoid heat generated by the potential harm on embryo or fetus.
6. The probe can not be fixed in the same part of patients to scan for a long time.
7. The instrument can't use with cardiac defibrillator and high-frequency surgery or treatment equipment, to prevent electric shock or damage to the instrument on patients.
8. The instrument is forbidden to use under the follows environment such as the air mixture flammable gas, mixed with oxygen or nitrous oxide of flammable gas and other combustible gas to prevent the risk of explosion.
9. The instrument cannot be used for patients with heart.
10. If it can detect the hot ultrasonic probe in the naturally air, it cannot be used for the vagina examine.
11. The instrument is not applicable to gas organs such as the stomach, intestine, lung and other organs; Can't have wounds or acute inflammation to detect, in order to avoid cross infection.
12. Power supply must comply with the provisions of the safe electricity, if the power protection grounding terminals is not conforming to the rules, using instrument is strictly prohibited. Otherwise it will cause personal injury accidents.
13. Should check the power cord of the instrument frequently, if found damage such as fracture should be replaced immediately.
14. Should inspect the probe frequently, if found there is any breakage, crack on the surface of cable or probe, should be immediately shut down and stop using.
15. Before cleaning host and probe appearance, in order to avoid the accident, should unplug the power cord and cut off power supply net completely.

Safety precautions



Careful

1. Should prevent the probe far away from the sharp, hard object, it is forbidden to collision probe acoustic window, otherwise it will cause damage of the probe.
2. Probe for a long time can cause fever, during the suspension diagnosis, should press the "frozen" button to make the probe to stop working.
3. The probe's waterproof grade is IPX7, and the part of the probe which is soaked in the water can not surpass 5mm than the acoustic window.
4. Use unqualified coupling agent can make the probe acoustic window from corrosion and damage should be used for medical ultrasonic coupling agent.
5. Only used in the probe head coupling agent, carefully clean after use.
6. Probe is forbidden to be heated. If the probe temperature is lower than the room temperature, it can be heated naturally before use.
7. Do not insert or take down the probe in the electric situation.
8. In using process, it is strictly prohibited to cover the heat emission hole of the instrument.
9. Please do not open the instrument shell by oneself, in order to avoid possible electric shock risk. Any instrument maintenance and upgrade must be authorized by the manufacturer, training and service personnel.
10. Sundry, water cup, etc. are not permitted on the operation panel.
11. The instrument can only use the probe of manufacturer configuration; otherwise it will cause damage of equipment.
12. In using process, if an exception occurs, please shut down immediately.

Attention

1. Power supply circuit of the instrument and the bearing capacity of the power supply socket range is 110V~240 V / 1.5 A. If use extended patch panel, please choose a product which with the safety certification.
2. When using should be far away from the strong electric field, strong magnetic field devices and high voltage equipment.
3. If the instruments used in conjunction with other medical equipment, please consult manufacturer, shall be carried out under the guidance of manufacturer.
4. Do not use the unspecified accessories (such as insurance and protect the earth wire, etc.), in order to avoid adverse impact on performance and security in the device.
5. After shutdown the instrument every time, should wait for at least 2 ~ 3 minutes to start up again, so as not to damage the instrument.
6. The screen is fragile, please do not hit, in order to avoid break.

Chapter 1 Outline

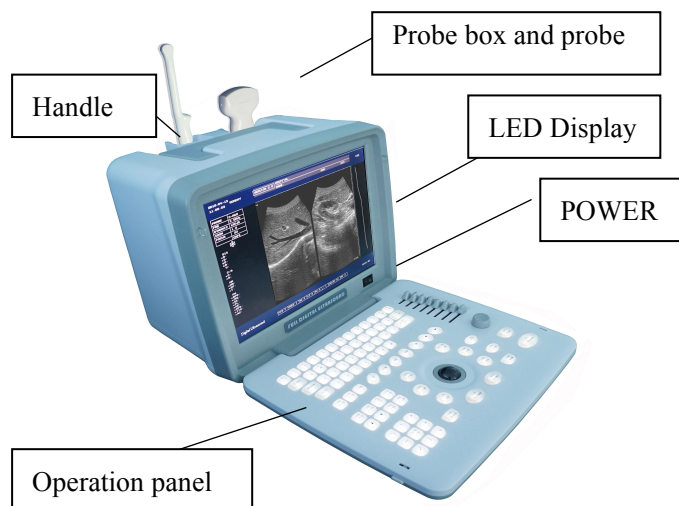
1.1 Functional Characteristics

This Ultrasonic diagnostic instrument (here in after referred as instrument) using 3.5 MHz electronic convex array probe, adopts full digital beam former(DBF); real-time dynamic aperture imaging (RDA); full digital dynamic receive focusing (DRF); frequency conversion; 8 segments TGC; dynamic digital filtering; dynamic digital filtering; image enhancement; line correlation, frame correlation, point correlation, linear interpolation and many other image processing technology, etc.; display modes as B, B/B, 4B, B+M and M, image multiplying factors of $\times 0.8$, $\times 1.0$, $\times 1.2$, $\times 1.5$, $\times 1.8$, $\times 2.0$ under the B mode; with 128 a large memory and offers permanent storage, cine loop in real time; 256 images available after diagnosis of real-time playback or by image viewer, has measurements of distance, area, circumference, heart rate, gestational weeks(BPD、GS、CRL、FL、HC、OFD、TTD、AC 8 measurement kinds) and so on; Chinese and English transformation; pseudo color processing; real-time clock; serial number of medical record; many note functions as full-screen character noting; adopts large scale integrated circuit FPGA, MSF, mass memory, surface mounting technology and so on.

1.2 Structural Feature

The instrument is made up of host (including the LED displayer) and probe, portable structure, electron scanning way. Standard configuration of 80 elements, R60mm, nominal frequency 3.5 MHz electronic convex array probe; Optional 80 elements, R13mm, electronic cavity of the nominal frequency 6.5 MHz probes.

Host and probe appearance is shown in figure 1-1.



80 elements R60, frequency of 3.5 MHz,

T35R60B convex array probe (standard)

80 elements R13, frequency of 6.5 MHz,

T65R13B type cavity probe (optional)



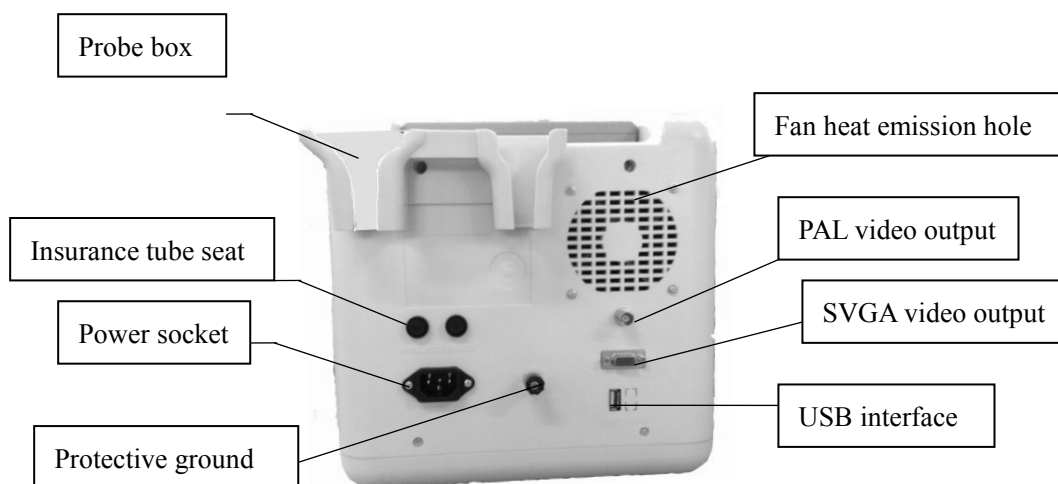


Figure 1-1 The host and probe appearance figure

(Note: The picture is only for reference)

1.3 Operating principle

1.3.1 The instrument working principle as shown in figure 1-2

1.3.2 Briefly principle

- 1) The digital scanning conversion controls the scanning transmission and receiving of ultrasonic wave. Image storage and display, user interface management, display mode conversion, annotation measurement, etc.; Press the key on the control panel and the digital scanning conversion can respond and send out kinds of control commands.
- 2) Send command emission circuit to receive the digital conversion, produce the high voltage pulse probe emission need.
- 3) The probe driven by the high voltage will change the electric signal into ultrasonic vibration, and the ultrasonic wave is transmitted into human body.
- 4) The ultrasonic wave produces the reflection signal in the body, then the probe will change it into electric signal and send to ultrasonic receiver.
- 5) The ultrasonic receiver will magnify compression detection the electrical signal.
- 6) The digital scanning converter transforms the simulated signal into digital signal and memorizes the received signal in the image memory synchronized with the ultrasonic wave scanning. And the synchronized signal reads the signal in the image memory and transforms the simulated signal to displayer and makes the ultrasonic wave image display on the screen.

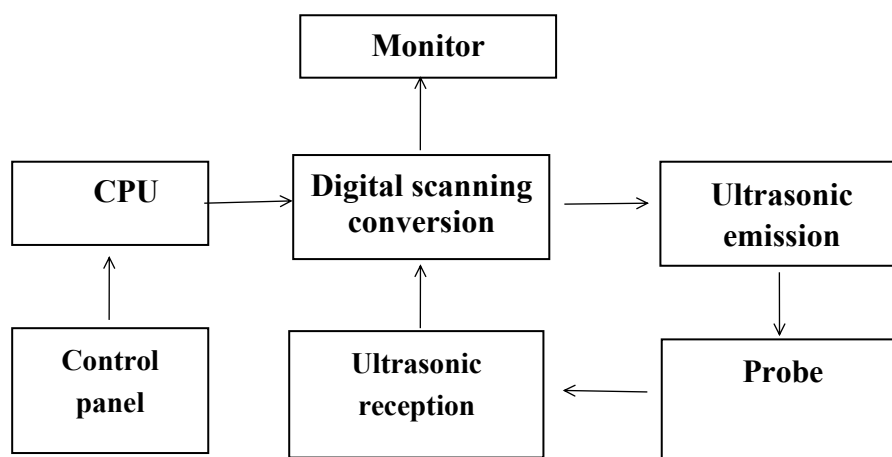


Figure 1-2 Functional Block Diagram

1.4 Field of Application and Contraindication

1.4.1 Field of Application

The instrument mainly applies in the dynamic image diagnosis of liver, gallbladder, spleen, kidney, urinary bladder, pancreatic gland, as well as gynecology, obstetrics examinations, pregnancy and contraception examination.

1.4.2 Contraindication

The instrument can not be used in the internal organs examinations like stomach, intestines and lungs which contain the gas. Patients with body burn, scalds or other trauma, cannot be used in the injured part.

1.5 Security features

Safety features of the instruments are as follows:

1.5.1 Prevent electric shock type: type I.

1.5.2 Shock proof of degree: type B applied part.

1.5.3 Application of into the liquid level of protection: IPX7.

1.5.4 Not in mixture with air of flammable gas and oxygen or nitrous oxide mixture of flammable gas.

1.5.5 Operation mode: run continuously.

1.5.6 The rated voltage and frequency: 110V~240 V, 50 Hz \pm 1 Hz.

1.5.7 The input power: 110 VA or less.

1.5.8 The instrument does not have to control fibrillation effect of discharge protection application of parts.

1.5.9 Instrument has signal output part, there is no signal input part.

1.5.10 The instrument is non-permanent installation equipment.

Chapter 2 Functions, Technical Indexes and Configuration

2.1 Operating environment

Operating ambient temperature: $+5^{\circ}\text{C}$ — $+40^{\circ}\text{C}$

Relative humidity: $\leq 80\%$

Atmospheric pressure: 700hPa—1060hPa

Power supply: AC 110V~240V 50Hz \pm 1Hz

Plug seat shall have independent power supply.

Be far away from strong electric field, strong magnetic field equipment and high voltage equipment.

2.2 Main Functions

Scanning mode: electron scanning

Probe configuration: T35R60B convex array probe (standard); T65R13B type cavity probe (user selected)

Display modes: 3T35R60B convex array probe: B, B/B, 4B, B+M, M;
T65R13B type cavity probe: B;

Image multiplying factor:

T35R60B convex array probe, Type B, real-time state: $\times 0.8$, $\times 1.0$, $\times 1.2$, $\times 1.5$, $\times 1.8$, $\times 2.0$;
 $\times 0.8$, $\times 2.0$ (display penetration depth);

T65R13B type cavity probe: $\times 0.8$, $\times 1.0$, $\times 1.2$, $\times 1.5$.

M type speed: M type scanning has eight kinds of speed can be selected.

Chinese and English translation: Transformation in both English and Chinese in interface.

Zoom: Local $\times 2.0$ magnification rate

Dynamic range: 0~120dB adjustable.

Frequency: T35R60B convex array probe real-time scan: 2.5MHz/3.0MHz/3.5MHz/4.0MHz/5.0MHz
five periods of frequency conversion;

T65R13B type cavity probe real-time scan: 5.5 MHz/6.0 MHz/6.5 MHz/7.0 MHz/7.5MHz five periods of frequency conversion.

Focus position: Send: 1, 2, 3 and 4-segments dynamic electron focusing; when 1、2-segments focus, and the focus can be moved.

Receive: receive real-time dynamic focus by focus

Measuring function: Distance, circumference/area (method of ellipse, method of loci), volume, heart rate, gestational weeks (BPD, GS, CRL, FL, HC、AC), expected date of confinement and fetus weight, etc.

Annotation function: hospital name, patient's name, age and gender;

Human body marks (with probe's position); Full-screen character annotation;

Real-time clock display;

Puncture guide: 3.5MHz convex array probe can display puncture guide line in B mode.

Gain control: 8 segments TGC and overall gain can be adjusted respectively.

Image polarity: left and right flip, black and white flip, up and down flip.

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Permanent storage: ≥ 128 images(Pseudo color display: External monitor 16 kinds of color display)

Image playback: series playback or check one by one.

Image processing: γ correction, frame correlation, point correlation, line correlation, digital filtering, digital edge enhancement and pseudo color processing, etc.

Output interface: SVGA video output offers connection to SVGA color display; workstation, etc.

PAL video output offers connection to PAL display, video image recorder and image

USB interface: Only for U disk storage image, image format is *.BMP.

Probe options: when inserted with two probes, the starting up or reset's default mode is T35R60B convex array probe.

2.3 Main Technical Indexes

Standard probe: T35R60B convex array probe: 80 elements, R60, frequency of 3.5 MHz

Optional probe: T65R13B type cavity probe: 80 elements, R13, frequency of 6.5 MHz

Basic performance as below:

NO.	Name of technical indexes	Type T35R60B convex array probe	Type T65R13B cavity probe
1	Nominal frequency of probe MHz	$f=3.5$ MHz	$f=6.5$ MHz
2	Type of probe	R=60, Convex array	R=13 , Micro-convex array
3	Scan depth mm	≥ 170 mm	≥ 60 mm
4	Lateral resolution mm	≤ 3 mm (depth ≤ 80 mm)	≤ 2 mm (depth ≤ 30 mm)
		≤ 4 mm (80 mm<depth ≤ 130 mm)	
5	Axial resolution mm	≤ 2 mm (depth ≤ 80 mm)	≤ 1 mm (depth ≤ 40 mm)
		≤ 3 mm (80 mm<depth ≤ 130 mm)	
6	Blind area	≤ 5 mm	≤ 4 mm
7	Transverse geometry precision	≤ 10 %	≤ 10 %
8	Longitudinal geometric location accuracy	≤ 8 %	≤ 5 %

Monitor: 12.1 inch LED display.

Grey scale: 256 levels.

The perimeter area measurement deviation: 20% or less.

Running hours: ≥ 8 h.

Input power: ≤ 110 VA.

Host weight: about 6 kg.

Host appearance size: 240 × 310 × 280 (length × width × height) (mm³).

2.4 Configuration

Standard configuration: 1 host; 1 T35R60B convex array probe.

Optional configuration: T65R13B type cavity probe.

Chapter 3 Operation Panel

3.1 Operation Panel Figure

The operation panel is as follows:

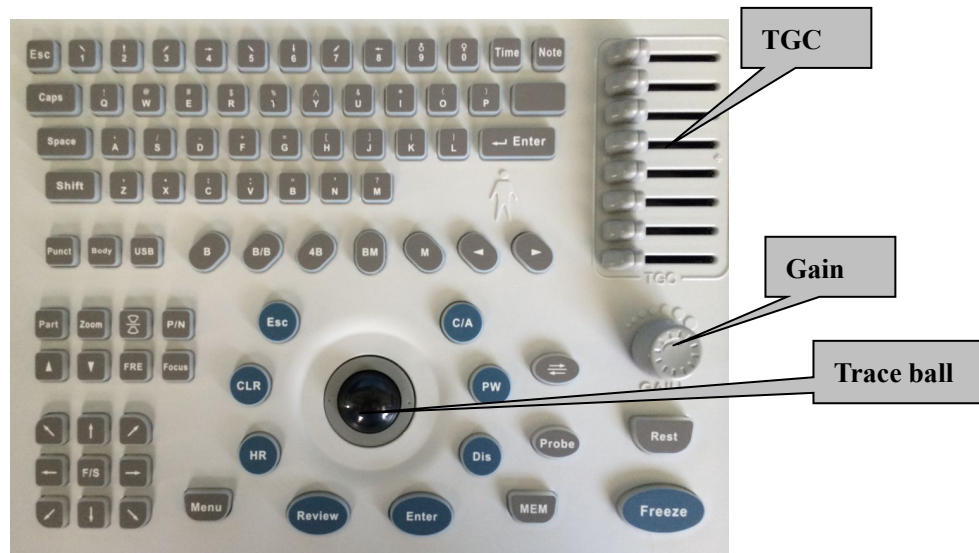





Figure 3-1 Control Panel

3.2 Key text/graphics


 ~  : enter numbers or marks


 ~  : enter characters or marks

 : Space

 : Make notes including hospital name, name and age of patient with full-screen character


 : Menu selection

 : Enter body mark


: Select focus point


: Freeze image


: Enter, confirm

: Distance measurement


: Circumference/ area measurement

: Heart rate measurement

: Gestational weeks (gestation) measurement mode

: Escape from the measurement and note


: Time set

: click arrow keys to move the cursor


: Speed conversion of the cursor


: Under B mode


: Under B/B mode

: Under 4B mode

: Under M mode


 : Under BM mode

 : Move scanning beam to the left under M mode

 : Move scanning beam to the right under M mode

 : Magnifies image


 : Partial image magnification


 : Puncture guidance function


 : Image memory


 : Up


 : Down


 : Clear the measurement and the note


 : Positive and negative image selection

 : Chinese/English transformation

 : Frequency conversion

 : Left and right flip under B mode

 : Real-time image review

 : Capital letter transformation



: Upper character conversion



: Select probe



: Up and down flip



: Reset the unit

◀ GAIN ▶ : Adjust the overall gain

◀ TGC ▶ : Adjust the gain applied to the near field of the image

◀ TGC ▶ : Adjust the gain applied to the far field of the image

Brightness: Brightness control

Contrast: Contrast control

Chapter 4 Instrument Installation

4.1 Open packing box


Should take the instrument from the top of the packing box, after open the plastic bags, take the top handle of the instrument at upward direction.

4.2 check

Should check whether there is any shipping damage on instrument or not.

4.3 Install Caution

In equipment installation, please observe the following precautions:

Install Caution	
	Warning
	1. Unpacking inspection if there is problem with the instrument or the probe; it is prohibited to use to ensure safety.
	2. Instruments shall be installed in a place where can avoid direct light display, also maintain indoor ventilation and dust prevention.
	3. The power supply circuit and the bearing capacity of the power supply socket range is 110V~240 V / 1.5 A.
	4. If the power needs to use extended patch panel, please choose a product with the safety certification.
Attention	
1. When unpacking and installation instrument to should take put down gently.	
2. Instruments used to 110 ~ 240V single-phase ac power supply, such as power grid voltage is not stable, please add ac voltage stabilizer.	

4.4 Install

4.4.1 Install Host Machine

Place the host in countertops or dedicated instrument cart, push in the direction shown by the arrow on the box before the lock hook cap, open the front panel cover flat, then probe box installed on the host is read from the packing foam.

4.4.2 Installation of the Probe

When installation, put the probe's plug of the lock handle according to the figure 4-1 turns to a locking state, the probe plug pins on the connector socket positioning hole, and then insert the plug of the probe into the host of the connector socket, and lock the handle gently turning to lock state, then insert the probe into the host on the back of the probe box.

Before use new probe, should tear down the protective tape gently.

When take off the probe from the host, should rotate the locked handle gently to the loosen state, to pull out the probe plug.

4.4.3 External Video Equipment

The video output socket may connect with the video output equipment recommended by the company. Install the instrument according to the operating instructions, and connect the video plug to the video output socket.

4.4.4 Protective Grounding

In order to guarantee the security while using, user must use the ground wire provide by the manufacturer which is in the packing box. Make sure one end of the wire is connected with ground pole, and the other end is connected with the ground (The connection must be safe, effective and reliable.).

If the ground wire is not long enough, it can be replaced by a metal wire whose sectional area is not less than 1.00mm^2 .

4.4.5 Power Supply Connection

According to the requirements of power supply of the instrument (AC 110V~240V/1.5A 50Hz) should to prepare plug seat. Make sure that the power supply is in the range of application. Insert one end of the power line into the plug seat of the instrument; insert the other end of the line into the plug seat of the power supply after confirming the power is off.

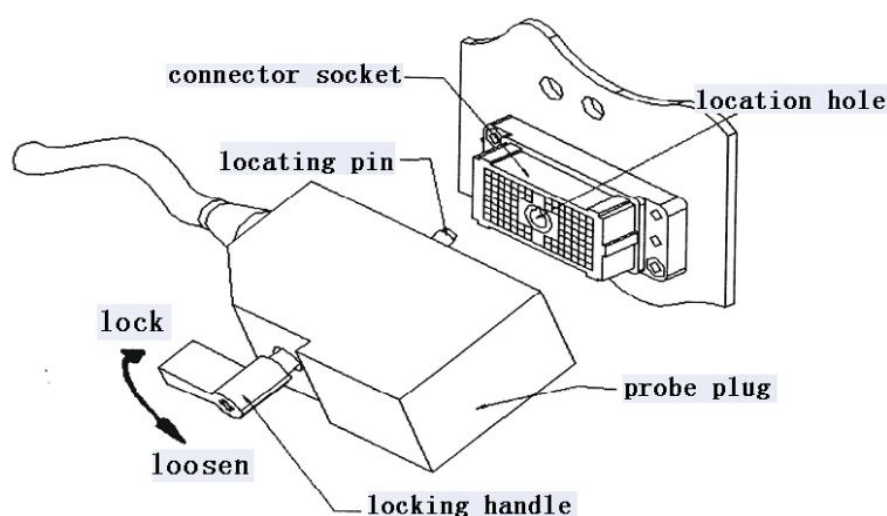


Figure 4-1 the probe connection diagram

4.5 Use of electromagnetic environment

Guidance of Using the electromagnetic environment

Attention

1. The instrument cannot be used in conjunction with the high frequency surgical equipment.
2. When using, should stay away from such as generator, X-ray equipment, radio stations and transmission lines, in order to avoid electromagnetic interference in the process of using, otherwise it will make the instrument image interference signals in diagnosis.
3. If there is a problem as follows, should inspect the room, find out the interference sources, and take the following measures to eliminate interference:
 - 1) Shut down the nearby device and then starting up again;
 - 2) Change the direction or position of the jamming equipment;
 - 3) Increase the distance between the interference equipment and the instrument.

Chapter 5 Method of Application

5.1 Caution

When using the instrument, please observe the following precautions:

Caution



Warning

1. Operation person should take professional skills training; study this manual, have skilled operation ability and knowledge of safe electricity.
2. When using, the instrument should be far away from the strong electric field, strong magnetic field devices and high voltage equipment.
3. Should check the power cord of the instrument, if there is damage such as fracture should be replaced immediately.
4. If found anything wrong when using instruments, should be immediately shut down and stop using.
5. Instrument to stop using, unplug the power cord to the instrument is required to power, the power of incomplete may lead to the risk of a lightning strike.



Careful

1. Sundry, water cup, etc. are not permitted on the operation panel.
2. It is forbidden to pull the plug before shut off the power switch.

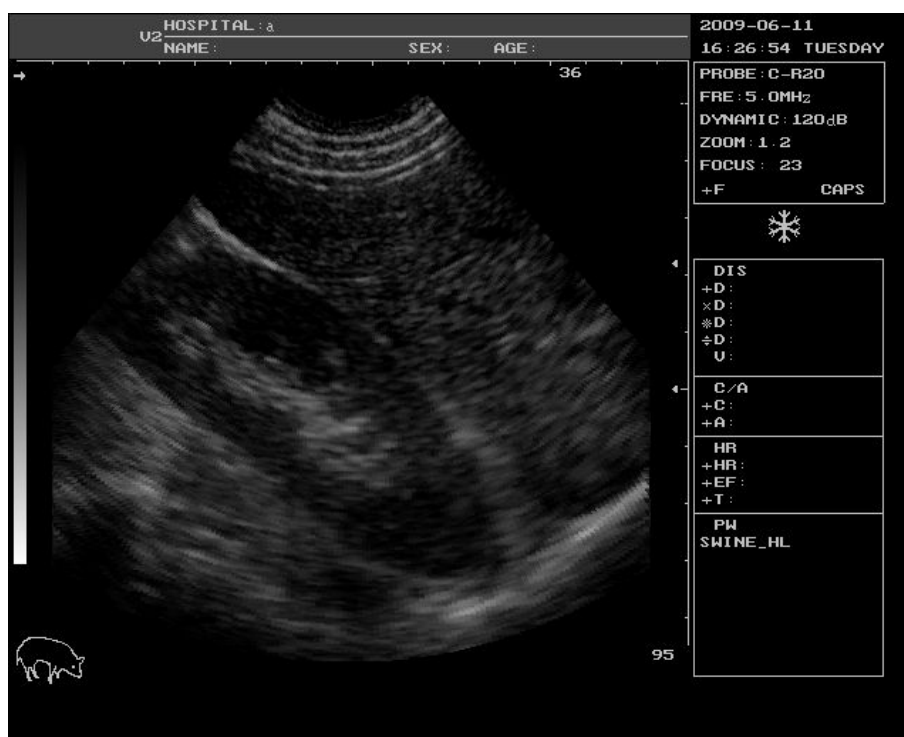
The correct use of the probe



Careful

1. Before starting up the instrument, make sure the installation of the probe is correct and reliable.
2. Power on, but without the probe, don't touch metal parts of the probe socket on the host to prevent electric shock.
3. The probe should not be impacted with sharp and hard object, it is forbidden to collision probe acoustic window, and otherwise it will cause damage of the probe.
4. Probe for a long time using will cause fever, during the suspension diagnosis, should press the "frozen" button to make the probe to stop working.
5. The probe's waterproof grade is IPX7, submerged probe for short periods of time shall not exceed 5 mm acoustic window position.
6. Using unqualified coupling agent can make acoustic window corrode and damage, should use medical ultrasonic coupling agent.
7. The coupling agent only can be used in the probe head, carefully clean after using.
8. Check the probe frequently, if found there is any breakage, crack on the surface of cable or probe, should be shut down and stop using immediately.
9. Probe is forbidden to heat. If the probe temperature is lower than the room temperature, it can be heated naturally before using.
10. Do not insert or take down the probe in electric situation.
11. After physician training then obtain the professional qualification, can use the cavity probe to operate.

5.2 Starting Up



Turn on the monitor power switch, and then the main engine power switch (in "|" condition), and the instrument works. The panel indicator lights on. If the screen is not bright, please press the "POWER" at the bottom of the monitor, in order to make display light, then the instrument work. After a few seconds, the screen display boot logo. Then, press any key on the keyboard (except reset button) or wait for about 2 minutes, the boot logo disappear, the instrument into the 3.5 MHz convex array real-time type B x 1.2 ratio scanning working state.


When first using, there is a need to adjust the total gain, the TGC, display brightness and contrast to make the image's contrast and brightness, and gain to a best state.


The interface is shown: hospital, name, gender, age, year/month/day, week, time; Probe, frequency, dynamic, range, ratio, focus, +F(cursor fast/slow instructions), CAPS(comments input state), etc.




5.3 Mode Selection

When in real-time (non- freezing) condition:

- a) Press **B** : The instrument works in single B mode, and this model can work on $\times 0.8$ 、 $\times 1.0$ 、 $\times 1.2$ 、 $\times 1.5$ 、 $\times 1.8$ 、 $\times 2.0$ six kind of rate.) ;
- b) Press **B/B** : The instrument works in B/B mode; when the left side is in real-time condition, the right freezes. Press the key once again and the right is in real-time condition and the left freezes. Press this key continuously and the real-time/freezing condition of the left/right side demonstrates

alternatively (this mode works with the magnification of 0.8, 1.0, and 1.2. Press  and the instrument enter the working condition with the magnification of 0.8, 1.0, 1.2. when it is with the magnification of 1.5 and 1.8 or 2.0.


c) Press  : The instrument works in 4B mode; 4 images equally will distribute on the monitor. First real-time, press this key again, first freezes, second real-time. Again presses this key, second freeze, third real-time, analogize in turn. Presses this key continuously, 4 real-time/freezes demonstrates (this pattern work in turn in $\times 1.2$ the percentage pattern.);


d) Press  : The instrument works in B/M mode. The left side is in B mode and the right side is in M mode. The sampling line is in the center of the image in B mode and it will move left or right by pressing  or  (This mode is effective only when it is in the magnification of 1.0).

e) Press  : The instrument works in M mode.



Note: this function only works for 3.5MHz convex array probe in M mode.

5.4 Image Magnification Selection


When 3.5MHz convex array probe in the real time under B mode, press  may choose zoom ratio include $\times 0.8$, $\times 1.0$, $\times 1.2$, $\times 1.5$, $\times 1.8$, $\times 2.0$ six patterns; Press this key once, the instrument will circulate to the next zoom ratio.


When 6.5MHz dimpling array probe or 7.5MHz linear array probe works, press  may choose zoom ratio include $\times 0.8$, $\times 1.0$, and $\times 1.2$, $\times 1.5$ four patterns.





5.5 Depths Penetration


If the image cannot be displayed in the condition of $\times 1.8$ or $\times 2.0$ with 3.5MHz convex array probe completely, press  or  to move the image up or down.





5.6 Distance Measurement (include volume measurement)

(Press  to exit from other operations before measurement):




a) Press  will display the cursor “+”;

b) Press     or touch the trackball to select the start point of the measurement;

c) Press  to confirm the start point of the measurement;

d) Press     or touch the trackball to select the end point of the


measurement; the measurement data (+D XX.X (cm)) will real-time display with the cursor;



















- e) Press  to exchange the start and end point of the measurement;
- f) Repeat Step d) and Step e) to carry on another measurement;
- g) Repeat Step a) –Step f) to fix the measurement of the first group of cursor “+” and enter the measurement of the second group of cursor “×”;
- h) Repeat Step a) –Step f) to fix the measurement of the second group of cursor “×” and enter the measurement of the third group of cursor “*”;;
- i) Repeat Step a) - Step f) to fix the measurement of the third group of cursor “*” and enter the measurement of the fourth group of cursor “÷”;
- j) Press  to exit from the distance measurement;
- k) Press  to clear the distance measurement mark after exited from the distance measurement.




Note: The distance measurement only shows the depth in M mode; the distance measurement also only shows the depth when the cursor is fixed (at the start point of the measurement) in the M area under BM mode.

Measurement can not be carried on in the mode of annotation, time setting and menu functions.

5.7 Circumference/ Area Measurement (oval and trajectory measurement)

(Press  to exit from other operations before measurement):


- a) Press  will display the ellipse measurement cursor (then entering circumference/ area measurement with ellipse method); press  again will display the cursor “+” (then entering cursor method);
- b) Press     or touch the trackball to select the start point of the measurement;
- c) Press  to confirm the start point of the measurement, press  again can change the size of ellipse cursor by direction key or touch trackball, after entered in this function, the size, position and shape of the ellipse cursor can be changed circularly. And the cursor “+” will change to the mark “.”;
- d) Press  will display the cursor “+”, and press     or touch the trackball to select the start point of the measurement;
- e) Press  to confirm the start point of the measurement, and press     or touch the trackball to draw the measurement tracks;














- f) Press  to connect the tracks to the start point of the measurement and the measurement data will be displayed as C: XX.X (cm) and A: XX.X (cm²) and the measurement ends;
- g) Repeat Step a) and Step e) to carry on another measurement;
- h) Press  to exit from the C/A measurement;
- i) Press  to clear the C/A measurement mark after exited from the C/A measurement.

Note: The C/A measurement can not be carried on in M area under M mode or BM mode.

Measurement can not be carried on in the mode of annotation, time setting and menu functions.

5.8 Heart Rates Measurement

(Press  ESC to exit from other operations before measurement):

- a) Press  will display the cursor "+";
- b) Press     or touch the trackball to select the start point of measurement (peak/ trough of the electrocardiogram);
- c) Press  to confirm the start point of measurement;
- d) Press     or touch the trackball to select the end point of measurement (peak/ trough of the electrocardiogram);
- e) Press  will display measured data on the right of the screen, as HR (Heart rate):XXX times/min; EF(inclination): XXX mm/s ; T(time) : XXX (ms), then the measurement is ended. Exchange the start and end point of the measurement;
- f) Repeat Step d) and Step e) to carry on another measurement (As new measurement starts, the former data will disappear when repeating Step d);
- g) Press  to exit from the HR measurement;
- h) Press  to clear HR measurement mark after exited from HR measurement.

Note: The HR measurement is only effective when it is carried on in M mode or in image M under BM mode.

Measurement can not be carried on in the mode of annotation, time setting and menu functions.

One cardiac cycle (peak - peak) is the effective HR value. To measure numerous (many) cardiac cycles can reduce the measurement error and the average of the results is an effective HR value.



Heart Rates Measurement

5.9 Gestational Weeks Measurement

Press **PW** to select the measurement pattern of gestational weeks as BPD, GS, CRL, FL and AC, measurement pattern is highlighted on the right of the screen and it is only effective under B mode, B/B mode and 4B mode.:

5.9.1 (BPD) Bipartitely Diameter

(Press **Esc** or **CLR** to exit from other operations before measurement):

a) Press **Enter** will display the cursor “+”;

b) Press **↑** **↓** **←** **→** or touch the trackball to select the start point of the measurement;

c) Press **Enter** to confirm the start point of the measurement;

d) Press **↑** **↓** **←** **→** or touch the trackball to select the end point of the measurement and the gestational weeks, expected date of confinement and the data of fetal weight will be displayed;

BPD

XX.X (cm)




W:XX (week)

EDD=



20XX (year)











XX/XX (month/date)

G: XX XX±XX (Gram)

- e) Press  to end the measurement; exchange the start and end point of the measurement;
- f) Repeat Step d) and Step e) to repeat the measurement;
- g) Press  to exit from the gestational weeks measurement;
- h) Press  to clear the measurement mark after exited from the measurement.

5.9.2 (GS) Gestation Sac

(Press  or  to exit from other operations before measurement):

- a) Press  until GS on the right side is highlighted and the cursor “+” displays in the screen;
- b) Press     or touch the trackball to select the start point of the measurement;
- c) Press  to confirm the start point of the measurement;
- d) Press     or touch the trackball to select the end point of the measurement and the gestational weeks, expected date of confinement and the data of fetal weight will be displayed;




GS:XX.X (cm)

W:XX (week)


EDD=






20XX (year)









XX/XX (month/date)

- e) Press  to end this measurement; exchange the start and end point of the measurement;
- f) Repeat Step d) and Step e) to carry on another measurement;
- g) Press  to exit from the gestational weeks measurement;
- h) Press  to clear the measurement mark after exited from the measurement.












5.9.3 (CRL) Crown Rump Length

(Press  to exit from other operations before measurement):

- a) Press  will display the cursor “+”;
- b) Press     or touch the trackball to select the start point of the measurement;

- c) Press  to confirm the start point of the measurement;
- d) Press     or touch the trackball to select the end point of the measurement and the gestational weeks, expected date of confinement and the data of fetal weight will be displayed;
- CRL
XX.X (cm)
W: XX (week)
EDD=
20XX (year)
XX/XX (month/date)
G: XX XX±XX (Gram)
- e) Press  to end the measurement; exchange the start and end point of the measurement;
- f) Repeat Step d) and Step e) to carry on another measurement;
- g) Press  to exit from the gestational weeks measurement;
- h) Press  to clear the measurement mark after exited from the measurement.

5.9.4 (FL) Femur Length


- (Press  to exit from other operations before measurement):
- a) Press  will display the cursor “+”;
- b) Press     or touch the trackball to select the start point of the measurement;
- c) Press  to confirm the start point of the measurement;
- d) Press     or touch the trackball to select the end point of the measurement and the gestational weeks, expected date of confinement and the data of fetal weight will be displayed;
- CRL
XX.X (cm)
W: XX (week)
EDD=
20XX (year)

XX/XX (month/date)

G: XX XX±XX (Gram)



e) Press  to end the measurement; exchange the start and end point of the measurement;


f) Repeat Step d) and Step e) to carry on another measurement;





g) Press  to exit from the gestational weeks measurement;


h) Press  to clear the measurement mark after exited from the measurement.





5.9.5 (HC) Head Circumference

(Press  or  to exit from other operations before measurement):

a) Press  to highlight HC on the right side; cursor “+” appears in the screen;

b) Press     or touch the trackball to move the cursor to the center of the fetus' head circumference;

c) Press  to confirm the center of the head circumference;


d) Press     or touch the trackball, should put the fetus' head image into the elliptical measurement cursor, the edge of the ellipse cursor is more close to the edge of the head measured data more accurate. And the gestational weeks, expected date of confinement and the data of fetal weight will be displayed;

HL: XX.X (cm)


G.A:XX (week)


EDD=20XX (Year) -XX-XX (Month-Date)

G: XXXX±XXX(g)


e) Press  to end the measurement; exchange the start and end point of the measurement;





f) Repeat Step b) - Step e) to carry on another measurement;


g) Press  to exit from the gestational week's measurement;





h) Press  to clear the measurement mark of HL after exited from the measurement.

5.9.6 (OFD), Occipital front Diameter

a) Press  to highlight OFD on the right side; cursor “+” appears in the screen;

b) Press     arrow keys or touch the trackball to select the start point of the measurement;

c) Press  to confirm the starting point of the measurement;

d) Press     arrow keys to select the end point of the measurement; and displays the gestational weeks, expected date of confinement and the data of fetal weight:

HL: XX.X (cm)


G.A: XX (weeks)


The EDD = 20XX (year)-XX-XX (month - day)

G: XXXX ± XXX (g)


e) Press  to end the measurement, exchange the start and end point of the measurement;





f) Repeat step d and step e to carry on another measurement;


g) Press the button  to exit the gestational week measurement;





h) After exited gestational week measurement, press  to clear the measurement mark of OFD.

5.9.7 (TTD) Transverse Trunk Diameter

a) Press  to highlight OFD on the right side; cursor “+” appears in the screen;

b) Press     arrow keys or touch the trackball to select the start point of the measurement;

c) Press  to determine the start point of the measurement;

d) Press     arrow keys to select the end point of the measurement; and displays the gestational weeks, expected date of confinement and the data of fetal weight:

HL: XX.X (cm)


G.A: XX (weeks)

The EDD = 20XX (year)-XX-XX (month - day)

G: XXXX ± XXX (g)


e) Press  to end the measurement, exchange the start and end point of the measurement;





f) Repeat step d and step e to carry on another measurement;


g) Press the button  to exit the gestational week measurement;





h) After exit gestational week measurement, press  to clear the measurement mark of TTD.

5.9.8 (AC) Abdominal Circumference

a) Press  to highlight AC on the right side; cursor “+” appears in the screen;

b) Press     or touch the trackball to move the cursor to the center of the fetus' abdomen circumference;

c) Press  to confirm the center of the abdomen circumference;

d) Press     or touch the trackball, should put the fetus' abdomen image into the elliptical measurement cursor, the edge of the ellipse cursor is more close to the edge of the abdomen measured data more accurate. And the gestational weeks, expected date of confinement and the data of fetal weight will be displayed;


AC: XX.X (cm²)

G.A: XX (weeks)

EDD = 20XX (year)-XX-XX (month - day)

G: XXXX ± XXX (g)

f) Repeat step b to step e to carry on another measurement;

g) Press the button  to exit the gestational week measurement;

h) After exit gestational week measurement, press  to clear the measuring mark of AC.

Note: Measurement can not be carried on in the mode of annotation, time setting and menu functions.



5.9.9 Gestational Age Data Report Page


After measured single or multiple data of gestational weeks (including BPD, CRL, GS, FL, HL, OFD, TTD and AC), “R” click in the freeze state will show the last measured data of all items as illustrated in Figure 6. It can be edited according to the annotation of 7.9, and also can save or store the image in accordance with the annotation of 7.20 and 7.21.

5.10 Notes


The Notes function contains the notes of serial number of medical record (ID), the AGE and the full-screen character.


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Press  continuously to enter the noting condition of ID, AGE and the full-screen character in turn when no measurement or setting up is carried on. Characters from 0-9, from A-Z, from a-z and some special characters may be input randomly at the point of the cursor. Press the direction keys or touch trace ball to move the cursor when noting characters in full-screen. Press  to newline the cursor.

Press  to transform between big and small letters; the screen will reveal “Caps” at the right-bottom of the screen. Press the key “Shift” to make shifts between the upper line and the lower line of the key; the screen will reveal “Shift” mark at the right-bottom of the screen.

Press  to clear the former noting character when noting.



Press  to exit from noting.

Press  to clear all of the noting marks after exit from the notes function.




PATIENT :	DOCTOR :
SECTION :	DATE :
BPD : D_3.4cm	
G_A_17W	
EDD_2012-09-11	
FW_170±30g	
CRL : D_9.9cm	
G_A_16W	
EDD_2012-09-18	
FW_140±29g	
GS : D_12.8cm	
G_A_00W	
EDD_2012-10-30	
FW_	
FL : D_2.4cm	
G_A_18W	
EDD_2012-09-04	
FW_220±33g	
HL : D_3.9cm	
G_A_24W	
EDD_2012-07-24	
FW_730±97g	
OFD : D_4.9cm	
G_A_17W	
EDD_2012-09-11	
FW_170±30g	
TTD : D_3.7cm	
G_A_17W	
EDD_2012-09-11	
FW_170±30g	
AC : D_15.5cm	
G_A_07W	
EDD_2012-11-20	
FW_	
FL/AC RATIO :	
FL/BPD RATIO :	
ULTRASOUND DIAGNOSIS :	











Report Page


5.11 Gender Notes

Press  to note the sex of female, and press  to note the sex of male. The sex mark will display after “Sex”.

5.12 Body Mark Notes

Press  to exit from other operations before noting. Press  and the body mark will be seen at the left-bottom of the screen. The instrument has set up with Human body marks; continuously press  and 64 body marks will be displayed circularly.

Press     to move the arrow of the body mark. Press       to change the direction of body mark.

Press  to exit from the body-mark noting.

5.13 Setting the Time

Exit from other operations before setting. Press  will display the following information:
TIMESE MENU

Year: 20××←

Mouth: ××

Day: ××

Hours: ××


Minutes: ××

Week: ××


Hospital name:


Contains the year, month, date, hours, minutes, week, and the hospital name setting items, “←” instructs the position of the current setting.

Press  or  to choose the setting item;

Press  to increase the data and press  to decrease when setting the year, month, date, hours, minutes, week, and hospital name;





When the choice cursor “←” moves to the hospital name setting item, it will show at the bottom of the screen, and the hospital name may be input at the cursor place.

After complete the setting, press  to start up the clock and display the name of the hospital.

During the setting, press , it means exit setting, the date is invalid.




5.14 Setting of Focus Point

The instrument has four sections of electron focusing, includes section 1, section2, section 3, and section4 when focusing:

- Press  : FO: 1 2 3 4 shows on right flank of the screen demonstrates. This instrumentation works in four section of focusing patterns;
- Press  : FO: 1 2 3 shows on right flank of the screen demonstrates. This instrumentation works in three section of focusing patterns;
- Press  : FO: 2 3 shows on right flank of the screen demonstrates. This instrumentation works in two section of focusing patterns;
- Press  : FO: 2 shows on right flank of the screen demonstrate. This instrumentation works in one section of focusing patterns;
- Note: One-section focusing can works only in BM mode and M mode, and other choice is invalid.

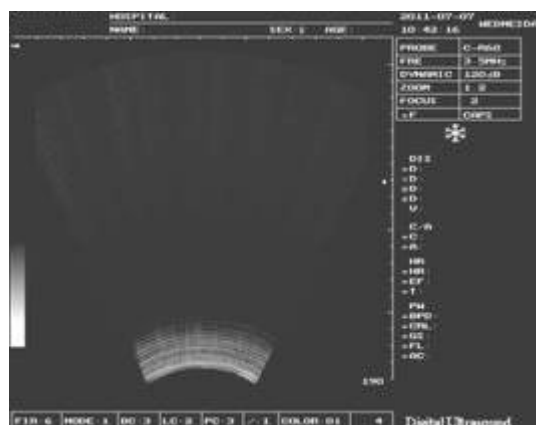
5.15 Image Polarity

The image polarity includes:

Left and right flip, up and down flip, and positive and negative flip. Press  to flip left and right; press  to flip up and down; and press  to flip black and white.

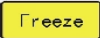


Left and right turn over




Up and down turn over

5.16 Images Freeze

Press  to freeze the image or return to real time image at any time. When image is frozen, the “Freeze” mark will display at the right-bottom of the screen.

User is suggested to make the instrument in freeze mode before checking when starting up.

5.17 Menu Function Selection

Press  to enter the menu function, and selections show at the bottom of the screen. There are selections of FIR, MODE, BC, LC, PC, γ , COLOR, MS;

“→” means the current choice. Press  to select other function.

FIR: digital filtering with 7 patterns;

MODE: image model with 3 patterns;

BC: frame correlation with 4 patterns;

LC: line correlation with 3 patterns;

PC: point correlation with 4 patterns;






γ : gamma correlation with 8 patterns;


COLOR: 16 pseudo colors (only effective with SVGA displayer),

MS: scanning speed under M, BM mode, 8 type to choice (only effective under M, BM mode).

Press Esc to quit from the menu.


5.18 Puncture Guide Lines

Press  the guide line when there is no noting or no measurement in B mode. Press  to make the line turn left, press  to make the line turn right, press  to make the line move left horizontally, and press  to make the line move right horizontally.






Press  to exit from the puncture guide.

Press  to clear the puncture guide line from the screen.

5.19 Transformation of Cursor Speed

Press  to transform the speed of the cursor when measuring, noting, moving the sampling line in M mode, moving the puncture line or depth penetrating.

5.20 Review of Images

Press  to enter the cine loop state in freeze mode. Press     or touch

the trackball to select and review the image one by one.

Cine loop is not available in BM or M mode.

5.21 Image Memory and Display

When image is frozen, press **MEM**, a numeral appears at the top right corner of the screen, press **↑** **↓** direction key to change the numeral. This numeral represents is the position image saved in, press **Enter**, this image will be stored in the selected position. The instrument may save 128 images.

Permanent image memory support the image multiplying factor of $\times 0.8$ 、 $\times 1.0$ 、 $\times 1.2$ 、 $\times 1.5$.

5.22 Partial Image Magnification

Under frozen state, press **Part** key, a magnified box shows on the screen, the image in the box is shown on the right as image multiplying factor of $\times 2.0$, press **↑** **↓** **←** **→** and other direction key or move the trackball to many the image.

Press **CLR** to exit from E-zoom.

Press **Freeze** to enter real time.





Partial Magnification

5.23 Frequency Conversion Selection

When 3.5MHz convex array is scanning in real time, press **FRE** to select the frequency. This instrument has five frequencies to be chosen, including 2.5MHz/3.0MHz/3.5MHz/4.0MHz /5.0MHz. The frequency conversion support for high frequency probe, the adjustable frequency is 5.5 MHz / 6.0 MHz / 6.0 MHz / 7.0 MHz / 7.5 MHz, a total of five.

5.24 Dynamic Range Adjustment

The instrument dynamic range of 0 db and 120 db is adjustable.

When need to scan on real time, press , dynamic range increase; press , dynamic range reduced.

Dynamic range size according to the information is showed on the right side of the screen area.

5.25 Gain Adjustment


Gain control including 8 period of the TGC, Gain (Gain)

Adjusting the TGC sliding handle, can adjust paragraphs respectively image gain strength; Slide the handle to the "+" (right) when the sliding direction, image enhancement; Slide in the direction of "-" (left), image.

Adjusting GAIN knob, can adjust image always GAIN strength;


Comprehensive adjust the TGC, GAIN, to make the image at the best state.

5.26 Probe Selection



If there a optional high frequency probe, press  to chose the probe after exited from the noting state. And the transformation order is: convex array probe→ high-frequency trans-vaginal probe → high frequency linear probe→ convex array probe, etc.

The instrument enters convex array probe scanning after opening or reset.

5.27 Chinese and English Transformation

When in boot up state without measuring, noting or setting, press  to select the language.

5.28 U Disk image storage

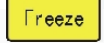
When scanning, choice the image to freeze which need to be stored, or after frozen bring up the permanent image, insert the U disk to the USB socket at the back of panel. Press  key, after it shows "INPUT SAVE FILE NAME: _", input the file name, then press , screen shows "WAIT ...", then it is storing. After the completion of the image storage, storage information disappears, exit the storage condition.

The image file name cannot be more than eight character, the characters must be uppercase letters A to Z or Numbers 0 to 9. If a name repetition, the system will automatically in the same file and add 1, became the new file name for storage.

5.29 Resetting

The resetting means system reset, press  key to revert the system to the boot up state.

5.30 Monitor Adjusted

Machine into other functions, under the condition of not press , eight direction key on the panel,

press the  or  can adjust the brightness of the LED screen, press the M key place of the

 or  button can adjust the contrast of the LED screen.


5.31 Turning Off

Turn off the host machine after using (The power switch in the "O" state). If the instrument will not be used for a long time, pull out the plug from the power supply.

Chapter 6 Simple Maintenance

6.1 Attention

In the maintenance of the instrument, please observe the following precautions:

Preventive maintenance and matters needing attention	
	<p style="text-align: center;">Warning</p> <ol style="list-style-type: none"> 1. Before cleaning the host and probe appearance, in order to avoid the accident, should unplug the power cord is completely cut off power supply net. 2. It is forbidden to use gasoline, paint thinner and other organic solvents to clean the host and the probe surface. 3. Maintenance should probe for inspection, if found there is any breakage, crack on the surface of cables or probe, should immediately stop using it.
<p style="text-align: center;">Attention</p> <ol style="list-style-type: none"> 1. When cleaning, should prevent the plug and socket splashed water, and soaked. 2. Should pay attention to forbidden to be liquid infiltration into the operation panel and host. 	


6.2 Host Machine Maintenance

6.2.1 If the case needs cleaning, please power off and use soft cloth (or add some toothpaste) to wipe the dirt. Any usage of alcohol and gasoline is forbidden.

6.2.2 If the instrument is scarcely used, please charge it at least one-week intervals and the charge duration for each time is about 4 hours;

6.2.3 If the instrument has not been used for a long time, please place the instrument in the box.

6.3 Probe Maintenance

6.3.1 The probes are vulnerable and precious. Collision and dropping is prohibited. When the diagnosis pauses, please put them in the probe holder and press  to make the probe in the freezing state.

6.3.2 When cleaning the probe surface, the coupling agent should be cleaned, in case of Acoustic lens and probe surface corrosion.

6.3.3 The probe's waterproof grade is IPX7; the part of the probe which is soaked in the water can not surpass 5mm than the acoustic window.

6.4 Probe Cleaning and Disinfection

Cleaning, sterilization and disinfection of the head: User should use the dipped in 75% alcoholic cotton ball to disinfect of the probe after each diagnosis ends for next time use.

6.5 Insurance Tube Replaced


6.5.1 The Insurance tube is back seat in the instrument, pipe specifications for: F1.5 L250V, phi 5 x 20

6.5.2 When replace insurance tube, should unplug the power plug instrument. According to identify the direction change knife unscrew the insurance with a cross on the header compression nut, remove the damaged insurance tube, reoccupy after into new insurance tube cross change knife spiral compression nut.

Chapter 7 Fault Checking and Ruled Out

7.1 Fault Checking Need Attention

When Fault check in, please observe the following precautions:

Fault Checking Need Attention	
	<p>Warning</p> <p>According to this chapter, if the problem can not be solved successfully, please send back the instrument to repair. Do not attempt to repair or remove instrument shell.</p>

7.2 Fault checking and ruled out


If there is a problem when you are using, please read this chapter. You may be able to solve the problem by yourself easily. Failure analysis and elimination of sample are shown in form as follows:

NO.	Fault phenomenon	Checking item	Ruled out methods
1	Open the instrument power switch, display is not bright, fan does not turn.	<ol style="list-style-type: none"> Whether a power outage? The power cord plugs loose? Insurance tube fuse? 	<ol style="list-style-type: none"> Energized before using. Plug the power cord plug tightly. Replace the new insurance tube.
2	The image on the screen is not clear.	Total gain, the TGC, display brightness and contrast adjustment is appropriate or not?	Adjust the total gain, the TGC, display brightness and contrast.
3	Intermittent interference or snowflake interference stripe to appear on the screen.	<ol style="list-style-type: none"> If there is a strong high frequency equipment or electric and magnetic field interference around the instrument? The power cord and probe plug and socket contacts are in good condition? The earthing rod connect with ground is good or not? 	<ol style="list-style-type: none"> To avoid the high frequency or high voltage equipment, magnetic field around. Plug the power cord and the probe socket of the instrument in right way. Well grounded as required.

Chapter 8 Transportation and Storage

8.1 Transportation and storage attention

During transportation and storage, please observe the following precautions:

Transportation and storage attention	
	<p>Warning</p> <ol style="list-style-type: none">1. Before equipment during transport or storage, the probe should be removed to a safe place. During the transportation and storage, it is forbidden to inversion or horizontal position.2. The instrument stopped for a long time, before using, it should be switched on electricity check, and then it can be put into use after each function is normal.

8.2 Transportation and storage environment

Ambient temperature range: $-10\text{ }^{\circ}\text{C} \sim \pm 55\text{ }^{\circ}\text{C}$

Range of relative humidity: 80% or less

Atmospheric pressure range: 500hPa~1060hPa.

8.3 Transportation

The packing box is equipped with the simple quakeproof facility which suits aerial transport, rail transport, highway transport and ship transport. Avoid sleet drenching, inversion and collision.

8.4 Storage

The instrument should be taken out if the storage period over for 3 months. After being charged with electricity for 4 hours, place the instrument according to the direction of the packing box showed and store it in the warehouse. The instrument should not be overlapped. Do not close to the ground、 walls or roof to protect it against moisture.

The instrument should stored in a warehouse where is the air ventilated and avoid strong sunlight and caustic gas.