

Wireless Probe Type Ultrasound Scanner

User Manual

Product information

Product name: Wireless Probe Type Ultrasound Scanner

Product Model:PIU1A,PIU1B,PIU1C, PIU1D,PIU2A,PIU2B,PEU1A,PEU1B,PEU1C, PEU1D,
PEU2A,PEU2B, PAU2A, PAU2B,PAU2C

Service life: 10 years

Version information

The version of this manual is as follows:

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Statement

The intellectual property rights of this product and this manual belong to manufacturer. The company reserves the right of final interpretation of this manual. No person or organization may reproduce,modify or translate this instruction manual without the written permission of the Company.

If users need other technical data other than this manual to facilitate the understanding, use and maintenance of the equipment, they may request from the Company separately, provided that the data is not obtained by any third party.

The screen graphics in this manual are only for illustration purposes and screen graphics text is replicated in English only. Actual screen output may differ with different software revisions.

User responsibility

Upon receipt of the product, the user shall first check the product and its accessories to ensure that they are consistent with the contract requirements. If the package is found before unpacking or the product is found damaged after unpacking, the company should immediately contact the after-sales service for treatment.

The user must install, operate, and maintain according to the instructions, and must carry out regular inspection. If the parts are damaged, lost, deformed or contaminated, please replace them immediately. If the product is faulty, please stop using it. Please call our after-sales service unit for repair and replacement. No changes shall be made to the product without the consent of the Company. In case of improper use, maintenance errors, improper maintenance, or even damage caused by non-maintenance personnel of the company, the user of the product shall be fully responsible.

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Chapter 1 Safety Specifications

1.1 Safety Specifications

In this instruction for use, the words "danger", "warning", "caution" and "Note" are used to indicate matters relating to safety and other important matters, their specific meanings are as follows.

Please understand and remember the meaning of these words carefully before reading this manual.

Sign	Meaning
 Danger	Indicates an imminently hazardous situation which, if not avoided, will result in death, serious injury, or fire.
 Warning	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury
 Caution	Indicates a potentially hazardous situation which, if not avoided, may result in malfunction or damage of the device.
 Note	Indicates precautions or recommendations should be used when operating the device.

To ensure the safety of patients and operators, please strictly observe the following safety precautions when using this ultrasound scanner.

Danger

- Do not operate this device in an atmosphere containing flammable gases or anesthetics such as anesthetic gases, hydrogen, and ethanol, because there is a danger of explosion.

Warning

- Do not use the device in the applications other than those listed in the intended use. Otherwise, it may result in system damage or serious injury.
- This device can only be used for diagnosis, cannot be used for treatment.
- Do not use this device at the same time with other device such as electric knife, defibrillator, and other high-frequency therapy equipment. Otherwise, there is danger of electric shock.
- If the ultrasound scanner and non-medical electric equipment connected to the ultrasound scanner, you should connect the plug to the hospital-graded standard socket. Do not use multi-function sockets to avoid the danger caused.
- Before using this device, please confirm that each part is connected correctly and works normally. Any incorrect connection or use of the abnormal machine may bring the danger of electric shock.
- Don't open the shell or panel. If the shell is opened with power on, it may lead to the danger of short circuit or electric shock.
- Only the probe of the device can be in direct contact with the patient. It is forbidden to let the patient touch other parts of the device, otherwise it may cause personal injury to the patient.
- Please use the probe carefully. If there is scratch on the contact surface of probe and human body, please stop using this probe immediately and contact this company or its

authorized agent. Using the scratched probe may bring a danger of electric shock.

- Only the peripherals and accessories (such as probes, peripherals or cables) provided or recommended by the manufacturer can be used. Using other devices or accessories may degrade the system performance and even cause an electrical shock.
- Do not pour any fluid onto the device surfaces, as fluid seepage into the electrical circuitry may cause excessive leakage current or system failure. If carelessly pour any water onto the device, immediately stop using the device and contact Service Representative.
- Do not use this device in the strong electromagnetic field. Using the device in the improper environment may result in malfunction or damage.
- Do not use the device near the high frequency device, otherwise the performance of the device will be adversely affected or even lead to failure.
- In order to prevent interference by radio waves, this device must be used in hospitals, clinics and other institutions with acceptable environmental conditions. The use of this device in an unqualified environment may cause interference from nearby radio equipment.
- All analog and digital devices connected to this device must be approved by specified IEC standards (e.g., IEC60950 Data processing equipment standard and IEC 60601-1 Medical equipment standard) certified products. Moreover, all configurations shall comply with the contents of the valid version of the IEC 60601-1-1 system standard.
- The device should not be maintained or maintained while in use by a patient.
- Make sure the device is powered off and power cable is disconnected before cleaning the device. Otherwise, an electric shock may happen.
- Regular inspection (at least once every two years) to ensure that the instrument has no obvious damage affecting safety and basic performance. The inspection shall be carried out by the manufacturer or the unit with corresponding qualifications.
- If the performance is not as described or has changed, discontinue use immediately and contact the manufacturer.
- Any serious incident that has occurred in relation to the device should be reported to the manufacturer and the competent authority of the Member State in which the user and/or patient is established.

-  **Caution**
- Federal law restricts this device to sale by or on the order of a physician.
- This device shall be operated by the qualified physicians or sonographers or used under their guidance.
- This manual does not describe clinical examination techniques. The correct technique must be selected based on professional training knowledge and clinical experience.
- Don't change the built-in parameters of the device but ask the manufacturer or its authorized agent to provide such service if necessary.
- If the device malfunctions, please power it off immediately and contact the manufacturer or its authorized agent.
- In order to avoid fatigue to operator's hand, wrist or arm, please pay attention to the followings: Avoid the long-repeated operation, take regular breaks or engage in other activity. Avoid the operation in uncomfortable posture.
- Always keep the device dry, avoid moving it from a cold place to a warm place, otherwise condensation or water drop may form and cause the danger of short circuit.
- Do not modify the device. Please contact the manufacturer if you wish to make any modifications.
- To avoid damage to the device, do not use it in the following occasions:

In direct sunlight Where the temperature changes sharply Dusty place Easy to vibrate Near a heat source ● To ensure data security, it is important to back up patient data user information to external storage media, as data stored inside the device may be lost due to abnormal operation or failure. ● The casing of the device is made of ABS material, and the surface of the sound lens is made of silicone rubber material. If you are allergic to these materials, please do not use this product. ● Do not use USB storage with insecure data (such as U disk, mobile hard disk, etc.), otherwise it will cause system damage. ● There is no risk of high temperature burns during normal ultrasound examinations. It is possible for the surface temperature of the probe to exceed the body temperature of a patient due to environmental temperature and exam mode combinations. Apply the probe only for a period of time required for the purpose of diagnosis. ● This device cannot operate in an environment with a temperature higher than 30℃, otherwise, it may cause burns to the patient. ● After checking, click the freeze button on the software to prevent unexpected changes in control device Settings and sound output levels.
 Note ● Before each use, the power and storage space of the ultrasound terminal equipment should be checked to ensure that there is sufficient power and storage space for use. ● Do not damage the preventive warning signs marked on the equipment. The warning signs indicate important matters regarding the normal and safe operation of the equipment. If these signs are damaged, the safety of the equipment cannot be guaranteed. ● Pay attention to protecting the surface of the probe. Avoid applying external force (such as heavy pressure from a heavy object), scratches or drops, which may cause damage to the probe. ● When the temperature of the probe reaches a certain value, the probe stops working. ● When user receives the examination of superficial and small organs and early pregnancy, the acoustic power output and scanning time shall be controlled, so as to reduce the action time of acoustic output power on organs.

1.2 Symbol and description

These symbols may be used on your device and its accessories and packing. As shown in the following table.

Symbol	Description	Symbol	Description
	Type BF applied part		Caution
	separate collection for electrical and electronic equipment		Manufacturer
	Follow instructions for use		Date of manufacture

	General warning sign		Keep dry
	Humidity limitation		This way up
	Temperature limit		Keep away from sunlight
	Model number		Stacking limit by number
	Medical device		Use-by date
IPX7	IP degree	IPX0	IP degree
	Unique Device Identifier		Batch code
	Non-ionization radiation	R_x only	Prescription use only
	Not made with natural rubber latex		

1.3 Maintenance and Check

With the prolongation of use time, due to the deformation and wear of parts, it will lead to the decrease of electrical safety performance or mechanical safety performance, and the image quality will deteriorate due to the decrease of sensitivity and resolution. In order to ensure the normal working performance of the machine, it is recommended to make a maintenance and inspection plan to prevent accidents and misdiagnosis.

The system is equipped with an integrated and externally verifiable function to test transducer element performance. Upon connection or activation, the system performs a self-diagnostic check, including impedance analysis, image uniformity inspection, and thermal monitoring.

1.4 Disposal of waste

- Please follow local laws to dispose of waste scrap.
- Follow local ordinances and recycling instructions regarding to disposal or recycling of the device and device components, including used batteries and packaging box.
- Declaration: Inexperienced responsible parties must contact their local authorities to determine the proper disposal of discarded parts and accessories that may present biological hazards.

1.5 Network Security



Note

- The device should not be connected to an unsecured network.
- The operating system should not be rooted or jail-broken. Otherwise, the security of the operating system will be degraded.
- The operating system of the device is a safe system. Follow the security suggestions of the operating system for use.

- Please download the application through the recommended channel of the device to prevent the security of the operating system from being degraded by third-party software or malicious software attacks.
- When network transmission is abnormal, the system will pop up a prompt message.
- When the WIFI connection status of the probe changes, the probe indicator will be blinking.
- When the device decommissions, please delete patient data or uninstall the software.
- Users are required to manually record audit logs (such as security event logs, usage control measures logs, etc.).
- It is recommended that users enable the "User Permission Management" function to restrict access to data by unauthorized users.

The following measures are taken to ensure information security and network security:

- Without the probe, the software cannot function properly.
- Access Control
 1. User identification method: Username, password.
 2. User type: Administrator, General User.
 3. User access rights: This software has two different roles of users, general user and administrator user. The access rights of different users are as follows:
 - a. General users: Default operator, with software operation function.
 - b. Administrator: In addition to the general user permissions, it also has permissions to add and remove general users.
- The patient database is encrypted locally, and the patient data is encrypted during transmission.
- Support wireless encryption standard WPA/WPA2(PSK).
- Use the latest commercial vulnerability scanning tool to evaluate potential system vulnerabilities.
- Patient database supports automatic backup and recovery mechanism to prevent accidental power outage or other reasons that may result in the patient database becoming damaged and unable to open.

Chapter 2 Product Overview

2.1 Operating principle

The device is based on the characteristics of different tissues and organs of the human body with different densities and different ultrasonic propagation speeds, that is, different acoustic impedance (product of medium density and sound speed), to have certain regular electrical pulses to stimulate the piezoelectric crystal (transducer), so that it produces a certain frequency of ultrasonic waves, and this ultrasonic wave (acoustic energy) is shot into the human body. Generate reflection echoes through the interface of different organs in the body. The reflected echoes of different sizes are received by the transducer that originally transmits ultrasonic waves, and then convert the received echoes (acoustic energy) into electrical pulses, which are processed by digital beam synthesis and digital scanning transformation to form a standard video signal, and display the organ cross section image on the display screen.

2.2 Indications for Use

This device is applicable for adults, pregnant women, pediatric patients and neonates.

It is intended for use in fetal, abdominal, small organ, musculo-skeletal (Conventional and Superficial), peripheral vessel, adult and pediatric cardiac, gynecology, obstetric, pediatric and urology exams.

This device is intended for use by qualified and trained healthcare professionals for ultrasound imaging, measurement, display and analysis of the human body and fluid, which is intended to be used in a hospital or medical clinic.

2.3 Contraindication

The wireless probe type ultrasound scanner is not intended for ophthalmic use or any use causing the acoustic beam to pass through the eye.

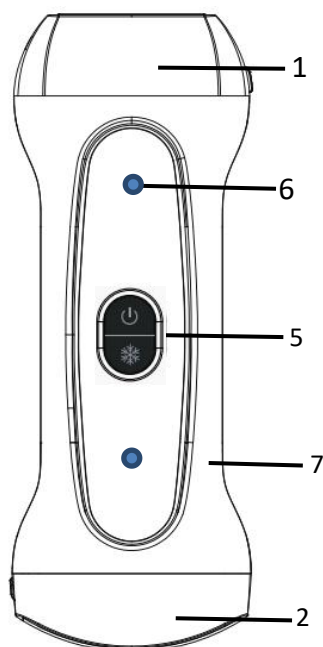
2.4 Product composition

Wireless probe type ultrasound scanner is composed of main unit, probes (Linear array L40, convex array R60, linear array L25, convex array R15, linear array L12) and software.

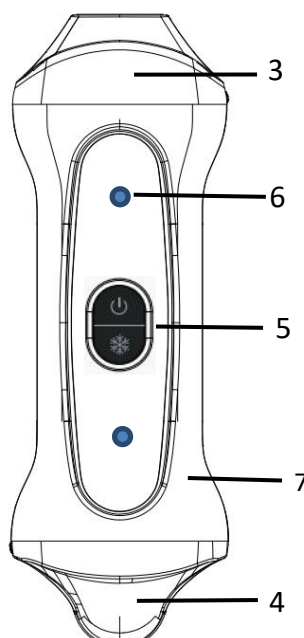
2.5 Product appearance

The appearance of all models, see the chapter “B.1 Product Differences”.

The following models are selected as examples:



Model:PAU2A



Model:PAU2B

No.	Name	Function
1	Linear array probe(L40)	Ultrasonic scan area

2	Convex array probe(R60)	Ultrasonic scan area
3	Linear array probe(L25)	Ultrasonic scan area
4	Convex probe(R15)	Ultrasonic scan area
5	Freeze/Power button	1.Freeze or unfreeze images for scanning 2.Turn the probe on or off
6	Indicator light	1. Indicates the battery level. 2. the direction in which the probe is working.
7	Main unit	/

Chapter 3 Power supply

3.1 Turn on/off the Probe

- ◆ In standby mode, press the "Freeze" button (about 2s). When the indicator light flashes a blue light (indicating the connection waiting state with a flashing period of 0.2 seconds), it indicates that the device into working state.
- ◆ Press this button under working state, can freeze or unfreeze scanning images.
- ◆ Long press the button, when the indicator light shows purple, wait until it goes out and then the device will shut down.

3.2 Indicator light description

- ◆ In the unfreeze state of operation, the indicator is displayed on the working side of the probe, the indicator is flashing (flashing period is 1s), and the indicator of different electricity shows different colors. In the freeze state of operation, the indicator light is constant on.
- ◆ Indicator light display color:
White: battery power 100%-80%, green: battery power 80%-40%, yellow: battery power 40%-20%, red: battery power $\leq 20\%$, purple: battery power 0%, (different battery color changes based on the battery power displayed in the APP).
- ◆ The indicator light flashes when charging (flashing cycle 2s) and does not flicker when fully charged.
- ◆ In standby mode, short press the button, the battery level display will turn off after 4 seconds.

3.3 Battery charge

- ◆ This device can be charged wirelessly, when the battery is low (the indicator light is red), the probe needs to be charged.
- ◆ Charging method: Insert the charging cable into the socket of the wireless charger and then insert the power adapter into the power socket. At this time, the indicator of the wireless charger is on. Place the bottom of the device horizontally and centered in the center of the wireless charger.
- ◆ When charging, the indicator turns on and flashes continuously, and the indicator will be constant on after the charging is finished.
- ◆ When charging is complete, unplug the adapter from the electrical outlet.
- ◆ When the battery is fully charged, the continuous working time is not less than 1 hour.
- ◆ Adapter specifications: Input 100V~240V, 50Hz/60Hz Output: DC 5V 2A.



Charging diagram

3.4 Battery replacement

If the battery is faulty, replace it only by the manufacturer. Replacing the battery with untrained personnel may cause risks such as over-temperature, fire, or explosion(Manufacturer will not be liable for any damage resulting from non-compliance with this provision).



Attention

- Be sure to use adapter that are dedicated and certified to security standards(IEC60601-1), otherwise it may cause fire or electric shock.
- The adapter is intended to be connected to device and used in combination, it's not part of the device.
- The adapter should be checked regularly, if found unsafe factors, should be replaced in time!
- Please do not remove the adapter from the socket with wet hands, otherwise it may cause electric shock or injury.
- Do not turn the power on/off frequently and wait at least one minute after the power is turned off before turning the power on.
- It is forbidden to assemble or disassemble the battery without authorization, otherwise there will be explosion danger.
- If you do not use the device for a long time, please charge it every 3 months to keep the battery charged and avoid damage.
- The power adapter must use a matching AC power. The socket must be used separately, otherwise it may cause fire or electric shock.
- If the battery is used extremely short after being fully charged, it indicates that the battery has reached the end of its service life, it is recommended to contact the manufacturer to replace the internal battery or scrap the device.
- When charging, not to position the equipment to make it difficult to operate the disconnection device.
- When this device is not used for a long time,remove the battery.Please contact the manufacturer to remove the battery.The user cannot remove it without permission.

Chapter 4 Installation and Use

4.1 Software environment

4.1.1 Software and hardware environment

The operating condition is the minimum configuration.

Device	Minimum configuration requirement
Software environment	■ Windows: Windows11 Pro and compatible ■ Android: Android 10 and compatible ■ iOS: iOS17.6.1 and compatible
Hardware environment	■ Windows: Screen resolution: 1920x1080 and above; Memory: 8G or above; Processor frequency 800MHz and above; Storage capacity: 100GB and above; Screen size: 13 inches and above. ■ Android: Screen resolution: 1920x1200 and above; Memory: 4G and above; Processor frequency: 2.3GHz and above, storage capacity: 128GB and above; Screen size: 10.29 inches and above. ■ iOS: Screen resolution: 1640x2360 and above; Memory: 8G or above; Storage capacity: 64GB and above; Screen size: 10.9 inches and above.

4.1.2 Software name

Software Name:Wireless Probe Type Ultrasound Scanner software

Software release version:V1

4.1.3 Wireless Specification

Electronic Interface	Specification
WI-FI	Support type:802.11n(H20), Operation Band:5.15~5.25GHz,5.725~5.825GHz, Bandwidth:20MHz

4.2 Software Installation

Please first install the corresponding ultrasound application provided by manufacturer on the display device.

4.2.1 Android installation

- After obtaining the supporting software successfully, click the software installation package to start the installation.
- After selecting to continue the installation, once the installation is successful, connect to the WIFI to enter the system.

4.2.2 iOS installation

You can download and install it by searching for “sonicaid” in the APP Store.

4.2.3 Windows installation

- After obtaining the supporting software successfully, click the software installation package to start the installation.

- After selecting to continue the installation, once the installation is successful, connect to the WIFI to enter the system.



Attention

- Before installation, check whether the operating system meets the requirements of the software operating environment.
- If the program file cannot be opened correctly, the downloaded file may be damaged, or the data is incorrect. Delete the file and download it again.
- If the application cannot be opened, uninstall the software and install it again.
- If this instruction does not solve your problem, please contact the manufacturer.

4.3 Unpacking Inspection

After the device is unpacked, Exam whether the random accessories are complete according to the "packing list", and whether there is blistering, peeling, cracking and whitening on the surface of the equipment. If necessary, you should pick up the host and make appropriate "shaking" actions to Exam if there is any "loosening" of internal components. If you find any problems, please contact the agent immediately.

4.4 Exam Before Starting

- Before using the device, please Exam the following items:

No.	Exam Item	Exam Method
1	Cleaning of the probe surface .	Visual inspection
2	Temperature, humidity and atmospheric pressure should meet the requirements of the conditions of use.	Temperature/ hygrometer measurements

4.5 Exam After Startup

- After the device is powered on, Exam the following items:

No.	Exam Item	Exam Method
1	Exam the device to ensure that the terminal device has sufficient power and storage space.	Visual inspection
2	Exam the image to make sure there are no abnormalities (such as noise, flicker) and error messages displayed.	Visual inspection
3	There must be no significant discontinuities displayed or black areas on the B-mode image.	Visual inspection
4	The surface of the probe acoustic lens must not overheat.	Touch measurement
5	The screen image has no black lines and no interference.	Visual inspection

4.6 Diagnosis

- When using the probe, wear sterile gloves to prevent infection.
- Apply couplant on the part to be investigated of the patient and put the probe in close contact with the part to be investigated. At this time, the section image of the part is observed on the screen. By changing the direction and inclination of the probe, different section images can be observed, select the desired slice image as the basis for diagnosis. During this period, if the image gain is not suitable, you can repeatedly adjust the gain in the software until a clear

image is obtained.



Attention

- During the use of the device, pay attention to the temperature changes on the probe surface to prevent burns to the patient. If the surface temperature of the probe exceeds 43°C, it should be used with caution to avoid causing harm to the patient.
- The ultrasonic probe is a valuable and fragile component, especially the lens surface, and it must not come into contact with sharp objects.
- It is forbidden to turn off the system power during the process of printing, saving and recalling data, otherwise the process will not be completed normally.
- During use, avoid mechanical damage such as collisions and drops. When pausing the diagnosis, place the probe flat on the table and press the "freeze" button to put it in a freeze state to prevent overheating due to prolonged operation. This can extend the service life of the probe.
- Use the probe carefully. If the surface of the transducer is scratched, stop using the probe immediately. Otherwise, there is a danger of electric shock.
- Keep the probe clean. Unclean probes may lead to infection.
- After each ultrasound examination, the ultrasound coupler on the probe surface should be thoroughly erased. Otherwise, the ultrasonic coupler will solidify on the probe acoustic lens and affect the quality of ultrasound image.
- Please use coupling agent that comply with local regulations. Do not use mineral oil, oily coupling gel, any kind of lotions, gel or other unapproved material. Otherwise, the probe may be damaged.

4.7 Restart Software

If the following exceptions occur, you can reconnect the device by exiting the software and restarting the software:

- An error message is displayed on the screen, and this message is always displayed.
- The screen display is abnormal.
- Not working properly.

4.8 Wireless Connection

4.8.1 Connection description

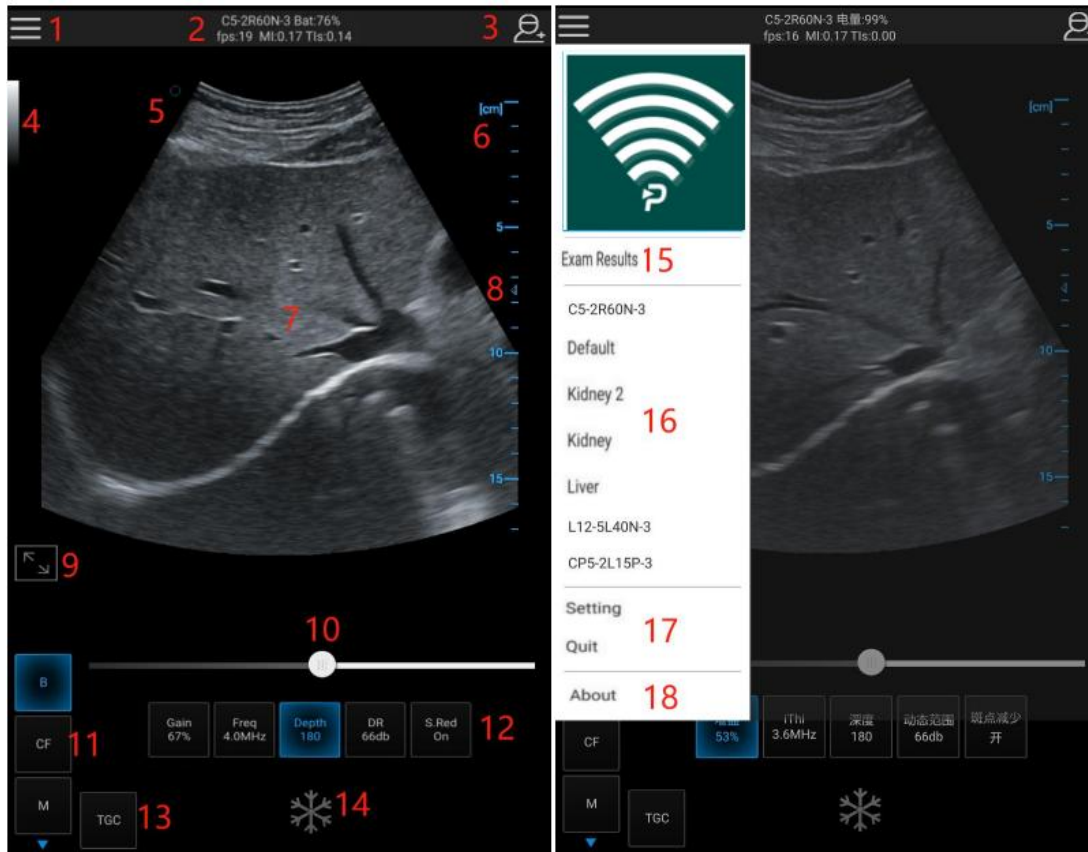
The device is turned on, turn on WIFI on your phone/tablet, open the software, click "Search Probe", and select the corresponding device in the probe list. If use WLAN connection, turn on the WLAN on your PC, Select the appropriate device in the available network. Enter the password for the first connection, find the SSID on the back of the probe. The SSID is like: "US_82CEE201", enter the post -eight characters as WLAN password. After the connection is successful, you can operate the ultrasound software.

4.8.2 Disconnect

Choose to disconnect the WIFI signal connection with the probe from ultrasound application, exit the ultrasound application and then close the probe (note the order of operation), the connection can be disconnected.

Chapter 5 Function and operation(Android/iOS)

5.1 Interface display



Interface description:

No.	Name	Function description
1	Settings	The Settings column includes inspection records, probe presets, system Settings, user Settings, Dicom Settings, and software version information.
2	Information display column	Display currently used probe model, battery, fps (frames per second) and acoustic output parameter (MI & TIs).
3	Patient information	New patients and selected patients can be added, and the ID, name, age, gender, and type of examination can be set.
4	Gray scale/ color bar	Display gray scale and color bar of screen.
5	Mark of probe position	Display the relation between ultrasound image and probe.
6	Scale	Display scale of current ultrasound pattern.
7	Image and measurement area	Display ultrasound image in current mode; measurement area in freeze state.
8	Focus	Display numbers and position of focus.

9	Full screen	Display the current ultrasound image in full screen.
10	Sliding bar	Adjustable parameter values and movie playback.
11	Mode	Display all operation mode, include B mode, CF mode, M mode, PW mode, PDI mode, DPDI mode and NE mode (only for linear probe).
12	Parameter adjustment and measurement	Adjust the parameters in the corresponding mode in unfreeze state; measurement, saving image and video, text annotation and other operations can be performed in freeze state.
13	TGC adjuster	Click TGC, the corresponding TGC adjuster will appear on the left side of the screen, select the most suitable graph through 8 TGC adjustments.
14	Freeze/unfreeze	Image freeze and unfreeze.
15	Exam Results	Display saved images and videos.
16	Preset	Display different presets for different probes.
17	Setting and Quit	In the system settings, you can perform operations such as automatic brightness adjustment, self-test, power policy and probe automatic freeze. In the user settings, you can enable user permission management operations. In the Dicom settings, you can make settings for Dicom local, Dicom storage, and Dicom printer. Click the "Exit" button to exit the software.
18	About	Display software version, serial number and firmware version information.

5.2 Probe selection and switching

- After the device is connected successfully, one side of the probe keeps flashing, which is the currently active and usable probe.
- Click " in the upper left corner of the software, and select the probe to be switched in the "Preset". After switching the probe, select the corresponding detection function module in the menu according to the actual detection requirements.
- After completing the switch and function selection, the other probe will start to flash, indicating that this probe has been successfully activated and is in a working state.

5.3 Settings

5.3.1 Exam Results

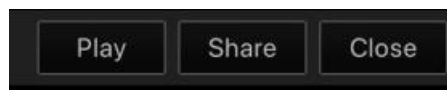
Operation steps: Click the upper left corner  -- click "Exam Results"



- You can view the image and video of the current patient in the "Exam Results" interface and do the following:
Delete Exam: All examination data for selected patients were deleted.
Delete File: Delete one of the examination data for the selected patient.
Open: Open an examination image or video of the selected patient.
Close: Close the "Exam Results".
- Open the image file, click "Open", and the image file can be sent or shared in Dicom format, as shown in the following picture:



- Open the video file and click "Open" to start playing and sharing the video, as shown in the following picture:



Click the "Play", the video will play automatically.



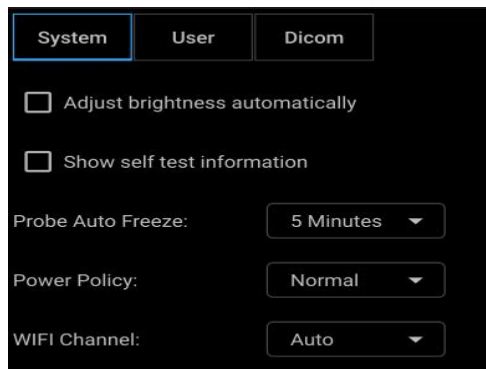
Play progress bar: Show the current play progress, you can also slide the play progress bar to select the image in the video playback.

5.3.2 Probe preset

Display the probe parameter information and probe preset information on the menu interface.

5.3.3 System settings

Operation steps: Click the upper left corner  -- click "Setting" -- system.

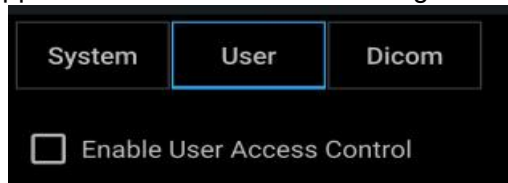


In the menu of "System", users may set the following items:

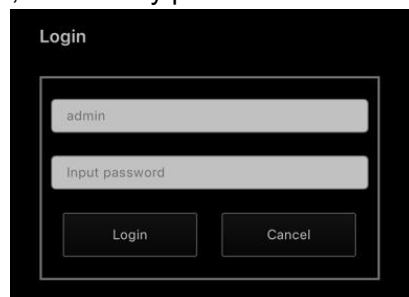
- Adjust brightness automatically: The software will automatically adjust the brightness of the display screen after starting, so that the display image, display characters are clearly visible.
- Show self-test information: After the user logs in, the software can self-check the running environment and enter the main interface of the software after the self-check passes and is confirmed by the user.
- Probe Auto Freeze: Click the drop-down menu and select the probe auto freezing time. You can choose: 5 Minutes, 10 Minutes, 15 Minutes, 30 Minutes, never.
- Power Policy: Normal, Save power.
- WIFI Channel: Default is automatic, other channels can be selected.

5.3.4 User

Operation steps: Click the upper left corner  -- click "Setting" -- User.



You can choose whether to "enable user access control". If so, enter the password (password). If the password is entered incorrectly, the system will prompt "Invalid user name or password. You have 2 times to try." Continue to enter the password. If the third attempt is also incorrect, the system will display "You have input wrong password too many times, please restart app to try again!" At this point, you need to restart the software in order to continue the login operation. After entering the correct password, you will enter the user settings interface (default user: admin). You can add users, delete users, and modify passwords.



- Click "Add" to add a new user. When adding a new user, you need to input the user's name and password, and perform the password confirmation operation. When deleting a user, you cannot delete the administrator user or the current user. When modifying the password, you need to input the login user's password before making the modification.



Add User

Input user Name

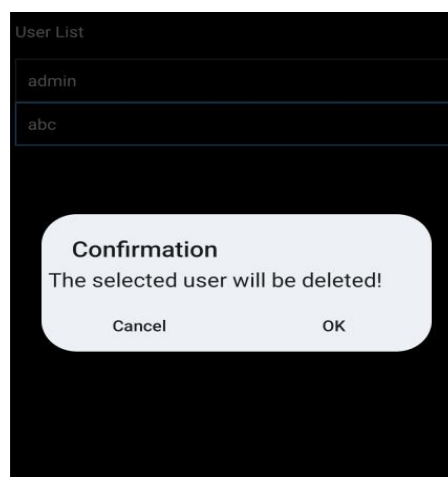
Input password

Confirm password

1. Length should be 6-16
2. Contains digit, lower and upper characters
3. No special characters

Add Cancel

Add user interface



User List

admin

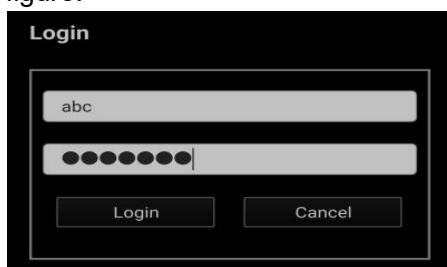
abc

Confirmation
The selected user will be deleted!

Cancel OK

Delete user interface

- After the software restarts, the user login interface appears. On this interface, users can log in by entering the different users that have been added, or they can select "Cancel" to exit the software. Users input the added username and enter the correct password to access the software, as shown in the figure:



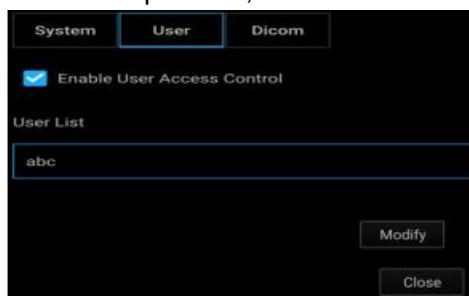
Login

abc

••••••••

Login Cancel

- If you log in as a non-administrator user, then in the user management interface, you can only perform the password modification operation, as shown in the following figure:



System **User** Dicom

☒ Enable User Access Control

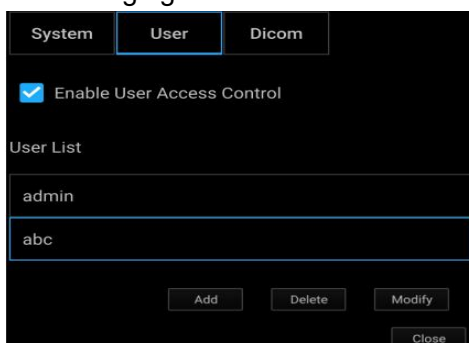
User List

abc

Modify

Close

- If you are logged in as an administrator, you will see all users when user access control is turned on, as shown in the following figure:



System **User** Dicom

☒ Enable User Access Control

User List

admin

abc

Add Delete Modify

Close

5.3.5 Dicom

Operation steps: Click the upper left corner  -- click "Setting" -- Dicom .

Dicom Local: Click the "Local" button to set the local AET name.

Dicom storage: Click "Storage" button to set IP address, port, AET and other related information, which can support Dicom storage function.

Dicom Printer: Click "Printer" button, set Dicom printer IP address, port, AET and other related information, can support Dicom printing function. Select media type, size, destination, and set horizontal and other related functions.

(Only available on the PC side).



Attention

- Before sending data to the DICOM server, ensure that the machine is successfully connected to the DICOM server, otherwise, the data cannot be sent.
- Disconnect the network before the configuration.

5.3.6 Software upgrade

When a software upgrade is required, you can choose to uninstall or overwrite the installation. If uninstalling, uninstall the current version of the software first, and then install the software upgrade package. If you override the installation, you do not need to uninstall the current version of the software, directly install the software upgrade package.

5.3.7 Language

The language of this software follows the system settings.

5.4 Patient Information

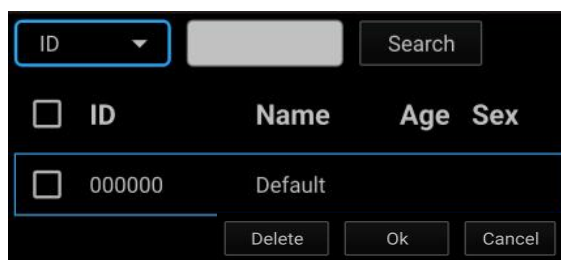
Click " " at the top right of the screen to enter the patient information interface, you can create a New Patient and Select Patient information.

5.4.1 New Patient

Click the "New Patient" button to create a new patient. You can select or edit patient ID, name, age, sex, exam type: Generic, Abdomen, Obstetrics, Gynecology, Cardiology, Vascular, Small Part, Urology, Musculoskeletal, Pediatrics, Transcranial.

5.4.2 Select Patient

Click the "Select Patient" button and click the drop-down menu to search for patients using patient ID or name.



Click "OK" to enter the patient information page. In the information page after selecting the patient, the patient information (age, gender, examination type) can be modified, but the patient ID and name cannot be modified. Click "OK" and the software returns to the ultrasound examination interface.

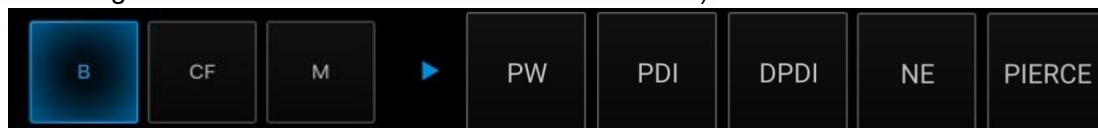
5.4.3 Delete Patient

Return to the patient management interface, check the patient, click "Delete", the system prompts "Default patient can not be deleted." Click the "OK" button to delete the checked patient and all the examination records for that patient.

5.5 Instruction to Mode Operation

5.5.1 Mode switchover

1. By default, the system displays the B-mode interface
2. Operation path: Move the icon of the mode to be switched to complete the mode switch(You can slide the image mode bar to select a mode that is not shown).



Mode Function Description:

Pattern	Function
B mode	B mode is the basic imaging mode that displays real-time views of anatomical tissues and organs.
CF mode	CF(Color flow) mode is used to detect color flow information, and the color is designed to judge the direction and speed of blood flow. Generally, the color above the color bar indicates the flow towards the probe, while the color below the color bar indicates the flow away from the probe. The brighter the color, the faster the flow speed, while the darker the color, the slower the flow speed.
PW mode	PW (Pulsed Wave Doppler) mode is used to provide blood flow velocity and direction utilizing a realtime spectrum display.
M mode	M mode shows graph image about the tissue motion in a time sequence,the tissue motion information comesfrom ultrasound beam echoes.M mode is mostly used in cardiology.

PDI mode	Power Doppler Imaging (PDI) mode is the blood imaging mode which is used to reflect strength of ultrasonic Doppler signal of motor tissue
DPDI mode	Directional Power Doppler Imaging (DPDI) mode, draw energy component and frequency information of Doppler signal can reduce sensitivity for low-speed blood flow with direction of color Doppler.
Pierce Mode	Puncture assistance is used to provide the doctor with an auxiliary orientation on the imaging screen during puncture surgery, so that the puncture needle can be more accurately placed to the doctor's desired position.
NE mode	NE(Puncture enhance)mode is used to improve the visibility of the puncture needle in the ultrasound image, assist the doctor to accurately locate the needle tip position, and reduce the risk of operation.(Only for linear probe)

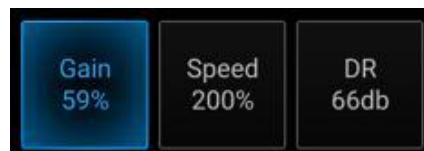
5.5.2 B Mode



B Mode parameters:

Parameter	Function
Gain	Increase or reduce gain to obtain a brighter or darker image by the Sliding bar, selecting the most appropriate gain value.
Freq (Frequency)	When choosing the frequency, the working frequency of the probe can be adjusted through the Sliding bar. The higher the frequency, the poorer the penetration ability and the higher the resolution.
Depth	Different depth can be more intuitive display of the image, so that the image is easy to observe. When choosing the depth, the depth value can be adjusted through the Sliding bar.
DR (Dynamic Range)	Dynamic range controls how echo intensity is translated into gray-scale gradients, and adjusting dynamic range to optimize tissue texture for different anatomical structures.
S.Red(Speckle Reduction)	Speckle Reduction adjustment can reduce the speckle noise of the image and obtain a smoother image through spatial filtering. The adjustment of image noise reduction affects the details of the image. The higher the image noise reduction value, the greater the loss of image details.

5.5.3 M Mode

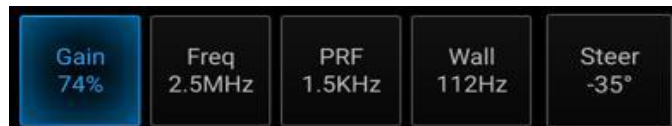


M Mode parameters:

Parameter	Function
DR (Dynamic Range)	Dynamic range controls how echo intensity is translated into gray-scale gradients, and adjusting dynamic range to optimize tissue texture for different anatomical structures.
Speed	The scanning speed controls the time axis size of the M-image by varying the density of sampling lines per unit time, so that more or fewer motion

	events are observed on the screen.
Gain	Increase or reduce gain to obtain a brighter or darker image by the Sliding bar, selecting the most appropriate gain value.

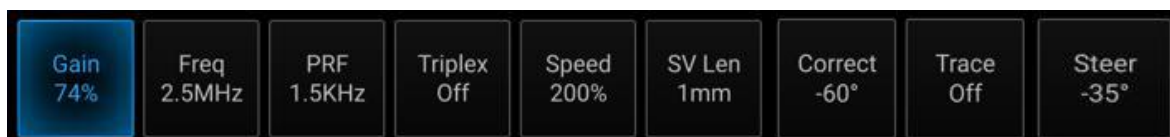
5.5.4 CF Mode



CF Mode parameters

Parameter	Function
Gain	Increase or reduce gain to obtain a brighter or darker image by the Sliding bar, selecting the most appropriate gain value.
Freq (Frequency)	When choosing the frequency, the working frequency of the probe can be adjusted through the Sliding bar. The higher the frequency, the poorer the penetration ability and the higher the resolution.
PRF (Pulse Repetition Frequency)	When used to observe tissues or organs at different speeds, it can be adjusted according to the movement speed of tissues or blood flow to make the image clearer and avoid confusion.
Wall (Wall Filter)	Using wall filtering to remove low frequency and high density noise signal. Increasing wall filtering will filter out low-speed moving tissue image, reducing wall filtering will show more tissue movement.
Steer	The angle deflection function, by deflecting the color sampling frame left and right, enables the operator to meet the Angle requirements required by the ultrasound Doppler effect without moving the probe, and obtain the required moving tissue information.

5.5.5 PW Mode

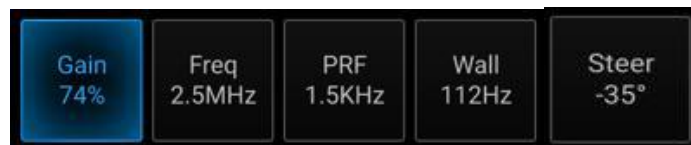


PW Mode parameters

Parameter	Function
Gain	Increase or reduce gain to obtain a brighter or darker image by the Sliding bar, selecting the most appropriate gain value.
Freq (Frequency)	When choosing the frequency, the working frequency of the probe can be adjusted through the Sliding bar. The higher the frequency, the poorer the penetration ability and the higher the resolution.
PRF (Pulse Repetition Frequency)	The pulse repetition frequency should be changed to meet the observation requirements of tissues with different motion speeds. Generally, when observing high-speed blood flow, the pulse repetition rate should be adjusted higher to avoid confusion.
Triplex	The triplex function can display the spectrum and B-mode image simultaneously, so that the doctor can observe the real-time image for diagnosis.

Speed	Adjust the speed of frequency spectrogram updating to observe more or less frequency spectrogram period on screen.
SV Len (Sampling Volume Door Length)	The length of the PW mode sampling volume gate will affect the sampling accuracy and Doppler sound output. The smaller the length of the sampling volume gate, the more sensitive it is, and the more accurate the sampling results can be produced. The larger the length of the sampling volume gate, the better the Doppler sound can be listened to (or the large blood vessels or regions can be sampled).
Correct	Estimate blood flow speed with certain angle direction with Doppler vector through calculating the angle between Doppler vector and blood flow to be measured so as to optimize precision of blood flow speed.
Trace	Automatic tracing function, by automatically obtaining the spectrum pattern envelope, automatically calculate the maximum value, minimum value and average value of speed on the spectrum pattern, convenient for the operator to observe.
Steer	By deflecting the sampling volume gate left and right, the operator can obtain the desired moving tissue information without moving the probe and meeting the Angle requirements required by the ultrasound Doppler effect.

5.5.6 PDI/DPDI Mode



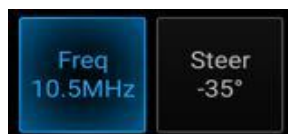
PDI/DPDI Mode parameters

Parameter	Function
Gain	Increase or reduce gain to obtain a brighter or darker image by the Sliding bar, selecting the most appropriate gain value.
Freq (Frequency)	When choosing the frequency, the working frequency of the probe can be adjusted through the Sliding bar. The higher the frequency, the poorer the penetration ability and the higher the resolution.
PRF (Pulse Repetition Frequency)	The pulse repetition frequency should be changed to meet the observation requirements of tissues with different motion speeds. Generally, when observing high-speed blood flow, the pulse repetition rate should be adjusted higher to avoid confusion.
Wall (Wall Filter)	Using wall filtering to remove low frequency and high density noise signal. Increasing wall filtering will filter out low-speed moving tissue image, reducing wall filtering will show more tissue movement.
Steer	By deflecting the color sampling frame left and right, the operator was allowed to obtain the desired moving tissue information without moving the probe and satisfying the Angle requirements required by the ultrasound Doppler effect.

5.5.7 Pierce Mode

Line Type	Angle	Micro-A	Offset	Center Line
◀ Off ▶	◀ 15deg ▶	◀ 0.0deg ▶	◀ 5mm ▶	Off
Parameter	Function			
Line Type	The imaging screen displays auxiliary dotted line to help the doctor provide a more accurate piercing angle during the piercing procedure.			
Angle	Adjust the angle of the guide wire on the screen,the adjustment range is from -5° to 59°.			
Micro-Angle	Slightly adjust the tilt Angle of the auxiliary wire on the screen,the adjustment range is from 0.0° to 0.9°.			
Offset	Adjust the left and right positions of the auxiliary cables on the screen,the adjustment range is from 0 to 39.			
Center Line	An auxiliary dotted line divides the left and right sides of the screen equally, with additional dotted lines at the top dividing the left and right sides of the screen into four equal parts.			

5.5.8 NE Mode (Puncture Enhance Mode)

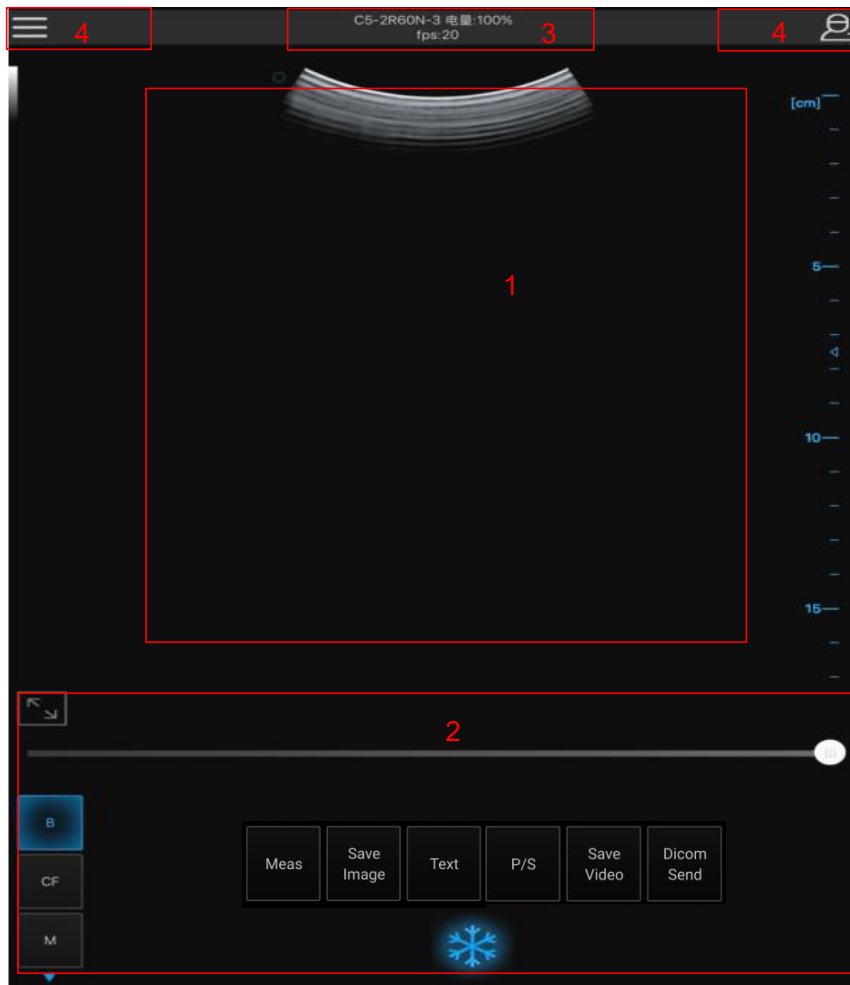


NE Mode parameters

Parameter	Function
Freq (Frequency)	The frequency adjustment of the puncture mode will affect the penetration and resolution of the image. Generally speaking, the higher the frequency, the worse the penetration and the higher the resolution.
Steer	The function of deflection is to adjust the Angle of deflection of the probe, so that the doctor can observe the clear image when the probe is inserted at different angles.

5.5.9 Freeze Mode

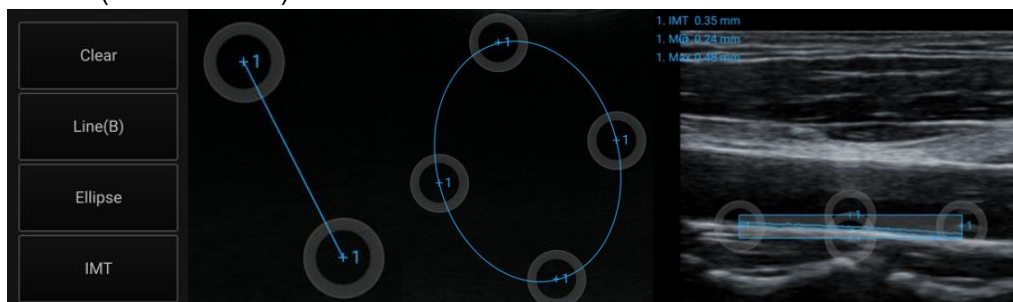
In freeze mode, users can perform measurement, save image, save video, play/stop and text annotation operations.



1	Image display area	Image display area for each mode
2	Button function area	Each mode is selected; the relevant value adjustment in the corresponding mode
3	Model display area	Probe model display area and FPS value
4	Parameter setting area	System Settings/Software Configuration/Tools

➤ Introduction of key functions:

(1) Meas (Measurement)



- Users can perform simple distance, area, Angle, IMT measurements, volume, A/B length, A/B perimeter, and A/B area measurements.
 - Adjust the line length, ellipse size, and IMT by dragging the point (the selected point is highlighted).
 - Click the "Clear" button to clear the previous measurement record; Click "Clear All" to clear all measurement records.
- (2) Save Image/video: save image or video, the saved images or videos can be viewed in the inspection results and can be deleted.
 - (3) P/S (Play/Stop): play or stop the current video.
 - (4) Text: text annotations can be made on the current measurement. Edit the corresponding text by clicking the soft keyboard, which can be edited in Chinese, English, numbers, symbols, etc. After editing, you can drag the text to the corresponding image position.
 - (5) Dicom send: Send images/videos via Dicom.

5.6 Measurement and Calculation

In B mode, click the interface  key or by pressing the [Freeze] keys of the device to enter the freezing mode, and then click [Measure] to select the measurement method, when selecting the line, you can adjust the position of the sampling line by moving 1 place in the image with your finger.



After measurement, click [Clear] to delete the previous measurement result. Click [Clear All] to clear all measurement results.

5.6.1 Description of the measurement and calculation Items corresponding to the measurement key

- (1) When frozen, press the measurement button to enter the measurement mode.
- (2) In the B, CF, PDI, and DPDI modes are consistent with those in the B mode, which are explained here.
- (3) In different working modes, the description of the routine measurement and calculation items corresponding to the general measurement items in the measurement menu is shown in the following table:

Working Modes/Measurements & Calculations		
B、CF、PDI、DPDI	M	PW
Distance	Distance	Distance
Area	Area	Area
Angle	Angle	Angle
IMT	IMT	IMT
Volume	Volume	Volume
A/B length	A/B length	A/B length
A/B perimeter	A/B perimeter	A/B perimeter
A/B area	A/B area	A/B area

	Velocity	Velocity
	Heart Rate	Acceleration
		Heart Rate
		PS/ED

5.6.2 Regular measurement

5.6.2.1 B mode regular measurement and calculation instructions

The measurements and calculations in the B, CF, PDI, and DPDI operating modes are consistent with the B mode and are described here.

5.6.2.2 Distance measurement

- Press the measurement button, click the "Distance" option, and the measurement result bar on the screen will prompt "Distance".
- Move the cursor through the trackball to the starting position to be measured and click on the blank space to confirm.
- Move the cursor through the trackball to the end position to be measured, and click on the blank space to confirm
- The measurement results column on the screen displays the measurement results (distance length value cm).

5.6.2.3 Area measurement

- Press the measurement button, click on the "Area" option, and the measurement result bar on the screen will prompt "Ellipse".
- Move the cursor through the trackball to the starting position to be measured and press the blank space to determine.
- Move the cursor through the trackball to the end position to be measured and press the blank space to determine.
- The measurement results are displayed in the measurement results column on the screen (perimeter value cm, area value cm²).

5.6.2.4 Angle measurement

- Press the measurement button, click the "Angle" option, and the measurement result column on the screen prompts "Angle between two lines"
- By measuring two straight lines, the angle between them is calculated the measurement result (angle) is displayed in the measurement result column on the screen.

5.6.2.5 IMT measurement

- Press the measurement button, click on the "IMT" option, and the measurement result bar on the screen will display "Square"
- Move the cursor through the trackball to the starting position to be measured, and press the blank space to determine
- Move the cursor through the trackball to the end position to be measured, and press the blank space to determine
- The measurement results are displayed in the measurement results column on the screen:

IMT	XX.XX mm
Min	XX.XX mm
Max	XX.XX mm

5.6.2.6 Volume measurement

- Press the measurement button, click on the "Volume" option, and the "Three Lines" will be displayed in the measurement result column on the screen.
- Volume can be measured and calculated in single-distance, double-distance, and three-distance modes, as shown in follow Table.

Measurement method	Calculation formula
Single distance	$\pi/6 \times A^3$
Double distance	$\pi/6 \times A \times B^2 (A > B)$
Three distances	$\pi/6 \times A \times B \times C$

5.6.2.7 Ratio measurement

- Press the measurement button, click on the "A/B Perimeter" option, and the measurement result bar on the screen will display "Double Line"
- Ratio measurement includes A/B length ratio, A/B perimeter ratio, and A/B area ratio
- The ratio can be calculated by measuring the diameter or area by the following formula:
 - Ratio= D1/D; D1、D2 They are the distances of two straight lines that are measured D1>D2
 - Ratio= A1/A; A1、A2 are the area of the two sections measured and A1>A2
- The measurement results are displayed in the measurement results column on the screen.

5.6.2.8 M mode regular measurement and calculation instructions

Distance, area, Angle, IMT, Volume, A/B length, A/B Girth, and A/B area were measured in the same way as in the B mode and are not described here.

5.6.2.9 Velocity measurement

- Press the measurement button, click on the "Velocity Perimeter" option, and the measurement result bar on the screen will display "Velocity"
- Move the cursor to the appropriate position by touching.
- The measurement results are displayed in the measurement results column on the screen:

Velocity x.xx m/s
Time x.xx s
Distance x.xx cm

5.6.2.10 Heart Rate measurement

- Press the measurement button, click on the "Heart Rate " option, and the measurement result bar on the screen will display "Heart Rate"
- Move the cursor to the appropriate position by touching.
- The measurement results are displayed in the measurement results column on the screen:

Heart Rate xx bpm

5.6.2.11 PW mode regular measurement and calculation instructions

Distance, area, Angle, IMT, Volume, A/B length, A/B Girth, and A/B area were measured in the same way as in the B mode, Velocity and Heart Rate were measured in the same way as in the M mode and are not described here.

5.6.2.12 Acceleration measurement

- Press the measurement button, click on the "Acceleration " option, and the measurement result bar on the screen will display "Acceleration"
- Move the cursor to the appropriate position by touching.
- The interface displays:

Acceleration x.xx m/s²
Time x.xx s
Velocity Diff x.xx cm/s

Calculation data	Velocity Diff(Velocity Difference) cm/s
Calculation formula	Velocity Diff(cm/s)=abs(V1(cm/s)-V2(cm/s))
Calculation results	Time S
Calculation formula	Time(s)=abs(t1(s)-t2(s))
Calculation results	Acceleration cm/s ²
Calculation formula	Acceleration(cm/s ² m/s ²)=abs(V2(cm/s)-V1(cm/s)/abs(t2(s)-t1(s))

5.6.2.13 PS/ED measurement

- Press the measurement button, click on the "PS/ED " option, and the measurement result bar on the screen will display "PS/ED"
- Move the cursor to the appropriate position by touching.
- The measurement results are displayed in the measurement results column on the screen.

Calculation results	PS/ED (Peak Systolic Velocity/End-Diastolic
Measured data	TMax cm/s
	TMin cm/s
	TMean cm/s
Calculation results	PGmax(Pressure Gradient Maximum)mmHg
	PGmean(Pressure Gradient Mean)mmHg
	VTI(Velocity-Time Integral)cm
Calculation results	RI (Resistance Index)
Calculation formula	RI= PS(m/s)-ED(m/s) /PS(m/s)
Calculation results	PI(Pulsatility Index)
Calculation formula	PI=(TMax(cm/s)-TMin(cm/s))/TMean(cm/s)
Measured data	HR(Heart Rate)bpm

5.6.3 Abdominal Measurement

In B mode, click the  button in the upper right corner, select the type of examination (abdomen), click OK. click Frozen, and click Measure.

5.6.3.1 Liver

Measured data	CC(Cranio-Caudal diameter) cm	Measurement in B mode
	AP(Antero-Posterior diameter) cm	
	LL(Latero-Lateral diameter) cm	
Calculation results	Liver Volume cm ³	
Calculation formula	Liver Volume (cm ³)=133.2+0.422*(CC(cm)*AP(cm)*LL(cm))	

5.6.3.2 Gallbladder

Measured data	Length	cm	Measurement in B mode
	Width	cm	
	Height	cm	
Calculation results	GB Volume		

5.6.3.3 Spleen

Measured data	Length	cm	Measurement in B mode
	Width	cm	
	Height	cm	
Calculation results	Spleen Vol		

5.6.3.4 Bladder

Measured data	Length	cm	Measurement in B mode
	Width	cm	
	Height	cm	
Calculation results	Bladder Vol cm ³		
Calculation formula	Bladder Volume(cm ³)=0.570*(Length(cm)*Width(cm)* Height(cm))		

5.6.3.5 Left Kidney

Measured data	Length	cm	Measurement in B mode
	Width	cm	
	Height	cm	
Calculation results	Kidney Left	cm ³	
Calculation formula	Kidney Left Volume(cm ³)=0.523*(Length(cm)*Width(cm)*Height(cm))		

5.6.3.6 Right Kidney

Measured data	Length	cm	Measurement in B mode
	Width	cm	
	Height	cm	
Calculation results	Kidney Right	cm ³	
Calculation formula	Kidney Right Volume(cm ³)=0.523*(L(cm)*W(cm)*H(cm))		

5.6.3.7 Pancreas

Measured data	Panc Head	cm	Measurement in B mode
	Panc Body	cm	
	Panc Tail	cm	
	Panc Duct Head	cm	
	Panc Duct Body	cm	

5.6.3.8 Gastrointestinal

Measured data	Appendix Wall	cm	Measurement in B mode
	Appendix Diam	cm	
Measured data	Thickness at Stomach	cm	
	Thickness Small Bowel	cm	
	Thickness Large Bowel	cm	

5.6.4 Obstetrics Measurements

Click the “” button in the upper right corner in mode B, select (Obstetrics) in the examination type, click OK, click Frozen, and click Measure.

5.6.4.1 Obstetrics

Measured data	GS (Gestational Sac Diameter)	mm	Measurement in B mode
	YS (Yolk Sac)	mm	
	BPD (Biparietal Diameter)	mm	
	CRL (Crown-Rump Length)	mm	
	FL (Femur Length)	mm	
	NT (Nuchal Translucency)	mm	
	AF (Amniotic Fluid)	mm	
	HC (Head Circumference)	mm	
	AC (Abdominal Circumference)	mm	
	HL (Humerus Length)	mm	
	PL Thick(Placental Thickness)	mm	
	AFI Q1 (Amniotic Fluid Index Q1)	mm	
	AFI Q2 (Amniotic Fluid Index Q2)	mm	
	AFI Q3 (Amniotic Fluid Index Q3)	mm	
	AFI Q4 (Amniotic Fluid Index Q4)	mm	
Calculation results	AFI (Amniotic Fluid Index)	mm	
Calculation formula	AFI(mm)=AFIQ1(mm)+AFIQ2(mm)+AFIQ3(mm)+AFIQ4 (mm)		
Measured data	TAD (Abdominal Transversal Diameter)	mm	
	APAD (Anteroposterior Abdominal Diameter)	mm	
	APTD (Anteroposterior Trunk Diameter)	mm	
	TTD (Transverse Trunk Diameter)	mm	
	FTA (Fetal Trunk Cross-sectional Area)	mm ²	
	THD (Thoracic Diameter)	mm	
	HrtC (Heart Circumference)	mm	
	TC (Thoracic Circumference)	mm	
	Umb VD (Umbilical Vein Diameter)	mm	

	F-Kidney (Fetal kidney Length)	mm	
	EFW(estimated fetal weight)	g	
	GA(Gestational Age)		
	EDD (Estimated Delivery Date)		

5.6.4.2 Obstetrics calculate

Calculation results	FL/AC	Measurement in B mode
Calculation formula	FL/AC = Femur Length(mm) / Abdominal Circumference(mm)	
Calculation results	FL/HC	
Calculation formula	FL/HC = Femur Length(mm) / Head Circumference(mm)	
Calculation results	FL/BPD	
Calculation formula	FL/BPD = Femur Length(mm) / Biparietal Diameter(mm)	
Calculation results	HC/AC	
Calculation formula	HC/AC = Head Circumference(mm) / Abdominal Circumference(mm)	

5.6.5 Gynecological Measurements

In mode B, click the“  ”button in the upper right corner, select the type of examination (Gynecology), click OK, click Frozen, and click Measure.

5.6.5.1 Left Ovary

Measured data	Length	cm	Measurement in B mode
	Width	cm	
	Height	cm	
Calculation results	Left Ovary Vol	cm³	
Calculation formula	Left Ovary Volume (cm³)=π/6*L(cm)*W (cm)*H(cm)		

5.6.5.2 Right Ovary

Measured data	Length	cm	Measurement in B mode
	Width	cm	
	Height	cm	
Calculation results	Right Ovary Vol.	cm ³	
Calculation formula	Right Ovary Volume(cm ³)=π/6*L(cm)*W (cm)*H(cm)		

5.6.5.3 Follicle

Measured data	Length	cm	Measurement in B mode
	Width	cm	
	Height	cm	
Calculation results	Follicle Vol	cm ³	
Calculation formula	Follicle Volume(cm ³) = π/6*L(cm)*W(cm)* H(cm)		

5.6.5.4 Uterine Cervix

Measured data	Length	cm	Measurement in B mode
	Width	cm	
	Height	cm	
Calculation results	UT Cervix Vol. cm ³		
Calculation formula	UT Cervix Volume(cm ³)=π/6*L(cm)*W(cm) *H(cm)		

5.6.5.5 Uterine

Measured data	Length	cm	Measurement in B mode
	Width	cm	
	Height	cm	
Calculation results	UT Vol. cm ³		
Calculation formula	UT Volume(cm ³)=π/6*L(cm)*W(cm)*H(cm)		

5.6.5.6 UT Line (Uterine Line)

Measured data	UT Line	cm	Measurement in B mode
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5.6.5.7 Endo (Endometrial Thickness)

Measured data	Endo	cm	Measurement in B mode
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5.6.6 Cardiology Measurements

Click the  button in the upper right corner in M mode, select (Heart) in the examination type, click OK , click Frozen, and click Measure

Measured data	IVSd(Interventricular Septal Thickness, diastole) cm	Measurement in M mode
	LVIDd(Left Ventricle InternalDiameter,diastole)cm	
	LVPWd(Left Ventricle Posterior WallThickness,diastole)cm	
	IVSs (Interventricular Septal Thickness, systole) cm	
	LVIDs(Left Ventricle InternalDiameter,systole)cm	
	LVPWs(Left Ventricle Posterior Wall Thickness,systole)cm	
	LVLd(Left Ventricular Long-axis Length at End diastole in apical view) cm	
	LVLs(Left Ventricular Long-axis Length at End systole in apical view)	
	LVAMd(Left Ventricular Long-axis Area at End diastole in apical view)	
	LVAMs(Left Ventricular Long-axis Area at End systole in apical view)	
	Distance between point E and Interventricular Septum cm	
Calculation results	EDV (End Diastolic Volume) ml	
Calculation results	ESV (End Systolic Volume) ml	
Calculation results	SV (Stroke Volume) ml	
Calculation formula	SV(ml)=EDV(ml)-ESV (ml)	

➤ EDV ESV

Single Plane Ellipse

LVLd(Left Ventricular Long-axis Length at End Diastole in Apical View)
LVLs(Left Ventricular Long-axis Length at End Systole in Apical View)
LVAMd(Left Ventricular Long-axis Area at End Diastole in Apical View)
LVAMs(Left Ventricular Long-axis Area at End Systole in Apical View)
EDV(ml)= $8/3\pi \cdot \text{LVAMd}(\text{cm}^2)^2 / \text{LVLd}(\text{cm})$
ESV(ml)= $8/3\pi \cdot \text{LVAMs}(\text{cm}^2)^2 / \text{LVLs}(\text{cm})$

5.6.7 Vascular Measurements

5.6.7.1 Blood flow

Measured data	Diam cm	Measurement in B mode
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5.6.8 Small Part Measurements

5.6.8.1 Thyroid

Measured data	Length cm	Measurement in B mode
	Width cm	
	Height cm	
Calculation results	L Thyroid Vol.(Left Thyroid Volume) cm ³	Measurement in B mode
Calculation formula	Left Thyroid Volume(cm ³)= $0.479 \cdot L(\text{cm}) \cdot W(\text{cm}) \cdot H(\text{cm})$	
Measured data	Length cm	
	Width cm	Measurement in B mode
	Height cm	
Calculation results	R Thyroid Vol(Right Thyroid Volume) cm	Measurement in B mode
Calculation formula	Right Thyroid Volume(cm ³)= $0.479 \cdot L(\text{cm}) \cdot W(\text{cm}) \cdot H(\text{cm})$	
Calculation results	Thyroid V (Thyroid Volume) cm ³	
Calculation formula	Thyroid Volume(cm ³)=Left Thyroid Volume(cm ³)+Right Thyroid Volume(cm ³)	

5.6.8.2 Galactophore

Measured data	Length cm	Measurement in B mode
	Width cm	
	Height cm	
Calculation results	Galactophore Vol(Galactophore Volume) cm	Measurement in B mode
Calculation formula	Galactophore Volume(cm ³)= $\pi/6 \cdot L(\text{cm}) \cdot W(\text{cm}) \cdot H(\text{cm})$	
Measured data	Length cm	
	Width cm	Measurement in B mode
	Height cm	
Calculation results	Mass Vol. (Mass Volume) cm ³	

Calculation formula	Mass Volume(cm^3)= $\pi/6 \times L(\text{cm}) \times W(\text{cm}) \times H(\text{cm})$	
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5.6.8.3 Testis

Measured data	Length	cm	Measurement in B mode
	Width	cm	
	Height	cm	
Calculation results	Testis Vol. (Testis Volume) cm ³		
Calculation formula	Testis Volume(cm ³)=π/6*L(cm)*W(cm)*H(cm)		

5.6.9 Urology measurements

5.6.9.1 Residual Urine Volume

Measured data	Length	cm	Measurement in B mode
	Width	cm	
	Height	cm	
Calculation results	RUV (Residual Urine Volume) ml		
Calculation formula	RUV (ml) = $\pi/6$ * Length(cm) *Width (cm) *Height (cm)		

5.6.9.2 Prostate

Measured data	Length	cm	Measurement in B mode
	Width	cm	
	Height	cm	
Calculation results	Prostate Vol. (Prostate Volume) cm³		
Calculation formula	Prostate Volume(cm³)=π/6*Length(cm)*Width(cm)*Height(cm)		

5.6.9.3 Testis

Measured data	Length	cm	Measurement in B mode
	Width	cm	
	Height	cm	
Calculation results	Testis Vol. (Testis Volume) cm³		
Calculation formula	Testis Volume(cm³)=π/6*Length(cm)*Width(cm)*Height(cm)		

5.6.9.4 Left Kidney

Measured data	Length	cm	Measurement in B mode
	Width	cm	
	Height	cm	
Calculation results	LK Vol. (Left Kidney Volume) cm ³		
Calculation formula	LK Volume(cm ³)=π/6*Length(cm)*Width(cm) *Height(cm)		

5.6.9.5 Right Kidney

Measured data	Length	cm	Measurement
	Width	cm	

	Height cm	in B mode
Calculation results	RK Vol (Right Kidney Volume) cm ³	
Calculation formula	$RK\ Volume\ (cm^3) = \pi/6 * Length(cm) * Width(cm) * Height(cm)$	

5.6.9.6 Bladder

Measured data	Length cm	Measurement in B mode
	Width cm	
	Height cm	
Calculation results	Bladder Vol. (Bladder Volume) cm ³	Measurement in B mode
Calculation formula	Bladder Volume(cm ³)= $\pi/6 * Length(cm) * Width(cm) * Height(cm)$	

5.6.10 Musculoskeletal Measurements

5.6.10.1 Hip Angles

Measured data	BL (Baseline) °	Measurement in B mode
	RL (Roof line) °	
	IL (Inclination line) °	
Calculation results	α °	
Calculation formula	$\alpha (^{\circ}) = \text{abs}(RL(^{\circ}) - BL(^{\circ}))$	
Calculation results	β °	
Calculation formula	$\beta (^{\circ}) = \text{abs}(IL(^{\circ}) - BL(^{\circ}))$	
Measuring method	Graf	

5.6.10.2 Femoral Head Coverage

Measured data	FH d cm	Measurement in B mode
	d:distance from the baseline to the medial aspect of the femoral head	
	FH D cm	
	D:maximum diameter of the femoral head	
Calculation results	FHC %	Measurement in B mode
Calculation formula	$FHC(\%) = (d(cm)/D(cm)) * 100\%$	

5.6.11 Pediatric Measurements

5.6.11.1 Orthop Surg

Measured data	Base L (Base line) °	Measurement in B mode
	C Top L (Roof line) °	
	B Top L (Inclination line) °	
Calculation results	α °	
Calculation formula	$\alpha (^{\circ}) = \text{abs}(C\ Top\ L(^{\circ}) - Base\ L(^{\circ}))$	
Calculation results	β °	
Calculation formula	$\beta (^{\circ}) = \text{abs}(B\ Top\ L (^{\circ}) - Base\ L(^{\circ}))$	
Measuring method	Graf	



Attention

- During the measurement process, if the frozen state is lifted, all measurement information on the image will be deleted.
- Mode changes will clear the measurements from the screen senseless measurements are prohibited.
- Measurement should be carried out in the ultrasound image display area, and measurement is prohibited in the non-image area to avoid misdiagnosis.
- The fixed point in the measurement should be accurate. If the fixed point is not accurate, please delete the measurement data and re-measure it to avoid misdiagnosis due to the incorrect measurement results.

Chapter 6 Function and operation(Windows)

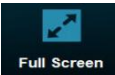
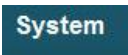
6.1 Description of Operation Panel



Diagrammatic Sketch of Operation Panel

Icon	Button name	Function description
B	B Mode	1. Valid when unfreeze 2. Switch the scan method to B mode
CF	CF Mode	1. Valid when unfreeze 2. Switch the scan method to CF mode
PW	PW Mode	1. Valid when unfreeze 2. Switch the scan method to PW mode

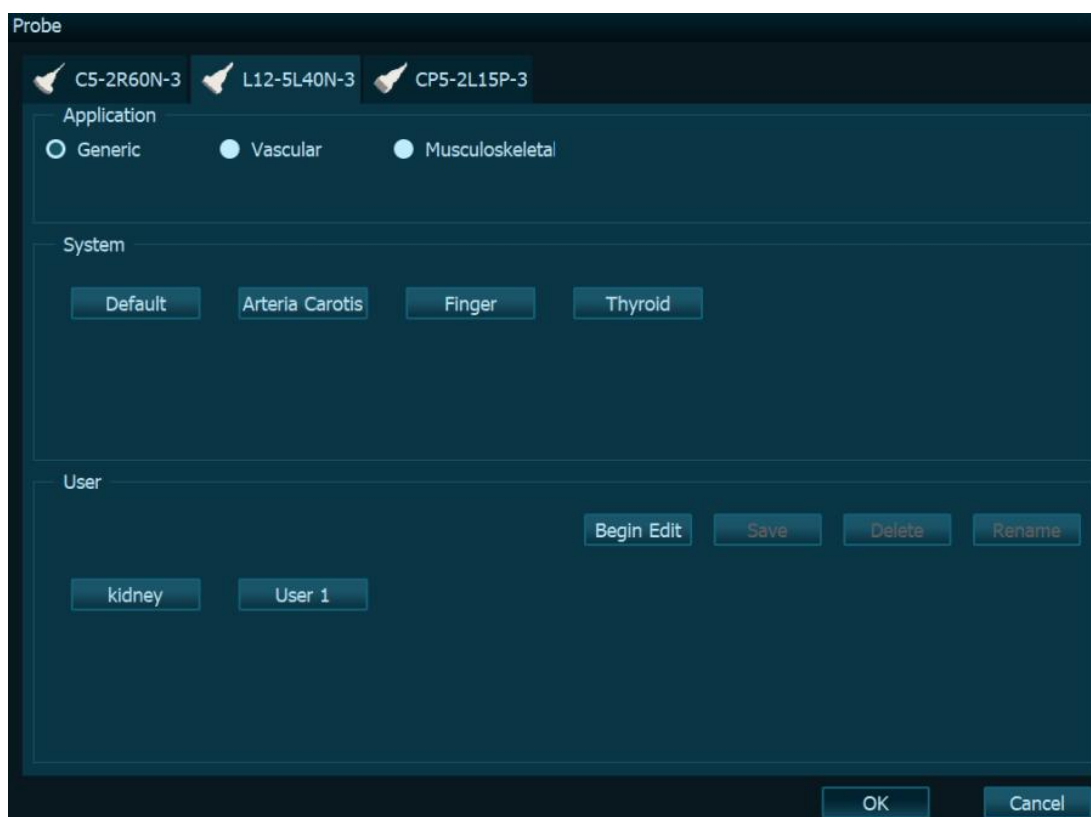
M	M Mode	1. Valid when unfreeze 2. Switch the scan method to M mode
2B	2B Mode	1. Valid when unfreeze 2. Switch the scan method to 2B mode
4B	4B Mode	1. Valid when unfreeze 2. Switch the scan method to 4B mode
PDI	PDI Mode	1. Valid when unfreeze 2. Switch the scan method to PDI mode
DPDI	DPDI Mode	1. Valid when unfreeze 2. Switch the scan method to DPDI mode
Pierce	Pierce	1. Valid when unfreeze 2. Switch the scan method to Pierce mode
Anatomy M	Antomy M	1. Valid when unfreeze 2. Switch the scan method to M mode
Wide View	Wide View	1. Valid when unfreeze 2. Switch the scan method to Wide View mode
NE Mode	NE Mode	1. Valid when unfreeze 2. Switch the scan method to NE mode
CE Mode	CE Mode	1. Valid when unfreeze 2. Switch the scan method to CE mode
Clear	Clear	1. Valid in freeze/unfreeze state. 2. Clear the measurement results. 3. Press once to clear the last measurement result. 4. Press twice to the screen prompts you whether to clear all the results on the screen. Select OK to clear all the measurement results, arrow, and text comments.
Text	Text	1. Valid when unfreeze 2. Annotate the text on the screen 3. Use the on-screen touch screen keyboard to enter text 4. After input, you can move it to the marked position and confirm by the confirm key
Measure	Measure	1. Valid in freeze/unfreeze state. 2. Only simple length measurements can be performed in the thawed state. 3. In the unfreeze state,press the“Measure” key to enter the simple measurement mode,press the"Select Menu"several times,and cycle to select the distance,ellipse,trace and other measurement modes. 4. The measurement mark appears in the image area of the screen,and the distance,ellipse and trajectory can be measured simply by manually touching the image.The measurement

		results are displayed in the upper left corner of the image display area. - When measuring the ellipse, adjust the length of the long axis and the short axis by sliding on the image to determine the size of the ellipse. - At the same time, the menu of the measurement software package applicable to the current mode appears on the right of the screen. You can select the corresponding measurement item through the "Scroll menu" and "Select Menu" and confirm key.
	Body Mark	- Valid when unfreeze - Mark a body mark at the lower right corner of the scan area - Select different position markers by manually touching the screen.
	Scan Area	- In the unfreeze state, this parameter is valid in CF,PW,or PDI mode. - In CF mode, press the ScanArea key and slide the screen horizontally or vertically to adjust the size of the sampling area. A text indicating the current function status will be displayed in the prompt bar at the bottom of the screen. Finish the adjustment by pressing this button again. - In PW mode, press the ScanArea key and select the pulse Doppler sampling position by manually touching the screen.Finish the adjustment by pressing this button again. - In PDI mode,the adjustment method is the same as that in CF mode.
	More	- Display other imaging modes other than the conventional mode - Press and select another imaging mode
	Finish Exam	- Display other imaging modes other than the conventional mode - Press and select another imaging mode.
	Full Screen	- Valid in freeze or unfreeze state - Changes the current image to a full screen display
	Save Video	- Valid when unfreeze - Press to save the just-freeze image video
	Save Image	- Valid when unfreeze - Press to save the just-freeze image
	Patient	- Valid when unfreeze - Create new medical records or patient information
	Report	- Valid when unfreeze - Press the report key to enter the report system and edit, print, and store the report.
	System	- Valid when unfreeze - Press the System key to perform system settings.
	Probe	- Valid in freeze or unfreeze state - Press the probe switch key, select the probe you need to use,

		and select the corresponding department application.
Optimize	Optimize	1. Valid in freeze or unfreeze state 2. Return to the B-mode image and restore all parameters to their default values.
Select Menu	Select Menu button	1. In the freeze or unfreeze state, use other function keys to confirm the function operation. 2. Use this feature to select or execute the relative measurement option.

6.2 Probe Selection and Switch

When the device is connected with multiple different probes, you can press the "Probe" button to select the probe required in clinic, which can be divided into three categories: linear array probe, convex array probe, phased array probe.



Linear array Probe Switch Interface

Probe

☒ C5-2R60N-3
 ☒ L12-5L40N-3
 ☒ CP5-2L15P-3

Application

☒ Generic
 ☒ Abdomen
 ☐ Obstetrics
 ☒ Gynecology
 ☒ Urology

System

User

Convex array Probe Switch Interface

Probe

☒ C5-2R60N-3
 ☒ L12-5L40N-3
 ☒ CP5-2L15P-3

Application

☒ Generic
 ☒ Abdomen
 ☐ Obstetrics
 ☒ Gynecology
 ☒ Urology

System

User

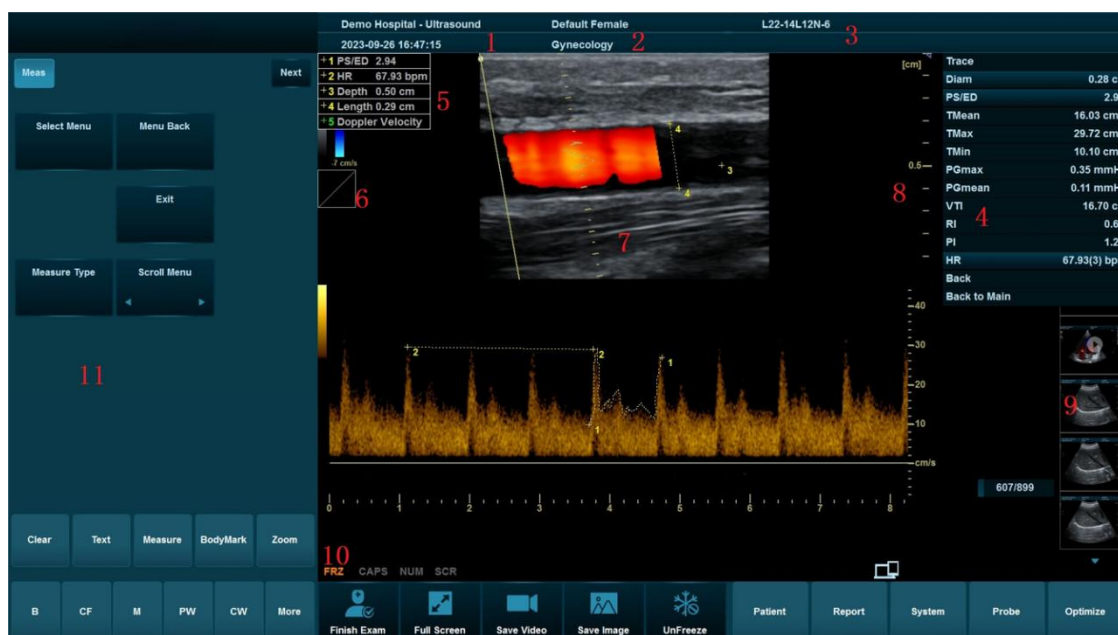
Phased Array Probe Switch Interface

Select corresponding diagnosis type, click necessary probe type and preset needed to be transferred to load preset parameter of corresponding part of the probe.

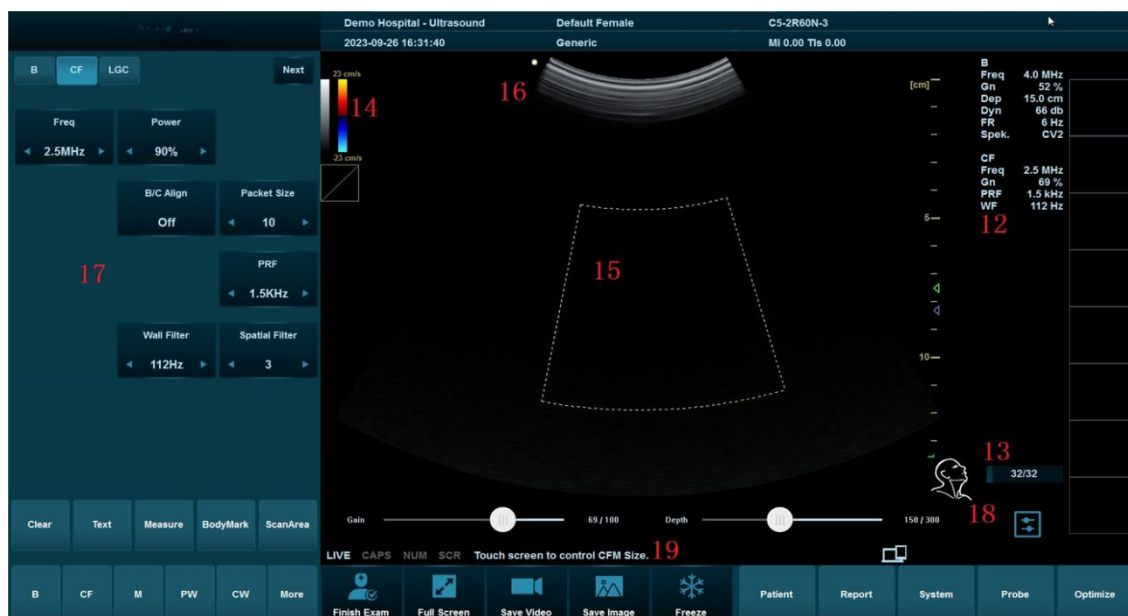
Attention

- The system needs to load corresponding control data when the probe is selected to switch, several seconds are needed for probe switch. Please wait patiently.
- Please confirm probe has been connected before opening the system; the self-inspection of software system shall report error when the main engine is opened without connecting the probe. It must be guaranteed that ultrasonic probe shall be installed or dismantled when the power is off; it may damage main engine and prove for equipment system error if it is installed or dismantled in open state.

6.3 Description of Screen Interface



Main Screen Interface A



Main Screen Interface B

No	Region name	Description
1	Top information display bar 1	Show the name of the hospital, the operating doctor, the time and date letter
2	Top information display bar 2	Display patient name, age, and gender information
3	Top information display bar 3	Displays sound output parameters and probe model information currently in use
4	Measurement function menu	Display the applicable measurement software package in the current mode. You can select the corresponding measurement item by touching it directly or by pressing the button in the left menu
5	Measurement results display area	Display the measurement results in the freeze state
6	Gray scale curve diagram	Displays the gray-scale graph corresponding to the current image
7	Image and measurement area	Display the ultrasonic image in the current mode; The measurement area in the freeze state
8	TGC, scale area	Display TGC curve, current ultrasound image scale, number and position of focal points
9	Save the image preview area	Displays a thumbnail of the currently saved image
10	Current status display area	Display the current operation status; Displayed in the unfreeze state based on the current operation mode
11	Menu bar	Displays the operation items corresponding to the menu bar buttons in the current state.
12	Imaging parameter region	The imaging parameters in the current mode can be displayed in different modes, such as B, M, CF, PW, PDI, DPDI
13	Video frame number display	Display the total frame number of the movie recording and the current image frame number information
14	Grayscale/color bar	Display screen gray and color bar information
15	Color sampling frame	Displays the position of the parameter sampling box
16	Probe position marking	Displays the position relationship between the ultrasonic image and the probe
17	Function menu	Displays the function menu in the current mode and adjusts the corresponding sub-function parameters
18	Position marker area	Displays the identification of the body part currently being examined
19	Operation navigation prompt bar	The current operation method is displayed for function navigation

List on Description of Screen Interface

6.3.1 Function menu instructions

Function menu in different modes:

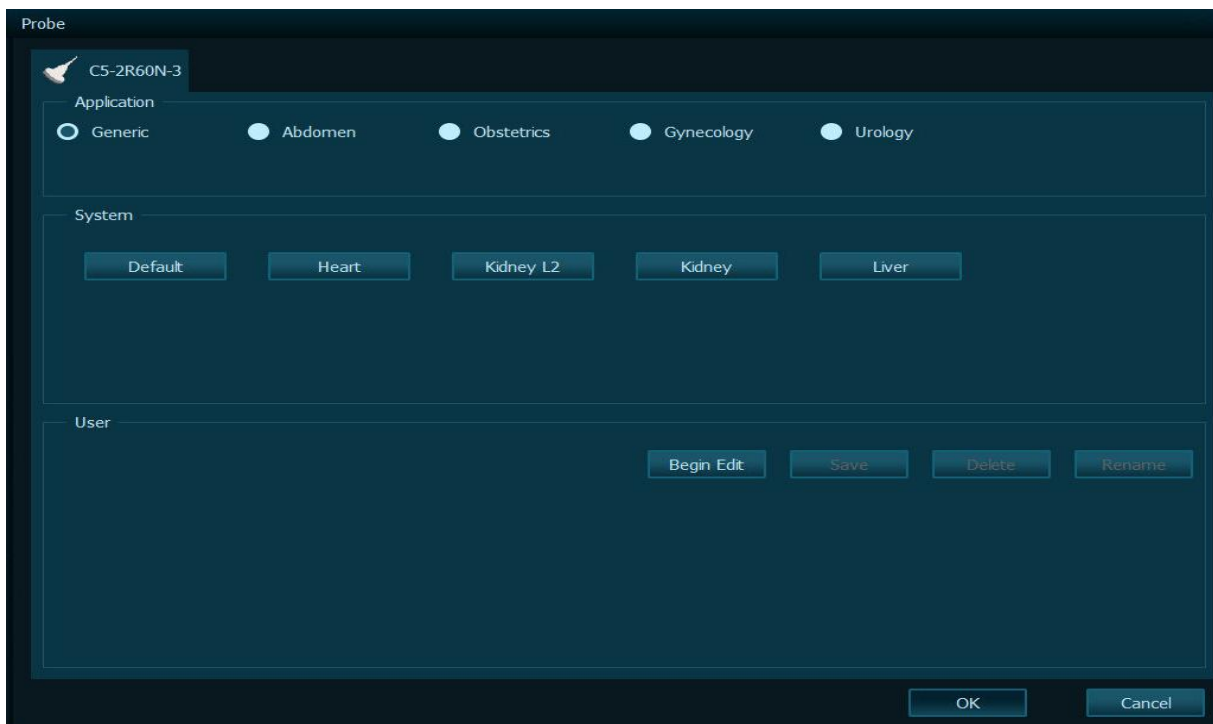
- In the unfreeze state, function menu buttons can adjust the parameters of each mode; In

the freeze state, the function menu button can realize Dicom and Print functions.

- The Previous/Next functions on the menu interface show more function parameters in the current mode.
- You can use the button on the function menu to adjust the value of this function. Hold down to adjust the value.

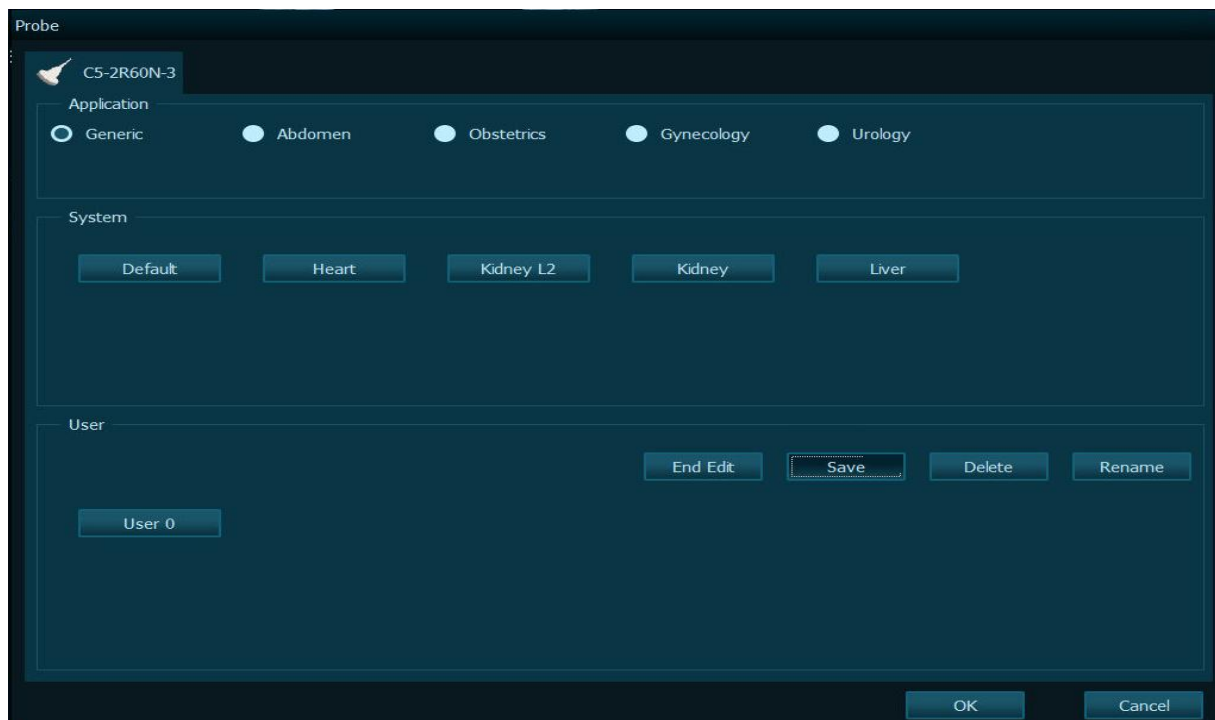
6.4 Save and Edition of Preset Parameter

After adjusting image parameter, press “Probe” button on the screen to pop up probe switch interface, just as follow shows. The preset in the system is system preset which cannot be increased, reduced and edited. Preset under User is customized by user which can be increased, reduced or edited.



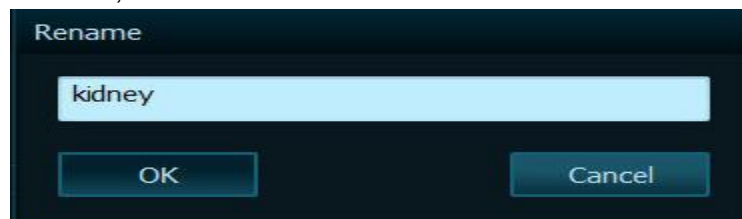
Probe Switch Interface

- Click “Begin Edit” to activate “Save user”, “Delete user” and “Rename user”, click “Save” to save currently adjusted parameter. The defaulted name is “User 0”, just as follow shows.

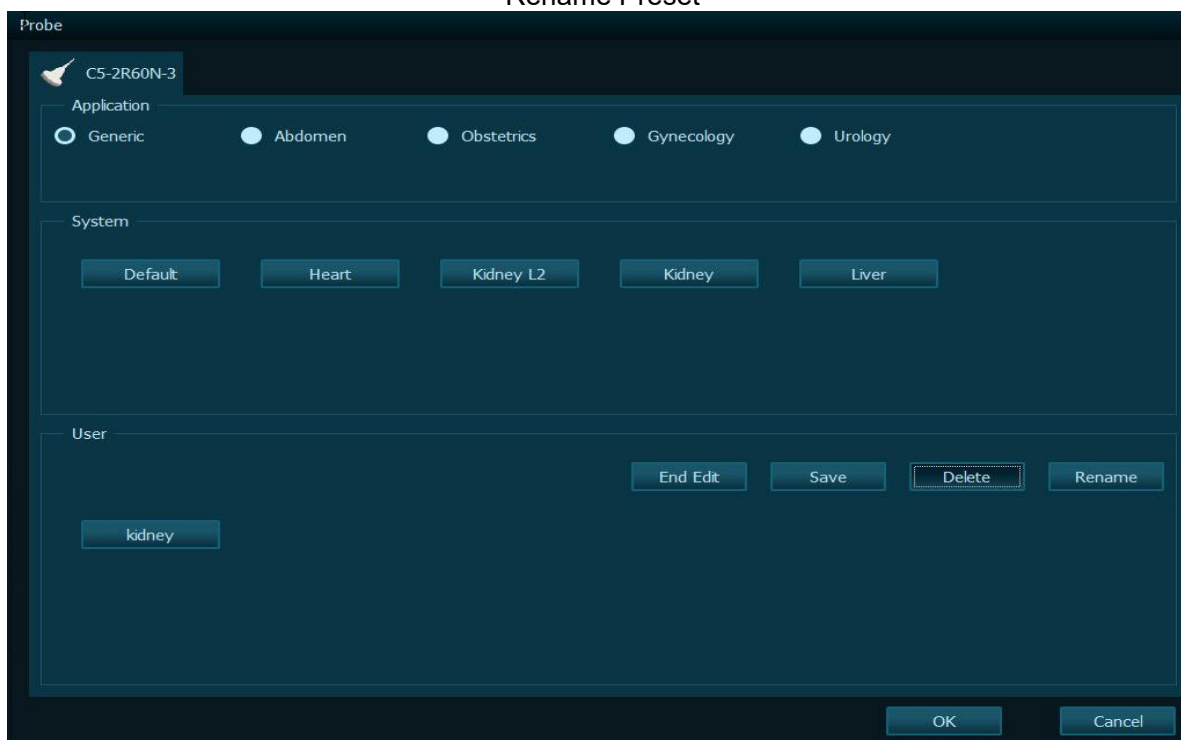


Save Preset

- Click "Rename" to pop up rename dialog box, input name you want and press "OK" to save the current parameters, as follow shows.



Rename Preset



Probe switch Interface after presetting rename

- Click “End Edit”,at that time,preset independently defined by user has been saved and completed.
- Delete preset independently defined by user: click “Begin Edit” and select customized preset you want to delete. Then, click “Delete” and “End Edit” to complete deletion.

Note: Only customized by user can be edited while system preset cannot be edited.

6.5 Patient Information

6.5.1 New Patient Information

Press “Patient” button on screen to transfer “Patient” dialogue box, just as follow shows.

Patient

Patient Information

Patient ID: Name:

Weight: kg Height: cm Age: ☐ Male ☐ Female ☐ Unknown

IP. No.: OP. No.:

Patient Filter

Search Key: Key Word:

ID	Name	Gender	Age	OP. No.	IP. No.	Weight	Height
2	Default	F					

Application

- ☐ Generic
- ☐ Abdomen
- ☐ Obstetrics
- ☐ Gynecology
- ☐ Cardiology
- ☐ Vascular
- ☐ Small Part
- ☐ Urology
- ☐ Musculoskeletal
- ☐ Pediatrics

New Patient Interface

- Click “New case” to establish a patient; patient ID, name, age, In Patient No, Out Patient No, gender, weight and height can be independently edited. Click “New Temp” to set the information of new patient into defaulted state.
- Select contents in “Search key” in “Patient” list and input key words to search. Contents shown in the following table are specific personal information of patients inspected by the machine.
- Select application at the right column, the corresponding to the list of current patients will come.

6.5.2 Recall Exam History

Click on the “Exam History” button in freeze state to enter into the dialogue box of “Exam History”, just as follow shows.

Exam History

Filter

Search Key Key Word

Capacity Information

Total Space: 1577.1G
Free Space: 797.9G

Patient:

ID	Name	Gender	Age	OP. No.	IP. No.	Weight	Height
2	Default	F	0				

Exam:

ID	Date	Operator	Department	Exam Type	Diagnosis
17	2023-09-26 10:37:04	Ultrasound		Generic	
16	2023-08-09 16:04:12	Ultrasound		Gynecology	
15	2023-08-03 14:29:49	Ultrasound		Gynecology	

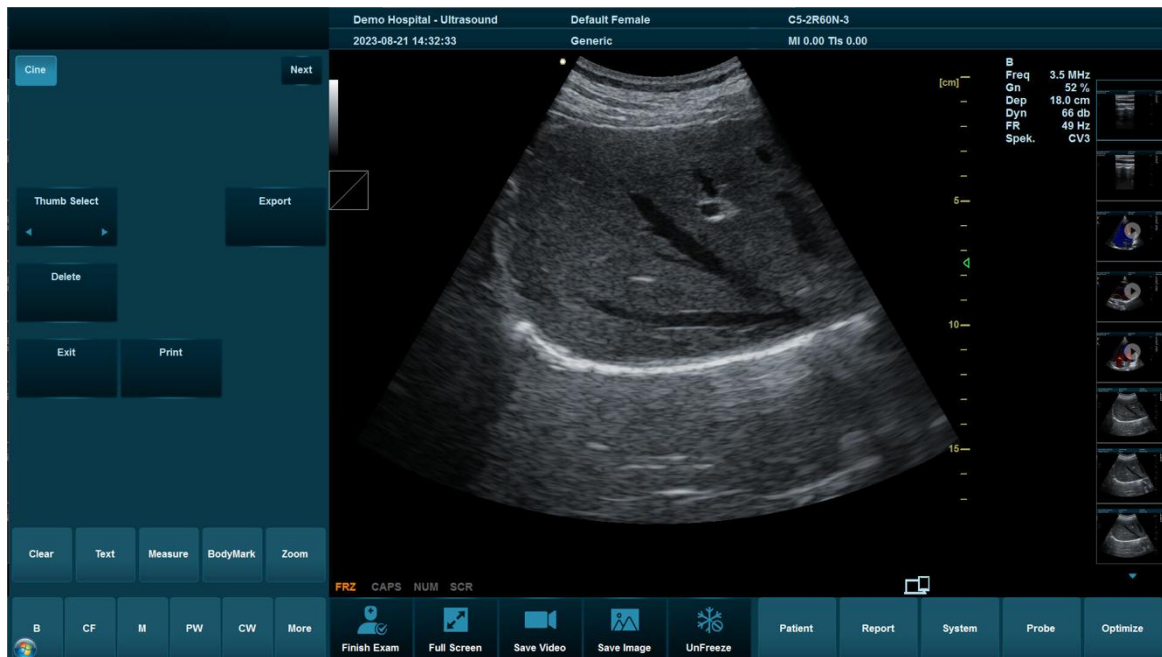
Exam History Interface

- Filter: Select contents in “Search Key” and input key words in the following input diagram to search key words, the result shall be shown in “Patient” area.
- Capacity information: Display overall space and available space of current system.
- Patient: After searching key words in “Filter”, information of all qualified patients shall be shown. Click one patient and select one data of the patient in “Exam”, images, videos and reports of the inspection saved at that time shall be shown at the bottom. Click “Open” at the bottom to specifically examine images, videos or reports.

6.5.3 Export Exam Information

6.5.3.1 Export Image

- Make sure it has been connected with USB successfully.
- After searching key words in “Filter”, click one patient and select one inspection of the patient in “Exam”, images, videos and reports of the inspection saved at that time shall be shown at the bottom. Click the image needed to be exported and click “Open” at the bottom to examine the image, just as follow shows.



Export Image Interface

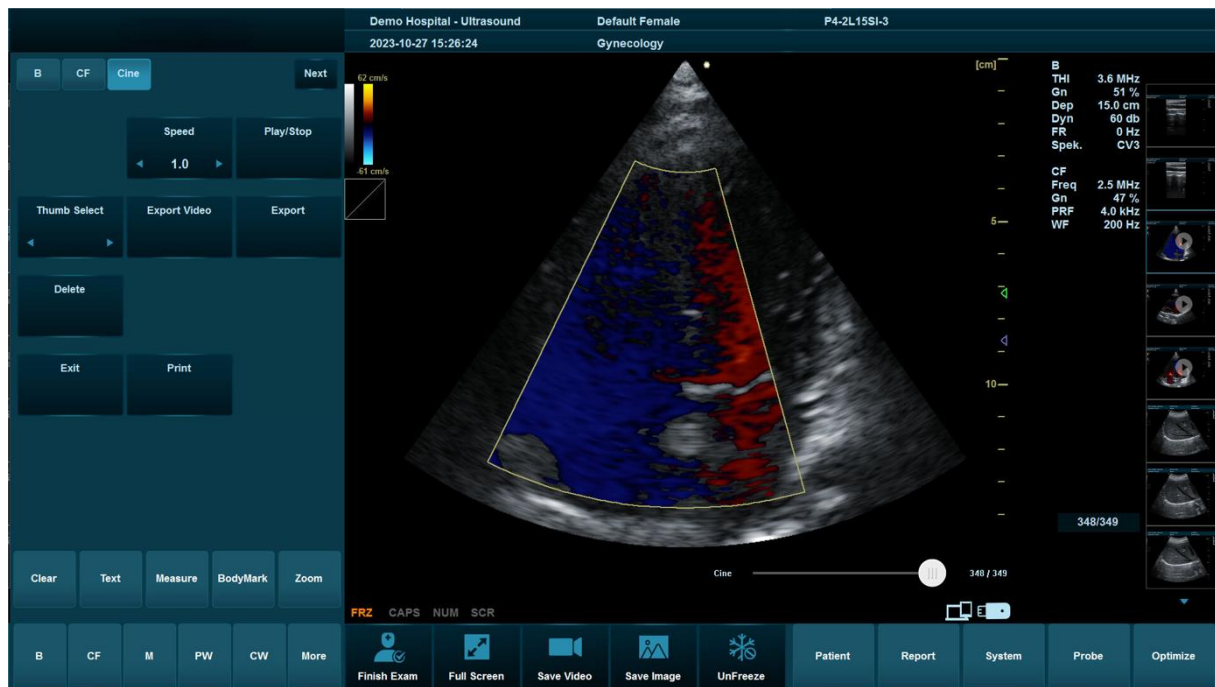
- Touch the corresponding buttons on the screen to export, print, delete, view, check, exit and other operations.
- Export image: In the current image interface, press the export button in the left menu bar to export the image to the USB flash drive. By default, the image is saved in PNG format. After the export succeeds, a message indicating that the image is exported successfully is displayed, as follow shows



Export Image Dialogue Frame

6.5.3.2 Export Video

- Make sure it has been connected with USB successfully.
- After searching key words in "Filter", click one patient and select one inspection of the patient in "Inspection", images, videos and reports of the inspection saved at that time shall be shown at the bottom. Click the video needed to be exported and click "Open" at the bottom to examine the video, just as follow shows.

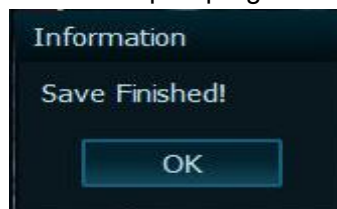


Export Video Interface

- The function menu on the left allows you to adjust the playback speed, pause/play the video, export the current frame, export the video, print, and exit.
- Export video: On the Export video screen, press the Export video button in the left function menu, you can see the video export progress and the message after export in the lower right corner of the current screen. The default video is saved in MP4 format.



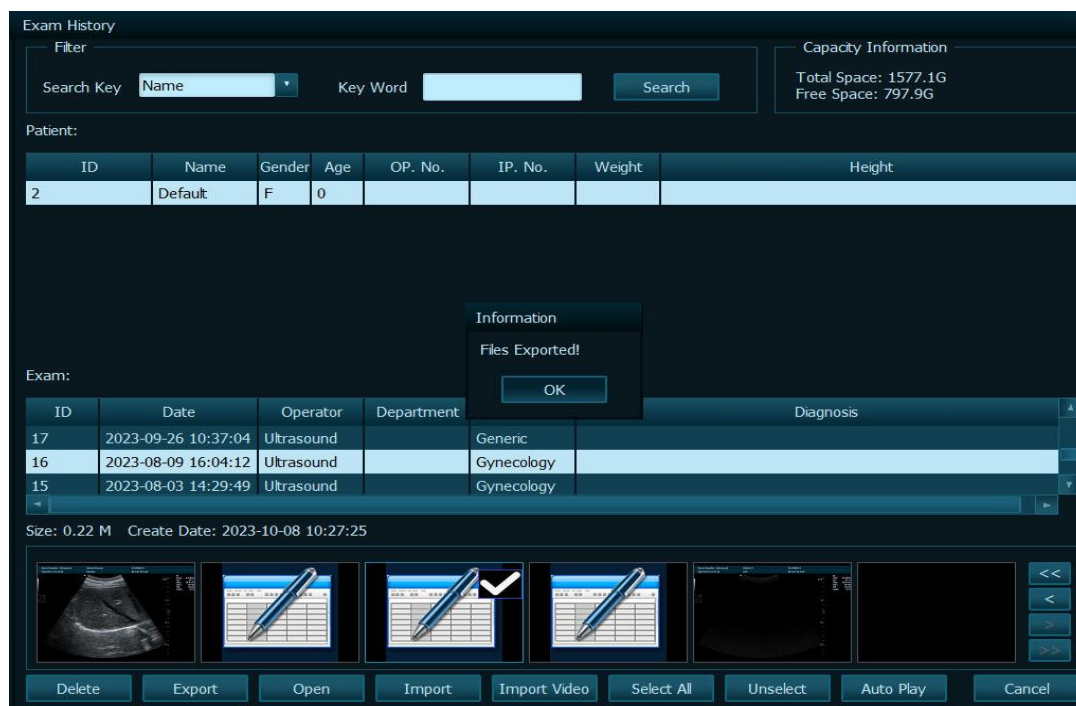
Video export progress



Export completion message

6.5.3.3 Export Report

After performing a keyword search in Filters, click on one of the patients and select a test for that patient from the "Tests" TAB below. Images, videos, and reports from that test will be displayed at the bottom. Select the report that you want to export and click Open to view the report. Click Export. After the report is successfully exported, a message is displayed. The report format is available only in PDF format. Click OK to export the report.



Export Report Interface

6.5.4 Import Exam Information

6.5.4.1 Import

The exported images, videos and examination report files can be re-imported into different "exam" of the patient.

- Make sure that the mobile USB has been successfully connected and that the device has the required files for import. After performing search in "Filter", click on one of the patients and "open".
- Select one of the patient's examinations, click "Import" to import the required files.

6.5.4.2 Import Video

Ensure that the mobile USB device is connected successfully and that the video file (.mp4 or.avi format file) is placed in the mobile USB device.

- Make sure that the mobile USB has been successfully connected and that the device has the required files for import. After performing search in "Filter", click on one of the patients and "open".
- Select one of the patient's examinations, click "Import Video" to import the required video.

6.5.5 Delete Data

6.5.5.1 Delete Exam Data

In "Filter", input the keyword, click some patient, some data of the patient, some image and some videos of the patient, then click "Delete", the selected data of the patient will be deleted. Click "Search" to refresh the exam history data.

6.5.5.2 Delete Patient Information

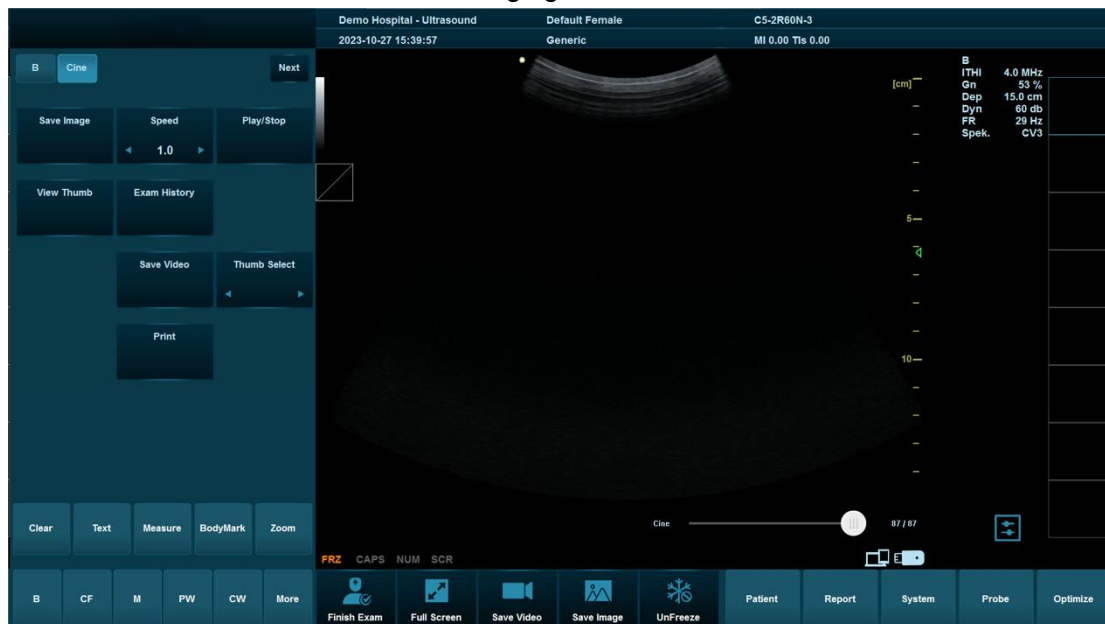
In "Filter", input keyword, click some patient, click "Delete" at the left bottom, then the selected patient and its data will be deleted, click "Search" to refresh the exam history.

6.6 Mode operation and description

6.6.1 Cine Mode

6.6.1.1 Introduction to Cine Mode

- The movie playback automatically selects the dynamic image between the last unfreeze and the current freeze, records the inspection process, saves as much as possible, and automatically covers the previous image if the storage exceeds the maximum value.
- Cine playback image can be saved when the device is opened, the image data of cine playback shall be lost after the device is closed.
- Press freeze key to enter into cine mode after gaining ideal inspection image.
- Frame number of current image and total frame number of cine video shall be shown in freeze state.
- Cine mode is shown as the following figure.



Cine Mode

6.6.1.2 Operation of Cine Mode

1. Select Previous and Rear Frame Image

- Adjust the progress bar next to the frame number display position to select the images before and after the current image in the movie playback.

2. Adjustment of Cine Playback Speed and Play/Stop

- The speed adjustment of movie playback is displayed as "Speed" in the menu bar, and it can be adjusted by the left and right buttons under this function in the frozen state.
- The movie playback is displayed as Play/Stop on the menu bar, and adjusted by Play/Stop when freeze.

3. Save Image

- Save the image displays as "Save Image" in the menu bar. In the freeze state, use "Save Image" on the function menu.
- The save image function saves the image of the current frame in the movie playback to the patient database and displays it in the save image preview area for future invocation.

4. Cine Playback Save

- The movie playback is displayed as "Save Video" in the menu bar, using "Save Video" on the function menu.
- The Save Image feature saves the current movie playback to a patient database for later call.

5. Thumbnail

- Thumbnail refers to the image saved in preview area of save Image.
- Thumbnail selection is displayed as "Thumbnail Select" in the menu bar and adjusted in the freeze state by clicking the "Thumbnail Select" button on the function menu.
- Thumbnail Viewing is displayed as "View Thumbnail" in the menu bar and is enabled by this button.
- Enter the thumbnail mode after viewing the thumbnail. You can export (to USB mobile device), print, delete, view thumbnail, exit, and other functions through the corresponding buttons on the function menu.

6. Adjust Image Parameter in Freeze State

- You can adjust the image parameters in Movie mode (freeze state) to make the image clearer.
- In the freeze state, press the button in the function menu to select the mode to adjust parameters and adjust specific parameters.

6.6.2 Instruction to Operation of B Mode

6.6.2.1 Introduction to B Mode

- B-mode displays the anatomical structure of soft tissue through B-image for diagnosis, analysis and measurement.
- The default system startup mode is B. To return to mode B from other modes, press the B mode key to enter mode B.
- The menu bar and function menu of B mode are shown as follows:

Freq	Power	Dyn.Range	Focus Gap	Focus Num
◀ 3.6MHz ▶	◀ 90% ▶	◀ 60db ▶	◀ 1 ▶	◀ 1 ▶
Speck.Red	Img Enhance	Frame Avg	Rejection	TSI
◀ CV3 ▶	◀ 2 ▶	◀ 3 ▶	◀ 1 ▶	◀ 1540m/s ▶
Line Density	View Area	Scan Type	Angle	Compound Frame
◀ 1 ▶	◀ 100% ▶	◀ Comp ▶	◀ 7 ▶	◀ 3 ▶
Updown Invert	Mirror	Rotation	Full Screen	Gamma
Off	Off	◀ 0 ▶	Off	◀ 1.0 ▶
Palette	Color Map	Negative	Brightness	Contrast
◀ 1 ▶	◀ 8 ▶	Off	◀ 0% ▶	◀ 0% ▶
HRuler				
Off				

6.6.2.2 Operation of B Mode

1. Gain

- The adjustment of the B-mode gain makes the total gain of the B-image higher or lower, resulting in a brighter or darker image.
- The gain value is adjusted by the total gain knob in the thawed state (located in the lower left corner of the imaging area).
- The gain in mode B is independent of the gain in CF, PW, PDI, DPDI modes. The gains in these modes can be controlled independently.
- Gain is displayed as Gn(%) in the imaging parameter area and adjusted by the gain bar when thawed.
- Gain value The default gain value is returned for operations such as changing the probe.
- Gain value in conjunction with TGC control for a suitable image effect.

2. Depth

- B mode image depth adjustment, control B mode anatomical structure imaging depth; To show a structure at a deeper distance, increase the depth; If there is a large display section at the bottom of the display and you do not care about the position image, you can reduce the depth.
- The image depth in mode B is adjusted by the progress bar of the depth parameter in the thawed state.
- The range of depth adjustment depends on the probe and is shown as "Dep(cm)" in the imaging parameter area.
- The depth adjustment affects the frame rate of the image. In general, the greater the depth range, the lower the frame rate.

3. Frequency

- B mode frequency can be adjusted based on the use demand to gain appropriate B image.
- B Mode frequency is displayed as "Frequency (MHz)" on the menu bar. When the mode is unfreeze, adjust it by clicking the left and right buttons on the function menu.
- Scope of adjustment of frequency on B mode is related to probe, and it is shown as Freq(MHz) in imaging parameter area.
- Adjustment of frequency on B mode shall influence the image force of penetration and resolution ratio; generally speaking, the higher frequency, the poor force of penetration, the higher resolution ratio.

4. Power

- Acoustic power adjustment Changes the acoustic power output of the device to adjust the intensity of the B mode B image.
- The regulation of acoustic power should follow the principle of ALARA (As Low As Reasonably Achievable).
- Acoustic power is displayed as "Power (%)" on the menu bar. When the acoustic power is unfreeze, you can adjust it by clicking the left and right buttons on the function menu.

5. Dynamic Range

- Dynamic range control how to transform the intensity of the echo into gray gradient. Adjusting the dynamic range helps to optimize the organization and texture of different

anatomical structures. You can adjust the dynamic range according to the needs of use, so as to obtain a suitable gray image.

- Dynamic range is displayed as Dynamic Range (db) on the menu bar. When this parameter is unfreeze, you can adjust it by clicking the left and right buttons on the function menu.
- Select different dynamic range values to change the image gray display effect. The dynamic range is displayed as Dyn(db) in the imaging parameter area.

6. Focus Number&Gap

- Increasing the number of focal points and adjusting the location of the focal area can enhance the scanning of the specified area, improve the resolution of the specified area, and obtain a clear image of the area of interest.
- The number of focal points is displayed as "Focus Num" on the menu bar. In the unfreeze state, adjust the number of focal points by clicking the left and right buttons under this parameter in the function menu. The focus position is adjusted manually by touching the screen.
- The focus position is indicated by the triangle symbol position on the screen ruler; Number of focal points, marked by the number of triangle symbols on the screen ruler, up to 4 focal points.
- The adjustment of the number of focal points will affect the frame rate of the image. In general, the more focal points, the lower the frame rate.
- Select a focus interval based on where you want to look to screen out the noisy image and better highlight the area you want to look at.

7. Speckle Reduction

- Image noise reduction adjustment Through spatial filtering processing, the speckle noise of B image is reduced, and a smoother image is obtained.
- Image noise reduction is displayed as "speck.Red" in the menu bar, which is divided into 6 levels: CV1-CV5 and Off, which can be adjusted by the left and right buttons under this parameter in the function menu when unfreezed.
- The adjustment of image noise reduction will affect the details of the image. Generally speaking, the higher the image noise reduction value, the greater the image detail loss.

8. Image Enhance

- Image enhancement reveals subtle tissue structural differences and boundaries to highlight blood vessels or organs by enhancing gray scale differences corresponding to the edges of anatomical structures.
- You can adjust the edge enhancement values according to your usage needs to obtain a clear edge image.
- The edge enhancement value is displayed as "Img Enhance" on the menu bar. When unfreeze, the edge enhancement value is adjusted by the left and right buttons under this parameter in the function menu.
- Select different edge enhancement values to change the image edge appearance on the screen.

9. Frame Average

- Frame average processing multi-frame images are filtered in the time domain to reduce random speckle noise and obtain smoother and softer images.

- The average frame is displayed as "Frame Avg" on the function menu. When the parameter is unfreeze, the left and right buttons under this parameter are used to adjust it.
- The adjustment of frame average processing will affect the real-time of the image. Generally speaking, the stronger the frame average processing, the worse the real-time.

10. Rejection

- Image rejection the low-amplitude echo signal is suppressed to eliminate the low-level echo caused by noise, thus reducing the impact of noise on ultrasonic images.
- The image rejection value can be adjusted according to the need for use to obtain a low noise image.
- Image rejection is displayed as "Rejection" in the function menu. When unfreeze, use the left and right buttons under this parameter in the function menu to adjust it.
- Select different image rejection values to change the display effect of low-level image echoes on the screen.

11. TSI

- According to the different sound propagation speed in different tissues, the sound speed is adjusted to obtain better imaging effect
- Tissue-specific imaging is displayed as "TSI" in the function menu, which is adjusted by the left and right buttons under this parameter in the function menu when unfreezed.

12. Line Density

- Linear density adjustment Changes the transverse linear density of B image, thereby balancing the transverse spatial resolution and frame rate to obtain the appropriate optimal image
- Line density is displayed as "Line Density" in the function menu. There are four levels: 1,2,3, 4. When the parameter is unfreeze, adjust it by pressing the left and right buttons in the function menu.
- The adjustment of the line density will affect the frame rate of the image. In general, the higher the line density, the lower the frame rate.

13. View Area

- The scanning area of mode B can be adjusted according to use needs to obtain a suitable image viewing range
- Scan range is displayed as "View Area(%)" in the function menu. Adjust the scanning range by clicking the left and right buttons under this parameter in the function menu when it is unfreeze.
- The range of scan area adjustment depends on the probe, changing the horizontal viewing range of the image on the screen.
- The scan area adjustment will affect the image frame rate. Generally speaking, the larger the scan area, the lower the frame rate.

14. Scan Type

- The scan type function is only available for linear array probes
- Scan Type is displayed as "Scan Type" on the function menu. Scan type can be normal, compound, or extended. When unfreeze, you can adjust the scan type by pressing the button on the function menu.

15. Angle

- Angle function is only applicable to linear array probe, can deflect B image a certain

Angle.

- The angle is displayed as "Angle" on the function menu. When the parameter is unfreeze, adjust it by clicking the left and right buttons on the function menu.
- Angle deflection can be selected to the left or right, the specific deflection range varies according to the type of scan.

16. Compound Frame

- Composite frame is only suitable for composite imaging type, composite frame can reduce speckle noise, get a higher signal-to-noise ratio, can better display the image.
- Composite frames are displayed as "Compound Frame" on the function menu bar and are divided into three types: 3,5,7. When the frame is unfreeze, the left and right buttons under this parameter can be adjusted.

17. Updown Invert

- The up/down invert function is used to display the image upside down for easy observation.
- The updown invert function is displayed as "Updown Invert" on the menu bar. When the image is unfreeze, tap in the function menu to adjust it.

18. Mirror

- The mirror function is used to flip the image left and right for easy viewing.
- The mirror function is displayed as "Mirror" on the menu bar, and can be adjusted by touch in the function menu under the unfreeze state.

19. Rotation

- Rotation can be used to rotate an image counterclockwise in 90° first gear when a particular image is difficult to observe.
- The parameters can be adjusted to 0°, 90°, 180°, and 270°.

20. Full Screen

- The image can be rendered on screen in a full-screen format for viewing as desired.
- The full screen function is displayed as "Full screen" on the menu bar, and can be adjusted by touch in the function menu under the unfreeze state.

21. Gamma

- The grayscale map can be adjusted according to the needs of the use to obtain the appropriate grayscale image.
- The gray scale map is displayed as "Gamma" in the menu bar, and can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state
- Select a different gray scale map and change the image gray display effect on the screen.

22. Palette

- Palette function can change the gray level of the image, but also can color the B mode, M mode gray image or doppler spectrum, to enhance the user's ability to distinguish B mode, M mode image or doppler spectrum, color palette is not doppler color mode.
- The palette effect can be adjusted according to use to obtain an image suitable for discrimination.
- The palette effect is displayed as "Palette" in the menu bar, and can be adjusted by the left and right buttons under this parameter in the function menu in the state of unfreeze. Select different palette effects and change the image color display effect on the screen, at

the same time, the gray bars also change accordingly.

23. Color Map

- Adjust the color of the image as required for easy observation.
- The color image is displayed as "Color Map" on the function menu, and can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state.
- Available in 37 colors.

24. Negative

- The image black and white inversion function of the image can be used as needed to obtain an image suitable for identification.
- The image black and white inversion function is displayed as "Negative" in the function menu and can be adjusted by touching in the function menu under the unfreeze state.

25. Brightness

- The brightness parameters of the screen can be adjusted according to the needs of the use, so as to obtain a suitable image.
- The brightness is displayed as "brightness (%)" in the function menu, and can be adjusted by the left and right buttons under the parameter in the function menu under the unfreeze state.

26. Contrast

- The contrast parameters of the screen can be adjusted according to the use needs, so as to obtain the appropriate image.
- The contrast is displayed as "Contrast (%)" in the function menu, and can be adjusted by the function menu button under the unfreeze state.

27. Horizontal Ruler

- Landscape ruler function is used to turn the landscape ruler display on/off above the image, each scale is 1cm
- The horizontal ruler is displayed as "HRuler" in the function menu, and can be adjusted by touching in the function menu under the unfreeze state.

28. Operation of 2B and 4B Mode

- 2B and 4B modes display 2 or 4B images on the screen, which is convenient for the operator to observe multiple images at the same time, image comparison and other operations, and its purpose is basically the same as the B mode.
- Press the 2B mode key to enter 2B mode. Press the 4B mode button to enter the 4B mode.
- 2B and 4B modes perform the same operations as in mode B.
- In 2B mode, press the 2B mode button to switch the active image window between the two B images.
- In 4B mode, press the 4B mode button to switch the active image window among the 4B images.

6.6.3 Instruction to Operation of CF Mode

6.6.3.1 Introduction to CF

- Color flow (CF) mode adds color-coded qualitative information related to the relative speed and direction of tissue movement to B-mode images through the Doppler effect of ultrasound,

so as to indicate the movement of anatomical tissues in B-mode images.

- Press the CF mode key to enter the CF mode.
- The menu bar and function menu of CF mode are shown below.

Freq	Power	B/C Align	Packet Size	PRF
◀ 2.5MHz ▶	◀ 90% ▶	Off	◀ 10 ▶	◀ 1.5KHz ▶
Wall Filter	Spatial Filter	Color Avg	Baseline	High PRF
◀ 75Hz ▶	◀ 2 ▶	◀ 3 ▶	◀ 127 ▶	Off
Line Density	Variance	Lighting	Color Invert	Color Threshold
◀ 2 ▶	Off	◀ 0 ▶	Off	◀ 7 ▶
Transparency		Color Priority	Palette	
◀ Off ▶		◀ 236 ▶	◀ 3 ▶	

6.6.3.2 Operation of CF mode

1. CF mode Sampling frame

- The CF mode sampling frame determines the position and size of the color Doppler image displayed in CF mode on the B image.
- CF mode sampling frame in the unfreeze state, you can manually adjust the position of the color sampling frame by touching the screen, use the scan area function in the function menu, then the sampling frame will be displayed as a dashed line, adjust the size of the color sampling frame, when adjusting, the prompt text of the current function status will be displayed in the prompt bar at the bottom of the screen.
- CF mode sampling frame, displayed on screen as a solid line over the B image.

2. Gain

- The adjustment of CF mode gain amplifies or reduces the overall intensity of echoes processed in the color flow window, thus obtaining the ideal color image.
- The gain in CF mode is independent of the gain in B, PW, PDI, DPDI modes. The gains in these modes can be controlled independently.
- The gain is displayed as Gn(%) in the imaging parameter area and adjusted by the gain bar under the unfreeze state.
- The default gain value is returned for operations such as changing the probe.

3. Frequency

- Change the CF mode frequency to adapt to the observation needs of different moving speed tissues. Generally, the CF mode frequency should be adjusted higher when observing low blood flow.
- The frequency of CF mode is displayed in the menu bar as "frequency (MHz)", and it can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state.
- The range of CF mode frequency adjustment is related to the probe and is displayed as CF Freq(MHz) in the imaging parameter area. When the speed value represented by the color bar on the screen changes accordingly when the CF mode frequency is changed.

4. Power

- acoustic power conditioning changes the acoustic power output of the device to adjust the intensity of the CF mode B image.
 - The regulation of acoustic power should follow the principle of ALARA (As Low As Reasonably Achievable).
 - The acoustic power is displayed as "Power (%)" in the menu bar, and can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state.
- 5. B/C Align**
- BC Align increases the frame rate by reducing the screen width to the color mode screen width.
 - BC same width is displayed as "BC Align" on the menu bar and can be adjusted by touching in the function menu under the unfreeze state.
- 6. Packet Size**
- Packet size controls the number of samples of a single-color flow vector, thereby increasing or decreasing the color sensitivity and color average accuracy, balancing the color image quality and frame rate to obtain the appropriate optimal image.
 - The package size is displayed as "Packet Size" on the menu bar, and can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state.
 - The packet size value affects the color image quality and frame rate. Increasing the sample packet size will improve the color image quality, but the frame rate will decrease.
- 7. PRF**
- Change the pulse repetition frequency of CF mode to adapt to the observation requirements of tissues with different moving speeds. Generally, when observing high-speed blood flow, it is necessary to adjust the pulse repetition frequency to avoid confusion.
 - The pulse repetition frequency is displayed as "PRF(KHz)" in the menu bar, and can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state
 - The range of pulse repetition frequency adjustment is related to the probe. As the pulse repetition frequency changes, the speed value represented by the color bar on the screen also changes accordingly. The pulse repetition frequency value is displayed as "PRF(KHz)" in the imaging parameter area.
- 8. Wall Filter**
- Wall filter hides unwanted motion by filtering out color signals at low flow rates, thereby removing color artifacts caused by breathing or other activities of the patient and obtaining clear and effective color images.
 - Wall filter is displayed as "Wall filter (Hz)" in the menu bar, and can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state
 - Wall filter values are displayed as "WF(Hz)" in the imaging parameter area.
- 9. Spatial Filter**
- Spatial filter adjustment filters the color image on the two-dimensional space plane, making the image look less pixel, smoother color image.
 - Spatial filter is displayed in the menu bar as "Spatial Filter", which is divided into five

levels: Off, 1-4. It can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state.

10. Color Average

- CF mode color average processing multi-frame color images are filtered in the time domain to reduce random speckle noise and obtain smoother and softer images.
- Color average is displayed as "Color Avg" on the menu bar. It can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state.
- A higher color average makes the color image appear longer, enhancing the visibility of the fluid.
- The adjustment of color average processing will affect the real-time image. The stronger the color average processing, the worse the real-time.

11. Baseline

- The baseline accommodates a higher blood flow rate in one direction by adjusting the position of the confusion points of the colors (e.g., red versus blue).
- The baseline defaults to the midpoint of the color display and appears in the center of the color bar on the screen.
- The zero rate corresponds to the baseline, and the entire PRF range remains unchanged
- The baseline parameter can be adjusted in the unfreeze state by the left and right buttons under the parameter in the function menu.

12. Steer Angle

- Angle deflection function, through the left and right deflection of the color sampling frame, so that the operator without moving the probe, to meet the Angle requirements of ultrasonic Doppler effect, to obtain the required motion tissue information.
- The angular deflection function is only available with linear array probes for peripheral vascular imaging.
- Angle deflection is displayed as "Steer Angle" on the menu bar. It can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state.
- Angle deflection can be selected from left to right $-20^{\circ} \sim +20^{\circ}$ deflection.

13. High PRF

- Adjust the upper limit of PRF function switch. After this switch is enabled, the upper limit of PRF function can be adjusted higher.
- High PRF is displayed as "High PRF" in the function menu and can be adjusted by touch in the function menu under unfreeze state.

14. Line Density

- Color blood flow linear density adjustment changes the transverse linear density of CF mode color images, thereby balancing the transverse spatial resolution and frame rate to obtain the appropriate optimal image.
- The color blood flow linear density is displayed as "Line Density" on the function menu, which is divided into 1-5 files. It can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state.
- The adjustment of the color blood flow linear density will affect the image frame rate. The higher the linear density, the lower the frame rate.

15. Variance

- Variance can cause green areas to appear in the image in CF mode. The greener the

image color is, the lower the credibility of the image.

- Variance is adjusted by touch under the unfreeze state.

16. Lighting

- Light and shadow change the color transparency of the CF mode image.
- With the increase of the parameter, the color transparency of the image becomes higher, which facilitates the observation of the actual motion of tissues and organs in CF mode, and can reduce the influence of color on the observation imaging results.
- Lighting is displayed as "Lighting" on the menu bar. In the unfreeze state, adjust the parameter using the left and right buttons under this parameter in the function menu. The adjustable value ranges from 0 to 2.

17. Color Invert

- General color flow diagram movement direction is defined as red toward the probe direction, blue away from the probe direction (red toward blue away).
- Color flip observes blood flow motion from another Angle such as red away (negative velocity) and blue come (positive velocity), allowing the operator to view the blood flow color image in any way desired.
- Color invert is adjusted by touch in the function menu under the unfreeze state.

18. Color Threshold

- Color threshold assigns a grayscale range level at the point where the color information stops, choosing to display more color images or more B-mode grayscale images.
- Color threshold is displayed as "Color Threshold" on the function menu. It can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state.
- The threshold limits the low-level echoes of colored blood flow that cover the inner wall of the blood vessel, helping to reduce color spill from the blood vessel wall.

19. Transparency

- Transparency adjustment Changes the transparency of a color image in CF mode so that the organization behind the color is observed through the color image.
- Clear Transparency is displayed as Transparency on the function menu. When it is unfreeze, adjust it by clicking the left and right buttons under this parameter in the function menu.

20. Color Priority

- Color Priority is displayed as "Color priority" on the function menu. It can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state.

21. Palette

- General color blood flow image movement direction is defined as red toward the probe direction, blue away from the probe direction (red toward blue away).
- The color palette function allows the operator to select special colors to indicate the direction and speed of motion, enhancing the ability to distinguish color images.
- The palette can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state.
- Select different palette to change the color display effect of Doppler blood flow on the screen. At the same time, the color bar changes accordingly.

6.6.4 Instruction to Operation of M Mode

6.6.4.1 Introduction to M Mode

- M mode observes movement image under ultrasonic through displaying tissue displacement (movement) of single vector in certain time, for example, it is frequently used for observing heart movement.
- Press M mode key to enter into B/M mode, then press M mode key again to enter into M mode. M mode is used with combination of B mode, sampling line of M mode shows position.
- Menu of M mode as follow shows.

Freq	Power	Dyn.Range	Sweep Speed	View Area
◀ 4.0MHz ▶	◀ 90% ▶	◀ 60db ▶	◀ 3 ▶	◀ 100% ▶
Rejection	Right/Down	Gamma	Palette	Color Map
◀ 1 ▶	Off	◀ 1.0 ▶	◀ 1 ▶	◀ 8 ▶
	Negative	Brightness	Contrast	
	Off	◀ 0% ▶	◀ 0% ▶	

Menu of M Mode

6.6.4.2 Operation of M Mode

1. Sampling Line of M Mode

- The M-mode sampling line determines the position of the single vector displayed in M-mode on the B-image so that the M-image at that position can be observed in the M-image.
- In practical use, place the M-mode sampling line (the moving area of interest) near the center of the B-mode image as much as possible to get a better M-image.
- M mode sampling line in the unfreeze state, by touching the screen to manually adjust the position, the sampling line can be moved to the desired position.
- M-mode sampling lines, shown on the screen as dashed lines on the B-image.

2. Gain

- Adjustment of gain of M mode can increase or reduce total gain of M mode so as to gain lighter or darker image.
- The gain value was adjusted by the total gain bar in the unfreezed state.
- The gain values varied according to the probe and were independent of the precise position of the total gain bar.
- Gain of M mode is unrelated to the gain of CF, PDI, DPDI, PW and other modes. Gain in these modes can be independently controlled without mutual influence.
- The gain is shown as "Gn(%)" in the imaging parameter area and is adjusted by the gain bar in the unfreezed state.
- Gain value shall be returned to defaulted gain value in changing the probe and other operations.
- Gain value can cooperate with TGC control to gain appropriate image effect.

3. Depth

- The adjustment of image depth in M mode can control the depth of imaging of anatomical structures in M mode. To display structures with deeper distances, please increase the

depth. If there is a relatively large part of the display at the bottom of the display and the image at this position is not concerned, the depth can be reduced.

- M mode image depth is adjusted by the depth bar under the unfreeze state.
- The range of depth adjustment depends on the probe and is shown as Dep(cm) in the imaging parameter area.
- Depth adjustment affects the frame rate and M-mode frequency of the image. In general, the larger the depth range, the lower the frame rate and M-mode frequency (Hz).



Attention

The adjustment of image depth in M mode is based on the operation of B mode (M+B), and the depth of single M mode cannot be adjusted.

4. Frequency

- The equipment uses a wide band probe technology, which can adjust the M-mode frequency according to the needs of use to obtain the appropriate B image and M image.
- M Mode frequency is displayed as “Frequency (MHz)” on the menu bar. When the mode is unfreeze, you can adjust it by clicking the left and right buttons on the function menu.
- The range of mode frequency adjustment is probe dependent.
- M mode frequency adjustment will affect the image penetration and resolution, the higher the frequency, the worse the penetration, the higher the resolution.

5. Power

- acoustic power adjustment changes the acoustic power output of the device to adjust the intensity of the M-mode B image.
- The regulation of acoustic power should follow the principle of ALARA (As Low As Reasonably Achievable).
- acoustic power is displayed as Power (%) on the menu bar. To adjust the acoustic power, click the left and right buttons under this parameter in the function menu.

6. Dynamic Range

- Dynamic range controls how echo intensity is converted as shade of gray; the dynamic range of adjustment is helpful for optimizing tissue texture of different anatomic structures.
- Adjust dynamic range based on the use demand so as to gain appropriate gray level image.
- The dynamic range value is displayed as Dynamic Range (db) on the menu bar. When the value is unfreeze, you can adjust it by clicking the left and right buttons on the function menu.
- Select different dynamic range values and change display effect of gray scale of image which is shown as “Dyn(db)” in imaging parameter area.

7. Sweep Speed

- Scan speed controls the timeline size of the M image by changing the density of sampling lines per unit time, so that more or fewer motion events are observed on the screen.
- Scan speed is displayed as Scan Speed on the menu bar. To adjust this parameter, click the left and right buttons in the function menu.
- Select different scanning speed values, change the time axis size of M image, and display it on the screen as the X-axis scale of M image (unit: second).

- Selecting different scanning speed values will affect the frequency of M image, which is displayed as M Freq (Hz) in the imaging parameter area. Generally speaking, the faster the scanning speed, the higher the frequency of M image.

8. View Area

- The view area of the B image can be adjusted according to the needs of the use to obtain a suitable observation range of the M image.
- The view area is displayed as "View Area (%)" in the function menu and can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state.
- The range of scan area adjustment depends on the probe, changing the horizontal viewing range of the image on the screen.
- The scan area adjustment will affect the image frame rate. The larger the scan area, the lower the frame rate.

9. Rejection

- Image rejection the low-amplitude echo signal is suppressed to eliminate the low-level echo caused by noise, thus reducing the impact of noise on ultrasonic images.
- The image rejection value can be adjusted according to the need for use to obtain a low noise image.
- Image rejection is displayed as "Rejection" in the function menu, which can be adjusted by touch in the function menu when unfreeze.
- Select different image rejection values to change the display effect of low-level image echoes on the screen.

10. Right/Down

- Changes the layout of the image and scale axis.
- It is displayed as "Right/Down" on the function menu and can be adjusted by touching in the function menu under the unfreeze state.
- Choose to display the image with the scale axis left or right or up or down according to your needs.

11. Gamma

- The grayscale map can be adjusted according to the needs of the use, so as to obtain the appropriate grayscale M image. Do not change the gray level of B image, do not change the gray level curve.
- The gray scale map is displayed as "Gamma" in the menu bar, and can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state.
- Select a different grayscale map and change the grayscale display effect of M image on the screen.

12. Palette

- Palette function can change the gray level of the image, but also can color the traditional B mode, M mode gray image or Doppler spectrum, to enhance the user's ability to distinguish B mode, M mode image or Doppler spectrum, palette is not Doppler color mode.
- The palette effect can be adjusted according to use to obtain an image suitable for discrimination.
- The palette effect is displayed as "Palette" in the menu bar and can be adjusted by the

left and right buttons under this parameter in the function menu under the unfreeze state.

- Select different palette effects and change the image color display effect on the screen. At the same time, the gray bars also change accordingly.

13. Color Map

- Adjust the color of the image as required for easy observation.
- Available in 37 colors.
- It is displayed as "Color Map" in the menu bar and it can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state.

14. Negative

- You can use the image black and white flip function according to the use needs, so as to obtain the appropriate M image.
- The image is flipped black and white as "negative" in the menu bar and can be adjusted by touching in the function menu under the unfreeze state.

15. Brightness

- You can adjust the brightness of the M image according to the needs of use, so as to obtain the appropriate brightness of the M image.
- The brightness is displayed as "Brightness (%)" on the function menu bar and it can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state.

16. Contrast

- The contrast parameters of the screen can be adjusted according to the use needs, so as to obtain the appropriate image.
- It is displayed as Contrast(%) on the function menu bar and it can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state.

6.6.5 Instruction to Operation of PW Mode

6.6.5.1 Instruction to PW Mode

- In pulsed Doppler (PW) mode, energy is transmitted from the ultrasound probe to the patient's body, and the received ultrasound echoes are processed to extract the difference between the transmitted and received signal frequencies (the difference is caused by moving objects in the path of the ultrasound signal, such as the movement of blood) to provide a measurement of moving tissue and fluid velocity. Thus, the operator has a selection of observed blood flow data in the sampling volume area; The PW mode is applied to display blood flow direction, rate, and spectral information in a selected anatomic area.
- In PW mode, the result of the signal is presented by sound through the device's speaker and is displayed graphically on the screen. In the figure, the X-axis is the time axis, and the Y-axis indicates the change in frequency, which is represented by the rate of the positive direction and the reverse direction.
- Press the PW mode button to enter the PW mode. PW mode and B mode are used in combination, and the sampling volume gate of PW mode is displayed on the B mode image.
- PW mode and CF mode can work at the same time, press the CF mode and PW mode keys to enter the triple mode (B mode, PW mode, and CF mode).
- The zero point of time (locus origin) of a PW mode spectrogram appears on the left side

of the graph, and the locus moves to the right over time

- The baseline of the PW mode spectrogram (representing zero rate, no spectral change, no detected blood flow) across the screen at solid line level; By convention, movement toward the probe is positive and appears above the baseline, and movement away from the probe is negative and appears below the baseline.
- In general, blood flow is not uniform, but at different rates in different directions; Therefore, the spectrum image displayed is composed of the spectrum with different grayscale values; Strong signals are shown as bright, and weak signals are shown as different gradients of gray.
- The menu bar and function menu of PW mode are shown below.

Freq	Power	Dynamic Range	Sweep Speed	Auto Trace
◀ 2.5MHz ▶	◀ 90% ▶	◀ 40db ▶	◀ 200 ▶	Off
Audio Volume	PRF	Wall Filter	SV Length	Baseline
◀ 100 ▶	◀ 1.7Khz ▶	◀ 6 ▶	◀ 3.0 mm ▶	◀ 151 ▶
Duplex/Triplex	Fast Angle	Angle Corr	Right/Down	High PRF
Off	◀ 60 ▶	◀ 60 ▶	Off	Off
Color Map	Negative	Spectral Avg	Invert	
◀ 9 ▶	Off	◀ 0 ▶	Off	

Function menu in PW mode

6.6.5.2 Operation of PW Mode

1. Sampling gate of PW Mode

- The PW mode sampling gate determines the position and length of the flow direction, rate, and spectrum information of interest to the PW mode on the B image.
- The PW mode sampling gate is positioned at a specified location for a specific vessel of interest to the operator.
- The position of the sampling gate in PW mode is adjusted by touching the screen in the tunfreeze state.
- PW mode sampling gate is shown on screen with solid line over B image.

2. Gain

- The modulation of the gain of PW mode amplifies or reduces the intensity of the spectrum signal, so as to obtain the ideal spectrum image.
- The gain is adjusted by the total gain in the unfreeze state.
- The gain value varies depending on the probe and is independent of the exact position of the total gain bar.
- The gain in PW mode is independent of the gain in B, CF, PDI, DPDI modes. The gains in these modes can be controlled independently.
- The gain is displayed as "Gn(%)" in the imaging parameter area, and the unfreeze state is adjusted by the total gain bar.
- The default gain value is returned for operations such as changing the probe.

3. Frequency

- Change PW mode frequency to adapt to the observation needs of different moving speed tissues. Generally, it is necessary to adjust PW mode frequency higher when observing low blood flow.
- PW mode frequency is displayed as “Frequency (MHz)” on the function menu. To adjust the frequency, click the left and right buttons under this parameter in the function menu.
- The range of PW mode frequency adjustment depends on the probe and is displayed as “PW Freq(MHz)” in the imaging parameter area. At the same time, changing the PW mode frequency, the speed scale of the Y-axis of the spectrum diagram on the screen changes accordingly.

4. Power

- Acoustic power regulation changes the acoustic power output of the device to adjust the intensity of the PW mode spectrogram.
- The regulation of acoustic power should follow the principle of ALARA (As Low As Reasonably Achievable).
- The acoustic power in PW mode is not related to the acoustic power in B, CF, PDI, DPDI and other modes. The acoustic power in these modes can be controlled independently without affecting each other.
- .Acoustic power is displayed as “Power (%)” on the menu bar and can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state.

5. Dynamic Range

- PW mode dynamic range control How does the echo intensity translate into gray gradient, adjusting the dynamic range helps to optimize the texture and smoothness of the spectral graph.
- Dynamic Range is displayed as “Dynamic Range (db)” on the function menu and can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state.
- The dynamic range of PW mode was not related to that of B mode, which could be controlled independently and had no influence on each other. In the imaging parameter area, PW “Dyn(db)” was displayed.
- The spectrum can be cleared by reducing the dynamic range value to determine whether the width spread is real; The spectrum can also be filled by increasing the dynamic range.

6. Sweep Speed

- Scan speed controls the rate at which the spectrogram is updated so that more or fewer spectral periods are observed on the screen.
- Sweep speed is displayed as “Sweep Speed” on the menu bar and can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state.
- Select different scanning speed values, change the PW spectrum time axis size, and display on the screen as the X-axis scale of the spectrum diagram (unit: second).

7. Auto Trace

- Automatic tracing function, by automatically obtaining the spectrum graph envelope, automatically calculate the maximum, minimum and average speed on the spectrum diagram, easy for operators to observe.
- Auto trace displays as “Auto Trace” in the menu bar and can be turned on/off by touching in the function menu under the unfreeze state.

- The automatic tracing function marks the envelope curve of the spectral graph with a solid yellow line on the screen, and automatically calculates the related results in PS, ED, MD (cm/s), PI, RI, and HR.

8. Audio Volume

- Volume controls the size of the audio output so that the operator hears a moderate Doppler sound to estimate the correct probe Angle and position.
- The volume is displayed as "Audio Volume" in the function menu and can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state.

9. Pulse Repetition Frequency

- Changes the pulse repetition frequency of PW mode to accommodate faster/slower blood flow velocity to meet the observation needs of different moving speed tissues; In general, when observing high speed blood flow, it is necessary to adjust the pulse repetition frequency to avoid confusion.
- The pulse repetition frequency is displayed as "PRF(KHz)" in the function menu and can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state.
- PRF(kHz) in the imaging parameter area. At the same time, change the pulse repetition frequency, the speed scale of the Y-axis of the spectrum diagram on the screen will change accordingly. If the current mode is triple mode (B mode, PW mode and CF mode), the speed value represented by the color bar of CF mode will also change correspondingly.

10. Steer Angle

- Angle deflection function, through the left and right deflection sampling volume door, so that the operator without moving the probe, to meet the Angle requirements required by ultrasonic Doppler effect, to obtain the required motion tissue information.
- The steer angle function is only available with linear array probes for peripheral vascular imaging.
- It is displayed as "Steer Angle" on the function menu and can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state.
- Angle deflection can be selected from left to right $-20^{\circ} \sim +20^{\circ}$ deflection.
- If the current mode is in triple synchronization mode (B mode, PW mode and CF mode), the color sampling frame of CF mode is deflected independently from the sampling volume gate of PW mode.

11. Wall Filter

- Wall filter filters out noise caused by blood vessel movement in the Doppler signal, removing low-level noise above and below the baseline, so that the operator does not see this excess noise on the spectrogram, and does not hear this excess noise in the Doppler sound.
- Wall filter is displayed as Wall Filter on the function menu and can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state.
- The wall filter value is displayed as "WF(%)" in the imaging parameter area.

12. SV Length

- The PW mode sampling volume gate determines the position and length of the flow

direction, rate, and spectrum information of interest to the PW mode on the B image

- The length of the sampling volume door in PW mode is displayed as "SV Length (mm)" in the function menu. In the unfreeze state, you can adjust it by clicking the left and right buttons under this parameter in the function menu.
- PW mode sampling volume gate length values vary depending on the probe and are displayed as SVL (mm) in the imaging parameter area.
- PW mode the change of the length of the sampling volume gate will affect the sampling accuracy and Doppler sound output. Generally speaking, the smaller the sampling volume gate is, because the more sensitive the sample will produce more accurate sampling results. The larger the sampling volume gate is, the better the listening of the Doppler sound (or the large sampling vessel or area).
- PW mode sampling volume gate, shown on screen with solid line over B image.

13. Baseline

- The baseline of the PW mode spectrogram (representing zero rate, no spectral change, and no detected blood flow) crosses the screen horizontally in a solid line; By convention, movement toward the probe is positive and appears above the baseline, and movement away from the probe is negative and appears below the baseline.
- Adjust the baseline and reset the scope of the scale without changing the speed scale to accommodate faster and slower blood flow and eliminate confusion.
- Baseline is displayed as Baseline on the menu bar. When the parameter is unfreeze, adjust it by clicking the left and right buttons on the function menu.
- When the adjustment baseline (in any direction) reaches its maximum value, the baseline will stop changing and the adjustment will not cycle.

14. Duplex/Triplex

- Duplex/Triplex function can synchronize the spectrum and B-mode image display, so that the doctor can observe the real-time image for diagnosis.
- Duplex/Triplex modes can be switched.
- Duplex/Triplex is displayed as "Duplex/Triplex" on the submenu. When the device is unfreeze, tap in the function menu to adjust it.

15. Fast Angle

- Fast Angle correction function, in essence and Angle correction is the same property, the difference from Angle correction is that the fast Angle correction is 60 degrees, so that the operator can easily obtain the required Angle correction through less adjustment operation.
- The quick Angle correction function can be adjusted by clicking the left and right buttons under this parameter in the function menu.

16. Angle Correct

- Angle correct function, estimate blood flow speed with certain angle direction with Doppler vector through calculating the angle between Doppler vector and blood flow to be measured so as to optimize precision of blood flow speed.
- Angle correction is shown as "Angle Corr" in menu which can be adjusted by touch in unfreeze state.
- Angle correction is shown as CA in imaging parameter area and it is increased or reduced with 1° per unit.

17. Right/Down

- Changes the layout of the image and spectrum.
- Choose to display the image and spectrum left and right or up and down according to your needs.
- Lower right is displayed as “Right/Down” on the function menu and can be adjusted by touch in the function menu under the unfreeze state.

18. High PRF

- Adjust the upper limit of PRF function switch. After this switch is enabled, the upper limit of PRF function can be adjusted higher.
- High PRF is displayed as “High PRF” on the function menu and can be adjusted by touch in the function menu under the unfreeze state.

19. Color Map

- Color map Adjusts the grayscale and color of the spectrogram.
- It is displayed as “Color Map” on the function menu and can be adjusted by the left and right buttons under the parameter in the function under the unfreeze state.

20. Negative

- The image inversion function can be used according to the needs of the use to obtain an image suitable for discrimination.
- The image black and white flip function is displayed as "Negative" in the function menu and can be adjusted by touching in the function menu under the unfreeze state.

21. Spectral Average

- The spectrum information is integrated and optimized to obtain a more complete and clearer image.
- Average spectrum is displayed as “Spectral Avg” in the function menu and can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state.

22. Invert

- Spectrum flipping flips the spectrum graph vertically so that positive velocity appears below the baseline and negative velocity appears above it.
- Spectrum flip is displayed as "Invert" in the function menu and can be adjusted by touching in the function menu under the unfreeze state.
- When the operator changes the probe Angle to accommodate the anatomy, the blood flow will still move in the same direction, but the Doppler information will be flipped, and at this point, the spectrum flip is easier to manipulate than the probe orientation flip.

6.6.6 Instruction to Operation of PDI/DPDI Mode

6.6.6.1 Introduction to PDI Mode

- Power Doppler (PDI) mode is a blood flow imaging mode, which is used to reflect the intensity of ultrasonic Doppler signal from the moving tissue, rather than the frequency shift of the signal. In PDI mode, the device divides the color blood flow by the number of moving reflectors, regardless of their speed, so confusion is less likely.
- Press the PDI mode button to enter the PDI mode. Or press the PDI mode button again in DPDI mode to enter the PDI mode.
- The menu bar and function menu of PDI mode are shown below.

Freq	Power	Dyn.Range	B/C Align	Packet Size
◀ 2.5MHz ▶	◀ 90% ▶	◀ 78db ▶	Off	◀ 10 ▶
PRF	Wall Filter	Spatial Filter	Color Avg	High PRF
◀ 1.0KHz ▶	◀ 75Hz ▶	◀ 1 ▶	◀ 5 ▶	Off
Line Density	Variance	Color Threshold	Transparency	Color Priority
◀ 4 ▶	Off	◀ 7 ▶	◀ Off ▶	◀ 236 ▶
Palette				
◀ 1 ▶				

Menu of PDI Mode

6.6.6.2 Introduction to DPDI Mode

- Uses: Directional power Doppler (DPDI) mode, color Doppler + energy Doppler, and extract the energy component and frequency information of Doppler signal at the same time, which can not only be sensitive to low-speed blood flow, but also have the direction of color Doppler, and can distinguish the direction of blood flow towards the probe or away from the probe.
- Press the DPDI mode button to enter the DPDI mode, or press the PDI mode button again in PDI mode to enter DPDI mode
- The menu bar and function menu of DPDI mode are shown below.

Freq	Power	Dyn.Range	B/C Align	Packet Size
◀ 2.5MHz ▶	◀ 90% ▶	◀ 78db ▶	Off	◀ 10 ▶
PRF	Wall Filter	Spatial Filter	Color Avg	Baseline
◀ 1.0KHz ▶	◀ 75Hz ▶	◀ 1 ▶	◀ 5 ▶	◀ 127 ▶
High PRF	Line Density	Variance	Color Priority	Palette
Off	◀ 4 ▶	Off	◀ 236 ▶	◀ 1 ▶
Color Invert				
Off				
Color Threshold				
◀ 7 ▶				
Transparency				
◀ Off ▶				

Menu of DPDI Mode

6.6.6.3 Operation to PDI/DPDI Mode

1. Sampling frame in PDI/DPDI mode

- The PDI/DPDI Mode sampling frame determines the position and size of the color Doppler image displayed in PDI/DPDI mode on the B image.
- PDI/DPDI mode sampling frame in the unfreeze state, you can manually adjust the position of the color sampling frame by touching the screen, use the scan area function in the function menu, then the sampling frame will be displayed as a dashed line, adjust the size of the color sampling frame, the current function status will be displayed in the prompt bar at the lower part of the screen.

- PDI/DPDI mode sampling frame, displayed on the screen with a solid line on the B image.

2. Gain

- The adjustment of PDI/DPDI mode gain amplifies or reduces the overall intensity of the processed echoes in the color flow window, resulting in an ideal color image.
- The gain is adjusted by the total gain in the unfreeze state.
- The gain value varies depending on the probe and is independent of the exact position of the total gain bar.
- The gain in PDI/DPDI mode is independent of the gain in B, CF, PDI, DPDI modes. The gain in these modes can be controlled independently.
- The gain is displayed as "Gn(%)" in the imaging parameter area, and the unfreeze state is adjusted by the total gain bar.
- The default gain value is returned for operations such as changing the probe.

3. Frequency

- Change the PDI/DPDI mode frequency to adapt to the observation requirements of tissues with different moving speeds. Generally, it is necessary to adjust the PDI/DPDI mode frequency higher when observing low-speed blood flow.
- PDI/DPDI mode frequency is displayed as "Frequency (MHz)" on the function menu. In the unfreeze state, you can adjust this parameter by clicking the left and right buttons on the function menu.
- The range of PDI/DPDI mode frequency adjustment depends on the probe and is displayed as "PDI/DPDI Freq(MHz)" on the screen. At the same time, change the PDI/DPDI mode frequency, the speed value represented by the color bar on the screen changes accordingly.

4. Power

- Acoustic power regulation changes the acoustic power output of the device to adjust the intensity of the color image in the PDI/DPDI mode.
- The adjustment of acoustic power should follow the principle of ALARA (As Low As Reasonably Achievable).
- PDI/DPDI mode acoustic power is independent of B, M, PW mode acoustic power, these modes can be independently controlled, do not affect each other.
- The acoustic power is displayed as "Power (%)" in the function menu and can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state.

5. Dynamic Range

- The dynamic range controls how the echo intensity is converted into a gray-scale gradient, and adjusting the dynamic range helps to optimize the tissue texture of different anatomical structures.
- The dynamic range can be adjusted according to the use needs to obtain the appropriate image.
- Dynamic range is displayed in the Function menu as "Dynamic Range (db)", and can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state.
- The dynamic range of PDI/DPDI mode is not related to the dynamic range of B, M and

PW mode, which can be controlled independently and have no influence on each other.

6. B/C Align

- BC Align increases the frame rate by reducing the screen width to the color mode screen width.
- BC same width is displayed as "B/C Align" on the function menu and it can be opened/closed by touching in the function menu under the unfreeze state.

7. Packet Size

- Packet size controls the number of samples of a single-color flow vector, thereby increasing or decreasing the color sensitivity and color average accuracy, balancing the color image quality and frame rate to obtain the appropriate optimal image.
- The package size is displayed as "Packet Size" on the function menu and can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state.
- The packet size value affects the color image quality and frame rate. Increasing the sample packet size will improve the color image quality, but the frame rate will decrease.

8. Pulse Repetition Frequency (PRF)

- Change the pulse repetition frequency of PDI/DPDI mode to adapt to the observation requirements of tissues with different moving speeds. Generally, when observing high-speed blood flow, it is necessary to adjust the pulse repetition frequency to avoid confusion.
- The pulse repetition frequency is displayed as "PRF(KHz)" on the function menu and can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state.
- The range of pulse repetition frequency adjustment is related to the probe. As the pulse repetition frequency changes, the speed value represented by the color bar on the screen also changes accordingly. The pulse repetition frequency value is displayed as PRF(KHz) in the imaging parameter area.

9. Wall Filter

- wall filtering hides unwanted movement by filtering out low-velocity color signals, thereby removing color artifacts due to breathing or other patient activities and obtaining a clear, effective color image.
- Wall filter is displayed as "Wall Filter (Hz)" on the function menu and can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state.
- Wall filter values are displayed as "WF(Hz)" in the imaging parameter area.

10. Spatial Filter

- Spatial filter adjustment filters the color image on the two-dimensional space plane, making the image look less pixel, smoother color image.
- Spatial filter is displayed as "spatial filter" on the function menu which is divided into five levels: Off, 1-4. It can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state.

11. Color Average

- Color average processing multi-frame color images are filtered in the time domain to reduce random speckle noise and obtain smoother and softer images.

- Color average is displayed as "Color Avg" on the function menu and can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state.

12. Baseline (DPDI Mode)

- The baseline accommodates a higher blood flow rate in one direction by adjusting the position of the confusion points of the colors (e.g., red versus blue).
- The baseline defaults to the midpoint of the color display and appears in the center of the color bar on the screen.
- The zero rate corresponds to the baseline, and the entire PRF range remains unchanged.
- When the baseline parameter is unfreeze, adjust it by clicking the left and right buttons under the parameter in the function menu.

13. Steer Angle

- Function: When the probe does not move, the operator deflects the color sampling frame left and right to meet the Angle requirements of ultrasonic Doppler effect and obtain the necessary motion-tissue information.
- The angular deflection function is only suitable for linear proof and is applied to peripheral vascular imaging.
- It is displayed as "Steer Angle" on the function menu and can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state.
- Angle deflection can be deflected from -20 to +20.

14. High PRF

- Adjust the upper limit of PRF function switch. After this switch is enabled, the upper limit of PRF function can be adjusted higher.
- It is displayed as "High PRF" on the function menu and can be adjusted by touch in the function menu under the unfreeze state.

15. Line Density

- Line density regulation changes the transverse linear density of the PDI/DPDI color image, thereby balancing the transverse spatial resolution and frame rate to obtain the appropriate optimal image.
- Line density is displayed as "Line density" in the function menu, which is divided into five levels: 1-5. Under the unfreeze state, it can be adjusted by the left and right buttons under the parameter in the function menu.
- The adjustment of the Line density will affect the image frame rate. The higher the line density, the lower the frame rate.

16. Variance

- Variance can make the image in PDI/DPDI mode display green area. The greener the image color is, the less reliable the image is.
- Variance is adjusted under the unfreeze state by touch within the function menu.

17. Color Invert(DPDI Mode)

- General color flow diagram movement direction is defined as red toward the probe direction, blue away from the probe direction (red toward blue away).
- Color flip observes blood flow motion from another Angle such as red away (negative velocity) and blue toward (positive velocity), allowing the operator to view the blood flow

color image in any way desired.

- Color invert is adjusted by touch in the function menu under the unfreeze state.

18. Color Threshold

- The threshold assigns gray-scale range levels at the stop of color information, thus selecting more color images to display or more gray-scale images in B-mode.
- The threshold is displayed as "Color Threshold" in the function menu, and can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state.
- The threshold limits the low-level echoes of colored blood flow that cover the inner wall of the blood vessel, helping to reduce color spill from the blood vessel wall.

19. Transparency

- Color Transparency adjustment changes the transparency of a color image in PDI/DPDI mode so that the organization behind the color is observed through the color image.
- Color transparency is displayed as "Transparency" on the function menu and can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state.

20. Color Priority

- Color Priority is displayed as Color priority on the function menu and can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state.

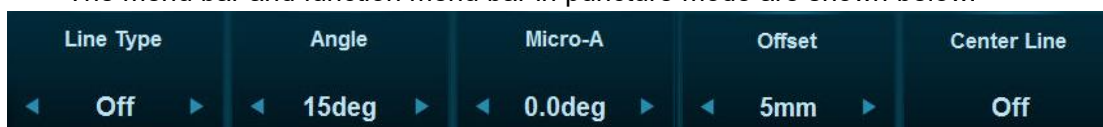
21. Palette

- Palette function can change the Doppler blood flow color display on the screen to enhance the user's ability to distinguish B-mode images, and the palette is not Doppler color mode.
- Adjust the palette effect according to the need for use, so as to obtain an image suitable for discrimination.
- The palette can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state.
- Select different palettes to change the color display effect of Doppler blood flow on the screen. The color bars also change accordingly.

6.6.7 Instruction to Operation of Pierce Mode

6.6.7.1 Introduction to Pierce Mode

- Puncture assistance is used to provide the doctor with an auxiliary orientation on the imaging screen during puncture surgery, so that the puncture needle can be more accurately placed to the doctor's desired position.
- The menu bar and function menu bar in puncture mode are shown below.



6.6.7.2 Operation of Pierce Assist Mode

1. Line Type

- The imaging screen displays an auxiliary dotted line to help the doctor provide a more accurate piercing angle during the piercing procedure.

- It is displayed as "Line Type" on the function menu, the adjustment range is 0-2. Adjust the value by clicking the left and right buttons under this parameter in the function menu under the unfreeze state.

2. Angle

- Adjust the angle of the guide wire on the screen.
- It is displayed as "Angle" in the function menu and the adjustment range is from -5 to 59. In the unfreeze state, it can be adjusted by the left and right buttons under the parameter in the function menu.

3. Micro-Angle

- Slightly adjust the tilt Angle of the auxiliary wire on the screen.
- Micro-Angle adjustment is displayed as "Micro-A" adjustment on the function menu. The adjustment range is 0.0-0.9. In the unfreeze state, it can be adjusted by the left and right buttons under the parameter in the function menu.

4. Offset

- Adjust the left and right positions of the auxiliary cables on the screen.
- Offset is displayed as "offset" on the menu bar and can be adjusted from 0 to 39. In the unfreeze state, it can be adjusted by the left and right buttons under the parameter in the function menu.

5. Center Line

- An auxiliary dotted line divides the left and right sides of the screen equally, with additional dotted lines at the top dividing the left and right sides of the screen into four equal parts.
- Center line is displayed as "center line" in the function menu, and the on/off is adjusted by touching in the function menu under the unfreeze state.

6.6.8 Instruction to Operation of Anatomy M Mode

6.6.8.1 Introduction to Anatomy M Mode

- In traditional M mode, the sound waves travel along the handle to the probe, so it is difficult to get a good plane, but in anatomy M mode, you can control the M mark line and move it to the position you want to get a good image.
- The menu Anatomical M mode is shown in the figure.

Freq	Length	Angle	View Area	Sweep Speed
◀ 3.6MHz ▶	◀ 15.00cm ▶	◀ 10deg ▶	◀ 100% ▶	◀ 3 ▶
Show AM1	Show AM2	Show AM3	Next Line	Updown Invert
On	On	On		Off
Right/Down				
Off				

Menu of Anatomy M mode

6.6.8.2 Operation of Anatomy M Mode

1. AM Mode Sampling Line

- There are three AM sampling lines to choose from. The top, middle and bottom samples

in the spectrum display area correspond to the left, middle and right options in the menu bar respectively.

- Manually touch the screen to adjust the currently selected sampling line position.

2. Frequency

- The device adopts the broadband probe technology, which can adjust the AM mode frequency according to the use needs to obtain the appropriate B image and M image.
- AM Mode frequency is displayed as "Frequency (MHz)" on the function menu and it can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state.
- Scope of adjustment of frequency on AM mode is related to probe, and it is shown as "Freq(MHz)" in imaging parameter area.
- Adjustment of frequency on AM mode shall influence the image force of penetration and resolution ratio, the higher frequency, the poor force of penetration, the higher resolution ratio.

3. Length

- Adjust the length of the currently selected M directrix.
- The length is displayed as length on the menu bar. In the unfreezing state, adjust the length by clicking the left and right buttons under this parameter in the function menu.

4. Angle

- Adjust the deflection Angle of the currently selected M directrix.
- The Angle is displayed as "Angle" in the function menu, and it can be adjusted by the left and right buttons under the parameter in the function menu under the unfreeze state. The adjustment is performed at 10° as a step, and the adjustment range is -90° to 90° .

5. Sweep Speed

- Scan speed Controls the timeline size of the M image by changing the density of sampling lines per unit time, so that more or fewer motion events are observed on the screen.
- Sweep speed is displayed as "Sweep Speed" on the menu bar. To adjust this parameter, click the left and right buttons in the function menu.
- Select different scanning speed values, change the AM image timeline size, and display the AM image on the screen with the X-axis scale (unit: second).
- Selecting different scanning Speed values will affect the AM image frequency. The AM Speed (Hz) is displayed in the imaging parameter area. Generally speaking, the faster the scanning speed, the higher the AM image frequency.

6. Show AM1

- Turn on/off the corresponding AM1 directrix display. After this is turned off, the image of the directrix in AM1 mode disappears.
- When you turn it off or on, the image of this sampling line also disappears or appears in AM mode.
- Displays it as "Show AM1" in the menu bar. When unfreeze, tap in the function menu to adjust.

7. Show AM2

- Turn on/off the corresponding AM2 directrix display. After this is turned off, the image of the directrix in AM1 mode disappears.

- When you turn it off or on, the image of this sampling line also disappears or appears in AM mode.
- Displays it as "Show AM2" in the menu bar. When unfreeze, tap in the function menu to adjust.

8. Show AM3

- Turn on/off the corresponding AM3 directrix display. After this is turned off, the image of the directrix in AM1 mode disappears.
- When you turn it off or on, the image of this sampling line also disappears or appears in AM mode.
- Displays it as "Show AM3" in the menu bar. When unfreeze, tap in the function menu to adjust.

9. Next Line

- Select M sampling lines one by one. The selected sampling lines change from dashed to solid.
- It is displayed as "Next Line" in the function menu, and adjusted by touching in the function menu under the unfreeze state.

10. Updown Invert

- Image up and down the image is flipped vertically to obtain an ultrasound image consistent with the actual anatomical position.
- Image updown can be adjusted according to the use of different probes the up and down position of image B, does not change the up and down position of image.
- It is displayed as "Updown Invert" in the function menu, and adjusted by touching in the function menu under the unfreeze state.

11. Right/Down

- Changes the layout of the image and scale axis.
- Choose to display the image with the scale axis left or right or up or down according to your needs.
- It is displayed as "Right/Down" on the function menu, and the on/off is adjusted by touching in the function menu under the unfreeze state.
- When the submenu is unfreeze, tap to adjust it.

6.6.9 Instruction to Operation of Wide View Mode

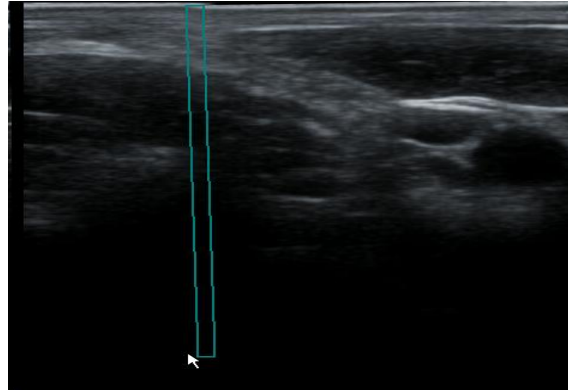
6.6.9.1 Introduction to Wide View Mode

- In practice, when scanning certain anatomical sites (such as the thyroid gland, etc.), a larger field of view is often required to view and measure the full picture of the anatomical structure with an area larger than a single image, in order to clearly understand its histology. Wide-field imaging is a special imaging mode designed to meet the clinical needs. When using the wide-view imaging function, the operator translates the probe according to the section scanned by the probe to obtain a whole ultrasonic image, and the system spliced these images in real time according to the position relationship between each image to obtain a large image that can fully observe the entire anatomical region. The operator can rotate, translate, enlarge, annotate, add the position map and measure the large image after the wide field imaging. In the process of real-time stitching, the system performs image stitching while scanning the image, and the direction of image

stitching is the same as that of the probe moving direction. The system also supports the splicing of color images and can display both two-dimensional and color blood flow images at the same time, so that the images are more intuitive and vivid.

6.6.9.2 Operation of Wide View Mode

- When Wide View is selected, the menu bar will have only one start/stop button.
- Press the Start Stop key on the menu bar to start or stop wide-field imaging mode
- Press "Start". The system performs wide-field imaging, as follow shows.



Wide View

- Once you have started, keep your hand steady and slide the probe over the desired position, keeping the frame as straight as possible during the slide.
- Then press the "Start/Stop" button again to stop the wide view imaging.
- After the scan is stopped, the ultrasonic image of the scanned area will be displayed on the screen, as follow shows.



6.6.10 Instruction to Operation of TDI (Tissue Doppler imaging) Mode

6.6.10.1 Introduction to TDI Mode

- TDI is designed to provide information on low-velocity and high-amplitude movements, especially for cardiac movements.
- Warm colors in the image indicate movement toward the probe, and cool colors indicate

movement away from the probe.

- The higher the color brightness, the smaller the motion amplitude.
- Press the TDI mode button to enter TDI mode.
- TDI mode menu bar and function menu are shown below.

Freq	Power	B/C Align	Packet Size	PRF
◀ 2.5MHz ▶	◀ 95% ▶	Off	◀ 8 ▶	◀ 1.0KHz ▶
Spatial Filter	Color Avg	Baseline	High PRF	Line Density
◀ 4 ▶	◀ 2 ▶	◀ 127 ▶	Off	◀ 2 ▶
Variance	Color Invert	Color Priority	Palette	
Off	Off	◀ 4 ▶	◀ 2 ▶	

TDI mode function menu

6.6.10.2 Operation of TDI Mode

1. Frequency

- Frequency adjustment will affect the image penetration and resolution, in general, the higher the frequency, the worse the penetration, the higher the resolution.
- The frequency is displayed as "frequency (MHz)" in the function menu and it can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state.
- The value ranges from 2.0~4.0.

2. Power

- Acoustic power regulation changes the acoustic power output of the device to adjust the intensity of the color image in TDI mode.
- It is displayed as "Power (%)" in the menu bar, and can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state.

3. B/C Align

- BC Align increases the frame rate by reducing the screen width to the color mode screen width.
- It is displayed as "B/C Align" in the menu bar, and can be adjusted by touching in the function menu under the unfreeze state

4. Packet Size

- Packet size controls the number of samples of a single-color flow vector, thereby increasing or decreasing the color sensitivity and color average accuracy, balancing the color image quality and frame rate to obtain the appropriate optimal image.
- The package size is displayed as "Packet Size" on the function menu and can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state.
- The packet size value affects the color image quality and frame rate. Increasing the sample packet size will improve the color image quality, but the frame rate will decrease.

5. Pulse Repetition Frequency (PRF)

- Change the pulse repetition frequency of TDI mode to adapt to the observation requirements of different moving speed tissues. Generally, when observing high-speed

blood flow, it is necessary to adjust the pulse repetition frequency to avoid confusion.

- The pulse repetition frequency is displayed as "PRF(kHz)" in the menu bar and can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state.
- The range of PRF adjustment is related to the probe. As the PRF changes, the speed value represented by the color bar on the screen changes accordingly. The PRF value is displayed as "PRF(kHz)" in the imaging parameter area.

6. Spatial Filter

- Spatial filter adjustment filters the color image on the two-dimensional space plane, making the image look less pixel, smoother color image.
- Spatial filter is displayed as "spatial filter" on the function menu which is divided into five levels: Off, 1-4. It can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state.

7. Color Average

- TDI mode color average processing multi-frame color images are filtered in the time domain to reduce random speckle noise and obtain smoother and softer images.
- Color average is displayed as "Color Avg" on the function menu and can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state.
- A higher color average makes the color image appear longer, enhancing the visibility of the fluid.
- The adjustment of color average processing will affect the real-time image, the stronger the color average processing, the worse the real-time.

8. Baseline

- The baseline accommodates a higher blood flow rate in one direction by adjusting the position of the confusion points of the colors (e.g., red versus blue).
- The baseline defaults to the midpoint of the color display and appears in the center of the color bar on the screen.
- The zero rate corresponds to the baseline, and the entire PRF range remains unchanged.
- In the state of unfreezing, it can be adjusted by the left and right buttons under the parameter in the function menu.

9. High PRF

- Adjust the upper limit of PRF function switch. After this switch is enabled, the upper limit of PRF function can be adjusted higher.
- High PRF is displayed as "High PRF" in the function menu, and can be adjusted by touch in the function menu under the unfreeze state.

10. Line Density

- Linear density adjustment Changes the transverse linear density of B image, thereby balancing the transverse spatial resolution and frame rate to obtain the appropriate optimal image.
- Line density is displayed as "Line density" in the function menu, which is divided into five levels: 1-5. Under the unfreeze state, it can be adjusted by the left and right buttons under the parameter in the function menu.
- The adjustment of the line density will affect the frame rate of the image. The higher the

line density, the lower the frame rate.

11. Variance

- Variance makes the image in CF mode appear in the green area. The greener the image color is, the less reliable the image is.
- Variance is adjusted under the unfreeze state by touch within the function menu.

12. Color Invert

- General color flow diagram movement direction is defined as red toward the probe direction, blue away from the probe direction (red toward blue away).
- Color flip observes blood flow motion from another Angle such as red away (negative velocity) and blue come (positive velocity), allowing the operator to view the blood flow color image in any way desired.
- Color invert is adjusted by touch in the function menu under the unfreeze state.

13. Color Priority

- Color priority is displayed as "Color priority" in the function menu, and can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state.

14. Palette

- General color blood flow image movement direction is defined as red toward the probe direction, blue away from the probe direction (red toward blue away).
- The palette function allows the operator to select special colors to indicate the direction and speed of motion, enhancing the ability to distinguish color images.
- The palette can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state.
- Select different color images to change the color display effect of Doppler blood flow on the screen. At the same time, the color bar changes accordingly.

6.6.11 Instruction to Operation of NE(Puncture enhance) Mode

6.6.11.1 Introduction to NE Mode

- During puncture, the metal needle is inserted into the tissue at a certain Angle with the probe surface. Due to the large acoustic impedance of the metal needle, ultrasonic waves cannot penetrate the metal needle, thus forming a reflective interface. Because it is when the deflection Angle of acupuncture is large, the needle display on ultrasonic B image will become blurred, which is not convenient for users to observe. When the direction of ultrasonic deflection emission is perpendicular to the direction of needle incidence, the reflection direction is also perpendicular to the direction of needle incidence, and the display effect of ultrasonic imaging on the needle is the clearest. Based on the original ultrasonic imaging system, the normal emission (emission perpendicular to the probe surface) is added at the same time, which is approximately perpendicular to the metal needle deflection and can choose the deflection angle.
- The puncture mode menu bar and function menu bar are shown below.

Freq	Power	Steering	Frame Avg	Rejection
◀ 8.5MHz ▶	◀ 90% ▶	◀ -35 ▶	◀ 1 ▶	◀ 60 ▶



6.6.11.2 Operation of NE Mode

1. Frequency

- The device uses broadband probe technology, which can adjust the puncture mode frequency to obtain appropriate images according to the use needs.
- The puncture mode frequency is displayed as "Frequency (MHz)" on the function menu and it can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state.
- The range of puncture mode frequency adjustment is probe dependent and is displayed as "NE Freq(MHz)" in the imaging parameter area.
- The frequency adjustment of the piercing mode will affect the image penetration and resolution. The higher the frequency, the worse the penetration and the higher the resolution.

2. Power

- Acoustic power adjustment the acoustic power output of the device is changed to adjust the intensity of the piercing mode image signal.
- The regulation of acoustic power should follow the principle of ALARA (As Low As Reasonably Achievable).
- The acoustic power is displayed as "Power (%)" in the menu bar, and can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state.

3. Steering

- The function of the deflection is to adjust the Angle at which the probe deflects sound waves, so that the doctor can observe a clear image when penetrating the probe at different angles.
- The steering is displayed as "Steering" in the menu bar, and it can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state. The adjustment range is -60 to -10.

4. Frame Average

- Frame average processing multi-frame images are filtered in the time domain to reduce random speckle noise and obtain smoother and softer images.
- The frame average is displayed as "Frame Avg" in the function menu, and it is adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state.
- The adjustment of frame average processing will affect the real-time of the image. The stronger the frame average processing, the worse the real-time.

5. Rejection

- Image rejection the low-amplitude echo signal is suppressed to eliminate the low-level echo caused by noise, thus reducing the impact of noise on ultrasonic images.

- The image rejection value can be adjusted according to the need for use to obtain a low noise image.
- It is displayed as "Rejection" in the function menu, and can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state.
- Select different image rejection values to change the display effect of low-level image echoes on the screen.

6. Duplex

- The purpose of the double synchronization is to display the piercing mode and the normal B mode on the screen for the doctor to observe and compare.
- It is displayed as "Duplex" in the menu bar, and can be adjusted by touch in the function menu under the unfreeze state.

7. Gamma

- The grayscale map can be adjusted according to the needs of the use to obtain the appropriate grayscale image.
- The gray scale map is displayed as "Gamma" in the menu bar, and can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state.
- Select a different gray scale map and change the image gray display effect on the screen.

8. Palette

- Palette function can change the gray level of the image and can also color the traditional piercing mode gray image or Doppler spectrum to enhance the user's ability to distinguish piercing mode images or Doppler spectrum, the color palette is not a Doppler color mode.
- The palette effect can be adjusted according to use to obtain an image suitable for discrimination.
- The palette can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state.
- Select different palette effects and change the image color display effect on the screen. At the same time, the gray bars also change accordingly.

9. Color Map

- Adjust the color of the image as required for easy observation.
- It is displayed as "Color Map" in the function menu, and can be adjusted by the left and right buttons under the parameter in the function menu under the unfreeze state.

10. Line Density

- Linear density adjustment changes the transverse linear density of the piercing mode image, thereby balancing the transverse spatial resolution and frame rate to obtain the appropriate optimal image.
- Line density is displayed as "Line density" in the function menu, which is divided into five levels: 1-5. Under the unfreeze state, it can be adjusted by the left and right buttons under the parameter in the function menu.
- The adjustment of the line density will affect the frame rate of the image. In general, the higher the line density, the lower the frame rate.

11. Brightness

- The brightness parameters of the screen can be adjusted according to the needs of the

use, so as to obtain a suitable image.

- The brightness is displayed as "Brightness (%)" on the function menu bar and it can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state.

12. Contrast

- The contrast parameters of the screen can be adjusted according to the use needs, so as to obtain the appropriate image.
- It is displayed as "Contrast(%)" on the function menu bar and it can be adjusted by the left and right buttons under this parameter in the function menu under the unfreeze state.

6.6.12 Instruction to Operation of Color M mode

6.6.12.1 Introduction to Color M Mode

- Color M-mode is the M-mode image with additional blood flow or tissue information to provide cardiac motion, which is sensitive to the instantaneous changes of motion signals, so as to provide detailed diagnostic information.
- Color M mode includes color blood flow M mode and color tissue M mode.

6.6.12.2 Operation of Color M Mode

- Color flow M mode: In B+M mode, press CF. Press the M key in B+CF or B+CF+PW mode.
- Color tissue M mode: Press TDI in B+M mode. Press the M key in B+TDI mode.
- Press CF to exit CF+M mode, or press B to return directly to B mode.

6.6.12.3 Operation of Color M Mode

- In Color Flow M-mode, the parameters are common to B-mode, M-mode, and CF-mode. For adjustment of specific parameters, please refer to the relevant chapters.
- In Color Flow M-mode, the parameters are common to B-mode, M-mode, and TDI-mode. For adjustment of specific parameters, please refer to the relevant chapters.
- Adjusting the Color Sampling Line: While in the unfrozen state, click the M-mode option from the left function menu. Tap the scanning area, then manually adjust its position by touching the screen (refer to the M-mode sampling line). The current function status will be displayed in the prompt bar at the bottom of the screen.
- Adjusting the Color Sampling Frame: While in the unfrozen state, click the CF-mode option from the left function menu. and the position or length of the color sampling frame on the sampling line can be switched and adjusted by clicking the scanning area, and manually adjusted by touching the screen (refer to the CF Mode Sampling Frame). The current function status will be displayed in the prompt bar at the bottom of the screen.

6.7 Measurement and Calculation

6.7.1 Introduction to Measurement and Calculation

- Provide assistant data support for clinical diagnosis of doctor through measuring and calculating distance, area, perimeter, volume, body surface area, ratio, slope, angle, time, speed and other parameters.
- Measurement and calculation function is valid in both freeze state and unfreeze state.
- Use the "Scroll menu" and "Select Menu" in the function menu and confirm the

measurement menu item.

- The functions related to measurement and calculation are shown in the table below. The function keys related to measurement and calculation are listed in Section “6.1 Description of Operation Panel”.
- This section only explains the usage of regular measurement and calculation.
- The results of regular measurement and calculation are displayed in the upper left corner of the screen.
- Different measurement and calculation results are distinguished by different numbers.
- The menu for other measurement items of regular measurement and calculation is displayed on the left side of the screen.



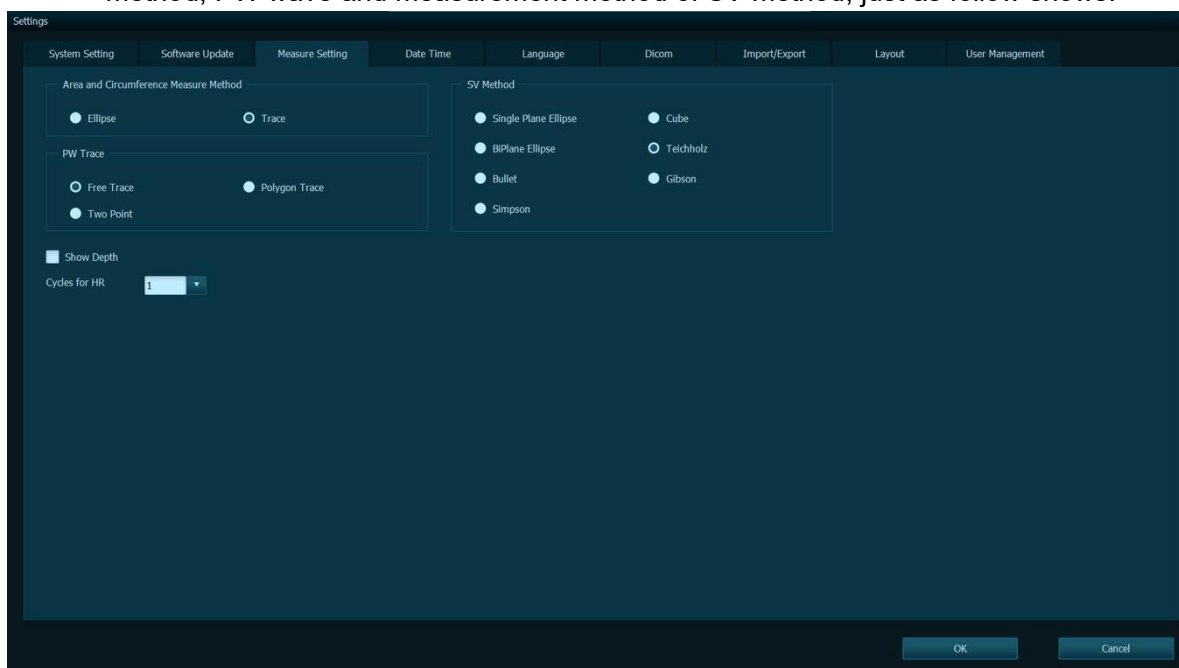
Attention

- All measurement results on the screen shall be automatically cleared when the system is unfreeze.
- Measurement and calculation result gained from ultrasound image is the supplement for other clinical diagnosis plans. Its measurement precision not only depends on the precision of ultrasonic diagnostic equipment but also influenced by whether users can use appropriate measurement calculation plan. Therefore, please refer to related original papers or materials if necessary, when users use calculation method, formula and database in equipment to learn about calculation method, formula, database and other clinical operation methods and applicable scopes recommended by researchers.

6.7.2 Instruction to Measurement and Calculation

6.7.2.1 Regular Measure Setting

- Press System key and select “Measure Setting” to set area and perimeter measurement method, PW wave and measurement method of SV method, just as follow shows:



Regular Measure and Calculation Setting

- Can select ellipse method or trace method as the defaulted method of area/perimeter measurement.

- Can select free trace method, polygon trace method and two-point trace method as defaulted method of PW automatic trace measurement.
- Can select single plane ellipse, B-plane ellipse, bullet, Simpson, Cube, Teichholz and Gibson as defaulted method of SV method.

6.7.2.2 Instruction to Measurement and Calculation

- In the freeze state, press the measurement key, will enter the simple measurement mode, press "Measurement Method" several times, cycle to select the distance, ellipse, trajectory and other measurement modes.
- The follow table lists the simple measurement and calculation items corresponding to touching the measurement mode button for different times in different working modes:

Times for pressing measurement key	Work mode		
	B、2B、4B、CF、PDI	B M、M	PW
0	B distance (B Distance)	Tissue depth (M Distance)	Speed (Doppler Speed)
1 time	Circumference and area(B Ellipse)	Time interval (M Time Interval)	Peak/Valley/Average speed (Doppler TAMAX/MIN/MEAN)
2 times	Perimeter and area (B Trace)	Speed (M Velocity)	Slope/Time interval (Doppler Acceleration)
3 times			Time interval (Doppler Time Interval)

Instruction to Simple Measurement and Calculation Item

6.7.2.3 Instruction to Regular Measurement and Calculation Item Corresponded in Measurement Menu

- Press Measure key in freeze state to enter into simple measurement mode, measurement menu occurs in the left of the screen.
- Select the corresponding measurement item through the "scroll menu". Press "select menu" to open the measurement folder menu, select the corresponding measurement function.
- Measurement mode corresponded with regular measurement item in measurement menu is different in different work modes.
- In different work modes, instruction to regular measurement and calculation item corresponded with regular measurement in measurement menu is shown as follow table:

Work mode/measurement and calculation item		
B, 2B, 4B, CF, PDI	B M, M	PW
Stenosis	Stenosis	Trace
A/B Ratio	A/B Ratio	Point
Depth	Time	Distance
Length	Distance	Volume Flow
Circumference(Circ.)	Heart rate	
Area	Velocity	
Volume		
Angle		

Histogram		
Anatomy		
IMT		

Work mode/measurement menu		
B, 2B, 4B, CF, PDI	B M, M	PW
B Generic Stenosis >> A/B Ratio >> Depth 0.00 cm Length 0.00 cm Circ. 0.00 cm Area 0.00 cm ² Volume >> Angle >> Histogram Anatomy IMT >> Back Back to Main	M Generic Stenosis >> A/B Ratio >> Time 0.00 s Distance 0.00 cm Heart Rate 0.00 bpm Velocity 0.00 cm/s Back Back to Main	Doppler Generic Trace >> Point >> Distance >> Volume Flow >> Back Back to Main

Instruction to Regular Measurement and Calculation in Measurement Menu

6.7.3 Measurement and Calculation of B Mode

- Measurement and calculation in B/2B/4B, CF, PDI and DPDI mode are the same as in B mode, which described here together.
- Distance, circumference and area(ellipse), circumference and area (trace) can be measured and calculated through measurement key and touching in B mode.
- In B mode, stenosis, A/B ratio, depth, length, circumference, area, volume, angle, histogram, anatomy and IMT can be measured and calculated through measurement menu.

6.7.3.1 Distance measurement

- In the B mode, press the measure button after freezing, and the measurement result bar on the screen will prompt "B distance".
- Click the first and last ends of the length to be measured on the image, or touch the beginning of the distance to be measured, then slide your finger to the end of the distance to be measured and click the end position again.
- The measured dotted line cannot be changed when it turns yellow.
- The measurement result column displays the measurement results:

Length X.XX cm

6.7.3.2 Circumference and Area (Ellipse) measurement

- In the B mode, after freezing the measurement button, then touch "Measurement Method", the measurement result bar displays on the screen.

- Touch two points of the image successively to determine both ends of the transverse diameter of the ellipse.
- Then determine the length of the vertical diameter of the ellipse by sliding from left to right on the image. When the finger leaves the screen, the ellipse becomes a yellow dashed line, which means that no further changes can be made.
- The measurement result column displays the measurement results:

Circ	X.XX cm
Area	X.XX cm ²

6.7.3.3 Circumference and Area (Trace) measurement

- In the B mode, press the measurement button and touch "Measurement Method" twice. The measurement result bar on the screen displays "B trace".
- Touch the image from the starting position of the measurement and slide to trace the area to be measured until the measurement area is completely traced. Then release your hand and click the starting point of the image tracing again. The system will automatically connect the traces
- The dotted line of the measurement turns yellow, and the measurement area cannot be changed
- The measurement result column displays the measurement results:

Length	XXX cm
Area	XXX cm ²

6.7.3.4 Stenosis measurement

- In mode B, press the measurement button and enter the measurement and calculation items in mode B Generic-Stenosis through Scroll Menu and Select Menu. Stenosis measurements include length ratio, diameter ratio, area stenosis ratio, and circumference stenosis ratio
- Stenosis can be calculated by measuring the diameter or area of the blood vessel as follows:
- $\text{Stenosis} = (d1-d2)/D1$; D1 and D2 are the distances of the two lines measured successively
- $\text{Stenosis} = (A1-A2)/A1$; A1 and A2 are respectively the areas of the two sections measured successively
- Refer to sections 6.7.3.1-6.7.3.3 for measurements of distance and area.
- The measurement results are displayed in the measurement menu.

6.7.3.5 Ratio measurement

- In mode B, press the measure button to enter the measurement menu. B Generic-A/B Ratio Measurement and calculation items. Ratio measurement includes A/B length ratio, A/B area ratio, and A/B circumference ratio.
- The ratio can be calculated by measuring the diameter or area as follows:
- $\text{Ratio} = D1/D2$; ratio = $d1 / d2$; D1 and D2 are the distances of the measured lines and $D1 > D2$
- $\text{Ratio} = A1/A2$; ratio = $A1/A2$; A1 and A2 are the areas of the two sections measured respectively and $A1 > A2$
- Refer to sections 6.7.3.1-6.7.3.3 for measurements of distance and area.
- The measurement results are displayed in the measurement menu.

6.7.3.6 Volume measurement

- Press Measure button in B mode, select B mode (B Generic) - volume - volume (length, width and height) measurement and calculation item on screen.
- Volume can be measured and calculated through single distance, dual distance and triple distance. Calculation formula is shown as follow Table:

Measurement method	Calculation method
Single distance	$\pi/6 \times A^3$
Dual distance	$\pi/6 \times A \times B^2 (A > B)$
Triple distance	$\pi/6 \times A \times B \times C$

Calculation Formula of Volume

- Refer to Section 6.7.3.1-6.7.3.3 for measurement method of distance and ellipse.
- The measurement results are displayed in the measurement menu.



Attention

In volume measurement, it is needed to measure between transverse section and vertical section of tissue, therefore, it is needed to be conducted in 2B mode generally.

6.7.3.7 Angle measurement

- Press Measure key in B mode to select B mode (B Generic) - Angle measurement and calculation item in measurement menu on screen through track ball and Set key.
- Calculate the included angle between two straight lines through measuring them.
- Refer to Section 6.7.3.1 for measurement method.
- The measurement results are displayed in the measurement menu.

6.7.3.8 Histogram measurement

- Press Measure key in B mode to select B mode (B Generic) - Histogram measurement and calculation item in measurement menu on screen through track ball and Set key.
- Moving cursor through track ball to fix initial position need measure, press Set key to confirm.
- Moving cursor through track ball to fix final position need measure, press Set key to confirm.
- The measurement result column displays the measurement results:

N	XXXXX
M	X.XX
Max	X.XX%
SD	X.XX

6.7.3.9 Anatomy (Sectional) measurement

- In the B mode, press the measurement button, and select the measurement and calculation items in the screen measurement menu B Generic - Anatomy by using the trackball and confirm keys.
- The measurement method of this function is the same as that of the distance measurement method in mode B.
- The measurement result column displays the measurement results:

Mean	XX.XX
Min	XX
Max	XXX

SD X.XX

- Section gained through measurement is shown at the bottom of measurement result column on screen.

6.7.3.10 IMT measurement

- In the B mode, press the measurement button, select the on-screen measurement menu B mode (B Generic) -IMT measurement and calculation items
- The measurement method of this function is the same as that of the histogram.
- The measurement result column displays the measurement results:

Mean	XX.XX mm
Min	XX.XX mm
Max	XX.XX mm
SD	XX.XX
ROI Len	XX.XX mm
Valid Len	XX.XX mm
Quality	XX.XX

6.7.4 Measurement and Calculation of M Mode

- The measurements and calculations in the B|M and M operating modes are consistent with the M mode and are described here.
- In M mode, the measurement and calculation of tissue depth, time interval and velocity can be carried out through the measurement button.
- In M mode, stenosis, A/B ratio, time, distance, heart rate and velocity can be measured and calculated through the measurement menu.

6.7.4.2 Time measurement

- In M mode, press the "Measurement" key, then click the "Measurement Method" in the function menu, and the screen measurement result bar prompts "M time interval".
- On the image, first place the cursor at the beginning of the time interval to be measured, then drag to the end of the time interval to be measured and click the end position again.
- The measurement result bar on the screen displays the measurement result.

Time X.XX s

6.7.4.1 Tissue depth (distance) measurement

- In the M mode, press the measurement button after freezing, and the measurement result bar on the screen will prompt "M distance".
- Click the first and last ends of the length to be measured on the image, or touch the beginning of the distance to be measured, then slide your finger to the end of the distance to be measured and click the end position again
- The measured dotted line cannot be changed when it turns yellow
- The measurement result bar on the screen displays the measurement result (distance length value cm)

Distance XXX cm

6.7.4.3 Velocity measurement

- In the M mode, press the measurement button and touch "Measurement Method" twice. The measurement result bar on the screen displays "M Velocity".

- On the image, first place the cursor at the beginning of the time interval to be measured, then drag to the end of the time interval to be measured and click the end position again.
- The dotted line of the measurement turns yellow, and the measurement area cannot be changed
- The measurement result bar of the screen displays the measurement result.

Time	X.XX s
Slope	X.XX cm/s

6.7.4.4 Stenosis measurement

- In mode M, press the measurement button and enter the measurement and calculation items in mode M Generic - Stenosis through Scroll Menu and Select Menu. Stenosis measurements include length ratio.
- Stenosis can be calculated by measuring the diameter or area of the blood vessel as follows:
- $\text{Stenosis} = (d1-d2)/D1$, D1 and D2 are the distances of the two lines measured successively
- Refer to sections 6.7.4.1 for measurements
- The measurement results are displayed in the measurement menu.

6.7.4.5 Ratio measurement

- In mode M, press the measurement button to enter the measurement menu. M Generic - A/B Ratio Measurement and calculation items. Ratio measurement includes Time interval, speed ratio.
- The ratio can be calculated by measuring the time or speed ratio as follows:
 $A/B = T1/T2$, T1 and T2 are two sections of time measured previously and later respectively
 $A/B = V1/V2$, V1 and V2 two velocities (gradients) measured previously and later respectively
- Refer to sections 6.7.3.5 for measurements.
- The measurement results are displayed in the measurement menu.

6.7.4.6 Heart Rate measurement

- In mode M, press the measurement button and enter the measurement and calculation items in mode M Generic - Heart Rate through Scroll Menu and Select Menu.
- Heart rate can be calculated through measuring time interval of heartbeat cycle (peak or valley).
- Refer to sections 6.7.4.2 for measurements .
- The measurement results are displayed in the measurement menu.

6.7.5 Measurement and Calculation of PW Mode

- Measure and calculate velocity, peak/valley/average speed, slope/time and time interval through Measure key in PW mode.
- Measure and calculate trace, point, distance and blood flow through measurement menu in PW mode.

6.7.5.1 Velocity measurement

- In the PW mode, press the measurement button, the measurement result bar on the screen displays "Doppler Velocity".
- On the image, first move the cursor to the position where the speed will be measured,

and then click the blank to confirm.

- The dotted line of the measurement turns yellow, and the measurement area cannot be changed.
- The measurement result bar of the screen displays the measurement result.

Velocity	X.XX cm/s
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6.7.5.2 Peak/valley/average speed measurement

- In PW mode, press the "Measurement" key, then click the "Measurement Method" in the function menu, and the screen measurement result bar prompts "Doppler trace".
- Peak/valley/average speed can be measured and calculated through manual trace or automatic trace, two measurement methods can be switched.
- When using manual tracing method, the cursor was moved to the starting point to be measured on the image, and the desired measurement trajectory was traced by dragging.
- When using the automatic tracing method, the system automatically traces the PW waveform trajectory (marked with yellow lines on the screen), and moves the cursor to mark the starting and ending positions of the required measurement and calculation on the automatic tracing waveform trajectory.
- The cursor cannot be changed when it changes yellow.
- After measurement of manual trace method or automatic trace method is finished, the system shall calculate automatically to gain valley speed cm/s, peak speed cm/s, average speed cm/s, pulse index PI, resistance index RI and S/D ratio in PW mode; among them, the calculation formula of PI and RI is listed below:

$$PI = (V_{MAX} - V_{MIN}) / V_{MEAN}$$

$$RI = (V_{MAX} - V_{MIN}) / V_{MAX}$$

- Measurement result is shown in measurement result column on screen:

VMIN	X.XX cm/s
VMAX	X.XX cm/s
VMEAN	X.XX cm/s
PI	X.XX
RI	X.XX
S/D	X.XX

6.7.5.3 Acceleration interval measurement

- In the PW mode, press the measurement button and touch "Measurement Method" twice. The measurement result bar on the screen displays "Doppler Acceleration".
- On the image, first place the cursor at the starting point to be measured, then drag to the end point to be measured and click the end point again to confirm.
- Measurement result is shown in measurement result column on screen:

Time	X.XX s
Acceleration	X.XX cm/s ²

6.7.5.4 Time interval measurement

- In the PW mode, press the measurement button and touch "Measurement Method" three times. The measurement result bar on the screen displays "Doppler Time interval".

- On the image, first place the cursor at the starting point to be measured, then drag to the end point to be measured and click the end point again to confirm.
- Measurement result is shown in measurement result column on screen:
Time X.XX s

6.7.5.5 Trace measurement

- In mode PW, press the measurement button and enter the measurement and calculation items in mode PW Generic - Trace through Scroll Menu and Select Menu.
- After entering into trace measurement, select diameter (Diam) to measure distance on 2D image; select PS/ED to measure trace on PW image
- Refer to Section 6.7.4.1 for measurement method of distance, refer to Section 6.7.5.2 for measurement method of trace.
- Related calculation results shown in measurement menu: average speed, maximum speed, minimum speed, PG, VIT, RI, PI and heart rate.

6.7.5.6 Point measurement

- In mode PW, press the measurement button and enter the measurement and calculation items in mode PW Generic - Point through Scroll Menu and Select Menu.
- Select velocity to measure speed on PW image after entering into point measurement
- Refer to Section 6.7.5.1 for measurement method of velocity.

6.7.5.7 Distance measurement

- In mode PW, press the measurement button and enter the measurement and calculation items in mode PW Generic - Distance through Scroll Menu and Select Menu.
- On the image, move the cursor to the starting point of the measurement, then drag to the end point of the measurement and click the end point again.
- Related calculation results are shown in measurement menu: velocity difference, pressure slope difference, time interval, accelerated speed, resistance index, heart rate, minimum flow speed, maximum flow speed and PS/ED.

6.7.5.8 Blood flow measurement

- In mode PW, press the measurement button and enter the measurement and calculation items in mode PW Generic - Volume Flow through Scroll Menu and Select Menu.
- Select distance (Diameter) to measure distance on 2D image and select average flow speed (Vmean) to measure trace on PW image after entering into blood flow measurement.
- Refer to Section 6.7.3.1 for measurement method of distance and Section 6.7.3.2 for measurement method of trace.
- Related calculation results are shown in measurement menu: volume flow.

6.7.6 Measurement of Abdomen Department

6.7.6.1 Preparation for Abdomen Ultrasonography

- Make sure the appropriate probe is currently in use.
- Check whether the current system date is correct.
- Press the New Patient button and register the Patient information in the interface.
- Adjust the appropriate measurement mode.

6.7.6.2 Basic Abdomen Measurement Procedure

- Register patient information in Patient Options
- Press the measurement button in the function menu to enter the measurement mode. If the current measurement menu is not abdominal measurement, use the "Return to Main menu" function to return to the main interface and select the abdominal measurement option
- Select Measurement Tool from the menu to start the measurement
- Press Report to view the inspection report

6.7.6.3 Abdomen B Mode Measurement

6.7.6.3.1 Liver

Measurement	CC(Cranio-Caudal diameter)	cm	Measure in B Mode
	AP(Antero-Posterior diameter)	cm	
	LL(Latero-Lateral diameter)	cm	
Calculation	LV(Liver Volume)	cm ³	
Formula	LV(cm ³)=133.2+0.422*(CC(cm)*AP(cm)*LL(cm))		

6.7.6.3.2 Gallbladder

Measurement	GB L(Gallbladder Length)	cm	Measure in B Mode
	GB W(Gallbladder Width)	cm	
	GB H(Gallbladder Height)	cm	
Calculation	GB Volume(Gallbladder Volume)	cm ³	
Formula	GB Volume(cm ³)=(π/6)*(GB L(cm)*GBW(cm)* GB H(cm))		
Measurement	GB Wall th(Gallbladder Wall thickness)	cm	
	EBD(Extrahepatic Bile Duct diameter)	cm	
	CBD(Common Bile Duct diameter)	cm	
	CHD(Common Hepatic Duct diameter)	cm	

6.7.6.3.3 Pancreas

Measurement	Panc Head cm	Measure in B Mode
	Panc Body cm	
	Panc Tail cm	
	Panc Duct Head cm	
	Panc Duct Body cm	

6.7.6.3.4 Spleen

Measurement	Spleen L(Spleen Length)	cm	Measure in B Mode
	Spleen W(Spleen Width)	cm	
	Spleen T(Spleen Thickness)	cm	
Calculation	Spleen Vol.(Spleen Volume)	cm ³	
Formula	Spleen Vol.(cm ³) =(π/6)*(L(cm)*W(cm)*T(cm))		

6.7.6.3.5 GI Tract (Gastrointestinal Tract)

- Appendix Meas.(Appendix Measurement)

Measurement	Appendix Wall cm	Measure in B
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	Appendix Diam	cm	Mode
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■ Bowel Meas.(Bowel Measurement)

Measurement	St(Stomach thickness)	cm	Measure in B Mode
	SB(Small Bowel thickness)	cm	
	LB(Large Bowel thickness)	cm	

6.7.6.3.6 Bladder

Measurement	Bladder L(Bladder Length)	cm	Measure in B Mode
	Bladder W(Bladder Width)	cm	
	Bladder T(Bladder Thickness)	cm	
Calculation	Bladder Vol.(Bladder Volume)	cm ³	
Formula	Bladder Vol.(cm ³) = 0.570 * (L(cm) * W(cm) * T(cm))		

6.7.6.3.7 Left Kidney

Measurement	LK L(Left Kidney Length)	cm	Measure in B Mode
	LK W(Left Kidney Width)	cm	
	LK T(Left Kidney Thickness)	cm	
Calculation	LK Vol.(Left Kidney Volume)	cm ³	
Formula	LK Vol.(cm ³) = (π/6) * (L(cm) * W(cm) * T(cm))		

6.7.6.3.8 Right Kidney

Measurement	RK L(Right Kidney Length)	cm	Measure in B Mode
	RK W(Right Kidney Width)	cm	
	RK T(Right Kidney Thickness)	cm	
Calculation	RK Vol.(Right Kidney Volume)	cm ³	
Formula	RK Vol.(cm ³) = (π/6) * (L(cm) * W(cm) * T(cm))		

6.7.6.3.9 Pelvis

Measurement	Pelvis	cm	Measure in B Mode
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6.7.6.3.10 Portal V Diam

Measurement	Portal V Diam(Portal Vein Diameter)	cm	Measure in B Mode
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6.7.6.3.11 Aorta Diameter

Measurement	Aorta Diam(Aorta Diameter)	cm	Measure in B Mode
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6.7.6.4 Abdomen Doppler Mode

All projects from 6.7.6.4.1 to 6.7.6.4.3 include the following options:

Measurement	Diam(Diameter)	cm	Measure in Doppler Mode
Calculation	PS/ED(Peak Systolic velocity/End Diastolic velocity)		
Measurement	TMean(Time Averaged Mean Velocity)	cm/s	
	TMax(Time Averaged Maximum Velocity)	cm/s	
	TMin(Time Averaged Minimum Velocity)	cm/s	

	PGmax(Maximum Pressure Gradient) mmHg	
	PGmean(Mean Pressure Gradient) mmHg	
Calculation	VTI(Velocity-Time Integral) cm	
Calculation	RI(Resistive Index)	
Formula	$RI = (PS \text{ (cm/s)} - ED \text{ (cm/s)}) / PS \text{ (cm/s)} $	
Calculation	PI(Pulsatility Index)	
Formula	$PI = (TMax \text{ (cm/s)} - TMin \text{ (cm/s)}) / TMean \text{ (cm/s)} $	
	HR(Heart Rate) bpm	

6.7.6.4.1 Renal

Options	M Renal A(Main Renal Artery)	Measure in Doppler Mode
	Segment	
	Interlobar	
	Arcuate A(Arcuate Artery)	
	Renal V(Renal Vein)	

6.7.6.4.2 Ab A(Abdominal Arteries)

Options	Aorta	Measure in Doppler Mode
	Celiac Axis	
	SMA(Superior Mesenteric Artery)	
	C Hepatic A(Common Hepatic Artery)	
	Hepatic A(Hepatic Artery)	
	Splenic A(Splenic Artery)	

6.7.6.4.3 Ab V(Abdominal Venous)

Options	IVC(Inferior Vena Cava)	Measure in Doppler Mode
	Portal V(Portal Vein)	
	Rt Hepatic V(Right Hepatic Vein)	
	M Hepatic V(Middle Hepatic Vein)	
	Lt Hepatic V(Left Hepatic Vein)	
	Splenic V(Splenic Vein)	

6.7.6.4.4 Volume Flow

Measurement	Diam(Diameter) cm	Measure in Doppler Mode
	Vmean(Mean Velocity) cm/s	
Calculation	Volume Flow ml/min	
Formula	Volume Flow(ml/min)=60*π*(Diam(cm)/2) ² *abs(Vmean(cm/s))	

6.7.7 Obstetrics Measurements

6.7.7.1 Preparation for Obstetrics Ultrasonography

- Make sure the appropriate probe is currently in use.
- Check whether the current system date is correct.
- Press the New Patient button and register the Patient information in the interface.
- Adjust the appropriate measurement mode.

6.7.7.2 Basic Obstetrics Measurement Procedure

- Register patient information in Patient Options
- Press the measurement button on the menu bar to enter the measurement mode. If the current measurement menu is not Obstetric measurement, use the "Back to Main menu" function to return to the main interface and select the Obstetric measurement option
- Select Measurement Tool from the menu to start the measurement
- Press Report to view the inspection report.

6.7.7.3 Obstetrics B Mode Measurement

Options	OB Early	Measure in B Mode
	OB Mid/Late	
Measurement	Cervix L(Cervix Length) cm	
	NT Auto(Nuchal Translucency Auto) mm	

6.7.7.3.1 OB Early(Obstetrics Early)

Measurement	GS(Gestational Sac Diameter)	mm	Measure in B Mode
	YS(Yolk Sac Diameter)	mm	
	BPD(Biparietal Diameter)	mm	
	CRL(Crown-Rump Length)	mm	
	FL(Femur Length)	mm	
	NT(Nuchal Translucency)	mm	
	AF(Amniotic Fluid)	mm	
Calculation	FHR(Fetal Heart Rate)	bpm	
Calculation	LMP(Last Menstrual Period)		
Calculation results	GA(LMP) (Gestational Age)(Last Menstrual Period)		
	EDD(LMP) (Estimated Delivery Date)(Last Menstrual Period)		
	EFW(Estimated Fetal Weight)	g	
	GA(AUA) (Gestational Age)(Average Ultrasound Age)		
	EDD(AUA) (Estimated Delivery Date)(Average Ultrasound Age)		

6.7.7.3.2 OB Mid/Late(Obstetrics Middle/Late)

Measurement	BPD(Biparietal Diameter)	mm	Measure in B Mode
	HC(Head Circumference)	mm	
	AC(Abdominal Cirumference)	mm	
	FL(Femur Length)	mm	
	HL(Humerus Length)	mm	
	PL Thickness(Placental Thickness)	mm	
	AFI Q1(Amniotic Fluid Index Q1)	mm	
	AFI Q2(Amniotic Fluid Index Q2)	mm	
	AFI Q3(Amniotic Fluid Index Q3)	mm	
	AFI Q4(Amniotic Fluid Index Q4)	mm	
Calculation	AFI (Amniotic Fluid Index)	mm	

Formula	AFI(mm)=AFIQ1(mm)+AFIQ2(mm) +AFIQ3(mm)+AFIQ4(mm)	
Measurement	NT(Nuchal Translucency) mm	
Calculation	FHR(Fetal Heart Rate) bpm	
Calculation	LMP(Last Menstrual Period)	
Calculation results	GA(LMP) (Gestational Age)(Last Menstrual Period)	
	EDD(LMP) (Estimated Delivery Date)(Last Menstrual Period)	
	EFW(Estimated Fetal Weight) g	
	GA(AUA) (Gestational Age)(Average Ultrasound Age)	
	EDD(AUA) (Estimated Delivery Date)(Average Ultrasound Age)	

■ Physiology

Measurement	TAD(Abdominal Transversal Diameter) mm	Measure in B Mode
	APAD(Anteroposterior Abdominal Diameter) mm	
	APTD(Anteroposterior Trunk Diameter) mm	
	TTD(Transverse Trunk Diameter) mm	
	FTA(Fetal Trunk Cross-sectional Area) mm ²	
	THD(Thoracic Diameter) mm	
	HrtC(Heart Circumference) mm	
	TC(Thoracic Circumference) mm	
	Umb VD(Umbilical Vein Diameter) mm	
	F-Kidney(Fetal Kidney Length) mm	

■ Skeleton

Measurement	Clav(Clavicle Length) mm	Measure in B Mode
	Ulna(Ulna Length) mm	
	Rad(Radius Length) mm	
	Tibia(Tibia Length) mm	
	FIB(Fibula Length) mm	
	Foot(Foot Length) mm	
	LV(Length of Vertebrae) mm	

■ Head

Measurement	OFD(Occipital Frontal Diameter) mm	Measure in B Mode
	TCD(Cerebellum Diameter) mm	
	Cist Magna mm	
	HW(Hemisphere Width) mm	
	OOD(Outer Orbital Diameter) mm	
	IOD(Inter Orbital Diameter) mm	
	Ear(Ear Length) mm	
	LVW(Lateral Ventricle Width) mm	
	BOD(Binocular Distance) mm	
	Cereb(Cerebellum) mm	

■ Heart

Measurement	RV Diam(Right Ventricular Diameter)	mm	Measure in B Mode
	RA Diam(Right Atrium Diameter)	mm	
	RVOT Diam(Right Ventricular Outflow Tract Diameter)	mm	
	LV Diam(Left Ventricular Diameter)	mm	
	LA Diam(Left Atrium Diameter)	mm	
	AO Diam(Aorta Diameter)	mm	
	MPA Diam(Main Pulmonary Artery Diameter)	mm	
	IVS(Interventricular Septal Thickness)	mm	
	APTD(Anteroposterior Trunk Diameter)	mm	
	TTD(Transverse Trunk Diameter)	mm	
	FTA(Fetal Trunk Cross-sectional Area)	mm ²	
	THD(Thoracic Diameter)	mm	
	HrtC(Heart Circumference)	mm	
	TC(Thoracic circumference)	mm	

■ OB Cal. (OB Calculation)

Calculation	FL/AC	Measure in B Mode
Formula	FL/AC = Femur Length(mm) / Abdominal Circumference(mm)	
Calculation	FL/HC	
Formula	FL/HC = Femur Length(mm) / Head Circumference(mm)	
Calculation	FL/BPD	
Formula	FL/BPD = Femur Length(mm) / Biparietal Diameter(mm)	
Calculation	HC/AC	
Formula	HC/AC = Head Circumference(mm) / Abdominal Circumference(mm)	
Calculation	CI %	
Formula	CI(%) = BPD(Biparietal Diameter)(mm) / OFD(Occipital Frontal Diameter)(mm) *100%	

6.7.7.4 Obstetric Doppler Mode Measurement

All items in Section 6.7.7.4.1 include the following measurement options

Measurement	Diam(Diameter)	cm	Measure in Doppler Mode
Calculation	PS/ED(Peak Systolic velocity/End Diastolic velocity)		
Measurement	TMean(Time Averaged Mean Velocity)	cm/s	
	TMax(Time Averaged Maximum Velocity)	cm/s	
	TMin(Time Averaged Minimum Velocity)	cm/s	
	PGmax(Maximum Pressure Gradient)	mmHg	
	PGmean(Mean Pressure Gradient)	mmHg	
Calculation	VTI(Velocity-Time Integral)	cm	
Calculation	RI(Resistive Index)		
Formula	RI = (PS (cm/s) - ED (cm/s)) / PS (cm/s)		

Calculation	PI(Pulsatility Index)	
Formula	$PI = (TMax(cm/s) - TMin(cm/s)) / TMean(cm/s) $	
	HR(Heart Rate)	bpm

6.7.7.4.1 Obstetrics Doppler Mode Measurement Option

Options	Umb.A(Umbilical Artery)	Measure in Doppler Mode
	Duct Ven(Ductus Venosus)	
	Duct Art(Ductus Arteriosus)	
	Placenta A(Placenta Artery)	
	MCA(Middle Cerebral Artery)	
	Fetal Ao(Fetal Aorta)	
	Desc Ao(Descending Aorta)	
	Ovarian A(Ovarian Artery)	
	LT Ut Art(Left Uterine Artery)	
	RT Ut Art(Right Uterine Artery)	
Calculation	FHR(Fetal Heart Rate)	bpm

6.7.7.4.2 Volume Flow

Measurement	Diam(Diameter)	cm	Measure in Doppler Mode
	Vmean(Mean Velocity)	cm/s	
Calculation	Volume Flow	ml/min	
Formula	Volume Flow(ml/min) = 60*π* (Diam(cm) / 2)² *abs (Vmean(cm/s))		

6.7.8 Gynecology Department Measurement

6.7.8.1 Preparation for Gynecology Ultrasonography

- Make sure the appropriate probe is currently in use.
- Check whether the current system date is correct.
- Press the New Patient button and register the Patient information in the interface.
- Adjust the appropriate measurement mode.

6.7.8.2 Basic Gynecology Measurement Procedure

- Register patient information in patient options.
- Press the measurement button on the machine to enter the measurement mode. If the current measurement menu is not gynecological measurement, use the "Back to main menu" function to return to the main interface and select gynecological measurement options.
- Select measuring tool from the menu to start measuring.
- Click Report to view the inspection Report.

6.7.8.3 Gynecology B Mode Measurement

6.7.8.3.1 Left Ovary

Measurement	Left Ovary L(Left Ovary Length)	cm	Measure in B Mode
	Left Ovary W(Left Ovary Width)	cm	
	Left Ovary H(Left Ovary Height)	cm	

Calculation	Left Ovary Vol.(Left Ovary Volume) cm ³	
Formula	Left Ovary Vol.(cm ³)=($\pi/6$) * (L(cm) * W(cm) * H(cm))	

6.7.8.3.2 Right Ovary

Measurement	Right Ovary L(Right Ovary Length) cm	Measure in B Mode
	Right Ovary W(Right Ovary Width) cm	
	Right Ovary H(Right Ovary Height) cm	
Calculation	Right Ovary Vol.(Right Ovary Volume) cm ³	
Formula	Right Ovary Vol.(cm ³)=($\pi/6$) * (L(cm)*W(cm)*H(cm))	

6.7.8.3.3 Follicle

- Follicle 1
- Follicle 2
- Follicle 3
-
- Follicle N
- Follicle Count

Measurement	Follicle L(Follicle Length) cm	Measure in B Mode
	Follicle W(Follicle Width) cm	
	Follicle H(Follicle Height) cm	
Calculation	Follicle Vol.(Follicle Volume) cm ³	
Formula	Follicle Vol.(cm ³) = ($\pi/6$) * (L(cm) * W(cm) * H(cm))	

6.7.8.3.4 Uterine Cervix

Measurement	UT Cervix L(Uterine Cervix Length) cm	Measure in B Mode
	UT Cervix W(Uterine Cervix Width) cm	
	UT Cervix H(Uterine Cervix Height) cm	
Calculation	UT Cervix Vol.(Uterine Cervix Volume) cm ³	
Formula	UT Cervix Vol.(cm ³) = ($\pi/6$) * (L(cm) * W(cm) * H(cm))	

6.7.8.3.5 Uterine

Measurement	UT L(Uterine Length) cm	Measure in B Mode
	UT W(Uterine Width) cm	
	UT H(Uterine Height) cm	
Calculation	UT Vol.(Uterine Volume) cm ³	
Formula	UT Vol.(cm ³) = ($\pi/6$) * (L(cm) * W(cm) * H(cm))	

6.7.8.3.6 UT Line (Uterine Line)

Measurement	UT Line(Uterine Line) cm	Measure in B Mode
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6.7.8.3.7 Endo (Endometrial Thickness)

Measurement	Endo (Endometrial Thickness) cm	Measure in B Mode
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6.7.8.4 GYN(Gynecology) Doppler Mode Measurement

Measurement	Acceleration cm/s ²	Measure in
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	HR(Heart Rate)	bpm	Doppler Mode
	Time Interval	s	
Calculation	PS/ED(Peak Systolic velocity/End Diastolic velocity)		
Measurement	TMean(Time Averaged Mean Velocity)	cm/s	
	TMax(Time Averaged Maximum Velocity)	cm/s	
	TMin(Time Averaged Minimum Velocity)	cm/s	
Calculation	PGmax(Maximum Pressure Gradient)	mmHg	
	PGmean(Mean Pressure Gradient)	mmHg	
	VTI(Velocity-Time Integral)	cm	
Calculation	RI(Resistive Index)		
Formula	RI = (PS (cm/s) - ED (cm/s)) / PS (cm/s)		
Calculation	PI(Pulsatility Index)		
Formula	PI = (TMax(cm/s) - TMin(cm/s)) / TMean(cm/s)		

6.7.8.4.1 Volume Flow

Measurement	Diam(Diameter)	cm	Measure in Doppler Mode
	Vmean(Mean Velocity)	cm/s	
Calculation	Volume Flow	ml/min	
Formula	Volume Flow(ml/min) = 60 * π * (Diam(cm) / 2) ² * abs (Vmean(cm/s))		

6.7.8.4.2 LT Ut Art (Left Uterine Artery)

Measurement	Diam(Diameter)	cm	Measure in Doppler Mode
Calculation	PS/ED(Peak Systolic velocity/End Diastolic velocity)		
Measurement	TMean(Time Averaged Mean Velocity)	cm/s	
	TMax(Time Averaged Maximum Velocity)	cm/s	
	TMin(Time Averaged Minimum Velocity)	cm/s	
Calculation	PGmax(Maximum Pressure Gradient)	mmHg	
	PGmean(Mean Pressure Gradient)	mmHg	
	VTI(Velocity-Time Integral)	cm	
Calculation	RI(Resistive Index)		
Formula	RI = (PS (cm/s) - ED (cm/s)) / PS (cm/s)		
Calculation	PI(Pulsatility Index)		
Formula	PI = (TMax(cm/s) - TMin(cm/s)) / TMean(cm/s)		
Calculation	HR(Heart Rate)	bpm	

6.7.8.4.3 RT Ut Art (Right Uterine Artery)

Measurement	Diam(Diameter)	cm	Measure in Doppler Mode
Calculation	PS/ED(Peak Systolic velocity/End Diastolic velocity)		
Measurement	TMean(Time Averaged Mean Velocity)	cm/s	
	TMax(Time Averaged Maximum Velocity)	cm/s	
	TMin(Time Averaged Minimum Velocity)	cm/s	
Calculation	PGmax(Maximum Pressure Gradient)	mmHg	
	PGmean(Mean Pressure Gradient)	mmHg	
	VTI(Velocity-Time Integral)	cm	

Calculation	RI(Resistive Index)	
Formula	$RI = (PS \text{ (cm/s)} - ED \text{ (cm/s)}) / PS \text{ (cm/s)} $	
Calculation	PI(Pulsatility Index)	
Formula	$PI = (TMax \text{ (cm/s)} - TMin \text{ (cm/s)}) / TMean \text{ (cm/s)} $	
Calculation	HR(Heart Rate) bpm	

6.7.9 Cardiology Department Measurement

6.7.9.1 Preparation for Cardiology Ultrasonography

- Make sure the appropriate probe is currently in use.
- Check whether the current system date is correct.
- Press the New Patient button and register the Patient information in the interface.
- Adjust the appropriate measurement mode.

6.7.9.2 Basic Cardiology Measurement Procedure

- Register patient information in Patient options.
- Press the measurement button on the machine to enter the measurement mode. If the current measurement menu is not cardiology measurement, use the "Return to main menu" function to return to the main interface of measurement and then select cardiology measurement options.
- Select Measurement tool from the menu to start the measurement.
- Press Report to view the inspection report.

6.7.9.3 Cardiology M Mode Measurement

Measurement	IVSd(Interventricular Septal Thickness, diastole) cm	Measure in M Mode
	LVIDd(Left Ventricle Internal Diameter, diastole) cm	
	LVPWd(Left Ventricle Posterior Wall Thickness, diastole) cm	
	IVSs(Interventricular Septal Thickness, systole) cm	
	LVIDs(Left Ventricle Internal Diameter, systole) cm	
	LVPWs(Left Ventricle Posterior Wall Thickness, systole) cm	
Calculation	HR(Heart Rate) bpm	
Calculation	EDV(End Diastolic Volume) ml	
Formula	Refer to Section "6.7.9.3.1EDV ESV "	
Calculation	ESV(End Systolic Volume) ml	
Formula	Refer to Section "6.7.9.3.1EDV ESV "	
Input Data	Input: Height cm	
	Weight kg	
Calculation	BSA (Body Surface Area) m ²	
Formula	$BSA(m^2) = 0.007184 * H(cm)^{0.725} * W(kg)^{0.425}$	
Calculation	SV(Stroke Volume) ml	
Formula	$SV(ml) = EDV(ml) - ESV(ml)$	
Calculation	FS(Fractional Shortening) %	
Formula	$FS(\%) = (LVIDd(cm) - LVIDs(cm)) / LVIDd(cm) * 100\%$	
Calculation	SVI(Stroke Volume Index) ml/m ²	
Formula	$SVI(ml/m^2) = SV(ml) / BSA(m^2)$	

Calculation	EF(Ejection Fraction) %	
Formula	$EF(\%) = SV(ml) / EDV(ml) * 100\%$	
Calculation	CO(Cardiac Output) ml/min	
Formula	$CO(ml/min) = SV(ml) * HR(bpm)$	
Calculation	CI(Cardiac Output Index) ml/min/m ²	
Formula	$CI(ml/min/m^2) = CO(ml/min) / BSA(m^2)$	

6.7.9.3.1 EDV ESV

■ SP Ellipse:

LVLd(Left Ventricular Long-axis Length at End diastole in apical view)

LVLs(Left Ventricular Long-axis Length at End systole in apical view)

LVAMd(Left Ventricular Long-axis Area at End diastole in apical view)

LVAMs(Left Ventricular Long-axis Area at End systole in apical view)

$$EDV(ml) = 8/3\pi * LVAMd(cm^2)^2 / LVLd(cm); \quad ESV(ml) = 8/3\pi * LVAMs(cm^2)^2 / LVLs(cm)$$

■ BiPlane Ellipse:

LVLd (Left Ventricular Long-axis Length at End diastole in apical view)

LVAd sax MV1(Left Ventricular Area at Mitral Valve level at End-diastole in Short-axis view)

LVAd sax MV2(Left Ventricular Area at Mitral Valve level at End-diastole in Short-axis view)

$$EDV(ml) = 8/3\pi * LVAd \text{ sax MV1}(cm^2) * LVAd \text{ sax MV2}(cm^2) / LVLd(cm)$$

LVLs(Left Ventricular Long-axis Length at End systole in apical view)

LVAs sax MV1 (Left Ventricular Area at Mitral Valve level at End-systole in Short-axis view)

LVAs sax MV2 (Left Ventricular Area at Mitral Valve level at End-systole in Short-axis view)

$$ESV(ml) = 8/3\pi * LVAs \text{ sax MV1}(cm^2) * LVAs \text{ sax MV2}(cm^2) / LVLs(cm)$$

■ Bullet:

LVLd(Left Ventricular Long-axis Length at End diastole in apical view)

LVLs(Left Ventricular Long-axis Length at End systole in apical view)

LVAMd(Left Ventricular Long-axis Area at End diastole in apical view)

LVAMs(Left Ventricular Long-axis Area at End systole in apical view)

$$EDV(ml) = 5/6 * LVLd(cm) * LVAMd(cm^2); \quad ESV(ml) = 5/6 * LVLs(cm) * LVAMs(cm^2)$$

■ Simpson:

LVLd(Left Ventricular Long-axis Length at End diastole in apical view)

LVLs(Left Ventricular Long-axis Length at End systole in apical view)

LVAPd(Left Ventricular Area at Papillary Muscle level at end-diastole in short axis view)

LVAMd(Left Ventricular Long-axis Area at End diastole in apical view)

LVAMs(Left Ventricular Long-axis Area at End systole in apical view)

LVAPs(Left Ventricular Area at Papillary Muscle level at end-systole in short axis view)

$$EDV(ml) = LVLd(cm) / 9 * [4 * LVAMd(cm^2) + 2 * LVAPd(cm^2) + \sqrt{LVAMd(cm^2) * LVAPd(cm^2)}]$$

$$ESV(ml) = LVLs(cm) / 9 * [4 * LVAMs(cm^2) + 2 * LVAPs(cm^2) + \sqrt{LVAMs(cm^2) * LVAPs(cm^2)}]$$

■ Cube:

$$EDV(ml) = LVIDd(cm)^3; \quad ESV(ml) = LVIDs(cm)^3$$

■ Teichholz:

$$EDV(ml) = (7 * LVIDd(cm)^3) / (2.4 + LVIDd); \quad ESV(ml) = (7 * LVIDs(cm)^3) / (2.4 + LVIDs)$$

■ Gibson:

$$EDV(ml) = \pi/6 * (0.98 * LVIDd(cm) + 0.59) * LVIDd(cm)^2;$$

$$ESV(ml) = \pi/6 * (1.14 * LVIDs(cm) + 4.18) * LVIDs(cm)^2$$

6.7.9.4 Cardiology Mode Measurement

Measurement	LA Diam(Left Atrium Diameter)	cm	Measure in B Mode
	Ao Diam(Aorta Diameter)	cm	
	Acs(Aortic Valve Cusp Separation)	cm	
	RVOT Diam(Right Ventricular Outflow Tract Diameter)	cm	
	RVDd(Right Ventricular Diameter at end-diastole)	cm	
	EPSS(Distance between point E and Interventricular Septum when mitral valve is fully open)	cm	
	LVOT Diam(Left Ventricular Outflow Tract Diameter)	cm	
	MCS(Mitral Valve Cusp Separation)	cm	
	MV Diam(Mitral Valve Diameter)	cm	
	MPA Diam(Main pulmonary Artery Diameter)	cm	

6.7.9.4.1 LA/AO (Left Atrium /Aortic Root)

Measurement	LA Diam(Left Atrium Diameter)	cm	Measure in B Mode
	AOd(Aorta Diameter)	cm	
Calculation	LA/AO	%	
Formula	LA/AO(%) = LA Diam(cm) / AOd(cm) * 100%		

6.7.9.4.2 Left Ventricle

Measurement	LVOT Diam(Diameter)	cm	Measure in Doppler Mode
Calculation	LVOT PS/ED(Peak Systolic velocity/End Diastolic velocity)		
Measurement	LVOT TMean(Time Averaged Mean Velocity)	cm/s	
	LVOT TMax(Time Averaged Maximum Velocity)	cm/s	
	LVOT TMin(Time Averaged Minimum Velocity)	cm/s	
Calculation	LVOT PGmax(Maximum Pressure Gradient)	mmHg	
	LVOT PGmean(Mean Pressure Gradient)	mmHg	
	LVOT VTI(Velocity-Time Integral)	cm	
Calculation	LVOT RI(Resistive Index)		
Formula	LVOT RI = (PS (cm/s) - ED (cm/s)) / PS (cm/s)		
Calculation	LVOT PI(Pulsatility Index)		
Formula	LVOT PI = (TMax(cm/s) - TMin(cm/s)) / TMean(cm/s)		
Calculation	LVOT HR(Heart Rate)	bpm	
Calculation	LVOT SV(Stroke Volume)	ml	
Formula	LVOT SV(ml) = EDV(ml) - ESV(ml)		

Input Data	Input: Height Weight	cm kg	
Calculation	BSA (Body Surface Area)	m ²	
Formula	$BSA(m^2) = 0.007184 * H(cm)^{0.725} * W(kg)^{0.425}$		
Calculation	LVOT SVI(Stroke Volume Index)	ml/m ²	
Formula	$LVOT\ SVI(ml/m^2) = SV(ml) / BSA(m^2)$		
Calculation	LVOT CO(Cardiac Output)	ml/min	
Formula	$LVOT\ CO(ml/min) = SV(ml) * HR(bpm)$		
Calculation	LVOT CI(Cardiac Output Index)	ml/min/m ²	
Formula	$LVOT\ CI(ml/min/m^2) = CO(ml/min) / BSA(m^2)$		
Measurement	PHT(Pressure Half Time)	ms	
	MCOT(Mitral Valve Closure to Opening Time)	s	
	LV ET(Ejection Time)	s	
Calculation	LV MPI(LV Myocardial Performance Index)(Tei)		
Formula	$LV\ MPI = abs\ (MCOT(s) - LV\ ET(s)) / LV\ ET(s)$		

6.7.9.4.3 Right Ventricle

Calculation	RV VTI(Velocity-Time Integral)	cm	Measure in Doppler Mode
Calculation	RV (dP:dt)	mmHg/s	
Formula	RV(dP:dt)(mmHg/s) = abs (PG1(mmHg) - PG2(mmHg)) / abs (t1(s) - t2(s))		

■ Right Ventricle MPI(Myocardial Performance Index)

Measurement	TCOT(Tricuspid Valve Closure to Opening Time s	Measure in Doppler Mode
	RV ET(Ejection Time) s	
Calculation	RV MPI	
Formula	RV MPI = abs (TCOT(s) - RV ET(s)) / RV ET(s)	

■ RV(Right Ventricle)

Measurement	RVDd(Right Ventricular Diameter at end-diastole)	cm	Measure in Doppler Mode
	RVDs(Right Ventricular Diameter at end-systole)	cm	
	RVET(Right Ventricular Ejection Time)	s	
	RV AccT(Acceleration Time)	s	
	RV PEP(Pre-Ejection Period)	s	
	RV STI(Systolic Time Interval)	s	
Calculation	RV AccT/ET		
Formula	RV AccT/ET = RV AccT(s) / RVET(s)		

6.7.9.4.4 LV Mass(Left Ventricle Mass)

Measurement	IVSd(Interventricular Septal Thickness at End-diastole)		Measure in Doppler Mode
	cm		
	LVIDd(Left Ventricle Internal Diameter at End-diastole)	cm	
	LVPWd(Left Ventricle Posterior Wall Thickness at End-diastole)	cm	

Calculation	LV Mass	g
Formula	LV Mass(g)=LV Mass(g)=1.04*(IVSd(cm)+LVIDd(cm)+LVPWd(cm)) ³ -LVIDd(cm) ³ -13.6	
Input Data	Input: Height	cm
	Weight	kg
Calculation	BSA (Body Surface Area)	m ²
Formula	BSA(m ²) = 0.007184 * H(cm) ^{0.725} * W(kg) ^{0.425}	
Calculation	LVMI(Left Ventricular Mass Index)	g/m ²
Formula	LVMI(g/m ²) = LV Mass(g) / BSA(m ²)	

6.7.9.4.5 Simpson SP

Calculation	EDV(End-diastolic Volume)(A4C)	ml	Measure in Doppler Mode
Formula	Refer to Section 6.7.8.3.1		
Calculation	ESV(End-systolic Volume)(A4C)	ml	
Formula	Refer to Section 6.7.8.3.1		
Calculation	SV(Stroke Volume)(SP)	ml	
Formula	SV(ml) = EDV(ml) - ESV(ml)		
Input Data	Input: Height	cm	
	Weight	kg	
Calculation	BSA (Body Surface Area)	m ²	
Formula	BSA(m ²) = 0.007184 * H(cm) ^{0.725} * W(kg) ^{0.425}		
Calculation	SVI(Stroke Volume Index)(SP)	ml/m ²	
Formula	SVI(ml/m ²) = SV(ml) / BSA(m ²)		
Calculation	EF(Ejection Fraction)(SP)	%	
Formula	EF(%) = [(EDV(ml) - ESV(ml)) / EDV(ml)]*100%		
Calculation	HR(Heart Rate)	bpm	
Calculation	CO(Cardiac Output)(SP)	ml/min	
Formula	CO(ml/min) = SV(ml) * HR(bpm)		
Calculation	CI(Cardiac Output Index)(SP)	ml/min/m ²	
Formula	CI(ml/min/m ²) = CO(ml/min) / BSA(m ²)		

6.7.9.4.6 Simpson DP

Calculation	EDV(End-diastolic Volume)	ml	Measure in Doppler Mode
Formula	Refer to Section 6.7.8.3.1		
Calculation	ESV(End-systolic Volume)	ml	
Formula	Refer to Section 6.7.8.3.1		
Calculation	SV(Stroke Volume)(DP)	ml	
Formula	SV(ml) = EDV(ml) - ESV(ml)		
Input Data	Input: Height	cm	
	Weight	kg	
Calculation	BSA (Body Surface Area)	m ²	
Formula	BSA(m ²) = 0.007184 * H(cm) ^{0.725} * W(kg) ^{0.425}		
Calculation	SVI(Stroke Volume Index)(DP)	ml/m ²	

Formula	$SVI(ml/m^2) = SV(ml) / BSA(m^2)$	
Calculation	EF(Ejection Fraction)(DP) %	
Formula	$EF(\%) = [(EDV(ml) - ESV(ml)) / EDV(ml)] * 100\%$	
Calculation	HR(Heart Rate) bpm	
Calculation	CO(Cardiac Output)(DP) ml/min	
Formula	$CO(ml/min) = SV(ml) * HR(bpm)$	
Calculation	CI(Cardiac Output Index)(DP) ml/min/m ²	
Formula	$CI(ml/min/m^2) = CO(ml/min) / BSA(m^2)$	

6.7.9.4.7 PISA (Proximal Isovelocity Surface Area)

■ PISA MR(Mitral Valve Regurgitation)

Calculation	MR PS/ED(Peak Systolic velocity/End Diastolic velocity)	
Measurement	MR TMean(Time Averaged Mean Velocity) cm/s	
	MR TMax(Time Averaged Maximum Velocity) cm/s	
	MR TMin(Time Averaged Minimum Velocity) cm/s	
Calculation	MR PGmax(Maximum Pressure Gradient) mmHg	
	MR PGmean(Mean Pressure Gradient) mmHg	
	MR VTI(Velocity-Time Integral) cm	
Calculation	MR RI(Resistive Index)	Measure in Doppler Mode
Formula	$RI = (PS (cm/s) - ED (cm/s)) / PS (cm/s) $	
Calculation	MR PI(Pulsatility Index)	
Formula	$PI = (TMax(cm/s) - TMin(cm/s)) / TMean(cm/s) $	
Calculation	MR HR(Heart Rate) bpm	
Calculation	MR dP:dt mmHg/s	
Formula	$dP:dt(mmHg/s) = abs (PG1(mmHg) - PG2(mmHg)) / abs (t1(s) - t2(s))$	

■ PISA AR(Aortic Valve Regurgitation)

Measurement	AR(Aortic Valve Regurgitation) cm/s	
	AR Vmax(Maximum Velocity) cm/s	
	AR Ved(Velocity at End-diastole) cm/s	
Calculation	AR DcR(Deceleration Rate) cm/s ²	Measure in Doppler Mode
Measurement	AR DcT(Deceleration Time) s	

■ PISA TR(Tricuspid Valve Regurgitation)

Calculation	TR PS/ED(Peak Systolic velocity/End Diastolic velocity)	
Measurement	TR TMean(Time Averaged Mean Velocity) cm/s	
	TR TMax(Time Averaged Maximum Velocity) cm/s	
	TR TMin(Time Averaged Minimum Velocity) cm/s	
Calculation	TR PGmax(Maximum Pressure Gradient) mmHg	
	TR PGmean(Mean Pressure Gradient) mmHg	
	TR VTI(Velocity-Time Integral) cm	
Calculation	TR RI(Resistive Index)	Measure in Doppler Mode
Formula	$RI = (PS (cm/s) - ED (cm/s)) / PS (cm/s) $	
Calculation	TR PI(Pulsatility Index)	

Formula	$PI = (TMax(cm/s) - TMin(cm/s)) / TMean(cm/s) $	
Calculation	TR HR(Heart Rate) bpm	

■ PISA PR(Pulmonary Valve Regurgitation)

Calculation	PR PS/ED(Peak Systolic velocity/End Diastolic velocity)	
Measurement	PR TMean(Time Averaged Mean Velocity) cm/s	
	PR TMax(Time Averaged Maximum Velocity) cm/s	
	PR TMin(Time Averaged Minimum Velocity) cm/s	
Calculation	PR PGmax(Maximum Pressure Gradient) mmHg	
	PR PGmean(Mean Pressure Gradient) mmHg	
	PR VTI(Velocity-Time Integral) cm	
Calculation	PR RI(Resistive Index)	
Formula	$RI = (PS (cm/s) - ED (cm/s)) / PS (cm/s) $	
Calculation	PR PI(Pulsatility Index)	
Formula	$PI = (TMax(cm/s) - TMin(cm/s)) / TMean(cm/s) $	
Calculation	PR HR(Heart Rate) bpm	
Measurement	PR PHT(Pressure Half Time) ms	
	PR Ved(Velocity at End-diastole) cm/s	

Measure in
Doppler
Mode

■ MV(Mitral Valve)

Measurement	MV Diam(Diameter) cm	
	MV Area cm ²	
	MV EPSS(Distance between point E and Interventricular Septum when mitral valve is fully open) cm	
	MV D-E Slope(The rate of change that exists between two-point (D, E)) cm/s	
	MV E-F Slope(The rate of change that exists between two-point (E, F)) cm/s	
	MV CA(Distance between two-point (C, A)) cm	
	MV CE(Distance between two-point (C, E)) cm	
	MV CA/CE	
	MV DE(Amplitude of the MV DE wave) cm	
	MV ACV(Accelerated Velocity) cm/s	

Measure in
Doppler
Mode

■ MV D(Mitral Valve Doppler)

Measurement	MV Diam(Diameter) cm	
	MV E Vel(E-wave Velocity) cm/s	
	MV A Vel(A-wave Velocity) cm/s	
Calculation	MV E/A(E Vel / A Vel)	
Measurement	MV PHT(Pressure Half Time) ms	
	MV Area(PHT) cm ²	
	MV DecT(Deceleration Time) s	
Calculation	MV PS/ED(Peak Systolic velocity/End Diastolic velocity)	
Measurement	MV TMean(Time Averaged Mean Velocity) cm/s	
	MV TMax(Time Averaged Maximum Velocity) cm/s	

Measure in
Doppler
Mode

	MV TMin(Time Averaged Minimum Velocity) cm/s	
	MV PGmax(Maximum Pressure Gradient) mmHg	
	MV PGmean(Mean Pressure Gradient) mmHg	
Calculation	MV VTI(Velocity-Time Integral) cm	
Calculation	MV RI(Resistive Index)	
Formula	$RI = (PS \text{ (cm/s)} - ED \text{ (cm/s)}) / PS \text{ (cm/s)} $	
Calculation	MV PI(Pulsatility Index)	
Formula	$PI = (TMax \text{ (cm/s)} - TMin \text{ (cm/s)}) / TMean \text{ (cm/s)} $	
Calculation	MV HR(Heart Rate) bpm	
Calculation	MV SV(Stroke Volume) ml	
Formula	$SV \text{ (ml)} = EDV \text{ (ml)} - ESV \text{ (ml)}$	
Input Data	Input: Height cm Weight kg	
Calculation	BSA (Body Surface Area) m ²	
Formula	$BSA \text{ (m}^2\text{)} = 0.007184 * H \text{ (cm)}^{0.725} * W \text{ (kg)}^{0.425}$	
Calculation	MV SVI(Stroke Volume Index) ml/m ²	
Formula	$SVI \text{ (ml/m}^2\text{)} = SV \text{ (ml)} / BSA \text{ (m}^2\text{)}$	
Calculation	MV CO(Cardiac Output) ml/min	
Formula	$CO \text{ (ml/min)} = SV \text{ (ml)} * HR \text{ (bpm)}$	
Calculation	MV CI(Cardiac Output Index) ml/min/m ²	
Formula	$CI \text{ (ml/min/m}^2\text{)} = CO \text{ (ml/min)} / BSA \text{ (m}^2\text{)}$	
Measurement	MV IRT(Isovolumic Relaxation Time) s	
	MV E Dur(E-wave Duration) s	
	MV A Dur(A-wave Duration) s	

■ TV(Tricuspid Valve)

Calculation	TV PS/ED(Peak Systolic velocity/End Diastolic velocity)	Measure in Doppler Mode
Measurement	TV TMean(Time Averaged Mean Velocity) cm/s	
	TV TMax(Time Averaged Maximum Velocity) cm/s	
	TV TMin(Time Averaged Minimum Velocity) cm/s	
	TV PGmax(Maximum Pressure Gradient) mmHg	
	TV PGmean(Mean Pressure Gradient) mmHg	
Calculation	TV VTI(Velocity-Time Integral) cm	
Calculation	TV RI(Resistive Index)	
Formula	$RI = (PS \text{ (cm/s)} - ED \text{ (cm/s)}) / PS \text{ (cm/s)} $	
Calculation	TV PI(Pulsatility Index)	
Formula	$PI = (TMax \text{ (cm/s)} - TMin \text{ (cm/s)}) / TMean \text{ (cm/s)} $	
Calculation	TV HR(Heart Rate) bpm	

■ AV(Aortic Valve)

Measurement	AoV Area cm ²	Measure in Doppler Mode
Calculation	AoV PS/ED(Peak Systolic velocity/End Diastolic velocity)	
Measurement	AoV TMean(Time Averaged Mean Velocity) cm/s	

	AoV TMax(Time Averaged Maximum Velocity) cm/s	
	AoV TMin(Time Averaged Minimum Velocity) cm/s	
	AoV PGmax(Maximum Pressure Gradient) mmHg	
	AoV PGmean(Mean Pressure Gradient) mmHg	
Calculation	AoV VTI(Velocity-Time Integral) cm	
Calculation	AoV RI(Resistive Index)	
Formula	$RI = (PS \text{ (cm/s)} - ED \text{ (cm/s)}) / PS \text{ (cm/s)} $	
Calculation	AoV PI(Pulsatility Index)	
Formula	$PI = (TMax \text{ (cm/s)} - TMin \text{ (cm/s)}) / TMean \text{ (cm/s)} $	
Calculation	AoV HR(Heart Rate) bpm	

■ PV(Pulmonary Valve)

Measurement	PV Diam(Diameter) cm	Measure in Doppler Mode
Calculation	PV PS/ED(Peak Systolic velocity/End Diastolic velocity)	
Measurement	PV TMean(Time Averaged Mean Velocity) cm/s	
	PV TMax(Time Averaged Maximum Velocity) cm/s	
	PV TMin(Time Averaged Minimum Velocity) cm/s	
	PV PGmax(Maximum Pressure Gradient) mmHg	
	PV PGmean(Mean Pressure Gradient) mmHg	
Calculation	PV VTI(Velocity-Time Integral) cm	
Calculation	PV RI(Resistive Index)	
Formula	$RI = (PS \text{ (cm/s)} - ED \text{ (cm/s)}) / PS \text{ (cm/s)} $	
Calculation	PV PI(Pulsatility Index)	
Formula	$PI = (TMax \text{ (cm/s)} - TMin \text{ (cm/s)}) / TMean \text{ (cm/s)} $	
Calculation	PV HR(Heart Rate) bpm	
Calculation	PV SV(Stroke Volume) ml	
Formula	$SV(ml) = EDV(ml) - ESV(ml)$	
Input Data	Input: Height cm	
	Weight kg	
Calculation	BSA (Body Surface Area) m ²	
Formula	$BSA(m^2) = 0.007184 * H(cm)^{0.725} * W(kg)^{0.425}$	
Calculation	PV SVI(Stroke Volume Index) ml/m ²	
Formula	$SVI(ml/m^2) = SV(ml) / BSA(m^2)$	
Calculation	PV CO(Cardiac Output) ml/min	
Formula	$CO(ml/min) = SV(ml) * HR(bpm)$	
Calculation	PV CI(Cardiac Output Index) ml/min/m ²	
Formula	$CI(ml/min/m^2) = CO(ml/min) / BSA(m^2)$	

■ PVein(Pulmonary Vein)

Measurement	PEin S1 Vel(S1-wave Flow Velocity) cm/s	Measure in Doppler Mode
	PEin S2 Vel(S2-wave Flow Velocity) cm/s	
	PEin A Vel(A-wave Flow Velocity) cm/s	
	PEin D Vel(D-wave Flow Velocity) cm/s	
	PEin A Dur(A-wave Duration) s	

	PVein S VTI(S-wave Velocity-time Integral) cm	
	PVein D VTI(D-wave Velocity-time Integral) cm	
	PVein DcT(Deceleration Time) s	
Calculation	PVein S2/D(S2-wave Flow Velocity/D-wave Flow Velocity)	
Calculation	PVein SF(Systolic Fraction)	
Formula	$\text{PVein SF} = \text{PVein S VTI(cm)} / (\text{PVein S VTI(cm)} + \text{PVein D VTI(cm)})$	

■ Qp:Qs(RVOT SV / LVOT SV)

Measurement	RVOT Diam(Right Ventricular Outflow Tract Diameter) cm	Measure in Doppler Mode
Calculation	RVOT VTI(Velocity-Time Integral) cm	
Calculation	Qp(Pulmonary Circulation Flow) ml	
Formula	$\text{Qp(ml)} = \text{RVOT SV(ml)} = \pi * (\text{RVOT Diam(cm)} / 2)^2 * \text{RVOT VTI(cm)}$	
Measurement	LVOT Diam(Left Ventricular Outflow Tract Diameter) cm	
Measurement	LVOT VTI(Velocity-Time Integral) cm	
Calculation	Qs(Systemic Circulation Flow) ml	
Formula	$\text{Qs(ml)} = \text{LVOT SV(ml)} = \pi * (\text{LVOT Diam(cm)} / 2)^2 * \text{LVOT VTI(cm)}$	
Calculation	Ratio Qp/Qs	

6.7.9.5 Cardiology TDI Mode

Measurement	MV Sa(Mitral Valve Systolic motion) cm/s	Measure in Doppler Mode
	MV Ea(Mitral Valve Early diastolic motion) cm/s	
	MV Aa(Mitral Valve Late diastolic motion) cm/s	
	MV IVRT(Mitral Valve Isovelocity Relaxation Time) s	
	MV IVCT(Mitral Valve Isovelocity Compression Time) s	

6.7.10 Vascular Department Measurement

6.7.10.1 Preparation for Vascular Ultrasonography

- Make sure the appropriate probe is currently in use.
- Check whether the current system date is correct.
- Press the New Patient button and register the Patient information in the interface.
- Adjust the appropriate measurement mode.

6.7.10.2 Basic Vascular Measurement Procedure

- Register patient information in patient options.
- Press the measurement button on the machine to enter the measurement mode. If the current measurement menu is not vascular measurement, use the "Return to main menu" function to return to the main interface of measurement and then select Vascular measurement options.
- Select measuring tool from the menu to start measuring.
- Click Report to view the inspection Report.

6.7.10.3 Vascular Mode Measurement

- All parameters in section 6.7.10.3.1 -6.7.10.3.6 include the following measurement options.

Measurement	Diam(Diameter) cm	Measure in
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Calculation	PS/ED(Peak Systolic velocity/End Diastolic velocity)	Doppler Mode
Measurement	TMean(Time Averaged Mean Velocity) cm/s	
	TMax(Time Averaged Maximum Velocity) cm/s	
	TMin(Time Averaged Minimum Velocity) cm/s	
Calculation	PGmax(Maximum Pressure Gradient) mmHg	
	PGmean(Mean Pressure Gradient) mmHg	
	VTI(Velocity-Time Integral) cm	
Calculation	RI(Resistive Index)	
Formula	$RI = (PS \text{ (cm/s)} - ED \text{ (cm/s)}) / PS \text{ (cm/s)} $	
Calculation	PI(Pulsatility Index)	
Formula	$PI = (TMax \text{ (cm/s)} - TMin \text{ (cm/s)}) / TMean \text{ (cm/s)} $	
Calculation	HR(Heart Rate) bpm	

6.7.10.3.1 CCA(Common Carotid Artery)

6.7.10.3.2 Arteria Carotis

6.7.10.3.3 UE A(Upper Extremity Artery)

6.7.10.3.4 UE V(Upper Extremity Vein)

6.7.10.3.5 LE A(Lower Extremity Artery)

6.7.10.3.6 LE V(Lower Extremity Vein)

6.7.10.3.7 IMT(Intima-Media Thickness)

Measurement	CCA IMT(Common Carotid Artery IMT) cm	Measure in Doppler Mode
	Bulb IMT(Bulbillate IMT) cm	
	ICA IMT(Internal Carotid Artery IMT) cm	
	ECA IMT(External Carotid Artery IMT) cm	

6.7.10.3.8 Volume Flow

Measurement	Diam(Diameter) cm	Measure in Doppler Mode
	Vmean(Mean Velocity) cm/s	
Calculation	Volume Flow ml/min	
Formula	$Volume \text{ Flow (ml/min)} = 60 * \pi * (Diam \text{ (cm)} / 2)^2 * abs(Vmean \text{ (cm/s)})$	

6.7.10.3.9 Vessel

Measurement	Vessel Diam(Diameter) cm	Measure in Doppler Mode
	Vessel Area cm ²	
Calculation	Vessel PS/ED(Peak Systolic velocity/End Diastolic velocity)	
Measurement	Vessel TMean(Time Averaged Mean Velocity) cm/s	
	Vessel TMax(Time Averaged Maximum Velocity) cm/s	
	Vessel TMin(Time Averaged Minimum Velocity) cm/s	
Calculation	Vessel PGmax(Maximum Pressure Gradient) mmHg	
	Vessel PGmean(Mean Pressure Gradient) mmHg	
	Vessel VTI(Velocity-Time Integral) cm	
Calculation	Vessel RI(Resistive Index)	
Formula	$RI = (PS \text{ (cm/s)} - ED \text{ (cm/s)}) / PS \text{ (cm/s)} $	
Calculation	Vessel PI(Pulsatility Index)	
Formula	$PI = (TMax \text{ (cm/s)} - TMin \text{ (cm/s)}) / TMean \text{ (cm/s)} $	
Calculation	Vessel HR(Heart Rate) bpm	

Measurement	Vessel AccT(Acceleration Time)	s	
	Vessel DecT(Deceleration Time)	s	
	Vessel CycleT(Cycle Time)	s	

6.7.11 Small Part Department Measurement

6.7.11.1 Preparation for Small Part Ultrasonography

- Make sure the appropriate probe is currently in use.
- Check whether the current system date is correct.
- Press the New Patient button and register the Patient information in the interface.
- Adjust the appropriate measurement mode.

6.7.11.2 Basic Small Part Measurement Procedure

- Register patient information in patient options.
- Press the measurement button on the machine to enter the measurement mode.If the current measurement menu is not small organ measurement,use the "Return to main menu" function to return to the main interface of measurement and then select the small organ measurement option.
- Select measuring tool from the menu to start measuring.
- Click Report to view the inspection Report.

6.7.11.3 Small Part Measurement

6.7.11.3.1 Small Part B

- Thyroid

Left Thyroid Lobe			
Measurement	L Thyroid L(Left Thyroid Length)	cm	Measure in B Mode
	L Thyroid W(Left Thyroid Width)	cm	
	L Thyroid H(Left Thyroid Height)	cm	
Calculation	L Thyroid Vol.(Left Thyroid Volume)	cm ³	
Formula	L Thyroid Vol.(cm ³) = 0.479 * (L(cm) * W(cm) * H(cm))		
Right Thyroid Lobe			
Measurement	R Thyroid L(Right Thyroid Length)	cm	Measure in B Mode
	R Thyroid W(Right Thyroid Width)	cm	
	R Thyroid H(Right Thyroid Height)	cm	
Calculation	R Thyroid Vol.(Right Thyroid Volume)	cm	
Formula	R Thyroid Vol.(cm ³)=0.479*(L(cm)*W(cm)*H(cm))		
Calculation	Thyroid V(Thyroid Volume)	cm ³	
Formula	Thyroid V(cm ³) = L Thyroid Vol.(cm ³) + R Thyroid Vol.(cm ³)		
Measurement	Isthmus H(Isthmus Height)	cm	

- Galactophore

Galactophore		
Measurement	Galactophore L(Galactophore Length)	cm
		Measure in B

	Galactophore W(Galactophore Width)	cm	Mode
	Galactophore H(Galactophore Height)	cm	
Calculation	Galactophore Vol.(Galactophore Volume)	cm ³	
Formula	Galactophore Vol.(cm ³) = (π/6) * (L(cm) * W(cm) * H(cm))		
Mass 1			
Measurement	1 Mass L(1 Mass Length)	cm	Measure in B Mode
	1 Mass W(1 Mass Width)	cm	
	1 Mass H(1 Mass Height)	cm	
Calculation	1 Mass Vol.(1 Mass Volume)	cm ³	
Formula	1 Mass Vol.(cm ³) = (π/6) * (L(cm) * W(cm) * H(cm))		
Mass 2			
Measurement	2 Mass L(2 Mass Length)	cm	Measure in B Mode
	2 Mass W(2 Mass Width)	cm	
	2 Mass H(2 Mass Height)	cm	
Calculation	2 Mass Vol.(2 Mass Volume)	cm ³	
Formula	2 Mass Vol.(cm ³) = (π/6) * (L(cm) * W(cm) * H(cm))		
Mass 3			
Measurement	3 Mass L(3 Mass Length)	cm	Measure in B Mode
	3 Mass W(3 Mass Width)	cm	
	3 Mass H(3 Mass Height)	cm	
Calculation	3 Mass Vol.(3 Mass Volume)	cm ³	
Formula	3 Mass Vol.(cm ³) = (π/6) * (L(cm) * W(cm) * H(cm))		

■ Testis

Measurement	Testis L(Testis Length) cm	Measure in B Mode
	Testis W(Testis Width) cm	
	Testis H(Testis Height) cm	
Calculation	Testis Vol.(Testis Volume) cm ³	
Formula	Testis Vol.(cm ³) = (π/6) * (L(cm) * W(cm) * H(cm))	

■ Testis D (Testis Doppler)

Measurement	Diam(Diameter) cm	Measure in PW Mode
Calculation	PS/ED(Peak Systolic velocity/End Diastolic velocity)	
Measurement	TMean(Time Averaged Mean Velocity) cm/s	
	TMax(Time Averaged Maximum Velocity) cm/s	
	TMin(Time Averaged Minimum Velocity) cm/s	
Calculation	PGmax(Maximum Pressure Gradient) mmHg	
	PGmean(Mean Pressure Gradient) mmHg	
	VTI(Velocity-Time Integral) cm	
Calculation	RI(Resistive Index)	

Formula	$RI = (PS \text{ (cm/s)} - ED \text{ (cm/s)}) / PS \text{ (cm/s)} $	
Calculation	PI(Pulsatility Index)	
Formula	$PI = (TMax \text{ (cm/s)} - TMin \text{ (cm/s)}) / TMean \text{ (cm/s)} $	
Calculation	HR(Heart Rate) bpm	

6.7.11.3.2 Small Part D

■ Thyroid STA (Superior Thyroid Artery)

Measurement	Diam(Diameter) cm	Measure in Doppler Mode
Calculation	PS/ED(Peak Systolic velocity/End Diastolic velocity)	
Measurement	TMean(Time Averaged Mean Velocity) cm/s	
	TMax(Time Averaged Maximum Velocity) cm/s	
	TMin(Time Averaged Minimum Velocity) cm/s	
Calculation	PGmax(Maximum Pressure Gradient) mmHg	
	PGmean(Mean Pressure Gradient) mmHg	
	VTI(Velocity-Time Integral) cm	
Calculation	RI(Resistive Index)	
Formula	$RI = (PS \text{ (cm/s)} - ED \text{ (cm/s)}) / PS \text{ (cm/s)} $	
Calculation	PI(Pulsatility Index)	
Formula	$PI = (TMax \text{ (cm/s)} - TMin \text{ (cm/s)}) / TMean \text{ (cm/s)} $	
Calculation	HR(Heart Rate) bpm	

■ Thyroid ITA (Inferior Thyroid Artery)

Measurement	Diam(Diameter) cm	Measure in Doppler Mode
Calculation	PS/ED(Peak Systolic velocity/End Diastolic velocity)	
Measurement	TMean(Time Averaged Mean Velocity) cm/s	
	TMax(Time Averaged Maximum Velocity) cm/s	
	TMin(Time Averaged Minimum Velocity) cm/s	
Calculation	PGmax(Maximum Pressure Gradient) mmHg	
	PGmean(Mean Pressure Gradient) mmHg	
	VTI(Velocity-Time Integral) cm	
Calculation	RI(Resistive Index)	
Formula	$RI = (PS \text{ (cm/s)} - ED \text{ (cm/s)}) / PS \text{ (cm/s)} $	
Calculation	PI(Pulsatility Index)	
Formula	$PI = (TMax \text{ (cm/s)} - TMin \text{ (cm/s)}) / TMean \text{ (cm/s)} $	
Calculation	HR(Heart Rate) bpm	

6.7.12 Urology Department measurement

6.7.12.1 Preparation for Urology Ultrasonography

- Make sure the appropriate probe is currently in use.
- Check whether the current system date is correct.
- Press the New Patient button and register the Patient information in the interface.
- Adjust the appropriate measurement mode.

6.7.12.2 Basic Urology Measurement Procedure

- Register patient information in patient options.

- Press the measurement button on the machine to enter the measurement mode. If the current measurement menu is not Urology measurement, use the "Back to Main menu" function to return to the main interface and select Urology measurement options
- Select measuring tool from the menu to start measuring.
- Click Report to view the inspection Report.

6.7.12.3 Urology Measurement

6.7.12.3.1 Left Kidney

Measurement	LK L(Left Kidney Length)	cm	Measure in B Mode
	LK W(Left Kidney Width)	cm	
	LK T(Left Kidney Thickness)	cm	
Calculation	LK Vol.(Left Kidney Volume)	cm ³	
Formula	LK Vol.(cm ³) = (π/6) * (L(cm) * W(cm) * T(cm))		

6.7.12.3.2 Right Kidney

Measurement	RK L(Right Kidney Length)	cm	Measure in B Mode
	RK W(Right Kidney Width)	cm	
	RK T(Right Kidney Thickness)	cm	
Calculation	RK Vol.(Right Kidney Volume)	cm ³	
Formula	RK Vol.(cm ³) = (π/6) * (L(cm) * W(cm) * T(cm))		

6.7.12.3.3 Bladder

Measurement	Bladder L(Bladder Length)	cm	Measure in B Mode
	Bladder W(Bladder Width)	cm	
	Bladder T(Bladder Thickness)	cm	
Calculation	Bladder Vol.(Bladder Volume)	cm ³	
Formula	Bladder Vol.(cm ³) = (π/6) * (L(cm) * W(cm) * T(cm))		

6.7.12.3.4 Residual Urine Volume

Measurement	Urine L(Urine Length)	cm	Measure in B Mode
	Urine W(Urine Width)	cm	
	Urine H(Urine Height)	cm	
Calculation	Urine Vol.(Urine Volume)	cm ³	
Formula	RUV(Residual Urine Volume)(cm ³) = (π/6) * (L(cm) * W(cm) * H(cm))		

6.7.12.3.5 Prostate

Measurement	Prostate L(Prostate Length)	cm	Measure in B Mode
	Prostate W(Prostate Width)	cm	
	Prostate H(Prostate Height)	cm	
Calculation	Prostate Vol.(Prostate Volume)	cm ³	
Formula	Prostate Vol.(cm ³) = (π/6) * (L(cm) * W(cm) * H(cm))		

6.7.12.3.6 PSAD(Prostate Specific Antigen Density)

Measurement	PSA (Prostate Specific Antigen)	ng/ml	Measure in B Mode
	Prostate Vol (Prostate Volume)	cm ³	
Calculation	PSAD	ng/ml/cm ³	

Formula	$PSAD(ng/ml/cm^3) = PSA(ng/ml) / \text{Prostate Volume}(cm^3)$	
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6.7.12.3.7 Testis

Measurement	Testis L(Testis Length)	cm	Measure in B Mode
	Testis W(Testis Width)	cm	
	Testis H(Testis Height)	cm	
Calculation	Testis Vol.(Testis Volume)	cm ³	
Formula	$\text{Testis Vol.}(cm^3) = (\pi/6) * (L(cm) * W(cm) * H(cm))$		

6.7.12.3.8 Testis D(Testis Doppler)

Measurement	Diam(Diameter)	cm	Measure in Doppler Mode
Calculation	PS/ED(Peak Systolic velocity/End Diastolic velocity)		
Measurement	TMean(Time Averaged Mean Velocity)	cm/s	
	TMax(Time Averaged Maximum Velocity)	cm/s	
	TMin(Time Averaged Minimum Velocity)	cm/s	
Calculation	PGmax(Maximum Pressure Gradient)	mmHg	
	PGmean(Mean Pressure Gradient)	mmHg	
	VTI(Velocity-Time Integral)	cm	
Calculation	RI(Resistive Index)		
Formula	RI = (PS (cm/s) - ED (cm/s)) / PS (cm/s)		
Calculation	PI(Pulsatility Index)		
Formula	PI = (TMax(cm/s) - TMin(cm/s)) / TMean(cm/s)		
Calculation	HR(Heart Rate)	bpm	

6.7.13 Generic Department

6.7.13.1 Preparation for Generic Ultrasonography

- Make sure the appropriate probe is currently in use.
- Check whether the current system date is correct.
- Press the New Patient button and register the Patient information in the interface.
- Adjust the appropriate measurement mode.

6.7.13.2 Basic Generic Measurement Procedure

- Register patient information in patient options.
- Press the measurement button on the machine to enter the measurement mode. If the current measurement menu is not general section measurement, use the "Return to main menu" function to return to the main interface of measurement and then select general section measurement options
- Select measuring tool from the menu to start measuring.
- Click Report to view the inspection Report.

6.7.13.3 Generic Department B Mode Measurement

6.7.13.3.1 Stenosis

- Stenosis D (Stenosis Distance)

Measurement	A Length	cm	Measure in B Mode
	B Length	cm	

Calculation	Stenosis D %	
Formula	$\text{Stenosis D(\%)} = L_A(\text{cm}) - L_B(\text{cm}) / \text{MAX}(L_A(\text{cm}), L_B(\text{cm})) * 100\%$	

■ Stenosis Diam (Stenosis Diameter)

Measurement	A Diam cm	Measure in B Mode
	B Diam cm	
Calculation	Stenosis Diam %	
Formula	$\text{Stenosis Diam(\%)} = D_A(\text{cm}) - D_B(\text{cm}) / \text{MAX}(D_A(\text{cm}), D_B(\text{cm})) * 100\%$	

■ Stenosis A (Stenosis Area)

Measurement	A Area cm^2	Measure in B Mode
	B Area cm^2	
Calculation	Stenosis A %	
Formula	$\text{Stenosis A(\%)} = S_A(\text{cm}^2) - S_B(\text{cm}^2) / \text{MAX}(S_A(\text{cm}^2), S_B(\text{cm}^2)) * 100\%$	

■ Stenosis Circ. (Stenosis Circumference)

Measurement	A Circ. cm	Measure in B Mode
	B Circ. cm	
Calculation	Stenosis Circ. %	
Formula	$\text{Stenosis Circ.(\%)} = C_A(\text{cm}) - C_B(\text{cm}) / \text{MAX}(C_A(\text{cm}), C_B(\text{cm})) * 100\%$	

6.7.13.3.2 A/B Ratio

■ A/B Length

Measurement	A Length cm	Measure in B Mode
	B Length cm	
Calculation	A/B Length	
Formula	$\text{A/B Length} = \text{A Length}(\text{cm}) / \text{B Length}(\text{cm})$	

■ A/B Area

Measurement	A Area cm^2	Measure in B Mode
	B Area cm^2	
Calculation	A/B Area	
Formula	$\text{A/B Area} = \text{A Area}(\text{cm}^2) / \text{B Area}(\text{cm}^2)$	

■ A/B Circ. (A/B Circumference)

Measurement	A Circ. cm	Measure in B Mode
	B Circ. cm	
Calculation	A/B Circ.	
Formula	$\text{A/B Circ.} = \text{A Circ.}(\text{cm}) / \text{B Circ.}(\text{cm})$	

Measurement	Depth cm	Measure in B Mode
	Length cm	
	Circ. cm	
	Area cm^2	

	Histogram	
	Anatomy	

6.7.13.3.3 Volume

Measurement	Volume L(Volume Length)	cm	Measure in B Mode
	Volume W(Volume Width)	cm	
	Volume H(Volume Height)	cm	
Calculation	Volume	cm ³	
Formula	Volume(cm ³) = (π/6) * (L(cm) * W(cm) * H(cm))		

6.7.13.3.4 Angle

The Angle of the line is calculated by 0° downward vertically and forward counterclockwise

Measurement	Line 1	°	Measure in B Mode
	Line 2	°	
Calculation	Angle	°	
Formula	Angle(°) = abs (Line 1(°) - Line 2(°))		

6.7.13.3.5 IMT(Intima-Media Thickness)

Measurement	IMT N (IMT Near)	mm	Measure in B Mode
	IMT F (IMT Far)	mm	

6.7.13.4 Generic Department M Mode Measurement

6.7.13.4.1 Stenosis

■ Stenosis D (Stenosis Distance)

Measurement	A Distance	cm	Measure in M Mode
	B Distance	cm	
Calculation	Stenosis D	%	
Formula	Stenosis D(%)= D _A (cm)-D _B (cm) / MAX(D _A (cm),D _B (cm))*100%		

6.7.13.4.2 A/B Ratio

■ A/B Time Interval

Measurement	A Time Interval	s	Measure in M Mode
	B Time Interval	s	
Calculation	A/B Time Interval		
Formula	A/B Time Interval = A Time Interval(s) / B Time Interval(s)		

■ A/B Velocity

Measurement	A Velocity	cm/s	Measure in M Mode
	B Velocity	cm/s	
Calculation	A/B Velocity		
Formula	A/B Velocity = A Velocity(cm/s) / B Velocity(cm/s)		
Measurement	Time	s	
	Distance	cm	
Calculation	Heart Rate		

Formula	$HR(bpm) = 60 * \text{beats_num} / \text{abs} (t_A(s) - t_B(s))$	
Measurement	Velocity cm/s	

6.7.13.5 Generic Department Doppler Mode Measurement

6.7.13.5.1 Trace

Measurement	Diam(Diameter) cm	Measure in Doppler Mode
Calculation	PS/ED(Peak Systolic velocity/End Diastolic velocity)	
Measurement	TMean(Time Averaged Mean Velocity) cm/s	
	TMax(Time Averaged Maximum Velocity) cm/s	
	TMin(Time Averaged Minimum Velocity) cm/s	
Calculation	PGmax(Maximum Pressure Gradient) mmHg	
	PGmean(Mean Pressure Gradient) mmHg	
	VTI(Velocity-Time Integral) cm	
Calculation	RI(Resistive Index)	
Formula	$RI = (PS \text{ (cm/s)} - ED \text{ (cm/s)}) / PS \text{ (cm/s)} $	
Calculation	PI(Pulsatility Index)	
Formula	$PI = (TMax(cm/s) - TMin(cm/s)) / TMean(cm/s) $	
Calculation	HR(Heart Rate) bpm	

6.7.13.5.2 Point

- Velocity
- PG(Pressure Gradient)

Measurement	Velocity cm/s	Measure in Doppler Mode
Calculation	PG(Pressure Gradient) mmHg	
Formula	$PG(mmHg) = 4 * \text{Velocity}(cm/s)^2$	

6.7.13.5.3 Distance

Calculation	Vel.Diff(Velocity Difference) cm/s	Measure in Doppler Mode
Formula	$Vel.Diff(cm/s) = \text{abs} (V1(cm/s) - V2(cm/s))$	
Calculation	PG Diff(Pressure Gradient Difference) mmHg	
Formula	$PG \text{ Diff}(mmHg) = \text{abs} (PG1(mmHg) - PG2(mmHg))$	
Calculation	Time Interval s	
Formula	$Time \text{ Interval}(s) = \text{abs} (t1(s) - t2(s))$	
Calculation	Acceleration cm/s^2	
Formula	$Acceleration(cm/s^2) = \text{abs} (V2(cm/s) - V1(cm/s)) / \text{abs} (t2(s) - t1(s))$	
Calculation	RI(Resistive Index)	
Formula	$RI = (PS \text{ (cm/s)} - ED \text{ (cm/s)}) / PS \text{ (cm/s)} $	
Measurement	Vel Min(Velocity Minimum) cm/s	
	Vel Max(Velocity Maximum) cm/s	
Calculation	PS/ED(Peak Systolic velocity/End Diastolic velocity)	
Calculation	HR(Heart Rate) bpm	

6.7.13.5.4 Volume Flow

- VF using Diameter

Measurement	Diam(Diameter)	cm	Measure in Doppler Mode
	Vmean(Velocity Mean)	cm/s	
Calculation	VF(Volume Flow)	ml/min	
Formula	VF(ml/min) = 60 * π * (Diam(cm) / 2) ² * abs (Vmean(cm/s))		

■ VF using Area

Measurement	Area	cm ²	Measure in Doppler Mode
	Vmean(Velocity Mean)	cm/s	
Calculation	VF(Volume Flow)	ml/min	
Formula	VF(ml/min) = 60 * Area(cm ²) * abs (Vmean(cm/s))		

6.7.14 Musculoskeletal Department

6.7.14.1 Preparation for Musculoskeletal Ultrasonography

- Make sure the appropriate probe is currently in use.
- Check whether the current system date is correct.
- Press the New Patient button and register the Patient information in the interface.
- Adjust the appropriate measurement mode.

6.7.14.2 Basic Musculoskeletal Measurement Procedure

- Register patient information in patient options.
- Press the measurement button on the machine to enter the measurement mode. If the current measurement menu is not musculoskeletal measurement, use the "Return to main menu" function to return to the main interface of measurement and then select the musculoskeletal measurement option.
- Select measuring tool from the menu to start measuring.
- Click Report to view the inspection Report.

6.7.14.3 MSK(Musculoskeletal) Department Measurement

6.7.14.3.1 Hip Angles

Measurement	BL(Baseline)	°	Measure in B Mode
	RL(Roof line)	°	
	IL(Inclination line)	°	
Calculation	α	°	
Formula	α(°) = abs (RL(°) - BL(°))		
Calculation	β	°	
Formula	β(°) = abs (IL(°) - BL(°))		
Method	Graf		

6.7.14.3.2 FHC(Femoral Head Coverage)

Measurement	d	cm	Measure in B Mode
	d:distance from the baseline to the medial aspect of the femoral head		
	D	cm	
	D:maximum diameter of the femoral head		
Calculation	FHC		

Formula	$FHC(\%) = (d(\text{cm}) / D(\text{cm})) * 100\%$	
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6.7.15 Pediatrics Department

6.7.15.1 Preparation for Pediatrics Ultrasonography

- Make sure the appropriate probe is currently in use.
- Check whether the current system date is correct.
- Press the New Patient button and register the Patient information in the interface.
- Adjust the appropriate measurement mode.

6.7.15.2 Basic Pediatrics Measurement Procedure

- Register patient information in patient options.
- Press the measurement button on the machine to enter the measurement mode. If the current measurement menu is not Pediatrics measurement, return to the main interface of measurement and select Pediatrics measurement options.
- Select measuring tool from the menu to start measuring.
- Click Report to view the inspection Report.

6.7.15.3 Pediatrics Department Measurement

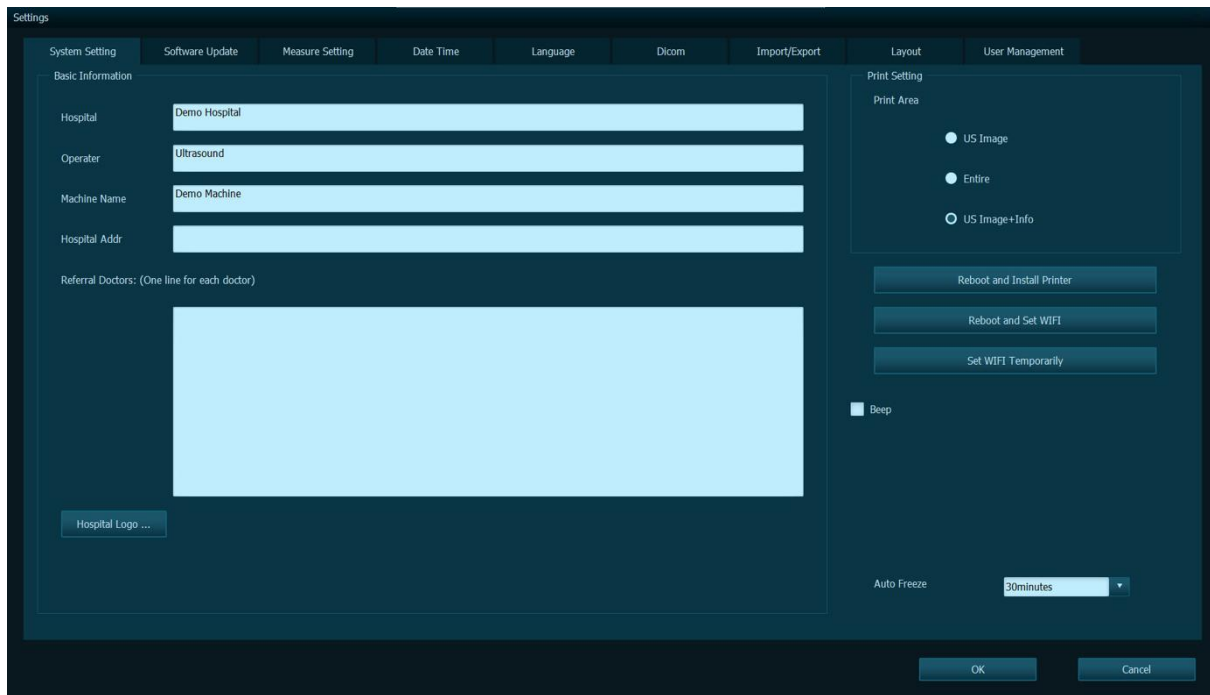
6.7.15.3.1 Orthop Surg

Measurement	Base L(Baseline)	°	Measure in B Mode
	C Top L(Top line of cartilage)	°	
	B Top L(Line of bone apex)	°	
Calculation	α	°	
Formula	$\alpha(^{\circ}) = \text{abs} (\text{C Top L} (^{\circ}) - \text{Base L} (^{\circ}))$		
Calculation	β	°	
Formula	$\beta(^{\circ}) = \text{abs} (\text{B Top L} (^{\circ}) - \text{Base L} (^{\circ}))$		
Method	Graf		

6.8 Settings

6.8.1 System Setting

- Press System button to enter into system setting interface, just as follow shows:

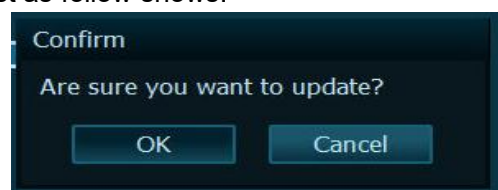


System Setting Interface

- In system setting, you can set basic information, software update, measurement methods, date and time, language, Dicom, import, export, image display layout and user management. Printing area can be selected when the image is directly printed.
- Set hospital name, operator, machine name, hospital address, referral doctors and hospital logo, after clicking “OK” to confirm, corresponding information shall be shown in display column on the top of main equipment interface.
- Set beep on/off and auto freeze time.

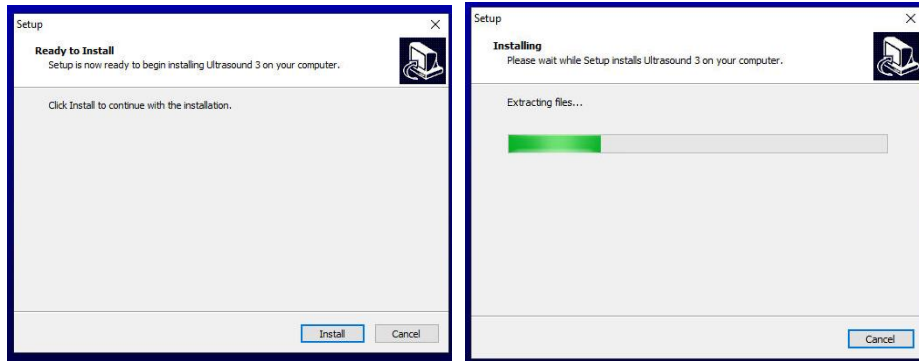
6.8.2 Software Update

- When the system is updated, copy the software updating file to U disk root directory.
- Insert U disk into USB port of PC.
- Press System key to enter into system setting interface and select “Software Update” to update system software.
- “Software Version” shall show version information of current software.
- Press “Find Update” key and the equipment shall automatically find software update package in U disk; if appropriate software package is found, version information of update package shall be shown in “Update Version”.
- After the device finds appropriate software update package in U disk, “Update” key on software updating interface shall be activated. It is needed to update software if update package version is determined and click “Update” key to continue the operation.
- After clicking “Update” key, the system shall prompt “Are you sure want to update?”. Click “OK” to confirm, just as follow shows:



Software Update Confirmation

- Equipment updates and system starts. Click “Install” respectively in popped update program dialogue frame to complete update, just as follow shows:

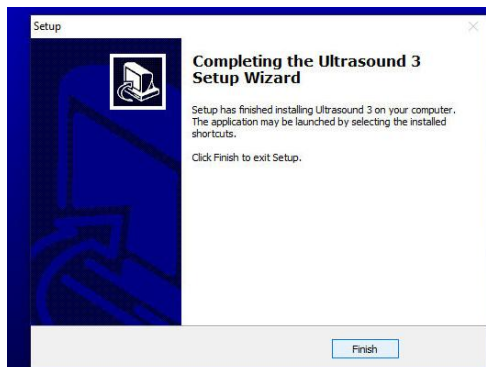


Update Program Dialogue Frame



Attention

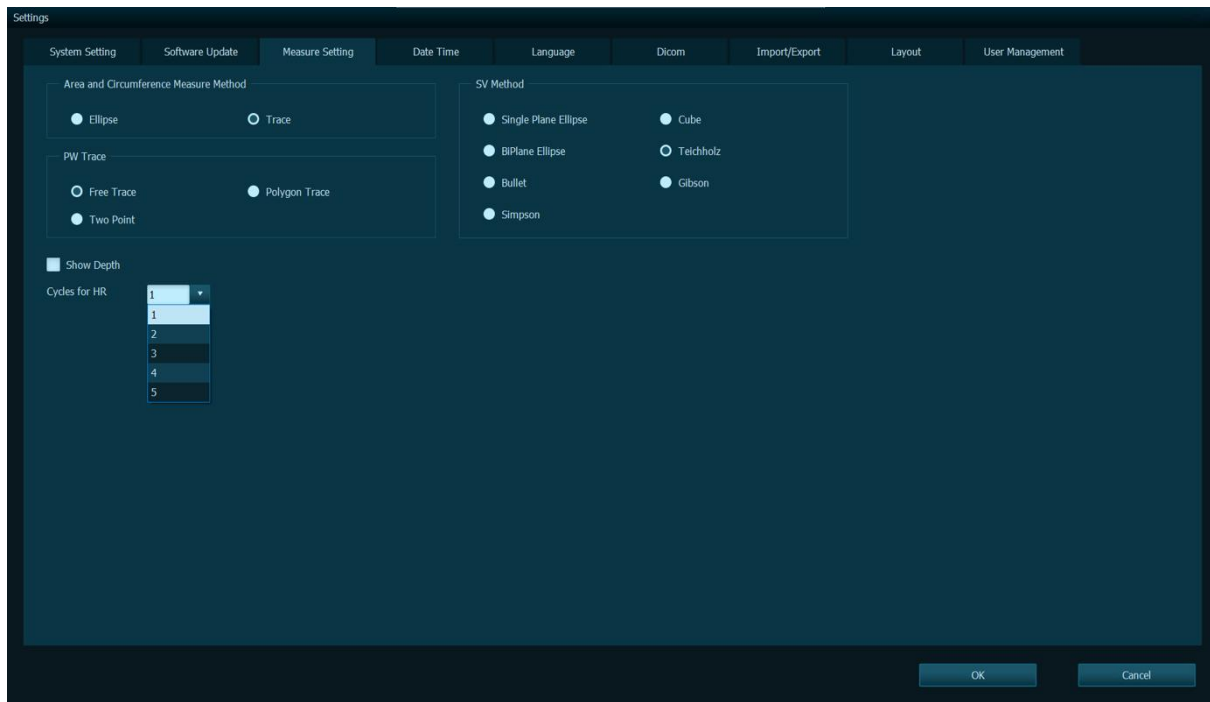
- About 1-2 minutes are needed for system updating and program installation. Please wait patiently.
- After the system updating is completed, dialogue frame of updating completion shall be popped, click “Finish” key to confirm and the system shall exit updating interface. The software updating operation is completed after automatic restart, just as follow shows:



Prompt Dialogue Frame of Updating Completion

6.8.3 Measure Setting

- Measurement method and formula can be switched here. Refer the follow shows for measure setting interface:

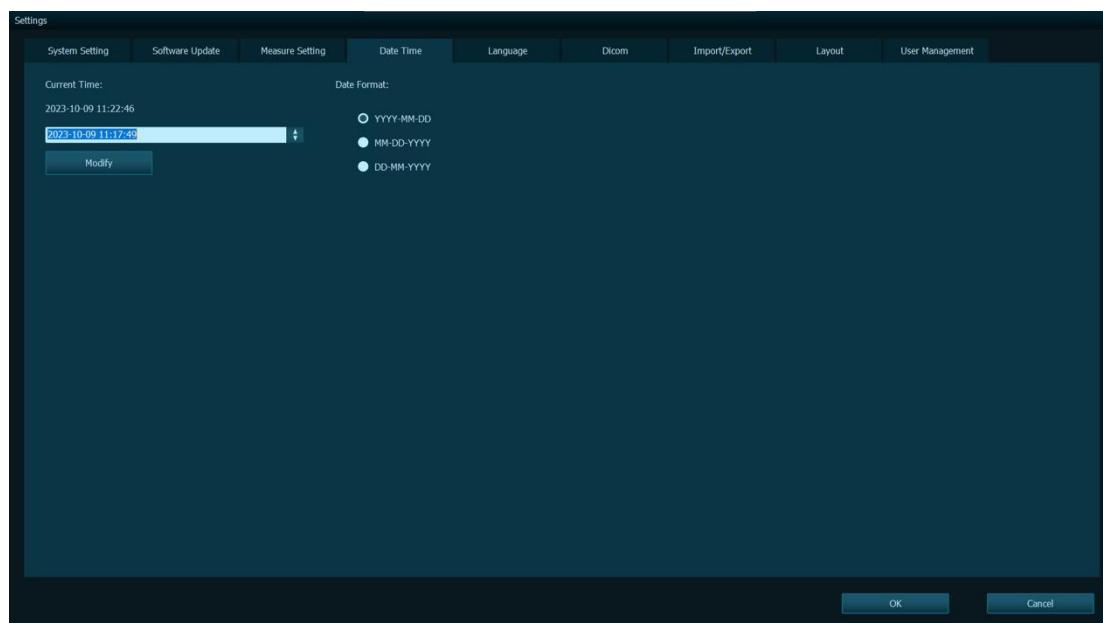


Measure Setting Interface

- Measurement method of area and circumference: ellipse and trace.
- Measurement method of PW trace: free trace, polygon trace, two point.
- SV method:single-plane ellipse,Biplane ellipse,Bullet, Simpson, Cube, Teichholz, Gibson.
- Heart rate detection cycle number: 5 cycles are available.
- measurement unit:mm,cm

6.8.4 Date and Time

- Set time and change date display format. Refer the follow shows for time setting interface:



Time Setting Interface

6.8.5 Language

- Software language can be switched and refer the follow shows for language setting

interface:

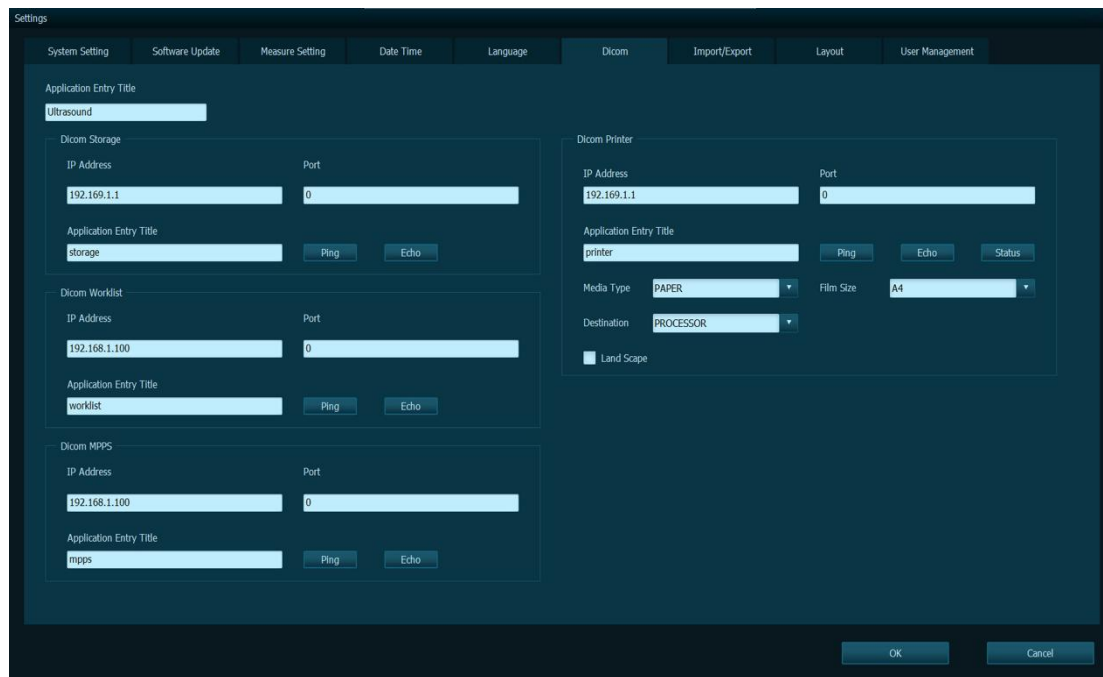


Language Setting Interface

- Currently supports ten languages: Chinese, English, Arabic, French, German, Indonesian, Italian, Portuguese, Russian and Spanish.

6.8.6 Dicom Setting

- Dicom function can be set to use; refer the follow shows for the interface:

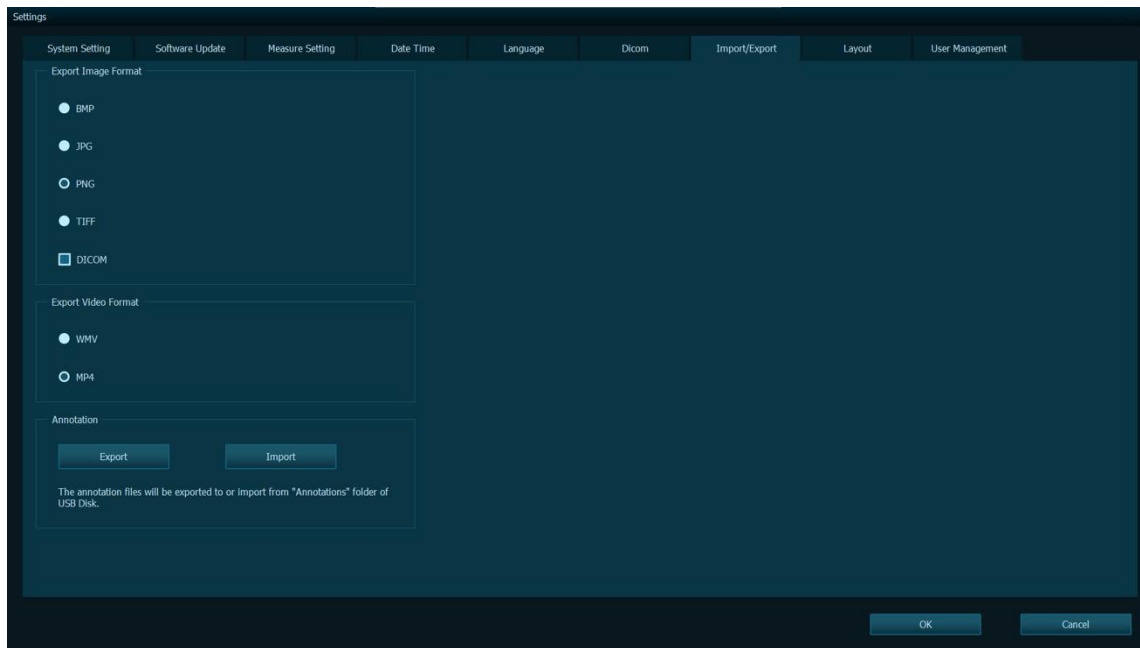


Dicom Setting Interface

- Application Entry Title: input name.
- Dicom Printer: set IP address, port, name information and other related information of Dicom printer which supports Dicom print function.
- Dicom Storage: set IP address, port, name information and other related information which supports Dicom storage function.
- Dicom Worklist: set IP address, port, name information and other related information which supports Dicom's function of obtaining patient information from the taskbar table.
- Dicom MPPS: set IP address, port, name information and other related information which supports Dicom patient real-time examination status dynamic monitoring function.

6.8.7 Import/Export Setting

- Set the format of import/export images or videos and the import/export of annotations; refer the follow shows for the interface:

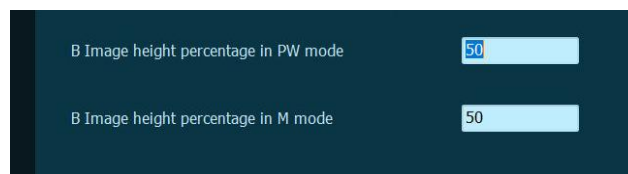


Import/Export Setting Interface

- Export image format: there are five formats available: BMP, JPG, PNG, TIFF, and DICOM.
- Export video format: WMV and MP4 are available.
- Annotation: the annotation files will be exported to or import from “Annotations” folder of USB disk.

6.8.8 Layout Setting

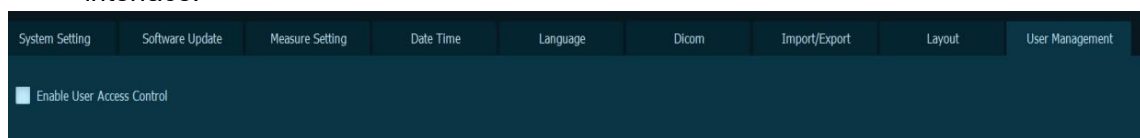
- Set B image height percentage in PW/M mode; refer the follow shows for the interface:



Layout Setting Interface

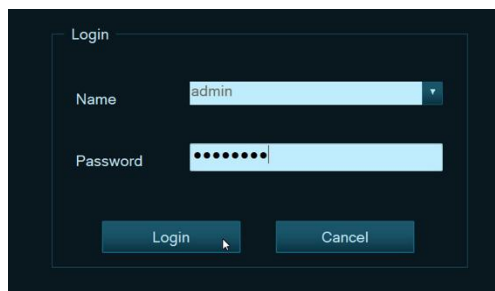
6.8.9 User Management Setting

- Set user management permissions and other functions; refer the follow shows for the interface:



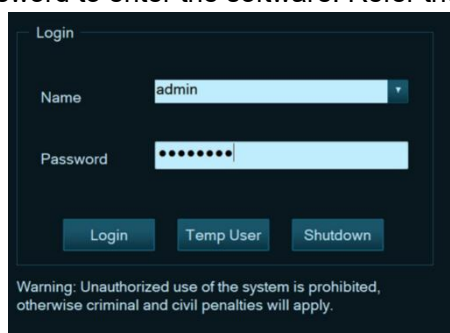
User Management Setting Interface

- After checking "Enable User Access Control", a pop-up window will display the login information. After entering the password(initial password is password), the software will restart. Refer the follow shows for the interface:



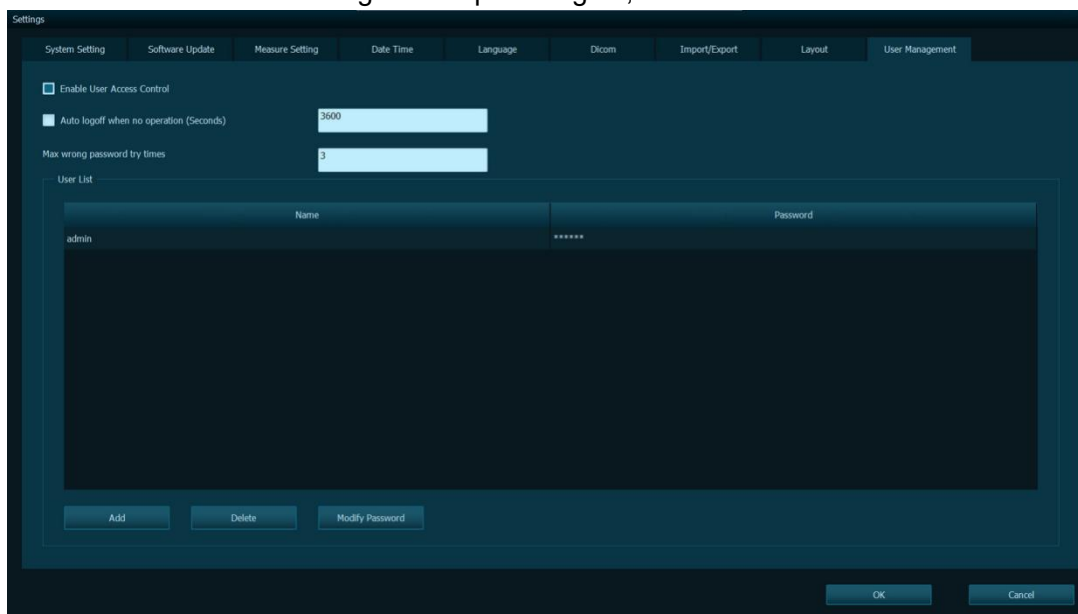
Login Interface

- After the software restarts, the user login interface appears. In this interface, you can select different users to log in or perform a "Shutdown" operation. After the user selects, enter the correct password to enter the software. Refer the follow shows for the interface:



User Login Interface

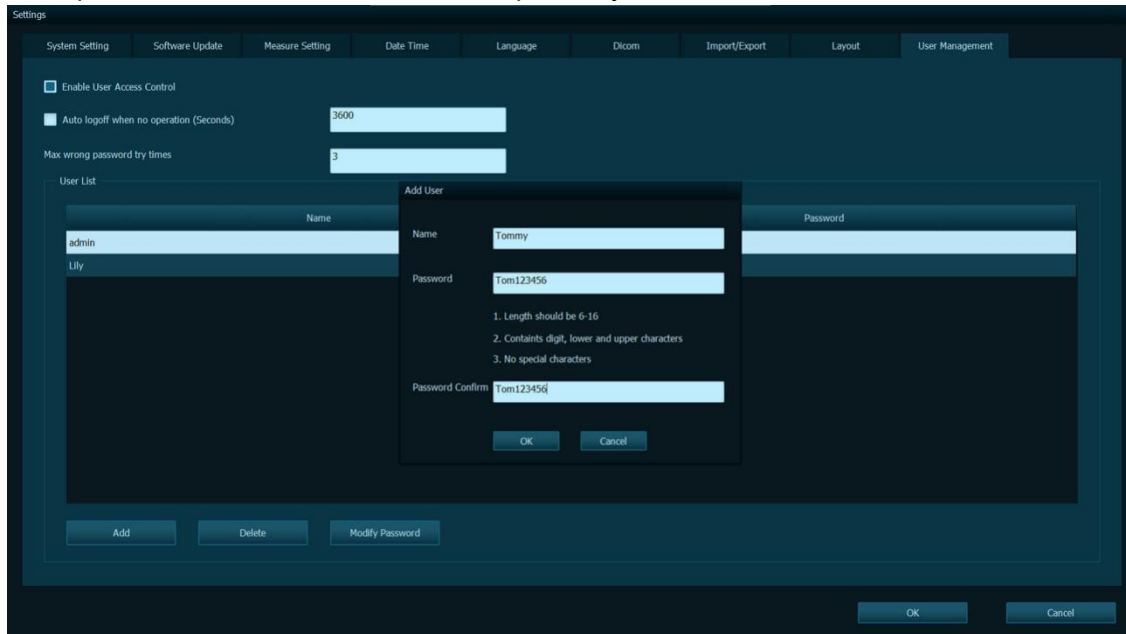
- Return to the user management options again, refer the follow shows for the interface:



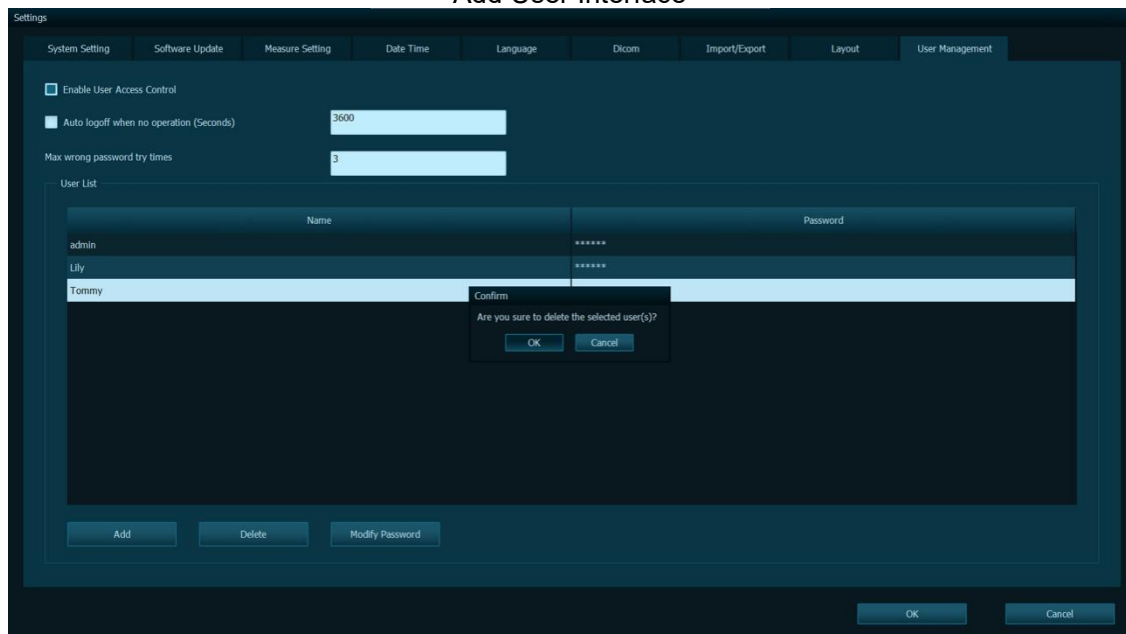
Admin User Management Interface

- At this time, "Enable User Access Control" has been checked. If you want to cancel the user management rights, click the check box, and the software will pop up the login interface. After logging in, the software will restart and directly enter the ultrasound operation interface.
- The option "Auto logoff when no operation (Seconds)" can set the automatic logout time.
- "Max wrong password try times" can set the maximum number of times the user can enter the password. The system will automatically shut down after the maximum number of times is exceeded.
- "User List" allows you to add new users, delete list users, and change passwords. When

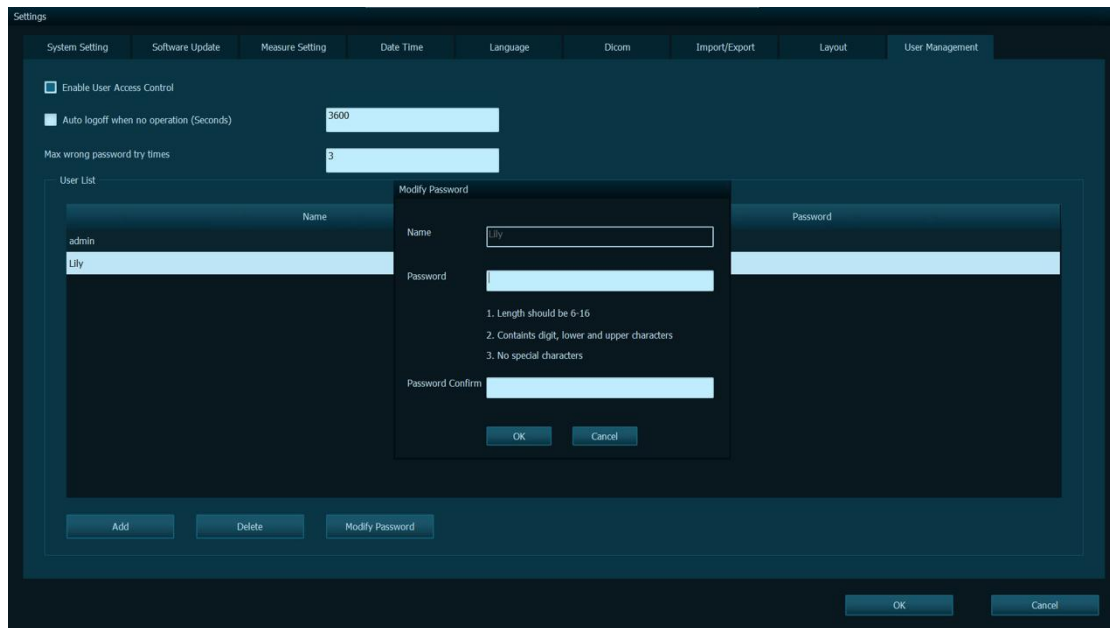
adding a new user, you need to enter the username and password and confirm the password. When entering the password, you should follow the following three rules: the password must be 6-16 characters long, contain numbers and uppercase and lowercase English letters, and cannot contain special characters. When deleting users, only non-administrator users can be deleted. When changing passwords, the above three rules should also be followed. The adding user interface, deleting interface and changing password interface are shown respectively:



Add User Interface

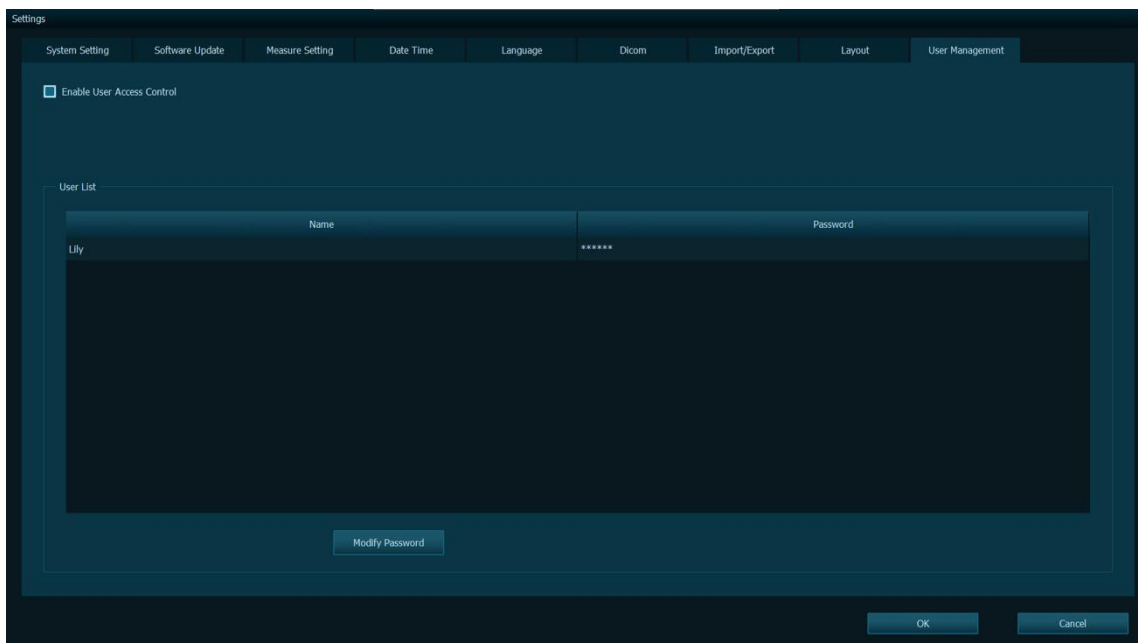


Delete User Interface



Modify Password Interface

- If you log in as a non-admin user, you can only change the password. The interface as follows shows :



Non-admin User Management Interface

6.9 Examination Report

6.9.1 Enter into Examination Report

- Press Report key to enter to ultrasonic report interface of corresponding department; related information and measured data in the examination shall be shown in the report automatically. Maternity department report as follows shows:

Report

Demo Hospital

Obstetrics Ultrasound Report

Name: Age: Sex:

ID: Date:

LMP: GA(LMP): EDD(LMP):

OB B Mode

OB Mid/Late <table border="1" style="width: 100%;"> <tr><td>BPD</td><td>46.32 mm</td></tr> <tr><td>HC</td><td>174.57 mm</td></tr> <tr><td>AC</td><td>135.70 mm</td></tr> <tr><td>FL</td><td>57.78 mm</td></tr> <tr><td>HL</td><td>37.90 mm</td></tr> <tr><td>PL Thickness</td><td>49.38 mm</td></tr> </table>	BPD	46.32 mm	HC	174.57 mm	AC	135.70 mm	FL	57.78 mm	HL	37.90 mm	PL Thickness	49.38 mm	OB Mid/Late \AFI <table border="1" style="width: 100%;"> <tr><td>AFI Q1</td><td>30.00 mm</td></tr> <tr><td>AFI Q2</td><td>31.20 mm</td></tr> <tr><td>AFI Q3</td><td>24.26 mm</td></tr> <tr><td>AFI Q4</td><td>21.80 mm</td></tr> <tr><td>AFI</td><td>107.26 mm</td></tr> </table>	AFI Q1	30.00 mm	AFI Q2	31.20 mm	AFI Q3	24.26 mm	AFI Q4	21.80 mm	AFI	107.26 mm
BPD	46.32 mm																						
HC	174.57 mm																						
AC	135.70 mm																						
FL	57.78 mm																						
HL	37.90 mm																						
PL Thickness	49.38 mm																						
AFI Q1	30.00 mm																						
AFI Q2	31.20 mm																						
AFI Q3	24.26 mm																						
AFI Q4	21.80 mm																						
AFI	107.26 mm																						

☐ Save Report

Report

HL 37.90 mm	AFI 107.26 mm
PL Thickness 49.38 mm	

OB Mid/Late \Physiology <table border="1" style="width: 100%;"> <tr><td>TAD</td><td>22.10 mm</td></tr> <tr><td>APAD</td><td>30.15 mm</td></tr> </table>	TAD	22.10 mm	APAD	30.15 mm	OB Mid/Late \OB Cal. <table border="1" style="width: 100%;"> <tr><td>FL/AC</td><td>0.43</td></tr> <tr><td>FL/HC</td><td>0.33</td></tr> <tr><td>FL/BPD</td><td>1.25</td></tr> <tr><td>HC/AC</td><td>1.29</td></tr> </table>	FL/AC	0.43	FL/HC	0.33	FL/BPD	1.25	HC/AC	1.29
TAD	22.10 mm												
APAD	30.15 mm												
FL/AC	0.43												
FL/HC	0.33												
FL/BPD	1.25												
HC/AC	1.29												

Description

Conclusion

Referral Doctor: Reported by:

Note: This report is for clinical reference only and not as evidence!

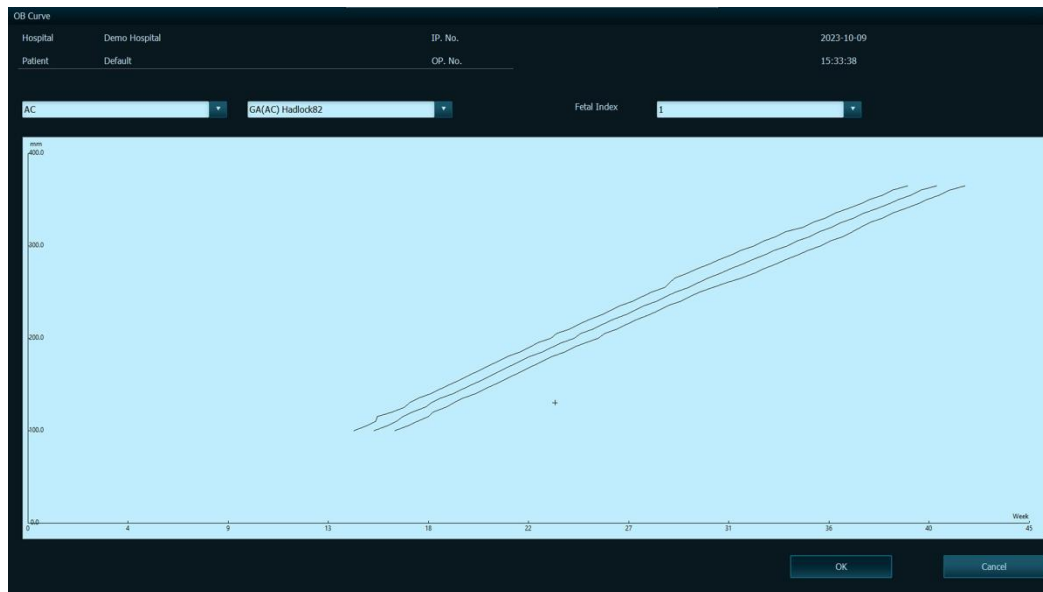
☐ Save Report

Report Page Interface

- Click “Save Report” at the bottom and the examination report shall be automatically saved in exiting the report which is convenient for reference in the future.

6.9.2 Fetus Growth Curve

- After entering into OB report, click “OB Curve” at bottom to transfer fetus growth curve, just as follow shows:



Fetus Growth Curve Interface

- Select measurement data used for examination in drop-down menu of “AC” and select calculation formula in drop-down menu of “GA(AC)Hadlock82”. Different fetus growth curves can be gotten through selecting previous different choices.
- Fetus growth curve can only occur when “Obstetrics” is selected for measurement department.

6.9.3 Fetus Appraise

- After completing “AFI” measurement during examination process, click “Fetus Appraise” at bottom to transfer fetus physiological score dialogue frame, just as follow shows:

Item	Points	Status	Description / Selection
Heart Rate Speed	2 pts	Normal	moving, FHR ≥ 15 cnt/min, dur ≥ 15s, ≥ 5cnt
Fetal Movement	2 pts	Normal	fetus moving ≥ 3 cnts
Fetus Breath	2 pts	Normal	FBM ≥ 1cnt, dur ≥ 60s
Fetus Muscle Strain	2 pts	Normal	≥ 2cnts, body and spine stretch moving
Placenta Grades	2 pts	Normal	Fetus ≤ II class
AFI	2 pts	Normal	
Total	12 pts	Normal, Low Suffocation Risk	

Notice: Observe 20-30 minutes

Fetus Appraise Interface

- Users can make own judgment based on image. Select appropriate choice in drop-down menu of “Heart Rate Speed”, “Fetal Movement” and other items respectively and score of corresponding items shall be changed. After completing selection of drop-down menu, “Total” item software shall automatically judge the risk of fetal asphyxia.
- Fetus appraise can only occur when “OB ” is selected for measurement department and after completing “AFI” measurement.

6.9.4 Add Image

- Click “Add Image” at bottom to add image saved during examination process, just as follow shows:



Add Image Interface

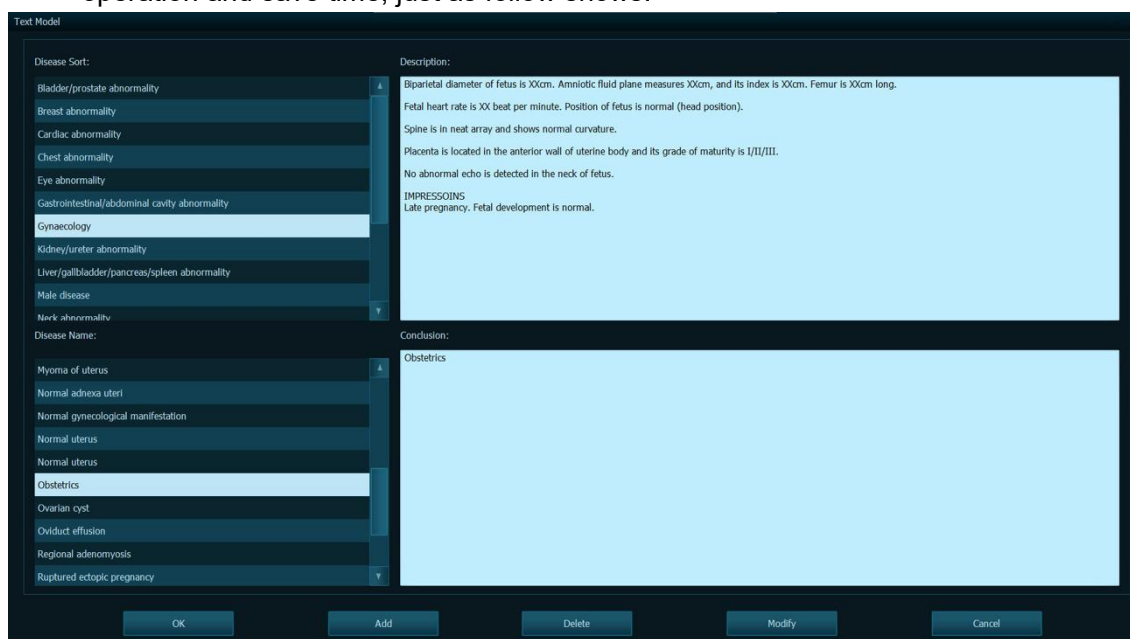
- Specific information of current image shall be shown in the top left corner; the middle part is the image preview; the bottom part is the abbreviated list of the image can be selected.

6.9.5 Delete Image

- Click “Delete Image” at bottom to delete the images added to the report one by one. When there are no images that can be deleted in the report, the pop-up window displays "There is no image in the report!".

6.9.6 Text Template

- Click “Text Model” at bottom to add diagnosis template in report which can simplify operation and save time, just as follow shows:



Text Template Interface

- Select symptom type in the left of dialogue frame of text model interface; its description and conclusion shall automatically occur at right; several keys at bottom can support users to edit diagnosis template independently which is convenient for use.

6.9.7 Edit Text Template

- After entering into text model, click diagnosis type in the left and input corresponding diagnosis conclusion text in description and conclusion dialogue frame in the right, just as follow shows:

The screenshot shows the 'Text Model' dialog box. On the left, under 'Disease Sort', the 'Others' option is selected. The 'Description' field on the right contains the text 'No abnormalities'. Below 'Disease Sort', under 'Disease Name', the option 'Carotid artery occlusion related to atherosclerosis' is selected. The 'Conclusion' field on the right contains the text 'Normal development'. At the bottom of the dialog box, there are five buttons: 'OK', 'Add', 'Delete', 'Modify', and 'Cancel'.

- Click “Add” to add input diagnosis description and conclusion into diagnosis type in the left, just as follow shows:

This screenshot shows the 'Text Model' dialog box after the 'Add' button was clicked. The 'Disease Sort' list remains with 'Others' selected. The 'Description' field still contains 'No abnormalities'. In the 'Disease Name' list, 'Normal abdomen' is now selected. The 'Conclusion' field still contains 'Normal development'. The buttons at the bottom ('OK', 'Add', 'Delete', 'Modify', 'Cancel') are still present.

- Select one type in diagnosis type in the left and click “Delete” to delete the diagnosis template text.

6.9.8 Complete Report

- After adding image and text model in examination report, the edition of examination report has been completed, just as follow shows:

Report

Demo Hospital

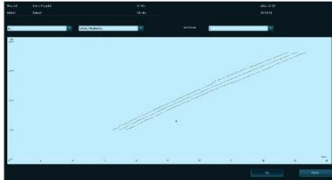
Obstetrics Ultrasound Report

Name:
Age:
Sex:

ID:
Date:

LMP:
GA(LMP):
EDD(LMP):

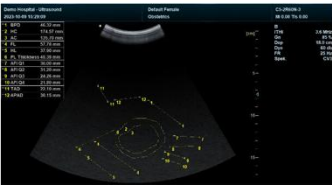
Ultrasound Image



Heart Rate (bpm)	120	Normal	Range: 110-160 bpm (1st-3rd Trimester)
Fetal Movement	2.00	Normal	Range: 1.0-4.0 (1st-3rd Trimester)
Fetal Growth	2.00	Normal	Range: 1.0-4.0 (1st-3rd Trimester)
Fetal Blood Flow	2.00	Normal	Range: 1.0-4.0 (1st-3rd Trimester)
Placental Grade	2.00	Normal	Range: 1.0-4.0 (1st-3rd Trimester)
AFI	2.00	Normal	Range: 1.0-4.0 (1st-3rd Trimester)
CVF	12.00	Normal	Range: 1.0-4.0 (1st-3rd Trimester)

☐ Save Report

Report



OB B Mode

OB Mid/Late Physiology

BPD:
HC:
AC:
FL:
HL:
PL Thickness:

OB Mid/Late AFI

AFI Q1:
AFI Q2:
AFI Q3:
AFI Q4:
AFI:

☐ Save Report

Report

OB Mid/Late Physiology

TAD:
APAD:

OB Mid/Late OB Cal.

FL/AC:
FL/HC:
FL/BPD:
HC/AC:

Description

Biparietal diameter of fetus is XXcm. Amniotic fluid plane measures XXcm, and its index is XXcm. Femur is XXcm long.
Fetal heart rate is XX beat per minute. Position of fetus is normal (head position).
Spine is in neat array and shows normal curvature.
Placenta is located in the anterior wall of uterine body and its grade of maturity is I/II/III.
No abnormal echo is detected in the neck of fetus.
IMPRESSOINS
Late pregnancy. Fetal development is normal.

Conclusion

Obstetrics

☐ Save Report

Report

Description

Biparietal diameter of fetus is XXcm. Amniotic fluid plane measures XXcm, and its index is XXcm. Femur is XXcm long.
 Fetal heart rate is XX beat per minute. Position of fetus is normal (head position).
 Spine is in neat array and shows normal curvature.
 Placenta is located in the anterior wall of uterine body and its grade of maturity is I/II/III.
 No abnormal echo is detected in the neck of fetus.
 IMPRESSOINS
 Late pregnancy. Fetal development is normal.

Conclusion

Obstetrics

Referral Doctor: _____ Reported by: Ultrasound

Note: This report is for clinical reference only and not as evidence!

Save Report OB Curve Fetus Appraise Referral Doctor Add Image Delete Image Text Model Close Print

Diagrammatic Sketch of Result of Examination Report

- Click "Close" and "Print" at right bottom corner to close the report.

6.9.9 Doctor Signature

- At the bottom of report, users are allowed to input doctor's name independently in "Referral Doctor" and "Report Doctor". The referral doctor can also be added by clicking the "Referral Doctor" button at the bottom, just as follow shows.

Report

HL 37.90 mm AFI 107.26 mm
 PL Thickness 49.38 mm

OB Mid/Late \Physiology

TAD 22.10 mm
 APAD 30.15 mm

OB Mid/Late \OB Cal.

FL/AC 0.43
 FL/HC 0.33
 FL/BPD 1.25
 HC/AC 1.29

Description

Conclusion

Referral Doctor: Doc.Zhang Reported by: Doc.Li

Note: This report is for clinical reference only and not as evidence!

Save Report OB Curve Fetus Appraise Referral Doctor Add Image Delete Image Text Model Close Print

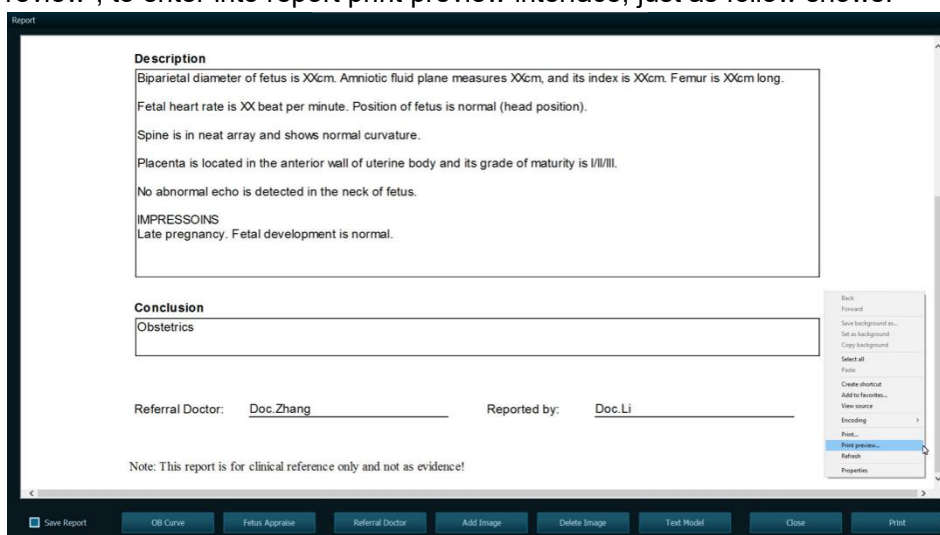
Input Doctor's Name



Select Referral Doctor

6.9.10 Report Print Preview

- Press Point key in blank area of the report after completing report and select “Print Preview”, to enter into report print preview interface, just as follow shows.



Report Print Preview Interface

- Click Page Setting in report print preview interface to enter into page setting interface to set header, footer, paper margin and other items of report page, just as follow shows.

Page Setting Interface

- After completing setting, click “Print” on the upper left corner to print report in print preview interface. Or return to report interface and click “Print” on the lower right corner to print report.

Chapter 7 Maintenance and care

In order to avoid long-term exposure of the device to dust or damp environment, which may impair its performance and reliability, the user must regularly clean and maintain the device.



Attention

- If image distortion, probe breakage, or other abnormalities are found, discontinue use immediately and contact the manufacturer. Self-repair is prohibited.
- The system shall not be serviced or maintained while in use with a patient.
- For the sake of the system performance and safety, you should perform periodical checks for the system.
- Always use the device accessories and spare parts. If other products are used, the normal performance of the equipment will not be guaranteed.
- Do not open the probe shell, so as not to cause damage to internal components.
- Only authorized personnel with relevant qualifications can maintain and repair the probe.
- Immediate maintenance is required if:
 1. The device is under excessive mechanical pressure(For example, after a heavy fall).
 2. Water, alcohol or other liquids enter the inside of the device.
 3. The device function button fails.
 4. The device shell is cracked or damaged.
 5. The battery is dead, and the charger will not charge.

7.1 Daily Maintenance

You are responsible for daily maintenance.

7.2 Probes cleaning

After completing each examination, clean the probes as required. If necessary, repeat the cleaning process before next use.

7.2.1 Cleaning method

1. Disconnect the probe from the system and turn off the device before cleaning.
2. Rinse all residues on the surface of the probe with purified water, and if necessary, use clean paper towels and gauze to wipe the residue on the surface of the probe. Brushes are prohibited as they may damage the probe.
3. The probe surface after cleaning was coated with [Ethanol 75%](#), and the contact time with the probe was about 3 minutes.
4. Clean the surface of the probe with purified water.
5. Allow the probe to air dry in a clean and well-ventilated place or dry the probe with a piece of disposable lint-free soft cloth or tissue. Do not dry the probe by heating.
6. Repeated cleaning during the expected service life of the probe may lead to degradation of the basic safety or basic performance of the probe. The function of the probe should be checked periodically. Check method: The equipment can be powered on normally and display images properly.

7.3 Main Unit Cleaning

After completing each examination, clean the main unit as required. If necessary, repeat the cleaning process before next use.

7.3.1 Cleaning method

1. Before cleaning, please turn off the main unit, wipe the surface of the main unit with a medical gauze moistened with pure water.
2. Dry the main unit with clean medical gauze after cleaning.



Attention

- After cleaning, the chemical reagents or odors on it must be completely removed, otherwise the residual chemical reagents or odors will damage the equipment or cause harm to the human body.
- Use only the materials and methods listed in this section to clean the device. The company does not provide any guarantee for damage or accident caused by the use of other materials or methods.
- Do not wipe the device with volatile liquid such as benzene, gasoline or diluent.
- It is recommended that the device should be kept dry anytime. A wet ambience might affect its lifetime and even damage the device.
- Do not use abrasive materials wipe the device (such as steel wool or silver polish).
- Do not let any liquid into the device.

- Do not pour liquid into the instrument while cleaning.
- Do not leave any cleaning liquid on the surface of the device.

7.4 Maintenance and inspection

To ensure the normal operation of the probe, the user is requested to perform the following daily maintenance and checks:

1. Check whether the power cord of the equipment is intact and not damaged.
2. Check whether the contact surface of the ultrasonic probe and the human body is broken, damaged or scratched.
3. Check whether there are cracks in the ultrasonic probe (immerse the ultrasonic probe into the conductive liquid) and whether there is conductive liquid infiltration into the probe.
4. Check whether the image is uniformity and whether the sensitivity is normal.
5. Check the ultrasonic probe to ensure good insulation and normal condition (No leakage and overheating).

7.5 Storage

- Put the device back to the original box or wrap it with soft cloth and sponge and store it separately.
- The device should be powered on for at least 1 hour each month for functional checks. The period during which the device is stored without power supply should not exceed 6 months.
- The device is placed in a clean and dry environment to avoid direct sunlight. The environment for storing the device should be kept at -20~55°C, and do not place in high pressure or vacuum environment. Put the device carefully to avoid impact and should be stored in the outer package of the special device.
- Transportation and storage of equipment should avoid the following environment:
 1. Environmental conditions for storage and transportation beyond those specified in this specification.
 2. Exposure to toxic gases.
 3. Exposure to high-density oil and gas.
 4. Exposure to salty air.
 5. Exposure to explosive gas or dust.
 6. Do not store in the open air when exposed to direct sunlight.

Chapter 8 Fault Guide

If the ultrasound scanner operation is abnormal, make the following inspection. If the fault cannot be resolved after maintenance, please contact manufacturer or the dealer.

No.	Problem	Cause	Processing method
1	After the power button is pressed, it cannot be turned on.	Battery is low.	Use the charger to charge the device.
2	The display has no output.	1.The interval between turning off and restarting	1.Turn off the system and wait at least 1 minute,

		the system is too short-wait at least 20 seconds. 2.The display brightness or contrastmay be improperly set.	then restart the system. 2.Adjust the display brightness and contrast.
3	The image quality isdegraded	1.The exam mode is incorrect. 2.The image parameter settings areincorrect.	1.Select an appropriate exam mode. 2.Adjust the image parameters.
4	The APP cannot start	/	Delete and reinstall the APP.
5	The APP crashes	/	Close and restart the APP.

Chapter 9 Acoustic output

This section of the operator's manual applies to the overall system including the main unit, probes, accessories and peripherals. This section contains important safety information for operators of the device, pertaining to acoustic output and how to control patient exposure through use of the ALARA (as low as reasonably achievable) principle. Also this section contains information regarding the acoustic output testing and the real-time output display.

Read this information carefully before using the device.

9.1 Concerns with Bioeffects

Diagnostic ultrasound is recognized as being safe. In fact, there have been no reports of injuries to patients caused by diagnostic ultrasound.

It cannot be stated categorically that ultrasound is 100% safe. Studies have revealed that ultrasound with extremely high intensity is harmful to body tissues.

Diagnostic ultrasound technology has made a great leap forward during the last several years. This rapid advance has generated concerns about the potential risk of biological effects when new applications or diagnostic technologies become available.

9.2 Prudent Use Statement

Although there are no confirmed biological effects on patients caused by exposures from present diagnostic ultrasound instruments, the possibility exists that such biological effects may be identified in the future. Thus, ultrasound should be used in a prudent manner to provide medical benefit to the patient. High exposure levels and long exposure times should be avoided while acquiring necessary clinical information.

9.3 ALARA principle (As Low As Reasonably Achievable)

It is required to practice ALARA when using ultrasound energy. Practicing ALARA ensures that the total energy level is controlled below a low enough level at which bioeffects are not generated while diagnostic information is being accumulated. The total energy is controlled by output intensity and total radiation time. The output intensity necessary for examinations differs depending on the patient and the clinical case. Not all examinations can be performed with an extremely low level of acoustic energy. Controlling the acoustic level at an extremely low-level leads to low-quality images or insufficient Doppler signals, adversely affecting the reliability of the diagnosis. However, increasing the acoustic power more than necessary does not always contribute to an increase in quality of information required for diagnosis, rather increasing the risk of generating bioeffects. Users must take responsibility for the safety of patients and utilize ultrasound deliberately. Deliberate use of ultrasound means that output power of ultrasound must be selected based on ALARA. Additional information regarding the concept of ALARA and the possible bioeffects of Ultrasound is available in a document from the AIUM (American Institute of Ultrasound Medicine) title "Medical Ultrasound Safety"

9.4 MI/TI Explanation

9.4.1 Basic Knowledge of MI and TI

1. Mechanical Bioeffect and Thermal Bioeffect

The relationship of various ultrasound output parameters (frequency, acoustic pressure and intensity, etc.) to bioeffects is not fully understood presently. It is recognized that two fundamental mechanisms may induce bioeffects. One is a thermal bioeffect with tissue absorption of ultrasound, and another one is a mechanical bioeffect based on cavitations. Thermal Index (TI) gives the relative index of temperature increase by thermal bioeffect, and Mechanical Index (MI) gives the relative index of mechanical bioeffect. TI and MI indices reflect instantaneous output conditions, so they do not consider the cumulative effects of the total examination time.

■ MI (Mechanical Index)

The mechanical bioeffects are the result of compression and decompression of insonated tissues with the formation of micro bubbles that may be referred to as cavitations.

MI is an index that shows the possibility of the cavitations generation based on acoustic pressure, and the value in which the peak-rarefactional acoustic pressure is divided by the square root of the frequency.

Therefore, MI value becomes smaller when the frequency is higher or the peak-rarefactional acoustic pressure is lower, it becomes difficult to generate the cavitations.

$$MI = \frac{P_{r, \alpha}}{\sqrt{f_{awf}} \times C_{MI}}$$

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

For the frequency 1 MHz and the peak-rarefactional acoustic pressure 1 MPa, MI becomes 1. It is possible to think MI to be one threshold of the cavitations generation. Especially, it is important to keep MI value to be low when both gases and the soft tissues exist together, for such as lung exposure in cardiac scanning and bowel gas in abdominal scanning.

If MI is displayed, the increment for the display of MECHANICAL INDEX shall be no more than 0.2 over the entire range.

If the MI does not exceed 1.0 under all working conditions and $f_{awf} > 1.0 \text{ MHz}$, there is no need to display the MI.

■ TI (Thermal Index)

TI is determined by the ratio of the total acoustic power to the acoustic power required to raise the tissue temperature by 1°C . In addition, because the temperature rises are greatly different according to tissue structures, TI is divided three kinds: TIS (Soft-tissue Thermal Index), TIB (Bone Thermal Index) and TIC (Cranial-bone Thermal Index).

- TIS: Thermal index related to soft tissues, such as abdominal and cardiac applications.
- TIB: Thermal index for applications, such as fetal (second and third trimester) or neonatal cephalic
- (through the fontanel), in which the ultrasound beam passes through soft tissue and a focal region

- is in the immediate vicinity of bone.
- TIC: Thermal index for applications, such as pediatric and adult cranial applications, in which the
- ultrasound beam passes through bone near the beam entrance into the body.
- WFUMB (World Federation for Ultrasound in Medicine and Biology) guidelines: state that
- temperature increase of 4 °C for 5 min or more should be considered as potentially
- hazardous to embryonic and fetal tissue.
- The smaller the MI/TI values, the lower the bioeffects.

9.4.2 MI/TI Display

The MI/ TI value of the device is real time displayed at screen. The operator should observe these index values during examinations and ensure that exposure time and output values are maintained at minimum amounts needed for effective diagnosis. The MI and TI precision is 0.01.

Real-time display accuracy: MI within $\pm 25\%$, TI within $\pm 50\%$.



Caution: If the value of MI or TI is more than 1.0, please follow the ALARA principle carefully.

9.5 Acoustic power control

The acoustic output ultimately depends on the system operator, and qualified operators should minimize the acoustic output while obtaining an effective diagnostic image. There are three types of operational control related to acoustic output control: direct control, indirect control, and receiver control.

9.5.1 Direct control

It is possible to control, if necessary, the acoustic output with the "Power" item. In this case, the maximum value of the acoustic output never exceeds an MI of 1.9, TI of 6 and an ISPTA.3 of 720 mW/cm² in any mode of operation.

9.5.2 Indirect control

The controls that indirectly affect output are the many imaging parameters. These are operating modes, frequency, focal point positions, image depth and pulse repetition frequency (PRF). The operating mode determines whether the ultrasound beam is scanning or non-scanning. Thermal bioeffect is closely connected to M mode, PW Doppler and Color mode. Acoustic attenuation of tissue is directly related to transducer frequency. The focal point is related to active aperture of transducer and beam width. For the higher PRF (pulse repetition frequency), the more output pulses occur over a period of time.

9.5.3 Receiver control

The receiver controls (for example, gain, dynamic range, and image post-processing, etc.) won't affect output. These controls should be used, when possible, to improve the image quality before using controls that directly or indirectly affect output.

9.6 Acoustic output

9.6.1 Derated Ultrasonic Output Parameters

In order to determine the relevant Ultrasonic Output Parameters, a method is used which allows for

the comparison of ultrasound systems which operate at different frequencies and are focused on different depths. This approach, called "derating" or "attenuating", adjusts the acoustic output as measured in a water tank to account for the effect of ultrasound propagation through tissue. By convention, a specific average intensity attenuation value is used, which corresponds to a loss of 0.3 dB/cm/MHz. That is, the intensity of ultrasound will be reduced by 0.3 dB/MHz for every centimeter of travel from the transducer. This can be expressed by the following equation:

$$I_{atten} = I_{water} \times 10^{(-0.3/10 \times f_c \times z)}$$

Where I_{atten} is the attenuated intensity, I_{water} is the intensity measured in a water tank (at distance z), f_c is the center frequency of the ultrasound wave (as measured in water), and z is the distance from the transducer. The equation for attenuating pressure values is similar except that the attenuation coefficient is 0.15 dB/cm/MHz, or one-half the intensity coefficient. The intensity coefficient is double the pressure coefficient because intensity is proportional to the square of pressure. Although the attenuation coefficient chosen, 0.3 dB/cm/MHz, is significantly lower than any specific solid tissue in the body, this value was chosen to account for fetal examinations. In early trimester ultrasound fetal examinations, there may be a significant fluid path between the transducer and the fetus, and the attenuation of fluid is very small. Therefore, the attenuation coefficient of 0.3 dB/cm/MHz is much lower than the actual attenuation coefficient.

9.6.2 Limits of the acoustic output

In accordance with the FDA Track 3 requirements, the derating (or attenuated) approach was incorporated into the FDA Acoustic Output Limits, as listed below. The maximum acoustic output level from any transducer in any operating mode is expected to fall below these limits.

FDA Maximum Acoustic Output Limits for Track 3 (Attenuated Values)

Application	$I_{spta.3}$ (mW/cm ²)	$I_{sppa.3}$ (W/cm ²)	Or	MI
Regions (except eyes)	720	190		1.9

9.6.3 Differences Between Actual and Displayed MI and TI

In operation, the system will display to the operator the Acoustic Output Parameters Thermal Index, TI, or Mechanical Index, MI (or sometimes both parameters simultaneously). These parameters were developed as general indicators of risk from either thermal or mechanical action of the ultrasound wave. They serve to indicate to the operator whether a particular setting of the system increases or decreases the possibility of Thermal or Mechanical effect. More specifically, they were designed to assist in the implementation of the ALARA principle. As an operator changes a given system control, the potential effect of the change in output will be indicated. However, the Thermal Index is not the same as temperature rise in the body, for several reasons. First of all, in order to provide a single display index to you, a number of simplifying assumptions had to be made. The biggest assumption was the use of the attenuating formula described above, which is much lower than the actual value for most tissues within the body. Scanning through muscle or organ tissue, for example, will produce much higher attenuation than 0.3 dB/cm/MHz. There were also significant simplifications made for the thermal properties of tissue. Therefore, scanning through highly perfused tissue, such as the heart or vasculature, will produce significantly less thermal effect than that suggested by the Thermal Index.

Similarly, the Mechanical Index was derived to indicate the relative possibility of mechanical (cavitation) effects. The MI is based on the derated peak-rarefactional pressure and the center frequency of the ultrasound wave. The actual peak-rarefactional pressure is affected by the actual attenuation caused by tissue in the path between the transducer and the focal point. Again, all solid tissues within the body have higher attenuation than the prescribed 0.3 dB/cm/MHz value, and therefore, the actual peak-rarefactional pressure will be lower. Further, the actual peak-rarefactional pressure will change depending upon the region of the body being scanned. For these reasons, the TI and MI displays should only be used to assist the operator in implementing ALARA at the time of the patient examination.

9.6.4 Uncertainty of Measurement

The total uncertainty (including the reflection, measurement, calculation and positioning of the hydrophone) has the following factors:

	Intensity	Pressure	Power	Center frequency	MI	TI
Total uncertainties	±24.01%	±12.00%	±24.01%	±0.10%	±12.42%	±24.01%

Appendix A Work principles of safe use

This device real-time reflection ultrasound displays section image. In the actual ultrasound examination, when the high-frequency ultrasound penetrates the body, almost all the energy is absorbed and scattered by the body tissue, causing the sound wave attenuation. When energy is absorbed by the body tissue molecules interact to the generation of thermal or mechanobiological effects. These biological effects can have harmful side effects on the human body.

A.1 Low-dose diagnostic principle

This device is suitable for doctors and professionals. The operator needs to grasp the status of the examination and make judgments about whether clinical examination is more important or patient protection when the risk of biological effects is increasing. In some cases, stop checking to eliminate the danger. Image diagnostic methods that do not use ultrasound devices are usually X-ray or nuclear magnetic. In these cases, the basic principles of using the most possible low doses of ultrasound energy to make a reasonable diagnosis are widely used, and the aim is to obtain more diagnostic data with the minimum dose of radiation to the human test site.

The same basic principle is also used in the handheld color ultrasound equipment diagnostic equipment. Increasing unnecessary ultrasound output or conducting prolonged examinations during the examination does not comply with this basic principle. It is recommended to obtain diagnostic data on the parts of the body tested at the minimum magnitude of ultrasound radiation dose.

A.2 Clinical Prevention

The diagnostic method of ultrasound equipment is likely to produce thermal biological effects and mechanical biological effects, such as the risk of cavitation, and the operator must take measures to avoid and reduce the harm to the patient. During the clinical examination:

When making an ultrasound diagnosis, if sufficient sensitivity is not obtained, first adjust the parameters that do not affect the ultrasound output, such as gain (GAIN) and time gain

compensation (TGC), and then improve the acoustic power if the sensitivity is still insufficient. Human tissue consists of soft tissue, water, bones, and other tissues. Ultrasound can be absorbed and attenuated by the body before reaching the deep tissue. Therefore, a large dose of the ultrasound energy located after the liquid can be received. Similarly, due to the biological effects caused by heat, and its easy to convert ultrasound energy into heat, care must be taken about the biological effects caused by adjacent tissues (such as bones). Since almost all ultrasounds can cross the amniotic fluid to the fetal bone without attenuation, making the bone tissue at high temperature risk, be particularly careful not to use high-dose ultrasound energy during the fetal bone formation period. Similarly, great care should be taken before examining fetal bone formation, as cells are active, and even relatively low temperature increases may be detrimental to their growth and development.

A.3 Precautions related to acoustic power

Human tissue consists of soft tissue, water, bones, and other tissues. When ultrasound penetrates the human body, it is constantly absorbed and attenuated. Because ultrasound passes through water to a small extent, the tissue located behind water can receive relatively large doses of ultrasound energy.

Similarly, care must be taken about biological effects caused by adjacent tissues such as bone, as it easily transforms ultrasound energy into thermal energy.

Take particular note that almost all ultrasound energy can cross the amniotic fluid without attenuation, and the fetus is at high risk of damage by heat during periods of bone formation. Even a fetus before bone development may be affected because its cells are active, even if the temperature rise is not high.

The body receiving ultrasound energy irradiation for long periods of time will produce mechanical biological effects such as thermal and cavitation reactions. To reduce the harm of tissue damage, the ultrasound source must be cut off before the ultrasound can reach the magnitude of tissue damage. In order to achieve the purpose of reasonable and correct use of palm color ultrasound equipment, it is necessary to master the functions of the equipment, skilled operation methods, and understand the parameters affecting the acoustic power. Furthermore, develop a good habit of operating the equipment and freeze the image immediately once the required diagnostic data is obtained.



Attention

- Try to use a low output within a reasonable range.
- Make a diagnosis of a body scan in the shortest possible time; prolonged use damages human health.

A.4 Safety precaution

A.4.1 Patient safety

In order to ensure the safety of the inspected, it is necessary to give safety reminders:

The investigated patient's name must be accurately entered, to ensure that all the recorded data as well as the medical record number provided in the hard copy are correct, otherwise it will lead to misdiagnosis.

A.4.2 Diagnostic information

Device failure or incorrect setup device can cause image measurement error or missed pathology details. To optimize the advantages of the equipment and to avoid potential operational errors, the operators should be trained to become familiar with the operation of the equipment, while increasing the operator's confidence through the equipment quality assurance program.

A.4.3 Clinical diagnosis

The measurement function is only a tool, and the operator should carefully study and accumulate the comparison of the data measured by the device and the clinical actual data data to improve the clinical diagnostic accuracy.

A.4.4 Mechanical damage

Using a damaged probe or incorrect use of the probe can cause injury to patients or increase the risk of infection between patients. The user should carefully operate the probe and protect the probe appearance.

A.4.5 Infection control

Users who use this handheld color ultrasound scanner should be responsible for its high disinfection to avoid infection between patients and staff. In order to avoid cross-infection, the relevant hospital departments should take relevant preventive measures.

Appendix B Product Specifications

This device is equipped with a tablet computer that complies with IEC 60601-1 and is designed to be used in conjunction with this device.

B.1 Product Differences

No.	Product model	External view	Probe model	Differences
1	PIU1A,PEU1A		L40	PIU series (96 array elements, 32 channels),PEU series/PAU series (128 array elements, 32 channels)
2	PIU1B,PEU1B		R60	
3	PIU1C,PEU1C		L25	
4	PIU1D,PEU1D		R15	
5	PIU2A,PEU2A		L40+R60	

6	PIU2B,PEU2B		L25+R15	
7	PAU2A		L40+R60	
8	PAU2B		L25+R15	
9	PAU2C		L40+L12	

B.2 Probe Specifications

Probe model	Probe type	Nominal frequency (MHz)	Frequency range (MHz)	Clinical applications
L40	Linear array	7.5	5~12	Small organ, musculo-skeletal(Conventional and Superficial),peripheral vessel.
R60	Convex array	3.5	2.5~6	Abdominal,obstetric,pediatric,gy necology,urology.
L25	Linear array	7.5	5~12	Small organ, musculo-skeletal(Conventional and Superficial),peripheral vessel.
R15	Convex array	6.5	5~9	Abdominal,obstetric,pediatric,gy necology,urology,adult and pediatric cardiac.
L12	Linear array	16.7	14~22	Small organ, musculo-skeletal(Conventional and Superficial),peripheral vessel.

B.3 Product dimensions and weight

Model	Dimension	Weight
PIU1A,PEU1A	Approx.179*71*27mm	Approx.193g
PIU1B,PEU1B	Approx.178*71*27mm	Approx.218g
PIU1C,PEU1C	Approx.184*70*27mm	Approx.188g
PIU1D,PEU1D	Approx.190*71*27mm	Approx.188g
PIU2A,PEU2A,PAU2A	Approx.189*72*25mm	Approx.233g
PIU2B,PEU2B,PAU2B	Approx.205*71*25mm	Approx.233g
PAU2C	Approx.185*72*25mm	Approx.233g

B.4 Environmental Conditions

	Operational conditions	Storage and transportation conditions
Temperature	5℃～30℃	-20℃～55℃
Humidity	20%RH~80%RH (no condensation)	20%RH~90%RH (no condensation)
Atmospheric	700hPa～1060hPa	700hPa～1060hPa

B.5 Power supply

Adapter specifications: Input 100V~240V,50Hz/60Hz Output DC 5V 2A.

Internal lithium battery:DC3.7V 3000mAh

B.6 Safety Classifications

Type of protection against electric shock	Class II equipment with internal powered equipment.
Degree of protection against electric shock	Type-BF applied part
Degrees of protection provided by enclosures(IP code)	Main unit:IPX0 Probe:IPX7
Mode of operation	Continuous
According to the mode of movement	Handheld

B.7 Clinical application scope,imaging modes,and functions of probes

Name: Wireless Probe Type Ultrasound Scanner

Probe: R60 (3.5MHz) Convex array、L40 (7.5MHz) Linear array、L25 (7.5 MHz) Linear array、R15 (6.5 MHz) Convex array、L12 (16.7 MHz) Linear array

Indications for use:For ultrasound imaging,measurement,display and analysis of the human body and fluid

	Clinical application	Mode of operation
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	Particular application	B	M	PW	CW	Color Doppler(CF)	Combined (B+M,B+PW,B+CF,B+PDI,B+DPDI,B+PW+CF mode)	Other(Anatomy M mode,Color M mode)
Fetal imaging and other	Fetal	●	●	●		●	●	●
	Abdominal	●	●	●		●	●	●
	Intra-operative Specify							
	Intra-operative Neuro							
	Laparoscopic							
	Pediatric	●	●	●		●	●	●
	Small organ (superficial such as thyroid and breast)	●	●	●		●	●	●
	Neonatal cephalic							
	Adult cephalic							
	Trans-rectal							
	Trans-vaginal							
	trans-urethral							
	Trans-esoph.(non-Card)							
	Musculo-skeletal(Conventional)	●	●	●		●	●	●
	Musculo-skeletal(Superficial)	●	●	●		●	●	●
	Intravascular							
	Other							
Cardiac	Cardiac adult	●	●	●		●	●	●
	Cardiac pediatric	●	●	●		●	●	●
	Intravascular (Cardiac)							
	Trans-esoph. (Cardiac)							
	Intra-cardiac							
	Other							
Peripheral vessel	Transcranial							
	Peripheral vessels	●	●	●		●	●	●
	Other (neck blood vessels)	●	●	●		●	●	●
	Note: Here the vessel refers to the action on the body surface, not the direct action on the blood vessel.							

Name: Wireless Probe Type Ultrasound Scanner

Probe: R60 (3.5MHz) convex array

Indications for use: For ultrasound imaging, measurement, display and analysis of the human body and fluid

Clinical application		Mode of operation						
	Particular application	B	M	PW	CW	Color Doppler (CF)	Combined (B+M,B+PW,B+CF,B+PDI,B+DPDI,B+PW+CF mode)	Other(Anatomy M mode, Color M mode)
Fetal imaging and other	Fetal	●	●	●		●	●	●
	Abdominal	●	●	●		●	●	●
	Intra-operative Specify							
	Intra-operative Neuro							
	Laparoscopic							
	Pediatric	●	●	●		●	●	●
	Small organ (superficial such as thyroid and breast)							
	Neonatal cephalic							
	Adult cephalic							
	Trans-rectal							
	Trans-vaginal							
	trans-urethral							
	Trans-esoph.(non-Card)							
	Musculo-skeletal(Conventional)							
	Musculo-skeletal(Superficial)							
	Intravascular							
	Other							
Cardiac	Cardiac adult							
	Cardiac pediatric							
	Intravascular (Cardiac)							
	Trans-esoph. (Cardiac)							
	Intra-cardiac							
	Other							
Peripheral vessel	Transcranial							
	Peripheral vessels							
	Other (neck blood vessels)							
	Note: Here the vessel refers to the action on the body surface, not the direct action on the blood vessel.							

Name: Wireless Probe Type Ultrasound Scanner

Probe: L40 (7.5MHz) linear array

Indications for use: For ultrasound imaging, measurement, display and analysis of the human body and fluid

	Clinical application	Mode of operation						
	Particular application	B	M	PW	CW	Color Doppler (CF)	Combined (B+M,B+PW,B+CF ,B+PDI,B+DPDI,B +PW+CF mode)	Other(Anatomy M mode, Color M mode)
Fetal imaging and other	Fetal							
	Abdominal							
	Intra-operative Specify							
	Intra-operative Neuro							
	Laparoscopic							
	Pediatric							
	Small organ (superficial such as thyroid and breast)	●	●	●		●	●	●
	Neonatal cephalic							
	Adult cephalic							
	Trans-rectal							
	Trans-vaginal							
	trans-urethral							
	Trans-esoph.(non-Card)							
	Musculo-skeletal(Conventional)	●	●	●		●	●	●
	Musculo-skeletal(Superficial)	●	●	●		●	●	●
	Intravascular							
	Other							
Cardiac	Cardiac adult							
	Cardiac pediatric							
	Intravascular (Cardiac)							
	Trans-esoph. (Cardiac)							
	Intra-cardiac							
	Other							
Peripheral vessel	Transcranial							
	Peripheral vessels	●		●		●	●	●
	Other (neck blood vessels)	●		●		●	●	●
	Note: Here the vessel refers to the action on the body surface, not the direct action on the blood vessel.							

Name: Wireless Probe Type Ultrasound Scanner

Probe: L25 (7.5 MHz) line array

Indications for use: For ultrasound imaging, measurement, display and analysis of the human body and fluid

	Clinical application	Mode of operation						
	Particular application	B	M	PW	CW	Color Doppler (CF)	Combined (B+M,B+PW,B+CF,B+PDI,B+DPDI,B+PW+CF mode)	Other(Anatomy M mode, Color M mode)
Fetal imaging and other	Fetal							
	Abdominal							
	Intra-operative Specify							
	Intra-operative Neuro							
	Laparoscopic							
	Pediatric							
	Small organ (superficial such as thyroid and breast)	●	●	●		●	●	●
	Neonatal cephalic							
	Adult cephalic							
	Trans-rectal							
	Trans-vaginal							
	trans-urethral							
	Trans-esoph.(non-Card)							
	Musculo-skeletal(Conventional)	●	●	●		●	●	●
	Musculo-skeletal(Superficial)	●	●	●		●	●	●
	Intravascular							
	Other							
Cardiac	Cardiac adult							
	Cardiac pediatric							
	Intravascular (Cardiac)							
	Trans-esoph. (Cardiac)							
	Intra-cardiac							
	Other							
Peripheral vessel	Transcranial							
	Peripheral vessels	●	●	●		●	●	●
	Other (neck blood vessels)	●	●	●		●	●	●
	Note: Here the vessel refers to the action on the body surface, not the direct action on the blood vessel.							

Name: Wireless Probe Type Ultrasound Scanner

Probe: R15 (6.5 MHz) convex array

Indications for use: For ultrasound imaging, measurement, display and analysis of the human body and fluid

	Clinical application	Mode of operation						
	Particular application	B	M	PW	CW	Color Doppler (CF)	Combined (B+M,B+PW,B+CF,B+PDI,B+DPDI, B+PW+CF mode)	Other(Anatomy M mode, Color M mode)
Fetal imaging and other	Fetal	●	●	●		●	●	●
	Abdominal	●	●	●		●	●	●
	Intra-operative Specify							
	Intra-operative Neuro							
	Laparoscopic							
	Pediatric	●	●	●		●	●	●
	Small organ (superficial such as thyroid and breast)							
	Neonatal cephalic							
	Adult cephalic							
	Trans-rectal							
	Trans-vaginal							
	trans-urethral							
	Trans-esoph.(non-Card)							
	Musculo-skeletal(Conventional)							
	Musculo-skeletal(Superficial)							
	Intravascular							
	Other							
Cardiac	Cardiac adult	●	●	●		●	●	●
	Cardiac pediatric	●	●	●		●	●	●
	Intravascular (Cardiac)							
	Trans-esoph. (Cardiac)							
	Intra-cardiac							
	Other							
Peripheral vessel	Transcranial							
	Peripheral vessels							
	Other (neck blood vessels)							
	Note: Here the vessel refers to the action on the body surface, not the direct action on the blood vessel.							

Name: Wireless Probe Type Ultrasound Scanner

Probe: L12 (16.7 MHz) line array

Indications for use: For ultrasound imaging, measurement, display and analysis of the human body and fluid

	Clinical application	Mode of operation						
	Particular application	B	M	PW	CW	Color Doppler (CF)	Combined (B+M,B+PW,B+CF,B+PDI,B+DPDI,B+PW+CF mode)	Other(Anatomy M mode, Color M mode)
Fetal imaging and other	Fetal							
	Abdominal							
	Intra-operative Specify							
	Intra-operative Neuro							
	Laparoscopic							
	Pediatric							
	Small organ (superficial such as thyroid and breast)	●	●	●		●	●	●
	Neonatal cephalic							
	Adult cephalic							
	Trans-rectal							
	Trans-vaginal							
	trans-urethral							
	Trans-esoph.(non-Card)							
	Musculo-skeletal(Conventional)	●	●	●		●	●	●
	Musculo-skeletal(Superficial)	●	●	●		●	●	●
	Intravascular							
	Other							
Cardiac	Cardiac adult							
	Cardiac pediatric							
	Intravascular (Cardiac)							
	Trans-esoph. (Cardiac)							
	Intra-cardiac							
	Other							
Peripheral vessel	Transcranial							
	Peripheral vessels	●		●		●	●	●
	Other (neck blood vessels)	●		●		●	●	●
	Note: Here the vessel refers to the action on the body surface, not the direct action on the blood vessel.							

Appendix C Measurement Accuracy

The following information is intended to provide guidance to the user in determining the amount of variation or measurement error that should be considered when performing clinical measurements with this equipment. Error can be contributed by equipment limitations and improper user technique. Be sure to follow all measurement instructions and develop uniform measurement techniques among all users to minimize the potential operator error. Also, in order to detect possible equipment malfunctions that could affect measurement accuracy, a quality assurance (QA) plan should be established for the equipment that includes routine accuracy checks with tissue mimicking phantoms.

Table : Measurement accuracy

Probe model	R60 convex array probe		
Nominal frequency(MHz)	3.5	2.5	6.0
Geometric position accuracy	≤15% (Horizontal)	≤15% (Horizontal)	≤10% (Horizontal)
	≤10% (Vertical)	≤10% (Vertical)	≤5% (Vertical)
Circumference and area measurement accuracy	±20%		
M mode distance display accuracy	±10%		
M mode time display accuracy	±10%		
Flow velocity accuracy	±20%		

Probe model	L40 Linear array probe		
Nominal frequency(MHz)	7.5	5	12
Geometric position accuracy	≤10% (Horizontal)	≤15% (Horizontal)	≤5% (Horizontal)
	≤5% (Vertical)	≤10% (Vertical)	≤5% (Vertical)
Circumference and area measurement accuracy	±20%		
M mode distance display accuracy	±10%		
M mode time display accuracy	±10%		
Flow velocity accuracy	±20%		

Probe model	L25 Linear array probe		
Nominal frequency(MHz)	7.5	5	12
Geometric position accuracy	≤10% (Horizontal)	≤10% (Horizontal)	≤5% (Horizontal)
	≤5% (Vertical)	≤10% (Vertical)	≤5% (Vertical)

Circumference and area measurement accuracy	±20%
M mode distance display accuracy	±10%
M mode time display accuracy	±10%
Flow velocity accuracy	±20%

Probe model	R15 convex array probe		
Nominal frequency(MHz)	6.5	5	9
Geometric position accuracy	≤10% (Horizontal)	≤20% (Horizontal)	≤5% (Horizontal)
	≤5% (Vertical)	≤10% (Vertical)	≤5% (Vertical)
Circumference and area measurement accuracy	±20%		
M mode distance display accuracy	±10%		
M mode time display accuracy	±10%		
Flow velocity accuracy	±20%		

Appendix D Manufacturer's Declaration of the EUT

- ◆ The electromagnetic compatibility of Wireless Probe Type Ultrasound Scanner complies with the IEC 60601-1-2:2014+A1:2020 standard, and the verification method of the electromagnetic compatibility index is also carried out according to this standard.
- ◆ When this device operates under the specified electromagnetic environment, its basic performance will not be affected.
Basic performances:
 - a. Free from noise on a waveform or artefacts or distortion in an image or error of a displayed numerical value which cannot be attributed to a physiological effect and which may alter the diagnosis.
 - b. Free from the display of incorrect numerical values associated with the diagnosis to be performed.
 - c. Free from the display of incorrect safety-related indications.
 - d. Free from the production of unintended or excessive ultrasound output.
 - e. Free from the production of unintended or excessive transducer assembly surface temperature.
- ◆ Magnetic fields may interfere with the proper operation of the equipment. And this equipment may cause electromagnetic interference to other electronic products. Therefore, please pay attention to the following points when the equipment is working:

FCC Caution:

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) This device must accept any interference received, including interference that may cause undesired operation.

FCC RF Radiation Exposure Statement:

1. This Transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
2. This equipment complies with RF radiation exposure limits set forth for an uncontrolled environment.

The device has been evaluated to meet general RF exposure requirement. The device can be used in portable exposure condition without restriction.



Warning

- Use of this device adjacent to or stacked with other device should be avoided because it could result in improper operation. If such use is necessary, this device and the other device should be observed to verify that they are operating normally.
- Use of accessories, transducers and cables other than those specified or provided by the manufacturer of this equipment could result in increased electromagnetic emissions or decreased electromagnetic immunity of this equipment.
- Portable RF communications device (including peripherals such as antenna cables and external antennas) should be used no closer than 30 cm (12 inches) to any part of the device, including cables specified by the manufacturer. Otherwise, degradation of the performance of this device could result.
- Portable and mobile RF communication devices may affect the performance of ultrasound diagnostic instruments and avoid strong electromagnetic interference, such as close proximity to microwave ovens.
- The emissions characteristics of this device make it suitable for use in industrial areas and hospitals (CISPR 11 class A). If it is used in a residential environment (for which CISPR 11 class B is normally required) this device might not offer adequate protection to radio-frequency communication services. The user might need to take mitigation measures, such as relocating or re-orienting the device.
- If the basic performance of the device is lost or degraded, adjust the operating environment based on the electromagnetic environment guidance from "Table 1" to "Table 5".

The following cables must be used to comply with electromagnetic emission and anti-interference requirements:

Name	Length(m)	Whether to black	Note
Charging cable	0.5	No	-

Table 1 - Guidance and manufacturer's declaration – electromagnetic emission – for all

EQUIPMENT AND SYSTEMS

Guidance and manufacturer's declaration – electromagnetic emission	
The device is intended for use in the electromagnetic environment specified below. The customer or the user of device should assure that it is used in such an environment.	
Emissions tests	Compliance
Radiated emissions CISPR 11	Group 1 Class A
Conducted emissions CISPR 11	Group 1 Class A
Harmonic emissions IEC 61000-3-2	Not Applicable
Voltage Fluctuations/Flicker Emissions IEC 61000- 3-3	Not Applicable

Table 2 - Guidance and manufacturer's declaration – electromagnetic immunity

Guidance and manufacturer's declaration – electromagnetic immunity		
The device is intended for use in the electromagnetic environment specified below. The customer or the user of the device should assure that it is used in such an environment.		
Immunity test	EN 60601 test level	Compliance level
Electrostatic discharge (ESD) IEC 61000-4-2	± 8 kV contact ± 15 kV air	± 8 kV contact ± 15kV air
Radiated RF EM fields IEC61000-4-3	3 V/m ^{f)} 80 MHz – 2,7 GHz ^{b)} 80 % AM at 1 kHz ^{c)}	3 V/m ^{f)} 80 MHz – 2,7 GHz ^{b)} 80 % AM at 1 kHz ^{c)}
Proximity fields from RF wireless communications equipment IEC61000-4-3	Table 3	Table 3
Electrostatic transient / burst IEC 61000-4-4	± 2 kV for power supply lines ± 1 kV for input/output lines	± 2 kV for power supply lines
Surge IEC 61000-4-5	± 1 kV differential mode ± 2 kV common mode	± 1 kV differential mode

Conducted RF IEC 61000-4-6	3 V 0.15 MHz -80 MHz 6 V in ISM between 0.15 MHz and 80 MHz 80 % AM at 1 kHz	3 V 0.15 MHz -80 MHz 6 V in ISM between 0.15 MHz and 80 MHz 80 % AM at 1 kHz
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	0 % U_T ; 0.5 cycle At 0°, 45°, 90°, 135°, 180°, 225°, 270° and 315° 0 % U_T ; 1 cycle and 70 % U_T ; 25/30 cycles Single phase: at 0° 0 % U_T ; 250/300 cycle	0 % U_T ; 0.5 cycle At 0°, 45°, 90°, 135°, 180°, 225°, 270° and 315° 0 % U_T ; 1 cycle and 70 % U_T ; 25/30 cycles Single phase: at 0° 0 % U_T ; 250/300 cycle
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	30 A/m	30A/m
Proximity magnetic fields IEC61000-4-39	Table 4	Table 4
NOTE U_T is the a. c. mains voltage prior to application of the test level.		

Table 3 - Test specifications for enclosure port immunity to RF wireless communications equipment

Test frequency (MHz)	Band ^{a)} (MHz)	Service ^{a)}	Modulation ^{b)}	IMMUNITY TEST LEVEL (V/m)
385	380 -390	TETRA 400	Pulse modulation ^{b)} 18 Hz	27
450	430 - 470	GMRS 460, FRS 460	FM ^{c)} ± 5 kHz deviation 1 kHz sine	28
710	704 - 787	LTE Band 13, 17	Pulse modulation ^{b)} 217 Hz	9
745				
780				
810	800 - 960	GSM 800/900. TETRA 800, iDEN 820, CDMA 850, LTE Band 5	Pulse modulation ^{b)} 18 Hz	28
870				
930				

1 720	1 700-1 990	GSM 1800; CDMA 1900; GSM 1900; DECT; LTE Band 1, 3 4, 25; UMTS	Pulse modulation ^{b)} 217 Hz	28
1 845				
1 970				
2 450	2 400-2 570	Bluetooth, WLAN, 802.11 b/g/n, RFID 2450, LTE Band 7	Pulse modulation ^{b)} 217 Hz	28
5 240	5 100-5 800	WLAN 802.11 a/n	Pulse modulation ^{b)} 217 Hz	9
5 500				
5 785				

If necessary to achieve the IMMUNITY TEST LEVEL, the distance between the transmitting antenna and the ME EQUIPMENT or ME SYSTEM may be reduced to 1 m. The 1 m test distance is permitted by IEC 61 000-4-3

- a) For some services, only the uplink frequencies are included.
b) The carrier shall be modulated using a 50 % duty cycle square wave signal.
c) As an alternative to FM modulation, the carrier may be pulse modulated using a 50 % duty cycle square wave signal at 18 Hz. While it does not represent actual modulation, it would be worst case.

Table 4 – Test specifications for ENCLOSURE PORT IMMUNITY to proximity magnetic fields

Test frequency	Modulation	IMMUNITY TEST LEVEL (A/m)
30 kHz ^{a)} (Not Applicable)	CW	8
1 34,2 kHz	Pulse modulation ^{b)} 2,1 kHz	65 ^{c)}
1 3,56 MHz	Pulse modulation ^{b)} 50 kHz	7,5 ^{c)}

- a) This test is applicable only to ME EQUIPMENT and ME SYSTEMS intended for use in the HOME HEALTHCARE ENVIRONMENT
b) The carrier shall be modulated using a 50 % duty cycle square wave signal.
c) r.m.s., before modulation is applied.

Table 5 – Recommended separation distances between

Recommended separation distances between portable and mobile RF communications equipment and the device	
The device is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the device can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the model / as recommended below, according to the maximum output power of the communications equipment.	
Rated maximum	Separation distance according to frequency of transmitter

output of transmitter /W	/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 2.7 GHz $d = \left[\frac{7}{E_1} \right] \sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.79	3.79	7.27
100	12	12	23
For transmitters rated at a maximum output power not listed above the recommended separation distance d in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.			
NOTE 1 At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.			
NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.			

Appendix E Acoustic Output Data

Acoustic output reporting table
(IEC60601-2-37:2007+AMD1:2015, table 201.103)

Transducer Model: L12

Operating Model: B Mode

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.95	1.39		1.39		N/A
Index component value			1.39	1.39	1.39	1.39	
Acoustic Parameters	$p_{r,\alpha}$ at z_{MI} (MPa)	3.67					
	P (mW)		19.59		19.59		N/A
	$P_{1 \times 1}$ (mW)		19.59		19.59		
	z_s (cm)			N/A			
	z_b (cm)					N/A	
	z_{MI} (cm)	0.63					
	$z_{pii,\alpha}$ (cm)	0.63					
Other Information	f_{awf} (MHz)	14.93	14.93		14.93		N/A
	p_{rr} (Hz)	10438.00					
	s_{rr} (Hz)	56.27					
	n_{pps}	1					
	$I_{pa,\alpha}$ at $z_{pii,\alpha}$ (W/cm ²)	114.70					
	$I_{spta,\alpha}$ at $z_{pii,\alpha}$ or $z_{sii,\alpha}$ (mW/cm ²)	9.02					
	I_{spta} at z_{pii} or z_{sii} (mW/cm ²)	12.07					

	p_r at z_{pii} (MPa)	4.73					
Operating control conditions	Focus(cm)	1.0	1.0	1.0	1.0	1.0	N/A
	Depth(cm)	1.5	1.5	1.5	1.5	1.5	N/A
	Frequency(MHz)	16.7	16.7	16.7	16.7	16.7	N/A
NOTE: N/A indicates that there is no corresponding intended use or no data reported.							

Acoustic output reporting table
(IEC60601-2-37:2007+AMD1:2015, table 201.103)

Transducer Model: L12

Operating Model: B+M Mode

Index label		<i>MI</i>	<i>TIS</i>		<i>TIB</i>		<i>TIC</i>
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.95	1.43		1.44		N/A
Index component value			B:1.39 M:0.04	B:1.39 M:0.03	B:1.39 M:0.04	B:1.39 M:0.05	
Acoustic Parameters	$p_{r,\alpha}$ at z_{MI} (MPa)	3.67					
	P (mW)		B:19.59 M:0.50		B:19.59 M:0.50		N/A
	$P_{1 \times 1}$ (mW)		B:19.59 M:0.50		B:19.59 M:0.50		
	z_s (cm)			N/A			
	z_b (cm)					0.67	
	z_{MI} (cm)	0.63					
	$z_{pii,\alpha}$ (cm)	0.63					
	f_{awf} (MHz)	14.93	14.93		14.93		N/A
Other Information	p_{rr} (Hz)	B:10438.00 M:267.65					
	s_{rr} (Hz)	54.65					
	n_{pps}	1					
	$I_{pa,\alpha}$ at $z_{pii,\alpha}$ (W/cm ²)	114.70					
	$I_{spta,\alpha}$ at $z_{pii,\alpha}$ or $z_{sii,\alpha}$ (mW/cm ²)	31.17					
	I_{spta} at z_{pii} or z_{sii} (mW/cm ²)	41.70					
	p_r at z_{pii} (MPa)	4.73					
Operating control conditions	Focus(cm)	1.0	1.0	1.0	1.0	1.0	N/A
	Depth(cm)	1.5	1.5	1.5	1.5	1.5	N/A
	Frequency(MHz)	16.7	16.7	16.7	16.7	16.7	N/A
NOTE: N/A indicates that there is no corresponding intended use or no data reported.							

Acoustic output reporting table
(IEC60601-2-37:2007+AMD1:2015, table 201.103)

Transducer Model: L12

Operating Model: B+CF/B+PDI/B+DPDI Mode

Index label	<i>MI</i>	<i>TIS</i>	<i>TIB</i>	<i>TIC</i>
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			At surface	Below surface	At surface	Below surface	
Maximum index value		0.95	1.56		1.56		N/A
Index component value			B:1.39 CF:0.17	B:1.39 CF:0.17	B:1.39 CF:0.17	B:1.39 CF:0.17	
Acoustic Parameters	$p_{r,\alpha}$ at z_{MI} (MPa)	3.67					
	P (mW)		B:19.59 CF:3.65		B:19.59 CF:3.65		N/A
	$P_{1 \times 1}$ (mW)		B:19.59 CF:3.65		B:19.59 CF:3.65		
	z_s (cm)			N/A			
	z_b (cm)					N/A	
	z_{MI} (cm)	0.63					
	$z_{pii,\alpha}$ (cm)	0.63					
	f_{awf} (MHz)	B:14.93	B:14.93 CF:9.79		B:14.93 CF:9.79		N/A
Other Information	p_{rr} (Hz)	B:10438.00 CF:8400.00					
	s_{rr} (Hz)	54.55					
	n_{pps}	B:1 CF:17					
	$I_{pa,\alpha}$ at $z_{pii,\alpha}$ (W/cm ²)	114.70					
	$I_{spta,\alpha}$ at $z_{pii,\alpha}$ or $z_{sii,\alpha}$ (mW/cm ²)	24.94					
	I_{spta} at z_{pii} or z_{sii} (mW/cm ²)	37.69					
	p_r at z_{pii} (MPa)	4.73					
Operating control conditions	Focus(cm)	1.0	1.0	1.0	1.0	1.0	N/A
	Depth(cm)	1.5	1.5	1.5	1.5	1.5	N/A
	B Frequency(MHz)	16.7	16.7	16.7	16.7	16.7	N/A
	CF Frequency(MHz)	10.0	10.0	10.0	10.0	10.0	N/A
	PRF(kHz)	8.4	8.4	8.4	8.4	8.4	N/A
NOTE: N/A indicates that there is no corresponding intended use or no data reported.							

Acoustic output reporting table
(IEC60601-2-37:2007+AMD1:2015, table 201.103)

Transducer Model: L12

Operating Model: PW Mode

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		1.07	1.32		2.65		N/A
Index component value			1.32	1.18	2.65	2.65	
Acoustic Parameters	$p_{r,\alpha}$ at z_{MI} (MPa)	3.27					
	P (mW)		29.70		29.70		N/A
	$P_{1 \times 1}$ (mW)		29.70		29.70		
	z_s (cm)			N/A			
	z_b (cm)					0.72	

	z_{MI} (cm)	0.72					
	$z_{pii,\alpha}$ (cm)	0.72					
	f_{awf} (MHz)	9.36	9.36		9.36		N/A
Other Information	p_{rr} (Hz)	8400.00					
	s_{rr} (Hz)	N/A					
	n_{pps}	N/A					
	$I_{pa,\alpha}$ at $z_{pii,\alpha}$ (W/cm ²)	82.90					
	$I_{spta,\alpha}$ at $z_{pii,\alpha}$ or $z_{sii,\alpha}$ (mW/cm ²)	619.70					
	I_{spta} at z_{pii} or z_{sii} (mW/cm ²)	1017.00					
	p_r at z_{pii} (MPa)	4.20					
Operating control conditions	Focus(cm)	1.0	1.0	1.0	1.0	1.0	N/A
	Depth(cm)	1.5	1.5	1.5	1.5	1.5	N/A
	Frequency(MHz)	10.0	10.0	10.0	10.0	10.0	N/A
	PRF(kHz)	8.4	8.4	8.4	8.4	8.4	N/A
	SV(mm)	0.5	0.5	0.5	0.5	0.5	N/A
NOTE: N/A indicates that there is no corresponding intended use or no data reported.							

Acoustic output reporting table
(IEC60601-2-37:2007+AMD1:2015, table 201.103)

Transducer Model: L25

Operating Model: B Mode

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.74	0.88		0.88		N/A
Index component value			0.88	0.88	0.88	0.88	
Acoustic Parameters	$p_{r,\alpha}$ at z_{MI} (MPa)	1.97					
	P (mW)		25.90		25.90		N/A
	P_{1x1} (mW)		25.90		25.90		
	z_s (cm)			N/A			
	z_b (cm)					N/A	
	z_{MI} (cm)	1.16					
	$z_{pii,\alpha}$ (cm)	1.16					
	f_{awf} (MHz)	7.12	7.12		7.12		N/A
Other Information	p_{rr} (Hz)	8241.40					
	s_{rr} (Hz)	39.43					
	n_{pps}	1					
	$I_{pa,\alpha}$ at $z_{pii,\alpha}$ (W/cm ²)	107.96					
	$I_{spta,\alpha}$ at $z_{pii,\alpha}$ or $z_{sii,\alpha}$ (mW/cm ²)	11.20					
	I_{spta} at z_{pii} or z_{sii} (mW/cm ²)	17.90					
	p_r at z_{pii} (MPa)	2.65					
Operating	Focus(cm)	1.8	1.8	1.8	1.8	1.8	N/A

control conditions	Depth(cm)	2.0	2.0	2.0	2.0	2.0	N/A
	Frequency(MHz)	7.5	7.5	7.5	7.5	7.5	N/A
NOTE: N/A indicates that there is no corresponding intended use or no data reported.							

Acoustic output reporting table
(IEC60601-2-37:2007+AMD1:2015, table 201.103)

Transducer Model: L25

Operating Model: B+M Mode

Index label		<i>MI</i>	<i>TIS</i>		<i>TIB</i>		<i>TIC</i>
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.74	0.91		0.94		N/A
Index component value			B:0.88 M:0.03	B:0.88 M:0.02	B:0.88 M:0.06	B:0.88 M:0.06	
Acoustic Parameters	$p_{r,\alpha}$ at z_{MI} (MPa)	1.97					
	P (mW)		B:25.90 M:0.78		B:25.90 M:0.78		N/A
	P_{1x1} (mW)		B:25.90 M:0.78		B:25.90 M:0.78		
	z_s (cm)			N/A			
	z_b (cm)					1.16	
	z_{MI} (cm)	1.16					
	$z_{pii,\alpha}$ (cm)	1.16					
	f_{awf} (MHz)	7.12	7.12		7.12		N/A
Other Information	p_{rr} (Hz)	B:8241.40 M:249.72					
	s_{rr} (Hz)	37.63					
	n_{pps}	1					
	$I_{pa,\alpha}$ at $z_{pii,\alpha}$ (W/cm ²)	107.96					
	$I_{spta,\alpha}$ at $z_{pii,\alpha}$ or $z_{sii,\alpha}$ (mW/cm ²)	24.44					
	I_{spta} at z_{pii} or z_{sii} (mW/cm ²)	39.05					
	p_r at z_{pii} (MPa)	2.65					
Operating control conditions	Focus(cm)	1.8	1.8	1.8	1.8	1.8	N/A
	Depth(cm)	2.0	2.0	2.0	2.0	2.0	N/A
	Frequency(MHz)	7.5	7.5	7.5	7.5	7.5	N/A
NOTE: N/A indicates that there is no corresponding intended use or no data reported.							

Acoustic output reporting table
(IEC60601-2-37:2007+AMD1:2015, table 201.103)

Transducer Model: L25

Operating Model: B+CF/B+PDI/B+DPDI Mode

Index label		<i>MI</i>	<i>TIS</i>		<i>TIB</i>		<i>TIC</i>
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.74	1.13		1.13		N/A

Index component value			B:0.88 CF:0.25	B:0.88 CF:0.25	B:0.88 CF:0.25	B:0.88 CF:0.25	
Acoustic Parameters	$p_{r,\alpha}$ at z_{MI} (MPa)	1.97					
	P (mW)		B:25.90 CF:9.24		B:25.90 CF:9.24		N/A
	$P_{1 \times 1}$ (mW)		B:25.90 CF:9.24		B:25.90 CF:9.24		
	z_s (cm)			N/A			
	z_b (cm)					N/A	
	z_{MI} (cm)	1.16					
	$z_{pii,\alpha}$ (cm)	1.16					
	f_{awf} (MHz)	B:7.12	B:7.12 CF:5.68		B:7.12 CF:5.68		N/A
Other Information	p_{rr} (Hz)	B:8241.40 CF:8400.00					
	s_{rr} (Hz)	55.09					
	n_{pps}	B:1 CF:11					
	$I_{pa,\alpha}$ at $z_{pii,\alpha}$ (W/cm ²)	107.96					
	$I_{spta,\alpha}$ at $z_{pii,\alpha}$ or $z_{sii,\alpha}$ (mW/cm ²)	50.44					
	I_{spta} at z_{pii} or z_{sii} (mW/cm ²)	74.90					
	p_r at z_{pii} (MPa)	2.65					
Operating control conditions	Focus(cm)	1.8	1.8	1.8	1.8	1.8	N/A
	Depth(cm)	2.0	2.0	2.0	2.0	2.0	N/A
	B Frequency(MHz)	7.5	7.5	7.5	7.5	7.5	N/A
	CF Frequency(MHz)	5.7	5.7	5.7	5.7	5.7	N/A
	PRF(kHz)	8.4	8.4	8.4	8.4	8.4	N/A
NOTE: N/A indicates that there is no corresponding intended use or no data reported.							

Acoustic output reporting table

(IEC60601-2-37:2007+AMD1:2015, table 201.103)

Transducer Model: L25

Operating Model: PW Mode

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		1.12	0.85		2.40		N/A
Index component value			0.85	0.79	2.40	2.40	
Acoustic Parameters	$p_{r,\alpha}$ at z_{MI} (MPa)	2.66					
	P (mW)		31.70		31.70		N/A
	$P_{1 \times 1}$ (mW)		31.70		31.70		
	z_s (cm)			N/A			
	z_b (cm)					1.40	
	z_{MI} (cm)	1.31					
	$z_{pii,\alpha}$ (cm)	1.31					
	f_{awf} (MHz)	5.65	5.65		5.65		N/A
Other	p_{rr} (Hz)	8400.00					

Information	srr (Hz)	N/A					
	n_{pps}	N/A					
	$I_{pa,\alpha}$ at $z_{pii,\alpha}$ (W/cm ²)	94.10					
	$I_{spta,\alpha}$ at $z_{pii,\alpha}$ or $z_{sii,\alpha}$ (mW/cm ²)	529.60					
	I_{spta} at z_{pii} or z_{sii} (mW/cm ²)	761.10					
	p_r at z_{pii} (MPa)	3.19					
Operating control conditions	Focus(cm)	1.8	1.8	1.8	1.8	1.8	N/A
	Depth(cm)	2.0	2.0	2.0	2.0	2.0	N/A
	Frequency(MHz)	5.7	5.7	5.7	5.7	5.7	N/A
	PRF(kHz)	8.4	8.4	8.4	8.4	8.4	N/A
	SV(mm)	0.5	0.5	0.5	0.5	0.5	N/A
NOTE: N/A indicates that there is no corresponding intended use or no data reported.							

Acoustic output reporting table
(IEC60601-2-37:2007+AMD1:2015, table 201.103)

Transducer Model: L40

Operating Model: B Mode

Index label		<i>MI</i>	<i>TIS</i>		<i>TIB</i>		<i>TIC</i>
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.55	0.62		0.62		N/A
Index component value			0.62	0.62	0.62	0.62	
Acoustic Parameters	$p_{r,\alpha}$ at z_{MI} (MPa)	1.42					
	P (mW)		19.52		19.52		N/A
	P_{1x1} (mW)		19.52		19.52		
	z_s (cm)			N/A			
	z_b (cm)					N/A	
	z_{MI} (cm)	1.15					
	$z_{pii,\alpha}$ (cm)	1.15					
	f_{awf} (MHz)	6.67	6.67		6.67		N/A
Other Information	pr_r (Hz)	8241.00					
	srr (Hz)	50.56					
	n_{pps}	1					
	$I_{pa,\alpha}$ at $z_{pii,\alpha}$ (W/cm ²)	65.95					
	$I_{spta,\alpha}$ at $z_{pii,\alpha}$ or $z_{sii,\alpha}$ (mW/cm ²)	13.71					
	I_{spta} at z_{pii} or z_{sii} (mW/cm ²)	20.39					
	p_r at z_{pii} (MPa)	1.67					
Operating control conditions	Focus(cm)	1.4	1.4	1.4	1.4	1.4	N/A
	Depth(cm)	2.0	2.0	2.0	2.0	2.0	N/A
	Frequency(MHz)	7.5	7.5	7.5	7.5	7.5	N/A
NOTE: N/A indicates that there is no corresponding intended use or no data reported.							

Acoustic output reporting table
(IEC60601-2-37:2007+AMD1:2015, table 201.103)

Transducer Model: L40

Operating Model: B+M Mode

Index label		<i>MI</i>	<i>TIS</i>		<i>TIB</i>		<i>TIC</i>
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.55	0.64		0.67		N/A
Index component value			B:0.62 M:0.02	B:0.62 M:0.01	B:0.62 M:0.03	B:0.62 M:0.05	
Acoustic Parameters	$p_{r,\alpha}$ at z_{MI} (MPa)	1.42					
	P (mW)		B:19.52 M:0.57		B:19.52 M:0.57		N/A
	P_{1x1} (mW)		B:19.52 M:0.57		B:19.52 M:0.57		

	z_s (cm)			N/A			
	z_b (cm)					1.58	
	z_{MI} (cm)	1.15					
	$z_{pii.\alpha}$ (cm)	1.15					
	f_{awf} (MHz)	6.67	6.67		6.67		N/A
Other Information	pr_r (Hz)	B:8241.00 M:240.67					
	srr (Hz)	48.76					
	η_{pps}	1					
	$I_{pa.\alpha}$ at $z_{pii.\alpha}$ (W/cm ²)	65.95					
	$I_{spta.\alpha}$ at $z_{pii.\alpha}$ or $z_{sii.\alpha}$ (mW/cm ²)	21.63					
	I_{spta} at z_{pii} or z_{sii} (mW/cm ²)	32.17					
	p_r at z_{pii} (MPa)	1.67					
Operating control conditions	Focus(cm)	1.4	1.4	1.4	1.4	1.4	N/A
	Depth(cm)	2.0	2.0	2.0	2.0	2.0	N/A
	Frequency(MHz)	7.5	7.5	7.5	7.5	7.5	N/A
NOTE: N/A indicates that there is no corresponding intended use or no data reported.							

Acoustic output reporting table
(IEC60601-2-37:2007+AMD1:2015, table 201.103)

Transducer Model: L40

Operating Model: B+CF/B+PDI/B+DPDI Mode

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.55	0.79		0.79		N/A
Index component value			B:0.62 CF:0.17	B:0.62 CF:0.17	B:0.62 CF:0.17	B:0.62 CF:0.17	
Acoustic Parameters	$p_{r.\alpha}$ at z_{MI} (MPa)	1.42					
	P (mW)		B:19.52 CF:6.51		B:19.52 CF:6.51		N/A
	P_{1x1} (mW)		B:19.52 CF:6.51		B:19.52 CF:6.51		
	z_s (cm)			N/A			
	z_b (cm)					N/A	
	z_{MI} (cm)	1.15					
	$z_{pii.\alpha}$ (cm)	1.15					
	f_{awf} (MHz)	B:6.67	B:6.67 CF:5.62		B:6.67 CF:5.62		N/A
Other Information	pr_r (Hz)	B:8241.00 CF:8400.00					
	srr (Hz)	62.16					
	η_{pps}	B:1 CF:11					
	$I_{pa.\alpha}$ at $z_{pii.\alpha}$ (W/cm ²)	65.95					
	$I_{spta.\alpha}$ at $z_{pii.\alpha}$ or	20.09					

	$z_{sii,\alpha}$ (mW/cm ²)						
	I_{spta} at z_{pii} or z_{sii} (mW/cm ²)	30.44					
	p_r at z_{pii} (MPa)	1.67					
Operating control conditions	Focus(cm)	1.4	1.4	1.4	1.4	1.4	N/A
	Depth(cm)	2.0	2.0	2.0	2.0	2.0	N/A
	B Frequency(MHz)	7.5	7.5	7.5	7.5	7.5	N/A
	CF Frequency(MHz)	5.7	5.7	5.7	5.7	5.7	N/A
	PRF(kHz)	8.4	8.4	8.4	8.4	8.4	N/A
NOTE: N/A indicates that there is no corresponding intended use or no data reported.							

Acoustic output reporting table
(IEC60601-2-37:2007+AMD1:2015, table 201.103)

Transducer Model: L40

Operating Model: PW Mode

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		1.04	0.79		2.07		N/A
Index component value			0.79	0.75	1.61	2.07	
Acoustic Parameters	$p_{r,\alpha}$ at z_{MI} (MPa)	2.46					
	P (mW)		29.68		29.68		N/A
	P_{1x1} (mW)		29.68		29.68		
	z_s (cm)			N/A			
	z_b (cm)					1.45	
	z_{MI} (cm)	1.07					
	$z_{pii,\alpha}$ (cm)	1.07					
	f_{awf} (MHz)	5.59	5.59		5.59		N/A
Other Information	p_{rr} (Hz)	8400.00					
	s_{rr} (Hz)	N/A					
	η_{pps}	N/A					
	$I_{pa,\alpha}$ at $z_{pii,\alpha}$ (W/cm ²)	105.10					
	$I_{spta,\alpha}$ at $z_{pii,\alpha}$ or $z_{sii,\alpha}$ (mW/cm ²)	538.50					
	I_{spta} at z_{pii} or z_{sii} (mW/cm ²)	695.60					
	p_r at z_{pii} (MPa)	2.79					
Operating control conditions	Focus(cm)	1.4	1.4	1.4	1.4	1.4	N/A
	Depth(cm)	2.0	2.0	2.0	2.0	2.0	N/A
	Frequency(MHz)	5.7	5.7	5.7	5.7	5.7	N/A
	PRF(kHz)	8.4	8.4	8.4	8.4	8.4	N/A
	SV(mm)	0.5	0.5	0.5	0.5	0.5	N/A
NOTE: N/A indicates that there is no corresponding intended use or no data reported.							

Acoustic output reporting table
(IEC60601-2-37:2007+AMD1:2015, table 201.103)

Transducer Model: R15
Operating Model: B Mode

Index label		<i>MI</i>	<i>TIS</i>		<i>TIB</i>		<i>TIC</i>
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.81	2.18		2.18		N/A
Index component value			2.18	2.18	2.18	2.18	
Acoustic Parameters	$p_{r,\alpha}$ at z_{MI} (MPa)	1.98					
	P (mW)		77.09		77.09		N/A
	$P_{1 \times 1}$ (mW)		77.09		77.09		
	z_s (cm)			N/A			
	z_b (cm)					N/A	
	z_{MI} (cm)	1.95					
	$z_{pii,\alpha}$ (cm)	1.95					
	f_{awf} (MHz)	5.95	5.95		5.95		N/A
Other Information	p_{rr} (Hz)	6244.50					
	s_{rr} (Hz)	34.69					
	n_{pps}	1					
	$I_{pa,\alpha}$ at $z_{pii,\alpha}$ (W/cm ²)	102.76					
	$I_{spta,\alpha}$ at $z_{pii,\alpha}$ or $z_{sii,\alpha}$ (mW/cm ²)	70.10					
	I_{spta} at z_{pii} or z_{sii} (mW/cm ²)	85.27					
	p_r at z_{pii} (MPa)	2.54					
Operating control conditions	Focus(cm)	4.0	4.0	4.0	4.0	4.0	N/A
	Depth(cm)	5.0	5.0	5.0	5.0	5.0	N/A
	Frequency(MHz)	6.5	6.5	6.5	6.5	6.5	N/A
NOTE: N/A indicates that there is no corresponding intended use or no data reported.							

Acoustic output reporting table
(IEC60601-2-37:2007+AMD1:2015, table 201.103)

Transducer Model: R15
Operating Model: B+M Mode

Index label		<i>MI</i>	<i>TIS</i>		<i>TIB</i>		<i>TIC</i>
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.81	2.26		2.28		N/A
Index component value			B:2.18 M:0.08	B:2.18 M:0.07	B:2.18 M:0.10	B:2.18 M:0.10	
Acoustic Parameters	$p_{r,\alpha}$ at z_{MI} (MPa)	1.98					
	P (mW)		B:77.09 M:2.75		B:77.09 M:2.75		N/A
	$P_{1 \times 1}$ (mW)		B:77.09 M:2.75		B:77.09 M:2.75		
	z_s (cm)			N/A			
	z_b (cm)					2.05	

	z_{MI} (cm)	1.95					
	$z_{pii,\alpha}$ (cm)	1.95					
	f_{awf} (MHz)	5.95	5.95		5.95		N/A
Other Information	pr_r (Hz)	B:6244.50 M:223.01					
	srr (Hz)	33.75					
	n_{pps}	1					
	$I_{pa,\alpha}$ at $z_{pii,\alpha}$ (W/cm ²)	102.76					
	$I_{spta,\alpha}$ at $z_{pii,\alpha}$ or $z_{sii,\alpha}$ (mW/cm ²)	77.14					
	I_{spta} at z_{pii} or z_{sii} (mW/cm ²)	93.83					
	p_r at z_{pii} (MPa)	2.54					
Operating control conditions	Focus(cm)	4.0	4.0	4.0	4.0	4.0	N/A
	Depth(cm)	5.0	5.0	5.0	5.0	5.0	N/A
	Frequency(MHz)	6.5	6.5	6.5	6.5	6.5	N/A

NOTE: N/A indicates that there is no corresponding intended use or no data reported.

Acoustic output reporting table
(IEC60601-2-37:2007+AMD1:2015, table 201.103)

Transducer Model: R15

Operating Model: B+CF/B+PDI/B+DPDI Mode

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.81	2.49		2.49		N/A
Index component value			B:2.18 CF:0.31	B:2.18 CF:0.31	B:2.18 CF:0.31	B:2.18 CF:0.31	
Acoustic Parameters	$p_{r,\alpha}$ at z_{MI} (MPa)	1.98					
	P (mW)		B:77.09 CF:15.29		B:77.09 CF:15.29		N/A
	P_{1x1} (mW)		B:77.09 CF:15.29		B:77.09 CF:15.29		
	z_s (cm)			N/A			
	z_b (cm)					N/A	
	z_{MI} (cm)	1.95					
	$z_{pii,\alpha}$ (cm)	1.95					
	f_{awf} (MHz)	B:5.95	B:5.95 CF:4.25		B:5.95 CF:4.25		N/A
Other Information	pr_r (Hz)	B:6244.50 CF:5000.00					
	srr (Hz)	40.16					
	n_{pps}	B:1 CF:11					
	$I_{pa,\alpha}$ at $z_{pii,\alpha}$ (W/cm ²)	102.76					
	$I_{spta,\alpha}$ at $z_{pii,\alpha}$ or $z_{sii,\alpha}$ (mW/cm ²)	106.12					
	I_{spta} at z_{pii} or z_{sii} (mW/cm ²)	140.42					

	p_r at z_{pii} (MPa)	2.54					
Operating control conditions	Focus(cm)	4.0	4.0	4.0	4.0	4.0	N/A
	Depth(cm)	5.0	5.0	5.0	5.0	5.0	N/A
	B Frequency(MHz)	6.5	6.5	6.5	6.5	6.5	N/A
	CF Frequency(MHz)	4.0	4.0	4.0	4.0	4.0	N/A
	PRF(kHz)	5.0	5.0	5.0	5.0	5.0	N/A
NOTE: N/A indicates that there is no corresponding intended use or no data reported.							

Acoustic output reporting table
(IEC60601-2-37:2007+AMD1:2015, table 201.103)

Transducer Model: R15

Operating Model: PW Mode

Index label		<i>MI</i>	<i>TIS</i>		<i>TIB</i>		<i>TIC</i>
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.97	0.44		1.15		N/A
Index component value			0.44	0.40	0.80	1.15	
Acoustic Parameters	$p_{r,\alpha}$ at z_{MI} (MPa)	2.02					
	P (mW)		21.23		21.23		N/A
	$P_{1 \times 1}$ (mW)		21.23		21.23		
	z_s (cm)			N/A			
	z_b (cm)					2.17	
	z_{MI} (cm)	2.15					
	$z_{pii,\alpha}$ (cm)	2.15					
	f_{awf} (MHz)	4.33	4.33		4.33		N/A
Other Information	p_{rr} (Hz)	5000.00					
	s_{rr} (Hz)	N/A					
	n_{pps}	N/A					
	$I_{pa,\alpha}$ at $z_{pii,\alpha}$ (W/cm ²)	83.05					
	$I_{spta,\alpha}$ at $z_{pii,\alpha}$ or $z_{sii,\alpha}$ (mW/cm ²)	382.00					
	I_{spta} at z_{pii} or z_{sii} (mW/cm ²)	599.60					
	p_r at z_{pii} (MPa)	2.52					
Operating control conditions	Focus(cm)	4.0	4.0	4.0	4.0	4.0	N/A
	Depth(cm)	5.0	5.0	5.0	5.0	5.0	N/A
	Frequency(MHz)	4.0	4.0	4.0	4.0	4.0	N/A
	PRF(kHz)	5.0	5.0	5.0	5.0	5.0	N/A
	SV(mm)	0.5	0.5	0.5	0.5	0.5	N/A
NOTE: N/A indicates that there is no corresponding intended use or no data reported.							

Acoustic output reporting table
(IEC60601-2-37:2007+AMD1:2015, table 201.103)

Transducer Model: R60

Operating Model: B Mode

Index label		<i>MI</i>	<i>TIS</i>		<i>TIB</i>		<i>TIC</i>
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.83	1.53		1.53		N/A
Index component value			1.53	1.53	1.53	1.53	
Acoustic Parameters	$p_{r,\alpha}$ at z_{MI} (MPa)	1.48					
	P (mW)		132.01		132.01		N/A
	$P_{1 \times 1}$ (mW)		101.55		101.55		
	z_s (cm)			N/A			
	z_b (cm)					N/A	
	z_{MI} (cm)	4.17					
	$z_{pii,\alpha}$ (cm)	4.17					
	f_{awf} (MHz)	3.17	3.17		3.17		N/A
Other Information	p_{rr} (Hz)	3599.50					
	s_{rr} (Hz)	27.06					
	n_{pps}	1					
	$I_{pa,\alpha}$ at $z_{pii,\alpha}$ (W/cm ²)	162.91					
	$I_{spta,\alpha}$ at $z_{pii,\alpha}$ or $z_{sii,\alpha}$ (mW/cm ²)	27.32					
	I_{spta} at z_{pii} or z_{sii} (mW/cm ²)	46.81					
	p_r at z_{pii} (MPa)	1.94					
Operating control conditions	Focus(cm)	4.9	4.9	4.9	4.9	4.9	N/A
	Depth(cm)	9.0	9.0	9.0	9.0	9.0	N/A
	Frequency(MHz)	3.5	3.5	3.5	3.5	3.5	N/A
NOTE: N/A indicates that there is no corresponding intended use or no data reported.							

Acoustic output reporting table
(IEC60601-2-37:2007+AMD1:2015, table 201.103)

Transducer Model: R60

Operating Model: B+M Mode

Index label		<i>MI</i>	<i>TIS</i>		<i>TIB</i>		<i>TIC</i>
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.83	1.65		1.72		N/A
Index component value			B:1.53 M:0.10	B:1.53 M:0.12	B:1.53 M:0.19	B:1.53 M:0.19	

Acoustic Parameters	$p_{r,\alpha}$ at z_{MI} (MPa)	1.48					
	P (mW)		B:132.01 M:8.80		B:132.01 M:8.80		N/A
	$P_{1 \times 1}$ (mW)		B:101.55 M:6.77		B:101.55 M:6.77		
	z_s (cm)			3.40			
	z_b (cm)					4.17	
	z_{MI} (cm)	4.17					
	$z_{pii,\alpha}$ (cm)	4.17					
	f_{awf} (MHz)	3.17	3.17		3.17		N/A
Other Information	p_{rr} (Hz)	B:3599.50 M:239.94					
	s_{rr} (Hz)	28.56					
	n_{pps}	1					
	$I_{pa,\alpha}$ at $z_{pii,\alpha}$ (W/cm ²)	162.91					
	$I_{spta,\alpha}$ at $z_{pii,\alpha}$ or $z_{sii,\alpha}$ (mW/cm ²)	68.70					
	I_{spta} at z_{pii} or z_{sii} (mW/cm ²)	117.71					
	p_r at z_{pii} (MPa)	1.94					
Operating control conditions	Focus(cm)	4.9	4.9	4.9	4.9	4.9	N/A
	Depth(cm)	9.0	9.0	9.0	9.0	9.0	N/A
	Frequency(MHz)	3.5	3.5	3.5	3.5	3.5	N/A
NOTE: N/A indicates that there is no corresponding intended use or no data reported.							

Acoustic output reporting table
(IEC60601-2-37:2007+AMD1:2015, table 201.103)

Transducer Model: R60

Operating Model: B+CF/B+PDI/B+DPDI Mode

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.83	1.71		1.71		N/A
Index component value			B:1.53 CF:0.18	B:1.53 CF:0.18	B:1.53 CF:0.18	B:1.53 CF:0.18	
Acoustic Parameters	$p_{r,\alpha}$ at z_{MI} (MPa)	1.48					
	P (mW)		B:132.01 CF:16.53		B:132.01 CF:16.53		N/A
	$P_{1 \times 1}$ (mW)		B:101.55 CF:12.72		B:101.55 CF:12.72		
	z_s (cm)			N/A			
	z_b (cm)					N/A	
	z_{MI} (cm)	4.17					
	$z_{pii,\alpha}$ (cm)	4.17					
	f_{awf} (MHz)	B:3.17	B:3.17 CF:2.90		B:3.17 CF:2.90		N/A

Other Information	p_{rr} (Hz)	B:3599.50 CF:5000.00					
	s_{rr} (Hz)	9.92					
	n_{pps}	B:1 CF:11					
	$I_{pa,\alpha}$ at $z_{pii,\alpha}$ (W/cm ²)	162.91					
	$I_{spta,\alpha}$ at $z_{pii,\alpha}$ or $z_{sii,\alpha}$ (mW/cm ²)	30.15					
	I_{spta} at z_{pii} or z_{sii} (mW/cm ²)	41.55					
	p_r at z_{pii} (MPa)	1.94					
Operating control conditions	Focus(cm)	4.9	4.9	4.9	4.9	4.9	N/A
	Depth(cm)	9.0	9.0	9.0	9.0	9.0	N/A
	B Frequency(MHz)	3.5	3.5	3.5	3.5	3.5	N/A
	CF Frequency(MHz)	3.1	3.1	3.1	3.1	3.1	N/A
	PRF(kHz)	5.0	5.0	5.0	5.0	5.0	N/A
NOTE: N/A indicates that there is no corresponding intended use or no data reported.							

Acoustic output reporting table
(IEC60601-2-37:2007+AMD1:2015, table 201.103)

Transducer Model: R60

Operating Model: PW Mode

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		1.01	1.35		2.64		N/A
Index component value			1.30	1.35	2.64	2.64	
Acoustic Parameters	$p_{r,\alpha}$ at z_{MI} (MPa)	1.73					
	P (mW)		120.59		120.59		N/A
	P_{1x1} (mW)		92.76		92.76		
	z_s (cm)			2.56			
	z_b (cm)					4.37	
	z_{MI} (cm)	4.72					
	$z_{pii,\alpha}$ (cm)	4.72					
	f_{awf} (MHz)	2.94	2.94		2.94		N/A
Other Information	p_{rr} (Hz)	5000.00					
	s_{rr} (Hz)	N/A					
	n_{pps}	N/A					
	$I_{pa,\alpha}$ at $z_{pii,\alpha}$ (W/cm ²)	86.10					
	$I_{spta,\alpha}$ at $z_{pii,\alpha}$ or $z_{sii,\alpha}$ (mW/cm ²)	624.20					
	I_{spta} at z_{pii} or z_{sii} (mW/cm ²)	749.30					
	p_r at z_{pii} (MPa)	1.90					

Operating control conditions	Focus(cm)	4.9	4.9	4.9	4.9	4.9	N/A
	Depth(cm)	9.0	9.0	9.0	9.0	9.0	N/A
	Frequency(MHz)	3.1	3.1	3.1	3.1	3.1	N/A
	PRF(kHz)	5.0	5.0	5.0	5.0	5.0	N/A
	SV(mm)	0.5	0.5	0.5	0.5	0.5	N/A
NOTE: N/A indicates that there is no corresponding intended use or no data reported.							

Appendix F Packing list

Name	Quantity
Main unit	1Pc
User manual	1Pc
Wireless charger(Charging cable included)	1Pc
Adapter	1Pc

After-sale Services

1. One year free warranty period will be provided after sales.
2. Our company cannot provide the free warranty service due to the malfunction caused by personal reason, details as follow:
 - 1) The malfunction caused by disassemble and modify the product.
 - 2) The product inner malfunction caused by dropping while picking up or operating.
 - 3) The malfunction caused by improper used or lack of reasonable cared.
 - 4) The malfunction caused by operating not following the operator's manual.
 - 5) The malfunction caused by natural disasters,Such as flooding,fire.
 - 6) The malfunction caused by improper repaired by repaired shop which isn't our authorized.
3. Please show your valid warranty card and shopping vouchers when you need free service.
4. Please bring the product to repaired shop which is our authorized when you need free repaired.
5. When performing warranty service, if needed, you can provide information on product components to circuit diagrams and repairable identified by our qualified technical personnel.
6. We will collect reasonable charge when we repair some malfunctions which out warranty service.

Manufacturer information

TEL:+86-516-68910109 +86-516-68910120

Web site:www.yonkercare.com

Date:see product label



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FCC Warning

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC RF Exposure Information and Statement

The SAR limit of USA (FCC) is 1.6 W/kg averaged over one gram of tissue. Device types: PEU2A (FCC ID: 2A2X3WPTUS) has also been tested against this SAR limit. The highest SAR value reported under this standard during product certification for use at the properly worn on the body is 0.60W/kg. This device was tested for typical body-worn operations with the back of the handset kept 0mm from the body. To maintain compliance with FCC RF exposure requirements, use accessories that maintain a 0mm separation distance between the user's body and the back of the handset. The use of belt clips, holsters and similar accessories should not contain metallic components in its assembly. The use of accessories that do not satisfy these requirements may not comply with FCC RF exposure requirements, and should be avoided.

Body-worn Operation

This device was tested for typical body-worn operations. To comply with RF exposure requirements, a minimum separation distance of 0mm must be maintained between the user's body, including the antenna. Third-party belt-clips, holsters, and similar accessories used by this device should not contain any metallic components. Body-worn accessories that do not meet these requirements may not comply with RF exposure requirements and should be avoided. Use only the supplied or an approved antenna.